



## SCREENING DECISION REPORT NIRB FILE No.: 19YN020

NPC File No.: 149049

**June 4, 2019**

Following the Nunavut Impact Review Board's (NIRB or Board) assessment of all materials provided, the NIRB is recommending that a review of the University of Alberta "Impacts of Melting tidewater Glaciers on Marine Biogeochemical Cycles" is not required pursuant to Article 12, Section 12.4.4(a) of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada (Nunavut Agreement)* and s. 92(1)(a) of the *Nunavut Planning and Project Assessment Act*, S.C. 2013, c. 14, s. 2 (*NuPPAA*).

Subject to the Proponent's compliance with the terms and conditions as set out in below, the NIRB is of the view that the project proposal is not likely to cause significant public concerns, and it is unlikely to result in significant adverse environmental and social impacts. The NIRB therefore recommends that the responsible Minister accepts this Screening Decision Report.

### OUTLINE OF SCREENING DECISION REPORT

- 1) REGULATORY FRAMEWORK
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The primary objectives of the NIRB are set out in Article 12, Section 12.2.5 of the *Nunavut Agreement* and are confirmed by s. 23 of the *NuPPAA*:

*Nunavut Agreement*, Article 12, Section 12.2.5: In carrying out its functions, the primary objectives of NIRB shall be at all times to protect and promote the existing and future well-being of the residents and communities of the Nunavut Settlement Area, and to protect the ecosystemic integrity of the Nunavut Settlement Area. NIRB shall take into account the well-being of the residents of Canada outside the Nunavut Settlement Area.

The purpose of screening is provided for under Article 12, Section 12.4.1 of the *Nunavut Agreement* and s. 88 of the *NuPPAA* which states:

*NuPPAA*, s. 88: The purpose of screening a project is to determine whether the project has the potential to result in significant ecosystemic or socio-economic impacts and, accordingly, whether it requires a review by the Board...

To determine whether a review of a project is required, the NIRB is guided by the considerations as set out under Article 12, Section 12.4.2(a) and (b) of the *Nunavut Agreement* and s. 89(1) of *NuPPAA* which states:

*NuPPAA*, s. 89(1): The Board must be guided by the following considerations when it is called on to determine, on the completion of a screening, whether a review of the project is required:

- (a) a review is required if, in the Board's opinion,
  - i. the project may have significant adverse ecosystemic or socio-economic impacts or significant adverse impacts on wildlife habitat or Inuit harvest activities,
  - ii. the project will cause significant public concern, or
  - iii. the project involves technological innovations, the effects of which are unknown; and
- (b) a review is not required if, in the Board's opinion,
  - i. the project is unlikely to cause significant public concern, and
  - ii. its adverse ecosystemic and socioeconomic impacts are unlikely to be significant, or are highly predictable and can be adequately mitigated by known technologies.

It is noted that under Article 12, Section 12.4.2(c) and s. 89(2) of the *NuPPAA* provides that the considerations set out in s.89(1)(a) prevail over the considerations set out in s. 89(1)(b) of the *NuPPAA*.

As set out under Article 12, Section 12.4.4 of the *Nunavut Agreement* and s. 92(1) of the *NuPPAA*, upon conclusion of the screening process, the Board must provide its written report the Minister. The contents of the NIRB's report are specified under *NuPPAA*:

*NuPPAA*, s. 92(1): The Board must submit a written report to the responsible Minister containing a description of the project that specifies its scope and indicating that:

- (a) a review of the project is not required;
- (b) a review of the project is required; or
- (c) the project should be modified or abandoned.

Where the NIRB determines that a project may be carried out without a review, the NIRB has the discretion to recommend specific terms and conditions to be attached to any approval of the project proposal pursuant to paragraph 92(2)(a) of *NuPPAA* as follows:

*NuPPAA*, s. 92(2) In its report, the Board may also

- (a) recommend specific terms and conditions to apply in respect of a project that it determines may be carried out without a review.

## PROJECT REFERRAL

On March 25, 2019 the Nunavut Impact Review Board (NIRB or Board) received a referral to screen the University of Alberta's (U of A) "Impacts of Melting Tidewater Glaciers on Marine Biogeochemical Cycles" project proposal from the Nunavut Planning Commission (NPC or Commission), with an accompanying positive conformity determination with the North Baffin Regional Land Use Plan.

Pursuant to Article 12, Sections 12.4.1 and 12.4.4 of the *Nunavut Agreement* and s. 87 of the *NuPPAA*, the NIRB has commenced screening this project proposal and has assigned it file number **19YN020**.

## PROJECT OVERVIEW & THE NIRB ASSESSMENT PROCESS

### 1. Information Requests

On March 25, 2019 the NIRB requested that the Proponent complete the online application form through the NIRB's public registry system and ensure, pursuant to s. 144(1) of the *NuPPAA*, that the information provided be sufficient to determine the scope of the project activities being proposed and that sufficient information has been provided to commence screening. On April 9, 2019 the NIRB followed up with the Proponent in order to obtain a complete online application and on April 16, 2019 the NIRB received the online application. Following a review of the application, the NIRB determined that additional information in order to carry out the screening of the project proposal and on April 26, 2019 the NIRB requested that the Proponent provide the required information.

On April 26, 2019 the NIRB received the required additional information and commenced the screening pursuant to Part 3 of the *NuPPAA*.

### 2. Project Scope

All documents received and pertaining to this project proposal can be accessed from the NIRB's online public registry at [www.nirb.ca/project/125462](http://www.nirb.ca/project/125462).

The proposed “Impact of Melting Tidewater Glaciers on Marine Biogeochemical Cycles” project is located within the Qikiqtani (North Baffin) region, up to 250 kilometres (km) from Grise Fiord on the Devon Ice Cap on Devon Island and in Jones Sound. The Proponent intends to monitor the glacier dynamics and hydrology of the Sverdrup, Belcher, Sydkap and Jakeman Glaciers over the course of five (5) years to determine the quantity, timing, and routing of meltwater delivery to the ocean, characterize the chemistry and microbiology of these meltwaters, and evaluate their impact on the downstream marine environment. The program is proposed to take place from July 2019 to July 2024.

