2022 NIRB ANNUAL REPORT

Baffinland Iron Mines
2022 Annual Report to the
Nunavut Impact Review Board

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Project Certificate No. 005

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April 30, 2023 | ᐊᐃᓚᓕ 30, 2023

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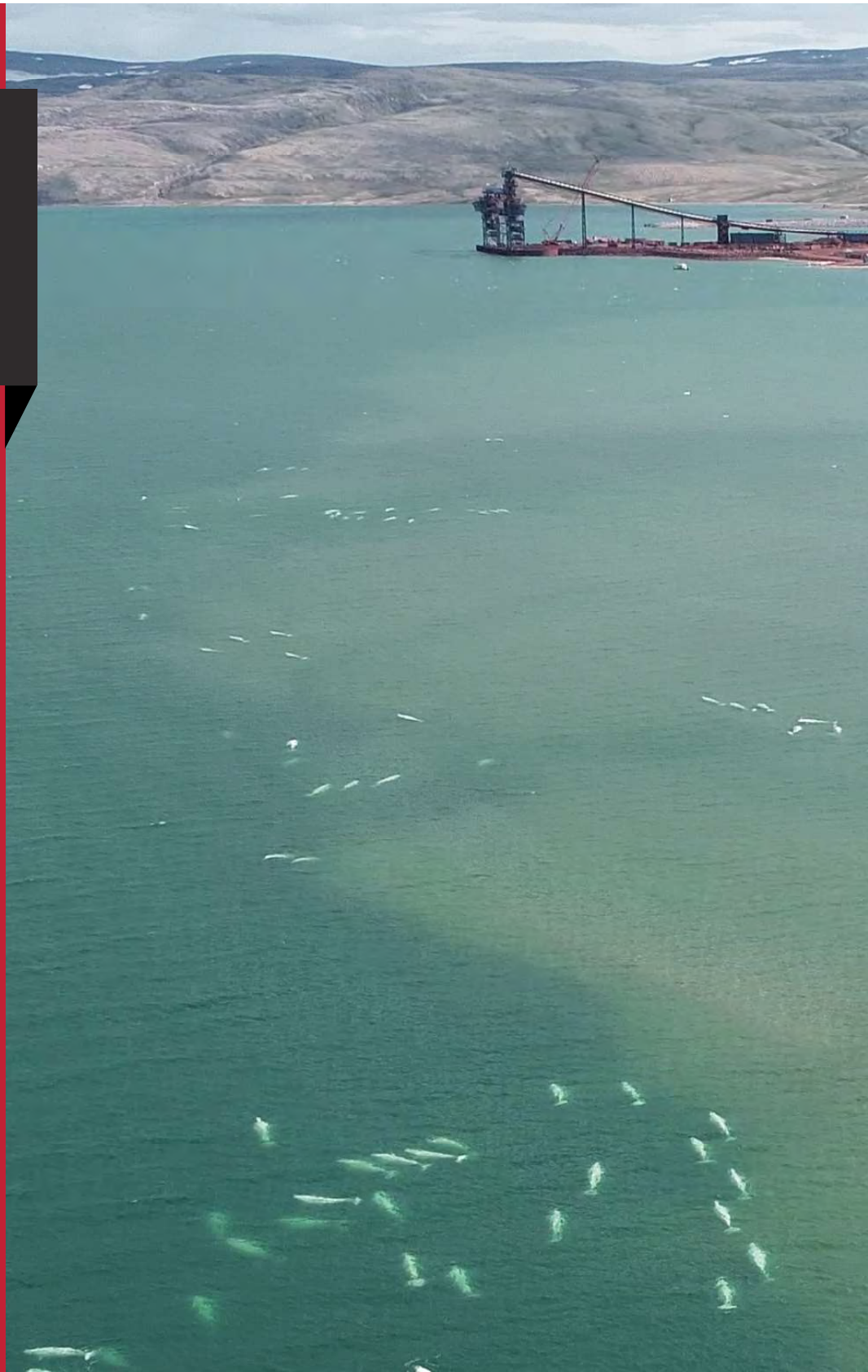
2022 NIRB ANNUAL REPORT

Popular Summary

MARY RIVER PROJECT



Planning Ahead

Learn how Baffinland is requesting an amendment to Project Certificate No. 005 to allow for continued operations at a nominal rate of 6 Mtpa activity level through 2024 and its heightened focus on the development of the Approved Steensby component.

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2022 Compliance Performance

Learn more about Baffinland's self-assessment status of compliance with PC conditions for 2022.

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Monitoring Programs

Gain insight into all the Marine, Terrestrial, Freshwater, and Air Quality Monitoring Programs at Baffinland.

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THE MARY RIVER PROJECT

The Mary River iron ore deposits on North Baffin Island are considered to be one of the largest and highest quality iron ore open pit deposits in the world. With such high grade iron ore, there are no concentrators, tailings, or tailings ponds associated with production activities. The Mary River Project (the Project) is operated by Baffinland Iron Mines Corporation (Baffinland) and is jointly owned by The Energy and Minerals Group and ArcelorMittal. The mine is 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. Baffinland's head office is located in Oakville, Ontario and its northern headquarters is located in Iqaluit, Nunavut. Baffinland also has offices in five North Baffin communities including Arctic Bay, Clyde River, Sanirajak, Igloolik and Pond Inlet. The Project is the only mine and largest private employer in the Qikiqtani Region, and is one of three operating mines in Nunavut.

The Project currently consists of four main operating centres: the Mary River Mine Site (the Mine Site), the 100-km long Milne Inlet Tote Road (Tote Road), the Milne Port facility (Milne Port) and the Northern Shipping Route. Collectively this area is known as the Northern Transportation Corridor. The operation includes open pit mining, crushing, transporting and stockpiling of ore 12 months of the year between the Mine Site, the Tote Road and Milne Port. The ore is then shipped to markets in Europe and Asia between July and the end of October.

Mining operations began in 2014 with the first iron ore shipped to Europe via Milne Port in 2015. The current Approved Project is limited to mining out of Deposit No. 1, however, Baffinland administers an extensive exploration program designed to increase the known reserves in Deposit No. 1, as well as in other deposits in close proximity to the Project Area. The Project represents a multi-generational opportunity for resource-driven socio-economic development in the North Baffin region.

Pursuant to the Nunavut Agreement, the Nunavut Impact Review Board (NIRB) issued Project Certificate No. 005 for the Project on December 28, 2012. Project Certificate No. 005 approved the existing mine and the transportation of iron ore along the

HISTORY OF THE MARY RIVER PROJECT

1962
Mary River's High Grade Iron Ore First Noted in an Airborne Reconnaissance

1973
Baffinland Acquires Mining Lease

1999
Nunavut Created; Mary River Project Site Selected as Inuit Own Land

2012
The Nunavut Impact Review Board (NIRB) Issues the Project Certificate (PC) No. 005 for Mary River Project

2013
Early Revenue Phase Proposed; Baffinland and QIA Sign the IIBA, Commercial Lease and Water Compensation Agreement; Type 'A' Water Licence Approved

2014
Early Revenue Phase Approved (PC No. 005 Amendment No. 01); Phase 2 Proposed

2015
First Iron Ore is Shipped to Europe

2018
Production Increase Proposal Approved (PC No. 005 Amendment No. 02); Amended IIBA; FEIS Submitted for Phase 2 Proposal

2020
Production Increase Proposal Extension Approved (PC No. 005 Amendment No. 03)

2022
Phase 2 Proposal Does Not Receive Approval; Production Increase Proposal Renewal (PIPR) Approved (PC No. 005 Amendment No. 04)

2023
Sustaining Operations Proposal Submitted to NIRB

Southern Transportation Corridor via the South Railway, Steensby Port and the Southern Shipping Route. Subsequent amendments to Project Certificate No. 005 for the Early Revenue Phase (ERP) (issued by NIRB in 2014 as Amendment No. 01) permitted Baffinland to transport an additional 4.2 million tonnes per annum (Mtpa) from 2015 to 2017 followed by the Production Increase Proposals (PIP) (issued by NIRB in 2018, 2020 and 2022 as Amendments No. 02, 03 and 04) which permitted up to Six (6) Mtpa through the Northern Transportation Corridor.

Vessel Being Loaded at Milne Port

2022 LOOK BACK

Mining operations continued at Deposit No. 1 in 2022 and a total of 5.7 Mt of ore was transported by ore haul trucks along the Tote Road from the Mine Site and stockpiled at Milne Port. During the 2022 shipping season a total of 4.7 Mt of ore was shipped from Milne Port to international markets through use of 62 individual ore carrier vessel voyages.

Baffinland's shipping operations were guided for the second year by the Narwhal Adaptive Management Response Plan (NAMRP), which involved the implementation of various mitigation measures to reduce the Project's potential effects on marine mammals, including:

- waiting for a continuous path of 3/10ths ice concentration prior to the commencement of shipping;
- adhering to strict vessel speed and course restrictions; and
- implementing a new convoy program.

Similar to 2021, Baffinland did not break ice to commence the 2022 shipping season, effectively delaying and shortening the season by 1 to 2 week(s). As a consequence, when multi-year ice drifted into the Northern Shipping Route and closed the season earlier than anticipated, more than one (1) million tonnes of ore was left at Milne Port before the season otherwise could have closed.

Through the PIP Renewal reconsideration process, Baffinland made over 70 new commitments, which are reflected in Appendix B to Project Certificate No. 005, Amendment No. 04. These extensive commitments relate to various aspects of the Project, ranging from dust mitigation and marine monitoring measures to substantial new investment in community infrastructure and other related funding. Status on these commitments will be reported in line with the requirements of Term and Condition No. 189, with the most recent report submitted to the NIRB on March 31, 2023.

On May 13, 2022, the NIRB recommended to the Minister of Northern Affairs that the Project's Phase 2 Expansion Proposal not proceed at that time. Subsequently, on November 16, 2022, the Minister accepted the NIRB's recommendation to not approve the Phase 2 Proposal at that time.

In the fall of 2022, Baffinland began engaging with the Qikiqtani Inuit Association (QIA) and the impacted communities and developing the Sustaining Operations Proposal (SOP) to support the continuation of transportation rates of 6 Mtpa through the Northern Transportation Corridor.

Due to the easing of COVID-19 restrictions, Baffinland was able to administer its annual Inuit Employee Survey at the Project with a total of 55 surveys completed. Baffinland also saw increasing Inuit employment through 2022 with over 330 Inuit employed by the Mary River Project.

Continued Development of Deposit No. 1 (Nuluujaak Pit)

PLANNING AHEAD

Mining from Deposit No. 1 will continue through 2023 as well as project environmental monitoring programs prescribed by Project Certificate No. 005, water licences, authorizations, management plans, and environmental effects monitoring plans will continue through 2023. The SOP was submitted to the NIRB in March 2023 requesting an amendment to Project Certificate No. 005 to allow for the continued operation of the Project at a nominal 6 Mtpa activity level through to 2024.

Baffinland continues to evaluate its plans for the long-term success of the Project. Baffinland is actively working with the QIA and impacted communities on the long-term planning of the project, which includes a dedicated focus on the development of the Steensby component of the Approved Project. Limited activities are expected to be carried out along the South Railway alignment and at Steensby Port to support environmental permit applications in 2023 as well as continued engagement activities. These activities are expected to occur within the scope of existing approvals and will be reported, as required, in the annual reporting cycle for the 2023 period.

Aerial View of the Haul Road (August 2022)

CONSULTATIONS & ENGAGEMENTS

Baffinland values meaningful and substantive Inuit, community, and other stakeholder engagement 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 to inform our planning, and resolving issues and concerns.

With gradual easing of all travel restrictions in 2022, Baffinland maintained a hybrid approach for community engagement activities in the five (5) North Baffin communities and Iqaluit, with some events and meetings being held in-person and others relying on video/teleconference. Baffinland also continued to maintain a presence on social media and local radio as a means to ensure that information about the Project is accessible to a wide audience. This hybrid model provides a suitable alternative to ensure that lines of communication remained in place between Inuit and other stakeholders and Baffinland.

Baffinland's Approach to Inuit and Other Stakeholders Engagement

Baffinland continued to provide relevant operational updates to the communities and regulators throughout 2022. Subsequent to the NIRB's recommendation to not approve the Phase 2 Proposal, Baffinland began focused consultation on maintaining a 6.0 Mtpa trucking and shipping operation in 2022 to provide stability to the Company under the PIP Renewal amendment. Subsequent to NIRB issuing Project Certificate No. 005 Amendment No. 04, Baffinland engaged almost immediately on an updated operations plan –the SOP –with the QIA and Inuit in the North Baffin communities to allow for the continued operation of the Project at a nominal 6.0 Mtpa activity level.

Wherever possible, Baffinland has taken feedback received throughout the recent Phase 2 and Production Increase Proposals and applied it to existing operations. In response to feedback and the NIRB's recommendations in the Phase 2 Recommendation Report, Baffinland has worked with the QIA, Inuit, impacted communities and stakeholders to develop new mitigations to address priority areas of the Project as identified by Inuit.

For example, through the Phase 2 technical review submissions, issues related to ballast water and narwhal entrapment events were raised. Despite not having approval on the Phase 2 Proposal, in 2021 Baffinland proactively implemented commitments for additional ballast water mitigations (i.e. requiring vessels to conduct both exchange and treatment) and has been running narwhal entrapment clearance aerial surveys since 2019 when supported by the community. Furthermore, Baffinland has continued since 2021 to avoid the use of an icebreaker at the start of the shipping season, delaying the entry of ore carriers until ice concentrations along the nominal shipping route were no greater than 3/10ths. These examples highlight that where synergies between current operations, the Phase 2 Proposal, or most recently through the PIP Renewal, were identified, Baffinland proactively integrated forward-looking commitments, to ensure that information received through previous engagement events were captured and addressed throughout 2022 to the extent possible, and integrated within the SOP application.

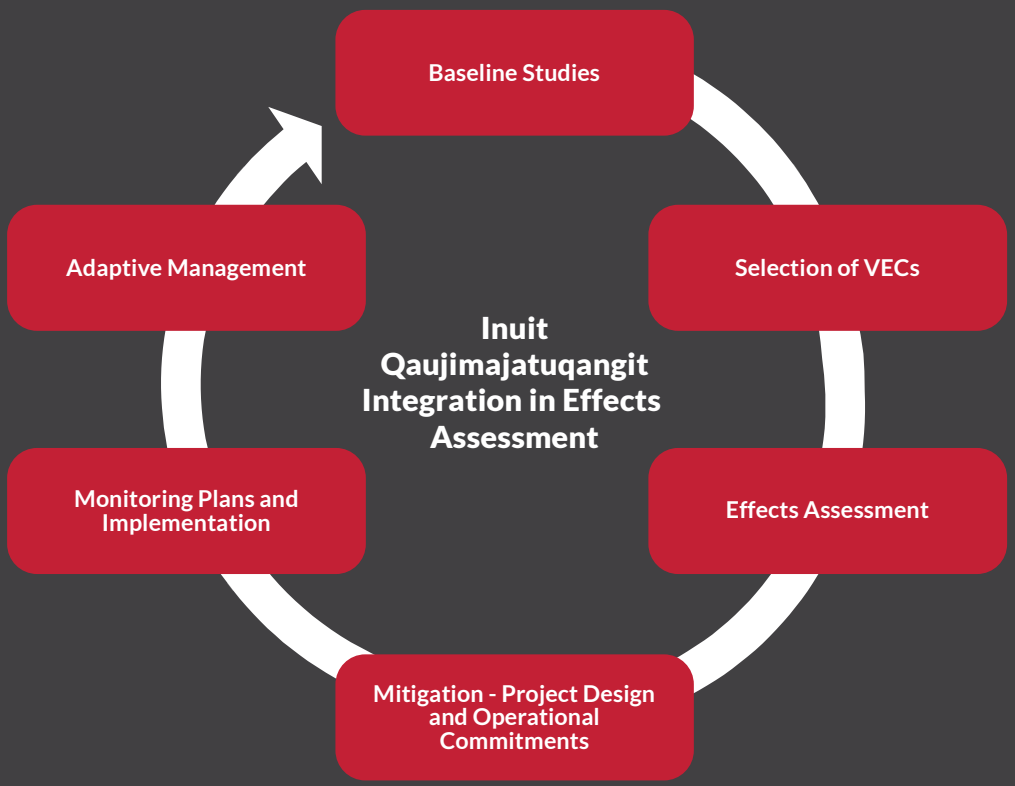
INCORPORATION OF INUIT QAUJIMAJATUQANGIT

Baffinland views Inuit Qaujimajatuqangit (IQ) as central to the successful planning and operations of the Project. IQ is reflective of Inuit knowledge transferred from generation to generation. IQ captures knowledge of relationships and morality, core values and worldviews, as well as environmental knowledge. Inuit use IQ for decision-making in their everyday life choices, such as determining where to go or what to hunt. It is important for Baffinland to acknowledge and understand how IQ is used and to ensure IQ has been considered in its decision-making.

Specifically, IQ is useful for determining the accuracy of impact predictions and relevance for the potential bio- physical and socio-economic effects of the Project. IQ also provides context for designing, conducting and interpreting results from project monitoring activities and interpreting the effectiveness of mitigation measures, and is useful to support the verification of the effectiveness of mitigation measures. Baffinland has worked with the QIA for over a decade to develop methodological approaches for IQ studies, consistent with the Mary River Inuit Impact Benefit Agreement (IIBA). This collaborative approach resulted in the QIA providing its written support for requisite Nunavut Research Institute Research Licences for IQ studies and participation in the 2015/2016 IQ workshops and 2019 Community Risk Workshops. The results of these undertakings have been consistently integrated into Baffinland's environmental impact statements and made available as part of the NIRB review and reconsideration processes.

Baffinland has and will continue to consider IQ principles in assessing the accuracy of impact predictions, when designing or interpreting the effectiveness of impact reduction activities, and the need to modify such activities including, but not limited to, socio-economic elements, such as Inuit Human Resource planning. Baffinland has made multiple project modifications as a direct result of IQ shared with it and the results of engagement with Inuit.

In 2022, Baffinland directly hired Inuit Knowledge Holders in each of the five impacted communities as well as Community Resource Guides. These roles are seen as critical to guiding Baffinland's senior management in its decision making, facilitating knowledge transfer within and between community members and Baffinland staff, and guiding the collection and use of IQ.



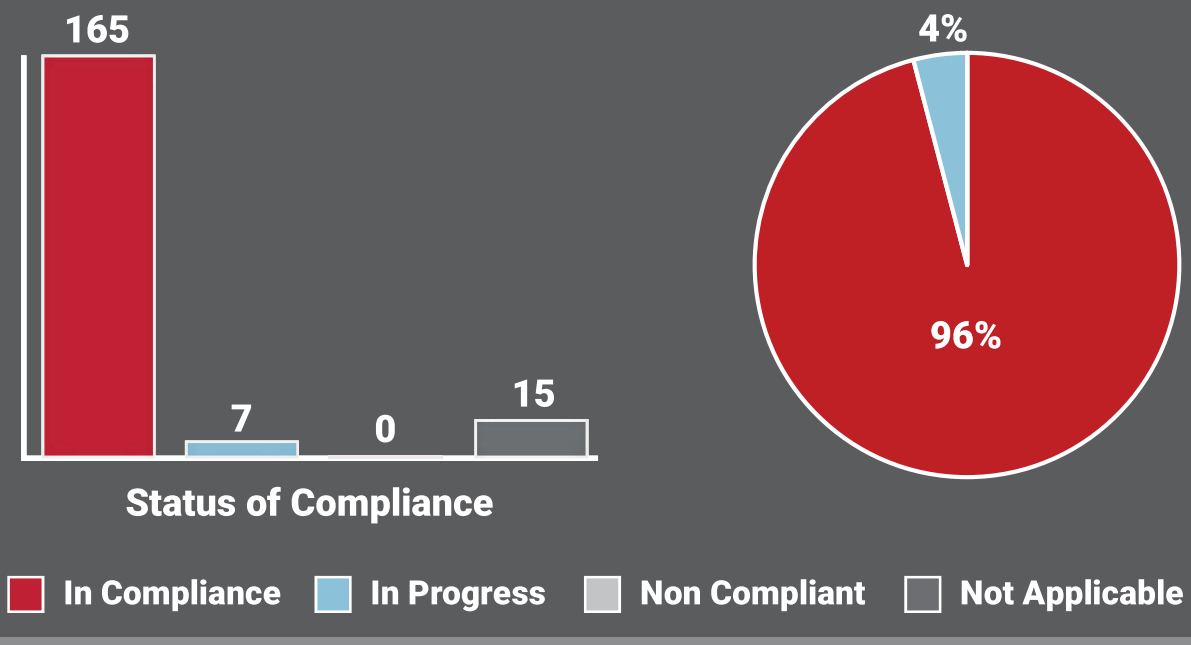
2022 COMPLIANCE PERFORMANCE

The Annual Report is a requirement of Project Certificate No. 005. The Annual Report provides information on how Baffinland is meeting the Terms and Conditions of Project Certificate No. 005 and its performance on the same. Since Terms and Conditions related to the not yet constructed components of the Approved Project (i.e., the Southern Transportation Corridor comprising the Southern Rail alignment and Steensby Port) were not applicable in 2022, compliance performance is focused on those related to the Mine Site and the Northern Transportation Corridor (Tote Road and Milne Port). Once applicable Terms and Conditions are triggered through the development of the Steensby component, compliance performance will consider all Approved Project components.

The Annual Report also presents an opportunity to discuss Project activities over the preceding calendar year and highlight what is coming ahead for the following year. The complete Annual Report can be found on the NIRB Public Registry and the Baffinland Document Portal.

Overall, Baffinland is In Compliance with the required Terms and Conditions for the Project for the active Mine Site and Northern Transportation Corridor. Baffinland will continue to improve and refine existing mitigations and monitoring programs, 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.

Summary of Baffinland's 2022 Overall Performance Against Project Certificate No. 005 Terms and Conditions



SELF ASSESSMENT METHODOLOGY

Baffinland has taken a conservative approach for self-assessing the status of compliance with Project Certificate (PC) No. 005 Terms and Conditions for 2022. When determining a status of compliance for each of the Terms and Conditions, Baffinland and its technical experts implemented the following process:

1. **A review of the specific requirements outlined in each PC Term and 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 Term and 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 Term and Condition and the work completed by Baffinland to meet these requirements.**
5. **Inuit and stakeholder comments as relevant to the PC Term and Condition are considered.**
6. **A status of compliance based on the results of Baffinland's self-assessment is assigned.**

STATUS OF COMPLIANCE

In Compliance	Obligations have been met or exceeded, as intended in Project Certificate No. 005 for the relevant monitoring period. A previous 'Completed' and 'Accomplished' by the NIRB status will remain 'In Compliance' with a 'Not Active' status. **Rationale for meeting compliance requirements is provided.*
In Progress	Obligations have been partially fulfilled, as intended in Project Certificate No. 005 for the relevant monitoring period, or a plan to achieve full compliance is being actioned. **Demonstrable efforts towards meeting compliance requirements is evidenced.*
Non Compliant	Obligations have not been met as intended in the Project Certificate No. 005 for the relevant monitoring period. **Rationale for being unable to meet compliance requirements is provided.*
Not Applicable	The Term and Condition is not applicable to the current phase of the Project for the relevant monitoring period.

**Project Certificate No. 005 compliance status is specific to those Terms and Conditions that are applicable to the Mine Site and Northern Transportation Corridor components (Tote Road and Milne Port).*

MOVING BEYOND COVID-19

At Baffinland, the safety and wellbeing of our employees, contractors and the North Baffin communities remains our highest priority, while ensuring the continuity of our business during these evolving and challenging times. Baffinland and its consultants continued to implement comprehensive health and safety plans and protocols to minimize the risk of COVID-19 exposure to employees, contractors and communities. When easing of public health restrictions allowed, Nunavummiut returned to work in late summer 2021, but were sent home again in December 2021 due to the presence of the Omicron variant. Baffinland was pleased to have employees re-transition to the Mary River Project Site in March 2022, allowing for regular routines to be re-established for our Nunavut staff.

Baffinland and its consultants and advisors implemented comprehensive safety plans and protocols to minimize the risk of COVID-19 exposure to their employees and local communities until restrictions were gradually lifted. In September 2022, testing protocols were lessened and PCR testing was phased out with the introduction of COVID-19 rapid antigen testing kits, which were less invasive and provided quicker results. While it was encouraged, mask wearing was no longer mandatory unless a person was post-COVID or exhibiting flu like symptoms. Baffinland slowly transitioned back to sharing spaces such as dining halls, recreation rooms and in person safety meetings. Baffinland has maintained handwashing protocols and community flight wellness checks as these are also important preventative measures for all transmittable viruses. This transition allowed Baffinland to ensure the risk of COVID-19 exposure to Nunavut communities was minimized, and the environmental monitoring programs were completed with minimal risk in a safe but communal environment.

For more information on Baffinland's COVID-19 response, please visit
www.baffinland.com/sustainability/health-and-safety/

EDUCATION & TRAINING

The Qikiqtani Skills and Training for Employment Partnership (Q-STEP) 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 was extended until March 31st, 2022, and the Q-STEP teams were authorized to expend the remaining funds. In a joint proposal, the Q-STEP team members at Baffinland and the QIA secured additional funding from Kakivak Association to ensure that the Q-STEP program would continue, which included:

1. Community based work readiness training
2. On-site work readiness training
3. Heavy Equipment Operators Training
4. Adult Basic Education and Pathway to Adult Secondary School programs

This funding expired on March 31, 2023 and, as a result, the Q-STEP team continues to seek additional third party funding to support the continuation of apprenticeship training at Baffinland.

In 2022, Inuit training hours totalled 52,055 hours, equivalent to 38.9% of the total training provided by Baffinland. This is an increase of 56.5% in Inuit training hours when compared to 2021, which is remarkable given that Inuit employees were returned home from site due to COVID-19, from late December 2021 to early March 2022.

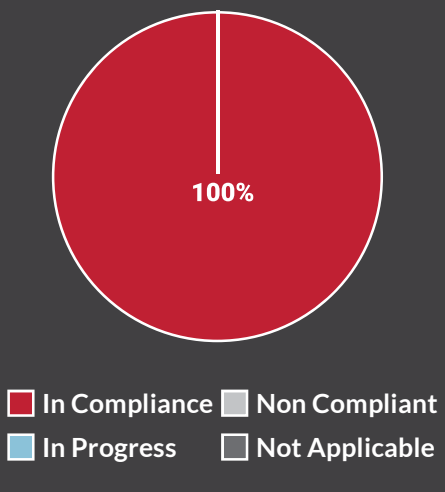
Successful Heavy Equipment Operator Training Graduates (June 2022)

AIR QUALITY MONITORING PROGRAMS

In 2022, the following data collection and monitoring was undertaken in relation to the atmospheric environment monitoring program:

- **Meteorological Monitoring**
- **Ambient Air Quality Monitoring**
- **Dustfall Monitoring**
- **Climate Change**

Air Quality 2022 Performance Against PC No. 005 Terms and Conditions



Weather conditions in 2022 were summarized and compared to conditions from previous years. Mary River and Milne Port observed higher maximum air temperatures in 2022 compared to 2021, while minimum air temperatures remained consistent. Windspeed trends between each site were similar in 2022. At Mary River, south-easterly winds were prevalent during 2022, which is consistent with the observed trends from previous years. At Milne Port, north-westerly and south-westerly winds were prevalent during 2022, consistent with data observed in 2021.

Ambient monitoring for sulphur dioxide (SO_2) and nitrogen oxides (NO_2) continued to be carried out at the Mine Site and Milne Port. Results from the continuous monitoring indicate that concentrations were below the Nunavut Ambient Air Quality Standards for NO_2 and SO_2. The 2022 measured concentrations of NO_2 and SO_2 were highest in the winter and lowest in the summer, consistent with previous years. In 2020, Baffinland retained expert support to evaluate the implementation of continuous particulate monitoring stations, a commitment made to Environment and Climate Change Canada through the PIP technical review. The stations were installed at both the Mine and Milne Port sites in 2021; data collected and analyzed is included in the Annual Air Quality, Dustfall and Meteorology Report for the 2022 period.

Ten years of passive dustfall monitoring from August 2013 to December 2022 are now complete. There are presently 49 dustfall monitors located across 43 monitoring stations, including 10 new stations installed in 2021 (four (4) stations located along the proposed Phase 2 railway were discontinued in October 2022 following the decision that Phase 2 expansion would not proceed). New dustfall monitors were installed to collect dust at 0.5 m as a pilot study to investigate the variability between dustfall sampling at the standardized height of 2.0 m and that closer to ground level showed no statistically significant differences in dustfall levels between the two heights.

Passive dustfall monitoring continues to show that the areas with the greatest dustfall deposition are restricted to mainly within 1,000 m of the Project Development Area (PDA) and deposition decreases with distance from the Project. Dustfall imagery analysis has also been used to estimate dustfall extent at the Project since 2020. Overall trends between satellite-derived mean dustfall concentrations and annual dustfall from the passive dustfall monitors were similar for Milne Port and the Tote Road Crossings.

In 2021, Baffinland expanded dustfall satellite imagery analysis to include undeveloped areas of the Project at Steensby, in order to facilitate an enhanced comparative analysis to a 'reference' site, while also establishing a baseline for a future development area. Results from that analysis showed that in some years, naturally occurring events (i.e. wind, precipitation trends, etc.) influence dustfall levels and that concentrations can be significant even in areas not influenced by the Project.

The pattern of dustfall extent on the landscape was similar from 2014 to 2022 for all areas, with the highest concentrations near the Project and

dustfall extending northeast along Milne Inlet, west and south of the Mine Site, and southwest of the South Crossing (KM 78) in the direction of prevailing and/or strong winds.

Baffinland also further amended its 2019 Climate Change Strategy throughout 2022. Baffinland incorporated the feedback received by Inuit and other stakeholders on a revised Climate Change Strategy in 2022. The newest Climate Change Strategy consists of a two-goal strategy focusing on (1) improving energy efficiency and forging a path to decarbonization, and (2) monitoring changes in climate and associated risks to inform adaptation and closure strategies.

THIRD-PARTY DUST AUDIT

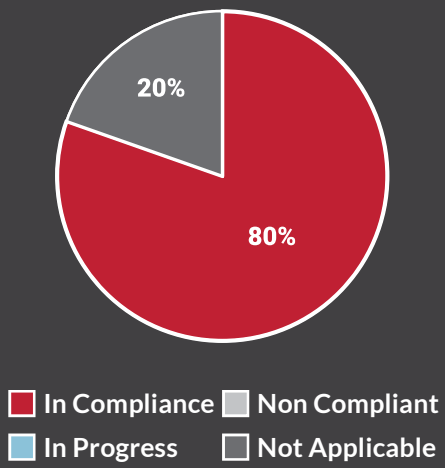
In 2021, Baffinland commissioned a third-party Dust Audit (the Audit) through Nunami Stantec, which included the establishment of a Dust Audit Committee comprised of representatives from the five North Baffin communities. As part of this work, the Dust Audit Committee undertook two on-site investigations and met with Nunami Stantec on a bi-weekly basis throughout 2022. An interim Dust Audit report was issued to Baffinland in September 2022. The results of the Audit were subsequently captured in a Final Recommendations Report submitted to the NIRB on February 16, 2023. Baffinland has since issued a formal response to the Recommendations Report, outlining its planned actions and, where applicable, schedule to address each recommendation.

MARINE MONITORING PROGRAMS

In 2022, Baffinland implemented the following marine environment monitoring programs;

- **Marine Mammal Aerial Survey Program**
- **Bruce Head Shore-based Monitoring Program**
- **Underwater Passive Acoustic Monitoring Program**
- **Marine Environmental Effects Monitoring Program (MEEMP) and Non-Indigenous Species /Aquatic Invasive Species (NIS/AIS) Monitoring Program**

Marine 2022 Performance Against PC No. 005 Terms and Conditions



As part of the Marine Mammal Aerial Survey program, a reconnaissance survey was initially run during the early shoulder season (Leg 1) to collect data on the presence/absence and distribution of marine mammals in the RSA relative to ice conditions at that time of year and prior to the start of shipping activities. Systematic aerial surveys were subsequently conducted over a two-week period in August 2022 to obtain an annual abundance estimate for the Eclipse Sound and Admiralty Inlet narwhal summer stocks during the open-water season. Results from the 2022 aerial surveys indicate that narwhal abundance in Eclipse Sound was statistically higher in 2022 than in 2021, although still statistically lower than 2016 and 2019. The combined narwhal abundance in Eclipse Sound and Admiralty Inlet was similar in 2022 to what was observed in recent years (2013, 2019, and 2020), indicating that narwhal numbers in the combined summering ground areas have not changed since prior to the start of Baffinland shipping operations.

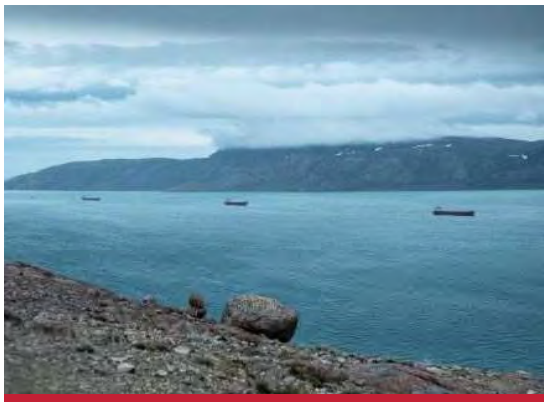
The Bruce Head Shore-based Monitoring Program was conducted for four (4) weeks in 2022 to monitor for potential adverse effects from shipping operations on marine mammals in the Regional Study Area (RSA). Highlights include:

- Observed behavioural responses of narwhal to shipping appear generally consistent with previous years, meaning that narwhal continue to demonstrate temporary and localized responses to shipping activities, with animals returning to their pre-response behaviour shortly following initial exposure.
- The proportion of immature narwhal (i.e., calves and yearlings) relative to the observed population (an Early Warning Indicator [EWI]) recorded at Bruce Head in 2022 (0.105) was shown to be similar to that observed in 2021 (0.102), but lower than levels recorded during baseline (pre-Project) (0.152 in 2014 and 0.167 in 2015)). A statistically significant decrease in the EWI relative to baseline conditions for the Bruce Head area triggered a moderate-level risk adaptive management response, which involves investigating trends and enhancing mitigation and monitoring efforts. Baffinland initiated a follow-up investigation in 2021/2022 by conducting an equivalent EWI analysis of its aerial survey data collected in the larger RSA during previous years (i.e., 2014, 2015, 2020-2022). Findings from the aerial EWI analysis indicated that the EWI in 2022 (0.124) was within the range of baseline values (0.150 in 2014 and 0.110 in 2015), and therefore did not show evidence that the proportion of immature narwhal declined in the broader RSA since the start of shipping operations (2014/2015).

- Narwhal relative abundance was higher in 2022 than in the two preceding years (300% higher than in 2021) and was similar to levels in 2015. These findings indicated that narwhal numbers in the RSA appeared to be increasing from the lower numbers observed in 2020/2021 but have not yet returned to levels observed during earlier shipping years (2016, 2017 and 2019). Over the combined 2014 to 2022 sampling period, the second highest relative abundance estimate at Bruce Head was observed in 2019, when shipping was highest and Project icebreaking occurred during the early shoulder season for the third consecutive year (2018 to 2020). The lowest relative abundance estimates at Bruce Head were recorded in 2020 to 2021, when shipping levels were similar to 2016 and no icebreaking activities occurred during the early shoulder season. These results suggest that the annual volume of Project shipping in the RSA did not predict the relative abundance at Bruce Head in that year. The 2022 results support the theory that some degree of natural exchange likely occurs between the two putative narwhal summer stock areas and, while shipping cannot be ruled out as a contributing factor, that the regional distribution and movement of narwhal off North Baffin Island during the summer was likely influenced by other external factors (e.g., local ice conditions, water temperature, prey availability, predation pressure, etc.). A review of available Inuit knowledge supports that the Admiralty Inlet and Eclipse Sound narwhal stocks may actually represent a single stock with natural exchange of animals between the two putative summering areas.

Baffinland is currently working towards a collaboration with Fisheries and Oceans Canada (DFO), which would involve conducting regional aerial surveys across the Eastern Canadian High Arctic to obtain an abundance estimate for the Baffin Bay narwhal population as a whole, which includes six putative summering stocks (Admiralty Inlet, Eclipse Sound, Somerset Island, East Baffin, Jones Sound and Smith Sound). The last time this population was censused was in 2013.

Underwater sounds from Project shipping activities (near Bruce Head and Ragged Island) and non-Project activities near Pond Inlet were also successfully recorded in 2022. Sound exposure levels from shipping never exceeded thresholds for acoustic injury (temporary or permanent hearing loss) at any recording location, and on average, underwater noise exceeded the established 120 dB disturbance threshold for marine mammals for less than one hour per day (on average) at any location, which is significantly lower than predictions derived through acoustic modelling. Additionally, acoustic monitoring was used to measure sound levels associated with vessel convoys, which were implemented in 2022. A total of nine vessel convoys were recorded, seven of which showed that the 120 dB exceedance duration was less than the sum of the average durations for the individual vessels in the convoy. The initial results of this program support the hypothesis that vessel convoys can be an effective means to reduce overall sound exposure throughout the shipping season.



Brucehead Shore-based Monitoring Program

In 2022, Baffinland also continued to undertake its MEEMP and NIS/AIS Monitoring Program at Milne Port. This included monitoring of marine water quality, sediment quality, benthic infauna, substrate macroflora epifauna, marine fish community, fish health, non-indigenous species and/or aquatic invasive species, as well as a physical oceanography component to monitor water levels with a tide gauge. Consistent with previous years, the results of this program indicate that effects of the Project on the marine environment are within predictions. There is no indication that the Project is negatively affecting fish health or resulting in changes to the local fish communities to date. Marine water and sediment quality at Milne Port remains below the applicable scientific guidelines or remains consistent with pre-Project operation levels for metals such as iron.

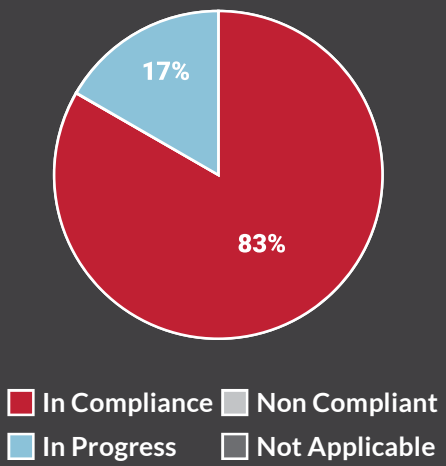
Marine Mammal Aerial Survey Program

FRESHWATER MONITORING PROGRAMS

Monitoring activities undertaken in relation to the freshwater environment in 2022 included:

- **Aquatic Effects Monitoring Program (AEMP)**
  - **o Core Receiving Environment Monitoring Program**
  - **o Lake Sedimentation Monitoring Program**
  - **o Hydrometric Monitoring Program**
- **Milne Inlet Freshwater Fish Health Study (Completed in collaboration with Mittimatalik Hunters and Trappers Organization [MHTO)**
- **Tote Road Water Quality Monitoring**
- **Surveillance Network Program (SNP)**
- **Groundwater Monitoring Program**

Freshwater 2022 Performance Against PC No. 005 Terms and Conditions



The Aquatic Effects Monitoring Program focuses on the key potential impacts to freshwater environment valued ecosystems components (VECs). The freshwater VECs include water quantity and quality, sediment quality, and freshwater biota and fish habitat. The results of the 2022 Core Receiving Environment Monitoring Program, which assesses Mine Site lakes and streams, indicate that no ecologically significant, adverse, mine-related effects to biota were identified at any of the receiving waterbodies based on comparisons to applicable reference and/or baseline conditions. Lake sedimentation monitoring at the Mine Site continues to indicate that sedimentation rates are generally consistent with baseline except in the shallow stations, but accumulation rates at these sites remain below the proposed Trigger Action Response Plan (TARP) low action response threshold of 0.15 mm.

Results of the 2022 SNP, which monitors all effluent discharge and runoff from Project areas, indicate that exceedances of applicable discharge criteria in 2022 involved primarily surface water runoff and effluents with elevated total suspended solids levels. In each case, appropriate control measures were implemented to restore total suspended solids (TSS) levels to below applicable discharge criteria. Baffinland continues to assess and implement the appropriate corrective and mitigation measures to address ongoing sedimentation concerns at the Project. As part of the first phase of the implementation of the Long Term Surface Water Management Plan, construction of the KM 105 dam to control sediment loading in the receiving environment was completed in 2022. Additional implementation of the Long Term Surface Water Management Plan was completed with the construction of erosion and sediment control infrastructure at Camp Lake to reduce potential erosion and sedimentation and minimize releases of TSS to Camp Lake in 2022. The Long Term Surface Water Management Plan will continue to be implemented in 2023.

A second year of monitoring was completed in 2022 as part of the Milne Inlet Freshwater Fish Health Assessment program following initial discussions with the MHTO about the potential effects of the Milne Port facility operations on anadromous Arctic char and to fulfill requirements

Mine Site Aquatic Effects Monitoring Program Winter Lake Sampling - April 2022

Mine Site Surveillance Network Program - August 2022

of Term and Condition No. 48(a). The design for the study was developed following consultation and direction from the MHTO on sampling locations, timing, and techniques for the study. In 2022, the field fish health assessment program ran from August 17 to 26, along with one individual representative for each of the Hamlet of Pond Inlet, the MHTO and the QIA. Ikaluit Lake was sampled for the first time in 2022, while Tugaat and Qurluktuk lakes were sampled a second year in a row. Following the completion of the field component, Baffinland met with the MHTO representatives to discuss 2021 and preliminary 2022 results, and gathered feedback on the type of data and results in support of 2022 reporting efforts.

Mine Site Hydrology Program - July 2022

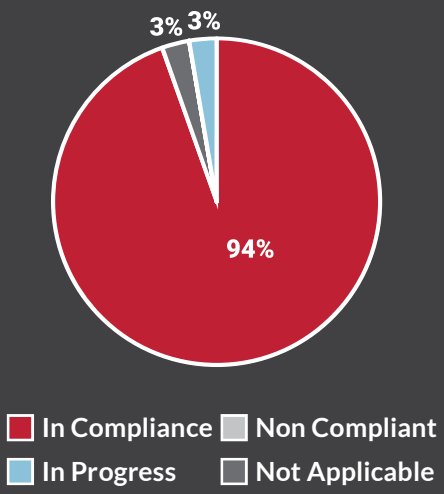
Milne Inlet Freshwater Fish Health Study- August 2022

TERRESTRIAL MONITORING PROGRAMS

In 2022, the following data collection and monitoring was undertaken in relation to the terrestrial environment:

- Helicopter Flight Height Analysis
- Dustfall Extent Imagery Analysis
- Noise Monitoring
- Vegetation and Soil Based Metals Monitoring
- Snow Track Surveys
- Snowbank Height Monitoring
- Height of Land Caribou Surveys
- Remote Camera Wildlife Monitoring
- Hunter and Visitor Log Summaries
- Incidental Wildlife Observations
- Active Migratory Bird Nest Surveys
- Wildlife Intteractions and Mortalities

Terrestrial 2022 Performance Against PC No. 005 Terms and Conditions



Vegetation monitoring in 2022 included vegetation and soils base metals monitoring. Soil-metal concentrations at the Project predominantly indicated no significant change or were significantly lower in relation to baseline values, and all samples remained within guidelines. Lichen-metal concentrations showed no significant changes in relation to baseline values, however, some discrete increases in constituents of potential concern (CoPCs) in relation to baseline conditions were recorded at the Mine Site, Milne Port, and along the Tote Road, with some individual values at or above indicator values. While some exceedances were attributed to sample variability, other CoPCs increases appear to be due to proximity to Project operations. Should these values continue to increase over time and result in year-over-year exceedances, corrective actions would be implemented. No significant risk to human or ecological health was identified.

Noise monitoring was conducted in the summer of 2022 to verify background sound levels and sound associated with the Project's ground operations. At the Mine Site and Milne Port, average sound levels at 1.5 km from the PDA were at or below levels predicted in the FEIS. Along the Tote Road, however, sound levels were generally higher than predicted in the FEIS. Overall, it is expected that the impacts of noise by the Project have remained in compliance with the criteria presented in the FEIS for most areas.

In 2022, after incorporating pilot rationale, overall helicopter cruising altitude compliance in all areas in all months was 95.8%. This represents an increase from 2021 compliance rates (93.2%), as well as the highest percentage of compliant flight hours since 2016. Although noise monitoring data indicates that helicopter noise is likely too infrequent in all Project areas to cause any significant disturbance to wildlife, Baffinland aims to continuously improve in this area.

Wildlife monitoring included snow track surveys, Height of Land caribou surveys, and active migratory bird nest surveys. No caribou were observed during the Height of Land surveys in 2022, and no caribou tracks were identified during the snow track surveys. These results are consistent with previous years, and with low regional abundance estimates provided by the Government of Nunavut. Remote wildlife cameras continued to be monitored at 12 Height of Land locations. Over 83,000 photos were captured from the 12 cameras between October 2021 and June 2022, which included a total of 28 wildlife detections— none of which were caribou. Baffinland remains confident that the results of the Height of Land surveys are a by-product of the low regional abundance numbers in caribou, and not due to a methodological issue with the program.

Bird nest surveys were completed before any land disturbance at the Project during the breeding bird season (May 17 to August 19). One survey was completed, but no nests were detected.

Fifteen wildlife mortality incidents were reported in 2022, all of which were individual losses. Mortalities involved five different species: Lapland longspur, arctic fox, arctic hare, snow bunting, and ptarmigan. Vehicle collisions were confirmed or suspected in most of these incidents. Mitigations will continue to be implemented to reduce the risk of wildlife injury or mortality at the Project.

SOCIO-ECONOMIC BENEFIT SUMMARY

2022 marks ten years since construction first began, and eight full years of operations at the Mary River Project. Baffinland has continued its phased development of the Mary River Project.

A total of 505,605 hours were worked by Inuit and 3,304,182 by Non-Inuit in 2022. These hours include both Baffinland and Contractor employees. In total, Inuit employment hours were 13.3% of the total hours worked. Baffinland's Inuit employee payroll totaled more than $17.4 million. These amounts include all Inuit employees who lived in and outside of Nunavut. Contractors' Inuit employee payroll totaled more than $6.6 million. These amounts include all Inuit employees who lived in and outside of Nunavut.

The value of contracts awarded to Inuit firms exceeded $162 million in 2022. This included twenty-six contracts with Inuit-owned firms, all of which were based in either the North Baffin communities or Iqaluit.

In addition to the direct impacts of the Project discussed above, there are direct community-benefit programs financed via the IIBA, such as the Harvesters Enabling Program that provide substantial benefits to Inuit in the North Baffin communities. In addition, revenues from the Project flows to other parties, which are expected to have positive spin-off effects for Inuit and other Nunavummiut. For example, in 2022, Baffinland paid a total of approximately $16.3 million in taxes to the Government of Nunavut: $10.5 million in employee payroll tax and $5.8 million in fuel tax, and $6.38 million in royalties to the QIA. Throughout 2022, Baffinland also heard Inuit communities express a desire to receive direct financial benefits from the Project. One such initiative includes payment to the Tasiuqtiit Working Group, which is jointly managed by the Hamlet of Pond Inlet and the MHTO. This Working Group has an agreement with Baffinland that requires Baffinland to provide payment of $10,000 for every ore carrier required to ship over 4.2 Mt of ore. For the years 2018 to 2022, this amounted to a total of $800,000 provided directly to the Working Group as a result of this agreement.

As of 2022, the Project has:

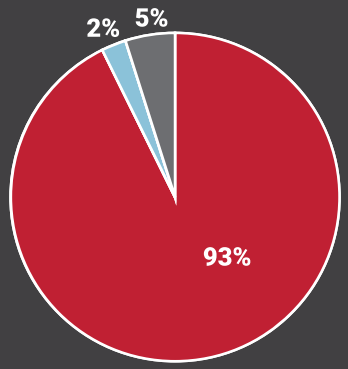
$115m

Provided over $115 million in wages to Inuit Project Employees and Contractors

$1.66b

Reached more than $1.66 billion in contracts signed and awarded to Inuit Firms

Socio-Economic 2022 Performance Against PC No. 005 Terms and Conditions



Baffinland's 2022 Shipping Monitor Team Visiting Mary River Project

QUESTIONS? HERE IS HOW YOU CAN REACH US

Baffinland Head Office

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

Communications
communications@baffinland.com

Employment & Training
recruitment@baffinland.com

General Comments, Questions and Concerns
communityquestions@baffinland.com

Procurement Opportunities
procurement@baffinland.com

Donation Requests
donationrequests@baffinland.com

Northern Head Office and Baffinland Community Liaison Officers:

Iqaluit
Joe Tigullaraq
Head of Northern Affairs
joseph.tigullaraq@baffinland.com
+1 867 975 2502
+1 867 222 6622

Manasee Ulayuk
Community Relations Manager
manasee.ulayuk@baffinland.com
+1 867 975 2502
+1 438 270 9413

Arctic Bay
+1 867 439 8847

Clyde River
George Iqalukjuak
george.iqalukjuak@baffinland.com
+ 1 867 924 6444

Igloolik
Lena Angutiqjuaq
lena.angutiqjuaq@baffinland.com
+1 867 934 8464

Pond Inlet
Erica Koonark
erica.koonark@baffinland.com
+1 867 222 0394

Sanirajak
Ragilee Nangmalik
ragilee.nangmalik@baffinland.com
+1 867 928 8497

Baffinland

2022–Γ ᓄᓇᕗᒻᒥ ᐊᖏᑎᓕᕆᔨᒋᐊᖅᓂᒃ ᐊᖁᕐᐅᔪᑕᒫᓯᒪᔪᓕᒃ ᐅᓂᒃᑲᖅᑕᒃ

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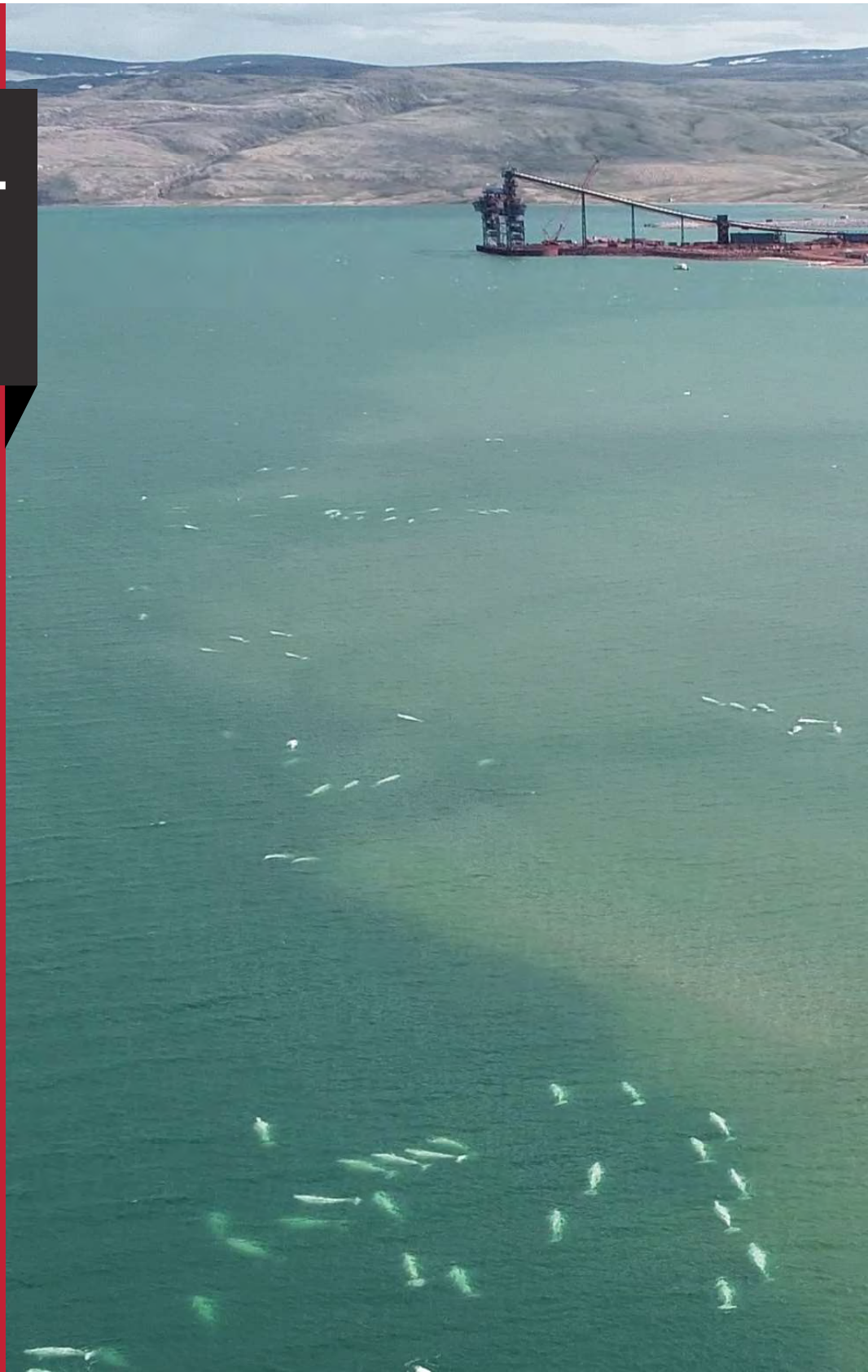

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[ᑕᓯᓗᒍ ᒪᓴᒪᖅ 3]

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[ᑕᓯᓗᒍ ᒪᓴᒪᖅ 7]

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2012
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2013
ᑭᓇᐅᖅᓴᖅᓱᓕᓗᓂᐅᓪᓕᒡ ᐱᓕᓗᐊᖅ ᑐᓵᓂᖅᑕᐅᔪᖅ; ᐊᖏᕐᓂᓗᑯᑦ ᐊᓘᒐᓗ ᖁᑭᖅᑕᓂ ᐃᓄᐃᑦ ᑲᑐᔾᔨᒃᑲᓂᑦ ᐊᑎᓂᐅᖅᓯᐅᕐᓂᖅ ᐃᓄᐃᑦ ᐊᓯᖅᓯᐅᓂᖅᓄᓇ ᐊᓘᒐᓗ ᐱᐊᕐᓂᓕᕐᓂᖅᓄᑦ ᐊᓯᖏᓪᓗᒥᒃ ᓄᓇᕗᒻᒥ ᐊᑐᖅᑐᕐᓂᖅ ᐊᓘᒐᓗ ᐃᓚᖓᑕᐅᓂᖅ ᐊᑎᖅᑕᕐᓂᖅ ᐊᓘᒐᓗ ᐃᓚᖓᑕᐅᓂᖅ ᐊᑐᖅᑐ

ᒪᐃ 13, 2022-ᖃᒧᑎᓪᓗᒍ, ᓄᓇᕗᒻᒥ ᐊᐅᑎᓯᓚᐅᕆᔨᒃᑯᓄᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᕆᔨᓂᖅᑐᑦ ᒥᓂᔅᓯᒪᓂᖅ ᑕᒪᓐᓇᖅᑐᑦ ᐅᑭᐅᖅᑕᕐᑐᓕᕆᓂᖅᓯᒪᓂᑦ ᑕᓐᓇ ᐱᓕᕆᐊᖅ ᒪᓕᑭᑦᓯᖅᑕᒪᓕᒃᓴᓂᑦ ᐊᖏᕐᓂᓕᕆᐊᖅᑕᐅᔪᓂᖓᓄᑦ ᑐᓴᕐᓯᐅᑎᓴᒃ ᑲᔪᓯᑎᐅᔾᔨᖓᓄᑦ ᐃᓚᖓ. ᑭᖑᓂᕐᑎᐊᖅᓴᖑᓂ, ᓄᕐᕕᐊᓇ 16, 2022-ᒥ, ᒥᓂᔅᓯ ᐊᖏᕐᕋᓯᓚᐅᖅᑐᑦ ᓄᓇᕗᒻᒥ ᐊᐅᑎᓪᓗᒍᓕᕆᓂᖅ ᑲᑎᒪᔨᖏᑦᑕ ᐊᑐᓕᕆᐊᖅᑐᑦ ᐱᓕᕆᐊᖅᑐᑦ ᓄᓇᕗᒻᒥ ᓄᓇᕗᒻᒥ ᐃᓚᖓ.

ᐅᑭᐊᕐᓴᓂᓄᑦ 2022-ᒥ, ᐸᐅᖅᓯᓐᓄᑦ ᐱᓕᕆᓴᑎᑦᑎᓚᓯᕆᔨᒪᓕᖅᑐᑦ ᕿᑭᕐᕈᓐᓇᑦ ᐃᓄᐃᓴᑎᑎᑦᑎᖅᑐᑦ (ᕿᑭᕐᕈᓐᓇᑦ ᐃᓄᐃᓴᑎᑎᑦᑎᖅᑐᑦ ᑲᑎᒪᔨᖏᑦ ᐊᐅᓚᓯᒪᔪᓂᖅᓴᓂᑦ ᓄᓇᕗᒻᒥᓄᑦ ᐊᐅᓚᓯᒪᔪᓂᖅᓴᓂᑦ) ᐊᐅᓚᓯᒪᔪᓂᖅᓴᓂᑦ ᐊᐅᓚᓯᒪᔪᓂᖅᓴᓂᑦ ᐃᓕᓴᕐ

ᑐᓴᕋᓯᐊᕐᓂᓪᓗ ᐃᓕᓴᐅᑎᖅᑎᓂᓪᓗ

ᐊᓂᒍᓴᒃᑯᓗᒃ ᐱᓚᒪᓕᐅᔪᓐᓇᖅ> ᑐᑭᖅᑎᑎᐊᖅᑐᑐᒃ ᐊᓚᒃ ᐊᖏᕐᕕᒃ ᐃᓄᐃᑦ, ᓄᓇᓕᓪᓗ, ᐊᓯᖏᑦᓯᓗ ᐱᖅᖁᖅᑕᐅᕗᑦ ᐃᓕᐅᑎᑕᐅᓂᖏᓐᓂᒃ ᐱᐅᖅᓯᐊᖅᑎᓯᓚᐅᑦ ᐊᓚᒃ ᑲᓇᖅᑎᑦᓴᕐᕕᓂᖅ ᐊᓚᓐᓂᒃ ᐃᓄᐃᑦ ᐊᓂᒍᓴᒃᑯᓗᒃ ᐃᓕᓴᐅᑎᑕᐅᓂᖏᓐᓂᒃ ᐊᓚᒃ ᐃᓕᓴᐅᑎᑕᐅᓂᖏᓐᓂᒃ, ᐊᓚᓗᓐ ᐊᓯᖏᓐᓂᒃ ᐱᖅᖁᖅᑕᐅᕗᑦ, ᐊᓚᓗᓐ ᐊᓯᖏᓐᓂᒃ ᐱᖅᖁᖅᑕᐅᕗᑦ, ᐊᓚᓗᓐ ᓴᖅᑭᕋᑎᓂᕐᕕᖅᑐᑦ ᐅᑐᑎᖅᑎᓂᕐᕕᖅᑐᑦ, ᐊᓚᓗᓐ ᐅᑎᖅᑎᓂᕐᕕᖅᑐᑦ ᐅᖅᑕᖅᑭᑎᓂᕐᕕᖅᑐᑦ, ᐊᓚᒃ ᑲᑎᑎᖅᑎᓂᕐᕕᖅᑐᑦ ᐅᖅᑕᖅᑭᑎᓂᕐᕕᖅᑐᑦ, ᐊᓚᓗᓐ ᐊᓯᖏᓐᓂᒃ ᐱᖅᖁᖅᑕᐅᕗᑦ ᐅᖅᑕᖅᑭᑎᓂᕐᕕᖅᑐᑦ, ᐊᓚᓗᓐ ᓴᖅᑭᕋᑎᓂᕐᕕᖅᑐᑦ ᐅᖅᑕᖅᑭᑎᓂᕐᕕᖅᑐᑦ, ᐊᓚᓗᓐ ᐃᓅᓯᕕᒃᑐᑦ ᐅᖅᑕᖅᑭᑎᓂᕐᕕᖅᑐᑦ, ᐊᓚᓗᓐ ᐊᓯᖏᓐᓂᒃ ᐱᖅᖁᖅᑕᐅᕗᑦ ᐅᖅᑕᖅᑭᑎᓂᕐᕕᖅᑐᑦ, ᐊᓚᓗᓐ ᐃᓅᓯᕕᒃᑐ

ᐃᓕᓴᐅᔪᖅᑐᖓᓂᒃ ᐃᓄᐃᑦ ᖃᐅᔨᓴᖓᓂᒃ

ᐊᕐᓇᓗᓐ ᑕᑯᓐᓇᖅᑐᑦ ᐃᓄᐃᑦ ᖃᐅᔨᓴᓕᕐᖃᖏᓐᓂᖅ (IQ) ᑐᑦᑕᕐᕿᐅᑦᓯᓗᒍ ᑲᔪᓯᕐᑎᕐᓂᖏᓄᑦ ᐊᑦᓇᓯᓂᖅᓯᒪᓄᑦ ᐸᕐᓇᓐᓂᖅᓯᒪᓂᖅ ᐊᒻᒪ ᐊᐅᓚᓂᖏᓐᓄᑦ ᐱᓕᕆᓂ. ᐃᓄᐃᑦ ᖃᐅᔨᓴᓕᕐᖃᖏᓐᓂ ᓴᖅᑭᐸᖅᑎᓂᕐᒪᖅ ᐃᓄᐃᑦ ᖃᐅᔨᓴᓂᖏᓐᓄᑦ ᐃᓕᑎᕐᓂᖏᓐᓄᑦ ᑭᖑᓪᓕᖅᑭᑦ. ᐃᓄᐃᑦ ᖃᐅᔨᓴᓕᕐᖃᖏᓐᓂ ᓴᖅᑭᐸᖅᑎᓂᕐᒪᖅ ᖃᐅᔨᓴᓂᖃᖅᑐᓂᒃ ᐃᓅᓯᖃᖅᑐᓂᒃ ᐃᓅᓯᖃᖅᑎᓂᕐᓂᖅᑐᓂᒃ, ᐱᓕᕆᐊᑎᕐᓯᒪᔪᓂᒃ ᓄᓇᕕᐊᖅᑐᓂ ᑕᑯᓐᓇᓂᖅᑐᑦ, ᐊᒻᒪᓗᐊᑎᓂᒃ ᐃᓄᐃᑦ ᖃᐅᔨᓴᓂᖅᑐᖅ. ᐃᓄᐃᑦ ᐊᑐᓵᖓᓂ ᐃᓄᐃᑦ ᖃᐅᔨᓴᓕᕐᖃᖏᓐᓄᑦ ᐃᓕᓴᐅᔪᖅᑐᕐᓂᖏᓐᓄᑦ ᖃᐅᔨᒡᒐᑦ ᓂᕈᐊᓕᕆᓂᖅ, ᓴᓇᓗ ᖃᐅᔨᓴᓕᕐᖃᖏᓐᓄᑦ ᓇᒧᓕᕆᓂᖅᓯᒪᓂᖅ ᖃᐅᔨᓴᓂᖅᑐᖅ. ᐱᓕᕆᐊᑎᕐᓯᒪᔪᓂᒃ ᐊᐅᓚᓂᖏᓐᓄᑦ ᐊᑐᓵᖓᓂ ᐃᓄᐃᑦ ᖃᐅᔨᓴᓕᕐᖃᖏᓐᓂ ᐊᐅᓚᓂᖏᓐᓄᑦ ᐊᑐᓵᖓᓂ ᐃᓄᐃᑦ ᖃᐅᔨᓴᓕᕐᖃᖏᓐᓂ ᐃᓕᓴᐅᔪᖅᑐᕐ

2022 ᒪᓕᕆᐊᖏᓂᒍᓱᑦ ᐱᓕᕆᓂᖅᐳᑦ

ᐊᖏᕐᕕᒋᑕᒪᐃᖏᑐᖅᑐᑎ ᐅᓂᒃᑲᓕᐅᕆᐊᖃᓐᓇᐅᑎᐅᓴᑦ ᐃᓕᓴᐅᑦ 005-ᒥ. ᐊᖏᕐᕕᒋᑕᒪᐃᖏᑐᖅᑐᑎ ᐅᓂᒃᑲᖅ ᐊᑐᐃᓐᓇᑭᐅᔪᓂᖅ ᑐᓴᒪᓯᐅᓂᒃ ᖃᓄᖅ ᓴᓇᐅᒪᓐᓇᖅᑐᑦ ᑎᑭᐅᒪᓐᓇᖅᑐᑦ ᑕᐃᔨᓱᓂᒃ ᐊᖏᕐᕕᒋᑕᒪᐃᖏᑐᖅᑐᑎ ᐃᓕᓴᐅᑦ 005 ᐊᒻᒪᓗ ᐱᓕᕆᓂᐅᓴᖅᑎᑦ ᑭᒃᑯᓄᖅᑐᓴᐃᐃᓐᓇᖅ. ᑕᐃᔨᓱᑦ ᐊᒻᒪᓗ ᒪᓕᕆᐊᓕᒃ ᐊᒃᑐᐊᓯᑦ ᓴᓇᐅᓴᕐᓯᒋᐊᓂᒃ ᐃᓐᓇᕐᓂᕆᓂᓄᓂᒃ ᐊᖏᕐᕕᒋᑕᐅᓴᒪᓯᑦᑐᒍᑦ ᐱᓕᕆᓂᐊᒍᑦ (ᓱᓴᓐ, ᓂᕆᐊᒍᑦ ᐅᓱᐅᖅᑕᕐᓂᕐᒍᑦ ᐊᖅᑯᓂᑎ ᐃᓐᓇᕐᓂᖅᑐᑦ ᓂᕆᐊᓄᑦ ᐊᖅᑯᑎᑯᑭᓴᐅᑦ ᐊᖅᑯᑎᑯᑭᓴᖅᓱᓂᒃ ᐊᒻᒪ ᐃᒃᐱᕆᑕᐅᓕᖅᓯᒪᒍᑦ ᐊᖏᕐᕕᒋᑕᒪᐃᖏᑐᖅᑐᑎ (ᐅᓱᐅᖅᑕᕐᓂᕐᒍᑦ ᐊᖅᑯᑎᑯᑭᓴᖅᓱᓂᒃ 2022–ᒥ, ᓕᕆᓂᐊᖏᓂᒍᓱᑦ ᐱᓕᕆᓂᖅᐳᑦ ᑐᓴᒪᔪᖅᑐᑦ ᑭᒃᑯᓄᖅᑐᓴᐃᐃᓐᓇᖅ) ᐊᑐᖅᑕᐅᓕᐅᖃᖅᑎᑦ 2022–ᒥ, ᓕᕆᓂᐊᖏᓂᒍᓱᑦ ᐱᓕᕆᓂᖅᐳᑦ ᑐᓴᒪᔪᖅᑐᑦ ᑭᒃᑯᓄᖅᑐᓴᐃᐃᓐᓇᖅ ᑭᒃᑯᓕᒃᓴᓂᒃ ᐊᖏᕐᕕᒋᑕᒪᐃᖏᑐᖅᑐᑎ ᐊᒻᒪᓗ ᐅᑭᐅᖅᑕᖅᑐᑎ (ᐅᓱᐅᖅᑕᕐᓂᕐᒍᑦ ᐊᖅᑯᑎᑯᑭᓴᖅᓱᓂᒃ ᐊᖅᑯᑎᑯᑭᓴᖅᑎᑦ ᐊᖅᑯᑎᑯᑭᓴᖅᓱᓂᒃ). ᐊᑐᖅᑐᑦ ᑕᐃᔨᓱᑦ ᐊᒻᒪᓗ ᓕᕆᓂᐊᖏᓂᒍᓱᑦ ᐱᕕᒃᓵᓱᒋᐊᕐᓂᖅ ᐃᓐᓇᕐᓂᕆᓂᓄᓂᒃ ᐊᖏᕐᕕᒋᑕᒪᐃᖏᑐᖅᑐᑎ ᐊᑐᖅᑕᐅᓕᐅᖃᖅᑎᑦ ᐃᓕᓴᐅᑦ ᐊᖏᕐᕕᒋᑕᒪᐃᖏᑐᖅᑐᑎ ᐊᒻᒪᓗ ᐊᖏᕐᕕᒋᑕᒪᐃᖏᑐᖅᑐᑎ ᐊᖅᑯᑎᑯᑭᓴᖅᓱᓂᒃ ᐊᖏᕐᕕᒋᑕᒪᐃᖏᑐᖅᑐᑎ ᐊᖅᑯᑎᑯᑭᓴᖅᓱᓂᒃ ᐊᖅᑯᑎᑯᑭᓴᖅᑎᑦ ᐊᖅᑯᑎᑯᑭᓴᖅᓱᓂᒃ ᐊᖅᑯᑎᑯᑭᓴᖅᑎᑦ ᐊᖅᑯᑎᑯᑭᓴᖅᓱᓂᒃ).

ᐊᑐᖅᑐᑦ ᑕᐃᔨᓱᑦ ᐊᒻᒪᓗ ᓕᕆᓂᐊᖏᓂᒍᓱᑦ ᐱᓕᕆᓂᖅᐳᑦ ᐊᖏᕐᕕᒋᑕᒪᐃᖏᑐᖅᑐᑎ ᐊᖅᑯᑎᑯᑭᓴᖅᓱᓂᒃ ᐊᑐᖅᑕᐅᓕᐅᖃᖅᑎᑦ ᐃᓕᓴᐅ

ᓇᖅᑎᓂᖅ ᖃᐅᔨᓴᖅᓂᒃᑯᑦ ᐱᓕᕆᔨᒃ

ᐊᕐᓇᓂᖅᓯᒪᓂ ᐃᓗᐊᖑᓇᐱᖅᑐᒥᒃ ᐊᑐᖅᓯᒪᔪᓂ ᓇᒥᔅᓂᖅ-ᖃᐅᔨᓴᖅᓂᖏᑦ ᖃᐅᔨᓴᓕᕆᓂᖅᓱᓂ ᒪᓕᒃᓴᓂᑦᓯᒪᓂ ᐅᕐᓂᖅᑐᒥᑦ ᐅᔾᔨᖅᓂᐊᕐᓇᐅᔨᒪᐅᑎᐅᓴᐅᓂ ᐃᓗᐊᖅᑕ 005 ᑐᐃᔪᓯᓂ ᐊᐖᓗᓐ ᒪᓕᑎᐊᓕᖅᓱᓂ 2022–ᒧᑦ. ᐃᓐᓇᐃᖅᓯᑎᓐᓄᑦ ᖃᐅᔨᓴᓕᕆᓂᖅᓱᑎᓂᖅᓱᓂ ᒪᓕᓂᑎᐊᖅᓂᖅᓯᒪᓂ ᐊᑐᓂ ᑕᐃᔪᓯᑦ ᐊᖓᓗᓐ ᒪᓕᑎᐊᓕᓐᓂ, ᐊᕐᓇᓂᖅᓯᒪᓂ ᐊᖓᓗᓐ ᐱᓕᕆᔨᒃᑯᓯᒪᓂ ᖃᐅᔨᓴᓕᓴᕐᓂᑦ ᐊᑐᓂᓯᓂᖅᑐᖅᓯᒪᓂ ᐊᑐᓂᖅᑎᓂᑎᓕᐅᖅᓱᓂ ᐅᐱᓂᖅ:

1. ᖃᑎᖅᑭᓂᖅ ᓇᓕᐊᓕᓕᑦᑕᓂ ᐱᓴᓇᐊᓕᓕᑦ ᓇᓐᓇᐃᓴᖅᑕᐅᔨᓪᓚᖅᓱᓕᑦᓱᓂᑕ ᐊᐖᓂ ᐅᓴᖅᓂᓂᐊᖅᓂᐅᓕᓂᖅ ᑕᐃᔪᔨᖅᑎᓂᒃ ᐊᖓᓗᓐ ᒪᓕᑎᐊᓕᖅᑎᓂᒃ ᐱᓕᕆᓂᖅᓱᓂᒃᑯᓯᒪᓂ.
2. ᖃᑎᖅᑭᓂᖅ ᐊᑕᖅᑎᓕᓂᑦ ᐊᒃᑐᐊᓕᑦ ᐱᐊᓂᒃᑕᐅᔨᓕᓪᓚᑦᑕᓂ ᐸᕐᓇᓂᖅᓯᒪᓂᒃ ᐅᓂᒃᑲᓕᐅᓕᒪᑎ ᐊᖏᔪᒪᓂ ᐊᖓᓗᓐ/ᐅᕙᓪᓕᔾᔪᓂᑦ ᐊᖏᔪᔪᓚᐅᖅᑐᐊᐅ ᐅᓂᒃᑲᓕᐅᔪᓐᓇᒪᑎ (ᐱᓴᐊᖏᖅᑲᖅᓯᑦ) ᐊᒃᑐᐊᓕᑦ ᐅᔾᔨᓴᓂᐊᖅᓱᓐᓂᐅᓕᐅᖅᑎᓂᒃ ᑕᐃᔪᓯᑎᓂᖅᓱᓂ ᐊᖓᓗᓐ ᒪᓕᑎᐊᓕᖅᑎᓂᖅᓱᓂ ᐱᓕᕆᓂᖅᓱᓂᒃᑯᓯᒪᓂ.
3. ᐃᓯᒪᓕᖅᑲᓯᐅᑎᐊᓕᑦ ᑭᖑᓂᖅᓱᑎᓕᐅᖅᑎᓂᒃ ᖃᐅᔨᓴᓕᕆᓂᖅᓱᓕᑦ ᑐᓂᔾᔨᒪᓕᐅᖅᑐᑦ ᓄᓇᕗᒻᒥ ᐊᐅᑎᓕᓪᓚᕆᓕᑦ ᑲᑎᒪᔨᖅᑎᓂᒃ ᐊᖓᓗᓐ ᐊᒃᑐᐊᓕᑦ ᑐᑭᓯᐊᓂᖅᓱᓕᑦ.
4. ᐃᓕᑯᐊᕐᑎᖅᑎᓂᓂᒃ ᖃᑎᖅᑭᓂᖅ ᐱᓴᓇᖅᑕᐅᔨᓪᓚᕆᓕᖅᑐᒃ ᖃᖅᑎᖅᓯᒪᓂᑦ ᐱᓕᕆᖅᑎᓂᒃᑯᓯᒪᓂ ᐊᐳᔪᐃᖅᑎᓂᕐᓂᐊᕐᓇᓂᖅᓱᓂ ᑭᓴᐅᔪᓂ ᐱᓴᓇᖅᑕᐅᔨᓪᓚᕆᓕᖅᑐᒃ ᑭᓴᐅᔪᓂ ᐊᐖᓂ ᐅᓴᖅᓂᓂᐊᖅᓂᐅᓕᐅᖅᑎᓂᒃ ᑕᐃᔪᔨᖅᑎᓂᖅᓱᓂ ᒪᓕᓂᑎᐊᖅᓂᖅᓯᒪᓂ ᐊᑐᓂ ᐱᓴᓇᖅᑕᐅᔨᓪᓚᕆᓕᖅᑐᒃ ᐊᖓᓗᓐ ᐱᓴᓇᖅᑕᐅᔨᓪᓚᕆᓕᖅᑐᒃ ᑭᓴᐅᔪᓂ ᐊᐖᓂ ᐅᓴᖅᓂᓂᐊᖅᓂᐅᓕᐅᖅᑎᓂᒃ ᑕᐃᔪᔨᖅᑎᓂᒃ ᐊᖓᓗᓐ ᐱᓴᓇᖅᑕᐅᔨᓪᓚᕆᓕᖅᑐᒃ ᐃᓕᑯᐊᕐᑎᖅᑎᓂᓂᒃ ᑭᓴᐅᔪᓂ ᐊᐖᓂ ᐅᓴᖅᓂᓂᐊᖅᓂᐅᓕᐅᖅᑎᓂᒃ ᑕᐃᔪᔨᖅᑎᓂᒃ ᐊᖓᓗᓐ ᒪᓕᓂᑎᐊᖅᓂᖅᓯᒪᓂ ᐊᑐᓂ

ᑲᓱᓕᕐᓂᐊᓂᖅ ᐅᖃᒪᓕᒻᒥ ᓄᖅᓴᐊᖅ -19

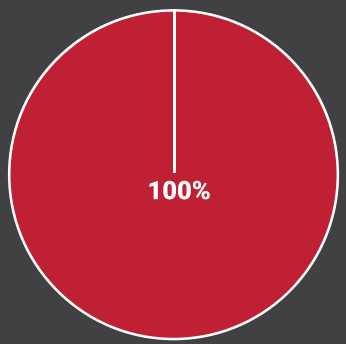
ᐊᕐᕋᓱᒃᑯᓂ, ᐊᑎᑕᓐᓇᖅᑕᐃᓕᓂᒪᓕᕆᓂ ᖃᓄᐃᙱᑎᐅᔪᓂᒃᑯᓂᓗ ᐃᖅᑲᓇᐃᔨᖅᑎᑎᑦ, ᑲᔪᑐᑦᑯᓪᓗ ᐊᒻᒪᓗ ᖁᑭᖅᑕᒍᔪᓂ ᓄᓇᓕᑦ ᖃᐅᔨᓴᓕᖅ ᓯᓚᑦᑐᖅ ᓯᓚᑦᑐᖅᓯᒪᓂᖅ>ᑦ, ᑲᔪᓯᑎᐊᖃᕆᑦᓇᖅᑐᓂᒃᑲᓐᓂᓗ ᓇᓗᓕᒫᑦᓯᐅᑎᓐᓂᓗ ᐊᑲᓕᖅᓯᕐᓗᐊᑎᓐᓂᓗ. ᐊᕐᕋᓱᒃᑯᓂ ᖃᐅᔨᓴᖅᑎᑦᓯᐊᕆᔨᖅᑐᑦ>ᑦ ᐊᑕᖅᑭᓯᒪᔨᓂᖅ ᐊᑲᓕᖅᓯᕐᓗᐊᑎᓐᓂᓗ ᐊᒻᒪᓗ ᐊᑎᑦᓇᖅᑕᐃᓕᓂᒪᓕᕆᓂᑦ ᐸᑦᑐᓂᖅ ᓄᓇᓕᑦ ᓄᓇᓕᖅᑐᖅ, ᑲᔪᓯᑎᐊᖃᕆᑦᓇᖅᑐᓂᒃᑲᓐᓂᓗ ᐊᑲᓕᖅᓯᕐᓗᐊᑎᓐᓂᓗ ᐊᑐᖅᑐᖅ ᓄᓇᓕᖅᑐᖅ ᐊᑲᓕᖅᓯᕐᓗᐊᑎᓐᓂᓗ

ᐊᓂᕆᕐᓴᖅᓯᒪᓕᕐᓂᑦ ᖃᓄᐃᔨᒋᓂᖅ ᖃᐅᔨᓴᖅᓯᓪᓕᐊ ᖁᑎᖓᔪᓂᑦ

2022-ᒥ, ᐅᑯᐊ ᖃᐅᔨᓴᕐᑎᑕᐅᓚᐅᓂ ᑲᑎᑕᐅᔪᓂ ᐊᒥᓱᓕᒫᓂᖅ ᐱᓕᕆᔨᒃᑯᓂ ᐊᓂᕆᕐᓴᖅᓯᓪᓕᐊᓂᖅ ᐊᓂᕆᕐᓴᖅᓯᓪᓕᐊᓂᖅ ᐱᓕᕆᔨᒃᑯᓂ:

- ᓯᓚᒥᑦ ᖃᐅᔨᓴᖅᓯᓪᓕᐊᖁᑎᖓᔪᓂᖅ
- ᐊᓂᕆᕐᓴᖅᓯᒪᓕᕐᓂᑦ ᖃᐅᔨᒋᓂᖅᓯᓪᓕᐊᓂᑦ ᖃᐅᔨᓴᖅᓯᓪᓕᐊᖁᑎᖓᔪᓂᖅ
- ᔪᓐᓇᖅ ᓯᐊᓪᓕᖅᓯᓪᓕᐊᓂᖅᓯᓪᓕᐊᓂᑦ ᖃᐅᔨᓴᖅᓯᓪᓕᐊᖁᑎᖓᔪᓂᖅ
- ᓯᓚᒥᑦ ᐊᓯᔨᓴᖅᓯᓪᓕᐊᓂᖅᓯᓪᓕᐊᓂᖅ

ᐊᓂᕆᕐᓴᖅᓯᒪᓕᕐᓂᑦ ᖃᐅᔨᒋᓂᖅᓯᓪᓕᐊᓂᑦ ᐱᓕᕆᔨᒃᑯᓂ 2022 ᐱᓕᕆᔨᒃᑯᓂᖅᓯᓪᓕᐊᓂᑦ ᐱᓕᕆᔨᒃᑯᓂᖅᓯᓪᓕᐊᓂᑦ ᑕᑯᐅᓚᐅᓂ ᐱᓕᕆᔨᒃᑯᓂᖅᓯᓪᓕᐊᓂᑦ 005 ᐊᐅᓚᑦᑎᐊᓕᕆᔨᖁᑎᖓᔪᓂᖅ ᓯᓚᒥᑦ ᐱᓕᕆᔨᒃᑯᓂᖅᓯᓪᓕᐊᓂᑦ



ᓯᓚᑦᑎᐊᓂᖅ ᓯᓚᖓᔪᓂᖅ ᐱᓕᕆᔨᒃᑯᓂᖅ ᐊᔪᕐᓇᓂᖅ ᐊᐅᓚᑦᑎᐊᓂᖅ

ᓯᓚᐅᑦ ᖃᐅᔨᓴᕐᓱᓪᓕᓂ 2022-ᒥ ᐅᓂᒃᑲᒥ ᓇᐃᔭᓕᕆᕕᖏᓚᐅᑦ ᖁᑎᑕᐅᔨᓴᕐᓂᑕᑎᓪᓗ ᖃᐅᔨᓇᓂᕆᔨᖓᓪᓚᑎᑦ ᖃᐅᔨᓇᓕᓂᑦ ᐊᓂᕆᕐᓴᖅᓯᓪᓕᐊᓂᑦ ᐊᖏᕐᕉᑐᓂ. ᓄᓕᒻᒥᒃ ᐊᒻᒪ ᖁᖓᒍᐊᓂ ᑐᓴᕈᓚᐅᖅ ᐊᑐᓕᐅᖅᑐᑦ ᓯᓚᐅᑦ 2022-ᒥᑦ ᑕᒪᓕᑐ 2021-ᒥᓂᑦ, ᓯᓚᐅᑦ ᐊᓯᔨᓴᓕᐊᖅᑎᑕᖏᓂᖅᓱᒃ ᓯᓚ ᒪᓕᓂᓇᓕᓕᐊᖅᑎᓕᑐ . ᐊᓄᓚᐅᑦ ᖃᐅᔨᓴᓕᓂᕐᓕᐊᓂᖅᓂᑦ ᐊᑐᓂ ᐃᓂᐅᔪᓂᑦ ᐊᔨᑦᑎᒪᓕᐅᖅᑐᑦ 2022-ᒥᑦ. ᓄᓕᒻᒥᒃᓱᓂ, ᓂᕆᐊᓂᓚᓇᖅᓯᓗᒥ ᐊᓄᕆᓴᐅᓚᐅᖅᑐᑦ 2022-ᒥᑦ, ᒪᓕᓂᑦ ᐅᔨᓴᓚᐅᓯᒪᔪᓂ ᖃᐅᔨᒋᓂᖅᓯᓪᓕᐊᓂᑦ ᐊᖏᕐᕉᑐᓂᑦ ᓴᖅᑭᒃᑯᓂᑦ. ᖃᓄᖅᓱᓂ ᑐᓴᕈᓚᐅᖅ, ᐅᐊᖓᓇᒻᒥᒃ–ᐊᐳᖓᓇᖅᓯᓗᒥ ᐊᒻᒪ ᓂᕆᖅᓯᓯᐊᓂᓂᖅᓯᓗᒥ ᐊᓄᕆᓴᐅᓚᐅᖅᑐᖅᓯᓪᓕᐊᓂᑦ 2022-ᒥ, ᒪᓕᓂᒃᓴᑎᓂ ᖃᐅᔨᓴᖅᓯᓪᓕᐊᓂᖅ ᐅᓂᒃᑲᒥ 2021-ᒥ.

ᐊᓂᕆᕐᓴᖅᓯᒪᓕᕐᓂᑦ ᖃᐅᔨᓴᖅᓯᓪᓕᐊᖁᑎᖓᔪᓂᖅ ᓴᓪᓕᓇᓂᖅ (SO2) ᐊᒻᒪ ᑐᕆᐊᖓᓇᖅᑐᓪᓕᓂ ᓴᓪᓕᓇᓂᖅ (NO2) ᐱᓪᓚᐊᖏᔪᓇᓕᓂᖅᓂᑦ ᐅᔨᕐᖓᓂᐊᕐᕆᒃᑐᑦ ᐊᒻᒪ ᖁᖓᒍᐊᓂ ᑐᓴᕈᓚᐅᖅ. ᖃᐅᔨᓴᖅᓯᓪᓕᐊᓂᖅ ᖃᐅᔨᓴᖅᓯᓪᓕᐊᖁᑎᖓᔪᓂᖅᓱᒃ ᓇᓗᓇᐃᖅᓯᓪᓕᐊᓂᖅᓂᑦ ᐱᓕᕆᖏᓂᖅᓯᓗᒥᓂᖅ ᑐᓴᕈᓚᐅᖅ ᑐᓴᕈᓚᐅᖅᓯᓪᓕᐊᓂᑦ ᐊᓂᕆᕐᓴᖅᓯᒪᓕᕐᓂᑦ (SO2) ᐊᒻᒪ ᑐᕆᐊᖓᓇᖅᑐᓪᓕᓂ ᓴᓪᓕᓇᓂᖅ (NO2). 2022-ᒥᑦ ᐅᖅᑐᓂᖅᑕᐅᓕᕐᓂᑦ ᐱᓕᕆᖏᓂᖅᓯᓗᒥᓂᖅ ᓴᓪᓕᓇᓂᖅ (SO2) ᐊᒻᒪ ᑐᕆᐊᖓᓇᖅᑐᓪᓕᓂ ᓴᓪᓕᓇᓂᖅ (NO2) ᖁᔪᓚᐅᖏᓚᐅᖅᓴᓂ ᐅᑭᐅᖅᔪᓂ ᐊᔪᕐᓇᓂᖅᓂᑦ ᐊᐅᓚᕐᔪᓂ, ᒪᓕᓇᓂᖅ ᐊᖁᔪᓚᐅᖅᑐᑦ. 2020-ᒥ, ᐋᖅᑭᒋᔪᓂ ᖃᐅᔨᓴᓕᓴᕐᑕᕆᓕᐅᖅᑐᑦ ᐃᐅᔪᖅᑐᑦᑕᕐᑕᕆᓕᐅᖅᑐᑦ ᖃᐅᔨᓴᖅᓯᓪᓕᐊᖁᑎᖓᔪᓂᖅ ᐊᑐᓂᓚᐅᖅᓯᓪᓕᐊᓂᖅᓂᑦ ᑎᑭᑐᑎᑎᕐᓂᖅᓱᒃ ᖃᐅᔨᓴᖅᓯᓪᓕᐊᖁᑎᖓᔪᓂᖅ ᐊᐅᓚᕐᔪᓂᑦ ᐊᐅᓚᕐᔪᓂᑦ, ᒪᓕᓂᒃᓴᑎᓂ ᐊᖁᔪᓚᐅᖅᑐᑦ. ᖃᐅᔨᓴᖅᓯᓪᓕᐊᓂᖅ ᐃᓕᓴᕐᓂᖅᓯᓪᓕᐊᓂᖅᓂᑦ ᐊᐅᓚᕐᔪᓂᑦ ᐱᓕᕆᖏᓂᖅᓯᓗᒥᓂᖅ ᐊᐅᓚᕐᔪᓂᑦ ᐊᐅᓚᕐᔪᓂᑦ, ᐃᓕᓴᕐᓂᖅᓯᓪᓕᐊᓂᖅᓂᑦ ᐊᐅᓚᕐᔪᓂᑦ ᐊᐅᓚᕐᔪᓂᑦ ᐊᐅᓚᕐᔪ

ᖃᓄᐃᓕᓐᓂᖅᓱᖅ ᐅᓴᖅᖃᓄᐃᑦ ᓄᓇᒥᒃᓴᓕᓕᒫᑦ ᐊᖏᑕᖅᓱᖅ ᓄᓇᑦ ᑕᐅᑐᐊᑎ ᐊᐅᓚᑕᒪᑕᒃᓴᖅᓱᖅ 2014-ᒥᑦ 2022-ᒧᑦ ᐃᓕᓴᕐᕕᓂᑦ, ᐱᑕᖃᖅᖢᐅᔪᓐᓇᓗᐊᓂ ᐱᓕᕆᑦ ᖃᓄᐃᖅᑲᓐᓂᖅᓱᖅ ᑕᐅᑐᖅᑕᐅᓂᒃᑯᑦ ᐅᐊᖏᓇᒃᒧᑦ ᖃᓄᐃᓕᓴᕐᕕᖏᓐᓂᒃ ᐊᓂᓇᖏᓐᓄᑦ ᐊᒻᒪ ᓂᒋᐊᓂ ᐅᓴᖏᓐᓂᖅᓱᖅ, ᐊᒻᒪ ᓂᒋᖅᓯᓄᓂ ᐱᓇᖏᓐᓄᑦ ᐊᒻᒪ ᓂᒋᖅᓯᓄᓂ ᐱᓇᖏᓐᓄᑦ ᐊᒻᒪ/ᐅᕐᓇᑲᕐᓂᑦ ᐊᓚᓴᕐᐊᖅᑎᑦᓯᐊᒍ.

ᕿᓐᓇᒃᓴ ᐃᖅᑲᒋᐊᖅᓯᐅᖃᓕᒫᖅᑎᓯᒪᔪᑦ 2019–ᒥ ᓯᓚᐅᑦ ᐊᓯᔾᔨᑦᑕᐊᓂᖅᓱᓕᓂ ᖃᓄᐃᓐᑐᓚᑎᖅᑐᓂ ᐊᑐᖅᑕᐅᓂᓚᒋᖅᓴᓕᓂ 2022. ᕿᓐᓇᒃᓴ ᐃᓕᓴᕐᔨᓕᓕᖅᑐᑦ ᑐᓴᖅᑕᓂᑦ ᐃᓄᖅᓂᑦ ᐊᒻᒪ ᐊᓯᖅᑎᓂᑦ ᓇᐱᖅᑲᖅᑕᐅᔨᓯᒪᔪᑦ ᐃᖅᑲᒋᐊᖅᑕᐅᓯᒪᔪᑦ ᓯᓚᐅᑦ ᐊᑐᖅᑕᐅᓂᓚᒋᖅᓴᓕᓂ ᖃᓄᐃᓐᑐᑎᓄᑦ 2022-ᖓᑎᒃᑐᓄᑯ. ᓄᑖᖓᓪᓕᖅ ᓯᓚᐅᑦ ᐊᓯᔾᔨᖅᑕᐅᓂᓚᒋᖅᓴᓕᓂ ᖃᓄᐃᓐᑐᑦᑕᐅᔨᖅ ᐃᓗᓕᖃᖅᓴᖅ ᒪᑭᓐᓂᒃᓴᓕᓕᒫᑦ ᖃᓄᐃᓐᑐᑎᓄᑦ ᐊᑐᖅᑕᐅᓂᓚᒋᖅᓴᓕᓂ ᖃᓄᐃᓐᑐᑎᓄᑦ ᐊᕐᕌᑎᖃᒃᑕᓚᐅᖅᑐᓄᑦ (1) ᐱᐅᓯᕐᐊᖃᖅᑎᕐᑎᓂᖅᑎᑦ ᐅᓪᒪᓂᖅᓂᑐᓗᐊᖖᕐᑐᓂᑐᓂᒃ ᐊᒻᒪ ᐊᑐᖅᑕᐅᔨᖅᓴᓂᒃ ᓯᓚᐅᑦᑐᓚᐅᖅᑐᖅᑕᐅᓂᒃᑯᑦ ᐊᓯᔾᔨᖅᑕᐅᓂᓚᒋᖅᓴᓕᓂ ᖃᓄᐃᓐᑐᑎᓄᑦ ᐊᕐᕌᑎᖃᒃᑕᓚᐅᖅᑐᓄᑦ ᓯᓚᐅᑦ (2) ᖃᓄᐃᓕᓴᕐᕕᖏᓐᓂᖅᓱᖅᓴᓂᒃ ᐊᓯᔾᔨᖅᑕᐅᓂᓚᒋᖅᓴᓕᓂ ᓯᓚᐅᑦ ᐊᒻᒪ ᐊᐅᑐᐊᔨᓕᓂ ᖃᔪᐊᖅᓴᓐᓇᖅᑐᓗᐊᖖᕐᑐᓂᒃ ᖃᓄᐃᓕᓴᕐᕕᓂᓚᐅᖅᑐᓂᒃ ᐊᓯᔾᔨᖅᑕᐅᓂᓚᒋᖅᓴᓕᓂ ᖃᓄᐃᓕᓴᕐᕕᓂᓚᐅᖅᑐᓂᒃ ᐊᓯᔾᔨᖅᑕᐅᓂᓚᒋᖅᓴᓕᓂ ᓯᓚᐅᑦ ᐊᒻᒪ ᓯᓚᐅᑦᑐᓚᐅᖅᑐᖅᑕᐅᓂᒃᑯᑦ ᐊᓯᔾᔨᖅᑕᐅᓂᓚᒋᖅᓴᓕᓂ ᖃᓄᐃᓐᑐᑎᓄᑦ ᐊᒻᒪ ᐊᐅᑐᐊᔨ

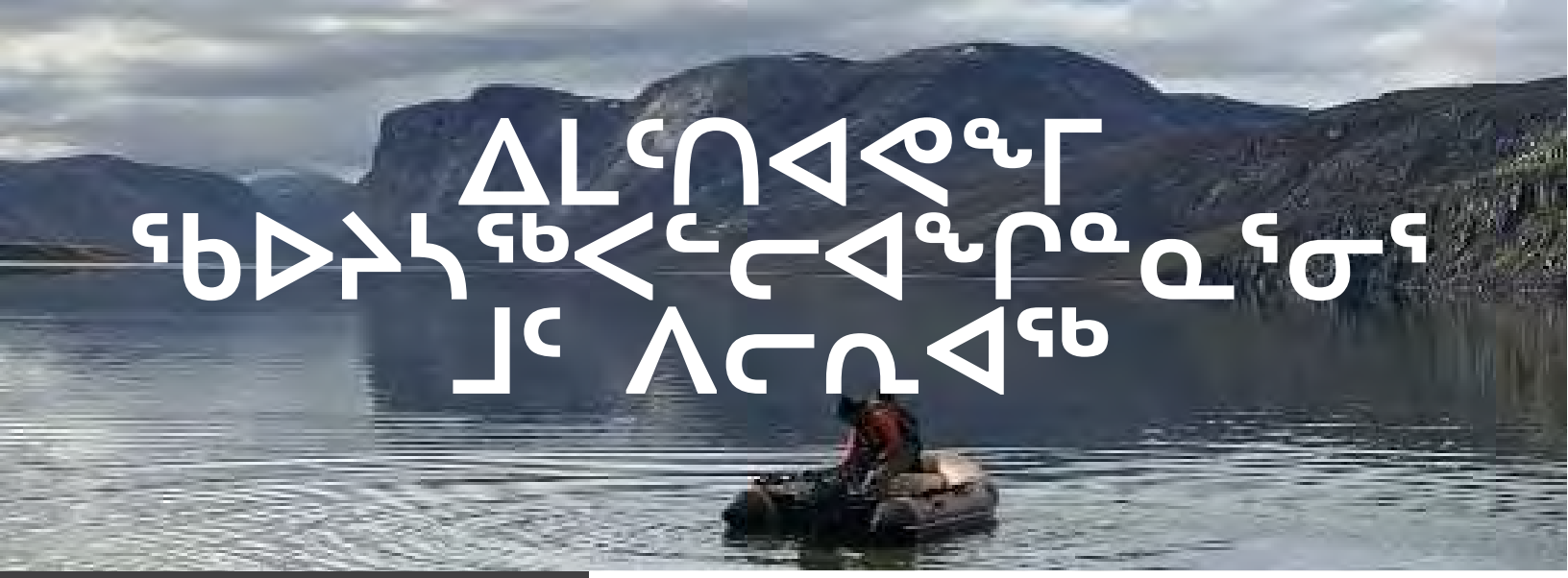
ᑕᓕᐅᒥᖅ ᖃᐅᔨᓴᖅᓯᑦᑕᐊᖏᑐᓂᓐᓂᖅ ᒪᑦ ᐱᑕᓕᐊᑦ

2022-ᖓᑎᑦᓗᒍ, ᑮᖏᓐᓇᓂᓐ ᐊᑐᓕᖅᑎᑦᑎᓇᐅᔭᖅᑐᑐᒍ ᐃᒪᐅᐸ ᐊᖏᑎᖓᓚᐅ ᖃᐅᔨᓴᖅᓯᑦᑕᐊᖏᑐᓂᓐᓂᖅᓯᒪᑦ ᐱᑕᓕᐊᑦᑎᒃ:

- ᑕᓕᐅᑎᒥ >ᐃᓕᓴᐅᒃ ᖃᖓᑕᒋᐊᖅᑯᑦ ᖃᐅᔨᓴᖅᓴᐅᓕᖅ ᐱᑕᓕᐊᑦᖅ
- ᐃᓗᐊᓕᖅᒥ ᓯᓚᒋᓗᑎᒃ ᖃᐅᔨᓴᖅᓯᑦᑕᐊᖏᑐᓂᓐᓂᖅᓯᒪᑦ ᐱᑕᓕᐊᑦᖅ
- ᐃᓕᐅᑦ ᐃᓗᐊᓂ ᓂᐱᖅᑲᐃᓐᓇᑐᒃ ᖃᐅᔨᓴᖅᓯᑦᑕᐊᖏᑐᓂᓐᓂᖅᓯᒪᑦ ᐱᑕᓕᐊᑦ
- ●ᑕᓕᐅᑦ ᐊᖏᑎᖓᓚᓂᑦ ᐊᑐᑐᐃᓂᓐᓂᑦ ᖃᐅᔨᓴᖅᐃᓐᓇᓂᓐᓂᑦᒪᑦ ᐱᑕᓕᐊᑦᖅ ᐊᒪᓕᓗ ᑕᒪᓐᓇᕐᑐᐅᖅᑐᓂᑦ ᐅᓪᓗᒥ / ᑎᑭᑦᓯᖅᑐᓂᑦ ᐅᓪᓗᔪᓂᓪ ᖃᐅᔨᓴᖅᓯᑦᑕᐊᖏᑐᓂᓐᓂᖅᓯᒪᑦ ᐱᑕᓕᐊᑦ

ᐃᓕᓴᕐᔨᓪᓗᒍ ᑕᓕᐅᑎᑦ >ᐃᓕᓴᑦ ᖃᖓᑕᒋᐊᖅᑯᑦ ᐃᓕᓴᕐᔨᓪᓗᒍ ᖃᐅᔨᓴᖅᓴᐅᓕᖅᑐᑦ ᐱᑕᓕᐊᑦᖅ, ᖃᖓᑕᒋᐊᖅᑯᑦ ᖃᐅᔨᓴᖅᖃᖓᓂᐅᔨᖅ>ᑦ ᔪᓄᑦᓗᒍ (ᖃᖓᑕᒋᐊᖅ 1) ᑲᑎᖅᔪᐊᔪᓚᑦᓗᒍᑎᒃ ᖃᐅᔨᓴᖅᑭᑐᒃ ᐱᑕᖅᖃᓂᖓᓂᐅᔪᓂᓪ/ᓇᓂᖓᓂᖅᓂᐅᓂᓪ ᐊᖏᒪ ᓇᓂᖓᓂᖅᑎ ᐃᓚᖅᑎᐅᑦ ᐅᓇᓱᒋᔭᐅᑦ ᐊᖏᑕᐅᓪᓗᒥ ᐃᓄᑦ ᖃᖓᑕᒋᐊᖅᑯᑦ ᓴᓇᔨᓴᖅᑐᑦ ᐃᓕᓴᕐᔨᓪᓗᒍ ᐅᓇᓱᒋᔭᐅᑦ ᐱᖓᓱᖓᒍᑦ ᐃᓚᖅᑎᑦᑎᓂᖅᑐᑦᑎᓂᖅᑐᑦ. ᖃᖓᑕᒋᐊᖅᑯᑦ ᖃᖓᑕᒋᐊᖅᑯᑦ ᐃᓚᖅᑎᑦᑎᓂᖅᑐᑦᑎᓂᖅᑐᑦ ᐱᖓᓱᖓᒍᑦ ᐱᖓᓱᖓᒍᑦ ᐃᓚᖅᑎᑦᑎᓂᖅᑐᑦᑎᓂᖅᑐ

- ᑕᒃᑯᐊ ᖃᐅᔨᓴᐅᔪᓂ ᓇᓗᓇᐃᖅᑯᓯᓂ ᑕᒪᒃᑯᐊ ᑐᐃᓐᓕᒃ ᐊᒥᓱᓄᖅᑭᓂ ᓄᓇᓕ ᐊᐃᒃᑐᖅᑯᓯᒪᔪᓕ ᖃᐅᔨᓴᓴᐃᓐᓇᐅᔪᓂ ᐊᒥᓱᓄᖅᑭᐅᓪᓚᕐᓂᕐᒥᓇᐅᔭᖅᑐᓂ ᐅᓄᖅᑲᓇᐃᓐᓇᐅᔪᓂ ᑕᒪᓐᓇᐅᑉ ᐊᒥᓱᓄᖅᑭᐅᓪᓚᕐᓂᕐᒥᓇᐅᔭᖅᑐᓂ ᐅᓄᖅᑲᓇᐃᓐᓇᐅᔪᓂ ᐅᓪᓗᒥᒃ ᐅᓂᒃᑳᖅᑐᓂ ᐊᑐᐊᓕᕆᔨᒃᑯ

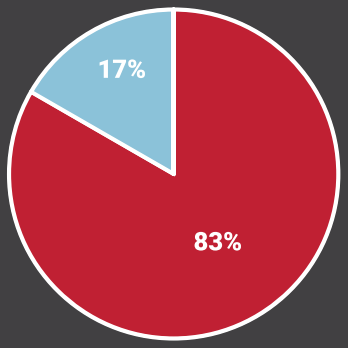


ᐃᒪᖅᑎᐊᓂᖅ ᖃᐅᔨᓴᖅᓯᒪᓕᕆᓂᖅᓄᑦ ᓄᓇᓕᒻ ᐱᓕᕆᐊᖅ

ᖃᐅᔨᓴᖅᓯᒪᓕᕆᓂᖅᓄᑦ ᐱᓕᕆᐊᖓᒍᑎᓪᓗᒍ ᐊᒃᑐᐊᖅᑐᒥ ᐃᓕᓴᕐᓂᖅ 2022-ᖓᑎᓪᓗᒍ ᐅᑯᐊ ᐱᖃᓕᕆᑎᓪᓗᒋᑦ:

- ᐃᒪᓐᓇ ᐊᒃᑐᐃᓂᕐᓂᖅ ᖃᐅᔨᓴᖅᓯᒪᓕᕆᓂᖅᓄᑦ ᐱᓕᕆᐊᖅ
  - o ᑯᐃᖏᕐᐅᓪᓗᒍᓯᒪᔪᖅᑐᑦ ᐊᖏᑎᒋᑦ ᖃᐅᔨᓴᖅᓯᒪᓕᕆᓂᖅᓄᑦ ᐱᓕᕆᐊᖅ
  - o ᑕᓯᖓ ᐃᓕᓴᕐᓂᒃᑲ ᖃᐅᔨᓴᖅᓯᒪᓕᕆᓂᖅᓄᑦ ᐱᓕᕆᐊᖅ
  - o ᐃᓕᓕᕆᓂᓪᓗᒋᑦ ᖃᐅᔨᓴᖅᓯᒪᓕᕆᓂᖅᓄᑦ ᐱᓕᕆᐊᖅ
- ᖃᐅᔭᐊᓂ ᐃᓕᓴᕐᑎᐊᖏᖓᑎᒃ ᐃᖅᑲᐃᓐᓇ ᓇᒃᓴᓂᖅᑐᑎᓪᓗᒍ ᖃᐅᔨᓴᖅᓂᖅ (ᐱᐊᓂᒃᑕᐅᓕᕆᔨᖅ ᑲᑎᒪᔨᖅᑎᑦᓴᖅᓯᒪᓂᑦ ᒥᑎᒪᒃᑯᓂᖓᓄᑦ ᐊᖓᔪᖅᑐᑎᓪᓗᒋᑦᓴᓕᐅᕐᓂᖓ)
- ᐅᓕᖅᑭᑦᑕᐅᑦ ᐊᖅᑯᓂᖓᓄᑦ ᐃᓕᓐᓂᑦ ᖃᐅᔨᓴᖅᓯᒪᓕᕆᓂᖅᓄᑦ ᓇᒃᓴᓂᖅᑐᑎᓪᓗᒍ
- ᐊᓐᓇᐅᑦ ᐃᑭᐊᖓᓄᑦ ᐱᓕᕆᖃᐅᔨᓴᖅᓯᒪᓕᕆᓂᖅᓄᑦ ᐱᓕᕆᐊᖅ
- ᓄᓇᓕᒻ ᐃᑭᐊᖓᓄᑦ ᐃᓕᓴᕐᓂᖅ ᖃᐅᔨᓴᖅᓯᒪᓕᕆᓂᖅᓄᑦ ᐱᓕᕆᐊᖅ

ᐃᓕᓴᕐᑕᕐᓂᓚᕐᓂᑦ 2021 ᐱᓕᕆᐊᖓᔪᓂᑦ ᑕᑯᓚᐅᑐᓂᑐᖅ ᐱᓕᕆᐊᒧᑦ ᐱᓂᐅᓚᐅᒋᑎᑦᓂᖅ 005 ᐊᑐᓕᖅᑎᑕᐅᓴᖏᓐᓂᖅᑎᑦᓂᖓᓂᕐᒧᑦ ᒪᓕᒃᑕᐅᓴᖏᓐᓂᖅᓂᕐᒧᓪᓗᑐ



■ ᒪᓕᕐᓂᐊᖓᓂᖅ ■ ᒪᓕᓂᕆᑐᓂᖅ
■ ᐱᖓᓕᕆᐊᖓ ■ ᐊᑐᓂᕆᑐᓂᖅ

ᐃᓕᖓᒍ ᐊᒃᑐᐃᓂᖓᓄᑦ ᖃᐅᔨᓴᖅᓯᒪᓕᕆᓂᖅᓂᖓᓄᑦ ᐱᓕᕆᐊᖅ ᑐᕐᖏᖅᑐᓕᒻᒥᓂᖅ ᐊᒃᑐᐃᓂᐅᑐᐃᓐᓇᐊᕆᓂᖅ ᐃᓕᓴᕐᓂᖅᑎᑦ ᐱᓕᕆᐊᖓᔪᖅ ᐅᓇᖏᓐᓂᖅᑐᖅ. ᐃᓕᓴᕐᓂᖅᑎᑦ ᐱᓕᕆᓂᖅᓂᖓᓄᑦ ᐱᓕᕆᐅᑎᕐᓂᖅᑐᑦ ᐅᓇᖏᓐᓂᖅᑐᓂ ᐊᒃᑐᐃᓂᖅᑎᑦᓴᖅᓯᒪᓂᑦ ᐃᓕᓴᕐᓂᖅᑎᑦ ᐱᓕᕆᐊᖅ ᐊᒃᑐᐃᓂᖅᑎᑦᓴᖅᓯᒪᓂᑦ ᐃᓕᓴᕐᓂᖅᑎᑦ ᐱᓕᕆᐊᖅ, ᖃᐅᔨᓴᖅᓯᒪᓕᕆᓂᖅᓄᑦ ᐱᓕᕆᐊᖅ, ᐃᓕᓴᕐᓂᖅᑎᑦ ᐱᓕᕆᐊᖅ ᐊᒃᑐᐃᓂᖅᑎᑦᓴᖅᓯᒪᓂᑦ ᐱᓕᕆᐊᖅ, ᐊᒃᑐᐃᓂᖅᑎᑦᓴᖅᓯᒪᓂᑦ ᐱᓕᕆᐊᖅ ᐊᒃᑐᐃᓂᖅᑎᑦᓴᖅᓯᒪᓂᑦ ᐱᓕᕆᐊᖅ, ᐃᓕᓴᕐᓂᖅᑎ

ᐅᓴᖏᓂᐊᖏᕐᓇᖅ ᐃᒪᓕᒃ ᐊᐢᑐᐃᓂᓐᓄᑦ ᖃᐅᔨᓴᕐᕕᖏᓐᓂᐊᕐᓂᑦ ᐱᓕᕆᐊᖃᖅ ᐅᑭᐅᖅᑕᕐᓂᖅ – ᐊᐃᑕᓕ 2022

ᐅᓴᖏᓂᐊᖏᕐᓇᖅ ᓇᐅᔪᑎᖅᑭᓂᓕᒃ ᑐᓴᐅᒪᔭᐅᑎᓂᐊᕐᓂᖅ ᐱᓕᕆᐊᖃᖅ – ᐊᐢᑎᓕ 2022

ᐊᐢᑐᐃᓂᐅᑐᐃᓐᓇᕆᐊᖃᖅᑐᐃᓄᑦ ᖃᓄᖓᐊᓂ ᑐᓪᓕᖅᖁᓪᓗ ᐊᐅᓪᓚᕆᐅᔨᓪᓕᖅ ᑕᕆᐅᕐᑎᐅᑕᓄᑦ ᐊᒻᒪ ᓇᓱᒪᓕᕆᓂᖅ ᐱᓕᕆᐊᖃᖅᓯᒪᓂᖅ ᑲᒪᒋᔭᖅ 48(Δ). ᓴᓇᒪᓂᖏᓐᓇ ᖃᐅᔨᓴᖅᓂᐅᓴ ᓴᖅᑭᑕᐅᓪᓚᐅᕐᖅᓱᖅ ᑐᓴᕿᓂᐅᕐᓂᑦ ᖃᓄᐃᓚᐅᕐᕕᖏᑎᓪᓗᑎᑦ ᑕᑎᑕᐅᓪᓚᐅᕐᖅᓱᖅᓯᒪᓂᖅ ᐱᓕᕆᐊᖃᖅᑐᑦ ᐃᓕᓴᕐᕕᖏᓂᖅ ᐊᐢᑐᐃᓂᐅᑐᐃᓐᓇ

ᓄᓇᒥ ᖃᐅᔨᓴᖅᓯᓪᓚᖅ ᐊᖏᕐᓂᓇᖅᑐᓂᖓᓪᓚᖅ ᐱᓕᕆᔨᒃ

2022-ᒥ, ᐅᑯᐊ ᖃᐅᔨᓴᐸᑎᐃᓕᓂ ᑲᑎᖅᓯᕐᓗᐊᖅᑐᓂ ᐊᓚᒪᓗ ᖃᐅᔨᓴᖅᓯᓂᕐᓂᓇᖅᑐᓂ ᐱᓕᕆᔨᒃᑲᓐᓂᕐᒧᑦ ᐃᓕᓴᕐᓂᖓᓂ ᐊᔪᕐᓇᖅᑐᖅ:

- ᖃᐅᓕᒪᓐᓇᑦ ᖃᖓᓕᑕᓂ ᖃᐅᓕᐅᖅᑐᖏᓐᓂᖅ ᖁᑎᖃᕐᓂ
- ᐳᔪᕋᖅ ᓯᐊᓚᒃᓴᓕᕆᓂᖅᓯᒍ ᐊᖏᕐᓂᖓᓚᓂ ᖃᖓᓚᑦᑕᕐᑎᑦᓯᐊᕐᓗᒍ ᐃᔨᖏᔪᐊᓂᖅ ᖁᑎᖃᕐᓂᖅ
- ᓂᐱᓂ ᖃᐅᔨᓴᖅᓯᓪᓕᐊᖏᓐᓇᓕᓂᖅ
- ᐱᕈᖅᑐᓂᖅ ᐊᓚᒪᓗ ᐃᔪᕐᓂᒃ ᓴᓇᒃᓴᖅᑕᖅᓴᓚᖓᓚᖓ ᖃᐅᔨᓴᖅᓯᓪᓕᐊᖏᓐᓇᓕᓂᖅ
- ᐊᐳᑎᖅ ᑐᓂᓂᒃ ᖃᐅᔨᓴᖅᓂᖅ
- ᐊᐳᔪᓚᖓᓂᐅᔪᓂᒃ ᖃᐅᔨᓴᖅᓯᓪᓕᐊᖏᓐᓇᓕᓂᖅ
- ᓇᓱᑕᖅᑐᖅᑎᑕᖅᓂᒋᔪᓂ ᖃᐅᔨᓴᖅᓂᖅ
- ᐅᖓᓚᔪᖅᑎᑦᑐᓂ ᐊᔪᓕᐅᕈᑎᑦ ᓂᕆᔨᑎᓂᒃ ᖃᐅᔨᓴᖅᓯᓪᓕᐊᖏᓐᓇᓕᓂᖅ
- ᐊᐳᔪᓕᔪᓂᑦ ᐳᓪᓴᖅᑎᑦ ᑎᑎᖅᑕᐅᓂᖅᓯᓂᖅ ᓇᐅᐃᓴᖅᓯᒪᔪᑦ
- ᖃᖓᓚᑦᑕᕐᑎᑦᓯᐊᕐᓗᒍ ᖃᐅᔨᓴᖅᓂᖅ
- ᐅᓪᓗᒥᔪᓂᑦ ᐊᔪᓕᐅᕈᑕᑦ ᑎᑎᖅᑕᐅᓂᖅᓯᓂᖅ
- ᖃᐅᔨᓴᖅᓯᓪᓕᐊᖏᓐᓇᓕᓂᖅ
- ᐊᐳᕐᓇᔪᓂᑦ ᐳᓪᓴᖅᑎᑦ ᑎᑎᖅᑕᐅᓂᖅᓯᓂᖅ ᓇᐃᐃᓴᖅᓯᒪᔪᑦ

ᐃᓄᒃᑎᑦᓄᓪᓗ-ᓯᑭᓪᓗᒍᓂᒃᑯᓂᖅ ᐱᖓᓱᓕᕆᓂᖅ ᓇᐃᓐᓇᕐᓂᖅ

2022 ᐊᓗᐊᕆᔨᖅ ᐊᖏᔪᒍ ᖃᓄᐃᑦᑐᓕᕆᓂᖅ ᑲᑎᕋᖅᑕᕐᓂᖅ ᓴᓇᖏᖅᑕᕐᓂᖅ ᓄᓇᕗᒻᒥᐅᓂᖅ ᐱᑕᕆᐊᓕᐅᖅᑐᑦ, ᐊᒻᒪᓗ ᐊᖏᔪᒍ 8-ᖃᓄᖅᑐᑦ ᐊᐅᓚᓂᖅᑲᓂᓂᒃ ᓄᓕᒃᓴᒃ ᐱᓕᕆᓂᖅ. ᐅᕙᓪᓕᐊᓂᖅ ᑲᔪᓯᑎᓯᒪᔭᖓᓗ ᐱᓕᕆᕙᓕᕆᓂᕐᒧᑦ ᓄᓕᒃᓴᓐᓂᖅ ᐱᓕᕆᐊᒧᑦ

ᐃᓄᐃᑦ ᐃᖅᑲᓇᐃᓚᐅᕐᓇᖅᑐᑐᒃ ᐃᑲᖏᖅᖁᓪᓕ ᑲᑎᒪᔨᓪᓕ 505,605, ᐊᒻᒪᓗ ᐃᓄᖅᑎᑦ 3,304,182 ᐊᖏᖅᔪᖓᓂᒃ 2022-ᒥ. ᑕᑯᐊ ᐃᑲᖏᖅᑐᑦ ᐃᓕᓴᐅᑎᓯᒪᔪᑦ ᑕᒪᖏᒥ ᐅᓪᓚᕆᐊᒃᑲᓂᖅ ᐃᖅᑲᓇᐃᓚᖅᑎᑦᑎᓕᓐᓂᖅ. ᑲᑎᓗᑕᖅᑳᓂᑦ, ᐃᓄᐃᑦ ᐃᖅᑲᓇᐃᓚᖏᖅᑐᑦ ᐃᑲᖏᖅᖁᓪᓕᐊᓂᖅ 13.3%-ᖃᓄᐅᑕᖅᑐᑦ ᑲᑎᓗᑕᖅᑳᓂᑦ ᐃᖅᑲᓇᐃᓚᖏᓕᐅᖅᑕᕐᓂᖅ ᐃᑲᖏᖅᑐᑦ. ᐅᓪᓚᕆᐊᒃᑲᓂᖅ ᐃᓄᐃᑦ ᐃᖅᑲᓇᐃᓚᖏᖅᑎᑦᑎᓕᓐᓂᖅ ᐊᑭᓕᐅᑕᐅᓕᐅᖅᑐᑦ $17.4 ᒥᓕᒃ ᐅᖃᓕᒫᒃ ᑲᑎᒪᔨᓪᓕ ᐃᓕᓴᐅᑎᓯᒪᔪᑦ ᐃᓄᐃᑦ ᐃᖅᑲᓇᐃᓚᖏᖅᑐᑦ ᐊᑭᓕᐅᑕᐅᓕᐅᖅᑐᑦ $6.6 ᒥᓕᒃ ᐅᖃᓕᒫᒃ. ᑕᑯᐊ ᓴᓇᐅᑦ ᐃᓕᓴᐅᑎᓯᒪᔪᑦ ᐊᑭᓖᑦᓯᓂᖅ ᐃᓄᐃᑦ ᐃᖅᑲᓇᐃᓚᖏᖅᑐᑦ $162 ᒥᓕᐊᒃ 2022-ᖃᓄᓕᓚᐅ. ᑕᑯᐊ ᐃᓕᐅᓕᓚᑎ 26 ᑲᑎᒪᔨᑕᐅᓯᒪᔪᑦ ᐃᓄᐃᑦ ᓇᓕᓂᑯᓂᕐᒪᐅᕐᓂᖅ, ᐊᑭᓖᑦᓯᓂᖅ ᑕᑯᐊ ᓇᓕᐊᖓᓂᐃᐊᓴᖅᑐᑦ ᖁᑭᖅᑕᒍᓱᑦ ᐅᐊᖏᓇᖓᓂ ᐅᖏᓕᓴᐅᓂᒃ ᐃᖅᑲᓇᐃᓚᖅᑐᑦ.

ᖁᒃᑲᖓᓂ ᑲᑎᑦᓯᑦ ᑐᓂᔅᐅᓯᒪᔪᑦ ᐃᓄᐃᑦ ᓇᓕᒥᓂᔨᖏᓐᓄᑦ ᐅᖏᓪᓕᓇᓕᐅᖅᑐᑦ $162 ᒥᓕᐊᓐ 2022-ᖃᓄᓕᓚᐅ. ᑕᑯᐊ ᐃᓕᐅᓕᓚᑎ 26 ᑲᑎᒪᔨᑕᐅᓯᒪᔪᑦ ᐃᓄᐃᑦ ᓇᓕᒥᓂᔨᖏᓐᓄᑦᑎᓕᓐᓂᖅᑕᒥ, ᐊᑭᓖᑦᓯᓂᖅ ᑕᑯᐊ ᓇᓕᐊᓂᑐᐃᓐᓇᖅᑐᑦ ᖁᑭᖅᑕᒍᓱᑦ, ᐅᐊᖏᓇᖓᓂ ᐅᖏᓕᓴᐅᓂᒃ ᐃᓄᐃᑦ.

