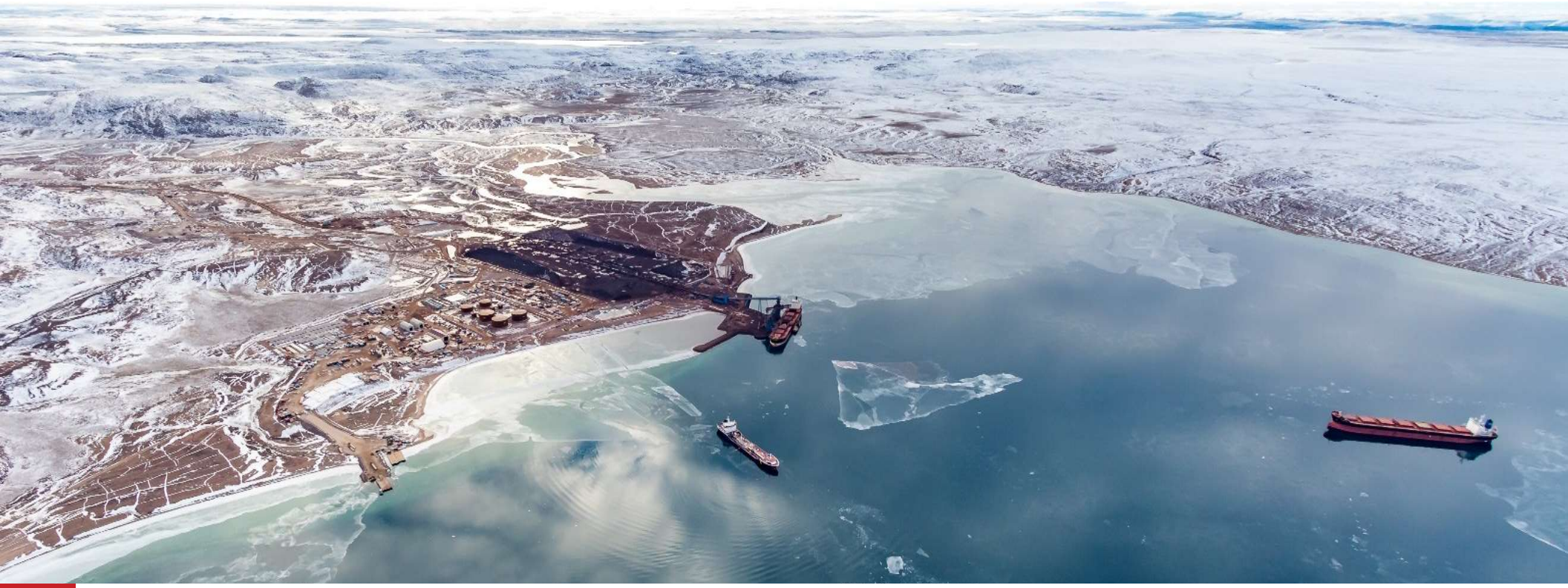


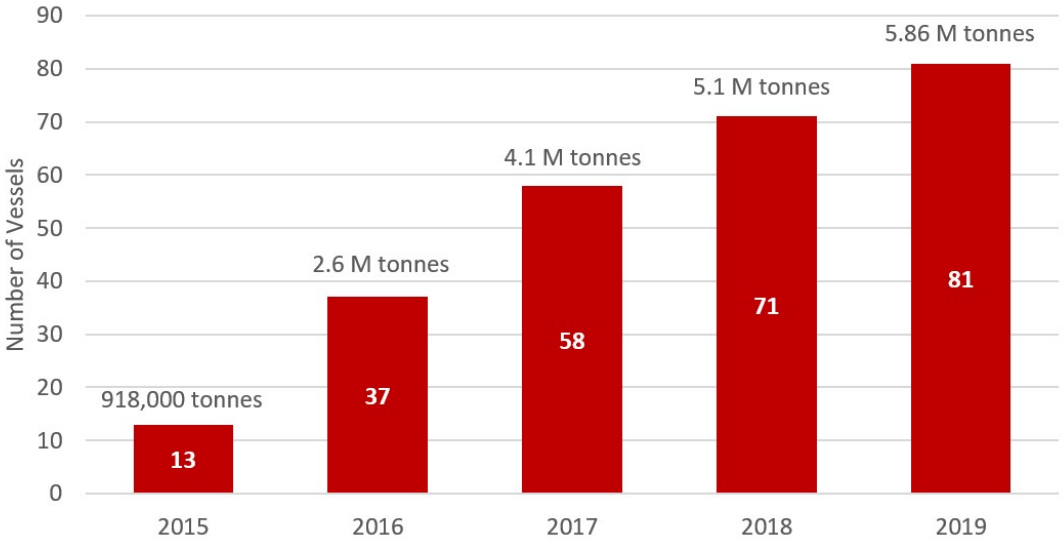
Baffinland

NIRB Marine Monitoring and Mitigation Workshop – Mary River Project

Marine Operational Overview/Marine Monitoring Programs

Pond Inlet – August 25, 2020

2015-2019: Number of Ore Carriers and Tonnage by Year



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2019 Shipping Season Highlights

Start of Season Conditions

- Operations commenced on July 17 – ice conditions lighter than normal
  - Communication received from MHTO that there is no land-fast ice and hunters no longer using the floe edge
  - Number of transits per 24 h were limited up to July 30th by prevailing ice conditions.
  - +6/10 concentration one transit per 24 hrs; 6/10-3/10 2 transits per 24 hrs; 3/10 or less normal operation.

Ice Management Vessel

- Botnica escorted vessels for ice mitigation purposes from July 18th to 26th.
- Inuit Marine Wildlife Observers joined Botnica at beginning and end of the season.
- Botnica supported placement/retrieval of acoustic equipment early August/late September/October.
- Bowhead hunt – BIM had Botnica standby in case of on water emergency during hunt.