As required under s. 86(1) of the *NuPPAA*, the Board accepts the scope of the “Impacts of Melting Tidewater Glaciers on Marine Biogeochemical Cycles” project as set out by the University of Alberta in the proposal. The scope of the project proposal includes the following undertakings, works, or activities:

- Use of Twin Otter or helicopter to transport equipment and personnel to field sites, temporary camp, and to conduct land reconnaissance surveys;
- Use and storage of approximately 5,000 litres (L) of fuel:
  - Aviation fuel stored in drums supplied by Polar Continental Shelf to operate helicopter and Twin Otter, with drums to be stored either at the camp or in a temporary fuel cash at TrueLove Inlet for subsequent years with empty fuel barrels removed annually;
- Land-based activities to conduct scientific research on the glacier:
  - Accommodations may be sources locally in Grise Fiord and/or the establishment of a six (6) man temporary camp for up to on (1) month annually;
  - Installation, data collection, and retrieval of the following equipment annually:
    - Cameras and tripods to be bolted into bedrock, battery and solar panel to take time-lapse pictures of the glaciers;
    - Pressure transducers in/around ice-marginal ponds and streams around the glaciers;
  - Collection of glacier ice and meltwater samples for analysis;
  - Generation and disposal of human waste and grey water by burial;
  - Drinking water would be sourced from glacial melt water;
- Marine-based research activities to conduct oceanic surveys;
  - Use of either a sailboat or small motor boat to transport equipment and personnel to travel from Grise Fiord to the termini of glaciers on Devon and Ellesmere Islands;
  - Use of multi-channel logger to collect and measure changes in seawater conductivity, temperature, and pressure;
  - Collection of seawater in Jones Sound for analysis;
  - Gasoline and/or diesel held on sailboat and for outboard motors and generators and to transport personnel and equipment to research sites;
  - Greywater would be stored in holding tanks and disposed of offshore in accordance with international norms;
  - Use and storage of three (3) litres of hazardous materials to sterilize tubes and preserve water samples; and
- All waste generated either by boat or camp would be brought back to appropriate locations (e.g., Resolute Bay, Grise Fiord or other locations) for proper disposal.

### 3. Inclusion or Exclusion to Scoping List

At this time, the NIRB has identified no additional works or activities in relation to the project proposal; however, the Proponent has indicated in their application and subsequent materials that any winter sampling would be applied for separately and not included in the application at this time. As a result, the NIRB will proceed with screening the project based on the scope as described above.

### 4. Key Stages of the Screening Process

The following key stages were completed:

Date	Stage
March 25, 2019	Receipt of project proposal and positive conformity determination (North Baffin Regional Land Use Plan) from the NPC
April 9, 2019 April 26, 2019	Information requests
April 16, 2019 April 26, 2019	Proponent responded to information requests
April 26, 2019	Scoping pursuant to s. 86(1) of the <i>NuPPAA</i>
May 14, 2019	Public engagement and comment request
May 24, 2019	Receipt of public comments

### 5. Public Comments and Concerns

Notice regarding the NIRB's screening of this project proposal was distributed on May 14, 2019 to community organizations in Grise Fiord and Resolute Bay, as well as to relevant federal and territorial government agencies, Inuit organizations and other parties. The NIRB requested that interested parties review the proposal and the NIRB's *proposed* project-specific terms and conditions, and provide the Board with any comments or concerns by May 24, 2019 regarding:

- Whether the project proposal is likely to arouse significant public concern; and if so, why;
- Whether the project proposal is likely to cause significant adverse eco-systemic or socio-economic effects; and if so, why;
- Whether the project proposal is likely to cause significant adverse impacts on wildlife habitat or Inuit harvest activities; and if so, why;
- Whether the project proposal is of a type where the potential adverse effects are highly predictable and mitigable with known technology, (and providing any recommended mitigation measures); and
- Any matter of importance to the Party related to the project proposal.

On or before May 24, 2019 the NIRB received comments from the following interested parties (see Summary of Comments and Concerns section below):

- **Government of Nunavut**
- **Crown-Indigenous Relations and Northern Affairs Canada**

On May 30, 2019 the NIRB received late comments from Fisheries and Oceans Canada see Summary of Comments and Concerns section below).

***a. Summary of Public Comments and Concerns Received during the Public comment period of this file***

The following provides a summary of the comments and concerns received by the NIRB:

**Government of Nunavut (GN)**

- Noted numerous archaeological sites within the study area.
- Recommended that the Proponent exercise caution in their movements in order to avoid archaeological sites. Specifically recommended landing sites be visually inspected prior to landing and takeoff, and areas also be visually inspected prior to the construction of campsites and that no activities be conducted in the vicinity (50 metre (m) buffer zone) of any archaeological sites.

**Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)**

- Recommended that the Proponent provide a brief written summary of its interaction with interested parties from the Hamlet of Grise Fiord (the Hamlet) to date.
- Recommended that a community consultation plan be developed.
- Noted how fuel should be stored for the project and recommended spill contingency measures (including spill response equipment and clean-up materials) such as planned procedures, and training of personnel.
- Noted how waste and food should be stored and that the area should be clean and tidy at all times, the environmental footprint of the project should be minimized, upon abandonment and at the end of each field season all waste, supplies, and equipment should be cleaned-up, removed and all lands restored.

**Fisheries and Oceans Canada (DFO)**

Recommended that the Proponent:

- Maintain a minimum altitude of 500 metres (m) over marine mammals;
- Be familiar with the Marine Mammal Regulations.
- Watercraft avoid Marine Mammals and provided measures for different species that may be encountered.

***b. Comments and Concerns with respect to Inuit Qaujimaningit, Traditional, and Community Knowledge***

No concerns or comments were received with respect to Inuit Qaujimaningit or traditional and community knowledge in relation to the proposed project.

ASSESSMENT OF THE PROJECT PROPOSAL IN ACCORDANCE WITH PART 3 OF *NUPPAA*

In determining whether a review of the project is required, the Board considered whether the project proposal had potential to result in significant ecosystemic or socio-economic impacts.

Accordingly, the assessment of impact significance was based on the analysis of those factors that are set out under s. 90 of the *NuPPAA*. The Board took particular care to take into account Inuit Qaujimaningit, traditional and community knowledge in carrying out its assessment and determination of the significance of impacts.

