

PART 1 FORM PROJECT PROPOSAL INFORMATION REQUIREMENTS

To access NIRB documents, project screenings, and project reviews please visit the Nunavut Impact Review Board's ftp site http://ftp.nirb.ca/. The NIRB's website (www.nirb.ca) is currently under construction. Please contact info@nirb.ca should you have any questions or require further information.

IMPORTANT!

Please be advised that your application will not be processed until the Sections 1 - 9 are completed in their entirety, in both English and Inuktitut (+ Inuinnagtun, if in the Kitikmeot).

	SECTION 1: APPLICANT	INFO	RMA	ATION
	Project Name Glacier-climate studies, Prince o	f Wales	s Icef	ield, Ellesmere Island
	Applicant's full name and mailing address:			
	Shawn Marshall	Pho	one:	403-220-4884
	Department of Geography, University of Calgary		ax:	403-282-6561
	2500 University Dr NW, Calgary AB, T2N 1N4	En	nail:	shawn.marshall@ucalgary.ca
3.	Primary contact's full name and mailing address:			
	Shawn Marshall	Pho	one:	403-220-4884
	Department of Geography, University of Calgary	Fa	ax:	403-282-6561
	2500 University Dr NW, Calgary AB, T2N 1N4	En	nail:	shawn.marshall@ucalgary.ca
	Indicate <u>all</u> authorizations associated with the projection (RIA)		Cana	ndian Launch Safety (CLS)
	Nunavut Water Board (NWB)			onment Canada (EC)
	Nunavut Planning Commission (NPC)			ernment of Nunavut (GN)
	Indian and Northern Affairs Canada (INAC)		•	artment of National Defense (DND)
	Department of Fisheries and Oceans (DFO)		Ham	
<u> </u>	Community Government & Services (CG&S) Nunavut Research Institute (NRI)			s Canada (PC) adian Wildlife Service (CWS)
`	Department of Culture, Language, Elders,			r (please specify):
	and Youth (CLEY)			RC and PCSP environmental screenin



3.	List the <u>pending</u> permits, licenses, or other authorizations related to the project proposal:
	Query submitted to Nunavut Water Board for renewal/waiver of license 3BC-GCS1212
4.	Has this project or <u>any components of this project</u> been previously screened or reviewed by NIRB? YES
If Y	ES, indicate the previous project name and NIRB File No. $12\mathrm{YN}016$
	SECTION 3: PROJECT PROPOSAL DESCRIPTION
1.	Indicate the type of project proposal (check all that apply) ^(1,2) : (See Appendix A for Project Type Definitions)

1	All-Weather Road/Access Trail	9	Site Cleanup/Remediation	
2	Winter Road/ Winter Trail	10	Oil and Natural Gas Exploration/Activities	
3	Mineral Exploration	11	Marine Based Activities	
4	Advanced Mineral Exploration	12	Scientific/International Polar Year Research*	х
5	Mine Development /Bulk Sampling	13	Harvesting Activities*	
6	Pits and quarries	14	Tourism Activities*	

Please note:

dock)

Seismic Survey

7

8

Offshore Infrastructure (port, break water,

 All project types listed above, except those marked with an asterisk (*), will also require the Proponent to submit a Part 2 Project Specific Information Requirement (PSIR) Form. The NIRB application process will not be considered complete without the Part 2 PSIR Form.

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Other⁽²⁾:

- 2. Please be advised that in order to complete the NIRB process, the NIRB may request additional information at any time during the process.
- 3. If "Other" is selected, contact NIRB for direction on whether a Part 2 PSIR Form is required.



Base Metals (zinc, co	opper gold silver etc)			
Diamonds	ppor, gola, silver, etc)			
Uranium				
Other:				
3a. If Project Type 12,	13 or 14 was sele	ected above, complet	e the table and quest	ions below.
Transportation Type	Quantity	Propo	osed Use	Length of Use
Twin Otter	1	PCSP, Resolute to Print Ellesmere Island	nce of Wales Icefield,	2 days (dropoff, pickup)
Skis		All travel on-site will	be on skis	
3b. Describe any docks, proposed project act We will use a ski-acces	ivities. Please no	ote: the building of nev	v structures may requir	
Temporary camp for 10 (portable), propane sto	of power for the c Odays (May 13-2)	amp site if applicable. 2, 2013), on the Prince	e of Wales Icefield. 1	Three tents
4. Personnel Total No. of personnel on	Total N	on-site	Total No (A) × (B)	
site = (A)	2 = (B)	10		20
5. Timing Period of operation:	from May 13, 2 6	013	to May 22, 2013	
Proposed term of				_
	from May 10, 2	013	to May 31, 2013	
6a. Region (check all that X North Baffin South Baffin	apply): Kivalliq National Park	Kitikmeot	Transbounda	ry:
6b. Describe the location the nearest commun			egional context, noting	the proximity to
There are no nearby co Grise Fiord and Eureka	-			-