Baffinland

2019 Shipping Season Highlights

Iron Ore Carrier Vessels

- Loading of ore occurred from July 19 to October 30.
- 82 voyages, or 164 transits through the corridor.
- Approval of application to NIRB ship up to 6 MTPA.
    - Total volume shipped = 5.86 MT (81 vessels)
    - 1 ore carrier sent out for additional ballast water exchange based on salinity < 30 ppt

Dry Operations Re-Supply/Infrastructure Cargo Vessels

- 9 operations/infrastructure
- 3 heavy sealift

Wet Re-Supply Cargo Vessels

- 5 voyages throughout the season
- Successful ship-to-ship transfer operations completed

Baffinland

2019 Shipping Season Highlights

Ongoing Management of Vessel Speeds

- Speed monitored for all vessels performing BIM business using Exact Earth.
- All exceedances followed up with Vessel Masters.
- Limited to 9 knots but some exceedances due to vessel control in turning.

Ongoing Ballast Water Management

- Golden Pearl sent out to Lancaster Sound to re-exchange ballast early August due to failure of ballast water test.

Routing in Shipping Corridor

- Routing monitored for all vessels performing BIM business.
- All variations followed up with Vessel Masters.
- Variations primarily due to ice, vessel avoidance.
- Some drifting took place in Eclipse due to windstorm on August 23 (vessels left ports/anchorages).

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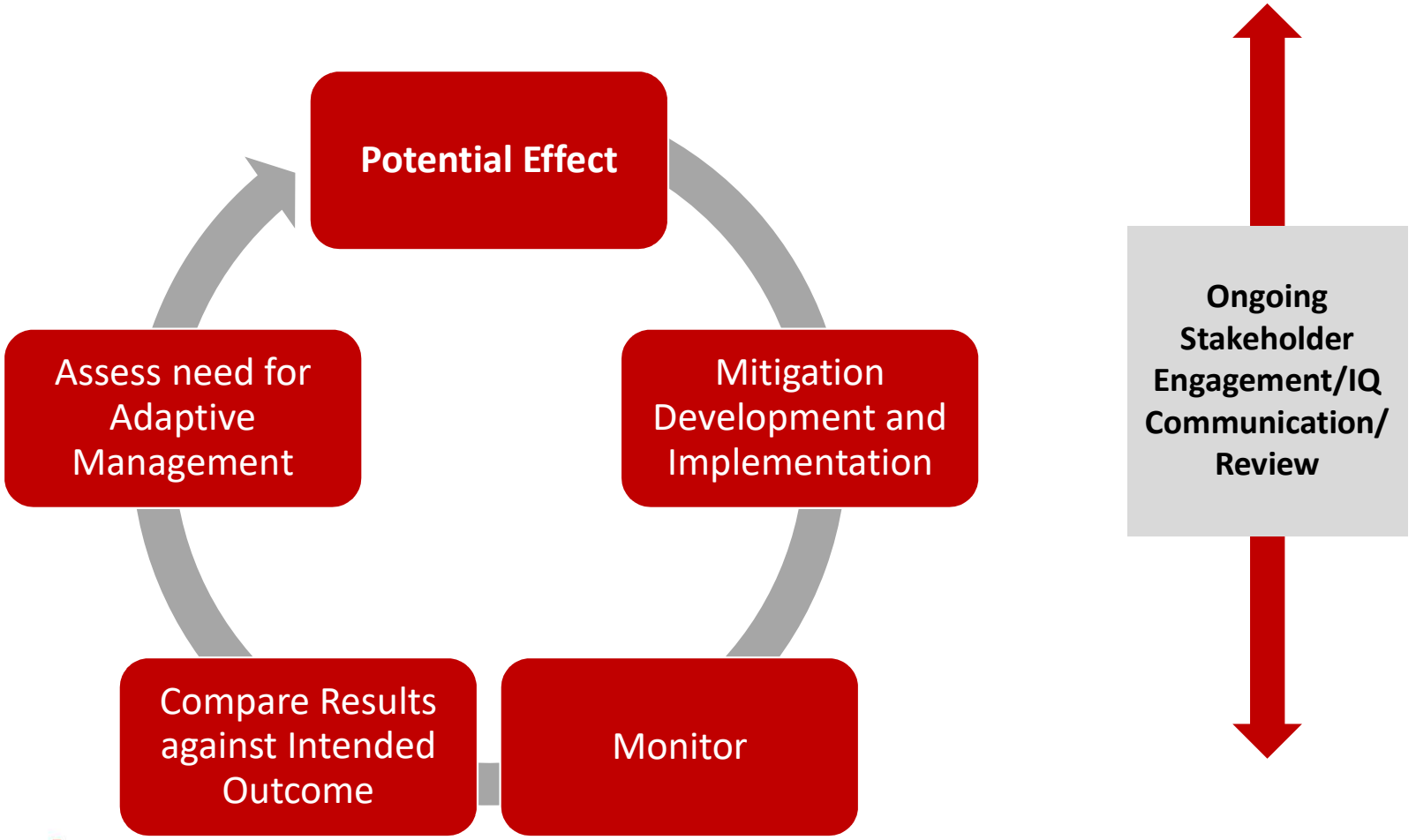
Shipping Management and Mitigation Measures