The following is a summary of the Board’s assessment of the factors that are relevant to the determination of significant impacts with respect of this project proposal:

<b>Factor</b>	<b>Comment</b>
The size of the geographic area, including the size of wildlife habitats, likely to be affected by the impacts.	<ul style="list-style-type: none"> <li>▪ The physical footprint of the proposed project components is up to 250 km from Grise Fiord on the Devon Island Ice Cap on Devon Island and in Jones Sound.</li> <li>▪ The proposed project would take place within an area used by migratory and non-migratory birds, fish and fish habitat, marine mammals such as whales and seals and their migratory routes and Species at Risk such as Polar Bears and Ivory Gull.</li> </ul>
The ecosystemic sensitivity of that area.	<ul style="list-style-type: none"> <li>▪ No specific areas of ecosystemic sensitivity have been identified by the Proponent within the physical footprint of the proposed project.</li> </ul>
The historical, cultural and archaeological significance of that area.	<ul style="list-style-type: none"> <li>▪ No specific areas of historical, cultural and archaeological significance have been identified by the Proponent within the physical footprint of the proposed project. However, the Government of Nunavut notes that there are numerous recorded archaeological sites within the proposed study areas.</li> </ul>
The size of the human and the animal populations likely to be affected by the impacts.	<ul style="list-style-type: none"> <li>▪ The proposed project may take place within the habitat of a number of species identified above and as such, may potentially affect wildlife, their habitat and their migratory patterns.</li> <li>▪ As components of the proposed project activities are expected to occur near the community of Grise Fiord, there is the potential for human populations and traditional land-use activities to be affected.</li> </ul>
The nature, magnitude and complexity of the impacts; the probability of the impacts occurring; the frequency and duration of the impacts; and the reversibility or irreversibility of the impacts.	<ul style="list-style-type: none"> <li>▪ A zone of influence of up to 20 km from the most potentially-disruptive project activities was selected for the NIRB’s assessment.</li> <li>▪ Based on past evidence from project with similar scope of activities, the potential adverse effects are considered to be well-known, with potential for localized effects to the biophysical environment that are mitigable with due care.</li> </ul>

Factor	Comment
	<ul style="list-style-type: none"> <li>▪ With adherence to the relevant regulatory requirements and application of the mitigation measures recommended by the NIRB, no significant residual effects are expected to occur.</li> </ul>
<p>The cumulative impacts that could result from the impacts of the project combined with those of any other project that has been carried out, is being carried out or is likely to be carried out.</p>	<ul style="list-style-type: none"> <li>▪ The NIRB has not identified any past, present, and reasonably foreseeable projects at this time; however, the mitigation measures recommended by the NIRB have been designed to reduce cumulative effects should projects occur in the area in the future.</li> </ul>
<p>Any other factor that the Board considers relevant to the assessment of the significance of impacts.</p>	<ul style="list-style-type: none"> <li>▪ No other relevant factors were identified.</li> </ul>

**VIEWS OF THE BOARD**

In considering the factors as set out above in the screening of the project proposal, the NIRB has identified a number of issues below and respectfully provide the following views regarding whether or not the proposed project has the potential to result in significant impacts. In addition, the NIRB has proposed terms and conditions that would mitigate the potential adverse impacts identified.

**Ecosystem, wildlife habitat and Inuit harvesting activities:**

- Potential adverse effects to migratory and non-migratory birds, fish and fish habitat, marine mammals such as whales and seals and their migratory routes and Species at Risk such as Polar Bears and Ivory Gull from noise and visual disturbance generated from the transportation of personnel and equipment via aircraft to the proposed research sites, establishment of temporary camp, associated camp activities, boating activities and the installation of data collection equipment. The potential for impacts is considered to be limited due to infrequent and temporary activities and any resulting impacts would be expected to be reversible. The Board recommends terms and conditions 4, 15 through 31 to mitigate any potential adverse effects from proposed research activities. In addition, the Proponent would be required to follow specific Acts and Regulations applicable to the project proposal (see Regulatory Requirements section).
- Potential for adverse effects to marine water quality, marine ecosystems and fish and fish habitat from the potential fuel spills due to the use of a sail boat or small motor boat to transport personnel to conduct research. The potential for impacts is considered to be limited due to infrequent and temporary activities and any resulting impacts would be expected to be reversible. In order to mitigate any potential adverse effects, the Board recommends terms and conditions 8 and 14.
- Potential adverse effects to soil, vegetation, surface water quality from research activities, including establishment of temporary camp and potential fuel spills due to the transportation and storage of fuel via aircraft and boat, and from transportation of personnel

and equipment on both land and water. The potential for impacts is considered to be limited due to infrequent and temporary activities and any resulting impacts would be expected to be reversible. In order to mitigate potential for adverse effects from the research activities, the Board recommends terms and conditions 5 through 7, 9 through 13 and 32 through 36 to mitigate the potential for adverse effects to surface and ground water, vegetation, and soil quality. In addition, the Proponent would be required to follow specific Acts and Regulations applicable to the project proposal (see Regulatory Requirements section).

- Potential adverse effects to traditional land use from the proposed research activities including transportation of personnel, vessel movement and installation of data collection equipment. Due to the project's proximity to the community of Grise Fiord, there is the potential for adverse impacts to result from project components overlapping with traditional land use areas. In addition, noise from the use of marine vessels (both sail or motor) may temporarily change the distribution of harvested species through avoidance and may affect personal enjoyment of traditional hunting and/or fishing areas. The Board recommends terms and conditions 37 and 38 to ensure project activities are informed by available Inuit Qaujimaningit and that proposed project activities do not interfere with Inuit wildlife harvesting or traditional land use activities.

#### **Socio-economic effects on northerners:**

- No specific areas of historical, cultural and archaeological significance have been identified by the Proponent. However, the Government of Nunavut - Department of Culture and Heritage indicated that there are numerous recorded archaeological sites within the proposed study area. The Proponent would be required to follow specific Acts and Regulations (see Regulatory Requirements section). In the event that any historical sites are encountered, the Board recommends term and condition 37 to ensure that available Inuit Qaujimaningit can inform proposed project activities and reduce the potential for adverse effects.

#### **Significant public concern:**

- No significant public concern was expressed during the public commenting period for this file. The NIRB recommends term and condition 37 to ensure follow-up consultation and the involvement of local community members. Further, the Board recommends term and condition 39 to ensure to the extent possible that the Proponent considers hiring local people for the proposed project where possible.

#### **Technological innovations for which the effects are unknown:**

- No specific issues have been identified associated with the project proposal.

#### **Administrative Conditions:**

To encourage compliance with applicable regulatory requirements and assist the Board and responsible authorities with compliance and effects monitoring for project activities, the following project-specific terms and conditions have been recommended: 1-3.

In considering the above factors and subject to the Proponent's compliance with the terms and conditions necessary to mitigate against the potential adverse environmental and social effects, the Board is of the view that the proposed project is unlikely to cause significant public concern and

its adverse ecosystemic and socioeconomic impacts are unlikely to be significant, or are highly predictable and can be adequately mitigated by known technologies.