ᖁᑦᑲᓐᓂᐊᓕ ᐊᐅᑐᐃᓕᑕᕐᓂᖅᑕᒪᔪᑦ ᐱᓕᕆᐊᒥ ᖁᑎᒋᓂ ᐅᖏᓪᓕᐊᓕᕆᔨᓂ, ᓄᓇᕗᒻᒥᓕᓴᐅᓂᖅ-ᐱᓇᓕᕐᓂᕐᒪᖏᑦ ᐱᓕᕆᐊᒃᑎ ᑭᓇᐅᔭᖏᑦᑐᖅᑕᕐᓂᖅᑕᒥ ᐃᓄᐃᑦ ᐊᑐᖅᑕᐅᓂᖅᑲᓂᖅᓯᒪᓂᖅ ᐊᑭᓚᐅ ᐱᓇᓕᕐᓂᕐᒪᖏᑦᑐᖅᑕᒥ ᐊᖓᔪᖅᓯᒪᔪᑦ ᐱᓕᕆᐊᒃᑎᒍᑦ, ᓯᑦᓗ ᐊᖓᔪᓇᓯᓇᖅᓯᒪᓂᕐᒥᑦ ᐱᓕᕆᐊᒃᑎᒍ ᐃᑲᔪᓯᓯᒪᓂᐊᕐᓂᖅᑐᑦ ᐃᓄᐃᑦ ᐊᐅᑐᐃᓕᑕᕐᓂᖅᑲᓂᖅᓯᒪᓂᖅ ᐃᓄᐃᑦ. ᖁᑦᑲᓐᓂᐊᓕ ᑭᒃᑯᓕᒫᓂᕐᒧᑦ ᐱᓕᕆᐊᒃᑎ ᑎᑎᕋᐅᓕᕆᔨᓂ ᐊᓯᖏᓪᓕᐊᓕᕆᔨᓂ ᐱᓕᕆᐊᒃᑎᑎᒍᑦ, ᐅᓐᓄᓕᒻᒥᐅᑦ ᐱᓕᕆᐊᒃᑎᑎᒍᑦ ᐊᓯᖏᓪᓕᐊᓕᕆᔨᓂ ᐱᓕᕆᐊᒃᑎᑎᒍᑦ ᐊᓯᖏᓪᓕᐊᓕᕆᔨᓂ ᐱᓕᕆᐊᒃᑎᑎᒍᑦ ᐃᓄᐃᑦ ᐊᐅᑐᐃᓕᑕᕐᓂᖅᑲᓂᖅᓯᒪᓂᖅ

ᐸᓀᓐᓯᓐᔪᐊᓂ 2022 ᐅᒥᐊᖅᔨᐊᖅᑎᑦ ᖃᐅᔨᓴᖅᓯᓕᕆᓂᐊᖑᓐᓇᖅᑐᓂᖅᓱᑦ ᐱᓕᓴᖃᐅᑎᓂ ᐅᓪᓗᕆᓂᖅ ᐱᓕᓴᐊᒧᑦ

ᐊᐱᖅᔪᑎᐃᕐ? ᐃᒪᓐᓇ ᐅᖃᖅᑭᓐᓇᖅᐳᑎᓂ ᐅᓚᕆᑎᓐᓄᑦ

ᐸᓚᓀᓐᓂᑦ ᑎᑎᕆᖏᓐᓄᐊᕐᓇᖅᑐᖅ

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

ᑐᓴᐅᒪᖃᕆᑕᐅᑎᔨᓕᓚᓂᖅ
communications@baffinland.com

ᐃᖅᑲᓇᐃᔾᔪᖅᓯ ᐊᓱᒪᓗ ᐱᓕᒪᖅᓂᕐ
recruitment@baffinland.com

ᐅᖃᐅᔨᖅᑐᐃᓐᓇᐃ, ᐊᐱᖅᔪᑎᖅᓯ, ᐊᓱᒪᓗ ᐃᔨᒻᓗᑎᓂ
communityquestions@baffinland.com

ᓂᐅᐃᖏᓕᓂᒧᑦ ᐱᖏᖅᓯ
procurement@baffinland.com

ᑭᓇᐅᔭᖅᑕᖅᑎᑕᐅᔨᒪᓂᒧᑦ ᑐᓴᔨᕐᔪᐊᓪᓚᔨᓯ
donationrequests@baffinland.com

ᐅᑭᐅᖅᑕᖅᑐᑦ ᑎᑎᕆᖏᓐᓄᐊᕐᓇᖅᑐᖅ ᐸᓀᓐᓂᑎᓪᓗ ᐃᖅᑲᓇᐃᔾᔪᖅᑐᓗ ᐃᓕᓴᕐᓂᖅᑐᑦ:

Iqaluit
Joe Tigullaraq
ᐊᖏᓚᔨᖅᑲᖅᖏᓐᓄᑦ ᐅᑭᐅᖅᑕᖅᑐᑐᒃᓯᒪᓂᒧᑦ
joseph.tigullaraq@baffinland.com
+1 867 975 2502
+1 867 222 6622

Manasee Ulayuk
ᓄᓇᓕᖕᓂ ᐱᓕᕆᖅᑎᑦᑲᖅᑕᖕᓂᒧᑦ ᐊᐅᓚᕐᑎᓗ
manasee.ulayuk@baffinland.com
+1 867 975 2502
+1 438 270 9413

Arctic Bay
+1 867 439 8847

Clyde River
George Iqalukjuak
george.iqalukjuak@baffinland.com
+ 1 867 924 6444

Igloolik
Lena Angutiqjuaq
lena.angutiqjuaq@baffinland.com
+1 867 934 8464

Pond Inlet
Erica Koonark
erica.koonark@baffinland.com
+1 867 222 0394

Sanirajak
Ragilee Nangmalik
ragilee.nangmalik@baffinland.com
+1 867 928 8497

Baffinland

Baffinland Iron Mines Corporation

Mary River Project

2022 ANNUAL REPORT TO THE NUNAVUT IMPACT REVIEW BOARD

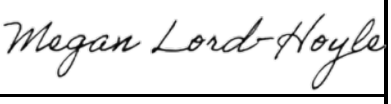
2023-04-30	0		
		L. Kamermans	M. Lord-Hoyle
Date	**Rev.**	**Reviewed By**	**Approved By**

TABLE 0: REPORT SUBMISSION SUMMARY

Year of Annual Report	2022
Annual Report Submission Date	April 30, 2023
Name and contact information of the Baffinland representative responsible for the preparation and approval of the Annual Report	**Lou Kamermans** Lou.kamermans@baffinland.com T: +1 416 364 8820 x5101 C: +1 647 278 3317
The name and contact information of the Baffinland representative that can be contacted for questions or comments regarding the Annual Report	**Lou Kamermans** Lou.kamermans@baffinland.com T: +1 416 364 8820 x5101 C: +1 647 278 3317

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ABBREVIATIONS

AANDC ..... Aboriginal Affairs and Northern Development Canada
AAQS ..... Ambient Air Quality Standards
ABE ..... Adult Basic Education
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
AMP ..... Adaptive Management Plan
ANOVA ..... analysis of Variance
APRF ..... Annual Project Review Forum
AQNAMP ..... Air Quality and Noise Abatement Management Plan
ARD ..... Acid Rock Drainage
ARFF ..... Aircraft Rescue and Firefighting
ARU ..... Autonomous Recording Units
As ..... Arsenic
ASR ..... Annual Security Review
ATV ..... All Terrain-Vehicle
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
BOS ..... Baffinland Operating System
BSA ..... Behavioural Study Area
BWM ..... Ballast Water Management
BWMP ..... Ballast Water Management Plan
CAAQS ..... Canadian Ambient Air Quality Standards
CANNOR ..... Canadian Northern Economic Development Agency
CC ..... Contracting Committee
CCCS ..... Canadian Centre for Climate Services
CCG ..... Canadian Coast Guard
CCME ..... Canadian Council of Ministers of the Environment
Cd ..... Cadmium
CEDO ..... Community Economic Development Officer
CF ..... Crusher Facility
CGVD ..... Canadian Geodetic Vertical Datum
CHS ..... Canadian Hydrographic Service
CIRNAC ..... Crown Indigenous Relations and Northern Affairs Canada

CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2eq	Carbon Dioxide Equivalent
COC	Chain of Custody
CoPC	Constituent of Potential Concern
CORI	Coastal and Ocean Resources Inc.
CPD	Career Development Plans
CPIT	Contracting and Procurement Information Tour
CPR	Cardiopulmonary Resuscitation
CPUE	Catch-Per-Unit-Effort
CRD	Collaborative Research and Development
CREMP	Core Receiving Environment Monitoring Program
CTD	Conductivity, Temperature, and Depth
Cu	Copper
CWA	CWA Engineers Inc.
CwS	Canada-Wide Standards
CWS	Canadian Wildlife Service
dB	Decibels
dBA	A-weighted Decibels
DAF	Dissolved Air Flotation
DFO	Fisheries and Oceans Canada
DPA	Development Partnership Agreement
DPF	Direct Project Footprint
DSD	Department of Sustainable Development
DSP	Direct Shipping Pellets
dw	Dry Weight
EC	Environment Canada
ECCC	Environment and Climate Change Canada
ECSAS	Eastern Canada Seabirds at Sea
EDI	Environmental Dynamics Inc.
EEM	Environmental Effects Monitoring
EEZ	Exclusive Economic Zone
EFAP	Employee Family Assistance Program
EIS	Environmental Impact Statement
EmC	Employment Committee
EMR	Emergency Medical Responder
EPA	Environmental Protection Agency
EPP	Environmental Protection Plan
ERP	Early Revenue Phase
ERT	Emergency Response Team
ES	Eclipse Sound
ETIS	Employment and Training Information Sessions

EWI ..... Early Warning Indicators
FA ..... Fishing Area
FAA ..... *Fisheries Act* Authorization
FDP ..... Final Discharge Point
FEIS ..... Final Environmental Impact Statement
FEL ..... Front-end Loader
FLIR ..... Forward-Looking Infrared
FTE ..... Full-Time Equivalents
FWSSWMP ..... Fresh Water Supply, Sewage and Wastewater Management Plan
GDP ..... Gross Domestic Product
GHG ..... Greenhouse Gas
GN ..... Government of Nunavut
GPS ..... Global Positioning System
GSI ..... Gonadalsomatic Index
GT ..... Gross Tonnage
ha ..... hectors
HADD ..... Harmful Alteration, Disruption or Destruction (of Fish Habitat)
Hatch ..... Hatch Ltd.
HBHTO ..... Hall Beach Hunters and Trappers Organization (Sanirajak)
HEO ..... Heavy Equipment Operator
HOL ..... Height of Land
HR ..... Human Resource
HSE ..... Health, Safety and Environment
HTA ..... Hunter and Trapper Association
HTO ..... Hunter and Trapper Organization
HWB ..... Hazardous Waste Berm
ICA ..... Inuit Certainty Agreement
ICAM ..... Incident Cause Analysis Method
ICE ..... Inuit Cultural Engagement
ICRP ..... Interim Closure and Reclamation Plan
IEG ..... Inuit Employment Goals
IFC ..... Issued-for-Construction
IFO ..... Intermediate Fuel Oil
IHRS ..... Inuit Human Resources Strategy
IHTA ..... Ikajutit Hunters and Trappers Association (Arctic Bay)
IHTO ..... Igloolik Hunters and Trappers Organization
IIBA ..... Inuit Impact and Benefit Agreement
IFO ..... Intermediate Fuel Oil
ILBA ..... Inuit Labour Force Barriers Analysis
IMO ..... International Maritime Organization
INPK ..... Ilagiiktunut Nunalinnullu Pivalliajutisait Kiinaujat
IOL ..... Inuit Owned Land

IOPPC	International Oil Pollution Prevention Certificate
IPCC	Intergovernmental Panel on Climate Change
IPF	Indirect Project Footprint
IQ	Inuit Qaujimajatuqangit
JEC	Joint Executive Committee (Baffinland and the QIA)
JPCSL	Jason Prno Consulting Services Ltd.
JRCC	Joint Rescue Coordination Centre
kn	Knot
kPa	Kilopascal
KPI	Key Performance Indicators
L	Litres
Landfill Facility	Mine Site Non-Hazardous Waste Landfill Facility
LMA	Labour Market Analysis
LMS	Learning Management System
LOA	Letters of Advice
LOTO	Lockout Tag-Out
LRR	Listening Range Reduction
LSA	Local Study Area
LSI	Liver Somatic Index
LTWMP	Long-Term Water Management Plan
MAC	Mining Association of Canada
magl	Meters Above Ground Level
MARSEC	Maritime Security Awareness
MDMER	Metal & Diamond Mining Effluent Regulations
MEEMP	Marine Environmental Effects Monitoring Program
MEWG	Marine Environment Working Group
MFSO	Marine Facility Security Officer
MHTO	Mittimatalik Hunters and Trappers Organization
MI	Milne Inlet
MIEG	Minimum Inuit Employment Goal
MiHR	Mining Industry Human Resources Council
Milne Port	Milne Port Facility
Mine Site	Mary River Mine Site
Mg/L	Milligrams per Liter
mL	Millilitre
MMASP	Marine Mammal Aerial Survey Program
MMO	Marine Mammal Observers
MMON	Marine Mammal Observation Network
MoU	Memorandum of Understanding
MRSEWG	Mary River Socio-Economic Working Group
m/s^2	Meter per Second Squared
MSC	Mine Site Complex

MSI	Mantle Somatic Index
MSV	Multipurpose Supply Vessel
Mt	Million Tonnes
Mtpa	Million Tonnes Per Annum
MWO	Marine Wildlife Observer
NAAQS	National Ambient Air Quality Standards
NAMRP	Narwhal Adaptive Management Response Plan
NAC	Nunavut Arctic College
NB	Navy Board Inlet
NCP	Northern Contaminants Program
NHC	Nunavut Housing Corporation
NHTO	Nangmautaq Hunters and Trappers Organization
NIRB	Nunavut Impact Review Board
NIS	Non-Indigenous Species
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxide
NPC	Nunavut Planning Commission
NPRI	National Pollutant Release Inventory
NRCan	Natural Resources Canada
NSA	Nunavut Settlement Area
NSERC	Natural Sciences and Engineering Research Council of Canada
NTI	Nunavut Tunngavik Incorporated
NT-NU	Northwest Territories-Nunavut
NuPPAA	Nunavut Planning and Project Assessment Act
NWB	Nunavut Water Board
NWMB	Nunavut Wildlife Management Board
NWPA	*Navigable Waters Protection Act*
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 Hydrocarbon
PAM	Passive Acoustic Monitoring
PASS	Pathway to Adult Secondary School
Pb	Lead
PC	Project Certificate
PCa	Parks Canada

PCR ..... Polymerase Chain Reaction
PDA ..... Project Development Area
PEFA ..... Peregrine Falcon
PIP ..... Production Increase Proposal
PIPE ..... Production Increase Proposal Extension
PIPR ..... Production Increase Proposal Renewal
Plan ..... Dust Mitigation Action Plan
PLC ..... Programmable Logic Controller
PM ..... Preventative Maintenance
PRISM ..... Program for Regional and International Shorebird Monitoring
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
QEC ..... Qulliq Energy Corporation
QIA ..... Qikiqtani Inuit Association
QLMA ..... Qikiqtani Labour Market Analysis
QSEMC ..... Qikiqtaaluk Socio-Economic Monitoring Committee
RBR ..... RBRconcerto
RCMP ..... Royal Canadian Mounted Police
RLHA ..... Rough-Legged Hawk
RMA ..... Raptor Monitoring Area
RMP ..... Roads Management Plan
ROM ..... Run of Mine
ROV ..... Remotely Operated Vehicle
ROW ..... Right-of-way
RPAN ..... Recreation and Parks Association of Nunavut
RPD ..... Relative Percent Difference
RSA ..... Regional Study Area
RSASP ..... Ringed Seal Aerial Survey Program
RTK ..... Real Time Kinematic
SAR ..... Search and Rescue
SBO ..... Ship-Based Observer
SCA ..... Skills and Capacities Assessment
SCUBA ..... Self Contained Breathing Apparatus
Se ..... Selenium
SEAT ..... Skills Equivalency Assessment Template
SEMC ..... Socio-Economic Monitoring Committee
SEMR ..... Socio-Economic Monitoring Report
SHL ..... Safe Harvest Level

SITM ..... Standing Instructions to Masters
SLR ..... Sea Level Rise
SMWMP ..... Shipping and Marine Wildlife Management Plan
SME ..... Subject Matter Experts
SNP ..... Surveillance Network Program
SO_2 ..... Sulphur Dioxide
SOLAS ..... Safety of Life at Sea
SOP ..... Sustaining Operations Proposal
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
SUSF ..... Super Sinter Fines
SWAEMP ..... Surface Water and Aquatic Ecosystem Management Plan
TARP ..... Threshold Action Response Plan
TC ..... Transport Canada
TCLP ..... Toxicity Characteristic Leaching Procedure
TCMSS ..... Transport Canada Marine Safety and Security
TDG ..... Transportation of Dangerous Goods
TDS ..... Total Dissolved Solids
TEAMR ..... Terrestrial Environment Annual Monitoring Report
TEMMP ..... Terrestrial Environment Mitigation and Monitoring Plan
TEWG ..... Terrestrial Environment Working Group
the Communities ..... North Baffin Communities
the Fund ..... Ilagiiktunut Nunalinnullu Pivalliajutisait Kiinaujat Fund
the Project ..... Mary River Project
the Strategy ..... Climate Change Strategy
TINMCA ..... Tallurutiup Imanga National Marine Conservation Area
ToR ..... Terms of Reference
Tote Road ..... Milne Inlet Tote Road
TPH ..... Total Petroleum Hydrocarbons
TREEP ..... Tote Road Earthworks Execution Plan
TRMP ..... Tote Road Management Plan
TS ..... Tremblay Sound
TSD ..... Technical Supporting Document
TSP ..... Total Suspended Particulate
TSS ..... Total Suspended Solids
UAV ..... Unmanned Aerial Vehicle
VHF ..... Very High Frequency
VSEC ..... Valued Socio-Economic Components

WAV ..... Work Assist Vehicle
WHMIS ..... Workplace Hazardous Materials Information System
Wood ..... Wood Canada Limited
WQG ..... Water Quality Guidelines
WRF ..... Waste Rock Facility
WRP ..... Work Ready Program
WSCC ..... Workers' Safety and Compensation Commission
WTP ..... Water Treatment Plant
WWF ..... World Wildlife Fund
wwt ..... Wet Weight
Zn ..... Zinc

1 INTRODUCTION

This 2022 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 (Amendment No. 04) for the Mary River Project (the Project). The Annual Report summarizes:

- Project activities undertaken during the reporting year (January 1, 2022 to December 31, 2022);
- Baffinland's performance against the requirements of the Terms and Conditions in PC No. 005 (Amendment No. 04);
- 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; NIRB Registry No. 290839) for the Early Revenue Phase (ERP) which included a temporary approval for production increase up to 6 million tonnes per annum (Mtpa), the Production Increase Proposal (PIP)/Production Increase Proposal Extension (PIPE) exclusive to years 2018 to 2021 (NIRB, 2018a, 2020a; NIRB Registry No. 320857, 330475), and most recently the Production Increase Proposal Renewal (PIPR; NIRB, 2022a; NIRB Registry No. 342056); and
- Planned Project work for the next reporting year (January 1, 2023 to December 31, 2023).

1.1 COMPANY DESCRIPTION

The Mary River iron ore deposits on North Baffin Island are considered to be one of the largest and highest quality iron ore open pit deposits in the world. With such high grade iron ore, there are no concentrators, tailings, or tailings ponds associated with production activities. 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). The Project is operated by Baffinland and is jointly owned by The Energy and Minerals Group and ArcelorMittal (minority).

The mine is located on Baffin Island, approximately 160 Km south-southwest of the nearest community of Pond Inlet (Mittimatalik), in the Qikiqtani region of Nunavut, and 1,000 Km north-northwest of the territorial capital of Iqaluit. Baffinland's head office is located in Oakville, Ontario and its northern headquarters is located in Iqaluit, Nunavut. Baffinland also has offices in five (5) North Baffin communities including Arctic Bay, Clyde River, Igloolik, Pond Inlet, and Sanirajak (Figure 1.1).

Baffinland's Mission, Vision and Values were developed with the Government of Nunavut's (GN) eight (8) 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

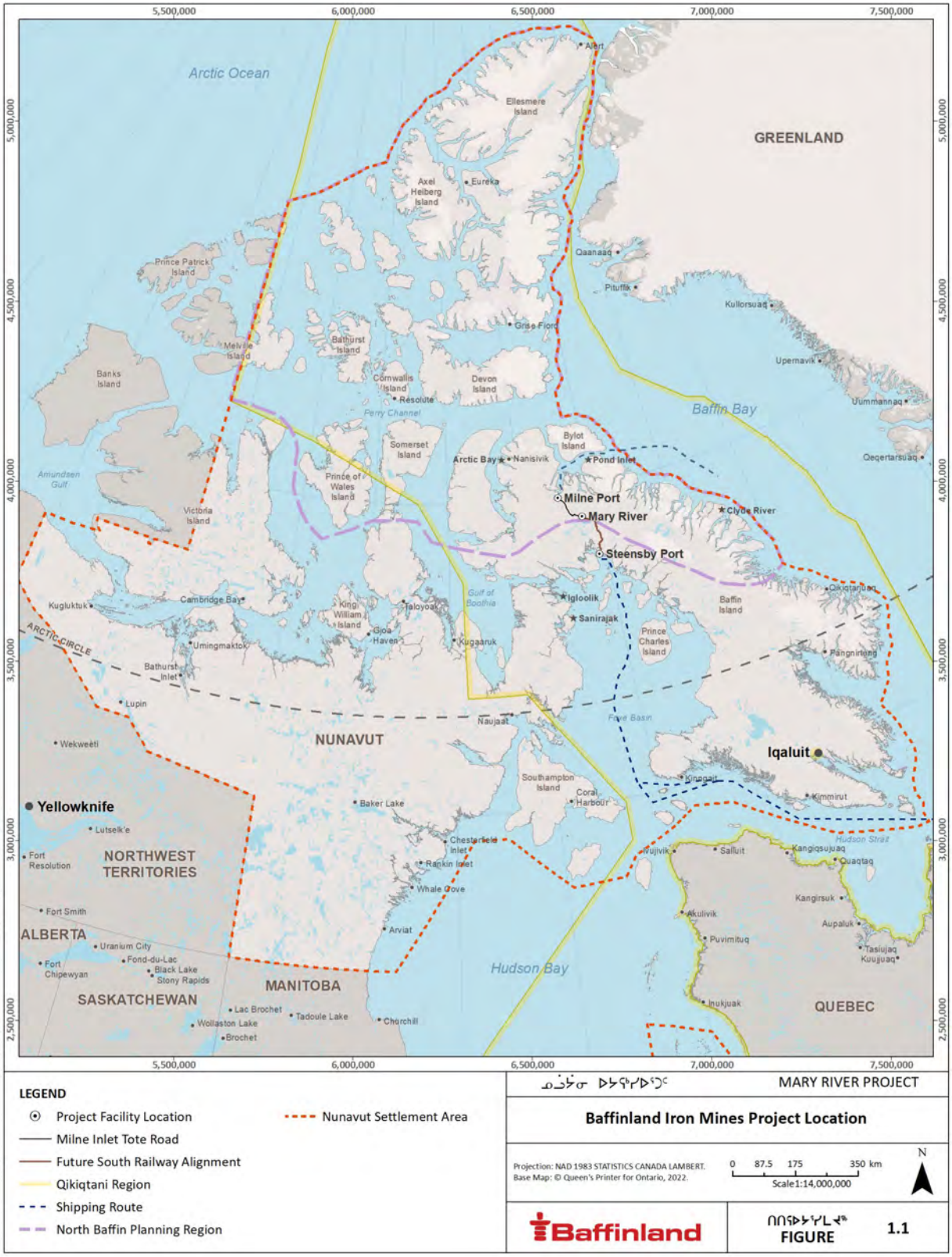


Figure 1.1: Baffinland Iron Mines Project Location

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.

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 Project represents a potential multi-generational opportunity for resource-driven socio-economic development in the North Baffin region.

The Project has gone through a number of important milestones prior to operating at the 2022 approved production rate of 6 Mtpa. Baffinland's initial proposal consisted of mining iron ore from the reserve at Deposit No. 1 and using a port south of the mine in Steensby Inlet, serviced by an approximately 150 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 ore market price 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 additional 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; NIRB Registry No. 320857.), 2020 (NIRB, 2020a; NIRB Registry No. 330475), and 2022 (NIRB, 2022a; NIRB Registry

No. 342056), the Project Certificate (PC) was amended again following approval of the PIP, PIPE, and most recently the PIPR, allowing for up to 6 Mtpa to be transported and shipped through Milne Port until the end of 2022.

Through the PIPR reconsideration process in 2022, Baffinland made over 70 new commitments, which are reflected in Appendix B to Project Certificate No. 005, Amendment No. 04. These extensive commitments relate to various aspects of the Project, ranging from dust mitigation and marine monitoring measures to substantial new investment in community infrastructure and other related funding. Status on these commitments will be reported in line with the requirements of Term and Condition No. 189, with the most recent report being submitted to the NIRB on March 31, 2023.

In parallel to the operation of the mine, Baffinland also developed the Phase 2 Proposal, which underwent regulatory review from 2015 until 2022. While there had been revisions to the Phase 2 Proposal since its inception, the most recent Phase 2 Proposal outlined an increase in output from Milne Port, from the originally approved 4.2 Mtpa to 12 Mtpa supported by the construction of a new railway running largely parallel to the existing Tote Road within the Northern Transportation Corridor. On May 13, 2022, the Nunavut Impact Review Board (NIRB) recommended to the Minister of Northern Affairs that the Project's Phase 2 Expansion Proposal not proceed at this time (NIRB, 2022b; NIRB Registry No. 339558). Subsequently, on November 16, 2022, the Minister accepted the Board's recommendation to not approve the Phase 2 Proposal at this time (Minister of Northern Affairs, 2022a).

1.3 EXISTING PROJECT OVERVIEW

The Approved Project currently consists of four (4) main locations in operation (Figure 1.2): The Mary River Mine Site (Mine Site), and the Northern Transportation Corridor consisting of the Tote Road, Milne Port and the Northern Shipping Route. Operational activities include:

- Ore extraction;
- Ore processing via crushing;
- Transportation of the ore from the Mine Site to Milne Port via the 100 Km long Tote Road;
- Loading and shipping of ore from Milne Port via the Northern Shipping Route (Milne Inlet – Eclipse Sound);
- Seasonal shipping of ore to markets in Europe and Asia between July and end of October;
- Stakeholder and Inuit community engagement; and
- Environmental monitoring and reporting.

During 2022 (the eighth (8) shipping season), mining operations at Deposit No.1 resulted in a total of 5.7 million tonnes (Mt) of ore crushed, which was an increase from the 5.3 Mt crushed in 2021. A total of 5.7 Mt of ore was transported by ore haul trucks along the Tote Road and stockpiled at Milne Port. Between July 30 to October 13, 2022, a total of 4.7 Mt of ore was shipped from Milne Port to international markets. The shipments included ore mined, transported and stockpiled after the 2021 shipping season ended. In 2022, marine ore shipments involved 62 individual ore carrier vessel round trip voyages during the shipping season.

In addition to the primary components of the current operation, the Approved Project also includes construction, operation, closure and post-closure activities associated with the following Approved Project components, known collectively as the Southern Transportation Corridor, that have yet to be developed:

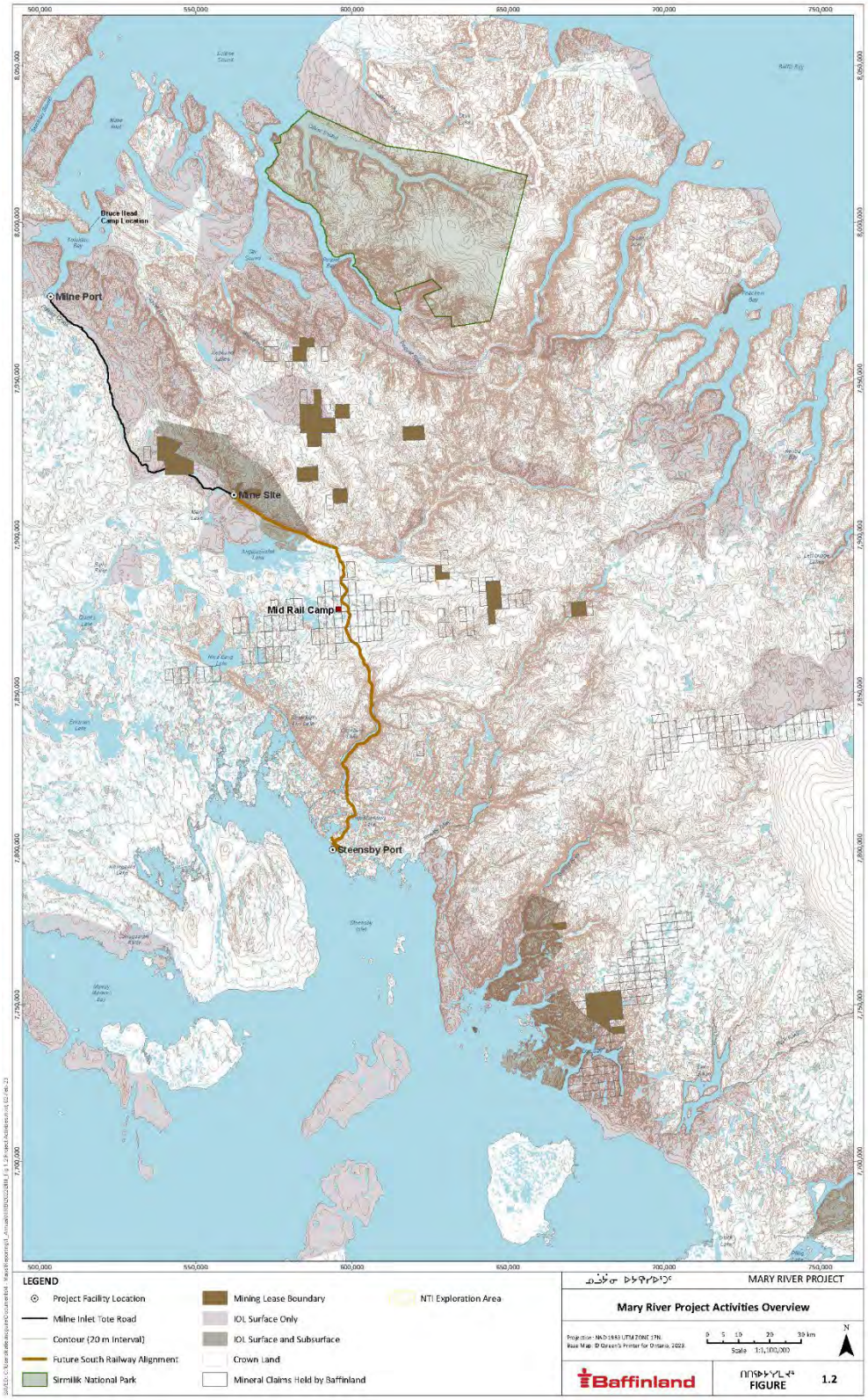


Figure 1.2: Project Activities Overview

- A 150 Km South Railway from the Mine Site to a new port facility at Steensby Inlet (Figure 1.2);
- Steensby Port, which will operate year-round; and
- Year-round shipping along the Southern Shipping Route (Foxe Basin - Hudson Strait).

A summary of the overall Approved 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; NIRB Registry No. 286442) pursuant to Section 12.5.12 of Article 12 of the Nunavut Agreement (CIRNAC and Nunavut Tunngavik Inc., 2018). The basis for the PC is Baffinland's FEIS (Baffinland, 2012), which presented an assessment of potential environmental and socio-economic effects associated with mining the reserves of Deposit No. 1.

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
Location	North Baffin Island, Nunavut; 160 Km south/southwest from the closest Inuit community, Pond Inlet (Mittimatalik) (Figure 1.1).
Facility Name	Mary River Mine and Milne Port connected via the Milne Inlet Tote Road. Steensby Port and southern railway (Southern Transportation Corridor) are approved but not active.
Type of Mine	Open pit (Deposit No. 1; Photo 1 in Appendix D)
Summary of Current Mine Operations (from blasting to shipping)	1 Iron ore is blasted and extracted from Deposit No. 1 and loaded onto trucks (Photos 1 and 2 in Appendix D). 2 Blasted iron ore is crushed at Mine Site. 3 Crushed ore is transported from Mine Site to Milne Port (Photo 3 Appendix D). 4 Ore is stockpiled at Milne Port until the shipping season is opened (Photo 4 in Appendix D). 5 Ore is loaded onto ships at Milne Port (Photo 5 in Appendix D). 6 Ore is shipped to customers worldwide.
Key Dates – Mary River and Milne Port	• Construction at Mary River and Milne Port initiated in 2013; • Bulk sample shipped from Milne Port in 2014; • Operations began in 2015; and • First ore carrier loaded and shipped out of Milne Port in 2015.
Environmental Impact Statement Submissions to the Nunavut Impact Review Board and Amendments	FEIS: Submitted in February 2012; approval in December 2012 (Southern Transportation Corridor). Amendment No. 01: Submitted in June 2013; approval in 2014 (4.2 Mtpa via Northern Transportation Corridor). Amendment No. 02: Submitted in April 2018; approval in 2018 (increase to 6 Mtpa)

Information Type	Description
	Amendment No. 03: Extension request submitted in January 2020, approval in June 2020 (6 Mtpa until end of 2021). Amendment No. 04: Renewal request submitted in June 2022, approval (October 2022) and revised Terms and Conditions issued in November 2022 (6 Mtpa until end of 2022).
Products	Direct Shipping Pellets (DSP), Super Sinter Fines (SUSF) and Baffinland Hematite Lump (BHL).
Expected Life	20+ years, with potential for expansion.
Access	Remote fly-in/fly-out access via charter flights to and from Mary River Mine from various hubs including Mirabel, Iqaluit, and five (5) North Baffin communities. There are also two land-based connections between the Mine Site and tidewater, the first being the Tote Road to Milne Port, which existed prior to Baffinland developing the Project. The other is the 160 Km railway to Steensby Port, which is approved to move forward but has not yet been developed.

Four (4) amendments to the PC have been issued to Baffinland, in 2013, 2018, 2020, and 2022. This history is described below.

Amendment No. 01 of Project Certificate No. 005 for the Early Revenue Phase (ERP)

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; NIRB Registry No. 290839). 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; NIRB Registry No. 290664).

Amendment No. 02 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, 2018; NIRB Registry No. 318140). On May 18, 2018 the NPC referred the Production Increase Proposal (PIP) to the NIRB for screening. In the PIP, Baffinland requested that NIRB reconsider Mary River PC No. 005 and amend Term and Condition 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 PIP required 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 (Baffinland, 2018a; NIRB Registry No. 318295) and on June 27, 2018, the NIRB issued correspondence formally accepting the FEIS Addendum (NIRB, 2018b; NIRB Registry No. 318402), 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.

The NIRB issued its Reconsideration Report and Recommendations on August 31, 2018 that recommended partial approval of the application. Specifically, NIRB recommended Baffinland be approved to move forward with the construction of its 380-person camp and additional 15 millilitre (mL) fuel tank at Milne Port, but not be approved to increase its annual limits for trucking and shipping ore to market (NIRB, 2018c; NIRB Registry No. 319640). On September 30, 2018, following an appeal by the Qikiqtani Inuit Association (QIA) to the Minister responsible for final approval – 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). Subsequently, on October 30, 2018, the NIRB issued PC Amendment No. 02 (NIRB, 2018a; NIRB Registry No. 320857).

Amendment No. 03 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 Term and Condition No. 179(a) and 179(b) (Baffinland, 2019a; NIRB Registry No. 327657. On January 6, 2020, Baffinland submitted a formal Extension Request Package. Baffinland's intention to continue shipping 6.0 Mtpa in 2020 was widely supported by the five (5) North Baffin region hamlets and regulators, with letters of support submitted to the NIRB (Baffinland, 2020a NIRB Registry No. 327951. On March 4, 2020 the NIRB issued its "Reconsideration Report and Recommendations" indicating that they recommended approval of the extension of the 6 Mtpa production increase until December 31, 2021 (NIRB, 2020b; NIRB Registry No. 328809). The Responsible Ministers approved the temporary expansion request on May 19, 2020. NIRB subsequently issued an amended Project Certificate in June 18, 2020 (NIRB, 2020a; NIRB Registry No. 330475) with varied or new PC Terms and Conditions, notably Term and Condition No. 179(c) and 183.

Amendment No. 04 of Project Certificate No. 005 for the Production Increase Proposal Renewal (PIPR)

On June 7, 2022 the NPC notified Baffinland, the NIRB and other relevant parties of a positive conformity determination for the Production Increase Proposal Renewal (PIPR or Proposal) and forwarded the Proposal to NIRB for consideration of the modifications to NIRB Project Certificate No. 005. On June 13, 2022 Baffinland completed NIRB's on-line application and the NIRB circulated the PIPR, inviting written comments by June 28, 2022. On June 15, Baffinland filed the Supplemental Information Package, which was circulated by the NIRB on June 17, 2022. On June 24, 2022 the NIRB approved an extension request by the Ikajutit (Arctic Bay) Hunters and Trappers Organization to submit written comments by July 5, 2022. On July 5, 2022 the NIRB received written comments from all parties. The formal notice of a reconsideration under NuPPAA s. 112(3) was issued on July 19, 2022 (NIRB, 2022c; NIRB Registry No. 124703.

On August 11, 2022, parties provided technical written submissions on the PIPR, which was followed by a hybrid (in person and virtual) Community Roundtable meeting in Pond Inlet. On August 19, 2022 Baffinland provided replies to parties' comments and on August 24, 2022 interested residents from pond Inlet unable to comment during the Community Roundtable were able to provide their written comment submissions. On September 22, 2022 the NIRB issued the Board's Reconsideration Report and Recommendation to the Responsible Minister, indicating the PIPR should be allowed to proceed (NIRB, 2022b; NIRB Registry No. 341713).

Based on mediation that began between Baffinland and QIA supported by the Government of Canada in June 2022, Baffinland and QIA agreed to a number of joint PC Terms and Conditions and commitments, which both parties

agreed to on September 23, 2022. On October 4, 2022 the Minister officially accepted the NIRB Reconsideration Report and Recommendations, and added the majority of the Baffinland and QIA jointly proposed PC Terms and Conditions and commitments in an amended Project Certificate No. 005 (Minister of Northern Affairs, 2022b; NIRB Registry No. 341711). On October 17, 2022 the NIRB held a Project Certificate Workshop to confirm parties' expectations with respect to the modified and new terms and conditions within Project Certificate No. 005, as well as the commitments contained within a new Appendix B. On November 3, 2022, NIRB issued an amended Project Certificate (NIRB, 2022a; NIRB Registry No. 342056) with revised Terms and Conditions (No. 179(a) and 179 (b)), varied Terms and Conditions (No. 49, 77 and 183), and additional Terms and Conditions (No. 185-189).

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
Nunavut Impact Review Board (NIRB) **Nunavut Agreement, and the *Nunavut Planning and Project Assessment Act***		
Project Certificate No. 005 (Amendment No. 01)	Required under Article 12 of the *Nunavut Agreement* to obtain the requisite permits and approvals to proceed with the Project.	No Expiry
Project Certificate No. 005 (Amendment No. 04)	Required under Article 12 of the *Nunavut Agreement* to obtain the requisite permits and approvals to proceed with the Project	No Expiry
Nunavut Agreement* (Article 12) Qikiqtani Inuit Association (QIA)** **Agreements issued under Articles 6, 20 and 26 of the *Nunavut Agreement		
Inuit Owned Land (IOL) Commercial Lease Q13C301	Mine development activities on IOL; Compliance with the lease is outlined in the *2022 QIA and NWB Annual Report for Operations* and the *2022 QIA and NWB Annual Report for Exploration and Geotechnical Drilling,* submitted March 31, 2023 (Baffinland, 2023a,b).	December 31, 2043
Inuit Impact and Benefit Agreement (IIBA)	Required under Article 26 of the *Nunavut Agreement* to proceed with Project - concluded first in September, 2013, subsequently amended in October, 2018 to account for the Production Increase Proposal; Compliance with the agreement is outlined in the Annual Inuit Impact and Benefit Agreement (IIBA) Implementation Report submitted by March 31st of each year.	No Expiry
Wildlife Compensation Agreement	Wildlife Compensation required under Article 6 of the *Nunavut Agreement,* with the regime set out in IIBA.	No Expiry
Quarry Concession Agreement	Required to extract specified substances (quarried rock and borrow sand and gravel) on Inuit Owned Land under the Commercial Lease	Not Applicable

Approval	Project Activity and Update	Expiry
Water Compensation Agreement	Required under Article 20 of the *Nunavut Agreement* to provide compensation to Inuit for water use by the project or impact to water use.	June 10, 2025
Nunavut Water Board (NWB) **Water Licences issued under the Nunavut Agreement (Article 13), the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*, and the Northwest Territories Water Regulations**		
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 2022. Compliance with the Licence is outlined in the *2022 QIA and NWB Annual Report for Operations,* submitted March 31, 2023 (Baffinland, 2023a,).	June 10, 2025
Type 'B' Water Licence 2BE-MRY2131	Regional exploration activities, including exploration drilling; In good standing; a licence renewal application was approved in 2021. Compliance with the Licence is outlined in the *2022 QIA and NWB Annual Report for Exploration and Geotechnical Drilling,* submitted March 31, 2023 (Baffinland, 2023b).	April 16, 2031
Crown Indigenous Relations and Northern Affairs Canada (CIRNAC) **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**		
Foreshore Lease 47H/16-1-2 Lease Amendment 47H/16-1-5	Supersedes historical Class A Land Use Permit N2014X0012; Use of foreshore area for current Milne Port Ore Dock; In good standing.	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
Fisheries and Oceans Canada (DFO) **Authorizations and Letters of Advice issued under the *Fisheries Act***		
Letters of Advice (various)	Prior to 2021, DFO issued Baffinland various letters of advice in regard to Project crossings along the Tote Road, culvert extensions and replacements, laydown construction, and for stockpile expansion and barge landing expansion work at Milne Port.	No Expiry
Fisheries Authorization 14-HCAA-00525	Authorization to construct the Milne Port Ore Dock in fish habitat; DFO reviewed final monitoring report and closed file on May 31, 2021.	Not applicable

Approval	Project Activity and Update	Expiry
Fisheries Authorization 18-HCAA-00160	Authorization to construct the Freight Dock in fish habitat; The Year 2 monitoring report for the Milne Port Freight Dock was submitted to DFO on March 18, 2022, in accordance with regulated timelines. A revised amendment application for the Freight Dock was also submitted by Baffinland on March 3, 2023 (Baffinland, 2023c).	Not applicable; Request for extension TBD
Transport Canada (TC) **Approvals of in-water works under the *Navigable Waters Protection Act* (NWPA; now the *Canadian Navigable Waters Act*); and Marine Facility Approval under the Marine Transportation Security Act and Regulations**		
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
Statement of Compliance of a Marine Facility # 1000000660	Approval for the Milne Inlet Marine Facility to conduct iron ore operations.	May 27, 2025
National Resources of Canada **Licensing of Explosives Manufacture and Storage Facilities under the *Explosives Act***		
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 was completed in 2022. Following the adjournment of the Phase 2 Proposal hearing in November 2019, 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. Then, on March 17, 2020 the NIRB revised their communications, and provided notification they would 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 issued 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 later cancelled due to logistics-related complications associated with COVID-19. Technical Meeting No. 3 was later rescheduled and held via teleconference between September 14 to 18, 2020, and followed up with an in-person

Community Roundtable and Pre-Hearing Conference on September 28 to October 1, 2020 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 to a hub in Iqaluit and for participants unable to travel into Nunavut via video or audio links. Due to delays in completing 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 and an organized hub in Pond Inlet.

On April 14, 2021, in response to the identification of a COVID-19 outbreak in Iqaluit, NIRB suspended the Phase 2 extended Public Hearing. On July 30, 2021, NIRB provided notification that the extended Public Hearing would resume November 1 through November 6, 2021 in Iqaluit with video and audio linkages available for remote participants and an organized hub in Pond Inlet. The extended Public Hearing was successfully completed between November 1 and November 6, 2021, and included a one (1) day technical session and five (5) day community roundtable.

NIRB provided additional time following the completion of the extended Public Hearing for intervenors and Baffinland to file written comments on correspondence and attachments from the Government of Canada related to an assessment conducted by Denmark under the international *Espoo Convention* (the Espoo Materials), and subsequently for intervenors and Baffinland to file Final Closing Statements. The deadlines for intervenors and Baffinland to file written comments on the Espoo Materials were December 10, 2021 and December 17, 2021, respectively. The initial deadlines set before the reconvened Public Hearing for intervenors and Baffinland to file Final Closing Statements were November 22, 2021 and December 6, 2021, respectively, but an extension was ultimately granted, moving the deadlines to Final Closing Statements to January 10, 2022 and January 24, 2022 for intervenors and Baffinland, respectively.

On January 28, 2022, NIRB issued correspondence that the Public Hearing Record for the Phase 2 Proposal was closed, and that the matter was remitted to NIRB's decision making Panel who would issue the Board's "Reconsideration and Recommendation Report" (NIRB, 2022d; NIRB Registry No. 337790). On February 4, 2022, NIRB issued a letter to the Minister of Northern Affairs indicating that they would be unable to meet the 45-day timeline prescribed in the Nunavut Planning and Project Assessment Act to produce their report, and would require an additional 60 days' time (NIRB, 2022e; NIRB Registry No. 337857). The Panel's "Reconsideration and Recommendation Report" would be conveyed to the Responsible Ministers on or before May 13, 2022.

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. Further updated documentation was submitted to the NWB for the Phase 2 Proposal on September 17, 2021, and an in-person Technical Meeting was held in Iqaluit on November 12, 2021.

On May 13, 2022, NIRB issued their Reconsideration Report and Recommendations (NIRB, 2022b); NIRB Registry No. 339558). and recommended to the responsible minister(s) that the Mary River Phase 2 Development Proposal should not be allowed to proceed at this time. On November 16, 2022, the Minister of Northern Affairs issued

correspondence (Minister of Northern Affairs, 2022a) that the responsible ministers accepted the Board's recommendation that Phase 2 should not proceed at this time, and that the existing Terms and Conditions of Project Certificate No. 005 should be maintained.

1.4.4 Permitting of Sustaining Operations Proposal

Baffinland is continuing to evaluate its plans for the long term success of the Project, which includes a renewed focus on the development of the Steensby component of the Approved Project. In the interim, Baffinland has submitted an application to the NIRB to support the amendment of Project Certificate No. 005 to allow for the continued operation of the Project at a nominal 6 million tonnes per annum (Mtpa) activity level through to 2024 under the Sustaining Operations Proposal (SOP).

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 (MRSEMWG).

Section 3: Describes the Project's operational context in 2022 and operational successes and challenges Baffinland associated with implementation of the PC Terms and Conditions.

Section 4: Includes tailored 'summary sheets' for each Term and Condition, which provide an overview of the work completed towards meeting the requirements of the PC Terms and Conditions as well as Baffinland's self-assessment of compliance. This section also describes stakeholder feedback on relevant components and effects of the Project, observed trends, a comparison of the Project's effects in comparison with predictions made in the FEIS and FEIS Addendum and plans for future works relative to the implementation of the PC Terms and Conditions, where relevant.

Section 5: Outlines the correspondence Baffinland has had with NIRB during 2022 and comments provided by interested Parties on Baffinland's 2021 Annual Report to NIRB.

Section 6: Lists all updates made to environmental management plans as a result of monitoring programs and engagement activities throughout 2022.

1.5.2 Supporting Documents and Appendices

Where PC Terms and Conditions specify that Baffinland provide supporting documentation to NIRB as part of the submission of this Report, these documents have been appended and are identified in the Table of Contents. 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. 2022 Final Marine, Terrestrial, and Socio-Economic monitoring reports have been included as appendices to this report. The Working Groups, to which the NIRB is an observing member, will have the opportunity to review and provide comments on these reports.

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 and substantive Inuit, community, and Stakeholder 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 to inform Company planning, and resolving issues and concerns (Figure 2.1). Baffinland understands that Inuit engagement and consultation must occur in a manner that is appropriate to the Nunavut and Qikiqtani regional context. Engagement and consultation methods and approaches appropriate for Southern groups, other Northern jurisdictions or an academic setting, are not necessarily transferable. Baffinland has made every effort to provide Inuit employees, individuals, communities, and Inuit organization groups with practical opportunities to engage in meaningful dialogue in the format of their choosing, and in a way that would meet their objectives and values.

Figure 2.1: Baffinland's Approach to Inuit and other Stakeholders Engagement

With gradual easing of all travel restrictions in 2022, Baffinland maintained a hybrid approach for community engagement activities in the five (5) North Baffin communities and Iqaluit, with some events and meetings being held in-person and others relying on video and teleconference formats. Baffinland also continued to maintain a presence on social media and local radio as a means to ensure that information about the Project was accessible to a wide audience. The hybrid model has proven effective in ensuring that multiple lines of communication remained

in place between community representatives, stakeholders and Baffinland allowing us to be responsive to the latest health and travel restrictions.

Baffinland continued to provide relevant operational updates to the communities and regulators throughout the year. Subsequent to the NIRB's recommendation to not approve the Phase 2 Proposal, Baffinland began focused consultation on maintaining at least a 6.0 Mtpa trucking and shipping operation in 2022 to provide stability to the Company under the PIPR amendment. Subsequent to NIRB issuing PC No. 005 Amendment No. 04., Baffinland engaged almost immediately on an updated operations plan, the Sustaining Operations Proposal (SOP), with Inuit in the five (5) North Baffin Communities and the QIA, to allow for the continued operation of the Project at a nominal 6.0 Mtpa activity level to the north until the Steensby component of the Approved Project is developed.

Wherever possible, Baffinland has taken feedback received throughout recent Phase 2 and PIPs, and applied it to existing operations. In response to feedback and the NIRB's recommendations in the Phase 2 Recommendation Report, Baffinland has worked with QIA, Inuit, the Communities and stakeholders to develop new mitigations to address priority areas of the Project as identified by Inuit. For example, through the Phase 2 technical review submissions, issues related to ballast water and narwhal entrapment events were raised. Despite not having approval on the Phase 2 Proposal, in 2021 Baffinland proactively implemented commitments for additional ballast water mitigations (i.e. requiring vessels to conduct both exchange and treatment) and has been running narwhal entrapment clearance aerial surveys since 2019 when supported by the community. Furthermore, Baffinland has continued since 2021 (first year of adoption) to avoid the use of an icebreaker at the start of the shipping season, delaying the entry of ore carriers until ice concentrations along the nominal shipping route were no greater than 3/10ths. These examples highlight that where synergies between current operations, the Phase 2 Proposal, or most recently through the PIPR, were identified, Baffinland proactively integrated forward-looking commitments, to ensure that information received through previous engagement events were captured and addressed throughout 2022 to the extent possible, and were integrated within the SOP application.

2.2 ENGAGEMENT OBJECTIVES

Baffinland is committed to meaningful engagement with Inuit and other stakeholders potentially affected by the Project, including the five (5) North Baffin Communities (Arctic Bay, Clyde River, Igloolik, Pond Inlet, and Sanirajak), 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 regularly implements a variety of engagement mechanisms that are intended to ensure a broad and comprehensive approach to the identification of Inuit stakeholders and relevant interested parties, and that enhanced opportunities for dialogue and input are provided. As noted in Section 3.2.2, Baffinland continued to be flexible in its engagement approach in early 2022 until all travel restrictions related to the ongoing COVID-19 had been lifted and/or risks were minimized to the extent possible. Notwithstanding these challenges, Baffinland successfully completed a number of public engagement activities in 2022, 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 Inuit 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, dedicated 'Baffinland Shipping' Facebook posts);
- Hosting public meetings, with enhanced use of public radio shows in response to in-person gathering limitations;
- Conducting employee surveys;
- Participation in virtual multi-stakeholder forums (e.g. Working Groups);
- Holding meetings with community groups and Hamlet Councils;
- Distributing Project-related information through the corporate website, social media sites including Facebook, LinkedIn and Twitter, newsletters, advertisements, radio shows, and other means; and
- Holding one-on-one virtual, teleconference and in-person discussions with Mayors and other officials from Arctic Bay, Clyde River, Igloolik, Pond Inlet, Sanirajak, and Iqaluit to provide updates on Mary River's existing operations, proposed Phase 2 expansion, the PIPR, SOP, and to listen to community updates and issues of importance.

A summary of engagement events including details on public meetings and community group meetings held in 2022 are presented in Appendix B.1.

Baffinland's approach to receiving and addressing concerns/feedback is dynamic and evolves based on the circumstances and channels through which feedback has been received. Baffinland uses a variety of methods for receiving and responding to community comments. In addition to Baffinland's Northern Headquarters, critical points of contact for employees, members of the public, elected officials, and other interested bodies in the five (5) Communities are the BCLOs. These team members receive feedback, often informally, and ensure follow-up is conducted and that responses to feedback are provided when required. Updates about Baffinland activities are also regularly provided by BCLOs on local radio as well as in-person during daily office hours (unless there are office closures). Inuit feedback and comments in some instances are gathered through informal phone or in-person interactions. Information gathered in this way is passed along to the relevant subject matter expert(s) at Baffinland and subsequently may be used to influence future engagement efforts, monitoring program design, or adaptive management considerations. A summary of Inuit feedback related to potential environmental effects of the Project,

captured through these engagement efforts, is provided in Section 4 when relevant to specific ecosystemic and socio-economic and detailed in Appendix B.

Baffinland has also created additional community-based positions in Pond Inlet in direct response to community feedback. For example, since 2019, Shipping Monitors have been hired annually during the shipping season to provide an in-community point of contact between Pond Inlet residents and their elected representatives, the Mittimatalik Hunters and Trappers Organization (MHTO) and Baffinland in order to expand local communications about shipping-related matters such as daily vessel activity. Comments, questions and concerns can be submitted by community residents through a variety of methods (e.g., Baffinland Shipping Facebook Messenger account, in-person interactions, email). This feedback is actively tracked by Shipping Monitors and responded to on an as-needed basis. Shipping monitors recorded 35 questions or concerns during the 2022 shipping season (Appendix B.2.1). Some concerns (e.g. how convoys are implemented, non-Baffinland vessels operating differently is not appreciated) required specific follow-up discussions/clarifications by Baffinland employees to the individuals who expressed these concerns. Comments requiring further discussions with particular community groups (e.g., MHTO) are also included as part of the annual shipping season-specific meeting agendas as needed.

In late 2021, Baffinland created a Community Environmental Coordinator position in Pond Inlet to provide a local point-of-contact throughout the year for residents and organizations (e.g., MHTO) to obtain information about Baffinland's environmental monitoring programs and provides an opportunity for residents to voice concerns/comments they may have on Baffinland's activities and the potential effects these may have on the environment. This role is provided exposure to the environmental monitoring programs and other capacity building opportunities such as participating in the Bruce Head Shore-based Monitoring Program field team as an Inuit researcher to experience first-hand one of the monitoring programs implemented by Baffinland to study potential impacts of shipping on narwhal.

A common topic of concern heard from impacted community members is related to the creation of dust from the project. In 2021, Baffinland hired a third party to create a Inuit Dust Audit Committee to undertake an evaluation of dust sources at the site and offer recommendations for improvement. As community concerns around dust were raised by impacted community members these were relayed to the community representatives sitting on the third-party Dust Audit Committee. Outcomes from this Dust Audit were captured and formalized through submission of a Recommendations Report (Nunami Stantec, 2023; NIRB Registry No. 342950) to the NIRB and Baffinland in February 2023. Baffinland will issue a formal response to the Recommendations Report, outlining its planned actions and, where applicable, schedule to address each recommendation.

Towards the end of 2022, Baffinland also created positions for and hired Inuit Knowledge Holders and Community Resource Guides in each of the five impacted communities. These roles are seen as critical to guiding Baffinland's senior management in its decision making, facilitating knowledge transfer within and between community members and Baffinland staff, and guiding the collection and use of Inuit Qaujimajatuqangit (IQ).

Baffinland uses a combination of manual entry of data into Excel and the StakeTracker software system to input meeting records (includes concerns and feedback) from more formal engagements like public meetings and working groups. Additionally, community- and activity- focused emails have been created, which are monitored by staff across relevant departments, as well as the creation of topic specific Facebook pages. In 2022, no comments were submitted to the Company email address "Communityquestions@baffinland.com" in relation to the Mary River IIBA or other topics. Similarly, no messages with comments, questions or concerns were sent by community members to

the "Shipping@baffinland.com" email address. During the 2022 shipping season communication with the Shipping Monitors and through the Baffinland Shipping Facebook page were the primary methods for communicating with Baffinland.

Baffinland will continue to implement a proactive approach to engagement with Inuit and other various stakeholders through informal and formal methods that include meetings, workshops, surveys and dissemination of information and reports. This broad range of engagement methods are designed to ensure that the communities, QIA, regulators and the public are informed in a timely and culturally relevant manner of the Project's progress and the potential environmental and social impacts of the Project.

2.3.1 Public Meetings & Events

In 2022, Baffinland held various public meetings and/or radio shows 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 more formal public meetings and events held in the communities is provided in Table 2.1.

A summary of engagement events including details on public meetings and community group meetings held in 2022 are presented in Appendix B.1.

Table 2.1: Public Meetings & Events in 2022

Date	Meeting Type	Sample of Topics Discussed
Arctic Bay		
June 29 December 7	Public Radio Show	• Employment and Training Information Session with Baffinland and QIA • Presentation on SOP, and Question and Answer period
July 12	Arctic Bay Elders	• Discussion on importance of mine for youth and the next generations, for employment and benefits.
July 27	Public Meeting	• Public meeting with discussion on proposed PIPR Motion as brought forward for support.
Clyde River		
March 16	Clyde River Elders	• Discussion of Phase 2; royalty payments from existing Project
March 17 December 13	Public Radio Shows	• Discussion of Phase 2, general Question and Answer period • Discussion on Sustaining Operations Proposal
Igloolik		
March 24, 25	Igloolik residents	• General recruitment efforts; employment and training
March 25	Igloolik pre-trades participants	• Pre-trades course summary and career path
Pond Inlet		
April 13 July 13	Public Radio Show	• Summary of Baffinland's proposed Phase 2 development and description of benefits should Phase 2 be approved.

Date	Meeting Type	Sample of Topics Discussed
November 2 December 6		• Shipping Season 2022 Shipping update - introduction of shipping monitor team, mitigation measures. • Mary River Project updates. • Presentation on SOP, and Question and Answer period.
Sanirajak		
March 23 March 30	Public Radio Show	• Summary of Phase 2 proposal/process. • General summary of Nunavut Agreement. • Job opportunities including Heavy Equipment Operator training.
March 21-23	Sanirajak residents	• Residents interested in working at Baffinland; general recruitment efforts.
March 30	Sanirajak Elders	• Phase 2 proposal/process through our meetings with individuals.

Note:
Engagements related to Eqe Bay are excluded from this table but listed in Appendix B.1. Engagements held in 2023 on the SOP are not included.

2.3.2 Community Group Meetings

As part of its engagement efforts, Baffinland also meets directly with various community groups on a regular basis to discuss aspects of the Project and ongoing issues, concerns or recommendations community representatives may have. Accordingly, Baffinland also engaged with several community groups in 2022 including local Hunter and Trapper Organisations/ Hunter and Trapper Associations (HTOs/HTAs), Hamlet Mayors and Councils, using in-person or virtual/teleconference methods. Key events are listed in Table 2.2. Specific details are provided in in Appendix B.1.

Table 2.2: Community Group Meetings in 2022

Date	Community Group	Sample of Topics Discussed
Arctic Bay		
February 16	Hamlet of Arctic Bay and/or Mayor of Arctic Bay and/or Economic Development Officer	• Office space for Ilisaqsivik Community Counsellor.
June 29 July 27 July 12 July 22	Ikajutit Hunters and Trappers Association (IHTA)	• Phase 2 Project Proposal, Phase 2 Review Process. • Discussion on key highlights of PIPR. • Follow-up call re. PIPR, honorarium, support on documents to support IHTA public meeting.
December 8	Hamlet of Arctic Bay and Ikajutit Hunters and Trapper Association (IHTA)	• SOP Presentation, Question and Answer period, and discussion on review process.
Clyde River		
March 16	Piqqusilirivvik (Cultural School)	• Discussion of Phase 2 Review Process.

Date	Community Group	Sample of Topics Discussed
March 16 August 8 November 14	Illisaqsivik Society	• Tour of facilities; discussed Hunter Training Program details; require funding for purchase of outboard motors for hunter training boat. • Discussion of community counsellor Program.
March 17	Municipality of Clyde River and/or Mayor of Clyde River	• Update on Phase 2 Review Process.
March 16, 17 June 29	Nangmautaq Hunters and Trappers Organization – Clyde River (NHTO)	• Discussion of Phase 2 Review Process. • Key messaging points on PIPR including max of 80 vessels, use of convoys and continued dust management focus.
December 12	Municipality of Clyde River and NHTO	• Presentation on SOP, Question & Answer Period, and discussion on process.
March 17	Qikiqtani Inuit Association – Clyde River	• Discussion of Phase 2 Review process.
Igloolik		
June 29	Igloolik Hunters and Trappers Organization (IHTO)	• Discussion with key messaging points on PIPR including max of 80 vessels, use of convoys and continued dust management focus.
July 26 December 12	Hamlet of Igloolik and Igloolik Hunters and Trappers Organization (IHTO)	• Discussion of PIPR. • Presentation on SOP, Question & Answer Period, and discussion on process.
Pond Inlet		
March 23 August 2 November 2 December 8	Mayor of Pond Inlet and/or Mayor of Pond Inlet	• Overview of Phase 2 proposal/process. • Overview of Production Increase Proposal Renewal (PIPR) review processes. • Sustaining Operations Proposal (SOP).
May 24 October 13 October 16 October 17	Mittimatalik Hunters and Trappers Organization (MHTO)	• Discussion of Phase 2. • Proposed 6 Mtpa under PIPR. • Shipping schedule based on 4.2 Mtpa (ERP) versus 6.0 Mtpa (PIPR).
December 6	MHTO and Hamlet of Pond Inlet	• SOP presentation and discussion of review process.
Sanirajak		
March 21 March 30	Mayor of Sanirajak, and/or Hamlet of Sanirajak (Council or Administration Officer)	• General Baffinland update, COVID-19 Return to Work, training and general training and recruitment discussion. • Phase 2 proposal/process.
March 30 July 7 July 22 July 27	Hall Beach Hunters and Trappers Association (HBHTA)	• Phase 2 proposal/process. • Key messaging points on PIPR including max of 80 vessels, use of convoys and continued dust management focus.

Date	Community Group	Sample of Topics Discussed
March 30	Sanirajak Hamlet Council, and Hall Beach Hunters and Trappers Association (HBHTA)	• Phase 2 proposal/process.
Multiple North Baffin Communities		
March 23	Igloolik Mary River Working Group	• Review of Phase 2 proposal/process.

2.3.3 Community Donations and Sponsorships

In keeping with its values, Baffinland understands the importance of supporting various social, recreational and cultural activities in communities. In addition to IIBA-dedicated staff, which oversee the implementation of social support programs outlined in the IIBA, Baffinland has a Donations and Sponsorship Committee that evaluates proposals requesting support, in addition to being mandated to proactively identify opportunities to support North Baffin communities. Baffinland also delivers annual support for Inuit who are advancing their education (i.e., high school graduation laptop program, annual scholarships, etc.). The following lists some of the community donations, sponsorships and IIBA commitments provided primarily in the first half of 2022, as Baffinland made the difficult decision to take a pause on all new donations and sponsorships until more certainty over the future of Baffinland's operations is secured.

- 50 laptops to high school graduates in the North Baffin Communities;
- $30,000 to six (6) recipients as part of the 2022/2023 annual scholarship fund;
- $300,000 made available as part of the North Baffin Local Study Area (LSA) School Lunch Program outlined in the IIBA; $300,000 is made available for the North Baffin LSA School Lunch Program annually, as per the IIBA. In 2022, $63,601.60 was distributed as part of this program to schools in Arctic Bay, Pond Inlet, and Sanirajak;
- funds towards youth leadership capacity building and camp programming (summer and winter) through Recreation and Parks Association of Nunavut (RPAN);
- in partnership with Summit Air, provided round-trip flights using the community Dornier plane for hockey players from Pond Inlet and Arctic Bay participating in the Qamutik Cup hockey tournament held in Igloolik;
- dog supplies (food) for Nunavut Quest and Iqaluit cod derby (Iqaluit Iqalliqitiitijiit);
- other examples of direct and/or in-kind support for various community initiatives or for specific needs included:
    - transporting 32 drums of heating fuel (P50) to Clyde River in late February 2022 due to shortage of heating fuel and sending over two occasions, two (2) heavy equipment mechanics from Mary River to fix heavy equipment typically used for snow removal due to equipment breakdown;
    - sending an electrical technician to investigate malfunction of the community freezer in Pond Inlet;
    - covering transportation fees of maktaat (narwhal) from Pond Inlet to Sanirajak using commercial flight instead of Baffinland's community charter due to flight restrictions related to COVID-19 pandemic;

- transporting equipment and donating 16 drums of Jet A fuel to the Hall Beach Hunters and Trappers Association in Sanirajak to support the installation of three (3) repeater stations by helicopter and coordinating use of a Mary River-bound helicopter to reduce ferry flight fees;
- Christmas donations to each of the five (5) hamlets in support of community gatherings;
- in support of the Nasivvik Land Trip Program (Pond Inlet), purchasing two ice augers and multiple rolls of canvas cloth for tent making with high school students, in addition to securing additional funding by shipping partner for purchase of other equipment; and
- providing food baskets in some of the impacted communities to help grieving families when a loved one passes away.

In summary, in 2022 Baffinland, its business partners such as Arctic Co-Ops (through quarterly benefits, food banks, other initiatives), Summit Air, and Nordic Bulk Carriers, contributed over $600,000 towards various social, recreational, educational and cultural initiatives throughout North Baffin Communities and Iqaluit, further enhancing Baffinland's commitment to creating a positive benefit to Nunavummiut communities. At this time, Baffinland continues to take a pause on all new donations and sponsorships until more certainty over the future of Baffinland's operations is secured.

2.4 ENGAGEMENT WITH THE QIA

Baffinland is committed to maintaining a productive 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 (EmC) 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, virtually or in-person.

During 2022, 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 2022.

Baffinland and QIA held teleconferences and in-person committee meetings with the JEC, EmC and CC on several occasions throughout 2022, as presented in Table 2.3.

Table 2.3: 2022 Meetings with QIA (IIBA)

Date	Location	Description
Employment Committee (EmC)		
19-Jan-22	Teleconference	Employment Committee Meeting
23-June-22	Teleconference	Employment Committee Meeting
20-Jul-22	Ottawa	Employment Committee Meeting
20-Sep-22	Teleconference	Employment Committee Meeting

Date	Location	Description
20-Oct-22	Teleconference	Employment Committee Meeting
2-Dec-22	Teleconference	Employment Committee Meeting
Contracting Committee (CC)		
25-Jan-22	Teleconference	Contracting Committee Meeting
23-Mar-22	Teleconference	Contracting Committee Meeting
2-June-22	Teleconference	Contracting Committee Meeting
19-Jul-22	Ottawa	Contracting Committee Meeting
19-Oct-22	Teleconference	Contracting Committee Meeting
6-Dec-22	Teleconference	Contracting Committee Meeting
Joint Executive Committee (JEC)		
9-Mar-22	Teleconference	Joint Executive Committee Meeting
21-July-22	Ottawa	Joint Executive Committee Meeting

With the COVID-19 situation stabilizing in 2022, Baffinland was able to resume operations in areas previously limited by COVID-19 restrictions. This includes both the community-based and site-based Work Ready Program (WRP), in-person Employment and Training Information Sessions (ETIS) tours, and cultural engagement activities on-site.

2.4.2 Engagement on the Commercial Lease and Associated Agreements

In addition to 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 2022 were primarily focused on discussing the Annual Work Plan and Annual Securities Review. Regular engagement with QIA on the commercial lease and associated agreements has been ongoing. In 2022, 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.

2.5 ENGAGEMENT WITH WORKING GROUPS

Project Certificate No. 005 Terms and 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
- Mary River Socio-Economic Monitoring Working Group (MRSEMWG).

The Working Groups provide a valuable forum for ongoing Project communication and reporting between Baffinland and interested parties. The Working Groups also function as an advisory group that 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 subsequent results in order to prioritize monitoring plans. Working group members are also able to 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 include member-status and observer-status participant organizations.

A MRSEMWG meeting is typically held following the Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) annual meeting. The MRSEMWG is delivered a short presentation and overview of monitoring activities scheduled for the year. Project and monitoring program updates are also provided. A general discussion and comment period is then held with all working group members. In 2022, a QSEMC meeting did not occur; however, one MRSEMWG meeting was held via teleconference.

Updates on 2022 activities specific to each working group are provided below. A record of meeting minutes for all Working Group meetings held in 2022 are provided in Appendix C.

2.5.1 Terrestrial and Marine Environment Working Groups

Project Certificate Terms and Conditions No. 49 and 77 mandated the establishment of working groups related to the terrestrial and marine environments. Members for each group include the MHTO, the GN, the QIA, Environment and Climate Change Canada (ECCC), and Baffinland. Fisheries and Oceans Canada (DFO), Parks Canada (PCa) and Makivik Corporation are also members of the MEWG. World Wildlife Foundation (WWF) Canada, the NIRB, and the Canadian Northern Economic Development Agency (CANNOR) participate as observers on both groups, Oceans North participates as an observer to the MEWG, and Natural Resources Canada (NRCan) participates as an observer to the TEWG. During 2022, Transport Canada (TC) began joining MEWG meetings as an observer, however, the organization has not been granted permanent observer status due to ongoing revisions to the terms of reference that affect this process.

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 from MEWG and TEWG members;
- Discussion of results of monitoring programs to obtain feedback by MEWG and TEWG members; and
- Various research presentations (given by Baffinland, Baffinland technical consultants, and other working group members).

The working groups typically schedule two (2) yearly in-person meetings, in addition to hosting two (2) interim teleconferences per year. This is subject to change based on the most recent draft of the TOR, which states that three regular meetings and up to three touchpoint meetings will be held, in addition to ad hoc meetings at the request of members. Virtual meetings remained the preferred platform for the MEWG and TEWG throughout 2022 due to travel restrictions associated with COVID-19, as well as to avoid consultation fatigue and overlap with scheduled engagements associated with the Production Increase Proposal Renewal (PIPR).

As mentioned in Section 2.1, wherever possible, Baffinland has taken feedback received throughout the PIPR and Phase 2 review processes, and applied it to existing operations.

Additionally, where Baffinland has made modifications to the Project and the Environment Working Groups, these changes have been integrated into the SOP. Amendments to PC No. 005, outlined in Section 1.4.1, require Baffinland to provide DFO and the MEWG with a tracking table and plain language summary every six (6) months, showing collective recommendations of other members of the Working Group, as well as additional directions from DFO. Baffinland has also committed to providing more certainty and predictable timelines with regards to shipping to increase safety for the traditional use of sea ice and mitigate impacts to marine mammals. This has included the implementation and continuation of various mitigation measures, including: the avoidance of breaking landfast ice at all times; ensuring that a continuous path of 3/10ths ice concentrations is present along the Northern shipping route prior to commencement of shipping; and cessation of all shipping activities from Milne Port by October 31st. Based on feedback from community consultations and the Working Groups, Baffinland has committed to constructing and maintaining a hunters access route along the Tote Road (PC Term and Condition No. 186). The specific location of the access route will be determined by the QIA and MHTO, both of whom will jointly approve the route. Concerns raised through NIRB-review processes (e.g., Phase 2) by various Inuit stakeholders, and the TEWG regarding dust contributed towards Baffinland's commitment for creating a third-Party Dust Audit Committee, which was formed in 2021 and consists of representatives from the five (5) most impacted communities - Arctic Bay, Clyde River, Igloolik, Pond Inlet, and Sanirajak. The Dust Audit Committee has and will continue to visit Project sites to assess the efficacy of dust mitigation measures and examine alternative mitigation and management options. The Dust Audit Committee will continue providing recommendations to Baffinland regarding dust mitigation efforts, which will be shared with Baffinland no later than January 31st of each calendar year. Furthermore, Baffinland is jointly developing thresholds with the TEWG for high risk dust dispersion days (PC Term and Condition No. 188) to assist with dust mitigation. Based on feedback from the TEWG at the December 1, 2022 TEWG meeting, Baffinland will also be conducting a caribou aerial survey in spring of 2023—which was adjusted from the Fall of 2022 based on input from the Working Group.

In addition to the annual operational activities of the Working Group outlined above, since 2019, Baffinland has been engaging with the Working Group to update 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. This draft version of the ToR was discussed with the Working Group in November 2020. Following this meeting, Baffinland presented a reasonable path forward that would result in meaningful changes to the Working Groups' current structure, operational schedule, and ability to influence the Project. Baffinland circulated a further draft ToR in August 2022 which incorporated feedback from Members and Observers and proposed solutions to ongoing concerns, including the addition of an Independent Chair for the Working Groups. An Independent Chair should improve Members' expectations and communication within the Working Groups and outcomes.

Baffinland provided the most recent draft ToR to the Working Group in April 2023 which incorporated further feedback and recommendations received on previous drafts. Baffinland met with the MEWG on April 19, 2023 to discuss the updated draft ToR and collaborated on next steps to see the ToR finalized in the near future. The Working Groups are working towards appointing an independent chair for both the MEWG and TEWG, who would be responsible for scheduling and administering meetings. The Working Groups' decision-making process is being amended so that decisions are consensus-based, and recorded in writing by the independent chair. Recommendations brought forward by the Working Group that are not seen as enforceable will go to the independent chair for dispute resolution to ensure a fair outcome. The TEWG and MEWG have also been modified to include Hunters and Trappers Organization (HTO) members from an additional four communities—Clyde River,

Arctic Bay, Igloolik and Sanirajak. Baffinland acknowledges the ToR are still draft and appreciate the feedback received to date. Baffinland will continue to work with the Working Groups to finalize the amended ToRs within a reasonable timeframe and will report back to the NIRB once a final decision with the Working Groups have been reached.

A list of the meetings and topics discussed with the TEWG and MEWG in 2022 is provided in Table 2.4. Meetings with the TEWG and MEWG continue in 2023 which Baffinland will report on in its subsequent annual report.

Table 2.4: Terrestrial Environment and Marine Environment Working Group Meetings in 2022

Date	Location	Topics Discussed
TEWG		
April 28, 2022	Teleconference	The purpose of this meeting was for Baffinland to answer any member/observer questions pertaining to the draft 2021 Terrestrial Environmental Annual Monitoring Report (TEAMR). The only questions received were related to: • Helicopter overflights • Migratory birds • Weather stations and historical data

June 23, 2022	Teleconference	Overview of proposed 2022 Terrestrial Environment Monitoring Programs:
		• Climate
		  o Temperature
		  o Wind
		  o Precipitation
		• Disturbance
		  o Helicopter flight analysis
		  o Dustfall monitoring
		  o Dustfall extent satellite imagery analysis
		• Effects Monitoring
		  o Snowbank height monitoring
		  o Snow track surveys
		  o Wildlife cameras
		  o Noise monitoring
		  o Height of Land surveys
		  o Trace metals monitoring (lichen and soil sampling)
		  o Incidental wildlife observations
		  o Migratory bird nest surveys
		• Presentation by Natural Resources Canada (NRCan) – Canadian Centre for Remote Sensing and Green Mining Innovation
		  o New dust monitoring techniques (i.e. passive air samplers)
		  o Dust characterization
		  o Effects of fugitive dust on the environment
		  o Remote sensing and earth observation

Date	Location	Topics Discussed
December 1, 2022	Teleconference	• Overview of completed 2022 Terrestrial Environment Monitoring Programs o Question and answer period related to final 2021 reports and completed 2022 monitoring programs • Roundtable discussion of PIPR commitments relevant to the TEWG • Presentation by Environment Climate Change Canada (ECCC)– o Overview of Arctic-wide and regional Program for Regional and International Shorebird Monitoring (PRISM) bird survey results o Exploring the potential use of sound recorders for PRISM surveys o Discussion on other relevant studies
MEWG		
May 3, 2022	Teleconference	The purpose of this meeting was for Baffinland to answer any member/observer questions pertaining to the draft 2021 marine monitoring reports, including the Ringed Seal Aerial Survey Report (RSASP), Marine Environmental Effects Monitoring Report (MEEMP), Marine Mammal Aerial Survey Report (MMASP), Passive Acoustic Monitoring (PAM) Report, and Bruce Head Shore-based Monitoring Report. The questions and comments received were related to: • Timing of released draft monitoring reports and the NIRB Annual Report • Whether additional monitoring would be completed at sediment quality sampling location SW-2, where a grain size anomaly had been previously observed • Whether or not ringed seal aerial survey program will continue in future years • Expected date of completion for the additional analysis of 2021 aerial survey data to evaluate the calf proportion early warning indicator
June 14, 2022	Teleconference	• 2022 shipping season overview and mitigation measures o Estimated number of vessels o Established start of shipping season procedures o Established communications protocol for addressing community concerns related to shipping o Established no-go zones for vessels o Anchorage locations o Established drifting zone o Ballast water sampling protocol, including no discharge of grey water in Regional Study Area (RSA) and an overview of Transport Canada (TC) regulations o Spring aerial surveys prior to start of shipping season to ensure there is no marine mammal entrapment o Maintaining speed restriction of 9 kn for vessels o Tightening of shipping lanes

Date	Location	Topics Discussed
		○ No ice breaking during the early shoulder season and no breaking of landfast ice ○ Introduction of convoy system to reduce total sound exposure • 2022 marine monitoring programs overview, including anticipated dates and durations: ○ Marine mammal aerial survey program ○ Three program legs and objectives of each leg ○ Bruce Head shore-based monitoring program ○ Study components (i.e. visual observations and drone-based surveys) and objectives ○ Marine environmental effects monitoring program ○ Study components (tide, salinity and temperature monitoring; marine water quality; benthic epifauna and epiflora; fish and fish habitat; fish tissue; marine sediment quality; benthic infauna; settlement plates and baskets) ○ Habitat offset monitoring – not required in 2022 ○ Acoustic monitoring program ○ Study components and objectives. Note that the 2022 acoustic monitoring program originally consisted of two recorder retrievals and zero deployments, which was highlighted in this meeting. This was later modified due to various MEWG member requests. ○ Ship-board observer program ○ Study components and objectives. Note that the 2022 Ship-board observer program ended up being cancelled due to ice conditions at the end of the shipping season. • Comment review and final drafting of 2021 marine monitoring reports • 2022 Marine Shipping and Vessel Management Report and Narwhal Adaptive Management Response Plan
June 22, 2022	Teleconference	• Question and answer period for the previous June 14th meeting. Questions and comments related to: ○ Vessel ballast water treatment system types ○ Maximum number of anchorage locations ○ Distances travelled by convoys ○ Importance of deploying hydrophones to ensure that total sound exposure from convoys is effectively captured ○ Preferred location for proposed hydrophone deployment
June 29, 2022	Teleconference	• Question and answer period for the previous June 14th and 22nd meetings. Questions and comments related to:

Date	Location	Topics Discussed
		• Sampling frequencies for Marine Environmental Effects Monitoring Program • Deployment of additional quadrats in the reference area for benthic epifauna monitoring • Use of net tows for zooplankton sampling • Comparing historical and future monitoring data for studies with different sample sizes • Importance of deploying hydrophones to ensure that total sound exposure from convoys is effectively captured • Mitigation measures, specifically no ice breaking during the early shoulder season; no breaking of landfast ice; no shipping until ice concentrations are 3/10s or less • Locations of Oceans North acoustic recorders • Maximum numbers of vessels in a convoy • Frequency of freight dock monitoring • QIA community visits to Pond Inlet • Timing of released draft monitoring reports and the NIRB Annual Report
August 4, 2022	Teleconference	• Review of the 2022 Narwhal Adaptive Management Response Plan (NAMRP) o Trigger, Action, Response Plan (TARP) • Discussion related to revised draft Terms of Reference (ToRs)
December 2, 2022	Teleconference	• Update on the Production Increase Proposal Renewal (PIPR) and commitments relevant to the MEWG • Update on the Terms of Reference (ToR) draft revisions • Overview of the 2022 shipping season (i.e. No. of vessels, mitigation measures, communication protocols) • Overview of completed 2022 Marine Monitoring Programs • Question and answer period related to final 2021 monitoring reports, completed 2022 monitoring programs, 2022 shipping season, ToRs, and PIPR commitments. • Presentation by Environment Climate Change Canada o Overview of seabird research at Cape Graham Moore

2.5.2 Mary River Socio-Economic Monitoring Working Group (MRSEMWG)

Baffinland coordinates the Mary River MRSEMWG in fulfillment of Project Certificate Term and Condition No. 129. The MRSEMWG is a sub-group of the Regional QSEMC, which usually meets annually. Baffinland also acts as a participant in the QSEMC which is organized and led by the GN. The MRSEMWG includes members from the GN, the QIA, CIRNAC, and Baffinland.

A MRSEMWG meeting was held on July 14, 2022 via teleconference. Topics discussed during the meeting are outlined in Table 2.5. Minutes from this meeting are also found in Appendix C.3. On September 28, 2022, Baffinland received written correspondence from the GN indicating that, due to lack of accommodation availability in Iqaluit, no QSEMC meeting would be held in 2022.

Additional information on the meeting held and information shared can be found in the 2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023).

Table 2.5: Mary River Socio-Economic Monitoring Working Group Meeting in 2022

Date	Location	Topics Discussed
MRSEMWG		
July 14, 2022	Teleconference	2021 Socio-Economic Monitoring Report (Aglu-Stratos, 2022) 1. Results of the 2021 Socio-Economic Monitoring Report 2. Baffinland Looking Forward 3. Socio-economic monitoring under future scenarios 4. 2022 QSEMC meeting

2.6 LOOKING AHEAD

In 2023, Baffinland will work towards continuing operations under the Approved Project, including mining from Deposit No. 1. Specific activities to support the Project that are proposed to be undertaken in 2023 include: continued development and construction of infrastructure required at Milne Port, Mine Site and along the Tote Road. This will include improvements to the Tote Road to address safety concerns, freshet runoff issues and progressive reclamation of historic borrow sources; and site grading and laydown construction for supplies and equipment to support future construction activities and remove ponding and permafrost degradation issues around current infrastructure (specific details are provided in Section 3.3). Project environmental monitoring programs prescribed by the Project Certificate in consideration of the applicable Project Phase(s), water licences, authorizations, management plans and environmental effects monitoring plans will also continue through 2023.

Baffinland will work towards advancing the Steensby component of the project, comprising the 150 Km South Railway from the Mine Site to a new port facility to be developed at Steensby Inlet (collectively known as the Steensby Transportation Corridor). Limited activities are expected to be carried out along the South Railway alignment and at Steensby Port to support environmental permit applications in 2023 as well as continued engagement activities. These activities are expected to occur within the scope of existing approvals and will be reported, as required, in the annual reporting cycle for the 2023 period.

Baffinland will continue to implement a proactive approach to engagement with Inuit and other stakeholders through meetings, workshops, surveys and dissemination of information using various oral (e.g., public radio, one-on-one in-person meetings, town halls) and written (e.g., brochures, reports) communication modes. This will serve to 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 heath advice and will adapt its engagements with communities, governments, and members of the public accordingly.

3 OPERATIONS OVERVIEW

3.1 SITE ACTIVITIES COMPLETED IN 2022

Baffinland continued to focus on mine production from Deposit No. 1 in 2022. Key activities undertaken in 2022 occurred at the active Project component areas including Milne Port, the Tote Road, and the Mine Site. No Project activities were undertaken related to the development of the South Railway or at Steensby Port in 2022, with the exception of studies to update baseline information on fish and fish habitat along the South Railway and at Steensby Port to support additional permitting activities.

Mining and hauling activities from the Mine Site to Milne Port continued throughout 2022, with 5.7 Mt of iron ore hauled using the Tote Road and stockpiled at Milne Port. This year also marked the eighth shipping season with a total of 4.7 Mt of iron ore shipped between July 30 to October 13, 2022. For the second year in a row, Baffinland pro-actively made the decision to delay the start of the shipping season until ice-breaking could be avoided on the shipping route. Subsequently, the development of unfavourable ice conditions resulted in an early end to the shipping season. Ultimately, the constrained shipping season limited the volume of ore that could be shipped in 2022. Sixty-two (62) individual ore carrier round trip voyages were executed during the 2022 shipping season, with vessels carrying an average of approximately 76,000 tonnes of iron ore each.

Operational activities in 2022 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 and Milne Port 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 the shipping season (approximately between end of July and October 13, 2022). 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;
- Continued maintenance of the Tote Road to improve surface water drainage and address safety and operational concerns, that did not involve in-stream work;
- Implementation of preventative and corrective measures (i.e. check dams, silt fences, excavating culverts of snow and ice, etc.) to address sedimentation concerns during high flow periods;
- On-going progressive reclamation of priority historic borrow pits along the Tote Road;
- Continued application of dust suppression treatment under the commercial name DUST/BLOKR® as well as calcium chloride and water applications;

- Construction of new water management infrastructure at KM 104.5; initiated in 2021 and completed in 2022;
- Construction of a landfarm for impacted soil and snow adjacent to the landfill at the mine site; and
- Construction of permanent erosion and sedimentation measures in the Camp Lake area.

Representative photographs showing major 2022 site activities are included in the Photo Essay (Appendix D).

3.2 2022 HIGHLIGHTS AND CHALLENGES

The Project has been in operation since September 2014 and operational experience 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.

The COVID-19 Pandemic presented challenges with safely operating a mine, and negatively impacted Nunavummiut employees who were asked to stay home on paid leave from December 2021 to March 2022 due to the Omicron variant. For the second year in a row, Baffinland pro-actively made the decision to delay the start of the shipping season until ice-breaking could be avoided on the shipping route. The development of unfavourable ice conditions resulted in an early end to the shipping season, resulting in the amount of ore shipped from Milne Port being lower in 2022 (4.7 Mt) than in 2021 (5.6 Mt).

The Phase 2 expansion project review concluded in 2022, with the result that Phase 2 was not approved to proceed in November 2022. While Baffinland is disappointed by this decision, the company remains committed to the development of a viable operation that will continue to deliver clear benefits to Inuit, Nunavut and Canada as a whole.

3.2.1 Project Economics

Throughout 2022, Baffinland continued to communicate with Inuit and other Project stakeholders that the economics of the current Project are not considered financially viable in the long-term and that a rail line and increased production is needed to ensure long-term stability. With the decision on the Phase 2 proposal which included a rail line to the north Baffinland has had to evaluate its options for long term development plans.

Baffinland is focusing on the development of the Steensby component of the Project and securing its financing. The improvements in production and transportation from this development will serve to insulate the Project against fluctuating global iron ore prices by reducing unit costs to produce and transport our iron ore. Development of the Steensby component of the Project will safeguard it from vulnerability to market fluctuations, which will subsequently help prevent temporary or early closure of the Project. Baffinland will continue to communicate the development of its long term project plans.

3.2.2 COVID-19 Pandemic

Baffinland and its consultants continued to implement comprehensive health and safety plans and protocols to minimize the risk of COVID-19 exposure to employees, contractors and communities. To protect communities in Nunavut from COVID-19, Baffinland requested that all Nunavummiut remain home on paid leave during the first half of 2021. When easing of public health restrictions allowed, Nunavummiut returned to work in late summer 2021, but were sent home again in December due to the presence of the Omicron variant. Nunavummiut returned to work in March of 2022 for the remainder of the year. Additionally, specific protocols continued to be implemented 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 continued to implement and monitor preventative protocols, established in consultation with federal and territorial public health personnel and external infectious disease experts, which included pre-flight and scheduled COVID-19 testing on site, physical distancing, proper hand washing, frequent sanitizing, and mask use during travel and on site at Mary River. Baffinland and its consultants and advisors implemented comprehensive safety plans and protocols to minimize the risk of COVID-19 exposure to their employees and local communities until restrictions were gradually lifted.

To help protect all employees, effective September 15, 2021, Baffinland mandated all employees, contractors and visitors to site to have at least two (2) vaccinations against COVID-19 and this requirement remains in place. This consistent layer of protection allowed Baffinland to ease some of the constraints and restrictions placed upon all personnel. In September 2022, testing protocols were lessened and Polymerase Chain Reaction (PCR) testing was phased out with the introduction of COVID-19 rapid antigen testing kits, which were less invasive and provided quicker results. While it was encouraged, mask wearing was no longer mandatory unless a person was post-COVID or exhibiting flu like symptoms. Baffinland slowly transitioned back to sharing spaces such as dining halls, recreation rooms and in person safety meetings. Baffinland has maintained handwashing protocols and community flight wellness checks as these are also important preventative measures for all transmittable viruses.

With the extensive precautions and protocols in place by Baffinland, the risk of COVID-19 exposure to Nunavut communities was minimized, and operations continued with minimal risks and remained viable. Table 3.1 provides an overview of the challenges and outcomes faced in 2022 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 2022

Challenge	Relevant Term(s) and Condition(s)	Description and Outcome
Health and Safety		
Ensuring health and safety of employees and contractors during the global COVID-19 Pandemic	General application of any Term and Condition relevant to on-site activities	• Existing robust Emergency and Crisis Management Plans remained in place that included an infectious disease component, rapid responses based on risk assessments continued to be applied. • Continued operation of full scale COVID-19 testing lab at Mine Site until September 2022; PCR testing was subsequently phased out with the introduction of less invasive rapid antigen testing which provided quicker results. • Pre departure flight testing at LUX terminal for inbound personnel at the full scale COVID-19 testing lab at LUX terminal installed for this purpose, community flight wellness checks implemented.

Challenge	Relevant Term(s) and Condition(s)	Description and Outcome
		• Nunavummiut workforce were requested to remain home and remain on standby pay until March 2022; • Maintained stringent preventative controls and increased Health and Safety protocols. For example: • Baffinland continues to successfully manage the risks of potential COVID-19 transmission at its Project sites. o Quarantine and isolation protocols in place at site; o Increased sanitation cleaning of site and equipment; o Increased employee hygiene practices; o Enhanced communications with employees; and o Strict travel policies. • Baffinland continues to successfully manage the risks of potential COVID-19 transmission at its Project sites.
Individual and family health (physical and mental health)	Not applicable	Employees and contractors continued to be faced with unprecedented challenges related to the pandemic including 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, continued focus has been placed on ensuring the wellness of individuals and their families.
Shift from 2-week to 3-week rotations over field season	Not applicable	Based on risk management, flight schedules remained 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 remain priority areas.
Monitoring Program Implementation		
Field Work Logistical Considerations	General and applicable to all site-based monitoring programs	Numerous health and safety protocols remained in place to ensure the safety of employees and contractors, including during travel to and from Mary River. Work rotations remained extended from 2 to 3 weeks, to ensure stable operations in respect of safety and travel restrictions that may change rapidly.

Challenge	Relevant Term(s) and Condition(s)	Description and Outcome
Reduced Inuit Participation	101c, 126	Nunavummiut were welcomed back to site at the end of March of 2022, and full Inuit participation in the environmental monitoring programs was resumed. Inuit researchers from local communities participated in the Bruce Head, Aerial survey, Marine Environmental Effects Monitoring Program / Aquatic Invasive Species (MEEMP/AIS), Milne Inlet Freshwater Fish Health Study and Steensby baseline data collections programs. Non-Nunavut based Inuit employees also continued working on environmental programs throughout 2022.
In-person Engagement Efforts		
Pre-shipping and End of Season Shipping Meeting	Not applicable	Baffinland made multiple attempts to hold a Pre-Shipping Meeting for the 2022 season, but was unable to confirm a meeting (See Appendix B.2.2). The MHTO did participate in three MEWG meetings in June of 2022 (June 14, June 22, and June 29), which included an overview for the upcoming shipping season. Baffinland did not receive a response from the MHTO regarding scheduling the end of season shipping meeting prior to November 1st, 2022. However, a meeting was held on February 8th, 2023, as well as a radio show in Pond Inlet.
Monitoring Program Engagement (Terrestrial, Marine and Freshwater)	Not applicable	Baffinland developed an information package for the Mittimatalik Hunters and Trappers Organization (MHTO) to provide details about the 2022 Monitoring Programs, which was shared via email on June 7, 2022. MHTO subsequent participated in three MEWG meetings in June of 2022 (June 14, June 22, and June 29), which included an overview of the proposed 2022 marine monitoring programs. MHTO participated in the June 24, 2022 TEWG meeting, which included an overview of proposed 2022 terrestrial monitoring programs. Subsequently, the MHTO and four (4) additional HTOs (Igloolik, Clyde River, Arctic Bay, Hall Beach) participated in the MEWG and TEWG meetings held from February 14-16, 2023 to discuss preliminary results for both the 2022 marine and terrestrial monitoring programs.
Procurement and Contracting/Employment Tours	Not applicable	Due to COVID-19 Baffinland was unable to hold the Annual Project Review Forum (APRF) and the Contracting and Procurement Information Tour (CPIT). Though Employment and Training Information Sessions (ETIS) were held in November 2022. It is expected that in-person sessions for the APRF and CPIT will occur in 2023.

Challenge	Relevant Term(s) and Condition(s)	Description and Outcome
Community Tours/In person Meetings	Not applicable	With the gradual easing of all travel restrictions in 2022, Baffinland continued to implement a hybrid approach to community engagement activities. Where possible, meetings were held in person, supplemented by meetings held through video and telephone conference.

3.2.3 IIBA Implementation Highlights

Implementation of the IIBA contributed to many new and notable highlights for the year 2022. These include, but are not limited to, the following:

- The Mary River Inuit Training budget (Article 8.6) at Baffinland was $2.25 million dollars between 2018 until 2021, and then $1.5 million dollars for the years of 2021 through 2031. Baffinland and QIA through the Annual Work Plan highlight what training will be conducted in each year. A large focus has been placed on increasing training and development across all skill classifications in 2022.
- Successful implementation of the Harvesters Enabling Program (Article 17.7) in Pond Inlet which supplies each Inuk residing in Pond Inlet, who on January 1st 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.
- In 2022, Baffinland extended their scholarship application deadline for school year 2022/2023 into January 2023 which awards five (5) scholarships (Article 8.8.2) to North Baffin residents, totaling $25,000. Following the 2022/2023 school year, Baffinland will have awarded $245,000 to 49 well-deserving students since 2014 in pursuit of continuing education. Inuit students are welcome to apply each year that they further their education.
- Baffinland continued to provide opportunities for Inuit to participate in training while keeping health and safety as the number one priority. Training was provided in both online, and in-person formats throughout 2022.
- With the COVID-19 situation stabilizing in 2022, Baffinland and QIA were able to return to in-person Employment and Training Information Session (ETIS) tours (Article 7.8) in each of the five impacted communities. These tours provided an opportunity to discuss training and employment opportunities related to the Mary River Project, share success stories, and connect with community members about their interests. The first in-person ETIS tour of 2022 was held in November.
- Baffinland hired two (2) new Inuk trainers as the Company's Inuit Employment and Training Specialists (Article 8.4) in 2022.
- Baffinland also hired Inuit Knowledge Holders and Community Relations Guides in each of the five (5) impacted communities. While not direct requirements of the IIBA, these positions were created to further our commitment to ongoing engagement with all Nunavummiut, and particularly in North Baffin.
- 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 50 laptops to grade 12 Inuit graduates in 2022.

3.2.4 Inuit Employment and Contracting

In 2022, a total of 505,605 hours were worked by Inuit and 3,304,182 by Non-Inuit. These hours include those worked by both Baffinland and Contractor employees. In total, Inuit employment hours were 15% of the total hours worked. Baffinland's Inuit employee payroll totaled $17,401,800.28. These amounts include all Inuit employees who lived in and outside of Nunavut. Contractor's Inuit employee payroll totaled $6,680,887.15. These amounts include all Inuit employees who lived in and outside of Nunavut.

Throughout 2022, Baffinland continued to hire Shipping Monitors in Pond Inlet to provide a direct liaison between the community of Pond Inlet, the MHTO and Baffinland. A total of ten (10) Shipping Monitors were hired in 2022 in order to provide local community oversight on Baffinland shipping operations over the entire length of the season, including daily tracking of vessel locations and speeds. Hires consisted of five (5) returning Shipping Monitors from previous years and five (5) new workers/summer students joined the shipping monitoring team between July and October 2022.

Since 2014, Baffinland (not inclusive of contractors) has provided $108.5 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 2022 totaled approximately $162.2 million. This includes twenty-six (26) contracts with Inuit-owned businesses and joint ventures, most of which were based in either the North Baffin communities or Iqaluit. Since Project development, a total of approximately $1.5 billion worth of contracts have been awarded to Inuit-owned businesses and joint ventures.

Throughout 2022, Baffinland continued to take steps to ensure that maximum benefits of the Project, represented by employment and contracting opportunities, were accessible to Inuit.

3.2.5 Training Initiatives

Baffinland and the Qikiqtani Inuit Association (QIA) as well as the Government of Nunavut (GN), Kakivak Association and the Government of Canada partnered in the $19 million Qikiqtani Skills and Training for Employment Partnership (Q-STEP) training program from 2017 to 2022. The objective of this program was 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 Qikiqtani region. Training under the Q-STEP program includes work ready programs (community-based and site-based), formal certification in heavy equipment operation, community-based driver training for Class 7, Class 5, and Class 3 (managed by QIA), general skills development, and apprenticeship programs.

The Q-STEP 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 was extended until March 31st, 2022, and the Q-STEP teams were authorized to expend the remaining funds. In a joint proposal, the Q-STEP team members at Baffinland and QIA secured additional funding from Kakivak Association to ensure that the Q-STEP program would continue. This additional funding, which expired on March 31, 2023, included:

1. Community based work readiness training
2. On-site work readiness training
3. Heavy Equipment Operator (HEO) Training
4. Adult Basic Education and Pathway to Adult Secondary School programs

The Q-STEP team continues to seek additional third party funding to support the continuation of apprenticeship training at Baffinland.

In 2022, Inuit training hours totalled 52,0558 hours, equivalent to 38.9% of the total training provided by Baffinland. This is an increase of 56.5% in Inuit training hours when compared to 2021, which is remarkable given that Inuit employees were returned home from site due to COVID-19, from late December 2021 to early March 2022.

3.2.6 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 IIBA and the Inuit Procurement and Contracting Strategy, Baffinland supports the development of local businesses through its annual contribution of $275,000 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 with, and will continue to work with local businesses on an ongoing basis to create contracting opportunities in the communities.

3.3 LOOKING AHEAD

The 2023 Annual Work Plan was submitted to the NWB, QIA and CIRNAC on December 15, 2022 (Baffinland, 2022b). 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.

A summary of the planned 2023 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 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;
- Ongoing 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.

Activities planned to be undertaken along the south railway or at Steensby Port in 2023, include a geotechnical drilling program, archeological site mitigation, and a sealift of supplies and equipment to Steensby Port that may occur to support the commencement of construction works in 2024.

Project environmental monitoring programs prescribed by the Project Certificate, water licences, authorizations, management plans and environmental effects monitoring plans will continue through 2023.

4 PERFORMANCE ON PC TERMS AND CONDITIONS

The following sections provide a discussion of Baffinland's self-assessed status of compliance and performance related to each of the Project Certificate (PC) Terms and Conditions for the Project in 2022.

The discussion of compliance with PC Terms and 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 Term and Condition has been assigned a status of compliance. Where a PC Term and Condition is designated as being only 'In Progress" or 'Non Compliant', a rationale explaining why 'In Compliance' was not achieved in 2022 and, where applicable, a strategy for moving towards full compliance in a future reporting year has been provided. It is noted that some Terms and Conditions may or may not be active during a phase of the Project and/or a specific component of the Approved Project may not yet be active in the reporting year (e.g., Steensby Port). Accordingly, for those Terms and Conditions that may be applicable to both the Northern (Tote Road and Milne Port) and Southern Transportation corridors (South Railway and Steensby Port), compliance status will be split up and reported for the active component only.

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

Status	Criteria
Status of Project Condition	
Active	The PC Term and Condition is active during the current phase of the Project for the relevant monitoring period and in consideration of the relevant active Project component.
Not Active	The PC Term and Condition is not active for the relevant monitoring period, is tied to a project component that was not yet applicable during the reporting year, and/or is tied to a phase of the project that is currently completed.
Status of Compliance	
In Compliance	Obligations have been met or exceeded, as intended in Project Certificate No. 005 for the relevant monitoring period. A previous 'Completed' and 'Accomplished' by the NIRB status will remain 'In Compliance' with a 'Not Active' status. *Rationale for meeting compliance requirements is provided.
In Progress	Obligations have been partially fulfilled, as intended in Project Certificate No. 005 for the relevant monitoring period, or a plan to achieve full compliance is being actioned. *Demonstrable efforts towards meeting compliance requirements is evidenced.
Non Compliant	Obligations have not been met as intended in the Project Certificate No. 005 for the relevant monitoring period.

Status	Criteria
	*Rationale for being unable to meet compliance requirements is provided.
Not Applicable	The 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 Terms and Conditions for 2022. When determining a status of compliance for each of the PC Terms and Conditions, the following process was implemented by Baffinland and its technical experts:

1. A review of the specific requirements outlined in each PC Term and 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 Term and 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 Term and Condition and the work completed by Baffinland to meet these requirements.
5. Inuit and stakeholder comments as relevant to the PC Term and 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 this approach in the absence of specific guidance from the NIRB on expectations on Proponents for the preparation of Annual Reports and a description of the NIRBs compliance assessment evaluation process.

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 Term and Condition Summary Sheets

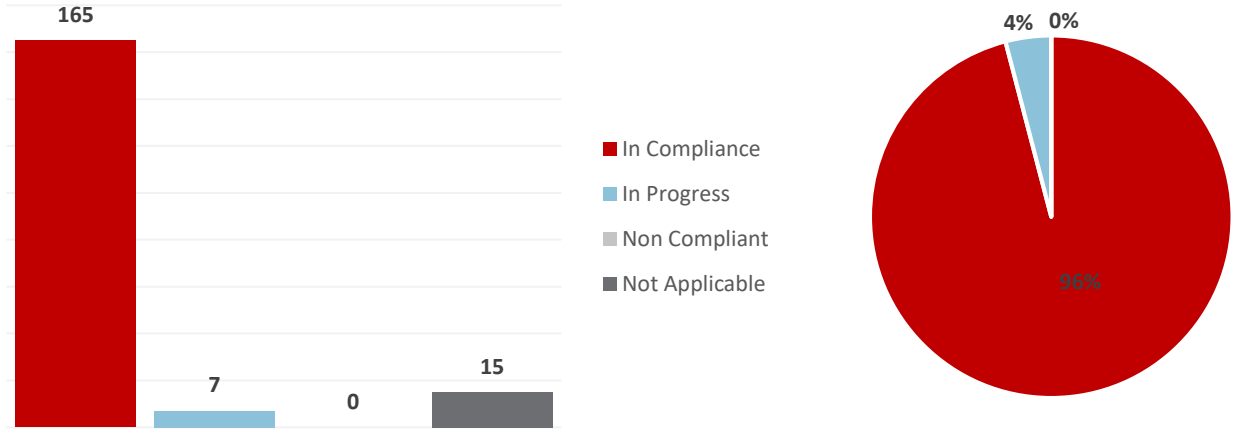
Item	Summary of Content
Category	• Category as defined in PC No. 005.
Responsible Parties	• Responsible party as defined in PC No. 005.
Project Phase(s)	• Phase(s) of the Project the PC Term and Condition is applicable to: o Construction o Operations o Temporary Closure / Care and Maintenance o Closure o Post-Closure Monitoring (as outlined in PC No. 005)

Item	Summary of Content
Objective	• The objective as outlined in PC No. 005
Term or Condition	• The Term or Condition as written in PC No. 005
Relevant Project Commitment	• List of all corresponding Baffinland commitments outlined in the Final Hearing Report (NIRB, 2012b) and PC No. 005 Amendment No. 04 (NIRB, 2022a)
Reporting Requirement	• The reporting requirement as outlined in PC No. 005.
Status of Project Condition	• A self-assessed status of compliance for the PC Term and Condition: o Active o Not Active
Status of Compliance	• A self-assessed status of compliance for the PC Term and Condition: o In Compliance o In Progress o Non Compliant o Not Applicable
Inuit and Stakeholder Review	• 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 Term and Condition.
Reference	• Description / title of relevant documents where supporting information related to PC Term and Condition status of compliance is available for review. • URL to web-portal where referenced documentation can be accessed, and/or Appendix where documentation can be found appended to the report.
Methods	• The methods employed to complete work required to meet compliance to the PC Term and Condition. • Summary of any adaptive management measures employed that year in support of achieving compliance to the PC Term and Condition.
Results	• Summary of analytical results, quantitative/qualitative data or work that were completed in support of achieving PC Term and Condition compliance in 2022.
Trends	• 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). • Trends are identified using the following general guidance: o A review of all work completed in the reporting year and/or previous reporting years (if applicable) relevant to the PC Term and Condition is conducted. o 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.

Item	Summary of Content
	o 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.
Recommendations / Lessons Learned	• Summary of any operational changes undertaken or recommended for the future to achieve compliance or to further enhance environmental performance. • Assessment of effectiveness of monitoring program and whether any changes to the scope of monitoring are appropriate. • Identification of any challenges related to implementing mitigation measures, undertaking monitoring, or obtaining data from other sources.

4.3 SUMMARY OF 2022 COMPLIANCE WITH TERMS AND CONDITIONS

Baffinland's performance in fulfilling the PC Terms and Conditions in 2022 is presented on Figure 4.1. A summary of each of the Terms and Conditions and the Project status with respect to 2022 is presented in Appendix A. Since Terms and Conditions related to the not yet constructed components of the Approved Project (i.e., the Southern Transportation Corridor comprising the Southern Rail alignment and Steensby Port) were not applicable in 2022, compliance performance is focused on those related to the Mine Site and the Northern Transportation Corridor (Tote Road and Milne Port). Once applicable Terms and Conditions are triggered through the development of the Steensby component, compliance performance will consider all Approved Project components.



Number of PC Terms and Conditions by Compliance Status

Percent of Total for Terms and Conditions that were Applicable in 2022

Figure 4.1: Baffinland's Overall Performance against Project Certificate Terms and Conditions in 2022

Overall, Baffinland is in compliance with the required Terms and Conditions for the Project. Of the 187 Terms and Conditions that were applicable to the Project in 2022, Baffinland is 96% In Compliance with these Terms and Conditions. This is consistent with 2020 and 2021 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 TERMS AND 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 2022 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 Steensby rail and port project, the Early Revenue Phase, and for the Production Increase Proposals starting in 2018 until the end of 2022 (NIRB, 2022c), as well as the permits necessary to operate the latter two (2) components of the Project (Table 1.2). Baffinland will obtain additional permits prior to initiating construction of the Steensby component of the project.

These approvals often include additional permits with 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 as per guidance. 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 2022 was issued to the QIA and Joint Executive Committee on March 31, 2022. 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 Annual Security Review (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 1, 2021 for the 2022 year. Publicly 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 2022 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 also began including a popular / executive summary translated into Inuktitut 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 and NWB Annual Report for Operations and the QIA and NWB Annual Report for Exploration and Geotechnical Drilling. Meeting minutes and presentation materials of 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 2022, and remains operational as of the date of this report's submission. Where relevant, 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 also 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 2022 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 Crown Indigenous Relations and Northern Affairs Canada (CIRNAC), Environment and Climate Change Canada (ECCC), Qikiqtani Inuit Association (QIA), Department of Fisheries and Oceans (DFO) and the Workers' Safety and Compensation Commission (WSCC) throughout the calendar year. Where relevant, documentation and correspondence associated with these inspections are available in the 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a). The following subsections outline the inspections conducted by regulatory agencies and stakeholders at the Project in 2022. Details regarding NIRB's site visits are provided in Section 5.1.

4.5.1.1 CIRNAC Inspections

During 2022, CIRNAC Water Resources Officers conducted two (2) inspections of the Project. The dates of the inspections are as follows:

- June 29, 2022; and,
- October 5, 2022.

Inspection results were conveyed during close-out meetings at the Project and are documented in Water Licence Inspection Reports distributed to Baffinland following the inspection. 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 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a).

4.5.1.2 QIA Inspections

In 2022, QIA completed two (2) inspections/visits of the Project under the Commercial Lease. The dates of the inspections are as follows:

- May 31 to June 2, 2022; and,
- August 24 to 25, 2022.

LGL Limited (LGL), and Source Environmental Associates (Source) conducted the August Inspection on QIA's behalf. In addition to the inspections, the QIA conducted one (1) environmental audit in 2022. A site visit component of the audit, scheduled for November 28 to 30, 2022, could not be performed due to inclement weather restricting QIA's travel arrangements on the planned site visit departure date. Alternative travel options reviewed by the QIA were determined to not be feasible and, therefore, the 2022 audit consisted of information review and desktop-based work, from which an Audit Report will be issued by QIA to Baffinland. While outside of this reporting period, Baffinland provided responses to QIA's December 13, 2022 Audit Information Request on January 3, 2023.

The findings from the inspections were conveyed during the close-out meetings and 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 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a).

Additionally, site-based QIA Environmental Monitors were employed by QIA and integrated into the Site Environment team. The QIA environmental monitors allow for QIA oversight of monitoring activities and data collection at the Project site year round.

4.5.1.3 ECCC Inspections

ECCC Enforcement Officers conducted two (2) site visits/inspections in 2022. The dates of the site visits are as follows:

- June 21- 23, 2022; and
- October 4 to 6, 2022.

On September 23, 2022 ECCC issued a warning letter to Baffinland for Total Suspended Solids (TSS) exceedances at MS-06 on June 4 and July 1, and at MS-11 on June 9 and June 11 as a result of freshet conditions and rapid spring melt. Initial design documents for the KM 105 Sedimentation Pond (MS-11) indicated that adequate total suspended solids (TSS) settling to meet MDMER and Water Licence Discharge Criteria should be met after 3 days of retention. When the settling performance observed during the 2022 freshet event did not reflect this, Baffinland immediately began investigating ways to improve settling at the KM 105 Sedimentation Pond, following the advice of the design engineers in consultation with other third party water treatment experts.

4.5.1.4 DFO Site Visit

In 2022, DFO completed one (1) inspection of the Project to inspect fish-bearing crossing locations along the Tote Road. The date of the inspection is as follows:

- June 28 to 30, 2022.

Baffinland is currently working with DFO to develop plans to address fish passage issues along the Tote road at specific locations. A Request for Review was submitted to DFO in May 2022, and DFO staff subsequently visited the Mary River site to inspect the fish-bearing crossing locations. Engagement with DFO is ongoing and plan is being developed to address the issues.

4.5.1.5 Transport Canada Marine Safety and Security (TCMSS) Inspection

TCMSS completed one (1) inspection of the Milne Inlet Ore Handling Facility in 2022 during the fuel transfer season, which included a review of the Oil Pollution Emergency Plan (OPEP). The date of the inspections is as follows:

- August 30 to 31, 2022.

TCMSS identified four (4) requirements to be met which pertained to updating the OPEP plan content, and two (2) on-site requirements to be met: one (1) respecting secondary communications usage for transfer operators, and one (1) pertaining to an outdated plan that was observed in a work area and an associated concern that locations onsite where the Plan is to be located were not adequately identified. To address the concerns raised by TCMSS, Baffinland submitted a Corrective Action Plan to TCMSS detailing how and when each of the concerns identified during the 2022 regulatory inspection will be rectified, and the 2023 OPEP and Oil Pollution Prevention Plan (OPPP) updates, to be submitted to Transport Canada in May, 2023, will include the updates described in the Corrective Action Plan.

4.5.1.6 Workers' Safety and Compensation Commission (WSCC) Mine Inspections

The WSCC conducted one (1) inspection of the Project in 2022. The date of the inspection is as follows:

- October 28 to November 1, 2022.

The inspector carried out general inspections at various locations at the Mine Site and Milne Port, and along the Tote Road. Deficiencies identified during the general inspections were captured in the WSCC inspection reports and distributed to Baffinland management and the Baffinland Occupational Health & Safety (OHS) Committee. The 2022 directives that resulted from the visit were reviewed by the management team; the majority of the directives were completed during the inspection and the remainder were completed in a timely manner shortly thereafter and before the requested completion dates.

4.5.2 Unauthorized Discharges and Spills

During 2022, twenty-four (24) spills were reported to the Northwest Territories-Nunavut (NT-NU) Spill Report Line, CIRNAC and QIA by the Project. Overall, this represented a frequency increase of 71% when compared to the frequency of reportable spills in 2021. Baffinland continues to work to identify basic causes so that effective long term corrective actions can be implemented.

In addition to the original spill report submitted within 24 hours of each spill event in 2022, a detailed follow-up report was submitted within thirty (30) days of each reported spill. An incident investigation was conducted for all spills that were reported to the 24-hour NT-NU Spill Report Line, or other applicable reporting processes, to assist in determining the root cause of a spill event and in identifying effective corrective actions. 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. A summary of the 2022 spills reported by the Project are outlined in Table 4.3. Details regarding all spills reported to the NT-NU Spill Line in 2022, including follow-up and original spill reports and

corrective actions and future plans for mitigation have been provided to relevant regulatory bodies and are also provided to the NWB, CIRNAC, ECCC and the QIA in March 2023 with the 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a).

Baffinland continued to investigate the basic causes of all spills that occurred on site in 2022 so that effective long-term corrective actions could be implemented to reduce the frequency of spills at Project sites. A basic analysis of the spills reported in 2022 indicated that the most common causes for the spills continued to be equipment failure, followed by procedural issues (inadequate procedure or training). Mandatory spill reporting is enforced at all levels in the organization and initiatives are undertaken by Baffinland to reduce the frequency spills at the Project, including but not limited to: improved preventive maintenance plans, daily pre-operational checks of all equipment, spill tray usage bulletins, tool box meetings, prescribed training sessions, specific product handling and spill reduction plans.

Construction began in 2021 on approved surface water management infrastructure outlined in the Long Term Surface Water Management Plan (Baffinland, 2021b). The Long Term Surface Water Management Plan will continue to be implemented in 2023. Construction activities planned for 2023 include engineering for the SDLT-1 Pond Ore Stockpile Stormwater Pond, as well as construction activities around the Quarry QMR2 Pond/Sump to reduce potential erosion and sedimentation and minimize releases of TSS to Camp Lake and its tributaries (Baffinland, 2021b).

Table 4.3: List of Reported Spills and Unauthorized Discharges – 2022

Date of Occurrence	Quantity (m^3)	Material Spilled	Approximate Location (UTM; NAD83 Zone 17W)		Proximity to a Waterbody? (m)	Spill Line ID No.
			Easting	Northing		
15-Mar-22	28	Oily Water	561669	7913161	160	2022-079
4-Apr-22	1	Sewage - Untreated	560791	7913291	90	2022-120
29-Apr-22	0.4	Diesel	561240	7913211	350	2022-157
7-May-22	5	Sewage - Untreated	560791	7913291	90	2022-169
14-May-22	Unquantified	Sediment-laden water	560332	7913519	0	2022-198
17-May-22	Unquantified	Sediment-laden water	557686	7914947	0	2022-205
2-Jun-22	Unquantified	Sediment-laden water	529245	7926918	0	2022-229
4-Jun-22	Unquantified	Sediment-laden water	561497	7912908	0	2022-233
5-Jun-22	Unquantified	Sediment-laden water	561018 557805	7912968 7914795	0	2022-237
9-Jun-22	Unquantified	Sediment-laden water	562171	7913160	0	2022-279
14-Jun-22	Unquantified	Sediment	557960	7914732	0	2022-283
24-Jun-22	Unquantified	Sediment-laden water	553544 527622 522927 521663 521033 507629	7914897 7930342 7945093 7953392 7954935 7970074	0	2022-340

Date of Occurrence	Quantity (m^3)	Material Spilled	Approximate Location (UTM; NAD83 Zone 17W)		Proximity to a Waterbody? (m)	Spill Line ID No.
			Easting	Northing		
			555751	7914736		
24-Jun-22	Unquantified	Sediment-laden water	504113 503187	7976509 7975602	0	2022-361
8-Jul-22	2	Diesel	563377	7914915	>1000 m	2022-358
14-Jul-22	Unquantified	Sediment-laden water	562166	7913144	0	2022-364
20-Jul-22	0.5	Sewage - Untreated	559447	7914090	100	2022-372
13-Aug-22	0.25	Diesel	560331	7913743	75	2022-415
14-Aug-22	0.3	Waste Oil	504096	7976574	21	2022-416
4-Sep-22	0.15	Hydraulic Oil	521552	7953734	0	2022-450
13-Sep-22	0.15	Diesel	503692	7976171	>100 m	2022-462
18-Sep-22	0.19	Hydraulic Oil	544610	7920334	320	2022-473
14-Oct-22	0.2	Glycol/Coolant	561240	7913211	140	2022-499
24-Nov-22	0.175	Glycol/Coolant	503615	7975861	40	2022-541
20-Dec-22	1761	Non-Compliant Effluent	562320	7911940	>100	2022-558

4.5.3 Water Licence Compliance (Type 'A' 2AM-MRY1325 and Type 'B' 2BE-MRY2131)

In 2022, Baffinland operated the Mary River Project under its Type 'A' Water Licence (2AM-MRY1325 – Amendment No. 1) and a Type 'B' Water Licence (2BE-MRY2131). 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.

Compliance with the conditions and requirements outlined in the Type 'A' Water Licence during 2022 is discussed in the 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a). Similarly, compliance with the conditions and requirements outlined in the Type 'B' Water Licence is discussed in the 2022 QIA and NWB Annual Report for Exploration and Geotechnical Activities (Baffinland, 2023b).

4.6 PERFORMANCE ON ECOSYSTEMIC TERMS AND CONDITIONS

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

The first six (6) PC Terms and 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, 2014) 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 2021, input on climate change considerations was specifically sought by various institutions, Inuit and community groups in order to further inform revisions to the Draft Climate Change Strategy. Baffinland recognizes that the Company has a role to play in reducing its energy use and emissions and is aware that arctic environments are changing, which is a concern to Inuit. Accordingly, Baffinland's newly revised Climate Change Strategy (Appendix G.1, Stratos, 2023a) recognizes the role that Inuit want to take to monitor climate changes and associated impacts and has integrated these considerations into its supporting actions.

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 2022 Final Terrestrial Environment Annual Monitoring Report (Appendix G.5.1; EDI, 2023a) as well as the Air Quality, Dustfall and Meteorology Report (Appendix G.2.1; Stantec, 2023).

Ongoing Project monitoring provides the potential to track potential changes in temperature, precipitation, and wind speed over time. Monthly mean temperatures at the Mine Site were lowest in February (−33.7°C), rising above zero in June (3.4°C) and peaking in July (13.4°C). Monthly means fell back below zero in October (−10.6°C). December 2022 presented the largest monthly anomaly, 6.8°C warmer than the baseline average, while November was 5.6°C below the baseline. The temperature from June 17 until September 18 remained above zero, except for seven (7) hours on August 30 and 31. Minimum and maximum temperatures in 2022 at the Mine Site were recorded on December 20 (−45.3°C) and July 16 (24.1°C), respectively. These extremes lie within the recorded historical range, although the summer high is within half a degree of the recorded maximum from 2016. Wind blows predominately along a northwest-southeast axis at the Mine Site, although uncommon eastward winds tend to be the very strongest to hit the station. Baseline (2005 to 2010) and post-baseline (2013 to 2021) wind directions and speeds at Mine Site were consistent compared to those in 2022. In baseline years, most winds were southeasterly and characterized as 'moderate breeze' to 'strong breeze'. Post-baseline years also had predominantly southeasterly

winds, typically ranging between a 'gentle breeze' and a 'fresh breeze', though occasional 'gale' (17.2 to 20.8 m/s) and 'strong gale' winds occurred.

Monthly mean temperatures at Milne Port were at their lowest in February (−33.4°C), rising above freezing in June (2.4°C) and peaking in July (11.3°C) before dropping back below freezing in October (−10.3°C). From June 26 to September 18, 2022, the temperature remained above the freezing point (see Figure 4-3 in EDI, 2023a; Appendix G.5.1). The year of 2022 at Milne Port can be characterized as closely matching baseline temperatures. The lowest temperature of 2022 at Milne Port was −41.6°C on February 2, while the highest was 21.7°C on July 13. Comparing trends between the two weather stations, Milne Port is consistently cooler and drier than the Mine Site. In 2022, temperatures recorded at Milne Port were, on average, 0.4°C cooler than the Mine Site throughout the year. The effect is more pronounced in the summer and less in the winter. Since the start of the baseline recording, Milne Port has averaged 2.1°C cooler than simultaneous measurements from the Mine Site. The prevailing wind directions at Milne Port in 2022 were north-northwest (onshore winds from the direction of the Project) and southwest (onshore winds blowing down the length of the inlet), with very little wind from the west or east. The 2022 wind records at Milne Inlet varied notably from baseline (2005 to 2010) and post-baseline (2013 to 2021) wind directions and speeds. Earlier records show prevailing winds blowing to the south southeast (offshore winds blowing across the inlet) and north-northeast (down the inlet and toward the ocean). However, despite this variation, the overall pattern remains consistent, with winds blowing along the northeast-southwest axis and north-northwest to south-southeast axis.

Baffinland continues to track and monitor GHG emissions and report as per ECCC'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 (AQNAMP; Baffinland, 2021c). Baffinland submitted a Climate Change Strategy to NIRB on February 12, 2019 (Baffinland, 2019b). This first strategy initially 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. A revised Climate Change Strategy has been developed, focusing on emissions reductions and work with Nunavummiut to monitor and adapt to climate changes in the North (Appendix G.1; Stratos, 2023a).

Table 4.4 provides a summary of monitoring completed in 2022, and an evaluation of impacts relative to the predictions presented in the FEIS and FEIS Addendum. The calculated gaseous emissions in 2022 (Table 4.4) are below the maximum annual GHG, Sulphur Dioxide (SO_2) and Nitrogen Dioxide (NO_2) 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_2 and NO_2 emissions at Milne Port	Increased SO_2 and NO_2 emissions	SO_2 and NO_2 emissions calculated from fuel combustion: Emissions below FEIS forecast	Effect within FEIS predictions
SO_2 and NO_2 emissions at Mine Site	Increased SO_2 and NO_2 emissions	SO_2 and NO_2 emissions calculated from fuel combustion: Emissions below FEIS forecast	Effect within FEIS predictions

Path Forward

As Baffinland implements the supporting actions of its amended two-goal Climate Change Strategy, updates regarding the status action plans will be provided as part of annual reporting efforts. The updated Climate Change Strategy will serve as an important tool to guide and articulate Baffinland's efforts on PC Terms and Conditions No. 2, 3 and 4 (Appendix G.1; Stratos, 2023a). Baffinland will continue to undertake 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 Term and Condition is included in the pages that follow.

Project Certificate Term and 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 Global Positioning System (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	Not applicable
Reporting Requirement	The Proponent shall summarize and supply these monitoring results to NIRB in the annual project report.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	A new national crustal velocity model for Canada (Robin et al., 2020) Arctic Sea Level Budget Assessment during the GRACE/Argo Time Period (Raj et al., 2020) Contributions to Arctic Sea Level from 2003-2015 (Ludwigsen and Andersen, 2020) Relative sea-level projections for Canada based on the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report and the NAD83v70VG national crustal velocity model (James et al., 2021) 2022 MEEMP and NIS/AIS Monitoring Report (WSP, 2023a)
Ref. Document Link	Not applicable

METHODS

Steensby Port

The lack of existing marine infrastructure at Steensby Port means that a water level gauge cannot currently be installed by attaching it to a repeatable location on fixed infrastructure (e.g., a pier or ladder at a dock). Hence, the approach taken to fulfill this Condition used measurements taken from both Acoustic Doppler Current Profilers (ADCP) and GPS systems to determine relative water levels, as further described below.

In September 2021, an oceanographic mooring was deployed southeast of the proposed Steensby ore dock in Steensby Inlet and recovered one year later, in September 2022. The oceanographic mooring included two (2) Acoustic Doppler Current Profilers (ADCPs) - one upward-looking and one downward-looking - that were programmed to continuously monitor currents, water levels, and temperature. Relative water levels in Steensby Port will be established during the 2023 calendar year using the water depth data recorded by the upward-looking ADCPs in 2021/2022.

It is standard practice to reference water level elevation data to a datum, which is a base elevation used as a reference point from which to reckon heights or depths. To create this datum, a measurement of water surface elevation at the mooring location was taken from a control point established on Steensby Island using a survey-grade Real Time Kinematic Global Positioning System (RTK GPS) in September 2021. The water level elevation data will then be compared to the surveyed water level elevations at the same time points.

Milne Port

In 2022, oceanographic monitoring continued at Milne Port to continuously measure water level, temperature, and conductivity using an RBRconcerto (RBR) Conductivity, Temperature, and Depth (CTD) sensor. Detailed methods are provided in WSP (2023a).

RESULTS

Steensby Port

Results are not yet available pending processing and analysis of data in 2023. Results will be presented in Baffinland's 2023 Annual Report to the NIRB.

Milne Port

Water level data recorded at Milne Port indicated typical fluctuations resulting from tidal forcing. During the measurement period, a total of seven neap-spring tidal cycles were observed and there were no observable storm surges. Detailed results are presented in (WSP, 2023a).

TRENDS

Steensby Port

Trend analysis is not yet possible given that this component of the Approved Project is inactive and accordingly lacks a multi-year dataset. However, results collected to date will be presented in Baffinland's 2023 Annual Report to the NIRB.

Milne Port

Results are consistent with prior years. Detailed results are presented in the Final Report for the 2022 MEEMP and NIS/AIS Monitoring Program (WSP, 2023a).

RECOMMENDATIONS / LESSONS LEARNED

Steensby Port

N/A

Milne Port

The current survey equipment at Milne Port that is used to measure water levels at Milne Port does not provide the level of accuracy and precision required to inform relative sea levels and storm surges at this site (i.e., as per the assumed intent of the Term and Condition). Changes in relative sea level are expected to be on the scale of fractions of a millimeter per year while the resolution of data collected using GPS surveys is on the order of centimetres. For example, modelling of vertical land motion for Canada (Robin et al., 2020 cited in James et al., 2021) indicates uplift rates of approximately 5 mm/year for northern Baffin Island while results of GPS surveys in 2022 show the elevation

of the tide gauge decreasing 0.354 m from 2021. It is well known that quantitative measurements with the degree of precision and accuracy required to measure uplift rates are extremely difficult to obtain at northern latitudes (e.g., Ludwigsen and Andersen, 2020; Raj et al., 2020).

While Baffinland can explore alternative options for survey equipment that would increase the accuracy and precision of field measurements, the resolution of the data is still unlikely to meaningfully fulfill this Condition. This is because significant trends in relative sea level are likely too small to be measurable in the short term based on projections that indicate that relative sea level will either fall or be near neutral for northern Baffin Island (James et al, 2021). Hence, relative changes in sea level are likely to be very small differences between two (2) small quantities, both with a high degree of uncertainty. Climate change impacts on the project are unlikely to show up in relative sea level changes, even if they could be measured, and are more likely to impact features such as changes in sea ice cover, temperature regime, and hydrologic regime.

Based on the above, Baffinland recommends discontinuing tidal gauge monitoring in 2023 in favour of exploring alternative options to better meet the objective of this Term and Condition using an alternative climate change indicator other than Sea Level Rise (SLR) such as temperature and precipitation regime, or climate response variables such as ice cover and hydrologic response.

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	Climate Change Strategy (Stratos, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.1

METHODS

No new or revised assessments or studies were required in 2022 to validate and/or update the climate change impact predictions for the Project.

Baffinland first submitted a Climate Change Strategy (the Strategy) to the NIRB on February 12, 2019 (Baffinland, 2019b). The Strategy described the actions the Company planned to undertake to validate and update climate change impact predictions for the Project, and the effects of the Project on climate change. These included:

- Implementing comprehensive environmental monitoring and management programs that are based on a combination of scientific data and Inuit Qaujimajatuqangit to safeguard the environment.
- Modifying or replacing equipment with more efficient alternatives to reduce Greenhouse Gas (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 subsequently 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 aimed to identify priorities and describe the approach to greenhouse gas emissions management including plans for emissions reductions, assessment of anticipated impacts of climate change on the Project, and how Baffinland may work with Nunavummiut to monitor and adapt to climate changes in the North.

RESULTS

In 2022, despite some previous delays related to challenges associated with the COVID-19 Pandemic, Baffinland continued to build upon the foundational basis initiated in September 2019 to further refine development of an amended Strategy based on a two-staged approach as summarized below and initially presented in the 2019 to 2021 Annual Report to the NIRB (Baffinland, 2020b, 2021a and 2022a):

- **Stage 1 (all tasks completed by end of January 2021)**: Development of an amended Draft Strategy, informed by an external scan for benchmarking across similar sectors and region (Task 1); an internal scan to assess current and future state of operations which incorporated information across the organization (Task 2); establishment of a current state assessment and options for positioning in consideration of internal and external scans (Task 3); and development of a two-goal Draft Strategy document that defines Baffinland's goals, objectives and priority action areas and approaches, with specific options for consideration for implementation (Task 4; see Appendix G.1 in Baffinland, 2022a).
- **Stage 2 (February 2021 to present)**: Refinement of the amended Draft Strategy and Action Planning, based on the following considerations including, external engagement using the draft Strategy (Task 5; interviews completed May to November 2021); finalization of the Strategy based on external engagement and approval on path forward for establishment of short- to medium-term action areas (Task 6; December 2021 – November 2022); and development of plans for supporting actions based on foundational elements (Task 7; November 2022 - present).

In collaboration with an environmental and sustainability consultancy, Baffinland completed all tasks associated with Stage 1 by the end of January 2021, 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 Terms and 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 earlier activities.

Following completion of the Draft Strategy (Stage 1), Baffinland sought external feedback to better understand Inuit and stakeholder interests and expectations related to its management of climate change impacts. Where appropriate, focus was also placed on exploring opportunities for collaborative action on climate change.

