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# **Effects on the Marine Environment as a Limiting Factor in Baffinland Iron Ore Mine's Proposal to Expand Production and Shipping through Milne Inlet and Eclipse Sound in the Tallurutiup Imanga National Marine Conservation Area.**

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## **Introduction**

The Hamlet is responding to counter-proposals put forth by Baffinland in response to conditions made by the Hamlet regarding the company's proposal to expand operation of the Mary River Mine, and to increase shipping through Milne Inlet and Eclipse Sound.

The Hamlet is using this opportunity to communicate to the Nunavut Impact Review Board (NIRB) its reservations about any further increase in the activities of Baffinland Iron Ore Mine affecting the environment of critical importance to the Hamlet of Pond Inlet. The proposal before the Board has implications for a conservation area that is the foundation of the culture, lifestyle, values - and a vital source of food and income - for Mittimatalingmiut.

We have listened to Elders, hunters, youth, and Inuit with knowledge of both western science and Inuit Qaujimajatuqangit. We have noted their testimony before the Community Inquiry and questions raised in Technical Hearings before the Board. In elaborating on the Hamlet's position, we focus on the marine environment to communicate the extent of uncertainty and risk associated with the Phase 2 Proposal before the Board.

## **Reasons for the Conditions**

### **An Incremental Approach to Shipping**

The intent of the Hamlet's condition was to insist on meaningful incremental increases to the amount of ore being shipped, as a minimum requirement. This was a response to the emphasis placed on Adaptive Management by both the QIA and Baffinland, as contained in the Inuit Certainty Agreement (ICA) (ID 2). The Inuit Stewardship Program is a project management plan, with Adaptive Management (AM) being how project impacts will be avoided, mitigated or eliminated (ICA, p.22). The complete ICA has been filed with NIRB.

The Hamlet regards details of the Adaptive Management Plan to be of considerable importance to the NIRB. Any recommendation regarding the Phase 2 Proposal must look critically at the feasibility of putting in place, a workable Adaptive Management system.<sup>1</sup>

The Hamlet recognizes the logic and universally accepted premises on which Adaptive Management plans operate. However, a survey of the international literature suggests that Adaptive Management has rarely been used to deal with the effects of large scale industrial projects, especially involving different social, political and economic interests in the making of management decisions. Adaptive Management is commonly used by community, state or government interests and departments dealing with environmental issues and concerns for which they have sole jurisdiction and responsibility.<sup>2</sup>

What is proposed by Baffinland and QIA is known as a *passive approach* to addressing project effects. Adaptive Management is also commonly used experimentally; making deliberate changes to ecosystems and measuring the effects before deciding to proceed further with an intervention designed to correct an existing problem, or to affect a desired outcome. This is known as an *active approach* to Adaptive Management.

While a project can be monitored following large-scale developments, modifying practices to prevent or reverse environmental effects that may have occurred is greatly limited by the magnitude of changes that may already have taken place. This is true in this case, where a sudden doubling of the output of the Mary River mine is proposed. This seriously undermines the likelihood of Adaptive Management being effective at detecting and being able to reverse serious environmental effects should they occur. Measuring and responding to incremental change is what Adaptive Management is all about.<sup>3</sup> This is not addressed in the outline of Adaptive Management found in the ICA.

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<sup>1</sup> The Hamlet's Technical Advisor researched and taught adaptive management practice in courses dealing with environmental and social impact assessment as Professor of Environmental Studies in the Faculty of Environmental Studies, York University.

<sup>2</sup> There are very many examples in the literature of Traditional Ecological Knowledge (the equivalent of IQ in this case) being used in relation to conservation initiatives by governments, and initiatives or efforts undertaken by conservation societies (Drew, Joshua, 2005, Use of Traditional Ecological Knowledge in Marine Conservation, *Conservation Biology*, 19 (4), 1286-1293). However, we could find in the literature, no examples of situations in which the equivalent of IQ and western science have been used in parallel to monitor an industrial project where parties with different mandates and objectives, were responsible for making management decisions resulting from the results of monitoring.

<sup>3</sup> Baresi, Umberto, Karen Vella, Neil Sipe, 2020, A limits-oriented adaptive approach for strategic environmental assessment, *Environmental Science and Policy*, 114, 128-139, and Healze, Michael, Peter Tangney, Paul Burton et al, 2013, Mainstreaming climate change adaptation: A incremental approach to disaster risk management in Australia, *Environmental Science and Policy*, 33, 162-170.

For these reasons the Hamlet introduced, as a condition, a requirement that Baffinland move toward 12 Mtpa (million tonnes per annum) in increments. There is, in this case, no exact science that can recommend what level of incremental change is most appropriate.

Our best estimate of the maximum increment that would address this concern is a tonnage of 1.5 Mtpa. However, any increment between 1.0 and 1.5 is likely to fit with a reasonably effective approach to Adaptive Management. Going from 6, or 7.5 to 12 Mtpa in one operation, with the introduction of a railroad making the mining and transport of larger volumes possible, involves taking risks with environmental effects.

This is not acceptable to the Hamlet. While there is room for debate on what increments should be, tonnage of ore mined and shipped being central to all effects, they should not be so small that changes are unlikely to be picked up by monitoring, or so large that critical thresholds are exceeded by a large margin and detected after irreparable harm has been done. Given its commitment to using Adaptive Management, incremental increases in amounts shipped should have been negotiated with Baffinland by the Qikiqtani Inuit Association.

### **An Increase in Inuit Employment**

The Hamlet has filed with the NIRB, an assessment: *Socio-Economic Impacts and an Analysis of the Socio-Economic Monitoring Report (2019) for the Mary River Project*, in relation to the *Addendum to the Final Environmental Impact Statement, Mary River Project - Phase 2 Proposal* (2018).

The Hamlet drew attention to the current lack of economic benefit for Mittimatalingmiut employees of Baffinland, the poor record of Inuit employment as a percentage of the workforce, and the absence of data, information and original research to support the effect ratings found in the Addendum application of 2018.

The Hamlet's estimate of the average income derived by Mittimatalingmiut employees of Baffinland, based on data provided by the company, was \$44,590 a year (in 2019). Contrary to claims made by Baffinland, this is nowhere near what would be required to create a market for local goods and services in the Hamlet of Pond Inlet, beyond what has historically been available in the community.

The intent of the second condition dealing with the percentage of Inuit in the work force was to draw attention to the need for clear commitments related to employment, promotion and other forms of support related to employment opportunities for Mittimatalingmiut, and Inuit of the five most affected communities.

The Hamlet used this condition to draw attention to these issues. The Hamlet was anticipating, in response to using, as a condition, Inuit employed as a percentage of the total workforce, specific commitments from Baffinland. Our expectation was that these would address directly and indirectly, concerns we have documented in the assessment noted previously and found on the NIRB registry, related to employment, training, promotion and support.

The Hamlet is not benefiting in a sustainable economic way from Baffinland's presence. The Hamlet does not want to find itself in the same position as Arctic Bay, where there was no economic legacy left to the Hamlet following the closure of the Nanisivik mine at nearby Strathcona Sound.<sup>4</sup> Baffinland's response falls considerably short of the Hamlet's expectations.

### **Support 'in principle' for the ICA and Inuit Stewardship Plan**

The Hamlet also drew attention to the Inuit Certainty Agreement in giving support *in principle* to the *intent* behind the document. At the same time, the Hamlet maintains that the details currently available and presented to the NIRB, do not allow the Board or the Hamlet to evaluate their adequacy.

The Hamlet cannot evaluate whether or not the Inuit Stewardship Plan will work, and notes that work on the content is to be ongoing, depending on the recommendation made by NIRB and the decision taken by the Federal Government with regard to the Phase 2 Proposal. The Hamlet is cautious, given that research on cases where Adaptive Management has been used, suggests that applying Adaptive Management to a large scale industrial development involving a party representing others (QIA) and an industrial interest (Baffinland) with different concerns and interests, is a novel idea, and not without many unrecognized and unresolved problems.

The Hamlet accepts that in many cases, having incomplete plans for dealing with environmental effects in place before a hearing, is not uncommon. It is more common when projects involve significant levels of risk and uncertainty. The Hamlet maintains that this is a relevant observation. Given the risks and uncertainties associated with the of the Phase 2 Proposal – detailed in what follows - a far more complete picture of what Adaptive Management looks like is required, especially as details involve negotiation with Baffinland.

Given the novelty of what is being proposed and risks the Hamlet maintains are involved in construction of the first Arctic railway, as well as shipping through the *Tallurutiup Imanga National Marine Conservation Area*, more than just a skeleton plan for managing environmental effects is required. Well-defined plans for monitoring, thresholds, clearly articulated ways in

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<sup>4</sup> Tester, Frank, Drummond Lambert and Tee Lim, 2013, Wistful thinking: Making Inuit labour and the Nanisivik mine near Ikpiarjuk (Arctic Bay), northern Baffin Island, *Études/Inuit/Studies*, 37(2), 15-36.

which both IQ and western science will inform decisions, addressing concerns about contradictions related to the Precautionary Principle outlined in the Inuit Stewardship Plan, and legally binding agreements as to actions to be taken if certain thresholds (triggers) are reached,<sup>5</sup> have not been addressed.

The Hamlet agrees that *if* this Project goes ahead, Inuit must play a meaningful role in monitoring and making decisions about actions to be taken in response to negative project effects that may arise. This is also true with respect to current operations. However, the Hamlet contends that what is known about critical effects at the present time is subject to considerable uncertainty and debate. As noted in what follows, what constitutes appropriate indicators of change is also the subject of debate. What might constitute appropriate baseline data for many species – including ringed seal and narwhals – is also contentious.

Consequently, it is difficult to establish how likely effects will be managed. In the presence of considerable uncertainty and given community concerns raised in the hearing process, the risk associated with the Project is not acceptable to the Hamlet. At present, it is unfairly allocated between the proponent, for whom the risks are primarily financial, and the community for whom the risks are environmental, social and cultural. The Hamlet regards risks and uncertainties associated with the Phase 2 development, suggested by Inuit Qaujimajatuqangit and western science, to be considerable. These risks and uncertainties do not recommend approval of the Phase 2 Project.

Insignificant ratings for many social and environmental effects found in the Addendum application for the Phase 2 Project are unsubstantiated or highly contentious. This is a further reason why the Hamlet does not support a recommendation in favour of the Phase 2 Proposal.

### **Ice-Breaking**

The fourth condition dealt with ice-breaking. The Hamlet believes there are very considerable risks and consequences for ringed seals, narwhals and other elements of the marine environment associated with ice-breaking.

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<sup>5</sup> In a paper analyzing whether decision-making triggers increase the accountability of adaptive management plans, researchers from the University of Montana and Colorado State University, concluded that monitoring and triggered plans for mitigation in the cases they studied were limited because of the degree of specificity in how triggers (thresholds) were written into plans. “Other controversial aspects of these plans revolved around who designed, conducted, interpreted and funded monitoring programs. Additional contentious issues were the levels of precaution associated with trigger mechanisms and the definition of ecological baselines used as points of comparison” [p.1137 of Nie, Martin and Courtenay Schultz, 2012, Decision-Making Triggers in Adaptive Management, *Conservation Biology*, 26 (6), 1137-1144].