## RECOMMENDED PROJECT-SPECIFIC TERMS AND CONDITIONS

The Board is recommending the following specific terms and conditions to apply in respect of the project:

### **General**

1. University of Alberta (the Proponent) shall maintain a copy of the Project Terms and Conditions at the site of operation at all times.
2. The Proponent shall operate in accordance with all commitments stated in correspondence provided to the Nunavut Planning Commission (NPC File No.: 149049), and the NIRB (Online Application Form, April 16, 2019; additional information with respect to the research activities, April 26, 2019).
3. The Proponent shall operate the site in accordance with all applicable Acts, Regulations and Guidelines.

### **Water Use**

4. The Proponent shall not use water, including constructing or disturbing any stream, lakebed or the banks of any definable water course unless approved by the Nunavut Water Board.

### **Waste Disposal**

5. The Proponent shall keep all garbage and debris in bags placed in a covered metal container or equivalent until disposed of at an approved facility. All such wastes shall be kept inaccessible to wildlife at all times.
6. The Proponent shall manage all wastes (including domestic, garbage and debris) on board the vessel prior to final disposal at approved port facilities.
7. The Proponent shall remove wastes from the project site to an approved facility for disposal.

### **Fuel and Chemical Storage - General**

8. The Proponent shall ensure that all personnel are properly trained in fuel and hazardous waste handling procedures, as well as spill response procedures. All spills of fuel or other deleterious materials of any amount must be reported immediately to the 24 hour Spill Line at (867) 920-8130.

### **Fuel and Chemical Storage for Land Based Activities**

9. The Proponent shall store all fuel and chemicals in such a manner that they are inaccessible to wildlife.
10. The Proponent shall locate all fuel and other hazardous materials a minimum of thirty-one (31) metres away from the high water mark of any water body and in such a manner as to prevent their release into the environment, unless otherwise authorized by the Nunavut Water Board.

11. The Proponent shall ensure that re-fueling of all equipment occurs a minimum of thirty-one (31) metres away from the high water mark of any water body, unless otherwise authorized by the Nunavut Water Board.
12. The Proponent shall use adequate secondary containment or a surface liner (e.g., self-supporting insta-berms and fold-a-tanks) when storing barreled fuel and chemicals at all locations.
13. The Proponent shall ensure that appropriate spill response equipment and clean-up materials (e.g., shovels, pumps, barrels, drip pans, and absorbents) are readily available during any transfer of fuel or hazardous substances, at all fuel storage sites and when refuelling equipment.

#### **Fuel and Chemical Storage for Water Based Activities**

14. The Proponent shall not deposit, nor permit the deposit of any fuel, chemicals, wastes (including waste water) or sediment into any marine waters.

#### **Wildlife - General**

15. The Proponent shall ensure that there is no damage to wildlife habitat in conducting this operation.
16. The Proponent shall not harass wildlife. This includes persistently circling, chasing, hovering over pursuing or in any other way harass wildlife, or disturbing large groups of animals.
17. The Proponent shall not hunt or fish, unless proper Nunavut authorizations have been acquired.
18. The Proponent shall ensure that all project personnel are made aware of the measures to protect wildlife and are provided with training and/or advice on how to implement these measures.
19. The Proponent shall, where practicable, coordinate with other vessels to minimize simultaneous vessel traffic in critical wildlife habitat areas allowing wildlife to continue to use the habitat undisturbed (e.g., Jones Sound).

#### **Migratory Birds and Raptors Disturbance**

20. The Proponent shall not disturb or destroy the nests or eggs of any birds. If active nests of any birds are discovered or located (i.e., with eggs or young), the Proponent shall avoid these areas until nesting is complete and the young have naturally left the vicinity of the nest by establishing a protection buffer zone<sup>1</sup> appropriate for the species and the surrounding habitat.
21. The Proponent shall minimize activities during periods when birds are particularly sensitive to disturbance such as migration, nesting and moulting.
22. The Proponent shall avoid the seaward site of seabird colonies and areas used by flocks of migrating waterfowl by three (3) kilometres.
23. The Proponent shall ensure its aircraft avoid excessive hovering or circling over areas where bird presence is likely.

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<sup>1</sup> Recommended setback distances to define buffer zones have been established by Environment and Climate Change Canada for different bird groups nesting in tundra habitat and can be found at [www.ec.gc.ca/paom-itmb](http://www.ec.gc.ca/paom-itmb).

### **Aircraft Flight Restrictions**

24. The Proponent shall not alter flight paths to approach wildlife, and avoid flying directly over animals.
25. The Proponent shall restrict aircraft/helicopter activity related to the project to a minimum flight altitude of 610 metres above ground level unless except during landing, take-off or if there is a specific requirement for low-level flying, which does not disturb wildlife or migratory birds.
26. The Proponent shall ensure that aircraft maintain a vertical distance of 1000 metres and a horizontal distance of 1500 metres from any observed groups (colonies) of migratory birds. Aircraft should avoid critical and sensitive wildlife areas at all times by choosing alternate flight corridors.
27. The Proponent shall ensure that aircraft/helicopter do not, unless for emergency, touch-down in areas where wildlife are present.
28. The Proponent shall advise all pilots of relevant flight restrictions and enforce their application over the project area, including flight paths to/from the project area.

### **Caribou Disturbance**

29. The Proponent shall cease activities that may disturb caribou if observed within 10 kilometre, until the caribou have passed or left the area.

### **Sea Mammal Disturbance**

30. The Proponent shall not attempt to intersect or interfere with the movements of marine mammals. Strategic positioning of vessels ahead of the path being traveled by mobile whales and waiting for the whales to pass is also prohibited.
31. The Proponent shall maintain a distance of 100 metres if a Polar Bear is encountered on land or ice while conducting activities from the vessel; all interaction with Polar Bears should be avoided if possible.

### **Temporary Camps and Land Use**

32. The Proponent shall ensure that camps are located on gravel, sand or other durable land, where possible.
33. The Proponent shall not erect camps or store material on the surface ice of lakes or streams.
34. The Proponent shall ensure that the land use area is kept clean and tidy at all times.

### **Restoration of Disturbed Areas**

35. The Proponent shall remove all garbage, fuel and equipment upon abandonment.
36. The Proponent shall complete all clean-up and restoration of the lands used prior to the end of each field season and/or upon abandonment of site.

### **Other**

37. The Proponent should engage with local residents regarding planned activities in the area and should solicit available Inuit Qaujimaningit and information regarding current recreational and traditional usage of the project area which may inform project activities. Posting of translated

public notices and direct engagement with potentially interested groups and individuals prior to undertaking project activities is strongly encouraged.

38. The Proponent shall ensure that project activities do not interfere with Inuit wildlife harvesting or traditional land use activities.
39. The Proponent should, to the extent possible, hire local people and access local services where possible.