Development of Shipping Management and Mitigation Measures



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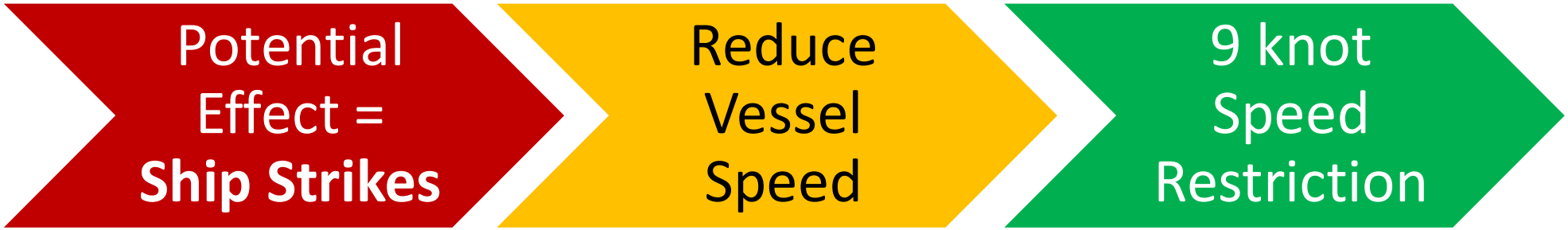
Shipping Mitigation and Management: Ship Strikes



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Shipping Mitigation and Management: Ship Strikes

- Maximum 9 knot speed restriction for Baffinland-contracted vessels
- Accepted as highly effective mitigation for reducing likelihood of lethal vessel strikes
- Baffinland remains the only operator in Regional Study Area to implement speed restrictions on vessels

Project Vessel Type	% of Travel in the RSA <9 knots	% of Travel in the RSA <10 knots
Ore Carriers	99.3	99.9
Cargo / Freight Vessels	93.6	99.3
Fuel Tankers	98.2	99.4
Tugs	94.5	99.0
MSV Botnica Icebreaker	99.7	99.9
Total Average	**97.8**	**99.2**

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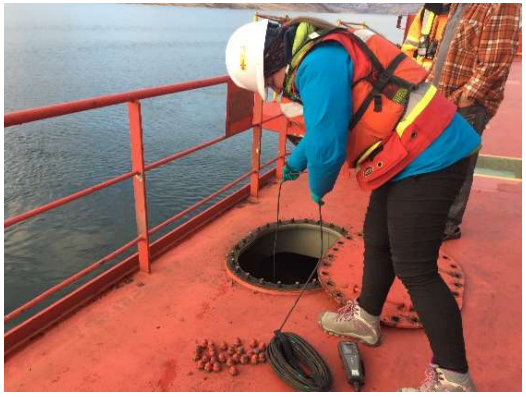
Shipping Mitigation and Management: Aquatic Invasive Species

Potential Effect = **Aquatic Invasive Species**

Reduce Pathways for Introduction of Aquatic Invasive Species

1. Ballast water exchange/treatment
2. Ballast water compliance testing prior to discharge at Milne Port
3. Compliance will all applicable IMO and TC regulations for biofouling
4. Monitor



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Prevention of Aquatic Invasive and Non-native Species: Ballast Water Management

Transport Canada requires that all foreign vessels on a transoceanic intending to enter Canadian waters must treat water before release or do following:

1. Conduct a ballast exchange (release all water from ballast tanks; intake water into ballast tanks) at least 200 nm from Canada at a depth of 2,000 m.
2. A Ballast Water Reporting Form must be submitted to Transport Canada after the exercise has been completed.

Baffinland takes this a step further and goes beyond the Canadian regulations:

- Every ore carrier that comes into Milne Inlet port has a salinity test performed on a random ballast tank. If the test shows that the salinity level is below 30 parts per thousand (ppt) then the ship is required to head out to Lancaster Sound to perform another exchange (and is re-tested)
- Every ore carrier with onboard treatment system both exchanges and treats water

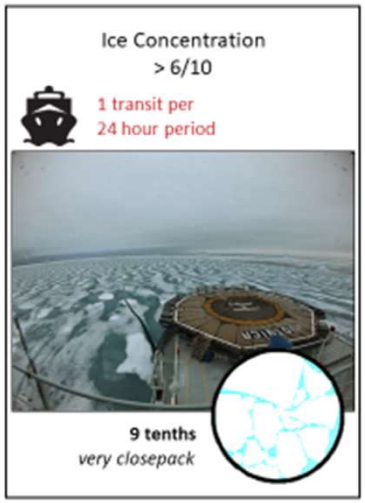
Baffinland

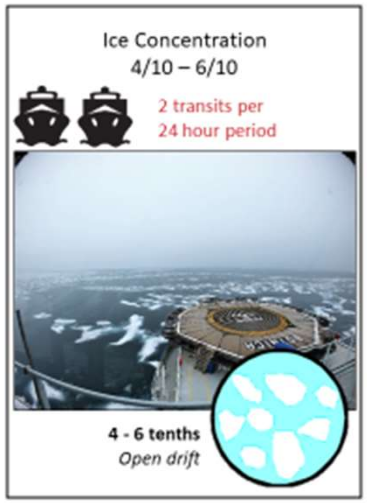
Shipping Mitigation and Management: Acoustic Masking and Disturbance

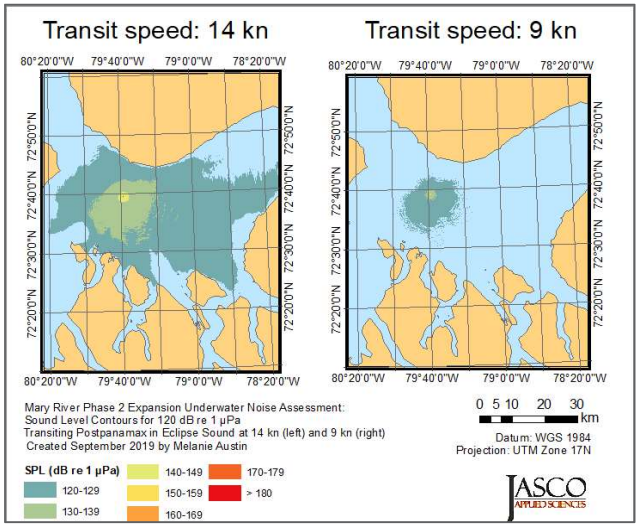
Potential Effect: Acoustic Masking and Disturbance