The Draft Strategy presented as part of external engagement efforts included an overarching statement highlighting Baffinland's commitment for improving energy efficiency and greenhouse gas emissions performance, and working

with Nunavummiut to monitor and adapt to climate change (See Appendix G.1 in Baffinland, 2022a*)*. Interviews were completed by third-party consultant Stratos Inc., and Aglu Consulting and Training Inc., with various institutions (e.g., federal and territorial governmental, non-governmental and Inuit organizations) and community representatives between May and November 2021 (see Table 4.5). Requests for participation were sent to hamlets and hunters and trappers organizations from all of the five North Baffin communities (i.e., Arctic Bay, Clyde River, Igloolik, Pond Inlet, and Sanirajak). In addition, a number of outreach methods including posters on community boards, social media and local radio were used to reach out to interested residents willing to take part in an interview to obtain feedback on Baffinland's Draft Strategy. Interview guides were tailored for each type of organization and/or community representative engagement. These guides included a copy of the proposed Draft Strategy framework (the "one pager"; see Appendix G.1 in Baffinland, 2022a) to support discussions, a list of targeted questions, and objectives for discussion including:

- Understanding the roles and actions that they may want to see Baffinland explore to manage its greenhouse gas emissions and to adapt to climate change;
- identifying potential areas for collaboration related to climate change; and
- identifying other sources of information or other groups working to research or address climate change in the North Baffin region.

Table 4.5: Summary of Completed External Engagement Interviews

Institutional Interviews	Community Interviews
• Environment and Climate Change Canada - Canadian Centre for Climate Services (ECCC-CCCS) • Government of Nunavut (GN; Climate Change Secretariat, Land Use and Environmental Assessment) • Natural Resources Canada (NRCAN) • Nunavut Tunngavik Incorporated (NTI) • Parks Canada (Climate Change team) • Qikiqtani Inuit Association (QIA; Inuit Qaujimajatuqangit and Engagement) • Qulliq Energy Corporation (QEC) • World Wildlife Fund (WWF)	• Hall Beach Hunters and Trappers Association (Sanirajak) • Municipality of Clyde River • Ikajutit Hunters and Trappers Association (Arctic Bay) • Pond Inlet residents • SmartICE (Pond Inlet)

Eight institutional and 5 community-based interviews were conducted by Stratos. Based on feedback heard, those interviewed indicated that the Draft Strategy was generally aligned with interests and concerns related to climate change for both Baffinland and communities, and contained many of the elements expected for a climate change strategy. However, Inuit and other stakeholders noted that they would like to see more detail in the final Strategy and underlying action plans, including specific targets, and additional commitments related to shipping ad environmental impacts, which further reinforced the importance of including feedback obtained through external engagement efforts prior to finalizing an updated Strategy. Some areas requiring further consideration for integration into the final Strategy as identified through these engagements included (i) Inuit leadership and ownership; (ii) targets and timeframes aligned with international commitments; (iii) inclusion of shipping-related actions (e.g., black carbon) and the setting of environmental priorities of concern for action planning; (iv) community

resilience and adaptation by assessing community and regional vulnerabilities; (iv) the importance of undertaking climate scenario analysis; and (v) the importance of monitoring and data sharing.

Baffinland further refined its overarching statement, goals, guiding principles, and supporting actions in consideration of the feedback obtained during these external engagement efforts in early 2022, prior to NIRB's decision on Phase 2. Following NIRB's recommendation and subsequent Federal Minister's decision that Phase 2 not proceed, the latest internal draft was further refined in consideration of this decision, and with the latest operational realities and associated uncertainties for the future of the Project.

The newest Climate Change Strategy was finalized in March 2023 (Appendix G.1; Stratos, 2023a).

Baffinland's overarching climate change aspiration, building upon its existing mission statement, is to become '*the lowest-cost, low carbon producer of high-grade iron ore in the world*'. Within the new Climate Change Strategy, Baffinland has established two (2) goals with associated actions to support achievement of its Climate Change Strategy:

1. Improve energy efficiency and forge a path to decarbonization; and
2. Monitor changes in climate and associated risks to inform adaptation and closure strategies.

Some of the key supporting actions will include undertaking a Site-wide energy audit to identify, evaluate and select reduction opportunities (some of this work already underway), establishing short, medium and long-term GHG emission targets, characterizing Scope 3 emissions, and engaging with organizations and supply chain partners where possible to advance climate action, including with shipping partners. Other supporting actions relevant to Goal 2 include a continued dialogue with North Baffin communities on climate change.

Table 4.6 provides a summary of some of the revisions made in direct response to feedback received through external engagements. As part of ongoing engagement activities, various annual reporting review processes and operational activities, Baffinland will provide status updates on implementation, and will continue to refine its implementation roadmaps as new opportunities and/or priority areas are identified over time. Accordingly, Baffinland's path to decarbonization is expected evolve over time based on the latest operational realities.

Table 4.6: Summary of External Engagement Insights and Examples of how Feedback has been incorporated in the revised Climate Change Strategy

Theme	Feedback and Revisions
Inuit leadership and ownership	Inuit need to be assured of implementation and should be 'in the driver's seat', leading some of the actions (e.g. environmental monitoring). *Revision: Baffinland changed the Guiding Principle from Collaboration to 'Collaboration and Co-Creation'. The Strategy was updated to reflect its intention to pursue collaborations to undertake Inuit-led monitoring and to investigate low carbon technologies and renewable energy with Inuit collaborators.*
Targets and timeframes aligned with international commitments	Interviewees expected short- and long-term GHG emissions reduction targets to be established and aligned with international commitments. *Revision: Baffinland updated one of its Strategy goals to cut direct GHG emissions with plans to establish short, medium, and long-term GHG emissions targets.*

Theme	Feedback and Revisions
Transparency	To foster trust, Baffinland should apply the principle of transparency to all streams of action, including data sharing and reporting. *Revision: In addition to establishing Transparency as a pillar within the Strategy, the updated Strategy also includes a commitment to publicly report on progress, and engage and involve Inuit to provide assurance on strategy implementation.*
Collaboration	Communities and institutions were all generally interested in collaborating on climate change. Network building was identified as being important for the promotion of renewable technology, industry collaboration ad information sharing. *Revision: One of the six (6) guiding principles focuses specifically on 'collaboration and co-creation' with Inuit and other stakeholders.*
Shipping and other transportation	Shipping and shipping management, including implications of changing climate conditions, should be addressed more directly in the Strategy and prioritized in implementation. *Revision: Baffinland included a specific action to engage with organizations and supply chain partners, including shipping partners, to advance climate action. This action seeks to support reduction of air and GHG emissions associated with marine transportation.*
Environmental priorities	Action plans should consider environmental priorities of concern and development of monitoring plans (e.g., glacial melt, ice, sea levels). *Revision: One of the supportive actions of Goal 2 focuses on pursuing collaborations to undertake Inuit-led monitoring of climate changes and associated impacts.*
Community resilience and adaptation	Action plans should consider community and regional vulnerabilities created by climate change. Communities should be supported through sharing of knowledge, resources and strategic investments. *Revision: Goal 2 supporting action includes sharing information and approaches to support increased community resilience and adaptation.*
Climate scenario analysis	A noted strength of the Strategy is its commitment to climate scenario analysis. This analysis should be prioritized to inform specific actions. It should also specifically consider implications for closure planning and reclamation. *Revision: Baffinland will prioritize climate scenario analysis in its strategy implementation roadmaps and included the specific consideration for adaptation planning to cover the full mine life, including closure.*
Data monitoring and reporting	Enhanced focus on data monitoring and sharing. Data collection is a major source of value that Baffinland can provide; monitoring should also be Inuit-led where feasible. *Revision: Inclusion of data sharing within supporting action and support of Inuit-led monitoring.*

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland remains 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 based on guiding principles inclusive of transparency, collaboration and co-creation, and continual improvement. In 2023, Baffinland will work

towards the development of goal- and cross-cutting-specific roadmaps in support of implementing the various supporting actions for the two-goal Climate Change Strategy. The draft actions and timeframes to be included in the internal roadmaps will likely evolve within the five-year implementation period to reflect learnings, stakeholder input, and changing internal and external conditions.

As Baffinland implements the various elements of the revised Climate Change Strategy from 2023 to 2028, Baffinland will make its approach to managing climate change publicly available, and this will include reporting performance relative to targets, once established (Appendix G.1; Stratos, 2023a). These results will be shared in future annual reports to NIRB, as well as part of the Mining Association of Canada's Towards Sustainable Mining reporting requirements through the Climate Change protocol.

Project Certificate Term and 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	Not applicable
Reporting Requirement	The Proponent shall include relevant information in the Annual Report submitted to the NIRB.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	Climate Change Strategy (Baffinland, 2019b) Climate Change Strategy (Stratos, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.1

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 (BAF-PH1-830-P16-0027; Baffinland, 2017a). 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 five (5) minutes for light vehicles and 10 minutes for heavy vehicles and equipment when the ambient temperature is between 0 to -2 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 between 2019 and 2021, however both radio and Automatic Identification 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 through the development of tailored roadmaps in support of the two (2) goal-goal Climate Change Strategy.

Baffinland developed and submitted its first Climate Change Strategy (The Strategy) to the NIRB on February 12, 2019 (Baffinland, 2019b). 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 2021, despite some previous 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 working through the drafting of an amended Draft Climate Change Strategy (Draft Strategy) based on its two-staged approach as initially presented in the 2019 Annual Report to the NIRB (Baffinland, 2020b). Additional details on the status of the refinement initiative is summarized as part of Methods under PC Term and Condition No. 2.

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 created in 2019 continues to bear 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 regular basis (and can be accessed daily) 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 2021 GHG emissions data was completed in 2022. An external verification of 2022 emissions data will occur in 2023. Results from this work will feed into the contribute towards the setting of more refined GHG short and medium term 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 2022 external verification are made publically available on the MAC website (https://mining.ca/companies/baffinland-iron-mines-corporation/). This protocol was revised and renamed the 'Climate Change' protocol, with the goal of driving further the performance of MAC members, and will be applicable for the 2023 reporting year.

RESULTS

As Baffinland continues to move ahead with building out specific roadmaps for its two-goal Climate Change Strategy, the Company 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 litres (L), equivalent to a reduction in fuel use of 16% and 29% for 777 and 793 mining trucks, respectively.

Baffinland has transitioned some existing infrastructure 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. For 2021, it is estimated that at least 5,240,720 L of fuel were saved by these new generators. This is equivalent to a saving of 18,866,591 kg Carbon Dioxide (CO_2) not produced (based on 3.6 kg CO_2 per litre of diesel).

2022 was considered a high fuel usage year for power generation, likely mainly due to below normal extreme weather conditions which required additional power. Without the new generators installed at the Mine Site, fuel use would have been higher in 2022 under these extreme conditions, as estimated for Milne Port where replacement of less efficient to more efficient generators has yet to occur.

Fuel reduction was emphasized as an important objective across all Site departments in 2022. A fuel reduction plan, developed and drafted in late 2022 by the Continuous Improvement Department, integrated feedback obtained through facilitation of ~15 Idea Generating Sessions held during the year. A list of potential fuel reduction opportunities was generated through these sessions. Ideas were assessed for effort and value/benefit, and subsequently categorized. Those considered ‘gems’ and ‘quick hits’ were collectively categorized into ‘rapid improvement opportunities’ targeting specific infrastructure, equipment, processes and behaviour; specific ideas are currently being evaluated and progressed by the Continuous Improvement Department for further evaluation and progression. Specific changes made in 2022 included isolating unused wings in the Port 380-Person Camp and the Port Site Complex Camp (equivalent to ~350 KWh savings). Major overhauls were also completed in 2022 on three (3) of the existing main generators at Milne Port to allow for better fuel usage in 2023.

Baffinland’s third-party verification of its 2019 to 2021 GHG emissions were completed in years 2020 to 2022, respectively, has confirmed that the data has been accurately calculated. The external verification of 2022 emissions will be undertaken in 2023. Results from this work will feed into the finalization of the supporting action roadmaps of the two-goal 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 from 2019 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 were considered as part of final edits to the Strategy initiative and subsequent implementation of future supporting actions.

TRENDS

Between 2015 to 2022, Baffinland increased the amount of iron ore hauled on the Tote Road by 338% from its first year of production, although GHG produced by the Project only increased by 44% (Figure 4.2).

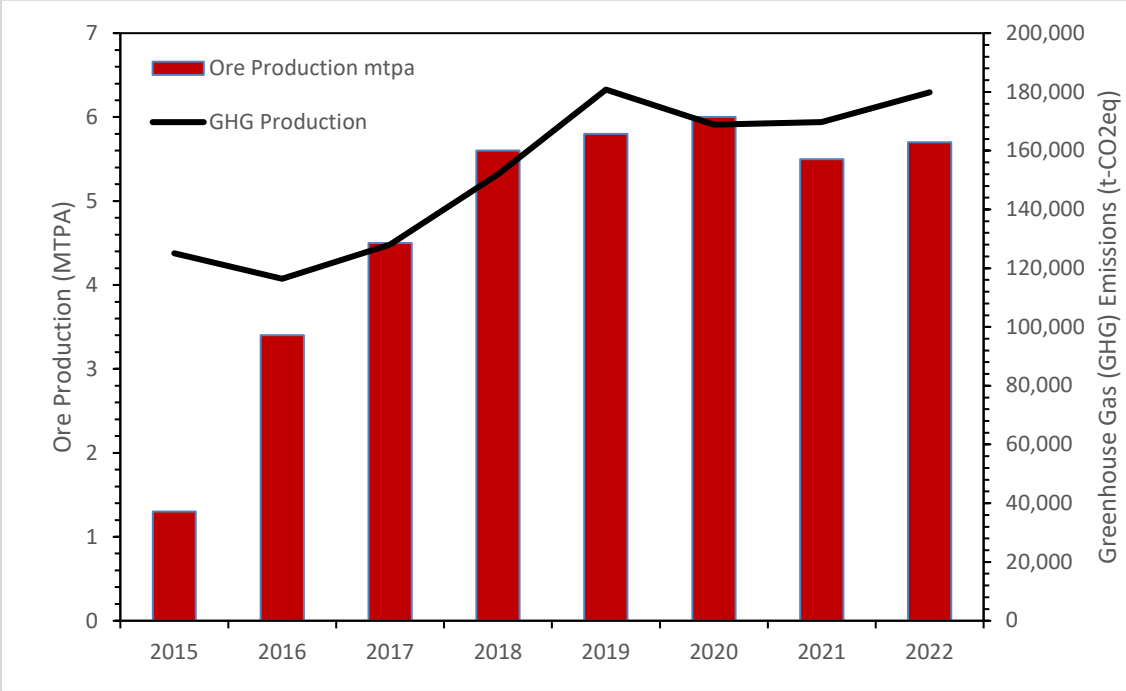


Figure 4.2: Greenhouse Gas (GHG) Emissions relative to Ore Production

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to build upon the fuel reduction efforts initiated in 2022 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 will evaluate the use of renewable energy sources (e.g., wind, solar) to reduce dependence on diesel fuel. 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, formalized and prioritized once implementation roadmaps are finalized and launched through implementation of the revised Climate Change Strategy.

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 providing updates on the various supporting actions developed through the roadmaps as Baffinland implements the various elements including setting of targets through implementation of its revised Climate Change Strategy.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	Climate Change Strategy (Baffinland, 2019b; Stratos, 2023)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.1

METHODS

No specific or additional climate change related studies or research other than those already required as part of PC No. 005 (e.g., tidal and climate data) were undertaken in 2022.

Baffinland submitted its first Climate Change Strategy (The Strategy) to the NIRB on February 12, 2019 (Baffinland, 2019b). The Strategy included 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 included, though was 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 since refined and elaborated its the Climate Change Strategy (Appendix G.1; Stratos, 2023a) and approach for effective implementation. Additional details on the efforts Baffinland has made to further amend its existing Climate Change Strategy is further described in PC Term and Condition No. 2.

In the newest Climate Change Strategy, one of the six guiding principles includes “Collaboration and Co-creation” to acknowledge that complex challenges like climate change require unique collaborations and partnerships to drive change. Accordingly, supporting actions identified as part of Goal 2, “Monitor Changes in Climate and Associated Risks to Inform Adaptation and Closure Strategies”, include the pursuit of collaborations to undertake Inuit-led monitoring of climate changes and associated impacts. This supporting action was well received by those interviewed during external engagement efforts.

It is noted that as Baffinland continues to collect and report data on climate-related metrics such as temperature, precipitation, and ice concentration data at start and end of shipping season, that additional information may be identified of importance through future external engagement efforts and considered for integration into future action planning. 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 roadmaps showing specific action plans.

RESULTS

Not applicable.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

As Baffinland develops roadmaps established under the newly revised Climate Change Strategy, updates regarding the status of these activities, including consultation/collaborating 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 Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Not applicable
Reference	Baffinland Corporate Website
Ref. Document Link	https://www.baffinland.com/operation/mary-river-mine/

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). Weather related information is pulled onto its website from the publically available website, 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 Term and 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_2) emissions, nitrogen oxide (NO_x) emissions and greenhouse gases generated by the Project using fuel consumption or other relevant criteria as a basis.
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	To be included in the Annual Report submitted to the NIRB.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Not applicable
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

Baffinland used guidance documents provided by Environment and Climate Change Canada (ECCC, 2016; 2017, 2019; 2020, 2021, 2022) and the Intergovernmental Panel on Climate Change (IPCC, 2006) along with published emission factors to estimate the Project's annual Greenhouse Gases (GHG), SO_2 and Nitrogen Oxide (NO_x) 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 National Pollutant Release Inventory (NPRI) and GHG reporting programs.

RESULTS

Baffinland's 2022 annual emissions for GHGs, SO_2 and NO_x are presented in Table 4.7.

Table 4.7: Calculated 2022 Project Gaseous Emissions

Gaseous Emission	Units	Calculated Emissions
GHG	t-CO_2eq	179,879
SO_2	t (SO_2)	14
NO_x	t (NO_2)	4,056

TRENDS

Total gaseous emissions have increased slightly from 169,719 tonnes in 2021 to 179,879 tonnes in 2022. When compared to FEIS predictions, Baffinland's 2022 total Scope 1 gaseous direct emissions from equipment owned or controlled by the company are below FEIS predicted emissions estimates.

RECOMMENDATIONS / LESSONS LEARNED

Consistent with the newest 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 Terms and Conditions 7 through 12)

Six (6) PC Terms and 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 Term and Condition No. 10 and 58c. Concerns about dust were expressed several times during 2022 consultation activities, mostly in relation to the Production Increase Proposal Renewal process, with regards to current operations (Appendix B). As a direct result of concerns regarding the extent of dust, particularly at Milne Port, Baffinland began an investigation to evaluate additional mitigation measures that could be implemented at the ore stockpiles and identified a crusting agent (DusTreat®) for trial implementation in 2020, with the objective of reducing the generation of wind blown fugitive dust. In 2021 and 2022, Baffinland moved forward with a third-party audit of current and future dust sources across the Project with the intent to evaluate and propose control improvements. The third party auditor is working directly with a Dust Audit Committee, formed by Inuit representatives from the five (5) North Baffin communities, who are both guiding and contributing to the audit. A final report from the Dust Audit Committee was received in February 2023, outside of this reporting period, and submitted to the NIRB.

Monitoring Activities

Table 4.8 provides a summary of air quality effects, monitoring completed in 2022, and an evaluation of impacts relative to the predictions presented in the FEIS and FEIS Addendum.

Table 4.8: 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	The results of stack testing completed in 2019, 2020, and 2022 demonstrated exceedances for one out of the three incinerators 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 additional maintenance work on the incinerators.
Release of air contaminants from mobile and	Increased concentrations of total suspended	Continuous NO_2 and SO_2 monitoring was conducted at Milne Port and the Mine Site throughout 2022.	2022 air quality monitoring for SO_2 and NO_2 were within Nunavut Ambient Air Quality

Component	Effect	Monitoring Program	Impact Evaluation
stationary equipment due to fuel combustion	particulate (TSP), sulphur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO) and Potential Acidic Input (PAI)	Continuous TSP and PM2.5 monitoring began in the spring of 2022.	Standards (AAQS) and FEIS predictions. TSP (and PM2.5) results were at times above the AAQS, however these exceedances are not due to combustion.
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 2022 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 2022 was within the ranges observed in previous years. Dust does not appear to be having measurable impacts in other environmental media (freshwater quality, vegetation, etc.)
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 2022 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 2022 was within the ranges observed in previous years. Dust does not appear to be having measurable impacts in other environmental media (freshwater quality, vegetation, etc.)

Baffinland continues to evaluate and report on dustfall through its approved dustfall monitoring program at the Mine Site, Milne Port, and Tote Road, including at additional monitoring stations deployed in 2019 and 2021. In 2021, fourteen (14) new dustfall monitoring stations were installed: four (4) additional monitors at Milne Port to better characterize dustfall near Milne Port; four (4) new monitors along the section of the proposed Phase 2 railway that departs the Tote Road (approximately between KM 63-80) to define baseline conditions; and, in response to a request from the QIA and the TEWG, six (6) dustfall monitors installed to collect dust at 0.5 m — 'short' monitors as a pilot study to investigate the variability between dustfall sampling at the standardized height of 2.0 m and at closer to ground level. As reported in the 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a), more than an entire year of data has shown no significant difference between the amount of dustfall captured from these two different monitor heights at 0.5 and 2.0 m. Due to the rejection of the Phase 2 application and associated

railway, and there being no significant difference between the regular and 'short' monitors, Baffinland will be recommending discontinuation of monitoring at these ten (10) monitors. Baffinland welcomes feedback from the TEWG with regards to these program modifications.

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 2022, Baffinland continued application of DUST/BLOKR® along sections of the Tote Road. DUST/BLOKR® performance is currently being evaluated to determine the suitability for continued use onsite. Following the trials completed from 2020 to 2022, it has been found that unique site conditions such as weather and short summer seasons do not always allow for the application to be completed as per manufacturer's specifications; highly limiting the effectiveness of the product and thus causing negative effects (i.e. equipment damage). In 2023, Baffinland plans to conduct a further trial application along a 5 Km section of roadway, adhering to manufacturer's specifications including the recommended cure time and applied during a sufficient period of no precipitation. Active dust monitoring along this trial section will be performed and compared to dust monitoring at areas with water only applications and other application methods used at the Project to assess DUST/BLOKR® performance. Baffinland's effort with respect to the application of dust suppressants on the Tote Road are documented in the 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a).

Path Forward

In 2023, 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. Baffinland is placing focus on additional methods to address dustfall concerns following review of the results of the third-party, community-driven Dust Audit and look to continue to implement preliminary and final recommendations from the Audit throughout 2023, as applicable. As per the amended Project Certificate issued by the NIRB in 2022 (NIRB, 2022a), Baffinland is committed to resourcing this third party dust audit annually and is responsible for sharing the results of the dust audit with the NIRB by January 31st of each calendar year, in accordance with Term and Condition No. 187. Additionally, Baffinland is jointly working with QIA to establish a program to identify high risk conditions for dust dispersal and plan for additional mitigation measures in order to satisfy the requirements of PC Term and Condition No. 188. Additionally, commitments related to dust mitigation efforts are outlined in Appendix B of the amended Project Certificate No. 005 (NIRB, 2022a). Required reporting on each PC Term and 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 Term and Condition No. 58, Item c).

Project Certificate Term and 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_2 and NO_2 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	Not applicable
Reference	Air Quality and Noise Abatement Management Plan (AQNAMP; Baffinland, 2021c) 2022 Air Quality, Dustfall and Meteorology Report (Stantec, 2023)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.2.1

METHODS

Continuous ambient air quality monitoring equipment was set up at Milne Port and the Mine Site to monitor sulphur dioxide (SO_2) and nitrogen oxides (NO_x) 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 (2011a) Ambient Air Quality Standards, resulting in the discontinuation of the monitoring program in 2016. To ensure compliance with Project Certificate Term and 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; both programs are still in place. Results of the monitoring conducted in 2022 were compared to the Nunavut Ambient Air Quality Standards.

The Air Quality and Noise Abatement Management Plan (AQNAMP) was updated in April 2021 (Baffinland, 2021c). The AQNAMP will be submitted to the NIRB in Q2 of 2023 in draft, at which point it will become available for public comment prior to finalization (Baffinland, 2023k). A high-level summary of modifications to the Management Plan is provided in table format in the updated Management Plan.

RESULTS

Results of the monitoring conducted in 2022 are presented in the 2022 Air Quality, Dustfall and Meteorology Report (Stantec, 2023) in Appendix G.2.1.

TRENDS

Ambient air quality data were collected at two (2) Baffinland sites (Mine Site Complex and Port Site Complex). NO_2 and SO_2 data were compared to previous years' data as provided by Stantec annual summary reports (Stantec, 2023; Appendix G.2.1). The 2022 data collected at Mine Site Complex and Port Site Complex were consistent to previous years' data trends, with the highest SO_2 and NO_2 levels occurring during the winter months and falling sharply during the summer periods.

Refer to the 2022 Annual Air Quality, Dustfall and Meteorology Report (Stantec, 2023; Appendix G.2.1) for a complete discussion of monitoring information and associated trends.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to monitor SO_2 and NO_2 levels at Milne Port and the Mine Site during 2023. Air quality monitoring at Steensby Port will be implemented when the Port is developed and shipping activities commence.

Project Certificate Term and 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_2 and NO_2 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	None
Reference	Air Quality and Noise Abatement Management Plan (AQNAMP; Baffinland, 2021c) 2022 Air Quality, Dustfall and Meteorology Report (Stantec, 2023)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.2.1 Appendix G.8.1

METHODS

Continuous ambient air quality monitoring equipment was set up at Milne Port and the Mine Site to monitor sulphur dioxide (SO_2) and nitrogen oxides (NO_x) 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 (2011a) Air Quality Standards, resulting in the discontinuation of the monitoring program in 2016. To ensure compliance with PC Term and 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; both programs continue to run to this day. Results of the monitoring conducted in 2022 were compared to both the Nunavut Ambient Air Quality Standards and the Canadian Ambient Air Quality Standards (CAAQS). The 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 air shed; CAAQS are not intended to determine ambient air quality compliance at the fence line for an industrial facility and are provided for comparison purposes only.

RESULTS

Results of the monitoring conducted in 2022 are presented in the 2022 Air Quality, Dustfall and Meteorology Report (Stantec, 2023) in Appendix G.2.1. The measured concentrations of NO_2 and SO_2 at the MSC and PSC were below the Nunavut Ambient Air Quality Standards (NAAQS) for 2022.

TRENDS

Ambient air quality data were collected at two Baffinland sites (Mine Site Complex and Port Site Complex). NO_2 and SO_2 data were compared to previous years' data as provided in the annual summary reports. The 2022 data collected at Mine Site Complex and Port Site Complex were consistent to previous years' data trends, with the highest SO_2 and NO_2 levels occurring during the winter months and falling sharply during the summer periods.

Refer to the 2022 Air Quality, Dustfall and Meteorology Report (Stantec, 2023; Appendix G.2.1) for a complete discussion of monitoring information and associated trends.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to monitor SO_2 and NO_2 levels at Milne Port and the Mine Site during 2023. Air quality monitoring at Steensby Port will be implemented when the Port is developed and shipping activities commence.

Project Certificate Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	Not applicable
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

Baffinland used guidance documents provided by Environment and Climate Change Canada (ECCC, 2016; 2017, 2019, 2020, 2021) 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. In accordance with ECCC guidance, Baffinland reports on Scope 1 emissions. Baffinland's 2022 annual emissions for GHGs are presented in Table 4.9.

Table 4.9: Calculated 2022 Project Greenhouse Gas Emissions

Gaseous Emission	Units	Calculated Emissions
GHG	t-CO_2eq	179,879

TRENDS

Total gaseous emissions have increased slightly from 169,719 tonnes in 2021 to 179,879 tonnes in 2022. When compared to FEIS predictions, Baffinland's 2022 total Scope 1 gaseous direct emissions from equipment owned or controlled by the company including fuel used by contractors and sub-contractors onsite, are below FEIS predicted emissions estimates.

RECOMMENDATIONS / LESSONS LEARNED

Consistent with the Climate Change Strategy (Stratos, 2023; Appendix G.1) 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 Term and 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 form dust dispersion.
Term or Condition	The Proponent shall update its Dust Management and Monitoring Plan to address and/or include the following additional items: a. Outline the specific plans for monitoring dust along the first few kilometres of the rail corridor leaving the Mary River mine site. b. 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. c. 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. d. 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. e. 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.
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 Term and 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 (AQNAMP; Baffinland, 2021c) Roads Management Plan (Baffinland, 2020c) Dust Mitigation Action Plan (Golder, 2016a) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a) Air Quality Memo (Stantec, 2022)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.5.1

METHODS

Dust management and monitoring were incorporated into the Air Quality and Noise Abatement Management Plan (AQNAMP) and the Roads Management Plan (RMP) before starting construction. Dust monitoring and mitigation measures continued to be implemented in 2022 at the Mine Site, Port Site, and along the Tote Road. In 2021,

fourteen (14) new dustfall monitoring stations were added to the existing monitoring program: four (4) additional monitors at Milne Port to better characterize dustfall near Milne Port; four (4) new monitors along the section of the proposed Phase 2 railway that departs the Tote Road right-of-way (ROW) to define baseline conditions; and, in response to a request from the QIA and the TEWG, six (6) dustfall monitors installed to collect dust at 0.5 m — 'short' monitors as a pilot study to investigate the variability between dustfall sampling at the standardized height of 2.0 m and that closer to ground level.

The Air Quality and Noise Abatement Management Plan (AQNAMP) was last updated in April 2021. The AQNAMP is currently undergoing additional revisions and will be submitted to the NIRB in final following a public review. A high-level summary of modifications for each Management Plan is provided in table format in the revised version.

A *Dust Mitigation Action Plan* (Plan) was developed in 2016 to identify specific measures to be implemented to reduce dust emissions (Golder, 2016a). Plan implementation continued in 2022, consistent with past years. Additionally, in 2022, DUST/BLOKR® (previously branded as Dust Stop®) was applied to the Tote Road in conjunction with applications of water and calcium. Initial applications began in early July along the Tote Road. Subsequent maintenance applications of DUST/BLOKR® were made throughout July as needed based on routine visual inspections. Approximately 324, 000 L of DUST/BLOKR® was applied along the Tote Road in 2022. Baffinland is currently evaluating the continued use of DUST/BLOKR® on site. Following the trials completed from 2020 to 2022, it has been found that unique site conditions such as weather and short seasons do not always allow for the application to be completed as per manufacturer's specifications; highly limiting the effectiveness of the product thus causing negative effects (i.e. damage to equipment). In addition, high levels of precipitation have also limited the effectiveness and reduced curing time after trial applications. In 2023, Baffinland plans to conduct a further trial application along a 5 km section of roadway, adhering to manufacturer's specifications including the recommended cure time and applied during a sufficient period of no precipitation. Active dust monitoring along this trial section will be performed and compared to dust monitoring at areas with water only applications and other application methods used at the Project to assess DUST/BLOKR® performance. Baffinland's effort with respect to the application of dust suppressants on the Tote Road are documented in the 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a).

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. Baffinland continued to apply DusTreat® throughout 2021 and 2022, in addition to continuing other mitigation measures such as shroud covers, ore stockpile management, and continuous monitoring of conveyor drop heights.

The inspection, maintenance and monitoring of dust mitigation equipment (i.e. dust shrouds and hoods) at the Crusher Facility was integrated into the equipment inspection and maintenance planning process in 2020. The integration of dust mitigation equipment maintenance into the equipment inspection and maintenance planning process has improved the availability of that equipment.

Finally, to address concerns from the MHTO that passive dustfall sampling and reporting did not provide a visual of what the dustfall looks like on the ground, a satellite imagery analysis was conducted again in 2022 to assess winter dustfall extent around the Project from 2014 to 2022. 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 an area greatly expanded from the 20 km buffer of the Project Development Area (PDA) used in 2021 reporting.

RESULTS

Discussion on dustfall monitoring, including the analysis of satellite imagery and results are included in Section 8 of the 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a).

TRENDS

Refer to Section 8 of the 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a) for Project dustfall monitoring information and associated trends.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland intends to discontinue sampling of the four additional monitors along the North Railway alignment, which is no longer anticipated to be developed. Due to the confirmed results of the 0.5 m dustfall monitor pilot study (no discernable difference between 2.0 m sample heights), Baffinland also intends to discontinue sampling at these locations in 2023. Baffinland welcomes feedback from the TEWG with regards to these program modifications.

Baffinland is committed to continuous improvement in its work activities to reduce risks to the environment and improve operational effectiveness. The strategy employed by Baffinland is regular monitoring supported by operational change and the adoption of other mitigating measures as warranted. Baffinland regularly conducts and documents management reviews of the Air Quality and Noise Abatement Management Plan. Such reviews will ensure that monitoring results for the AQNAMP are integrated with other aspects of the Project, and that necessary adjustments are implemented as required.

During the 2023 dust suppression season, Baffinland will increase the number of water trucks used for Tote Road dust suppression. Baffinland is reviewing internal systems to inform the timing and frequency of dust suppression application. Baffinland continues to investigate and trial different early notification methods to identify increasing dust levels on the Tote Road. Examples include establishing a communication protocol between drivers and Site Dispatch, and identifying high risk days for dust suppression, based on weather.

In 2023, Baffinland will continue to trial DUST/BLOKR® and monitor effectiveness to evaluate it for continued use on site, and to compare its performance to other dust suppression application methods used at the Project. Baffinland will also continue to apply DusTreat®, as per the application techniques and dosage calculations provided by the manufacturer, as sections of Milne Port stockpiles are formed throughout the year.

Baffinland is placing focus on additional methods to address dustfall concerns following review of the results of the third-party, community-driven Dust Audit, including:

- Reviewing dust controls at all locations were ore is moving or being handled at the Mine Site and Milne Port to determine if additional controls are required, including further defining drop distance (i.e., using adjustable stackers) for stockpiling activities.
- Full consideration of the 2022 Dust Audit Report suggestions with assessment/implementation of accepted recommendations from the independent Dust Audit at the earliest opportunity. As per the amended Project Certificate No. 005 issued by the NIRB in 2022 (NIRB, 2022a), Baffinland is committed to resourcing this third party dust audit annually and is responsible for sharing the results of the dust audit with the NIRB no later than January 31st of each calendar year, in accordance with Term and Condition No. 187.
- Identifying high risk days for dust dispersion, based on weather. Baffinland will develop weather-specific measures after further review of the QIA's 2021 Dust Investigation Report, the 2022 independent Dust Audit

Report, and subsequent discussions with the TEWG. Baffinland is jointly working with QIA to establish a program to identify high risk conditions for dust dispersal and plan for additional mitigation measures in order to satisfy the requirements of PC Term and Condition No. 188. Additionally, commitments related to dust mitigation efforts are outlined in Appendix B of the amended Project Certificate No. 005 (NIRB, 2022a).

- Continued evaluation of DUST/BLOKR® effectiveness through trials in accordance with manufacturer's instructions.
- Completion of a feasibility study of wind fencing at the Milne Port ore stockpiles.

Project Certificate Term and 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 (EC, 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board
Reference	Waste Management Plan (Baffinland, 2023d) Incinerator Operation Procedure (see Waste Management Plan)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

An Incineration Management Plan is presented in Section 4.5 of the Waste Management Plan (Baffinland, 2023d). 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 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 most recently updated in 2021 (Baffinland, 2021d).

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

Project Certificate Term and 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	Not applicable
Reporting Requirement	Stack test results to be reported to the NIRB and Environment Canada annually as required.
Status of PC Term and 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 (AWNAMP; Baffinland, 2021b) Waste Management Plan (Baffinland, 2023d)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

Stack testing was conducted on the Mine Site and Milne Port incinerators when commissioned in 2013, as required by PC Term and 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, consistent with the Canadian Council of Ministers of the Environment (CCME), Canada Wide Standards (CwS) for mercury emissions, and the CCME-CwS for dioxins and furans, follow up incinerator stack tests will be completed every year for dioxins, furans and mercury for all Project incinerator units incinerating more than 26 tonnes of waste per year to confirm Project incinerators continue to remain within the applicable air emission standards. Follow up stacks tests will be completed every five (5) years for dioxins, furans and mercury at Project incinerators that burn less than 26 tonnes of waste per year.

RESULTS

Confirmatory stack testing required to verify emissions standards continue to be met was completed in 2022 on the existing Mine Site and Milne Port incineration units. Operating incinerators showed emission concentrations below the CCME-CwS for dioxins and furans. Mercury was not tested in 2022 due to the timing of the stack testing, which was conducted during winter conditions in late November to early December 2022. Since previous testing for mercury showed very low mercury levels for all tests on all three (3) incinerators of less than 5% of the CwS of 20 µg/DRm^3 @11%O_2, it is not anticipated that this emission will have changed significantly.

Environment and Climate Change Canada (ECCC) comments following its review of the 2021 NIRB report submission identified the need for Baffinland to update the Project's Waste Management Plan (BAF-PH1-830-P16-0028) for

consistency with the CCME-CwS for dioxins and furans which require annual stack testing for incinerator units incinerating more than 26 tonnes of waste per year. The Waste Management Plan has been updated and submitted as part of the 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a). Mercury emissions testing will be included in future stack testing programs. Results of the incineration unit stack tests conducted in 2022 are presented in the 2022 Incinerator Stack Testing Report (WSP, 2023b) in Appendix G.2.2.

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, 2011b). Any exceedances are reported in the 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a). In 2022, all ash samples were below the threshold values for monitored parameters with the exception of three (3) ash samples from Milne Port. 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. Testing conducted in 2022 confirmed that corrective actions previously put in place have been effective for operating incinerators at the Mine Site and Milne Port. Additional testing will continue to be conducted annually as required to demonstrate ongoing compliance with applicable emissions standards. An additional incinerator installed at Milne Port to support 380-Person Camp infrastructure has not been commissioned due to the results of initial and follow-up stack testing. Additional stack testing will be completed to confirm emissions standards are being met prior to operation of 380-Person Camp incinerator unit.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to conduct annual stack testing for all Project incinerators that incinerate more than 26 tonnes of waste per year and report results to demonstrate and confirm emissions standards are met. Future stack testing programs in 2023 and in subsequent years will include testing for mercury emissions in addition to dioxins and furans and will be scheduled to be conducted prior to the onset of winter weather conditions to ensure favourable conditions for completion of testing requirements. Baffinland will also continue to monitor the incinerator operational and residual bottom ash data to identify changes in operational effectiveness.

4.6.3 Noise & Vibration (PC Terms and Conditions 13 through 15)

Five (5) PC Terms and 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. A 2020 noise monitoring program was implemented in response to this, and subsequent monitoring was completed during the 2022 field season. The results of the 2022 noise monitoring program are outlined in Section 7 of the 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a).

Monitoring Activities

In April and August 2022, accommodations at the Mine Site Complex (MSC), Sailiivik Camp, Port Site Complex (PSC) and 380-Person Camp were tested for noise and vibration.

No in-water works that had the potential to create noise or vibratory impacts to fish or marine mammals were undertaken in 2022.

Table 4.10 provides a summary of noise effects monitored in 2022, and an evaluation of impacts relative to the predictions presented in the FEIS and FEIS Addendum.

Table 4.10: 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 April and August 2022. 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 2022 averaged from 45-47 (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 2021 (average 50.24 dBA) and with average recorded noise levels in 2020 (<65 dBA). In general, average noise levels have experienced an increase over average recorded noise levels in years prior to 2018 (28 dBA	Effect within FEIS predictions

Component	Effects	Monitoring Program	Impact Evaluation
		in 2017, 30.6 dBA in 2016, and 34.8 in 2015); however, values remained below the 75 dBA exposure criteria. Potential causes of the trend are discussed further in relation to PC Term and Condition No. 14	
Noise and Vibration Levels	Increased noise or vibration levels affecting fish in nearby watercourses	Not applicable in 2022.	Not applicable in 2022.
Terrestrial Wildlife	Noise disturbance from the Project acting as a deterrent to wildlife	Results from the 2022 Noise Monitoring Study (Section 7 of the 2022 Final Terrestrial Environment Annual Monitoring Report; EDI, 2023a) indicate that overall, the impacts of noise by the Project have complied with the criteria presented in the FEIS in most areas. Exceedances of those criteria and the FEIS predictions were observed, but did not occur continuously, were within close proximity to high-traffic areas of the Project, and are not expected to occur in all directions from the Project.	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). 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 Term and Condition is provided in the pages that follow.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Fisheries and Oceans Canada, Nunavut Water Board, Crown-Indigenous Relations and Northern Affairs Canada, Nunavut Impact Review Board, Qikiqtani Inuit Association
Reference	Environmental Protection Plan (Baffinland, 2021e) Surface Water and Aquatic Ecosystem Management Plan (Baffinland, 2021f) Quarry Blasting Operations Management Plan (Baffinland, 2013b)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

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 (DFO) 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; Baffinland, 2013b; 2021e).

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 pounds per Square Inch [psi]) in the swim bladder of a fish.

RESULTS

Not applicable. No blasting occurred in 2022 within the required setback distances detailed in the DFO guidance document (Wright and Hopky, 1998).

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

Project Certificate Term and 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 Term and 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 (GN, 2011c) Noise and Vibration Surveys – Accommodation Facilities (HDS, 2022a,b)
Ref. Document Link	Appendix G.2.3

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 Meter per Second Squared (m/s^2), and an exposure limit of 1.15 m/s^2. The action value provides the threshold for increased vigilance to prevent reaching the exposure limit.

In 2022, 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 April and August 2022, accommodations at the MSC, Sailiivik Camp, PSC and 380-Person Camp were tested for noise and vibration.

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 4.11.

Table 4.11: Summary Statistics of 2022 Noise Monitoring Results

Sampling Period	Average Noise Level (dBA)
April Monitoring	
Sailiivik Camp	44.3
MSC	50.9
PSC	44.6
380-Person Camp	41.0
August Monitoring	
Sailiivik Camp	45.4, 46.5
MSC	46.8
PSC	39.1
380-Person Camp	49.5

Vibration measurements were below the applicable criteria, and are presented in Table 4.12.

Table 4.12: Summary Statistics of 2022 Vibration Monitoring Results

Sampling Period	Peak[1] Vibration Exposure (m/s^2)
April Monitoring	
Sailiivik Camp	0.066
MSC	0.027
PSC	0.910
380-Person Camp	0.211
August Monitoring	
Sailiivik Camp	0.1, 1.6
MSC	0.4
PSC	0.6
380-Person Camp	0.2

Notes:
[1] 2022 results presented as Apeak (frequency-weighted, peak acceleration sum over the sampling period) same as 2021 and 2020, 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 2022 were an average of 46.78 dBA and therefore respected the 75 dBA exposure level for 16 hrs/day and 85 dBA exposure level for 8 hrs/day. This is consistent with overall average noise levels recorded at the Mine Site in previous years (50.24 in 2021, <65 dBA in 2020[1], 43 dBA in 2019, 45 dBA In 2018). 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 2022 were an average of 43.55 dBA and therefore respected the 75 dBA exposure level. This is consistent with overall average noise levels recorded at Milne Port in previous years (50.17 dBA in 2021, <65 dBA in 2020[1], 46 dBA in 2019, 48 dBA in 2018, 43 dBA in 2017 and 50 dBA in 2016).

Vibration levels measured in 2022 (0.027 to 1.60 m/s^2) were higher than all previous years (0.020 to 0.219 m/s^2 in 2021, 0.022 to 0.052 m/s^2 in 2020; 0.003 to 0.18 m/s^2, 0.001 to 0.008 m/s^2 in 2019, and 0.49 m/s^2 in 2017), and exceeded the established comfort threshold of 0.015 m/s^2 at all sampling stations. More than 50% of the exceedances were measured before 9 p.m. or after 3 a.m. All the whole-body vibration measurements taken in the accommodations respect the 8-hour exposure limits of 0.5 m/s^2 and 1.15 m/s^2 considered by the NIRB for exposure to whole-body vibration during rest.

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 further noise and/or vibration reduction efforts, a plan will be formulated to address these concerns in consultation with stakeholders.

[1] Note, in 2020 the dosimeters were set on a dynamic sampling range of 70 dBA – 140 dBA for noise measurements. Therefore, specific measurements under 70 dBA were not recorded as they were outside of the instrument's sampling range.

Project Certificate Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Not Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

No construction activities occurred at Milne Inlet in 2022. 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 Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021a; NIRB Registry No. 336729) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a) Mary River Project Final Environmental Impact Statement: Volume 5, Appendix 5D-1 — Noise Baseline Study (RWDI Air Inc., 2008)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.5.1

METHODS

In 2020, noise monitoring stations were established to assess noise levels that may disturb wildlife. The monitoring program consisted of three (3) transects: at the Mine Site, Tote Road, and 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 (≥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 noise sample 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 ≥3 Km Reference distance was selected based on the same noise modelling, which predicted no elevated Project-related noise at this distance. Additional details on the methods are provided in the 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021a; NIRB Registry No. 336729).

Based on comments received from the TEWG and results of the 2020 monitoring, additional noise monitoring was completed in 2022 to assess how Project noise is perceived by wildlife and other users across the landscape, with the monitoring focusing on the three main areas; the Mine Site, the Tote Road, and Milne Port. A total of nine noise monitoring stations were established with three sites each at the Mine Site, Tote Road, and Milne Port. Distance classes were at 1.5 Km and beyond to compare project noise with background noise. Additional details on the methods are provided in the 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a).

RESULTS

2020 — As was predicted for areas directly near Project infrastructure, operational activities generate frequent and impulsive anthropogenic noise loud enough to elicit a wildlife response (i.e., continuous peak sound or impulsive sound events above 55 dBA). For example, both the Tote Road and Mine Site Near (200 m distance) stations (200 m from the Tote Road) had typical continuous Sound Pressure Levels (SPLs) above 55 dBA. However, over 90% of continuous sound at 1.5 Km from the PDA was below 55 dBA in all Project Areas (which would not be expected to illicit a wildlife response) and these were only detected 3% of the time. Furthermore, noise was below 40 dBA at 3 Km from all Project areas, and Project-related noise was typically not audible at 3 Km from the Project.

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 the cumulative frequency of impulsive aircraft noise over these sites was 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.

2022 — At the Mine Site and Milne Port, average sound levels at 1.5 Km from the PDA were at or below the levels predicted in the FEIS (Table 4.13). In the FEIS modelling, the distribution of sound levels around the Project throughout the day was necessarily simplified due to the complex and unpredictable nature of the operations. The average sound level from the entire monitoring period is a useful comparator to the FEIS modelling because it similarly averages the noise from Project operations. The highest one-hour levels ranged from 1 dB below the FEIS modelled levels to 7 dB above the modelled FEIS levels.

Monitoring locations were chosen where sound levels were expected to be highest. Considering the sound levels measured in this program, and the FEIS modelling, it was likely that sound levels at other locations 1.5 Km from the PDA comply with the 40 dBA criterion.

Table 4.13: Measured Equivalent Continuous Sound Levels (Leq) 1.5 Km From Mine Site, Milne Port And Tote Road Sites Within The Project Development Area (PDA)

Location	Distance from PDA	Measured 2022			FEIS Modelling Leq-1hr (dBA)
		Leq (dBA) All Valid Data	Number of Valid Hours	Highest Valid Leq-1hr (dBA)	
Mine Site South	1.5 Km	43	50	48	43
Mine Site East	1.5 Km	30	25	43	44
Milne Port West	1.5 Km	35	99	41	42
Milne Port East	1.5 Km	38	83	45	38
Tote Road	1.5 Km	37	122	43	29
Tote Road	3 Km	35	104	42	-

The noise levels along the Tote Road were measured to be higher than the FEIS predicted (Table 4.13). Operational differences between the FEIS modelling scenario and the actual operations on the ground were the likely cause. The measured levels at 1.5 Km from the road's centre line were, on average, below the limits adopted from D038, although they exceeded these limits by up to 3 dB at some times. The weather from Milne Port was used to generate weather exclusions given it is the closest weather station. In addition to the measurement location at 1.5 Km from the centre line, a measurement was conducted at 3 Km from the road's centre line. These data were collected to show a reduction in sound level over distance and are helpful for validating the FEIS model results.

TRENDS

Overall, results show that all areas monitored for noise disturbance at the Project have remained in compliance with the criteria discussed in the FEIS. Exceedances of those criteria and of the FEIS predictions were observed, but did not occur continuously, and are not expected to occur in all directions from the project.

RECOMMENDATIONS / LESSONS LEARNED

The noise created by the Project is generally within the modelled predictions of the FEIS, and meet relevant noise guidelines 1.5 Km from the Project. As identified in the Air Quality and Noise Abatement Management Plan, the primary mitigations for the project ensure all mobile equipment is equipped with mufflers and machinery is well-maintained.

Project Certificate Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Not Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	Not applicable
Reference	2022 MEWG Meeting Minutes 2022 Shipping and Monitoring Program Meeting Records
Ref. Document Link	https://www.baffinland.com/operation/shipping-and-monitoring/ Appendix C.1 Appendix B.2.2

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, which are kept updated on relevant operations (marine and terrestrial transportation) and associated monitoring programs.

Baffinland has created full-time Baffinland Community Liaison Officer (BCLO) roles in each of the five (5) North Baffin communities. BCLOs provide for regular and ongoing opportunities for the dissemination of Project-related information and receipt of community-based input.

Through feedback obtained through various engagement activities such as pre- and end of shipping season meetings (see Table 2.1 and Appendix B.1 for summary of 2022 engagement activities), changes in communications have been made over time to better inform communities about Baffinland's 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). Anticipated vessel schedules are also sent to the MHTO, the Hamlet of Pond Inlet and QIA on a regular basis to provide advance notifications of upcoming shipping activity. These updates were introduced in 2020 to again expand the breadth of information provided to community members.

In order to support visual tracking of its vessels transiting to Milne Port, Baffinland also contracts annually Spire Shipview®, a global vessel monitoring and tracking service to track and report on vessel movements using Automatic Identification System (AiS) technology. The ship tracks are accessible to residents of Pond Inlet at the Baffinland office on a large wall-mounted monitor if desired, (See Photo 27 in Appendix D in Baffinland, 2021a) 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.

Through the development of the Phase 2 Proposal, Baffinland also carried out several knowledge gathering exercises that gave community members direct experience observing shipping through ice outside of Nain, Labrador at the Voisey's Bay Project (2015), and in Trois-Rivieres, Quebec an active railway operation owned by Genesee and Wyoming. There were also a series of IQ workshops held between 2015 and 2016 that sought a better understanding of contemporary land and ice use in the Project area that may overlap modified or increasing transportation activities associated with the Project. Despite the relationship between these activities and the now rejected Phase 2, they are equally relevant to the modes and nature of transportation activities approved as part of the current Approved Project.

Baffinland has also in place a Hunter and Visitor 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. This procedure was updated in 2020 to include safe access procedures during risks identified during the COVID-19 Pandemic. BCLOs are in continuous contact with Site to ensure up to date, important information is relayed to their communities via radio and posters. Baffinland continues to encourage hunter and visitors, via

announcements and posters, to provide their BCLOs with advanced notice of intent to visit the Mary River Project areas.

RESULTS

During the June 14, 2022 MEWG meeting Baffinland reviewed the plans for the 2022 shipping schedule, mitigation and management, and communications protocol to be implemented during the 2022 shipping season. In addition, Baffinland shared a slide deck summarizing its upcoming shipping and communications plans with the MHTO on July 7, 2022 when dates for holding a pre-shipping season could not be confirmed after multiple attempts (see Appendix B.2.2). Baffinland continues to develop an annual Shipping and Marine Monitoring Summary brochure showing the latest shipping route and describing key mitigation measures implemented by Baffinland over the shipping season.

Baffinland continues to accommodate all hunting parties and other visitors that travel to the Project, though alternative practices were developed in 2020 and 2021, which remain in place, to address transmission risks related to the COVID-19 Pandemic. To prevent potential transfer of the COVID-19 virus to Nunavummiut, all visits to Project facilities by non-project staff were continued to be halted in 2022. As a result of the temporary closure, all camps and accommodations remained closed to non-Project staff, however, the MHTO Cabins and Visitor Communication Centres remained available for use by hunters/visitors.

Regular public communications via radio occur in Pond Inlet to notify personnel of protocols in place. The BCLO monitors social media and advises Nunavummiut of the COVID-19 protocols in place at the Project. Baffinland also continues to maintain COVID-19 signage at the HTO hunting cabins and Visitor Communication Centers. Hunter and visitor supply requests continued to be accommodated in 2022 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 maintained 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, vehicles used for hunter/visitor transport purposes were sanitized before and after use until COVID-19 protocols were eased. Roll off trailers continue to be utilized to transport all terrain vehicles on the Tote Road.

Ten Shipping Monitors, consisting of part-time and full-time employees and an intern based in Pond Inlet supported the shipping season in 2022 (see Photos 27 and 28 in Appendix D; additional information available in summary sheet for PC Term and Condition No. 102). Baffinland notes that due to COVID-19 restrictions, the office was often closed to visitors over the length of the shipping season, and as a result viewing of vessels from the office was limited, though they could be observed by accessing the website through individual access points. Baffinland also continued to maintain its “Baffinland Shipping” Facebook page to further enhance regular communications over the shipping season, attracting hundreds of followers during the active shipping season.

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, MHTO 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 Terms and Conditions 16 through 19)

Four (4) PC Terms and 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, 2018). Water diversions have the potential to impact fish and fish habitat, and DFO administers the fish and fish habitat sections of the *Fisheries Act.*

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 (6) 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 2022 to sustain three key activities at the Project: potable water supply (domestic), dust suppression, and for miscellaneous (industrial) uses. During 2022, 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 for Camp Lake (355.4 m^3/day) was not exceeded in 2022, there was five (5) incidents in July 2022 (July 6, July 7, July 15, July 22 and July 23) where the daily water volume withdrawn for domestic purposes exceeded the domestic daily water withdrawal limit for Camp Lake (203.8 m^3/day). The findings of the root cause investigation of the July exceedances determined that the exceedances were likely the result of inaccurate categorization/accounting of water withdrawn from the Camp Lake jetty. Baffinland is currently automating the system at the water jetty by connecting the flow meter to the site Programmable Logic Controller (PLC) and implementing logic coded programming to improve characterization of domestic and industrial daily water volumes withdrawn at the Camp Lake jetty by multiple users.
- During 2022, thirty (30) exceedances of source specific total daily water withdrawal limits, outlined in the Type 'A' Water Licence, occurred at five (5) approved dust suppression water sources along the Tote Road including: three (3) exceedances at KM 32 Lake, eleven (11) exceedances at BG50, ten (10) exceedances at CV217, five (5) exceedances at Muriel Lake, and one (1) exceedance at Tom River (CV233). A third party consultant reviewed the dust suppression water withdrawals to assess the effects of the daily water withdrawal exceedances on instantaneous flows of streams and lake outflows at the five (5) locations where the daily water withdrawal limits were exceeded in 2022, using estimated mean monthly and 10-year low flows, and concluded that the exceedances in 2022 were not environmentally significant and are not expected to adversely affect stream flows, lake flows, fish, or fish habitat (Knight Piésold, 2023a). 2022 exceedances resulted from a water use accounting issue that occurred because the water use limits are daily

limits and do not correspond with operator work shifts, which occur over two (2) partial days, as well as a lack of a formalized tracking processes and training. This is a significant increase compared to only two (2) exceedances in 2021, but is comparable to 2020, when thirty-one (31) exceedances of the daily water volume for dust suppression use exceeded the dust suppression daily withdrawal limits. Corrective actions that Baffinland is taking to prevent similar incidents from re-occurring are outlined in the following subsection.

Further discussion on the water withdrawals at the Project, including all supporting daily and monthly volumes, are provided in the 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a).

Table 4.14 provides an evaluation of the Project's impacts on hydrology and hydrogeology based on monitoring activities completed in 2022, relative to predictions presented in the FEIS and FEIS Addendum.

Table 4.14: 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 subsequently automated the system at the water jetty by connecting the flow meter to the site PLC and implemented logic coded programming to improve characterization of domestic and industrial daily water volumes withdrawn at the Camp Lake jetty by multiple users. The new automated system will be monitored throughout 2023 to ensure accuracy of water use accounting.

Further actions that Baffinland is taking to prevent an over withdrawal of water for dust suppression purposes include: the development of an SoP for the dust suppression water log tracking process; applying to increase the daily withdrawal limit to reflect the instantaneous withdrawal rate rather than a daily total; maximizing opportunities to use recycled water for dust suppression; and Investigating the use of a tablet system connected to the local LTE network for real-time tracking of individual water withdrawals, with visual warnings when daily limits are being approached.

Training for operators, supervisors and environmental staff will occur prior to 2023 use of water for dust suppression and will be ongoing throughout 2023.

Project Certificate Term and 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 in advance of constructing those facilities.
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and 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	Not applicable

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), and associated Type 'A' Water License Amendments. Minor modifications to the Type 'A' Water License are submitted from time to time consistent with the processes provided under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act,* as well as the Type 'A' Water License.

RESULTS

During 2022, the following work was completed on water related infrastructure and facilities at the Project. Note that all are consistent with the broad descriptions of works described in EIS documents, but may have been further evaluated with respect to more detailed environmental permitting requirements by NWB (water license modification) or DFO (request for review):

- Maintenance of site surface water drainage infrastructure (i.e. culverts) to address sedimentation concerns and improve surface water drainage;

- Continued implementation of the Ore Crusher Pad Regrading Strategy to prevent the pooling of water on and around the Crusher Facility pad and continued use of a pumping system to transfer collected water to Crusher Facility Pond MS-06;
- Continued implementation of the Ore Stockpile Pad Regrading strategy to prevent the pooling of water on and around the Ore Stockpile Pad;
- 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 (TREEP) and the Hatch Ltd. (Hatch, 2013) design; Note that no in-water culvert crossing work or other in-water work was conducted along the Tote Road in 2022. Baffinland is working with Fisheries and Oceans Canada (DFO) to develop plans to address fish passage issues along the Tote Road at specific locations. A Request for Review was submitted to DFO in May 2022, and DFO staff visited the Mary River site in June 2022 to inspect fish-bearing crossing locations along the Tote Road. Engagement with DFO is required prior to in-water remedial works. Baffinland submitted a design brief and issued for construction drawings in October 2022 and continues to work with DFO to refine plans to ensure fish passage issues are addressed. Engagement and dialogue continues with DFO on Baffinland's permanent crossing plan at 20 crossings along the Tote Road. Baffinland will work with DFO as necessary to ensure planned modifications to fish bearing crossings are in compliance of the *Fisheries Act*;
- Construction of permanent erosion and sedimentation measures in the Camp Lake area;
- 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; and
- Construction of the MS-11 Surface Water Management Pond as part of the first phase of the implementation of the Long Term Surface Water Management Plan at the Mine Site was completed in June 2022, and the pond was immediately commissioned to manage freshet runoff from the Mine Haul Road and surrounding hillside (Baffinland, 2021b). A remediation plan was subsequently developed by the third-party design consultant and implemented to address observed seepage through the dam.

Prior to the commencement of construction, the applicable regulatory approvals were obtained by Baffinland for the works listed above. Future construction activities are planned, as part of the Long Term Surface Water Management Plan under Modification No. 13 submitted to the NWB, to collect runoff to reduce potential erosion and sedimentation from the Project (Baffinland, 2021b).

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. Baffinland will continue to monitor water retention structures across the Project and complete ongoing routine maintenance as necessary. Should surveillance observations indicate seepage or deviations from an Issued For Construction (IFC) design, Operations will implement structure specific remedial measures to capture/recover seepage as applicable in conjunction with water quality monitoring, or maintenance repairs to re-establish design criteria as necessary to correct any issue that might undermine infrastructure integrity. Any adjustments to water related infrastructure that occur under the broad descriptions contained in Environmental Impact Statement (EIS) documentation have been

and will continue to be subject to permitting administered by the NWB (water license modifications) and DFO (request for reviews).

Project Certificate Term and 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 waterbodies 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 Term and 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, 2023e) Metals and Diamond Mining Effluent Regulations (MDMER; Minister of Justice, 2022) Metals and Diamond Mining Effluent Regulations Emergency Response Plan (MDMER ERP; Baffinland, 2022X) Sampling Program - Quality Assurance and Quality Control Plan (Baffinland, 2022f) Surface Water and Aquatic Ecosystem Management Plan (Baffinland, 2021f) 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

Wastewater and effluent management practices are outlined in the Project's Fresh Water Supply, Sewage and Wastewater Management Plan (FWSSWMP) (Baffinland, 2023e) and the Metal and Diamond Mining Effluent Regulations – Early Revenue Phase (MDMER ERP), which is appended to the FWSSWMP (Baffinland, 2023e). Surface water monitoring, management practices and procedures are outlined in the Project's Surface Water and Aquatic Ecosystem Management Plan (SWAEMP; Baffinland, 2021f). 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, 2022).

Consistent with the FWSSWMP (Baffinland, 2022e), prior to discharge, wastewater (e.g. treated sewage, treated contact water, oily water, etc.) is sampled to ensure 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; 2023f).

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 (CF), KM 106 Run of Mine Ore Stockpile Facility, KM 105 Sedimentation Pond, 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 2022 included: sewage; contact water retained in surface water management ponds associated with ore and waste rock facilities; and oily water containment areas, such as bulk fuel facilities. Effluent treatment systems operated at the Project in 2022, 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 Water Treatment Plant (WRF WTP) at the Waste Rock Facility (MS-08).

Seven (7) discharge events of effluent at the Project in 2022 did not comply with the applicable discharge criteria. The events occurred at the Milne Port East Ore Stockpile Sedimentation Pond (MP-05), and at the Mine Site Crusher Facility (CF) Pond (MS-06), KM 105 Pond (MS-11), KM 106 ROM Ore Stockpile Facility Pond (MS-07), and at the Mine Site Sewage Treatment Plants MS-01 and MS-01B. These events are outlined as follows:

- On June 8, 2022, at the Milne Port surface water management pond MP-05, total suspended solids (TSS) measured 15.4 mg/L; minimally exceeding the applicable water licence maximum grab sample concentration of 15 mg/L. The elevated TSS occurred as a result of warming temperatures, associated with annual freshet conditions, which typically occur from mid-May to end of June, resulting in snowmelt runoff containing sediment-laden water. MP-05 receives water from a melting snow stockpile on the ore stockpile pad that enters the drainage ditch and is subsequently directed to the MP-05 surface water management pond.
- On June 4, the CF pond was sampled and discharged through the FDP; MS-06. Due to the timing of pond melt, recent heavy snow accumulation and limited remaining capacity in the pond, a controlled discharge was initiated, as per Baffinland's MDMER Emergency Response Plan (BIM-5000-PLA-0003, BAF-PH1-830-P16-0047; Baffinland, 2022d), to lower the level of effluent in the pond and prevent the releasing of water over the emergency spillway. Initial results of the release were compliant with applicable water licence and MDMER criteria with the exception of TSS, which was measured at 59.8 mg/L; exceeding the maximum MDMER and water licence criteria of 30 mg/L and 15mg/L, respectively, for TSS concentrations

in a grab sample. A second sample collected the following day on June 5 showed a significant reduction in TSS of 19.5 mg/L; compliant with MDMER criteria for maximum allowable concentrations in a grab sample but above the applicable water licence criteria. As per Baffinland's MDMER Emergency Response Plan (BIM-5000-PLA-0003, BAF-PH1-830-P16-0047, Baffinland, 2022d), increased sampling occurred to ensure levels of TSS decreased and remained below allowable limits throughout the controlled discharge. Subsequent MS-06 Final Discharge Point (FDP) lab results for all parameters analyzed from the discharge in June were compliant with applicable water licence criteria, with the exception of the maximum concentration of a grab sample for TSS on June 11 (15.3 mg/L). Once sufficient volume was removed from the pond, pumping was stopped to allow additional settling time and controlled discharge.

- On June 9, at Mine Site KM 105 surface water management pond, MS-11, TSS was observed to be 45.7 mg/L; exceeding the maximum water licence criteria of 15 mg/L for TSS concentrations in a grab sample. On June 9, following commencement of a controlled discharge through the FDP, water quality samples were collected. Due to a major snow event the previous week and unanticipated freeze up resulting in limited settling, followed by an extreme pond melt affecting overall capacity, a controlled discharge was initiated, as per Baffinland's MDMER Emergency Response Plan (Baffinland, 2022d), to lower the level of effluent in the pond and prevent the releasing of water over the emergency spillway. Due to the observation of solids remaining suspended in the pond at the end of May, treatment with the addition of a coagulant and flocculent to settle remaining suspended solids from the pond was initiated in preparation for discharge. Once discharging, treatment continued with daily monitoring. Initial results of the release were compliant with applicable water licence and MDMER criteria with the exception of TSS, which was measured at 45.7 mg/L on June 9; exceeding the maximum MDMER and water licence criteria of 30 mg/L and 15 mg/L, respectively, for TSS concentrations in a grab sample. Subsequent MS-11 FDP lab results for all parameters analyzed from the discharge in June were compliant with applicable water licence criteria, with the exception of the maximum concentration of a grab sample for TSS on June 22, June 23, and June 30. However, discharge TSS values decreased over time, from 45.7 mg/L on June 9 to 16.7 mg/L on June 30; demonstrating treatment measures to settle suspended solids within the pond were effective.
- On August 2, at Mine Site surface water management pond MS-07, TSS was observed to be 29.9 mg/L; exceeding the monitoring station's water licence criteria of 15 mg/L for maximum TSS concentrations in a grab sample. Discharge from MS-07 ended on August 2 and did not resume until August 29. A discharge sample collected on August 29 when discharge from MS-07 was resumed was compliant with all applicable water quality discharge criteria. A subsequent general chemistry (pH, TSS, Total Dissolved Solids [TDS], turbidity) sample collected on August 30 during discharge was also compliant with all applicable water quality discharge criteria.
- On October 12, fecal coliforms measured 1,440 CFU/100 mL; exceeding the stipulated criteria for the Mary River MS-01B effluent monitoring station of 1,000 CFU/100 mL for fecal coliforms in a grab sample. The cause of the exceedance could not be determined; however, it likely resulted from cross contamination during sample collection or at the external laboratory. As a precaution, MS-01B sample equipment was cleaned and sample tubing was replaced. In addition, parts of the UV disinfection system were replaced. MS-01B was resampled on October 31 and the laboratory result indicated zero fecal coliforms present in the effluent sample.
- In December 2022, there were five (5) exceedances of the site specific grab sample limits stipulated in the water licence at Mary River effluent monitoring stations MS-01 and MS-01B. Three (3) of the exceedances

were above the site specific grab sample limit of 4.0 mg/L for Total Ammonia (as N) and two (2) of the exceedances were above the site specific grab sample limit of 4.0 mg/L for Total Phosphorus, as follows:

- Effluent at monitoring station MS-01 was 10.3 mg/L for Total Ammonia and 5.22 mg/L for Total Phosphorus on December 6;
- Effluent at monitoring station MS-01B was 9.0 mg/L for Total Ammonia and 5.26 mg/L for Total Phosphorus on December 6; and
- Effluent at monitoring station MS-01B was 21.9 mg/L for Total Ammonia On December 20.

Sample results were received on December 20, 2022 at which time MS-01 had been shut down for the winter and effluent from facilities redirected to the Sailiivik STP for treatment. A re-sample of MS-01B was collected on the same day and sent off site for rush analysis. Results confirmed the initial exceedance at effluent monitoring station MS-01B with a concentration of 21.9 mg/L for Total Ammonia. Following receipt of sample results received on December 23, discharge from MS-01B was immediately diverted to the Polishing Water Stabilization Ponds (PWSPs) for the remainder of December while a full investigation was initiated. Internal analysis continued throughout December, and a compliant discharge sample was obtained in January 2023 and analyzed by a third party lab; confirming that effluent had returned to compliant levels.

In addition, there was two (2) instances where the external laboratory returned lab results for Fecal Coliforms that were invalid or inconclusive. The September 13 sample result for station MS-01B indicated a Fecal Coliforms result of “No Data: overgrowth with target. “This indicates likely a generic bacterial contamination at the lab made it impossible to accurately count the analysis plate. The lab was able to confirm the absence of Total or Fecal Coliforms, however, the interpretation does not match the analysis method requirements; rendering the test result invalid. Based on communications with the lab there was no Total or Fecal Coliforms present in the sample.

Similarly, the October 11, 2022 sample collected at MP-01B indicates the presence of Fecal Coliforms in the sample at a concentration of >200 CFU/100 mL; however, due to overgrowth with non-target bacteria, the laboratory was unable to determine the distinct Fecal Coliforms count. This indicates likely a generic bacterial contamination at the laboratory made it impossible to accurately count the analysis plate.

Total Petroleum Hydrocarbons (TPH) was not analyzed at Mine Site Bulk Fuel Storage Facility Stormwater discharge monitoring station MS-03B during the discharge in July 2022. An incorrect bottle set was used when the scheduled discharge sample was collected during the initiation of discharge on July 10. A second sampling event was subsequently completed on July 13 for the remaining parameters; however, the requested analysis was miscommunicated to the external third-party laboratory and TPH was not included in the laboratory analysis for the July 13 sample. Discharge from the facility was completed on July 13 and, therefore, a resample was unable to be collected. Field observations and analysis performed gave no indication that TPHs were present, and all measured parameters were below discharge criteria.

2022 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. A full discussion of the Project’s 2022 monitoring results under the Type ‘A’ Water Licence is provided in the 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a).

During 2022, in June to 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 2022, controlled discharges of effluent from the WRF Pond were conducted and resulted in no exceedances of the water licence water quality discharge

criteria in 2022 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 2022 MDMER annual effluent monitoring report for the Mary River Mine Site (Baffinland, 2022d).

Periodic controlled discharges of the treated effluent from the CF Pond occurred during June to mid-September 2022. Controlled effluent discharges from the CF in 2022 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. Exceedances of applicable Type 'A' Water Licence water quality discharge criteria for TSS occurred on June 4 and June 5, as outlined above. During the subsequent investigation, laboratory results for additional samples collected at the CF Pond monitoring station in June were compliant with all applicable water licence criteria, with the exception of TSS on June 11 which measured 15.3 mg/L. TSS on June 4 also exceeded the MDMER discharge criteria of 30 mg/L for TSS concentrations in a grab sample. Subsequent lab results for all parameters analyzed from the discharge in June were compliant with MDMER criteria; however, the elevated grab sample results contributed to an exceedance of the average TSS concentration in June which measured 22.58 mg/L; exceeding the MDMER criterion of 15 mg/L. The results of sampling completed to satisfy MDMER requirements are detailed in Baffinland's 2022 MDMER annual effluent monitoring report for the Mary River Mine Site (Baffinland, 2022d). The elevated TSS measured at the CF Pond on June 4 was reported to the NT-NU Spill Reporting Line on June 6, 2022 following receipt of preliminary results from the third-party laboratory indicating the elevated TSS concentration (NT-NU Spill Report #2022-233).

Periodic controlled discharges of treated effluent from the KM 106 Run-of-mine (ROM) Ore Stockpile Facility Pond (KM 106 Pond) occurred during July and August 2022. Controlled discharges of the treated effluent from the KM 106 Pond in 2022 involved pumping retained surface water runoff from the KM 106 Pond through rigid and lay-flay hose 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 2022 KM 106 Pond effluent discharges with the exception of TSS on August 2, as outlined above, which was measured to be 29.9 mg/L; exceeding the applicable water licence water quality discharge criteria for TSS of 15 mg/L. The results of sampling completed to satisfy MDMER requirements are detailed in Baffinland's 2022 MDMER annual effluent monitoring report for the Mary River Mine Site.

Periodic controlled discharges of treated effluent from the KM 105 Pond, which collects surface water runoff from the Mine Haul Road and surrounding hillside, occurred during June and July, 2022. Controlled discharges of the treated effluent from the KM 105 Pond in 2022 involved pumping the retained surface water from the KM 105 Pond and dam retainment infrastructure down the slope of the spillway through rigid hose and releasing the effluent at an approved discharge point in the upper reaches of Sheardown Lake Tributary. 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. An exceedance of applicable MDMER and Type 'A' Water Licence water quality discharge criteria for TSS occurred on June 9 and resulted in additional instances of elevated TSS in follow up sampling, as outlined above. An additional TSS exceedance occurred on July 15 as a result of a seepage event from the KM 105 Pond dam structure.

On July 15, 2022, system control software indicated an unexpected decrease in the KM 105 water level beginning at approximately 22:08 on July 14. An immediate visual inspection was subsequently completed, which confirmed seepage from the dam structure; observed at the downstream toe of the northwest dam embankment. Subsequent water quality samples collected from a newly established water quality monitoring station (KM105SWMMP-SEEP-01) at the seepage location, and at downstream receiving environment water quality monitoring station D1-05, were compliant with all applicable water licence and MDMER criteria with the exception of TSS in the June 15 KM105-SWMP-SEEP-01 sample, which was measured at 68.7 mg/L; exceeding the maximum MDMER and water licence criteria of 30 mg/L and 15 mg/L, respectively. External laboratory results for subsequent samples collected between July 20 and August 3 at KM105-SWMP-SEEP-01 and D1-05 showed TSS levels near or below laboratory detection limits; confirming no impact to the receiving environment. The third-party design consultant was contacted to evaluate remediation measures to address the containment failure. Their analysis of data provided from site investigations and observations indicates the seepage likely originated immediately upstream of the northwest embankment geomembrane tie-in trench, at the area where the trench transitions from the upstream embankment to the abutment slope. Sediment control fences were strategically installed, in accordance with Baffinland's Surface Water and Aquatic Ecosystem Management Plan (SWAEMP; Baffinland, 2021f), downstream of the seepage for sediment control. Regulatory monitoring under the water licence and MDMER was continued at seepage location KM105-SWMP-SEEP-01 for the duration of the 2022 flowing water season. A remediation plan developed in consultation with the third-party design engineer, which included the use of a bentonite mixture to fill voids, was completed in October 2022. Water treatment for TSS removal is planned to be in place at the KM 105 Pond prior to freshet 2023.

The results of sampling completed to satisfy MDMER requirements are detailed in Baffinland's 2022 MDMER annual effluent monitoring report for the Mary River Mine Site (Baffinland, 2022d). The June TSS exceedance event and the July seepage event identified at the KM 105 facility in 2022 were reported by Baffinland to relevant regulators and are documented in NT-NU Spill Report 2022-279 and in NT-NU Spill Report 2022-364, respectively.

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

Baffinland continues to conduct incident investigations to determine the root cause of water quality discharge exceedances so that effective corrective actions can be developed and implemented.

Following a thorough investigation, the key finding from the December MS-01 and MS-01B exceedances was an inadequate preventative maintenance (PM) plan to properly coordinate the timely inspection, cleaning, repair and replacement of the various components that make up the MSC and Sailiivik STPs. Baffinland has committed to the development and implementation of a PM plan for the project's wastewater treatment facilities. Additionally, a Standard Operating Procedure is under development that will include calibration and equipment replacement schedules for all monitoring equipment.

To prevent a re-occurrence of missed sampling parameters, such as the missed TPH analysis in July 2022, in-depth training for field staff will be conducted prior to the field season in 2023 in which bottle types and associated analysis will be reviewed. In addition, data management software (EQuIS) implementation will involve a bottle set list per

each sample location prior to samples being taken, as well as automatically generated Chain of Custody (COC) forms based on analysis required under the water license.

Construction began in 2021 on approved surface water management infrastructure outlined in the Long Term Surface Water Management Plan, to enable effective management of surface water at the Mine Site (Baffinland, 2021b). In 2022, construction of the MS-11 Surface Water Management Pond was completed, as part of the first phase of the implementation of the plan. The pond was immediately commissioned to manage freshet runoff from the Mine Haul Road and surrounding hillside. A remediation plan developed in consultation with the third-party design engineer was completed in October 2022 to repair the KM 105 Pond containment failure which occurred in July 2022, and water treatment for TSS removal will be in place at the KM 105 Pond prior to freshet 2023. Baffinland will continue to implement the Long Term Surface Water Management Plan in 2023 (Baffinland, 2021b).

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, 2023f).

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 Term and 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 Term and 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	https://www.baffinland.com/media-centre/document-portal/

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 are 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 (Baffinland, 2018a).

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 Term and 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 Term and 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, 2021e) Fish Habitat Monitoring – 2021 Annual Report - Early Revenue Phase - Tote Road Upgrades (Baffinland, 2021g) 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, 2021f) 2022 QIA and NWB Annual Report for Exploration and Geotechnical Activities (Baffinland, 2023b) 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a) Updated Review of 2022 Dust Suppression Water Withdrawals, Mary River Project. (Knight Piésold, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

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 (SWAEMP; Baffinland, 2021f), Roads Management Plan (Baffinland, 2020c) and EPP (Baffinland, 2021e).

Baffinland inspects fish bearing water crossings at the Project, at a minimum, 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. Baffinland continues to work with DFO to refine

permanent crossing plans for crossings identified with fish passage issues from the assessments. Detailed engineering and extensive engagement has occurred on this Project to date.

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 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a). Water withdrawal under the Type 'B' Water Licence is presented annually in the 2022 QIA and NWB Annual Report for Exploration and Geotechnical Drilling (Baffinland, 2023b).

RESULTS

During 2022, 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 2022 included the clearing of snow and ice at the ends of culverts prior to and during freshet.

Water withdrawal rates in 2022 for approved water sources under the Type 'A' and 'B' Water Licences are presented in the 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a) and the 2022 QIA and NWB Annual Report for Exploration and Geotechnical Activities (Baffinland, 2023b), 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 2022, 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 for domestic and dust suppression purposes:

- Although the total daily water withdrawal for Camp Lake (355.4 m^3/day) was not exceeded in 2022, there was five (5) incidents in July 2022 (July 6, July 7, July 15, July 22 and July 23) where the daily water volume withdrawn for domestic purposes exceeded the domestic daily water withdrawal limit for Camp Lake (203.8 m^3/day). The findings of the root cause investigation of the July exceedances determined that the exceedances were likely the result of inaccurate categorization/accounting of water withdrawn from the Camp Lake jetty. Baffinland is currently automating the system at the water jetty by connecting the flow meter to the site Programmable Logic Controller (PLC) and implementing logic coded programming to improve characterization of domestic and industrial daily water volumes withdrawn at the Camp Lake jetty by multiple users.
- Total daily water volume withdrawal limits for dust suppression purposes were exceeded thirty (30 times at Approved Project water sources in 2022, including; three (3) exceedances at KM 32 Lake, eleven (11) exceedances at BG50, ten (10) exceedances at CV217, five (5) exceedances at Muriel Lake, and one (1) exceedance at Tom River (CV233). A third party consultant reviewed the dust suppression water withdrawals to assess the effects of the daily water withdrawal exceedances on instantaneous flows of streams and lake outflows at the five (5) locations where the daily water withdrawal limits were exceeded in 2022, using estimated mean monthly and 10-year low flows, and concluded that the exceedances in 2022 were not environmentally significant and are not expected to adversely affect stream flows, lake flows, fish, or fish habitat (Knight Piésold, 2023a). The memorandum regarding the review of the 2022 dust suppression water withdrawals is provided in Appendix E.2.6 of this report. Exceedances which occurred in 2022 resulted from a water use accounting issue which occurred because the water use limits are daily limits and do not

correspond with operator work shifts which occur over two (2) partial days, and a lack of a formalized tracking and training process.

- Corrective actions that Baffinland is taking to prevent similar incidents from re-occurring include the development of an SoP for the dust suppression water log tracking process, applying to increase the daily withdrawal limit to reflect the instantaneous withdrawal rate rather than a daily total, maximize opportunities to use recycled water for dust suppression, and Investigate the use of a tablet system connected to the local LTE network for real-time tracking of individual water withdrawals, with visual warnings when daily limits are being approached.
- Training for operators, supervisors and environmental staff will occur prior to 2023 use of water for dust suppression and will be ongoing throughout 2023.

Further discussion on the water withdrawals at the Project, including all supporting daily and monthly volumes, are provided in the 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a).

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 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 Terms and Conditions 20 through 30)

Eleven (11) PC Terms and Conditions relate to the potential impacts of the Project on groundwater and surface water. There is overlap in the scope of these PC Terms and Conditions with PC Terms and Conditions No. 16 to 19 for hydrology and hydrogeology. Several of the Terms and Conditions require the development of management plans. These Terms and 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 Term and Condition No. 29 and No. 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 Inuit Owned land (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 and aquatic effects monitoring required under the Project's water licences.

Monitoring Activities

Throughout 2022, 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 2022 SNP results reported to the NWB, CIRNAC and the QIA, exceedances of applicable discharge criteria in 2022 involved mainly surface water runoff and effluents with elevated Total Suspended Solids (TSS). 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 (TRMP) 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 4.15 provides an evaluation of the Project's impacts on groundwater and surface water, based on monitoring activities completed in 2022, relative to predictions presented in the FEIS and FEIS Addendum.

Table 4.15: 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 and Mine Site Hazardous Waste Berm areas in 2022. Risk-based screening criteria have been developed for evaluating whether groundwater monitoring should be conducted at other Mine Site facilities	Groundwater monitoring 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. A conceptual contaminant transport model for the Landfill Facility will be populated as data is collected in future years to quantify contaminant transport occurring at the Landfill Facility.
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 Site, Milne Port, and along the Tote Road corridor. 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.	Site runoff did not exceed FEIS predictions.

Path Forward

Baffinland will continue to implement the Tote Road Earthworks Execution Plan (TREEP; Golder, 2017) and other sedimentation and erosion mitigation measures in 2023, and will monitor effluents and receiving waters in accordance with Type 'A' Water Licence and AEMP.

Baffinland will continue the groundwater monitoring program in 2023, and will continue to retain consultants to execute the program which will be implemented based on the assessment and recommendations from the 2022 Groundwater Monitoring Report (Knight Piésold, 2023b). 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 2023.

Project Certificate Term and 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 Term and 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, 2022e) 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, 2023f) 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a) 2022 CREMP Report (Minnow, 2023a).
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.4.1

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, 2023f), which is an approved plan under the Type 'A' Water Licence.

In addition, the Aquatic Effects Monitoring Plan (AEMP; Baffinland, 2022e), 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 2022, 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. Of the Project's two (2) quarries, only one (1); the Milne Port Q1 quarry, was active during the 2022 open water season. Un-ionized ammonia and nitrate levels were below the CCME water quality guideline for all samples downstream of the Milne Port Q1 quarry except for select samples at one of Q1's monitoring sites (MP-Q1-02); however, the concentration of both ammonia and nitrate in the surface water sampling site (MP-C-H) downstream of MP-Q1-02 was below CCME guidelines for all samples in 2022, and thus within FEIS predictions (CCME, 2010; 2012). At the Mine Site, un-ionized ammonia and nitrate levels were below the CCME water quality guideline for all samples downstream of the QMR2 quarry except for one (1) sample at QMR2's MQ-C-B monitoring station which exceeded the CCME guideline for nitrate in one (1) sample. All acute toxicity water samples collected in 2022 downstream of Project quarries and mining areas were demonstrated to be acutely non-lethal. A complete discussion of the 2022 water quality monitoring results collected under the Type 'A' Water Licence is provided in the 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a).

Monitoring under the AEMP in 2022 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. Within the Sheardown Lake system, elevated levels of nitrate and ammonia were observed in 2022 when compared to baseline and/or reference conditions, however no adverse effects to phytoplankton, benthic invertebrates or Arctic char were indicated. A special investigation is planned to be conducted in 2023 including implementation of an expanded spatial water quality program to identify the source(s) of ammonia, nitrite, and nitrate to the affected tributary; Sheardown Lake Tributary 9 (SDLT9).

Reports discussing the 2022 results for the CREMP and Lake Sedimentation Monitoring Program are provided in Appendix G.4.1 and Appendix G.4.2 and as appendices to the 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a).

TRENDS

Overall, 2022 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.

Trends associated with water quality, sediment quality, and biological monitoring under the CREMP are presented in the 2022 CREMP Report (Appendix G.4.1; Minnow, 2023a).

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, 2022e).

Project Certificate Term and 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	The Proponent shall ensure that the scope of the Aquatic Effects Monitoring Plan (AEMP) includes, at a minimum: • 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 a. Measures for dustfall monitoring designed as follows: i. To establish a pre-trucking baseline and collect data during Project operation for comparison 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) 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.
Relevant Baffinland Commitment	2
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and 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	Aquatic Effects Monitoring Plan (Baffinland, 2022e) Final Environmental Impact Statement (FEIS; Baffinland, 2012) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a) 2021 QIA and NWB Annual Report for Operations (Baffinland, 2022f) 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a) 2022 CREMP (Minnow, 2023a) 2022 Lake Sedimentation Monitoring Report (Minnow, 2023b)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.4.1 Appendix G.4.2 Appendix G.5.1

METHODS

The Aquatic Effects Monitoring Plan (AEMP) was initially submitted to the NWB on June 27, 2014, as required by the Type 'A' Water Licence, and was subsequently approved by the NWB. On March 31, 2022, Revision 2 of the AEMP was submitted to the NWB with the 2021 QIA and NWB Annual Report for Operations (Baffinland, 2022f).

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 2022 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 in Appendix G.4.1 and G.4.2 as appendices to the 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a).

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 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a).

RESULTS

Reports discussing the 2022 results for the CREMP and Lake Sedimentation Monitoring Program are provided in Appendix G.4.1 and G.4.2 and as appendices to the 2022 QIA and NWB Annual Report for Operations

(Baffinland, 2023a). The 2022 results of the Dustfall Monitoring Program are presented in the 2022 Final Terrestrial Environment Annual Monitoring Report (Appendix G.5.1; EDI, 2023a).

The current revision of the Project's AEMP (Baffinland, 2022f) meets the requirements and intended scope outlined in PC Term and 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 with the 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a) that captures current operational activities and monitoring requirements.

Project Certificate Term and 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 Term and 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, 2021f)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

A comprehensive sediment and erosion management plan is incorporated into Baffinland's Surface Water and Aquatic Ecosystem Management Plan (SWAEMP; Baffinland, 2021f). 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 Term and 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 Term and 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, 2021f) 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a) 2022 Groundwater Monitoring Program Report (Knight Piésold, 2023b) Groundwater Monitoring Program Review and Assessment (Knight Piésold, 2023c) Development of a Conceptual Contaminant Transport Model for the Landfill at the Mary River Mine Site (Knight Piésold, 2023d)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.3.1 Appendix G.3.2 Appendix G.3.3

METHODS

A groundwater monitoring program, involving the installation of shallow groundwater wells downstream of Project infrastructure, is discussed in Baffinland's SWAEMP (Baffinland, 2021f).

Baffinland continued to implement the groundwater monitoring program, as outlined in the 2022 Groundwater Monitoring Report in Appendix G.3.1 (Knight Piésold, 2023b). In 2022, Baffinland retained groundwater consultants that are specialized in Arctic environments to provide a comprehensive third-party review and assessment of the current program, execute the 2022 groundwater monitoring program at the Mine Site Non-Hazardous Waste Landfill Facility (Landfill Facility) and Mine Site Hazardous Waste Berm (HWB) Facility, and provide recommendations for the program for future years. The 2022 monitoring program included:

- Soil sampling at the Landfill facility to evaluate active-layer soil conditions and landfill cover material physical properties;

- Soil sampling at the HWB Facility to assess the presence of hydrocarbons and metals in the soil;
- Collection of leachate grab samples from test pits completed within the waste area at the Landfill Facility;
- Installation of additional 2-inch diameter standpipes (two (2) down gradient and one (1) up gradient at the Landfill Facility and three (3) down gradient and two (2) up gradient at the HWB Facility);
- Response testing within the installed standpipes to evaluate the hydraulic properties of the active layer soils within the vicinity of the facilities; and
- Water level measurements and groundwater quality sample collection from existing drive point piezometers (where possible) and newly installed standpipes.

In September 2022, the groundwater monitoring program was completed and involved the installation of shallow groundwater wells up-gradient and down-gradient of the Mine Site Non-Hazardous Waste Landfill Facility (Landfill Facility) and Mine Site Hazardous Waste Berms using existing drive-point piezometers (where possible) and newly installed nominal 2-inch diameter PVC standpipes. Groundwater wells were established to the depth of permafrost (approximately 1.1 to 2.3 meters) and water samples were collected near the depth of the active layer. The methodology for the 2022 groundwater monitoring program is detailed in the 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a). The 2022 Groundwater Monitoring Report is provided in Appendix G.3.1 (Knight Piésold, 2023b).

RESULTS

Results of the monitoring conducted in 2022 are presented in the 2022 Groundwater Monitoring Program Report (Knight Piésold, 2023b) in Appendix G.3.1. The Groundwater monitoring program review and assessment is presented in Appendix G.3.2 and the development of a conceptual containment transport model for the landfill is presented in Appendix G.3.3.

TRENDS

Refer to the 2022 Groundwater Monitoring Report (Knight Piésold, 2023b) for Project groundwater monitoring information and associated trends.

On-going groundwater monitoring is required to gain a better understanding of natural groundwater chemistry and any impacts at the Project site. 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 potential trends, including potential impacts from Project activities or infrastructure.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to retain consultants to execute the groundwater monitoring program in 2023, which will be implemented based on the assessment and recommendations from the 2022 Groundwater Monitoring Report.

In 2022, following a desktop review of the key components of the Mine Site, the third-party consultant developed risk-based screening criteria for evaluating whether groundwater monitoring should be conducted at other Mine Site facilities. Based on the screening criteria, expansion of the current groundwater monitoring program to additional facilities was not recommended. The third-party consultant noted, however, that should the risk level of a Project facility increase in the future due to changing site conditions, groundwater monitoring at the facility may

become warranted; therefore, the facility will require re-evaluation against the screening criteria should site conditions change.

The third-party consultant is also developing a conceptual contaminant transport assessment model for the Landfill Facility to quantify contaminant transport occurring at the Landfill Facility. Currently, only limited data is available, however, additional data collected in future years will be used to inform the analytical model with the goal of developing a fully realistic model, which will continue to be further refined over time as data continues to be collected in future years.

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 2023 to gain a better understanding of natural groundwater chemistry and potential project related effects at the Project site.

Project Certificate Term and 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 Term and 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	Not applicable
Ref. Document Link	Not applicable

METHODS

Methods for monitoring and reporting on Project Certification Condition No. 24 are discussed in the response to Project Certificate Term and Condition No. 17.

RESULTS

Results are discussed in Project Certificate Term and Condition No. 17.

TRENDS

Trends are discussed in Project Certificate Term and Condition No. 17.

RECOMMENDATIONS / LESSONS LEARNED

Recommendations/lessons learned are discussed in Project Certificate Term and Condition No. 17.

Project Certificate Term and 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	Not applicable
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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Nunavut Water Board, Indigenous and Northern Affairs Canada, Qikiqtani Inuit Association
Reference	Annual Geotechnical Inspections – 2022 Report 1 (Wood, 2022) 2022 Annual Geotechnical Inspection Report 2 (WSP, 2022) 2019 Inspection of the Milne Inlet Tote Road and Associated Borrow Sources (See Appendix G.15 in Baffinland, 2020d) Borrow Source Management Plan - Kilometre 97 (Baffinland, 2014b) 2022 QIA and NWB Annual Report for Exploration and Geotechnical Activities (Baffinland, 2023b) 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.2.4.1 Appendix G.2.4.2

METHODS

In 2022, Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited (Wood), and WSP (formerly Wood Canada Limited) 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);
- Non-hazardous Landfill Facility;
- Landfarm Facility;
- Deposit No. 1 Pit walls;
- Existing rock quarries;

- Former borrow areas (4); and
- Bridges (4) and former borrow areas (4) along the Tote Road.

The inspections took place from June 21 to 24, 2022 and from August 31 to September 7, 2022 (see Appendix G.2.4).

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 to support engineering studies for future Project infrastructure.

Geotechnical inspections completed by Wood and WSP can be found in Appendix G.2.4.

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 structurally stable with no sign of seepage.

A potential leak from the MS-11 surface water management ponds at KM105 at the Mine Site was identified. The potential location of the leak is under investigation and this issue will be rectified in 2023.

Minor repairs and actions were recommended at Hazardous Waste Berms to remove timber/lumber and/or regrading damaged slopes and crest, and to limit foot and truck traffic on slopes and crest of the berms, at MS-06 to remove granular soil clogging a culvert, at MS-08 to remove boulders from the wet ditch, at the generator fuel berm to redirect melting snow in an adjacent area prone to flooding, and at the effluent discharge area to correct minor surface erosion. Actions were also recommended to address ponding water at the QMR2 quarry, and a diversion berm at the KM 106 ore facility (formerly D1Q2 quarry area). These are scheduled to be addressed in 2023.

At Milne Port, minor repairs and actions were recommended at the landfarm to address minor damage to geotextile protecting the liner, at the LP-5 storage area to address minor surface cracks, and at the P-SWD-5 drainage ditch to address missing riprap and sloughing/erosion. It was recommended that the P-SWD-3 and PSC drainage ditches be redesigned and reconstructed to improve their drainage capacity. These are scheduled to be addressed in 2023.

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.

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 2022. Works outlined in the Execution Plan are expected to continue in 2023. It was recommended that issues with grade control and a lack of appropriate drainage ditches

at the four former borrow areas inspected be rectified during Baffinland's regular maintenance program on the Tote Road.

Details of the geotechnical investigations (e.g. drilling) completed in 2022 are discussed in the 2022 QIA and NWB Annual Report for Exploration and Geotechnical Activities (Baffinland, 2023b). The 2022 Geotechnical inspections reports, along with Baffinland's plans to address any identified concerns, are included in Appendix G.2.4.

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. Changes to the thermal regime of sensitive landforms is limited to these locations, which are within the Project Development Area (PDA). Outside of this, there were no distinguishable Project-related effects on permafrost or sensitive landforms. These results are consistent with the FEIS prediction of no significant impact.

RECOMMENDATIONS / LESSONS LEARNED

Results from geotechnical investigations conducted in 2022 will be used to support the design of future Project infrastructure. Recommendations outlined in the 2022 geotechnical inspections reports will be completed in 2023 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 and additional works in 2021 and 2022. An action plan was submitted to the NWB and QIA to address these priority locations, and was included in the 2019 NIRB Annual Report (Baffinland, 2020b).

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 Term and 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 Term and 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, 2021e) Surface Water and Aquatic Ecosystem Management Plan (Baffinland, 2021f) Roads Management Plan (Baffinland, 2020c)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

A comprehensive erosion management plan is included in the Project's Surface Water and Aquatic Ecosystem Management Plan (SWAEMP; Baffinland, 2021f). 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 Section 3.4.5 of the Project's Roads Management Plan (Baffinland, 2020c) and Environmental Protection Plan (Baffinland, 2021e):

- 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 Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Not Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	The Communities of: Arctic Bay, Clyde River, Sanirajak, Igloolik and Pond Inlet
Reference	2022 Engagement Records 2022 TEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix B.1 Appendix C.2

METHODS

With easing of travel/health restriction measures in Nunavut as established by the Government of Nunavut Public Health Department related to the COVID-19 Pandemic in 2022, Baffinland's typical and preferred approach for holding community group meetings at frequencies or in-person formats as done in previous years was partially resumed. Alternative methods were explored and implemented as described in Section 2.3. Baffinland also participated in the Community Round Table organized by the NIRB as part of the PIPR review process. Regardless of format, engagements in communities provide an important opportunity for Baffinland to share information on existing operations, the results of ongoing environmental monitoring programs and future planning to support the development of the Project. These engagements provide an opportunity for community representatives to discuss ongoing concerns, interests in participating in the environmental management related to the Project, which can include any changes they may have seen in the landscape as a result of the Project. Public and Community Group meetings held in 2022 are presented in Tables 2.1 and 2.2, respectively, with additional details provided in Appendix B.1.

RESULTS

Public consultation continues to 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. Most comments about changes to the land and sea continue to focus 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 as part of current operations particularly around Milne Port and along the Tote Road and with respect to current and future operations. This topic has been brought forward during individual and public meetings, including during radio shows. 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 in Baffinland, 2021a). Baffinland takes the concerns provided by community members on generation of dust by Baffinland activities seriously. Accordingly, Baffinland undertakes annual dust monitoring throughout Project areas, and has modified its operations and incorporated changes through the years to minimize dust generation (for additional details, refer to PC Term and Condition No. 10). In 2021, an independently-led Dust Audit was initiated, and continued throughout 2022, to further investigate dust concerns related to Baffinland's operations. The third-party auditors work with a Dust Audit committee composed of representatives from each of the five (5) North Baffin communities including Arctic Bay, Clyde River, Igloolik, Pond Inlet, and Sanirajak. Committee members were nominated by Hamlet and Hunters and Trappers Organizations to participate in the Audit. The third-party auditor completed two (2) field investigations with the support of the Dust Audit Committee, in 2021 (September 30 to October 5) and 2022 (June 8 to 14). A Baffinland Dust Audit - Final Recommendations Report was released publically in 2023, following this reporting period (Nunami Stantec, 2023). This report includes recommendations for actions to take based on feedback brought forward by Committee members to better manage dust at the Mary River Project. Baffinland is committed to resourcing this third party dust audit annually and it responsible for sharing the results of the dust audit with the NIRB no later than January 31st of each calendar year, in accordance with Term and Condition No. 187.

Other 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 and engage with communities. Baffinland will develop weather-specific measures after further review of the QIA's 2021 Dust Investigation Report, the 2022 independent Dust Audit Report, and subsequent discussions with the TEWG. Baffinland will continue to jointly work with QIA to establish a program to identify high risk conditions for dust dispersal and plan for additional mitigation measures in order to satisfy the requirements of PC Term and Condition No. 188. Additionally, commitments related to dust mitigation efforts, primarily in response to community member concerns, are outlined in Appendix B of the amended Project Certificate No. 005 (NIRB, 2022a).

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and 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 – 2022 Report 1 (Wood, 2022) 2022 Annual Geotechnical Inspection Report 2 (WSP, 2022) 2019 Inspection of the Milne Inlet Tote Road and Associated Borrow Sources (See Appendix G.15 in Baffinland, 2020d) Environmental Protection Plan (Baffinland, 2021e)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.2.4.1 Appendix G.2.4.2

METHODS

Bi-annual geotechnical inspections were completed by Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited (Wood), and WSP (formerly Wood Canada Limited) in 2022, 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);
- Non-hazardous Landfill Facility;
- Landfarm Facility;
- Deposit No. 1 Pit walls;
- Existing rock quarries;
- Former borrow areas (4); and
- Bridges (4) and former borrow areas (4) along the Tote Road.

Inspections took place from June 21 to 24, 2022 and from August 31 to September 7, 2022.

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; and
- New structures under construction were reviewed for conformity with design drawings.

Geotechnical investigations continued to be conducted at Project sites 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 (See Appendix G.15 in Baffinland, 2020b). The investigation completed by Tetra Tech was included in the 2019 Annual Report to the NIRB.

Geotechnical inspections completed by Wood and WSP can be found in Appendix G.2.4.

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, 2020, 2021 and 2022 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. Changes to the thermal regime of sensitive landforms is limited to these locations, which are within the Project Development Area (PDA). Outside of this, there were no distinguishable Project-related effects on permafrost or sensitive landforms. These results are consistent with the FEIS prediction of no significant impact.

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 and 2021, and additional works in 2022.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and 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	2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a)
Ref. Document Link	Not applicable

METHODS

Not applicable.

RESULTS

As required by the Project's Type 'A' Water Licence and Commercial Lease with QIA, two engineering submissions were provided to regulatory agencies and stakeholders in 2022, comprising Design Briefs and Issued-for-Construction (IFC) Drawings, as summarized in Table 4.16.

Table 4.16: 2022 Submissions to Regulatory Agencies and Stakeholders

Date of Submission	Regulatory Agencies and Stakeholders	Content
July 15, 2022	NWB, CIRNAC, QIA, DFO	Camp Lake Area Water Management Measures – Design Brief and IFC Drawings
October 29, 2022	NWB, CIRNAC, QIA, DFO	2022/2023 Tote Road Culvert Upgrades - Design Brief & For-Construction Drawings

In addition, relevant as-built documentation for infrastructure completed in 2022 was submitted in Appendix C of the 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a). These documents pertain to the following pieces of infrastructure:

- Mine Site Landfarm – Cell 1 and Cell 2
- KM 105 Sedimentation Pond
- Camp Lake Area Water Management

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 Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Not applicable
Reference	QMR2 Quarry Management Plan (Baffinland, 2021h) Q1 Quarry Management Plan (Baffinland, 2020e) Quarry Blasting Operations Management Plan (Baffinland, 2013b) Borrow Source Management Plan – KM 97 (Baffinland, 2014b) Borrow Pit and Quarry Management Plan (Baffinland, 2014c)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

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 2022.

RESULTS

During 2022, Baffinland operated several quarries and borrow sources to support Project road maintenance and infrastructure construction. Quarries and borrow sources in operation during 2021 included the Q1 Quarry at Milne Port and the KM 97 Borrow Source near the Mine Site.

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 Terms and Conditions 31 through 40)

Ten (10) PC Terms and Conditions relate to the potential impacts of the Project on vegetation and 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 include local land users, the QIA, ECCC and the Government of Nunavut (GN). Comments have focused on the need 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, which could lead to potential uptake effects on wildlife such as caribou through consumption of forage near the Project area. Stakeholders have also expressed an interest in revegetation being incorporated into reclamation plans. Responses to these issues are reflected in PC Terms and Conditions No. 31 through 40.

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 and dustfall extent analysis

The objectives of the vegetation and soil base metals monitoring program are to monitor metal concentrations in vegetation and soil, particularly caribou forage (i.e., lichen) near Project infrastructure and verify that metal concentrations are below or within the acceptable range for established soil quality guidelines and relevant vegetation indicator values. 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 (Sections 8 Dustfall and 9 Vegetation in the 2022 Final Terrestrial Environment Annual Monitoring Report; EDI, 2023a) to assess metals uptake in vegetation and soil related to Project activities.

In 2022, a full review of vegetation and soil base metals analysis was conducted, including historic reference standards and indicator values. Vegetation (i.e. lichen) and soil sampling was conducted at a total of 61 sites across the study area. Soil and vegetation samples were analyzed for 36 elements, including six (6) metal/metalloid Constituents Of Potential Concern (CoPCs), which have been reported on since 2012: arsenic (As), cadmium (Cd), copper (Cu), lead (Pb), selenium (Se), and zinc (Zn). Soil-metal concentrations at the Project predominantly indicated no significant change or were significantly lower than the baseline values. Values were below or within an acceptable range for soil-metal concentrations. Lichen-metal concentrations had some discrete increases at the Project, with some individual values at or above indicator values for lichen-metal concentrations. As such, soil-metal and lichen-metal concentrations presently represent a low risk to environmental and human health. Baffinland will continue monitoring these conditions and further document CoPCs. Should these values continue to increase or result in year-over-year exceedances of threshold values, it may be necessary to re-evaluate and refine potential triggers and corrective actions. These results indicate that current effects levels are within predictions outlined in the Final Environmental Impact Statement (FEIS), which 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 was also predicted that that sensitive vegetation classes might be affected by metal uptake.

The vegetation abundance monitoring program was not carried out in the 2022 season, consistent with its 3 to 5-year schedule. The last sampling year was 2019 and the next proposed sampling year is 2023. 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 (9) 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.

Given that year-over-year trends have shown that invasive plants do not appear to be a significant potential effect of concern, no targeted exotic invasive plant monitoring was conducted in 2022. During opportunistic incidental monitoring opportunities, no exotic invasive plants were identified.

The revegetation research program was initiated in 2019, establishing test plots to monitor for post-disturbance natural revegetation. Follow-up monitoring continued in 2021, which included an exception of survey location and reclamation trial sites. Revegetation plots were not visited in 2022. Study plots were established at four (4) locations selected to represent different revegetation timeframes, from 1-Year Post-Disturbance up to >60 Years Post-Disturbance. A key observation of the revegetation survey is that natural/unassisted revegetation does occur at the Project. The results of the study conducted to date will be shared with Stakeholders through a Mine Closure Working Group, which could convene as early as 2024. Updates on the outcome of the ongoing reclamation research study and activities of the Mine Closure Working Group will be provided to the NIRB as they become available.

Table 4.17 provides an evaluation of the Project's impacts on vegetation.

Table 4.17: 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 2022.	Soil-metal concentrations at the Project generally indicated no significant increases compared with baseline values. Some discrete increases in CoPC lichen-metal concentrations have been identified, with some values at or above indicator values. Soil-metal and lichen-metal concentrations presently represent a low risk to environmental and human health. Results within FEIS predictions.
Vegetation Abundance	Dustfall results in changes in species composition and vegetation abundance	Vegetation abundance monitoring was last completed in 2019. This program is planned for 2023.	No Project-related effects on vegetation ground cover, canopy cover or plant group composition. Results within FEIS predictions

Component	Effects	Monitoring Program	Impact Evaluation
Invasive Species	Invasive species introduction to North Baffin Island	Exotic Invasive Vegetation Targeted Monitoring was completed in 2020. Incidental monitoring continued in 2022.	No new exotic invasive vegetation was identified during incidental sampling in 2022. Results within FEIS predictions.

Path Forward

Soil-metal concentrations at the Project predominantly indicated no net change (i.e., no significant increases) from the baseline values. Values were below or within an acceptable range for soil-metal concentrations. Lichen-metal concentrations had some discrete increases at the Project, with some sample locations at or above indicator values for lichen-metal concentrations. As such, soil-metal and lichen-metal concentrations presently represent a low risk to environmental and human health. Baffinland will continue monitoring these conditions and further document CoPCs. Should these values increase and result in year-over-year exceedances of threshold values, it may be necessary to re-evaluate and refine potential triggers and corrective actions.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and 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, 2021e) Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland, 2016a) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.5.1

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 before construction on undisturbed ground;
- Ensuring appropriate approvals are met with applicable stakeholders and land lease agreement; and
- Documenting and tracking land disturbance approvals associated with the Project.

RESULTS

At the end of 2022, the total Project footprint was 605 hectares (ha). That area is less than what was assessed in the FEIS (7,618 ha). Any unauthorized land disturbance or deviation from the PDA is reported as an incident and investigated. Overburden suitable for re-use is stockpiled for the area's remediation, wherever possible. A total area of 0.05 ha of land was disturbed within the PDA from Project related activities in 2022, and is reported in the 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a).

TRENDS

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

RECOMMENDATIONS / LESSONS LEARNED

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

Project Certificate Term and 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 the 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and 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	2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

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 also conduct visual inspections of equipment and supplies during offloading to verify compliance.

RESULTS

No exotic invasive plant species have been introduced via equipment, or supplies brought to the Project sites. Refer to PC Term and Condition No. 37 for additional information about site surveys for exotic invasive species.

TRENDS

The potential for introducing exotic invasive vegetation on equipment and supplies is managed through current practices.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland staff, contractors and suppliers will continue to clean, inspect, and monitor all equipment and supplies before loading at source and offloading at Milne Port, as applicable. If multiple non-compliance events were to occur, Baffinland will consider using a third-party auditor to monitor compliance for better enforcement of contractual policies.

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2021 TEWG Meeting Records (Baffinland, 2022a) 2022 TEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.2

METHODS

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 the 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 needed.

RESULTS

Not applicable.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland is currently updating the Terrestrial Environment Mitigation and Monitoring Plan (TEMMP) and Air Quality Noise Abatement Monitoring Plan (AQNAMP). Management plans will be circulated to the TEWG for review prior to finalization. Modifications to terrestrial monitoring programs that have occurred since 2016 are all captured in the draft revision of the TEMMP. A more detailed description of the updated dustfall monitoring program is provided in

AQNAMP. Management plans will continue to be updated as terrestrial monitoring programs are expanded and/or modified.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and 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) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a) 2021 TEWG Meeting Records (Baffinland, 2022a)) 2022 TEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.2 Appendix G.5.1

METHODS

This Project condition is addressed by implementing a long-term vegetation and soil base metals monitoring program. Since dustfall deposition is the primary source of anthropogenic metals at the Project, the vegetation and soil base metals monitoring program was designed to align and facilitate comparisons with the dustfall monitoring program to assess metals uptake in vegetation and soils adjacent Project activities.

Procedures for the vegetation and soils base metals monitoring program have evolved over time. Initially, in 2012 and 2013, vegetation sampling focused on three focal groups: lichen (*Flavocetraria cucullata, Flavocetraria nivalis, Cladina arbuscula and Cladina rangiferina*), willow (*Salix spp*.), and blueberry (*Vaccinium uliginosum*). In 2014, sampling design and intensity were increased to improve data capture and analysis. Lichen—recognized as an indicator of environmental conditions and accumulator of atmospheric pollutants (Aslan et. al., 2011)—was selected as the key indicator and focal group for metals uptake. Blueberry and willow were removed as assessment targets due to their limited abundance in the area.

The study design examines the spatiotemporal 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). Data has been collected in 2012, 2013, 2014, 2016, 2019, 2020, 2021, and 2022.

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 Canadian Council of Ministers of the Environment (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 2022 Monitoring Program are presented in the 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a). The soil-metal concentrations at the Project predominantly indicated no net change (i.e., significant increases) from the baseline values. Values were below or within an acceptable range for soil-metal concentrations. Lichen-metal concentrations had some discrete increases in CoPCs at the Project. Still, all sample locations were below or within an acceptable range for lichen-metal concentrations. As such, soil-metal and lichen-metal concentrations present 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 key objective of the study, which is driven by feedback provided by the TEWG, was to align with relevant data from the dustfall monitoring program. The alignment allows for better interpretations of the effects of dustfall on soil-metal and lichen-metal concentrations. So far, no cohesive trends have been identified. Further analysis following data collection in future years will help draw meaningful conclusions and recommendations. These outcomes will be presented (as necessary) to examine this information's current and potential value to inform the vegetation and soil base metals monitoring program.

TRENDS

The soil-metal concentrations at the Project predominantly indicated no net change (i.e., significant increases) from the baseline values. Values were below or within an acceptable range for soil-metal concentrations. Lichen-metal concentrations had some discrete increases at the Project. Still, all sample locations were below or within an acceptable range for lichen-metal concentrations. As such, soil-metal and lichen-metal concentrations present a low risk to environmental and human health and safety.

RECOMMENDATIONS / LESSONS LEARNED

Presently, soil-metal and lichen-metal concentrations represent a low risk to environmental and human health and safety. Monitoring will continue as outlined in the TEMMP schedule.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Progress
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a) 2021 TEWG Meeting Records (Baffinland, 2022a) 2023 TEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.5.1

METHODS

As part of the approved Northern Contaminants Program (NCP) project funding for the 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 (MHTO) to secure samples for analysis.

During an August 2021 call with the GN Regional Wildlife Biologist regarding Caribou Health Monitoring, it was confirmed by both Parties that Baffinland conducting this in parallel to the GN-led program would create a potential conflict. In light of that consideration, it was agreed that the best approach was to defer to data made publically available to meet our requirements for PC Term and Condition No. 35. Once the GN program is complete, and depending on the results, Baffinland may put in a separate permit application to extend this type of research.

RESULTS

The Government of Nunavut provided an update on the health monitoring program for caribou on Baffin Island at the February 2023 TEWG meeting, which started in the 2020/2021 harvest season and intended to capture harvest samples from community members. It was highlighted that the COVID-19 Pandemic placed limitations on this program and the GN was only able to collect samples from Pond Inlet. With regards to the NCP, there were very few samples collected from Pond Inlet—a total of two (2) blood samples, two (2) skin and hair samples, one (1) liver

sample, and one (1) kidney sample. During the 2021/2022 harvest season, the GN was able to collect samples in other regions of Baffin Island, including Iqaluit, but was not able to obtain any samples from Pond Inlet.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

An HTO representative suggested increasing the payment that GN provides to hunters for each sample to further encourage sample collection. The GN representative stated that sample payments are currently set at $60 for four (4) samples through the GN, whereas sample payments were set at $120 for the NCP.

Project Certificate Term and 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 Term and 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, 2020) 2021 TEWG Meeting Records (Baffinland, 2022a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

The vegetation abundance and diversity monitoring program considers the abundance and composition of caribou forage at varying distances from the Mine Site, Milne Port, and the Tote Road. Lichen (caribou forage) monitoring is included in the broader vegetation abundance program, which is to be repeated every 3 to 5-years. The program was run continuously from 2014 to 2019. Based on the proposed scheduled, the program will be repeated in 2023.

RESULTS

Direct loss of plant habitat remains limited to 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 is no evidence that changes in vegetation abundance are due to potential Project-related effects. Variations in abundance are from natural variation between years rather than a potential Project-related effect. Trends will continue to be examined as per the TEMMP methods and schedule.

RECOMMENDATIONS / LESSONS LEARNED

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

Project Certificate Term and 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 the 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2021 TEWG Meeting Records (Baffinland, 2021) 2019 Terrestrial Environment Annual Monitoring Report (EDI, 2020)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

Exotic invasive vegetation monitoring has 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 (~25 km/h) along the Tote Road. Each of the three focal areas (Mine Site, Milne Port, and Tote Road) was surveyed to the extent permitted to walk or drive in the Project footprint safely.

As outlined in the TEMMP, exotic invasive vegetation and natural regeneration monitoring are scheduled every 3 to 5 years or triggered by observations of exotic invasive plant species. Exotic invasive species monitoring occurred in 2014 and 2019. In 2020, follow-up targeted exotic invasive species monitoring focused on one location where an exotic plant was located during the 2019 survey.

RESULTS

In 2019, a garden tomato plant (*Solanum lycopersicum*) was observed growing at the Mine Site below the sewage/effluent discharge pipe. Twenty (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 could not produce flowers or fruit, 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. During the growing season, no tomato plants were found during two (2) surveys (July 13 and July 20, 2020), and the population was determined to have been eradicated. In 2022, no additional exotic invasive species were identified through incidental monitoring activities.

TRENDS

One (1) exotic invasive species was found in 2019, associated with sewage/effluent.

RECOMMENDATIONS / LESSONS LEARNED

As demonstrated by the detection and response to the garden tomato plants, Baffinland's exotic invasive plant monitoring program effectively detects and manages exotic invasive plants before they can establish permanent populations. The program will continue to monitor for the occurrence of exotic invasive plants in disturbed areas following the methods outlined in the TEMMP.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be included in the Annual Report submitted to the NIRB
Status of PC Term and 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, 2016a) 2021 TEWG Meeting Records (Baffinland, 2022a) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.5.1

METHODS

The vegetation monitoring program findings are summarized in each Terrestrial Environment Annual Monitoring Report for the given assessment year. 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.

RESULTS

As described in the Summary for PC Term and Condition No. 34, based on TEWG feedback, in 2022 the soils and vegetation metals survey was designed to align with relevant data from the dustfall monitoring program. The alignment allows for better interpretation of the effects of dustfall on soil-metal and lichen-metal concentrations. So far, no cohesive trends have been identified. Further analysis following data collection in future years will help draw meaningful conclusions and recommendations. These outcomes will be presented (as necessary) to examine this information's current and potential value to inform the vegetation and soil base metals monitoring program.

TRENDS

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 this approach.

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 this approach. See also Summary for PC Term and Condition No. 49.

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board
Reference	Interim Closure and Reclamation Plan (Baffinland, 2018a) Implications for Reclamation Practices & Trials at the Mary River Project (EDI, 2019a) Revegetation Survey & Preliminary Reclamation Trial 2021 (EDI, 2021b).
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

As described in the Interim Closure and Reclamation Plan (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 for mines in the Canadian Arctic, the research will focus on developing 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 to enhance physical stability and/or achieve the desired aesthetic conditions for vegetation cover throughout the Project site at closure.

In 2019, Baffinland retained Environmental Dynamics Inc. (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, 2019a). 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, 2021b). 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

The test plot locations were revisited in 2021 to evaluate revegetation success to date. A key observation of the revegetation survey is that natural/unassisted revegetation does occur at the Project. Predictably, revegetation following disturbance appeared to be shaped by initial starting conditions, such as the level of landscape disturbance (i.e., landscape form and function), soil characteristics (i.e., nutrient availability and organic matter content), and integrity of nearby 'undisturbed' vegetation (i.e., as a source of native seed) (EDI, 2021b). Revegetation plots were not visited in 2022, but are anticipated to be revisited in 2023.

TRENDS

The reclamation trial's sample size (n=3) is small, represents a short-term timeframe, and therefore imposes some design limitations. However, it does provide insight into some of the conditions, challenges and opportunities at the Project (i.e. that unassisted revegetation does occur at the Project). Ultimately, it is still too early within the reclamation trial to identify conclusive trends.

RECOMMENDATIONS / LESSONS LEARNED

The preliminary reclamation trials from 2019 and 2021 are intended to be a starting point for research and development to examine revegetation strategies appropriate for and adaptable to the Project. The reclamation trial sites will require periodic monitoring to determine revegetation status and growth. Since natural revegetation patterns and processes in the Arctic are characteristically slow, annual or biannual surveys are expected to be adequate to assess the long-term performance of surface configurations and to characterize rates of revegetation by early succession species. The results of the study conducted to date will be shared with Stakeholders through a Mine Closure Working Group. Updates on the outcome of the ongoing reclamation research study and activities of the Mine Closure Working Group will be provided to the NIRB as they are available. As confirmed above, revegetation plots will be visited in 2023.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	QIA
Reference	Interim Closure and Reclamation Plan (Baffinland, 2018a) Revegetation Survey & Preliminary Reclamation Trial - 2022 Project Update (EDI, 2023b) Implications for Reclamation Practices & Trials at the Mary River Project (EDI, 2019a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.5.2

METHODS

As described in the Interim Closure Reclamation Plan (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 for mines in the Canadian Arctic, the research will focus on developing 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 the desired aesthetic conditions for the Project site at closure.

In 2019, Baffinland retained Environmental Dynamics Inc. (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, 2019a). Following this, a field program to assess current conditions and establish test plots was implemented in 2019. The first field component (summer 2019) focused on surveying natural/unassisted revegetation at the Project and establishing a preliminary trial design. The second field component (summer 2021) expanded the number of survey locations and reclamation trial sites. Periodic follow-up monitoring occurred in summer 2020 and summer 2022, respectively.

The reclamation pilot study involved the establishment of reclamation plots to assess methods for surface preparation. Two surface configurations were applied: (1) 'rough and loose' and (2) 'track packing'. Periodic follow-

up monitoring (summer 2020, summer 2022) documented site revegetation status and related observations (EDI, 2023b).

RESULTS

Test plot locations were re-evaluated in 2020, 2021 and 2022. A general observation was that surface preparations (i.e., rough-and-loose and track-packing) had been 'washed out' due to weathering and were no longer apparent at any trial sites. The surface preparations are intended to create surface heterogeneity and micro-site conditions favourable to seed establishment and germination while reducing erosion potential and enhancing surface stability. All sites were stable and deemed low erosion potential; but wind erosion and 'wind-swept' surface soil (i.e., due to saltation and sediment creep) were apparent. Evidently, given the Project setting being prone to prolonged periods of high wind, these surface preparations should represent a short-term mitigation and reclamation strategy.

Moreover, an increasing number of small forbs and graminoids had colonized all sites (KM 16, KM 18, KM 52). The highest levels of revegetation (i.e., based on a visual assessment) were observed at KM 18 and KM 16 (both characterized as subxeric), whereas KM 52 (characterized as xeric) had the lowest levels of revegetation. Notably, the status of volunteer colonization and revegetation at KM18 was more advanced than expected, given only 1-year post-disturbance. In this case, adjacent land vegetation cover remained intact and viable. Following 2021 surface preparations, this species is suspected to have quickly adapted to site conditions leading to its predominance within the disturbed landscape. A similar observation regarding the proximity and viability of adjacent vegetation cover was made with respect to the vegetation cover conditions at KM 16 during the 2019 assessment.

TRENDS

Rates of natural revegetation in the Arctic are characteristically slow due to the region's climate, narrow growing season, and challenging site conditions and terrain. A key observation of the revegetation survey is that natural/unassisted revegetation does occur at the Project. Revegetation following disturbance appeared to be shaped by initial starting conditions, such as the level of landscape disturbance (i.e., landscape form and function), soil characteristics (i.e., nutrient availability and organic matter content), and integrity of nearby 'undisturbed' vegetation (i.e., as a source of native seed).

RECOMMENDATIONS / LESSONS LEARNED

So far, study findings provide insight into some of the conditions, challenges and opportunities at the Project. Baffinland will continue to review locations for new test sites, intending to establish test plots across various landscapes intersected by the Project. 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 Terms and Conditions 41 through 48a)

Nine (9) PC Terms and 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 (NWB) also regulates in-water structures such as bridges and culverts. In previous environmental reviews, the QIA has also provided valuable feedback for freshwater biota. Community members have previously raised concerns regarding Arctic char abundance and health in the Milne Inlet and Eclipse Sound area in general, however, these comments have not identified any specific freshwater bodies that the Project interacts with. It is worth noting that 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 has also been a key area of concern.

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;
- 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; and
- Monitoring of fish health in Qurluktuk, Tugaat and Ikaluit river systems.

2022 assessments of Project fish bearing water crossings were completed by a third-party Professional Fisheries Biologist in June of 2022. The emphasis of the 2022 spring monitoring program was to assess the presence of fish, habitat quality, and upstream accessibility through installed culverts at fish-bearing sites and identify crossings requiring remediation to allow for fish passage. The fish habitat monitoring associated with the Tote Road *Fisheries Act* Authorization identified that the fish use of the rustic fishway installed at BG-30 continued to be successful in 2022. In 2022, 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. No in-water culvert crossing work or other in-water work was conducted along the Tote Road in 2022. Baffinland is working with Fisheries and Oceans Canada (DFO) to develop plans to address fish passage issues along the Tote Road at specific locations. A Request for Review was submitted to DFO in May 2022, and DFO staff visited the Mary River site in June 2022 to inspect fish-bearing crossing locations along the Tote Road. Engagement with DFO is required prior to in-water remedial works. Baffinland submitted a design brief and issued for construction drawings in October 2022 and continues to work with DFO to refine plans to ensure fish passage issues are addressed. Engagement and dialogue continues with DFO on Baffinland's permanent crossing plan at twenty (20) crossings along the Tote Road. Baffinland

will work with DFO as necessary to ensure planned modifications to fish bearing crossings are in compliance of the *Fisheries Act*.

The AEMP encompasses several component studies, including the Core Receiving Environment Monitoring Program (CREMP). The results of the 2022 CREMP indicated some mine-related influences on water and sediment quality at some of the mine primary receiving systems, but no ecologically significant, adverse, mine-related effects to biota were identified in any of the Mine Site receiving waterbodies based on comparisons to applicable reference conditions or baseline data (Minnow, 2023a). 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 over the open-water period at Sheardown Lake NW habitat likely to be used for Arctic char spawning did not differ significantly between 2022 and baseline. Sediment accumulation thickness estimated for the 2021 to 2022 Arctic char egg incubation/larval pre-emergence period at Sheardown Lake NW was below the proposed low action threshold of 0.15 mm. Overall, the 2021 to 2022 results indicated no effects on Arctic char reproductive success were likely at Sheardown Lake NW as the result of sedimentation rates/accumulation over the 2021 to 2022 egg incubation/larval pre-emergence period and, based on these results, no further management response was triggered for future studies.

After further engagement with the MHTO regarding monitoring Arctic char in freshwater bodies near Milne Inlet, Baffinland implemented a monitoring program in 2021 to survey the Tugaat, Qurluktuk and Ikaluit freshwater systems (note Ikaluit was not accessed in 2021 due to weather limitations). Overall, the Milne Inlet Freshwater Fish Health Assessment demonstrated no adverse port-related effects on Arctic char health and tissue chemistry within the Tugaat and Qurluktuk freshwater systems in 2021. A second year of monitoring was completed in 2022 as part of the Milne Inlet Freshwater Fish Health Assessment program. In 2022, the field fish health assessment program ran from August 17 to 26, and included a total of three representatives from the Hamlet of Pond Inlet, the Mittimatalik Hunters and Trappers Organization (MHTO), and the Qikiqtani Inuit Association (QIA). Ikaluit Lake was sampled for the first time in 2022, while Tugaat and Qurluktuk lakes were sampled a second year in a row. Following the completion of the field component, Baffinland met with the MHTO representatives to discuss the final 2021 and preliminary 2022 results of the monitoring program. Baffinland specifically sought insight on the execution of the program and the interpretation of the results for future planning and reporting.

Details of this monitoring program and results can be found in Appendix G.4.3, 2022 Milne Inlet Freshwater Fish Health Program Report (Minnow, 2023b).

To date, the main objectives of this program have focused on health endpoints for Arctic char such as survival (age), growth (size relative to age), condition (length relative to weight), and tissue quality as it relates to consumption. Inuit Qaujimajatuqangit has helped to define these objectives and the following outlines contributions to the study:

- Two lakes (Tugaat and Qurluktuk) were initially identified as important sources of the sustenance fishery for community members. Community feedback identified a third lake (Ikaluit) which was added to the program.
- During initial discussions with the MHTO, mercury and iron tissue concentrations were identified as analytes of concern in fish tissue.
- To facilitate a two-eyed seeing approach crews were made up of individuals who brought a combination of traditional knowledge and western science to the project.