## OTHER NIRB CONCERNS AND RECOMMENDATIONS

In addition to the project-specific terms and conditions, the Board is recommending the following:

### **Change in Project Scope**

1. Responsible authorities or Proponent shall notify the Nunavut Planning Commission and the NIRB of any changes in operating plans or conditions, including phase advancement, associated with this project prior to any such change.

### **Copy of licences, etc. to the Board and Commission**

2. As per s. 137(4) of the *NuPPAA*, responsible authorities are required to submit a copy of each licence, permit or other authorization issued for the Project to the Nunavut Planning Commission and the NIRB. Please forward a copy of the licences, permits and/or other authorizations to the NIRB directly at [info@nirb.ca](mailto:info@nirb.ca) or upload a copy to the NIRB's online registry at [www.nirb.ca](http://www.nirb.ca).

### **Results of Project Activities**

3. The Proponent is encouraged to share the results of its research activities with the local community(ies). Care should be taken to ensure that the information is provided in a plain language with interpretation into appropriate local dialects of Inuktitut.

### **Use of Inuit Qaujimaningit**

4. The Proponent is encouraged to work with local communities and knowledge holders to inform project design, to carry out the project, and to confirm or validate the perspectives represented in publications, film or other media produced as part of the project. Care should be taken to ensure that Inuit Qaujimaningit and local knowledge collected for the project is used with permission and is accurately represented.

### **Bear and Carnivore Safety**

5. The Proponent should review the Government of Nunavut's booklet on Bear Safety, which can be downloaded from this link: [http://gov.nu.ca/sites/default/files/bear\\_safety\\_-\\_reducing\\_bear-people\\_conflicts\\_in\\_nunavut.pdf](http://gov.nu.ca/sites/default/files/bear_safety_-_reducing_bear-people_conflicts_in_nunavut.pdf).
6. There are polar bear safety resources available from the Bear Smart Society with videos on polar bear safety available in English, French and Inuktitut at <http://www.bearsmart.com/play/safety-in-polar-bear-country/>. Information can also be obtained from Parks Canada's website on bear safety at the following link: <http://www.pc.gc.ca/eng/pn-np/nu/quttinirpaaq/visit/visit6/d.aspx> or in reviewing the "Safety in Polar Bear Country" pamphlet, which can be downloaded from the following link:

[http://www.pc.gc.ca/eng/pn-np/nu/quttinirpaaq/visit/visit6/~~/media/pn-np/nu/auyuittuq/pdf/shared/PolarBearSafety\\_English.ashx](http://www.pc.gc.ca/eng/pn-np/nu/quttinirpaaq/visit/visit6/~~/media/pn-np/nu/auyuittuq/pdf/shared/PolarBearSafety_English.ashx).

7. Any problem wildlife or any interaction with carnivores should be reported immediately to the local Government of Nunavut, Department of Environment Conservation Office (Conservation Officer of Grise Fiord, phone: (867) 980-4164).

### **Species at Risk**

8. The Proponent review Environment and Climate Change Canada's "Environment Assessment Best Practice Guide for Wildlife at Risk in Canada", available at the following link: [http://www.sararegistry.gc.ca/virtual\\_sara/files/policies/EA%20Best%20Practices%202004.pdf](http://www.sararegistry.gc.ca/virtual_sara/files/policies/EA%20Best%20Practices%202004.pdf). The guide provides information to the Proponent on what is required when Wildlife at Risk, including *Species at Risk*, are encountered or affected by the project.

### **Migratory Birds**

9. The Proponent review Canadian Wildlife Services' "Key migratory bird terrestrial habitat sites in the Northwest Territories and Nunavut", available at the following link: <http://publications.gc.ca/site/eng/317630/publication.html> and "Key marine habitat sites for migratory birds in Nunavut and the Northwest Territories", available at the following link: <http://publications.gc.ca/site/eng/392824/publication.html>. The guide provides information to the Proponent on key terrestrial and marine habitat areas that are essential to the welfare of various migratory bird species in Canada.
10. For further information on how to protect migratory birds, their nests and eggs when planning or carrying out project activities, consult Environment and Climate Change Canada's Incidental Take web page and the fact sheet "Planning Ahead to Reduce the Risk of Detrimental Effects to Migratory Birds, and their Nests and Eggs" available at <http://www.ec.gc.ca/paom-itmb/>.

### **Transport of Dangerous Goods and Waste Management**

11. Environment and Climate Change Canada recommends that all hazardous wastes, including waste oil, receive proper treatment and disposal at an approved facility.
12. The Proponent shall ensure that proper shipping documents (waste manifests, transportation of dangerous goods, etc.) accompany all movements of dangerous goods. Further, the Proponent shall ensure that the shipment of all dangerous goods is registered with the Government of Nunavut Department of Environment, Department of Environment Manager. Contact the Manager (867) 975-7748 to obtain a manifest if dangerous goods including hazardous wastes will be transported.
13. The Proponent shall provide an authorization or letter of conformation of disposal be obtained from the owner/operator of the landfill to be used for disposal of project-related wastes.

### **Aircraft Identification**

14. The Proponent shall provide the community of Grise Fiord and Resolute Bay a description of the planned helicopter activities, including photo(s) of the helicopter to be used, approximate flight paths, plans and times as available prior to commencement of activities to ensure community members are aware of the planned activities.

The Proponent is also advised that the following legislation may apply to the project:

### **Acts and Regulations**

1. The *Fisheries Act* (<http://laws-lois.justice.gc.ca/eng/acts/F-14/index.html>).
2. The *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (<http://laws-lois.justice.gc.ca/eng/acts/n-28.8/>).
3. The *Migratory Birds Convention Act* and *Migratory Birds Regulations* (<http://laws-lois.justice.gc.ca/eng/acts/M-7.01/>).
4. The *Species at Risk Act* (<http://laws-lois.justice.gc.ca/eng/acts/S-15.3/index.html>). Attached in **Appendix A** is a list of Species at Risk in Nunavut.
5. The *Wildlife Act (Nunavut)* and its corresponding regulations (<http://www.canlii.org/en/nu/laws/stat/snu-2003-c-26/latest/snu-2003-c-26.html>).
6. The *Nunavut Act* (<http://laws-lois.justice.gc.ca/eng/acts/N-28.6/>). The Proponent must comply with the proposed terms and conditions listed in the attached **Appendix B**.
7. The *Transportation of Dangerous Goods Regulations* (<http://www.tc.gc.ca/eng/tdg/clear-tofc-211.htm>), *Transportation of Dangerous Goods Act* (<http://laws-lois.justice.gc.ca/eng/acts/t-19.01/>), and the *Canadian Environmental Protection Act* (<http://laws-lois.justice.gc.ca/eng/acts/C-15.31/>).
8. The *Aeronautics Act* (<http://laws-lois.justice.gc.ca/eng/acts/A-2/>) and the Interim Order No. 9 Respecting the Use of Model Aircraft (<http://www.gazette.gc.ca/rp-pr/p1/2018/2018-06-16/html/notice-avis-eng.html#ne6>).
9. The *Arctic Waters Pollution Prevention Act* (<http://laws-lois.justice.gc.ca/eng/acts/A-12/>).
10. The *Canada Shipping Act, 2001* (<http://laws-lois.justice.gc.ca/eng/acts/C-10.15/>).
11. The *Marine Liability Act* (<http://laws-lois.justice.gc.ca/eng/acts/M-0.7/>).
12. The *Navigation Protection Act* (<http://laws-lois.justice.gc.ca/eng/acts/N-22/index.html>).