1. Restriction of transits in heavier ice conditions
2. Minimize amount of time where noise levels would onset disturbance and avoidance behaviour

1. Avoidance of ice if and when safe to do so
2. 9 knot speed restriction
3. Commitment to not break landfast ice







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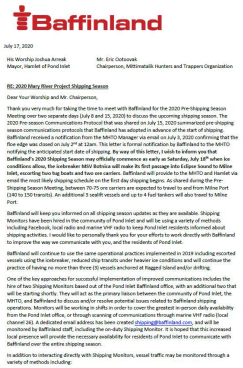
Shipping Season Communications

Overall Shipping Season Communications

- Enhanced communications through the community
- Develop and implement Communications Protocol and provide Baffinland team contact information to community members
  - Pre-shipping season
  - During shipping
  - End of season:
    - Wrap-up meeting
    - Improvements for next year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July 17, 2020

His Worship Joshua Arnaek
Mayor, Hamlet of Pond Inlet

Mr. Eric Ootoovak
Chairperson, Mittimatalik Hunters and Trappers Organization

RE: 2020 Mary River Project Shipping Season

Dear Your Worship and Mr. Chairperson,

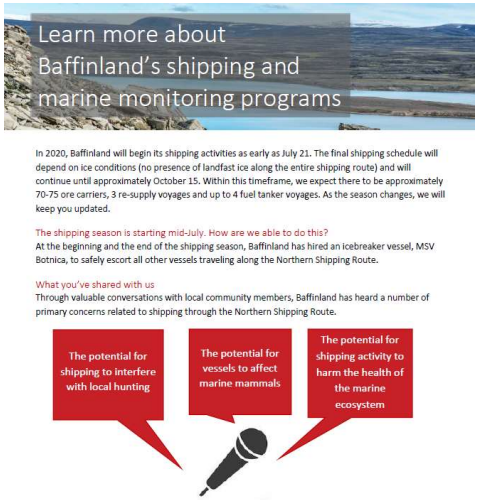
Thank you very much for taking the time to meet with Baffinland for the 2020 Pre-Shipping Season Meeting over two separate days (July 8 and 15, 2020) to discuss the upcoming shipping season. The 2020 Pre-season Communications Protocol that was shared on July 15, 2020 summarized pre-shipping season communications protocols that Baffinland has adopted in advance of the start of shipping. Baffinland received a notification from the MHTO Manager via email on July 6, 2020 confirming that the floe edge was closed on July 2nd at 12am. This letter is a formal notification by Baffinland to the MHTO notifying the anticipated start date of shipping. By way of this letter, I wish to inform you that Baffinland's 2020 Shipping Season may officially commence as early as Saturday, July 18th when ice conditions allow, the icebreaker MSV Botnica will make its first passage into Eclipse Sound to Milne Inlet, escorting two tug boats and two ore carriers. Baffinland will provide to the MHTO and Hamlet via email the most likely shipping schedule on the first day shipping begins. As shared during the Pre-Shipping Season Meeting, between 70-75 ore carriers are expected to travel to and from Milne Port (140 to 150 transits). An additional 3 seallift vessels and up to 4 fuel tankers will also travel to Milne Port.

Baffinland will keep you informed on all shipping season updates as they are available. Shipping Monitors have been hired in the community of Pond Inlet and will be using a variety of methods, including Facebook, local radio and marine VHF radio to keep Pond Inlet residents informed about shipping activities. I would like to personally thank you for your efforts to work directly with Baffinland to improve the way we communicate with you, and the residents of Pond Inlet.

Baffinland will continue to use the same operational practices implemented in 2019 including escorted vessels using the icebreaker, reduced ship transits under heavier ice conditions and will continue the practice of having no more than three (3) vessels anchored at Ragged Island and/or drifting.

One of the key approaches for successful implementation of improved communications includes the hire of two Shipping Monitors based out of the Pond Inlet Baffinland office, with an additional two that will be starting shortly. They will act as the primary liaison between the community of Pond Inlet, the MHTO, and Baffinland to discuss and/or resolve potential issues related to Baffinland shipping operations. Monitors will be working in shifts in order to cover the greatest in-person daily availability from the Pond Inlet office, or through scanning of communications through marine VHF radio (local channel 16). A dedicated email address has been created shipping@baffinland.com, and will be monitored by Baffinland staff, including the on-duty Shipping Monitor. It is hoped that this increased local presence will provide the necessary availability for residents of Pond Inlet to communicate with Baffinland over the entire shipping season.

In addition to interacting directly with Shipping Monitors, vessel traffic may be monitored through a variety of methods including:



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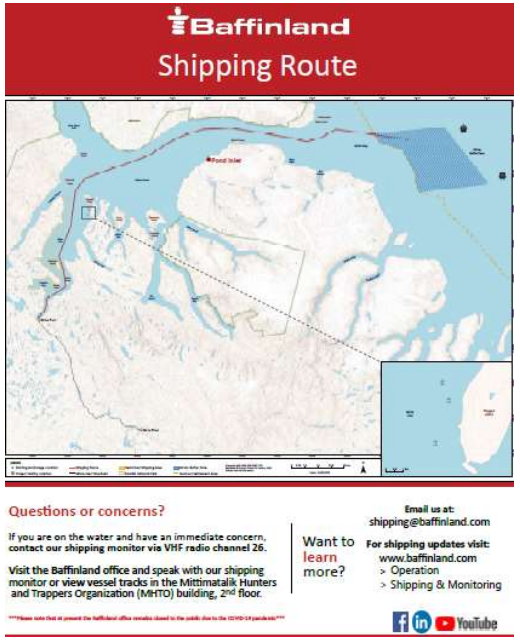
Pre-season and Start of Shipping