- During the field program, members with traditional knowledge identified appropriate locations where fishing should occur within the study lakes.
- During fish processing in 2022 there were some char that the community partners had no interest in keeping for human (nor animal) consumption. Several community members communicated that these particular fish, referred to by some as "unhealthy," could be identified either by the way the fish fought when angled, or slight nuances in appearance and smell. Pairing these or other qualitative descriptors (e.g., texture or color, based on the experience of hunters and trappers) with fish attributes such as age and length may facilitate a more holistic picture of char health from the study areas and help to ensure that community members can have confidence in consuming the fish which comprise their sustenance. Moreover, traditional anecdotes of the occurrence of both "healthy and unhealthy" fish co-occurring in certain lakes has aided in the interpretation of results here, facilitating inferences of resident and anadromous char and consequences for mercury concentrations. Further tools to assist the community to distinguish between anadromous and resident fish (i.e., field ID and cross validation with the use of otolith microchemistry) would be of tremendous value.
- During the 2022 field season members of the field team with traditional knowledge expressed an interest in assessing winter fish health since fish harvesting often happens under ice. This is a valid concern, as many aspects of fish physiology change during the winter months, when conditions are harsh, and resources are scarce. Although Arctic char continue to feed during the ice-covered winter period, somatic growth ceases and body condition decreases, due to dietary shifting (Amundsen and Knudsen, 2009). Seasonal dietary shifts have been linked to changes in char muscle tissue mercury concentrations (Kahilainen et al., 2016). As such, the addition of a winter monitoring component to this program would be a valuable addition.
- During discussion with the MHTO, the MHTO expressed the need for increased transparency for all fish data which has been included in this report (see Appendix D in Minnow, 2023b).
- During discussion with the MHTO, the MHTO expressed interest in the study evaluating whether the arctic char are acceptable for consumption. In response, this report has included a screening of all tissue data collected with available consumption values (see Table 2.2 and Appendix D in Minnow, 2023b).

Table 4.18 provides an evaluation of the Project's impacts on the freshwater environment, based on monitoring activities completed in 2022, relative to predictions presented in the FEIS and FEIS Addendum.

Path Forward

Baffinland plans to continue the implementation of improvements outlined in the Tote Road Earthworks Execution Plan (TREEP; Golder, 2017) and the Hatch (2013) design throughout 2023 to improve surface water drainage along the Tote Road, and to continue to work with DFO as necessary to ensure planned modifications to fish bearing crossings to address outstanding fish passage concerns are in compliance with the *Fisheries Act*. To improve conditions at these sites, Baffinland is currently planning culvert remediation works for 2023 and is working with DFO to establish a practical course of action for the identified culverts. Baffinland will continue implementing the CREMP in 2023, and will again work with the MHTO to finalize the Milne Inlet Freshwater Fish Health Assessment and develop the scope of work for the 2023 program.

Monitoring will continue in 2023 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 remediation works conducted.

Table 4.18: 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 *Fisheries Act*.	All compensation works are effective and within FEIS predictions.
	Culvert perching	Monitoring undertaken in accordance with the 2007 authorization under the *Fisheries Act*.	Perching was identified at six (6) crossings. Appropriate remedial measures are being identified and will be discussed with DFO and implemented to address these issues. Effects are 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. Effects are within FEIS predictions
	Fish impingements at camp and dust suppression water takes	No monitoring; appropriate screens are used on all intakes	Within FEIS predictions.

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association, Nunavut Water Board, Crown-Indigenous Relations and Northern Affairs Canada, Nunavut Impact Review Board
Reference	Borrow Pit and Quarry Management Plan (Baffinland, 2014c) Q1 Quarry Management Plan (Baffinland, 2020e) QMR2 Quarry Management Plan (Baffinland, 2021h) 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

Baffinland maintains the 100 metre (m) 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 2022. Existing quarries maintained the 100 m buffer from the high water mark to any fish bearing waterbodies. 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 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a).

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 ARD (Borrow Pit and Quarry Management Plan, Baffinland, 2014c; Appendix 2) and the 100 m buffer from the high water mark to any fish bearing water bodies will be maintained.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association, Crown-Indigenous Relations and Northern Affairs Canada, Nunavut Impact Review Board
Reference	Surface Water and Aquatic Ecosystems Management Plan (Baffinland, 2021f) Environmental Protection Plan (EPP ; Baffinland, 2021e) Terrestrial Environmental Management and Monitoring Plan (TEMMP; Baffinland, 2016a) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

Baffinland continues to perform regular inspections during construction activities to ensure all Project-related operations are at a distance greater than 31 m from any waterbody, except where authorized under the Type 'A' Water License and DFO Letters of Advice (LOA). 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 m from the high water mark of natural waterbodies, or is otherwise permitted to do so. Consultants preparing design drawings for new infrastructure are also made aware of the requirement. Baffinland conducts orientation training on the Environmental Protection Plan (EPP) for new contractors. The presentation provides an overview of key Project activities and the required natural vegetation buffers to any waterbodies. Additionally, site environmental technicians are required to monitor all Project infrastructure during routine bi-weekly compliance inspections to ensure that the 31 m distance from the high water mark is being maintained.

RESULTS

No permanent or temporary Project-related operations were sited within 31 metre of a waterbody during 2022, unless authorized under the Type 'A' Water License and DFO LOA.

TRENDS

Project operations have maintained the 31 m buffer between waterbodies, except where authorized under the Type 'A' or 'B' Water License and DFO LOA, and the condition continues to be enforced.

RECOMMENDATIONS / LESSONS LEARNED

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

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and 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, 2021f) Long Term Surface Water Management Plan (Baffinland, 2021b)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

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 (SWAEMP; Baffinland, 2021f). A modification to the Type 'A' Water Licence for the implementation of the Milne Port Surface Water Management Plan was approved in 2018. A modification to the Type 'A' Water License for the implementation of the Mary River Long Term Surface Water Management Plan was approved in 2021 (Baffinland, 2021b). These plans were developed to manage surface water at Milne Port and Mary River 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 and constructing surface water management ponds as required.

RESULTS

Not applicable.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

The SWAEMP will continue to be followed and enforced at the Project. Baffinland will continue to implement the approved Long Term Surface 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 Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Not applicable
Reference	Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (Wright and Hopky, 1998) Environmental Protection Plan (EPP; Baffinland, 2021e)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

Baffinland implements the management practices for blasting in or near water as outlined in Section 4.24 of the Environmental Protection Plan (EPP) (Baffinland, 2021e).

RESULTS

No blasting occurred in 2022 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 Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Department of Fisheries and Oceans (DFO)
Reference	Fisheries Authorization No. 18-HCAA-00160 (For Freight Dock; DFO, 2019) No Net Loss and Monitoring Plan (Knight Piésold, 2007) 2021 Freight Dock Offset Monitoring Report (Golder, 2021a) 2022 Freight Dock Offset Monitoring Report (Golder, 2022b) Floating Freight Dock: Application for Fisheries Act Authorization (Baffinland, 2019c)
Ref. Document Link	Not applicable

METHODS

In 2022, no in-water construction works requiring a *Fisheries Act Authorization* were completed that required adherence to the No-Net-Loss principle.

In June 2022 assessments of freshwater fish bearing water crossings were completed by a third-party Professional Fisheries Biologist. The emphasis of the 2022 spring monitoring program was to assess the presence of fish, habitat quality, and upstream accessibility through installed culverts at fish-bearing sites and identify crossings requiring remediation to allow for fish passage.

Monitoring of habitat offsetting works associated with the Milne Port Freight Dock were not planned for in 2022 under the frequency of monitoring set out in the DFO approved monitoring plan. The next year of monitoring is scheduled for 2024.

RESULTS

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

Fish use assessments were completed at forty-nine (49) fish bearing crossings during the spring of 2022. During the spring survey, fish were captured at twenty-six (26) crossings; observed but not captured at one (1) crossing; and neither observed nor captured at twenty-one (21) crossings. Fish presence at the Tote Road stream crossing areas and overall catch rates from spring 2022 were more abundant than 2021 surveys. It was also noted that the fish ladder installed at BG-30 remained successful in 2022.

No fish passage or habitat issues were documented at 32 of the 49 fish bearing water crossings. Potential issues with fish passage and/or habitat were observed at seventeen (17) fish bearing crossings. To improve conditions at these sites, Baffinland is currently planning culvert remediation works for 2023/2024 and is working with DFO to establish a practical course of actions for the identified culverts.

TRENDS

Current monitoring and assessment of project watercourses is sufficiently robust to identify fish passage issues. There have been recurring perches taking place at several culverts (CV-129, CV-114, CV-111, BG-50, CV-106 and CV-216), and recurring sedimentation issues at culverts CV-057, BG-01 and CV-186. Appropriate remedial measures are being identified and will be discussed with DFO and implemented to address these issues. The necessary permits will be obtained prior to executing the remedial works.

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 (TREEP) 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).

Overall, Year 2 of habitat offset monitoring at the Freight Dock completed in 2021 indicated that the three-dimensional structure of the introduced habitat is providing a suitable and stable substrate for colonization and growth of marine organisms, as evidenced by the presence of macroalgae, motile invertebrate, and fish taxa. Post-construction monitoring is required in years 1, 2, 5, 8 and 10, and therefore was not conducted in 2022. The next monitoring year will be 2024.

RECOMMENDATIONS / LESSONS LEARNED

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 the No Net Loss and Monitoring Plan (Knight Piésold, 2007). Assessments of fish bearing water crossings will be continued in 2023 as part of the Project's fish habitat monitoring program.

Future Tote Road remedial works/improvements/realignments required in support of on-going operations and future expansion projects will either follow the Code of Practice for culvert maintenance or a request for review will

be submitted to DFO with the approved designs prepared by qualified consultants. 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 2023 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 remediation works conducted.

Project Certificate Term and 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 Term and 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, 2023e) Metals and Diamond Mining Effluent Regulations (MDMER; Minister of Justice, 2022) Metals and Diamond Mining Effluent Regulations Emergency Response Plan (MDMER ERP; Baffinland, 2022d) Surface Water and Aquatic Ecosystem Management Plan (Baffinland, 2021e) Sampling Program - Quality Assurance and Quality Control Plan (Baffinland, 2023f) 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a) Dust Mitigation Action Plan (Golder, 2016a) Sedimentation Mitigation Action Plan (Golder, 2016b) Snow Management Plan (Baffinland, 2023h) Long Term Surface Water Management Plan (Baffinland, 2021b)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.2.5

METHODS

Consistent with the FWSSWMP (Baffinland, 2023e), prior to discharge, wastewater (e.g. treated sewage, treated contact water, oily water, etc.) is sampled to ensure 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; 2023f).

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 (CF), KM 106 Run of Mine Ore Stockpile Facility, KM 105 Sedimentation Pond, and Waste Rock Facility (WRF) at the Mine Site are reported to ECCC on a quarterly and annual basis.

Methodology for effluent discharges in 2022 are discussed in the Project Certificate Term and Condition No. 17.

RESULTS

Results from effluent discharges in 2022 are discussed in the Project Certificate Term and Condition No. 17. Results are for pre-discharge and discharge samples taken at surface water management ponds associated with ore and waste rock facilities, and oily water retained in containment areas, such as bulk fuel facilities. The effluent treatment systems include:

- 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 Water Treatment Plant (WRF WTP) at the WRF (MS 08).

TRENDS

Trends from effluent discharges in 2022 are discussed in the Project Certificate Term and Condition No. 17. Overall, the frequency of incidents involving the discharge of effluents to the receiving environment that exceed the applicable discharge criteria remained low in 2022, which has been consistent since 2014.

RECOMMENDATIONS / LESSONS LEARNED

Recommendations and lessons learned from effluent discharges in 2022 are discussed in the PC Term and Condition No. 17.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and 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) Fisheries Act Authorization No. NU-06-0084 (For Tote Road Crossings; DFO, 2007)
Ref. Document Link	Not applicable

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. In 2022, monitoring was conducted at fish bearing water crossings at the Project. The methodology of the 2022 program is discussed in Project Certificate Term and Condition No. 45.

RESULTS

2022 assessments of Project fish bearing water crossings were completed by a third-party Professional Fisheries Biologist in June of 2022. Results of this assessment are discussed in Project Certificate Term and Condition No. 45.

TRENDS

Trends are discussed in the Project Certificate Term and Condition No. 45.

RECOMMENDATIONS / LESSONS LEARNED

Recommendations and lessons learned are discussed in Project Certificate Term and Condition No. 45.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Not Active
Status of Compliance	In Compliance
Stakeholder Review	Not applicable
Reference	Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (Wright and Hopky, 1998) Environmental Protection Plan (Baffinland, 2021e)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

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 (DFO) and the Qikiqtani Inuit Association (QIA). Baffinland implements the management practices for blasting in or near water as outlined in Section 4.24 the Environmental Protection Plan (Baffinland, 2021e).

RESULTS

No blasting occurred in 2022 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 DFO and the QIA. Baffinland will discuss Project specific blasting thresholds with the appropriate parties if required in the future.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and 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	2022 Milne Inlet Freshwater Fish Health Program Report (Minnow, 2023b) 2022 CREMP Report (Minnow, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.4.1 Appendix G.4.3

METHODS

In addition to the annual fish use assessments completed near Project water crossings, as discussed in PC Term and Condition No. 45 and PC Term and 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 Arctic char from nearshore lake habitat via electrofishing and 100 Arctic char from littoral/profundal lake habitat via gill netting in each monitored lake.

In 2021, Baffinland implemented a Milne Inlet Freshwater Fish Health Assessment program. This program was initiated following discussions with the Mittimatalik Hunters and Trappers Organization (MHTO) about the potential effects of the Milne Port facility operations on anadromous Arctic char (*Salvelinus alpinus*) health and metal concentrations in tissues. The design for the study was developed following consultation with the MHTO from a teleconference meeting held during February 2021 in which the MHTO provided information regarding sampling locations, timing, and techniques for the study. Based on discussions from this meeting, Arctic char from three (3)

river systems that flow into Milne Inlet, including the Tugaat, Qurluktuk, and Ikaluit river systems, were to be targeted for sampling in mid- to late August 2021 following an approach comparable to that used for Environmental Effects Monitoring (EEM) under the Metal and Diamond Mining Effluent Regulations (MDMER) for evaluating effects on fish health.

The overall objective of the study was to evaluate the effects of the Project on anadromous Arctic char health and tissue metal concentrations in freshwater systems located near the Milne Inlet. Given the timing suggested by the MHTO, the field study was conducted between August 12 and 19, 2021. Due to unsafe helicopter travel conditions related to weather, the Ikaluit river system was not able to be accessed for sampling in 2021. The field crew included representatives from the MHTO/community of Pond Inlet, and the QIA. For the assessment; age, body length, body weight, reproductive organ weight, and liver weight measurements were collected from adult female and male Arctic char collected at each freshwater system as the basis for assessing growth and condition in fish captured in 2021 compared to historical information, as well as the basis of future tracking changes in fish health over time. The historical data were collected at Tugaat Lake in 1992 and 1995, and at the Robertson River (Qurluktuk system) in 1979 by Department of Fisheries and Oceans (DFO), well prior to the commencement of Baffinland Milne Inlet port operations, and thus serve as a strong basis for evaluating potential changes in Arctic char health since the operations were initiated. Assessment of metal concentrations in Arctic char muscle and liver tissues sampled from the Tugaat and Qurluktuk river systems focussed on comparison of mercury concentrations to applicable consumption guidelines and iron concentrations to amounts recommended for daily dietary intake in humans.

A second year of monitoring was completed in 2022 as part of the Milne Inlet Freshwater Fish Health Assessment program. In 2022, the field fish health assessment program ran from August 17 to 26, along with one individual representative for each of the Hamlet of Pond Inlet, the MHTO and QIA. Ikaluit Lake was sampled for the first time in 2022, while Tugaat and Qurluktuk lakes were sampled a second year in a row. Following the completion of the field component, Baffinland met with the MHTO representatives to discuss 2021 and preliminary 2022 results, and gathered feedback on the type of data and results in support of 2022 reporting efforts.

RESULTS

Overall, the Milne Inlet Freshwater Fish Health Assessment demonstrated no adverse port-related effects on arctic char health and tissue chemistry within the Tugaat and Qurluktuk freshwater systems in 2021, or the Tugaat, Qurluktuk, and Ikaluit freshwater systems in 2022. The 2022 Milne Inlet Freshwater Fish Program Report, which provides a complete analysis and discussion of 2022 monitoring results, is provided in Appendix G.4.3 (Minnow, 2023b).

As documented in the 2022 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 2022 CREMP Monitoring Report, which provides a complete analysis and discussion of 2022 monitoring results, is provided in Appendix G.4.1 and in the 2022 QIA and NWB Annual Report for Operations (Baffinland, 2022a).

TRENDS

No adverse mine-related effects on Arctic char populations within monitored lakes under the CREMP or the Milne Inlet Freshwater Fish Assessment have been observed to date. Trends associated with Arctic char populations within lakes monitored under the CREMP are presented in the 2022 CREMP Monitoring Report (Appendix G.4.1). Trends are not applicable currently for the Milne Inlet Freshwater Fish Health Assessment program.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland plans to continue the CREMP and the Milne Inlet Freshwater Fish Health Assessment, described above, to assess the condition of Arctic char populations within aquatic environments near the Mine Site and Milne Inlet.

Baffinland will continue to meet with the MHTO in 2023 to discuss the monitoring report results and scope of work for the 2023 program. The Milne Inlet Freshwater Fish Health Assessment is planned for August 2023.

4.6.8 Terrestrial Environment (PC Terms and Conditions 49 through 64)

Sixteen (16) PC Terms and Conditions relate to the potential impacts of the Project on the terrestrial environment, focusing primarily on caribou, carnivores, and terrestrial wildlife habitat. Within these conditions, the importance of collaboration on 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 2022 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.

Baffinland's terrestrial monitoring programs include the following components:

- Snow Track Surveys
- Snowbank Height Monitoring
- Height of Land Surveys and Wildlife Monitoring via Remote Cameras (Paired with Certain HOL Survey Locations)
- Migratory Bird Nest Surveys
- Noise Monitoring
- Tote Road Traffic Analysis
- Incidental Observations and Wildlife Interaction (Incidental Mortalities) Tracking
- Helicopter Overflight Compliance Tracking

The objectives of the terrestrial monitoring programs are to monitor for mitigations put in place to minimize effects of the Project and the residual effects of the Project after the application of mitigation. Additionally, effects on terrestrial wildlife are assessed by looking at effects of the Project on other components of the environment, including dust on vegetation, which could impact caribou forage, or noise impacts to understand potential disturbances wildlife may be exposed to as a result of the Project.

Table 4.19 provides an evaluation of the Project's impacts on the terrestrial environment, based on monitoring activities completed in 2022, relative to predictions presented in the FEIS and FEIS Addendum.

Table 4.19: 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.

Project Certificate Term and Condition No. 49

Category	Terrestrial Wildlife and Wildlife Habitat - Terrestrial Environment Working Group
Responsible Parties	The Proponent, Qikiqtani Inuit Association, Government of Nunavut, Government of Canada, Hunters and Trappers Organizations of the Impacted Communities (Pond Inlet, Arctic Bay, Clyde River, Sanirajak, Igloolik).
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	The Terrestrial Environmental Working Group (TEWG) will provide advice, guidance and enforceable recommendations regarding: adding to and improving baseline information, mitigation measures for the protection of the terrestrial environment, monitoring of effects on the terrestrial environment, assessing the accuracy of impact predictions, the development and implementation of adaptive management plans, sharing of relevant Inuit Qaujimajatuqangit, scientific and/or technical knowledge and industry best practice, and, consideration of project changes that may be required to make sure the management of negative impacts is effective and that lasting damage to the terrestrial environment is prevented. 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. The Terms of Reference (ToR) for the TEWG shall be revised to include the following requirements: a. That an independent chair be appointed for TEWG and that this independent Chair be responsible for scheduling and administering meetings including circulating meeting invitations, agendas and documentation. b. That the Working Group's decision-making process be amended to provide that it must occur on a consensus basis between all working group member parties, with all votes and decisions in writing and recorded by the chair. c. That the Working Group's recommendations be recognized as enforceable recommendations (i.e. will be implemented by the Proponent), with provision that the Proponent may request not to enforce the recommendation at which point the matter shall go to an independent third party (agreed upon by the Proponent, QIA, and the Government of Canada) for dispute resolution. d. That the Working Group will include all Responsible Parties as member parties. The Proponent may be required to facilitate the participation of Hunters and Trappers Organizations through payment of honoraria and other participation costs in accordance with the Commitment List appended at Appendix B. e. That Working Group materials and records of decisions become public information with the independent chair responsible for keeping and circulating minutes which shall be posted to the Baffinland website and the NIRB public registry including all meeting minutes once finalized and provided to Baffinland by the independent chair.
Term or Condition	A Terrestrial Environment Working Group (TEWG) shall be established as an advisory oversight body, providing advice, guidance and enforceable recommendations to

	fulfill the intended objectives. The operation of the TEWG shall not duplicate or impede the exercise of regulatory authority of authorizing agencies or government. The TEWG shall have the following permanent members: The Proponent, the Qikiqtani Inuit Association, the Government of Nunavut, the Government of Canada, the Mittimatalik HTO, and the Hunters and Trappers Organizations of the other Impacted Communities (Arctic Bay, Clyde River, Sanirajak, Igloolik), should they wish to participate. A Terms of Reference shall be established that guides additional participation in the TEWG by observers. The TEWG shall be chaired by an independent third party as chosen by the permanent members. A revised Terms of Reference shall be presented to NIRB no later than December 15th, 2022, or at another date on consent of the Proponent, Canada, and the Qikiqtani Inuit Association. Project monitoring reports and relevant data to be considered by the TEWG will be provided to members not less than ten (10) working days prior to a scheduled meeting, or as otherwise described in the Terms of Reference. Draft meeting minutes of the TEWG shall be filed by the independent chair with working group members within fifteen (15) working days following a meeting for review by TEWG working group members, or as otherwise described in the Terms of Reference. All final meeting minutes shall be submitted to the NIRB registry by the Proponent for circulation to NIRB's distribution list not more than thirty (30) working days following receipt from the independent chair. All final meeting minutes shall be included in the Annual Report to the NIRB.
Relevant Baffinland Commitment	46, 47, 49, 50
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	2022 TEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.2

METHODS

Baffinland established a TEWG in 2013. Members of the TEWG include representatives from: Environment and Climate Change Canada (ECCC), Qikiqtani Inuit Association (QIA), Government of Nunavut (GN), and Baffinland with technical experts as required. The Mittimatalik Hunters and Trappers Organization (MHTO) joined the group in 2016. In 2022, representatives from the HTOs of Arctic Bay, Clyde River, Igloolik and Sanirajak have been added to the Term and Condition should they wish to participate. World Wildlife Fund (WWF) Canada, Natural Resources Canada (NRCan), the Nunavut Impact Review Board (NIRB), and the Canadian Northern Economic Development Agency (CANNOR) also participate as observers on the TEWG. Baffinland provided all costs for administration of all Working Group meetings in 2022, including simultaneous translation, translation of materials, and funding for participation of the MHTO. Refer to Appendix C.2 for 2022 Terrestrial Working Group minutes for meetings held in April, June and December.

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 TEWG members;
- Discussion of results of monitoring programs to obtain feedback by TEWG members; and
- Various research presentations (given by Baffinland, Baffinland technical consultants and other members).

Baffinland has been working in good faith with the TEWG to draft an update to the Terms of Reference (ToR) that reflects inclusion of all items in this term and condition including appointment of an Independent Chair, amendments to the decision making process and the inclusion of new members (namely the HTOs from Arctic Bay, Clyde River, Igloolik and Sanirajak). The ToR update process is occurring simultaneously and in tandem with the ToR for the Marine Environmental Working Group (MEWG). Baffinland has circulated iterations of the draft ToR to Working Group members incorporating feedback as received. At the close of 2022, a version of the draft ToR was in circulation for comment by the Working Group, with further updates provided in April 2023, and an additional version was circulated in April 2023. It is expected that a final version will be completed in 2023.

The group typically schedules two (2) yearly in-person meetings, in addition to hosting two (2) interim teleconferences per year. This is subject to change based on the most recent draft of the TOR, which proposes that three regular meetings and up to three touchpoint meetings will be held, in addition to ac hoc meetings at the request of members. 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. Based on feedback from the TEWG in 2022, Baffinland is considering revising this approach in 2023, so that members are commenting on reports in final.

RESULT

In 2022, the TEWG met on April 28th, June 23rd, and December 1st via teleconference (Table 4.20). In-person meetings were not held in 2022 due to ongoing concerns associated with COVID-19. In-person meetings will resume in 2023.

As a result of inputs from the TEWG, numerous program modifications have been made since 2015. 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. Key recommendations from the TEWG in 2022 included: (1) a commitment to review available information regarding known migratory bird areas in the vicinity of the Mary River Project (the Project); (2) an evaluation of potential patterns of non-compliant helicopter flights and a commitment to improving compliance; and (3) engagement with Natural Resources Canada to discuss research opportunities at the Project. Responses to these key action items and initiatives are captured in Appendix F of the 2022 Final Terrestrial Environment Mitigation and Monitoring Report (EDI, 2023a).

Table 4.20: Terrestrial Environment Working Group Meetings in 2022

Date	Location	Topics Discussed
TEWG		
April 28th, 2022	Teleconference	• Draft 2021 Terrestrial Environment Annual Monitoring Report (TEAMR)
June 23rd, 2022	Teleconference	• Proposed 2022 terrestrial monitoring programs • Presentation by NRCan Canadian Centre for Remote Sensing and Green Mining Innovation o New dust monitoring techniques (i.e. passive air samplers) o Dust characterization o Effects of fugitive dust on the environment o Remote sensing and earth observation
December 1st, 2022	Teleconference	• Overview of completed 2022 terrestrial monitoring programs • Round-table discussion of PIPR commitments relevant to the TEWG • Presentation by Environment Climate Change Canada (ECCC)– o Overview of Arctic-wide and regional Program for Regional and International Shorebird Monitoring (PRISM) bird survey results

Many of the members that participate in the Working Groups also represent regulatory bodies that have the ability to issue directions to Baffinland in accordance with their jurisdiction, mandate or issued permits. As has always been the intention of the Working Groups, they should not duplicate or fetter regulatory obligations, and rather remain focused on the enhancement of Baffinland's monitoring programs and providing advice on best practices or new research they are aware of to inform the ongoing development and implementation of Baffinland's comprehensive environmental management system.

TRENDS

As the NIRB has previously been made aware, from time to time Baffinland has struggled to reconcile recommendations from the Working Groups that do not properly appreciate or weight health and safety concerns and limitations or operational constraints. Costs or logistics of implementing recommendations are rarely taken into account, despite this reasonably needing to be a consideration when weighing the feasibility of a proposed program or activity. In many cases, despite Baffinland's efforts to specifically and clearly communicate these considerations to the Working Groups, members continue to advocate for research studies that are not feasible (e.g. collecting dust at far sites in winter months). In all cases, it is important to distinguish between initiatives that may be of personal interest or curiosity to individual Working Group members, and those that have a reasonable link to the Mary River Project's activities and are a requirement to fulfill the proponent's obligations under its Project Certificate and monitoring program requirements.

While recommendations brought forward within these Working Groups must be subject to appropriate consideration and discussions taking into consideration IQ and western science, they must also be weighed against the practical operationalization of the recommendation along with a fulsome cost benefit analysis, which no other party is suited to do outside of Baffinland. To be clear, Baffinland accepts that some Working Group members wish to see a process inserted into the Terms of Reference to generate and record consensus-based recommendations and this has been reflected in the most recent drafts, however, Baffinland must stress the need to retain ultimate authority to reject recommendations that do not meet reasonable criteria for implementation, and to provide explicit rationale to this effect. The draft of the ToR, released in August 2022 and updated further in April 2023, outlined a formal recommendation process. If incorporated into the finalized ToR, this process would require members to send draft recommendations to the independent chair for review, who would then distribute the recommendation to the Working Group, followed by a 30 day period for members to provide comment on the recommendation. The sponsoring member would then submit a final proposed recommendation to the independent chair within 30 days of receiving member feedback. Subsequently, Baffinland would have 60 days following the receipt of the final recommendation to accept the recommendation or provide a response with supporting evidence (i.e. financial and operational limitations), should they not agree with the recommendation. The chair would then circulate Baffinland's response and the recommendation to the Working Group to be put to vote. While this process is not yet finalized, Baffinland is confident that it will allow for more enforceable recommendations to be put forward. Additional details related to the most recent ToR are outlined in Section 2.5.1. It should be noted that the revised draft ToR was circulated solely to the MEWG, not the TEWG, and that the final version will be used as the draft ToR for the TEWG. The majority of members on the TEWG are also members of the MEWG, as highlighted in Section 2.5.1, and all TEWG and MEWG members were invited to a ToR discussion at the February 2023 in person meetings, which occurred following this reporting period.

RECOMMENDATIONS / LESSONS LEARNED

The Working Groups are a tool that can be used by the proponent as well as working group participants to discuss, debate and continuously improve monitoring programs and outcomes. It is imperative that all participants participate in good faith, be forthright in providing the appropriate expertise and knowledge relevant to their organizations and participation and contribute collaboratively with a mind to problem solving where issues or concerns are brought forward. In its most recent draft Terms of Reference (ToR) for the Working Groups Baffinland presented a reasonable path forward that would result in meaningful changes to the Groups' current structure, operational schedule, and ability to influence the Project. It is expected that this should improve Members' expectations, communication within the Group and outcomes. Baffinland will continue to engage with the Working Groups on the development of a revised Terms of Reference throughout 2023 in hopes of resolving any outstanding concerns raised by members to date.

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a) 2021 Terrestrial Environment Annual Monitoring Report (EDI, 2022a) 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021a) 2018 Terrestrial Environment Annual Monitoring Report (EDI, 2019b) 2017 Terrestrial Environment Annual Monitoring Report (EDI, 2018) 2016 Terrestrial Environment Annual Monitoring Report (EDI, 2017) 2013 Terrestrial Environment Annual Monitoring Report (EDI, 2014) 2022 TEWG Meeting Records 2020 TEWG Meeting Records (Baffinland, 2021a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.2 Appendix G.5.1

METHODS

The Terrestrial Environment Mitigation and Monitoring Plan (TEMMP) outlines Baffinland's monitoring programs for terrestrial wildlife and habitat. Terrestrial environment monitoring programs are reviewed regularly during Terrestrial Environment Working Group (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 (GN), PRISM plot surveys, and seabird research by Environment and Climate Change Canada (ECCC), and previous research on cliff-nesting raptor ecology by ArcticRaptors Inc.

RESULTS

Following methods outlined in the TEMMP, monitoring of the terrestrial environment has been ongoing since 2012. Procedures described in the TEMMP are reviewed and updated (as-needed); key amendments to experimental design (e.g., in response to reported trends and/or discussions with the TEWG) are documented in the respective Terrestrial Environment Annual Monitoring Report (TEAMR). To date, updates have been commonly related to statistical analysis and sampling design to improve robustness of the data capture and interpretations. 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.

Select examples of updates that have been made to methodologies over time as a result of input, including the selections of indicators and thresholds is as follows. The below is meant to be representative of changes incorporated into the terrestrial monitoring program design and is not exhaustive of all recommendations and IQ incorporated into the development and design of the programs. Detailed summaries are provided in the 2022 Final TEAMR (EDI, 2023a):

Helicopter Overflights

The helicopter overflight analysis initially reported on compliance based on the elevation above the ground of points from the helicopter flight logs. Starting in 2017, pilot rationale for low-level flights were recorded on the pilots' daily timesheets and used to assess compliance. During 2020 TEWG meetings, additional reporting on helicopter pilot rationale and flight time was requested (Baffinland, 2021a). The helicopter flight database used for assessing compliance was re-analyzed from 2017 to 2019 and incorporated into the 2020 analysis to address this request. The 2017 to 2019 re-analysis results were previously presented in Appendix D of the 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021a).

In its responses to the NIRB's request for comments on Baffinland's 2020 Annual Monitoring Report, the GN provided a comment requesting that Baffinland re-analyze the 2015 and 2016 helicopter overflight data using the newer methods (2017 onwards), as no analysis was conducted at the time using pilot rationale because rationale data were not collected in 2015 and 2016. The monthly breakdown of the number of transits flown, flight hours, and flight hours of cruising altitude compliance for 2015 and 2016 is presented in Appendix Table B-1 to Appendix Table B-8, and the inter-annual comparison is presented in Section 5.3 of the 2021 TEAMR (EDI, 2022a).

Dustfall

Over time, changes have been made to the dustfall monitoring program based on data analysis, interpretation, and input from the Terrestrial Environment Working Group (TEWG). The following summarizes key milestones and responses to TEWG comments, leading to the 2022 Dustfall Monitoring:

2013 — The dustfall monitoring program was initiated in August 2013. A total of 26 monitoring stations were established near Project infrastructure at the Mine Site, Milne Port, along the Tote Road, and reference sites (located 14 Km from the Project).

2014 — First full year of monitoring, which includes Project activities during the Construction Phase. Based on preliminary analysis, the program was expanded in September 2014 to increase the number of monitoring stations at the Mine Site and Milne Port. Additional stations were intended to improve understanding of 'how dustfall pattern may change with distance from Project infrastructure'.

2015 — First full year of monitoring during Mine Operations. One additional monitoring site was added at the Mine Site to address a gap in the program.

2019 — Data collection at 1,000 m distance from the Tote Road was increased in response to a request from the Qikiqtani Inuit Organization (QIA) and the Mittimatalik Hunters and Trappers Organization (MHTO). Six (6) additional dustfall monitors were installed (three paired monitoring stations, one of each on the east and west sides of the Tote Road at KM 25, KM 56, and KM 75). Sites selected for the monitoring stations was done in conjunction with input from the MHTO and QIA. Additionally, dustfall data collection at other 1,000 m distant sites was changed to year-round, where data were only collected during the summer months from 2013 to 2018. This brought the total number of dustfall monitors at the 1,000 m Potential Development Area (PDA) boundary to 12.

A monitor at Milne Port (DF-P-01) was relocated and was renamed (DF-P-08) to allow for the expansion of an ore stockpile.

2020 — Satellite imagery analysis of dustfall extent was conducted to address concerns from the MTHO that the past dustfall monitoring data and analyses did not reflect what hunters saw on the ground. The analysis included Landsat and Sentinel-2 imagery from 2004 to 2020 between March 15 and May 15.

2021 — Reported quantitative measurements from the dustfall satellite imagery analysis as requested from the NIRB, including dustfall concentrations and area using the Snow Darkening Index, a measure of mineral dust on snow. Data from Steensby Inlet was included as a reference area for comparison.

2021 — A total of 14 new dustfall monitoring stations were installed, including:

a. four additional monitors at Milne Port to better characterize dustfall moving off the Milne Port site;

b. four new monitors along the section of Phase 2 railway that departs the Tote Road right-of-way (ROW). These monitors are to define baseline conditions; and,

c. six dustfall monitors installed to collect dust at a height of 0.5 m. These 'short' monitors were part of a pilot study to investigate the variability between dustfall sampling at the standardized height of 2.0 m and closer to ground level. This program was implemented in response to specific requests from the impacted communities and QIA.

As of the end-of-year 2021, a total of 53 dustfall monitors (including the six 'short' monitors as part of the trial) have been installed at defined/pre-existing monitoring locations.

2022 — Further analysis on dustfall concentration estimation from satellite imagery will be conducted, including an explicit comparison of inter-annual trends determined by passive dustfall monitoring and satellite imagery analysis in subsequent annual reports.

Vegetation

Procedures for the vegetation and soil base metals monitoring program have been adapted over time due to Project circumstances, investigative outcomes, and recommendations from the TEWG.

a. Pre-construction baseline data on vegetation and soil base metal concentrations were first collected for the Project in 2008; however, these data were not used due to sampling and analytical discrepancies. Additionally, collection methods were not effectively documented and did not facilitate data continuity or comparability.

b. Additional baseline sampling was conducted within the Regional Study Area in 2012 and 2013. Vegetation sampling targeted three focal groups: lichen (*Flavocetraria cucullata*, *F. nivalis*, *Cladina arbuscula*, and *C. rangiferina*), willow (*Salix* spp.), and blueberry (*Vaccinium uliginosum*). The analysis focused on seven metals/metalloids deemed to be constituents of potential concern (CoPC): aluminum (Al), arsenic (As), cadmium (Cd), copper (Cu), lead (Pb), selenium (Se), and zinc (Zn) (EDI, 2014). Standardized sampling procedures and soil quality guidelines from the Canadian Council of Ministers of the Environment (CCME) were used as threshold values for soil. Peer-reviewed literature sources were used in the absence of explicit quality guidelines for lichen. Monitoring design and key findings are presented in the 2013 Terrestrial Environment Annual Monitoring Report (EDI, 2014).

c. Sampling design and intensity were increased in 2014 to improve data capture and analysis. Lichen—recognized as an indicator of environmental conditions and accumulator of atmospheric pollutants (Aslan et. al., 2011)—was selected as the key indicator and focal group for metals uptake. Aluminum was removed as a CoPC due to its high variability, ubiquitous nature, and lack of CCME and US Environment Protection Agency (US EPA) soil quality guidelines to protect environmental and human health.

d. In its 2014 to 2015 Annual Monitoring Report for the Mary River Project, comments provided by the GN, issued recommendations for Baffinland to further modify the vegetation and soil base metals monitoring program. Before implementing any modifications, Baffinland evaluated the program's experimental design—especially concerning statistical power and the ability to detect Project-related effects—to optimize sampling intensity and distribution. Ultimately, the study design was expanded to facilitate 'Near', 'Far', and 'Reference' locations; the procedures were then aligned with the dustfall monitoring program where feasible. Monitoring design and key findings are presented in the 2017 and 2018 Terrestrial Environment Annual Monitoring Reports (EDI, 2018, 2019b).

e. The vegetation and soil base metals monitoring program was formalized in 2019 (using present methodology) with considerations and inclusions per the NIRB and GN recommendations (EDI, 2017). The analysis focused on six (6) CoPCs in soil and lichen: As, Cd, Cu, Pb, Se, and Zn. Soil and lichen CoPC concentrations were compared between the 'Before' and 'After' periods and the distance from the Potential Development Area (PDA).

f. Ten additional sample sites were added in 2020 to the Far distance category. Since most Project-emitted dust is deposited within 1,000 m of the PDA, increasing sample size in this range is expected to improve statistical ability to detect and quantify changes in metal concentrations associated with this distance. This modification to the study design was implemented in response to TEWG reviewer comments in 2019.

At present, the 2022 vegetation and soil base metals monitoring program is directly comparable with assessments from 2016 to 2019. Where possible, modifications to the methods have incorporated input from the TEWG and NIRB to improve and further refine data capture and baseline comparisons. Baseline data for the vegetation and soil base metals monitoring program includes sampling from 2012 to 2016.

Height-of-land

In 2016, viewshed modelling and mapping were completed to determine the amount of viewable area at each Height of Land (HOL) survey station. A total of 227 km² were surveyed within the viewshed area, with viewshed ranging from 5 to 22 km² at each HOL station. Refer to Section 4.3.1 of the 2016 Terrestrial Environmental Annual Monitoring Report for a detailed description of viewshed modelling and mapping (EDI, 2017).

During the June 2019 TEWG meeting, the MHTO suggested that HOL station locations should be re-evaluated to incorporate historic migration and calving areas and any new information relevant to HOL goals and methodologies. In 2020 and 2021, the survey intensity was increased (as it is presently) by conducting a minimum of two (2) station visits and increasing survey observations from 20 to 40 minutes. To date, Baffinland has not been able to confirm with the MHTO alternate locations for the HOL stations, but will continue to consult with MHTO representatives on the program via the TEWG and other engagement methods. As an interim solution, a remote camera monitoring program was implemented in 2021 to address comments from the MHTO that caribou were being 'missed' during the HOL surveys.

Birds — Refer to Section 4.6.9 for Terms and Conditions related to monitoring potential Project impacts on birds, including active migratory birds nest surveys, helicopter overflight compliance tracking, incidental wildlife observations, and monitoring of land disturbance/habitat loss.

TRENDS

Baffinland continues to make refinements to monitoring programs design, methodologies, indicators and thresholds over time in response to input from the TEWG.

RECOMMENDATIONS / LESSONS LEARNED

Constructive dialogue through the Terrestrial Environment Working Group has led to continuous refinements and improvements in the terrestrial monitoring programs design and outcomes.

Project Certificate Term and 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 TEWG, 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2022 TEWG Meeting Records 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a) Caribou Monitoring – Triggers and Recommendations (EDI, 2022b)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.2 Appendix G.5.1

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 relevant GN caribou surveys to enhance Baffinland's understanding of potential Project-related effects and regional knowledge about wildlife distribution and abundance.

For example, Baffinland presented options for larger-scale caribou surveys to the TEWG during the June 2021 meeting, including aerial surveys and a collaring program as monitoring options, ideally collaborating with GN. During the June and December 2021 TEWG meetings, discussions surrounded planning for aerial caribou survey of the regional study area (proposed between 2023 and 2024).

Discussions during TEWG meetings resulted in recommended deployment of wildlife cameras to enhance wildlife monitoring at the Project (i.e., in addition to existing and ongoing height of land monitoring). Cameras were deployed at six (6) of the HOL locations in 2021 with input from the TEWG. Remote cameras are presently (and will continue to be) deployed year-round; service visits occur twice per year (minimum) to verify camera function and swap in/out SD memory cards and batteries.

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 or 2020. In 2021, the GN undertook a collaring program, and completed composition surveys. No requests for support from Baffinland were made by the GN, likely because of the need to maintain separation between Nunavummiut and site-based employees due to COVID-19. In addition, the GN continued their collaborative research program with the MHTO and Northern Contaminants Program (NCP) to understand metals composition in caribou tissues. Baffinland is a Party to the agreement with the Northern Contaminants Program and has provided financial resources for this work. Baffinland has regularly engaged with several Federal, Territorial, and Non-Government Organizations, including the Mittimatalik Hunters and Trapper's Organization (MHTO), through TEWG meetings.

During the 2021 TEWG meeting, details surrounding a potential aerial survey program were discussed 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 (RSA) were discussed with the group and a report summarizing this analysis was provided (EDI, 2022b). A collaring program would not be effective until ~350 caribou per study area (northern and southern halves of the terrestrial RSA) are present, with a minimum of 30 to 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 better understand caribou distribution and behaviour in the Mary River stratum compared to the larger regional scale. Baffinland will be completing a reconnaissance survey in 2023 to assess current caribou numbers within the regional study area and if there are sufficient numbers for a collaring program.

Furthermore, as outlined in the Summary for Term and Condition No. 35, during an August 2021 call with the GN Regional Wildlife Biologist Caribou Health Monitoring, it was confirmed by both Parties that Baffinland conducting this in parallel to the GN-led program would create a potential conflict. In light of that consideration, it was agreed that the best approach was to defer to data made publically available through the NCP to meet our requirements for PC Term and Condition No. 35. Once the GN program is complete, and depending on the results, Baffinland may put in a separate permit application to extend this type of research.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

In 2016, the MHTO became a member of the TEWG, adding a community perspective to decisions and discussions within the group. In August 2022 and April 2023, Baffinland released draft Terms of Reference to the Marine Environment Working Group, which are still under review. Once finalized, these Terms of Reference will be used as a draft Terms of Reference for the TEWG and will involve the addition of Nangmautuaq Hunters and Trappers Organization (NHTO), Igloolik Hunters and Trappers Organization (IHTO), Sanirajak (Hall Beach) Hunters and Trappers Organization (HBHTA), and Ikajutit Hunters and Trappers Organization (IHTO) to both the Marine and Terrestrial Environment Working Groups. Refer to Term and Condition No. 50 for modifications to terrestrial monitoring programs that have occurred over time based on feedback from the TEWG.

Project Certificate Term and 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, Inuksuk's, or fencing and subsequent monitoring for effectiveness. These activities shall be reported back to the Terrestrial Environment Working Group.
Relevant Baffinland Commitments	Not applicable
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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2022 TEWG Meeting Records 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.2 Appendix G.5.1

METHODS

The issues of caribou protection measures and caribou deterrents were discussed with the TEWG in December 2013. 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 Project Development Area (PDA), which reduces hazardous conditions. Baffinland has created guidelines (the Caribou Decision Tree; Figure 3-2 in the TEMMP - Baffinland, 2016a) 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 10.5 in the 2022 Final Terrestrial Environment Annual Monitoring Report; EDI, 2023a). Baffinland will continue to monitor caribou within the Project sites and Regional Study Area (RSA), support regional caribou monitoring conducted by the GN, and identify appropriate caribou deterrents from Deposit No. 1 and hazardous areas in conjunction with the TEWG as necessary.

Project Certificate Term and 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	The Proponent shall demonstrate consideration for the following: 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. 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. 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 (TEWG). 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. 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. 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.
Relevant Baffinland Commitments	15, 71, 73
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Steensby Rail Corridor – Not Active Milne Inlet Tote Road – Active
Status of Compliance	Steensby Rail Corridor – Not Applicable Milne Inlet Tote Road – In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland, 2016a) 2022 TEWG Meeting Records 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.2 Appendix G.5.1

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 in the TEMMP, Baffinland 2016) 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; 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 between February and November 2022 when snow and daylight conditions allowed.

Detailed methods are identified in the TEMMP (Baffinland 2016, Sections 3.3.3 and 4.5.2, and Figure 3-2) and the 2022 Final Terrestrial Environment Annual Monitoring Report (Sections 10.1 and 10.2; EDI, 2023a).

b. Monitoring and Mitigation Measures

In 2022, all twenty-four (24) Height of Land (HOL) survey stations were visited (twice) during the caribou calving period annually to monitor caribou distribution, abundance, and behaviour.

Observations were completed for a minimum of 40 min (average of 45 min) per visit during which the landscape was scanned using binoculars and a spotting scope to detect caribou presence and their proximity to Project infrastructure. More detailed documentation of caribou behaviour and interaction with Project infrastructure and vehicles were completed if/when caribou were observed. Monitoring data is intended to inform mitigation measures.

Detailed methods are identified in the TEMMP (Section 4.5, Appendix 4-8, Baffinland 2016) and the 2022 Final Terrestrial Environment Annual Monitoring Report (Section 9.3, EDI 2023a).

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 HOL surveys may be too focused on local caribou detections. 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 Regional Study Area (RSA) scale (including known calving areas) with a focus on the Tote Road and proposed railway acting as potential barriers to movement. Remote cameras were initially deployed in 2021 at six (6) of the HOL sites to expand caribou detection efforts. During the 2022 TEWG meetings, details surrounding a planned 2023 aerial survey program were discussed for monitoring Project effects on caribou (Appendix C.2). See also Summary for Term and Condition No. 51.

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 2022 Final Terrestrial Environment Annual Monitoring Report (Section 10; EDI, 2023a).

In 2022, snow track surveys were conducted in March, April, October and November by two or three Baffinland Site Environment employees using the methods described above.

Due to low embankments and existing low profile road conditions, there are no designated 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 meetings (i.e. aerial surveys, 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 2022 as the railway has not yet been constructed. The TEMMP (Sections 3.3.1, 3.3.2, 3.3.3, and 4.5.2, Baffinland 2016) 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, Baffinland 2016) 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 2022, and therefore interactions with the Tote Road and vehicles have not occurred;
    - A total of 57 caribou were reported as incidental observations in 2022, of which 54 were outside the Project Development Area (PDA).
- 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 2022 resulted in 91% compliance to the 1 m height limit, ensuring the barrier-free movement of caribou; and
- Snow tracking surveys did not observe caribou tracks in 2022, consistent with the low regional caribou numbers.

b. Monitoring and Mitigation Measures

- A total of 36 hours of HOL survey effort was conducted during the calving period in 2022;
- no caribou were detected on the landscape during 2022 snow track or HOL surveys;

- details of previous surveys dating back to 2013 are provided in the previous annual reports;
- a total of 57 caribou from six (6) separate groups were reported from incidental observations in 2022. Three (3) of the caribou were observed within the PDA; and
- remote Wildlife Camera Monitoring also did not identify any caribou, supporting findings of HOL data that has been collected to date.

c. Evaluation of Effectiveness of Caribou Crossings

Caribou have only been incidentally and sporadically detected in or near the PDA since 2013 (see the 2022 Final Terrestrial Environment Annual Monitoring Report, EDI 2023a). However, ongoing snowbank height management and wildlife response monitoring continues. In 2020, 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 2022 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 2022, nor any other year of Project operation.

TRENDS

a. Prevention of Caribou Mortality and Injury as a Result of Vehicular Traffic

Training on using the Caribou Decision Tree, snowbank height management, and snow tracking surveys continue. 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.

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 (Figure 4.4). These data reflect the low regional caribou numbers of the North Baffin Island herd.

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 2022. However, Arctic fox and Arctic hare tracks were observed during all survey years (Figure 4.5).

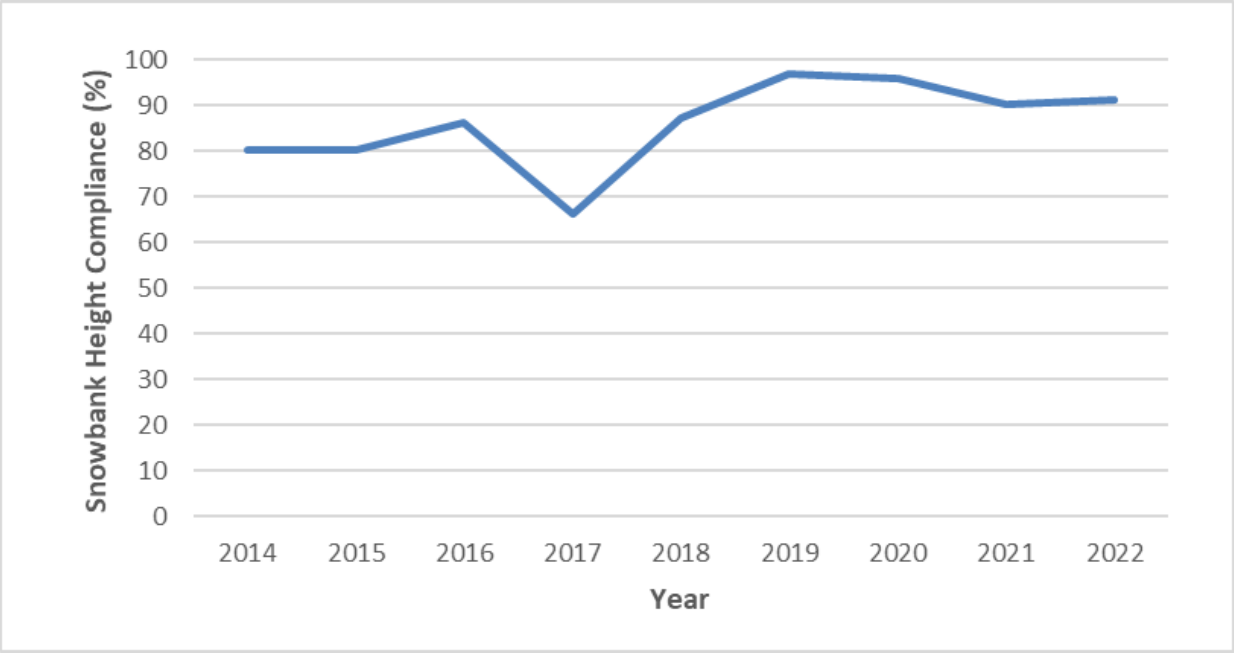


Figure 4.3: Snowbank Height Compliance Monitoring Results from 2014 to 2022 on the Tote Road

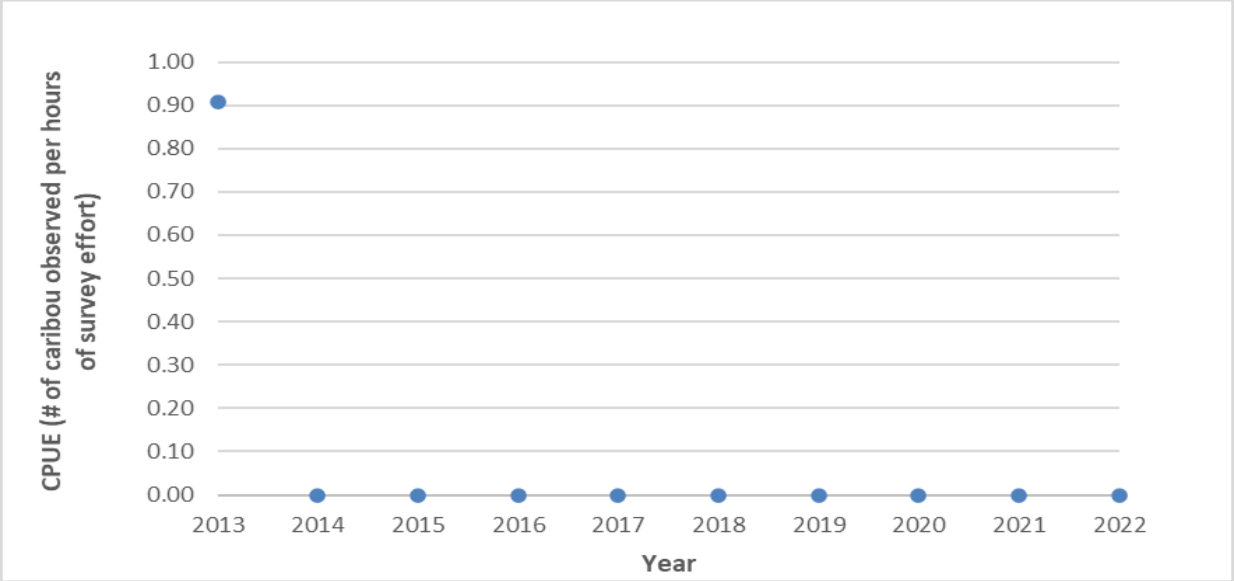


Figure 4.4: Caribou Observations from Height of Land Surveys from 2013 to 2022

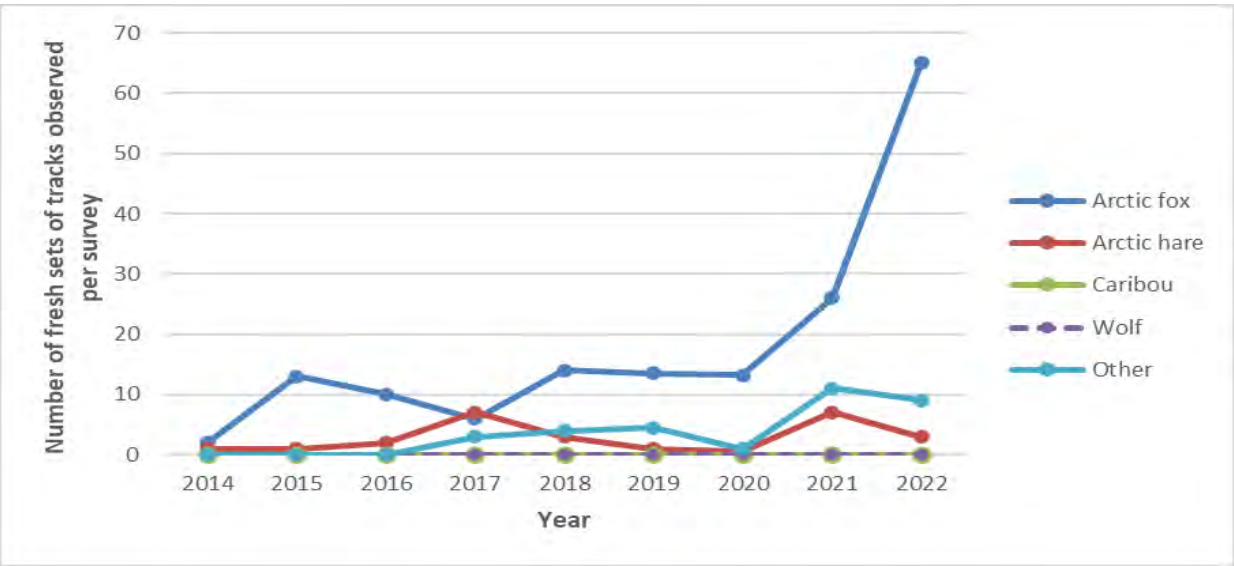


Figure 4.5: Snow Track Survey Trends from 2014 to 2022

RECOMMENDATIONS / LESSONS LEARNED

Snowbank height, snow track, and HOL surveys will continue annually to evaluate potential Project effects on caribou and terrestrial wildlife. Efforts will continue to ensure snowbank height monitoring is conducted consistently each month until consistent snow management practices are characterized. The use of remote wildlife cameras will also be implemented again in 2023. As regional caribou numbers increase and 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.

The TEWG is engaged regularly to discuss annual monitoring programs for the terrestrial environment. Feedback from TEWG members is incorporated into annual monitoring reports and updates to the TEMMP where relevant.

Project Certificate Term and 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	The Proponent shall provide an updated Terrestrial Environmental Management and Monitoring Plan which shall include, but not be limited to the following: a. Details of the methods and rationale for conducting monitoring prior to the commencement of construction; b. Monitoring for caribou presence and behaviour during railway and Tote Road construction; 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; d. Details of monitoring and mitigation activities, which should be established in collaboration with the Terrestrial Environment Working Group and are expected to include: iv. Dustfall (fugitive and Total Suspended Particulates), that addresses methods to reduce risk to caribou forage from dustfall; v. 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. vi. Details of monitoring thresholds related to level of mitigation and management; and vii. 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.
Relevant Baffinland Commitments	Not applicable
Reporting Requirement	Plan to be submitted to the NIRB and the TEWG within 6 months of issuance of a Project Certificate.
Status of PC Term and Condition	Steensby Rail Corridor – Not Active Milne Inlet Tote Road – Active
Status of Compliance	Steensby Rail Corridor – Not Applicable Milne Inlet Tote Road – In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG), Nunavut Impact Review Board
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2022 TEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.2

METHODS

The Terrestrial Environment Mitigation and Monitoring Plan (TEMMP) (Baffinland, 2016a) directly addresses PC Term and Condition No. 54. The TEMMP outlines a detailed rationale and methodology for Baffinland's monitoring and mitigation programs. It is reviewed and updated periodically. The TEMMP is currently under revision and is expected to be released publicly in Q2 of 2023. Changes may be implemented in advance of formal updates as the need arises. Regarding PC Term and 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 (Baffinland, 2016a):

PC Term and Condition No. 54a.

- Section 4 – Monitoring Framework

PC Term and Condition No. 54b.

- Section 4.5.1 – Caribou Habitat Monitoring
- Section 4.5.2 – Caribou Movement

PC Term and Condition No. 54c.

- Appendix B – Monitoring Methods and Details

PC Term and 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 Term and 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. 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 Term and Condition No. 54e.

- Thresholds are described throughout Section 4 – Monitoring Framework and Appendix B – Monitoring Methods and Details

PC Term and Condition 54f.

- Section 4.5.3 – Caribou Mortality
- Section 4.5.4 – Caribou Health

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Regarding PC Term and Condition No. 54b, Baffinland discussed additional caribou monitoring methods with the TEWG during 2022 meetings (i.e., aerial surveys, GPS collars, 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 Regional Study Area (RSA) scale to assess potential population-level effects when caribou population density increases. Remote camera monitoring was piloted in 2021, and is currently ongoing. Experimental design and methods for remote camera monitoring are being incorporated into the next revision of the TEMMP. Experimental designs and methods for caribou aerial surveys will be included in the respective Terrestrial Environment Annual Monitoring Report (TEAMR) for the monitoring year.

Baffinland is continuing to investigate controls that can be implemented at the Project to mitigate dustfall dispersion by helicopters. Baffinland is currently working jointly with the QIA to develop a list of thresholds for high dust dispersion days that would trigger a delay or cancellation of specific planned Project activities. The Project continues to monitor the dustfall along the road in effort to determine if dust suppression efforts are effective. Further analysis on dustfall concentration estimation from satellite imagery is included in the 2022 Final TEAMR. As of 2022, the TEAMR includes an explicit comparison of inter-annual trends determined by passive dustfall monitoring and satellite imagery analysis. These trends will continue to be reported on in subsequent TEAMRs.

Project Certificate Term and 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	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 *Nunavut Wildlife Act*. Consideration must be given to the following: a. 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); b. Estimating the available (glacio-fluvial materials) esker habitat within the Regional Study Area/PDA and identifying such habitat as ecologically sensitive; c. Developing "wolf indices" for presence/abundance of wolves (by conducting studies) to set a baseline pre-construction baseline; and d. Ensuring that wolf monitoring is capable of determining the relative abundance and distribution of wolves in the PDA over time.
Relevant Baffinland Commitments	57, 74
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	Not applicable
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.5.1

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 Project Development Area (PDA) throughout 2022). Wolf monitoring programs will be re-initiated when wolves and/or caribou are consistently observed near the Project area (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 Terrestrial Environment Working Group (TEWG). Monitoring of carnivore dens will continue to be discussed within the TEWG based on discussions within the group. When and if deemed necessary, Baffinland will re-initiate carnivore den monitoring.

RESULTS

Not applicable.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and 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 Trial (EDI, 2021b) Implications for Reclamation Practices & Trials at the Mary River Project (EDI, 2019a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

As described in the Interim Closure and Reclamation plan (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 both sustainable vegetation cover, and enhance physical stability and achieve the desired aesthetic conditions for the Project site at closure.

Refer to Term and Condition No. 39 for further details.

RESULTS

Not applicable

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

The results of the reclamation study conducted to-date will be shared with Stakeholders through a Mine Closure Working Group, which may begin convening as early as 2024. Updates on the outcome of the ongoing reclamation research study and activities of the Mine Closure Working Group will be provided to the NIRB as they are available.

Project Certificate Term and 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	The Proponent shall report annually regarding its terrestrial environment monitoring efforts, with inclusion of the following information: a. Description of all updates to terrestrial ecosystem baseline data; b. A description of the involvement of Inuit in the monitoring program; c. 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; d. 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; e. Results of the annual monitoring program, including field methodologies and statistical approaches used to support conclusions drawn; f. A summary of the chronology and level of mine activities (such as vehicle frequency and type); g. An assessment and presentation of annual environmental conditions including timing of snowmelt, green-up, as well as standard weather summaries; h. 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.
Relevant Baffinland Commitments	Not applicable
Reporting Requirement	To be included in the Annual Report submitted to the NIRB.
Status of PC Term and 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, 2016a) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a) 2022 TEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.2 Appendix G.5.1

METHODS AND RESULTS

The Terrestrial Environment Mitigation and Monitoring Plan (TEMMP) is the primary guidance document for mitigation and monitoring at the Mary River Mine; the Terrestrial Environment Annual Monitoring Report (TEAMR) is the primary source for terrestrial environment reporting. For brevity, the following responses highlight summary findings and notable outcomes from the TEMMP and TEAMR concerning PC Terms and 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; and funding for three full-time on-site Environmental Monitors that are appointed and solely employed by QIA but fully integrated into the Site Environment team. 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, snowbank height surveys, Height of Land surveys, vegetation monitoring, and raptor monitoring.

c. In 2022, territorial and site restrictions associated with the COVID-19 Pandemic were lifted. Four local Inuit residents assisted with Height of Land caribou surveys and/or soil, vegetation, or noise monitoring for a combined total of 415 hours during the 2022 field season.

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 Government of Nunavut (GN).

e. A total of 57 caribou were recorded from six separate observations from incidental observations in 2022. Two observations of three caribou were made near the Mary River Project and the remainder were observed outside of the Project Development Area (PDA). 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 2022. Caribou abundance surveys conducted in 2014 and 2018 by the Government of Nunavut also reported low abundance throughout Baffin Island.

f. PC Term and Condition No. 57(d) is addressed in the TEAMR by reporting the results of the HOL surveys, snow track surveys, incidental observation logs, wildlife mortalities log, and reference to regional conditions from other publications and documents.

g. All results of the monitoring programs, including methods and approaches to statistics, are included in the 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a), which has been released to the Working Group for review and comment.

h. In 2022, approximately 5.7 Mt of iron ore was hauled from the Mine to the Milne Port stockpile, and 4.7 Mt of iron ore was shipped out of Milne Port. Construction in 2022 was limited to continued development and construction of infrastructure and laydowns required at the Mine Site and Milne Port to support operations for additional supplies and equipment occurred. At the end of 2022, the total project footprint was 605 ha.

i. The 2022 Final TEAMR (EDI, 2023a) 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.

j. The mean number of ore haul transits from January 1 to December 31, 2022, was 243.6 transits per day; this represents a slight decrease in the average daily number of ore haul transits in 2022 compared with 2021 (255.8 ore haul transits per day). 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. The average daily number of transits was steady through the 2022 calendar year with the exception of December, which had less traffic. Other non-haul truck traffic had an annual average of 26.7 vehicle transits per day, which was slightly lower than the 2021 average of 28.6 transits per day. The average daily total vehicle transits (haul and other) on the Tote Road in 2021 was 269.7 vehicle transits per day, slightly above the 2021 average of 255.8 transits per day. Ore haul transits are depicted below in Figure 4.6 and Figure 4.6.

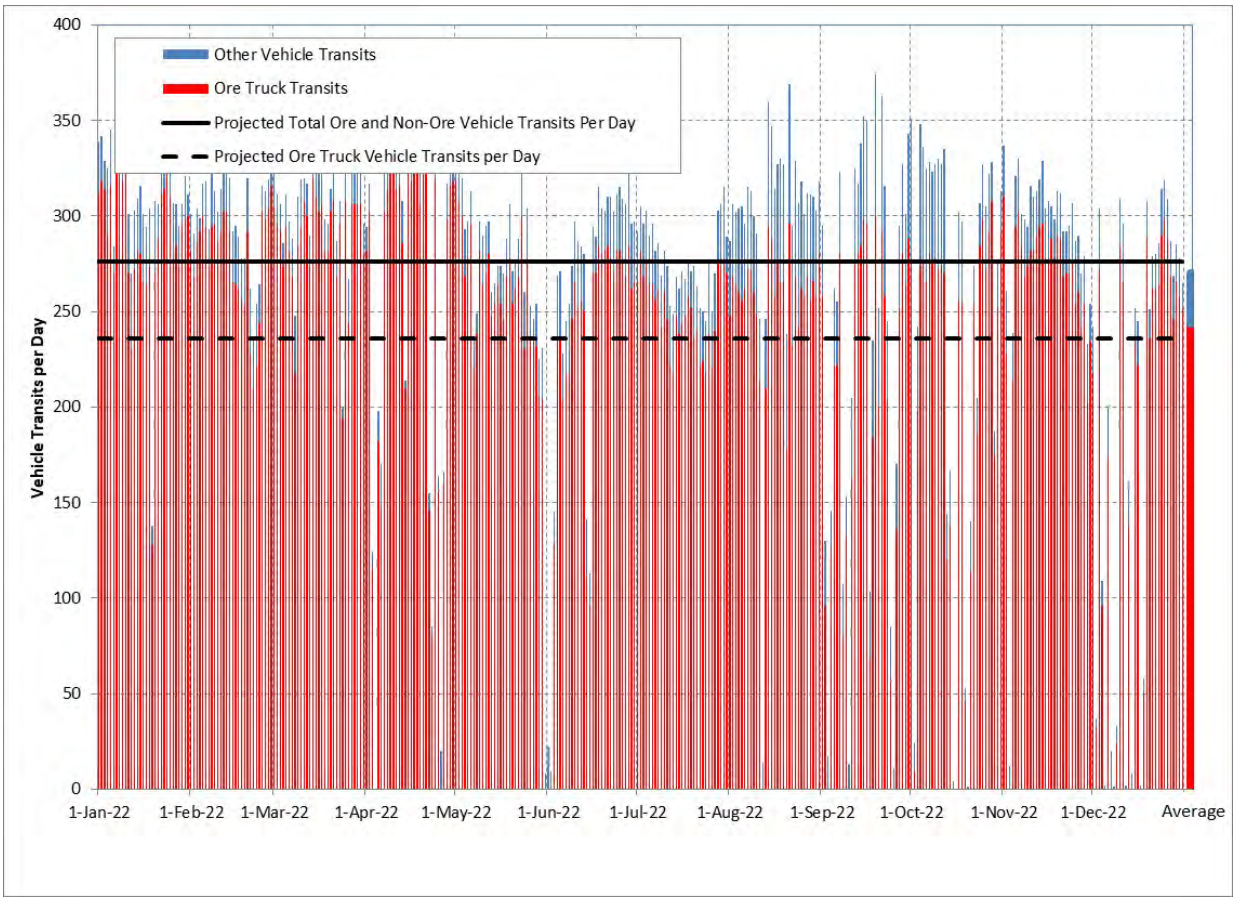


Figure 4.6: Vehicle Transits Per Day On The Tote Road, Including Ore Trucks (Red) And All Other Traffic (Blue), January 1 To December 31, 2022

Note:
Also included are the projected maximum number of vehicle transits per day and the projected maximum number of ore haul trucks per day on the Tote Road.

Figure 4.7: Trends in Vehicle Transits on the Tote Road and Total Ore Shipped from 2015 to 2022

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 square indicates the total annual amount of ore shipped.

k. A summary of annual weather conditions is included in the 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a). In 2022, monthly mean air temperatures were lowest in February, rising above zero in June, peaking in July, and falling back below zero in October. Mean monthly air temperatures at Milne Port were at their lowest in February, rising above freezing in June, peaking in July, and dropping back below freezing in October. The timing and magnitude of mean monthly air temperatures at Mine Site and Milne Port were fairly consistent with baseline and post-baseline periods. May and July 2022 were unusually dry, while June, September and October were unusually wet at the Mine Site. September was the most unusually rainy month, while July had the greatest dry anomaly at Milne Port. 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.

l. The TEMMP addresses PC Term and 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.

TRENDS

a. Annual monitoring programs continue to increase knowledge of the terrestrial environment, in addition to knowledge gathered vis-à-vis support to regional monitoring programs.

b. Inuit participants in the terrestrial monitoring programs continue to provide valuable knowledge and skill sets to the implementation of the program. Additionally, Baffinland will continue to provide support for

community-based monitoring programs through Inuit Impact Benefit Agreement (IIBA) requirements, and/or other collaborative opportunities should they arise in the future.

c. Overall, results for the terrestrial environment monitoring are consistent with FEIS predictions.

d. Wolf and caribou observations on-site follow the trends of regional observations; very low abundance. Sightings of other terrestrial animals (i.e. arctic hare) have remained consistent with previous years.

e. Overall, results for the terrestrial environment monitoring is consistent with FEIS predictions.

f. Production levels, and the transportation of ore have remained relatively consistent since 2018 when the Production Increase Proposal (PIP) was initially approved by the NIRB. Results of monitoring to-date do not indicate that effects of the Project on the terrestrial environment increased significantly, or in parallel with the increase in operations from 4.2 to 6 Mtpa (Figure 4.7).

g. Baseline (2005 to 2010) and post-baseline (2013 to 2025) wind directions and speeds were consistent with 2022 data. Both had primarily north-north-easterly and southeasterly winds, with the strongest winds from the southeast. Milne Port is consistently cooler and drier than the Mine Site. In 2022, temperatures recorded at Milne Port were, on average, 0.4°C cooler than the Mine Site throughout the year. Since the start of the baseline recording, Milne Port has averaged 2.1°C cooler than simultaneous measurements from the Mine Site. (Figure 4.8 and Figure 4.9).

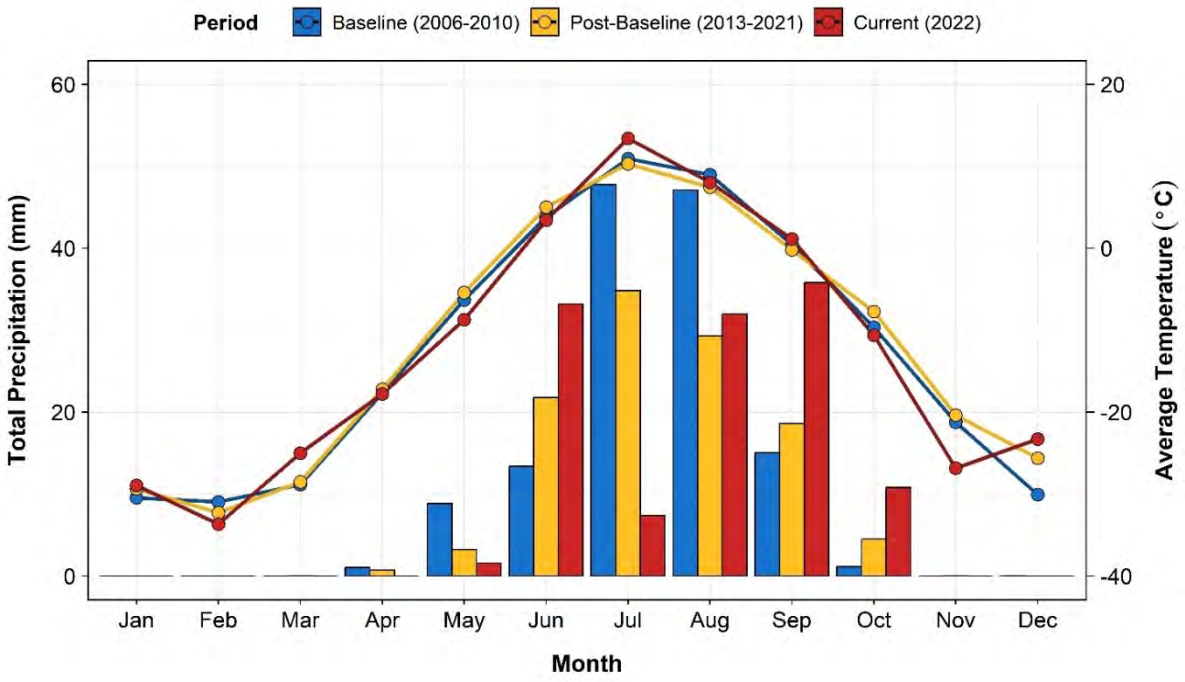


Figure 4.8: Mine Site Monthly Average Air Temperatures (Lines) And Total Precipitation (Bars) During The Baseline Period (2005 To 2010), Post-Baseline Period (2013 To 2022) And Most Recent Year (2022)

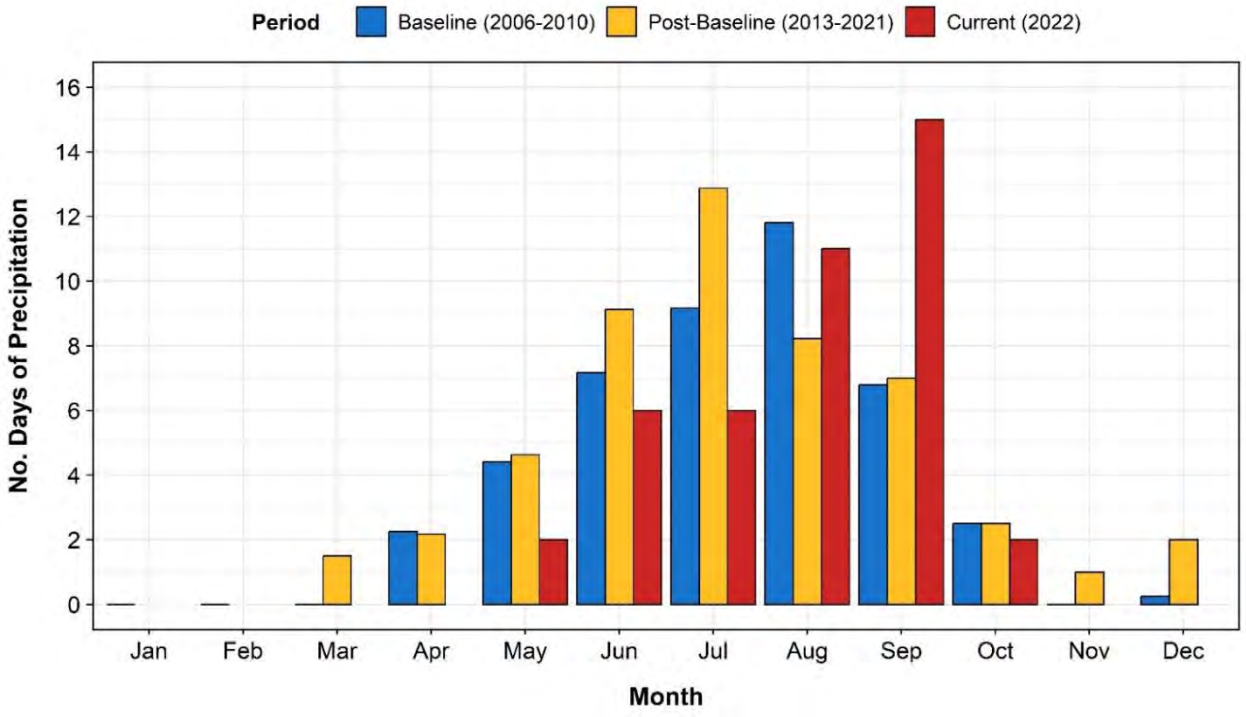


Figure 4.9: Mine Site Monthly Precipitation Frequency (Number Of Days Experiencing Precipitation) During The Baseline Period (2005 To 2010), Post-Baseline Period (2013 To 2022) And Most Recent Year (2022)

RECOMMENDATIONS / LESSONS LEARNED

The TEWG is engaged regularly to discuss annual monitoring programs for the terrestrial environment. Feedback from TEWG members is incorporated into annual monitoring reports and updates to the TEMMP where relevant.

Project Certificate Term and 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	Within its annual report to the NIRB, the Proponent shall incorporate a review section which includes: a. An examination for trends in the measured natural variability of Valued Ecosystem Components in the region relative to the baseline reporting; b. 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; c. 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; d. 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; e. Any proposed changes to the monitoring survey methodologies, statistical approaches or proposed adaptive management stemming from the results of the monitoring program; f. 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.
Relevant Baffinland Commitments	60, 71
Reporting Requirement	To be included in the Annual Report submitted to the NIRB.
Status of PC Term and Condition	Steensby Rail Corridor – Not Active Milne Inlet Tote Road – Active
Status of Compliance	Steensby Rail Corridor – Not Applicable Milne Inlet Tote Road – In Compliance
Stakeholder Review	Nunavut Impact Review Board, Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a) 2022 TEWG Meeting Records 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.2 Appendix G.5.1

METHODS AND RESULTS

The Terrestrial Environment Mitigation and Monitoring Plan (TEMMP) is the primary guidance document for environmental mitigation and monitoring at the Mary River Project; the Terrestrial Environment Annual Monitoring Report (TEAMR) is the primary source for terrestrial environment summary reporting. For brevity, the following are references to related PC Terms and Conditions that address the subcomponents (a-f) of PC Term and Condition No. 58. Note that the TEMMP and TEAMR should also be referenced for comprehensive descriptions of study design, data capture, analytical methods (including assessment limitations and assumptions), and monitoring results.

a. Refer to Summary for Term and Condition No. 57

b. A total of 57 caribou were recorded from six (6) separate observations from incidental observations in 2022. A total of three (3) caribou in two (2) separate observations were made near the Mary River are and the remainder were observed outside of the PDA. Behaviour was not noted in incidental caribou sightings. No caribou were identified during the Height of Land (HOL) surveys. Caribou have not been observed directly in the PDA during Height of Land surveys between 2014 and 2022. Caribou abundance surveys conducted in 2014 and 2018 by the Government of Nunavut also reported low abundance throughout Baffin Island (Ringrose, 2018).

c. Refer to Summary for Term and Condition No. 53, 54 and 57.

d. Refer to Summary for Term and Condition No. 10, 34, and 54.

e. Refer to Summary for Term and Condition No. 57.

f. Refer to Summary for Term and Condition No. 10, 34, 50, 54 and 57

g. There is no new information on caribou migration trails since the data collection for the FEIS baseline report was completed in 2012. In 2021, 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 Regional Study Area (RSA) scale, including in calving areas, with a focus on the Tote Road and proposed railway acting as barriers to movement. Collectively, these data would further contribute to identifying caribou migration patterns and trails. Remote camera monitoring was conducted again in 2022, but consistent with the results of the Height of Land (HOL) surveys, no caribou were detected using this method. By the end of 2022, relevant collar data were not available to Baffinland. These results are reviewed with the TEWG, within which the QIA participates. While outside of this reporting period, there was conversation at the February 2023 TEWG meeting regarding caribou collaring. An MHTO representative clarified that the MHTO was not in support of a collaring program in 2022. A GN representative stressed the importance of a caribou collaring program and indicated that the status of this program is still uncertain for the 2023 calendar year.

TRENDS

a. Refer to PC Condition No. 53 for trends related to wildlife response (as indicated by outcomes from HOL surveys, snow track surveys, and incidental observations).

b. Refer to PC Condition No. 53, and 57 for trends related to wildlife response (as indicated by outcomes from HOL surveys, snow track surveys, and incidental observations).

c. Refer to PC Condition No. 34 for trends related to vegetation and soil base metals monitoring.

d. 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 since 2014 at each Project site are summarized below and are presented in Figure 4.10.

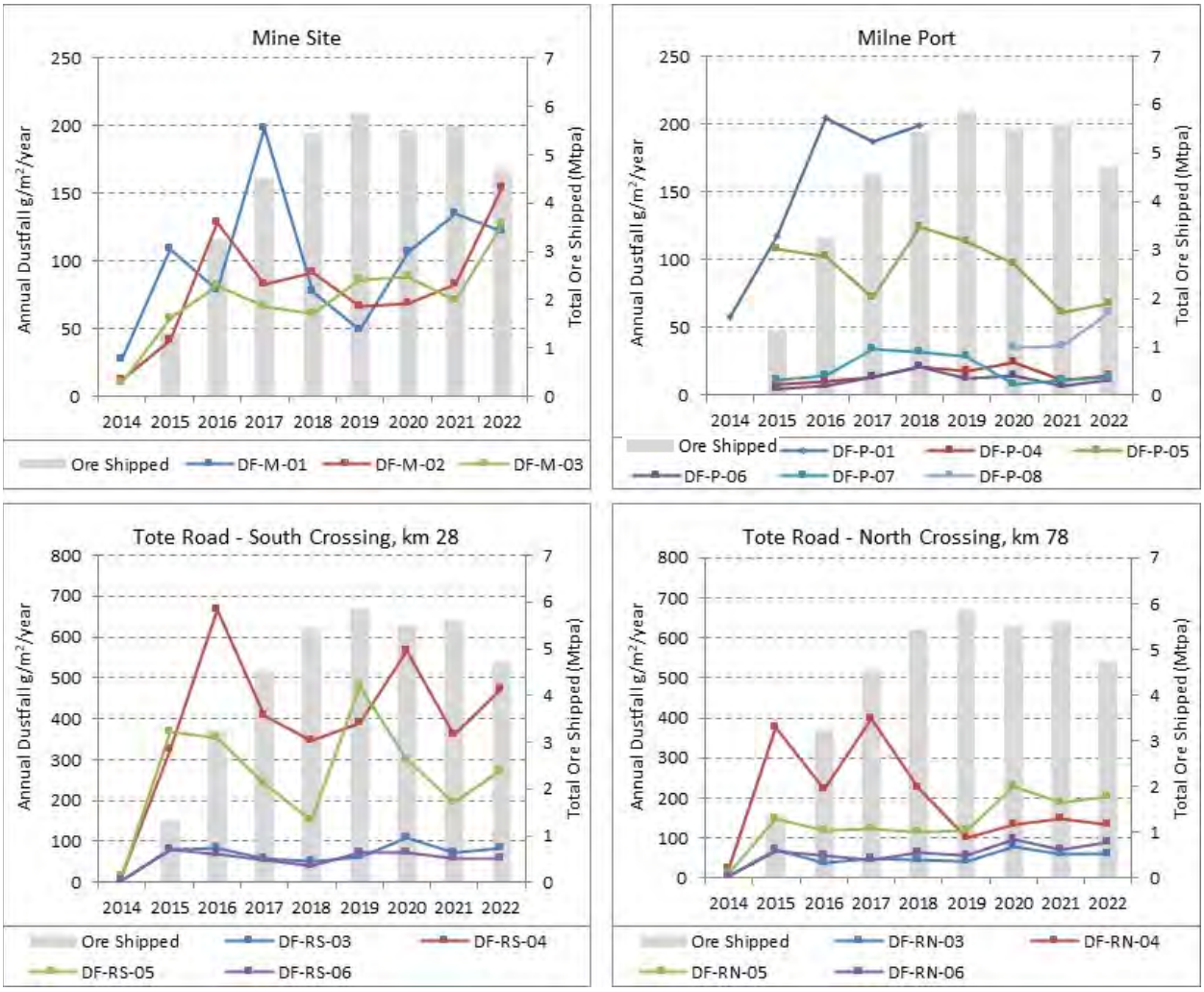


Figure 4.10: Annual Dustfall and Ore Shipping Trends from 2014 to 2022

- Mine Site (DF-M Monitors) — There was an increase in dustfall at the Mine Site dustfall monitoring sites. Dustfall at DF-M-02 and DF-M-03 has remained relatively consistent from 2018 to 2021, but trended up in 2022. May, June, and July 2022 were comparatively dry at the Mine Site; these conditions likely contributed to the increase in dustfall.
- Milne Port (DF-P Monitors) — Following some modest increases in 2017, dustfall has remained constant at the Milne Port Site.
- Tote Road North (DF-RN, DF-RS Monitors) — Dustfall along the Tote Road remained constant at the North Crossings (KM 28) and increased slightly at the South Crossings (KM 78).

The overall trends between the satellite-derived mean dustfall concentrations and the annual dustfall from the passive dustfall monitors were similar for Milne Port and the Tote Road Crossings, capturing most of the same fluctuations, while the trend fluctuations differed between the two datasets for the Mine Site monitors. This may be due to monitoring locations being located along the southern edge of the PDA where dustfall is high compared to the mean dustfall concentration within the whole PDA of the Mine Site, which includes areas of low dustfall due to prevailing winds.

The 2022 dustfall extent covered 13.3% of the regional study area with dust concentrations < 4.5 g/m^2. Milne Inlet and the Port Site had the largest percentage of dust extent at 33.62% and 28.77%, respectively, followed by the Mine Site at 19.88%. The pattern of dustfall extent on the landscape was similar from 2014 to 2022 for all areas, with the highest concentrations near the Project and dustfall extending northeast along Milne Inlet, west and south of the Mine Site, and southwest of the South Crossing (KM 78) in the direction of prevailing and/or strong winds.

e. The TEMMP addresses PC Condition No. 58(e). 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.

f. Not applicable

RECOMMENDATIONS / LESSONS LEARNED

Refer to PC Term and 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 PC Term and 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. As stated in the 2022 Final TEAMR (EDI, 2023a), CCME guidelines were consistent with the risk assessment and evaluation of exposure potential from ore dusting events in selected Valued Ecosystem Components.
- The TEWG and land users have raised concerns about dustfall extent on the landscape and impacts to vegetation and wildlife. To address the concerns, more in-depth data analyses were applied (including spatiotemporal 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.
- Baffinland is committed to mitigating dust generation at the Project by improving and refining its approaches to dust suppression, including applying dust suppressants on the Tote Road, Air Strip, and Milne Port Stockpile.
- Baffinland will continue to investigate controls that can be implemented at the Project to mitigate dustfall dispersion by helicopters and the project will continue to monitor the dustfall along the road in effort to determine if DUST/BLOKR® is resulting in a measurable effect.
- Subsequent annual reports will include an explicit comparison of inter-annual trends determined by passive dustfall monitoring and satellite imagery analysis.
- Baffinland developed the Dust Audit Committee in 2022, which is comprised of members from the QIA, Government of Nunavut, Government of Canada, Hamlets and Hunters and Trappers Organization of the impacted communities (Pond Inlet, Arctic Bay, Clyde River, Sanirajak, Igloolik). New PC Term and Condition No. 187 affiliated with Amendment No. 04 of PC No. 005 states that Baffinland will resource the Dust Audit

Committee to conduct an annual audit of dust impacts and mitigations associated with Project activities. The Committee will evaluate the effectiveness of current dust mitigation measures and provide recommendations and options to reduce the spread and impacts of dust, if deemed necessary by participating members.

- New PC Term and Condition No. 188 affiliated with Amendment No. 04 of PC No. 005 requires Baffinland to establish a program to identify high risk conditions for dust dispersal and plan for additional measures to be taken at the times the conditions are present, which may include the use of additional dust suppression and operational staged decreases in dust generating site activities. Baffinland is currently jointly developing a program with the QIA, which will be presented to the TEWG only agreed upon by both parties for additional feedback.
- Appendix B of the revised PC No. 005, Amendment No. 04 has various commitments related to dust mitigation and monitoring efforts that must be completed by Baffinland. As per new PC Term and Condition No. 189, Baffinland is required to report on the status of these commitments bi-annually to the NIRB.
- As of 2022, annual reports include an explicit comparison of inter-annual trends determined by passive dustfall monitoring and satellite imagery analysis.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2020 Terrestrial Environment Annual Monitoring Report (EDI, 2021a) 2021 Terrestrial Environment Annual Monitoring Report (EDI, 2022a) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a) Nunavut Impact Review Board's 2020-2021 Annual Monitoring Report (NIRB, 2021a) 2022 TEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.2 Appendix G.5.1

METHODS

There is a discrepancy between Project Term and Condition No. 59 and 71. Project Term and Condition No. 59, suggests that minimum cruising altitude should be 610 metres above ground level (magl) in all areas, while Project Term and Condition No. 71 prescribes a minimum cruising altitude of 650 magl. Considering that most, if not all, areas where Baffinland operated in May through September were likely to have migratory birds, the default minimum cruising altitude for helicopter overflights was the more conservative 650 magl.

In consultation with the Terrestrial Environment Working Group (TEWG), Baffinland implemented a requirement for all helicopter pilots to complete a daily pilot timesheet to track flight data, including rationale for low-level flights when required. Descriptions of the rationales recorded in the daily pilot timesheets are listed in Table 4.21. As per

requests in the 2021-2022 NIRB Annual Monitoring Report (NIRB, 2022f), Baffinland has been working with the Government of Nunavut (GN) to jointly revise the list of acceptable rationale to better reflect feedback from the TEWG that has been received throughout the years. The revised list of rationale that was developed based on input from the GN is included in Appendix E. Baffinland encourages members of the TEWG to provide their comments on the revised table when submitting comments on the 2022 NIRB Annual Report through the public registry. 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 4.21: 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, so if there is an issue, the load can be quickly lowered to the ground in a controlled manner or dropped and visual reference of the landing location is maintained.
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 do 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 (which reduces a pilot's depth-of-field causing poor ground reference) can make it difficult to maintain a consistent 650 magl cruising altitude.
Mobilization/Demobilization	Ferrying of the aircraft to and from the Project where operational constraints (e.g., fuel capacity and flight range) were a factor.
Other	The nature of the flight requires low-level flying or short distances/durations (e.g., inspections, maintenance flights, evacuations, and search and rescue).

Canadian Helicopters provided flight tracklog data (GPS points along the flight path at 2 minute intervals). Baffinland provided a compliance database using daily pilot timesheets (with flight details) from May to September 2022, when the helicopters were active and on-site. The two datasets were combined and analyzed for cruising altitude

compliance. The methods used to calculate flight altitudes above ground level and compliance are described in detail in the TEAMR.

Data were split into two (2) categories: 1) those data within the Snow Geese area (provided by Environment and Climate Change Canada) during the 2022 moulting season (July and August) in relation to the 1,100 magl cruising altitude and 1,500 m horizontal distance requirement and 2) those data outside the Snow Geese area during the 2022 moulting season, and in all areas during all other months, in relation to the 650 magl cruising altitude requirement. The datasets were then analyzed separately to assess specific cruising altitude allowances using the different areas and minimum cruising altitude requirements. Using the pilot rationale, any flight data with justifications for flying at lower altitudes than required was considered compliant with rationale. When no justification was provided for low-level flights, 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 Geese area in July and August where the 1,100 magl cruising altitude requirement was achieved (compliant);
2. Those data within the Snow Geese area in July and August where the 1,100 magl cruising altitude requirement was not achieved, but a rationale for low-level flying was given (compliant with rationale);
3. Those data within the Snow Geese area in July and August where the 1,100 magl cruising altitude requirement was not achieved and no rationale for low-level flying was given (non-compliant);
4. Those data outside the Snow Geese area in July and August, and in all areas during all other months, where the 650 magl cruising altitude requirement was achieved (compliant);
5. Those data outside the Snow Geese area in July and August, and in all areas during all other months, where the 650 magl cruising altitude requirement was not achieved, but a rationale for low-level flying was given (compliant with rationale); and,
6. Those data outside the Snow Geese area in July and August, and in all areas during all other months, where the 650 magl cruising altitude requirement was not achieved and no rationale for low-level flying was given (non-compliant).

Additional details concerning helicopter pilot rationale and flight time were requested during 2020 TEWG meetings. Therefore, the helicopter flight database used for assessing compliance was re-analyzed from 2017 to 2019 and incorporated into the 2020 analysis to address this request and was presented in the 2020 TEAMR. A re-analysis by flight time of the 2015 and 2016 helicopter overflight data was requested in comments to the 2020 Terrestrial Environment Annual Monitoring Report (TEAMR) and were presented in the 2021 TEAMR along with the 2021 analysis (EDI, 2022a). Analysis and reporting for 2022 continued to be based on flight time and incorporated pilot rationale. Compliant and compliant with rationale categories were reported separately, and flight time was reported for each pilot rationale in the compliance database.

RESULTS

No locations or boundaries of areas prescribed explicitly by the TEWG or of observed concentrations of migratory birds other than the Snow Goose key moulting area were identified in 2022 for avoidance. Except for the Snow Geese area, no analysis was required to determine compliance of 1,100 m vertical and 1,500 m horizontal distance of any

other location. Pilots made efforts to avoid the Snow Geese area during the moulting season when possible in 2022. Out of 2,691 transits flown from May to September, 112 (4%) intersected the Snow Geese area during moulting season, and only 22 hours (1%) of a total flight time of 1,694 hours were flown within the Snow Geese area during moulting season. Most transits over the Snow Geese area were primarily related to environmental monitoring and transits to Steensby Inlet, 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 2022, combined compliance for flight time within the Snow Geese area during the moulting season was 71%, with 41% compliant and 30% compliant with rationale. Overall combined compliance in all areas for all months (May to September) was 96%, with 42% compliant and 54% compliant with rationale.

2022 was the sixth (6) 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" if/when cruising altitude requirements were followed, "compliant with rationale" if/when cruising altitude requirements were not met, but pilot discretionary rationale was provided, and "non-compliant", if/when cruising altitude requirements were not met and no explanation/rationale was provided. A summary of 2022 low-level flights and rationale is provided in Table 4.22.

Table 4.22: Helicopter Flight Hours Summarized According to the Pilot Rationale for Flights Within The ≥1,100 magl and ≥650 magl Cruising Altitude Requirements, May 1 – September 30, 2022

Rationale	Flight Hours	% of Total Flight Hours	≥1,100 magl Cruising Altitude Requirement		≥650 magl Cruising Altitude Requirement	
			Flight Hours	% of Total Flight Hours	Flight Hours	% of Total Flight Hours
Short distance	818.858	48.341	4.624	0.273	814.234	48.068
Slinging	33.178	1.959	1.010	0.060	32.167	1.899
Survey	19.781	1.168	0.343	0.020	19.439	1.148
Weather	19.651	1.160	0.523	0.031	19.128	1.129
Drop off/pick up	8.986	0.530	0	0	8.986	0.530
Other	4.256	0.251	0	0	4.256	0.251
Sampling	0.868	0.051	0	0	0.868	0.051
Mobilization/ Demobilization	0.734	0.043	0	0	0.734	0.043
Total	**906.312**	**53.503**	**6.500**	**0.384**	**899.812**	**53.119**

Flights with justification from pilot daily timesheets in 2022 was lower than in 2021 (57%). 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, geophysical surveys), or involves multiple short-distance flights whereby helicopters cannot reach the required altitudes between take-off and landing sites (e.g., short-

distance flights required for sampling, drop-offs/pickups). In 2022, the most common reason stated by pilots for flying below the cruising altitude requirements was short distance. Of the total low-level flight hours with rationale, 62% were over the Project Development Area (PDA). Low-level flights due to weather occurred when weather conditions, requiring low cruising altitudes, were encountered during the flight and accounted for 20 total flight hours and 0.5 hours within the Snow Goose area during the moulting season. Flights were cancelled or delayed if poor weather occurred prior to departure unless required to ensure the safe return to camp of staff from remote work areas already working in the field when poor weather starts. Weather conditions may have prevented the scheduling of flights, which does not allow for a count of the number of delayed/cancelled flights due to weather.

During the moulting season within the Snow Geese area, with a cruising altitude requirement of ≥1,100 magl, the percentage of compliant with rationale flight hours decreased from 52% to 30% (7 hours) from 2021 to 2022 and was accompanied be a comparable increase in compliant flight hours from 20% to 41% (9 hours). The percentage of non-compliant flights was 29%, approximately 6 hours of non-compliant flight time. The 2022 compliance to the ≥650 magl cruising altitude requirement followed a similar pattern as overall compliance, with an increase in percentage of compliant flight hours and a decrease in the percentage of non-compliant flight hours.

Additional details and analysis concerning pilot rationale and flight time are included in the 2022 Final Terrestrial Environment Monitoring Annual Report (EDI, 2023a).

TRENDS

During the moulting period, flights inside the Snow Goose area decreased over the last eight years, from 15% of transits and 5.6% of flight hours in 2015 down to 4% of transits and 1.3% of flight hours in 2022. Helicopter cruising altitude compliance inside the Snow Goose area during moulting period was 72% in 2022, which was higher than 2015 (49%) and 2016 (11%), similar to 2021 (72%), but still below combined compliance seen between 2017 and 2020, which ranged from 82% to 94% (Figure 4.11). Helicopter cruising altitude combined compliance outside the Snow Goose area during the moulting season and in all areas during all other months for 2022 was 95.75%, similar to 2018 and 2020 (around 96%) and an increase over 2021 (93%).

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to work with their helicopter provider to improve cruising altitude compliance by communicating cruising altitude requirements and improving the rationale for not meeting the requirements. Helicopter flight overflight analysis based on flight line segments and flight time, including rationale from pilot timesheets, will continue in 2023.

Figure 4.11: Percent (%) Compliance for Flights Inside the Snow Geese (SNGO) Area During the Moulting Season and Outside the Snow Geese Area During the Moulting Season and in all Areas in all Other Months (2015 to 2022)

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Not applicable
Reference	Quarry Blasting Operations Management Plan (Baffinland, 2013b) Borrow Pit and Quarry Management Plan (Baffinland, 2014c) Environmental Protection Plan (Baffinland, 2021e)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

Baffinland submitted a Borrow Pit and Quarry Management Plan to the Nunavut Water Board (NWB) 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. 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 Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Environmental Protection Plan (Baffinland, 2021e) Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

The Environmental Protection Plan outlines the 'stop work' procedure when wildlife are in the area.

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 Terrestrial Environment Working Group (TEWG) as: at risk of physical injury or death.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Not applicable
Reference	Weapons on Site Policy (Baffinland, 2019d) Hunting and Fishing Policy (Baffinland, 2013c) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a)
Ref. Document Link	Not applicable

METHODS

Baffinland implements its Weapons on Site Policy (Baffinland, 2019d), 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). Baffinland does not interfere with rights of public hunting or fishing near or within the Project Development Area (PDA). All visitors that check in with Site Security and reported visitor activities are tracked through a Hunter and Visitor log. Visitor logs for 2022 are included in Section 10.6 of the 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a).

RESULTS

No incidences of Project personnel hunting or fishing within the Impact Area leased to Baffinland and/or PDA occurred in 2022.

TRENDS

No Project personnel have participated in hunting or fishing on the PDA unless approved by scientific permit and Baffinland has 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, while at the same time accommodating all hunting parties.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG) and with local Hunter and Trappers Organizations (HTOs)
Reference	2022 Engagement Records 2022 Shipping Season Meeting Records 2022 TEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix B.1 Appendix B.2.2 Appendix C.2

METHODS

The Mittimatalik Inlet Hunters' and Trappers' Organization (MHTO) became a member of the TEWG in 2016. The TEWG typically meets 4 times a year, twice in-person, with the remaining regular and/or ad hoc meetings held via conference call, though this has varied since 2020 due to COVID-19 related challenges persisting into early 2022. 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 exchanged information 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, discuss specific monitoring program (e.g., freshwater fish health monitoring or caribou surveys) or mitigations (narwhal adaptive management response), and proposed Project amendments (e.g., Phase 2, PIPR and most recently the SOP). These meetings are listed in Table 2.1. Baffinland also provided summaries via email on the anticipated monitoring programs (freshwater, marine and terrestrial) to be completed in 2022 including request for participation in surveys.

RESULTS

Wildlife monitoring and mitigation programs and wildlife surveys are reviewed at the TEWG meetings where MHTO is a member (Appendix C.2). In addition, annual monitoring reports are release annually and shared directly with TEWG members and observers for review and comment so that feedback may be considered in future monitoring programs.

2022 monitoring for terrestrial mammals included a number of surveys designed to monitor caribou interactions with the Project. Relevant programs included:

- helicopter flight height analysis;
- vegetation and soil base metals monitoring;
- snow track surveys;
- snowbank height monitoring;
- Height of Land caribou surveys;
- remote camera monitoring;
- hunter and visitor log summaries;
- incidental wildlife observations; and
- wildlife interactions and mortalities.

The 2022 surveys were informed by input previously received from MHTO members who had participated in the Height of Land (HOL) surveys.

TRENDS

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 (2) 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 wherever possible, understanding that this was limited during the COVID-19 Pandemic. This has included participation in snow track surveys, HOL surveys, vegetation monitoring, and raptor monitoring.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to work with the MHTO at TEWG meetings and other meetings organized between Baffinland and the local HTOs. Furthermore, TEWG and MEWG membership has now been expanded to the other four (4) Hunters and Trappers Organizations/Associations located in Arctic River, Clyde River, Igloolik and Sanirajak. It is Baffinland's expectation that local Inuit, including representatives from the MHTO will continue to play an important role in the terrestrial monitoring programs at Site. Inuit were invited to participate in the 2023 aerial caribou surveys completed in March 2023. Additionally, Baffinland will continue to provide support for community-based monitoring programs through IIBA requirements, and/or other collaborative opportunities should they arise in the future.

Project Certificate Term and 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	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: 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 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).
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Environment Climate Change Canada, Qikiqtani Inuit Association, Crown-Indigenous Relations and Northern Affairs Canada, Nunavut Impact Review Board.
Reference	Environmental Protection Plan (Baffinland, 2021e) Waste Management Plan (Baffinland, 2023d) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

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; Baffinland, 2021e) and the Waste Management Plan (Baffinland, 2023d), including the associated Incinerator Operation Procedure). 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. Prior to disposal of ash, the ash is tested using Toxicity Characteristic Leaching Procedure (TCLP) analysis in accordance with the Type 'A' Water Licence. Results are summarized in the 2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a). Metal Skirting has also been installed on kitchen and accommodation buildings, including Sailiivik camp, on the Project site to prevent carnivores accessing under buildings.

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 2022(Baffinland, 2021e; 2023d). 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. In 2022, the Mine Site incinerator was not operational for part of the year. Material requiring incineration during that time was containerized into seacans for storage for subsequent incineration or backhaul offsite. Repairs were completed to the Mine Site incinerator in June 2022 and operation of the incinerator was subsequently resumed. The Mine Site Landfill Facility continued to only accept inert, non-hazardous waste materials in 2022, with all animal attractants (food scraps, wrappers, etc.) diverted to the incineration units. While landfill fencing completed in 2019 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.

Baffinland ongoing employee education around proper waste sorting continues to be conducted to ensure site-wide adherence to the Waste Management Plan (Baffinland, 2023d). 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.

Carnivore interactions have been minimized, however, Arctic fox do still occur. 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 2022 Final Terrestrial Environment Annual Monitoring Report (TEAMR; EDI, 2023a).

TRENDS

Carnivore and/or Arctic Fox interactions have generally increased over the life of the Project as it continues to grow in scale. In 2022, the number of interactions with carnivore and/or Arctic Fox remained generally consistent compared to the number of interactions in previous years; validating the continued success of ongoing waste management practices implemented on site. Incineration, employee training, animal attractant mitigation measures and metal skirting maintenance continue to be measures implemented to reduce wildlife interactions at the Project.

Refer to the 2022 Final TEAMR (EDI, 2023a) for additional trends associated with wildlife interactions on the Project.

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; in 2022, some of the containerized waste was backhauled offsite because the Mine Site incinerator was not operational for part of the year. 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 minimalize wildlife entry under buildings (Baffinland, 2021d). 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 Terms and Conditions 65 through 75)

Eleven (11) PC Terms and Conditions focus on the potential impacts of the Project on birds. Most of these conditions relate to the implementation of mitigation measures 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, 2008). 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 multiple times per year on the mitigation and monitoring of Project effects on birds through the TEWG.

Monitoring

Baffinland's bird monitoring program included the following in 2022:

- Active migratory bird nest surveys (AMBNS);
- Helicopter Overflight Compliance Tracking;
- Calculating the amount of habitat lost annually; and
- Incidental Observation and Wildlife Interaction Tracking

The CWS-ECCC has also conducted seabird monitoring programs that contribute to regional bird distribution data.

The objectives of Baffinland's bird monitoring programs are to monitor the effectiveness of mitigations put in place to minimize effects of the Project on birds (i.e., AMBNS and Helicopter Overflight Compliance Tracking), and the potential residual effects of the Project after the application of mitigations (i.e. Raptor and cliff nesting monitoring programs, calculating the amount of habitat within the Project that is lost annually and wildlife mortality tracking).

From 2011 to 2020, a raptor monitoring program was conducted in collaboration with Arctic Raptors Inc. As reported previously and discussed with the TEWG, the study design is statistically robust. It has provided trends in raptor occupancy and productivity for the Project. After several years of monitoring, a key finding is that occupancy and productivity appear to be stable, and there has been no evidence of Project-related effects on raptors. Therefore, raptor occupancy and productivity surveys were discontinued in 2021 and efforts were put into preparing a manuscript for a peer-reviewed publication.

To the extent that Project impacts on the terrestrial environment can be evaluated, the Project's effects appear to be within FEIS predictions. Table 4.23 summarizes the main activities in 2022 in relation to birds and an impact evaluation compared to the predictions outlined in the FEIS and FEIS Addendum.

Table 4.23: Birds Impact Evaluation

Component	Effects	Monitoring Program	Impact Evaluation
Bird Indicator Species/Species at Risk	Destruction of active nests due to development in the project footprint	One pre-clearing nest survey was completed at the Project and no nests were discovered.	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. Additionally, as of the end of 2022, the total Project footprint was 605 ha, which is less than what was assessed in the FEIS (7,618 ha).	Effect negligible, within FEIS predictions
	Influences on health	In 2022, after incorporating pilot rationale, helicopter cruising altitude compliance within the Snow Geese area during the moulting season was >70%, up from 2021. Overall compliance in all areas in all months was >95%.	Consistent with FEIS predictions
	Mortality	Three (3) bird mortalities were observed in 2022. One of these mortalities was a snow bunting found without any evidence to indicate cause of death. The second mortality was a Lapland Longspur found without any evidence to indicate cause of death. The third mortality was a ptarmigan, which was involved in a vehicle collision.	Three (3) 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 also partnered on an initiative 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. Field work was conducted at Cape Graham Moore during the 2022 season and a program overview was presented at the December 1st, 2022 TEWG meeting.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and 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 (Baffinland, 2021e) 2022 TEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.2

METHODS

Section 4.13 (Bird Protection Measures) of the Environmental Protection Plan (EPP) is the relevant document that deals with Bird Awareness training delivered to employees.

In 2022, on-site training of pre-clearing Bird Nest Surveys was performed by Environmental Dynamics Inc. (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 17 and August 19, 2022), 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 2022, Baffinland continued to monitor all new construction activities around development areas prior to conducting any ground disturbance. Of the 512 m^2 of new land disturbed for Project infrastructure in 2022; all 512 m^2 of land was disturbed outside of the breeding bird window. During the breeding bird window, land was surveyed through active migratory bird nest surveys (AMBNS) prior to disturbance. Only one survey was completed, which was in a pre-disturbed area and no nests were found.

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 mid-May and late August.

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.5.1

METHODS

To the fullest extent possible, Baffinland plans for new ground disturbance outside of the breeding bird season and conducts active migratory bird nest surveys in areas disturbed in the breeding season, before any activities proceed. 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. Baffinland establishes clear zones of avoidance when bird nests are found based on species-specific nest setback distances included in Table 3-1 in the Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland, 2016a).

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 Term and 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 Term and 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) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.5.1

METHODS

Environment and Climate Change Canada (ECCC) provides input to develop mitigation and monitoring strategies for Species at Risk via participation in the TEWG. Section 3 of the Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland, 2016a) identifies mitigation and monitoring strategies relevant to all wildlife that could interact with the Project, including Species at Risk. This Management Plan is currently under review and will be circulated publically to allow for regulators to provide comments.

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 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 Term and 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	Not applicable
Reporting Requirement	To be included in the Annual Report submitted to the NIRB.
Status of PC Term and 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	https://www.baffinland.com/media-centre/document-portal/

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. If it does not present any risks to operating the Project safely, consideration has been given to reducing lighting where possible.

RESULTS

Not applicable.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Strobe lights were not 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 continue using this method on any new infrastructure as required.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.5.1

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 (AMBNS) were completed, deterrents were not erected. While not specific to land clearing activities, Baffinland has implemented the use of deterrents at waste water containment ponds, including both decoy birds of prey and scarecrows. During the open water season, routine bi-weekly compliance inspections are completed to ensure that these deterrents are still in place and not damaged. Baffinland conducts clearing activities outside of the breeding bird season whenever possible to discourage birds from nesting in these areas and minimize the potential for nests to be disturbed by clearing or construction.

RESULTS

In 2022, there were no apparent nesting attempts by birds in the previously cleared areas, and no nest were found in previously undisturbed areas.

Of the 512 m^2 of new land disturbed for Project infrastructure in 2022, 100% occurred outside of the breeding bird window. No nests were found.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Since the areas cleared during the breeding season are managed by active migratory bird nest surveys before disturbance, deterrents have not been required during land disturbance activities. Avoidance has been the primary method used to prevent disturbances to nesting birds. The TEWG has made no recommendations that an alternative approach would be more successful or necessary. Baffinland will continue to maintain bird deterrents at waste water ponds to discourage use by migratory birds.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.2 Appendix G.5.1

METHODS

Active migratory bird nest surveys (AMBNS) are conducted in areas scheduled for clearing disturbance during the breeding bird season (May 17- August 19). 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 Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland, 2016a). This Management Plan is currently under review and is expected to be released in draft to the NIRB during Q2 of 2023, at which point regulators will be able to submit comments prior to finalization.

RESULTS

Of the 512 m^2 of new land disturbed for Project infrastructure in 2022, 100% occurred outside of the breeding bird window. Only one AMBNS was completed in 2022, which occurred on pre-disturbed land and no nests were discovered. Baffinland Environmental staff did not observe any indications of nesting behavior (e.g., carrying food, carrying nesting material) while conducting this survey.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to avoid new ground disturbance during the nesting season where possible and continue to conduct AMBNS throughout the breeding bird season in areas that need to be cleared.

Project Certificate Term and 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	Subject to safety requirements, the Proponent shall require all Project related aircraft to maintain a cruising altitude of at least: • 650 m during point to point travel when in areas likely to have migratory birds; • 1,100 m vertical and 1,500 m horizontal distance from observed concentrations of migratory birds; and • 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.
Relevant Baffinland Commitments	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a) 2022 TEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.2 Appendix G.5.1

METHODS / RESULTS

Refer to PC Term and Condition No. 59. Reporting on PC Term and Condition No. 71 is identical to that of PC Term and Condition No. 59.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and 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, 2021e) Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a) 2022 TEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.2 Appendix G.5.1

METHODS

Flight height requirements are included in all aviation contracts, and flight paths are recorded using 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 is incorporated into the helicopter contract Baffinland holds with Canadian Helicopters. Random audits of flight logs are also completed throughout the season to help ensure compliance with requirements.

RESULTS

Refer to PC Term and Condition No. 59.

TRENDS

Refer to PC Term and Condition No. 59.

RECOMMENDATIONS / LESSONS LEARNED

Refer to PC Term and Condition No. 59.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and 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 (Baffinland, 2016a) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a) 2015 TEWG Meeting Records (Baffinland, 2016b) 2022 TEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.2 Appendix G.5.1

METHODS AND RESULTS

With respect to monitoring, since 2011, Baffinland has conducted several collaborative research initiatives with relevant members (primarily Environment and Climate Change Canada; ECCC) of the Terrestrial and Marine Environment Working Groups (TEWG and MEWG, respectively) as detailed in the Summary for Term and Condition No. 74. Additionally, in accordance with Canadian Wildlife Services (CWS) input provided in the 2015 TEWG meetings, 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).

With respect to mitigation, 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. If it does not present any risks to operating the Project safely, consideration has been given to reduce lighting where possible. Baffinland also 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. Baffinland does use bird deterrents, including decoy birds of prey and scarecrows, at wastewater containment ponds throughout the open water season to discourage nesting birds.

Active migratory bird nest surveys (AMBNS) are also completed annually during any land clearing activities within the bird breeding window (May 17 to August 19, 2022). One AMBNS was conducted on August 14, 2022, however, it was in an area that was already previously disturbed and no nests were detected. Baffinland conducts clearing activities outside of the breeding bird season whenever possible to discourage birds from nesting in these areas and minimize the potential for nests to be disturbed by clearing or construction.

TRENDS AND LESSONS LEARNED

Baffinland continues to benefit from the expertise of ECCC via the TEWG and MEWG. See Summary for Term and Condition No. 68, 69 and 74 for more details.

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a) 2022 TEWG Meeting Records 2022 MEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.1 Appendix C.2 Appendix G.5.1

METHODS

Baffinland monitored cliff-nesting raptor site occupancy and productivity at the Project from 2011 to 2020. This was a monitoring program with the statistical power and robust design required to detect nesting raptor response to disturbances associated with the Project. That program evolved over time to accommodate statistical data requirements and is described in the TEMMP (Baffinland, 2016a) and terrestrial environment annual monitoring reports. From 2018 to 2020, 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. This program involved conducting an aerial survey during the nesting period and before fledging for peregrine falcon and gyrafalcon, which are key indicators for cliff-nesting raptor species. Nest site occupancy and productivity relative to the distance of the nest site to project infrastructure were then modelled to determine potential Project-effects. Findings from this program showed that additional monitoring was not warranted, which led to the discontinuation of the program in 2021.

Starting in 2012, Baffinland has provided financial support to Environment and Climate Change Canada's (ECCC) Program for Regional and International Shorebird Monitoring (PRISM) plot surveys. The primary objective of PRISM

is to monitor the status and trends of Arctic bird populations by estimating the population size at different intervals to determine changes over time. The research results of the PRISM program are reported separately by ECCC's National Research Centre. A presentation on PRISM was given by ECCC at the December 1, 2022 Terrestrial Environment Working Group (TEWG) meeting. Additionally, Baffinland contributes to an industry Natural Sciences and Engineering Research Council (NSERC) research program focused on the study of seabirds in the shipping corridor, effective December 2019. Fieldwork for this was to begin in 2020, but was postponed due to COVID-19 travel restrictions. Researchers were able to visit Cape Graham Moore on Bylot Island in summer of 2022 to begin generating this baseline data. This program uses biologging and physiological tools to map environmental sensitivities in the Arctic, applied to shipping associated with the Project. This collaborates with multiple researchers from various universities, including McGill University, University of Windsor, Carleton University, and ECCC. The period the program was initially intended to occur will be extended into future years due to the delays associated with COVID-19 Pandemic restrictions. ECCC gave a presentation on the 2022 Cape Graham Moore research at the December 2, 2022 Marine Environment Working Group (MEWG) meeting, which is captured in detail in the meeting minutes.

The Ship Board Observer (SBO) program has not been conducted since 2019. The program could not be completed in 2020 or 2021 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. Additionally, the program could not be completed in 2022 due to heavy ice conditions that led to an early termination of the shipping season. The program was originally scheduled for a 2 week duration from October 12 to 24, 2022, and was subsequently cancelled when conditions were deemed unsafe for vessel traffic, ultimately preventing the use of the MSV Botnica to conduct the program.

In 2019, Baffinland deployed nine passive Autonomous Recording Units (ARUs) to detect red knot vocalizations in collaboration with Canadian Wildlife Services (CWS) and ECCC. No Red Knot were detected during 2019, and CWS-ECCC concluded that further ARU monitoring was not necessary. 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 (AMBNS) for areas of planned disturbance. Pre-clearing nest surveys were conducted by Baffinland Environment staff over the 2022 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 Port 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 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023: Appendix G.5.1; Section 11). Bird monitoring and survey programs by key indicators are conducted as follows:

Peregrine falcon, rough-legged hawk, and gyrfalcon

- Baseline data on cliff-nesting raptors began with exploratory surveys in 2006 and continued through to 2008.
- Known nest sites were surveyed annually from 2011 to 2020. As part of these surveys, crews also attempted to locate new nest sites in suitable areas. All nesting sites were 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) were 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 Km 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 Km of shoreline along Milne Inlet were surveyed.
- Eider Duck Ecology on East Bay Island (2018). Research on eider duck ecology has been conducted on East Bay Island for the past 20 years in response to concerns regarding overharvesting of northern Common Eiders on their wintering range in west Greenland. This long-term dataset was expanded over the years and has been used as a baseline in response to various other concerns raised by northern communities and environmental assessments, including resource development in the region. This study examines the impacts of weather, harvest, Polar Bear predation, and physiology on eider reproductive decisions in the absence of shipping activity.

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^2) 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 Project Development Area (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 and 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 used by thick-billed murres on Coats Island (2018 to 2020) and Cape Graham Moore (2022):
  - Long-term changes in the nesting, diet, growth, and population size of Coats Island murre colony has been recorded since the 1980s.
  - ECCC sampling in 2018 to 2019 included: breeding timing, reproductive success, and diet to assess future impacts of planned shipping activity and climate change.
  - All fieldwork was suspended in 2020 due to the COVID-19 Pandemic. Field work resumed in 2022 at Cape Graham Moore on Bylot Island to begin collecting baseline data for the aforementioned parameters (nesting, diet, growth, and population size).
- East Bay Island migratory bird research (2018 to 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 fieldwork was suspended in 2020 due to the COVID-19 Pandemic.
- Ship-based Observer (SBO) 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

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, cliff-nesting raptor monitoring was paused in 2021 and efforts were put towards preparing a draft manuscript for a peer-reviewed publication. This manuscript has not yet been approved for publication.

TRENDS

Annual variation in productivity for Peregrine Falcons and Rough-legged Hawks has been apparent (Figure 4.12); 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. The 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, ongoing 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. Program results determined that additional monitoring was not warranted.

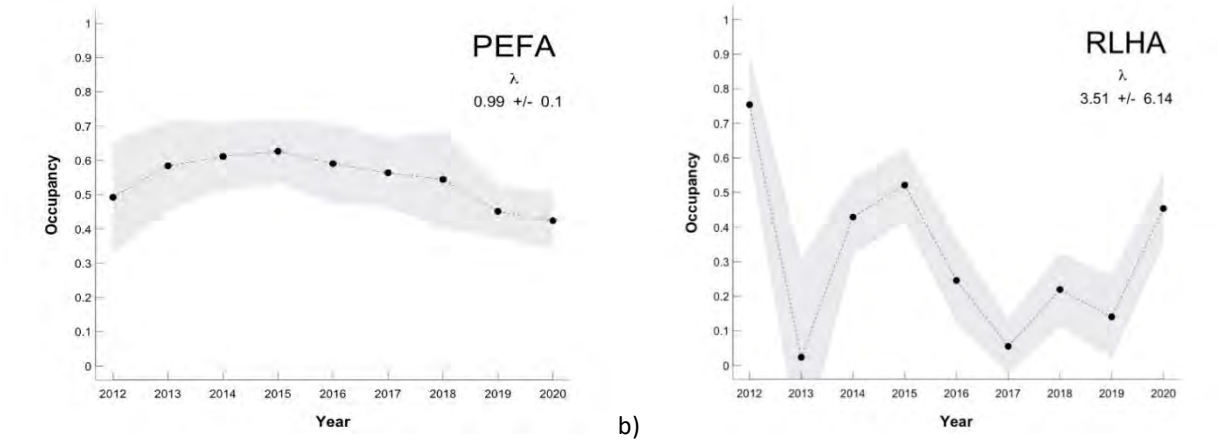


Figure 4.12: Annual Estimates of Peregrine Falcon (PEFA) and Rough-legged Hawk (RLHA) Nesting Territory Occupancy (2012 to 2020)

Notes:
Annual Estimates include ± standard errors.

The analysis of all PRISM data is complete, including the direct tests of mine impacts and the arctic-wide analyses. These results were presented by the ECCC to the TEWG at December 2022 meeting.

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. 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. Upon the recommendation of CWS-ECCC, Red Knot monitoring using ARUs will resume before increasing activities in the southern transportation corridor.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be provided within the Annual Report to the NIRB.
Status of PC Term and Condition	Active
Status	In Compliance
Stakeholder Review	Qikiqtani Inuit Association, Nunavut Impact Review Board, Terrestrial Environment Working Group (TEWG)
Reference	Environmental Protection Plan (Baffinland, 2021e) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.5.1

METHODS

Before construction on undisturbed land, the appropriate approvals must be obtained, and construction plans must adhere to the Environment Protection Plan. Baffinland tracks the new disturbance of land by maintaining construction and disturbance records and mapping spatial extent for cumulative totals.

RESULTS

As of the end of 2022, the total Project footprint was 605 ha, less than what was assessed in the FEIS (7,618 ha). Predictions were based on the assumption that the entire PDA would be disturbed. 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 2022, and all disturbed land is reported in the 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a).

TRENDS

To date, all disturbed land has remained within the PDA and below FEIS predictions (Figure 4.13).

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.

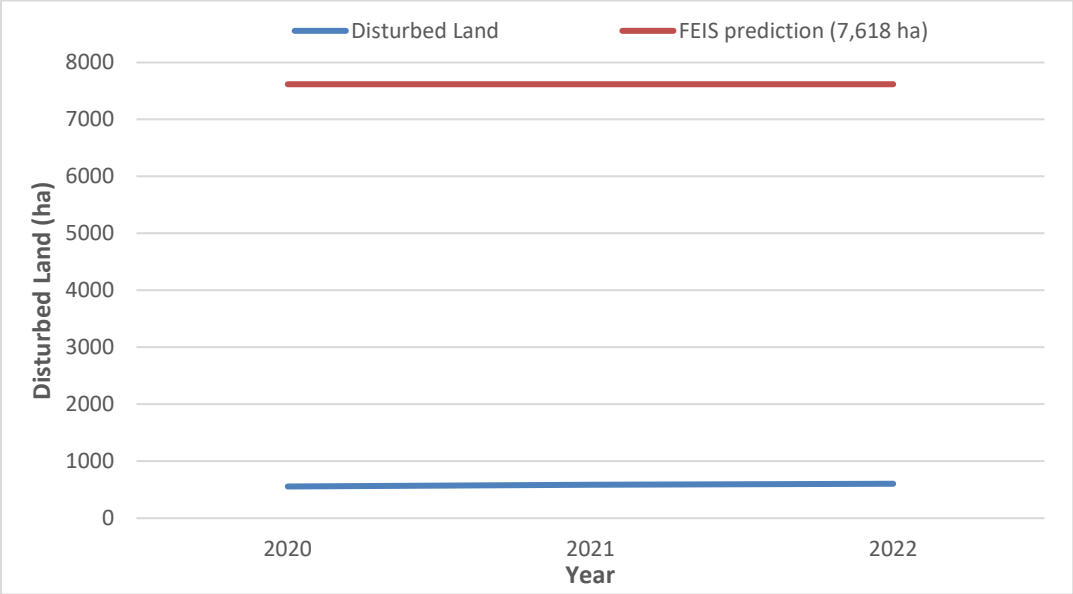


Figure 4.13: Annual Project Footprint Of Disturbed Land Trend For 2020 To 2022

4.6.9 Birds (PC Terms and Conditions 65 through 75)

4.6.10 Marine Environment (PC Terms and Conditions 76 through 98)

Twenty-four (24) PC Terms and 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 marine water quality, marine sediment quality, fish and fish habitat, the potential for introduction of non-indigenous species (NIS) and/or aquatic invasive species (AIS) 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 Transport Canada on these issues, as well as the QIA and Inuit community members through regular engagement (Appendix B) and meetings of the MEWG (Appendix C.1).

Monitoring

Marine biota and the physical environment (marine water and sediment quality) is subject to a marine EEM program, which includes the following components:

- Benthic Infauna – Sampling for benthic infauna to characterize benthic infauna communities and detect changes over time.
- Marine Sediment Quality - 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.
- Marine Water Quality - Sampling measuring total suspended solids (TSS), salinity, temperature, pH, metals, nutrients and hydrocarbon concentrations over time.
- Substrate, Macroflora, Epifauna - Diver-based biophysical surveys in permanent quadrats to enumerate macroflora and benthic epifauna and compare changes over time.
- Fish Community – Sampling to monitor the abundance and diversity of the fish community and compare changes over time and in relation to proximity to the ore dock and other port activities
- Fish Health - Opportunistic sampling of contaminants in Arctic Char, and targeted sampling of tissues from Fourhorn Sculpin and Hiatella arctica (a shellfish species).
- Non-indigenous Species (NIS)/Aquatic Invasive Species (AIS) - Sampling for the presence/absence of aquatic organisms (zooplankton, benthic infauna, benthic epifauna, macroflora, encrusting epifauna, fish) potentially introduced by Project activities.
- Ballast Water Monitoring - Monitoring of salinity levels in ballast water to verify exchange of ballast in accordance with Ballast Water Regulations.