### **Other Applicable Guidelines**

The *Guidance Document for Passenger Vessels Operating in the Canadian Arctic* (<https://www.tc.gc.ca/eng/marinesafety/tp-tp13670-menu-2315.htm>).

## CONCLUSION

The foregoing constitutes the Board's screening decision with respect to the University of Alberta's "Impacts of Melting Glaciers on Marine Biogeochemical Cycles". The NIRB remains available for consultation with the Minister regarding this report as necessary.

Dated June 10, 2019 at Baker Lake, NU.



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Kaviq Kaluraq, A/Chairperson

Attachments: Appendix A: Species at Risk in Nunavut  
Appendix B: Archaeological and Palaeontological Resources Terms and Conditions for Land Use  
Permit Holders

## APPENDIX A: SPECIES AT RISK IN NUNAVUT

Due to the requirements of Section 79(2) of the Species at Risk Act (SARA), and the potential for project-specific adverse effects on listed wildlife species and its critical habitat, measures should be taken as appropriate to avoid or lessen those effects, and the effects need to be monitored. Project effects could include species disturbance, attraction to operations and destruction of habitat. This section applies to all species listed on Schedule 1 of SARA, as listed in the table below, or have been assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), which may be encountered in the project area. This list may not include all species identified as at risk by the Territorial Government. The following points provide clarification on the applicability of the species outlined in the table.

- Schedule 1 is the official legal list of Species at Risk for SARA. SARA applies to all species on Schedule 1. The term “listed” species refers to species on Schedule 1.
- Schedule 2 and 3 of SARA identify species that were designated at risk by the COSEWIC prior to October 1999 and must be reassessed using revised criteria before they can be considered for addition to Schedule 1.
- Some species identified at risk by COSEWIC are “pending” addition to Schedule 1 of SARA. These species are under consideration for addition to Schedule 1, subject to further consultation or assessment.

If species at risk are encountered or affected, the primary mitigation measure should be avoidance. The Proponent should avoid contact with or disturbance to each species, its habitat and/or its residence. All direct, indirect, and cumulative effects should be considered. Refer to species status reports and other information on the species at risk Registry at <http://www.sararegistry.gc.ca> for information on specific species.

Monitoring should be undertaken by the Proponent to determine the effectiveness of mitigation and/or identify where further mitigation is required. As a minimum, this monitoring should include recording the locations and dates of any observations of species at risk, behaviour or actions taken by the animals when project activities were encountered, and any actions taken by the proponent to avoid contact or disturbance to the species, its habitat, and/or its residence. This information should be submitted to the appropriate regulators and organizations with management responsibility for that species, as requested.

For species primarily managed by the Territorial Government, the Territorial Government should be consulted to identify other appropriate mitigation and/or monitoring measures to minimize effects to these species from the project.

Mitigation and monitoring measures must be undertaken in a way that is consistent with applicable recovery strategies and action/management plans.

Schedules of SARA are amended on a regular basis so it is important to check the SARA registry ([www.sararegistry.gc.ca](http://www.sararegistry.gc.ca)) to get the current status of a species.

Updated: November 2018

<b>Terrestrial Species at Risk<sup>2</sup></b>	<b>COSEWIC Designation</b>	<b>Schedule of SARA</b>	<b>Government Organization with Primary Management Responsibility<sup>3</sup></b>
<b>Migratory Birds</b>			
Buff-breasted Sandpiper	Special Concern	Schedule 1	Environment and Climate Change Canada (ECCC)
Common Nighthawk	Threatened	Schedule 1	ECCC
Eskimo Curlew	Endangered	Schedule 1	ECCC
Harlequin Duck	Special Concern	Schedule 1	ECCC
Harris's Sparrow	Special Concern	Schedule 1	ECCC
Horned Grebe	Special Concern	Schedule 1	ECCC
Ivory Gull	Endangered	Schedule 1	ECCC
Olive-sided Flycatcher	Special Concern	Schedule 1	ECCC
Red Knot Islandica Subspecies	Special Concern	Schedule 1	ECCC
Red-necked Phalarope	Special Concern	No Schedule	ECCC
Ross's Gull	Threatened	Schedule 1	ECCC
Rusty Blackbird	Special Concern	Schedule 1	ECCC
Short-eared Owl	Special Concern	Schedule 1	ECCC
<b>Vegetation</b>			
Porsild's Bryum	Threatened	Schedule 1	Government of Nunavut (GN)
<b>Arthropods</b>			
Transverse Lady Beetle	Special Concern	No Schedule	GN
<b>Terrestrial Wildlife</b>			
Caribou (Dolphin and Union Population)	Endangered	Schedule 1	GN
Caribou (Barren-ground Population)	Threatened	No Schedule	GN
Caribou (Torngat Mountains Population)	Endangered	No Schedule	GN
Grizzly Bear (Western Population)	Special Concern	Schedule 1	GN
Peary Caribou	Threatened	Schedule 1	GN
Polar Bear	Special Concern	Schedule 1	GN
Wolverine	Special Concern	Schedule 1	GN
<b>Marine Wildlife</b>			
Atlantic Walrus (High Arctic Population)	Special Concern	No Schedule	Fisheries and Oceans Canada (DFO)
Atlantic Walrus (Central/Low Arctic Population)	Special Concern	No Schedule	DFO
Beluga Whale (Cumberland Sound Population)	Threatened	Schedule 1	DFO
Beluga Whale (Eastern Hudson Bay Population)	Endangered	No Schedule	DFO
Beluga Whale (Eastern High Arctic-Baffin Bay Population)	Special Concern	No Schedule	DFO

2 The Department of Fisheries and Oceans has responsibility for aquatic species.

3 Environment and Climate Change Canada (ECCC) has a national role to play in the conservation and recovery of Species at Risk in Canada, as well as responsibility for management of birds described in the Migratory Birds Convention Act (MBCA). Day-to-day management of terrestrial species not covered in the MBCA is the responsibility of the Territorial Government. Populations that exist in National Parks are also managed under the authority of the Parks Canada Agency.