The condition put forward by the Hamlet would put restrictions on ice-breaking, minimizing and severely limiting the extent to which ice-breaking would occur. The Hamlet also notes with concern, the absence of significant research done by the proponent on the relationship of ice-breaking to the life cycle of ringed seals.

The Hamlet does not accept the unsubstantiated claim that as the path of shipping through Eclipse Sound and Milne Inlet only involves 0.33% of the marine environment, the impact upon seals is likely negligible. The implications of ice-breaking, particularly in a critical fall period related to the identification of territory, establishment of breathing holes and likely areas for denning and pupping, are synergistic. They may involve far more than the narrow path to which Baffinland refers in making this claim. These concerns are outlined in the detailed response that follows.

The Hamlet recognizes and appreciates the conditions related to ice-breaking advanced by Baffinland in its letter to the Hamlet of January 27, 2021, and the information contained in Attachment 3. The information provided deals with the safety of community members in relation to use of ice late in the season, in July when ice-breaking is to commence, and in the fall/early winter period. Baffinland's concern and willingness to accommodate Inuit use of ice is noted and appreciated.

The Hamlet defers to the MHTO in making decisions about when ice-breaking should occur. Agreement between the MHTO and Baffinland with regard to ice-breaking is a condition for Hamlet support.

### **A Detailed Response and Concerns Relevant to Baffinland's Proposals**

#### **The Vulnerability of Arctic Environments**

Before dealing with shipping effects, we briefly review important observations about arctic marine environments. Mittimatalingmuit are well aware of how quickly changes to one element of the environment can have implications for another. For example, despite claims made by Baffinland, hunters and elders are concerned about what iron ore dust means for fish eggs, marine copepods and other species in a food chain that is particularly vulnerable to change.

The European Commission has designated Arctic ecosystems as "highly vulnerable". Marine arctic ecosystems are particularly vulnerable because of the strong linkage between food webs and ocean-ice-atmosphere systems.<sup>6</sup> Changes in abiotic factors like ice cover, temperature, and

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<sup>6</sup> Johannessen, Ola M., and Martin W. Miles, 2011, Critical Vulnerabilities of Marine and Sea Ice-Based Ecosystems in the High Arctic, *Regional Environmental Change* 11 (SUPPL. 1): 239–48, <https://doi.org/10.1007/s10113-010-0186-5>.

the chemical composition of the ocean can have substantial effects on all trophic levels in the ecosystem, from invertebrates, to fish, to marine mammals. Changes to any trophic level will send ripple effects through all trophic levels. For example, increased cloud cover can result in fewer phytoplankton, limiting food for zooplankton, their predators - capelin and young herring - and as a result, cod.<sup>7</sup>

The Food and Agriculture Organization of the United Nations classifies marine Arctic ecosystems as vulnerable because of their uniqueness, the significance of the habitat, their fragility, the life histories of particular species, and the complexity of the ecosystem.<sup>8</sup> In a vulnerable system, the risk of detrimental impacts is high. Life histories specific to marine mammals - their foraging specializations, slow intrinsic growth rates, and long generations – may increase their vulnerability.<sup>9</sup>

### **An Incremental Approach to Shipping**

The Hamlet asked that Baffinland ship in increments of 1.5 Mtpa each year until it reached 12 Mtpa, subject to the results of monitoring.

The Hamlet left it to Baffinland to figure out how to configure this arrangement. As anticipated, doing this while construction of the railway was taking place would be logistically challenging and likely impossible, given limits on the number of trucks and transits on the tote road, and environmental and regulatory implications.

The more feasible option is to build the railway and then gradually increase tonnage in the first four years of operation. Baffinland has rejected the condition of moving in increments of 1.5 Mtpa, citing financial reasons. These financial reasons are not detailed in Baffinland's response.

Baffinland suggested that it would examine two options in relation to the Hamlet's condition.

1. Allow Baffinland to truck and ship up to 6.5 Mtpa for the duration of the additional permitting and construction period (approximately 3 years). This could require up to 7 more

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<sup>7</sup> Stenseth, Nils Chr, Atle Mysterud, Geir Ottersen, James W Hurrell, Kung-Sik Chan, and Mauricio Lima, 2002, Ecological Effects of Climate Fluctuations, *New Series*. Vol. 297.

<sup>8</sup> Food and Agriculture Organization of the United Nations, 202, Vulnerable Marine Ecosystems, 2021.

<sup>9</sup> Hauser, Donna D.W., Kristin L. Laidre, and Harry L. Stern, 2018, Vulnerability of Arctic Marine Mammals to Vessel Traffic in the Increasingly Ice-Free Northwest Passage and Northern Sea Route, *Proceedings of the National Academy of Sciences of the United States of America* 115 (29): 7617–22, <https://doi.org/10.1073/pnas.1803543115>.



vessels (14 one way transits) than the current schedule each year; for clarity this would be approximately 90 vessels (180 one way transits) total per season for three seasons.

2. Allow Baffinland to truck up to 6.5 Mtpa for the duration of the construction period, stockpiling each year's additional amount until the third year when up to 1.5 Mt (culmination of trucking additional .5 Mt for three years) would be shipped in a single season (total of up to 7.5 Mt). This timeline is proposed to coincide with the construction of the second ore dock which would increase capability to ship more in a single shipping season. This could require up to approximately 21 more vessels (42 one way transits) than the current schedule or approximately 104 vessels (208 one way transits) total in that year. This allows for an additional two years at the current shipping schedule (approximately 80-85 vessels) and one year at a more significant level (approximately 104 vessels) before moving into the full Phase 2 operation (maximum of 176 vessels).

Neither of these options is acceptable.

Shipping 6.5 Mtpa for 3 years may identify effects above the current level of 6.0 Mtpa. It may confirm that there are already significant effects taking place. The construction of the railway during this period is concerning. Given financing and the implications for investment, the pressure on Baffinland to proceed, uninterrupted, with railway construction will be a determining factor. If, for example, several more years of monitoring using the approach taken in 2019 were to reveal significant effects on narwhals, any high level change in shipping would, in turn, have very serious consequences for Baffinland's finances. In fact, the financial implications involved in any indication that shipping increases need to be halted or to revert to a previous level, suggest that despite the mechanisms built into the ICA, the result could be considerable controversy and conflict over what is to be done. This is further discussed later in this report in relation to the Precautionary Principle outlined in the ICA.

In option 2, a single season at 7.5 Mtpa, followed by an increase to 12 Mtpa, defeats the purpose of Adaptive Management. The increment in the second subsequent year of this option is so large that it may exceed an important threshold or synergistic effect that occurs between 7.5 and 12 Mtpa. That being the case, there could be serious and perhaps irreversible effects on narwhals or/and other species and systems of biological importance.

Baffinland advanced another scenario involving the movement in two years – 2022 and 2023 – of an extra 30 vessels, solely for the purpose of monitoring effects. These would not be shipping ore. This proposal is not acceptable for obvious reasons. Empty vessels have characteristics very different from fully loaded ones. The results would be highly questionable and disputable in relation to determining effects on the marine environment.

The literature on Adaptive Management, or where Adaptive Management is recommended, makes consistent references to the importance and role it can play *if* management efforts can be applied to smaller scales of change.<sup>10</sup>

As noted, there is, in this case, no exact science that can recommend what level of incremental change is most appropriate. Our best estimate of the maximum increment that would address this concern was a tonnage of 1.5 Mtpa. Any increment between 1.0 and 1.5 is most likely to fit with an effective approach to Adaptive Management. As stated, going from 6 or 7.5 Mtpa to 12 Mtpa involves changes that may be transformational and can easily overwhelm the adaptive capacity of ecosystems. Changes of this magnitude are not recommended in any situation where there are elements of risk and many effects that are highly debateable and unknown.

Proposals put forward by Baffinland absolve it of any risk, other than the distant possibility (for reasons explained) that progress toward 12 Mtpa might be halted by the transgression of a maximum threshold most likely dealing with effects on the marine environment, with implications for shipping. Some limits to this are discussed in what follows, in relation to the precautionary principle found in the Inuit Certainty Agreement. The options proposed are to the financial advantage of Baffinland, involving the shipping of some volume above what would otherwise be the case, during the period of construction. Financial concerns and opportunities underpin Baffinland's response to the Hamlet's condition.

The risk in this case is disproportionately distributed. The risk to Baffinland's interests, depending to some degree on unknown details of an Inuit Stewardship Plan and approach to Adaptive management, is minimal. Risks to the Hamlet remain considerable with the possibility of important thresholds being exceeded by a considerable margin with consequences that are likely to be irreversible or reversible with actions that Baffinland likely to dispute, given the financial consequences.

### **An Increase in Inuit Employment**

The Hamlet has serious concerns about the employment benefits currently going to Mittimatalingmiut. The average annual wage earned by Mittimatalingmiut is currently \$44,590 a year and only 2.8% of the Inuit workforce has been promoted in the past 2 years, an increase from 2.0 in the previous year. Allowing for about \$11,000 paid to the Nunavut Housing Corporation for rent, this average annual wage

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<sup>10</sup> Writing in 'MPA regulations should incorporate adaptive management — The case of Gilbert Bay Labrador Atlantic cod (*Gadus morhua*)', *Marine Policy*, 2014, 49: 20–28, Corey Morris, with Fisheries and Oceans Canada, and John Green, Biology Department, Memorial University of Newfoundland note that: "To conserve local populations, management effort needs to be applied at smaller scales than has traditionally been the case, adding additional challenges in understanding those smaller scales and developing management strategies appropriate to them."

is only about \$3000 more than what this family would receive on social assistance. There is no possibility, as Baffinland claims, that this level of contribution to the local economy is a stimulus to demand for local goods and services.

As a percentage of the workforce, Inuit labour has been dropping since 2015. Promotions are only 2.8% of the Inuit workforce. Training programs and counselling services for Inuit employees have not been evaluated. These realities and numbers indicate the status of Inuit labour with Baffinland. They are unacceptable to the Hamlet.

Baffinland claims that these concerns have been addressed by the ICA and refers the reader to Schedules 11 and 12 of the ICA. In asking Baffinland to commit to an increase in Inuit employment, the Hamlet was giving Baffinland an opportunity to address these circumstances. They did not take advantage of it. Baffinland's reference to schedules 11 and 12 of the ICA are references to a framework for addressing this problem.

Schedule 11 describes the workings of a 'Multi-year Inuit Employment Goal'. It describes the creation of "Minimum Inuit Employment Goals (MIEG) [11.1.1] for three year periods over the life of the Project. In 11.1.5 (b) it is suggested that "Wages to Inuit, whereby the MIEGs will be converted into a total anticipated Inuit wage bill for the project". This, as is true of many of the details of the ICA and Adaptive Management Plan, has yet to be negotiated with Baffinland. The total wage bill for the Hamlet of Pond Inlet (2019) was \$2.72 M. It is hard to imagine Baffinland negotiating a wage bill that will create hardship if the penalties outlined in schedule 12 were to come into force.