Table 4.24 provides an evaluation of the Project's potential impacts on the marine environment, based on monitoring activities completed at Milne Port up to 2022, relative to predictions presented in the Final Environmental Impact Statement (FEIS) (Baffinland 2012) and subsequent Early Revenue Phase (ERP) addenda (Baffinland, 2013a).

To the extent that potential Project impacts on the marine environment can be evaluated, the effects of the Project are within FEIS and subsequent ERP addenda predictions.

Table 4.1: Marine Environment Impact Evaluation

Component	Potential Effects	Monitoring Program	Impact Evaluation
Marine Water and Sediment Quality	Changes in marine water and sediment quality due to prop wash, ballast water discharge, and ore dust deposition	The MEEMP did not detect any meaningful changes in marine water quality. Reported analytical results for marine water quality parameters measured in 2022 were below applicable CCME WQG, or were generally within range of conditions observed in previous MEEMP surveys (2015 to 2022). Iron concentrations in water have not shown a clear increase between 2014 and 2022. Hydrocarbons and PAHs were not detected in marine water quality samples collected in 2022. Environmental effects monitoring (EEM) for marine sediment was conducted at a reduced scale compared to 2020, based on multiple years of monitoring showing no directional changes, or trends, have occurred in marine sediment quality as a result of the Project. Baffinland's technical experts have suggested the full-scale program can be completed every three to five years to align with federal environmental effects monitoring requirements. In 2022, the sediment quality program focused on targeted sampling at station SW-2, along with adjacent stations SW-1, SW-3 and SW-4. Concentrations of metals and hydrocarbons at these four stations continue to be below applicable CCME sediment quality guidelines, and data do not suggest Project-related impacts. In terms of grain size composition, the sediment results show high spatial and temporal variability-potentially driven by natural factors, such ice movement and coastal sediment processes, as well potential influences of vessel propellor wash.	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

Component	Potential Effects	Monitoring Program	Impact Evaluation
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
Fish Health	Changes in fish health and tissue chemistry related to impacts on marine habitat	Monitoring for fishing effort, relative abundance, fish health indicators (e.g., weight and length) and tissue chemistry. Results of monitoring show that the health of both Fourhorn Sculpin and *Hiatella arctica* from the Milne Port area appeared good at the time of sampling. Tissue concentrations of metals for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* in 2022 were generally comparable to historical data. Annual fish sampling for years 2020, 2021, and 2022 yielded similar species diversity and similar numbers and proportional representation of the dominant fish species in Milne Port (Arctic char, Fourhorn Sculpin, and Shorthorn Sculpin) relative to previous years.	Effects within FEIS predictions
Marine Biota	Potential changes to marine biota due to discharges to the marine environment, propeller scour, installation of dock structure.	Environmental Effects Monitoring (EEM) for benthic infauna was not performed in 2022 as part of the 2022 MEEMP based on multiple years of monitoring showing no directional changes, or trends, have occurred in marine benthic infauna as a result of the Project. In 2022, the benthic infauna sampling program for the MEEMP focused on targeted sampling at station SW-2, along with adjacent stations SW-1, SW-3 and SW-4. The benthic community at SW-2 seems to have increased from the impacts associated with changes in grain size in 2020 when propeller scour appeared to have occurred in a localized area adjacent to the Ore Dock, showing substantially more diversity and higher density and taxa richness in the two years following the localized physical disturbance event. To date, 2020 was the only instance where reduced fines content was accompanied by a visually determined reduction in benthic density, richness and diversity (sample numbers in 2022 were below what can be statistically analysed).	Effect within FEIS predictions
Marine Biota	Potential changes to marine biota from the introduction of NIS/AIS due to shipping (ballast water discharges, etc.)	In 2022, sampling undertaken as part of the MEEMP and Aquatic Invasive Species/ Non-Indigenous Species (AIS/NIS) Monitoring Program detected 29 taxa that had not been identified previously at Milne Port during baseline sampling. Almost all new taxa had	Effect within FEIS predictions

Component	Potential Effects	Monitoring Program	Impact Evaluation
		records of occurrence in the Canadian Arctic. Algal specimens identified as cf. *Punctaria latifolia* and cf. *Stictyosiphon soriferus* were flagged for further review due to no or limited records in the Canadian Arctic. The fish species Halfbarred Pout (*Gymnelus hemifasciatus*) lacks records for the Eastern Canadian Arctic but is known from Arctic waters and the range may have been obscured by similarities to other *Gymnelus* species. A new record of Bryophyta indet. was sent to an expert for further identification as it had only been identified to phylum; this group mainly occurs in freshwater or terrestrial habitats and there are hundreds of species with records from the Canadian Arctic. Additionally, 2022 samples included two (2) taxa (*Marenzelleria* sp. and *Hesperonoe* sp.) that were flagged in previous years due to uncertainties in their natural range or because they were listed on an AIS database. Expert taxonomic review of the *Marenzelleria* specimens indicated they are likely *M. wireni*, a species previously documented in Milne Port with a natural range that likely includes the Eastern Canadian Arctic that has a natural Arctic range. However, damage to the specimens prevented a confident classification and so the identification was left at the genus level. As the *Marenzelleria* sp. were damaged they will not be sent for further review. Additionally, unidentified specimens from the bryozoan superfamily Buguloidea were also flagged for review. While representative Arctic species in this superfamily have been previously documented in Milne Port, these specimens were flagged for review as the superfamily also contains *Tricellaria inopinata*, a species flagged as a high-risk invader to Arctic waters (Casas-Monroy et al., 2014). 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.	

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 Hunters and Trappers Organizations(HTO) (e.g., Mittimatalik Hunters and Trappers Organization [MHTO]), Hamlet (e.g. Pond Inlet) and QIA. Reporting on each PC Term and Condition follows.

Project Certificate Term and 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 Term and 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) 2020 and 2021 MEEMP and AIS Monitoring Program Reports (Golder, 2021c, 2022c) 2022 MEEMP and NIS/AIS Monitoring Report (WSP, 2023a) 2022 MEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.1

METHODS

The Marine Environmental Effects Monitoring Program (MEEMP) was initially developed in 2015 following completion of marine biological baseline studies at Milne Port during 2010, 2013 and 2014. The MEEMP included 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. Detailed information on study design and sampling methodology is available in the annual monitoring report for the MEEMP and NIS/AIS monitoring programs (WSP, 2023a). The MEEMP sampling design is generally based on Environmental Effects Monitoring (EEM) guidance from Environment Canada (EC, 2012). Monitoring has been conducted annually since 2015. However, given that sampling results to date do not suggest degradation or impairment of the marine physical or biological environment due to the Project, the scope and effort for the 2021 and 2022 MEEMPs were reduced, focusing exclusively on targeted monitoring for marine water quality, targeted sediment and benthic infauna sampling at SW-2 (and, in 2022, surrounding stations) and environmental effects monitoring for marine fish (i.e., fish and fish habitat, fish health).

In 2018, a local shellfish species, *Hiatella arctica*, was added to the MEEMP as an additional effects indicator for the fish sampling program. In 2020, additional changes to the fish health and tissue chemistry program were implemented to better align the MEEMP with the Metal and Diamond Mining Effluent Regulations (MDMER) Environmental Effects Monitoring (EEM) program (Government of Canada, 2002). Fourhorn Sculpin and *H. arctica* were selected as sentinel species to monitor for effects from the Project due to their abundance in the study area

and suitability as a study species. Lethal target sample sizes were established for Fourhorn Sculpin and *H. arctica* as part of the 2020 fish health program. Fish health effect indicators included measures of energy use (i.e., growth, reproduction), energy storage (i.e., condition) and survival (i.e., age), in addition to supporting endpoints (as appropriate for each species) such as length, body weight, the prevalence of external and internal abnormalities, organ weights, stomach fullness, parasite presence/absence, sex, life stage, and state-of-maturity. For fish tissue chemistry, concentrations of total metals and polycyclic aromatic hydrocarbons (PAHs) were measured for the three species (i.e., Arctic Char, Fourhorn Sculpin, and *H. arctica*) and compared to MEEMP data from previous years, where possible. The availability of older data for comparison varied for each species, with data extending back to 2010 for Arctic Char intermittently, and for Fourhorn Sculpin and *H. arctica* to 2018. In both 2021 and 2022, reconnaissance surveys were undertaken in an effort to identify a suitable reference area for the fish health and fish tissue chemistry programs. A summary of the 2022 NIS/AIS program will be provided in the response to PC Term and Condition No. 87 below, rather than duplicating content here.

RESULTS

Detailed sampling results are available in the 2022 MEEMP and NIS/AIS monitoring report (WSP, 2023a). Monitoring completed to date as part of the MEEMP reflects concordance with the applicable Terms and Conditions of PC No. 005, including PC Terms and Conditions No. 1, 76, 83, 83(a), 85, 87, 91, 99, 99(b), 113, 114 and 126.

Overall, MEEMP sampling results from 2022 do not suggest degradation or impairment of the marine physical or biological environment (i.e., water and sediment quality, marine fish, benthic infaunal and macroflora/epibenthic communities, fish health, NIS/AIS) associated with the construction and operation of Milne Port; therefore, no additional mitigation measures are warranted at this time. With respect to targeted sampling (as requested by the Qikiqtani Inuit Association [QIA]) of SW-2, a station close to the existing Ore Dock from which anomalous sediment and benthic infauna indicators were reported in 2020, sampling in 2022 indicates that the benthic infauna community has increased from 2020 and continues to be stable from the localized physical disturbance. Sediment results from SW-2 and three adjacent stations along the West coastal transect confirm that these stations are dominated by sand and have some variability in fines content. At SW-2, the fines content in 2022 continues to be higher than in 2020 and more comparable to 2019. Benthic invertebrates were present at all four stations sampled in 2022 at densities one to two orders of magnitude more than the low density observed in 2020 at SW-2. More detailed discussion on the results from the four stations targeted for sampling in 2022 for sediment quality and benthic invertebrate communities is available in the 2022 MEEMP and NIS/AIS Monitoring Report (WSP, 2023a)

Marine Physical Environment

Marine Water Quality

In 2022, concentrations of water quality parameters (including major ions, nutrients, metals, hydrocarbons, and PAHs), were below applicable CCME WQGs (CCME, 2014) in the marine environment downstream of seasonal discharge locations monitored by the MEEMP. The only exception was a single sample for total chromium that was just above the CCME WQG and within analytical variability; as such, this is not considered to represent a meaningful exceedance. Moreover, chromium was mostly present in particulate form which is less bioavailable for uptake by aquatic biota, because dissolved chromium was below detection in every sample taken. For other metals mostly present in particulate form, such as iron and nickel, this was also the case because where total concentrations were detected, dissolved concentrations were below detection. Iron concentrations in water samples collected in 2022 remained within the concentration range measured in previous years.

Where applicable guidelines were not available, maximum metal concentrations downstream of both discharges were within detected concentration ranges measured from the 2015 to 2021 MEEMP water quality dataset, with the exception of total copper which was more variable in concentration in Milne Inlet in 2022 compared to previous years, with the maximum concentration being a potential outlier. Higher variability in total copper concentrations in Milne Inlet in 2022 did not appear to be due to the Site effluent discharges given measured concentrations at the source. The 2022 dissolved copper concentrations (that are more bioavailable for uptake by marine biota) remained low and were consistent with most other years, with concentrations not expected to have adverse effects on marine life. For both discharges, hydrocarbons and PAHs were not detected in downstream water samples, consistent with results from previous sampling years.

The 2022 results are consistent with previous monitoring years, and measured concentrations of parameters of potential concern (e.g., metals, nutrients, hydrocarbons) were either not detected or were present at low concentrations, such that adverse impacts to the biota in the Milne Inlet receiving environment are unlikely to occur.

Increased iron deposition in the marine environment as a result of Project activities is a primary interest for local Inuit. Given that CCME marine WQGs for iron have not been developed, 2022 data were compared to iron data collected during previous MEEMP programs (2015 to 2021) to evaluate whether shipping of iron from Milne Port have led to associated increases in iron concentrations in the marine receiving environment. Analysis shows that iron concentrations have not shown a clear increase over time and concentrations measured in 2022 water samples remain within the range of what has been detected previously.

Marine water quality monitoring undertaken to date indicates that mitigation measures for site drainage and 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

Targeted sampling was continued at station SW-2 in 2022, along with additional sampling at adjacent West transect stations SW-1, SW-3 and SW-4. Rationale for targeted sampling at these stations dates back to 2020, where SW-2 was considered an outlier in the 2020 sediment quality dataset due to higher sand content and lower percent fines compared to other West transect stations sampled, and substantially lower 2020 benthic invertebrate abundance relative to the other West transect stations. Accordingly, this station (and, in 2022, surrounding stations) has been flagged for targeted sampling to investigate anomalous results and monitor for trends in sediment grain size in relation to benthic community indicators.

Sediment results from 2019 to 2022 confirm that these four stations were dominated by sand and had some variability in fines content. At SW-2, the fines content in 2022 continued to be higher than in 2020, and more comparable to 2019. As predicted in the FEIS and subsequent addenda, there is the possibility of some localized sediment disturbance during operations due to Project activities, with overall negligible residual effects on sediment quality in Milne Port. Natural factors such a ice movement and coastal sediment processes may also have contributed to the spatial and temporal variability in fines content observed at these four stations. Regardless these four (4) stations are mostly dominated by sand and continue to support benthic invertebrate communities, with no repeat in 2021 or 2022 of the low mean density and diversity observed at SW-2 in 2020. All West transect stations will be sampled in 2023 as part of the full MEEMP sediment and benthic program.

Physical Oceanography

Measurements of currents, water levels, temperature, and salinity continued in 2022. The tidal gauge was reinstalled at the Ore Dock from July 5 to October 16, 2022. Analysis of tidal gauge data indicates typical fluctuations resulting from tidal forcing as well as a distinct seasonal pattern for near-surface water in Milne Inlet, consistent with that observed in previous years.

During the measurement period in 2022, data from a total of seven neap-spring tidal cycles were recorded. Water levels ranged between -1.66 m and +0.68 m Canadian Geodetic Vertical Datum (CGVD).

Marine Biological Environment

Benthic Infauna

Benthic infauna monitoring in 2022 again focussed on targeted sampling at station SW-2, along with additional sampling at adjacent West transect stations SW-1, SW-3 and SW-4. Rationale for targeted sampling at these stations dates back to 2020, where SW-2 was considered an outlier in the 2020 data in terms of sediment and benthic community composition. The data suggested that there may have been localized physical disturbance at station SW-2 in 2020, potentially due at least in part to propeller-generated currents from berthing ore carriers. Based on 2021 results the benthic infauna community appeared to rebound from this disturbance, evidenced by substantial increases in monitoring metrics such as density and diversity. Accordingly, this station (and, in 2022, surrounding stations) has been flagged for targeted sampling to investigate anomalous results and monitor the subsequent conditions.

Examination of the 2022 benthic data at station SW-2 indicates that the benthic community appears to have continued to rebound with respect to density and taxa richness, consistent with the 2021 results. Overall, monitoring results align with FEIS predictions and subsequent ERP addenda, which indicated the potential for some localized resuspension of fine-grained sediments from propellor-generated currents and associated alteration to benthic community composition; however, natural factors such as ice movement and coastal sediment processes, as well as ecological factors may also have contributed to the documented results. Benthic invertebrates were present at all four stations sampled in 2022 at densities one to two orders of magnitude more than the low density observed in 2020 at SW-2. A more detailed discussion on the results from the four stations targeted for sampling in 2022 for sediment quality and benthic invertebrate communities is provided in the 2022 MEEMP and NIS/AIS Monitoring Report (WSP, 2023a)

Limited sampling for benthic infaunal organisms was completed in 2022 to support the NIS/AIS Monitoring Program, and results are reported in the response for PC Term and Condition No. 87.

Substrate, Macroflora, and Benthic Epifauna

As in 2021, Self Contained Breathing Apparatus (SCUBA) surveys were used to monitor for potential Project-related effects on epibenthic communities (i.e., macroflora and epifauna). An additional seven steel quadrats were fabricated and deployed in 2022, three (3) in each the exposure and reference areas as well as one to replace a quadrat not recovered in 2021. Overall, twenty-six quadrats were sampled in 2022 (thirteen in each of the exposure and reference areas).

For macroflora and benthic epifauna, statistical comparisons were made both spatially (i.e., between project exposure and reference areas) and temporally (i.e., between 2021 and 2022 sampling years) for percent cover,

density, and diversity performance indicators. High variability is expected for this component of the MEEMP, given the dynamic coastal environment of Milne Inlet: factors such as freshwater input, sediment transport processes, and ice scour influence the density and distribution of species in any given year.

Quadrat sampling in 2022 indicated the benthic environment of Milne Port mainly consisted of soft substrate, primarily silt and sand. Similar macroflora and epifaunal taxa were observed in 2022 as in previous years (2018-2021). Community indicators (i.e., percent cover, density, taxa richness, and SDI) were variable among quadrats, but were not statistically significantly different between exposure and reference areas in 2022. Interannual differences were observed in sessile epifauna taxa richness and motile density between years with lower values in 2022 compared to 2021, but the trend was equivalent between both areas. As the lower values of 2022 indicators were observed in both the exposure and reference areas, there was no evidence that they were caused by Project-related impairment; they were attributed to addition of new quadrats influenced by freshwater outflows.

Bivalve mortalities were observed opportunistically near and within quadrats in both the exposure and reference area in 2022. The cause of the mortalities could not be determined but does not appear to be related to changes in water quality or sediment quality. The apparent widespread nature of the bivalve mortalities, which occurred across multiple species and in both areas, suggest some other factor or factors were affecting marine bivalves. It is possible that the cause was a naturally occurring event involving the release of supercooled high salinity brine from sea ice, flowing to the sea floor.

As was done in 2021, effect size was explored using a power analysis to estimate the sample size needed to detect Project-related change based on levels of observed variability among quadrats, and whether the increase in sample size (in total, 25 quadrats in 2022 compared to 16 quadrats in 2021) was adequate to detect change. Power analysis results, in combination with a taxa accumulation curve generated for this dataset, indicate that the current sample size remains insufficient to reliably detect a Project-induced change in community structure or fully characterize the epibenthic community. As such, the current statistical results should be interpreted with caution. The predicted sampling effort that would be required for this program to achieve statistical power to detect a 40% effect size with >0.8 power, as determined by power analysis, would be unattainable within the limited open-water sampling window (August/September). It is therefore recommended to maintain the current sampling methodology and sampling effort (i.e., detection of large-scale trends only), accepting the associated statistical limitations.

Overall, there is no evidence of Project-related effects on this component, given decreases in 2022 indicators were observed in both exposure and reference areas and hence reflect external and/or regional factors.

Marine Fish Community

A total of 484 fish belonging to 11 known taxa were recorded in the DPF and IPF from 84 fishing efforts using a combination of methods during the 2022 open water survey season in Milne Port. Similar to previous sampling years, Arctic char (*Salvelinus alpinus*), Fourhorn Sculpin (*Myoxocephalus quadricornis*) and Shorthorn Sculpin (*Myoxocephalus scorpius*) were the most abundant species. Other fish captured were Ribbed Sculpin (*Triglops pingelii*), Greenland Cod (*Gadus ogac*), Arctic Staghorn Sculpin (*Gymnocanthus tricuspis*), Arctic Sculpin (*Myoxocephalus scorpioides*), Polar Cod (*Boreogadus saida*), and Saddled Eelpout (*Lycodes mucosus).* Two (2) taxa were recorded for the first time in Milne Port: Spatulate Sculpin (*Icelus spatulate*) and Halfbarred Pout (*Gymnelus hemifasciatus*); however, these are Arctic species not considered to pose a risk as Nonindigenous Species.

Methods used included gillnetting, angling-jigging, angling-trolling, hoop nets, Fukui traps and trawling. Statistical comparison of catch per unit effort (CPUE) is not possible between methods, but as in previous years, it was observed

that gill nets remained the most effective method for capturing Arctic char. Unlike in previous years where the majority of Fourhorn Sculpin were caught via angling-jigging, gill nets were also successful in capturing Fourhorn Sculpin in 2022. Longline sampling, added as a trial in 2021 as Commitment No. 37 to the Marine Environment Working Group (MEWG; Appendix 1A in Golder, 2021c) in an attempt to target large-bodied demersal fish, was discontinued in 2022 as no fish were captured during the 2021 trial. Hoop nets, added to the MEEMP study design in 2019 as a three-year trial based on recommendations from the MEWG as a sampling method that could replace Fukui traps, and trawling, added to the MEEMP study design in 2020 to target rarely caught fish, were continued in 2022. However, 2022 represented the third year of trials to compare hoop net and Fukui trap capture efficiency; over the trial study period, hoop nets sampling events yielded twice as many captured fish (n = 151 from 2020 – 2022) compared to Fukui traps (n = 71 from 2020 – 2022), despite being deployed fewer than half the number of total efforts (i.e., sampling events) and half the number of total set hours.

Two distinct Fishing Areas (FAs) were delineated in Milne Port in 2021 based on habitat features and their location relative to existing port infrastructure and operational activities. This included a Direct Project Footprint (DPF) area and an Indirect Project Footprint (IPF) area. The FAs are intended to help standardize sampling efforts and address variability in the catch data across Milne Port. Using 2020, 2021, and 2022 datasets, CPUE of each fishing method was compared across FAs and across years using an Analysis of Variance (ANOVA). While no statistically significant differences in CPUE were noted for any fishing method between the fishing areas and between years, CPUE was generally higher within the DPF, possibly due to the rocky habitat provided by marine infrastructure.

Overall, there is no evidence of Project-related effects on this component, apart from a localized fish abundance increase which may be associated with the rocky habitat provided by marine infrastructure in the Port.

Marine Fish Health and Tissue Chemistry

Fourhorn Sculpin were targeted using both active (i.e., angling, trawling) and passive (i.e., Fukui traps, hoop nets, and gill netting) capture methods. Incidental mortalities of Arctic char were retained for analysis of age, stomach contents, and tissue chemistry. *Hiatella arctica* were collected opportunistically from benthic infauna samples, with specimens being selected for processing if the shell was intact, greater than 15 mm in length, and had no indications of damage to the umbo or hinge area. Collected fish and *Hiatella arctica* were processed for fish health endpoints and tissues were collected for tissue chemistry analysis.

A total of 40 Fourhorn Sculpin were collected in 2022, comprising 20 adult females and 20 adult males. Captured females were longer and heavier, based on median total length and total weight, and had greater energy stores based on median liver somatic index (LSI), compared to captured males in 2022. The median age of both sexes was seven (7), with females ranging from 5 to 9 years and males ranging from 5 to 10 years. No difference in condition (i.e., weight-at-length) was observed between female and male Fourhorn Sculpin.

Differences in fish health endpoints were observed for female and male Fourhorn Sculpin among sampling years. Fourhorn Sculpin survival, as age, was statistically significantly greater in 2022 compared to previous years for both sexes. Growth of male and female Fourhorn Sculpin, examined as size-at-age, was statistically significantly different among years (i.e., it was lower in 2022 compared to 2021, but did not differ from 2020 for females, and it was significantly greater in 2022 compared to 2020, but did not differ from 2021 for males). Fish condition, as relative weight (i.e., total weight-at-total length), and relative liver weight (i.e., liver weight-at-total weight), differed among sampling years for both sexes. Female Fourhorn Sculpin relative weight was significantly greater in 2022 compared to 2020 and 2021, while relative liver weight did not differ among years. Male Fourhorn Sculpin relative weight was

significantly greater in 2022 compared to 2020 but did not differ from 2021, while relative liver weight was significantly greater in 2022 compared to 2021. Reproductive investment, as relative gonad weight, was significantly lower in 2022 than in 2020 and 2021 for female Fourhorn Sculpin, while no difference in relative gonad weight was observed for male Fourhorn Sculpin.

A total of 40 *Hiatella arctica* were collected and processed for fish health endpoints in 2022. No differences in survival (as length-frequency distribution), growth (as whole animal wet weight), or condition (as whole animal wet weight-at-total length) were observed among sampling years (i.e., 2022, 2021 and 2020). Reproductive endpoints, as mantle weight-at-tissue weight (or mantle somatic index, MSI), were compared only between 2021 and 2022, as gonad tissue weights were not available from 2020. Significant differences were found for MSI between 2021 and 2022, and were dependent on size: smaller *Hiatella arctica* (i.e., lower weight) had significantly greater MSI in 2021 than 2022, while larger *Hiatella arctica* (i.e., higher weight) had significantly greater MSI in 2022 than 2021.

A total of 26 incidental mortalities of Arctic Char were retained in 2022, comprising 12 adult females, ten adult males, and four juveniles of unknown sex. Of these, 26 samples were submitted for tissue PAH analysis, and 8 samples were submitted for tissue metals analysis. A total of 24 tissue samples were submitted collectively in 2022 from Arctic char, Fourhorn Sculpin, and *Hiatella arctica* for tissue chemistry metals analysis. Constituents of potential concern (CoPCs) were identified based on the primary constituents of the Project iron ore (i.e., aluminum, magnesium, and iron), as well as metals with existing regulatory guidelines for fish tissue (i.e., mercury and selenium). Statistical comparisons of CoPCs (i.e., aluminum, iron, magnesium, mercury, and selenium) were completed for each species, separately, among sampling years (i.e., 2018 to 2022), and other metals were considered qualitatively for general trends over time.

Concentrations of most metals were similar among years within each species, although some metals exhibited greater interannual variability (e.g., copper, nickel, tin). For Arctic char, statistically significant differences in tissue concentrations of aluminum, magnesium, mercury, and selenium were observed; no differences were observed for iron. Interannual differences in CoPC concentrations in Arctic char showed no temporal trends (i.e., 6% to 124% relative percent difference [RPD] among years, with no consistent pattern over time). For Fourhorn Sculpin, statistically significant differences were observed among years for aluminum, iron, mercury, and selenium, but not magnesium. Interannual differences in CoPC concentrations in Fourhorn Sculpin showed no temporal trends (i.e., 15% to 150% RPD among years, with no consistent pattern over time). Concentrations of most metals were greater for *Hiatella arctica* when compared to Arctic char and Fourhorn Sculpin, reflecting interspecies differences in metals bioaccumulation and tissue types. Elevated concentrations of some metals are expected in *H. arctica,* reflecting 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 (Bonsignore et al., 2018). For *Hiatella arctica*, significant differences were observed among years for aluminum, iron, magnesium, and selenium, but observed differences were relatively small (i.e., 12% to 55% RPD, with no consistent patterns over time). Mercury and selenium concentrations in all Arctic char and Fourhorn Sculpin samples were below Health Canada's Maximum Levels for Chemical Contaminants in Foods mercury consumption guideline of 0.5 mg/kg wet weight [ww] (Health Canada, 2015) and the BC Ministry of Environment selenium concentration guidelines of 4 mg/kg dry weight [dw] (BC MOE, 2014), respectively. In *Hiatella arctica*, mercury concentrations were compared with the Health Canada consumption guideline in order to provide context, as this is not a common food shellfish species. Mercury concentrations in *Hiatella arctica* were below the Health Canada consumption guideline.

Selenium concentrations in *Hiatella arctica* were below the BC Ministry of Environment and Climate Change Strategy (BC MOE) invertebrate tissue selenium concentration guideline of 4 mg/kg dw (BC MOE, 2014).

A total of 26 Arctic char samples, eight Fourhorn Sculpin samples, and four *Hiatella arctica* composite samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) in 2022. For Arctic char, detection limits for PAHs were two to three orders of magnitude lower in 2022 than in previous years due to differing methodology used in 2022, resulting in detected concentrations of acenaphthene, fluoranthene, fluorene, methylnaphthalene, naphthalene, phenanthrene, and pyrene in eight (8) samples. Therefore, it does not appear detectable concentrations of PAHs in 2022 represent an increase in concentrations, but rather an improvement in the analytical method resulting in improved detection. Overall, concentrations of all PAHs in all species were below reported detection limits from previous sampling years (<0.070 mg/kg ww).

Assessments of fish health and tissue chemistry in 2022 for Arctic char, Fourhorn Sculpin, and *Hiatella arctica* indicated low magnitude differences in endpoints over time, suggesting inherent interannual variability in endpoints. Sample timing continued to be appropriate for the assessment of reproductive endpoints for Fourhorn Sculpin and *Hiatella arctica*. All results are within predictions of the FEIS and subsequent addenda, which indicated the potential for non-statistically significant, low magnitude effects on marine fish health and condition. There was no evidence for Project-related effects beyond the magnitude of these predictions on fish health or tissue chemistry in 2022.

Impact predictions in the original FEIS (Baffinland, 2012) and subsequent addenda 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 2022 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.

TRENDS

Environmental effects monitoring (EEM) specific to marine sediment and benthic infauna, apart from targeted sampling to address questions related to station SW-2 and adjacent stations, was not performed for the 2022 MEEMP based on multiple years of monitoring that showed no directional changes, or trends, have occurred in either component of the marine receiving environment.

Overall, MEEMP sampling results from 2022 did not suggest degradation or impairment of the marine physical or biological environment (i.e., physical oceanography, marine water quality, macroflora and epibenthic communities, fish community, fish health, NIS/AIS) associated with the construction and operation of Milne Port.

RECOMMENDATIONS / LESSONS LEARNED

The MEEMP study design, data collection methodology and results are reviewed yearly with the MEWG. Recommendations from the MEWG inform refinements to the program, enhancement of existing mitigation measures, and development of adaptive management measures (when and where applicable). 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. Based on results collected to date, no additional mitigation measures are recommended at this time.

The following is a list of 2022 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. While monitoring of marine sediment quality should continue, it is not required annually. Monitoring of marine sediment quality is recommended once every three years, with the next sampling program planned for the summer of 2023.

Physical Oceanography

It has become apparent that the current survey equipment used to quantify relative sea level change using Milne Port tidal data is not providing the level of accuracy and precision required. Changes in relative sea level are expected to be on the scale of fractions of a millimeter per year while the resolution of data collected using GPS surveys is on the order of centimetres, accompanied by large errors. For example, modelling of vertical land motion for Canada (Robin et al., 2020 cited in James et al., 2021) indicates uplift rates of approximately 5 mm/year for northern Baffin Island while results of GPS surveys in 2022 show the elevation of the tide gauge decreasing 0.354 m from 2021. It is well known that quantitative measurements within this degree of precision and accuracy are extremely difficult to obtain at northern latitudes (e.g., Ludwigsen and Andersen, 2020; Raj et al., 2020).

While Baffinland can explore alternative options for survey equipment that would increase the accuracy and precision of field measurements, the resolution of the data is still unlikely to meaningfully meet the intent of this Term and Condition. This is because significant trends in relative sea level are likely too small to be measurable in the short term based on projections that indicate that relative sea level will either fall or be near neutral for northern Baffin Island (James et al, 2021). Hence, relative changes in sea level are likely to be very small differences between two small quantities, both with high uncertainty. Climate change impacts on the project are unlikely to show up in relative sea level changes, even if this could be measured with adequate accuracy, and are more likely to impact features such as changes in sea ice cover, temperature regime, and hydrologic regime.

Based on the above, Baffinland proposes not moving forward with tidal gauge monitoring in 2023 in favour of exploring alternative options to meet this Term and Condition using an indicator(s) other than Sea Level Rise (SLR).

Benthic Infauna

Monitoring of benthic infaunal communities 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 community composition or population parameters in the Milne Inlet study area. While monitoring of benthic invertebrates should continue, it is not required annually. Monitoring of benthic infaunal communities is recommended once every three years, with the next sampling program planned for the summer of 2023.

Substrate, Macroflora, and Benthic Epifauna

Monitoring of macroflora and benthic epifauna should continue using the same sampling design, but statistical analysis methodology should be reviewed to more efficiently detect change between exposure and reference areas and between sampling years.

Marine Fish Community

It is recommended to continue fishing efforts using multiple methods with the repeated survey design, based on the two (2) FAs, to facilitate comparisons through time. Given the much higher catch rate of hoop nets as compared to Fukui traps, the effort used to fish the Fukui traps could be reallocated to other fishing methods to increase their sample size and improve statistical power.

Marine Fish Health and Tissue Chemistry

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., Fourhorn Sculpin and *Hiatella arctica* tissue chemistry). Additional effort to identify a suitable reference area for the fish health/fish tissue chemistry program is recommended.

Project Certificate Term and Condition No. 77

Category	Marine Environment - Working Group
Responsible Parties	The Proponent, Qikiqtani Inuit Association, Government of Nunavut, Government of Canada, Hunters and Trappers Organizations of the Impacted Communities (Pond Inlet, Arctic Bay, Clyde River, Sanirajak, Igloolik).
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	The Marine Environment Working Group (MEWG) will provide advice, guidance and enforceable recommendations regarding: adding to and improving baseline information, mitigation measures for the protection of the marine environment, monitoring of effects on the marine environment, assessing the accuracy of impact predictions, the development and implementation of adaptive management plans, sharing of relevant Inuit Qaujimajatuqangit, scientific and/or technical knowledge and industry best practice and, consideration of project changes that may be required to make sure the management of negative impacts is effective and that lasting damage to the marine environment is prevented. 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. The Terms of Reference (ToR) for the MEWG shall be revised to include the following requirements: That an independent chair be appointed for MEWG and that this independent Chair be responsible for scheduling and administering meetings including circulating meeting invitations, agendas and documentation: a. That the Working Group's decision-making process be amended to provide that it must occur on a consensus basis between all working group member parties, with all votes and decisions in writing and recorded by the chair. b. That the Working Group's recommendations be recognized as enforceable recommendations (i.e. will be implemented by the Proponent), with provision that the Proponent may request not to enforce the recommendation at which point the matter shall go to an independent third party (agreed upon by the Proponent, QIA, and the Government of Canada) for dispute resolution. c. That the Working Group will include all Responsible Parties as member parties, should they wish to participate. The Proponent may be required to facilitate the participation of Hunters and Trappers Organizations through payment of honoraria and other participation costs in accordance with the Commitment List appended at Appendix B. d. That Working Group materials and records of decisions become public information with the independent chair responsible for keeping and circulating minutes which shall be posted to the Baffinland website including all meeting minutes once finalized and provided to Baffinland by the independent chair.
Term or Condition	A Marine Environment Working Group (MEWG) shall be established as an advisory oversight body providing advice, guidance and enforceable recommendations to fulfill the intended objectives. The operation of the MEWG shall not duplicate or impede the exercise of regulatory authority of authorizing agencies or government. The MEWG shall have the following permanent members: The Proponent, the Qikiqtani Inuit Association, the Government of Nunavut, the Government of Canada, the Mittimatalik HTO, and the Hunters and Trappers Organizations of the other Impacted Communities (Arctic Bay, Clyde River, Sanirajak, Igloolik), should they wish to participate. Makivik Corporation shall also be entitled to membership on the MEWG at its election.

	A Terms of Reference shall be established that guides the participation of observers. The MEWG shall be chaired by an independent third party as chosen by the permanent members. A revised Terms of Reference shall be presented to NIRB no later than December 15th, 2022, or at another date on consent of the Proponent, Canada, and the Qikiqtani Inuit Association.
Relevant Baffinland Commitment	46, 49, 51
Reporting Requirement	Project monitoring reports and relevant data to be considered by the MEWG will be provided to members not less ten (10) working days prior to a scheduled meeting, or as otherwise described in the Terms of Reference. Draft meeting minutes of the MEWG shall be filed by the independent chair with working group members within fifteen (15) working days following a meeting for review by MEWG working group members, or as otherwise described in the Terms of Reference. All final meeting minutes shall be submitted to the NIRB registry by the Proponent for circulation to NIRB's distribution list not more than thirty (30) working days following receipt from the independent chair. All final meeting minutes shall be included in the Annual Report to the NIRB.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	2022 MEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.1

METHODS

Baffinland established a MEWG in 2013. Members include representatives from: Environment and Climate Change Canada (ECCC), Fisheries and Oceans Canada (DFO), Qikiqtani Inuit Association (QIA), Government of Nunavut (GN), Parks Canada (PCa), Makivik and Baffinland, with technical experts as required. The Mittimatalik Hunters and Trappers Organization (MHTO) joined the group in 2016. In 2022, representatives from the HTOs of Arctic Bay, Clyde River, Igloolik and Sanirajak have been added to the Term and Condition should they wish to participate. The World Wildlife Fund (WWF)-Canada, Oceans North (ON), the NIRB, and the Canadian Northern Economic Development Agency (CANNOR) participate as observers on the MEWG. During 2022, Transport Canada (TC) began joining MEWG meetings as an observer, however, the organization has not been granted permanent observer status due to ongoing revisions to the terms of reference that affect this process. Refer to Appendix C.1 for 2022 Marine Environment Working Group minutes for meetings held in May, June, August and December. Baffinland provided all costs for administration of all working group meetings in 2022 including simultaneous translation and translation of materials and funding for participation of the MHTO.

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. This is subject to change based on the most recent draft of the ToR, which proposes that three regular meetings and up to three (3) touchpoint meetings will be held, in addition to ad hoc meetings at the request of members.

Baffinland has been working in good faith with the MEWG to draft an update to the Terms of Reference (ToR) that reflects inclusion of all items in this term and condition including appointment of an Independent Chair, amendments to the decision making process and the inclusion of new members (namely the HTOs from Arctic Bay, Clyde River, Igloolik and Sanirajak). Baffinland has circulated iterations of the draft ToR to working group members incorporating feedback as received. At the close of 2022, a version of the draft ToR was in circulation for comment by the Working Group and it is expected that a final version will be completed in 2023.

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. Based on feedback from the Working Groups in 2022, Baffinland is considering revising this approach in 2023, so that members are commenting on reports in final.

RESULTS

In 2022, the MEWG met on six (6) occasions. All meetings were held via teleconference due to ongoing concerns associated with the COVID-19 Pandemic. In-person meetings will resume in 2023.

A list of the meetings and topics discussed with the MEWG in 2022 is provided in Table 4.25.

Table 4.2: Marine Environment Working Group Meetings in 2022

Date	Location	Topics Discussed
MEWG		
May 3, 2022	Teleconference	The purpose of this meeting was for Baffinland to answer any member/observer questions pertaining to the draft 2021 marine monitoring reports, including the Ringed Seal Aerial Survey Report (RSASP), Marine Environmental Effects Monitoring Report (MEEMP), Marine Mammal Aerial Survey Report (MMASP), Passive Acoustic Monitoring (PAM) Report, and Bruce Head Shore-based Monitoring Report. The questions and comments received were related to: • Timing of released draft monitoring reports and the NIRB Annual Report • Whether additional monitoring would be completed at sediment quality sampling location SW-2, where a grain size anomaly had been previously observed

Date	Location	Topics Discussed
		• Whether or not ringed seal aerial survey program will continue in future years • Expected date of completion for the additional analysis of 2021 aerial survey data to evaluate the calf proportion early warning indicator
June 14, 2022	Teleconference	• 2022 shipping season overview and mitigation measures o Estimated number of vessels o Established start of shipping season procedures o Established communications protocol for addressing community concerns related to shipping o Established no-go zones for vessels o Anchorage locations o Established drifting zone o Ballast water sampling protocol, including no discharge of grey water in Regional Study Area (RSA) and an overview of Transport Canada (TC) regulations o Spring aerial surveys prior to start of shipping season to ensure there is no marine mammal entrapment o Maintaining speed restriction of 9 kn for vessels o Tightening of shipping lanes o No ice breaking during the early shoulder season and no breaking of landfast ice o Introduction of convoy system to reduce total sound exposure • 2022 marine monitoring programs overview, including anticipated dates and durations: • Marine mammal aerial survey program o Three program legs and objectives of each leg • Bruce Head shore-based monitoring program o Study components (i.e. visual observations and drone-based surveys) and objectives • Marine environmental effects monitoring program o Study components (tide, salinity and temperature monitoring; marine water quality; benthic epifauna and epiflora; fish and fish habitat; fish tissue; marine sediment quality; benthic infauna; settlement plates and baskets) o Habitat offset monitoring – not required in 2022 • Acoustic monitoring program o Study components and objectives. Note that the 2022 acoustic monitoring program originally consisted of two recorder retrievals and zero deployments, which was highlighted in this meeting. This was later modified due to various MEWG member requests. • Ship-board observer program

Date	Location	Topics Discussed
		○ Study components and objectives. Note that the 2022 Ship-board observer program ended up being cancelled due to ice conditions at the end of the shipping season. • Comment review and final drafting of 2021 marine monitoring reports • 2022 Marine Shipping and Vessel Management Report and Narwhal Adaptive Management Response Plan
June 22, 2022	Teleconference	• Question and answer period for the previous June 14th meeting. Questions and comments related to: ○ Vessel ballast water treatment system types ○ Maximum number of anchorage locations ○ Distances travelled by convoys ○ Importance of deploying hydrophones to ensure that total sound exposure from convoys is effectively captured ○ Preferred location for proposed hydrophone deployment
June 29, 2022	Teleconference	• Question and answer period for the previous June 14th and 22nd meetings. Questions and comments related to: • Sampling frequencies for Marine Environmental Effects Monitoring Program • Deployment of additional quadrats in the reference area for benthic epifauna monitoring • Use of net tows for zooplankton sampling • Comparing historical and future monitoring data for studies with different sample sizes • Importance of deploying hydrophones to ensure that total sound exposure from convoys is effectively captured • Mitigation measures, specifically no ice breaking during the early shoulder season; no breaking of landfast ice; no shipping until ice concentrations are 3/10s or less • Locations of Oceans North acoustic recorders • Maximum numbers of vessels in a convoy • Frequency of freight dock monitoring • QIA community visits to Pond Inlet • Timing of released draft monitoring reports and the NIRB Annual Report
August 4, 2022	Teleconference	• Review of the 2022 Narwhal Adaptive Management Response Plan (NAMRP) ○ Trigger, Action, Response Plan (TARP) • Discussion related to revised draft Terms of Reference (ToRs)
December 2, 2022	Teleconference	• Update on the Production Increase Proposal Renewal (PIPR) and commitments relevant to the MEWG • Update on the Terms of Reference (ToR) draft revisions

Date	Location	Topics Discussed
		• Overview of the 2022 shipping season (i.e. No. of vessels, mitigation measures, communication protocols) • Overview of completed 2022 Marine Monitoring Programs • Question and answer period related to final 2021 monitoring reports, completed 2022 monitoring programs, 2022 shipping season, ToRs, and PIPR commitments. • Presentation by Environment Climate Change Canada o Overview of seabird research at Cape Graham Moore

As a result of inputs from the MEWG, numerous program modifications have been made since 2015, and additional mitigations have been adapted. 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.

Many of the members that participate in the Working Groups also represent regulatory bodies that have the ability to issue directions to Baffinland in accordance with their jurisdiction, mandate or issued permits. As has always been the intention of the Working Groups, they should not duplicate or fetter regulatory obligations, and rather remain focused on the enhancement of Baffinland's monitoring programs and providing advice on best practices or new research they are aware of to inform the ongoing development and implementation of Baffinland's comprehensive environmental management system.

See also Summary for Term and Condition No. 183.

TRENDS

As the NIRB has previously been made aware, from time to time Baffinland has struggled to reconcile recommendations from the Working Groups that do not properly appreciate or weight health and safety concerns and limitations or operational constraints. Costs or logistics of implementing recommendations are rarely taken into account, despite this reasonably needing to be a consideration when weighing the value of a proposed program or activity. In many cases, despite Baffinland's efforts to specifically and clearly communicate these considerations to the Working Groups, members continue to advocate for research studies that are not feasible. In all cases, it is important to distinguish between initiatives that may be of personal interest or curiosity to individual Working Group members, and those that have a reasonable link to the Mary River Project's activities and are a requirement to fulfill the proponents obligations under its Project Certificate and monitoring program requirements.

Some Working Group members have expertise conducting research on the marine or terrestrial environments or have intimate knowledge of the area, while others do not have that experience. Some participate solely in their capacity as a government regulator or as an interested Party. However, to Baffinland's knowledge none of the other participants have significant experience operating industrial projects, particularly in the complex and challenging Arctic. While recommendations brought forward within these Working Groups must be subject to appropriate

consideration and discussions taking into consideration IQ and western science, they must also be weighed against the practical operationalization of the recommendation along with a fulsome cost benefit analysis, which no other party is suited to do outside of Baffinland. To be clear, Baffinland accepts that some Working Group members wish to see a process inserted into the Terms of Reference to generate and record consensus-based recommendations and this has been reflected in the most recent drafts, however, Baffinland must stress the need to retain ultimate authority to reject recommendations that don't meet reasonable criteria for implementation. The draft of the ToR, released in August 2022, outlines a formal recommendation process. If incorporated into the finalized ToR, this process would require members to send draft recommendations to the independent chair for review, who would then distribute the recommendation to the Working Group, followed by a 30 day period for members to provide comment on the recommendation. The sponsoring member would then submit a final proposed recommendation to the independent chair within 30 days of receiving member feedback. Subsequently, Baffinland would have 60 days following the receipt of the final recommendation to accept the recommendation or provide a response with supporting evidence (i.e. financial and operational limitations), should they not agree with the recommendation. The chair would then circulate Baffinland's response and the recommendation to the Working Group to be put to vote. While this process is not yet finalized, Baffinland is confident that it will allow for more enforceable recommendations to be put forward. Additional details related to the most recent ToR are outlined in Section 2.5.1.

RECOMMENDATIONS / LESSONS LEARNED

The Working Groups are a tool that can be used by the proponent as well as working group participants to discuss, debate and continuously improve monitoring programs and outcomes. It is imperative that all participants participate in good faith, be forthright in providing the appropriate expertise and knowledge relevant to their organizations and participation and contribute collaboratively with a mind to problem solving where issues or concerns are brought forward. In its most recent draft Terms of Reference (ToR) for the Working Groups Baffinland presented a reasonable path forward that would result in meaningful changes to the Groups current structure, operational schedule, and ability to influence the Project. It is expected that this should improve Members' expectations, communication within the Group and outcomes. Baffinland will continue to engage with the Working Groups on the development of a revised Terms of Reference throughout 2023 in hopes of resolving any outstanding concerns raised by members to date.

Project Certificate Term and Condition No. 78

Category	Marine Environment - Ice Breaking and Shipping
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operation, 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	Not applicable
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 Technical Services Inc. (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) 'Baffinland Ice Concentrations – 1997-2020' in Baffinland's Response to Reviewer Comments on Golder's Preliminary Summary of 2020 Narwhal Monitoring Programs (Appendix 2 of Attachment 1 in Baffinland, 2021i) 'Daily Ice Charts for Period of 12-22 July (2018, 2019 and 2020)' in Golder's Preliminary Summary of 2020 Narwhal Monitoring Programs (Attachment 1 in Golder, 2021b). 2022 Shipping and Marine Wildlife Management Plan (Baffinland, 2022g)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

Ice conditions study reports have been commissioned by Baffinland for the Northern Shipping Route on several occasions, including 2011, 2015, 2016 and 2021 (ENFOTEC, 2011; ENFOTEC, 2015; ENFOTEC, 2016; Baffinland, 2021; Golder, 2021b). Additionally, in support of previous amendment applications (e.g., Phase 2), 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 (NIRB Registry No. 325731, ENFOTEC, 2019). 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 (NIRB Registry No. 331227, Baffinland, 2020).

Additionally, accurate and current ice information from the Canadian Ice Service and satellite imagery is obtained by Fednav, on behalf of Baffinland's Shipping Department, on a daily basis before the start and at end of 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, delaying shipping until ice is no greater than 3/10ths along the nominal Northern Shipping Route). Ice conditions are also available in real-time from the icebreaker if utilized to escort vessels. 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; Baffinland, 2022g), 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 (Baffinland, 2022g).

RESULTS

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 and Appendix B ((Baffinland Pre-Charter Bulk Carrier Ice Capability Assessment) of the SMWMP (Baffinland, 2022g), 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 (Baffinland, 2022g).

TRENDS

Over the first eight years of Baffinland's shipping season, ice conditions have been quite variable, with no obvious trends apparent. For example, the decay of landfast ice has typically occurred within the same 1.5-week period beginning mid-to-end of July, with ice freeze occurring over a similar two-week time frame at the mid-to-end of October. If and when climate conditions change such that the ice-free season is notably consistently longer, Baffinland will report on these trends in future years.

RECOMMENDATIONS / LESSONS LEARNED

While Baffinland understands that PC Term and Condition No. 78 was intended for shipping operations along the Southern Shipping Route (Steensby Inlet) where Project shipping engages with landfast ice, the ice condition report for the Northern Shipping Route (where Project shipping does not engage with landfast ice) will be updated periodically as new data becomes available. The ice condition study for the Southern Shipping Route will be updated prior to the construction and operation of the Steensby Port.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Canadian Hydrographic Service (CHS)
Reference	Not applicable
Ref. Document Link	Not applicable

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 Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Not Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Not applicable
Reference	Emergency Response Plan (ERP; Baffinland, 2020g) 2022 Oil Pollution Emergency Plan – Milne Inlet (OPEP; Baffinland, 2022h) 2022 Oil Pollution Prevention Plan – Milne Inlet (OPPP; Baffinland, 2022i) 2022 Shipping and Marine Wildlife Management Plan (Baffinland, 2022g) Spill at Sea Response Plan (SSRP; Baffinland, 2023i) Spill Contingency Plan (Baffinland, 2021j) Diesel Environmental Emergency (E2) Plan - Milne Port (Baffinland, 2020h)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

Applicable to the Construction phase only. Since start of operations, 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 Term and 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 Term and 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 Term and 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 Term and Condition No. 78 and 92.

Project Certificate Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	Mary River Project – FEIS (Baffinland, 2012) Mary River Project – Phase 2 Proposal – Technical Supporting Document (TSD) No. 22 - Ship Wake and Propeller Wash Assessment (Golder, 2018a)
Ref. Document Link	Not applicable

METHODS

Ship wake effects on shorelines were assessed in Appendix 8D-2 of the FEIS (Baffinland, 2012) and TSD No. 22 for the Phase 2 Proposal (Golder, 2018a). 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 Term and Condition No. 82

Category	Marine Environment - Shoreline Effects and Sediment Redistribution
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operation
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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Not Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – Not Applicable
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	Mary River Project – FEIS (Baffinland, 2012)
Ref. Document Link	Not applicable

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 of 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 Term and 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	Not applicable
Reporting Requirement	The Proponent shall summarize and supply these monitoring results to NIRB in the annual Project report.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	A new national crustal velocity model for Canada (Robin et al., 2020) Arctic Sea Level Budget Assessment during the GRACE/Argo Time Period (Raj et al., 2020) Contributions to Arctic Sea Level from 2003-2015 (Ludwigsen and Andersen, 2020) Relative sea-level projections for Canada based on the IPCC Fifth Assessment Report and the NAD83v70VG national crustal velocity model (James et al., 2021) 2022 MEEMP and NIS/AIS Monitoring Report (WSP, 2023a)
Ref. Document Link	Not applicable Appendix G.6.9

METHODS

Steensby Port

The lack of existing marine infrastructure at Steensby Port means that a water level gauge cannot currently be installed by attaching it to a repeatable location on fixed infrastructure (e.g., a pier or ladder at a dock). Hence, the approach taken to fulfill this Condition used measurements taken from both Acoustic Doppler Current Profilers (ADCP) and GPS systems to determine relative water levels, as further described below.

In September 2021, an oceanographic mooring was deployed southeast of the proposed Steensby ore dock in Steensby Inlet and recovered one (1) year later, in September 2022. The oceanographic mooring included two (2) ADCPs - one (1) upward-looking and one (1) downward-looking - that were programmed to continuously monitor currents, water levels, and temperature. Relative water levels in Steensby Port will be established during the 2023 calendar year using the water depth data recorded by the upward-looking ADCPs in 2021/2022.

It is standard practice to reference water level elevation data to a datum, which is a base elevation used as a reference point from which to reckon heights or depths. To create this datum, a measurement of water surface elevation at the mooring location was taken from a control point established on Steensby Island using a survey-grade

Real Time Kinematic Global Positioning System (RTK GPS) in September 2021. The water level elevation data will then be compared to the surveyed water level elevations at the same time points.

Milne Port

In 2022, oceanographic monitoring continued at Milne Port to continuously measure water level, temperature, and conductivity using an RBRconcerto (RBR) Conductivity, Temperature, and Depth (CTD) sensor. Detailed methods are provided in WSP (2023a).

RESULTS

Steensby Port

Results not yet available but will be processed and analysed in 2023.

Milne Port

Water level data recorded at Milne Port indicated typical fluctuations resulting from tidal forcing. During the measurement period, a total of seven (7) neap-spring tidal cycles were observed and there were no observable storm surges. Detailed results are presented in (WSP, 2023a).

TRENDS

Steensby Port

Trend analysis is not yet possible given that this component of the Approved Project is inactive and accordingly lacks a multi-year dataset.

Milne Port

Results are consistent with prior years. Detailed results are presented in the Final Report for the 2022 MEEMP and NIS/AIS Monitoring Program (WSP, 2023a).

RECOMMENDATIONS / LESSONS LEARNED

Steensby Port

N/A

Milne Port

The current survey equipment at Milne Port that is used to measure water levels at Milne Port does not provide the level of accuracy and precision required to inform relative sea levels and storm surges at this site (i.e., as per the assumed intent of the Term and Condition). Changes in relative sea level are expected to be on the scale of fractions of a millimeter per year while the resolution of data collected using GPS surveys is on the order of centimetres. For example, modelling of vertical land motion for Canada (Robin et al., 2020 cited in James et al., 2021) indicates uplift rates of approximately 5 mm/year for northern Baffin Island while results of GPS surveys in 2022 show the elevation of the tide gauge decreasing 0.354 m from 2021. It is well known that quantitative measurements with the degree of precision and accuracy required to measure uplift rates are extremely difficult to obtain at northern latitudes (e.g., Ludwigsen and Andersen, 2020; Raj et al., 2020).

While Baffinland can explore alternative options for survey equipment that would increase the accuracy and precision of field measurements, the resolution of the data is still unlikely to meaningfully fulfill this Condition. This

is because significant trends in relative sea level are likely too small to be measurable in the short term based on projections that indicate that relative sea level will either fall or be near neutral for northern Baffin Island (James et al., 2021). Hence, relative changes in sea level are likely to be very small differences between two (2) small quantities, both with a high degree of uncertainty. Climate change impacts on the project are unlikely to show up in relative sea level changes, even if they could be measured, and are more likely to impact features such as changes in sea ice cover, temperature regime, and hydrologic regime.

Based on the above, Baffinland recommends discontinuing tidal gauge monitoring in 2023 in favour of exploring alternative options to better meet the objective of this Term and Condition using an alternative climate change indicator other than Sea Level Rise (SLR) such as temperature and precipitation regime, or climate response variables such as ice cover and hydrologic response.

Project Certificate Term and Condition No. 83 (a)

Category	Marine Environment - Shoreline Effects and Sediment Redistribution
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operation
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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and 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) Ambient Water Quality Guidelines for Selenium Update (BC MOE, 2014) Canadian Environmental Quality Guidelines (CCME, 2014) Maximum Levels for Chemical Contaminants in Foods (Health Canada, 2015) 2017 MEEMP and AIS Monitoring Program Report (Golder, 2018e) TSD #20 - Hydrodynamic Modelling Report - Milne Port (Golder, 2018f) 2019 MEEMP and AIS Monitoring Program Report (Golder, 2020a) 2021 MEEMP and AIS Monitoring Program (Golder, 2022c) 2022 MEEMP and NIS/AIS Monitoring Report (WSP, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

In the FEIS (Baffinland, 2012) and the FEIS Addendum for the Early Revenue Phase (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 2022) 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, 2018f). 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. The largest changes in current, wave, and sediment transport conditions were predicted in the areas behind (I.e., shoreward of) 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, 2021 or 2022.

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: (i) Phillips Creek Delta is a dynamic environment that migrates because of sediment deposition and coastal processes; and, (ii) 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. The dynamic influence of Phillips Creek on the Milne Inlet receiving environment means that large spatial and temporal variabilities are to be expected in the sediment data along the West transect.

MEEMP

Baffinland's monitoring efforts at Milne Port include an ongoing assessment of potential Project-related introductions of nutrients, metals, and hydrocarbons to the marine environment that may have the potential to bio-accumulate in the marine food chain. The 2022 MEEMP (WSP, 2023a; Year 8 of the Program) included marine water quality sampling as well as various levels of biological sampling including fish tissue collection for analysis of metals and polycyclic aromatic hydrocarbons (PAHs). The marine water quality monitoring program was designed to monitor for potential changes to water quality of the marine environment at Milne Port. Water quality samples were analyzed for a variety of parameters that included total and dissolved metals, and screening against CCME Water Quality Guidelines (WQG) where applicable.

In order to assess for the potential introduction of metals that bio-accumulate in the marine food chain, analysis of metal concentrations in tissue (i.e., body burden) is performed for fish at various trophic (i.e., food web) levels, including the clam *Hiatella arctica*, the resident fish species Fourhorn sculpin, and the migratory Arctic Char. Mercury concentrations in fish and *Hiatella arctica* (*H. arctica*) muscle tissue were compared to the Health Canada Maximum Levels for Chemical Contaminants in Foods mercury consumption guideline of 0.5 milligrams per kilogram wet weight (mg/kg wet weight [wwt]; Health Canada, 2015) and the British Columbia Ministry of Environment (BC MOE) and fish tissue guidelines of 0.4 mg/kg dry weight (mg/kg dw) for selenium (BC MOE, 2014).

Detailed information on study design and sampling methodology is available in the 2022 Annual Report for the MEEMP and AIS Monitoring Program (WSP, 2023a), which has been released to the Working Group and posted to the NIRB public registry for review and comment.

RESULTS

Hydrodynamic Modelling

Not applicable in 2022.

Review of Hydrology and Geomorphology of Phillips Creek

Not applicable in 2022.

MEEMP

Results from marine water and sediment quality sampling and fish health and tissue chemistry analyses are presented in the 2022 MEEMP and NIS/AIS Monitoring Report (WSP, 2023a), with a brief summary provided below.

Concentrations of water quality parameters (including major ions, nutrients, metals, hydrocarbons, and PAHs), were below applicable CCME WQGs (CCME, 2014) in the marine environment downstream of seasonal discharge locations monitored by the MEEMP. The only exception was a single sample for chromium that was just above the long-term CCME WQG, but within the concentration range measured by the MEEMP to date. The measured chromium concentration is not expected to adversely affect aquatic life because chromium was present mostly in particulate form and thus less bioavailable for uptake by aquatic biota (dissolved chromium in 2022 was below detection in every sample taken). For other metals mostly present in particulate form, such as iron and nickel, this was also the case because where total concentrations were detected, dissolved concentrations were below detection. Iron concentrations in water samples collected in 2022 remained within the concentration range measured in previous years.

Where guidelines were not available, maximum concentrations downstream of both discharges were within detected concentration ranges measured from the 2015 to 2021 MEEMP water quality dataset, with the exception of total copper which was more variable in concentration in Milne Inlet in 2022 compared to previous years. Higher variability in total copper concentrations in Milne Inlet in 2022 did not appear to be due to the site effluent discharges given measured concentrations at the source. Dissolved copper concentrations (I.e., those that are more bioavailable for uptake by marine biota) remained low and were consistent with most other years, with concentrations not expected to have adverse effects on marine life. Consistent with previous years, hydrocarbons and PAHs were not detected in any of the samples collected in the 2022 MEEMP (WSP, 2023a). The 2022 results indicate that the receiving environment water quality in Milne Inlet in 2022 is consistent with previous monitoring years and no adverse effects to aquatic life are expected.

Detailed fish health data were collected for Fourhorn Sculpin and *H. arctica* in 2020, 2021, and 2022. Differences in fish health endpoints were observed for female and male Fourhorn Sculpin among sampling years. Fourhorn Sculpin survival, as age, was statistically significantly greater in 2022 compared to previous years for both sexes. Growth of male and female Fourhorn Sculpin, examined as size-at-age, was statistically significantly different among years (i.e., it was lower in 2022 compared to 2021, but did not differ from 2020 for females, and it was significantly greater in 2022 compared to 2020, but did not differ from 2021 for males). Fish condition, as relative weight (i.e., total weight-at-total length), and relative liver weight (i.e., liver weight-at-total weight), differed among sampling years for both sexes. Female Fourhorn Sculpin relative weight was significantly greater in 2022 compared to 2020 and 2021, while relative liver weight did not differ among years. Male Fourhorn Sculpin relative weight was significantly greater in 2022 compared to 2020 but did not differ from 2021, while relative liver weight was significantly greater in 2022 compared to 2021. Reproductive investment, as relative gonad weight, was significantly lower in 2022 than in 2020

and 2021 for female Fourhorn Sculpin, while no difference in relative gonad weight was observed for male Fourhorn Sculpin.

A total of 40 *Hiatella arctica* were collected and processed for fish health endpoints in 2022. No differences in survival (as length-frequency distribution), growth (as whole animal wet weight), or condition (as whole animal wet weight-at-total length) were observed among sampling years (i.e., 2022, 2021 and 2020). Reproductive endpoints, as mantle weight-at-tissue weight (or mantle somatic index, MSI), were compared only between 2021 and 2022, as gonad tissue weights were not available from 2020. Significant differences were found for MSI between 2021 and 2022, and were dependent on size: smaller *Hiatella arctica* (i.e., lower weight) had significantly greater MSI in 2021 than 2022, while larger *Hiatella arctica* (i.e., higher weight) had significantly greater MSI in 2022 than 2021.

A total of 26 incidental mortalities of Arctic Char were retained in 2022, comprising 12 adult females, ten adult males, and four juveniles of unknown sex. Of these, 26 samples were submitted for tissue PAH analysis, and 8 samples were submitted for tissue metals analysis. A total of 24 tissue samples were submitted collectively in 2022 from Arctic char, Fourhorn Sculpin, and *Hiatella arctica* for tissue chemistry metals analysis. Constituents of potential concern (CoPCs) were identified based on the primary constituents of the Project iron ore (i.e., aluminum, magnesium, and iron), as well as metals with existing regulatory guidelines for fish tissue (i.e., mercury and selenium). Statistical comparisons of COPCs (i.e., aluminum, iron, magnesium, mercury, and selenium) were completed for each species, separately, among sampling years (i.e., 2018 to 2022), and other metals were considered qualitatively for general trends over time.

Concentrations of most metals were similar among years within each species, although some metals exhibited greater interannual variability (e.g., copper, nickel, tin). For Arctic char, statistically significant differences in tissue concentrations of aluminum, magnesium, mercury, and selenium were observed; no differences were observed for iron. Interannual differences in CoPC concentrations in Arctic char showed no temporal trends (i.e., 6% to 124% relative percent difference [RPD] among years, with no consistent pattern over time). For Fourhorn Sculpin, statistically significant differences were observed among years for aluminum, iron, mercury, and selenium, but not magnesium. Interannual differences in CoPC concentrations in Fourhorn Sculpin showed no temporal trends (i.e., 15% to 150% RPD among years, with no consistent pattern over time). Concentrations of most metals were greater for *Hiatella arctica* when compared to Arctic Char and Fourhorn Sculpin, reflecting interspecies differences in metals bioaccumulation and tissue types. For *Hiatella arctica*, significant differences were observed among years for aluminum, iron, magnesium, and selenium, but observed differences were relatively small (i.e., 12% to 55% RPD, with no consistent patterns over time). Mercury and selenium concentrations in all Arctic char and Fourhorn Sculpin samples were below Health Canada's Maximum Levels for Chemical Contaminants in Foods mercury consumption guideline of 0.5 mg/kg wet weight [ww] (Health Canada, 2015) and the BC Ministry of Environment selenium concentration guidelines of 4 mg/kg dry weight [dw] (BC MOE 2014), respectively. In *Hiatella arctica*, mercury concentrations were compared with the Health Canada consumption guideline in order to provide context, as this is not a common food shellfish species. Mercury concentrations in *Hiatella arctica* were below the Health Canada consumption guideline. Selenium concentrations in *Hiatella arctica* were below the BC Ministry of Environment and Climate Change Strategy (BC MOE) invertebrate tissue selenium concentration guideline of 4 mg/kg dw (BC MOE, 2014).

A total of 26 Arctic Char samples, eight Fourhorn Sculpin samples, and four *Hiatella arctica* composite samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) in 2022. For Arctic char, detection limits for PAHs were two (2) to three (3) orders of magnitude lower in 2022 than in previous years due to differing methodology used in 2022,

resulting in detected concentrations of acenaphthene, fluoranthene, fluorene, methylnaphthalene, naphthalene, phenanthrene, and pyrene in eight samples. Therefore, it does not appear detectable concentrations of PAHs in 2022 represent an increase in concentrations, but rather an improvement in the analytical method resulting in improved detection. Overall, concentrations of all PAHs in all species were below reported detection limits from previous sampling years (<0.070 mg/kg ww).

TRENDS

Hydrodynamic Modelling

Not applicable.

Review of Hydrology and Geomorphology of Phillips Creek

Not applicable. Review performed in 2019.

MEEMP

Collectively, monitoring undertaken to date indicates that the construction and operation of Milne Port with respect to site discharges has not negatively affected water quality in Milne Inlet. Water quality parameters measured in 2022 continue to be below applicable CCME WQGs, or within the range of conditions observed in previous MEEMP surveys. The only exception was total copper, which showed increased variability in 2022, with two potential outlying data points; however, dissolved concentrations were low and consistent with previous years such that no effects to marine biota are expected. The observed variability in total copper did not appear to be associated with the MP-05 and MP-06 effluent discharges which were lower in concentration; further, dissolved copper concentrations were substantially lower and more stable. Water quality monitoring results remain within original FEIS predictions, which forecasted no significant residual effects on water quality but did indicate the potential for minor localized increases in TSS, nutrient, metal, and hydrocarbon concentrations. With respect to iron, which is one of the primary concerns identified by Inuit and considered as a potential pathway of effect for FEIS/ERP predictions for the Project, laboratory analyses have not revealed a trend of increased concentrations between 2014 and 2022. Total iron concentrations in marine water samples collected in 2022 remained within the range measured in previous years in the receiving environments of the MP-05 and MP-06 site discharges. While mean concentrations downstream of MP-05 remained fairly stable, higher variability was noted in the receiving environment, which was comparable to that observed in 2018. Dissolved iron concentrations were below detection limits in each of the samples collected in 2022, meaning the majority of detectable iron concentrations were driven by the particulate form, which is less bioavailable for uptake by aquatic biota.

Assessments of fish health and tissue chemistry in 2022 for Arctic char, Fourhorn Sculpin, and *Hiatella arctica* indicated low magnitude differences in endpoints over time, suggesting inherent interannual variability in endpoints. Sample timing continued to be appropriate for the assessment of reproductive endpoints for Fourhorn Sculpin and *Hiatella arctica*. All results are within predictions of the FEIS and subsequent addenda, which indicated the potential for non-statistically significant, low magnitude effects on marine fish health and condition. There was no evidence for Project-related effects beyond the magnitude of these predictions on fish health or tissue chemistry in 2022.

RECOMMENDATIONS / LESSONS LEARNED

Hydrodynamic Modelling

Not applicable.

Review of Hydrology and Geomorphology of Phillips Creek

Not applicable. Review performed in 2019.

MEEMP

Marine water quality sampling should be repeated in 2023 following the procedures outlined in the 2022 MEEMP Annual Monitoring Report (WSP, 2023a).

Fish health (i.e., external and internal assessments) and tissue chemistry analyses are recommended to continue for incidental fish mortalities and targeted species (Fourhorn Sculpin, *Hiatella arctica*). Fourhorn Sculpin, Arctic Char and *H. arctica* remain recommended sentinel species for tissue chemistry 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 Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – 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, 2018b)
Ref. Document Link	Not applicable

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 of the FEIS (Baffinland, 2012) and along the Northern Shipping Route in Appendix 8D-2 of the FEIS (Baffinland, 2012) and TSD No. 22 (Golder, 2018b). Additionally, propeller wash effects on sediment redistribution in direct vicinity of the proposed Phase 2 ore dock were assessed in TSD No. 22 (Golder, 2018b). 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 Term and Condition No. 85

Category	Marine Environment - Shoreline Effects and Sediment Redistribution
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operation
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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – Not Applicable
Stakeholder Review	None
Reference	Mary River Project – Phase 2 Proposal - TSD No. 22 - Ship Wake and Propeller Wash Assessment (Golder, 2018b)
Ref. Document Link	Not applicable

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, 2018b). 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 Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	Ocean Circulation and Ballast Water Dispersal in Milne Inlet, Baffin Island (CORI, 2014) Data Report for the 2015-2016 Observational Oceanography Program in Milne Inlet (CORI, 2016) Tide Gauge Data Collection at Milne Port During the 2017 Open Water Season (Golder, 2018c) TSD 18 - Ballast Water Dispersion Modelling Report (Golder, 2018d) 2015 MEEMP Report (SEM, 2016a) 2016 MEEMP and AIS Monitoring Program Report (SEM, 2017a) 2017 MEEMP and AIS Monitoring Program Report (Golder, 2018e) 2018 MEEMP and AIS Monitoring Program Report (Golder, 2019a) Ballast Water Model Validation Report (Golder, 2019b) 2019 Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program (Golder, 2020a) Response to DFO Ballast Water Modelling Concerns (Golder, 2020b) Baffinland Milne Port Tide Gauge Data Collection – 2021 Ice Free Season (Golder, 2022d) 2022 MEEMP and Non-Invasive Specie (NIS)/AIS Monitoring Report (WSP, 2023a) National Risk Assessment for Introduction of Aquatic Nonindigenous Species to Canada by Ballast Water (Casas-Monroy et al., 2014)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

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). Model inputs were based on oceanographic data local to the region and outputs were validated with measured data collected in Milne Inlet. 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 Technical Supporting Document T(SD) No. 18; (Golder, 2018d) 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 Milne Inlet (CORI, 2014).

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, Phillips Creek discharge estimates, and more spatially resolved heat-flux inputs. This involved running the model for the 2018 open-water season with measured 2018 ballast water discharge volumes, as well as temperature and salinity measurements. Sensitivity of ballast water dispersion to variations in ballast water salinity and temperature was explored through six simulations and a box model analysis was developed 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 (Golder, 2019b; 2020b).

No additional ballast water modelling was undertaken in 2020, 2021, or 2022.

Additional oceanographic data were collected in Milne Inlet, specifically near Milne Port in 2017-2022 as follows:

- Water level data were collected at a tide gauge installed at the Milne Port ore dock between 2017 and 2022 (Golder, 2018c; 2019a; 2020c; 2022d; WSP; 2023a).
- Conductivity, depth, temperature (CTD) vertical depth profile data were collected annually as part of the MEEMP between 2014 and 2019 (SEM, 2016a; 2017a; Golder, 2018e; 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. Based on these results, the NIS/AIS program was designed to include sampling at Ragged Island; however, monitoring during the 2022 field season was focused on sampling locations near Milne Port.

TRENDS

Modelling indicates that significant long term changes in salinity / temperature structure of Milne inlet are not anticipated as a result of ballast water releases.

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 Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	2014 Marine Baseline Report (SEM, 2015) 2015 AIS Monitoring Report (SEM, 2016a) 2016 MEEMP and AIS Monitoring Report (SEM, 2017a) 2016 Milne Ore Dock Fish Offset Monitoring Report (SEM, 2017b) 2017 MEEMP and AIS Monitoring Program Report (Golder, 2018e) 2018 MEEMP and AIS Monitoring Program Report (Golder, 2019a) 2019 MEEMP and AIS Monitoring Program Report (Golder, 2020a) 2020 MEEMP and NIS/AIS Monitoring Report (Golder, 2021c) 2021 MEEMP and NIS/AIS Monitoring Report (Golder, 2022c) 2022 MEEMP and NIS/AIS Monitoring Report (WSP, 2023a) National risk assessment for introduction of aquatic nonindigenous species to Canada by ballast water (Casas-Monroy et al., 2014)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

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 target lower trophic levels, including zooplankton, benthic infauna, epifauna and fish, using direct sampling methods in addition to considering all species observed during the MEEMP surveys. All species identified through baseline and monitoring programs at Milne Port are added to the taxonomic inventory for Milne Port.

Taxa identified in samples or through direct observation are cross-checked against the taxonomic inventory for Milne Inlet and, if a taxon is newly observed (i.e., not listed), it is checked for NIS/AIS status through a detailed literature review of species descriptions and collection records to determine documented and presumed ranges as well as compared against various databases listing NIS/AIS. Any taxa flagged as potential NIS/AIS, or with uncertainties in their ranges, are sent for independent verification of the taxonomic identification; specimens are typically sent to a DFO-endorsed Benthic Ecology Lab at Université Laval (Quebec) for independent verification of the taxonomic identification, the Canadian Centre for DNA Barcoding at the University of Guelph, or a global expert specializing in the taxonomic group in question (e.g., Dr. Vasily Radashevsky for the genus *Marenzelleria*). Results and rationale for the independent verifications are reviewed and taxa that are not determined to be "no risk" undergo a detailed information gathering stage and, ultimately, either placed on the "Watch List" or the "Trigger List"; the Watch List is comprised of taxa that are considered to be low risk (i.e., not listed on AIS databases, but the Canadian Arctic is not part of accepted range on record) or high risk (i.e., listed on AIS databases and/or Canadian Arctic not part of accepted range on record) but not attributable to the Project while the Trigger List is comprised of high risk taxa introduced via Project shipping activities.

Detailed information on study design and sampling methodology is available in the annual monitoring reports for the MEEMP and NIS/AIS monitoring programs (WSP, 2023a).

RESULTS

Detailed results of the 2022 NIS/AIS Monitoring Program are presented in the 2022 MEEMP and NIS/AIS Monitoring Report (WSP, 2023a), with a summary provided below. The extensive monitoring undertaken in Milne Inlet has detected no confirmed introduced AIS.

The 2022 surveys resulted in 29 new additions to the taxonomic inventory for Milne Inlet (i.e., had not been observed in previous surveys). Almost all new taxa had records of occurrence in the Canadian Arctic. Algal specimens identified as cf. *Punctaria latifolia* and cf. *Stictyosiphon soriferus* were flagged for further review due to no or limited records in the Canadian Arctic. The fish species Halfbarred Pout (*Gymnelus hemifasciatus*) lacks records for the Eastern Canadian Arctic but is known from Arctic waters and the range may have been obscured by similarities to other *Gymnelus* species. A new record of Bryophyta indet. was sent to an expert for further identification as it had only been identified to phylum; this group mainly occurs in freshwater or terrestrial habitats and there are hundreds of species with records from the Canadian Arctic.

Additionally, AIS/NIS sampling in 2022 recorded two taxa that were flagged in previous years due to uncertainties in their natural range or because they were listed in an existing AIS database (the polychaetes *Marenzelleria* sp. and *Hesperonoe* sp. Specimens of. *Hesperonoe* sp. were sent to taxonomic experts for independent verification.

Taxonomists at Biologica Environmental Services Ltd. indicated that the *Marenzelleria* sp. specimens closely matched the description for *Marenzelleria wireni*, an Arctic species known to occur in Milne Port, however the features required to make a confident identification of species were damaged or missing. The identification was left at the genus level as a precaution. Due to the missing features, the specimens were not sent for independent review as it was unlikely to be further resolved.

Unidentified specimens from the superfamily Buguloidea were also collected. This superfamily includes multiple species with documented ranges that include the project area, however, it also contains the genus *Tricellaria*, which was flagged in 2021 due to the genus containing a high-risk invader to the Canadian Arctic. Due to previous concerns,

the specimens were flagged for independent review to determine if the identification could be clarified. Results of independent review remain pending for all taxa.

Two (2) taxa, *Punctaria latifolia* and *Stictyosiphon soriferus,* were added to the Watch List in 2022 as a precaution. There are still no species on the Trigger List.

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

The NIS/AIS program represents the most comprehensive monitoring program for NIS/AIS conducted by a marine port in Canada. Eight (8) years of monitoring during Project operations has yielded a comprehensive inventory of marine organisms residing in Milne Port and Milne Inlet; in fact, approximately 900 taxa have been identified in Milne Inlet through NIS/AIS monitoring to date, and include macroflora, zooplankton, benthic invertebrates and fish. The identification and flagging of individual taxa out of the hundreds identified in Milne Inlet indicate this surveillance program is effective and functioning as intended. The vast majority of these taxa have been designated as "No Risk" and are not considered to be of concern. To date, no Project-related introduction of a NIS/AIS species have been documented at Milne Port and the requirement for a rapid response has not been triggered (i.e., no species have been placed on the Trigger List).

In 2022, a total of nine (9) species were recorded in the 2022 samples that had not been identified previously at Milne Port during previous baseline, MEEMP and NIS/AIS sampling efforts. These species will be added to Baffinland's taxonomic inventory for Milne Inlet. All the new taxa had clear records of occurrence in the Canadian Arctic with no record on the AIS databases. Additionally, 2022 samples included two taxa (*Marenzelleria* sp. and *Hesperonoe* sp.) that were flagged in previous years due to uncertainties in their natural range or because they were listed on an AIS database. *Hesperonoe* sp. will be sent to taxonomic experts for independent verification. The *Marenzelleria* sp. were fragmented and lacking the required features for confirmation of species, and therefore, will not be sent for further review. Unidentified specimens from the bryozoan superfamily Buguloidea were flagged for review. While representative Arctic species in this superfamily have been previously documented in Milne Port, these specimens were flagged for review for conservatism as the superfamily also contains *Tricellaria inopinata*, a species flagged as a high-risk invader to Arctic waters (Casas-Monroy et al., 2014). The majority of identified taxa in benthic infauna samples collected at Milne Port and Ragged Island were not considered NIS or AIS.

RECOMMENDATIONS / LESSONS LEARNED

NIS/AIS results will continue to be presented to the MEWG on an annual basis and reported to the NIRB, and adjustments to the programs will be made as needed.

It is recommended that sampling across multiple trophic levels continues in 2023, 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.

The extensive monitoring undertaken in Milne Inlet has detected no confirmed introduced AIS.

Project Certificate Term and 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	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: a. Invasive species b. Seasonal oceanography c. Ballast water quality and quantity d. Receiving water quality; e. Residual physical, chemical, and/or biological effects; and f. Any risk assessment analysis regarding ballast water exchange and treatment efficacy in arctic waters
Relevant Baffinland Commitment	85, 86
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Marine Environment Work Group (MEWG)
Reference	Risk assessment for ship-mediated introductions of aquatic nonindigenous species to the Canadian Arctic (Chan et al., 2012) National risk assessment for introduction of aquatic nonindigenous species to Canada by ballast water (Casas-Monroy et al., 2014) Risk Assessment for Potential Introduction of Aquatic Nonindigenous Species through Ballast Water Discharge at Milne Port (SEM, 2013) International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (Convention; International Maritime Organization [IMO], 2017) Ballast Water Regulations (SOR/2021-120) (Transport Canada, 2022) Ballast Water Management Plan (Baffinland, 2023h) Mary River Project – Addendum to the Final Environmental Impact Statement. (Baffinland, 2013a) 2022 MEEMP NIS/AIS Report (WSP, 2023a) 2022 MEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.1

METHODS

In order to establish the relative risk of introduction of Aquatic Invasive Species (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 (SEM, 2013) using methods developed by DFO (Chan et al., 2012) prior to commercial shipping of iron ore during the Construction phase of the Approved Northern Transportation Corridor (Milne Port) component. The results, as presented in Appendix 8B-4 of the ERP Addendum to the FEIS (Baffinland, 2013a), 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

Since then, under a 6 million tonnes per annum (Mtpa) scenario, the number of yearly ballast water discharge events may increase from 53 (as assumed in Appendix 8B-4) to 84 vessels. This would increase the total estimated volume of ballast water discharged per year in the marine environment from 662,000 tonnes to 1,025,000 tonnes, assuming ballast water discharge is equivalent to 30% of the vessel's dry weight tonnage (WSP, 2023c). However, Project vessels are required under Baffinland's Ballast Water Management Plan (Baffinland, 2019e) to conduct a mid-ocean ballast water exchange followed by ballast water treatment with a D-2 standard ballast water management system as required by Transport Canada (the Ballast Water Control and Management Regulations under the *Canada Shipping Act*, 2001; Stewart et al. 2015). This correction factor is based on exchange efficiency rates, as determined by total zooplankton abundance, which was defined as 90% for saline water (Ruiz and Smith 2005; Chan et al. 2012). Based on this efficiency rate, a correction factor of 0.1 was applied, following the procedure of Chan et al. (2012). In other words, only 10% of the original ballast water from the port of origin would remain, mixed with the mid-ocean water taken on during the exchange, in the ballast tank following the exchange. A mid-ocean exchange should result in the salinity of the water in the ballast tank being 30 PSU or greater. A further reduction in probability of arrival was applied based on the use of ballast water management systems to reduce the arrival of viable organisms. The effect of ballast water exchange followed by the application of ballast water treatment the IMO D-2 standard (IMO, 2004) which regulates the maximum number of organism per unit volume of water was then considered. Paolucci et al. (2017) found that a hybrid ballast water management strategy, utilizing ballast water exchange followed by a treatment system, reduced the colonization pressure of ballast water from 25 taxa to 16 taxa. Therefore, probability of arrival based solely on ballast water exchange will be multiplied by 16/25 (0.64) and the proportion of Baffinland Project vessels that applied ballast water exchange followed by a D-2 ballast water treatment in 2022 (90%; WSP, 2023c) to account for the effect of treatment on probability of arrival. Probability of survival was determined using climate matching between Milne Port and the 60 known ports of origin of Project shipping arriving in Milne Port in 2022, assuming these represent future ports of origin. The probability of survival and probability of arrival were combined to obtain an estimate of probability of introduction (WSP, 2023c). Magnitude of consequence of an introduction was estimated using a weighted average of a conservative estimate of recorded number of Aquatic Invasive Species in each of the ecoregions from which the Project vessels originated in 2022. Invasion risk was then determined as a relative risk, using a matrix approach (WSP, 2023c). The 84-vessel scenario resulted in the same overall relative risk ranking as the ERP scenario, interpreted as an intermediate AIS

invasion risk. Magnitude of consequences remained the same across both scenarios but probability of introduction was slightly higher in the 84-vessel scenario.

Ballast water exchange (required in all years) and combination of exchange and ballast water treatment (conducted for 76% of ore carrier voyages in 2021 and 90% in 2022) has been shown to be an effective method for preventing the introduction of AIS in Milne Inlet as the extensive monitoring undertaken in Milne Inlet has detected no confirmed introduced AIS. Throughout 2022, Baffinland continued to require ore carriers to undertake both exchange and treatment (in that order, for vessels that have treatment systems onboard in anticipation of requirements for meeting the D-2 standard) prior to discharge. This commitment serves to further address potential risks for AIS introductions to the marine environment from ballast water discharges under a 6 Mtpa scenario.

In addition, Baffinland's Ballast Water Management Plan (Baffinland, 2019e) and most recent version (Baffinland, 2023h) exceeds federal ballast water regulatory requirements by voluntarily conducting ballast water compliance monitoring. Prior to ballast water discharge, all ore carriers calling on Milne Port have one of their ballast tanks randomly sampled to measure temperature and salinity thereby verifying compliance with the Ballast Water Regulations and International Maritime Organization's (IMO's) D-1 standards (Transport Canada, 2022, IMO 2017).

In 2019, the ballast water simulation was updated and re-run for the 2018 shipping season (mid-July to mid-October) using 2018 oceanographic data for comparison with direct observations of ballast water volumes. 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. Based on these results, the Nonindigenous species (NIS)/Aquatic Invasive Species (AIS) program was designed to include sampling at Ragged Island. Monitoring during the 2022 field season was focused on sampling locations near Milne Port due to weather and time limitations for sampling at Ragged Island; however, monitoring is planned to occur at Ragged Island in 2023. Additional details are provided in response to PC Term and Condition No. 86.

RESULTS

In 2022, 30 of the 35 ore carriers (86%) that serviced Milne Port had IMO-approved D-2 ballast water treatment systems installed onboard. All vessels with a D-2 system on board completed a ballast water exchange in addition to treating their ballast water prior to discharge at Milne Port. Most of these vessels conducted repeat voyages to Milne Port during the 2022 shipping season such that 56 of the 62 (90%) of ore carrier voyages involved both exchange and treatment of ballast water prior to discharge.

The 2022 NIS/AIS monitoring program resulted in 29 new additions to the taxonomic inventory for Milne Inlet (i.e., taxa that had not been observed in previous surveys), but almost all new taxa had records of occurrence in the Canadian Arctic. Algal specimens identified as cf. *Punctaria latifolia* and cf. *Stictyosiphon soriferus* were flagged for further review due to no or limited records in the Canadian Arctic. The fish species Halfbarred Pout (*Gymnelus hemifasciatus*) lacks records for the Eastern Canadian Arctic but is known from Arctic waters and the range may have been obscured by similarities to other *Gymnelus* species. A new record of Bryophyta indet. was sent to an expert for further identification as it had only been identified to phylum; this group mainly occurs in freshwater or terrestrial habitats and there are hundreds of species with records from the Canadian Arctic.

Review of the 2022 taxa list for NIS/AIS monitoring in 2022 identified three (3) taxa flagged for further review/investigation due to uncertainties in each species' natural range and known biological distribution, or presence on the Program's Watch List (a list of taxa identified in Milne Inlet that are considered to be "Low Risk" or "High Risk" but not directly attributable to the Project, or requiring more data; taxa on this list are subjected to a

heightened level of monitoring, which may include targeted sampling for DNA analysis or population assessment). This included identification of *Marenzelleria* sp., a spionid polychaete genus with a representative species (i.e., *M. viridis*) on the Watch List. *Marenzelleria* sp. were first recorded in Milne Port in 2016, but were not flagged for review until the tentative identification of *M. viridis* in 2018 (the specimens were subsequently corrected to the Arctic species *M. wireni* and potentially *M. arctia* by a specialist in the taxonomic group). Expert taxonomic review of the 2022 specimens suggest they are likely *M. wireni*, a species previously documented in Milne Port that has a natural Arctic range; however, damage to the specimens prevented a confident classification so the identification was left at the genus level.

Unidentified specimens from the genus *Hesperonoe* were found in benthic infauna samples. This genus was flagged in 2020 due to uncertainties in the range. Currently, species in the genus are only described from Arctic waters near Alaska and Russia, however the collections are limited to a few specimens and the genus may be cryptogenic in the Eastern Canadian Arctic.

Unidentified specimens from the bryozoan superfamily Buguloidea were also flagged for review. While representative species in this superfamily are documented to occur naturally in the eastern Canadian Arctic, including Baffin Island, these specimens were flagged for review as the superfamily also contains *Tricellaria inopinata*, a species flagged as a high-risk invader to Arctic waters (Casas-Monroy et al., 2014). Further review is ongoing to determine NIS/AIS status of taxa flagged in 2022. More information is presented in the response to PC Condition No. 87 and in the Draft 2022 MEEMP and NIS/AIS Monitoring report (WSP, 2023a), which will be distributed to the Marine Environment Working Group for review and comment. Some identifications remain pending and will be included in the 2022 MEEMP report, or later revisions as results are received.

Two (2) taxa, *Punctaria latifolia* and *Stictyosiphon soriferus,* were added to the Watch List in 2022 as a precaution. There are still no species on the Trigger List (a list that contains species confirmed as Project-related introductions of High-Risk taxa), therefore, no species-specific response or action plans have been developed to date. Should a species be added to the Trigger List, a species-specific response plan proportional to the risk would be developed in consultation with Fisheries and Oceans Canada (DFO).

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.

TRENDS

Eight (8) years of NIS/AIS monitoring has yielded a large taxonomic inventory of marine organisms residing in Milne Port and Milne Inlet. To date, over 870 unique taxa, including approximately 400 distinct species, have been identified in Milne Port surveys with no detections of Project-related NIS or AIS.

RECOMMENDATIONS / LESSONS LEARNED

Ongoing annual NIS/AIS monitoring will add to the current taxonomic inventory. 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 committed to collaborate with DFO to develop a risk-based approach for biological ballast water sampling. The pilot program originally intended to start in 2021 but was suspended due to COVID-19 travel and ship boarding restrictions. Baffinland has resumed engagement with DFO regarding proposed implementation of the pilot program in 2023.

Project Certificate Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Transport Canada, Marine Environmental Working Group (MEWG)
Reference	Ballast Water Management Plan (BWMP; Baffinland, 2020h 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	https://www.baffinland.com/media-centre/document-portal/ http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships'-Ballast-Water-and-Sediments-(BWM).aspx

METHODS

In response to the threat of the introduction and spread on non-native species through ballast water, the 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 September 8, 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 while requirements for meeting the D2 standard are phased, but must occur no later than September 8, 2024.

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. 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 developed a comprehensive, stand-alone BWMP that is reflective of its current (ERP; Baffinland, 2019e) and future shipping operations (Baffinland, 2023h). The BWMP includes information on applicable legislation, 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 BWMP (Baffinland, 2023h), 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 2022, 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. 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 ballast water compliance monitoring represents a level of monitoring that

exceeds all federal (Transport Canada, 2012) and international (IMO, 2017) regulatory requirements related to ballast water management, and surpasses management practices currently implemented at any marine port in Canada.

RESULTS

In 2022, 30 of the 35 ore carriers (86%) that serviced Milne Port had IMO-approved D-2 ballast water treatment systems installed onboard. As most vessels conducted repeat voyages to Milne Port during the 2022 shipping season, this resulted in 56 of the 62 ore carrier voyages having completed both ballast water exchange and treatment methods prior to releasing their ballast water in the RSA (i.e., representing 86% of all ore carriers that called to Milne Port and 90% of all voyages in 2022).

All bulk carriers servicing Milne Port, including those during the 2022 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=62) that called to Milne Port in 2022. Results are presented in Table 4.26. Salinity measurements for most carriers ranged between 30.3‰ to 34.5‰, which was compliant with federal Ballast Water Regulations (>30.0‰). One exception occurred on 4 August 2022 where ballast water tested on the Golden Ice measured 29.4‰. Baffinland confirmed that the Port of Origin for this vessel was Port Alfred, Quebec, Canada, and that she had exchanged its ballast water in the Canadian Alternate Ballast Exchange Area on the Labrador Coast before making her way to Milne Port. Accordingly, 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 4.3: 2022 Vessel Ballast Water Salinity Test Results Prior to Discharge in Milne Port

Vessel	Date	Salinity (‰)	Tank Tested
Nordic Olympic Voyage 1^{D-2}	July 31, 2022	31.8	Ch #4
Nordic Siku Voyage 1^{D-2}	July 31, 2022	31.9	Ch #4
Nordic Odin Voyage 1^{D-2}	August 1, 2022	32.3	Ch #4
Nordic Sanngijuq Voyage 1^{D-2}	August 2, 2022	31.0	Ch #4
Arkadia Voyage 1^{D-2}	August 3, 2022	30.3	Ch #4
Golden Ice Voyage 1	August 4, 2022	29.4*	3P and 4P
Golden Brilliant Voyage 1^{D-2}	August 5, 2022	30.6	4P
Nordic Odyssey Voyage 1^{D-2}	August 5, 2022	32.7	4S [TS]
Nordic Qinngua Voyage 1^{D-2}	August 6, 2022	31.6	Ch #4
Nordic Orion Voyage 1^{D-2}	August 7, 2022	31.8	Ch #4
Golden Opal Voyage 1^{D-2}	August 8, 2022	31.3	3PTS
Nordic Oshima Voyage 1^{D-2}	August 10, 2022	31.3	Ch #4
Nordic Nuluujaak Voyage 1^{D-2}	August 9, 2022	30.9	Ch #4
Golden Suek Voyage 1^{D-2}	August 11, 2022	31.0	3PTs

Vessel	Date	Salinity (‰)	Tank Tested
Golden Fast Voyage 1^{D-2}	August 12, 2022	31.2	Ch #4
Golden Strength Voyage 1^{D-2}	August 14, 2022	32.8	3PTs
Sagar Samrat Voyage 1^{D-2}	August 14, 2022	33.2	Ch #4
Nordic Oasis Voyage 1^{D-2}	August 15, 2022	33.8	Ch #4
Golden Bull Voyage 1^{D-2}	August 16, 2022	32.6	4 Pts
Elena Ve Voyage 1^{D-2}	August 17, 2022	32.3	DB 3P
Golden Furious Voyage 1^{D-2}	August 18, 2022	32.6	Ch #4
Golden Ruby Voyage 1^{D-2}	August 20, 2022	32.3	3L S Ts
Golden Amber Voyage 1^{D-2}	August 20, 2022	34.0	4 Pts
Kira Oldendorff Voyage 1^{D-2}	August 26, 2022	34.0	WBT 5/6 STBD
Gerdt Oldendorff Voyage 1^{D-2}	August 29, 2022	31.6	BWT 5/6 P TS
Cornelie Oldendorff Voyage 1^{D-2}	August 30, 2022	31.8	CH#4
Golden Freeze Voyage 1^{D-2}	September 1, 2022	31.3	3 & 4 SS TS
Nordic Olympic Voyage 2^{D-2}	September 1, 2022	32.5	Ch #4
Nordic Siku Voyage 2^{D-2}	September 2, 2022	32.7	6PTSWBT
Nordic Orion Voyage 2^{D-2}	September 3, 2022	33.1	Ch #4
Golden Frost Voyage 1^{D-2}	September 4, 2022	32.0	2 PWBT
Nordic Sanngijuq Voyage 2^{D-2}	September 3, 2022	33.0	Ch #4
Golden Ice Voyage 2	September 5, 2022	33.2	4P TS WBT
Arkadia Voyage 2^{D-2}	September 7, 2022	31.6	H3 STBD
AM Quebec Voyage 1	September 6, 2022	32.8	CH 4 TS
Nordic Odin Voyage 2^{D-2}	September 7, 2022	32.7	CH 4
Golden Opal Voyage 2^{D-2}	September 9, 2022	31.7	4 PTS
Nordic Oshima Voyage 2^{D-2}	September 10, 2022	31.7	CH 4
AM Buchanan Voyage 1	September 11, 2022	32.3	CH 4
Nordic Odyssey Voyage 2^{D-2}	September 13, 2022	31.6	CH 4
Nordic Qinngua Voyage 2^{D-2}	September 12, 2022	30.9	CH 4
Golden Fortune Voyage 1^{D-2}	September 13, 2022	30.5	3/4 TS/P
Golden Diamond Voyage 1	September 14, 2022	30.4	TS D13 3 port
Golden Forward Voyage 1^{D-2}	September 15, 2022	31.9	3/4 DB P
AM Krakow Voyage 1	September 18, 2022	33.2	CH 4
Nordic Nuluujaak Voyage 2^{D-2}	September 16, 2022	33.0	CH 4
Nordic Oasis Voyage 2^{D-2}	September 19, 2022	32.9	TS/DB 3Port
Sagar Samrat Voyage 2^{D-2}	September 21, 2022	32.7	4T/S (S)
Golden Brilliant Voyage 2^{D-2}	September 23, 2022	34.4	TS/DB 4Port
Golden Fast Voyage 2^{D-2}	September 25, 2022	33.8	5/6 TS Stbd
Golden Suek Voyage 2^{D-2}	September 27, 2022	32.6	TS/DB 5 PORT
Golden Bull Voyage 2^{D-2}	September 30, 2022	32.5	5S DBTS
Golden Furious Voyage 2^{D-2}	September 30, 2022	33.3	#2 TS/DB Port

Vessel	Date	Salinity (‰)	Tank Tested
Golden Ruby Voyage 2[D-2]	October 2, 2022	32.5	4P TS/DB
Golden Amber Voyage 2[D-2]	October 3, 2022	34.5	TS/DB #4 Port
Golden Strength Voyage 2[D-2]	October 4, 2022	33.8	4P TS
Golden Freeze Voyage 2[D-2]	October 5, 2022	32.9	DB & TS 3&4 Port
Golden Frost Voyage 2[D-2]	October 7, 2022	33.1	1P
Elena Ve Voyage 2[D-2]	October 7, 2022	33.0	DB 4 Port
Nordic Olympic Voyage 3[D-2]	October 8, 2022	32.8	CH 4 Hatch
Flag Mette Voyage 1[D-2]	October 9, 2022	33.8	DB/TS NP.3+4 Port
Nordic Orion Voyage 3[D-2]	October 11, 2022	33.6	CH 4 TS

Notes:
* Golden Ice originated from a port within Canadian waters and was not required to exchange prior to arrival at Milne Port under the D-1 standard. Prior to heading to Milne Port, ballast water was exchanged in the Canadian Alternate Ballast Exchange Area on the Labrador Coast.
[D-2] 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 2022 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 2021 (90% of carrier voyages compared to 73% in 2021) and 2020 (58%). Compliance monitoring data indicate that the current ballast water management measures, as outlined in Baffinland's BWMP, have been effective in protecting the marine environment from ballast-mediated introductions.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to implement and, as necessary, update the BWMP to maintain and/or exceed compliance with Canadian and international ballast water regulations.

Project Certificate Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Transport Canada, Marine Environment Working Group (MEWG)
Reference	Ballast Water Management Plan (Baffinland, 2019e, 2023h) 2022 Shipping and Marine Wildlife Management Plan (Baffinland, 2022g) International Convention for the Control and Management of Ships' Ballast Water and Sediments (IMO, 2017) Ballast Water Regulations (SOR/2021-120) (Transport Canada, 2022)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

Baffinland's stand-alone Ballast Water Management Plan (BWMP) (Baffinland, 2019e, 2023h), which is one component of Baffinland's overall Shipping and Marine Wildlife Management Plan (SMWMP; Baffinland, 2022g) 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 Regulations under the *Canada Shipping Act* (SOR/2021-120; Transport Canada, 2022). The Milne Port BWMP includes voluntary on-board inspection of ship logs by a Baffinland representative to 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.

RESULTS

In 2022, 30 of the 35 ore carriers (86%) that serviced Milne Port had IMO-approved D-2 ballast water treatment systems installed onboard. As most of these vessels conducted repeat voyages to Milne Port during the 2022 shipping season, this resulted in 56 of the 62 ore carrier voyages having completed both ballast water exchange and

treatment methods prior to releasing their ballast water in the RSA (i.e., representing 86% of all ore carriers that called to Milne Port and 90% of all voyages in 2022).

Ballast water salinity was measured in all ore carriers (n = 62) that called to Milne Port in 2022. Results are presented in Table 4.26. Salinity measurements for most carriers ranged between 30.3‰ to 34.5‰, which was compliant with federal Ballast Water Regulations (>30.0‰). One exception occurred on 4 August 2022 where ballast water tested on the Golden Ice measured 29.4‰. Baffinland confirmed that the Port of Origin for this vessel was Port Alfred, Quebec, Canada, and that she had exchanged its ballast water in the Canadian Alternate Ballast Exchange Area on the Labrador Coast before making her way to Milne Port. Accordingly, 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).

TRENDS

Given Baffinland's stringent BWMP, ballast tank salinity measurements for ships calling on Milne Port verify compliance with federal Ballast Water Regulations (≥30.0‰).

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to implement and, as necessary, update the BWMP to maintain and/or exceed 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 Exclusive Economic Zone (EEZ).

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Transport Canada, Marine Environmental Working Group (MEWG)
Reference	Shipping and Marine Wildlife Management Plan (SMWMP; Baffinland, 2022g) 2022 MEEMP and AIS Monitoring Program Report (WSP, 2023a) Guidelines for the control and management of ships' biofouling to minimize the transfer of aquatic invasive species (IMO, 2011) Biofouling Monitoring for Aquatic Invasive Species (AIS) in DFO Maritimes Region (Sephton et al., 2017) Survival of ship biofouling assemblages during and after voyages to the Canadian Arctic (Chan et al., 2016)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.6.9

METHODS

Mitigation for hull fouling is implemented for all vessels calling on Milne Inlet and for all international vessels. As outlined in the SMWMP (Baffinland, 2022g), 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. Baffinland is committed to ensuring all vessels procured for the Project comply with the IMO International Convention on the Control of Harmful Anti-fouling Systems on Ships as well as the Pest Management Regulatory Agency of Canada and Regulations for the Prevention of Pollution from Ships and for Dangerous Chemicals (2007-86). 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 Certificate.

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; and
- Other biocide-free paints.

As per Annex I of the convention (and Schedule 6 of the Regulations for the Prevention of Pollution from Ships and for Dangerous Chemicals), 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.

Note that as of January 1, 2023, the use of chemical cybutryne in anti-fouling systems is prohibited and it must be removed or sealed under a barrier coating at the next renewal of the anti-fouling system and no more than 60 months from the last application of a cybutryne-containing coating.

To date, no regulatory requirement or guideline for monitoring hull fouling have been issued by Transport Canada. Transport Canada does support the International Maritime Organization's Guidelines for the control and management of ships' biofouling to minimize the transfer of aquatic invasive species. Baffinland is in progress of analysing options for developing a hull fouling plan to monitor for the presence of non-indigenous species on the hulls of Project vessels calling on Milne Inlet.

Ship hull biofouling monitoring was undertaken in Milne Port over a three-year period (2018 to 2020) in Milne Port as part of Baffinland's Non-Invasive Species (NIS/Aquatic Invasive Species (AIS) program. This consisted of conducting underwater video surveys of the hulls of several ore carriers per season using a Remotely Operated Vehicle (ROV) based underwater video system. Video footage was subsequently reviewed by qualified marine biologists to identify potential biofouling species to the lowest practical taxonomic level including potential NIS/AIS.

As outlined in the update for PC Term and Condition No. 87, in addition to ship hull monitoring during 2018-2020, multi-trophic NIS/AIS monitoring (zooplankton, macroflora, benthic epifauna and infauna, and fish) has been conducted every shipping season since 2014. AIS surveys conducted as part of the MEEMP are designed to detect potential NIS/AIS introductions whether from ship ballast water releases or ship hull fouling.

RESULTS

Ship hull surveys were not conducted during the 2022 open water season as an options analysis for hull fouling monitoring is in progress, following the conclusion that results from the three-year ROV-based ship hull biofouling program demonstrated that the ROV-based video surveys do not allow for adequate taxonomic resolution (to species-level) to achieve the program objective of identifying NIS/AIS due to the difficulty of identification of encrusting or small bodied taxa without collecting a specimen. Diver-based sample collection from hulls is also not possible due to health and safety concerns associated with diving on a berthed ship. As an alternative however, the settlement substrates deployed through Milne Port served to monitor for recruitment of encrusting species, similar to what may be present on ship hull biofouling. Use of this method is consistent with biofouling studies undertaken annually by DFO since 2006 in Nova Scotia, New Brunswick, Prince Edward Island, Newfoundland, and Quebec (e.g., Sephton et al., 2017).

Furthermore, as detailed in a study conducted by DFO on biofouling potential for vessels travelling to the Arctic, biofouling assemblages on vessels have poor survivorship (i.e. reduced risk) when travelling through the Arctic

(Chan et al. 2016). Nevertheless, Baffinland is open to working further with DFO to explore options to improve taxonomic resolution in ship hull surveys. This may include evaluating the use of ROVs with 'manipulator arms', which are intended to facilitate sample grabs on areas of the vessels where video/photographic imagery would be inadequate to support species identification. An options analysis document is in preparation and subsequent discussions will be initiated with DFO. In the meantime, current methods (i.e. use of settlement substrates), in conjunction with the extensive AIS/NIS monitoring conducted in the receiving environment are being used to monitor the risks associated with current operations.

The ship hull biological sampling program will also be applied to vessels calling at Steensby Port as soon as shipping commences for the Southern Shipping Route.

TRENDS

Surveys from 2018 to 2020 revealed various extents of biofouling on ship hulls, ranging from low to high. Barnacles (unidentifiable to species) were the most commonly observed biofouling taxa. Modifications to the hull biofouling monitoring methodology are required, as analysis of video imagery does not enable taxonomic identification at the resolution required to be informative.

Despite the introduction of a high-resolution camera in 2019 and having an additional biologist with local Arctic faunal expertise present onboard with the ROV operator while video data was being collected in 2020, the taxonomic resolution of biofouling organisms did not improve in the third year of monitoring. Many taxa were not resolved to species level due to the difficulty of identification of encrusting or small-bodied taxa without a specimen. Specimen collection cannot be performed by divers along the hulls, as these surveys occur in an active shipping port, where diving on a berthed vessel may be severely hazardous. Moving forward, Baffinland will be working collaboratively with DFO to explore alternative options for improving the methodology of hull fouling surveys so that data can be collected with greater resolution. In the meantime, current methods (i.e. use of settlement substrates), in conjunction with the extensive AIS/NIS monitoring conducted in the receiving environment are being used to monitor the risks associated with current operations.

RECOMMENDATIONS / LESSONS LEARNED

It is recommended that Baffinland, DFO, and other relevant parties continue to work collaboratively to devise a sampling methodology for ship hull biofouling monitoring that improves taxonomic resolution without putting divers at risk. It is also recommended that the number of ore carriers targeted for annual sampling be determined in consultation with the MEWG while being subject to the operating realities of a high arctic seasonal port.

Project Certificate Term and Condition No. 92

Category	Marine Environment – Spill Prevention
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operation, 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	Emergency Response Plan (Baffinland, 2020g) Spill Contingency Plan (Baffinland, 2021j) 2021 Oil Pollution Emergency Plan – Milne Inlet (Baffinland, 2022h) Spill at Sea Response Plan (Baffinland, 2015, 2023i)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

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 necessary training 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 2022, 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 from July 22 to 24, 2022. The training encompassed classroom and hands-on spill response techniques, including a mock exercise for potential port oil spills during ship-to-shore transfer. In addition to the training, an audit was completed by Navenco Marine 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

Transport Canada Marine Safety and Security (TCMSS) conducted an oil handling facility regulatory inspection of Baffinland's Class 2 facility during the 2022 fuel transfer season, which included a review of the OPEP plan. TCMSS identified four (4) requirements to be met which pertained to updating the OPEP plan content, and two (2) on-site

requirements to be met: one (1) respecting secondary communications usage for transfer operators, and one (1) pertaining to an outdated plan that was observed in a work area and an associated concern that locations onsite where the Plan is to be located were not adequately identified. To address the concerns raised by TCMSS, Baffinland submitted a Corrective Action Plan to TCMSS detailing how and when each of the concerns identified during the 2022 regulatory inspection will be rectified, and the 2023 OPEP and OPPP updates, to be submitted to Transport Canada in May, 2023, will include the updates described in the Corrective Action Plan.

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 Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable
Stakeholder Review	Not applicable
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

Not Applicable. The use of vessel-based fuel storage is not currently active.

RESULTS

Not applicable.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

Project Certificate Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable
Stakeholder Review	Communities of Sanirajak and Igloolik
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

Not Applicable. Overwintering of fuel in Steensby Inlet is not currently active.

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 Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable
Stakeholder Review	Not applicable
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

Not applicable. Overwintering of fuel in Steensby Inlet is not currently active.

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 Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable
Stakeholder Review	Not applicable
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

Not applicable. Overwintering of fuel in Steensby Inlet is not currently active.

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 Term and 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	Prior to the commercial shipping of iron ore, the Proponent shall conduct fuel spill dispersion modeling that will, at a minimum, consider: 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: i. Pinch points; ii. The approaches into Steensby Inlet and Milne Inlet; iii. Shallow water and shorelines; and, iv. Areas that have been identified as having high flows and/or high concentrations of marine mammals, marine fish or seabirds. b. Open water and, where applicable, ice-covered conditions i. Spill volumes up to and including loss of a full tanker cargo ii. 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
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - 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, 2015)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

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^3 (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^3 (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 (5) 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.

Further spill modelling was carried out in 2018 for shipping activities along the Northern Shipping Route from Baffin Bay through Pond Inlet, Eclipse Sound, and Milne Inlet that could be occurring in the presence of ice.

Two (2) spill scenarios are included that release 1 ML of intermediate fuel oil from an ore carrier at locations along the Northern Shipping Route. These include a mid-July sea ice break-up scenario in Eclipse Sound and a mid-October sea ice freeze-up scenario at the mouth of Milne Inlet. A spill distribution probability map for each spill scenario location is presented showing the probability that fuel would reach any particular location on the map, should a spill occur.

For the mid-July scenario at Eclipse Sound, the majority of the simulated trajectories reach shore. For these scenarios, ice temporarily keeps the fuel offshore and delays any drift to the shorelines. As the break-up season progresses, the spill trajectories spend increasingly more time in ice of lesser concentrations, approaching open water. For the mid-October scenario the number of trajectories reaching shore decreases steadily as freeze-up progresses. The ice keeps the fuel offshore and effectively traps the fuel in the ice as it freezes.

RESULTS

The spill modelling results highlight the importance of spill prevention and fuel spill 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. The 2015 spill model informed the development of Baffinland's Spill at Sea Response Plan (Baffinland, 2015). While the 2018 spill model informed an update the Baffinland's Spill at Sea Response Plan, see Appendix G.8.2.

See also PC Term and Condition No. 98 and 176.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

The spill modelling results highlight the importance of spill prevention, the OPPP 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.

The Spill at Sea Response Plan was recently updated to append the results of additional fuel spill modelling carried out in 2018. 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 Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - 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, 2015)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

See PC Term and Condition No.98 and No.176

RESULTS

The modelling results from the 2015 report (AMEC Foster Wheeler, 2015) 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 (Baffinland, 2015). Further spill modelling was carried out in 2018 for shipping activities along the Northern Shipping Route from Baffin Bay through Pond Inlet, Eclipse Sound, and Milne Inlet that could be occurring in the presence of ice.

Two spill scenarios are included that release 1 ML of intermediate fuel oil from an ore carrier at locations along the Northern Shipping Route. These include a mid-July sea ice break-up scenario in Eclipse Sound and a mid-October sea ice freeze-up scenario at the mouth of Milne Inlet. A spill distribution probability map for each spill scenario location is presented showing the probability that fuel would reach any particular location on the map, should a spill occur.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

The spill modelling results highlight the importance of spill prevention, the OPPP 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.

The Spill at Sea Response Plan was recently updated to append the results of additional fuel spill modelling carried out in 2018. The OPPP and 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 Terms and Conditions 99 through 128)

Thirty-one (31) PC Terms and Conditions (including Term and Condition No. 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 shipping on marine mammals (particularly narwhal, seal, bowhead) continues to be brought forward to Baffinland during community engagement sessions (Appendix B.1), and through the MEWG (Appendix C.1). Underwater noise from shipping and its potential impact on marine mammals and, by extension, traditional hunting activities, has been consistently raised as key concerns. In recent years (2020 and 2021), Baffinland was also provided feedback from Inuit community members regarding the need for increased monitoring of ringed seal. Baffinland addressed this concern through the implementation of a Ringed Seal Aerial Survey Monitoring Program in 2021.

Monitoring

Throughout 2022, Baffinland again implemented a robust suite of marine mammal monitoring programs designed to assess ship noise levels in the RSA in relation to established acoustic thresholds for marine mammals, to study the effects of shipping on narwhal abundance, distribution, group composition and behaviour, and to generate updated abundance estimates of the Eclipse Sound and Admiralty Inlet narwhal summer stocks. A list of the marine mammal monitoring programs conducted in 2022 is as follows:

- 2022 Ship-based Observer Monitoring Program – replaced by the ongoing Marine Mammal Observer Network (MMON) Monitoring Program due to absence of icebreaking activities at the start of the shipping season in 2022;
- 2022 Marine Mammal Aerial Survey Program (Eclipse Sound and Admiralty Inlet) (WSP, 2023d);
- 2022 Bruce Head Shore-based Monitoring Program (WSP, 2023e);
- 2022 Acoustic Monitoring Program (Austin et. al., 2023).

In addition, Baffinland undertook the 2022 Marine Environmental Effects Monitoring Program (MEEMP) and Non-indigenous Species / Aquatic Invasive Species (NIS/AIS) Monitoring Program (WSP, 2023a) to evaluate potential Project effects on marine fish and their habitats, including species for which marine mammals are potentially reliant on over the course of the shipping season.

Table 4.27 provides an evaluation of the Project's impacts on the marine environment, based on monitoring activities completed in 2022, relative to predictions presented in the FEIS and FEIS Addendum.

To the extent that potential Project impacts on the marine environment can be evaluated, the effects of the Project are within FEIS and subsequent addenda predictions.

Table 4.4: Marine Mammals Impact Evaluation

Component	Effects	Monitoring Program	Impact Evaluation
Ringed Seal, Bearded Seal, Walrus, Beluga, Narwhal, Bowhead Whale, 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 2022.
	Hearing impairment and/or damage caused by sound from construction activities	No constructions activities occurred at Milne Port in 2022 that would have the potential to cause hearing impairment.	Not Applicable in 2022.
		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	Data available to date from Baffinland's acoustic monitoring programs (Austin et. al., 2023) and narwhal behavioural response studies (Golder, 2022e, WSP, 2023e) have demonstrated that: • Vessel noise in the RSA is lower than predicted in the FEIS. • Vessel noise exposure on marine mammals in the RSA is temporary in nature and below sound levels that could cause acoustic injury. • Assessed relative to a broadband Sound Pressure Level (SPL) of 120 dB re 1 µPa (i.e., the current noise disturbance threshold standard used by industry and government for assessing disturbance to marine mammals by continuous-type sounds such as vessel noise), sound exposure durations averaged less than one (1) hour per day. • Narwhal behavioural responses to shipping are limited to short-term and localized disturbance effects. Results from the 2022 aerial survey (WSP, 2023d) indicate that:	A holistic review of the data from the 2022 shipping season, in addition to data from previous years, does not conclude that the relatively lower number of narwhal observed in Eclipse Sound in 2020 and 2021 is Project-related. Acoustic monitoring and behavioural observations of marine mammal behavioural responses to shipping activities remain within FEIS predictions. Available data suggests 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.

Component	Effects	Monitoring Program	Impact Evaluation
		i) the 2022 narwhal abundance estimate in Eclipse Sound (4,592 narwhal) was statistically higher than that observed in 2021 (2,595 narwhal), indicating narwhal numbers in the RSA appear to be increasing from the low numbers observed in 2021. The 2022 abundance estimate was, however, statistically lower than the 2016 estimate (12,039 narwhal) and the 2019 estimate (9,931 narwhal), and was not statistically different from the 2013 estimate (10,489 narwhal) and the 2020 estimate (5,018 narwhal); and ii) the 2022 abundance estimate for the combined Eclipse Sound and Admiralty Inlet stocks was statistically lower (46,408 narwhal) than the 2021 estimate (75,177 narwhal), but not statistically different from the 2013 estimate (45,532 narwhal), the 2019 estimate (38,677 narwhal), or the 2020 estimate (36,044 narwhal). A review of available Inuit knowledge and scientific monitoring data supports that the Admiralty Inlet and Eclipse Sound stock may actually be one stock that shift between summering areas. Another factor could be that narwhal migratory routes and summering areas are being influenced by changing environmental factors such as climate change, seasonal ice conditions, food availability and local predator/prey dynamics.	
Narwhal	Masking of environmental sounds caused by vessel and construction sound	Acoustic monitoring results collected to date (Austin et al., 2023; Appendix G.6.6) demonstrate that both ambient noise (e.g., wind, waves, rain) and vessel noise can result in Listening Range Reduction (LRR), at different contributing levels depending on sound frequency. The listening	Effects within FEIS predictions

Component	Effects	Monitoring Program	Impact Evaluation
		range for sound at 25 kHz (representative of narwhal clicks and high-frequency buzzes) was more affected, by both vessel noise and ambient noise, than sound at 1 kHz (a representation frequency for burst pulses) where narwhal have decreased hearing sensitivity. A potential consequence is a reduced range at which the listener (narwhal) can detect potential prey during echolocation. Vessel noise at 25 kHz caused at least a 50% reduction in listening range during less than 4.8% of the recording period. At 5 kHz, a frequency consistent with narwhal knocks and whistles, vessel noise resulted in LRR similar to what narwhal experience from ambient noise fluctuations, causing at least 50% LRR during 3.6% of the recording period. Burst pulses were the least susceptible vocalization type to LRR due to vessel noise, with at least 50% LRR occurring ≤1.2% of the time. As aforementioned, ambient noise did not result in any appreciable level of LRR for burst pulses because the hearing threshold for narwhal at 1 kHz is higher than the median ambient sound level at this frequency.	
Bowhead Whales	Mortality from collisions with vessels and blasting during construction	No collisions were noted by ship crews in 2022. No blasting during construction occurred.	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 mortalities resulted from Project operations in 2022.	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 Term and Condition follows.

Project Certificate Term and 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	The Proponent, working with the Marine Environment Working Group, shall consider and identify priorities for conducting the following supplemental baseline assessments: 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). b. The collection of additional baseline data: i. In Steensby Inlet on walrus, beluga, bearded seal anadromous arctic char abundance, distribution ecology and habitat use. ii. In Milne Inlet on narwhal, bowhead and anadromous arctic char abundance, distribution ecology and habitat use. 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: i. Aerial surveys for basking ringed seals throughout the landfast ice of Steensby Inlet and at an appropriate control location ii. 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 d. Enhance the baseline for affected freshwater systems, which includes control sites to detect Project-related changes before they cause significant harm.
Relevant Baffinland Commitment	81
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	Marine Monitoring Plan (Baffinland, 2021l)

Ref. Document Link	Not applicable

METHODS

This PC Term and Condition applies to the Construction phase of the Approved Project and completion of supplemental baseline assessments. The Approved Project is currently in operation; supplemental baseline assessments are complete (pre-2021). 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 Monitoring Plan (MMP; Baffinland, 2021l).

RESULTS

Not applicable.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Environmental effects monitoring will continue through the life of the project.

Project Certificate Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Not Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - Not Applicable
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	2022 Shipping and Marine Wildlife Management Plan (Baffinland, 2022g)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

Applicable only to the Construction phase thus not active for 2022.

Fuel Spills

As outlined in Section 1.2 and Section 3 of the Shipping and Marine Wildlife Management Plan (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.6.1 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 (NIRB Registry No. 325730; Baffinland, 2019f). 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 (Baffinland, 2022g) 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 2022, 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 (applicable to the Southern Shipping Route only). Furthermore, Baffinland notes that this condition is relevant only to the Construction phase of the Project thus not applicable to the Northern Shipping Route.

Project Certificate Term and Condition No. 101

Category	Marine Environment – Monitoring
Responsible Parties	The Proponent, Marine Environment Working Group
Project Phase(s)	Construction and Operation
Objective	To monitor for potential impacts to marine wildlife and marine habitat.
Term or Condition	The Proponent shall incorporate into the appropriate monitoring plans the following items: a. A monitoring program that focuses on walrus use of Steensby Inlet and their reaction to disturbance from construction activities, aircraft, and vessels; b. Efforts to involve Inuit in monitoring studies at all levels; c. Monitoring protocols that are responsive to Inuit concerns; d. Marine monitoring protocols are to consider the use of additional detecting devices to ensure adequate monitoring through changing seasonal conditions and daylight; e. Schedule for periodic aerial surveys as recommended by the Marine Environment Working Group; 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; 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); h. Conduct landfast ice monitoring for the duration of the Project Operations phase, which will include: i. The number of ship transits that are able to use the same track; ii. The area of landfast ice disrupted annually by ship traffic; and iii. Monitoring strategy focused on assessing and mitigating interaction between humans and wildlife at the port site(s).
Relevant Baffinland Commitment	Not Applicable
Reporting Requirement	To be provided in the Annual Report to the NIRB.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG), Nunavut Impact Review Board
Reference	Marine Mammal Trigger Action Response Plan (TARP) (Baffinland 2021k) 2022 Marine Mammal Aerial Survey Program - Final Report (WSP, 2023d) 2022 Bruce Head Shore-based Monitoring Program – Final Report (WSP, 2023e) 2022 MEWG Meeting Minutes 2022 Early Warning Indicator (EWI) Aerial Survey Results (WSP, 2023f) 2022 Narwhal Adaptive Management Response Plan (NAMRP; Baffinland, 2022j) 2021 Marine Mammal Trigger Action Response Plan (TARP; Baffinland, 2021k)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix B.1 Appendix B.2.2

	Appendix C.1

METHODS

a. No construction or operational activity took place at Steensby Port in 2022. 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 a teleconference MEWG meeting on May 3, 2022, Baffinland discussed the Draft marine monitoring reports that were submitted to the MEWG for comments. During teleconference MEWG meetings on June 14, 22 and 29, 2022, Baffinland discussed upcoming 2022 monitoring programs. During the teleconference MEWG meeting on August 4,2022, Baffinland discussed the 2022 Narwhal Adaptive Management Response Plan (NAMRP; Baffinland, 2022j). Baffinland reached out to the MHTO multiple times in order to set up a 2022 pre-shipping meeting and share details on upcoming season (corresponding slide decks that were shared with the MHTO are included in Appendix B.2). A 2022 pre-shipping season radio show was held in Pond Inlet on July 13, 2022 to provide a summary to Pond Inlet residents on Baffinland's anticipated shipping activities. An End of 2022 Shipping Season meeting and public radio show were also held on February 8, 2023 in Pond Inlet (meeting and radio show summaries available in Appendix B.2). Follow-up correspondence also occurred following MEWG meetings, and distribution of meeting minutes. Inuit are also directly involved in marine monitoring programs as field technicians who receive training and actively contribute to the program outcomes.

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 endeavours to meet directly with the MHTO multiple times each year, shares information with the MHTO on its planned monitoring programs, and requests letters of support on an annual basis from the MHTO prior to program implementation. Baffinland also engages with Inuit in the local communities through public radio shows, meetings with the Hamlet council and active engagement through the Shipping Monitor Program run in Pond Inlet throughout the entirety of the shipping season.

   Prior to the start of the 2022 shipping season and monitoring programs, Baffinland reached out to the MHTO to set up a meeting in Pond Inlet. Due to limited board member availability, a meeting was not held however information describing the 2021 and upcoming 2022 shipping season was provided (Appendix B.2). A radio show was also held on July 13, 2022 in Pond Inlet to inform residents about Baffinland's past and anticipated shipping activities for 2022. 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. Offers to meet with the MHTO in Pond Inlet and discuss the monitoring results are provided to the MHTO. Communications between Baffinland and local Inuit through other forums including hamlet and one-on-one meetings, radio shows and the Shipping Monitor Program remain on-going.

d. Not Active. Baffinland understands that the intent of Term and 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 construction or operational activities took place along the Southern Shipping Route or in Steensby Inlet during 2022 - this phase of the Project is currently inactive. Shipping operations in 2022 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 2022, marine mammal aerial surveys were conducted in the North Baffin during the early shoulder season (July) and the peak open-water season (August) as part of the 2022 Marine Mammal Aerial Survey Program (MMASP; WSP, 2023d). Two different types of marine mammal aerial surveys were performed in 2022. A reconnaissance survey was initially run during the early shoulder season (Leg 1) to collect data on the presence/absence and distribution of marine mammals in the RSA relative to ice conditions at that time of year and prior to the start of shipping activities. A systematic aerial-based transect survey was then conducted during the open-water season (Leg 2) to obtain abundance estimates of the Eclipse Sound and Admiralty Inlet narwhal summer stocks. In 2019 and 2021, visual clearance surveys (Leg 3) were also conducted during the fall shoulder season to confirm that no narwhal entrapment events occurred in the RSA following completion of Baffinland's shipping operations along the Northern Shipping Route. No Leg 3 marine mammal aerial survey was conducted at the end of the shipping season (October) in 2020 due to the absence of ice at the end of the shipping season and in 2022 due to the earlier than anticipated end of the shipping season as a result of incoming multi-year ice into the shipping lane through Navy Board Inlet.

   A letter of support for the 2022 MMASP was requested from the MHTO and Arctic Bay HTO. DFO and other MEWG members were actively consulted on the study design and data collection methods during 2022 MEWG meetings (Appendix C.1). Input and recommendations provided by these parties were incorporated into the program. Detailed methodology and analytical procedures of the 2022 MMASP are presented in WSP (2023d).

f. Baffinland will continue to collect ringed seal aerial survey data in the RSA at an appropriate sampling frequency throughout the life of the Project to continue to monitor and evaluate this potential impact pathway for ringed seal.

g. Baffinland undertook a shore-based narwhal monitoring program at Bruce Head from 2013–2017[1] and again from 2019 to 2022[2]. The objective of the Bruce Head Shore-based Monitoring Program is to investigate narwhal response to shipping activities along the Northern Shipping Route in Milne Inlet. During the 2022 open-water season, visual survey data were collected from a cliff-based observation platform at Bruce Head overlooking the nominal shipping route. Data were systematically collected on the relative

[1] 2013 represented a pilot study year for the Bruce Head Shore-based Monitoring Program.
[2] A Bruce Head vessel-based 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.

abundance and distribution of narwhal, and on narwhal group composition via shore-based Marine Mammal Observers (MMOs). Narwhal behavioural data were collected using Unmanned Aerial Vehicle (i.e. drones) to evaluate behavioural responses of narwhal to vessel traffic via focal follow video surveys of individual groups. 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. Detailed methodology and analytical procedures of the 2022 Bruce Head Shore-based Monitoring Program are presented in WSP (2023e).

h. Baffinland understands that the intent of Term and Condition No. 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, the commencement of 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 received verbal confirmation on July 10, 2022 from an MHTO board member that the floe edge had been closed for harvesting. As a temporary precautionary-based mitigation measure introduced in 2021, and carried over in 2022, shipping operations in 2022 did not commence until a continuous path of 3/10ths or less ice concentrations was present in the RSA between the entrance of Eclipse Sound and Milne Port.