1. Provide communities with anticipated shipping schedule
   - Host pre-shipping season meeting (8, 15 July 2020)
   - Distribute Shipping and Marine Monitoring Fact Sheet
   - Provide MHTO with copies of past year monitoring reports
   - No presence of landfast ice along entire Northern Shipping Route

2. Baffinland to contact MHTO to confirm floe edge is no longer being used by hunters at the start of the shipping season
   - Receive confirmation from MHTO to Baffinland in writing via email
   - Start of shipping season letter sent to MHTO and Hamlet in advance of start



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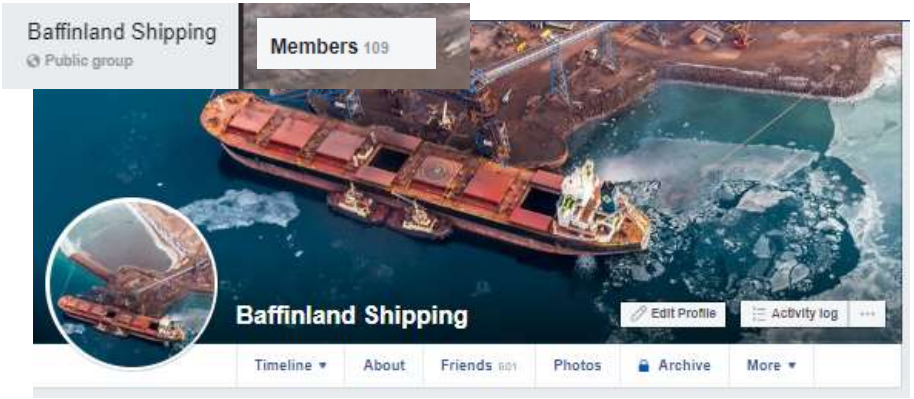
During Shipping Season

1. Maintain communications with community members during the shipping season through the Pond Inlet Shipping Monitors
2. Set up Automatic Identification System (AIS) monitoring station
3. Maintain involvement of Inuit in monitoring programs***

***Not possible in 2020 due to COVID-19 pandemic



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Community Input

What is Baffinland doing when ice is present?

- Baffinland has been using an icebreaking vessel at the beginning and end of the season to manage safe vessel transit when ice is present (~2 weeks at the beginning and end of season)
- Baffinland will not start shipping until confirmation that there is no more landfast ice along the entire Northern Shipping Route
- Baffinland will not start shipping until confirmation from the Mittimatalik Hunters and Trappers Organization that the floe edge is closed to hunting
- Transit restrictions in heavier ice concentrations: limiting the number of vessels traveling to and from Milne Port based on ice conditions
- Baffinland is not shipping during periods of seal pupping

Vessel Speed

What we have heard?

- Vessels (mostly sealifts) are travelling too fast
- Larger vessels and speed of vessels is creating wakes that affects hunters

How are we addressing your concerns?

- All ship captains are provided with instructions for shipping including ship speed to follow
- In 2018 we reduced the ship speed to 9 knots unless not possible for safe passage
- Implementation of AIS monitoring alert system to track vessels while they are transiting through corridor to see where they are travelling and the speed they are travelling at
- We contact vessels when they are going too fast
- We prepare an internal report on ship speeds and discuss with vessel owners exceedances of ship speeds

Baffinland

Narwhal Abundance and Noise

What we have heard?

- Number of narwhals have been changing
- Hunters have to travel further to harvest narwhal
- Condition and health of narwhal may be declining
- Reasons for changing narwhal numbers may be related to climate, presence of killer whales, ice conditions, project shipping
- Narwhal move away from noisy vessels
- Icebreaking will scare narwhal away

How are we addressing your concerns?

- Ore carriers to wait in Baffin Bay at least 40 km east of Nunavut Settlement Area
- Transit restrictions in heavier ice concentrations: limiting the number of vessels traveling to and from Milne Port based on ice conditions
- Conducting monitoring programs to assess if behavior, abundance or distribution of narwhal is being affected by the Project:
  - Bruce Head shore-based monitoring program
  - Aerial abundance surveys
  - Acoustic monitoring
  - 2017-2018 Tremblay Sound narwhal tagging program in collaboration with Fisheries and Oceans Canada

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Aquatic Invasive Species

What we have heard?

- There are new species in the area since shipping started
- Concerns that invasive species could have negative effect on fish and marine mammals that are important food sources for community
- Invasive species are being introduced by ballast water discharged by vessels

How are we addressing your concerns?

- Extension of invasive species monitoring program to include sampling at Ragged Island (note: ballast water is not discharged at Ragged Island)
- Ongoing monitoring of physical components of marine environment (sediment and plants), monitoring of fish presence and health, monitoring of abundance of marine mammals
- Improved quality control of ballast water testing process (note: all ballast water must be managed in accordance with regulations)

Baffinland

Dustfall

What we have heard?

- Red dust observed on snow is concerning
  - Snow will not be used for melting and making tea near Project Area

How are we addressing your concerns?

- Identification of new mitigation measures:
  - Use of dust suppression on roads (e.g., Dust Stop); Reducing drop distances to stockpiles; Addition of hoods, shrouds and rubber bellows used on crush equipment (stackers and conveyors); Adjustments in conveyor heights to minimize ore drop
  - Stockpile suppressant (DusTreat) – product arriving on 2020 Sealift
- Amended Air Quality and Noise Abatement Management Plan (2020)
- Exploring use of satellite imagery to better assess the extent of dust dispersion during winter months when snow is present
- Ongoing monitoring of physical components of marine environment (water, sediment), monitoring of fish presence and health, monitoring of abundance of marine mammals

Baffinland

Vessel Management

What we have heard?

- Vessels are travelling too close to the western shoreline of Milne Inlet
  - Request to move slightly the shipping lane away from Bruce Head
- There are too many vessels drifting or anchored in Eclipse Sound
- There are too many ships in the area and it is disrupting hunting and availability of marine mammals
  - Preference for no drifting in Eclipse Sound or anchoring at Ragged Island

How are we addressing your concerns?