The same can be said for section 11.1.5 (c). It states that "Training effort measured according to number of Inuit who participated in Baffinland training, training under the Mary River Project Inuit Training Program (e.g., QSTEP), number of graduates, number of Inuit offered employment, number of Inuit retained, number of Inuit advanced". The Hamlet has not been involved in any discussions about what this might look like. Furthermore, no research has been done to determine what barriers, in the minds of, and given the experience of Baffinland trainees, are acting as impediments to their employment. No evaluation has been done of existing training programs, focused on the experience of those being trained. This section deals with numbers. What those numbers might be is an unanswered question. There may be good reason why numbers are not met.

Simply put, there are not enough details as to how existing problems (whatever they may be) are to be addressed, and there is little information as to what problems with increasing Inuit employment and financial benefit to Inuit employees might be. If NIRB is to take a benefit/cost approach to evaluating the merits of the Phase 2 proposal, the ICA, in relation to employment,

provides no information that allows NIRB to gauge what those benefits might actually be. The implications for the well-being of Mittimatalingmiut are not something that the NIRB, in making a recommendation, can ignore. These are just as important as likely effects of caribou, sea mammals, seals, etc.

The Hamlet gave Baffinland an opportunity to come forward with numbers – or a range of possibilities – or principles it might employ, suggesting their commitments with regard to employment, employment categories and status for Inuit, alternative approaches to promotion and advancement, etc.

The Hamlet has noted, for example, that Baffinland does not have in place a policy or procedures for dealing with Mittimatalingmiut who may have a criminal record in relation to something they did in the past. Inuit Qaujimajatuqangit - practices and values - are ones that work to restore anyone who has committed an offense, back to their rightful place in their family and community. Punishing someone forever is not an Inuit way of dealing with these circumstances. Baffinland has not recognized or accommodated this in its hiring practices.

Not only did Baffinland not come forward with changes to policies and practices, they repeated information in the *2019 Socio-Economic Report* that the Hamlet has identified as misleading, and a misrepresentation of the current employment situation of Mittimatalingmiut. Baffinland's response with regard to badly needed improvements in employment benefits and conditions is not acceptable to the Hamlet.

### **Support 'in principle': for the idea of an 'Inuit Stewardship Plan'**

Having in place details of a monitoring and management system is critical to evaluating the Phase 2 Proposal. The Hamlet's third condition with respect to the Inuit Certainty Agreement, the Inuit Stewardship Plan and having in place a significantly more complete Adaptive Management Plan would have to be met before these could be properly evaluated.

The Hamlet notes with concern, that Baffinland will be building a railway while the small increments they proposed in addressing the Hamlet's conditions, are being shipped or, with regard to the second option, being stockpiled. The Hamlet is concerned about the pressure that Baffinland will be under to complete and operate the railway in relation to capital borrowed for rail construction and expenditures already made in anticipation of Phase 2 approval.

This draws the Hamlet's attention to the Precautionary Principle found in the Inuit Certainty Agreement (ICA). It adopts the Precautionary Principle as a guiding standard for the working of the Adaptive Management Plan. It is defined as follows: "When an activity raises threats of harm to environmental, sociocultural, and economic wellbeing and resilience, precautionary

measures and preventative action should be taken using a systems approach, *even if some cause and effect relationships are not fully established*" (ICA, ID2, 2.1.13, p. 46) (emphasis added). The Precautionary Principle is one that is applied to the interpretation of data in situations – for example, reaching a threshold with regard to effects - where what data reveals is not necessarily clear.

However, elsewhere the Precautionary Principle is given a different emphasis. The ICA also states that "because High Action Level responses may challenge the overall scope, scale and viability of the Project, *a higher degree of certainty that the Project is reasonably causing the effect* and that the High Action Level response is appropriately designed to reverse the effect *is required*" (ICA, Adaptive Management Response Framework, p. 23.) (emphasis added). In other words, where an effect is identified as serious and requires a substantial management response a higher level of cause-effect certainty will be required. For example, it must be conclusively established that narwhal populations are declining as a result of shipping and not because of changes in winter feeding, climate change, changing ice conditions, etc.

The problem the Hamlet has with this application of the Precautionary Principle is that in situations like this, what is required is exactly the opposite of is outlined by the above quote from page 23 of the ICA. It is when serious changes are taking place to environmental values that every possible action that might affect a positive outcome should be implemented. The Precautionary Principle is particularly relevant when a high level of change or effect is identified. Its purpose is to mandate that everything possible should be done in an attempt to protect the species or environmental value in question. What the ICA does with the statement above, is strip the Precautionary Principle of its most significant value and most important role in environmental protection. With this statement, it is not difficult to imagine what an arbitrator would conclude were a dispute to arise over the course of action to be taken. This serves the interests of Baffinland to a considerable degree. It does nothing to protect the interests of the Hamlet should a situation requiring a high level of change be identified.

The Hamlet has good reason to believe that should significant effects of narwhal or the marine environment be detected, there is likely, without predetermined and clearly agreed upon thresholds and actions being in place, to be any mitigation measure implemented that will interfere with Baffinland's intentions to move resolutely toward the shipment of 12 Mtpa.

This draws the Hamlet's attention to another problem with the ICA. The Hamlet draws the attention of the NIRB to the conflict of interest found in the relationship of the Qikiqtani Inuit Associations roles and responsibilities in protecting the interests of Mittimatalingmiut and Inuit of the other four affected communities. Under Article 25 of the Nunavut Land Claims

Agreement, Nunavut Tunngavik Incorporated (and the QIA) are entitled to financial benefits from resource development taking place on Inuit owned lands. QIA has negotiated a royalty regime with Baffinland related to the financial success of its operations and the volume and value of ore shipped. This places QIA in a potential 'conflict of interest', being responsible for protecting Inuit harvesting rights and encouraging the cultural and social well-being of Inuit, as stated in the preamble to the Nunavut Agreement. What happens when maximizing the financial benefits outlined in ID28 of the Inuit Certainty Agreement conflict with other obligations and commitments?<sup>11</sup> What the Inuit Certainty Agreement attempts is to achieve both. Environmental, social and cultural values are to be protected with the Inuit Stewardship Plan and Adaptive Management scheme.

There are very many places in the proposed Adaptive Management Plan where disagreements over the interpretation of monitoring data and actions to be taken, could arise. The result, despite proposals to deal with disputes and disagreements, could be to compromise a system absolutely critical to protection of Mittimatalingmiut values, interests and the marine, fresh water and terrestrial environments. Conditions 1 and 3 put forward by the Hamlet are related in this way.

The Inuit Certainty Agreement is intended to give Inuit more responsibilities and a more direct role in not only monitoring for effects, but in decision making about actions to be taken if certain thresholds are met or exceeded. Should disputes arise, there is in place an agreement that mediation will be used to resolve differences.

The mechanism for dispute resolution concerns the Hamlet. The Hamlet draws attention to the letter found in Appendix A. This correspondence between Mr. Brian Penny, CEO of Baffinland, and Mr. P.J. Akeegok, President of the Qikiqtani Inuit Association, is dated January 29, 2020. Sent before the ICA was fully developed, the first paragraph under point 2 (page 2) raises an important consideration relevant to concerns about how decisions will be made and, in particular, how disagreements about priorities for monitoring, indicators, thresholds, and actions to be taken may be resolved.

Mr. Penny is correct in noting Baffinland's ultimate responsibility for the "safe and sustainable operation of the Mary River Mine". Baffinland is also legally responsible for meeting standards and conditions affecting mine operations, and would be responsible for meeting conditions

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<sup>11</sup> ID 28 of the Inuit Certainty Agreement deals with royalty payments to QIA, and other payments dependent on the coming into effect of the Phase 2 Proposal. It also outlines payments as milestones are achieved throughout the life of the project. Royalty payments rise from 1.19% to 1.50% upon the coming into effect of the Phase 2 Project and increase to 3% at the end of the sixth year of operation of the Phase 2 Project. Milestone payments include lump sums of \$5 M when Phase 2 comes into effect and \$15 M at the end of 4.5 years and again at the end of 6 years of operation.

attached to its operating certificate. All of these would inform any matter that might be put to arbitration, and form a context within which decisions will be rendered. The Hamlet regards QIA's expectations for the role it will ultimately play in decision making as optimistic and is, for other reasons, concerned about likely compromises, given the interests of both parties.

This, combined with the complexities of integrating IQ with western science and determining and defining the many details important to an Adaptive Management system, raise important questions about how committees are to be structured to develop and promote equitable representation and involvement by Mittimatalingmiut and other affected communities.<sup>12 13</sup> To work, Adaptive Management, in this case, must not only involve Inuit at the community level – hunters and others – it involves working effectively across cultures and dealing with what may be different priorities, competing not only with regard to their importance, but also in relation to the costs associated with monitoring the species or element in question.<sup>14</sup> Achieving a working relationship between Inuit knowledge holders and western scientists is an easily taken-for-granted consideration. It may be important in explaining why, based on experience with the existing Marine and Terrestrial Environment Working Groups, and research submitted to NIRB by the HTO and Hamlet of Clyde River, these committees are not currently working effectively.

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<sup>12</sup> Western scientists and Inuit will conduct monitoring in relation to the adaptive management system proposed for the Phase 2 Project. The Hamlet is concerned about how Inuit Qaujimagatuqangit and those working from this knowledge base will come together with western scientists and the logic of western science. In order for the Adaptive Management Plan to work, at the field level as well as in committee, collaboration is important. University of Manitoba ecologist, Fikret Berkes, identifies the importance to adaptive management of “collaborative approaches to improve social and institutional learning” (Environmental Governance for the Anthropocene? Social-Ecological Systems, Resilience, and Collaborative Learning, *Sustainability*, 2017, 9, 1232; doi:10.3390/su9071232). The Hamlet notes that no attention has been given to means for accomplishing “social and institutional learning” in the Inuit Certainty Agreement.

<sup>13</sup> The same point is emphasized in a paper by James Butler, Alifereti Tawake, Tim Skewes et al, 2012, Integrating Traditional Ecological Knowledge and Fisheries Management in the Torres Strait, Australia: the Catalytic role of Turtles and Dugong as Cultural Keystone Species, *Ecology and Society*, 17 (4) 34, <http://www.ecologyandsociety.org/vol17/iss4/art34/>

<sup>14</sup> This problem is explored to some extent in the literature, and example being Helen Wheeler, Dominique Berteaux, Chris Furgal et al, 2018, Identifying key needs for the integration of social-ecological outcomes in arctic wildlife monitoring, *Conservation Biology*, 33 (4), 861-872. The authors note that if decision making is evidence based (as is true in this case), what is monitored, where and who is involved can influence the fairness of the decisions that are made (869). The authors note that this issue was highlighted in contexts they examined involving questions about which species were the focus of monitoring, and the difference between the priorities of traditional versus economic activities.