RESULTS

a. Not applicable in 2022.

b. Inuit participants were able to join the 2022 monitoring programs with COVID-19 restrictions lifted in 2022 allowing Inuit back at site. A total of 12 Inuit participants (nine from Pond Inlet, two from Arctic Bay, and one from Fort McPherson) were employed for the 2022 monitoring programs. Inuit participants were hired through an Inuvialuit-owned company. The total amount of work hours for Inuit staff on the 2022 monitoring programs was 3,180 hours. The work positions filled by Inuit participants in 2022 included: marine wildlife observers, polar bear monitors, boat operator and field technicians.

c. Not applicable in 2022.

d. Not applicable in 2022.

e. A total of eight (8) different species of marine mammals were observed during the 2022 aerial surveys: narwhal, bowhead whale, beluga whale, ringed seal, harp seal, bearded seal, walrus, and polar bear. In 2022, killer whale were not observed during the 2022 Leg 1 surveys. However, on 25 July, killer whale sightings were reported by the community of Pond Inlet and relayed to the aerial survey team through the Inuit observers. Killer whale were also not observed in the Eclipse Sound grid during Leg 2 surveys or during the Bruce Head shore-based monitoring program.

At the beginning of the Leg 1 survey program, open water was present in the central portion of Navy Board Inlet, south Milne Inlet (Assumption Harbour and Koluktoo Bay), Tremblay Sound and in Eastern Eclipse Sound (i.e., Pond Inlet strata). By the end of the Leg 1 survey program, open water was present throughout

the RSA. Results from the 2022 Leg 1 survey indicated high narwhal numbers at the start of the program (21–24 July) with narwhal numbers dropping during the second half of the program (27 July – 1 August). During the first ore carrier transit in the RSA on 30 July 2022, large numbers of narwhal had already migrated through the RSA and narwhal remaining in the RSA were primarily concentrated in south Milne Inlet and in Tremblay Sound. Detailed results for Leg 1 surveys are presented in WSP (2023d).

For the Leg 2 surveys, narwhal summer stock abundance was calculated for the Eclipse Sound stock, Admiralty Inlet stock, and the combined Eclipse Sound and Admiralty Inlet stock. The narwhal abundance estimate for the combined Eclipse Sound and Admiralty Inlet stock during the 2022 open-water season (Leg 2) was 46,408 individuals based on aerial surveys completed on 17–18 August 2022. The 2022 estimate was not statistically different than the 2013 DFO estimate of 45,532 narwhal, the 2019 Baffinland estimate of 38,677 narwhal, or the 2020 Baffinland estimate of 36,044 narwhal. The 2022 estimate was statistically lower than the 2021 Baffinland estimate of 75,177 narwhal. These findings support the theory that a portion of the Eclipse Sound stock continued to occupy the Admiralty Inlet summering ground during the summer of 2022.

For the Eclipse Sound stock alone, the narwhal abundance estimate for the 2022 open-water season was 4,592 individuals based on averaged abundance estimates from aerial surveys conducted on 17 and 21 August 2022. The 2022 estimate for the Eclipse Sound stock was statistically higher than the 2021 estimate of 2,595 narwhal, indicating that narwhal numbers in the RSA appear to be increasing from the low numbers observed in 2021. However, the 2022 estimate was statistically lower than the 2016 estimate of 12,039 narwhal and the 2019 abundance estimate of 9,931 narwhal. The 2022 estimate (4,592 narwhal) was not statistically different than the 2013 estimate of 10,489 narwhal or the 2020 estimate of 5,018 narwhal. Detailed results of the 2022 Marine Mammal Aerial Survey Program are presented in WSP (2023d).

f. Not applicable in 2022.

g. The requirement to complete a minimum of three years of shore-based monitoring of narwhal behaviour in Milne Inlet (relative to shipping activities) has been achieved. In 2022, the Bruce Head Shore-based Monitoring Program completed its eighth year of monitoring of narwhal behavioural monitoring in the RSA (WSP, 2023e). The following is a summary of key findings pertaining to narwhal behavioural response to vessel traffic based on seven years of shore-based visual survey data collected at Bruce Head between 2014 and 2021.

Relative Abundance and Distribution in the Stratified Study Area (SSA):

- Interannual variation: The relative abundance of narwhal (total number of narwhal corrected for survey effort) in the Stratified Study Area (SSA) was higher in 2022 (84.9) than in 2020 and 2021 (47.5 and 29.4, respectively) and approaching the 2015 baseline level (first year of operations; 98.2). However, narwhal relative abundance in 2022 (84.9) was lower than the 2014 baseline level (131.4) and lower than levels observed in 2016 (178.0), 2017 (121.8) and 2019 (127.2). These findings indicate that narwhal numbers in the Regional Study Area (RSA) appeared to be increasing from the numbers observed in 2020/2021. Over the combined 2014 to 2022 monitoring period, the second highest relative abundance estimate at Bruce Head was observed in 2019, when shipping was highest and Project icebreaking occurred during the early shoulder season for the

third consecutive year (2018 to 2020). In contrast, the lowest relative abundance estimates at Bruce Head were recorded in 2020 and 2021, when shipping levels were similar to 2016. Icebreaking operations took place during the 2020 early shoulder season but no icebreaking took place in the RSA during 2021. These results suggest that the annual volume of Project shipping in the RSA is not a reliable predictor of narwhal relative abundance at Bruce Head in the same year. The 2022 results support the theory that some degree of natural exchange likely occurs between the two presumed narwhal summer stock areas and, while shipping cannot be ruled out as a contributing factor, that the regional distribution and movement of narwhal off North Baffin Island during the summer was likely influenced by other external factors (e.g., local ice conditions, water temperature, prey availability, predation pressure, etc.)

- Density: Vessel exposure was shown to result in a statistically significant temporary decrease in narwhal density in the SSA compared to when no vessels were present; this decrease was limited to when narwhal were in close proximity (≤2 km) to approaching northbound vessels, after which narwhal densities were shown to increase as northbound vessels transited away from the SSA (i.e., temporary effect). This was equivalent to a maximum period of 14 min per vessel transit (based on a 9-knot travel speed, assuming narwhal remained stationary during exposure), with animals returning to their pre-response behaviour shortly following the initial vessel exposure (i.e., a temporary effect). During the 2022 Program (31 July to 23 August), there were approximately two vessel transits per day in the SSA (56 one-way transits in SSA over a 24-day period). Therefore, the maximum period per day associated with vessel disturbance on narwhal density was 28 min. These findings were consistent with previous years' findings and with behavioural results from the narwhal tagging study (Golder, 2020c), indicating that narwhal density in the SSA was temporarily influenced by vessel traffic, with the decrease limited to close distances (i.e., within 2 km of a northbound vessel). Localized avoidance of the sound source (i.e., the vessel) by narwhal was consistent with a moderate severity behavioural response (Southall et al., 2021). However, given the temporary nature of the effect (i.e., up to 14 min per vessel transit), this would not be considered a biologically significant behavioural response and would not be expected to result in a significant alteration of natural behavioural patterns by narwhal in the RSA or disruption to their daily routine. Accordingly, no effects were anticipated on the individual fitness and/or vital rates of narwhal in the RSA, which may ultimately affect population parameters. This response was in line with impact predictions made in the Final Environmental Impact Statement (FEIS) for the Early Revenue Phase (ERP), in that vessel noise effects on narwhal were anticipated to be limited to temporary, localized avoidance behaviour.

Group Composition in the BSA:

- Group Composition: The number of narwhal groups in the BSA in 2022 was the second highest observed since the start of the eight-year study period, with 1,523 narwhal groups (comprising 5,864 individuals) recorded. All narwhal life stage categories (adults, juveniles, yearlings, and calves) were recorded in the Behavioural Study Area (BSA) throughout the eight-year sampling program, with the majority of the sightings consisting of adult narwhal, followed by juveniles, calves, and yearlings.
- Proportion of Immatures (Early Warning Indicator; 'EWI'): Findings from the combined multi-year Bruce Head dataset indicated that the relative proportion of immature narwhal observed in the

BSA in 2022 (0.105) was significantly lower than the 2014/2015 baseline condition (0.152 in 2014 and 0.167 in 2015). This was similar to the 2021 EWI results, in which the relative proportion of immature narwhal observed in the BSA in 2021 (0.102) was significantly lower than the 2014/2015 baseline condition. The 2021 and 2022 results indicate an exceedance of the Moderate Risk threshold for this specific indicator, as per the Trigger Action Response Plan (TARP) for marine mammals (Baffinland, 2021k), and that the Risk Status / Threshold trigger has been observed in at least two consecutive monitoring years. The pre-defined response for exceedance of a moderate risk indicator includes the following: 1) investigate trend over time and consider any uncertainties (i.e., changes in operational processes, potential sources, confounding influences) in a formal Response Plan; and 2) initiate component-specific targeted studies as part of the response planning. Based on prior monitoring results for narwhal, Baffinland proactively developed and implemented a Narwhal Adaptive Management Response Plan (NAMRP; Baffinland 2022j), which included a follow-up investigation involving an EWI analysis of 2020 to 2022 aerial survey data using dedicated 1,000 ft. (305 m) aerial survey data (WSP, 2023f). Findings from the aerial EWI indicated that the proportion of immature narwhal in Eclipse Sound in 2022 (0.124) was within the range of the 2014/2015 baseline condition (0.150 in 2014 and 0.110 in 2015), although a statistical analysis was not possible since the raw data from 2014/2015 aerial surveys were not available. Both Bruce Head and aerial-based EWI datasets were associated with high variability and low sample sizes, resulting in high uncertainty in the EWI estimates. In summary, while the EWI data collected at Bruce Head suggested a localized change in narwhal group composition, the equivalent EWI analysis derived from the spatially broader aerial survey dataset provided no indication that the proportion of immature narwhal had declined in the broader RSA since the start of shipping operations (2014/2015) (WSP, 2023f). Ongoing EWI monitoring through both the Bruce Head Shore-based Monitoring Program and Marine Mammal Aerial Survey Program is therefore recommended in future years.

- The following summarizes key findings pertaining to narwhal behavioural responses to ship traffic at Bruce Head based on three years (2020-2022) of drone-based focal follow imagery collected in Milne Inlet: Primary behaviour:
    - Findings based on the three-year Unmanned Aerial Vehicle (UAV) dataset provide possible, though conflicting, support that narwhal groups may change the proportion of time that they engage in critical activities (i.e., resting, milling, and social behaviours) when in the presence of vessels. Specifically, group types with immatures (i.e., mother-immature pairs and mixed groups with immatures) and adult groups were shown to decrease the proportion of time that they engage in critical activities when within 5 Km and 4 Km of vessels, respectively. Conversely, mixed groups without immatures were shown to increase the proportion of time that they engaged in critical activities when within 3 Km of vessels. While these findings suggest that vessel traffic may have some effect on the ability of narwhal to carry out these critical life functions, the conflicting trends among group types suggest that the results should be interpreted with caution. Additional focal follow monitoring is recommended to increase overall sample size of the corresponding dataset.

- Unique behaviours: Unique behaviours were displayed less frequently by all narwhal group types in close proximity (<2 Km) to transiting vessels, although comparisons relative to vessel absence scenarios were not significant despite large effect sizes at 0.5 Km and 1.0 Km from vessels. The lack of statistical significance was likely due to the low sample size and high data variability at close range (<2 Km) to vessels. The results suggest that unique behaviours such as rubbing, rolling, nursing, and sexual displays may be temporarily disrupted in close proximity (<2 Km) to vessel traffic, though this finding was based on a limited sample size at close range to vessels. Additional focal follow (UAV-based) monitoring is therefore recommended to increase overall sample size and the robustness of the corresponding analysis.

- Association of immatures with presumed mother: Immature narwhal were recorded in 148 of the 397 focal follow surveys conducted to date. Of these, immature narwhal occurred on their own in 35 of the surveys, with their presumed mother in 64 of the surveys, and in mixed groups in 49 of the surveys. Nursing behaviour was recorded during 30 of the surveys, of which five (5) coincided with a vessel being present within 5 Km of the focal group.
  - Presence of nursing behaviour: Immature narwhal engaged in nursing less often when in the presence of vessel traffic (vessel within 5 Km of the focal group), although this effect was not statistically significant despite a large effect size (-69%). The lack of a statistically significant effect was likely due to low sample size and high data variability. As a result, these findings should be interpreted with caution. Additional focal follow monitoring is recommended to increase overall sample size and the robustness of the corresponding analysis.
  - Relative and distal positioning of immatures: Immature narwhal were found to change their association with their mother when in close proximity to vessel traffic, for both mother-immature pairs and for mixed groups with immatures. That is, immature narwhal tended to favour the underside of their mother over other relative positions when within 1 Km of vessels (though this finding was based on a small effect size) and they associated more tightly with their mother when within 5 Km of vessels. The full spatial extent of the latter finding may be a modelling artefact and the effect may only extend to <3 Km from a vessel. Additional focal follow surveys are required to increase sample size, thereby allowing for a more robust analysis.

- Group formation: Narwhal groups were shown to alter their group formation when in close proximity to vessels, with the majority of group types decreasing the proportion of time that they spend in parallel formation when within 1 to 3 Km of vessels. Conversely, mother-immature pairs were the only group type to increase the proportion of time that they spend in parallel formation when within 2 Km of vessels, however the effect size was small. These results were based on a limited sample size and should therefore be interpreted with caution. A change in group cohesion (e.g., change in group formation) by narwhal would be consistent with a moderate severity behavioural response (Southall et al., 2021). Given the temporary nature of the effect (i.e., change in group formation within 3 Km of a vessel), this finding was not anticipated to result in a biologically significant alteration of natural behavioural patterns by narwhal in the RSA or disruption to their daily routine. The noted response was shown to be short in duration, equivalent

to a maximum period of 21 min per vessel transit (based on a 9 knot travel speed, assuming narwhal remained stationary during exposure), with animals returning to their pre-response behaviour shortly following the initial vessel exposure (i.e., a temporary effect). Accordingly, no effects were anticipated on the individual fitness and/or vital rates of narwhal in the RSA, which may ultimately affect population parameters. This response was in line with impact predictions made in the FEIS for the ERP, in that vessel noise effects on narwhal were anticipated to be limited to temporary, localized avoidance behaviour.

- Group spread: Narwhal groups were shown to loosen their association when in close proximity (≤3 km) to vessel traffic for all group types, although modelling results indicated that this effect was not statistically significant despite a large effect size. A change in group cohesion (e.g., change in group spread) by narwhal would be consistent with a moderate severity behavioural response (Southall et al., 2021). Given the temporary nature of the effect observed, this finding was not anticipated to result in a significant alteration of natural behavioural patterns by narwhal in the RSA or disruption to their daily routine. The noted response was shown to be short in duration, equivalent to a maximum period of 21 min per vessel transit (based on a 9-knot travel speed, assuming narwhal remained stationary during exposure), with animals returning to their pre-response behaviour shortly following the initial vessel exposure (i.e., a temporary effect). Accordingly, no effects were anticipated on the individual fitness and/or vital rates of narwhal in the RSA, which may ultimately affect population parameters. This response was in line with impact predictions made in the FEIS for the ERP, in that vessel noise effects on narwhal were anticipated to be limited to temporary, localized avoidance behaviour.
- Group size: Of the different narwhal group types, only mixed groups with immatures were shown to temporarily associate in slightly larger groups when within 4 Km of vessels. For the other group types, effect sizes were small and did not suggest a biologically significant effect. While mother-immature pairs had a large effect size, data in close proximity to vessels were limited, and additional focal follow surveys are recommended to increase sample size. A change in group cohesion (e.g., change in group size) by narwhal would be consistent with a moderate severity behavioural response (Southall et al., 2021). Given the temporary nature of the effect evident for only mixed groups with immatures (i.e., increase in group size when within 4 km of a vessel), this finding was not anticipated to result in a significant alteration of natural behavioural patterns by narwhal in the RSA or disruption to their daily routine. The noted response was shown to be short in duration, equivalent to a maximum period of 28 min per vessel transit (based on a 9-knot travel speed, assuming narwhal remained stationary during exposure), with animals returning to their pre-response behaviour shortly following the initial vessel exposure (i.e., a temporary effect). Accordingly, no effects were anticipated on the individual fitness and/or vital rates of narwhal in the RSA, which may ultimately affect population parameters. This response was in line with impact predictions made in the FEIS for the ERP, in that vessel noise effects on narwhal were anticipated to be limited to temporary, localized avoidance behaviour.
- Group travel speed: Narwhal did not significantly alter their travel speed in response to vessel traffic. A change in energy expenditure (e.g., change in travel speed) by narwhal would be consistent with a moderate severity behavioural response (Southall et al., 2021), though no such change was evident. The lack of response was supportive of impact predictions made in the FEIS

for the ERP, in that vessel noise effects on narwhal were anticipated to be limited to temporary, localized avoidance behaviour.

Detailed results of the 2022 Bruce Head Shore-based Monitoring Program are presented in WSP (2023e).

h. Not applicable in 2022.

TRENDS

a. Not applicable in 2022.

b. Inuit have been involved in monitoring studies at all levels since the inception of the program, with the exception of the 2020 to 2021 monitoring 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-based companies has increased the participation of Inuit in this process. Prior to the COVID-19 Pandemic, Inuit participation in Baffinland's monitoring programs had increased in 2019 (6,500 hours / 23 participants in 2019) compared to 2017 (2,265 hours / 12 participants) and 2018 (1,610 hours / 9 participants). Inuit engagement also progressed to include training in data analysis and reporting in 2019. Due to he COVID-19 Pandemic Inuit participation was not possible in 2020 and was resumed, with limited participation, in 2021. In spite of limited involvement in 2021, Inuit participation consisted of a total of 1,922 hours / 10 Inuit participants for the 2021 monitoring programs. Inuit participation in the 2022 monitoring programs was consistent with levels prior to the COVID-19 Pandemic and consisted of a total of 3,180 hours / 12 participants. Modifications to the terms and conditions associated with the Production Increase Proposal in 2022 also encourages participants from the other four impacted HTOs/HTAs to participate in the MEWG should they wish to do so.

c. Engagement with Inuit community members with respect to monitoring protocols applied within the marine-based monitoring programs has continued to increase on an annual basis, with the exception of some alterations and timing of engagement during the 2020 to 2021 seasons given restrictions associated with the COVID-19 Pandemic.

d. Not applicable in 2022.

e. Results from the 2022 narwhal abundance aerial survey (Leg 2) indicated that: i) narwhal abundance in Eclipse Sound was statistically higher in 2022 than the previous year (2021), although still statistically lower than in 2016 and 2019, and ii) the combined narwhal abundance in Eclipse Sound and Admiralty Inlet was similar in 2022 to what was observed in recent years (2013, 2019 and 2020). These results suggest a portion of the Eclipse Sound stock continued to occupy the Admiralty Inlet summering ground during the summer of 2022.

f. Not applicable in 2022.

g. A summary of trends observed in the integrated nine-year Bruce Head Shore-based Monitoring Program is presented above under Results – see Results (g).

h. Not applicable in 2022.

RECOMMENDATIONS / LESSONS LEARNED

a. Not applicable in 2022.

b. Marine monitoring programs will continue increasing Inuit involvement in field monitoring and data reporting whenever possible.

c. Baffinland will continue to engage with the MEWG, HTOs and local Inuit in 2023 with regards to marine monitoring programs to ensure responsiveness to Inuit concerns. Continuous communication with the HTOs and Inuit communities will continue in 2023.

d. Not applicable in 2022.

e. Given that the combined stock estimate for Admiralty Inlet and Eclipse Sound indicated that the regional narwhal population remained stable relative to pre-shipping conditions, and in consideration of the available IQ regarding the degree of exchange between narwhal groups on their summering grounds (NWMB 2016a, 2016b; QWB, 2022), the observed changes in narwhal abundance in Eclipse Sound in recent years likely reflects a natural exchange between the two putative stock areas that began prior to Baffinland shipping operations, with animals shifting between Eclipse Sound and Admiralty Inlet based on where habitat conditions may be more favorable that season (e.g., ice coverage, prey availability, predation pressure). With the recent influence of rapidly warming ocean temperatures and longer open-water seasons due to climate change, more pronounced changes in habitat conditions are to be expected throughout the Arctic along with commensurate changes in animal distributions and migratory movements. For example, it is well documented that sea ice in the Arctic is presently undergoing rapid reduction due to climate warming (Stroeve et al., 2012; IPCC, 2013; Overland and Wang 2013) and this has been directly associated with notable shifts in species distributions for Arctic marine mammals (Laidre et al., 2008, 2015; Frederiksen and Haug, 2015; Nøttestad et al., 2015; Víkingsson et al., 2015; Albouy et al., 2020; Chambault et al., 2022;) and their prey (Frainer et al., 2017; Steiner et al., 2019, 2021; Møller and Nielsen, 2020). How this might be manifesting on a micro-geographic scale in the North Baffin region is presently unclear, although some insight is offered when considering changes reported in other Arctic environments in close proximity to Eclipse Sound.

   Two major oceanographic changes have recently been observed in coastal areas of Southeast Greenland; a lack of pack ice in summer and increasing sea temperature (NAAMCO, 2021). This has had cascading effects on the marine ecosystem, as observed through shifts in fish species assemblages in the region (i.e., change in fish community structure) and previously undocumented occurrences of temperate water cetaceans in Southeast Greenland in high abundances (e.g., humpback whales, fin whales, killer whales, pilot whales and white beaked dolphins). Traditional narwhal habitat in this area has become restricted by the warming oceans and the ability of narwhal to adapt to warming water temperatures is also limited due to their general physiology. Shifts in narwhal distribution in Greenland have also been documented in recent years, with multiple sightings of narwhal in locations well north of their traditional range (e.g., Dove Bay, Greenland Sea, Northeast water and Petermann glacier front) (NAAMCO, 2021). Current evidence suggests that a combination of hunting and climate change is negatively impacting the long-term viability of populations in Southeast Greenland (NAAMCO, 2021).

   A recent study by Chambault et al. (2022) predicted the future distribution of Eastern Baffin Bay narwhal under two different climate change scenarios using narwhal satellite tracking data collected over two decades. The long-term predictive models suggested that the current distribution of Baffin Bay narwhal during summer will undergo a northward shift of more than 200 km by the end of the century in order to

cope with climate change, and that summer narwhal habitats in this region are predicted to decline from 31 to 66% over this period depending on the climate model. These changes may already be underway in the Eastern Canadian Arctic and may affect Eclipse Sound and Admiralty Inlet differently.

For the above reasons, the potential for climate-driven shifts in species distributions cannot be ignored as a potential driver of the recently observed changes in summer narwhal distribution in Eclipse Sound. To better understand what is occurring, additional engagement and monitoring with Inuit stakeholders and regulatory agencies are needed, inclusive of collaborative regional scale monitoring that looks at the population dynamics of the entire Baffin Bay narwhal stock. No ringed seal aerial surveys along the Northern Shipping Route were conducted in 2022 or planned for 2023. Baffinland will continue to collect ringed seal aerial survey data in the RSA at an appropriate sampling frequency throughout the life of the Project to continue to monitor and evaluate this potential impact pathway for ringed seal.

f. Although the current phase of the Project does not involve breaking of landfast ice, Baffinland acknowledges past 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 conducted a ringed seal aerial survey program in 2021 along the Northern Shipping Route 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 results of the 2021 survey indicate that ringed seal densities in the RSA are stable relative to 2016 survey estimates since the onset of shipping or ice-breaking activities in the RSA, with some natural inter-annual variation expected. No ringed seal aerial surveys along the Northern Shipping Route are planned for 2023.

g. With respect to future monitoring initiatives for the Bruce Head Shore-based Monitoring Program, Baffinland will consult with the MEWG on making the following changes to the programs:

- Increase emphasis on the UAV survey component of the Program, given the valuable insight this tool provides with respect to monitoring changes in fine scale behaviours in the presence of shipping. UAV surveys provide a detailed and permanent record of key narwhal behaviours (i.e., nursing, resting, socializing, sexual displays) that may not otherwise be quantifiable by shore-based visual methods. For example, one of the benefits of the focal follow surveys is an enhanced ability to monitor for moderate to high severity responses such as change in nursing or signs of aggression. While the sample size of surveys conducted with narwhal in close proximity to ships remains low, increasing the sample size through future UAV surveys will increase the statistical power to more fulsomely evaluate changes in key narwhal behaviours in response to shipping. Furthermore, UAV survey methods allow for increased data collection at the closer vessel approach distances (i.e., 0–2 km range) compared to the BSA study design because focal follow surveys can be undertaken directly on the shipping lane; whereas vessels no longer approach at close distances to the BSA given the present location of the shipping lane (which was adjusted further eastward in 2020).

- Continue to undertake additional analyses of the aerial survey data for specific evaluation of the EWI metric (using the dedicated 1,000 ft survey data which was collected for this purpose) to compare with findings of the EWI analysis conducted using the Bruce Head shore-based data.

h. Not applicable in 2022.

Project Certificate Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	Not applicable
Reference	Baffinland Corporate Website – Operation – Shipping and Monitoring
Ref. Document Link	https://www.baffinland.com/operation/shipping-and-monitoring/

METHODS

Baffinland has contracted Spire Shipview® (previously known as 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, seven (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 snapshots 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, in 2022 Baffinland continued its Shipping Monitor Program, 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 Spire Shipview®, and in relation to reported marine mammal sightings (as shared by residents of Pond Inlet through marine Very High Frequency (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

Ten (10) Shipping Monitors from Pond Inlet, consisting of part-time and full-time employees (and returning from previous year(s)) and an intern supported the shipping season in 2022 (see Photos 27 and 28 in Appendix D). The Shipping Monitors provide up to date information on a daily basis (or as relevant) regarding shipping activities throughout the entirety of the shipping season. Baffinland has made vessel routing accessible to the public via the Baffinland website. Baffinland continues to maintain an Automatic Identification System (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. This provides live continuous monitoring of vessels active in the Northern Shipping Route to all office visitors during office hours (8am to 5pm). 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 Spire Shipview® 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 2023, and to continue the hiring of Shipping Monitors over the entire duration of the shipping season.

Project Certificate Term and 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	The Proponent shall report annually to the NIRB regarding project-related ship track and sea ice information, including: a. A record of all ship tracks taken along both shipping routes covering the entire shipping season; b. When employing ice-breaking, an overlay of ship tracks onto ice imagery to determine whether ships are effectively avoiding shore leads and polynyas; c. 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; d. An assessment of the level of adherence to the nominal shipping route and the spatial extent of the shipping zone of influence; and e. When employing ice-breaking, marine bird and mammal species and number of individuals attracted to ship tracks in ice.
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	To be provided in the Annual Report to the NIRB.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Nunavut Impact Review Board
Reference	Daily Ice Charts (Canadian Ice Service, 2022) 2022 Marine Mammal Aerial Survey Program (WSP, 2023d) All Project-related Vessel Transits Along the Northern Shipping Route During 2022 (Figure 4.14) 2018 Annual Report to the Nunavut Impact Review Board. (Baffinland, 2019g) 2022 Daily Ship Tracks with Ice Imagery 2022 Incidental Marine Mammal Sightings
Ref. Document Link	https://www.baffinland.com/operation/shipping-and-monitoring/ https://www.baffinland.com/media-centre/document-portal/ Appendix G.6.1 Appendix G.6.4

METHODS

a. 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 (Spire ShipView™ [previously 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-related 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 (2022) 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. The Ship-based Observer (SBO) Program was not implemented in 2022 due to no icebreaking during the spring shoulder season (precautionary mitigation) and due to an earlier than anticipated end to the shipping season due to the presence of multi-year ice (all vessels left the RSA on October 13). Baffinland continues to collaborate with the Marine Mammal Observation Network (MMON) to run a marine mammal incidental sightings program through the participation of vessels contracted by Baffinland, the MSV *Botnica*, Nordic Bulk Carriers and Oldendorff 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, 2019g). In 2021, MMON made available a new whale identification training to participating vessels through an online link, https://observers.navigatingwhales.ca/. Vessel crews unable to take the online training were also provided offline training.

   No early season icebreaking was conducted by Baffinland in 2022. An aerial clearance survey, for identifying the risk for marine mammal ice entrapment in the region, was not completed in the RSA at the end of the shipping 2022 shipping season due to earlier than anticipated end of shipping season due to the presence of multi-year ice (all vessels left the RSA on October 13) (WSP, 2023d).

RESULTS

a. Recorded 2022 Project-related vessel tracks are plotted in Figure 4.14.

b. Figures showing daily Project-related vessel tracks overlaid on ice imagery for both the early and late 2022 shoulder seasons (July 28 to September 1 and September 28 to 20 October) are presented in Appendix G.9. These figures demonstrate that Project vessels actively avoided shore leads, polynyas and areas of high ice concentrations during their transits in Baffin Bay and the RSA.

c. Project vessel tracks from 2022 are plotted in Figure 4.14. Project vessels are required to leave the nominal shipping route near Ragged Island to access established anchorages at that location (Figure 4.14). The Project vessel tracks shown deviating from the nominal shipping route within Eclipse Sound (e.g., ELENA VE and ZELADA DESGAGNES) were due to the presence of multi-year ice in the RSA (that had drifted in from Navy Board Inlet) during the period of October 5 through October 13 (see Figure 4.14 and Appendix G.9). The ROSAIRE A. DESGAGNES and ROSSI A. DESGAGNES were both on contract to external parties (community resupplies) before they were contracted by Baffinland for provisions to Milne Port and thus approached Eclipse Sound via Navy Board Inlet. Apart from these instances, there were no major Project-

related vessel deviations from the nominal shipping route in the RSA during the 2022 shipping season (see PC TerM and Condition No.-120). Also note that tracks crossing land (i.e. straight lines across Ragged Island and Bruce Head) are due to gaps in satellite AiS coverage and do not represent vessel paths.

d. See update to (c) above.

e. A total of fourteen (14) vessels (1 icebreaker and 13 ore carriers) participated in the MMON program in 2022, with sightings recorded in August and September (Table 4.28). The majority of incidental sightings (50%) were made by the MSV Botnica in the Regional Study Area. Most sightings (67%) consisted of ringed seal (Table 4.29). Two (2) whale species (narwhal and bowhead) were also recorded. Appendix G.6.1 includes the locations of marine mammal sightings recorded in the RSA by the MMON program in August and September, 2022.

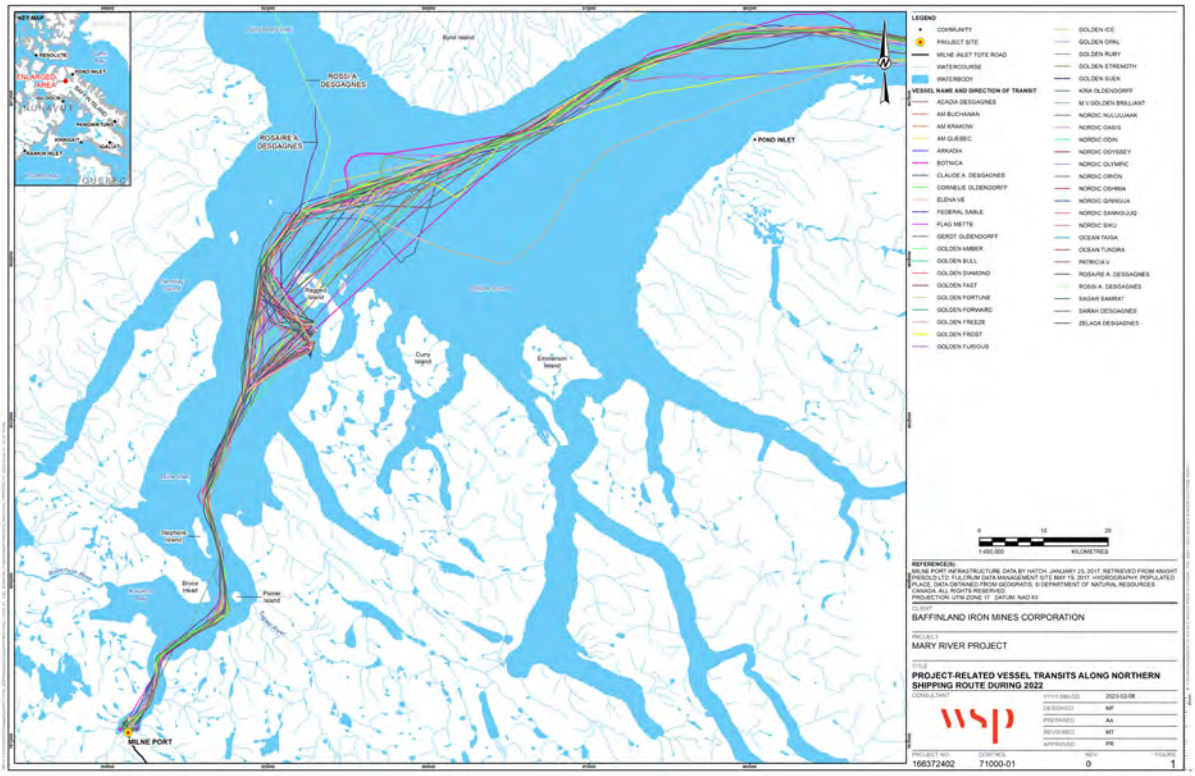


Figure 4.1: All Project-Related Vessel Transits Along Northern Shipping Route During 2022

TRENDS

No unplanned deviations from the nominal Northern Shipping Route in the RSA were undertaken by Project ore carriers during the first eight (8) years of iron ore shipping in this area (2015 to 2022).

Table 4.5: Number of Marine Mammal Sightings in the Regional Study Area by Participating Vessel, August to September, 2022

Vessel Name	No. of Sightings	Total No. of Individuals	Month of Sighting
MSV Botnica	3	4	August
Nordic Nuluujaak	1	5	September
Nordic Oasis	0	-	-
Nordic Odin	1	2	September
Nordic Odyssey	0	-	-
Nordic Olympic	0	-	-
Nordic Orion	1	1	August
Nordic Oshima	0	-	-
Nordic Qinngua	0	-	-
Nordic Sanngijuq	0	-	-
Nordic Siku	0	-	-
Cornelie Oldendorff	0	-	-
Gerdt Oldendorff	0	-	-
Kira Oldendorff	0	-	-
Total	**6**		

Note:
A sighting refers to when a minimum of one individual was recorded at a specific location by a participating vessel during its transit along the Northern Shipping Route.

Table 4.6: Summary of Marine Mammal Sightings in the Regional Study Area, August to September, 2022

Species	No. of Sightings	Total No. of Individuals	Month of Sighting
Bowhead	1	1	August
Narwhal	1	5	September
Ringed Seal	4	6	August, September
Total	**6**	**12**	

Note:
A sighting refers to when a minimum of one individual was recorded at a specific location by a participating vessel during its transit along the Northern Shipping Route.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to monitor Project vessel movements in the RSA using the shore-based AiS stations at Pond Inlet and Bruce Head, and satellite-based AiS using the Spire ShipView™ 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 the use of notification alerts. Participation in the MMON program is also expected to continue into 2023.

Project Certificate Term and 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	Subject to safety considerations and the potential for conditions as determined by the crew of transiting vessels, to result in route deviations: 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. 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.
Relevant Baffinland Commitment	Not Applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Not applicable
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

a. Not applicable

a. Project-related vessel tracks and associated speeds along the Northern Shipping Route are recorded throughout the shipping season using the Automatic Identification System (AiS) on ships. AiS is a digital positional awareness system that integrates a standardized Very High Frequency (VHF) transceiver with a Global Positioning System (GPS) receiver installed on marine vessels, along with other onboard electronic navigation sensors, such as a gyrocompass or rate of turn indicator. Vessels fitted with dedicated AiS transceivers can be tracked by AiS base stations located along coastlines or, when out of range of terrestrial networks, through satellites fitted with special AiS receivers. The purpose of the AiS system is to allow vessels, maritime authorities and/or other third parties to track and monitor vessel movements in a defined area in relation to navigational markers and bathymetric features. In Canada, all self-propelled vessels of ≥150 gross tonnage carrying more than 12 passengers are required to carry Class A AiS systems, as per the

federal *Navigation Safety Regulations* (SOR/2005-134). The International Maritime Organization Convention for the Safety Of Life At Sea (SOLAS) Regulation V/19.2.4 requires all vessels of 300 gross tonnage (GT) and above engaged on international voyages and all passenger ships irrespective of size to carry AiS onboard. AiS signals emitted by Project vessels transiting in the RSA are recorded by shore-based stations set up at Pond Inlet and Bruce Head; and when out of range of the base stations, through satellite-based AiS receivers (Spire [previously exactEarth®] ShipView™ 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. Project-related vessel tracks from 2022 are plotted in Figure 4.14. Project vessels are required to leave the nominal shipping route near Ragged Island to access established anchorages at that location (Figure 4.14). The Project vessel tracks shown deviating from the nominal shipping route within Eclipse Sound (e.g., ELENA VE and ZELADA DESGAGNES) were due to the presence of multi-year ice in the RSA (that had drifted in from Navy Board Inlet) during the period of October 5 through October 13 (see Figure 4.14 and Appendix G.9). The ROSAIRE A. DESGAGNES and ROSSI A. DESGAGNES were both on contract to external parties (community resupplies) before they were contracted by Baffinland for provisions to Milne Port and thus approached Eclipse Sound via Navy Board Inlet. Apart from these instances, there were no major Project-related vessel deviations from the nominal shipping route in the RSA during the 2022 shipping season (see PC Term and Condition No. 103 and 120).

TRENDS

a. Not applicable in 2022.

b. No unplanned deviations from the nominal Northern Shipping Route in the RSA were undertaken by Project ore carriers during the first eight years of iron ore shipping in this area (2015 to 2022).

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 Spire ShipView™ 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 and monitoring by Shipping Monitors based in Pond Inlet.

Project Certificate Term and Condition No. 105

Category	Marine Environment - Traffic Log and Shipping Information
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operation
Objective	To prevent impacts to marine wildlife from Project shipping activities.
Term or Condition	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: 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. b. Reduced shipping speeds where ship-marine mammal interactions are most likely. 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.
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	Standing Instructions and General Information for Masters of Vessels Loading at Milne Inlet Port (Fednav, 2022) 2022 Marine Mammal Aerial Survey Program Report (WSP, 2023d) 2022 Bruce Head Shore-based Monitoring Program Report (WSP, 2023e) 2022 Underwater Acoustic Monitoring Program (Open-Water Season) - Report (Austin et al., 2023) 2022 Shipping and Marine Wildlife Management Plan (Baffinland, 2022g) 2022 MEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.1 Appendix G.6.5 Appendix G.6.6 Appendix G.6.8

METHOD

a. Several mitigation measures, 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 are identified in Baffinland's Shipping and Marine Wildlife Management Plan (Baffinland, 2022g) including:

- Defined shipping lane throughout the RSA.
- Maintain constant speed and course when possible.
- All Project vessels will reduce speeds to a voluntary maximum of 9 knots when travelling within the RSA.
- No breaking of landfast ice will occur in the spring or fall shoulder season.
- No icebreaking to commence the 2022 shipping season. Ore carriers will not begin their transit to Milne Port until 3/10ths or less ice is present along the entire shipping route through the Nunavut Settlement Area (NSA) from the entrance of Eclipse Sound and Milne Port.
- 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.
- Vessels awaiting instructions from the Port Captain to enter the RSA will be instructed to wait in Baffin Bay at least 40 km east of the NSA.
- No more than 80 ore carriers will be chartered during the 2022 season to transport up to 6 Mtpa.
- Baffinland will place Marine Wildlife Observers (via the SBO Program) on icebreaking vessels during the fall shoulder season that will be responsible for recording relative abundance, group composition and behaviour of marine mammals, and if relevant any incidences of marine mammal strike of near misses with Project vessels.
- Use of convoys throughout the 2022 season to further reduce total sound exposure. Baffinland proposed to target a 15% reduction in overall independent one way transits by implementing convoys.
- 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).

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 2022, monitoring programs included the 2022 Bruce Head Shore-based Monitoring Program (WSP, 2023e), the

2022 Marine Mammal Aerial Survey Program (WSP, 2023d), and the 2022 Passive Acoustic Monitoring (PAM) Program (Austin et al., 2023; Appendix G.6.6). The SBO Program was not conducted in 2022 because of the absence of icebreaking during the spring shoulder season and the unanticipated early end of the shipping season in October.

b. Baffinland's Standing Instructions to Masters (SITM; Fednav, 2022) 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 (2) shore-based AiS base stations installed along the Northern Shipping Route (at Bruce Head and Pond Inlet).

c. Not Active. Not applicable in 2022 as the Project component related to the Southern Route is not active.

RESULTS

a. Mitigations outlined in the methods section above were successfully implemented by Baffinland in 2022.

The use of convoys as a mitigation method was implemented for the first time in 2022. In total, 31 Project vessel transits included the use of convoys. Two of these convoys extended from Baffin Bay to Milne Port, 24 extended from Baffin Bay to Ragged Island, two extended from Ragged Island to Milne Port, and three extended from Milne Port to Baffin Bay. The use of convoys resulted in a 20% reduction in transits in the RSA in 2022.

b. Table 4.30 presents vessel speed information for all Project-related vessels calling at Milne Port in 2022. A total of 62 ore carrier voyages (comprising 35 ore carrier vessels), 8 freight vessels/tanker voyages (comprising 6 vessels), 2 tugs, and 1 icebreaker called to Milne Port during the 2022 shipping season. Project vessels traveled below the 9-knot speed limit for 99.8% of their transit period in the RSA (Table 4.31). The maximum recorded travel speed for an ore carrier in 2022 was 10.8 knots. The maximum recorded speed for a freight / fuel tanker in 2022 was 9.2 knots. The proportional breakdown of vessel travel speed in the RSA during the 2022 shipping season is presented for all vessels combined (ore carriers and cargo/fuel vessels) in Figure 4.15.

c. Not Active. Not applicable in 2022 as the Project component related to the Southern Route is not active.

Table 4.7: Recorded Speeds of Project Vessels transiting along Northern Shipping Route, 2022

Vessel Name	No. of Round Trips	Vessel Type	Max Speed (knots)	Median Speed (knots)	% of travel >9 knots	% of travel >10 knots
AM BUCHANAN	1	Ore Carrier	8.9	7.8	0	0
AM KRAKOW	1	Ore Carrier	8.9	8.2	0	0
AM QUEBEC	1	Ore Carrier	9.1	7.3	0.19	0
ARKADIA	2	Ore Carrier	9	7.7	0	0
CORNELIE OLDENDORFF	1	Ore Carrier	9.1	7.7	0.14	0
ELENA VE	2	Ore Carrier	9.5	7.9	0.13	0

Vessel Name	No. of Round Trips	Vessel Type	Max Speed (knots)	Median Speed (knots)	% of travel >9 knots	% of travel >10 knots
FLAG METTE	1	Ore Carrier	9.2	7.4	0.43	0
GERDT OLDENDORFF	1	Ore Carrier	9.1	7.8	0.13	0
GOLDEN AMBER	2	Ore Carrier	8.9	7.4	0	0
GOLDEN BULL	2	Ore Carrier	9.2	8.1	0.02	0
GOLDEN DIAMOND	1	Ore Carrier	8.9	7.7	0	0
GOLDEN FAST	2	Ore Carrier	9.2	7.8	0.02	0
GOLDEN FORTUNE	1	Ore Carrier	8.8	7.7	0	0
GOLDEN FORWARD	1	Ore Carrier	8.9	7.9	0	0
GOLDEN FREEZE	2	Ore Carrier	9	8	0	0
GOLDEN FROST	2	Ore Carrier	9.4	8	0.46	0
GOLDEN FURIOUS	2	Ore Carrier	8.8	8.3	0	0
GOLDEN ICE	2	Ore Carrier	10.3	6.6	0.10	0.03
GOLDEN OPAL	2	Ore Carrier	9.1	8.2	0.01	0
GOLDEN RUBY	2	Ore Carrier	8.9	7.4	0	0
GOLDEN STRENGTH	2	Ore Carrier	8.8	7.5	0	0
GOLDEN SUEK	2	Ore Carrier	10.8	7.7	0.08	0.08
KIRA OLDENDORFF	1	Ore Carrier	9	7.8	0	0
M.V.GOLDEN BRILLIANT	2	Ore Carrier	9.1	7.8	0.03	0
NORDIC NULUUJAAK	2	Ore Carrier	8.8	7.7	0	0
NORDIC OASIS	2	Ore Carrier	9.1	8.1	0.01	0
NORDIC ODIN	2	Ore Carrier	8.9	8	0	0
NORDIC ODYSSEY	2	Ore Carrier	8.9	8	0	0
NORDIC OLYMPIC	3	Ore Carrier	9	7.5	0	0
NORDIC ORION	3	Ore Carrier	9.3	8.5	0.29	0
NORDIC OSHIMA	2	Ore Carrier	8.9	7.7	0	0
NORDIC QINNGUA	2	Ore Carrier	9.8	7.9	0.29	0
NORDIC SANNGIJUQ	2	Ore Carrier	9.1	8.3	0.10	0
NORDIC SIKU	2	Ore Carrier	8.8	7.9	0	0
SAGAR SAMRAT	2	Ore Carrier	9	7.9	0	0
ROSSI A. DESGAGNES	1	Fuel Tanker	9.2	8.2	3.66	0
SARAH DESGAGNES	3	Fuel Tanker	9.2	8.4	0.29	0

Vessel Name	No. of Round Trips	Vessel Type	Max Speed (knots)	Median Speed (knots)	% of travel >9 knots	% of travel >10 knots
ACADIA DESGAGNES	1	General Cargo	9.1	8.5	0.72	0
CLAUDE A. DESGAGNES	1	General Cargo	8.8	8.3	0	0
ROSAIRE A. DESGAGNES	1	General Cargo	9.1	9.0	0.87	0
ZELADA DESGAGNES	1	General Cargo	8.9	8.5	0	0
BOTNICA	4	Ice Breaker	9.1	8.2	0.03	0
OCEAN TAIGA	1	Tug	10.1	6.8	0.11	0.01
OCEAN TUNDRA	1	Tug	9.6	7.1	0.18	0

Table 4.8: Proportion of Travel Time in RSA Relative to Speed Restriction – 2022 Shipping Season

Project Vessel Type	% of travel in the RSA <9 knots	% of travel in the RSA <10 knots
Ore carriers	99.9	100.0
Cargo / freight vessels	99.8	100.0
Fuel tankers	99.4	100.0
Tugs	99.9	100.0
MSV Botnica	100.0	100.0
Total	**99.9**	**100.0**

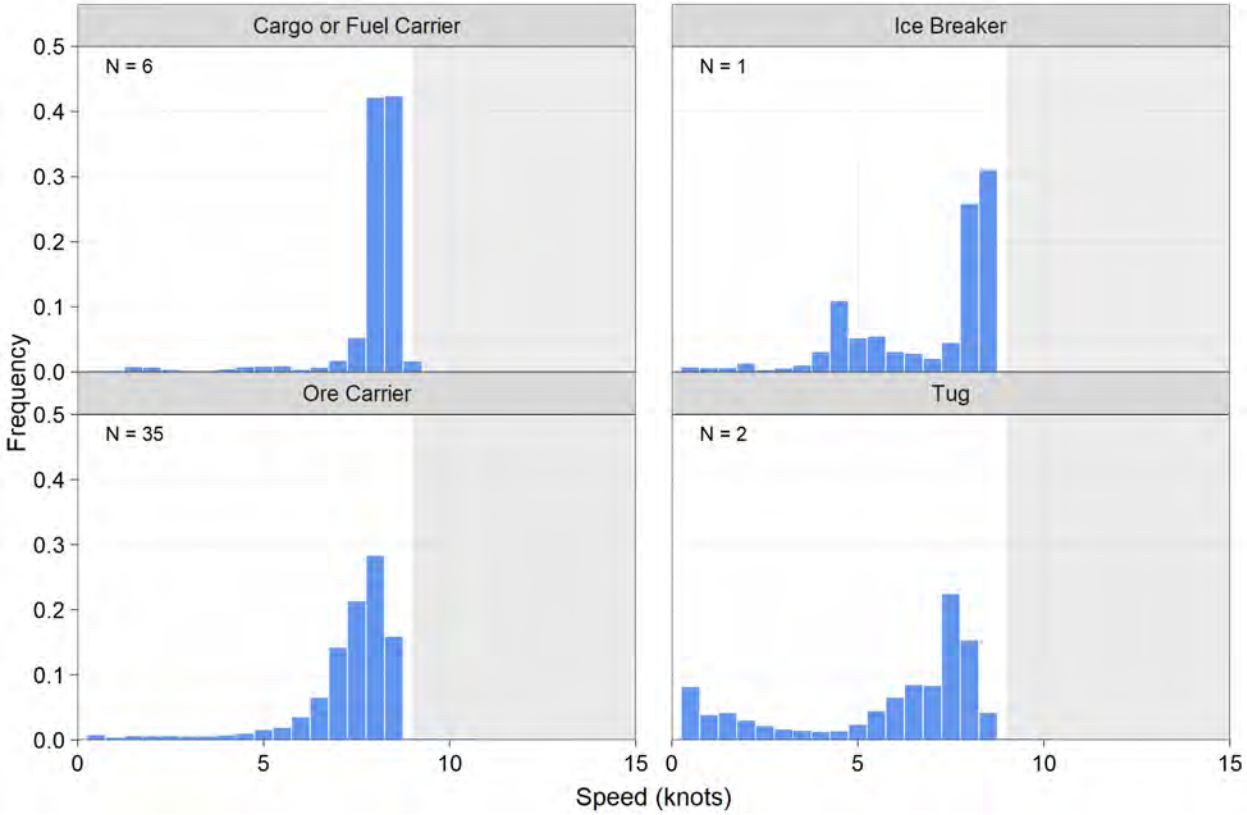


Figure 4.2: Proportional Ship Travel Speed for all Project-related Vessels - 2022 Shipping Season

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 FEIS Addendum, 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, use of convoys, etc.) are demonstratively effective at managing Project incremental effects from shipping on narwhal in the RSA.

b. There has been a marked improvement by Project vessel operators since 2018 in terms of adherence to the 9-knot speed restriction in the RSA. This has been largely the result of continuous improvements in 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 4.32 provides the proportion of time Project vessels transited under 9 knots in the RSA for the 2018 to 2022 shipping seasons.

Table 4.9: Proportion of Travel Time in RSA Relative to 9-knot Speed Restriction – 2018 to 2022 Shipping Seasons

Project Vessel Type	2018	2019	2020	2021	2022
Ore carriers	93.7	99.3	98.5	99.7	99.9
Cargo / freight vessels	79.0	93.6	99.9	99.8	99.8
Fuel tankers	79.0	98.2	100	99.0	99.4
Tugs	85.7	94.5	97.4	95.7	99.9
MSV Botnica	92.5	99.7	99.8	99.99	100.0
TOTAL	**92.2**	**97.8**	**99.0**	**99.0**	**99.9**

c. Not Active. Not applicable in 2022 as the Project component related to the Southern Route is not active.

RECOMMENDATIONS / LESSONS LEARNED

a. Results from the 2022 Marine Mammal Aerial Survey Program (WSP, 2023d) are consistent with results from the 2022 Bruce Head Shore-Based Program (WSP, 2023e), indicating that narwhal numbers in the RSA are increased from the lower numbers observed in 2021.

b. Given that the combined stock estimate for Admiralty Inlet and Eclipse Sound indicates that the regional narwhal population has remained stable relative to pre-shipping conditions, and in consideration of the available IQ regarding the degree of exchange between narwhal groups on their summering grounds (NWMB, 2016a, 2016b; QWB, 2022), the observed changes in narwhal abundance in Eclipse Sound in recent years likely reflects natural exchange between the two putative stock areas that began prior to Baffinland shipping operations, with animals shifting between Eclipse Sound and Admiralty Inlet based on where habitat conditions may be more favorable that season (e.g., ice coverage, prey availability, predation pressure). With the recent influence of rapidly warming ocean temperatures and longer open-water seasons due to climate change, more pronounced changes in habitat conditions are to be expected throughout the Arctic along with commensurate changes in animal distributions and migratory movements. For example, it is well documented that sea ice in the Arctic is presently undergoing rapid reduction due to climate warming (Stroeve et al. 2012; IPCC 2013; Overland and Wang 2013) and this has been directly associated with notable shifts in species distributions for both Arctic marine mammals (Laidre et al., 2008, 2015; Frederiksen and Haug, 2015; Nøttestad et al., 2015; Víkingsson et al., 2015; Albouy et al., 2020; Chambault et al., 2022;) and their prey (Frainer et al., 2017; Steiner et al., 2019, 2021; Møller and Nielsen, 2020). How this might be manifesting on a micro-geographic scale in the North Baffin region is presently unclear, although some insight is offered when considering changes reported in other Arctic environments in close proximity to Eclipse Sound.

   Two major oceanographic changes have recently been observed in coastal areas of Southeast Greenland; a lack of pack ice in summer and increasing sea temperature (NAAMCO, 2021). This has had cascading effects

on the marine ecosystem, as observed through shifts in fish species assemblages in the region (i.e., change in fish community structure) and previously undocumented occurrences of temperate water cetaceans in Southeast Greenland in high abundances (e.g., humpback whales, fin whales, killer whales, pilot whales and white beaked dolphins). Traditional narwhal habitat in this area has become restricted by the warming oceans and the ability of narwhal to adapt to warming water temperatures is also limited due to their general physiology. Shifts in narwhal distribution in Greenland have also been documented in recent years, with multiple sightings of narwhal in locations well north of their traditional range (e.g., Dove Bay, Greenland Sea, Northeast water and Petermann glacier front) (NAAMCO, 2021). Current evidence suggests that a combination of hunting and climate change is negatively impacting the long-term viability of populations in Southeast Greenland (NAAMCO, 2021).

A recent study by Chambault et al. (2022) predicted the future distribution of Eastern Baffin Bay narwhal under two different climate change scenarios using narwhal satellite tracking data collected over two decades. The long-term predictive models suggested that the current distribution of Baffin Bay narwhal during summer will undergo a northward shift of more than 200 Km by the end of the century to cope with climate change, and that summer narwhal habitats in this region were predicted to decline from 31 to 66% over this period, depending on the climate model. These changes may already be underway in the Eastern Canadian Arctic and may affect Eclipse Sound and Admiralty Inlet differently.

For the above reasons, the potential for climate-driven shifts in species distributions cannot be ignored as a potential driver of the recently observed changes in summer narwhal distribution in Eclipse Sound. To better understand what is occurring, additional engagement and monitoring with Inuit stakeholders and regulatory agencies are needed, inclusive of collaborative regional-scale monitoring to better understand how climate change is impacting the Baffin Bay narwhal population as a whole.

In 2023, Baffinland plans to continue with mitigation measures implemented in 2022 and further evaluate the potential short-term, long-term and cumulative effects of Project-related shipping noise impacts on narwhal during the open-water period.

The following monitoring programs will be considered, in consultation with the MEWG for implementation in 2023:

- 2023 Marine Mammal Aerial Survey Program
- 2023 Bruce Head Shore-based Monitoring Program
- 2023 Ship-based Observer Program
- 2023 Passive Acoustic Monitoring Program

b. In 2023, 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 Spire ShipView™ archive and alerts will be sent to vessels exceeding speed limits and diverting from the shipping lane.

c. Not Active. Not applicable in 2022 as the Project component related to the Southern Route is not active.

Project Certificate Term and 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	Not applicable
Reporting Requirement	As-needed.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	2022 Incidental Marine Mammal Sightings 2018 MEWG Meeting Records (Appendix C.1 in Baffinland, 2019g) 2022 MEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.1 Appendix G.6.4

METHODS

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 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 (Golder, 2020c) and the Bruce Head Shore-based Monitoring Program (WSP, 2023e).

The SBO Program was not implemented in 2022 due to the absence of icebreaking during the spring shoulder season (precautionary mitigation) and an earlier than anticipated end of shipping season due to the presence of multi-year ice along the Northern Shipping Route (all vessels left the RSA on October 13). As an alternative, Baffinland continues

to collaborate with the Marine Mammal Observation Network (MMON) to implement a marine mammal incidental sighting programs through the participation of vessels contracted by Baffinland. Participating contracted vessels include the MSV *Botnica*, Nordic Bulk Carriers and Oldendorff. MMON is a network of observer members that include shipping operators and is intended to collect data on whale and seal sightings during their regular in-season activities.

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 (Appendix C.1 in Baffinland, 2019g). In 2021, MMON made available a new whale identification training program to participating vessels through an online link, https://observers.navigatingwhales.ca/. Vessel crews unable to take the online training were also provided offline training files to be uploaded directly on vessels' Learning Management System.

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 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 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

A total of fourteen (14) vessels from three (3) participating vessel companies participated in the MMON program between July and October 2022 (Table 4.28 in PC Term and Condition No. 103). The majority of sightings (50%) were made by the MSV *Botnica*. Most sightings consisted of ringed seals (67%; Table 4.28 in PC Term and Condition No. 103).

Appendix G.6.4 includes locations of marine mammal sightings in the RSA between months of July to October, 2022.

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 2022. The only seabird strike reported over six years of monitoring occurred during the 2019 SBO Program (Baffinland, 2020g).

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 2023. Baffinland will also continue with its incidental marine mammal sightings program in collaboration with MMON.

Project Certificate Term and 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 seaducks 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 seaduck 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 walruses, 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	2022 MEWG Meeting Records 2022 Incidental Marine Mammal Sightings
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.1 Appendix G.6.4

METHODS

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 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 (Golder, 2020c) and the Bruce Head Shore-based Monitoring Program (WSP, 2023e).

The SBO Program was not implemented in 2022 due to the absence of icebreaking during the spring shoulder season (precautionary mitigation) and an earlier than anticipated end of shipping season due to the presence of multi-year ice along the Northern Shipping Route (the last vessels left the RSA on October 13). However, Baffinland continues to collaborate with the Marine Mammal Observation Network (MMON) to implement a marine mammal incidental

sighting programs through the participation of vessels contracted by Baffinland. Participating contracted vessels include the MSV *Botnica*, Nordic Bulk Carriers and Oldendorff. MMON is a network of observer members that include shipping operators and is intended to collect data on incidental whale and seal sightings during their regular in-season activities.

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 (Appendix C.1 in Baffinland, 2019g). In 2021, MMON made available a new whale identification training program to participating vessels through an online link, https://observers.navigatingwhales.ca/. Vessel crews unable to take the online training were also provided offline training files to be uploaded directly on vessels' Learning Management System.

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 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 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).

Surveillance monitoring programs, other than the SBO Program, 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 Survey Program. Additional information is available in PC Term and Condition No. 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, 2020d). 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 into 2023 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

A total of fourteen (14) vessels from three (3) participating ship owners participated in the MMON program, with sightings recorded in August and September (Table 4.28 in PC Term and Condition No. 103 The majority of sightings (50%) were made by the MSV Botnica in the RSA. Most sightings (67%) consisted of Ringed Seal (Table 4.29). Two whale species (narwhal and bowhead) were also recorded. (Table 4.29 in PC Term and Condition No. 103).

Appendix G.10 includes locations of marine mammal sightings in the RSA between months of August and September, 2022.

Seabird sightings using the ECSAS protocol were again not possible in 2022 since the SBO program did not run.

Baffinland completed early shoulder season marine mammal aerial surveys just prior, during and after the start of the 2022 shipping season. 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 Term and 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 2022. The only seabird strike reported over six (6) years of monitoring occurred during the 2019 SBO Program (Baffinland, 2020d).

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 necessary.

Given the success of the SBO program in prior years, continuation of the program utilizing the MSV *Botnica* will be evaluated for 2023. Baffinland also intends to continue with its incidental marine mammal 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. Field work is currently being planned for 2023.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	2022 MEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.1

METHODS

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 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]). Additionally, Baffinland has partnered with governmental agencies (e.g., ECCC-CWS) and academic researchers from various universities to complete work, which includes data analysis and interpretation by experienced analysts.

The SBO Program was not implemented in 2022 due to the absence of icebreaking during the spring shoulder season (precautionary mitigation) and an earlier than anticipated end of shipping season due to the presence of multi-year ice along the Northern Shipping Route (the last vessels left the RSA on October 13, 2022). Baffinland continues to collaborate with the Marine Mammal Observation Network (MMON) to implement a marine mammal incidental sighting programs through the participation of vessels contracted by Baffinland. Participating contracted vessels include the MSV *Botnica*, Nordic Bulk Carriers and Oldendorff. MMON is a network of observer members that include shipping operators and is intended to collect data on whale and seal sightings during their regular in-season activities. Data collection by participating shipping operators are supported by a Training and Responsible Whale-Watching Guide, an initiative led by MMON, WWF and the St. Lawrence Global Observatory, and developed in close collaboration with numerous partners and funded by DFO. A publically available marine mammal visualization tool has been developed with data obtained through all participating members.

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, 2019g). 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. 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, 2020d). 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 into 2023 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

A total of fourteen (14) vessels (1 icebreaker and 13 ore carriers) from three (3) participating vessel companies participated in the MMON program in 2022 (Table 4.28 in PC Term and Condition No. 103). The majority of incidental sightings (50%) were made by the *MSV Botnica* in the Regional Study Area (RSA). Most sightings (67%) consisted of Ringed Seal (Table 4.29). Two (2) whale species (narwhal and bowhead) were also recorded.

Appendix G.6.4 includes locations of marine mammals sightings in the RSA between months of July to October, 2021.

Seabird sightings using the ECSAS protocol were again not possible in 2022 since the SBO program did not run.

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 2022. The only seabird strike reported over six years of monitoring occurred during the 2019 SBO Program (Golder, 2020d).

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 necessary.

Given the success of the SBO program in prior years, continuation of the program utilizing the MSV *Botnica* will be evaluated for 2023. Baffinland will also continue with its incidental marine mammal 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. Field work is currently being planned for 2023.

Project Certificate Term and Condition No. 109

Category	Marine Environment - Ship Noise
Responsible Parties	The Proponent
Project Phase(s)	Construction and Operation
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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	2022 Underwater Acoustic Monitoring Program (Open-Water Season) – Report (Austin et al., 2023) 2017 - 2018 Integrated Narwhal Tagging Study Report (Golder, 2020c) 2022 Marine Mammal Aerial Survey Program - Final Report (WSP, 2023d) 2022 Bruce Head Shore-based Monitoring Program – Final Report (WSP, 2023e) Early Warning Indicators for Marine Mammals Technical Memorandum (Golder, 2020e) 2022 MEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Baffinland Iron Mines 2022 Annual Report to the Nunavut Impact Review Board (this report): Appendix C.1 Appendix G.6.2 Appendix G.6.5 Appendix G.6.6 Appendix G.6.7 Appendix G.6.8

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 2022 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 are predicted to occur.

In 2022, 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 2022 monitoring programs included the 2022 Bruce Head Shore-based Monitoring Program, the 2022 Marine Mammal Aerial Survey Program (MMASP), the 2022 Underwater Acoustic Monitoring Program, and the 2022 Incidental Marine Mammals Sightings Program. No narwhal tagging was conducted in 2022 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 2022 monitoring programs are available in the respective 2022 annual monitoring reports (WSP, 2023d, 2023e; Austin et al., 2023), with a brief overview provided below (by monitoring program).

2022 Marine Mammal Aerial Survey Program

In 2022, marine mammal aerial surveys were conducted in the North Baffin during the early shoulder season (July) and the peak open-water season (August) as part of the 2022 MMASP. Two different types of marine mammal aerial surveys were performed in 2022. A reconnaissance survey was initially run during the early shoulder season (Leg 1) to collect data on the presence/absence and distribution of marine mammals in the RSA relative to ice conditions at that time of year and prior to the start of shipping activities. A systematic aerial-based transect survey was then conducted during the open-water season (Leg 2) to obtain abundance estimates of the Eclipse Sound and Admiralty Inlet narwhal summer stocks. In 2019 and 2021, visual clearance surveys (Leg 3) were conducted during the fall shoulder season to confirm that no narwhal entrapment events occurred in the RSA following completion of Baffinland's shipping operations along the Northern Shipping Route. No Leg 3 marine mammal aerial survey was conducted at the end of the shipping season (October) in 2020 due to the absence of ice at the end of the shipping season and in 2022 due to the earlier than anticipated end of the shipping season as a result of incoming multi-year ice into the shipping lane through Navy Board Inlet.

DFO and other MEWG members were actively consulted on the study design and data collection methods during 2022 MEWG Meetings (Appendix C.1). Input and recommendations provided by these parties were incorporated into the program. Detailed methodology and analytical procedures of the 2022 MMASP are presented in WSP (2023d).

2022 Bruce Head Shore-based Monitoring Program

Baffinland undertook a shore-based narwhal monitoring program at Bruce Head from 2013–2017[3] and again from 2019 to 2022[4]. The objective of the Bruce Head Shore-based Monitoring Program is to investigate narwhal response

[3] 2013 represented a pilot study year for the shore-based monitoring program.
[4] 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.

to shipping activities along the Northern Shipping Route in Milne Inlet. During the 2022 open-water season, visual survey data were collected from a cliff-based observation platform at Bruce Head overlooking the nominal shipping route. Data were systematically collected on the relative abundance and distribution of narwhal, and on narwhal group composition via shore-based Marine Mammal Observers (MMOs). Narwhal behavioural data were collected using Unmanned Aerial Vehicle (UAV; i.e., drones) to evaluate behavioural responses of narwhal to vessel traffic via focal follow video surveys of individual groups. 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. Detailed methodology and analytical procedures of the 2022 Bruce Head Shore-based Monitoring Program are presented in WSP (2023e).

2022 Underwater Passive Acoustic Monitoring Program

The 2022 Underwater Acoustic Monitoring Program was developed by JASCO Applied Sciences (JASCO), in collaboration with WSP and Baffinland, to evaluate potential Project-related effects to marine mammals from shipping noise. The main objective of this program was to document and characterize ambient and anthropogenic underwater noise levels recorded in 2022 at three acoustic monitoring stations: one in Milne Inlet (the Milne Inlet recorder, AMAR-MI) located along Baffinland's Northern Shipping Route approximately 4 Km south-south-west of Iluvilik (Bruce Head), one at a western floe edge location (western floe edge recorder, AMAR-WFE) 25 km west of Mittimatalik (Pond Inlet), and one at an eastern floe edge location (the eastern floe edge recorder, AMAR-EFE) 55 km east of Pond Inlet. The Milne Inlet recorder was deployed on 13 August and retrieved on 1 October 2022, and recorded continuously. The western and eastern floe edge recorders were deployed on 15 September 2021, recorded continuously for one month then powered off until 7 July 2022 when they recorded continuously for one additional month before retrieval in August 2022. The 2021 floe edge data are considered part of the 2022 underwater acoustic monitoring program dataset for the purposes of this report.

Additional objectives of the program were: to acoustically identify marine mammal species (notably narwhal) present along the Northern Shipping Route in 2022; to evaluate Project-shipping noise levels in relation to established marine mammal acoustic thresholds for injury and disturbance and to compare measured sound levels from shipping activities to modelled estimates used for environmental effects assessment; to characterize the noise footprints for vessel convoys involving transits of two or more Project vessels spaced less than 10 km from each other; and to estimate the extent of Listening Range Reduction (LRR) associated with Project vessels relative to ambient noise levels. Year over year comparisons of the LRR calculations since 2018 were made.

Detailed methodology on data collection and analytical procedures for the 2022 Acoustic Monitoring Program are presented in Austin et. al. (2023).

Ship-based Observer Program/2022 Incidental Marine Mammals Sightings 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 to 2015 and was subsequently resumed in 2018 and 2019. 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 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).

The SBO Program was not implemented in 2022 due to no icebreaking during the spring shoulder season (precautionary mitigation) and earlier than anticipated end of shipping season due to the presence of multi-year ice along the Northern Shipping Route (the last vessels left the RSA on October 13). Baffinland continues to collaborate with the Marine Mammal Observation Network (MMON) to run a marine mammal incidental sightings program through the participation of vessels contracted by Baffinland, the MSV *Botnica*, Nordic Bulk Carriers and Oldendorff 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, 2019g). In 2021, MMON made available a new whale identification training program to participating vessels through an online link, https://observers.navigatingwhales.ca/. Vessel crews unable to take the online training were also provided offline training files to be uploaded directly on vessels' Learning Management System.

Determination of Habituation

With respect to the third component of this condition 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 behavioural 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 subsequent ERP addenda for the Project, and as observed for narwhal in the integrated monitoring programs, then the PC 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, 2020), and more typically only occurs for a maximum of 28 minutes. 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 stimulus. 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 2022 monitoring programs are available in the respective 2022 annual monitoring reports (WSP 2023d, 2023e; Austin et al., 2023), with a brief overview provided below (by monitoring program).

2022 Marine Mammal Aerial Survey Program

A total of eight (8) different species of marine mammals were observed during the 2022 aerial surveys: narwhal, bowhead whale, beluga whale, ringed seal, harp seal, bearded seal, walrus, and polar bear.

At the beginning of the Leg 1 survey program, open water was present in the central portion of Navy Board Inlet, south Milne Inlet (Assumption Harbour and Koluktoo Bay), Tremblay Sound and in Eastern Eclipse Sound (i.e., Pond Inlet strata). By the end of the Leg 1 survey program, open water was present throughout the RSA. Results from the 2022 Leg 1 survey indicated high narwhal numbers at the start of the program (21–24 July) with narwhal numbers dropping during the second half of the program (27 July–1 August). During the first ore carrier transit in the RSA on 30 July 2022, large numbers of narwhal had already migrated through the RSA and the remaining narwhal were primarily concentrated in south Milne Inlet and in Tremblay Sound. Detailed results for Leg 1 surveys are presented in WSP (2023d).

For the Leg 2 surveys, narwhal summer stock abundance was calculated for the Eclipse Sound stock, Admiralty Inlet stock, and the combined Eclipse Sound and Admiralty Inlet stock. The 2022 abundance estimate for the combined Eclipse Sound and Admiralty Inlet stock was 46,408 individuals based on aerial surveys completed on 17–18 August 2022. The 2022 estimate was not statistically different than the 2013 DFO survey (45,532 narwhal), the 2019 Baffinland estimate (38,677 narwhal), or the 2020 Baffinland estimate (36,044 narwhal). The 2022 estimate was statistically lower than the 2021 Baffinland estimate of 75,177 narwhal.

For the Eclipse Sound stock alone, the narwhal abundance estimate for the 2022 open-water season was 4,592 individuals based on averaged abundance estimates from aerial surveys conducted on 17 and 21 August 2022. The 2022 estimate for the Eclipse Sound stock was statistically higher than the 2021 estimate of 2,595 narwhal, indicating that narwhal numbers appear to be increasing from the low numbers seen in 2021. The 2022 estimate was statistically lower than the 2016 estimate of 12,039 narwhal and the 2019 abundance estimate of 9,931 narwhal, indicating that narwhal number in Eclipse Sound have not yet rebounded to 2016 and 2019 levels. The 2022 estimate was not statistically different than the 2013 estimate of 10,489 narwhal or the 2020 estimate of 5,018 narwhal (WSP, 2023d).

Results from the 2022 aerial survey indicate that: i) narwhal abundance in Eclipse Sound was statistically higher than observed in 2021, indicating narwhal numbers appear to be increasing from the low numbers observed in 2021, however, the 2022 abundance was statistically lower than the 2016 and 2019, and not statistically different from 2013 and 2020, and ii) the combined narwhal abundance in Eclipse Sound and Admiralty Inlet was not statistically different from 2013, 2019, and 2020. These findings suggest a portion of the Eclipse Sound stock has occupied the Admiralty Inlet summering grounds during summer surveys in recent years.

2022 Bruce Head Shore-based Monitoring Program

Results from the 2022 Bruce Head Shore-based Monitoring Program are summarized in PC Term and Condition No. 101. Detailed results of the 2022 Bruce Head Shore-based Monitoring Program are presented in WSP (2023e).

2022 Underwater Acoustic Monitoring Program

All underwater recordings were made during open-water shipping periods with no icebreaking activities. Mean broadband sound levels in 2022 (one-minute averaged) were 115.9, 105.2, and 105.4 decibel relative to 1 micropascal (dB re 1 µPa) at the Milne Inlet, western floe edge, and eastern floe edge recorders, respectively (median levels were 100.3, 95.1, and 93.5 dB re 1 µPa). In late 2021, mean broadband sound levels were 112.3 and 109.3 dB re 1 µPa the western and eastern floe edge locations, respectively (median levels were 96.1 and 100.3 dB re 1 µPa). Sound exposure levels (SELs) never exceeded thresholds for acoustic injury to marine mammals (i.e., temporary or permanent hearing loss) at any of the three recording locations. The one-minute averaged Sound Pressure Level (SPL) occasionally exceeded the 120 dB re 1 µPa marine mammal disturbance threshold at each station; for 2.8 % of the 49 days of recording at Milne Inlet, 0.5 % of the 29 days of recording at the western floe edge recorder in 2022 (1.3 % of the 30 days of recording there in late 2021), and 0.4 % of the 29 days of recording at the eastern floe edge recorder in 2022 (1.0 % of the 30 days of recording there in late 2021).

Sounds from three marine mammal species (bowhead, beluga, and narwhal) were identified in the acoustic data, in addition to suspected sounds from pinnipeds. Though the timing for narwhal acoustic detections at Bruce Head was consistent with recordings since 2018, the number of acoustic detections were lower compared to an apparent peak number of detections in 2019. This is consistent with the results of Baffinland's marine mammal aerial survey program (WSP, 2023d), which recorded lower numbers of narwhal in the RSA in 2020 and 2021 compared to 2019. Based on this, it is not likely that the decreased number of acoustic detections is a result of changed acoustic behaviour in 2020–2021 compared to 2019, but rather a product of there being fewer narwhal in the area. Beluga whale acoustic detections were confidently identified following the methodology of Zahn et al. (2021), indicating that beluga were occasionally present in the region amongst or near narwhal. Bowhead whale vocalizations were acoustically detected (and manually validated) occasionally at all stations. Some acoustic signals consistent with those produced by bearded seals and ringed seals were also detected throughout the recordings. All of the detected cetacean species were acoustically present in eastern and western Eclipse Sound at the start of the 2022 recording period, in early July. Calls were detected first at the eastern Eclipse Sound recorder and later at the western Eclipse Sound recorder, indicating that the animals were likely travelling from east to west. Calls decreased at the western Eclipse Sound recorder just prior to the start of the Baffinland shipping season, likely indicating that the animals had continued their migrations past that location.

Vessels were acoustically detected in 32% and 23% of the late 2021 acoustic recordings at the western and eastern floe edge recorders, respectively, and in 20%, 11%, and 14% of the total recordings at the Milne Inlet, western floe edge, and eastern floe edge recorders, respectively, in the 2022 recording periods. Listening range reduction (LRR)—the fractional decrease in the available listening range for marine animals—was computed at each recording station for three frequencies, each representative of different narwhal vocalization types: 1 Kilohertz (kHz; representative of narwhal burst pulses), 5 kHz (representative of whistles and knock trains) and 25 kHz (representative of clicks and high-frequency buzzes). The LRR results for each of the three frequencies are summarized as follows:

1 kHz (burst pulses)

In the late 2021 season, greater than 50% LRR for sound at 1 kHz occurred during 1.1% and 1.7% of the time when vessels were detected (i.e. 0.35% and 0.39% of the respective recording periods) at the western and eastern floe edge recorders, respectively. Greater than 50% LRR for sound at 1 kHz occurred during 5.9%, 3.2%, and 3.6% of the time when vessels were detected (i.e. 1.2%, 0.4%, and 0.5% of the recording period) at the Milne Inlet, western floe edge, and eastern floe edge recorders, respectively in 2022. Ambient noise did not cause appreciable LRR at 1 kHz at any recording station, given the hearing threshold for a narwhal at 1 kHz is higher than the median ambient sound

level at this specific frequency. These LRR values at Milne Inlet are consistent with values computed in the same area between 2019 and 2021, when vessel noise resulted in greater than 50% LRR for sound at 1 kHz during between 1.2% and 1.9% of the total recording durations for those years.

5 kHz (whistles/knock trains)

In the late 2021 season, greater than 50% LRR for sound at 5 kHz occurred during 20.7% and 20.6% of the time when vessels were detected (i.e. 6.6% and 4.7% of the recording period) at the western and eastern floe edge recorders, respectively. Greater than 50% LRR for sound at 5 kHz occurred during 18.1%, 26.1% and 48.2% of the time when vessels were detected (i.e., 3.6%, 2.9%, and 6.7% of the recording periods) at the Milne Inlet, western floe edge, and eastern floe edge recorders, respectively in 2022. Ambient noise resulted in greater than 50% LRR for sound at 5 kHz during 22.6%, and 22.8% of the recording period without vessel noise (i.e. 15.4% and 17.6% of the recording period) at western and eastern floe edge recorders in late 2021, and in 20.8%, 28.9% and 29.6% of the recording period without vessel noise (i.e. 16.6%, 25.7%, and 25.5% of the recording period) at the Milne Inlet, western floe edge, and eastern floe edge recorders, respectively in 2022. These vessel-attributed LRR values at Milne Inlet are lower than the values computed in the same area between 2019 and 2021, when vessel noise resulted in greater than 50% LRR for sound at 5 kHz during between 7% and 8% of the total recording durations in those years. Ambient noise at Milne Inlet resulted in greater than 50% LRR for sound at 5 kHz during between 8% and 18% of the total recording durations in those years, with the results for 2022 falling within that range.

25 kHz (clicks / high frequency buzzes)

In the late 2021 season, greater than 50% LRR for sound at 25 kHz occurred during 14.2% and 2.1% of the time when vessels were detected (i.e. 4.5% and 0.5% of the recording period) at the western and eastern floe edge recorders, respectively. Greater than 50% LRR for sound at 25 kHz occurred during 24.2%, 7.3%, and 13.5% of the time when vessels were detected (i.e., 4.8%, 0.8%, and 1.9% of the recording periods) at the Milne Inlet, western floe edge, and eastern floe edge recorders, respectively in 2022. Ambient noise resulted in greater than 50% LRR for sound at 25 kHz during 19.5% and 1.2% of the recording period without vessel noise (i.e. 13.3% and 0.9% of the recording period) at western and eastern Eclipse Sound in later 2021, and in 28.6%, 20.0% and 11.8% of the recording period without vessel noise (i.e. 22.9%, 17.8%, and 10.1% of the recording period) at the Milne Inlet, western floe edge, and eastern floe edge recorders, respectively in 2022. These vessels attributed LRR values at Milne Inlet are consistent with results in the area from 2021 and are lower than the values computed in 2019 and 2020 (with greater than 50% LRR at 25 kHz occurring for 8–9% of the total recording durations in those years). Ambient noise at Milne Inlet resulted in greater than 50% LRR for sound at 25 kHz during between 10% and 26% of the total recording durations between 2019 and 2021, with the results for 2022 falling within that range.

Overall, the results of 2022 PAM program are consistent with results from previous annual acoustic monitoring programs conducted by JASCO in the regional study area since 2018. The results demonstrate that while noise from Project vessels is detectable in the underwater soundscape, vessel noise exposure is temporary in nature (detectable in at most 32% of the recordings) and below sound levels that could cause acoustic injury. Assessed relative to a broadband SPL of 120 dB re 1 µPa (i.e., the current noise disturbance threshold standard used by industry and government for assessing disturbance to marine mammals by continuous-type sounds such as vessel noise, and the threshold against which this Project was assessed and approved), sound exposure durations averaged less than one hour per day. This is consistent with effects predictions that acoustic impacts would be localized and temporary and that there are substantial periods in each day when marine mammals are not disturbed by Project vessel noise.

2022 Incidental Marine Mammals Sightings Program

Detailed results for the 2022 Incidental Marine Mammals Sightings Pilot Program are presented as part of Summary Sheet for PC Term and Condition No. 103. A total of fourteen (14) vessels participated in the MMON pilot program (Table 4.28 in PC Term and Condition No. 103). The majority of incidental sightings (50%) were made by the MSV Botnica in the Regional Study Area. Most sightings (67%) consisted of Ringed Seal (Table 4.29). Two (2) whale species (narwhal and bowhead) were also recorded (See Appendix G.6.4 for locations of sightings by species).

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, no icebreaking during early shoulder season based on local ice conditions, etc.) are demonstratively effective at managing Project incremental effects from shipping on narwhal in the RSA.

Given that the combined stock estimate for Admiralty Inlet and Eclipse Sound indicate that the regional narwhal population remains stable relative to pre-shipping conditions, and in consideration of the available IQ regarding the degree of exchange between narwhal groups on their summering grounds, the observed decrease in narwhal relative abundance in Eclipse Sound most likely reflects natural exchange between the two putative stock areas, or alternatively, that animals are being displaced from Eclipse Sound due to ecological factors such as changing ice conditions, prey availability and/or predation pressure, all of which are known to be influenced by a rapidly changing climate in the Arctic.

RECOMMENDATIONS / LESSONS LEARNED

In 2023, Baffinland plans to continue with mitigation measures implemented in 2022 and further evaluate the potential short-term, long-term and cumulative effects of Project-related shipping noise impacts on narwhal during the shipping season.

The following monitoring programs will be considered, in consultation with the MEWG for implementation in 2023:

- 2023 Marine Mammal Aerial Survey Program
- 2023 Bruce Head Shore-based Monitoring Program
- 2023 Ship-based Observer Program
- 2023 Passive Acoustic Monitoring Program

Project Certificate Term and Condition No. 110

Category	Marine Environment - Ship Noise
Responsible Parties	The Proponent, Marine Environment Working Group
Project Phase(s)	Construction and Operation
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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	Draft Adaptive Management Plan (Baffinland, 2020i) Narwhal Adaptive Management Response Plan (NAMRP; Baffinland, 2022j) Marine Mammal Trigger Action Response Plan (TARP; Baffinland, 2021k) 2022 Underwater Acoustic Monitoring Program (Open-Water Season) (Austin et al., 2023) Marine Mammal Aerial Survey Program Report (WSP, 2023d) Bruce Head Shore-based Monitoring Program Report (WSP, 2023e) Early Warning Indicators for Marine Mammals Technical Memorandum (Golder, 2020e) 2022 MEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Baffinland Iron Mines 2022 Annual Report to the Nunavut Impact Review Board (this report): Appendix C.1 Appendix G.6.2 Appendix G.6.5 Appendix G.6.6 Appendix G.6.7 Appendix G.6.8

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, Marine Mammal Aerial Survey Program (MMASP), Narwhal Tagging Study, Ship-based Observer (SBO) Program, Ringed Seal Aerial Survey Program, Underwater Passive Acoustic Monitoring (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 4.33. A summary of the marine mammal monitoring activities undertaken in 2022 is presented in PC Term and Condition No. 109.

Table 4.10: Baffinland's Marine Mammal Monitoring Programs Undertaken for Northern Shipping Route (2006 to 2022)

Marine Mammal Monitoring Program	Baseline						ERP (4.2 Mtpa)			ERP (6 Mtpa)				
	2006	2007	2008	2010	2013	2014[1]	2015[1]	2016	2017	2018	2019	2020	2021	2022
Bruce Head shore-based study	—	—	—	—	X	X	X	X	X	—	X	X	X	X
Passive acoustic monitoring	—	—	—	—	—	X	X	—	—	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[2]	—	—	X	X	X	X
Aerial surveys - pinnipeds	X	X	X	—	-	X	—	—	—	—	—	—	X	—
Narwhal tagging study	—	—	—	—	—	—	—	X	X	—	—	—	—	—

Notes:
[1] 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).
[2] DFO 2016 aerial survey data analyzed by Baffinland (Golder, 2018h)

Early Warning Indicator

Baffinland has developed a number of indicators in support of the Project aimed at the rapid identification of adverse impacts on narwhal along the Northern Shipping Route. Many of these indicators, monitored across multiple

monitoring programs, are suitable for the purpose of early detection of adverse effects on narwhal resulting from Project activities and/or other contributing factors in the marine environment (Baffinland, 2021k). Of these, one indicator has been formally identified as an early warning indicator (EWI) for narwhal, based on consolidated input from members of the Marine Environmental Working Group (MEWG) since 2018. This EWI is defined as 'a decrease in the proportion of immature narwhal (defined as calves and yearlings) relative to the observed population'. This EWI was originally proposed by Fisheries and Oceans Canada (DFO) and was also confirmed as being of high importance by the Mittimatalik Hunters and Trappers Organization (MHTO; Golder, 2020e). A detailed description of the EWI selection process is presented in Golder (2020e).

The data used for deriving the EWI is primarily collected as part of the Bruce Head Shore-based Monitoring Program, and specifically from narwhal group compositional data collected in the defined Behavioural Study Area (BSA). The threshold for the EWI was originally defined as a '10% decrease in the proportion of immatures (i.e., calves and yearlings) observed at Bruce Head relative to the lowest available baseline value (0.152 recorded in 2014).' The 10% decrease (0.137) was used to maintain consistency with the threshold level used in the marine mammal impact assessment as per the FEIS (Baffinland, 2012) and the FEIS Addendum (Early Revenue Phase; Baffinland, 2013a). If potential Project-related effects (i.e., shipping noise) were shown to be responsible for an observed exceedance of the threshold (0.137), this would trigger EWI adaptive management practices as summarized in Section 5.4 of Golder (2020e).

As part of the MEWG advisory process, DFO subsequently recommended that an index of variability be incorporated into the EWI calculation, along with an estimate of error associated with this value (Baffinland 2021). The EWI analysis method was thus modified in 2021 to include an index of variability in the EWI calculations. To achieve this, the number of narwhal groups recorded in each sampling year at Bruce Head was divided into ten bins with an equal number of groups assigned per bin. A set of planned contrasts was constructed, so that each sampling year was compared to the average of the 2014–2015 mean least squares. Since the question of interest was whether each sampling year was different from baseline levels (2014–2015) and not whether a difference between years existed, an ANOVA was not run prior to performing the planned contrasts. An effect size was calculated as the difference between each year's least squares mean and the average of the 2014–2015 least squares mean values, expressed as a percentage of the average of the 2014–2015 least squares mean values. The EWI threshold was therefore revised to 'a statistically significant difference between the annual least squares mean value and the average of the 2014–2015 least squares mean values'.

Based on prior monitoring results for narwhal, Baffinland proactively developed and implemented a Narwhal Adaptive Management Response Plan (Baffinland, 2022j), which included a follow-up investigation on the EWI through an analysis of 2020–2022 aerial survey data. The objective was to investigate whether the observed decline in the proportion of immature narwhal at Bruce Head in 2022 was reflected in the Eclipse Sound summer stock regional population. The data sources used for this analysis included targeted photographic survey (1,000 ft altitude) flown in Milne Inlet and Tremblay Sound during the 2022 open-water marine mammal aerial survey program, and equivalent aerial surveys flown in 2020 and 2021. A similar analysis of photographic aerial survey data collected in Admiralty Inlet in 2022 was undertaken to compare the EWI results to an adjacent narwhal summering ground area where Project-related shipping does not occur.

Adaptive Management Protocol

In support of Baffinland's Phase 2 Proposal for the Project, Baffinland developed a draft Adaptive Management Plan (AMP) which provides a framework for how adaptive management is incorporated into Project operations (Baffinland, 2020i). As part of this process, a Marine Mammal Trigger Action Response Plan (TARP) was developed for the Project which identifies a number of performance indicators, effect thresholds and pre-defined actions (i.e., responses) that are used to evaluate and respond to potential Project effects on narwhal and other marine mammal species in the Project area (Baffinland, 2021k). The TARP shares the same objective as the EWI identified above, although uses a broader range of effect indicators that are measured against a series of tiered thresholds (i.e., low, moderate and high-risk thresholds) that are designed to guide short-term and long-term adaptive management strategies. The pre-defined actions identified in the TARP describe the responses that Baffinland would implement should the corresponding threshold levels be exceeded and assuming there is some degree of certainty that the measured change is Project-related. Three levels of action have been identified: low, moderate, and high. These responses range from increased monitoring and data analysis (e.g., trend analysis); identification of possible sources; to risk assessment and/or mitigation. On March 22, 2021, Baffinland released the most current version of the Marine Mammal TARP and Action Toolkits as part of its responses to Post-Hearing Questions related to Phase 2 (Baffinland, 2021k).

RESULTS

Detailed results of the 2022 marine mammal monitoring programs are available in the respective 2022 annual monitoring reports (WSP 2023d, 2023e; Austin et al., 2023), with a brief overview provided (by monitoring program) in PC Term and Condition No. 109.

Early Warning Indicator

During 2022, a total of 1,523 narwhal groups (comprising 5,864 individuals) were observed in the Bruce Head Behavioural Study Area (BSA), including 357 calves and 251 yearlings. The combined annual proportion of immatures relative to the total number of narwhal observed in 2022 was 0.105. This represented a 32% decrease from the 2014 to 2015 baseline condition that was statistically significant from the baseline condition (p=0.041; Table 4.34).

Table 4.11: Change in the Annual Proportion of Immature Narwhal Compared to the 2014 to 2015 Baseline Condition

Year	*P*-value	Effect Size (%)	
		Mean	95% Confidence Interval
2016	0.508	10.4	-20.3 to +41.0
2017	0.602	8.1	-22.5 to +38.8
2018	Not applicable	Not applicable	Not applicable
2019	0.578	8.7	-22.0 to +39.4
2020	0.641	-7.3	-38.0 to +23.4
2021	0.130	-23.9	-54.6 to +6.8
2022	0.041	-32.0	-62.7 to -1.3

When we compare the results from the photographic aerial survey EWI analysis for 2020, 2021, and 2022 to analogous results for Eclipse Sound narwhal derived from 2014 and 2015 photographic aerial surveys (Moulton et al., 2019), we find the proportion of immature narwhal in the Eclipse Sound summer stock area (combined strata) was 0.150 in 2014 and 0.110 in 2015. The proportion of immature narwhal values resulting from aerial surveys conducted in 2020 (0.117), 2021 (0.128), and 2022 (0.124) fall within the range of the proportion of immature estimates for 2014 and 2015. While there appeared to be variability between years, there was no indication that the proportion of immature narwhal in the RSA in 2022 had declined compared to 2020–2021 estimates or 2014–2015 estimates. A statistical comparison between the 2020/2021/2022 proportion of immature narwhal and results derived from Moulton et al. (2019) was not possible as the detailed 2014–2015 dataset was not available for 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 was exceeded in 2022 based on group composition data obtained at Bruce Head. The effect size observed in 2022 (32% decrease in the proportion of immatures relative to all narwhal observed) represents a statistically significant decrease in the EWI. This is similar to 2021 results, in which the relative proportion of immature narwhal observed in the BSA in 2021 (0.102) was significantly lower than the baseline condition. The 2021 and 2022 results indicate an exceedance of the Moderate Risk threshold for this specific indicator, as per the Marine Mammal Trigger Action Response Plan (TARP; Baffinland, 2021k), and that the Risk Status / Threshold trigger has now been observed in at least two consecutive monitoring years. The pre-defined response for exceedance of a moderate risk indictor includes the following: 1) investigate trend over time and consider any uncertainties (i.e., changes in operational processes, potential sources, confounding influences) in a formal Response Plan; and 2) Initiate component specific targeted studies as part of the response planning. Based on prior monitoring results for narwhal, Baffinland proactively developed and implemented a Narwhal Adaptive Management Response Plan (NAMRP; Baffinland, 202jk), which included a follow-up investigation on the EWI through EWI analysis of 2020–2022 aerial survey data using dedicated photographic aerial survey data obtained at 1,000 ft (305 m). Findings from the analysis of 2022 aerial survey data indicated that the proportion of immature narwhal in the Eclipse Sound stock (0.124) was not significantly different than the 2020 and 2021 (0.117 and 0.128, respectively), though this dataset was associated with high variability and low sample sizes, resulting in high uncertainty of the EWI estimates. The 2020, 2021, and 2022 aerial data fell within range of analogous EWI results for Eclipse Sound derived in 2014 and 2015 (0.15 and 0.11, respectively). In summary, there appears to be variability between years, but while the EWI data collected at Bruce Head suggested a localized change in narwhal group composition, the equivalent EWI analysis derived from the spatially broader photographic aerial survey dataset provides no indication that the proportion of immature narwhal in the RSA has declined compared to 2021–2020 estimates or 2014–2015 estimates.

As requested by the QIA, a correlation analysis between the Bruce Head Shore-based Monitoring Program relative abundance from 2014 to 2022 (number of narwhal observed per hour) and the Eclipse Sound aerial survey abundance estimates from 2016 to 2022 was run to determine if the former could be used as an potential predictor

of narwhal stock abundance in the RSA. A resampling simulation method was used to account for the uncertainty in aerial estimates. The median estimated correlation between the two datasets was 0.9, with 95% confidence interval between 0.6 and 1.0 (Figure 4.16). In 99.8% of the simulations, the relationship between the aerial survey population estimate and the Bruce Head relative abundance was shown to be significant. These results indicate that there is a strong correlation between the aerial survey population estimate and the Bruce Head relative abundance estimate. The uncertainty associated with the extent of this correlation is, however, high.

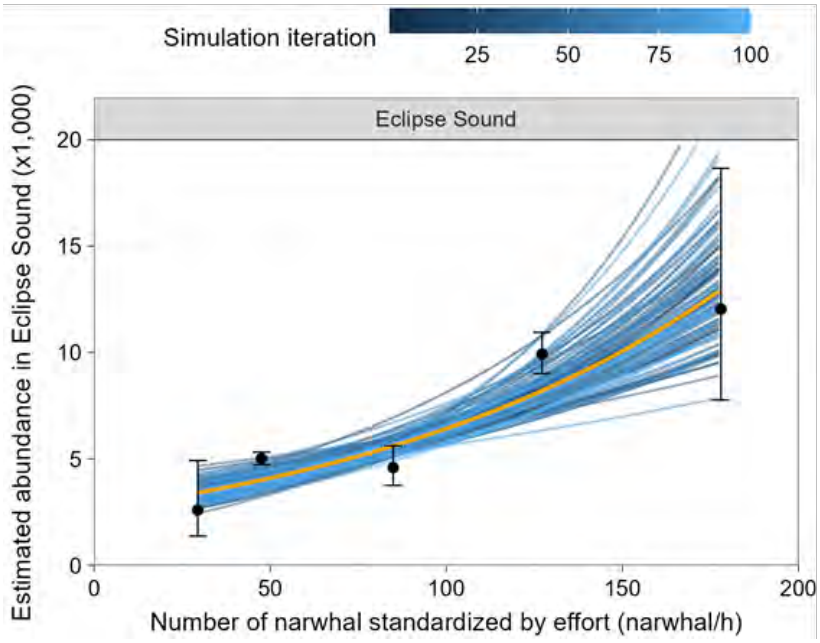


Figure 4.3: Correlation Analysis Between Eclipse Sound Aerial Survey Abundance Estimates And Bruce Head Relative Abundance Using A Resampling Method

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, no icebreaking during early shoulder season based on local ice conditions, etc.) are demonstratively effective at managing Project incremental effects from shipping on narwhal in the RSA.

In 2023, Baffinland plans to continue with mitigation measures implemented in 2022 and further evaluate the potential short-term, long-term and cumulative effects of Project-related shipping noise impacts on narwhal during the open-water period.

The following monitoring programs will be considered, in consultation with the MEWG for implementation in 2023:

- 2023 Marine Mammal Aerial Survey Program
- 2023 Bruce Head Shore-based Monitoring Program

- 2023 Ship-based Observer Program
- 2023 Passive Acoustic Monitoring Program

Early Warning Indicator

There appeared to be variability between years, but there was no indication that the proportion of immature narwhal in the RSA in 2022 had declined compared to 2021–2020 estimates or 2014–2015 estimates. The 2020, 2021, and 2022 proportions of immature narwhal derived from photographic aerial survey were associated with high variability and low sample sizes, resulting in high uncertainty of the proportion of immature estimates, and hence low ability to detect small- and medium-sized effect sizes. Ongoing EWI monitoring through both the Bruce Head Shore-based Monitoring Program and the Marine Mammal Aerial Survey Program is thus recommended.

Project Certificate Term and Condition No. 111

Category	Marine Environment - Ship Noise
Responsible Parties	The Proponent, Marine Environment Working Group
Project Phase(s)	Construction and Operation
Objective	To prevent impacts to marine mammals from Project shipping activities.
Term or Condition	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: 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.) 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
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	Draft Adaptive Management Plan (Baffinland 2020i) Narwhal Adaptive Management Response Plan (NAMRP; Baffinland, 2022j) Marine Mammal Trigger Action Response Plan (TARP) (Baffinland, 2021k) 2022 Underwater Acoustic Monitoring Program (Open-Water Season) (Austin et al., 2023) Marine Mammal Aerial Survey Program Report (WSP, 2023d) Bruce Head Shore-based Monitoring Program Report (WSP, 2023e) EWIs for Marine Mammals Technical Memorandum (Golder, 2020e) 2022 EWI Aerial Survey Results (WSP, 2023f) 2022 MEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.1 Appendix G.6.2 Appendix G.6.3 Appendix G.6.5 Appendix G.6.6 Appendix G.6.7 Appendix G.6.8

METHODS

Project Effect 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 Project shipping (Baffinland, 2021k). These include, but are not limited to, the following:

- change in underwater noise level relevant to established acoustic thresholds and ambient (i.e., background) noise levels
- 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., proportion of immature narwhal in the population) 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, 2021; 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 (EWI) and Trigger Action Response Plan (TARP) for Marine Mammals

A detailed description on the development of Early Warning Indicators (EWI) for the Project is presented in PC Term and Condition No. 110, along with how the EWI is monitored as part of the Bruce Head Shore-based Monitoring Program and the Marine Mammal Aerial Survey Program.

In addition, Baffinland has developed a draft Adaptive Management Plan (AMP) which provides a framework for how adaptive management is incorporated into Project operations (Baffinland, 2020i). As part of this process, a Marine Mammal TARP was developed for the Project which identifies a number of performance indicators, effect thresholds and pre-defined actions (i.e., responses) that are used to evaluate and respond to potential Project effects on narwhal and other marine mammal species in the Project area (Baffinland, 2021k). The TARP shares the same objectives as the EWI identified in PC Term and Condition No. 110, although uses a broader range of effect indicators that are measured against a series of tiered thresholds (i.e., low, moderate and high-risk thresholds) that are designed to guide short-term and long-term adaptive management strategies. The pre-defined actions identified in the TARP describe the responses that Baffinland would implement should the corresponding threshold levels be exceeded and assuming there is some degree of certainty that the measured change is Project-related. Three levels of action have been identified: low, moderate, and high. These responses range from increased monitoring and data analysis (e.g., trend analysis); identification of possible sources; to risk assessment and/or mitigation. On March 22, 2021, Baffinland released the most current version of the Marine Mammal TARP and Action Toolkits as part of its responses to Post-Hearing Questions related to Phase 2 (Baffinland, 2021k).

RESULTS

Project Effect Indicators

Results for the various Project effect indicators for the marine environment are presented in the respective 2022 annual marine monitoring reports (WSP, 2023d, 2023e; Austin et al., 2023), with a brief overview provided (by monitoring program) in PC Condition No. 109.

EWI and TARP for Marine Mammals

Results from the multi-year Bruce Head Shore-based Monitoring Program (WSP, 2023e) demonstrated that the relative proportion of immature narwhal (EWI) observed in the BSA in 2022 (0.105) was significantly lower than pre-shipping values in 2014 and 2015 (0.152 and 0.167, respectively), representing a 32% decrease from the baseline condition. This was similar to 2021 results, in which the relative proportion of immature narwhal observed in the BSA in 2021 (0.102) was significantly lower than the baseline condition. The 2021 and 2022 results indicated an exceedance of the Moderate Risk threshold for this specific indicator, as per the Marine Mammal TARP (Baffinland, 2021k), and that the Risk Status / Threshold trigger has now been observed in at least two consecutive monitoring years. The pre-defined response for exceedance of a moderate risk indictor includes the following: 1) investigate trend over time and consider any uncertainties (i.e., changes in operational processes, potential sources, confounding influences) in a formal Response Plan; and 2) initiate component specific targeted studies as part of the response planning. Based on prior monitoring results for narwhal, Baffinland proactively developed and implemented a Narwhal Adaptive Management Response Plan (Baffinland, 2022j), which included a follow-up investigation on the EWI through EWI analysis of 2020-2022 aerial survey data using dedicated 1,000 ft. survey data. Findings from the EWI analysis of 2022 aerial survey data indicated that the proportion of immature narwhal in the Eclipse Sound stock (0.124) was not significantly different from 2020 (0.117) or 2021 (0.128) estimates (P=0.3), though this dataset was associated with high variability and low sample sizes, resulting in high uncertainty of the EWI estimates (WSP, 2023f). The 2020, 2021, and 2022 proportions of immature narwhal fell within the range of the baseline condition in 2014 and 2015 (0.150 and 0.110, respectively) (WSP, 2023f).

TRENDS

Project Indicators

Data trends for the various effect indicators monitored as part of ongoing monitoring programs for marine mammals are described in PC Term and Condition No. 109 (presented for each respective monitoring program separately).

EWI and TARP for Marine Mammals

The EWI selected for narwhal (i.e., proportion of immature narwhal relative to the observed population) has been monitored for three consecutive years (2020-2022); EWI results over this time period are within range of the baseline condition (0.150 in 2014 and 0.110 in 2015) (WSP, 2023f).

RECOMMENDATIONS/LESSONS LEARNED

Monitoring data available to date have demonstrated that shipping noise in the RSA is lower than predicted in the FEIS and FEIS Addendum, 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, no icebreaking during early shoulder

season based on local ice conditions, etc.) are demonstratively effective at managing Project incremental effects from shipping on narwhal in the RSA.

In 2023, Baffinland plans to continue with mitigation measures implemented in 2022 and further evaluate the potential short-term, long-term and cumulative effects of Project-related shipping noise impacts on narwhal during the open-water period.

The following monitoring programs will be considered, in consultation with the MEWG for implementation in 2023:

- 2023 Marine Mammal Aerial Survey Program
- 2023 Bruce Head Shore-based Monitoring Program
- 2023 Ship-based Observer Program
- 2023 Passive Acoustic Monitoring Program

Early Warning Indicator

There appeared to be variability between years, but there was no indication that the proportion of immature narwhal in the RSA in 2022 had declined compared to 2021–2020 estimates or 2014–2015 estimates. The 2020, 2021, and 2022 proportions of immature narwhal derived from photographic aerial survey were associated with high variability and low sample sizes, resulting in high uncertainty of the proportion of immature estimates, and hence low ability to detect small- and medium-sized effect sizes. Ongoing EWI monitoring through both the Bruce Head Shore-based Monitoring Program and the Marine Mammal Aerial Survey Program is thus recommended.

Project Certificate Term and Condition No. 112

Category	Marine Environment - Ship Noise
Responsible Parties	The Proponent, Marine Environment Working Group
Project Phase(s)	Construction and Operation
Objective	To prevent impacts to marine mammals from Project shipping activities.
Term or Condition	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: • 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.). • Vessel transit planning, for all seasons. • A monitoring and mitigation plan is to be developed, and approved by the Department of Fisheries and Oceans prior to the commencement of blasting in marine areas.
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	Draft Adaptive Management Plan (Baffinland 2020i) Narwhal Adaptive Management Response Plan (NAMRP; Baffinland, 2022j) Marine Mammal Trigger Action Response Plan (TARP; Baffinland, 2021k) 2022 Underwater Acoustic Monitoring Program (Open-Water Season) (Austin et al., 2023) Marine Mammal Aerial Survey Program Report (WSP, 2023d) Bruce Head Shore-based Monitoring Program Report (WSP, 2023r) EWIs for Marine Mammals Technical Memorandum (Golder, 2020e) 2022 EWI Aerial Survey Results (WSP, 2023f) 2022 MEWG Meeting Records
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	Appendix G.6.7 Appendix G.6.8

METHODS

Refer to summary for PC Terms and Conditions No 109, 110 and 111.

RESULTS

Refer to summary for PC Terms and Conditions No. 109, 110 and 111.

TRENDS

Refer to summary for PC Terms and Conditions No. 109, 110 and 111.

RECOMMENDATIONS/LESSONS LEARNED

Refer to summary for PC Terms and Conditions No. 109, 110 and 111.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	Health Canada's Maximum Levels for Chemical Contaminants in Foods (Health Canada, 2015) Management of the commercial fishery for anadromous Arctic Char in the Cambridge Bay Region, Northwest Territories, Canada (Kristofferson et al., 1984) Ambient Water Quality Guidelines for Selenium (BC MOE, 2014) 2020 MEEMP and AIS Monitoring Program Report (Golder, 2021c) 2021 MEEMP and AIS Monitoring Program Report (Golder, 2022c) 2022 MEEMP and AIS Monitoring Program Report (WSP, 2023a) DFO Review of Pond Inlet Emerging Arctic Char Fishery Application. Submission to the Nunavut Wildlife Management Board (NWMB; DFO, 2013) Exploratory Fishery Protocol - Nunavut and Northwest Territories anadromous Arctic Char (DFO, 2010) Pond Inlet Arctic Char Fishery Development Research Program (NWRTF, 2017) Pond Inlet Arctic Char Fishery Development Research Program (NWRTF, 2018) Pond Inlet Arctic Char Fishery Development Research Program (NWRTF, 2020) An Assessment of the Arctic Char Population of Tugaat River, Nunavut (Read, 2004) Report of the Arctic Fisheries Scientific Advisory Committee for 1993/94 and 94/95 (Cosens et al, 1995) 2022 MEWG Meeting Records
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METHODS

In support of the Project, fish monitoring in Milne Inlet 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 the study 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 2022. Modifications incorporated to the marine fish program in 2022 (as part of Baffinland's 2022 MEEMP and AIS Monitoring Program) in response to recommendations and feedback provided by the MEWG, DFO, and Inuit stakeholders, included the following:

- Longline fishing methods to target large-bodied demersal fish species (e.g., cod species), which were trialed in 2021, were discontinued.
- Catch-Per-Unit-Effort (CPUE) calculations were standardized for hoop net and Fukui trap methods to number of fish per hour of effort per trap or net, rather than fish per 24 hour of effort per trap or net. This change was made to better account for field variability.
- Exploratory fishing at Tugaat River and Koluktoo Bay in order to determine the viability of the site for a reference area for fishing studies were continued.

Detailed information on study design and sampling methodology is available in the annual monitoring reports for the MEEMP program (SEM, 2016a, 2017a; Golder, 2018e, 2019a, 2020a, 2021c, 2022c; WSP, 2023a)

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. See 'Recommendations and Lessons Learned' section below for more information.

RESULTS

Detailed sampling results are available in the draft 2022 MEEMP and NIS/AIS monitoring programs annual reports (WSP, 2023a). An overview summary is provided below.

Fish Community

A total of 484 fish belonging to 11 known taxa were recorded in the DPF and IPF from 84 fishing efforts using a combination of methods during the 2022 open water survey season in Milne Port. Similar to previous sampling years, Arctic Char (*Salvelinus alpinus*), Fourhorn Sculpin (*Myoxocephalus quadricornis*) and Shorthorn Sculpin (*Myoxocephalus scorpius*) were the most abundant species. Other fish captured were Ribbed Sculpin (*Triglops pingelii*), Greenland Cod (*Gadus ogac*), Arctic Staghorn Sculpin (*Gymnocanthus tricuspis*), Arctic Sculpin (*Myoxocephalus scorpioides*), Polar Cod (*Boreogadus saida*), and Saddled Eelpout (*Lycodes mucosus).* Two (2) taxa were recorded for the first time in Milne Port: Spatulate Sculpin (*Icelus spatulate*) and Halfbarred Pout (*Gymnelus hemifasciatus*); however, these are Arctic species not considered to pose a risk as Nonindigenous Species.

Methods used included gillnetting, angling-jigging, angling-trolling, hoop nets, Fukui traps and trawling. Statistical comparison of catch per unit effort (CPUE) is not possible between methods, but as in previous years, it was observed that gill nets remained the most effective method for capturing Arctic Char. Unlike in previous years where the majority of Fourhorn Sculpin were caught via angling-jigging, gill nets were were also successful in capturing Fourhorn Sculpin in 2022. Longline sampling, added as a trial in 2021 as Commitment No. 37 to the Marine Environment Working Group (MEWG; Appendix 1A in Golder, 2021c) in an attempt to target large-bodied demersal fish, was discontinued in 2022 as no fish were captured during the 2021 trial. Hoop nets, added to the MEEMP study design in 2019 as a three-year trial based on recommendations from the MEWG as a sampling method that could replace Fukui traps, and trawling, added to the MEEMP study design in 2020 to target rarely caught fish, were

continued in 2022. However, 2022 represented the third year of trials to compare hoop net and Fukui trap capture efficiency; over the trial study period, hoop nets sampling events yielded twice as many captured fish (n = 151 from 2020 – 2022) compared to Fukui traps (n = 71 from 2020 – 2022), despite being deployed fewer than half the number of total efforts (i.e., sampling events) and half the number of total set hours.

Two distinct Fishing Areas were delineated in Milne Port in 2021 based on habitat features and their location relative to existing port infrastructure and operational activities. This included a Direct Project Footprint (DPF) area and an Indirect Project Footprint (IPF) area. The FAs are intended to help standardize sampling efforts and address variability in the catch data across Milne Port. Using 2020, 2021, and 2022 datasets, catch-per-unit-effort (CPUE) of each fishing method was compared across FAs and across years using an Analysis of Variance (ANOVA). While no statistically significant differences in CPUE were noted for any fishing method between the fishing areas and among years, CPUE was generally higher within the DPF, possibly due to the rocky habitat provided by marine infrastructure.

Fish Health and Tissue Chemistry

Age

In 2022, Arctic Char ranged in age from 4 to 22 years (n = 24), with a median age of 12 years. Ages were generally similar to fish processed in 2021 (n = 25), 2020 (n = 43), 2019 (n = 46), and 2018 (n = 26), which ranged from 4 to 17 with a median age of 8 in 2021, 2 to 16 with a median age of 11 in 2020, 4 to 19 years with a median age of 12 in 2019, and 5 to 17 years with a median age of 11 in 2018.

In 2022, ages of Fourhorn Sculpin processed for the fish health program (n = 40) ranged from 5 to 10 years, with a median age of 7. Ages were generally similar to those processed in 2021 (n = 42), 2020 (n = 44), and 2019 (n = 30), which ranged from 3 to 12 with a median age of 6 in 2021, 4 to 9 with a median age of 5 in 2020, and 4 to 8 with a median age of 6 in 2019. Age data were not available from 2018 for comparison.

Fourhorn Sculpin survival, as age, was statistically significantly greater in 2022 compared to previous years for both sexes. Growth of male and female Fourhorn Sculpin, examined as size-at-age, was statistically significantly different among years (i.e., it was lower in 2022 compared to 2021, but did not differ from 2020 for females, and it was significantly greater in 2022 compared to 2020, but did not differ from 2021 for males).

Stomach Contents

An analysis of stomach contents for Arctic Char captured from the Milne Port area in 2022 (n = 16) identified a total of 17 unique taxa. Stomach contents were predominantly composed of indeterminate crustaceans, accounting for 36% of stomach contents by weight. Other major constituents included amphipods of the genus *Themisto* (19%), as well as amphipods of the Family Hyperiidae and indeterminate fishes, each comprising 14% of the stomach contents. Generally, Arctic Char consumed primarily small crustaceans (83%) including amphipods (34%) and copepods (12%) in 2022, and supplemented their diet with fishes (14%). Results are similar to those from 2019, but contrast those from 2021 and 2020, where fishes were the primary constituent of Arctic char stomachs, comprising 47% and 55% of stomach contents by weight (Golder 2021cb, 2022c). This suggests that the diet of Arctic char in the Milne Port Area varies over time, and the fish feed opportunistically, influenced by relative prey abundance and catchability.

Stomach contents of Fourhorn Sculpin captured from the Milne Port area (n = 14) contained a total of 20 unique taxa, consisting primarily of indeterminate polychaete worms of the Orders Pectinariidae (46%) and the Subphylum Polychaeta (31%). Other constituents included indeterminate polychate worms of the Families Lumbrineridae (8%), Phyllodocidae (7%), and Nereididae (3%), as well as of the genus *Nephtys* (3%). The diet of Fourhorn Sculpin consisted

nearly entirely of polychaete worms (98%) by weight. These results contrast with previous observations from 2021, 2020, and 2019. In 2020, the diet of Fourhorn Sculpin consisted of Tipulid invertebrates (34%), fishes (36%), and crustaceans (27%) by weight. In 2020 and 2019, crustaceans (specifically amphipod *Anonyx sp*., 52%) and fishes (27%) were the primary constituents of Fourhorn Sculpin stomach contents by weight, respectively. As with Arctic Char, these results indicate that the diet of Fourhorn Sculpin varies over time and these fish also feed opportunistically.

Fish Health

A total of 40 Fourhorn Sculpin were processed from the Milne Port area during the 2022 fish health assessment, comprising 20 females and 20 males. Female Fourhorn Sculpin were of larger median size (Relative Percent Difference [RPD]: weight, 31%; length, 8%) at the time of sampling than male Fourhorn Sculpin, with greater energy investment but lower reproductive investment, based on comparisons of median Liver Somatic Index (LSI; RPD 19%) and Gonadosomatic Index (GSI; RPD 5%). Both sexes had median ages of 7, with females ranging from 5 to 9 years and males ranging from 5 to 10 years. Female Fourhorn Sculpin ranged in length from 225 mm to 306 mm and in weight from 116 g to 353 g. Female condition factor ranged from 0.90 to 1.57, LSI ranged from 2.15 to 7.35, and GSI ranged from 1.83 to 5.16. Male Fourhorn Sculpin ranged in length from 212 mm to 278 mm and in weight from 84.0 g to 211 g. Male condition factor ranged from 0.78 to 1.23, LSI ranged from 1.82 to 4.87 and GSI ranged from 2.47 to 5.04.

Fish condition, as relative weight (i.e., total weight-at-total length), and relative liver weight (i.e., liver weight-at-total weight), differed among sampling years for both sexes. Female Fourhorn Sculpin relative weight was significantly greater in 2022 compared to 2020 and 2021, while relative liver weight did not differ among years. Male Fourhorn Sculpin relative weight was significantly greater in 2022 compared to 2020 but did not differ from 2021, while relative liver weight was significantly greater in 2022 compared to 2021. Reproductive investment, as relative gonad weight, was significantly lower in 2022 than in 2020 and 2021 for female Fourhorn Sculpin, while no difference in relative gonad weight was observed for male Fourhorn Sculpin.

In 2022, a total of 40 *H. arctica* were processed for fish health endpoints. The collected individuals ranged in length from 23.7 mm to 38.0 mm and ranged in whole animal wet weight from 1.56 g to 6.08 g. Length data were approximately evenly distributed, showing little skew or multimodality. Length exhibited a strong relationship with total weight ($p < 0.001$; $R2 = 0.74$). Gonad weights ranged from 0.0061 g to 0.0987 g, with a median value of 0.0224 g; mantle somatic index (MSI, the equivalent of GSI in bivalves) ranged from 0.75 to 3.85 with a median value of 1.84. *Hiatella arctica* sampled from the Milne Port area ranged in age from 6 to 34 years, with a median age of 17. Median condition factor in 2022 was 1.69.

No differences in survival (as length-frequency distribution), growth (as whole animal wet weight), or condition (as whole animal wet weight-at-total length) were observed among sampling years (i.e., 2022, 2021 and 2020). Reproductive endpoints, as mantle weight-at-tissue weight (or mantle somatic index, MSI), were compared only between 2021 and 2022, as gonad tissue weights were not available from 2020. Significant differences were found for MSI between 2021 and 2022, and were dependent on size: smaller *Hiatella arctica* (i.e., lower weight) had significantly greater MSI in 2021 than 2022, while larger *Hiatella arctica* (i.e., higher weight) had significantly greater MSI in 2022 than 2021.

Fish Tissue Chemistry

A total of 26 incidental mortalities of Arctic Char were retained in 2022, comprising 12 adult females, ten adult males, and four juveniles of unknown sex. Of these, 26 samples were submitted for tissue PAH analysis, and 8 samples were submitted for tissue metals analysis. A total of 24 tissue samples were submitted collectively in 2022 from Arctic Char, Fourhorn Sculpin, and *Hiatella arctica* for tissue chemistry metals analysis. Constituents of potential concern (COPCs) were identified based on the primary constituents of the Project iron ore (i.e., aluminum, magnesium, and iron), as well as metals with existing regulatory guidelines for fish tissue (i.e., mercury and selenium). Statistical comparisons of COPCs (i.e., aluminum, iron, magnesium, mercury, and selenium) were completed for each species, separately, among sampling years (i.e., 2018 to 2022), and other metals were considered qualitatively for general trends over time.

Concentrations of most metals were similar among years within each species, although some metals exhibited greater interannual variability (e.g., copper, nickel, tin). For Arctic Char, statistically significant differences in tissue concentrations of aluminum, magnesium, mercury, and selenium were observed; no differences were observed for iron. Interannual differences in COPC concentrations in Arctic Char showed no temporal trends (i.e., 6% to 124% relative percent difference [RPD] among years, with no consistent pattern over time). For Fourhorn Sculpin, statistically significant differences were observed among years for aluminum, iron, mercury, and selenium, but not magnesium. Interannual differences in COPC concentrations in Fourhorn Sculpin showed no temporal trends (i.e., 15% to 150% RPD among years, with no consistent pattern over time). Concentrations of most metals were greater for *Hiatella arctica* when compared to Arctic Char and Fourhorn Sculpin, reflecting interspecies differences in metals bioaccumulation and tissue types. For *Hiatella arctica*, significant differences were observed among years for aluminum, iron, magnesium, and selenium, but observed differences were relatively small (i.e., 12% to 55% RPD, with no consistent patterns over time). Mercury and selenium concentrations in all Arctic Char and Fourhorn Sculpin samples were below Health Canada's Maximum Levels for Chemical Contaminants in Foods mercury consumption guideline of 0.5 mg/kg wet weight [ww] (Health Canada, 2015) and the BC Ministry of Environment selenium concentration guidelines of 4 mg/kg dry weight [dw] (BC MOE, 2014), respectively. In *Hiatella arctica*, mercury concentrations were compared with the Health Canada consumption guideline in order to provide context, as this is not a common food shellfish species. Mercury concentrations in *Hiatella arctica* were below the Health Canada consumption guideline. Selenium concentrations in *Hiatella arctica* were below the BC Ministry of Environment and Climate Change Strategy (BC MOE) invertebrate tissue selenium concentration guideline of 4 mg/kg dw (BC MOE, 2014).

A total of 26 Arctic Char samples, eight Fourhorn Sculpin samples, and four *Hiatella arctica* composite samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) in 2022. For Arctic Char, detection limits for PAHs were two to three orders of magnitude lower in 2022 than in previous years due to differing methodology used in 2022, resulting in detected concentrations of acenaphthene, fluoranthene, fluorene, methylnaphthalene, naphthalene, phenanthrene, and pyrene in eight samples. Therefore, it does not appear detectable concentrations of PAHs in 2022 represent an increase in concentrations, but rather an improvement in the analytical method resulting in improved detection. Overall, concentrations of all PAHs in all species were below reported detection limits from previous sampling years (<0.070 mg/kg ww).

All tissue samples for Arctic Char, Fourhorn Sculpin and *H. arctica* collected from 2018 to 2022 were below Health Canada's Maximum Levels for Chemical Contaminants in Foods mercury consumption guideline of 0.5 mg/kg ww (Health Canada, 2015). All tissue samples for Arctic Char and Fourhorn Sculpin were also below BC MOE fish tissue

guidelines of 4 mg/kg dw 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 (WSP, 2023a).

TRENDS

Fish Community

- To date, construction and operation of the Milne Port do not appear to have negatively affected fish community structure or body condition.
- Presence and diversity data collected in 2022 were comparable to previous years, with the addition of two Arctic fish species not previously observed in the 2014-2021 studies.
- Statistical comparisons of CPUE detected no statistically significant differences between fishing areas or among years.
- Monitoring results align with original FEIS predictions and subsequent addenda, 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* in 2022 for the third consecutive year and are serving to expand a growing dataset allowing for future temporal (i.e., interannual) comparisons.
- 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.
- Fourhorn Sculpin from the Milne Port area appeared to be healthy at the time of sampling with few abnormalities observed. The small magnitude and direction of differences in length and weight between survey years suggest the Project has not affected condition of fishes in the Milne Port area.

Tissue Chemistry

- Monitoring results remain within original FEIS predictions, and subsequent addenda, 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 2022 were similar to concentrations that have been observed in the Milne Port area since 2010. For Fourhorn Sculpin, metal concentrations were generally similar between survey years; however, some interannual variability was observed. For *H. arctica*, concentrations of metals were generally similar among years with a few exceptions, such as chromium, nickel, and tin, which exhibited more variability.
- As observed in 2019, 2020, and 2021, metals concentrations, as expected, 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 2022 were below Health Canada's Maximum Levels for Chemical Contaminants in Foods mercury consumption guideline of

0.5 mg/kg wet weight. Selenium concentrations in Arctic Char and Fourhorn were below BC MOE fish tissue guidelines of 4 mg/kg dry weight for selenium. Tissue chemistry results were within FEIS predictions, and subsequent ERP addenda, 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.

Arctic Char Stock Monitoring

Monitoring of stock size of for Arctic Char is not recommended as part of future monitoring studies in Milne Port with rationale provided below.

Anadromous Arctic char are common in many river systems feeding into Milne Inlet and Eclipse Sound on North Baffin Island. It is presently unknown if individual river systems in this region represent genetically discrete stocks or if there is a high degree of migration (gene flow) between these systems (NWMB; DFO, 2013). Most river system fisheries on North Baffin Island, especially during the open-water season, have the potential to harvest a mixture of Arctic Char stocks from proximate systems (i.e., these likely represent mixed-stock fisheries). The Tugaat, Koluktoo (i.e., Robertson River), Ikaluit and Satuut watersheds are examples of river systems in Milne Inlet that are inhabited by anadromous Arctic Char and these fish are an important local resource for residents of Pond Inlet. It is important to note however, that the management of Arctic char fisheries in the Canadian Arctic (co-managed by DFO and NWMB) 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).

Baffinland's EEM program (i.e., monitoring designed for detection of potential Project-related effects) does not include tracking of Arctic Char stocks. Effects monitoring for this receptor species is accomplished through monitoring of incidental mortalities of Arctic char for health, habitat quality (water and sediment quality, productivity) and habitat use (relative abundance). Other sentinel species are monitored more specifically with targeted lethal sampling to assess fish health in Milne Port for potential Project-related changes in fish health. To date, the extensive monitoring completed in both the marine environment at Milne Port and in the freshwater environment near the operating mine has not demonstrated any evidence of adverse effects of the Project on Arctic Char via these pathways (Golder, 2022c). The rationale follows that if no Project effects are being observed on fish health, fish habitat quality or fish habitat use near Milne Port where impacts from the Project are greatest, then it is highly unlikely that the Project is resulting in adverse effects on Arctic Char stock sizes in the local receiving environment. For example, each year as part of the Marine Environmental Effects Monitoring Program (MEEMP), multiple receptors in the marine environment are monitored that collectively reflect the habitat quality, food availability, and health of Artic Char; specifically, concentrations of metals and other contaminants in marine waters, sediments (habitat quality), abundance of benthic invertebrates (prey availability), and assess body condition and muscle tissue concentrations (fish health) are all measured as part of ongoing monitoring programs. Following

multiple years of monitoring in the Milne Port area, there is no evidence that Arctic Char habitat, their prey base, or their health condition has been compromised by the Project. Concentrations of contaminants in sediments and fish tissues are consistent with baseline and the number of Arctic Char caught in the MEEMP annual surveys has remained consistent through time (Golder, 2022c).

More recently, there has been feedback provided by some community members suggesting that the Mary River Project is responsible for lower Arctic Char numbers observed in recent years within the local waterways of Milne Inlet and Eclipse Sound, in addition to reports of Artic Char in poor health conditions in these areas. In specific response to these concerns, Baffinland has expanded its Arctic Char health monitoring program in 2021 to include both Tugaat and Qurluktuk lakes (both waterbodies identified as target study areas by the MHTO for ongoing fish monitoring). Baffinland and its contractor Minnow Environmental designed and implemented a field program that looked specifically at Arctic Char body condition and fish health in Tugaat and Qurluktuk lakes during the 2021 and 2022 open-water seasons. In 2022, sampling for Arctic Char was also completed in Ikaluit Lake. The Milne Inlet Freshwater Fish Health Program was developed in close consultation with the MHTO to inform field work and subsequent data analysis and reporting. Fish data collected during this program will include a comparison of Arctic Char body condition and growth metrics and sampling conducted prior to Milne Port construction (e.g., historical studies from 1992 and 1996). Any evidence of Project impacts on Arctic char health or growth parameters in these waterbodies would likely serve to trigger future monitoring of fish stock sizes in the corresponding freshwater systems. Similarly, a lack of evidence of adverse effects of the Project on Arctic Char health in this waterway would rationalize why a stock size assessment would not be a reasonable Project monitoring requirement.