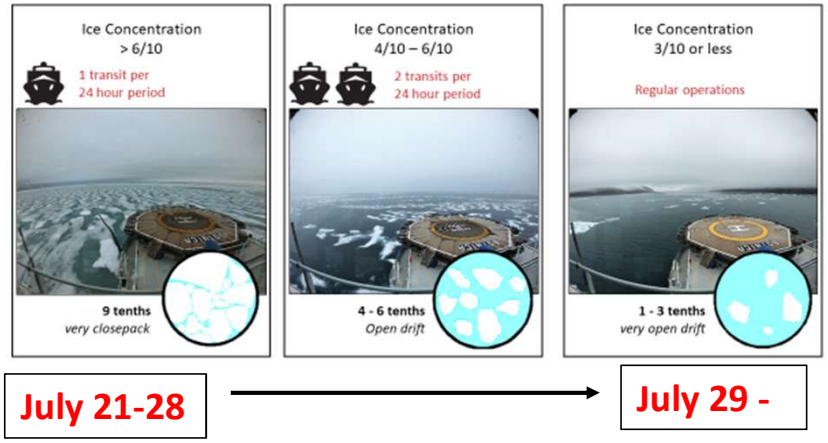
- All ship captains are provided with a shipping route to follow
- Provide direction to captains that they should avoid deviating from shipping route unless this is necessary for safe passage
- No drifting in Eclipse Sound unless warranted for safety reasons and maximum of 3 vessels can anchor at any time
- Shipping lane was moved east and away from Bruce Head, just west of Poirier Island allowing still for safe navigation
- Commitment to have no more than 3 vessels anchored or in drifting zones in Eclipse Sound
- Implementation of AIS monitoring alert system to track vessels
- We are hiring two people from Pond Inlet to monitor ship activity through the season

Baffinland

2020 Shipping Operations

2020 Shipping Operations

- Iron Ore Carrier Vessels
  - Targeting shipment of up to 6 MTPA of iron ore
  - Operations started on July 21*: convoy of 1 Botnica, 2 tugs and 2 ore carrier vessels
  - Will be supported by two tugs
  - Will be supported by the Botnica at the beginning (July 21 - 31) and end of shipping season.
  - Anticipating 70 -75* ore carriers (140 – 150 transits)
    - 31-32 vessel currently loading at Milne Port (Aug 25)
- Resupply and Fuel Vessels
  - Anticipating 3* cargo vessels
  - Anticipating 3 - 4 fuel tankers



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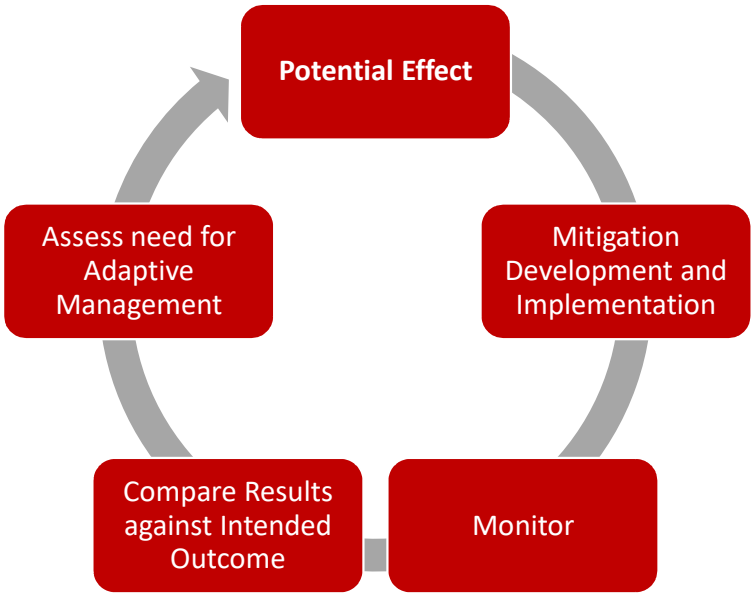
Marine Monitoring Programs

Studying the Marine Environment

- Marine Mammals
- Water
- Sediment
- Invasive Species
- Fish



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Studying the Marine Environment

	Year										
	2006	2007	2008	2013	2014	2015	2016	2017	2018	2019	2020
Aerial Surveys and/or Narwhal Tagging Program	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bruce Head Shore-based Monitoring				✓	✓	✓	✓	✓	*	✓	✓
Ship-based Observer Program				✓	✓	✓			✓	✓	**
Acoustic Monitoring Program				✓	✓			✓	✓	✓	✓
Marine Environmental Effects Monitoring Program/AIS/Habitat Offset	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Baseline Data → **Post-Baseline Data**

- Prior to shipping, environmental monitoring was conducted to understand the baseline conditions of Project area
- We use baseline information and monitoring data to track and compare if there have been any changes in the marine environment since we started shipping

Baffinland

Marine Monitoring Programs - 2019

Aerial Survey

Monitor narwhal abundance and distribution (Eclipse Sound summer herd) and other marine mammal species in Project area

Bruce Head Shore-based Monitoring

Investigate narwhal response to shipping along the Northern Shipping Route by observing them from top of Bruce Head

Marine Environmental Effects and Aquatic Invasive Species/Habitat Offset

Ballast water and video monitoring of vessel hulls

Water quality, sediment, metals

Fish abundance and health

Ongoing monitoring for the construction of ore dock

Ship-based Observer

This program investigates narwhal response to shipping activities by observing them from MSV Botnica

Objectives:

- Measure the effects that the shipping is having on the marine environment
- Assess the accuracy of predictions of effects
- Determines if adaptive mitigation measures need to be developed