In this case, the focus on narwhal and the absence of a focus on seals in the research conducted for Baffinland is a good example, given that seals are of more importance as a country food source than narwhal, yet have received virtually no attention from the proponent. One would, in this situation, expect both to be the focus of research, the social (and cultural) being linked with the ecological. This is a case of a disconnect between decision making and monitoring, the NIRB being asked to make a decision based on data and information (about narwhal) that does not entirely match with important needs and concerns (for seals) of Mittimatalingmiut.

As Lynn Scarlet notes, “Many resource management questions are technical and complex. But policies and project decisions have distributional effects and often involve trade-offs. These effects raise issues about the respective roles of scientists, technical experts, and the public; underscore the relevance of adaptive decision frameworks, and heighten the importance of collaborate decision making”.<sup>15</sup> The “public” in this case, is Mittimatalingmiut and other communities. Unless this is addressed deliberately, there may be serious problems resulting from the Adaptive Management regime outlined in the Inuit Certainty Agreement. How to accomplish the cross-cultural awareness and understanding critical to making adaptive management work has not been outlined in the ICA.

We are also concerned about what cooperation at the field level between Inuit knowledge holders and western scientists looks like for the complex terms, conditions and processes related to arbitration (ID 34 of the ICA) and the development of Adaptive Management Systems (ID 2 of the ICA).

The Hamlet is concerned that in the ICA, no attention has been paid to the international literature on Adaptive Management Systems, documenting the problems, issues and shortcomings of attempts to implement Adaptive Management Systems in contexts not nearly as complicated as the one before the Board.<sup>16</sup> The result is the presentation of a system that is highly idealistic and theoretical in its assumptions and descriptions of how it will work.

In some cases there will be serious questions raised and likely disagreements as to what constitutes baseline data. Baseline data is available for some elements as a result of work done prior to the start of mine operations. For effects on the marine environment - narwhals and

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<sup>15</sup> Lynn Scarlet, 2013, Collaborative Adaptive Management: Challenges and Opportunities, *Ecology and Society*, (2013) 18(3) 26, <https://www.ecologyandsociety.org/vol18/iss3/art26/>.

<sup>16</sup> A review of the literature on adaptive management, and the many problems encountered in attempts to apply the idea to different forms of development, can be found in M. Westgate, G. Likens & D. Lindenmayer, 2013, Adaptive management of biological systems: A review, *Biological Conservation*, 158, 128-139. One of the most important conclusions from their extensive review of 316 projects using adaptive management is that adaptive management is hard to do and that many attempts appear to fail. They note that adaptive management projects involving rare or endangered species “can be very difficult if not impossible” and that adaptive management is more commonly applied to terrestrial systems than aquatic systems (p.134). Evidence presented to the Board in relation to establishing a baseline for monitoring effects on narwhal may be an example of why this is true.

The literature reviewed also suggests that there may be “considerable barriers to the establishment of long-term adaptive management projects” (p.136), as required by the Phase 2 Project before the Board. They also note that successful adaptive management projects “typically require partnerships among people with scientific, policy making and resource management expertise” (p.136). In this case, a working knowledge of Inuit Qaujimajatuqangit is also essential. No indication of the expertise that is available and will be brought to bear on the management regime to be considered by the Board, has been provided.



ringed seals - what constitutes baseline data is likely a contentious issue. Other problems exist with indicators and what indicators are appropriate to measuring effects.

These concerns must be understood in reference to the considerable international literature on Adaptive Management, and the novelty of what is being proposed. This, in relation to the largest industrial development project in what is the most important, threatened and environmentally important ecosystem in the Canadian Arctic, designated as the *Tullurutiup Imanga Marine Protected Area* for very good reason.

The Hamlet concludes that the Board has before it, a system for managing potential impacts that does not allow the Board to say with any confidence, that there is in place a workable approach to addressing effects that may arise from the operation of the Phase 2 Proposal. The absence of an effective incremental approach to shipping throws further and very considerable doubt on the effectiveness of what has been proposed.

In what follows we illustrate the problems noted above in relation to questions about baselines indicators, thresholds and effects with regard to seal and narwhal, species of critical importance to Mittimatalingmiut. While narwhals have received considerable attention in Baffinland's assessment of effects on the marine environment, ringed seal are the most important source of country food. They have received virtually no attention in research Baffinland has done on the marine environment.

### *Measuring marine mammal populations*

Detecting biologically important changes in marine mammal populations is particularly difficult. In a major study, Gordon et al. state the following: "One might expect serious effects to cause changes in the size of populations, but, given the poor precision with which the size of any marine mammal population can be measured, and the fact that in many parts of the world there are no reliable estimates for many populations, only very large changes in population size would be identified. As many marine mammal populations have very small rates of increase, biologically important changes in these rates would be especially difficult to identify, particularly in a timely fashion."<sup>17</sup>

Stress experienced by individuals may not be seen in population levels until drastic declines occur. A study of the effects of whale watching vessels on bottlenose dolphin calf survival found

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<sup>17</sup> Gordon, J., D. Gillespie, J. Potter, Alexandros Frantzis, Mark Simmonds, Rene Swift and D. Thompson, 2003, A Review of the Effects of Seismic Surveys on Marine Mammals, *Marine Technology Society Journal*, 37 (4): 16–34.

that while there was no apparent short-term effect of the vessels on dolphin behaviour, calving rates decreased.<sup>18</sup>

It is important to consider the timing of stress felt by a population in relation to the species' life history. For example, in a study that examined the effect of exposure to low-level flying jets on calf survival in a caribou herd in Labrador, it was found that while their short-term startle response to the noise seemed insignificant, increased exposure was negatively correlated to calf exposure in the calving and immediate post-calving seasons.<sup>19</sup> While, no relationship was seen during pre- or post-calving or during the fall, overall, the population of caribou decreased.

Narwhals' calving rate could remain the same, while their survivorship through the winter decreases due to depleted energy stores. Specific indicators examined in isolation can be seriously misleading. Although the overall narwhal population may be decreasing, this might not be reflected in the calving rates. Baffinland is relying on rough estimates of calving rates and populations that, until the survey of 2019, have large ranges at the 95% confidence interval. But what calving rates reveal about overall population health is also, based on experiences with other species, questionable. Is this an appropriate or reliable indicator?

### *Shore based monitoring*

A recent study that attempts to quantify the uncertainty associated with shore-based monitoring, found it best suited for large, slow-moving, and low-herd-size species such as the humpback whale.<sup>20</sup> For smaller species like the porpoise, shore-based monitoring was seen to underestimate their detectability. Often shore-based monitoring data are input into modelling programs. Rarely are shore-based data used in isolation to inform management.<sup>21 22 23</sup>

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<sup>18</sup> Bejder, Lars, Amy Samuels, Hal Whitehead, Nick Gales, Janet Mann, Richard Connor, Mike Heithaus, Jana Watson-Capps, Cindy Flaherty, and Michael Krützen, 2006, Decline in Relative Abundance of Bottlenose Dolphins Exposed to Long-Term Disturbance, *Conservation Biology* 20 (6): 1791–98. <https://doi.org/10.1111/j.1523-1739.2006.00540.x>.

<sup>19</sup> Harrington, Fred H., and Alasdair M. Veitch, 1992, Calving Success of Woodland Caribou Exposed to Low-Level Jet Fighter Overflights, *Arctic* 45 (3): 213–18.

<sup>20</sup> Keen, Eric M., Janie Wray, Benjamin Hendricks, Éadin O. Mahony, Chris R. Picard, and Hussein Alidina, 2020, Determining Marine Mammal Detection Functions for a Stationary Land-Based Survey Site, *Wildlife Research*. <https://doi.org/10.1071/WR19232>.

<sup>21</sup> Sagnol, Ophélie, and Femke Reitsma, 2014, A Spatio-Temporal Model to Track Individuals from a Shore-Based Station: A Case Study for Sperm Whales (*Physeter Macrocephalus*) off Kaikoura, New Zealand, *Aquatic Mammals*, 40 (4): 321–28. <https://doi.org/10.1578/AM.40.4.2014.321>.

### *Effects on Narwhal of Noise from Shipping and Icebreaking*

In this case, the general literature is clear – noise from vessels negatively affects marine mammals.<sup>24</sup> An extensive review of almost 8,000 quantitative studies found, with a high degree of confidence, that 85-94% showed that noise from vessels negatively affected marine mammals. This included physiological changes (91.2%), compromised hearing (90.6%), and displacement actions (83.9%).

The local literature is minimal.

- Studies of the effects of shipping and icebreaking on narwhals from the Nanisivik Mine found that narwhal responded to icebreaking activities within 55-40km by exhibiting a freeze response; they would slow their movement, decrease their vocalizations and move to the cover of ice.<sup>25</sup>
- A report for the Mary River Mine project by JASCO Applied Sciences on the modelling of acoustic disturbances felt by narwhals found that under 0% ice, one icebreaker escorting two ore carriers could produce a noise above the 120 dB re 1 µPa threshold for up from 0.5 – 1.3 hours per transit. Through fall icebreaking operations it is predicted that 3731 and 3536 narwhals would be affected within the 120 dB re 1 µPa disturbance zone for heavy and moderate ice regimes respectively.<sup>26</sup>
- In a summary of modelling for the Mary River Mine project performed through the University of California San Diego, the noise level of an icebreaker that was escorting a bulk carrier was

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<sup>22</sup> Bröker, Koen C.A., Rikke G. `Hansen, Kathleen E. Leonard, William R. Koski, and Mads Peter Heide-Jørgensen. 2019, A Comparison of Image and Observer Based Aerial Surveys of Narwhal, *Marine Mammal Science* 35 (4): 1253–79. <https://doi.org/10.1111/mms.12586>.

<sup>23</sup> Photopoulou, T., P. B. Best, P. S. Hammond, and K. P. Findlay, 2011, Movement Patterns of Coastal Bottlenose Dolphins in the Presence of a Fast-Flowing, Prevailing Current: Shore-Based Observations at Cape Vidal, South Africa, *African Journal of Marine Science*, 33 (3): 393–401, <https://doi.org/10.2989/1814232X.2011.637346>.

<sup>24</sup> Duarte, Carlos M., Lucille Chapuis, Shaun P. Collin et al, 2021, The Soundscape of the Anthropocene Ocean (Supplementary Materials), *Science* 371, (6529): eaba4658. <https://doi.org/10.1126/science.aba4658>.

<sup>25</sup> Finley, K., G. Miller, and C. Greene, 1990, *Reactions of Belugas, Delphinapterus Leucas, and Narwhals, Monodon Monoceros., to Ice-Breaking Ships in the Canadian High Arctic*. Edited by D. J. st. Aubin, T. G. Smith, and J. R. Geraci, Canadian Bulletin of Fisheries and Aquatic Sciences/Bulletin Canadien des Sciences Halieutiques et Aquatiques.