Given the recommendation, it is important to remind the Board that DFO is the responsible authority for assessing the status of Arctic char stocks in the North Baffin Region and to provide advice on the sustainability of these fisheries. For example, before a fishery is licenced as a commercial operation, the sustainability of the harvest on the stock must be evaluated (DFO, 2010). This is typically done by operating a fishery under an exploratory licence for five or more consecutive years. The specific objective of the exploratory fishery stage is to determine whether the harvested stock or population can sustain a commercially viable operation by collecting and analysing biological and catch and effort data. Essentially the resilience of a stock to sustained fishing pressure is assessed and if resilience to the level of harvest is demonstrated, the stock may be considered for designation as a commercial waterbody. The Robertson River (i.e., Koluktoo River) in Milne Inlet and the Satuut River in Eclipse Sound (south end of Navy Board Inlet) are two such waterbodies that are presently being assessed by DFO for the feasibility of a sustainable fishery (DFO, 2013; NWRTF, 2020), as detailed below.

In 2013, Mr. Charlie Inuarak submitted to the co-management board (DFO and NWMB) an application requesting an exploratory license to fish for Arctic char from a total of 16 locations (i.e., points, coves, river outlets and lakes) in the Pond Inlet area, as outlined in Figure 4.17 below, such to support regulatory approval for a commercial Arctic Char fishery in the region (DFO, 2013). This application was formally recognized by the NWMB and DFO as the 'Pond Inlet Emerging Arctic char Fishery Program'. As outlined in the application, the proposed fishery program requested a harvest of 500 Arctic char from each of the 16 harvest locations. According to the application, Mr. Inuarak consulted with the MHTO and received its support for the proposed fishery program. It is worth noting that Koluktoo Bay (#15) was the only waterbody identified in this plan that had been previously fished under an exploratory licence (i.e., 95/96, 96/97, 97/98) and received past DFO Science advice that supported a harvest level of 2,500 kg (DFO, 2013). According to the application, Arctic Char are abundant in the Pond Inlet area, especially at the points and coves identified in the figure below. As per the application, it was proposed to spread out the exploratory fishing

effort in an attempt to minimize impacts on local subsistence fishers. As per the application all 16 locations identified below offered the potential to develop into a viable commercial fishery (DFO, 2013).

Figure 4.4: Map of Proposed Arctic Char Exploratory Fishing Sites Near Pond Inlet, Nunavut

Source: DFO, 2013.

DFO Science conducted a review of the application and provided NWMB with scientific advice (i.e., recommendations) for the program (DFO, 2013). DFO recommended that a modified version of the proposed fisheries program be approved in order to ensure that the fishery remain sustainably harvested and that exploratory fishing pressure will not have a negative impact on Arctic Char stocks and subsistence fisheries in the Pond Inlet Area. Specifically, DFO recommended the following:

- Approving the fisheries program in two (2) separate phases, with Phase 1 beginning in the summer of 2013, and Phase II initiated as early as 2014 based on the 2013 results and based on follow-up discussions with DFO and the NWMB as co-management partners.
- Harvesting only occur at some of the locations recommended by Mr. Inuarak, namely those sites considered low or moderate risk of harm from fishing. DFO noted that several of the sites recommended by Mr. Inuarak were previously identified as sites considered as 'high risk' of harm from fishing based on previous studies and scientific advice on record (i.e., they represented compromised Arctic Char fisheries). This included the three proposed harvest locations associated with the Tugaat watershed including Tugaat Lake/River (#17;

Schedule V; PI006); Tuapak (#13) and Nasaarjuaq (# 14); as well as the one sampling location associated with the Phillips Creek watershed, namely Qinnquat Milne Inlet (proposed location 16; Schedule V PI022). Based on the past Science advice, the Tugaat River is advised to remain as a subsistence fishery only, with no commercial quota. This is due to fact that the stock was unable to sustain both commercial and subsistence fisheries in the past. Arctic Char from the Tugaat River are recognized by the Pond Inlet community as a superior stock compared to other areas, and consequently the subsistence fishing pressure is higher from this system (Read, 2004). For Qinnguat Milne Inlet (i.e., Phillips Creek), the sampling location coordinates are the same as the Phillips Creek source stock (PI022), which is a Schedule V waterbody under the Northwest Territories Fishery Regulations. The most recent Science Advice indicates that this waterbody remains closed (Cosens et al., 1995).

- DFO Stock Assessment Science advice is structured to be provided on a stock-by-stock basis, not by fishing location. For many of the fishing locations proposed, there is limited or no science information available; specifically, for locations #1 to 12. One of the major information gaps is that DFO does not know the source stocks for some of these fishing locations. The problem this presents is as follows: many of the closely located fishing sites may have one or multiple source stocks (DFO, 2013). It is probable that on the summer feeding grounds, Arctic Char from Tugaat Lake/River, Phillips Creek and Koluktoo (i.e., Robertson River) are mixing. In order to err on the side of caution and avoid overharvesting from any one stock, DFO advised that the exploratory harvest levels for some locations be grouped together in Phase I of the proposed fishing plan, as per Table 4.35 below. DFO notes that they expect that future meetings with the MHTO and Pond Inlet elders would help fill in some of the gaps in DFO's current knowledge (as of 2013) and help move forward with Phase II of the proposed fishery program.
- DFO recommended that Mr. Inuarak follow a five-year exploratory protocol of collecting biological and catch-effort information that would allow DFO Science to evaluate sustainable harvest levels. DFO recommended that the exploratory fishery begin with the first year of the 5-year approach (as Phase I) due to the limited information currently available. DFO committed to work with Mr. Inuarak to provide support for the data collection requirements. The five-year exploratory fishery protocol is intended to provide information on the viability of a fishery in a particular waterbody. The protocol requires effort be taken to annually harvest the full quota over the five-year period; the collection of biological characteristics of the fish (i.e., individual fork length, round weight, sex and sagittal otoliths for a minimum of 200 Arctic char); CPUE; and total harvest data should also be collected every year for five years before stocks are assessed and recommendations are made. Permit requirement of employing a minimum gillnet mesh-size of 5 ½ inches for all fish collection. Changes to the population structure following continuous harvest of the maximum quota may indicate that the harvest level is not sustainable. However, if the harvest over that period does not change indicators of population health, then the existing level of harvest is likely sustainable. Harvest of the full quota annually is necessary for this approach. Each fishery should follow the exploratory fisheries five-year approach, with all samples and data being submitted annually to DFO Resource Management.
- DFO provided their technical / recommendations to the Nunavut Wildlife Management Board (NWMB) in the form of a briefing note with a formalized fishing plan (referred to as the Pond Inlet Emerging Arctic Char Fishery Plan – Phase I) for NWMB's decision (DFO, 2013). NWMB approved the program in accordance with DFO advice, and the program was formally recognized as the 'Pond Inlet Arctic Char Fishery Development Research Program'.

- DFO representatives were identified as 'Project Leaders' for the above program – this included Dr. Ross Tallman (DFO Winnipeg) and Zoya Martin (DFO Iqaluit). The latter representative was subsequently replaced by Erin O'Dell (DFO Iqaluit).

Table 4.12: DFO Recommended Harvest Locations And Annual Harvest Levels For The Pond Inlet Arctic Char Fishery Program

Fishing Location	Coordinates	Exploratory Harvest Level
Igluluarjuit (1) and/or Tullukaat (2) and/or Tikiraalukjuaq Qanigijaani (3)	1) 72°35'38"N 78°24'26"W 2) 72°33'12"N 78°27'51"W 3) 72°27'02"N 78°33'08"W	1,500 kg total
Qimmivik (4)	72°23'31"N 79°03'30"W	1,500 kg
Aulitiviik Illua (5)	72°21'06"N 79°29'27"W	1,500 kg
Tuqajaat (6) and/or Tuqajaat Illuani (7) and/or Sulukuluk (8)	6) 72°30'22"N 79°48'19"W 7) 72°28'31"N 79°51'42"W 8) 72°24'34"N 79°59'32"W	1,500 kg total
Saatut (9) and/or Qaunirq (10)	9) 72°43'29"N 80°13'47"W 10) 72°41'18"N 80°21'56"W	1,500 kg total
Saviit Nuvua (11)	72°23'20"N 80°30'07"W	1,500 kg total
Ipiutalik (12)	72°11'11"N 80°21'31"W	1,500 kg
Koluktoo Bay – PI035 (15)	72°05'27"N 80°59'49"W	2,500 kg

Source: DFO, 2013

Currently available annual reporting for the 'Pond Inlet Arctic Char Fishery Development Research Program' indicates that sampling over the five-year study period has largely been limited to two (2) locations (Koluktoo River and Satuut River) with recent interruptions incurred in the sampling program due to COVID-19-related constraints. Following is a high-level summary of program success to date based on the limited information publicly available (note that more detailed information is available in the annual NWMB summary reports).

- Year 2 of the 5-year program occurred in 2017. Data was only collected at one location (Koluktoo River Mouth) (NWRTF, 2017)
- Year 3 of the program occurred in 2018. Char harvesting occurred at Koluktoo Bay and Saatut locations. Koluktoo Bay was fully sampled (n = 213) while Saatut was not as successfully sampled (n = 33; NWRTF, 2018)
- Year 4 of the program occurred in 2020 (NWRTF, 2020). Delays in the program occurred due to COVID-19 restrictions with respect to field sampling etc. For instance, no Arctic Char harvests were possible during the summer 2020 due to COVID-19 limitations.
- Year 5 of the program was assumed to be completed in 2021. To our knowledge, no information is currently publicly available on Year 5 of the program.

Baffinland also feels it is important for the Board to be aware that concerns of compromised char stocks in the local waterways of Milne Inlet and Eclipse Sound have been expressed by the communities well before the Mary River Project began. For example, DFO undertook a stock assessment of the Ikaluit River Arctic char stock in 1989 in direct response to concerns expressed by the community of Pond Inlet regarding lower Arctic char numbers and impacts on their local subsistence fishery, as summarized in Cosens et al. (1995). An overview summary extracted from this report is provided below:

- The Ikaluit River is located approximately 90 Km southeast of the community of Pond Inlet (feeding into Tay Sound). Anadromous Arctic char are known to migrate up this river system to overwinter and spawn. Char from this system have traditionally been an important source of food for the Inuit of the Pond Inlet area and, since the early 1960s, have supported a mixed subsistence and commercial fishery. Commercial harvest may have occurred as early as 1961 when 3,468 kg of char were harvested from rivers and lakes in the Pond Inlet area. A total of 10,306 kg of char were reportedly harvested by the commercial fishery in 1969 and undoubtedly unreported commercial harvests occurred between 1961 and 1969. The annual commercial harvest of char averaged 2,536 kg in the 1970s and 3,364 kg in the 1980s. In the early 1980s, the community of Pond Inlet expressed concerns about the size and abundance of Arctic char in their traditional fishing areas including the Ikaluit River system. In 1989, an assessment of the Ikaluit River Arctic Char stock was conducted in response to these concerns.
- Stock definition of Arctic Char in the Ikaluit River system was unknown at the time of study.
- Stock size: In 1989, a total of 282,564 Arctic char were enumerated as they migrated upstream in the Ikaluit River (estimated biomass 283,000 kg). The weir was located upstream of the northern tributary so any char returning from sea to this possible spawning and overwintering area were not included in the count.
- Major issues identified: The community of Pond Inlet, the major user of the resource, expressed concerns in the early 1980s that the anadromous Arctic Char they were harvesting from the Ikaluit River were becoming smaller in size and less abundant. In response, DFO conducted a stock assessment project in 1989, to gather data as a basis for future fishery management recommendations. The subsistence harvest, which represented 83 % of the 1989 harvest, remains basically unmanaged. Presently, there are no reliable harvest statistics for this important component of the fishery. Apparently, the mixing of subsistence fishing with the commercial fishery continues, with the probable use of gillnets less than the commercial mesh size of 139 mm.
- Stock prognosis: Exploitation of the Ikaluit River Arctic char stock has been in the light to moderate range and the stock did not appear to have been overexploited at the time of the study in 1989. The run appears to be large. The estimated annual exploitation rate of 6.1 % based on the 1989 study is within the limits of presently accepted sustainable harvest levels. Arctic char in this run are relatively small as reported by the Pond Inlet harvesters. Larger, less abundant Arctic Char have apparently been removed from the population due to their greater vulnerability to the fishing gear. Reduction of size and age may have increased the productive capacity of this population, however in the absence of multi-year biological and harvest data this stock should be managed conservatively.
- A “Safe Harvest Level” (SHL) of no more than the 1989 total harvest of 13,872 kg is recommended. Allocation to the subsistence, commercial and sports fisheries should fall within this SHL. With the provisional commercial quota of 2,300 kg, a maximum subsistence harvest of 11,572 kg is recommended.

Another example of Inuit historical concerns of local Arctic char stock sizes in Milne Inlet prior to the existence of the Mary River Project was for Arctic Char belonging to the Tugaat River system. In 1992, DFO undertook a weir assessment of the Tugaat River in order to address concerns expressed by Pond Inlet fishers regarding the declining size and relative abundance of the Tugaat River Arctic char stock. The specific objective of the study was to determine if the Tugaat River Arctic char stock could sustain the local subsistence/commercial fishing pressure. Data collected from the weir study, as well as from a 1980 tagging program, were presented in a report by Read (2004), including a summary of historical fisheries data collected in this system to monitor changes in the local char stock over time. Monitoring data was collected from 1975 to 2000, primarily by the Pond Inlet Wildlife Officer, Department of Sustainable Development (DSD), Government of Nunavut (formerly Government of the Northwest Territories). Results of this study indicated that the Tugaat River stock was stable and that the low fish count of 1992 may have been the result of yearly fluctuations in migration into Tugaat River, or due to the lack of overwintering capacity, suggesting that the Tugaat River population is, and always was, relatively small (Read, 2004).

In summary, Baffinland is not currently undertaking Arctic Char stock size assessments in the RSA for the following reasons:

- Baffinland extensively monitors several Arctic Char metrics in the Project zone of influence (including fish health and body condition, fish habitat quality, fish habitat use, prey availability) which would effectively capture the applicable Project-related potential effects pathway (e.g., potential effect of iron ore dust emissions on fish health). If we are seeing no adverse effects in fish health or other Arctic Char effect indicators (i.e., fish habitat) from the Project, there is no reasonable justification to conduct a stock assessment for Arctic Char for the same pathway of concern. Baffinland has recently expanded on its Arctic Char fish health monitoring program in other local waterways in direct response to recent community concerns on this topic.
- Stock size is not assessed in the marine environment, given that Arctic Char are only resident in the marine environment for a limited period during the open-water season and there are multiple Arctic Char stocks mixing in the marine at this time. Given current data gaps on stock definition, stock size would be undertaken in the corresponding river or lakes systems. This work is ongoing by the responsible parties (as outlined above).
- It is the responsibility of DFO to assess the status of local Arctic char stocks in the Canadian arctic and to manage these stocks accordingly. To this effect, there has been limited study undertaken to date in the North Baffin region to inform this process, although there is some work in progress under the direction of DFO and the NWMB to fill these existing data gaps (i.e., exploratory fishery in Milne Inlet and Eclipse Sound). There is little justification for redundancy in this effort (i.e., multiple parties conducting equivalent char population/stock investigations), particularly when several of these stocks are considered high risk from prior commercial and subsistence harvesting, including those belonging to the Tugaat River watershed (DFO, 2013).

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Not Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – Not Applicable
Stakeholder Review	Not applicable
Reference	Not applicable
Ref. Document Link	Not applicable

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 2022.

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 Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	Fisheries and Oceans Canada (DFO), Marine Environment Working Group (MEWG)
Reference	2020 Milne Ore Dock Fish Offset Monitoring Report (Golder, 2020f) Year 2 Freight Dock Offset Habitat Monitoring Report (Golder, 2022b) TSD No. 23: Conceptual-level Marine Offsetting Plan (Golder, 2018g)
Ref. Document Link	Not applicable

METHODS

Baffinland has engaged and conducted comprehensive consultation on the Project as a whole with the five (5) North Baffin communities (Arctic Bay, Clyde River, Igloolik, Pond Inlet, and Sanirajak) 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 (ERP) of the Project. 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. Although outside of this reporting period, Baffinland submitted an application to amend the Fisheries Authorization

for the Freight Dock on March 3, 2023 to allow the construction of a submerged rocky reef at Milne Port to complete the offsetting requirements for the Freight Dock.

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 South railway and at Steensby Port (water crossings, pond encroachment, stream diversions, construction access road). Exploration of potential marine offsetting options are aimed at offsetting in-water works associated with the Ore Dock and Island Causeway at Steensby Port.

Options considered for fish habitat offsetting in the freshwater environment include 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 2022 were geared towards collection and analysis of baseline data and development of conceptual offsetting plans 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, 2018g). 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 2020. Potential offsetting options (type and/or locations) identified for the Phase 2 Proposal will contribute to potential options for future offsetting requirements for the on-going operation and/or development of the South railway and Steensby Port.

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. The *Fisheries Act* Authorization (FAA) for the Milne Port Ore Dock was closed by DFO in 2021 as monitoring results demonstrated the effectiveness of the offsetting habitat.

Year 2 of post-construction monitoring for the Freight Dock offset habitat occurred in 2021. Year 2 of monitoring indicated that macroalgae, motile invertebrates and fish continue to colonize the Freight Dock offset habitat, and that it appears to be providing a suitable and stable substrate for continued colonization and growth of marine organisms.

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

In 2021, DFO closed the FAA for the Milne Port Ore Dock, based on their review of the results of the 6-year Ore Dock offset monitoring program which 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.

Project Certificate Term and Condition No. 116

Category	Marine Environment – Blasting
Responsible Parties	The Proponent, the Department of Fisheries and Oceans
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 the Department of Fisheries and Oceans for use in the North and as revised from time to time.
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Not Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – Not applicable
Stakeholder Review	Not applicable
Reference	Not applicable
Ref. Document Link	Not applicable

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 2022.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and 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, 2021f)Quarry Blasting Operations Management Plan (Baffinland, 2013b) Guidelines for Use of Explosives In or Near Canadian Fisheries Water (Wright and Hopky, 1998)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

Not Applicable in 2022. 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 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, 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 Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Not Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – Not Applicable
Stakeholder Review	Not applicable
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

No marine construction activity occurred at Steensby or Milne Port in 2022.

RESULTS

Not applicable.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Not applicable
Status of Compliance	Not applicable
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	2021 Ringed Seal Aerial Survey Monitoring Program (Golder, 2022f) Comparing infrared imagery to traditional methods for estimated ringed seal density (Young et al., 2019) Spring distribution of ringed seals (Pusa hispida) in Eclipse sound and Milne Inlet, Nunavut: implications for potential ice-breaking activities (Yurkowski et al., 2019)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

Winter shipping has not been required in the previous and current Project phases (ERP, PIP, PIPE, PIPR). 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). Baffinland did not ice break during the early 2022 shoulder season and did not commence shipping until ice concentrations were less than 3/10ths, on July 30, 2022. Baffinland did not conduct ringed seal aerial surveys in 2022, however, surveys were conducted along the Northern Shipping Route Study Area in June 2021 in response to concerns raised by the MHTO that ringed seal abundance and distribution has changed since Project shipping began, and more acutely since icebreaking activities in the shoulder season commenced in 2018.

Prior to 2021, 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 to update baseline data on ringed seal density and distribution. 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).

In 2021, ringed seal aerial surveys took place over a two-week period with flights occurring between June 8 to 14, 2021. The survey team consisted of two biologists with marine mammal survey experience, two pilots, and one mechanic.

The study area for the survey was based on the boundaries used by DFO. The aerial surveys were designed to characterize ringed seal distribution and density in the RSA during the period when ringed seals were hauled out on the ice during the peak moulting period and to allow for comparison with past surveys. Aerial surveys were conducted in four strata within the RSA: Eclipse Sound (ES), Milne Inlet (MI), Tremblay Sound (TS), and Navy Board Inlet (NB).

Survey design and data collection methodology followed the preferred method identified by Young et al. (2019), using the strip-transect analysis of infrared imagery, coupled with digital photographs. Surveys were flown during June 2021 using a de Havilland Twin Otter (DHC-6) fixed-wing aircraft equipped with a ventral camera port. Surveys planned for ES, MI, TS, and NB consisted of 36, 13, 2, and 23 transects, respectively four to six transects on the eastern end of the ES stratum were not flown at the request of the Mittimatalik Hunters and Trappers Organization (MHTO) to avoid potential interference with the community harvesters along the Pond Inlet floe edge.

RESULTS

While no ringed seal aerial surveys were conducted in 2022, results from the 2021 forward-looking infrared (FLIR) survey indicated that ringed seal densities are stable in ES and NB strata and increased in MI stratum compared to surveys flown in 2016. A comparison in the ES stratum of the highest estimate in 2021 (1.04 seals/km^2, CV = 0.08) with the highest estimate in 2016 (0.92 seals/km^2, CV = 0.09) indicated no statistically significant difference in density estimates in ES stratum (z-score = 1.02, p = 0.31). Similarly, a comparison in the NB stratum of the highest estimate in 2021 (0.83 seals/km^2, CV = 0.12) with the highest estimate in 2016 (0.74 seals/km^2, CV = 0.43) indicated no statistically significant difference in density estimates in NB stratum (t-test = 0.27, p = 0.79). In the MI stratum ringed seal densities were higher in 2021 compared to previous surveys in 2016 and 2017. A comparison of the highest estimate in 2021 (2.84 seals/km^2, CV = 0.15) with the highest estimate in 2016 (1.40 seals/km^2, CV = 0.12) indicated a statistically significantly higher ringed seal density observed in 2021 in the MI stratum (t-test = 3.14, p = 0.007). However, surveys flown prior to 2016 indicated MI stratum varies in ringed seal densities annually.

Results from the visual strip-transect analysis found similar ringed seal density estimates in ES stratum between 2014 and 2016. A comparison of the highest estimate in 2014 (0.60 seals/km^2, CV = 0.07) with the highest estimate in 2016 (0.52 seals/km^2, CV = 0.10) indicated no statistically significant difference in ringed seal densities (z-score = 1.25, p = 0.21). In the MI stratum ringed seal densities appeared higher in 2014 compared to subsequent surveys in 2016. A comparison of the highest estimate in 2014 (1.45 seals/km^2, CV = 0.14) with the highest estimate in 2016 (0.31 seals/km^2, CV = 0.17) indicated a statistically significantly higher density observed in 2014 in the MI stratum (t-test = 5.49, p < 0.001).

The MI stratum appeared to fluctuate in ring seal density annually. Ringed seal surveys flown in 2008 and 2014 saw high densities of ringed seal in MI (1.44 seals/km^2 and 1.45 seals/km^2, respectively; Baffinland, 2012) whereas ringed seal surveys flown in 2007 and 2016 observed lower densities of ringed seal in MI (0.27 seals/km^2 and 0.31 seals/km^2, respectively; Baffinland, 2012; Young et al., 2019). Based on visual strip-transect surveys flown in 2007, 2008, 2014, and 2016, ringed seal densities appeared to be stable in ES and variable in MI strata.

Results from the line-transect analysis found in the ES stratum ringed seal densities were higher in 2014 (ranged from 1.07 to 1.27 seals/km^2) compared to 2016 (ranged from 0.57 to 0.79 seals/km^2) surveys. A comparison of the

highest estimate in 2014 (1.27 seals/km^2, CV = 0.09) with the highest estimate in 2016 (0.79 seals/km^2, CV = 0.11) indicated a statistically significantly higher ringed seal density observed in 2014 in the ES stratum (t-test = 3.36, p = 0.008). Similarly, in the MI stratum, ringed seal densities were higher in 2014 (ranged from 1.14 to 2.13 seals/km^2) compared to 2016 (ranged from 0.93 to 1.27 seals/km^2) surveys. A comparison of the highest estimate in 2014 (2.13 seals/km^2, CV = 0.12) with the highest estimate in 2016 (1.27 seals/km^2, CV = 0.16) indicated a statistically significantly higher ringed seal density observed in 2014 in the MI stratum (t-test = 2.66, p = 0.03).

Comparing 2021 infrared strip-transect densities (1.04 seals/km^2 in ES and 2.84 seals/km^2 in MI) to 2014 line-transect distance analysis densities (1.27 seals/km^2 in ES and 2.13 seals/km^2 in MI), no statistical difference was observed between the two years (t-test = 1.63, p = 0.013 and t-test = 1.44, p = 0.017, respectively). These results indicated ring seal densities have not changed in the RSA since the onset of shipping operations in 2015, and since Project icebreaking activities began in the shoulder seasons in 2018.

TRENDS

The results of the 2021 RSASP showed ringed seal densities have overall remained stable with some annual variations since the onset of shipping operations in 2015, and since Project icebreaking activities began in the shoulder seasons in 2018. These results confirmed that mitigation measures were functioning as intended and that these Project activities were are being managed in a way that has not adversely affected ringed seals. The cessation of ice-breaking during the early shoulder season, in combination with the 2021 aerial survey results, indicated that a 2022 ringed seal aerial survey was not required as recommend by Baffinland's technical marine mammal experts.

RECOMMENDATIONS / LESSONS LEARNED

Mitigation measures in place for ringed seal have been carefully developed to completely avoid shipping impacts on ringed seal during periods when they are "grouped up" (i.e., the winter and spring) when group behaviour is critical to reproductive activities such as mating. The timing of the shipping season protects seals during the basking period, and aims to avoid impacts on seals at the time when they start maintaining breathing holes during initial ice freeze-up. Results from the 2021 surveys demonstrate that mitigations are functioning as intended.

Project Certificate Term and Condition No. 120

Category	Marine Environment - Marine Mammal Interactions
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operation, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To prevent impacts to marine mammals associated with Project shipping.
Term or Condition	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: a. Wildlife will be given right of way. b. Ships will when possible, maintain a straight course and constant speed, avoiding erratic behavior. 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.
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Marine Environmental Working Group (MEWG)
Reference	2022 Shipping and Marine Wildlife Management Plan (Baffinland, 2022g) Standing Instructions and General Information for Masters of Vessels Loading at Milne Inlet Port (Fednav, 2022) 2022 MEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.1

METHODS

Several mitigation measures, 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 are identified in Baffinland's Shipping and Marine Wildlife Management Plan (Baffinland, 2022g) including:

- Defined shipping lane throughout the RSA.
- Maintain constant speed and course when possible.
- All Project vessels will reduce speeds to a voluntary maximum of 9 knots when travelling within the RSA.
- No breaking of landfast ice will occur in the spring or fall shoulder season.

- No icebreaking to commence the 2022 shipping season. Ore carriers will not begin their transit to Milne Port until 3/10ths or less ice is present along the entire shipping route through the Nunavut Settlement Area (NSA) from the entrance of Eclipse Sound and Milne Port.
- 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.
- Vessels awaiting instructions from the Port Captain to enter the RSA will be instructed to wait in Baffin Bay at least 40 Km east of the NSA.
- No more than 80 ore carriers will be chartered during the 2022 season to transport up to 6 Mtpa.
- Baffinland will place Marine Wildlife Observers (via the SBO Program) on icebreaking vessels during the fall shoulder season that will be responsible for recording relative abundance, group composition and behaviour of marine mammals, and if relevant any incidences of marine mammal strike of near misses with Project vessels.
- Use of convoys throughout the 2022 season to further reduce total sound exposure. Baffinland targeted a 15% reduction in overall independent one way transits by implementing convoys.
- 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 unless warranted for safety.
- Maximum of three (3) vessels anchored at Ragged Island.
- Limiting vessel idling.

In addition to the above, Baffinland used vessel convoys as a mitigation method which was implemented for the first time in 2022. In total, 31 Project vessel transits included the use of convoys. Two of these convoys extended from Baffin Bay to Milne Port, 24 extended from Baffin Bay to Ragged Island, two extended from Ragged Island to Milne Port, and three extended from Milne Port to Baffin Bay. The use of convoys resulted in a 20% reduction in transits in the RSA in 2022.

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).

Baffinland’s Standing Instructions to Masters (SITM; Fednav, 2022) 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-related vessel tracks and associated speeds along the Northern Shipping Route are recorded throughout the shipping season using the Automatic Identification System (AiS), supported by two shore-based AiS base stations installed along the Northern Shipping Route (at Bruce Head and Pond Inlet). These systems

effectively track 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 (Spire ShipView™ 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.

RESULTS

Project vessel tracks from 2022 are plotted in Figure 4.14. Project vessels are required to leave the nominal shipping route near Ragged Island to access established anchorages at that location (Figure 4.14). The Project vessel tracks shown deviating from the nominal shipping route within Eclipse Sound (e.g. ELENA VE and ZELADA DESGAGNES) are due the arrival of multi-year ice from Navy Board Inlet from 5 to 13 October. (see Figures 4.14 and Appendix G.6.1). Also note that tracks crossing land (i.e. straight lines across Ragged Island and Bruce Head) are due to gaps in satellite AiS coverage and do not represent actual vessel tracklines. Apart from these instances, there were no Project vessel deviations from the nominal shipping route in the RSA during the 2022 shipping season.

Table 4.30 presents vessel speed information for all Project-related vessels calling at Milne Port in 2022. A total of 62 ore carrier voyages (comprising 35 ore carrier vessels), eight freight vessels/tanker voyages (comprising six vessels), two tugs, and one icebreaker called to Milne Port during the 2022 shipping season. Project vessels traveled below the 9 knot speed limit for 99.9% of their transit period in the RSA (Table 4.31). The maximum recorded travel speed for an ore carrier in 2022 was 10.8 knots. The maximum recorded speed for a freight/fuel tanker in 2022 was 9.2 knots. The proportional breakdown of vessel travel speed in the RSA during the 2022 shipping season is presented for all vessels combined (ore carriers and cargo/fuel vessels) in Figure 4.15.

TRENDS

No unplanned major deviations from the nominal Northern Shipping Route occurred from Project vessels in the RSA during the first eight years of iron ore shipping in this area (2015 to 2022).

There has been a marked improvement by Project vessel operators since 2018 in terms of adherence to the 9-knot speed restriction in the RSA. This has been largely the result of continuous improvements in 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.

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 Spire ShipView™ archive.

In 2023, 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 also continue to hire community-based Shipping Monitors based in Pond Inlet to provide community oversight of its shipping activities.

Project Certificate Term and 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	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: • Date, time and location of the incident; • Species of marine mammal or seabird involved; • Circumstances of the incident; • Weather and sea conditions at the time; • Observed state of the marine mammal or sea bird colony after the incident; and, • Direction of travel of the marine mammal after the incident, to the extent that it can be determined.
Relevant Baffinland Commitment	80, 83
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG), Fisheries and Oceans Canada (DFO), Environment and Climate Change Canada (ECCC)
Reference	2022 Shipping and Marine Wildlife Management Plan (Baffinland, 2022g)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

Baffinland's Shipping and Marine Wildlife Management Plan (Baffinland, 2022g) 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. The SBO program was not implemented as planned in 2022 at the start of the shipping season since shipping did not begin until icebreaking was no longer required (i.e., until a continuous path of no greater than 3/10th ice concentrations from Eclipse Sound to Milne Port).

Initiated in 2020, Baffinland continues to partner with the Marine Mammal Observation Network (MMON) to implement a marine mammal incidental sighting program through the participation of the MSV Botnica, Nordic Bulk Carriers and Oldendorff vessels. 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. Training was made available to participating vessel representatives through a new platform developed by MMON.

RESULTS

There were no marine mammal or seabird strikes reported in 2022, and therefore no notification was required.

TRENDS

From 2013 through 2022, no notifications of accidental contact with marine mammals or seabirds were required, with the exception of one seabird strike that occurred in October 2019. Given that this remains the only 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.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be provided in the Annual Report to the NIRB.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	2022 Shipping and Marine Wildlife Management Plan (Baffinland, 2022g)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

Baffinland's Shipping and Marine Wildlife Management Plan (Baffinland, 2022g) 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 again not be implemented in 2021. The SBO program was not run at the start of the shipping season in 2022 as no icebreaker was required, however plans to implement a 2022 Fall shoulder season program were developed. Because of an earlier than anticipated end of shipping season due to the presence of multi-year ice (all vessels left the RSA on October 13), the SBO program could not be run in 2022.

Regardless of whether the SBO program is implemented annually, Baffinland has partnered with the Marine Mammal Observation Network (MMON) since 2020 to implement a marine mammal incidental sighting program through the participation of the MSV Botnica, Nordic Ore Carriers and Oldendorff. Training was made available to participating vessel representatives through an online platform developed by MMON in 2021.

RESULTS

There were no notifications of marine mammal or seabird strikes in 2022.

TRENDS

From 2013 through 2022, 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 was 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.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	Not applicable
Ref. Document Link	Not applicable

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 2021, as was the case in 2020.

The SBO Program was not implemented in 2022 due to the absence of icebreaking during the spring shoulder season (precautionary mitigation) and an earlier than anticipated end of shipping season due to the presence of multi-year ice along the Northern Shipping Route (all vessels left the RSA on October 13).

As an ongoing alternative, Baffinland continues to collaborate with the Marine Mammal Observation Network (MMON) to implement a marine mammal incidental sighting programs through the participation of vessels contracted by Baffinland. Participating contracted vessels include the MSV *Botnica*, Nordic Bulk Carriers and Oldendorff. MMON is a network of observer members that include shipping operators and is intended to collect data on whale and seal sightings during their regular in-season activities. 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 also communicated with vessel captains through Baffinland's daily shipping calls.

RESULTS

Detailed results for the 2022 Incidental Marine Mammals Sightings Pilot Program are presented as part of Summary Sheet for PC Term and Condition No. 103 and 106.

Similar to 2020 and 2021, seabird sightings using the ECSAS protocol were not possible in 2022.

Baffinland completed early shoulder season marine mammal aerial surveys just prior, during and after the start of the shipping season in 2022. 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 Term and 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 at the start of shipping operations as well as confirmation of ice conditions.

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 2022. The only seabird strike reported over six years of monitoring occurred in October 2019.

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.

Project Certificate Term and 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 Term and 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	2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a) Hunting and Fishing (Harvesting) Policy (Baffinland, 2013c) Environmental Protection Plan (Baffinland, 2021e)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

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 (Baffinland, 2013c). Baffinland does not interfere with rights of public hunting or fishing near or on the Project Development Area. All visitors that check in with site security and visitor activities reported to security are tracked through a Hunter and Visitor Log, which are captured in Section 10.6 of the 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a).

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 Project Development Area (PDA) occurred in 2022.

Consulting groups Minnow Environmental Inc., North South Consultants and WSP (formerly known as Golder Associated Ltd.) completed various fish surveys over the course of 2022 to collect environmental data and fish population health metrics. The purpose was to gather information on distribution, relative abundance, size and other biological characteristics to evaluate potential mine related effects as required under *Fisheries Act* Authorizations, licences and applicable management plans.

In 2022, a total of 358 land use visitor person-days were recorded at Project sites, a 36% decrease from 2021 and comparable to 2020 levels. It is difficult to draw conclusions when comparing to 2020 and 2021 due to restrictions around COVID-19 and impacts on access log data. In 2022, Baffinland continued providing support to land users upon request and when possible, following health and safety precautions as needed.

TRENDS

No Project personnel have participated in hunting or fishing on the Project Development Area (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. 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 2021. As a result of the temporary closure, all camps and accommodations facilities remained closed to non-Project staff throughout 2022, however, the HTO Cabins and Visitor Communication Centers 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 in 2020 at each work site (Mary River and Milne Inlet), eliminating the necessity for visitors and Baffinland employees to interact closely, and was continued to be used in 2021 and 2022. 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.

The BCLOs continued to advise Nunavummiut of the COVID-19 protocols in place at the Project. Baffinland continued to maintain COVID-19 signage at the MHTO hunting cabins and Visitor Communication Centers. Hunter and visitor supply requests continued to be accommodated in 2022 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 Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - Not Applicable
Stakeholder Review	Not applicable
Reference	Not applicable
Ref. Document Link	Not applicable

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 Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	Mittimatalik Hunters and Trappers Organization (MHTO)
Reference	Request for Further Modification of Condition 179(a) and 179(b) of Mary River Project Certificate No. 005 (Baffinland, 2019h) Northern Shipping Corridor Anchorage Locations (Baffinland, 2020j) Marine Shipping and Vessel Management Report (Baffinland, 2020k) 2022 Shipping and Marine Wildlife Management Plan (Baffinland, 2022g)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

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 (2020j) submitted to NIRB on June 8, 2020 (NIRB Registry. No. 327657; Baffinland, 2019h) 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, 2020k). As indicated in Baffinland (2020j), 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).

As indicated previously and again in Baffinland (2022g), 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 (2020j), 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).

To minimize community concerns expressed, Baffinland limits the number of ships anchored at Ragged Island to a maximum of three (3) Project-related vessels. Baffinland also commits to restricting vessels drifting to the extent possible in Eclipse Sound since the 2019 shipping season. There is an established drifting zone proximal to Ragged Island, which is to only be used for safety-related needs, that ensures vessels will not drift near Pond Inlet or other parts of the shipping corridor. These management practices will continue to be implemented in 2023.

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 Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Responsible Party	Baffinland
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	Not applicable
Ref. Document Link	Not applicable

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. Amendments to the Terms and Conditions in 2022 encourages the other four impacted HTO/HTAs to participate in the MEWG, if they wish to do so.

Unlike previous years, most in-person engagements with the MHTO continued to be limited in 2022. In response, Baffinland has continued to rely on a written exchange of information in the form of written summaries (Inuktitut and English) of planned annual surveys via email and by providing hard copies to the MHTO through the BCLO for their review. Baffinland also makes numerous meeting requests to the MHTO to seek feedback on program plans, to further share program details, and to provide opportunity for questions to be answered.

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.

Baffinland has also implemented since 2019 a Pond Inlet-based Shipping Monitor Program, which consists of hiring a minimum of two full-time employees to actively track daily Project vessel movements in the RSA through the use of a tracking software ShipView™, and in relation to reported marine mammal sightings (as shared by residents of

Pond Inlet through marine VHF radio and Baffinland 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

Input on the design of the 2022 monitoring programs was sought through a number of mechanisms in 2022, in addition to building upon previous years' programs. During a teleconference MEWG meeting on May 3, 2022, Baffinland discussed the Draft marine monitoring reports that were submitted to the MEWG for comments. During teleconference MEWG meetings on June 14, 22 and 29 2022, Baffinland discussed upcoming 2022 monitoring programs. During the teleconference MEWG meeting on August 4, 2022, Baffinland discussed the 2022 Narwhal Adaptive Management Response Plan (NAMRP). Baffinland reached out to the MHTO multiple times between November 2021 and July 2022 in order to set up a 2022 pre-shipping meeting and share details on upcoming season (corresponding slide decks are included in Appendix B.2). A 2022 pre-shipping season radio show was held in Pond Inlet on July 13, 2022 to provide a summary to Pond Inlet residents on Baffinland's anticipated shipping activities. An End of 2022 Shipping Season meeting and public radio show were also held on February 8, 2023 in Pond Inlet (meeting and radio show summaries available in Appendix B.2). Follow-up correspondence also occurred following MEWG meetings, and distribution of meeting minutes (Appendix C.1).

Monitoring results are reviewed annually by MEWG members, and by Inuit participants through in-person meetings and actively during participation in monitoring programs such as the Bruce Head Shore-based Monitoring Program, Marine Mammal Aerial Survey Program. Ship-based Observer Program, and Marine Environmental Effects Monitoring Program and Aquatic Invasive Species programs.

Inuit participants were able to join the 2022 monitoring programs with COVID-19 restrictions lifted in 2022 thus allowing Inuit back at site. A total of 12 Inuit participants (nine (9) from Pond Inlet, two from Arctic Bay, and one (1) from Fort McPherson) were employed for the 2022 monitoring programs. Inuit participants were hired through an Inuvialuit-owned company. The work positions filled by Inuit participants in 2022 included: marine wildlife observers, polar bear monitors, boat operator and field technicians

Ten (10) Shipping Monitors consisting of returning employees supported the planning and monitoring of shipping season activities in 2022 (see Photo 27 and Photo 28 in Appendix D). Shipping Monitors can be reached by local residents up to 24 hours a day, and are also actively tracking shipping activity using the online AiS vessel tracker.

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 monitoring studies at all levels since the inception of the program, with the exception of the 2020 to 2021 monitoring 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-based companies has increased the participation of Inuit in this process. Prior to the COVID-19 Pandemic, Inuit participation in Baffinland's

monitoring programs had 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 also progressed to include training in data analysis and reporting in 2019. Due to the COVID-19 Pandemic Inuit participation was not possible in 2020 and was resumed, with limited participation, in 2021. In spite of limited involvement in 2021, Inuit participation consisted of a total of 1,922 hours / 10 Inuit participants for the 2021 monitoring programs. Inuit participation in monitoring programs in 2022 wee consistent with levels prior to the COVID-19 Pandemic and consisted of a total of 3,180 hours / 12 participants.

RECOMMENDATIONS / LESSONS LEARNED

Marine monitoring programs will continue to ensure Inuit involvement in field monitoring and data reporting whenever possible. 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 Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	Mittimatalik Hunter and Trappers Organization, Marine Environment Working Group (MEWG)
Reference	Baffinland website
Ref. Document Link	https://www.baffinland.com/operation/shipping-and-monitoring/

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 Spire Shipview®, 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 for viewing the live continuous Spire Shipview® feeds of vessels active in the Northern Shipping Route by all visitors during Baffinland's regular office hours (8 am to 5 pm).

In 2022, Baffinland trained and hired 10 full-time and part-time shipping monitors (inclusive of summer students), from Pond Inlet to maximize coverage of daily vessel activity up to 24 hours per day over the length of the shipping season (see Photo 27 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 Spire Shipview® 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 2023. 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 Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Fisheries and Oceans Canada, Mittimatalik Hunter and Trapper Organization, Pisiksik Working Group
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

Baffinland has engaged and conducted comprehensive consultation on the Project as a whole with the five (5) North Baffin communities (Arctic Bay, Clyde River, Igloolik, Pond Inlet, and Sanirajak) 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 (ERP) of the Project. 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. Although outside of this reporting period, Baffinland submitted an application to amend the Fisheries Authorization for the Freight Dock on March 3, 2023 to allow the construction of a submerged rocky reef at Milne Port to complete the offsetting requirements for the Freight Dock.

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 South railway and at Steensby Port (water crossings, pond encroachment, stream diversions, construction access road). Exploration of potential marine offsetting options are aimed at offsetting in-water works associated with the Ore Dock and Island Causeway at Steensby Port.

Options considered for fish habitat offsetting in the freshwater environment include 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 2022 were geared towards collection and analysis of baseline data and development of conceptual offsetting plans 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, 2018g). 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 2020. Potential offsetting options (type and/or locations) identified for the Phase 2 Proposal will contribute to potential options for future offsetting requirements for the on-going operation and/or development of the South railway and Steensby Port.

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. The FAA for the Milne Port Ore Dock was closed by DFO in 2021 as monitoring results demonstrated the effectiveness of the offsetting habitat.

Year 2 of post-construction monitoring for the Freight Dock offset habitat occurred in 2021. Year 2 of monitoring indicated that macroalgae, motile invertebrates and fish continue to colonize the Freight Dock offset habitat, and that it appears to be providing a suitable and stable substrate for continued colonization and growth of marine organisms.

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

In 2021, DFO closed the FAA for the Milne Port Ore Dock, based on their review of the results of the 6-year Ore Dock offset monitoring program which 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.

4.7 PERFORMANCE ON SOCIO-ECONOMIC TERMS AND CONDITIONS

4.7.1 Population Demographics (PC Terms and Conditions 129 through 134)

Six (6) PC Terms and Conditions are listed in the Population Demographics section of 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. The remaining three (3) PC Terms and Conditions relate to mitigating the potential for demographic changes, and the monitoring and reporting of demographic change within the North Baffin communities as a result of Project employment.

Inuit & Stakeholder Feedback

Key stakeholders who provide input related to the socio-economic monitoring program for the Project include the five (5) North Baffin communities, the QIA, various departments of the GN, and CIRNAC, all of which are members of the regional QSEMC. The QIA, GN and CIRNAC are also members of the project specific Mary River Socio-economic Monitoring Working Group (MRSEMWG). 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 2022.

Monitoring

The Local Study Area (LSA) is defined by the five (5) North Baffin communities. Baffinland conducts monitoring of population demographics in the LSA by reviewing government population statistics, tracking employee origin information, and the tracking of changes to an employee(s) address. Table 4.36 provides an evaluation of Project impacts on population demographics, based on monitoring activities completed in 2022, relative to predictions presented in the FEIS and FEIS Addendum.

Table 4.13: 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 2022 Socio-Economic Monitoring Report includes a review of population statistics and BCLO tracking of worker changes in home community. Baffinland was able to administer the Inuit Employee Survey at Mary River in Q4 2022 (Stratos, 2023b). Cumulative Baffinland data (i.e. Baffinland Human Resources data and BCLO survey) since 2015 indicates a net of one non-Inuit employee/contractor is known to have in-migrated to the North Baffin LSA. In that same time period Baffinland data indicates a net negative migration (out-migration) of 24 Inuit workers from the North Baffin LSA, which includes a net out-migration of one (1) Inuit employees/contractors in 2022. 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.	Effects may be occurring but links to Project are uncertain. Recorded effects are not significant.
	Out-migration from North Baffin		

Path Forward

Baffinland will continue to monitor this aspect of the socio-economic environment, and will discuss monitoring results with the MRSEMWG and QSEMC. Reporting on each PC Term and Condition follows.

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 Socio-Economic Monitoring Report (SEMR; Aglu and Stratos, 2023) Draft Socio-Economic Monitoring Plan (Baffinland, 2019i). BIM Letter to QSEMC re. 2021 Socio-Economic Monitoring Report (Baffinland, 2022k) 2022 MRSEMWG Meeting Records and Correspondence 2022 QSEMC Correspondences
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.3 Appendix C.4 Appendix G.7.1

METHODS

Baffinland continues to engage with the Government of Nunavut (GN) led regional Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and the Mary River Socio Economic Monitoring Working Group (MRSEMWG). The MRSEMWG is a sub-set of the QSEMC whose members include Baffinland (Lead), the Government of Nunavut (GN), the Government of Canada, and the QIA. A Terms of Reference for the MRSEMWG (which identifies socio-economic monitoring priorities and objectives for the Project, as well as the responsibilities of the Parties) has been developed and is provided in the Socio-Economic Monitoring Plan (Baffinland, 2019i). Baffinland has also incorporated feedback from MRSEMWG members while developing the Project's socio-economic monitoring program and continues to welcome feedback on the program from the MRSEMWG and QSEMC.

RESULTS

On August 29, 2022 the GN informed Baffinland that it had started preliminary planning for the QSEMC and that it would take place in October 2022. Due to issues with securing a venue for the committee meeting, the GN deferred the 2022 meeting and confirmed the next QSEMC meeting will take place in 2023.

Baffinland did maintain engagement with QSEMC members through written correspondence regarding the 2021 Socio-Economic Monitoring Report and its findings, which is typically the main subject of discussion at annual QSEMC meetings (Baffinland, 2022k). In this letter, Baffinland provided QSEMC members with an opportunity to review a summary slide deck of monitoring results from the 2021 Socio-Economic Monitoring Report and to provide feedback.

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 this 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, which include:

- North Baffin LSA (i.e. Arctic Bay, Clyde River, Igloolik, Pond Inlet, Sanirajak);
- 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 2022 SEMR (Aglu and Stratos, 2023).

RECOMMENDATIONS / LESSONS LEARNED

The socio-economic monitoring report is in alignment with the Mary River Environmental Impact Statement's predictions, Project Certificate's Terms and Conditions and Socio-Economic Monitoring Program. 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 is committed to using adaptive management as a tool to identify and make necessary improvements to the Project's socio-economic performance in the future.

Baffinland plans to participate in the 2023 meeting of the QSEMC, which is currently planned for May 2-3, 2023.

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023) 2022 SEMWG Meeting Records and Correspondence 2022 QSEMC Correspondences Draft Socio-Economic Monitoring Plan (Baffinland, 2019i)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.3 Appendix C.4 Appendix G.7.1

METHODS

Baffinland continues to engage with the QSEMC and the MRSEMWG 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. A complete community engagement record for the 2022 year is provided in Appendix B.1 of this report. Topics discussed during the MRSEMWG meeting held in 2022 are listed in Table 2.5.

RESULTS

Baffinland continues to maintain and engage the MRSEMWG, whose members include Baffinland, the Government of Nunavut, the Government of Canada, and the QIA. A Terms of Reference for the MRSEMWG (which identifies socio-economic monitoring priorities and objectives for the Project) has been developed and is provided in the Socio-Economic Monitoring Plan (Baffinland, 2019i). Baffinland has incorporated feedback from MRSEMWG members while developing the Project's Socio-Economic Monitoring Program and continues to welcome feedback on the

program from working group members. In 2022, Baffinland received feedback from MRSEMWG members on the Inuit Employee Survey (Stratos, 2023b). The survey has been updated and is reflective of input received. The updated survey was administered at Mary River between October 17, 2022 and November 28, 2022. The survey was made available at the Mine Site and at Milne Port.

TRENDS

See trend reporting for Project Certificate Term and Condition No. 129.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to engage with the QSEMC, MRSEMWG 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 Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023) Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019i)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.7.1

METHODS

Baffinland has provided demographic change information in the 2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023). This includes data on population estimates, known in-migrations of non-Inuit Project employees and contractors, known out-migrations of Inuit and non-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 4.37. Detailed results are presented in the 2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023).

TRENDS

Where appropriate, trends have been described for the indicators assessed in the 2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023).

Table 4.14: 2022 Monitoring of Indicators of Demographic Change

Indicator / Topic	Summary
Known in-migrations of non-Inuit Project employees and contractors	Cumulative Baffinland data (i.e. Baffinland Human Resources data and BCLO survey) since 2015 indicates a net of one non-Inuit employee/contractor is known to have in-migrated to the North Baffin LSA.
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. However, data to monitor this metric relies on annual data from public institutions, and this data has not been updated since 2016.
Known out-migrations of Inuit Project employees and contractors	Cumulative Baffinland data (i.e. Baffinland Human Resources data and BCLO survey) since 2015 indicates a net negative migration (out-migration) of 24 Inuit workers from the North Baffin LSA, which includes 1 Inuit employees/contractors in 2022.
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. However, data to monitor this metric relies on annual data from public institutions, and this data has not been updated since 2016.
Population estimates	The average annual population growth rates over the post-development period for North Baffin LSA communities was 2.1%, Iqaluit 1.7%, and Nunavut 1.6%, higher than the Canadian average growth rate of 1.1%. 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 (the latest year data is available from public institutions), continuing a negative trend over the past 5 years.
Employee and contractor changes of address, housing status, and migration intentions	Information relating to changes of address, housing status, and migration intentions is gathered from the annual Inuit Employee Survey. Like previous surveys, some respondents to the 2022 Inuit Employee Survey indicated they had moved to a different community in the past 12 months (9% in 2022, 5% in 2020, 4% in 2019, 10% in 2018, and 7% in 2017) or planned to move to a different community in the next 12 months (10% in 2022, 5% in 2020, 14% in 2019, 18% in 2018, and 16% in 2017).

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 Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023) 2022 MRSEMWG Meeting Records and Correspondence 2022 QSEMC Correspondence Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019i) Qikiqtani Skills And Training For Employment Partnership (Q-STEP), March 18th 2022 2022 Q-Step Project Advisory Committee Meeting Records 2022 The Qikiqtani Skills and Training for Employment Partnership Project Advisory Committee Report Baffinland IIBA Quarterly Reports
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.3 Appendix C.4 Appendix G7.1 Appendix G.7.2

METHODS

In 2022, 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.

Baffinland and the Qikiqtani Inuit Association (QIA) as well as the Government of Nunavut (GN), Kakivak Association and the Government of Canada partnered in the $19 million Qikiqtani Skills and Training for Employment Partnership (Q-STEP) training program from 2017 to 2022. The objective of this program was 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 Qikiqtani region. Training under the Q-STEP program includes work ready programs (community-based and Site-based), formal certification in heavy equipment operation, general skills development, and apprenticeship programs. The Work Ready Program (WRP) in each of the five (5) impacted communities and Iqaluit is a five (5) -day program that introduces the mining industry and working at a fly-in, fly-out operation includes, but also contains learning about skills that are transferable such as essential skills, safety and financial literacy.

Baffinland liaised with Nunavut Arctic College (NAC) in the communities to promote their programs that are pertinent to the preparation and development of one to either work at the mine or for other opportunities in their communities: Adult Basic Education (ABE), Pathway to Adult Secondary School programs (PASS), and Pre-Trades training.

RESULTS

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 was extended until March 31st, 2022, and the Q-STEP teams were authorized to expend the remaining funds. In a joint proposal, the Q-STEP team members at Baffinland and QIA secured additional funding from Kakivak Association to ensure that the Q-STEP program would continue. The funding for this will expire on March 31, 2023 and includes: community-based and on-site Work Ready Program (WRP), Heavy Equipment Operator (HEO) training, Adult Basic Education, and Pathway to Adult Secondary School programs.

In 2022, a clear and purposeful transition to more community-based training was realized. In community training was increased in each of the impacted communities, which included continued Work Ready Program training as well as Pre-Trades training. 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.

This was overall quite successful and will be continued in future years. The relationship that has been built between NAC, QIA and Baffinland is strong and this should ensure the continued ability to highlight additional training opportunities in each of the impacted communities.

TRENDS

Not applicable.

RECOMMENDATIONS/LESSONS LEARNED

The Q-STEP team continues to seek additional third party funding to support the continuation of apprenticeship training at Baffinland as it is a very sought after program that leads to certification.

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023) 2022 Inuit Employee Survey (Stratos, 2023b) Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019i)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal Appendix G.7.1

METHODS

Baffinland regularly administers a voluntary Inuit Employee Survey, which collects information on employee changes of address, housing status, and migration intentions. In 2021, the survey underwent modification based on feedback received by the MRSEMWG. Baffinland will continue to discuss the survey with the MRSEMWG and the QSEMC and will continue to engage on the Project's Socio-Economic Monitoring Program. From October 17 to November 28, 2022, the Inuit Employee survey was administered at the Mary River project site (Stratos, 2023b).

RESULTS

Site-based survey administration occurred at Mary River between October 17th to November 30th, 2022. In-community survey administration did not take place in 2022 due to logistical constraints and COVID-19

considerations. The survey was well-advertised around site. It was administered through the Baffinland Human Resources and Labour Relations department, and respondents had the option of having a cultural advisor, a member of the Inuit Success Team, and/or an HR representative to support them in filling out the survey (e.g., by reading the questions and explaining the options). Surveys were offered in paper format and could be completed in English or Inuktitut. Participation in the survey was voluntary and respondents were able to skip any questions they did not wish to answer. Respondents were advised prior to the survey that their responses would remain confidential, and their names would not be used publicly by Baffinland, however, Baffinland could use survey information in public reports and/or presentations.

In total, 55 surveys were completed. Applying the same methodology as used in the 2020 Inuit Employee Survey Report, based on the number of Inuit Project employees on staff in Q3 2022, the survey response rate was 18%. This compares to the 32.5% response rate achieved in 2020.

Table 4.38 pertains to current Inuit employee and contractor survey respondent changes of address (*n*=55).

Table 4.15: Changes in Inuit Employee and Contractor Residence and Community (2022 Inuit Employee Survey Results)

Type of Change	Number of Respondents	Percentage of Respondents
All survey respondents (n=54)		
Residence changed in the past 12 months, within existing community	6	11%
Residence changed in the past 12 months, moved to new community	5	9%
Residence did not change in the past 12 months	43	80%
Total	**54**	**100.0%**
If you answered 'Yes, from one community to another community', which community did you move from? (n=5)		
Stayed in Ottawa for three years	1	20%
Iqaluit to Arctic Bay then to Pond Inlet	1	20%
Pond Inlet to Fort McPherson	1	20%
Pond Inlet to Resolute Bay	1	20%
Clyde River	1	20%
Total	5	**100.0%**

Notes: Some percentages may not add to 100% due to rounding.
Source: 2022 Inuit Employee Survey (Stratos, 2023b)

Table 4.39 pertains to current Inuit employee and contractor housing status (*n*=55).

Table 4.16: Current Inuit Employee and Contractor Housing Status (2022 Inuit Employee Survey Results)

Current Housing Status	Number of Respondents	Percentage of Respondents
What type of housing do you currently live in? (n=55)		
Public housing	27	49%
Privately owned – owned by you	4	7%
Privately owned - Owned by another individual	10	18%
Renting from a private company or individual	10	18%
Other	4	7%
Total	**55**	**100.0%**
Have you ever considered purchasing a home in your community? (n=53)		
I already own my own home	6	11%
No	34	64%
Yes	13	25%
Total	**53**	**100.0%**

Notes:
Some percentages may not add to 100% due to rounding.
Source: 2022 Inuit Employee Survey (Stratos, 2023b).

Table 4.40 summarizes results pertaining to Inuit employee and contractor migration intentions (*n*=51).

Table 4.17: Inuit Employee and Contractor Migration Intentions (2022 Inuit Employee Survey Results)

Migration Intentions	Number of Respondents	Percentage of Respondents
Do you plan on moving from one residence to another residence in the next 12 months? (n=51)		
Plan to move residences in the next 12 months, within existing community	7	14%
Plan to move residences in the next 12 months, to a new community	5	10%
Do not plan to move residences in the next 12 months	39	76%
Total	**51**	**100%**
If yes, which community are you planning to move to? (n=7)		
Near Montreal	1	14%
Kinngait	1	14%
Near/in Ottawa	2	29%
Inuvik	1	14%
Unsure / didn't specify	2	29%
Total	**7**	**100.0%**

Notes:
Some percentages may not add to 100% due to rounding.
Source: 2022 Inuit Employee Survey (Stratos, 2023b).

TRENDS

Like previous surveys, some respondents to the 2022 Inuit Employee Survey indicated they had moved to a different community in the past 12 months (9% in 2022, 5% in 2020, 4% in 2019, 10% in 2018, and 7% in 2017) or planned to move to a different community in the next 12 months (10% in 2022, 5% in 2020, 14% in 2019, 18% in 2018, and 16% in 2017). The proportion of employees living in public housing appears to be trending downwards (66.7% in 2017, 60.7% in 2018, 54.9% in 2020 and 49% in 2022). 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 explore different methods to administer the survey to Inuit employees, including considering a virtual option. This would also allow Baffinland to administer the survey during a situation where COVID-19 restrictions, or other unforeseen circumstances are occurring.

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 Term and 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	The Proponent shall include with its annual reporting to the NIRB a summation of employee origin information as follows: a. The number of Inuit and non-Inuit employees hired from each of the North Baffin communities, specifying the number from each b. The number of Inuit and non-Inuit employees hired from each of the Kitikmeot and Kivalliq regions, specifying the number from each c. 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 d. The number of non-Canadian foreign employees hired, specifying the locations and number from each foreign point of hire.
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	To be determined following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023) Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019i)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.7.1

METHODS

Data on the origin, number, and ethnicity of employees and contractors who worked on the Project are presented in the 2022 Socio-Economic Monitoring Report, and summarized in the below Table 4.41 (Aglu and Stratos, 2023). This information was obtained from internal Baffinland records.

RESULTS

The results of employee origin information is presented by Full-Time Equivalents (FTEs), as opposed to headcount. One FTE represents 2,184 hours[5], which is the approximate time one person works on a full-time basis each year.

[5] Starting in 2022, Baffinland modified the average employee schedule from a two-week in/two-week out rotatonal schedule, to a three-week in/three week-out rotational schedule. This was done to support COVID-19 isolation period requirements under various provincial jursdictions. In line with this change, Baffinland modified the number of hours used to calculate FTEs from 2,016 hours to 2,184 hours.

Headcount, on the other hand, provides a 'snapshot' of who is working at a specific point in time (e.g. the end of a quarter).

Table 4.18: Detailed Baffinland and Contractor Employment Full-Time Equivalents (FTEs) 2022, Site Based

Location	Baffinland			Contractor			All workers		
	Inuit	Non-Inuit	Total	Inuit	Non-Inuit	Total	Inuit	Non-Inuit	Total
LSA Communities									
Arctic Bay	20	1	21	11	-	11	31	1	32
Clyde River	17	-	17	7	-	7	24	-	24
Pond Inlet	30	-	31	10	-	10	40	-	41
Igloolik	8	-	8	13	-	13	21	-	21
Iqaluit	22	1	23	17	-	17	39	1	40
Sanirajak	21	-	21	7	-	7	28	-	28
LSA total	**118**	**2**	**120**	**64**	**-**	**65**	**182**	**2**	**185**
Other Qikiqtaaluk Communities									
Cape Dorset	-	-	-	-	-	-	-	-	-
Kimmirut	1	-	1	-	-	-	1	-	1
Pangnirtung	1	-	1	-	-	-	1	-	1
Qikiqtarjuaq	-	-	-	-	-	-	-	-	-
Resolute	1	-	1	-	-	-	1	-	1
Sanikiluaq	1	-	1	-	-	-	1	-	1
Other Qikiqtaaluk	-	-	-	-	-	-	-	-	-
Other Qikiqtaaluk total	4	-	4	-	-	-	4	-	4
Other Nunavut									
*There were no Baffinland or Contractor employees from the Kivalliq or Kitikmeot regions in 2022									
Other provinces and territories									
Alberta	1	78	80	1	85	87	3	164	166
British Columbia	1	35	36	-	24	24	1	59	60
Manitoba	1	21	22	1	19	20	2	40	42
New Brunswick	2	74	76	-	36	36	2	110	112
Newfoundland & Labrador	1	207	208	-	122	122	1	329	330
Northwest Territories	-	-	-	-	3	4	1	4	4
Nova Scotia	-	164	164	1	67	68	1	231	232

Location	Baffinland			Contractor			All workers		
	Inuit	Non-Inuit	Total	Inuit	Non-Inuit	Total	Inuit	Non-Inuit	Total
Ontario	24	272	296	5	123	128	29	395	424
Prince Edward Island	-	9	9	-	4	4	-	14	14
Quebec	2	54	56	3	65	68	4	119	123
Saskatchewan	1	26	26	-	12	12	1	38	38
Yukon	-	-	-	-	1	1	-	1	1
Other Provinces and Territories Total	**33**	**941**	**974**	**11**	**562**	**573**	**44**	**1,503**	**1,548**
Other									
International	-	-	-	-	2	2	-	2	2
Unknown	-	-	-	1	5	6	1	5	6
Other Total	**-**	**-**	**-**	**1**	**7**	**8**	**1**	**7**	**8**
Totals	**156**	**943**	**1,099**	**76**	**570**	**646**	**232**	**1,513**	**1,744**

Note:
Due to issues associated with rounding, numbers presented – most notably with regard to FTEs – may not add up precisely to the totals provided and percentages may not precisely reflect the absolute figures. This is due to presenting FTE data broken down across a number of dimensions (e.g., by community, region, Inuit status and gender).

Using FTEs to present employee origin provides a good indication of where employees and contractors are being hired from, on average, over the year.

TRENDS

There were 232 Inuit FTEs at the Project in 2022 (including direct and contractor employees), including 143 from North Baffin LSA communities and 39 from Iqaluit. This represents an increase of 68 Inuit FTEs (an approximate 41%) since operation began in 2015. There was an initial drop in Inuit FTEs from 2014 to 2016, likely caused by a shift away from the large amount of labour used during construction. Inuit FTEs have experienced a general increase since 2016; however, a slight decline in Inuit FTEs has been observed since 2019 when employment in general peaked in anticipation of expansion. The drop in Inuit FTEs can be attributed to the 2019 adjournment of the Phase 2 Public Hearing and the onset of the COVID-19 Pandemic in early 2020. Acting in line with Government of Nunavut Public Health Orders, Baffinland demobilized Nunavummiut employees and contractors from site from January to July 2021, and again from end of December 2021 to March 2022. Standby wages were paid to Inuit employees who were demobilized from site in 2021. This amounted to a total of $5,008,386 in standby wages being paid out to Inuit in 2021. In 2022, Inuit employees were demobilized from site from January to the week of March 7, 2022. Baffinland Inuit employees received full wages during this period.

The number of directly employed Inuit from LSA communities was 118 (FTEs) in 2022, representing a slight decrease from 2021 figures (i.e. 130 FTEs). The number of Inuit contractor FTEs remained relatively steady at 64 in 2022, compared to 65 in 2021.

The remainder of Inuit FTEs were residing either elsewhere in Nunavut, or in other Canadian provinces or territories, with the majority living in Ontario.

For non-Inuit, there were 1,513 FTEs at the Project in 2022. The number of non-Inuit FTEs living in LSA communities remained steady compared to 2021 at two (2) FTEs. Of the 1,513 non-Inuit FTEs, most resided in Ontario (26%), Newfoundland (22%), and Nova Scotia (15%).

There were a total of two (2) non-Inuit contractor FTEs reporting living outside of Canada in 2022. These FTEs represent the total of smaller amounts of work (e.g. hours worked ranging from 12 to 600 per individual) done by a variety of specialized contractors originating from Estonia, France, New Zealand, Australia and Mexico.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to provide information regarding employee origin in future Socio-Economic Monitoring Reports. The Socio-Economic Monitoring Report (SEMR) provides detailed Baffinland and contractor employment data, including Inuit and non-Inuit employment by North Baffin communities, other Nunavut regions, outside Nunavut, and internationally (see Table 3 in the 2022 Socio-Economic Monitoring Report; Aglu and Stratos, 2023).

4.7.2 Education and Training (PC Terms and Conditions 135 through 141)

Seven (7) PC Terms and 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 five (5) North Baffin communities, the QIA, various departments of the Government of Nunavut (GN), and CIRNAC. There is an inherent relationship between the education and training initiatives and objectives implemented by Baffinland and the GN, 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 MRSEMWG 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 4.42 provides an evaluation of the Project's impacts on education and training, based on monitoring activities completed in 2022, relative to predictions presented in the FEIS and FEIS Addendum.

Table 4.19: Education and Training Impact Evaluation

Component	Effects	Monitoring Program	Impact Evaluation
Life Skills	Training of workers and contractors, resulting in improved like skills amongst LSA residents. Training in 2022 is described in PC Term and 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. In 2022, Inuit training hours totalled 52,055 hours which is 39% of the total training provided by Baffinland.	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		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 MRSEMWG, QSEMC, and the Project's workforce. Reporting on each PC Term and Condition follows.

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 MRSEMWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.3

METHODS

Baffinland utilizes a learning management system (CogniBox) to track and record training activities for all employees at the Mine Site and Milne Port. All of this training is available to Nunavummiut and is beneficial as they expand their skills and knowledge.

Online Training

Online training is available through the Learning Management System (LMS) whereby employees can complete training prior to arriving at site. Baffinland and 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, Respectful Workplace 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 partnered in the $19 million Qikiqtani Skills and Training for Employment Partnership (Q-STEP) training program from 2017 to 2022. The objective of this program was 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 Qikiqtani region. Training under the Q-STEP program includes work ready programs (community-based and site-based), formal certification in heavy equipment operation, community-based driver training for Class 7, Class 5, and Class 3 (managed by QIA), general skills development, and apprenticeship programs.

Baffinland works with the Mary River Inuit Impact and Benefit Agreement (IIBA) and the Joint Employment Committee (JEC) to discuss training opportunities at both the mine site and in communities. These discussions are of an ongoing and of an iterative nature and will continue to occur in 2023.

RESULTS

The Q-STEP 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 was extended until March 31st, 2022, and the Q-STEP teams were authorized to expend the remaining funds. In a joint proposal, the Q-STEP team members at Baffinland and QIA secured additional funding from Kakivak Association to ensure that the Q-STEP program would continue. The funding, which expired on March 31, 2023, included:

1. Community based work readiness training
2. On-site work readiness training
3. Heavy Equipment Operator Training
4. Adult Basic Education and Pathway to Adult Secondary School programs

The Q-STEP team continues to seek additional third party funding to support the continuation of apprenticeship training at Baffinland.

TRENDS

In 2022, community based training continued to be delivered. 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 received a training allowance recognizing their successful participation in training. As a result of the community-based training, numerous participants realized employment at both the Project as well as within the community.

RECOMMENDATIONS / LESSONS LEARNED

The Q-STEP team continues to seek additional third party funding to support the continuation of apprenticeship training at Baffinland.

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 option for employees and community residents.

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 MRSEMWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.3

METHODS

On-Site Training

Baffinland has trained a number of Inuit employees in Standard First Aid with CPR/AED level C. Training has also been provided for Mine Rescue, which 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. A number of employees are also part of the Emergency Response Team (ERT) which provides them with a large number of skills and recognition which can be used outside of Baffinland. There are a number of other certificates offered at Baffinland that remain valid and may be recognized for other opportunities: Workplace Hazardous Materials Information System (WHMIS) awareness training certificate, Transportation of Dangerous Goods (TDG) certificate and Workers' Safety and Compensation Commission (WSCC) Supervisor certificate.

Apprenticeship Program

Baffinland works in partnership with the Government of Nunavut (GN), Department of Family Services to deliver apprenticeship programs. 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 upskilling 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, Welder, Heavy Equipment Mechanic, Automotive Service Technician, Heat Systems Technician/Oil Burner Mechanic, Millwright and Machinist.

Heavy Equipment Operator Training

Baffinland offers Inuit opportunities to participate in the Heavy Equipment Operating (HEO) training delivered by the Operating Engineers Training Institute of Ontario (OETIO) in Morrisburg, Ontario in partnership with Q-STEP. This leads to a Certification of completion of Loader, Haul Truck and Skid Steer Practical Field Training certified by OETIO.

Programs offered at Nunavut Arctic College

In 2022, Baffinland partnered with Nunavut Arctic College (NAC) to explore highlighting the availability of both the Adult Basic Education Program and the Pathway to Adult Secondary School Program. Baffinland socialized these programs utilizing social media and in-community posters, and assisted interested residents in registering and beginning this training.

RESULTS

On Site Training

In 2022, the Training Department provided numerous training and qualifications; a list of qualifications that Baffinland employees can obtain is provided in the 'Methods' section for PC Term and Condition No. 137. The objective of these training programs is to upskill the trainees and provide them transferable skills to work at the Project, or to be able to apply to other careers and opportunities. In 2022, Inuit training hours totalled 52,055 hours, equivalent to 38.9% of the total training provided by Baffinland.

Apprenticeship Program

Baffinland continued to offer apprenticeship training in 2022. Throughout 2022 there were eleven (11) Inuit apprentices undergoing training. Pre-Trades training was offered in the communities of Igloolik and Clyde River. Thirteen (13) participants completed the Pre-Trades training, and six (6) were successful on challenging the Trades Entrance Exam. Baffinland is proposing to increase the number of apprentices to sixteen (16). During 2022, a total of three (3) apprentices attended block training, two (2) in Alberta and one (1) in Rankin Inlet. All were unfortunately unsuccessful; a plan has been made for their second try at the block training. Baffinland will continue to assist, support and encourage apprentices to attend and complete their eight-week apprenticeship block training advancement. Baffinland is also proposing to shorten or break up the eight-week block training program to assist in improving the success rate among apprentices.

Heavy Equipment Operator Training

The HEO training delivered by the OETIO in Morrisburg, Ontario in partnership with Q-STEP resumed in 2022 after being interrupted due to COVID-19. A total of eight (8) cohorts attended this training with a total of 44 graduates (75%). All interested graduates who met Baffinland's hiring requirements and who were interested were provided with an offer of employment except for a small group who graduated in the last quarter of 2022. This group will be processed in 2023.

Programs offered at Nunavut Arctic College

In 2022, Adult Basic Education and Pathway to Adult Secondary School (PASS) Programs have been successfully delivered in a number of the impacted communities in partnership with NAC.

TRENDS

With a total of 52,055 hours of training delivered at site by the Training Department to Inuit workers, this is an increase of 57.9% in Inuit training hours when compared to 2021, which is remarkable given that Inuit employees were returned home from site due to COVID-19, from late December 2021 to early March 2022.

RECOMMENDATIONS / LESSONS LEARNED

The Q-STEP team continues to seek additional third party funding to support the continuation of apprenticeship training at Baffinland as it is a very sought after program that leads to certification.

Baffinland will work closely with NAC to highlight and promote new training opportunities. In addition, these training opportunities will be included as part of the agenda during community tours, radio shows, and engagements.

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 MRSEMWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.3 Appendix G.7.3

METHODS

There are a number of qualifications that employees can obtain which would aid them for their work and their personal lives. The objective of these training programs is to upskill the trainees and provide them transferable skills to work at the Project, or to be able to apply to other careers and opportunities. An exhaustive list of training is provided in Appendix G.7.3.

Baffinland delivers training that is job specific, and all of which 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 2022, Inuit training hours totalled 52,055 hours, equivalent to 38.9% of the total training provided by Baffinland. This is an increase of 57.9% in Inuit training hours when compared to 2021, which is remarkable given that Inuit employees were returned home from site due to COVID-19, from late December 2021 to early March 2022. Baffinland is also working to develop new training programs that would be offered both in the community and at the Mary River Project. 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 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.

Project Certificate Term and 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 Term and Condition	Not Active
Status of Compliance	In Compliance
Stakeholder Review	Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 MRSEMWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.3

METHODS

Baffinland and the Qikiqtani Inuit Association (QIA) as well as the Government of Nunavut, Kakivak Association and the Government of Canada partnered in the $19 million Qikiqtani Skills and Training for Employment Partnership (Q-STEP) training program from 2017 to 2022. The objective of this program was 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 Qikiqtani region. Training under the Q-STEP program includes work ready programs (community-based and site-based), formal certification in heavy equipment operation, community-based driver training for Class 7, Class 5, and Class 3 (managed by QIA), general skills development, and apprenticeship programs.

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.

In order to improve Inuk employee retention, Baffinland looks to establish structures for more frequent interactions about one's career development and their opportunities within the business. These will be achieved through Career Development Plans (CDP) for every Inuk employee. These plans are developed through series of periodic discussions that 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. Once the actions and plans are mutually agreed, the employee will be supported so that they can undertake training and development as required to grow their career.

RESULTS

Qikiqtani Skills and Training for Employment Partnership

The Q-STEP 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 was extended until March 31st, 2022, and the Q-STEP teams were authorized to expend the remaining funds. In a joint proposal, the Q-STEP team members at Baffinland and QIA secured additional funding from Kakivak Association to ensure that the Q-STEP program would continue. The funding for this expired on March 31, 2023 and included: community-based and Site based work ready program, Heavy Equipment Operator (HEO) training, Adult Basic Education and Pathway to Adult Secondary School (PASS) programs. The Q-STEP team continues to seek additional third party funding to support the continuation of apprenticeship training at Baffinland.

Baffinland continued to work with its partners, such as Nunavut Arctic College (NAC), to offer ongoing training and development in the communities including: The Adult Basic Education Program, the PASS Program, and the Pre-Trades Program.

Community Based Work Ready Program

Baffinland continues to offer the Community Based Work Ready Program (WRP) training. The community WRP is a 40-hour training program facilitated in the communities in person or virtually which 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 2022, in line with the IIBA commitments, the Work Ready Program was delivered in all five of the North Baffin impacted communities as well as Iqaluit.

The COVID-19 pandemic directly impacted Nunavut and Nunavummiut during 2021 and 2022. Nunavut based staff were demobilized for a portion of the year in an effort to protect employees and their communities. In 2022, Baffinland held 13 community based WRP sessions, including four (4) virtual sessions. There was a total of 81 graduates (94% success rate). Because of COVID-19 and travel restrictions, delivery of the program was conducted both in person and in an online distance format. The online distance format continued to be successful and will be continued moving forward even after in person training resumes. The virtual sessions are delivered over ten (10) days instead of five (5) days for the in-community program. Participants from multiple communities can join the same session. This is particularly well adapted for regrouping participants when the numbers are not sufficient in one community to hold an in-community training session.

Heavy Equipment Operator Training

In previous years, Baffinland offered Inuit opportunities to participate in the Heavy Equipment Operating (HEO) Training delivered by the OETIO in Morrisburg, Ontario in partnership with Q-STEP. However, due to COVID-19 restrictions, training sessions were unable to take place in 2021.

The HEO Training delivered by the Operating Engineers Training Institute of Ontario (OEITO) in Morrisburg, Ontario in partnership with Q-STEP resumed in 2022 after being interrupted due to COVID-19. A total of eight (8) cohorts attended this training with a total of 44 graduates (75%). All interested graduates who met Baffinland's hiring requirements and who were interested were provided with an offer of employment except for a small group who graduated in the last quarter of 2022. This group will be processed in 2023.

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; and
- 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 3rd 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 2022, there were 11 Inuit apprentices (9 males and 2 females) of which two (2) were inactive, as summarized in Table 4.43. All current apprentices at Baffinland shall continue to attend technical training school for their specific trade and apprenticeship level in 2023. Baffinland is coordinating the training with the Nunavut Apprenticeship Department.

Table 4.20: Apprentices at Baffinland in 2021

Number of Apprentices	Level of Training	Occupation
3	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
0	Year 1 Apprentice	Millwright “Industrial Mechanic”
0	Year 1 Apprentice	Oil Heat Systems Technician “Oil Burner Mechanic”
2	Year 1 Apprentice	Housing Maintainer
2	Year 1 Apprentice	Electrician

Career Development Plan

In 2022, Baffinland developed a process, a plan and the associated documents for Career Development Plans. A Career Development Plan is a plan established between an Inuk employee and their department focusing on the individual’s career aspirations and interest, whether it’s skills development, career advancement, change in career, etc. Baffinland will implement Career Development Plans for all Inuk employees in 2023 in a systematic approach.

TRENDS

In 2022, 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.

Due to COVID-19 travel restrictions and other conditions, pre-trades training were offered in the communities through NAC instead of being offered on site. 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 WRP has also been adapted with the inclusion of an online distance format to deal with COVID-19 travel restrictions. Baffinland plans to continue to prioritize community-based training where possible during the global Pandemic and thereafter.

RECOMMENDATIONS / LESSONS LEARNED

In early 2022, the COVID-19 Pandemic continued to cause travel and other restrictions in Nunavut and across the world. This impacted Nunavut based employees who, for the majority of Q1, 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 when they received training bonuses.

During 2022, Baffinland committed to increase community training initiatives. The WRP was initially transitioned to an online delivery format with participants being provided an iPad and internet access to be able to participate in the program. Even when in-person training resumed, Baffinland will continue to offer the distance online format which was well received by participants.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Not Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association, Mary River Socio-Economic Monitoring Working Group
Reference	Qikiqtani Labour Market Analysis (NIRB Registry No. 291437, FHW Consulting, 2014a) Qikiqtani Labour Market Analysis (MiHR, 2020)
Ref. Document Link	Not applicable

METHODS

Baffinland ensures priority hiring is available for Inuit within the five (5) point of hire communities as well as the Qikiqtani region. Following this Inuit who are beneficiaries under the *Nunavut Agreement* and who reside anywhere else in Canada are priority hires. 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.

As per the 2021 Qikiqtani Labour Market Analysis (QLMA) report (MiHR, 2020) completed by Mining Industry Human Resources Council (MiHR) from March 2020, there are challenges in recruiting Inuit from the North Baffin region and Nunavut as a whole given the limited skillset available within Qikiqtani labour supply. Limited numbers of semi-skilled and skilled qualified workers currently seeking work are available. Because of this limited availability of labour, Baffinland is required to employ southern Canadian workers at site to meet operational and business requirements.

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.

In 2022, Baffinland and QIA continued to work with MiHR to develop a Skills Equivalency Assessment Template (SEAT). This assessment template is designed to 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 2021 QLMA report is organized around two (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

The Qikiqtani Labour Market Analysis is a critical resource when examining labour supply and demand. QLMA is to be completed triennially.

Through MiHR, Baffinland, QIA, research and understanding 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 QLMA indicate that there is limited detailed understanding of what mining work involves and what employment opportunities there may be. The community based work readiness training program helps understand employment and training opportunities at Baffinland. Improvements to the work readiness training program in 2021 included resume writing with the inclusion of traditional knowledge and skills and interviewing skills. These improvements in the work readiness training program prepares Inuit participants with more employable and transferable skills.

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 this, Baffinland has undertaken Career Path interviews with all Inuit employees to understand the individual employees' current career path interest and other opportunities as part of their career development.

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.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023) Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019i)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.7.1

METHODS

When a candidate applies to a job listing through Baffinland's online application system, the candidate is prompted to fill out employment and education details in their profile for the application to the respective role, including their current employment status, whether they are currently enrolled in an education program, and their highest level of education. In early 2022, Baffinland updated its tracking system to be able to compile and report on these data systematically, as reported below.

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 (GN), MRSEMWG (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 October/November 2022, results shown below in Table 4.44. Results from the Inuit Employee Survey are also provided, where relevant, in the Project's Socio-Economic Monitoring Reports.

RESULTS

In 2022, Baffinland collected information for 284 Inuit applicants to job positions with the company. Information on Baffinland's Inuit applicants' pre-employment activities is shown in Table 4.44 below.

Table 4.21: Pre-Employment Activities of Baffinland Inuit Applicants

Pre-Employment Activities of Baffinland Inuit Applicants	Number of Applicants	Percentage of Applicants
Are you enrolled in an education program (n=284)		
Yes	7	3%
No	274	96%
Unknown	3	1%
Total	**284**	**100.0%**
Current Employment Status (n=284)		
Employed	90	32%
Unemployed	192	68%
Other	1	<1%
Unknown	1	<1%
Total	**284**	**100%**

Notes:
Some percentages may not add to 100% due to rounding
Source: 2022 Inuit Employee Survey (Stratos, 2023b).

As noted above, the data shown in Table 4.44 pertains to pre-employment activities of applicants. Not all applicants will proceed to be hired by Baffinland. In 2022, a total of two (2) Inuit applicants were hired who indicated they were currently enrolled in an education program and six (6) Inuit applicants were hired who indicated they were currently employed at the time they applied to work for Baffinland.

Out of the 284 Inuit applicants, 187 applicants submitted a General Application. General Application postings do not reflect current workforce requirements. Baffinland collects applications from interested parties on an ongoing basis, and utilizes these applications when vacancies become available.

Inuit Employee Survey

In 2022, a total of 55 surveys were completed by Inuit employees and contractors. Table 4.45 summarizes results on the education status of survey respondents prior to Project employment (n=40).

Table 4.46 summarizes results on the employment status of survey respondents prior to Project employment (n=45).

TRENDS

2022 was the first year that Baffinland was able to report on Inuit applicant information on current employment and educational program status. Results showed few Inuit applicants (4%) were enrolled in an education program when they applied for a position with Baffinland. This is compared to the 2022 Inuit Employee Survey, where 10% of respondents indicated that they were enrolled in an education program.

Table 4.22: Education Status Prior to Project Employment (2022 Inuit Employee Survey Results)

Pre-Employment Status	Number of Respondents	Percentage of Respondents
Were you enrolled in an academic or vocational program at the time of your hire at the Mary River Project? (n=40)		
Yes	4	10%
No	36	90%
Total	**40**	**100%**
If yes, did you suspend or discontinue your education because you were hired to work at the Mary River Project? (n=5)		
Yes	3	60%
No	2	40%
Total	**5**[6]	**100%**

Notes:
Some percentages may not add to 100% due to rounding.
Source: 2022 Inuit Employee Survey (Stratos, 2023b).

Table 4.23: Employment Status Prior to Project Employment (2022 Inuit Employee Survey Results)

Pre-Employment Status	Number of Respondents	Percentage of Respondents
Did you resign from a previous job in order to take up employment with the Mary River Project? (n=45)		
Yes	10	22%
No	35	78%
Total	**45**	**100%**
If yes, what was your previous employment status? (n=19)		
Casual	3	30%
Full-time	7	70%
Total	**10**	**100%**

Notes:
Source: 2022 Inuit Employee Survey (Stratos, 2023b).

In the 2022 Inuit Employee Survey, 3 of the 4 respondents who reported being enrolled in an education program prior to their employment reported that they suspended or discontinued that education because they were hired. This is an increase from the 2020 survey during which only one respondent reporting leaving an academic program in 2020. In 2017, 2018 and 2019, 0%, 3% and 0% of survey respondents report suspending their education as a result

[6] Total does not align with number of respondents who indicated enrollment in an academic or vocation program at time of hire. Variance can be due to respondent selecting incorrect answer box and/or personal interpretation of a question(s). To ensure no bias was introducted in results, Baffinland has considered and included all answers received by survey respondents.

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.

68% of Inuit applicants were not currently employed when they applied to work with Baffinland, compared to 32% who reported being employed. From the 2022 Inuit Employee survey, 22% of respondents indicated that they resigned from a previous job to take up employment at the Project.

In 2022, two (2) Inuit employees were hired who indicated they were currently enrolled in an education program and six (6) Inuit employees were hired who indicated they were currently employed at the time they applied to work for Baffinland.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to collect information from applicants on pre-employment activities, and administer the Inuit Employee Survey on a regular basis.

Project Certificate Term and 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 Term and Condition	Not Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association (QIA)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.7.1

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:

- The 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 (HEO) training program (not mentioned specifically in the IIBA, but heavy equipment operator 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 Qikiqtani Inuit Association (QIA) as well as the Government of Nunavut, Kakivak Association and the Government of Canada partnered in the $19 million Qikiqtani Skills and Training for Employment Partnership (Q-STEP) training program from 2017 to 2022. The objective of this program

was 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 Qikiqtani region. Training under the Q-STEP program includes work ready programs (community-based and site-based), formal certification in heavy equipment operation, community-based driver training for Class 7, Class 5, and Class 3 (managed by QIA), general skills development, and apprenticeship programs.

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 was extended until March 31st, 2022, and the Q-STEP teams were authorized to expend the remaining funds. In a joint proposal, the Q-STEP team members at Baffinland and QIA secured additional funding from Kakivak Association to ensure that the Q-STEP program would continue. The funding for this will expire on March 31, 2023.

RESULTS

Detailed information on training programs is provided in responses to Term and Condition No. 136, 137, and 138 as well as in the 2022 SEMR (Aglu and Stratos, 2023).

TRENDS

Detailed information on training programs is provided in responses to Term and Condition No. 136, 137, and 138 as well as in the 2022 SEMR (Aglu and Stratos, 2023).

RECOMMENDATIONS / LESSONS LEARNED

While this condition was met for the construction period for which it applied, 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.

4.7.3 Livelihood & Employment (PC Terms and Conditions 142 through 147)

The Project provides direct and indirect employment opportunities to residents of the five (5) North Baffin communities and Iqaluit, as well as Nunavummiut in general.

Six (6) PC Terms and 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. Both parties worked together to develop 3-year MIEGs for all skill categories (i.e. Unskilled, Semi-Skilled, Skilled, Professional, Management) which will be in place until 2025.

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 Team. This team ensures Inuit success at Baffinland by directly interacting with all Inuit working at Baffinland. The team encourages Inuit to access available on-site and community-based training opportunities as well as ensures Baffinland continues to develop and retain 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. Employment impacts and/or opportunities is a common topic discussed in MRSEMWG meetings (Appendix C.3).

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 Mary River Socio-Economic Monitoring Report (SEMR). Furthermore, Baffinland has provided information on potential barriers to employment for women in the 2022 SEMR 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 4.47 provides an evaluation of the Project's impacts on employment, relative to predictions presented in the FEIS.

In 2022, the Project continued to generate substantial wage employment for LSA residents. The generation of 313,170 employment hours for North Baffin LSA Inuit is greater than the FEIS prediction of 230,000 hours, while the 85,218 employee hours generated by Inuit from Iqaluit is less than the 112,000 hours predicted in the FEIS. Combined, the 398,388 hours for the North Baffin LSA and Iqaluit is significantly greater than the predicted 342,000 hours.

Path Forward

Baffinland continues to refine its Inuit human resources programs and remains committed to meeting Inuit employment targets. The 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), the running of on-site and community-based training initiatives, and other actions to meet the 3-year Minimum Inuit Employment Goals 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 Term and Condition follows.

Table 4.24: Livelihood and Employment Impact Evaluation

Component	Effects	Monitoring Program	Impact Evaluation
Wage Employment	Employment of LSA residents	In 2022, the Project continued to generate substantial wage employment for LSA residents. The generation of 313,170 employment hours for North Baffin LSA Inuit is greater than the FEIS prediction of 230,000 hours, while the 85,218 hours in Iqaluit is less than the 112,000 hours predicted in the FEIS. Combined, the 398,388 hours for the LSA is significantly greater than the predicted 342,000 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, more than $1.66 billion in contracts have been awarded to Inuit Firms. The value of contracts awarded to Inuit Firms was more than $162 million in 2022. Furthermore, the Project created 3,809,787 hours of labour opportunity in 2022, much greater than the predicted 900,000 hours.	Positive effects consistent with FEIS predictions
Job Progression and Career Advancement	Expanded employment and career development options	In 2022, Baffinland continued providing training and skills development opportunities to Inuit. This included more than 52,000 hours of training for Inuit in dozens of training programs. An average of 13 Inuit apprentices were also employed by Baffinland. Two interns were hired in 2022. Over 190,000 hours of training have been provided to Inuit since Project development. 10 Inuit were promoted in 2022, an increase from 9 promotions in 2021.	Positive effects consistent with FEIS predictions

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association (QIA)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023) 2022 Inuit Employee Survey(Stratos, 2023b)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.7.1

METHODS

Although the working language at the work sites is English, the Company supports the principle of increased use of Inuktitut in the workplace over the lifetime of the Project. As an operating mine in Nunavut, Baffinland must also comply with the *Inuit Language Protection Act*. In 2020, the updated *Inuktitut in the Workplace Policy*, which was revised with QIA as part of the work completed by the IIBA Employment Committee, was rolled out at the Project sites.

As such, Baffinland has implemented the following considerations throughout the employment lifecycle in order to proactively address direct and indirect effects:

- In order to ensure that ability to access opportunities is not impacted by language, Baffinland integrates language consideration throughout its recruitment, employment and training processes. An Inuktitut language portal is available in the Baffinland job search database, which 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. Baffinland also includes Inuktitut-speaking trainers for the Work Ready Program (WRP) offered in North Baffin Local Study Area (LSA) communities. Baffinland also has an individual who will be able to support apprentices in Inuktitut as required.
- Baffinland is committed to providing translation in the dialect required to ensure that every employee is able to fully understand materials and documents. All staffing documents and processes, including notices, applications and interviews, are available in and can be completed in Inuktitut. In 2022, Baffinland employed three full-time translators. 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.

- To address potential health and safety effects of language use at the Project sites', as well as other effects, such as potential alienation of employees, Baffinland applies its *Inuktitut in the Workplace Policy*, which outlines the Company's position in respect to 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 mine site, for both health and safety considerations as well as to promote inclusivity, Baffinland works to reduce barriers associated with language through increased use of bilingual (English and Inuktitut) signs and documents, with the use of graphics and symbols where possible. All safety materials, policies, directives and public postings are available in both English and Inuktitut. Baffinland also provides translation and interpretation services as necessary, including at certain meeting and presentations to ensure respectful, transparent dialogue, and understanding. 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. Article 11.4 (Inuktitut in the Workplace) of the IIBA also specifically addresses the topic of Inuktitut in the workplace. The *Inuktitut in the Workplace Policy* has been in place since 2013. In 2019, Baffinland worked with the QIA to update the Policy, which is currently implemented at Site. Progress in adherence to the policy is tracked in the IIBA Annual Implementation Report and is further discussed at the Employment Committee.
- Baffinland is proactive in addressing any potential language or cultural barriers. To address potential alienation of employees that may occur as a result of language or other cultural barriers, Baffinland uses a variety of activities and programming that promotes the use and awareness of Inuktitut and Inuit culture on site for all staff, including:
    - Inuit Cultural Engagement Workshops: these workshops are provided to all employees at the project and which share information on Inuit history, customs and traditions, and language;
    - Mandatory Cultural Awareness Employee Orientation Program: this cultural awareness training is compulsory and is completed by all Baffinland employees and contractors during site orientation (excluding short-duration visitors);
    - Inuktitut lessons, which are delivered by site-based Cultural Advisors; and
    - Country food cooking classes, and country food tastings.
- Baffinland has also revised its Mission, Vision and Values statements in direct alignment with Inuit Societal Values.

To ensure an understanding of workplace conditions, including the use of language, QIA and Baffinland also administer the Annual Workplace Conditions Survey, which provides opportunity for employees to report concerns. The Survey was not administered in 2021 and 2022. The Survey will be administered in 2023.

RESULTS

Baffinland monitors Inuit employee and contractor's use of Inuktitut through the Inuit Employee Survey. In 2022, when asked what language they speak, almost all 48 question respondents (94%) indicated they speak both Inuktitut and English. Two (2) respondents (4%) indicated they were unilingual Inuktitut speakers, and one (1) respondent (2%) did not indicate they spoke Inuktitut.

TRENDS

2022 was the first year that a question on language was included in the Inuit Employee Survey (Stratos, 2023b).

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to monitor trends through the annual Inuit Employee Surveys.

Project Certificate Term and 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	Not applicable
Reporting Requirement	As needed
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Not applicable
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

Internet and telephone access is available free of charge to employees in the accommodations rooms at site, and in some common areas. If the individual has a phone, tablet or laptop they may use the wireless internet to connect their devices and communicate with friends and family via audio or video applications, in the privacy of their own room or 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 Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Not applicable
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

Job postings identify employment prerequisites and requirements, as do Baffinland Community Liaison Officers (BCLOs) when individuals drop off their resumes at their local offices. Employment prerequisites and requirements are also made clear to potential employees during Work Ready Program (WRP) training (general) and pre-screening interviews (specific). Ongoing requirements (background check, and medical) are included in the employment agreement that new employees receive and sign. Between the various channels, all the listed prerequisites and requirements as listed in Project Certificate Term and Condition No. 144 are effectively communicated to potential employees.

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 Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023) 2022 Engagement Records 2022 MRSEMWG Meeting Records Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019i)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix B.1 Appendix C.3 Appendix G.7.1

METHODS

Baffinland has provided information on potential barriers to employment for women in the 2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023). 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.

The Arnait 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 Arnait 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 Arnait Action Plan.

The Arnait 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

In 2021, an Arnait Action Plan committee was formed where its members were comprised of on-site female employees. The convening of committee members at site has proved of challenge due to long working days and/or members being on different work rotations. As a result, in 2022 the structure of the Arnait Action Plan committee changed where BCLOs now comprise committee members. The committee met three (3) times in the first quarter of 2022 where various employment barriers were discussed.

RESULTS

Table 4.48 presents the hours (and percentage of hours) worked by women and men on the Project in 2022. 431,190 hours (or 11.3% of total hours worked on the Project) were worked by women, which is 82,161 hours less than documented for 2021. As a percentage of the workforce, Inuit women represented approximately 28% of the Inuit workforce (which is consistent with the proportion in 2021), and non-Inuit women represented approximately 9% of the non-Inuit workforce (down from 10.2% in 2021). When looking at the ratio of female vs. male employment at site for Inuit and non-Inuit employees, the percentage of hours worked by Inuit women (i.e. approximately 28% of total Inuit workforce) exceeded that for non-Inuit women (i.e. 8.7% of total non-Inuit workforce) in 2022.

Table 4.25: Hours Worked by Project Employees and Contractors by Ethnicity and Gender (2022)

	Hours Worked	FTE	% of 2022 Total
Inuit			
Male	362,729	166	9.5%
Female	142,876	65	3.8%
Non-Inuit			
Male	3,015,868	1,381	79.2%
Female	288,314	132	7.6%
All Ethnicities			
Male	3,378,597	1,547	88.7%
Female	431,190	197	11.3%
Total	**3,809,787**	**1,744**	**100%**

Women in mining have been under-represented over the last five (5) years, representing 15% of the Canadian workforce (MiHR, 2021). When looking at the ratio of female vs. male employment at site for Inuit employees, the percentage of hours worked by Inuit females exceeds the average 5-year trend across Canada by more than 10%.

Appropriate community-level indicator data are currently unavailable for the topic of childcare availability and costs. As such, this topic continues to be tracked and discussed through informal discussions aligned with GN-Baffinland Memorandum of Understanding (MoU) priorities, QSEMC process, community engagement conducted for the Project, and through the Inuit employee survey that is typically administered on an annual basis. Employment levels can be influenced by many factors, including the existence of barriers faced by certain demographic groups. The Arnait Action Plan committee has identified that inadequate access to childcare in the LSA may be creating some barriers to increased employment of women at the Project. However, new employment opportunities created for women in the LSA resulting from 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 continues to strive for the inclusion of Inuit women in its annual training programs. In 2022, training completed by Inuit women represented an approximate 24% - or 12,886 hours – of total training hours completed by Inuit (i.e. 53,086 hours).

TRENDS

As indicated in Figure 4.18, there were 65 female Inuit Full-Time Equivalents (FTEs) in the workforce in 2022 (Baffinland and contractor employees), down from 69 in 2021. Female Inuit employment as a percentage of the total Inuit workforce and entire workforce (i.e. Inuit and Non-Inuit) was 28.3% and 3.8%, respectively, representing an insignificant change when compared to 2021 values.

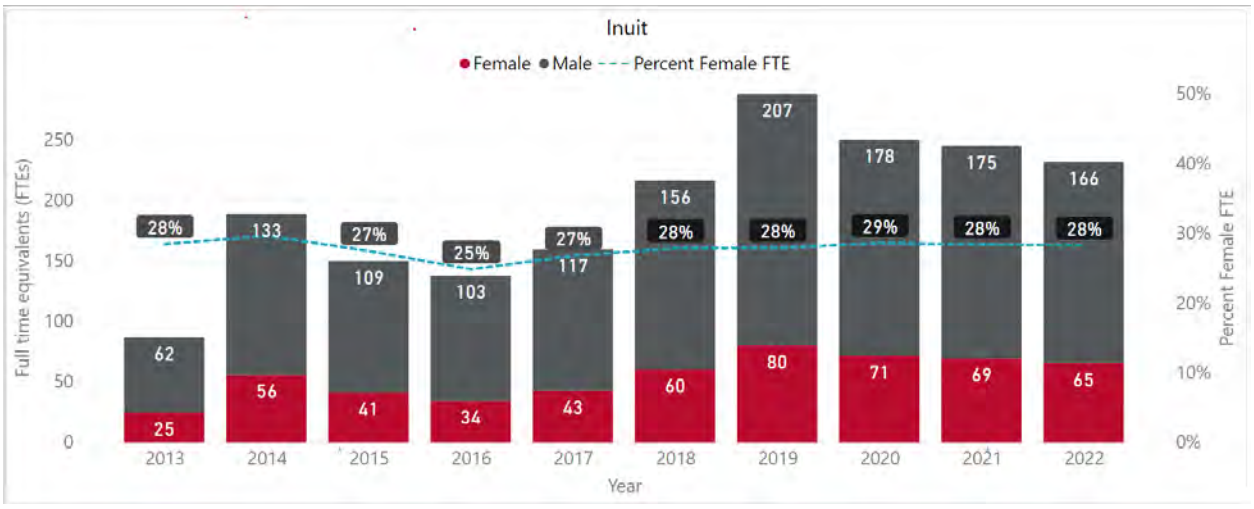

Figure 4.5: Baffinland and Contractor Inuit FTEs by Gender

Note:
Values may not add up due to rounding.

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.

Baffinland engages with the GN on employment topics through the MRSEMWG and QSEMC as well as the MoU signed in 2019. Baffinland remains open to discussions with the GN and members of the QSEMC on the subjects of female employment and access to child care, including discussions on how improved monitoring data may be obtained.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	Not Applicable
Stakeholder Review	Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

This PC Term and Condition is not directed at Baffinland.

RESULTS

Not applicable.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Progress
Stakeholder Review	Government of Nunavut (Nunavut Housing Corporation; Community and Government Services; Economic Development and Transportation); Mary River Socio-Economic Monitoring Working Group (MRSEMWG); Qikiqtani Socio-economic Monitoring Committee (QSEMC)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023) Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019i)
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In 2014, the Nunavut Housing Corporation (NHC) implemented changes to the Public Housing Rent Scale that were intended to reduce disincentives to employment, support the goals of poverty reduction, and make the calculation of rents fairer for tenants. Public Housing rent is now assessed based on the total gross income(s) of only the one or two Primary Tenants in the unit, and is based on an annual assessment of income. To reduce an abrupt and significant increase in rent after gaining new employment, the new Public Housing Rent Scale limits rent increases to 25% of the new rent assessed per year until the rent asses total is reached.

Baffinland continues to regularly discuss housing with the QSEMC and MRSEMWG, of which the Government of Nunavut (GN; including Nunavut Housing Corporation) is an active participant. Baffinland and the Government of Nunavut also maintain a Memorandum of Understanding (MoU) that highlights priority areas for potential collaboration. This MoU provides a venue for any GN Department or Agency, including Nunavut Housing Corporation (NHC), to approach Baffinland with proposals relevant to their mandates, including housing. Baffinland will always remain open to any discussions related to housing the GN and NHC wishes to have.

Baffinland delivered basic financial literacy training to North Baffin community members through the Work Ready Program in 2022. The company is currently reviewing enhanced financial literacy and computer basics programming

that may be made available in the North Baffin communities, which could include a component specific to housing and rent.

RESULTS

Not applicable

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to engage and discuss housing-related issues with the GN and the NHC and will advocate for more work-friendly social housing policies for its workers.

Baffinland is looking forward to engaging with the GN and the NHC through the MoU in 2023. Going forward, and if agreed upon with the GN, Baffinland will report on successes and achievements under the MoU in subsequent annual reports.

4.7.4 Economic Development, Self-Reliance, and, Contracting and Business Opportunities (PC Terms and Conditions 148 through 152)

Five (5) PC Terms and 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. Commitments and contracting guidelines are contained in the IIBA to encourage contracting of Inuit firms.

Concerns have been expressed regarding the potential negative effects or challenges associated with temporary or early closure of the Project. In response to these concerns, and in accordance with Term and Condition No. 149, Baffinland updated its temporary closure planning report in 2021. The updated report was informed by perspectives and feedback received during a series of engagements with the QSEMC, SEMWC, and North Baffin LSA community members (i.e. community economic development officers) in the 2021 year.

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. Such Project interactions are discussed in the 2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023). Table 4.49 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 2022, 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 Term and Condition follows.

Table 4.26: 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 2022, a total of 354 land use visitor person-days were recorded at Project sites, an approximate 36% reduction from 2021.	Not applicable.
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 2022 Socio-economic Monitoring Report presents 2022 training, employment, income, and contracting statistics, as 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, the value of contracts awarded to Inuit firms has been more than $1.6 billion. $162.2 million in contracts was awarded to Inuit Firms in 2022. Furthermore, Baffinland's Inuit employee payroll totaled $17.4 million. These amounts include all Inuit employees who lived inside and outside of Nunavut. Contractor's Inuit employee payroll totaled $6.6 million. Therefore, Project Inuit employee payroll expenditures totaled more than $24.1 million in 2022.	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 Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023) 2022 QSEMC 2021 Socio-Economic Monitoring Memo (Baffinland, 2022k) 2022 Inuit Employee Survey (Stratos, 2023b) Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019i) 2022 Engagement Records 2022 MRSEMWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix B.1 Appendix C.3 Appendix G.7.1

METHODS

Baffinland monitors and provides information on Project harvesting interactions and food security in the Socio-Economic Monitoring Report.

Appropriate indicator data at the community level 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 [SEMR]). Some territorial (but not community-scale) government data are available on harvesting and food security in Nunavut and are presented in the SEMR. Other data related to this topic are 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.

Baffinland also collects information related to employee's perspectives on ability to provide, health and well-being, and ability to participate in harvesting and land-based activities through the Inuit Employee Survey.

The Qikiqtani Inuit Association's 2019 and 2021 Tusaqtavut studies (QIA, 2019a; 2019b; 2021), supported by Baffinland under IIBA and Inuit Certainty Agreement (ICA) cost recovery provisions, reported baseline interactions with the existing Approved project and anticipated Phase 2 interactions, and including harvesting interactions, from interviewed Inuit participants in the North Baffin LSA communities. Community-level data collected through the QIA's Tusaqtavut Studies is also included in the SEMR.

RESULTS

Harvesting and consumption of country food remains a valued and important part of the Inuit culture and diet. Monitoring data presented in the SEMR suggest Inuit land use activities coexist 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).

Based on numbers reported to the Government of Canada by Inuit, harvesting levels of narwhal have been consistently higher since current project ore shipments began in 2015. The following Table 4.50 sets out the reported narwhal harvesting records for the period 2001 through 2021.

It is unknown what the reported narwhal tag numbers are to date for 2022: this information has not been made publicly available to Baffinland although it is available from Canada via reporting from the Government of Nunavut (GN) and MHTO. In summary, based on 21 years of available harvest and population data for Pond Inlet, an above average number of narwhal have been harvested on a nominal and per capita basis in 6 of the 7 years Project shipping has occurred.

Table 4.27: DFO Narwhal Harvesting Records (2015-2021)

Year	Pond Inlet Population	Narwhal Harvest	Per Capita Narwhal Harvest	Average Narwhal Harvest	Average Per Capita Narwhal
2001	1,282	65	0.051	82	0.056
2002	1,307	63	0.048		
2003	1,341	67	0.050		
2004	1,358	65	0.048		
2005	1,375	62	0.045		
2006	1,369	88	0.064		
2007	1,383	65	0.047		
2008	1,400	73	0.052		
2009	1,453	44	0.030		
2010	1,482	62	0.042		
2011	1,533	112	0.073		
2012	1,544	97	0.063		
2013	1,579	147	0.093		
2014	1,613	135	0.084		
2015	1,639	190	0.116	144	0.082
2016	1,663	118	0.071		
2017	1,790	159	0.089		

Year	Pond Inlet Population	Narwhal Harvest	Per Capita Narwhal Harvest	Average Narwhal Harvest	Average Per Capita Narwhal
2018	1,784	64	0.036		
2019	1,809	184	0.102		
2020	1,835	140	0.076		
2021	1,862	152	0.082		
Increase in Harvest (2015-2021 compared to 2001-2014 period)				176%	144%

Annual average harvesting of narwhal has been higher in the years since commercial shipping began in 2015, then in the period before where no shipping occurred. Between 2001 and 2014 the average annual harvest was 82, and between 2015 and 2019 it was 143, a roughly 75% increase.

The Qikiqtaaluk Wildlife Board (QWB) recently provided data to NIRB which illustrates that full Pond Inlet caribou quotas have continued to be harvested during operations. On May 18, 2022, the GN confirmed the Baffin Island harvest quota of 250 caribou was met and the harvest was closed. The QWB allocated more than 60% of the Basic Needs Level of 250 Baffin Island caribou to South Baffin communities, which harvested 59% of the caribou on Baffin Island in 2021-2022. The following harvest data (Table 4.51) for the 2021/2022 season was reported for the Nunavut communities subject to the Baffin Island harvest quota.

Table 4.28: Caribou Harvest data for 2021/2022 Season

Community	Tags	Harvest	Surplus/Deficit
Pond Inlet	34	42	124%
Arctic Bay	19	16	84%
Clyde River	30	31	103%
Igloolik	10	12	120%
Sanirajak	4	2	50%
Total North Baffin	**97**	**103**	**105%**
Iqaluit	43	45	105%
Kimmirut	35	35	100%
Kinngait	21	21	100%
Pangnirtung	35	36	103%
Qikiqtarjuaq	19	10	53%
Total South Baffin	**153**	**147**	**95%**
Total Baffin Island	**250**	**250**	**100%**

Since 2022 the Nunavut Wildlife Management Board (NWMB) has determined to increase harvest limits across Baffin Island from 250 in 2021/2022 to 350 in 2022/2023. In each year that follows for the next eight years the harvest allowance will increase by 50, with 20% of the total harvest allowed for females. The GN has confirmed there are some positive signs that show the recovery of the Baffin Island caribou herd may be occurring, but stresses ongoing

caution and a need to evaluate data as it becomes available that may require a change in course. The QWB's submissions on the matter supported the increase, also acknowledging an increase in caribou numbers and a need for harvesting to manage available food sources to support the larger recovery in the caribou population.

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 an initial $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.

The QIA reported that 19 Wildlife Compensation claims were paid in 2022, with total funds distributed amounting to $99,824. This increase in claims compared to previous years may be the result of ongoing work between the QIA and North Baffin HTOs to resolve long standing issues with the administration of the program. Baffinland plans to explore program administration further with the QIA to better understand and interpret the number and total payout of claims. Baffinland has also established a Harvesters Enabling Program in Pond Inlet through the IIBA, whereby Baffinland contributes $400,000 per year for 10 years for a gas program to enhance travel for Inuit in the area.

There are positive indications that the Project contributes to improved household income and food security in the LSA. This has occurred by providing LSA residents with meaningful employment opportunities and through related contributions and initiatives. Employment income can facilitate the purchase of food and other family goods, including those needed to participate in harvesting if desired. The 2022 Inuit Employee Survey results had 40 respondents (77%) indicating their ability to provide for themselves and their family has improved or very much improved since obtaining Project employment, with 11 respondents (22%) reported no effect, and 2 respondents (2) indicating that it was variable (Stratos, 2023b). No respondents indicated that their ability to provide for themselves or their family has worsened. When asked about effect on their or their family's ability to participate in harvesting or other land-based activities since obtaining Project employment, more than half of respondents (60%) reported that there has been no effect on their or their family's ability to participate in harvesting or other land-based activities since obtaining Project employment. 18 respondents (38%) reported that their ability to participate in land-based activities has improved or very much improved, with 1 respondent (2%) saying it has worsened. On the question on whether health and well-being has changed since gaining Project employment, one survey respondent left a comment that *"I am now more able to provide what my children need (better food) because I make more money.*"

Baffinland also contributes to various community wellbeing initiatives directly (e.g. through the IIBA's Ilagiiktunut Nunalinnullu Pivalliajutisait 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

Comparing 2022 Inuit Employee Survey results to the previous year's survey, the proportion of respondents who indicated their ability to provide has improved or very much improved was higher (77% compared to 67% in 2020; Stratos, 2023b). However, the proportion of respondents who indicated their ability to participate in land-based activities since obtaining Project employment has improved or very much improved was less (38% compared to 44% in 2020).

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.

No QSEMC meeting was scheduled in 2022. To account for the lack of meeting, Baffinland developed and distributed a memo and material providing an overview of the 2021 socio-economic monitoring results to the members of the QSEMC by email. In the memo, Baffinland flagged data limitations and asked the QSEMC for feedback on specific topics, including whether, in their experience, Baffinland's current programs to address food security are making an impact in their community, and for suggestions on how they can be adjusted. Baffinland did not receive any feedback from QSEMC members in response to the memo.

Baffinland is open to discussing with the MRSEMWG and QSEMC how improved monitoring data may be obtained, which may include reporting wildlife harvest success under quota's each year for caribou and narwhal.

Baffinland has provided the necessary funding and support to QIA to conduct a Pond Inlet Country Food Baseline Study. The study commenced in 2021 with the QIA initiating engagements with the Hamlet of Pond Inlet and the MHTO on the topics of food security and sovereignty. The study is being conducted by a team made out of QIA representatives, Inuit chosen researchers, and Pond Inlet Community Members.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Not Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	Potential Effects of a Mine Closure (FHW Consulting, 2014b) Temporary Closure Planning: Socio-Economic Considerations for the Mary River Project (Jason Prno Consulting Services Ltd. [JPCSL], 2022)
Ref. Document Link	Not applicable

METHODS

Acknowledging the Project has evolved considerably since the 2014 submission of the previous closure planning report (FHW Consulting, 2014b) Baffinland conducted additional planning for socio-economic aspects of temporary closure in 2021. Baffinland engaged with the MRSEMWG and QSEMC community members on potential impacts and community and stakeholder concerns relating to the heightened risk of temporary closure in 2022.

In January 2022, Baffinland submitted the updated report '*Temporary Closure Planning: Socio-Economic Considerations for the Mary River Project*' to the Nunavut Impact Review Board which considers risks for temporary mine closure and how communities in the North Baffin region may be affected by it, including economic, social and cultural effects (JPCSL, 2022). The content of the report was informed by community and stakeholder perspectives, and Baffinland engaged QSEMC and MRSEMWG, as well as the north Baffin Community Economic Development Officers (CEDOs), ahead of its submission.

RESULTS

After considering current economic, social, and environmental risk factors, the Project has been assessed to currently be in a 'moderate to high' risk profile for temporary closure. This conclusion considers the highest risk rankings identified in all categories assessed in addition to the role of other pertinent risk factors. It is evident the socio-economic effects of temporary closure would be varied and complex, however, the adverse economic

implications for North Baffin communities could be considerably negative. Additional mitigation measures are proposed to provide minor offsets to the anticipated negative consequences of closure on our employees and contractors as we transition from an operating project to a care and maintenance scenario.

Due to operational uncertainty brought about from the negative NIRB recommendation regarding the Phase 2 Proposal and Baffinland's ability to continue operating at 6 Mtpa in 2022, Baffinland issued termination notices to site-based employees in anticipation of the need to suspend operations once the 4.2 Mt transportation limits were reached. Baffinland engaged with other employers in the industry for potential placement of employees in the event termination notices came into effect. The Company also engaged with Service Canada for support and expedited process of employment insurance claims in the event the termination notices came into effect.

In the event termination notices were to come into effect, employees would have continued access to Employee Family Assistance Program (EFAP) services. During operational uncertainty, the Company dedicated two counsellors from Homewood on-site for private counselling sessions to assist employees with concerns related to termination notices. Baffinland also has two dedicated mental health counsellors that are direct employees on-site available for counselling support. These services were accessible to all employees.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

In the case of temporary mine closure, Baffinland's socio-economic goal is to mitigate unanticipated losses in Project economic benefits for local communities by addressing adverse effects through relevant employee, family, and community programs and support. Through its analysis of risk of temporary mine closure, Baffinland has put in place a variety of mitigation and management measures to address potential socio-economic effects of temporary closure. These include, but are not limited to:

- Continuing to provide meaningful work experience, training and skills development, including on-the-job and formal training experiences, to increase employability in the case of closure, and to put in place workforce transition measures (e.g. provision of skills/training records, job search assistance and resume assistance) to assist with transitioning to new endeavours;
- Use of different employment scenarios during temporary closure periods, such as unpaid leaves of absence, early retirement, and work-sharing;
- Providing appropriate notice and engagement to employees, contractors, and communities; and,
- Providing assistance to support health and well-being, including continued availability of EFAP for one (1) year following closure, financial management training, and transitional funding to continue community counsellors program

When the Project is approaching closure, Baffinland will work with government and community stakeholders to implement programs to support employee transition. Baffinland is also committed to 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 Term and 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	The Proponent will ensure the following: a. 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 b. The Proponent will ensure that certification of noise compliance is current, where compliance is applicable c. 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 d. 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.
Relevant Baffinland Commitment	34
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and 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	2022 Final Terrestrial Environmental Annual Monitoring Report (EDI, 2023a) 2022 Final Marine Mammal Aerial Survey Program Report (WSP, 2023a) 2022 MEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.1 Appendix G.5.1 Appendix G.6.2

METHODS

Pilots are made aware of the minimum flying altitude in the region, which are included in aviation contracts. Helicopter flight height compliance is monitored annually and is reported on in the 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a). Flight paths were also tracked during the implementation of marine mammal aerial surveys completed in July and August, 2022 (WSP, 2023a).

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 Spire Shipview® (previously known as 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 any member of the public to check on vessel coordinates, which direction the vessel is moving, and its destination.

RESULTS

No helicopter flights over Sirmilik Park occurred in 2022 (EDI, 2023a). 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. There were two marine mammal aerial surveys completed by aircraft transiting over Oliver Sound on August 16th and 17th, 2022 (WSP, 2023a), both of which maintained a minimum altitude of 2,000 ft. No marine mammal aerial surveys during the Leg 1 component of the Marine Mammal Aerial Survey Program (July 19 – August 2, 2022) occurred over Sirmilik Park.

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, Baffinland's Annual Report to the NIRB and through MEWG updates (i.e. presentations, monitoring reports, etc.). Parks Canada can also access vessel tracking information at any time on Baffinland's website to check on vessel coordinates, which direction the vessel is moving, and its destination.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to make all pilots aware of the cruising altitude of at least 650 magl minimum throughout the PDA, as well as the minimum flying altitude of 2,000 feet over Sirmilik Park.

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 Spire Shipview® 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, and providing live viewing to the public and any agencies with an interest in the Project, including Parks Canada, on the Baffinland website in 2023.

Baffinland will continue to provide information about its shipping season through MEWG correspondence and/or relevant MEWG meetings.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	Nunavut Housing Corporation Home Renovation and Repair Program to Nunavut Residents(NHC, 2016)
Ref. Document Link	Not applicable

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 engages with the Government of Nunavut and NHC on specific issues and supports for Project employees, and the NHC is a member of the QSEMC. Baffinland and the GN have also signed a Memorandum of Understanding (MoU) in 2019 to work on issues of mutual concern (the Government of Nunavut and Baffinland MoU is a public document and can be found on the Nunavut Legislative Assembly Website: https://assembly.nu.ca/sites/default/files/TD-178-5(2)-EN-GN-BaffinlandMOU.pdf.PDF).

Baffinland regularly administers an Inuit Employee Survey, which collects data on employee housing status and other topics. Baffinland administered the most recent survey in October/November 2022.

In 2022, Baffinland continued to provide basic financial literacy training through the Work Ready Program.

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.

In the 2022 Inuit Employee Survey, the majority (83%) of respondents' reported that their housing situations have not changed since obtaining Baffinland employment (Stratos, 2023b). Two (2) respondents purchased a home since obtaining employment, with both indicating their belief that the change was made possible through Project employment. When asked if they have ever considered purchasing a home in their community, most respondents (64%) answered 'No' and 13 respondents (25%) answered yes.

In 2022, for those who have not considered purchasing a home, the reasons varied, including the inability to save money for purchasing a home (19%), expenses associated with maintenance (17%), and the high costs associated with mortgage payments (8%). Many respondents (75%) were not aware of the Nunavut Down Payment Assistance Program offered by the NHC.

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

In 2022, 25% of survey respondents reported considering purchasing a home in their community, a decrease from 43% in 2020 (Stratos, 2023b).

RECOMMENDATIONS / LESSONS LEARNED

Baffinland is looking forward to engaging with the GN and the NHC through the MoU in 2023, as well as through the QSEMC. Going forward, and if agreed upon with the GN, Baffinland will report on successes and achievements under the MoU in subsequent annual reports.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	Not Applicable
Stakeholder Review	Qikiqtani Inuit Association, Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 MRSEMWG Meeting Records and Correspondence 2022 QSEMC Correspondence
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.3 Appendix C.4

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 monthly and 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 2022, 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 (MRSEMWG). 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 as informing the utilization of the Business Capacity and Start-Up Fund. Based on feedback from earlier surveys, Baffinland is in the process of developing a number of business development workshops for Inuit Firms including, at a minimum: 1) a bid simulation workshop, which will walk participants through a typical contracting process at Baffinland and provide participants with guidance on how to pre-qualify and bid for contracting opportunities ; and 2) a workshop targeted at Inuit youth and women entrepreneurs looking to establish a business in the North Baffin communities. These workshops are planned to be delivered in 2023.

RESULTS

The total value of contracts awarded to Inuit Firms was in 2022 totalled approximately $162.2 million. This includes twenty-six (26) contracts with Inuit-owned businesses and joint ventures, most of which were based in either the North Baffin communities or Iqaluit. Since Project development, more than $1.5 billion worth of contracts have been awarded to Inuit-owned businesses and joint ventures.

TRENDS

Table 4.52 provides a breakdown of contracts awarded to Inuit Firms. The value of Inuit contracting changes greatly from year to year due to the nature of mine development with large projects being carried out for one to two years at a time. Impacts on contract commitments and expenditure due to COVID-19 and the reduction of non-essential contract work in 2020 was largely resolved in 2021, which saw an increase in contract activity and values paid to Inuit Firms. In 2022, the value of contracts awarded to Inuit Firms decreased when compared to 2021 values; however, 2022 values are larger than those awarded in 2020.

Table 4.29: Annual Breakdown of Contracts Provided to Inuit Firms

Procurement Details	2014	2015	2016	2017	2018	2019	2020	2021	2022
Value of Procurement with Inuit Owned Businesses and JV's (Millions)	$64 M	$103.5 M	$64.4 M	$387.2 M	$104.8 M	$288.8 M	$91.1 M	$195.6 M	$162.2 M
Total Number of Contracts with Inuit	19	12	9	18	9	8	10	24	25

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.

Based on results from earlier surveys to Inuit Firms, Baffinland will deliver a bid simulation workshop and Inuit youth and women entrepreneur workshop in 2023. The Inuit Firm Survey remains open, and additional feedback will be utilized to inform further Inuit Firm development initiatives.

4.7.5 Human Health & Wellbeing (PC Terms and Conditions 153 through 157)

Five (5) PC Terms and 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 GN 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.1). The MRSEMWG 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 2022 Socio-Economic Monitoring Report (SEMR; Aglu and Stratos, 2023). Table 4.53 provides an evaluation of the Project's impacts on human health and well-being, based on monitoring activities completed in 2022, 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 2022.

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 MRSEMWG, the QSEMC, and the Project's workforce. Reporting on each PC Term and Condition follows.

Table 4.30: 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 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	Security searches employees arriving and departing site, and the site is searched with drug dogs and trained staff. In 2022, twenty (20) drug and alcohol related contraband infractions occurred at Project sites amongst employees and contractors. This is an increase when compared to occurrences in 2021 (i.e. five (5) infractions). While all contraband infractions are of concern and taken seriously by Baffinland, the 20 infractions that occurred in 2022 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 Royal Canadian Mounted Police (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 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.	Relevant monitoring activities for human health and well-being are longer term and conclusions will be drawn in future years

Component	Effects	Monitoring Program	Impact Evaluation
		As Project construction only began in 2013, there is a minimal amount of post-Project data currently available. Correlations between the Project and 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.	

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.7.1

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 as well as topic-specific life coaching 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 also been established by Baffinland in the North Baffin LSA communities. In June 2019, Baffinland commenced funding a 3-year agreement with the Ilisaqsivik Society to hire qualified Inuit counsellors to work within Arctic Bay, Clyde River, Igloolik, Sanirajak and Pond Inlet. This partnership has allowed Ilisaqsivik 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 Ilisaqsivik Society adjusted their programming to include virtual services as well as in-community services as public health advice allowed.

In 2022, Baffinland hired two (2) on-site mental health counsellors. These counsellors are accessible by all Baffinland employees and contractors.

RESULTS

EFAP usage increased from five (5) in 2021 to approximately seven (7) accesses per 100 employees in 2022. The usage of EFAP by Nunavut-based employees increased in 2022, with 40 EFAP accesses, an increase of six (6) accesses from 2021 For non-Nunavut based employees, EFAP access also increased from 38 accesses in 2021, to 51 accesses in 2022. The majority of EFAP counselling service usage was conducted over the phone or through video. 63% of the

86 counseling cases in 2022 were classified as “psychological” support, with other issues including marital, work, family, addiction, and trauma.

On-site Cultural Advisors and counsellors are also available for all of Baffinland’s Inuit employees, however usage of this resource is not tracked.

TRENDS

Following several years of EFAP usage remaining relatively consistent at approximately five (5) accesses per 100 employees, EFAP usage increased for both Nunavut based and non-Nunavut based employees to approximately seven (7) accesses per 100 employees in 2022 (Figure 4.19).

The usage of EFAP by Nunavut-based employees continued to increase in 2022, with 40 EFAP accesses, an increase of 6 from 2021. For non-Nunavut based employees, EFAP access also increased from 38 accesses in 2021, to 51 accesses in 2022.

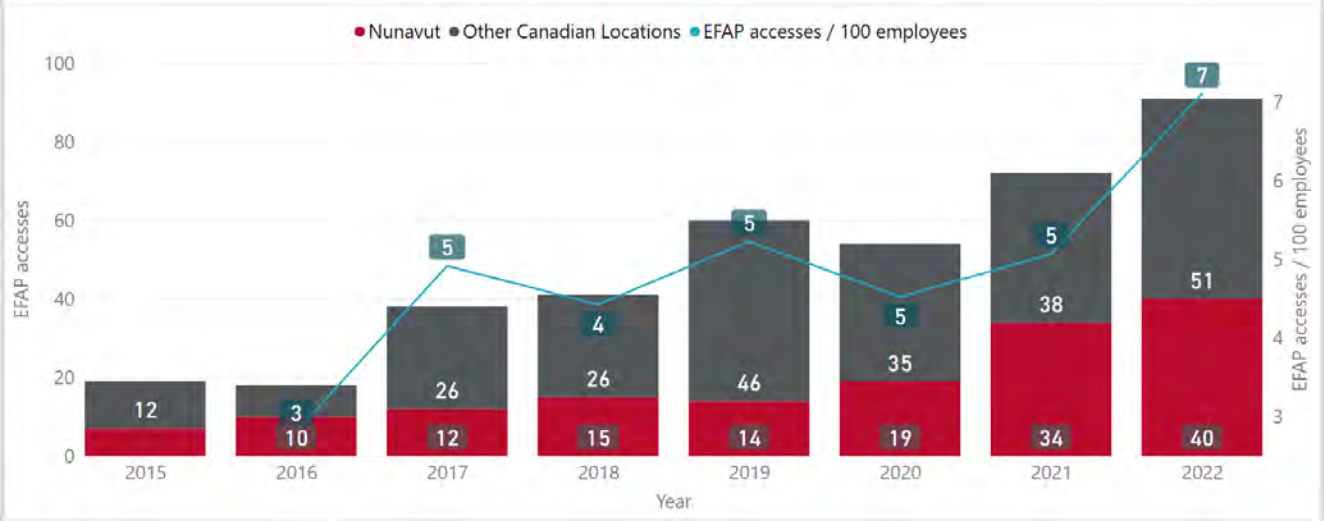

Figure 4.6: Number of times Baffinland’s Employee and Family Assistance Plan (EFAP) was accessed

It is possible that increased promotion of the program for Baffinland’s employees and their families, coupled with the ongoing impacts of the COVID-19 Pandemic and operational uncertainty, influenced increased use of the service during 2022. Similar to the number of visits to the site’s physician assistant, increased EFAP usage does not necessarily indicate negative effects. Increased EFAP usage, like other company-provided health services, can be an indicator of either positive (e.g. provision of health services that may have been less available in the community), negative (e.g. onset of Project-related negative health condition), or neutral effects (e.g. provision of health services that would have otherwise been accessed in the community).