Baffinland

Marine Mammals Monitoring – Results to Date

- Relative abundance of narwhal has remained relatively constant throughout 2014-2019
- Narwhal abundance in Eclipse Sound has also remained constant since pre-shipping
- Narwhal numbers highest from mid-August to mid-September
  - Most common in Tremblay Sound, Eclipse Sound West, Milne Inlet, and Koluktoo Bay
- Narwhal temporarily move away from vessels and then come back into the ship track line
- Studies will continue to further the understanding of effects – duration and distance of displacement

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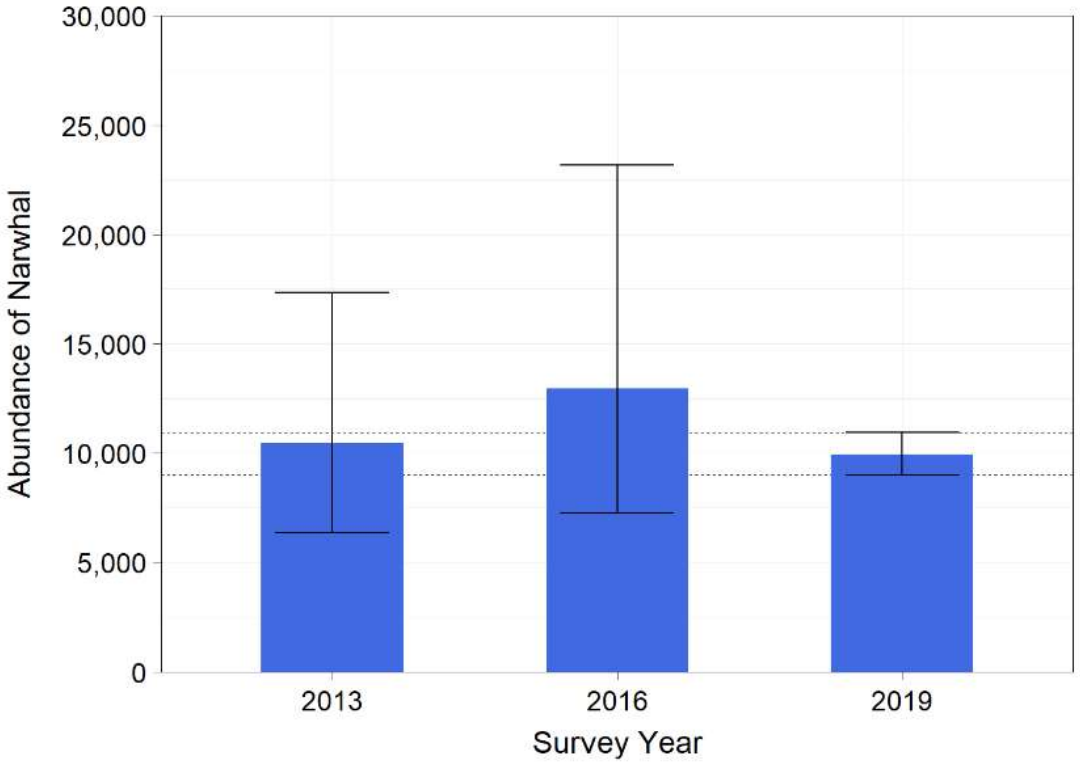
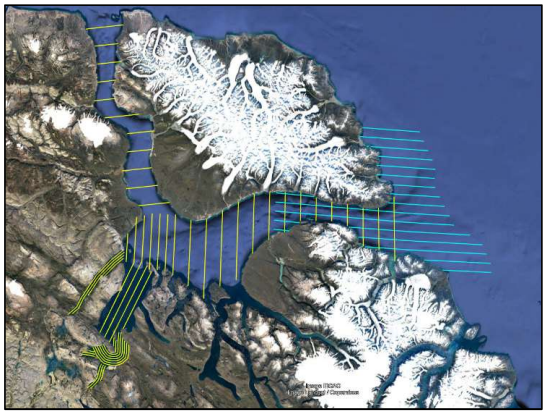
Marine Mammal Aerial Survey Program – Annual Comparisons





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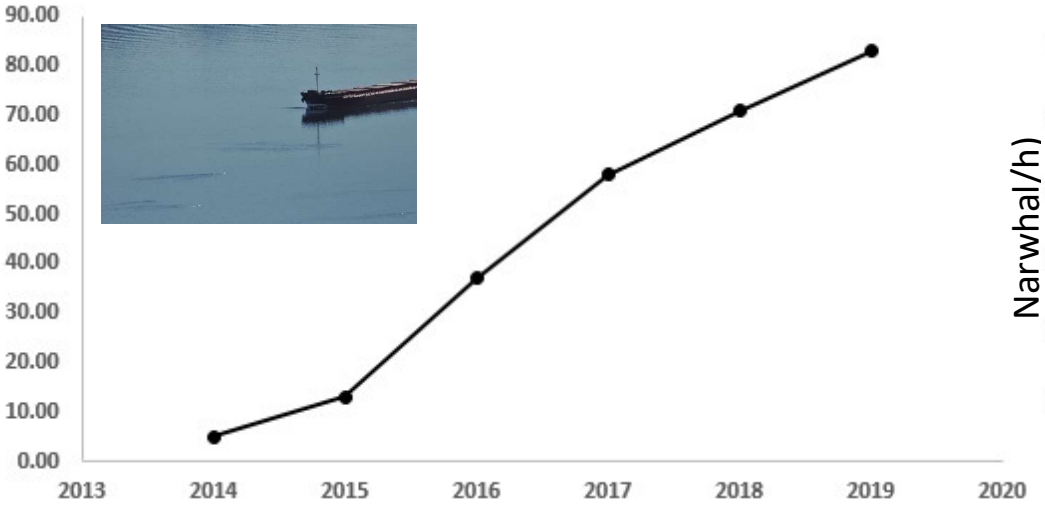
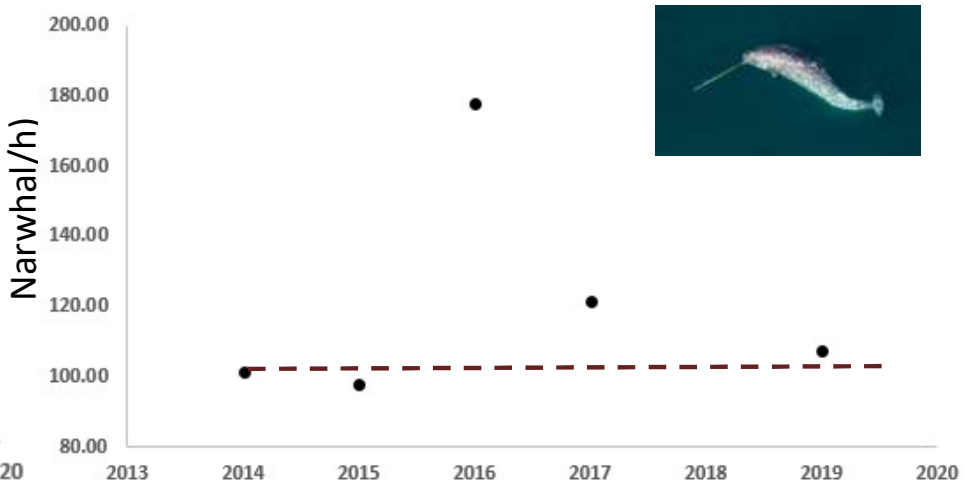
Bruce Head Shore-based Monitoring Program – Relative Abundance and Distribution (RAD): 2014-2017, 2019