<sup>26</sup> Baffinland. 2018. TSD 24, Marine Mammal Effects Assessment.

found to be 120 dB re 1  $\mu$ Pa at a range of about 5km from the bow and 5 to 15 km from the stern.<sup>27</sup>

- Oceans and Fisheries Canada has voiced that there is still a “high degree of uncertainty that exists in the assessment” of the effects of shipping and icebreaking on narwhals in Milne Inlet and Eclipse Sound.<sup>28</sup>

Both the general literature and reports from icebreaking activities through the Nanisivik mining operation indicate that narwhal respond negatively to vessels. This response has been documented by Baffinland in the tagging study, which found that narwhal avoid close contact (<100m) with vessels, increase their dive rates, decrease their surface time, and experience a response when a vessel is within 4km.

Information from Baffinland’s tagging study makes it clear that narwhals flee the area around passing ships, and return sometime later to the area they have vacated, a behaviour has also been documented by the MHTO. This suggests that shipping does not displace narwhals long-term, but says nothing about their experienced stress and the implications for energy budgets.

A review of the impacts of noise on marine mammals notes that if they are not displaced from their habitat and stay in areas of importance while being subject to stressors, it is likely that there are effects on them that are not readily observable, but nonetheless important.<sup>29</sup> As the review notes, noise can affect the neuroendocrine system, cardiovascular function, can induce physiological changes, and can inhibit the immune system. Among marine mammals, noise has been shown to induce changes to hormone levels and heart rate.

A review of arctic marine mammal vulnerability to vessel traffic found that narwhals of Eclipse Sound were the most vulnerable of 80 populations of marine mammals during open-water seasons.<sup>30</sup> This was attributed to their long life spans and high exposure to vessels.

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<sup>27</sup> Jones, Joshua M., 2021, Underwater Soundscape and Radiated Noise from Ships in Eclipse Sound, NE Canadian Arctic, Marine Physical Laboratory, Scripps Institution of Oceanography, Submitted to NIRB, 2021-01-19.

<sup>28</sup> Fisheries and Oceans Canada, 2021, Updated Written Submission Baffinland Iron Mines Corporation Mary River ‘Phase 2 Development’ Project Proposal.

<sup>29</sup> Weilgart, L. S., 2007, The Impacts of Anthropogenic Ocean Noise on Cetaceans and Implications for Management, *Canadian Journal of Zoology*, <https://doi.org/10.1139/Z07-101>.

<sup>30</sup> Hauser, Donna D.W., Kristin L. Laidre, and Harry L. Stern, 2018, Vulnerability of Arctic Marine Mammals to Vessel Traffic in the Increasingly Ice-Free Northwest Passage and Northern Sea Route, *Proceedings of the National Academy of Sciences of the United States of America*, 115 (29): 7617–22. <https://doi.org/10.1073/pnas.1803543115>.

As a species with a long life (maximum estimated age of a female is 115 years), a late age at sexual maturity (6-7 years old for females and 9 years old for males)<sup>31</sup>, and low genetic diversity<sup>32</sup> narwhals might not quickly adapt at the rate necessary for their changing environmental conditions.

If the narwhal population of Eclipse Sound and Milne Inlet is in a precarious and high-risk position, care must be taken in developing plans for both monitoring and determining appropriate responses to thresholds. Adoption of a precautionary principle, in which precautionary actions are taken despite lack of concrete cause and effect evidence appears, given the uncertainty and debates associated with research results is very important in this case. The degree of risk involved in increased shipping – and especially icebreaking - should not be underestimated.

Most concerning for feeding and non-feeding narwhals is the increase in deep dives when vessels are within 2km and 1 km. This may be indicative of a flight response similar to the response characterized by Williams et al.<sup>33</sup> Recent and not yet published data suggests that narwhal experience a paradoxical escape response to high frequency noise (241 dB 1  $\mu$ Pa-m) from a seismic pulse.<sup>34</sup> In this reaction, narwhals exhibited longer dives, extreme bradycardia, and longer periods of hyper-activity through increased stroke frequency.<sup>35</sup> Such dive responses could significantly increase their energy output, place them under metabolic stress, and lead to decreasing their energy stores thereby making them more vulnerable.

There is no published literature describing the physiological effect of these disturbances, their potential cumulative effects, and the result of long-term stress on individual narwhals.

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<sup>31</sup> Garde, Eva, Mads Peter Heide-jørgensen, Steen H Hansen, Sta Nachman, and Mads C Forchhammer, 2007, Age-Specific Growth and Remarkable Longevity in Narwhals (*Monodon Monoceros*) From West Greenland as Estimated by Aspartic Acid Racemization, *Journal of Mammalogy*, 88 (1): 49–58. <https://academic.oup.com/jmammal/article/88/1/49/927563>.

<sup>32</sup> Kenyon, Krista A., David J. Yurkowski, Jack Orr, David Barber, and Steven H. Ferguson, 2018, Baffin Bay Narwhal (*Monodon Monoceros*) Select Bathymetry over Sea Ice during Winter, *Polar Biology*, 41 (10): 2053–63. <https://doi.org/10.1007/s00300-018-2345-y>.

<sup>33</sup> Williams, Terrie M., Susanna B. Blackwell, Beau Richter et al, 2017, Paradoxical Escape Responses by Narwhals (*Monodon Monoceros*), <http://science.sciencemag.org/>.

<sup>34</sup> Williams, personal communication, January 30<sup>th</sup> 2021.

<sup>35</sup> Williams, Terrie M., Mads Peter-Heide Jørgensen, Anthony M. Pagano, and Caleb M. Bryce, 2020, Hunters versus Hunted: New Perspectives on the Energetic Costs of Survival at the Top of the Food Chain, *Functional Ecology*. Blackwell Publishing Ltd. <https://doi.org/10.1111/1365-2435.13649>.

Baffinland classifies the risk of acoustic masking as moderate, and the potential for long term effects as medium.<sup>16</sup> In effect, it admits that shipping in Milne Inlet and Eclipse Sound is a risk for marine animals. The general literature identifies such risks. The local literature is too thin to be conclusive one way or the other. The fact is that until much more research is completed no one knows the risks increased shipping poses for marine mammals in these waters.

### *Impact of Shipping on Seals*

Female ringed seals give birth to a single pup in March – April then spend the next 5-8 weeks lactating. This period is the most physically demanding of a seal's life history and is important for population growth.<sup>36</sup> Female ringed seals have been documented to experience a significant drop (32% decrease) in weight after parturition and lactation.<sup>37</sup> Most of the weight loss can be attributed to lost blubber, indicative of decreased energy stores. Birthing puts ringed seals under physiological stress. After the lactation period, ringed seals mate then moult on the ice. This is a critical time for seals, whose body condition is the poorest from June through August<sup>38</sup> following the fasting that occurs during the moulting period from mid-May through July.<sup>39</sup> Ringed seals haul-out more frequently and for longer later in the moulting season with higher densities of seals seen on the ice through July.<sup>40</sup> Following molting, in the open water season, ringed seals feed intensely to replenish their depleted energy stores and travel far, spending an average of 17 hours diving.<sup>41</sup> As an "income breeder" ringed seals have been found to spend

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<sup>36</sup> Hin, Vincent, John Harwood, and André M. de Roos, 2019, "Bio-Energetic Modeling of Medium-Sized Cetaceans Shows High Sensitivity to Disturbance in Seasons of Low Resource Supply." *Ecological Applications* 29 (5). <https://doi.org/10.1002/eap.1903>.

<sup>37</sup> Hammill, M. O., C. Lydersen, M. Ryg, and T. G. Smith, 1991, Lactation in the Ringed Sea (Phoca hispida), *Canadian Journal of Fisheries and Aquatic Sciences*, 48 (12): 2471–76.

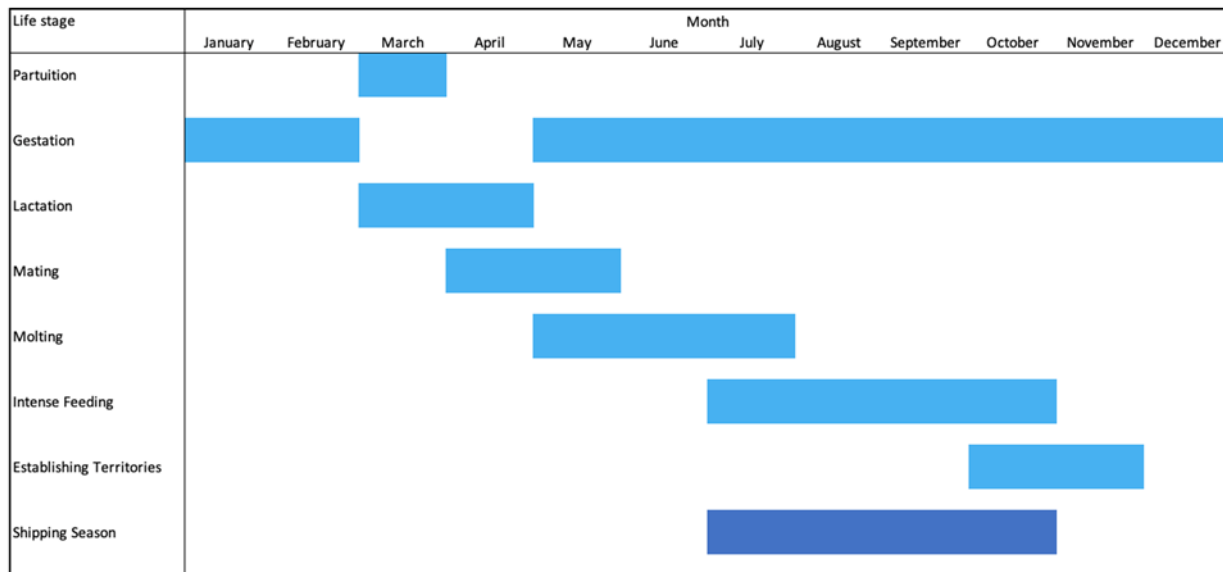
<sup>38</sup> Young, B. G., and S. H. Ferguson, 2013, Seasons of the Ringed Seal: Pelagic Open-Water Hyperphagy, Benthic Feeding over Winter and Spring Fasting during Molt, *Wildlife Research*, 40 (1): 52–60. <https://doi.org/10.1071/WR12168>.

<sup>39</sup> Chambellant, Magaly, Ian Stirling, William A. Gough, and Steven H. Ferguson, 2012, Temporal Variations in Hudson Bay Ringed Seal (Phoca hispida) Life-History Parameters in Relation to Environment, *Journal of Mammalogy*, 93 (1): 267–81. <https://doi.org/10.1644/10-MAMM-A-253.1>.