<b>Terrestrial Species at Risk<sup>2</sup></b>	<b>COSEWIC Designation</b>	<b>Schedule of SARA</b>	<b>Government Organization with Primary Management Responsibility<sup>3</sup></b>
Beluga Whale (Western Hudson Bay Population)	Special Concern	No Schedule	DFO
Fish			
Atlantic Cod (Arctic Lakes Population)	Special Concern	No Schedule	DFO
Fourhorn Sculpin (Freshwater Form)	Data Deficient	Schedule 3	DFO
Lumpfish	Threatened	No Schedule	DFO
Thorny Skate	Special Concern	No Schedule	DFO

APPENDIX B: ARCHAEOLOGICAL AND PALAEOLOGICAL RESOURCES TERMS AND  
CONDITIONS FOR LAND USE PERMIT HOLDERS



INTRODUCTION

The Department of Culture and Heritage (CH) routinely reviews land use applications sent to the Nunavut Water Board, Nunavut Impact Review Board and the Indigenous and Northern Affairs Canada. These terms and conditions provide general direction to the permittee/proponent regarding the appropriate actions to be taken to ensure the permittee/proponent carries out its role in the protection of Nunavut’s archaeological and palaeontological resources.

TERMS AND CONDITIONS

- 1) The permittee/proponent shall have a professional archaeologist and/or palaeontologist perform the following **Functions** associated with the **Types of Development** listed below or similar development activities:

	<b>Types of Development</b> (See Guidelines below)	<b>Function</b> (See Guidelines below)
a)	Large scale prospecting	Archaeological/Palaeontological Overview Assessment
b)	Diamond drilling for exploration or geotechnical purpose or planning of linear disturbances	Archaeological/ Palaeontological Inventory
c)	Construction of linear disturbances, Extractive disturbances, Impounding disturbances and other land disturbance activities	Archaeological/ Palaeontological Inventory or Assessment or Mitigation

Note that the above-mentioned functions require either a Nunavut Archaeologist Permit or a Nunavut Palaeontologist Permit. CH is authorized by way of the *Nunavut and Archaeological and Palaeontological Site Regulations*<sup>4</sup> to issue such permits.

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<sup>4</sup>P.C. 2001-1111 14 June, 2001

- 2) The permittee/proponent shall not operate any vehicle over a known or suspected archaeological or palaeontological site.
- 3) The permittee/proponent shall not remove, disturb, or displace any archaeological artifact or site, or any fossil or palaeontological site.
- 4) The permittee/proponent shall immediately contact CH at (867) 934-2046 or (867) 975-5500 should an archaeological site or specimen, or a palaeontological site or fossil, be encountered or disturbed by any land use activity.
- 5) The permittee/proponent shall immediately cease any activity that disturbs an archaeological or palaeontological site encountered during the course of a land use operation until permitted to proceed with the authorization of CH.
- 6) The permittee/proponent shall follow the direction of CH in restoring disturbed archaeological or palaeontological sites to an acceptable condition. If these conditions are attached to either a Class A or B Permit under the Territorial Lands Act Indigenous and Northern Affairs Canada directions will also be followed.
- 7) The permittee/proponent shall provide all information requested by CH concerning all archaeological sites or artifacts and all palaeontological sites and fossils encountered in the course of any land use activity.
- 8) The permittee/proponent shall make best efforts to ensure that all persons working under its authority are aware of these conditions concerning archaeological sites and artifacts and palaeontological sites and fossils.
- 9) If a list of recorded archaeological and/or palaeontological sites is provided to the permittee/proponent by CH as part of the review of the land use application the permittee/proponent shall avoid the archaeological and/or palaeontological sites listed.
- 10) Should a list of recorded sites be provided to the permittee/proponent, the information is provided solely for the purpose of the proponent's land use activities as described in the land use application, and must otherwise be treated confidentially by the proponent.

### **Legal Framework**

As stated in Article 33 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada (Nunavut Agreement)*:

*Where an application is made for a land use permit in the Nunavut Settlement Area, and there are reasonable grounds to believe that there could be sites of archaeological importance on the lands affected, no land use permit shall be issued without written consent of the Designated Agency. Such consent shall not be unreasonably withheld. [33.5.12]*

*Each land use permit referred to in Section 33.5.12 shall specify the plans and methods of archeological site protection and restoration to be followed by the permit holder, and any other conditions the Designated Agency may deem fit. [33.5.13]*

### **Palaeontology and Archaeology**

Under the *Nunavut Act*<sup>5</sup>, the federal government can make regulations for the protection, care and preservation of palaeontological and archaeological sites and specimens in Nunavut. Under the *Nunavut Archaeological and Palaeontological Sites Regulations*<sup>6</sup>, it is illegal to alter or disturb any palaeontological or archaeological site in Nunavut unless permission is first granted through the permitting process.

## Definitions

As defined in the *Nunavut Archaeological and Palaeontological Sites Regulations*, the following definitions apply:

*“archaeological site” means a place where an archaeological artifact is found.*

*“archaeological artifact” means any tangible evidence of human activity that is more than 50 years old and in respect of which an unbroken chain of possession or regular pattern of usage cannot be demonstrated, and includes a Denesuline archaeological specimen referred to in section 40.4.9 of the Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada (Nunavut Agreement).*

*“palaeontological site” means a site where a fossil is found.*

*“fossil” includes:*

*Fossil means the hardened or preserved remains or impression of previously living organisms or vegetation and includes:*

- (a) natural casts;*
- (b) preserved tracks, coprolites and plant remains; and*
- (c) the preserved shells and exoskeletons of invertebrates and the preserved eggs, teeth and bones of vertebrates.*

## *Guidelines for Developers for the Protection of Archaeological Resources in the Nunavut Territory*

(**Note:** Partial document only, complete document at: [www.ch.gov.nu.ca/en/Archaeology.aspx](http://www.ch.gov.nu.ca/en/Archaeology.aspx))

## Introduction

The following guidelines have been formulated to ensure that the impacts of proposed developments upon heritage resources are assessed and mitigated before ground surface altering activities occur. Heritage resources are defined as, but not limited to, archaeological and historical sites, burial grounds, palaeontological sites, historic buildings and cairns. Effective collaboration between the developer, the Department of Culture, and Heritage (CH), and the contract archaeologist(s) will ensure proper preservation of heritage resources in the Nunavut Territory. The roles of each are briefly described.