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Bruce Head Shore-based Monitoring Program – Behavioural Study

- Group composition

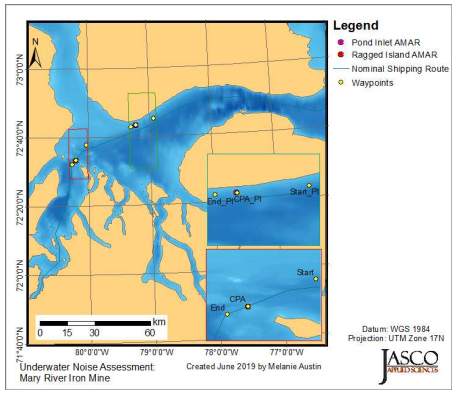
Year	Calves & Yearlings %
2014	39.9
2015	35.9
2016	36.8
2017	33.5
2018	N/A
2019	36.8

Baffinland

2019 Acoustic Monitoring

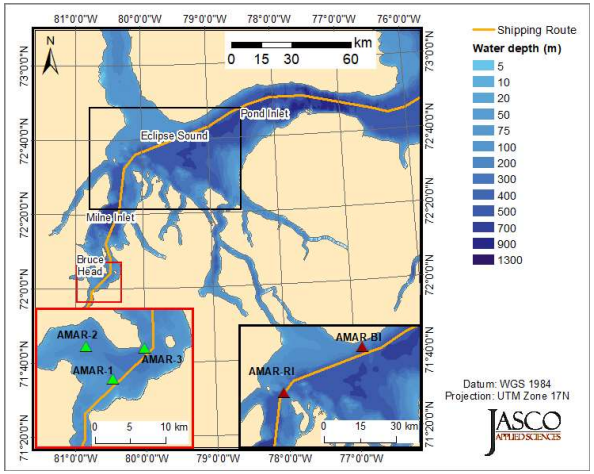
Results - Early Shoulder Season

- 18 – 23 July, 2019
  - Less noise > 120 db than modelled
  - More quiet time < 120 db
- Additional data analysis required with newest 2020 data



Results - Open-water Season

- 5 August - 28 September, 2019
  - Less noise > 120 db than modelled
  - More quiet time < 120 db
- Additional data analysis required with newest 2020 data



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Marine Environment Monitoring – Results to Date

- Water Quality : no detection of Project-related effects
  - Water quality has been consistent between 2014-2019 and generally did not differ from pre-shipping conditions
  - Clear water: Low turbidity and total suspended solids
- Seabed changes : no detection of Project-related effects
  - Sediment quality has been consistent between 2014-2019
  - Sediment composition has been consistent between 2014-2019
  - No significant changes to seabed flora and fauna
- Fish Health and Numbers
  - Arctic Char most common during summer
  - Other species: sculpin, cod, Northern sand lance
  - Fish tissue collected does not exceed guidelines for metals and hydrocarbons
- Offset habitat functioning as fish habitat as intended
- Invasive species
  - One potentially invasive species has been found though further investigation is required to determine if presence in Milne Port is recent since it has been previously observed near Baffin Island

Baffinland

Marine Environment Monitoring – Results to Date

- Water Quality
  - Water quality
  - Clear water: L
- Seabed chan
  - Sediment qua
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Marenzelleria viridis

Baffinland

2020 Marine Monitoring Programs

Marine Monitoring Programs - 2020

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Ongoing monitoring for the construction of ore and freight docks

Ship-based Observer

Not possible in 2020 due to COVID-19 pandemic

Objectives:

- Measure the effects that the shipping is having on the marine environment
- Assess the accuracy of predictions of effects
- Determines if adaptive mitigation measures need to be developed

ROMM
RÉSEAU D'OBSERVATION DE MAMMIFÈRES MARINS

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2020 Shipping Season Summary

2020 Shipping Season Summary

- Targeting shipment of up to 6 MTPA of iron ore
  - Operations started on July 21*: convoy of 1 Botnica, 2 tugs and 2 ore carrier vessels
- 2020 marine monitoring programs are underway
  - ***No community member participation possible due to COVID-19 pandemic***
- Shipping-related communications underway
  - Shipping monitors hired
  - Pre-shipping season meeting: 8, 15 July 2020
  - End of Shipping Season Meeting: to be determined

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Questions?
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