<sup>40</sup> Moulton, Valerie D., W. John Richardson, Trent L. McDonald, Robert E. Elliott, and Michael T. Williams, 2002, Factors Influencing Local Abundance and Haulout Behaviour of Ringed Seals (Phoca hispida) on Landfast Ice of the Alaskan Beaufort Sea, *Canadian Journal of Zoology*, 80 (11): 1900–1917. <https://doi.org/10.1139/z02-173>.

<sup>41</sup> Duyke, Andrew L. von, David C. Douglas, Jason K. Herreman, and Justin A. Crawford, 2020, Ringed Seal (Pusa hispida) Seasonal Movements, Diving, and Haul-out Behavior in the Beaufort, Chukchi, and Bering Seas (2011–2017), *Ecology and Evolution*, 10 (12): 5595–5616. <https://doi.org/10.1002/ece3.6302>.

energy as they collect it resulting in lower energy stores.<sup>42</sup> As a species with already low energy budgets, the cumulative effects of low energy stores post moulting and additional stresses felt by shipping, may be significant. As seen in Figure 1 shows that periods of intense feeding in preparation for the winter season, gestation, the later parts of the period of molting and the early period of establishing territory all overlap with the proposed Baffinland shipping season.



**Figure 1: Life Stages for Ringed Seal**

As blubber is used for thermoregulation, severely depleted energy stores may have a negative feedback effect where more energy is spent regulating seal body temperature resulting in more energy being spent.<sup>43</sup> Southern sea lions experienced devastating population declines after changes to their feeding increased their energy expenditure.<sup>44</sup>

<sup>42</sup> Ferguson, Steven H., David J. Yurkowski, Brent G. Young, Cornelia Willing, Xinhua Zhu, Derek C.G. Muir, Aaron T. Fisk, and Gregory W. Thiemann, 2019, Do Intraspecific Life History Patterns Follow Interspecific Predictions? A Test Using Latitudinal Variation in Ringed Seals, *Population Ecology*, 61 (4): 371–82. <https://doi.org/10.1002/1438-390X.12008>.

<sup>43</sup> Rosen, David A.S., Arliss J. Winship, and Lisa A. Hoopes, 2007, Thermal and Digestive Constraints to Foraging Behaviour in Marine Mammals, *Philosophical Transactions of the Royal Society B: Biological Sciences*, Royal Society <https://doi.org/10.1098/rstb.2007.2108>.

<sup>44</sup> Baylis, Alastair M., Rachael A. Orben, John P. Y. Arnould, Fredrik Christiansen, Graeme C. Hays and Iain J. Staniland, 2015, Disentangling the Cause of a Catastrophic Population Decline in a Large Marine Mammal, *Ecology*, 96 (10): 2834–47.

After basking, ringed seals feed on pelagic fish to replenish their energy.<sup>45</sup> One of the seals' main foods is arctic cod. With a high concentration of fat, Arctic cod are nutritious and valuable for the marine environment of Milne Inlet and Eclipse Sound. A study in Resolute Bay, Nunavut, found that Arctic Cod respond to moving and anchored vessels by moving away from the noise and by being less exploratory.<sup>46</sup> The presence of vessels in Milne Inlet, may reduce the local abundance of Arctic cod, and also, therefore, of ringed seals – another considerable environmental risk.

The effects of shipping through these periods of vulnerability, while seals are moulting and then feeding extensively, are not known. Ringed seal responses to shipping through July and August in northwest Greenland have been documented as flush responses when vessels reach 700m from a basking seal.<sup>47</sup>

It will be important to compare monitoring information to baseline data about the behaviour of ringed seals. There is some literature that characterizes their behaviour. In the Beaufort, Bearing, and Chukchi Seas, ringed seal haul-out behaviour, seasonal movements, diving rate and ovulation rate have been studied to provide a baseline when comparing against future industrial projects.<sup>48</sup> It is important to note that place differences exist between ringed seal species. Northern and Southern ringed seals have been seen to show different characteristics; northern seals were larger and grew more slowly than their southern counterparts.<sup>49</sup> This is important to note as these characteristics are what determines the vulnerability of a species.

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<sup>45</sup> Young, B. G., and S. H. Ferguson, 2013, Seasons of the Ringed Seal: Pelagic Open-Water Hyperphagy, Benthic Feeding over Winter and Spring Fasting during Molt, *Wildlife Research*, 40 (1): 52–60. <https://doi.org/10.1071/WR12168>.

<sup>46</sup> Ivanova, Silviyav, Steven T. Kessel, Mario Espinoza, Montana F. Mclean, Caitlin O'Neill, Justin Landry, Nigel E Hussey, Rob Williams, Svein Vagle, and Aaron T. Fisk, 2019, Shipping Alters the Movement and Behavior of Arctic Cod (*Boreogadus Saidai*), a Keystone Fish in Arctic Marine Ecosystems, <http://www.natureearthda>.

<sup>47</sup> Lomac-Macnair, Kate, and José Pedro Andrade, 2019, Seal and Polar Bear Behavioral Response to an Icebreaker Vessel in Northwest Greenland, *Human-Wildlife Interactions*, 13 (2): 277–89.

<sup>48</sup> Duyke, Andrew L. von, David C. Douglas, Jason K. Herreman, and Justin A. Crawford, 2020, Ringed Seal (*Pusa hispida*) Seasonal Movements, Diving, and Haul-out Behavior in the Beaufort, Chukchi, and Bering Seas (2011–2017), *Ecology and Evolution*, 10 (12): 5595–5616. <https://doi.org/10.1002/ece3.6302>.

<sup>49</sup> Ferguson, Steven H., David J. Yurkowski, Brent G. Young, Cornelia Willing, Xinhua Zhu, Derek C.G. Muir, Aaron T. Fisk, and Gregory W. Thiemann, 2019, Do Intraspecific Life History Patterns Follow Interspecific Predictions? A Test Using Latitudinal Variation in Ringed Seals, *Population Ecology*, 61 (4): 371–82. <https://doi.org/10.1002/1438-390X.12008>.



Results from the sampling of hunted ringed seals from 1991 – 2006 suggested that ringed seals have evolved in response to specific environmental conditions.<sup>50</sup> It is possible that they will be affected by changes to their environment. For example, female ovulation rates have been found to be correlated to sea-ice conditions.<sup>51</sup> With a 5-6 week delay in ice clearance, there was a significant drop in ovulation rates. The long-term effects of shipping on seals are unknown, and the short-term physiological effects are not yet clear.

In the Draft Marine Mammal Aerial Survey (2019), 121 ringed seals and 4649 unidentified seals were seen through July – August 2017.<sup>52</sup> Ringed seals are present in Eclipse Sound and Milne Inlet through the shipping period. No information is provided on how shipping and icebreaking might affect their foraging. Given the importance to the community of Pond Inlet of seal as a primary food source, this is of serious concern to the Hamlet.

#### *Available Energy Budgets of Narwhals Leaving Eclipse Sound*

For readers who may know little about narwhals, they spend summers in Eclipse Sound and Milne Inlet where they calve before migrating to Baffin Bay to spend winters. After calving in July – August, narwhals leave Eclipse sound for their wintering grounds where they do most of their feeding.<sup>53</sup> They may leave Eclipse Sound with low energy reserves, having used these in the case of females in relation to calving, in dealing with predators (orca whales), addressing anthropogenic noise - shipping now being the primary source - and a food supply that does not compare with what is available during winter months in Baffin Bay. Baffinland has done no studies involving energy budgets and changes that may be the result of its current activities. Like other marine mammals, narwhals have adapted to harsh environmental conditions and variable food sources by using blubber to store energy. Female narwhals who have undergone

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<sup>50</sup> Chambellant, Magaly, Ian Stirling, William A. Gough, and Steven H. Ferguson, 2012, Temporal Variations in Hudson Bay Ringed Seal (*Phoca hispida*) Life-History Parameters in Relation to Environment, *Journal of Mammalogy*, 93 (1): 267–81. <https://doi.org/10.1644/10-MAMM-A-253.1>.

<sup>51</sup> Harwood, Lois A., Thomas G. Smith, John Alikamik, Emma Alikamik, Ellen v. Lea, Ian Stirling, Harold Wright, Humfrey Melling, and Xinhua Zhu, 2020, Long-Term, Harvest-Based Monitoring of Ringed Seal Body Condition and Reproduction in Canada's Western Arctic: An Update through 2019, *Arctic*, 73 (2): 206–20. <https://doi.org/10.14430/arctic70428>.

<sup>52</sup> Golder Associates Ltd, 2020, 2019 Marine Mammal Aerial Survey Baffinland Iron Mines Corporation.

<sup>53</sup> Laidre, K. L. and M. P. Heide-Jørgensen, Winter Feeding Intensity of Narwhals (*Monodon Monoceros*), *Marine Mammal Science*, 21, no. 1 (2005): 45-57.

the taxing process of birthing, have been documented leaving for the wintering waters with little reserve of blubber.<sup>54 55</sup>

The health of narwhals is a primary concern. Since their individual health and fitness are dependent on their energy stores,<sup>56</sup> blubber depth and composition can be used as a mammalian health indicator.<sup>57</sup> Narwhals under nutritional, reproductive, predation, and anthropogenic stress, have less energy and therefore less blubber. In addition to blubber depth, blubber cortisol levels can also show us if a marine mammal has been under stress.<sup>58</sup> A recent and forthcoming paper compares cortisol levels in narwhal blubber pre- and during shipping activity in Milne Inlet and Eclipse Sound.<sup>59</sup> Researchers found that blubber cortisol levels increased significantly during the period of shipping activity, indicating elevated levels of stress.

Current reports and observations from Mittimatalingmiut hunters indicate concern about the number and health of narwhal in Eclipse sound. Recently caught narwhals have a reduced thickness of blubber. Rather than floating after being shot, they will instead sink -- a float must be attached quickly. IQ and western science informs us that narwhals are experiencing changes to their body composition and blubber, and therefore also, their energy stores.

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<sup>54</sup> Committee on the Status of Endangered Wildlife in Canada, 2004, *COSEWIC Assessment and Update Status Report on the Narwhal, Monodon Monoceros, in Canada*. COSEWIC=COSEPAC.

<sup>55</sup> Hin, Vincent, John Harwood, and André M. de Roos, 2019, Bio-Energetic Modeling of Medium-Sized Cetaceans Shows High Sensitivity to Disturbance in Seasons of Low Resource Supply, *Ecological Applications*, 29 (5), <https://doi.org/10.1002/eap.1903>.

<sup>56</sup> Castrillon, Juliana, and Susan Bengtson Nash, 2020, Evaluating Cetacean Body Condition; a Review of Traditional Approaches and New Developments, *Ecology and Evolution*, John Wiley and Sons Ltd. <https://doi.org/10.1002/ece3.6301>.

<sup>57</sup> Irvine, Lyn G., Michele Thums, Christine E. Hanson, Clive R. McMahon, and Mark A. Hindell, 2017, Quantifying the Energy Stores of Capital Breeding Humpback Whales and Income Breeding Sperm Whales Using Historical Whaling Records, *Royal Society Open Science*, 4 (3). <https://doi.org/10.1098/rsos.160290>.