CH is the Nunavut Government agency which oversees the protection and management of heritage resources in Nunavut, in partnership with land claim authorities, regulatory agencies, and the federal government. Its role in mitigating impacts of developments on heritage resources is as

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<sup>5</sup> s. 51(1)

<sup>6</sup> P.C. 2001-1111 14 June, 2001

follows: to identify the need for an impact assessment and make recommendations to the appropriate regulatory agency; set the terms of reference for the study depending upon the scope of the development; suggest the names of qualified individuals prepared to undertake the study to the developer; issue an archaeologist or palaeontologist permit authorizing field work; assess the completeness of the study and its recommendations; and ensure that the developer complies with the recommendations.

The primary regulatory agencies that CH provides information and assistance to are the Nunavut Impact Review Board, for development activities proposed for Inuit Owned Lands (as defined in Section 1.1.1 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada (Nunavut Agreement)*), and the Indigenous and Northern Affairs Canada, for development activities proposed for federal Crown Lands.

A developer is the initiator of a land use activity. It is the obligation of the developer to ensure that a qualified archaeologist or palaeontologist is hired to perform the required study and that provisions of the contract with the archaeologist or palaeontologist allow permit requirements to be met; i.e. fieldwork, collections management, artifact and specimen conservation, and report preparation. On the recommendation of the contract archaeologist or palaeontologist in the field and the Government of Nunavut, the developer shall implement avoidance or mitigative measures to protect heritage resources or to salvage the information they contain through excavation, analysis, and report writing. The developer assumes all costs associated with the study in its entirety.

Through his or her active participation and supervision of the study, the contract archaeologist or palaeontologist is accountable for the quality of work undertaken and the quality of the report produced. Facilities to conduct fieldwork, analysis, and report preparation should be available to this individual through institutional, agency, or company affiliations. Responsibility for the curation of objects recovered during field work while under study and for documents generated in the course of the study as well as remittance of artifacts, specimens and documents to the repository specified on the permit accrue to the contract archaeologist or palaeontologist. This individual is also bound by the legal requirements of the *Nunavut Archaeological and Palaeontological Sites Regulations*.

### **Types of Development**

In general, those developments that cause concern for the safety of heritage resources will include one or more of the following kinds of surface disturbances. These categories, in combination, are comprehensive of the major kinds of developments commonly proposed in Nunavut. For any single development proposal, several kinds of these disturbances may be involved

- *Linear disturbances: including the construction of highways, roads, winter roads, transmission lines, and pipelines;*
- *Extractive disturbances: including mining, gravel removal, quarrying, and land filling;*
- *Impoundment disturbances: including dams, reservoirs, and tailings ponds;*

- *Intensive land use disturbances: including industrial, residential, commercial, recreational, and land reclamation work, and use of heritage resources as tourist developments.*
- *Mineral, oil and gas exploration: establishment of camps, temporary airstrips, access routes, well sites, or quarries all have potential for impacting heritage resources.*

### **Types of Studies Undertaken to Preserve Heritage Resources**

**Overview:** An overview study of heritage resources should be conducted at the same time as the development project is being designed or its feasibility addressed. They usually lack specificity with regard to the exact location(s) and form(s) of impact and involve limited, if any, field surveys. Their main aim is to accumulate, evaluate, and synthesize the existing knowledge of the heritage of the known area of impact. The overview study provides managers with baseline data from which recommendations for future research and forecasts of potential impacts can be made. A Class I Permit is required for this type of study if field surveys are undertaken.

**Reconnaissance:** This is done to provide a judgmental appraisal of a region sufficient to provide the developer, the consultant, and government managers with recommendations for further development planning. This study may be implemented as a preliminary step to inventory and assessment investigations except in cases where a reconnaissance may indicate a very low or negligible heritage resource potential. Alternately, in the case of small-scale or linear developments, an inventory study may be recommended and obviate the need for a reconnaissance.

The main goal of a reconnaissance study is to provide baseline data for the verification of the presence of potential heritage resources, the determination of impacts to these resources, the generation of terms of reference for further studies and, if required, the advancement of preliminary mitigative and compensatory plans. The results of reconnaissance studies are primarily useful for the selection of alternatives and secondarily as a means of identifying impacts that must be mitigated after the final siting and design of the development project. Depending on the scope of the study, a Class 1 or Class 2 Permit is required for this type of investigation.

**Inventory:** A resource inventory is generally conducted at that stage in a project's development at which the geographical area(s) likely to sustain direct, indirect, and perceived impacts can be well defined. This requires systematic and intensive fieldwork to ascertain the effects of all possible and alternate construction components on heritage resources. All heritage sites must be recorded on Government of Nunavut Site Survey forms. Sufficient information must be amassed from field, library and archival components of the study to generate a predictive model of the heritage resource base that will:

- allow the identification of research and conservation opportunities;
- enable the developer to make planning decisions and recognize their likely effects on the known or predicted resources; and
- make the developer aware of the expenditures, which may be required for subsequent studies and mitigation. A Class 1 or 2 permit is required.

**Assessment:** At this stage, sufficient information concerning the numbers and locations of heritage resources will be available, as well as data to predict the forms and magnitude of impacts. Assessments provide information on the size, volume, complexity and content of a heritage resource, which is used to rank the values of different sites or site types given current archaeological knowledge. As this information will shape subsequent mitigation program(s), great care is necessary during this phase.

**Mitigation:** This refers to the amelioration of adverse impacts to heritage resources and involves the avoidance of impact through the redesign or relocation of a development or its components; the protection of the resource by constructing physical facilities; or, the scientific investigation and recovery of information from the resource by excavation or other method. The type(s) of appropriate mitigative measures are dictated by their viability in the context of the development project. Mitigation strategies must be developed in consultation with, and approved by, the Department of Culture and Heritage. It is important to note that mitigation activities should be initiated as far in advance of the construction of the development as possible.

**Surveillance and monitoring:** These may be required as part of the mitigation program.

*Surveillance* may be conducted during the construction phase of a project to ensure that the developer has complied with the recommendations.

*Monitoring* involves identification and inspection of residual and long-term impacts of a development (i.e. shoreline stability of a reservoir); or the use of impacts to disclose the presence of heritage resources, for example, the uncovering of buried sites during the construction of a pipeline.