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 administer this program.

Baffinland will also continue to explore other options and opportunities to provide support to its Inuit employees, their families and communities. In the 2020 NIRB Annual Report, Baffinland indicated it would investigate support for related substance abuse/alcohol and addictions through a medical practitioner as well as the establishment of alcohol and narcotic anonymous programs at Project sites (Baffinland, 2021a). In 2022, Baffinland hired two (2) on-site mental health counsellors who work with employees and provide counselling services. There are no longer plans to start an alcohol and narcotic anonymous site-based program as these counsellors are able to meet one-on-one with employees for counselling support.

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023) 2022 Engagement Records Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019i)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix B.1 Appendix G.7.1

METHODS

Baffinland has provided information on potential indirect effects of the Project in the Socio-Economic Monitoring Report. This includes information and indicators (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).

Baffinland also monitors the number of drug and alcohol related contraband infractions as an indicator for the presence of illicit substances. All contraband infractions at the Project are of concern and are taken seriously. The infractions that have occurred to date appear to represent 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. This management response supports Baffinland's goal of 'Safety First, Always,' while also preventing further transport of contraband substances through Project sites.

RESULTS

Detailed results are presented in the Socio-Economic Monitoring Report across a range of indicators.

In 2022, 20 drug and alcohol-related contraband infractions occurred at Project sites among Baffinland and contractor employees – an increase of 15 infractions from 2021 (Aglu and Stratos, 2023).

TRENDS

Detailed trends analysis is presented in the 2022 Socio Economic Monitoring Report (Aglu and Stratos, 2023).

- Graduation rates steadily declined in the Qikiqtani region from 2009 to 2014 but have risen quickly since then, although there was a slight decrease from 2017 to 2018. School attendance rates in the North Baffin Local Study Area (LSA) region have not changed considerably over time or compared to the rest of Qikiqtani, although attendance noticeably decreased across the region in 2020. Many factors affect school attendance and graduation rates, significantly including the onset of remote learning beginning in March 2020. Given the wide variety of factors impacting these rates, the data does not suggest a significant effect of the Project.
- Drug violations have shown a downward turn during the post-development period in the North Baffin LSA after an increase in the pre-development period. These trends mirror Iqaluit and Nunavut-wide trends, which are seeing promising, steep declines in the past few years. Various factors may have influenced a decrease in drug violations pre-development, including the legalization of marijuana in 2018. Due to the rise during the pre-development period and the alignment with territory-wide trends, it is difficult to say if the Project is having a significant impact on drug use, though a negative effect is currently not apparent.
- 2016 was the most recent year data on the percentage of health centre visits related to infectious diseases were available from the Nunavut Bureau of Statistics. 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, as possible, through the QSEMC monitoring and reporting process and community engagement conducted for the Project.

Due to challenges securing a venue for the convening of the QSEMC, committee members did not meet in 2022. To account for the lack of meeting, Baffinland developed and distributed a memo and material providing an overview of the 2021 socio-economic monitoring results to the members of the QSEMC by email. In the memo, Baffinland flagged data limitations and asked the QSEMC for feedback on specific topics, including whether, in their view, project employment has led to any changes in substance use or gambling in their communities. Baffinland did not receive any feedback from QSEMC members in response to the memo.

Baffinland is working to increase its engagement of Community Services Providers (i.e. educators, Royal Canadian Mounted Police (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 has hired two on-site counsellors who work one-on-one with employees and provide counselling support.

Baffinland is also open to discussing with the MRSEMWG and QSEMC how improved monitoring data may be obtained.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be provided at least 60 days prior to the commencement of any construction activities.
Status of PC Term and Condition	Not Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

Baffinland is committed to promoting employee cohesion through cultural awareness and social programs. In 2022, 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.

Baffinland has a robust Proactive Dispute Resolution Process that is designed to facilitate trust, promote open, honest, and accurate communication, expedite the resolution of issues, enhance the relationship, and conform with the Complaints and Grievances process in the IIBA. It focuses on providing a proactive method to amicably resolve issues and in cases involving an Inuit employee, the Human Resources Advisor of Inuit Relations or Cultural Advisor are involved in all meetings.

Nunavut Day celebrates the official division of Nunavut from the Northwest Territories and the official recognition of Nunavut as an independent territory. In 2022, Baffinland celebrated the signing of the Nunavut Land Claims Agreement on July 9th. All site personnel at both the Mine Site and Milne Port were invited to enjoy a Country Food Feast in the dining halls, along with many fun festivities and draws that lasted throughout the weekend. Former Nunavut premier and Baffinland Senior Advisor Paul Quassa spent time at both sites to meet employees and to talk about the history of the territory and his role in negotiating and signing the Nunavut Agreement. There was also a promotion of Inuit films for all staff. Country food was served to employees in the staff cafeterias.

On November 7th, 2022 Baffinland celebrated International Inuit day on site. The Cultural Advisors conducted classes for employees who wanted to learn how to sew and make various traditional clothing; this was a part of the classes

they were running through the month of November and into December. Traditional Country Food was also cooked in the country kitchen for employees to enjoy.

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 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 two (2) 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, Human Resource (HR) Advisor, Inuit Relations and Cultural Advisors continue 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.

Baffinland has employed two (2) full time Mental Health Counsellors to provide support and assistance to all employees onsite and continues to make 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

In addition to quarterly Cultural Activities, which in 2022 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.

Baffinland continues to work with all departments and Inuit employees on the Inuit Career Mobility Strategy. The strategy provides a structured approach to proactively managing the development of Inuit employees by focusing on experiential learning supplemented with training. As employees gain knowledge and skills, they are better able to identify career goals and Baffinland can support this through training and experiential learning opportunities.

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 2023 to increase cultural awareness and reduce misunderstandings that will be confirmed in the 2023 IIBA work plan and may include:

- Measures to promote the use of Inuktitut (ongoing efforts to translate signs / manuals – will continue in 2023, also incorporating Inuktitut translation and support in training.);
- Continue providing language lessons on-site for interested employees;
- Continued review and enhancement of cross-cultural training programs and on-boarding orientation programs;
- Delivery of presentations (on-site and at corporate head office) relating to Inuit culture and the IIBA;
- Conducting an Ulu Making Workshop with Site Employees (Inuit and Non-Inuit);
- Conducting an Inuit Drum Making Workshop at site with Site Employees (Inuit and Non-Inuit);
- Conducting a workshop where site employees learn how to make traditional Inuit Sunglasses;
- Conducting a Workshop to allow site employees to sew Sealskin Mitts; and
- Celebration of Inuit Societal Days including Nunavut Day, Indigenous Peoples Day, and Inuit Day.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

The following is a summary of programs aimed at the provision and/or support of recreation programs and other opportunities to mitigate potential impacts of employees' absences from those who remain at home and in the communities.

An Ilagiiktunut Nunalinnullu Pivalliajutisait 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. 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.

RESULTS

Not applicable.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.7.1

METHODS

Baffinland provides 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. In 2022, Baffinland hired two (2) on-site mental health counsellors who also work with employees and provide counselling services on site.

A Community Counsellor Program has also been established by Baffinland in the North Baffin LSA communities. In June 2019, Baffinland commenced funding a 3-year agreement with the Ilisaqsivik Society to hire qualified Inuit counsellors to work within Arctic Bay, Clyde River, Igloolik, Sanirajak and Pond Inlet. This partnership has allowed Ilisaqsivik 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.

RESULTS

EFAP usage increased from five (5) in 2021 to approximately seven (7) accesses per 100 employees in 2022. The usage of EFAP by Nunavut-based employees increased in 2022, with 40 EFAP accesses, an increase of six (6) accesses from 2021. For non-Nunavut based employees, EFAP access also increased from 38 accesses in 2021, to 51 accesses in 2022. The majority of EFAP counselling service usage was conducted over the phone or through video. 63% of the 86 counseling cases in 2022 were classified as "psychological" support, with other issues including marital, work, family, addiction, and trauma.

On-site Cultural Advisors are also available for all of Baffinland's Inuit employees. As of 2022, Baffinland now has two (2) on-site counsellors which provide counselling services to all Baffinland employees and contractors. Usage of these resources is not tracked.

TRENDS

In 2022, following several years of EFAP usage remaining relatively consistent at approximately seven (7) accesses per 100 employees, EFAP usage increased for both Nunavut-based and non-Nunavut-based employees.

It is possible that increased promotion of the program for Baffinland's employees and their families, coupled with the ongoing impacts of the COVID-19 Pandemic and operational uncertainty, influenced increased use of the service during 2022. Increased EFAP usage, like other company-provided health services, can be an indicator of either positive (e.g. provision of health services that may have been less available in the community), negative (e.g. onset of Project-related negative health condition), or neutral effects (e.g. provision of health services that would have otherwise been accessed in the community).

A summary of monitoring results and trends is also provided in the 2022 Socio-Economic Monitoring Report (Stratos and Aglu, 2023).

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 provides ongoing support to employees with challenges related to substance abuse by setting them up for an assessment with Homewood Health EFAP and based on the recommendations from the assessment placing them in the in-patient treatment programs. Baffinland covers all costs related to this treatment from the assessment cost, bridge-counselling cost, in-patient treatment center placement cost to flight cost etc. As a result, we have had a few employees successfully return to work after completing these programs.

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.

In the 2021 NIRB Annual Report (Baffinland, 2022a), Baffinland indicated it would investigate support for related substance abuse/alcohol and addictions through a medical practitioner as well as the establishment of alcohol and narcotic anonymous programs at Project sites. In 2022, Baffinland has hired two (2) on-site counsellors which make available counselling services (e.g. one-on-one substance-related counselling) to all Baffinland employees and contractors.

4.7.6 Community Infrastructure and Public Services (PC Terms and Conditions 158 through 161)

Four (4) PC Terms and Conditions relate to the potential impacts of the Project on community infrastructure and public services. All four conditions name the Government of Nunavut (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 conducted Inuit Employee Surveys in 2017, 2018, 2019, 2020, and 2022. 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 4.54 provides an evaluation of the Project's impacts on community infrastructure and public services, based on monitoring activities completed in 2022, relative to predictions presented in the FEIS and the FEIS addendum.

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 over time.

Path Forward

Baffinland will continue to monitor this aspect of the socio-economic environment, and will discuss monitoring results with the MRSEMWG. Baffinland will administer the Inuit Employee Survey in Q4 of 2023. Reporting on each PC Term and Condition follows.

Table 4.31: 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 2022 Inuit Employee Survey show that 18%	Effect within FEIS predictions

Component	Effects	Monitoring Program	Impact Evaluation
Education and Skills	Long term improvement in labour force capacity	of respondents left a previous job to join Baffinland. Out of the 10 respondents who left a previous job, one left a position with a Hamlet. 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 Inuit employees cited for resigning in 2022 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. 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.	Long-term effect may be realized over time

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023) 2022 Engagement Records 2022 MRSEMWG Meeting Records Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019i)
Ref. Document Link	Appendix B.1 Appendix C.3 Appendix G.7.1

METHODS

Baffinland actively engages with the Government of Nunavut (GN) on its socio-economic monitoring program and other general socio-economic issues through the QSEMC, the MRSEMWG and general socio-economic Baffinland-GN MoU. Baffinland also signed an MoU directly relate to health care services 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 2022 Socio-Economic Monitoring Report (Appendix G.7.1; Aglu and Stratos, 2023). 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 4.55. Detailed results are presented in the 2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023).

Table 4.32: Selected Human Health and Well-Being Indicators and Trends in 2022

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, however data has not been updated by the Nunavut Bureau of Statistics since 2018.
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, however data has not been updated by the Nunavut Bureau of Statistics since 2016.
Number of health centre visits (total)	Between 2010 and 2016 (within both the pre-development and the post-development period), there were significant changes in per capita health centre visits in Pond Inlet, Clyde River, and Arctic Bay. Per capita visits in 2016, the latest year data was available, in all North Baffin LSA communities, except Arctic Bay, were similar to historical levels (2009 and earlier). Based on this observation, and given the lack of data for more recent years (when Inuit employment grew significantly), the Project is not considered to have had a significant effect on the use of public health services and infrastructure in the LSA.
Number of health centre visits (per capita)	
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). The number of visits per Inuit employee in 2022 increased after a predictable drop in 2020 and 2021 with Nunavummiut demobilized for parts of those years, however has not returned to pre-pandemic levels. A trip to the physician's assistance could be an indicator of either positive, negative, or neutral effects.

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 in-migration is not occurring in any significant manner (see Section 4 of the 2022 Socio-Economic Monitoring Report; Appendix G.7.1; Aglu and Stratos, 2023).

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 4.2 of the 2022 Socio-Economic Monitoring Report; Appendix G.7.1; Aglu and Stratos, 2023). More generally, Appendix C of the 2022 Socio-Economic Monitoring Report indicates an average of 55 Inuit and one (1) non-Inuit employees/contractors (by headcount) with known origins lived in Iqaluit in 2022 (Appendix G.7.1; Aglu and Stratos, 2023). 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, on-site mental health counsellors, Community Counsellor Program).

TRENDS

Baffinland's analysis concludes that it is doubtful the Project had significant effect on the number of clinic visits in North Baffin LSA communities. This is largely based on available data (per capita clinic visits in LSA communities), which shows no significant trend which correlates with mining activity. Baffinland finds this conclusion reasonable given the currently available data.

Trends are presented in the 2022 Socio-Economic Monitoring Report (Appendix G.7.1; Aglu and Stratos, 2023).

RECOMMENDATIONS / LESSONS LEARNED

The Government of Nunavut (GN) is responsible for health reporting and Baffinland would expect that if additional collaboration with the GN was desired in this area it would be raised through the MRSEMWG, QSEMC, or general Socio-Economic MoU Working Group.

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 GN, MRSEMWG and QSEMC on its Socio-Economic Monitoring Program.

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023) 2022 Engagement Records 2022 MRSEMWG Meeting Records Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019i)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix B.1 Appendix C.3 Appendix G.7.1

METHODS

Baffinland continues to engage the Government of Nunavut directly, and through their membership in the QSEMC and the MRSEMWG, on the Mary River Socio-Economic Monitoring Program. Baffinland also provides information on potential socio-economic effects of the Project in the Socio-Economic Monitoring Report (SEMR). 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, Igloolik, Iqaluit, Pond Inlet, and Sanirajak).

Further, following the 2019 fuel shortage at the Iqaluit Airport, Baffinland committed to ensuring that each year Baffinland's airline partner would provide a fuel usage estimate report to the GN in advance of the annual fuel sealift to 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).

In 2022, Baffinland's utilization of community infrastructure, particularly airports, continued to be lower than pre-pandemic levels. In 2022, there were 990 Project aircraft movements at LSA community airports. 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 as well as the change from a two-week-in/two-week-out to a three-week-in/three-week-out rotation were key contributing factors influencing Baffinland's utilization of community infrastructure in 2022, particularly airports.

Baffinland reported to the GN that it would consume an estimated 5,100,000 litres of Jet A fuel from the Iqaluit Airport in the 2022 fiscal year.

TRENDS

In 2022, Baffinland's utilization of community infrastructure, particularly airports, increased compared to 2021 (731 Project aircraft movements) and 2020 (421 Project aircraft movements), though remain significantly less than in pre-pandemic years (i.e. down from a total of 2,253 movements in 2019).

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 (the latest year data is available) represented a small portion (8.4%) of this total.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland continues to engage with the GN through the MRSEMWG, QSEMC, and MoU Working Group on the Project's Socio-Economic Monitoring Program. As this is an area that is already monitored by the GN, Baffinland would expect that if additional collaboration was desired in this area it would be raised and/or responded to through these forums by the GN.

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.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and 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) 2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.7.1

METHODS

This PC Term and Condition is not aimed at Baffinland. See Baffinland's reporting under PC Term and Condition No. 167 for an understanding of the benefits, royalties and taxation that was paid to the GN and QIA for 2021.

RESULTS

Not applicable.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Not applicable.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Government of Nunavut (GN)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023) 2022 Engagement Records 2022 MRSEMWG Meeting Records Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019i)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix B.1 Appendix C.3 Appendix G.7.1

METHODS

This PC Term and Condition is not aimed at Baffinland.

Baffinland regularly engages the Government of Nunavut (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 MRSEMWG to discuss socio-economic impacts and benefits of the Project. GN representatives are active members of both the QSEMC and the MRSEMWG. 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 security and 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 MRSEMWG, 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 Terms and Conditions 162 through 166)

Five (5) PC Terms and 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

In addition to the Inuit of the five (5) North Baffin communities, key stakeholders focused on culture, resources and land use include the QIA, the GN Department of Culture and Heritage, and the Inuit Heritage Trust. The latter two (2) 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 4.56 provides an evaluation of the Project's impacts on culture, resources and land use, based on monitoring activities completed in 2022, relative to predictions presented in the FEIS and FEIS Addendum.

Table 4.33: 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	Reporting of chance finds as per Cultural and Heritage Resource Protection Plan: no chance finds located in 2022.	Effects did not occur
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 19 claims were paid from the Wildlife Compensation Fund in 2022, totaling $99,824.01. The Total Allowable Harvest (TAH) for caribou on Baffin Island was increased	Effect within FEIS predictions

Component	Effects	Monitoring Program	Impact Evaluation
		from 250 to 350 for the 2022/2023 harvest season. As of February 10th, 320 of 350 tags had been used. Pond Inlet has used 49/46 tags (inclusive of 16/8 female tags), Arctic Bay has used 17/26 tags (inclusive of 4/10 tags). Baffinland has not been able to procure 2022/2023 harvest data from the GN or DFO, however, in 2021/2022 a total of 152 tags were issued to Pond Inlet (137 for Summer, and 15 for the Fall/Spring). The entire summer quota of 137 narwhal were successfully harvested and reported to the GN Wildlife Office. Fishing is not subject to a quota system for Inuit and therefore there is no reportable data for the 2022 period.	
Travel and Camps	Potential for reduced safety travelling around Eclipse Sound and Pond Inlet and through Milne Port. Emissions and noise disruption during travel and/or camping	Site observations suggest Inuit land use coexists with the Project's activities. In 2022, a total of 358 land use visitor person-days were recorded at Project sites, a 36% decrease from 2021.	Effect within FEIS predictions
	Sensory disturbance and safety along Milne Inlet Tote Road		Effect within FEIS predictions
	Detour around Mine Site		
	HTO cabin closure	No closures were experienced in 2022. Hunter and visitor support was provided on an as-needed basis.	Effect within FEIS predictions

Baffinland's monitoring data suggests Inuit land use and harvesting coexists with the Project to some degree, in general. However, Baffinland respects that each individuals experience with the Project can be unique and varied.

Baffinland acknowledges the potential for wildlife-related impacts from the Project that can affect harvesting and has accordingly contributed $750,000.00 to a Wildlife Compensation Fund (administered by the QIA under the terms of the IIBA) to address this issue.

Baffinland will continue to provide maintenance services to the MHTO Cabins in the Project Area when requested by the MHTO. Additionally, Inuit travel through the site will continue to be accommodated by escorted travel over the Tote Road, conducting repairs to identified land use crossing areas as needed, and the continued provision of food, fuel and equipment repairs.

Path Forward

Baffinland will continue to monitor this aspect of the socio-economic environment, and will discuss monitoring results with the MRSMWG and QSEMC, as well as with HTOs in each of the impacted communities, either directly or through their participation in environmental working groups, or ad hoc initiatives to better understand specific project and land use interactions. Reporting on each PC Term and Condition follows.

Baffinland also awaits the outcomes of several undertakings by the QIA to further understand the Project's effects on culture, resources and land use beyond the Tusaqtavut Studies., which includes the ongoing supplemental CRLU Assessment and the Pond Inlet Country Food Baseline Report.

Project Certificate Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtani Inuit Association (QIA), North Baffin Communities
Reference	2022 MEWG Meeting Records 2022 TEWG Meeting Records 2022 Shipping and Monitoring Program Meeting Records
Ref. Document Link	Appendix C.1 Appendix C.2 Appendix B.2.2

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, Igloolik, Pond Inlet, and Sanirajak). 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.

Baffinland meets and/or shares Project-related information including monitoring programs implemented annually with various community groups on a regular basis to discuss aspects of the Project and any concerns or recommendations Community representatives may have. Baffinland directly funds the participation of the Mittimatalik Hunters and Trappers Organization (MHTO) in both the Terrestrial and Marine Environment Working Groups. Aside from creating a forum for the most affected community of Pond Inlet to understand what monitoring programs are planned each year, and what the outcomes of previous programs were, Baffinland relies on the MHTO to provide practical insights into the feasibility and value of our monitoring programs given their intimate knowledge of the land and wildlife.

For more general engagement of the community of Pond Inlet with respect to our shipping activities, Baffinland aims to hold annual pre-shipping and end of shipping season meetings with representatives of the Hamlet of Pond Inlet, the MHTO (including Elders) and QIA in order to discuss past and upcoming shipping seasons. During these meetings, various topics are discussed including, though not exclusively, shipping activity levels, relevant mitigation measures, shipping communications, monitoring intentions and timing, etc. Information is also shared via written submissions and through email correspondence throughout the year, and more regularly during the shipping season to ensure the community is informed about shipping activities.

Furthermore, through the undertaking of annual monitoring programs, Baffinland strives to leverage as many local resources as required, including the hiring of Inuit (including Elders) during program implementation (e.g., caribou Height of Land and marine mammal aerial surveys), and to provide Inuit training and employment opportunities in a variety of settings. This incudes 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).

RESULTS

Community members and other stakeholders continue to provide valuable input that guides the development of monitoring programs and mitigation measures, as needed. A specific example includes the development of an Arctic char health monitoring program in the Milne Port area since 2021 in fulfillment of PC Term and Condition No. 48a. Prior meetings with the MHTO were crucial to establishing the monitoring locations and objectives, while direct MHTO representative participation in the field program assisted with the day to day execution of the program and its overall success over these two years. Further discussion is provided in response to PC Term and Condition No. 48a.

Baffinland recognizes that the potential to engage with Elders and community members in-person continued to be partially affected in early 2022 due to travel and other operational restrictions related to the COVID-19 Pandemic. Engagements relied heavily on the use of teleconferences, videoconferencing and radio show formats thereby allowing for critical discussions to continue in a remote setting, but may be less optimal in certain situations. A list of meetings held with the public (including with Elders) and with community groups such as the MHTO in 2022 are listed in Table 2.1.

The MHTO participated in numerous teleconference calls held for MEWG (May 3, June 14, June 22, June 29, August 4, December 2; Appendix C.1) and TEWG (April 28, June 23, December 1; Appendix C.2) in 2022. As part of these meetings, past results and future planned studies were discussed for input. In addition, although Baffinland was unable to schedule a pre-shipping season meeting in 2022, slides were exchanged with shipping details as an alternative to a meeting (Appendix B.2.2). An in-person End of 2022 Shipping Season Meeting was held in Pond Inlet with representatives (including Elders) from the MHTO and the Hamlet on February 8, 2023 (see Appendix B.2.2). During this meeting, Baffinland shared its past shipping activities, reviewed implemented mitigation and management measures such as use of convoys, and a high-level summary of the communications protocol implemented during the 2022 shipping season was shared. Overall, a number of follow-up actions were captured and closed out (Appendix B.2.2).

Following from commitments related to dust management issued through the Phase 2 review, a third-party Dust Audit was initiated in 2021 and continued throughout 2022. The third-party auditors work with a Dust Audit Committee composed of representatives from each of the five (5) North Baffin communities including Arctic Bay, Clyde River, Igloolik, Pond Inlet, and Sanirajak. Committee members were nominated by Hamlets and HTOs to

participate in the Audit. Committee members have been regularly meeting in order to drive forward the dust audit. The third-party auditor completed two (2) field investigations with the support of the Dust Audit Committee, in 2021 (September 30 to October 5) and 2022 (June 8 to 14). A Baffinland Dust Audit - Final Recommendations Report was released publically in 2023 (Nunami Stantec, 2023). This report includes recommendations for actions to take based on feedback brought forward by Committee members to better manage dust at the Mary River Project.

Inuit participation from North Baffin communities improved in 2022 in comparison to 2019 (pre- COVID-19), a total of 12 individuals were hired from either Pond Inlet or Arctic Bay in 2022 to participate in the marine monitoring programs (marine mammal aerial surveys, Bruce Head Shore-based Monitoring, and MEEMP and AIS Monitoring and Ship-based Observer [program eventually cancelled]) as marine wildlife observers, polar bear monitors, field technician and boat operator. Six (6) Inuit also participated in the terrestrial monitoring programs including Height of Land caribou surveys. Baffinland also collaborated with the MHTO during the sampling of Arctic char in lakes Milne Inlet.

In 2022, a QSEMC meeting did not occur due to lack of accommodation availability in Iqaluit; however, one (1) MRSEMWG meeting was held via teleconference (Appendix C.3). Baffinland also engaged with Mayors, Hamlet Councils and other community groups from the North Baffin LSA Hamlets throughout 2022 to provide updates on Mary River's existing operations, and to listen to community updates and issues of importance.

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 MEWG and TEWG, through Baffinland-led annual Pre-Shipping and End of Shipping Season meetings and/or periodic information exchanges, etc. Baffinland will also engage Inuit directly on programs on an ad hoc basis as needed. Furthermore, through anticipated changes to the TEWG and MEWG Terms of Reference, Baffinland intends to include one additional representative from each of the HTOs in Arctic Bay, Clyde River, Igloolik, and Sanirajak to participate during meetings, as well as provide the opportunity to review annual monitoring program reports.

Baffinland intends to continue training and employing Inuit participants in environmental monitoring programs in 2023.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	North Baffin Communities
Reference	2022 Engagement Records 2022 MEWG Meeting Minutes 2022 TEWG Meeting Minutes
Ref. Document Link	Appendix B Appendix C.1 Appendix C.2

METHODS

The methods Baffinland employs to satisfy this term and condition are consistent with those outlined in response to PC Term and Condition No. 162. In addition to those mechanisms, and of specific relevance to this PC Term and Condition relates to various types of engagement methods including more regular public radio shows and individual one-on-one meetings with Elders as an alternative during COVID-19 Pandemic to what otherwise would have been in-person open houses. This format has continued to reach Nunavummiut from the affected communities to keep the communities broadly informed of the Projects current activities, inclusive of its environmental monitoring and mitigation plans.

Baffinland also further broadened its local 'boots on the ground' in each of the five (5) impacted communities by hiring Inuit Knowledge Holders and Community Relations Guides towards the end of 2022. These roles are seen as critical to guiding Baffinland's senior management in its decision making, facilitating knowledge transfer within and between community members and Baffinland staff, and guiding the collection and use of Inuit Qaujimajatuqangit (IQ).

RESULTS

In 2022, Baffinland hosted ten (10) radio shows and held various meetings in each of the five (5) impacted communities. A list of all meetings held with the public (including with Elders) and with community groups such as the MHTO in 2022 is provided in Table 2.1.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to implement a proactive approach to engagement in 2023 with Inuit and various stakeholders, through meetings, workshops, surveys and dissemination of information and reports. This will ensure that Inuit, communities, QIA, regulators and the broader 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. All input received by the Company through its engagements is meaningfully considered and where possible, reported back to those that have provided to it.

Project Certificate Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG) and Mittimatalik Hunter and Trappers Organization (MHTO)
Reference	Marine Shipping and Vessel Management Report (Baffinland, 2022l) Convoy Technical Memo (JASCO, 2022)
Ref. Document Link	https://www.baffinland.com/operation/shipping-and-monitoring/

METHODS

Baffinland continues to partner with Spire Shipview®, 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 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 Mittimatalik Hunters and Trappers Organization (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. Live continuous monitoring of vessels active in the Northern Shipping Route is made available to any visitors during Baffinland's regular office hours (8 am to 5 pm).

As first initiated in 2019, Baffinland continued with its implementation of the Pond Inlet Shipping Monitor Program in 2022. This program consists 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). In 2022, nine (9) Shipping Monitors were hired, five (5) of whom had been previously employed by Baffinland, either as a Shipping Monitor or with other departments. 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).

Following the direction of the NIRB outlined in the Production Increase Proposal Extension Recommendation Report, Baffinland has submitted a Marine Shipping and Vessel Management Report in advance of each shipping season since 2020. The Report outlines Baffinland's plans for the shipping season in terms of operations (number of vessels, types of vessels, anchorage locations, approximate timing, commencement conditions, etc.), consultation and engagement activities that have occurred with relevant Parties prior to the start of the shipping season and planned monitoring (ship board observer program, aerial survey program, shore based survey program, etc.). As in all years, in 2022, the shipping season did not commence until the MHTO has confirmed the close of the floe edge for harvesting, which is a direct indicator of the safety of ice for travel.

In addition to the regular communications about daily shipping activity via marine VHF radio, local radio and Facebook, Baffinland initiated the weekly sharing of an anticipated approximate 10-day rolling schedule in 2021. This schedule outlines upcoming Baffinland vessel activity in the Regional Study Area (RSA) and is shared via email with the MHTO and Hamlet of Pond Inlet. Rolling schedules were shared throughout the 2022 shipping season and will continue to be shared in 2023.

RESULTS

The programs described above continued to be actively implemented in 2022.

Since the start of operations, Baffinland has clearly demonstrated its commitment to successfully implementing the various shipping-related mitigation and management measures (e.g., tight adherence to the defined shipping route and vessel speed restrictions) and by adopting new procedures over the years to improve performance based on previous' years results. This includes expanding upon the types of communication methods being employed over the years to inform residents about its activities (e.g., hiring of shipping monitors to communicate vessel locations through use of marine VHF radio, public radio, Facebook) and also by providing updated rolling schedules on anticipated shipping activities on a regular basis in addition to the live online tracking available 24 h/day.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland has found the use of Spire Shipview® 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 in weekly emails to rolling 10 day schedules, 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. Baffinland will also remain open to updating its communications methods as informed by community needs.

Project Certificate Term and 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 Term and Condition	Steensby Rail Corridor – Not Active Milne Inlet Tote Road – Active
Status of Compliance	Steensby Rail Corridor – Not Applicable Milne Inlet Tote Road – In Compliance
Stakeholder Review	Qikiqtani Inuit Association, Nunavut Water Board, Crown-Indigenous Relations and Northern Affairs Canada, Nunavut Impact Review Board
Reference	Emergency Response Plan (Baffinland, 2020) Roads Management Plan (Baffinland, 2020c)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

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. All buildings are accessible for emergency purposes by employees and land users.

Baffinland has a trained Emergency Response Team (ERT) at both ends of the Tote Road with emergency vehicles to rapidly respond to any concerns. The ERT also has access to snowmobiles, a side by side and a Sno-Cat® that are capable of moving through snowdrifts and effecting a rescue as required. The Tote Road Travel Procedure is publicly available and outlines the emergency response procedure (Baffinland, 2019j).

Ensuring the health and safety of local hunters on-site is of utmost importance to Baffinland. If travel across or along the Tote Road is required, local hunters are continued to be advised to report to security and request a transport for their equipment and personnel. To prevent potential transfer of the COVID-19 virus to Nunavummiut, all visits to Project facilities by non-project staff were continued to be halted during 2022. 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 remain in place, the non-contact Visitor Communication Centers continued to be used (the Mine Site and Milne Port), 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.

The BCLO's continued to advise Nunavummiut of the COVID-19 protocols in place at the Project. Baffinland maintained COVID-19 signage at the HTO hunting cabins and Visitor Communication Centers. Hunter and visitor supply requests continued to be accommodated in 2022 based upon supplies available on site.

In 2022, Baffinland participated in four (4) Search and Rescue (SAR) responses. One involved accommodating federal Joint Rescue Coordination Centre (JRCC) SAR personnel (i.e., accommodating staging, provision of fuel and accommodations for JRCC SAR personnel rest period), and one (1) involved provision of food, fuel, resources and transportation related to SAR for two (2) missing individuals. During another event, Baffinland released a helicopter for ongoing SAR in Sanirajak. The helicopter was on standby and ready to respond, however, was unable to due to weather conditions and crew time-out; the missing individual was subsequently located. The fourth (4) Baffinland assistance SAR involved the utilization of a helicopter to pick up a stranded Quad near the Project, which was returned to site facilities to thaw prior to being returned. In addition, a DND-Hercules plane landed at the Project site.

The Steensby rail line has not yet been constructed and is therefore not applicable at this time.

RESULTS

No Project related safety related incidents occurred in 2022 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 2022.

RECOMMENDATIONS / LESSONS LEARNED

PC Term and Condition No. 165 was originally intended for the development of the southern railway to Steensby Inlet. For the Emergency Response Plan, use of the Tote Road means that there are multiple types of vehicles readily available to access a person in need of assistance. Construction of emergency shelters along the railway to Steensby Port will be planned in concert with other interested Parties when this phase of the Project becomes active.

Project Certificate Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Not applicable
Reference	Hunter and Visitor Site Access Procedure (Baffinland, 2020l)
Ref. Document Link	https://www.baffinland.com/operation/shipping-and-monitoring/

METHODS

Baffinland continues to implement a shipping communications protocol with the community of Pond Inlet. Information regarding the communications protocol is shared with the MHTO during the pre- and end of shipping season meetings where feedback is requested for improvements, as needed. Baffinland also made available a Shipping and Marine Monitoring Program Summary brochure that is updated annually incorporating the latest updates, which contained relevant Baffinland staff contact information should community members have any concerns throughout the season.

RESULTS

The public has 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 other Sustainable Development Department representatives, 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 Term and Condition No. 102 and 164.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to promote the use of the Hunter and Visitor Site Access Procedure, and the vessel transit web tracking service available on the Baffinland website. Shipping and Marine Monitoring Summary brochure 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 2023. This includes the continuation of a minimum hiring of four (4) full-time and up to six (6) Shipping Monitors (aiming for up to 10 to cover up to 24 hours/day, 7 days a week over entire shipping season) 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 Term and Condition 167)

One (1) PC Term and 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 (including a royalty), as well as rent payment for the lease of Inuit Owned Land (IOL), royalties on aggregate from IOL, tipping fees for waste deposited on IOL, water consumption payments, and a portion of royalties paid to NTI under the grandfathered mining lease;
- 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, fuel, income 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;
- Other Nunavummiut - Beneficiaries of mineral royalties' payable to NTI; and
- Communities – The five (5) North Baffin communities are recipients of donations under Baffinland's Community Donation Program; the community of Pond Inlet also receives direct payments under the Tasiuqtiit Agreement as well as the Harvesters Enabling Program.

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 4.57 provides an evaluation of the Project's impacts on benefits, royalties and taxes, based on monitoring activities completed in 2022, relative to predictions presented in the FEIS and FEIS Addendum.

Significant positive benefits have been realized by the stakeholders listed above, as a result of benefits, royalties and taxes paid by the Project in 2022.

Path Forward

Baffinland will continue to meet its commitments with respect to benefits, royalties and taxes. Reporting on PC Term and Condition No. 167 follows.

Table 4.34: 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	Baffinland paid a total of $6,378,688 in royalties to QIA in 2022 as well as $3,486,295 in land leases and fees payments. Baffinland spends $5.9 million annually to implement the IIBA to support training, business capacity, and community wellness.	Within FEIS predictions

Component	Effects	Monitoring Program	Impact Evaluation
		Spending by Inuit organizations can be tracked at a high level through NTI and QIA annual reporting. A total of $12,168,500 has been paid to the QIA for the Pond Inlet Training Centre. $7,013,298 of this was paid to the QIA in the 2022 year. The Hamlet of Pond Inlet and MHTO earned $70,000 in 2022 under the Tasiuqtiit Agreement. Residents of Pond Inlet also received $400,000 in support through the Harvesters Enabling Program.	
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 and fuel taxes. In 2022, Baffinland paid a total of approximately $16.3 million in taxes to the Government of Nunavut: $10.5 million in employee payroll tax and $5.8 million in fuel tax.	Within FEIS predictions

Project Certificate Term and 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 Term and Condition	Not Active
Status of Compliance	In Compliance
Stakeholder Review	Not applicable
Reference	Not applicable
Ref. Document Link	Not applicable

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. The GN DPA Policy expired on March 31, 2016 and was never extended or replaced. Baffinland and the Government of Nunavut cannot negotiate a Development Partnership Agreement as instructed by PC Term and Condition No. 167 as the program no longer exists.

In lieu of a Development Partnership Agreement, Baffinland and the GN signed a Memorandum of Understanding (MoU) in 2019 on the basis 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 four (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

Not applicable.

4.7.9 Governance & Leadership (PC Terms and Conditions 168 through 169)

Two (2) PC Terms and 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 MRSEMWG 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. Baffinland regularly revises 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. The Government of Nunavut (GN) did not schedule a QSEMC meeting in 2022.

In 2022, Baffinland received input from MRSEMWG members on the Inuit Employee Survey. The survey was updated to reflect input received from the GN and CIRNAC. The survey was administered in October/November 2022 (Stratos, 2023b). The company is exploring additional methods on how the survey could be administered in the future (i.e. hybrid, virtual) to increase participation.

Acknowledging the Project has evolved considerably since the 2014 submission of the previous closure planning report (FHW Consulting, 2014b) Baffinland conducted additional planning for socio-economic aspects of temporary closure in 2021.

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 2022 (Aglu and Stratos, 2023). As such, no mitigation measures have been proposed to manage negative effects. The Socio-Economic Monitoring Program has been developed in consultation with the MRSEMWG, and monitoring results are also reviewed by this group and QSEMC annually.

The COVID-19 Pandemic as well as operational uncertainty involving the proposed Phase 2 project and Baffinland's application to maintain 6 Mtpa in 2022 had a major impact on the Mary River Project, and both of these events have been considered in the monitoring.

Path Forward

Baffinland will continue to undertake the collection of socio-economic monitoring data in consultation with the MRSEMWG and QSEMC, and report this monitoring data annually through its Socio-Economic Monitoring Report. Reporting on each PC Term and Condition follows.

Project Certificate Term and 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 socio-economic 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023) Draft 2019 Socio-Economic Monitoring Plan (Baffinland, 2019i)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.7.1

METHODS

This Project Certificate Term and Condition is addressed in reporting related to PC Terms and Conditions No. 131, 140, 144, 145, 148, 157, and 154. Additional reporting is provided here, however, those additional PC Terms and Conditions should be reviewed as well when considering compliance. Socio-economic data collection and analysis methods are described in the Socio-Economic Monitoring Plan (Baffinland, 2019i) 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 4.58. 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 4.35: 2022 Monitoring Results and Trends for Selected Socio-Economic Indicators

Indicator / Topic	Summary and Trend
Known in-migrations of non-Inuit Project employees and contractors	Cumulative Baffinland data (i.e. Baffinland Human Resources data and BCLO survey) since 2015 indicates a net of one non-Inuit employee/contractor is known to have in-migrated to the North Baffin LSA.
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	Cumulative Baffinland data (i.e. Baffinland Human Resources data and BCLO survey) since 2015 indicates a net negative migration (out-migration) of 24 Inuit workers from the North Baffin LSA, which includes a net out-migration of one (1) Inuit employees/contractors in 2022.
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 2022 Inuit Employee Survey results, declared migration intentions for 2022 align with the past several years of movement, with five respondents expressing an intention to move from one community to another in the next year.
Project female employment	The project had 197 female FTEs in 2022, representing 11% of the total workforce, an decrease in both number and proportion from 2021.
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. The majority (89%) of Nunavut-based Inuit employee survey respondents reported that there was not sufficient and affordable options and access to childcare in their communities. 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 (20) drug and alcohol-related contraband infractions occurred at Project sites among Baffinland and contractor employees in 2022, representing an increase from 2021 (5).
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.

Indicator / Topic	Summary and Trend
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 gradually decreased since 2013, with an uptick in 2019, however mirror changes seen in the rest of Qikiqtani and Iqaluit. 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

In response to feedback received from NIRB and Pond Inlet, Baffinland has updated its Inuit Employee Survey to explore motivations for completed or planned moves to different communities and the extent to which they may or may not be connected to Project activities.

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 MRSEMWG and QSEMC how improved monitoring data may be obtained, understanding that some data is outside of industry's ability or responsibility to collect. The MRSEMWG Terms of References acknowledged this point as it outlines each member's (Baffinland, Government of Canada, GN and QIA) roles and responsibilities, including what type of data is most appropriate for each organization to provide.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval of the Project by the Minister.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio-Economic Monitoring Working Group (MRSEMWG)
Reference	2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023) 2022 Engagement Records 2022 MRSEMWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix B.1 Appendix C.3 Appendix G.7.1

METHODS

Baffinland has provided a summary of monitoring data related to regional and cumulative economic effects associated with the Project in its annual 2022 Socio-Economic Monitoring Report (Aglu and Stratos, 2023).

RESULTS

The Project continues to make positive contributions to Nunavut's economy. Some highlights include that 232 Inuit FTEs were employed by the Project in 2022, earning a combined total of $24,082,687. A total of $162.2 million in contracts was awarded to Inuit Firms in 2022. Since Project development, a total of $1.68 billion dollars in contracts has been awarded to Inuit Firms.

Mining remains an important contributor to the Nunavut economy. Nunavut's real gross domestic product (GDP) for all industries in 2021 (the latest year for which data is available) was $3,454 million[7] (Statistics Canada, 2021). Of this amount, 'metal ore mining' was responsible for contributing $1,186 million (or 34%). Mining may also make economic contributions to supporting industries such as 'construction' ($313 million contribution to the Nunavut

[7] Chained (2012) dollars; current dollars for 2021 is not available.

economy in 2021), 'transportation and warehousing' ($53 million contribution to the Nunavut economy in 2021), and 'accommodation and food services' ($21 million contribution to the Nunavut economy in 2021), 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 2022.

4.8 PERFORMANCE ON OTHER TERMS AND CONDITIONS

4.8.1 Accidents & Malfunctions (PC Terms and Conditions 170 through 177)

Eight (8) PC Terms and Conditions relate to accidents and malfunctions. Two (2) of these Terms and 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 Terms and Conditions are provided in the pages that follow.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be included in the Annual Report submitted to the NIRB.
Responsible Party	Baffinland
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable
Stakeholder Review	Terrestrial Environment Working Group (TEWG), Nunavut Impact Review Board
Reference	Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland, 2016a) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix G.5.1

METHODS

The purpose of snow track surveys is to monitor the patterns of movement and response of caribou and other wildlife to Project-related activities based on their observable tracks in proximity to roadways. Snow track surveys were conducted on March 22, April 2, October 22, and November 9-10 in 2022, typically within 24 to 48 hrs following a fresh snowfall. Two or three Baffinland personnel led the surveys, which were conducted along the Tote Road from a light truck at a speed of ~30 km/hr. If/when wildlife tracks were suspected, personnel would investigate on-foot, confirm the species' identity and follow the tracks (to or from the roadway) to document the patterns of movement, behaviour, and habitat use to the extent possible. The following information was recorded:

- geo-referencing (latitude and longitude) at the location of the tracks/wildlife crossing;
- species identity;
- number of distinct sets of tracks (i.e., group size);
- description of the pattern of movement (e.g., deflected, travelled along, or crossing the road);
- height of the snowbank measured at either the crossing point or likely point of deflection (i.e., the point where the animal redirected its path away from the road); and,
- site photo-documentation and other miscellaneous survey observations (if/where applicable).

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. The Terrestrial Environment Mitigation and

Monitoring Plan (TEMMP; Baffinland, 2016a) includes a plan to increase the frequency of these surveys when caribou populations increase to a level that supports robust statistical analysis.

RESULTS

No caribou tracks were observed during snow track surveys in 2022. Results of the snow track surveys are presented in the 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a; Appendix G.5.1).

TRENDS

Caribou density is still too low and observations too infrequent to warrant increased survey frequency.

RECOMMENDATIONS / LESSONS LEARNED

Project Certificate Term and Condition No. 170 refers to better understanding and minimizing caribou interactions with the Railway. Construction for the Railway for the Steensby Port phase of the Project has not been begun, and the railway associated with the Phase 2 Proposal is not currently under consideration since the Phase 2 Proposal was not approved. Therefore, these monitoring activities have not been triggered. Rail specific monitoring programs will be re-evaluated once plans for railway construction and operation are determined and associated construction activities begin. Caribou density remains too low and observations too infrequent to warrant increased survey frequency.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be included in the Annual Report submitted to the NIRB.
Responsible Party	Baffinland
Status of PC Term and Condition	Steensby Rail Corridor – Not Active Milne Inlet Tote Road – Active
Status of Compliance	Steensby Rail Corridor – Not Applicable Milne Inlet Tote Road – In Compliance
Stakeholder Review	Terrestrial Environment Working Group (TEWG)
Reference	Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016a) FEIS Terrestrial Wildlife Baseline Report (EDI, 2012) 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

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. Results of terrestrial monitoring programs that support the protection of caribou are included in the 2022 Final Terrestrial Environment Annual Monitoring Report (EDI, 2023a).

Section 3.3.3 and 3.3.4 of the Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland, 2016a) outline specific mitigation and management measures concerning caribou movement and mitigating mortalities. Any new trail crossings will be identified and reviewed with QIA, 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. Note that the TEMMP is currently under a review and a revised draft is expected to be released to the NIRB in Q2 of 2023 for comments.

RESULTS

Not applicable.

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 Term and 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 Term and Condition	Not Active
Status	Not applicable
Stakeholder Review	Not applicable
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

Not applicable in 2022, Baffinland did not require the overwintering of fuel via vessel in 2022.

RESULTS

Not applicable.

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 Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Environment and Climate Change Canada, Qikiqtani Inuit Association, Nunavut Water Board, Crown-Indigenous Relations and Northern Affairs Canada, Nunavut Impact Review Board.
Reference	Spill Contingency Plan (Baffinland, 2021j) 2022 Oil Pollution Emergency Plan – Milne Inlet (OPEP; Baffinland, 2022h) 2022 Oil Pollution Prevention Plan – Milne Inlet (OPPP; Baffinland, 2022i) 2022 Shipping and Marine Wildlife Management Plan (Baffinland, 2022g) Spill at Sea Response Plan (SSRP; Baffinland, 2023i)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

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 2022. Training of Baffinland staff on the Milne Inlet OPEP was conducted by a qualified marine spill response contractor (Navenco Marine) between July 22 to 24, 2022. 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, 2022i), 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 at sea, including 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 2022. 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, 2022 visits to Project facilities by non-project staff remained on hold 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.

Transport Canada Marine Safety and Security (TCMSS) conducted an oil handling facility regulatory inspection of Baffinland's Class 2 facility during the 2022 fuel transfer season, which included a review of the OPEP plan. TCMSS identified four (4) requirements to be met which pertained to updating the OPEP plan content, and two (2) on-site requirements to be met: one (1) respecting secondary communications usage for transfer operators, and one (1) pertaining to an outdated plan that was observed in a work area and an associated concern that locations onsite where the Plan is to be located were not adequately identified. To address the concerns raised by TCMSS, Baffinland provided a Corrective Action Plan detailing how and when each of the raised concerns will be rectified. Identified concerns with the Plan will be addressed in Baffinland's 2023 OPEP and OPPP updates, to be submitted to Transport Canada in May, 2023.

TRENDS

As in previous years, Transport Canada's Guidelines for Baffinland's Class 2 (previously Class 1) Oil Handling Facility were adhered to. Baffinland submitted a Corrective Action Plan to TCMSS detailing how and when each of the concerns identified during the 2022 regulatory inspection will be rectified, and the 2023 OPEP and OPPP updates, to be submitted to Transport Canada in May, 2023, will include the updates described in the Corrective Action Plan.

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 Term and 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Environment Climate Change Canada (ECCC), Qikiqtani Inuit Association (QIA), Nunavut Water Board (NWB), Crown-Indigenous Relations and Northern Affairs Canada, Nunavut Impact Review Board (NIRB).
Reference	2022 Oil Pollution Emergency Plan – Milne Inlet (OPEP; Baffinland, 2022h) 2022 Oil Pollution Prevention Plan – Milne Inlet (Baffinland, 2022i) 2022 Shipping and Marine Wildlife Management Plan (Baffinland, 2022g) Spill at Sea Response Plan (Baffinland, 2015)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

In a January 29, 2015 letter from the Canadian Coast Guard (CCG) to the 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 22 to 24, 2022. 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 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 2022. 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 remained on hold in 2022 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 Term and 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 Wildlife 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable
Stakeholder Review	Not applicable
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

Not applicable in 2022. There is no winter shipping associated with the current active phase of the Project. Furthermore, action on this PC Term and 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 Term and 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	Not applicable
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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – 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, 2020g) 2022 Oil Pollution Emergency Plan – Milne Inlet (Baffinland, 2022h) 202Oil Pollution Prevention Plan – Milne Inlet (Baffinland, 2022i) 2022 Shipping and Marine Wildlife Management Plan (Baffinland, 2022g) Spill at Sea Response Plan (Baffinland, 2015) Spill Contingency Plan (Baffinland, 2021j) Diesel Environmental Emergency (E2) Plan – Mine Site (Baffinland, 2020m). Diesel Environmental Emergency (E2) Plan - Milne Port (Baffinland, 2020h). Exploration Spill Contingency Plan (Baffinland, 2014d)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

Not applicable as Steensby Port and the Southern Shipping Route were not developed or active in 2022. 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^3 (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^3 (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 2014 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.

Further spill modelling was carried out in 2018 for shipping activities along the Northern Shipping Route from Baffin Bay through Pond Inlet, Eclipse Sound, and Milne Inlet that could be occurring in the presence of ice.

Two spill scenarios are included that release 1 ML of intermediate fuel oil from an ore carrier at locations along the Northern Shipping Route. These include a mid-July sea ice break-up scenario in Eclipse Sound and a mid-October sea ice freeze-up scenario at the mouth of Milne Inlet. A spill distribution probability map for each spill scenario location is presented showing the probability that fuel would reach any particular location on the map, should a spill occur.

For the mid-July scenario at Eclipse Sound, the majority of the simulated trajectories reach shore. For these scenarios, ice temporarily keeps the fuel offshore and delays any drift to the shorelines. As the break-up season progresses, the spill trajectories spend increasingly more time in ice of lesser concentrations, approaching open water. For the mid-October scenario the number of trajectories reaching shore decreases steadily as freeze-up progresses. The ice keeps the fuel offshore and effectively traps the fuel in the ice as it freezes.

The spill modelling results highlight the importance of spill prevention and fuel spill 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. The 2015 spill model informed the development of Baffinland's Spill at Sea Response Plan (Baffinland, 2015). While the 2018 spill model informed an update the Baffinland's Spill at Sea Response Plan, see Appendix G.8.2.

See also PC Term and Condition No. 97 and No 98

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

The spill modelling results highlight the importance of spill prevention, the OPPP 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.

The Spill at Sea Response Plan was recently updated to append the results of additional fuel spill modelling carried out in 2018. 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 Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Transport Canada
Reference	Not applicable
Ref. Document Link	Not applicable

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 Term and Condition 178)

One (1) PC Term and Condition relates to alternatives analysis. Baffinland's updates to this PC Term and Condition are provided in the pages that follow.

Project Certificate Term and 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	Not applicable
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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) - Not Applicable
Stakeholder Review	Not applicable
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

Not applicable in 2022. 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.

4.8.3 Operational Variability (PC Term and Condition 179)

Three (3) PC Terms and Conditions relate to Baffinland's production and transportation limits. One (1) PC Term and Condition relates to auditing of project commitments and terms by a third party to confirm compliance against the relevant topic areas. Baffinland's updates to these PC Term and Conditions are provided in the pages that follow.

Project Certificate Term and 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 Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active
Status	Southern Transportation Corridor (Steensby Port) – Not Applicable
Stakeholder Review	Not applicable
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

Not applicable in 2022. 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 Term and 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, 2022, 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, 2022, 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 Section 112 of Nunavut Planning and Project Assessment Act, 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 Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	Not applicable
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

The total volume of ore shipped via Milne Inlet is tracked annually by Baffinland.

RESULTS

Baffinland shipped a total a total of 4.7 million tonnes (Mt) of iron ore during the 2022 shipping season, which is a decrease from 2021 (~5.6 Mt).

TRENDS

The total volume of ore shipped via Milne Inlet increased between 2015 (~0.92 Mt) and 2019 (~5.9 Mt), but decreased slightly in 2020 (~5.5 Mt), 2021 (~5.6 Mt), and 2022 (~4.7 Mt) in comparison to volumes reached in 2019 (Figure 4.20).

Baffinland continues to operate within the existing allowance for shipping limits outlined in PC Term and Condition No. 179(a).

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to track ore volumes shipped on a yearly basis. As of January 1, 2022, the maximum total volume of ore to be shipped in a calendar year was returned to 4.2 million tonnes per year; however, in October, 2022, the Federal Minister of Northern Affairs supported Baffinland's application and the NIRB recommendation for a 6.0 Mt permit for the remainder of 2022. Baffinland is continuing to evaluate its plans for the long term success of the Project, which includes a renewed focus on the development of the Steensby component of the Approved Project. In the interim, Baffinland has submitted an application to the NIRB to support the amendment of Project Certificate No. 005 to allow for the continued operation of the project at a nominal 6 Mtpa activity level through to 2024.

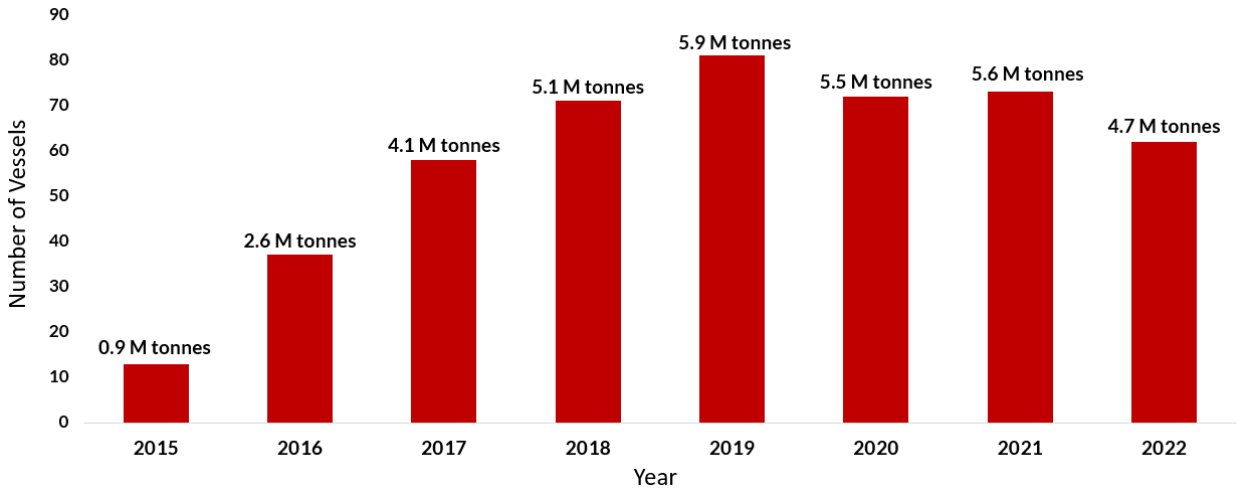

Figure 4.7: Number of Ore Carriers and Tonnage by Year through Milne Port, 2015 to 2022

Project Certificate Term and 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, 2022, the total volume of ore transported by truck on the Milne Inlet Tote Road may exceed 4.2 million tonnes per year, but must not exceed 6.0 million tonnes in any calendar year. After December 31, 2022, 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 Section 112 of Nunavut Planning and Project Assessment Act, S.C. 2013, c. 14, s. 2.
Relevant Baffinland Commitment	
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 Term and Condition	Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	Nunavut Impact Review Board (NIRB)
Reference	2022 QIA and NWB Annual Report for Operations (Baffinland, 2023a)
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

The total volume of ore transported by truck on the Tote Road is tracked annually by Baffinland.

RESULTS

In 2022, a total of ~5.7 Mt of iron ore was transported by ore haul trucks along the Tote Road.

TRENDS

From 2017 to 2020, the amount of ore transported by truck on the Milne Inlet Tote road was increased from ~4.5 to 6.0 Mt. With ~5.7 Mt of ore transported by truck on the Milne Inlet Tote Road in 2022. Baffinland continues to operate within the existing allowance for trucking limits outlined in PC Term and Condition No. 179(b).

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to track ore volumes transported by truck on the Tote Road. As of January 1, 2022, the maximum total volume of ore transported by truck on the Milne Inlet Tote Road in a calendar year was returned to 4.2 Mtpa; however, in October, 2022, the Federal Minister of Northern Affairs supported Baffinland's application

and the NIRB recommendation for a 6.0 Mt permit for the remainder of 2022. Baffinland is continuing to evaluate its plans for the long term success of the Project, which includes a renewed focus on the development of the Steensby component of the Approved Project. In the interim, Baffinland has submitted an application to the NIRB to support the amendment of Project Certificate No. 005 to allow for the continued operation of the project at a nominal 6 Mtpa activity level through to 2024. The volume of iron ore generated and transported by truck on the Tote Road since 2015 is provided in Figure 4.21.

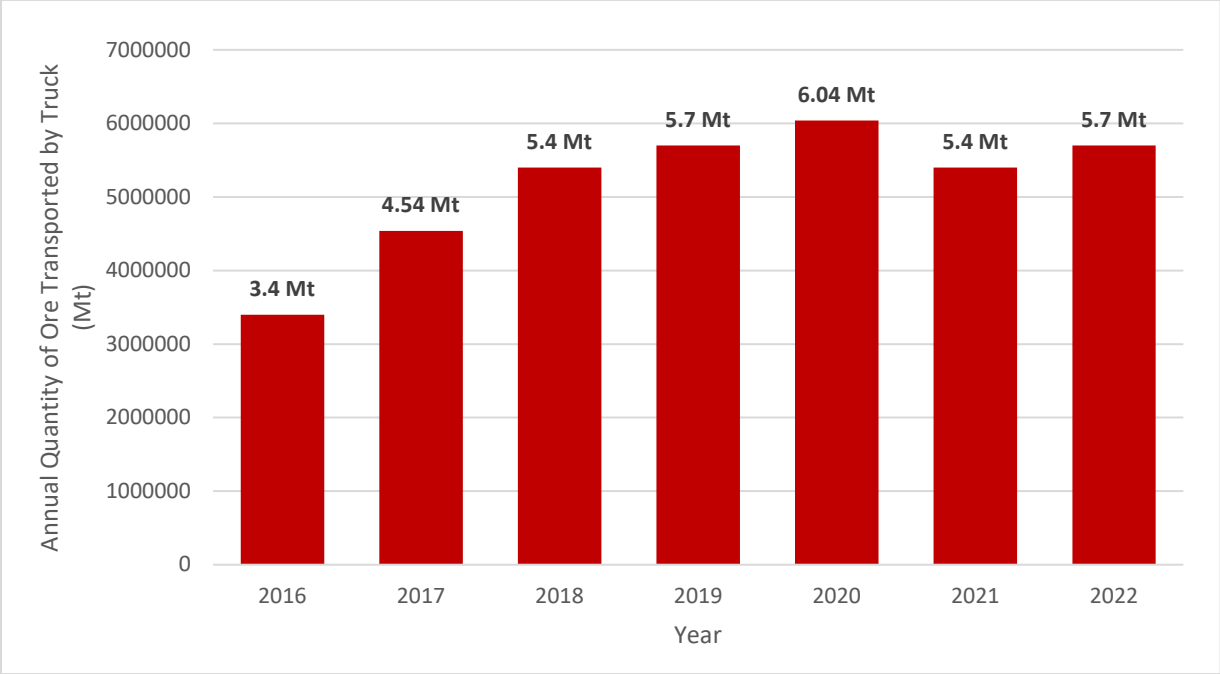

Figure 4.8: Annual Quantities of Ore Transported Via the Tote Road in 2016-2022

Project Certificate Term and 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 term 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	Not applicable
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 *Nunavut Planning and Project Assessment Act.*
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Not applicable
Reference	Agree-Upon Procedures on the Commitments Audit Protocol Report to the Nunavut Impact Review Board For the period ending June 30, 2022. (BDO, 2022; NIRB Registry No. 341829) Agree-Upon Procedures on the Commitments Audit Protocol Report to the Nunavut Impact Review Board For the period ending December 31, 2022. (BDO, 2023)
Ref. Document Link	Not applicable

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 Term and Condition No. 179 (c). Prior to its implementation, the audit template was shared with the Qikiqtani Inuit Association (QIA) to confirm the scope. A contract was established with BDO Canada LLP (BDO) to conduct two (2) audits in 2022 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 for the 2022 year, was submitted to the NIRB in October 2022, for the period between January 1, 2022 and June 30, 2022 (BDO, 2022; NIRB Registry No. 341829). For the IIBA section of the audit report, Baffinland had a 92% completion rate. For the PC No. 005 Terms and Conditions section, Baffinland had a 100% completion rate.

The second Performance Audit Report for the 2022 year, which covers the period of July 1, 2022 to December 31, 2022, was submitted on March 31, 2022 (BDO, 2023; NIRB Registry No. 341829). For the IIBA section of the audit report, Baffinland maintained a 92% completion rate. For the PC No. 005 Terms and Conditions section, Baffinland maintained a 100% completion rate.

TRENDS

In 2022, Baffinland improved its completion rate for the Project Certificate Commitments to 100 %, and maintained its completion rate of 92% for the Inuit Impact and Benefit Agreement (IIBA) Commitments (Figure 4.22).

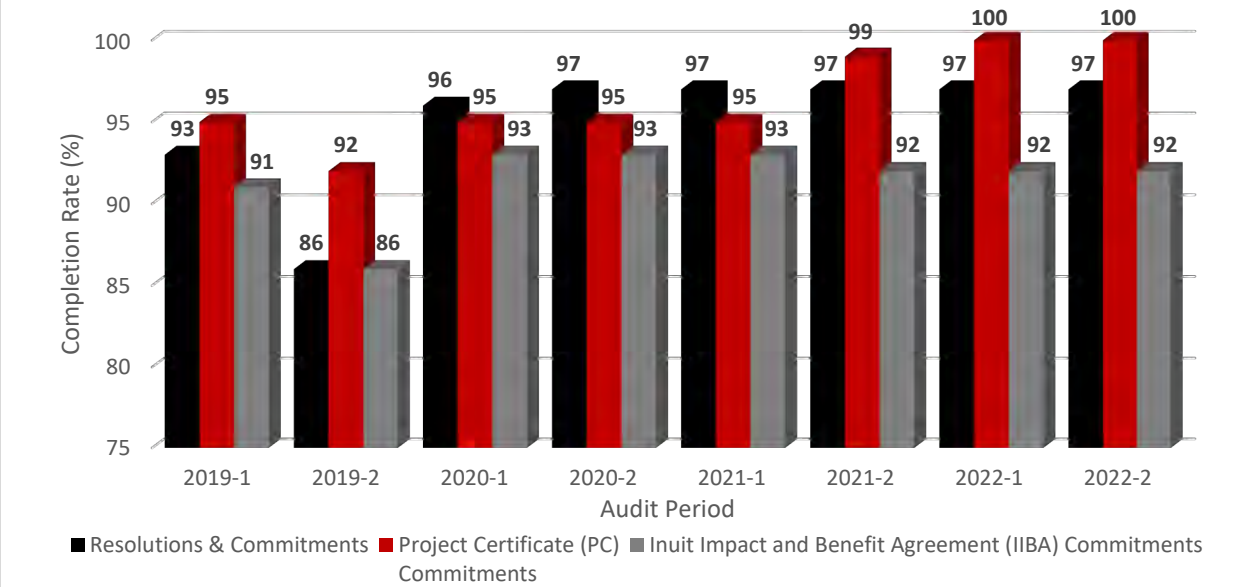

Figure 4.9: Baffinland's Audit Performance Year Over Year (2019-2022)

Note:
Audit period is defined by '-1' January 1 to June 30, or '-2' July 1 to December 31.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to execute the bi-annual audits required under Project Certificate Term and Condition No. 179(c) in 2023.

4.8.4 Transboundary Effects (PC Terms and Conditions 180 through 182)

Three (3) PC Terms and Conditions are related to the potential for transboundary effects. Baffinland's updates to these conditions are found below.

Project Certificate Term and 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	Not applicable
Reporting Requirement	To be developed following approval by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	2022 MEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ 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 in Inuktitut and English, and meeting minutes (draft and final versions in 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 2022.

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 Term and 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	Not applicable
Reporting Requirement	To be developed following approval by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	2022 MEWG Meeting Records
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ 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 2022.

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 Term and 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	Not applicable
Reporting Requirement	To be developed following approval by the Minister.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG)
Reference	Not applicable
Ref. Document Link	https://www.baffinland.com/operation/shipping-and-monitoring/

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 in place until after shipping has ended (typically set to provide data from July to October, inclusively). Baffinland will provide relevant ship route deviation reports to Makivik when required.

RESULTS

There were no changes to the ship route in 2022 that would be relevant to the Southern Shipping Route since the portion of the Project is not active. Baffinland did share through MEWG meeting slide decks and minutes that the slight deviation of the Northern Shipping Route near Bruce Head initiated in 2020 continues to be enforced.

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.

4.8.5 Verification of Project Monitoring and Mitigation for Potential Effects on Marine Mammals (PC Terms and Condition 183 through 189)

Seven (7) PC Terms and Conditions relate to project monitoring and mitigation of impacts specific to marine mammals. Four (4) of these Terms and Conditions were added to the Project Certificate in 2022 (Term and Condition No. 185 to 189) as a result of approval of Baffinland's production increase proposal renewal to allow for shipment of 6 Mtpa of ore through Milne Inlet until December 31, 2022. Baffinland's updates to these PC Terms and Conditions are provided in the pages that follow.

Project Certificate Term and 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	Not applicable
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. 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 No. 04 to the Project Certificate No. 005 and shall provide subsequent updates to the table every 6 months thereafter.
Status of PC Term and Condition	Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Northern Transportation Corridor (Milne Port) - In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG), Department of Fisheries and Oceans (DFO)
Reference	2022 Shipping and Marine Wildlife Management Plan (Baffinland, 2022g) 2022 Narwhal Adaptive Management Response Plan (Baffinland, 2022j) 2022 MEWG Meeting Minutes
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/ Appendix C.1 Appendix G.6.3

METHODS

Baffinland has regularly consulted with the, DFO, MEWG 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 recommendations received by the MEWG are recorded in meeting minutes as action items, which Baffinland must respond to. These meeting minutes are provided to the MEWG following each meeting, which happens on a frequency much greater than twice per year as required under Term and Condition No. 183.

Any new or modified/enhanced mitigation measures related to shipping or port operations are documented in Baffinland's Shipping and Marine Wildlife Management Plan (SMWMP; Appendix G.8.5; Baffinland, 2022g) and the Annual Marine Shipping and Vessel Management Report (Baffinland, 2022m).

Baffinland conducted engagements with several Parties throughout 2022, most of which are provided in Baffinland's 2022 Marine Shipping and Vessel Management Report (Baffinland, 2022m), and are as follows:

MEWG Communications (including DFO)

1. Provided the MEWG copies of all its 2021 Draft Marine Monitoring Program Reports on April 3rd, 2022, with comments requested back from the MEWG on May 27th, 2022.
2. Submitted to the Nunavut Impact Review Board (NIRB) its 2021 Annual Monitoring Report as of March 31st, 2022, with comments requested back from interested Parties on June 30th, 2022.
3. Held a meeting with the MEWG on May 3rd, 2022 to provide an opportunity for members to ask questions or address concerns related to the Draft 2021 Marine Monitoring Reports in advance of their written submissions. These draft reports were circulated to working group members a month prior on April 3rd, 2022. Distributed reports included: 2021 Bruce Head Shore-based Monitoring Program, 2021 Marine Mammal Aerial Survey, Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program, 2021 Ringed Seal Aerial Survey Report, Passive Acoustic Monitoring Program (Open-Water Season) Report, in addition to two final reports including Year 2 Freight Dock Offset Habitat Monitoring Report (submitted to DFO as part of *Fisheries Authorization* 18-HCAA-00160) and 2020 Passive Acoustic Monitoring Report.
4. Held a meeting with the MEWG on June 14th, 2022 to provide an update on proposed 2022 shipping activities, as well as marine monitoring programs. Three hours were allocated for this teleconference, which was extended to four (4) hours to allow for additional comment. Presentation materials were circulated to the MEWG on June 7th, 2022 in both English and Inuktitut.
5. Held a meeting with the MEWG on June 22nd, 2022 to provide a question and answer period related to the shipping update and proposed 2022 marine monitoring program presentations that were given on June 14th, 2022. Three hours were allocated for this teleconference, which was extended to four to allow for additional comment.

6. Held a meeting with the MEWG on June 29th, 2022 to provide an additional question and answer period related to the shipping update and proposed 2022 marine monitoring program presentations that were given on June 14th, 2022. Three hours were allocated for this teleconference.

Other Communications

7. WSP (formerly Golder Associates Ltd), Baffinland's marine consultants, reached out to the MHTO on April 27th, 2022 via email to discuss the development of a narwhal tagging program in partnership with the MHTO. This proposed program was intended to be a community-based monitoring program, but the MHTO did not support the program.
8. On May 10th, 2022, Baffinland responded to a letter submitted to the NIRB by the MHTO on May 6th, 2022.
9. On May 31st, 2022, Baffinland provided the MHTO with the letter that was submitted to the NIRB regarding the submission of Production Increase Proposal Renewal—refer to Attachment 1 in Appendix D of Appendix 1 in the Marine Shipping and Vessel Management Report (Baffinland, 2022m).
10. Baffinland had a phone call with the Igloolik Hunters and Trappers Organization on June 29th, 2022 to discuss the upcoming shipping season. Key points of conversation included proposed mitigation measures associated with the Proposal for Production Increase Renewal (PIPR), such as a reduction in vessel transits, a maximum of 80 vessels in a 6.0 Mtpa scenario, and ongoing dust management efforts.
11. Baffinland staff met with MHTO representatives and the Hamlet of Pond Inlet on July 4th, 2022 to discuss plans for the 2022 shipping season. As outlined in Section 4.2 of the Marine Shipping and Vessel Management Report to the NIRB (Baffinland, 2022m), no formal meeting was able to be held with the MHTO board as a group, however, Baffinland was able to engage independently with the MHTO Manager and Chairperson.
12. Hosted a radio show in Pond Inlet with a question and answer period on July 13th, 2022.
13. On August 4th, 2022, Baffinland held a meeting with the MEWG to discuss the 2022 Narwhal Adaptive Management Plan, inclusive of the Threshold Action Response Plan (TARP), as well as revisions being made to the ToR.
14. On September 23rd, 2022, Baffinland staff virtually met with two (2) representatives from Oceans North to better understand their comments on the draft MEWG ToR.
15. On October 13th, 2022, Baffinland virtually met with one representative from WWF Canada to better understand their comments on the draft MEWG ToR.
16. On December 2nd, 2022, Baffinland held a meeting with the MEWG to discuss: PIPR commitments relevant to the MEWG; Terms of Reference (ToR) revisions; the 2022 shipping season (i.e. no. vessels, mitigation measures, communications protocols); completed 2022 marine monitoring programs; final 2021 marine monitoring reports; and seabird research being conducted at Cape Graham Moore.

This is not an exhaustive list of all Baffinland engagements and does not include meeting requests that were rejected or left unacknowledged by external parties.

RESULTS

DFO has not issued any direction to Baffinland in furtherance of their mandate, for any avoidance or mitigation measures, including cessation of any activity, for the protection of the marine environment.

However, Baffinland regularly communicates with many parties and receives advice regarding monitoring and adaptive management for the protection of the marine environment.

Through these consultation efforts, Baffinland received at a high level, the following feedback regarding marine mammal mitigations from the MEWG and other interested Parties (Table 4.59).

Recognizing the value of the Eclipse Sound narwhal stock to the residents of Pond Inlet, and that there are unknown and/or unmitigated cumulative activities occurring in the Marine RSA that could have continued in 2022, Baffinland took a precautionary approach and added additional mitigations to its shipping activities in 2022.

Similarly, to 2021, the 2022 shipping season did not commence until a continuous path of 3/10ths or less ice concentration was available along the Northern Shipping Route. The mitigation measure delayed the commencement of the shipping season, eliminated icebreaking activities, and shortened the overall number of shipping days available to Baffinland in the 2022 season. Baffinland also committed to chartering no more than 80 ore carriers during the 2022 shipping season and introduced the use of vessel convoys as a method to reduce total sound exposure, which is further outlined below and in the 2022 Convoy Technical Memo (JASCO, 2022). Baffinland also continued to implement all other existing mitigation measures as described in Section 6 of the Shipping and Marine Wildlife Management Plan (Appendix G.8.5; Baffinland, 2022g) and summarized below.

Table 4.36: Summary Of Engagement Outcomes

Summary of Comment/ Recommendation	Baffinland Response / Outcomes
Recommendations from Hamlet of Pond Inlet, Parks Canada, DFO and QIA on enhancements to Baffinland's existing and proposed monitoring programs.	Baffinland has committed to working with these Parties further on the refinement of these programs (i.e. analysis of EWI monitoring at Bruce Head). Baffinland also reaffirmed the need for and importance of strengthened regional monitoring that will enhance Baffinland's ability to discriminate Project-related effects from other anthropogenic activities or environmental changes that could be affecting the Eclipse Sound narwhal stock. Baffinland has been corresponding with DFO regarding a potential collaborative marine mammal aerial survey during the 2023 shipping season.
Recommendations from MHTO to further reduce ship speed beyond the current commitment of 9 nm/h	Baffinland has directly contacted the affiliated shipping companies (Nordic, Oldendorff, Golden Ocean) to understand if it is possible to reduce speeds further than the current 9 nm/h speed limit. The general response is that even a reduction to 8 nm/h could not be implemented across the fleet, and the implications of doing it may not be desirable to the intent shared by the MHTO, some key points include: • Auxiliary Blowers: the lowest speed that most of the vessels can run at without the auxiliary blowers (used to flush air out of engine) cutting out is between 9-10 nm/h. Running at lower speeds of even 8 nm/h would require the auxiliary blowers to run non-stop, which they are not designed for, substantially increasing the risk of equipment failure.

Summary of Comment/ Recommendation	Baffinland Response / Outcomes
	• Engine Maintenance: Extended periods at 8 nm/h and below will see a build-up of engine/stack soot and accumulated cylinder oil in the exhaust system, which would require a daily speed increase to full power for 2-3 hours to clear exhaust passages. Without this, fouling of engine and turbochargers will occur, substantially increasing the risk of failures and creating the need for additional maintenance. • Safe Navigation: Even at 8 nm/h the vessels that serve Milne Port would be nearing an unsafe steering speed, which means at that speed or under vessel Captains can lose the ability to effectively maneuver their vessels. Removing the ability to maneuver/steer vessels as they transit through Eclipse Sound and Milne Inlet is not an option. • Longer Transits: The reduction in speed to 8 nm/h would also cause an increase in transit time of 3-4 hours for vessels as they transit from the entrance of Eclipse Sound to Milne Port. This would increase the time vessels and hunters would interact in the marine area.
Recommendations from MHTO to further reduce shipping	• Baffinland committed to decreasing the total number of vessel transits by a minimum of 15 per cent through the use of convoys. The reference value is what the total number of transits would have been in the 2022 season if vessels travelled individually. Additional details pertaining to convoys are included in the SMWMP (Baffinland, 2022g). Baffinland exceeded this target during the 2022 shipping season, with a 20% total reduction in the number of vessel transits through convoy implementation. Baffinland committed to allowing no more than 80 ore carriers enter the RSA under a 6.0 Mtpa scenario. This is 4 to 6 vessels less than what Baffinland had previously proposed for a 6.0 Mtpa scenario. Baffinland used a total of 62 ore carriers in 2022.
Recommendations from MHTO and Hamlet of Pond Inlet to eliminate all icebreaking activities from Baffinland's operational activities.	Baffinland committed to avoid icebreaking at the beginning of the 2022 shipping season. The trigger to begin shipping was a continuous path of 3/10ths ice concentrations between Baffin Bay and Milne Port. The icebreaker was still present throughout the season, however, it only served as a precaution at the beginning of the shipping season. Icebreaking was required at the end of the shipping season due to ice conditions. Baffinland continues to avoid breaking landfast ice.
Recommendations from MHTO and the community of Pond Inlet to discontinue the use of acoustic monitors in the RSA	• Baffinland did not redeploy the two acoustic recorders that overwintered in 2021/2022. These monitors were retrieved in August, 2022. • Baffinland did deploy a single acoustic recorder in August, 2022 approximately 2 km south of Bruce Head to satisfy the requests

Summary of Comment/ Recommendation	Baffinland Response / Outcomes
	received at the June 22nd and 29th MEWG meetings from both DFO and Oceans North to capture vessel convoys (outlined below).
Recommendations from Oceans North to continue acoustic monitoring in the RSA, to ensure that all vessel convoy combinations are captured during the 2022 shipping season. This acoustic monitoring will support the concept of using convoys to mitigate total sound exposure to marine mammals.	• Baffinland deployed a single acoustic monitor in August, 2022 approximately 2 km south of Bruce Head to ensure that a convoy without the Botnica (ice management vessel) is captured in the absence of icebreaking. Recordings of convoys from previous seasons occurred at the beginning of the shipping season and all included the Botnica.
Concerns from the MHTO that Baffinland did not include the results of their 2021 Marine Mammal Aerial Survey within the 2021 Annual Report to the NIRB.	• Baffinland responded to the MHTO letter on May 10th, 2022. • Baffinland clarified that due to the structure of the MEWG, all draft marine monitoring reports are reviewed by the MEWG prior to finalization. 2021 Draft Marine Monitoring Reports were circulated to the MEWG on April 3rd, 2022 for review. MEWG members were then given an opportunity to provide written comment on these reports, as well as engage in a teleconference meeting on May 3, 2022 to address questions/concerns in advance of the written submission deadline. The deadline to submit written comments to Baffinland on these reports was May 27th, 2022. Consequently, the final 2021 marine monitoring reports could not be appended to the 2021 NIRB Annual Report, which was submitted March 31st, 2022. Final reports are also publicly available on the Baffinland website.
Recommendations from the MHTO to include an MHTO representative on the marine mammal aerial surveys.	• Baffinland engaged with MHTO on July 6 and 11th, 2022 to request MHTO participation in Leg 2 of the 2022 Marine Mammal Aerial Survey, occurring August 9th to August 23rd, 2022. A response was not received. Baffinland will continue to correspond with MHTO regarding participation in future aerial studies.
On May 17th, 2022, the MHTO recommended that Baffinland abandon the proposed narwhal tagging program. MHTO voiced concerns about additional stress imposed on narwhals during their migratory stage through the use of tagging darts, as well as the proposed work being issued by Baffinland. MHTO stated that preference is given to DFO for any programs involving the tagging of marine mammals.	• Baffinland abandoned the proposed 2022 Narwhal Tagging Program.

Summary of Comment/ Recommendation	Baffinland Response / Outcomes
Recommendations from DFO that Baffinland develop a more robust zooplankton monitoring program.	• Baffinland's current zooplankton monitoring program involves both the use of settlement plates and vessel-based net tows. No comments have been received to date from DFO regarding a more robust form of monitoring.
The MEWG identified the need for additional meetings to discuss concerns related to the draft 2021 marine monitoring reports.	• Baffinland distributed copies of all of its draft 2021 marine monitoring programs to the MEWG on April 3rd, 2022. Comments were to be submitted by MEWG members on May 27th, 2022. Responses to all comments received were provided as an appendix to the final versions of these monitoring reports, which incorporated comments from the MEWG. Question and answer periods were also provided at the June 14th and December 2nd, 2022 MEWG meetings for members to ask questions related to the 2021 monitoring reports.
Recommendations from MHTO that community members be stationed at Ragged Island to observe anchored vessels. As stated in Section 4.2, there were concerns related to the discoloration of water near Ragged Island, which had been noted by local hunters.	• Baffinland confirmed with MHTO that no ballast water or grey water discharges occur at Ragged Island. Discolouration of the water may be the result of anchor wash from the vessel hawespipe. While stationing Inuit monitors at Ragged Island raises numerous health and safety concerns, Baffinland encourages community members to document any items of concern, including the location, date, and time of observation. Photos and video footage is encouraged and can be provided to Baffinland's shipping monitors via email (shipping@baffinland.com) or in person. All documentation will be reviewed by Sustainable Development Department representatives and a written response will be provided, as well as follow-up actions if required. While outside of this reporting period, this information was also shared at the February 2023 End of Shipping Season Meeting with the MHTO.
Multiple organizations from the MEWG recommended that the comment and response system for monitoring reports be revised to correspond with Annual Report dates.	• Baffinland has proposed two approaches to deal with monitoring reports as part of the updated Terms of Reference for the MEWG. The final ToR will reflect the approach selected for monitoring reports.
Various MEWG members had concerns related to convoys, including whether these convoys will minimize noise, what the maximum number of vessels per convoy will be, and what the approximate percentage of vessels travelling in convoy will be.	• Details were provided in the Convoy System Operational Guide, appended to the Marine Shipping and Vessel Management Report (Baffinland, 2022m).

Summary of Comment/ Recommendation	Baffinland Response / Outcomes
Recommendations from MHTO that QIA visit the community of Pond Inlet to document Inuit Qaujimajatuqangit related to the Mary River Project.	• QIA agreed to inform the MHTO of any upcoming consultations planned in the community of Pond Inlet and arrange future visits.
DFO requested additional clarification on which treatment types are specific to each vessel fleet.	• Baffinland provided an email summary on June 22nd, 2022, outlining the treatment type and make for each vessel company that would be calling to Milne Port throughout the 2022 season.
Recommendations from the Ikajutit (Arctic Bay) Hunters and Trappers Association (IHTA) that members be included in future programs and that hard copies be provided of reports in addition to USB and/or links being provided.	• Baffinland will engage with the IHTA to ensure that members are included in future marine monitoring programs. USB sticks with all historical Baffinland reports from 2015-2021 were provided to the HTA and Hamlet of Arctic Bay during a December 2022 visit.

All vessels are instructed to follow the nominal shipping route to the fullest extent possible, however at the start and end of the shipping season there may be a need for slight deviations from the nominal route to avoid interactions with ice. Any notable deviations will be communicated to hunters on the water and in the communities via the Baffinland's Shipping Monitors. A deviation report is created for all vessels that deviate more than one (1) nm from the shipping route, which indicates rationale for the deviation, and allows the Port Captain to communicate with the vessel captain regarding follow-up actions. In all cases vessels will continue to be instructed to avoid Koluktoo Bay, the western shoreline near Bruce Head and ten (10) Km from the shoreline of Pond Inlet to minimize effects on marine mammals and interference with hunting activities.

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

A detailed description of mitigations for minimizing Project-related activities on marine mammals are available for review in Baffinland's Shipping and Marine Wildlife Management. Table 4.60 summarizes these mitigations.

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

Table 4.37: 2022 Mitigation Measures For Marine Mammals

Project Activity	Mitigation Measure(s)	Species
Vessel traffic to/from Milne Port	• Maintain constant speed and course when possible. • Reduce vessel speed to 9 knots. • Reduce vessel idling • No more than 3 ore carriers anchoring at Ragged Island and/or drifting in Eclipse Sound. Drifting to be avoided unless warranted for safety reasons. • No icebreaking to commence the 2022 shipping season. Ore carriers will not begin their transit to Milne Port until 3/10ths or less ice is present along the entire shipping route through the Nunavut Settlement Area (NSA) from the entrance of Eclipse Sound and Milne Port. • No breaking of landfast ice will occur in the spring or fall shoulder season. • When marine mammals appear to be trapped or disturbed by Project vessel movements, the vessel will implement appropriate measures to mitigate disturbance, including stoppage of movement until wildlife move away from the immediate area (as safe navigation allows). • All Project vessels will be provided with standard instructions to operate their vessel in a manner that avoids separating an individual member(s) of a group of marine mammals from other members of the group; • All Project vessels will be provided with standard instructions to not approach within 300 m of a walrus or polar bear observed on sea ice; • Vessels awaiting instructions from the Port Captain to enter the RSA will be instructed to wait in Baffin Bay at least 40 km east of the Nunavut Settlement Area. • No more than 80 ore carriers will be chartered during the 2022 season to transport up to 6 Mtpa, pending approval. This is six (6) ore carriers less than the maximum anticipated and approved in the previous Production Increase Proposal and Extension Request. • Use of convoys throughout the 2022 season to further reduce total sound exposure. Acoustic monitoring data indicates that if ore carriers transit in convoys with inter-vessel separation less than 10 Km, there is an overall reduction of the total sound exposure in the Regional Study Area (RSA) compared to multiple individual transits of an equivalent number of vessels. Slight	Ringed Seal, Bearded Seal, Walrus, Beluga, Narwhal, Bowhead Whale, Polar Bear

Project Activity	Mitigation Measure(s)	Species
	increases of instantaneous sound levels in the regions between the vessels are compensated for by shorter exposure duration, resulting in a net decrease of noise exposure. Baffinland proposes to target a 15% reduction in overall independent one way transits by implementing convoys, which effectively combines individual transits into single 'effective transits'. **2022 Narwhal Adaptive Management Response Mitigations:** • Use of convoys throughout the 2022 season to further reduce total sound exposure. Acoustic monitoring data indicates that if ore carriers transit in convoys with inter-vessel separation less than 10 Km, there is an overall reduction of the total sound exposure in the Regional Study Area compared to multiple individual transits of an equivalent number of vessels. Slight increases of instantaneous sound levels in the regions between the vessels are compensated for by shorter exposure duration, resulting in a net decrease of noise exposure (JASCO, 2022). Baffinland proposes to target a 15% reduction in overall independent one way transits by implementing convoys, which effectively combines individual transits into single 'effective transits'.	

TRENDS

The MEWG including DFO has successfully provided input into the Baffinland annual marine monitoring programs and shipping related mitigation measures.

DFO has not provided any directions to Baffinland with respect to Terms and Conditions No. 183. 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".

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to work with the MEWG to review and guide marine monitoring programs and shipping mitigation and management strategies on an annual basis. These will be reported through MEWG meetings, the annual Marine Shipping and Vessel Management Report to the NIRB, and annual year end reporting to the NIRB. Where monitoring indicates the need for adaptive management, Baffinland will provide additional reporting to remain transparent and accountable. These venues more than satisfy the twice per year requirement of the term and condition, as written.

Project Certificate Term and 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 Environmental 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	Not applicable
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.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	Marine Environment Working Group (MEWG), Department of Fisheries and Oceans (DFO)
Reference	Not applicable
Ref. Document Link	https://www.baffinland.com/media-centre/document-portal/

METHODS

Refer to summary for PC Term and Condition No. 77, 179(c) and 183.

RESULTS

Refer to summary for PC Term and Condition No. 77, 179(c) and 183.

TRENDS

Refer to summary for PC Term and Condition No. 77, 179(c) and 183.

RECOMMENDATIONS / LESSONS LEARNED

Refer to summary for PC Term and Condition No. 77, 179(c) and 183.

Project Certificate Term and Condition No. 185

Category	General
Responsible Parties	The Proponent, Nunavut Impact Review Board, Qikiqtani Inuit Association, Mittimatalik Hunters and Trappers Organization, Hamlet of Pond Inlet
Project Phase(s)	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To provide certainty and predictable timelines for shipping for the project, and to better define criteria for the commencement and closing of the shipping season. Certainty and predictability will increase safety for traditional use of sea ice, and mitigate impacts to marine wildlife.
Term or Condition	All project related shipping associated with the Northern Shipping Route shall observe the following conditions, subject to the variances and/or exceptions below: 1. The Proponent must avoid breaking landfast ice at all times during the shipping season. 2. The Proponent shall confirm a continuous path of 3/10th ice concentrations along the Northern Shipping route is available prior to commencement of the shipping season. 3. The Proponent is required to plan for and cease all shipping from Milne Port by October 31. The Proponent may proceed with a variance to condition (b) above, or under exceptional circumstances that may occur from time to time seek an exception to condition (c). Variances and exceptional circumstances require the direct engagement of Qikiqtani Inuit Association (QIA), as well as the written confirmations obtained from the Hamlet of Pond Inlet, the Mittimatalik HTO (MHTO) and QIA as described below. Examples of a variance may include: sea ice coverage changing from 3/10th or less to greater than 3/10th due to changes in environmental conditions such as wind, or a generally later forecast for ice break up. Exceptional circumstances include events that are unforeseen and occur outside of Baffinland's control but will not include contingencies that the Proponent should reasonably have planned for. Examples of unforeseen events may include: a breakdown in loading equipment, weather disruptions to shipping schedules, or a later than expected ice break up past July 15. In the event a need for variance or an exceptional circumstance arises, the Proponent is required to provide a detailed written description to the NIRB, QIA, Hamlet of Pond Inlet and MHTO clearly demonstrating how it will meet each of the following criteria before continuing with operations: 1. a description of the rationale for variation or exceptional circumstances and anticipated duration of the extended shipping season; • a description as to whether the anticipated ice conditions during the shipping period are consistent with Appendix B commitments and the Shipping and Marine Wildlife Management Plan; • a description confirming that shipping will proceed in full compliance with all Project Certificate Terms and Conditions and Appendix B commitments (including but not limited to the 6 Mtpa limits described in PC Terms and Conditions No. 179(a) and (b) and the requirement not to break landfast ice);

	• a description of any additional mitigation or monitoring efforts being undertaken as a result of the variation or exceptional circumstance; 2. a description of how the Proponent has made best efforts to meet with the Hamlet, MHTO and the QIA to discuss and consider the variation or exceptional circumstance; 3. copies of all public communications relating to the variation or exceptional circumstance; and 4. written confirmation (or evidence of verbal confirmation) from the Hamlet and the MHTO that sea ice overlapping the shipping route is not being used for travel or harvesting by harvesters or community members, and that the proposed shipping activity will not result in additional safety risks to hunters or the community that cannot be mitigated, for instance, by transiting through a path of less consolidated ice in Eclipse Sound and Milne Inlet The Qikiqtani Inuit Association, Hamlet of Pond Inlet and Mittimatalik Hunters and Trappers (MHTO) agree to review and respond to requests of the Proponent within a reasonable timeframe that will not unduly delay shipping activities. The Proponent is required to review and respond to items raised by QIA, Hamlet of Pond Inlet and MHTO including requested changes to monitoring, mitigation and compensation associated with the variance or exceptional circumstance. All determinations related to variances and exceptional circumstances will be communicated to NIRB. For greater clarity, this condition applies to all ships supporting the Mary River Project including ore carriers and supply ships.
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	Proponent to report annually on commencement and closing of shipping season. Proponent will include conditions leading to decisions to commence and cease shipping for the year.
Status of PC Term and Condition	Southern Transportation Corridor (Steensby Port) – Not Active Northern Transportation Corridor (Milne Port) – Active
Status of Compliance	Southern Transportation Corridor (Steensby Port) – Not Applicable Northern Transportation Corridor (Milne Port) – In Compliance
Stakeholder Review	Mittimatalik Hunters and Trappers Organization, Qikiqtani Inuit Association, Hamlet of Pond Inlet
Reference	2022 Shipping and Marine Wildlife Management Plan (Baffinland, 2022g) 2022 Shipping Season Meeting Records
Ref. Document Link	Appendix B.2.2

METHODS

Several mitigation measures, 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 are identified in Baffinland's Shipping and Marine Wildlife Management Plan (Appendix G.8.5; Baffinland, 2022g). This includes:

- Avoidance of breaking landfast ice at all times during the shipping season.
- Confirmation of a continuous path of 3/10th ice concentrations along the Northern Shipping route is available prior to commencement of the shipping season.

- Plan for and cease all shipping from Milne Port by October 31.

Baffinland has also developed an internal communications protocol that summarizes the need for a confirmation by the Mittimatalik Hunters and Trappers Organization (MHTO) or the Hamlet of Pond Inlet that the floe edge has been closed to hunters, though noting that no floe edge remains when ice concentrations have degraded to 3/10ths or less this is no longer a necessity.

RESULTS

In 2022, a verbal confirmation of closure of the floe edge was provided to Baffinland on July 10, 2022, 20 days prior to the start of Baffinland's shipping operations.

Baffinland avoided all landfast ice and concentrations of 3/10ths and greater before starting the 2022 shipping season (Appendix G.8.5). Baffinland commenced shipping on July 30, 2022 once it was confirmed via an ice analyst that ice concentrations met the requirements of Term and Condition No. 185 (Appendices B.2.2). A combination of methods was used to provide this confirmation, including review of satellite imagery and aerial survey photos acquired on July 30.

Baffinland ended its shipping operations earlier than expected on October 13, 2022, 18 days earlier than anticipated.

TRENDS

Not applicable

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to implement its Shipping and Marine Wildlife Management Plan which is consistent with this Term and Condition and which stipulates that start of shipping be delayed until a continuous path of no greater than 3/10ths ice exists along the Northern Shipping Route, that it will cease its shipping activities no later than October 31 on every calendar year, and at all times shipping through landfast ice will be avoided.

Project Certificate Term and Condition No. 186

Category	Terrestrial Environment – Hunters' Access Route(s)
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To establish a safe access route for hunters to travel within the project area thereby reducing the shared use of the Milne Inlet Tote Road.
Term or Condition	The proponent is required to construct and maintain hunters access route(s) in and around the Milne Inlet Tote Road. The specific location of hunters' access route(s) shall be confirmed based upon input from the Mittimatalik Hunters and Trappers Organization and the Qikiqtani Inuit Association. The responsible parties shall also develop and jointly approve an Access Route Operations and Maintenance Procedure and/or Plan.
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	All hunters' access route(s) developed under this section and a summary of related engagement activities are to be reported in the proponent's annual monitoring report.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	QIA, MHTO
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

Baffinland has continued to work with the MHTO to advance the proposed trail modification adjacent to the Project Area along the Milne Inlet Tote Road at KM 13. This proposed work is what prompted the development of this term and condition between Baffinland and the QIA. This item was most recently discussed between Baffinland and the MHTO in Pond Inlet on February 17, 2023. Based on that engagement, Baffinland understands the MHTO's preference remains to modify a section of trail on the opposite side of Phillips Creek from where the Tote Road exists, in an area outside the Commercial Lease. This work requires a Land Use Permit from Crown Indigenous Relations and Northern Affairs Canada (CIRNAC), which requires a detailed description of the proposed works, including a precise trail alignment. To ensure the trail is constructed as envisioned, and to ensure all requisite permits are in place, Baffinland has requested the MHTO provide the GPS coordinates of the route. Following the last engagement, the MHTO requested Baffinland send a formal request asking for the coordinates and offering to pay honorarium for the work to be completed, which Baffinland provided on March 30, 2023. On April 12, 2023, follow-up correspondence was sent to the MHTO inquiring on the status of the individual selected to do the GPS track. At the time of this submission, no further information has been provided by the MHTO, i.e. no individual has been identified by the MHTO to date to complete this work.

Baffinland has developed a draft Access Route Operations and Maintenance Procedure and will provide it to the MHTO and the Qikiqtani Inuit Association (QIA) before it is finalized. The draft Procedure outlines a process whereby members of the MHTO can identify the need for a modified or new trail in areas adjacent to and/or over project

infrastructure for MHTO Board consideration, how the Board can refer to works to Baffinland, how Baffinland will evaluate the feasibility of the proposed works and respond to the MHTO, and how Baffinland and the MHTO will implement the proposed works. Baffinland, the QIA and the MHTO must jointly approve the Procedure before it is finalized. Once the process is complete Baffinland will provide a copy to the NIRB.

RESULTS

At the time of this submission, no further information has been provided by the MHTO, and no individual has been identified by the MHTO to complete this work.

TRENDS

Not applicable

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to coordinate with the MHTO and QIA in furtherance of this commitment and construction activity.

Project Certificate Term and Condition No. 187

Category	Terrestrial Environment – Dust Audit
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To consistently assess and monitor impacts of dust from project activities for the purpose of assessing the efficacy of project mitigation measures and to examine alternative mitigation and management options.
Term or Condition	The Proponent is required to resource an annual audit of dust impacts and mitigations associated with project activities to be completed by a third party acceptable to the responsible parties. The dust audit shall evaluate effectiveness of current measures and if necessary, contain recommendations and options to reduce the spread and impacts of dust from project activities.
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	Each year a dust audit shall be completed and shared with NIRB by the Proponent not later than January 31st.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	North Baffin Hamlets and HTO's; Qikiqtani Inuit Association
Reference	Baffinland Dust Audit Report – Final Recommendations Report (Nunami Stantec, 2023.)
Ref. Document Link	Not applicable

METHODS

Formation of Dust Audit Committee

In June 2021, Baffinland submitted a Notice and Request to five (5) North Baffin communities of Arctic Bay, Clyde River, Igloolik, Pond Inlet, and Sanirajak regarding a commitment to the Nunavut Impact Review Board (NIRB) to resolve outstanding issues with the Phase 2 Proposal identified by the Pond Inlet Hamlet Council, including dust-related issues. The Dust Audit Committee was formed in response to a commitment outlined in Appendix C – Final Table of Post Phase 2 Approval/Regulatory Phase Commitments for the Mary River Project Phase 2 Proposal issued on January 24, 2022. This commitment was later integrated into Amendment No. 04 to Project Certificate No. 005 as Term and Condition No. 187, which allowed for the operation to continue at a transportation rate of 6 million tonnes per annum (Mtpa) for 2022 (NIRB, 2022a).

Baffinland contracted Nunami Stantec to conduct a third-party audit involving the five (5) Inuit communities on North Baffin to identify the greatest sources of fugitive dust at the Mary River Mine and any modifications or controls that could effectively reduce the generation or spread of dust.

The Dust Audit Committee is comprised of nominated representatives from the hamlets and their Hunter and Trappers' associations including Arctic Bay, Clyde River, Igloolik, Pond Inlet, and Sanirajak, as well as representatives

from the Qikiqtani Inuit Association (QIA), and facilitators and engineering subject matter experts from Nunami Stantec and CWA Engineers Inc. (CWA).

Final Recommendation Report

The final report provides a summative analysis and final recommendations based on information collected through the various tasks completed by the Dust Audit Committee (Section 4 of the Dust Audit Report; Nunami Stantec, 2023) and includes a review of existing reports and documents provided by Baffinland to identify current processes as related to recommendations, mitigations, and observations (Section 5 of the Dust Audit Report; Nunami Stantec, 2023). The Dust Audit Committee focuses specifically on dust, dust sources, and dust mitigations as defined through Baffinland's NIRB commitments.

The objectives and deliverables of the Dust Audit were established in alignment with the commitment from Baffinland and through collaborative discussions with the Dust Audit Committee. The study was facilitated by Nunami Stantec, involving engagement specialists and engineers and supported by CWA Engineers Inc. (CWA). The methodology used to develop recommendations included discussions on key components of dust and dust sources, such as:

- Known current sources of dust
- Known and current mitigations for dust suppression at the Mine Site, Milne Port, and the Tote Road on which ore is hauled from the mine to the port.
- Potential future sources of dust
- Harvested species or resources impacted by dust
- Timing or seasons for harvesting that are impacted by dust (if applicable)
- Changes to land access due to perceived impacts of dust

The methodology considers Baffinland's commitment to identify present and future sources of dust and mitigations, to ensure proper dust controls are in place, and the approach to include Inuit Qaujimajatuqangit (IQ) in understanding and recording recommendations of the Dust Audit Committee.

Questions or recommendations that were raised and out of scope of the Dust Audit Committee have been documented and provided to Baffinland for their follow up and are tracked in Appendix D of the Dust Audit Report (Nunami Stantec, 2023).

Data was collected through the field trips, bi-weekly meetings of the Dust Committee, and technical research conducted by Nunami Stantec and CWA. During community interviews and workshops, an overview of the Project and the purpose and goals of the study was presented to the Committee members by Nunami Stantec facilitators at the start of the interviews and workshops in order to obtain informed consent. Study participants were asked to sign consent forms or to provide oral consent prior to participating in the sessions (see Appendix B of the Dust Audit Report; Nunami Stantec, 2023))

All interviews were recorded, and notes were taken with names associated with each statement to allow for redaction of information from the produced reports, however no names or identifying language are used in the quotes and information outlined below. Photographs were taken while at site by the Dust Audit Committee as well as additional photographs provided by several members of the committee members taken outside of the site visits.

Recommendations put forward in this report were reviewed and endorsed by the Dust Audit Committee with the understanding that further dialogue will continue in the future.

RESULTS

The recommendations contained in the Baffinland Dust Audit Report – Final Recommendations Report are provided in Table 4.61 below. In March 2023 Baffinland provided its preliminary response to the Dust Audit Committee, indicating how Baffinland proposes to proceed with respect to each mitigation. These recommendations and our responses continue to be discussed and informed by the Dust Audit Committee.

Table 4.38: Dust Audit Committee Final Report Recommendations

Topic	Summary of Dust Audit Committee Recommendations
Blasting	Work with explosives supplier and Subject Matter Experts (SME) to identify dust control measures during the blasting process and to refine blasting protocols to reduce dust and nitrogen oxide (NOx) fumes for implementation.
Blasting	Continue conversations with the Dust Audit Committee regarding ground surface winds during the new moon to integrate IQ into the program under development regarding conditions of high-risk dust dispersion and to determine conditions where additional mitigations to reduce dust can be implemented or, where outlined by the wind thresholds report, blasting may be delayed or rescheduled until wind speeds are within identified thresholds.
Blasting	Conduct a blast fragmentation size study with explosive supplier and blasting specialists that can be incorporated into the program under develop regarding conditions of high-risk dust dispersion.
Blasting	Update draft explosives management plan once the explosive suppliers and SME's have determined the blasting protocols to develop a Standard Operating Procedure (SoP) for blasting.
Material Handling	Conduct a run-of-mine (ROM) optimization study to assess the viability of implementing the following processes to be considered for current and future expansion, including Steensby: • Using a ROM dump pocket • Minimizing the use of front-end loaders (FEL) at the ore pad and the port • Use of enclosures to collect and minimize dust. • Increasing the use of conveyors and transfer chutes • Using luffing stackers to reduce drop height when forming stockpiles • Cover hoppers when loading conveyors, crushers, or screens • Load or unload B-Trains within an enclosed area
Dust Suppression Technology	Conduct a study to assess the amount of watering and road maintenance equipment will required for current and future operations.
Dust Suppression Technology	Research the viability of applying sea water on the haul roads and Tote Road, due to the lower freezing point, if Baffinland considers applying water exclusively as dust suppression.
Dust Suppression Technology	Develop a SoP on dust suppression products that includes procedures for the application on and the ongoing maintenance of the active mine haul roads.
Dust Suppression Technology	Conduct a study on dust suppressants for utilization on ore that is loaded onto the B-train trucks, instead of covers due to challenges of Arctic winter conditions. The study

Topic	Summary of Dust Audit Committee Recommendations
	should also examine which is the most effective dust suppressant for the Arctic weather conditions (liquid or dry).
Dust Suppression Technology	Analyze aircraft approved dust suppression products for use on the runway. Approved products for runway use should be incorporated into the SOP on dust suppression.
Dust Suppression Technology	Examine the use of wind fences around dust generating infrastructure and complete a feasibility study to determine how to use wind fencing most effectively at both the mine site and the port site, taking into consideration Arctic weather conditions.
Dust Suppression Technology	Explore options to implement a continuous site wide dust monitoring system, for Artic conditions, to track the effectiveness of implemented dust mitigations.
Dust fall Monitoring	Install additional passive monitors at a greater distance from the mine to capture the broader regional impacts of dust, including up and down wind of prevailing winds.
Dust Audit Committee	Request: • Ongoing funding of the Dust Audit Committee. • Provision of documents in both English and Inuktitut through accessible means. • A transparent process of providing data obtained through ongoing studies conducted by Baffinland, the Terrestrial Environment Working Group and the Marine Environment Working Group. • Establish a virtual monitoring website that is accessible to the five Northern communities.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland intends to continue to maintain the Dust Audit Committee in support of the annual dust audit required of Term and Condition No. 187. Updates with respect to the implementation of recommendations contained within the Final Recommendations Report will be provided to the NIRB annually and on an as needed basis. Baffinland will encourage community participants to the Dust Audit Committee to communicate what they contribute to and learn from these engagements. Baffinland will include frequent updates on dust mitigation and monitoring, inclusive of the progress towards meetings the recommendations of the Dust Audit Committee in public engagements, working group meetings, and other regulatory processes.

Project Certificate Term and Condition No. 188

Category	Terrestrial Environment – High Risk Conditions for Dust Dispersion
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	To establish a program to identify high risk conditions for dust dispersal, and a plan for additional measures to be taken at the times the conditions are present, which may include the use of additional dust suppression and operational staged decreases in dust generating site activities. Baffinland, working with the TEWG will establish site specific thresholds for conditions that may increase dust dispersion (i.e., wind speed), and corresponding mitigations to implement when thresholds are met.
Term or Condition	The Proponent working with the TEWG is required to develop a program for identification of conditions with high risk for dust dispersal and plan for additional mitigation measures that shall be applied at the times the conditions are present. The program shall also include the use of dust suppressants.
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	The program shall be developed and implemented with the advice of the TEWG not later than December 31, 2022 with annual reports on implementation and any modifications to this plan presented through annual reporting.
Status of PC Term and Condition	Active
Status of Compliance	In Progress
Stakeholder Review	Not applicable
Reference	Not applicable
Ref. Document Link	Not applicable

METHODS

Baffinland has commenced work to create a program to identify high risk conditions for dust dispersal. The first step in this program is to establish a monitoring program to collect data to enable thresholds to be developed against 'high risk conditions'. This involves monitoring dust sources and confounding factors such as wind speed and precipitation to develop specific thresholds by area or activity. Once these thresholds are established, high risk conditions will be selected and a plan developed for additional measures to be taken at the times the conditions are present, including additional dust suppression or operational staged decreases in dust generating site activities.

RESULTS

Baffinland has presented the preliminary plan to QIA and the TEWG at the February 2023 working group meeting. Baffinland is committed to continue to work with all parties to develop the monitoring program.

TRENDS

Not applicable

RECOMMENDATIONS / LESSONS LEARNED

Baffinland will continue to provide updates on the progress for this program development to the NIRB, QIA and the TEWG. Baffinland will collect the required data to develop the thresholds throughout 2023 and have a draft plan for QIA and the TEWG by December 15, 2023.

Project Certificate Term and Condition No. 189

Category	General
Responsible Parties	The Proponent
Project Phase(s)	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective	There is a need to ensure that Proponent commitments which are made on the public record but not recorded in Project Certificate Terms and Conditions are carried out as agreed to. An interim Project Monitor, appointed on agreement of the Responsible Parties, will review and report on a bi-annual (twice yearly) basis regarding the Proponent's performance of Project Certificate Terms and Conditions and the Proponent commitments listed in Appendix B to this Project Certificate No. 005.
Term or Condition	The Proponent is to carry out all commitments listed in Appendix B to this Project Certificate No. 005. Performance of these commitments will be evaluated by an interim Project Monitor appointed on agreement of the Responsible Parties. Where the Proponent has not carried out a commitment the Proponent is required to provide a detailed written description to the NIRB, clearly explaining why they were unable to carry out the condition and how it will meet the condition going forward.
Relevant Baffinland Commitment	Not applicable
Reporting Requirement	Reports including the findings of the interim Project Monitor shall be provided to NIRB no later than March 31st and September 30th of each calendar year.
Status of PC Term and Condition	Active
Status of Compliance	In Compliance
Stakeholder Review	QIA; Government of Canada
Reference	Mary River Project Certificate 005 Appendix B Commitments, Interim Status Update (Baffinland, 2023j)
Ref. Document Link	Not applicable

METHODS

The first interim status update on efforts to implement the commitments contained within Appendix B of Project Certificate No. 005 was jointly developed by Baffinland and the QIA and submitted to the NIRB on March 31, 2023 (Baffinland, 2023j) and is attached as Appendix F.2. The report included a summary table that provided a current status update for each commitment, a designation of compliance (In Compliance or Not) and a qualifier (Complete, In Progress).

RESULTS

Significant progress has been made since the amended Project Certificate was issued on November 4, 2022. Currently, 16 of the Appendix B commitments are now "Complete" while 60 are "In Progress" and only one (1) remains "On Hold". This reflects the understanding at the time the commitments were added to the Project Certificate that the majority of them would require development and implementation beyond 2022. We will continue to report regularly to the NIRB as the status of progress advances in order to support transparency and understanding that commitments made during the Production Increase Proposal Renewal (PIPR) NIRB process

during 2022 are being implemented by Baffinland and QIA. Should the NIRB require supporting documentation in relation to any of the items in the attached table, we would be pleased to provide it.

TRENDS

Not applicable.

RECOMMENDATIONS / LESSONS LEARNED

Baffinland continues to work with the QIA and Government of Canada to identify an Interim Project Monitor that satisfies the intent of Term and Condition No. 189. At the same time, the three parties are also working to develop a permanent Project Monitor role, as directed in the Minister's approval of the PIPR, and in a capacity that addresses the community's interests through direct engagement.

Since November 2022, Baffinland, QIA and CIRNAC/Canada have had multiple engagements on the topic of the Interim Project Monitor and are satisfied that significant progress is being made towards an appointment. A further status report on this initiative will be provided to the NIRB in the coming months.

5 NIRB CORRESPONDENCE

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 PC 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 PC 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 *Nunavut Planning and Project Assessment Act* (*NuPPAA;* NIRB, 2021b,2021c; NIRB Registry No. 336741.).

In 2022, NIRB conducted two (2) in-person site inspections at both the Mine Site and Milne Port, which took place on the following days:

- June 13 to 16, 2022, and;
- August 23 to 25.

Upon completion of the 2022 site visits, NIRB Monitoring Officers met with Baffinland staff to discuss observations noted during the site visit. These meetings 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 June 2022 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, 2022g; NIRB Registry No. 341416). Several improvements were also noted by NIRB staff across the Project area during the June visit, including:

- The Waste Rock Storage Facility has a new water treatment plant building which is now a permanent structure and easier to maintain through the seasons;
- The completed fence and gate around the landfill and the newly constructed landfarm at the Mine Site; and
- The construction of a new water run-off dam at the base of Deposit No. 1 to help settle and treat contact water from the deposit.

No dust concerns were observed at the Crusher Facility during the June 2022 site visit and NIRB Monitoring Officers noted that NIRB staff have observed the effectiveness of hoods, shrouds, and bellows to reduce the dust emission from the Crusher Facility, when they are properly installed.

NIRB staff also identified some minor issues related to dust emissions and water management which required follow-up actions from Baffinland, During the inspection of Milne Port, NIRB Monitoring Officers observed dust accumulation along the sea ice near the ore stockpiles and noted that there appears to be continued release of dust while the stockpile is being built using the conveyor. As such, NIRB staff encouraged Baffinland to continue exploring mitigation options to reduce dust produced from this source. Due to the timing of the site visit during freshet,

Monitoring Officers also observed ongoing water management challenges along the Tore Road, Ore Haul Road to Deposit No. 1, and more generally across site during the June inspection. Baffinland committed to provide the Board with follow-up photos, labelled with estimated number of hours since the closure, to show the improved road conditions and demonstrate the effects on operations and the amount of time it takes to return the road to safe conditions.

Following NIRB's completion of the August 2022 site visit, NIRB staff identified two (2) minor issues related to debris which required follow up action from Baffinland, and requested information related to specific areas of the operation to support the in-person site inspection. Baffinland provided a follow-up report on September 12, 2022, to NIRB addressing the Monitoring Officers' observations and requests.

A summary of the conclusions from these monitoring inspections, in addition to general performance related to the PC No. 005 is also provided in the 2021 to 2022 NIRB Annual Monitoring Report and the Board Recommendations report (NIRB, 2022f; NIRB Registry No. 342276), further described below.

5.2 COMMENTS ON THE 2021 ANNUAL REPORT TO THE NIRB

Baffinland submitted its 2021 Annual Monitoring Report (the 2021 Annual Report; Baffinland, 2022a; NIRB Registry No. 338435).to the NIRB on April 1, 2022. The NIRB subsequently sent a notification to its Mary River Distribution List on April 12, 2022 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 Friday, May 27, 2022. On May 6, 2022 the MHTO sent a letter to the NIRB with specific concerns. Baffinland subsequently provided a response to the MHTO on May 10, 2022. Shortly after, the NIRB responded to the MHTO on May 17, 2022. Following requests from various parties to delay the comment submission deadline, the deadline for reviewers to provide comments was extended by the NIRB until to June 30, 2022.

Subsequently, between June 29 and June 30, 2022, the NIRB provided Baffinland with comments submitted by Qikiqtani Inuit Association (QIA), Government toff Nunavut (GN), Crown Indigenous Relations and Northern Affairs Canada (CIRNAC), Fisheries and Oceans Canada (DFO), Environment and Climate Change Canada (ECCC), Parks Canada (PCa), Transport Canada (TC) and Oceans North (ON) on its 2021 Annual Report. On July 5, the NIRB requested that Baffinland provide a response to reviewer comments to the NIRB by August 5, 2022.

In Baffinland's response to the NIRB regarding comments received on the 2021 Annual Report, Baffinland provided itemized responses to 148 comments received, where applicable, from QIA (106), GN (4), CIRNAC (10), ECCC (10), DFO (7), PCa (5), ON (3), and TC (3) (Baffinland 2022n; NIRB Registry No. 341226). As part of its responses to reviewer comments, Baffinland also provided the following considerations to NIRB in light of comments received:

- Comments from the GN included those based on a review of the 2021 Terrestrial Environment Annual Monitoring Report, but not included as part of Baffinland's Annual Report to the NIRB. These comments were related to the effectiveness of Height of Land (HOL) surveys and snow track surveys in determining caribou interactions with the Project; emerging trends within lichen-metal concentrations; helicopter overflight requirements and acceptable rationale for low-level flights; and whether 0.5 m passive dustfall canisters effectively capture dust at the ground level.
- Several comments from PCa and DFO relate to the effectiveness of the Early Warning Indicator (EWI) currently in place for the marine monitoring programs, which is the change in the proportion of immature narwhal relative to the observed population. These organizations recommend developing additional EWIs

to support the marine monitoring programs and stress that a robust and effective EWI program can help compensate for uncertainties in the impact assessment. While the aforementioned EWI is the only formal EWI in place at this time, Baffinland does use multiple performance indicators to monitor for the potential effects of shipping on narwhal within the Regional Study Area (RSA). These performance indicators are outlined in the Marine Monitoring Plan (Baffinland, 2021l), which was revised following this reporting period in Q2 of 2023 to ensure that it is relevant to both the current operation and Sustaining Operations Proposal (SOP). In addition to the formal EWI, a decrease in stock abundance, change in relative abundance, and a change in surface or dive behaviour are all used as performance indicators for the Marine Mammal Aerial Survey Program and Bruce Head Shore-based Monitoring Program. Baffinland recognizes that dive behaviour cannot be monitored without a tagging program. The MHTO did not offer support for this program in the 2022 field season. Further discussions around this topic took place at the February 2023 MEWG meetings, following this reporting period. The MHTO expressed that a tagging program would be supported if ran by DFO rather than Baffinland. Subsequently, DFO indicated that support from Baffinland would be preferable should this program take place. Baffinland will continue to endeavour for a tagging program to allow for effective use of these performance indicators. Additionally, Baffinland intends to engage the MEWG in discussions related to the EWIs once the most recent draft of the Marine Monitoring Plan has been reviewed by members. If parties cannot come to an agreement on the establishment of new EWIs, Baffinland will explore alternative options, including the formalization of the current performance indicators that are in place.

- In addition to the above recommendations related to EWIs, the QIA and PCa both recommended that Baffinland continue to conduct an additional analysis or aerial photographs to document the change in proportion of immature narwhal relative to the observed population. Baffinland appended an EWI technical memorandum to the 2021 Marine Mammal Aerial Survey Program Report, which was released on October 31st, 2022 (Golder, 2022g; NIRB Registry No. 342105). Baffinland conducted the same analysis in 2022 and the EWI technical memorandum will be submitted in conjunction with 2022 annual monitoring reports. Both of these analyses were a component of the pre-defined response, inclusive of heightened monitoring, for moderate risk thresholds in relation to the EWI. These thresholds are outlined in the Trigger, Action, Response Plan, Table 5.2 of the Marine Monitoring Plan (MMP; Baffinland, 2021l).
- Consistent with feedback from the 2021 Annual Report to the NIRB, the QIA, ECCC, and PCa suggested that the exclusion of the draft marine and terrestrial monitoring reports provided to the MEWG and TEWG from Baffinland's Annual Report to the NIRB limits a fulsome review of the information presented in the Report. Baffinland notes, however, that Baffinland's terrestrial and marine mammal monitoring programs are detailed and extensive and that the current timelines to produce reports far exceed what any other organization that performs similar work in the area is able to accomplish. Baffinland is currently revising the Terms of Reference for the MEWG, which is expected to be submitted to the NIRB in 2023 and plans to address this recommendation therein. In its review of the MEWG Terms of Reference, Baffinland continues to evaluate the logistics of an adjusted annual meeting schedule and information exchange timelines to accommodate the submission of annual monitoring reports in conjunction with Annual Report submissions. Baffinland intends to release the 2022 final annual monitoring reports in conjunction with the 2022 NIRB Annual Report, which differs from previous years, where the reports were circulated in draft. The MEWG and TEWG will subsequently have the opportunity to provide comments on the final reports through the NIRB Registry, and Baffinland will incorporate feedback as required into monitoring reports the following

year. Furthermore, Baffinland provides a summary of the marine and terrestrial monitoring programs, where relevant, in relation to each Term and Condition included in the Project Certificate. As the NIRB Annual Report is meant to report on the Project's status against the Terms and Conditions set forth in the Project Certificate, the level of detail provided is consistent and sufficient for these purposes.

- Choosing to include or not include the draft marine or terrestrial monitoring program reports as an Appendix to the Annual Report does not mean the Annual Report to the NIRB is absent of the results for each of these programs. The Annual Report to the NIRB provides details on the methodology, trends and results of each of these monitoring programs, and is written with the express intent to make the details of these monitoring programs accessible to a less technical audience and to allow for the NIRB to provide guidance on Baffinland's operationalization of the Terms and Conditions of the Project Certificate.

Baffinland did not offer any additional suggestions to the NIRB, as done in previous years.

5.3 NIRB'S ANNUAL MONITORING REPORT AND BOARD RECOMMENDATIONS

On December 6th, 2022 the NIRB issued its 2021 to 2022 Annual Monitoring Report for Baffinland Iron Mines Corporation's Mary River Project and the Board's Recommendation (NIRB, 2022f; NIRB Registry No. 342276). As stated by the NIRB, in December 2022, the Board motioned to issue one (1) recommendation meant to assist Baffinland in achieving compliance with the Project Certificate and to ensure the NIRB has all information necessary to fully execute its mandate under the Nunavut Agreement and *NuPPAA* as it pertains to the Project.

The Board Recommendation focused on the following key area:

a. Narwhal Population Exchange Between Admiralty and Milne Inlet

The Board recommended that Baffinland and Fisheries and Oceans Canada (DFO) coordinate on the collection and analysis of monitoring data as it related to the narwhal population(s) of Admiralty and Milne Inlet. While Baffinland and DFO are proposing a regional, collaborative aerial survey program for the 2023 monitoring season, it should be understood that this program will not determine rates of exchange between putative narwhal stocks and will only provide regional abundance estimates. A tagging program would be required to determine rates of exchange, which the MHTO did not support in 2022. At the February 16th, 2023 MEWG meeting (outside of this reporting period), the MHTO said that a tagging program would be supported if it was run by DFO, but that the MHTO did not support Baffinland leading the program.

Given that only one formal recommendation was provided by the NIRB and Baffinland is unable to satisfy that recommendation due to the aforementioned limiting factors, Baffinland did not provide responses to the Board's 60 and 90 day recommendation, and instead had bilateral conversations with NIRB representatives to explain barriers associated with meeting this request. Although not considered recommendations, the NIRB did provide Baffinland with a list of areas requiring further study or changes. These items are captured in Appendix E, including statuses and efforts that have been put forward by Baffinland to date.

6 MANAGEMENT PLAN UPDATES

Table 6.1 provides a list of the Management Plans for the Project.

Table 6.1: Current List Environmental Monitoring and Management Plans

Document Number	Revision	Plan Name	Current Revision Date
BAF-PH1-300-P16-0002	6	Snow Management Plan	Mar-23
BAF-PH1-310-P16-0001	15	Milne Inlet Marine Facility Security Plan	Sep-22
BAF-PH1-830-P16-0001	6	Sampling Program - Quality Assurance and Quality Control Plan	Mar-23
BAF-PH1-830-P16-0002	8	Air Quality and Noise Abatement Management Plan	Apr-21
BAF-PH1-830-P16-0004	0	Borrow Pit and Quarry Management Plan	Mar-14
BAF-PH1-830-P16-0006	3	Cultural Heritage Resource Protection Plan	Mar-16
BAF-PH1-830-P16-0008	2	Environmental Protection Plan	Apr-21
BAF-PH1-830-P16-0010	10	Fresh Water Supply, Sewage and Wastewater Management Plan	Mar-23
BAF-PH1-830-P16-0011	6	Hazardous Materials and Hazardous Waste Management Plan	Mar-22
BAF-PH1-830-P16-0012	5	Interim Closure and Reclamation Plan	Oct-18
BAF-PH1-830-P16-0013	9	Oil Pollution Emergency Plan - Milne Inlet (OPEP)	May-22
BAF-PH1-830-P16-0017	0	Q1 Quarry Management Plan	Jul-17
BAF-PH1-830-P16-0023	7	Roads Management Plan	Feb-20
BAF-PH1-830-P16-0024	9	Shipping and Marine Wildlife Management Plan	July-22
BAF-PH1-830-P16-0025	1	Stakeholder Engagement Plan	Mar-16
BAF-PH1-830-P16-0026	7	Surface Water and Aquatic Ecosystems Management Plan	Mar-21
BAF-PH1-830-P16-0027	1	Terrestrial Environmental Management and Monitoring Plan	Mar-16
BAF-PH1-830-P16-0028	9	Waste Management Plan	Mar-23
BAF-PH1-830-P16-0029	3	Phase 1 Waste Rock Management Plan	Jun-20
BAF-PH1-830-P16-0030	0	Borrow Source Management Plan – KM 2	Oct-14
BAF-PH1-830-P16-0031	0	Life of Mine Waste Rock Management Plan	Apr-14
BAF-PH1-830-P16-0032	0	Borrow Source Management Plan - KM 97	Oct-14
BAF-PH1-830-P16-0035	0	Borrow Source Management Plan - KM 104	Mar-14
BAF-PH1-830-P16-0036	6	Spill Contingency Plan	Feb-21

Document Number	Revision	Plan Name	Current Revision Date
BAF-PH1-830-P16-0037	0	Exploration Spill Contingency Plan	Jun-14
BAF-PH1-830-P16-0038	1	Exploration Closure and Reclamation Plan	Jul-14
BAF-PH1-830-P16-0039	2	Aquatic Effects Monitoring Plan	Mar-22
BAF-PH1-830-P16-0040	3	QMR2 Quarry Management Plan	Jul-21
BAF-PH1-830-P16-0041	1	Polar Bear Safety Plan	Mar-16
BAF-PH1-830-P16-0042	0	Spill at Sea Response Plan	Aug-15
BAF-PH1-830-P16-0046	0	Marine Environmental Effects Monitoring Plan	Mar-16
BAF-PH1-830-P16-0047	6	MDMER Emergency Response Plan	Mar-23
BAF-PH1-830-P16-0050	1	Ballast Water Management Plan	Mar-19
BAF-PH1-830-P16-0056	0	Diesel Environmental Emergency (E2) Plan - Milne Port	Feb-20
BAF-PH1-830-P16-0057	0	Diesel Environmental Emergency (E2) Plan – Mine Site	Feb-20
BAF-PH1-830-P16-0058	2	Oil Pollution Prevention Plan - Milne Inlet (OPPP)	May-22
BAF-PH1-840-P16-0002	5	Emergency Response Plan	Dec-20

Baffinland's Environmental Management Plans relevant to the Annual Report are available on the document web portal: https://www.baffinland.com/media-centre/document-portal/.

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