<sup>58</sup> Trana, Marci R., James D. Roth, Gregg T. Tomy, W. Gary Anderson, and Steven H. Ferguson, 2016, Increased Blubber Cortisol in Ice-Entrapped Beluga Whales (*Delphinapterus leucas*), *Polar Biology*, 39 (9): 1563–69. <https://doi.org/10.1007/s00300-015-1881-y>.

<sup>59</sup> Watt, Cortney A, James Simonee, Vincent L’Herault, Ruokun Zhou, Steven H Ferguson, Marianne Marcoux, and Sandra Black, 2020, Cortisol Levels in Narwhal (*Monodon Monoceros*) Blubber from 2000-2019, *Arctic Science*, (forthcoming).

## Ice Breaking and the Hemmera Report

The Hamlet remains very concerned about ice-breaking and does not accept the observations made by Baffinland about the implications for narwhal. We are further concerned about the implications for seal in the fall season. Evidence presented at the hearings on this topic lends credibility to our initial concerns about ice-breaking.

The Hamlet acknowledges the ongoing concern expressed by hunters about the impacts of ice breaking on narwhal and seal. IQ in relation to narwhal has been documented by Baffinland in the report prepared by Hemmera Envirochem for Baffinland, October 15, 2019.<sup>60</sup> The Hamlet has reviewed the results of investigations by both Golder and the Assessment Conclusions provided to Baffinland by Hemmera.

There remains a long list of uncertainties and unknowns about the possible effects of icebreaking on Narwhal. IQ observations on life cycle events recorded in the Hemmera report are minimal (p. 8-9). Section 3.3.2.1 deals with IQ observations in relation to effects (p.20). However, these observations are later ignored and play no role in the discussion and conclusions reached by the authors. It is stated that, “IQ was relied upon in this review to address potential uncertainty and to develop acoustic thresholds used to quantify acoustic avoidance (p.53). However, there does not appear to be any elaboration on how, or the extent to which IQ was relied upon in reaching the report’s conclusions. Furthermore, the IQ observations coming from Arctic Bay do not appear to have been collected in any rigorous way in response to requests for specific observations in relation to particular circumstances (p. 20-21).

The Hemmera document contains a lot of information. It is masterfully organized and crafted. It is dismissive, but not obviously so, of anything that might contradict the conclusions reached. The report reviews literature that lends credibility to the hypothesis suggested by IQ observations on narwhal fat and possible impacts on the energy budgets, that shipping may have implications both morbidity and mortality.<sup>61</sup> The text appears to be reasonable, noting that narwhal return to an area of disturbance and that their initial reaction “*may have been a*

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<sup>60</sup> Hemmera Envirochem Inc., October 15, 2019, *Review of Mary River Phase 2 Assessment Conclusions on the Effects of Icebreaking to Narwhal*, prepared for Baffinland Iron Mines Corporation, Oakville, Ontario.

<sup>61</sup> The literature reviewed reports behaviours that could result in the use of considerable amounts of energy, including swimming away and back to an area from which they have been displaced, a “freeze response” and other forms of fright. The literature reviewed is not extensive or conclusive. However the literature now being produced on the effects of noise on whales, internationally, is extensive. Increasingly it suggests that the effects of noise on whales is serious and negative. A review of this literature is found in Carlos Duarte, Lucille Chapuis, Shaun Collin et al, 2021, The soundscape of the Anthropocene ocean, *Science*, 05 Feb., 371 (6529) 1 – 10, eaba4658.

startle response” and “that some level of habituation or tolerance *may* have occurred (p. 26). This is clever wording. “*May*” is a word that, in the English language, suggests the equal validity of its exact opposite; that “*may not*” is equally, and also possible. The authors also like to suggest that the observations and conclusions of others should be “interpreted with caution” (p.25), but clearly not their own.

This is but one example of a pejorative and questionable use of language, repeated page after page throughout a well organized and cleanly worded document. It serves to covers over evidence suggesting the fragility of its conclusions.

The use of the words like ‘may’, ‘likely’, ‘possibly’, ‘suggests’, ‘expected’ and that with regard to some things there is “some level of uncertainty”, lend a tone of pleasant reasonableness to the text. The result is to make the reader far more receptive to conclusions that are also seemingly reasonable (i.e. “on balance”). In this case, it is concluded that: “On balance, literature evidence affirms the potential for low to moderate severity behavioural responses pre-mitigation.” It is not difficult to conclude that in this case, there is enough evidence to suggest that “there is potential for moderate to high severity behavioural responses pre-mitigation and that, at best, there is in this case, much uncertainty”.

Seen in another light, the evidence suggests the very real possibility that shipping has an effect on the energy consumption of narwhal. Furthermore, this must be understood as relevant to considering the cumulative and synergistic effects that all anthropogenic activity may be having on narwhal and other species in the maritime environments of Eclipse Sound and Milne Inlet.

The review of the literature we have conducted does not support the conclusion reached by in Hemmera’s *Review of Mary River Phase 2 Assessment Conclusions on the Effects of Icebreaking on Narwhal*. The Hamlet does not agree that, even given the mitigation measures proposed by Baffinland, the residual effects on narwhal are not significant (p. 53). The report’s authors in reaching their conclusion, pay little attention to the conditional language they have used throughout the report. Furthermore, they have gone to extraordinary lengths to support the conclusions and mitigation measures introduced by Baffinland, to the point of stretching their credibility.

On page 38 of the report they suggest that “vessel operators will choose nearby existing leads or spans of open water and avoid icebreaking of larger pans to the extent possible, such that it is likely that less icebreaking (and hence noise from icebreaking and related impacts to narwhal) will occur than has been assessed.”<sup>62</sup> The authors did not consult with vessel operators or

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<sup>62</sup> Hemmera Envirochem Inc., October 15, 2019, *Review of Mary River Phase 2 Assessment of Conclusions on the Effects of Icebreaking to Narwhal*, prepared for Baffinland Iron Mines Corporation, Oakville Ontario.

captains to see how plausible this suggestion might be. Leads occur in anything but a straight line. Ocean going, fully loaded ore carriers have a momentum such that they are not easily maneuverable and capable of carrying out this type of operation in the midst of floating and shifting ice pans, depending on currents and tides. Attempting to do so would involve changing speed and force in order to effect changes in direction, affecting underwater noise and likely doing more harm than good.<sup>63</sup>

The Hamlet takes issues with the indicators used to reach the conclusion that effects on narwhal are not significant. This shows a degree of certainty that is not supported by attention to international literature, the lack of attention to energy budgets and changes in fat reserves, and the attention drawn to these by Inuit hunters. Inuit IQ has been noted in the report, but summarily dismissed, along with - in some cases and with regard to some concerns - observations made by Fisheries and Oceans Canada. The report only deals with narwhal and does not consider potential effects on ringed seal, a species of the greatest importance to the community of Pond Inlet.

At best, the effects of shipping are indeterminate and the potential effects of going from 6 Mtpa to 12 Mtpa are unknown. However enough is known to suggest that there is considerable uncertainty and a great deal of risk associated with a doubling of the anthropogenic disturbance caused to this marine environment by shipping. As noted previously, the Hamlet has reason to doubt that the plans advanced for Adaptive Management will prove capable of dealing with any serious effects that may arise.

### *The Significance of reduced ice*

In summer months, orca whales are the main predators of narwhals in Eclipse Sound through the summer. Early and late in the season, narwhals use the cover of sea-ice to protect themselves from predation. In the presence of orca whales, narwhals spend more time close to shore and travel less frequently.<sup>64</sup> This has been documented by both western knowledge and IQ.

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<sup>63</sup> The author (Tester) makes this observation as an experienced open water sailor, having sailed the Atlantic Ocean and having navigated shipping lanes on the east coast of North America, as well as the Pacific Northwest, spoken with ship captains, and being well-aware of limits to the maneuverability of fully laden vessels, especially moving at a reduced speed. That this is possible under the conditions likely to be encountered is uninformed speculation on the part of the authors.

<sup>64</sup> Breed, Greg A., Cory J.D. Matthews, Marianne Marcoux, Jeff W. Higdon, Bernard le Blanc, Stephen D. Petersen, Jack Orr, Natalie R. Reinhart, and Steven H. Ferguson, 2017, Sustained Disruption of Narwhal Habitat Use and

Narwhals are known to keep regular migration routes and timing.<sup>65</sup> They stay where there is ice so that they can be protected from their predators, namely, orcas who, through satellite telemetry, have been shown to avoid heavy sea ice.<sup>66</sup> As their movements are dependent on ice conditions, with more breakup of the pack ice from shipping, orcas will be able to move more freely earlier in the season.

With ice-broken up in Eclipse Sound and Milne Inlet, it is likely that orca whales will expand their range into newly accessible areas.<sup>67</sup> A study that predicted the consumption of narwhals by orca whales estimated that 167 +/- 27 orcas could consume more than 1000 narwhals in a standard 90-day seasonal residency.<sup>33</sup>

### *Cumulative Interactive Effects*

When evaluating possible effects of shipping on the marine mammals of Eclipse Sound and Milne Inlet, the literature and examples such as the Athabasca oil sands teach us that all stressors must be considered.<sup>68</sup> When two stressors interact, the result can be greater, smaller, or different than if each stressor acted individually. Often, combined stressors result in a stronger biological effect than the sum of individual effects.<sup>69</sup> It is possible that while noise levels or changes to marine mammal behaviour do not individually surpass a pre-determined

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Behavior in the Presence of Arctic Killer Whales, *Proceedings of the National Academy of Sciences of the United States of America*, 114 (10): 2628–33, <https://doi.org/10.1073/pnas.1611707114>.

<sup>65</sup> Laidre, Kristin L., and Mads Peter Heide-Jørgensen, 2005, Arctic Sea Ice Trends and Narwhal Vulnerability, *Biological Conservation*, 121 (4): 509–17. <https://doi.org/10.1016/j.biocon.2004.06.003>.

<sup>66</sup> Lefort, K. J., C. J. D. Matthews, J. W. Higdon, S. D. Petersen, K. H. Westdal, C. J. Garroway, and S. H. Ferguson, 2020, A Review of Canadian Arctic Killer Whale (*Orcinus Orca*) Ecology, *Canadian Journal of Zoology*, Canadian Science Publishing, <https://doi.org/10.1139/cjz-2019-0207>.

<sup>67</sup> Higdon, Jeff W. and Steven H. Ferguson, 2009, Loss of Arctic Sea Ice Causing Punctuated Change in Sightings of Killer Whales (*Orcinus Orca*) Over the Past Century, *Ecological Applications*, 19 (5): 1365-1375.

<sup>68</sup> Mahon, C. Lisa, Gillian L. Holloway, Erin M. Bayne, and Judith D. Toms, 2019, Additive and Interactive Cumulative Effects on Boreal Landbirds: Winners and Losers in a Multi-Stressor Landscape, *Ecological Applications*, 29 (5), <https://doi.org/10.1002/eap.1895>.

<sup>69</sup> Harvey, Ben P., Dylan Gwynn-Jones, and Pippa J. Moore, 2013, Meta-Analysis Reveals Complex Marine Biological Responses to the Interactive Effects of Ocean Acidification and Warming, *Ecology and Evolution*, 3 (4): 1016–30, <https://doi.org/10.1002/ece3.516>.

threshold, together these stressors have a severely detrimental effect. It is important to study the potential interactive effects of stressors, particularly where there is uncertainty about individual stressors.

IQ about seals in Milne Inlet, Eclipse Sound suggest further concerns, particularly in relation to ice formation, identification of territory, sites for breathing holes, development of the fetus and making choices for the denning that comes later. The Hamlet regards the risk to be significant enough to justify its condition that ice breaking be severely limited in relation to ice breakup in the spring and ice formation in the fall.

The observations made by Baffinland on shipping effects and ice breaking on narwhal have been thoroughly challenged by information subsequently presented by a number of well-qualified and experienced marine biologists and qualified scientists at the hearings.

As noted by Baffinland, the Hamlet's proposal would put a severe restriction on ice breaking, perhaps limiting Baffinland to the open-water season. The Hamlet concludes that its initial position against ice breaking is consistent with what marine biologists, elders and hunters have identified as necessary to protect narwhal and ringed seal in Eclipse Sound and Milne Inlet.

The Hamlet acknowledges the MHTOs collective experience with regard to the importance and use of ice by species vital to the food security of the community. The Hamlet defers to the collective experience of the MHTO in any decisions that are to be made about ice and shipping.

## **Conclusion**

In reviewing the studies and literature on narwhal and ringed seal, an important observation has been hard to ignore. While research scientists – most of them being academics – convey the results of their studies with appropriate and most often cautionary language in keeping with the results of their studies, this is anything but true of the scientists engaged by Baffinland. They are driven to reaching absolute and clear-cut conclusions, entirely consistent with what one can reasonably assume to be results and conclusions supportive of and desirable to Baffinland, their client.

This is not always the case. Where western scientists have written summary papers, their conclusions are often inclined to certainty and declarative conclusions. This may be a result of reviewing hundreds of pieces of research that, even if not declarative, are strongly inclined toward a particular conclusion. Little research has been done on the biases of scientists working under contract for entities with a particular and obvious interest in a particular outcome. However, some research has been done on the biases that expert field scientists bring to

interpreting their data in cases of uncertainty. Wilson, Shipley and Davatzes note the relationship between bias in interpreting field data and the cognitive history of the individual.<sup>70</sup>

In another study, both scientists and managers dealing with aquatic non-indigenous species impacts and faced with knowledge gaps and uncertainty, were inclined to assign lower consequence to their findings.<sup>71</sup> “Both scientists and managers assigned lower consequence when faced with knowledge gaps and other forms of uncertainty. This aligns with an “innocent until proven guilty” or hindsight approach, as opposed to a “guilty until proven innocent” or *precaution approach*” (p.103) (emphasis added).

The certainty projected in the Hemmera Report does not speak well for the Adaptive Management approach found in the ICA. It clearly indicates what Inuit will confront in determining thresholds, indicators and actions to be taken when project effects – especially serious effects – are encountered. Baffinland has demonstrated that it is willing to downplay research that contradicts or suggests that there may be limits to its conclusions with regard to effects, that it will defend its choice of indicators in the face of evidence suggesting that a cautionary approach should be taken to what has been chosen and the results obtained. All of this should be understood in relation to the caveats placed on the Precautionary Principle noted earlier in the text.

Finally, the Hamlet of Pond Inlet draws the attention of the Nunavut Impact Review Board to the United Nations Declaration on the Rights of Indigenous Peoples in relation to what has already been determined for the marine environment in question in relation to those rights.

Article 8 (2) reads, “States shall provide effective mechanisms for prevention of (a) Any action which has the aim or effect of depriving (Indigenous Peoples) of their integrity as distinct peoples, or of the cultural values or ethnic identities (b) any action which has the aim or effect of dispossessing of their lands, territories or resources.

For many years, Mittimatalingmiut have worked extensively with their regional association (QIA), Parks Canada and Fisheries and Oceans to create Sirmilik National Park and the Tallurutiup Imanga National Marine Conservation Area. Mittimatalingmiut have spoken clearly about their priorities for the lands and water which form the basis of their culture, lifestyles,

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<sup>70</sup> Wilson, Cristina G., Thomas F. Shipley and Alexandra K. Davatzes, 2020, Evidence of vulnerability to decision bias in expert field scientists, *Applied Cognitive Psychology*, 34: 1217-1223.

<sup>71</sup> Davidson, Alisha, Dahlstron, Marnie L. Campbell and Chad L. Hewitt, 2013, The role of uncertainty and subjective influences on consequence assessment by aquatic biosecurity experts, *Journal of Environmental Management*, 127 (2013) 103-113.



values and way of life, including a source of traditional foods. The Government of Canada has clearly recognized the vulnerability of this region and has taken important steps to protect it as a resource upon which Mittimatalingmiut and others depend for their well-being and that of future generations.

The Phase 2 Project has the potential to affect these lands and waters in a manner that could dispossess Mittimatalingmiut of resources upon which they depend. Ultimate responsibility for what happens to these lands and resources rests with the QIA as the legal entity responsible for Inuit lands in the region. However, the Hamlet notes the contradiction that would be obvious to all Inuit and Canadians in recognizing the vulnerability of these lands and waters, and steps previously taken by QIA and federal authorities to protect them on the one hand, while approving a development project that has already had detrimental effects on access and the environment, and that threatens these values on the other. The Phase 2 Proposal threatens the identity of Mittimatalingmiut and access to resources upon which they have, as a distinct culture, always depended.

Article 29 (1) of the Declaration states that “Indigenous peoples have the right to the conservation and protection of the environment and the productive capacity of their lands or territories and resources. States shall establish and implement assistance programs for indigenous peoples for such conservation and protection, without discrimination”.

The Government of Canada has taken steps to protect the right of Inuit “to the conservation and protection of the environment and the productive capacity of their lands (or) territories and resources”, presumably for good reason. This has been the result of research conducted by Fisheries and Oceans Canada and others, with the support of QIA, the Hamlet of Pond Inlet and the Mittimatalik Hunters and Trappers Organization. It is now being asked to declare that the region is not vulnerable, did not warrant being declared a marine conservation area and can be subjected to the expansion of a resource development project that was not originally planned for this environment. It involves risks and uncertainties to be borne by Mittimatalingmiut, in the interest of investors, shareholders and industrial interests, the vast majority of whom are not located in Canada.

Recommending this project would be insulting to the dedicated efforts of public servants, including researchers, Inuit researchers and elders – and many others – who have spent decades negotiating and creating Sirmilik National Park and the Tallurutiup Imanga Marine Conservation Area. Mittimatalingmiut have spoken about the value and the purpose to which their lands and resources will be put. They are not supportive of an industrial project with considerable risk and uncertainty and the considerable potential to undermine what has already been determined.

The Hamlet does not support the proposed Phase 2 Project of Baffinland Iron Mines Corporation.

## **APPENDIX A**



January 29, 2020

Mr. PJ Akeeagok  
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Igluvut Building, 2nd floor  
P.O. Box 1340  
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**Re: 2020 Path Forward**

Dear Mr. Akeeagok,

During our meeting in Iqaluit on January 21<sup>st</sup>, 2020 and follow-up conference call on January 24<sup>th</sup>, 2020 we discussed how the Qikiqtani Inuit Association (QIA) and Baffinland Iron Mines Corporation (Baffinland) can map out a 2020 path that leads both parties to mutual success. Baffinland sincerely appreciates QIA's spirit of collaboration and the effort put forward to delineate the key areas of focus. This letter is meant to be a formal commitment on behalf of Baffinland to deliver in these areas and work with the QIA in a transparent manner.

**1. Creation of a Mary River Project Inuit Committee**

QIA has requested the opportunity to meet with impacted communities in an effort to determine how Inuit want to engage in the next steps related to the Phase 2 proposal. Baffinland recognizes the value of these meetings and will provide QIA and communities the necessary time and freedom to conduct these meetings. Baffinland will work with QIA and amend its current schedule to accommodate this effort.

Baffinland understands one of the topics of discussion at QIA-led meetings will be the development of an Inuit Committee. Baffinland anticipates that following meetings QIA will bring forward its proposals for how such a committee could function in the future Mary River Project. Baffinland anticipates particular attention will be placed upon how Inuit Qaujimajatuqangit (IQ) is incorporated into the project, and where parties can improve the delivery of project benefits. Baffinland is committed to engaging on and responding to proposals brought forward by QIA. Baffinland is also committed to

resourcing agreed upon proposals including a clear Terms of Reference for the committee. Baffinland appreciates invaluable Inuit input that will improve the Mary River Project.

## **2. Approval of Management Plans**

Baffinland maintains that it cannot defer its decision-making responsibilities to QIA or an Inuit Committee for the safe and sustainable operation of the Mary River Mine. Baffinland understands this view will be taken into consideration when QIA develops its proposals.

Baffinland will work with QIA in an expeditious manner to identify management and/or monitoring plans that would benefit from an expanded role for the QIA and the Inuit Committee. It is the intention of this work to create a framework for QIA to approve these plans and for QIA to incorporate IQ and technical expertise as needed when evaluating these plans.

Baffinland can commit today to providing QIA with approval authority of the Adaptive Management Plan. Baffinland is committed to reaching agreement on the details of QIA's role with respect to this plan prior to the upcoming Nunavut Impact Review Board (NIRB) technical meeting.

Baffinland remains open-minded to having QIA also approve additional management and monitoring plans. Baffinland is committed to exploring this work further and reporting to all involved during the NIRB process.

## **3. Negotiation of Benefits**

Baffinland will work with the QIA in negotiation of IIBA Benefits that will flow from an operation approved under Phase 2. Baffinland feels it is important that all IIBA negotiations be conducted between our two organizations, with QIA representing the interests of Qikiqtani communities. Baffinland respects that QIA will work with communities to develop the most appropriate approach to ensure they are properly represented. Baffinland will not undertake any IIBA negotiation outside the group identified by QIA. It is understood that the CEO of Baffinland and the President of the QIA will be the lead negotiators.

Baffinland will prepare introduction and clarification of information to ensure details of offers are well understood. Baffinland will work with the negotiating team in a spirit of full transparency.

It is Baffinland's intention that all benefits will flow through the IIBA or through amendment to other existing agreements. Baffinland also feels it is important that the communities see annual benefits from this agreement and it is easily understood that as Baffinland succeeds, so do the Inuit of the Qikiqtani Region.

I am open to discuss at any time if these commitments from Baffinland do not meet with the intention of the conversation to date. I appreciate QIA's continued support for the Mary River Operation.

Best regards

Brian Penney

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