work on the SW margin of the Prince of Wales Icefield, about 15 km from the head of Vendom Fiord (NTS map sheet 49E, Strathcona Fiord). Our work in 2013 is confined to the icefield.				
•	•			
6c. Discuss the history of the site if it has been used for any project activities in the past.				
balance stakes, and takir	We worked at this site in spring in summer 2012, setting up weather stations, glacier mass balance stakes, and taking snow samples for chemical analysis. In spring 2013 we will collect our meteorological data and remove our instruments.			
6d. Indicate if there are an	y known archaeological/pa	alaeontological historical si	ites in the area.	
Not to our knowledge.				
7. Land Status (check all th	at applies):			
X Crown Inuit Owned Surface L	ands Commissioners	s'	1unicipal	
8a. Co-ordinates:				
Min Lat (degree/minute) Max Lat (degree/minute)	N 78/00 N 78/05	Min Long (degree/minute) Max Long (degree/minute)	W 80/30 W 82/10	
, ,				
NTS Map Sheet No: 49E, Strathcona Fiord (Please ensure that maps of the project are attached (1:50,000 if available, 1:250, 000 Mandatory) available from Natural Resources Canada)				
8b. If the project proposal includes a camp , please provide the coordinates of the camp location				
Min Lat (degree/minute)	N 78/02.5	Min Long (degree/minute)	W 81/20	
Max Lat (degree/minute)	N 78/03.3	Max Long (degree/minute)	W 81/40	
If different from above for the camp: NTS Map Sheet No: Please ensure that maps of the project are attached (1:50,000 if available, 1:250, 000 Mandatory) available from Natural Resources Canada				

Please note that additional location information may be required in a subsequent Project Specific Information Requirement (PSIR) submission. This may take the form of a digital Geographic Information Systems (GIS) file.

SECTION 4: NON-TECHNICAL PROJECT PROPOSAL DESCRIPTION

Please include a non-technical description of the project proposal, no more than 500 words, in English and Inuktitut (+Inuinnagtun, if in the Kitikmeot). The project description should outline the following:

- The project activities, their necessity and duration;
- Method of transportation;
- Any structures that will be erected (permanent/ temporary);
- Alternatives considered: and
- Long-term developments, the projected outcome of the development for the area and its timeline.



Project Description, 2013 Glacier-Climate Studies on the Prince of Wales Icefield, Ellesmere Island

Shawn Marshall Professor, Department of Geography University of Calgary

Glaciers and ice sheets are an integral part of the world's polar landscapes, affecting sea level, climate, and the hydrologic cycle. The rate of sea level rise has increased in the past two decades, largely driven by increased runoff from the Greenland Ice Sheet and smaller Arctic icefields. Forecasts of glacier and ice sheet response to climate change require an understanding of ice-atmosphere interactions and feedbacks, and our research project is examining these on the Prince of Wales (POW) Icefield, Ellesmere Island. We are specifically focused on meteorological conditions and energy balance fluxes on an outlet glacier that is unofficially named 'Humphrey Glacier'. Access to the site will be via twin otter (on skis) from PCSP-Resolute, landing us directly on the icefield. We will be a party of two travelling by foot and ski for a 10-day visit from May 13-22, 2013.

Project Description

The proposed research is a continuation and completion of studies initiated in spring 2012. We are studying the icefield to measure the meteorological and energy balance processes that govern glacier melting, to advance understanding of glacier-climate processes and glacier response to climate change. We will also be taking snow and ice samples to understand the effects of widespread melting in summer 2012 on ice-core climate reconstructions. i.e. how does melting affect the snow chemistry and the ice-core stratigraphy?

Our work will be carried out on the glacier, and travel will be on skis from a base camp about 12 km from the glacier margin. We established this camp and several weather stations in spring 2012, and in 2013 we need to collect the data and extract all of our instruments. We will set up a temporary camp (2 sleeping tents, 1 gear tent, 1 kitchen tent). All equipment and gear will be removed on completion of the project (late May, 2013).

Methodology

Automatic weather stations have been deployed along a vertical transect on the icefield, from an elevation of 400 m (4 km from the glacier toe) to 1000 m, about 5 km above our camp. These instruments were installed in May 2012 and have been recording through the year. We will visit each site, download the data, and dismantle the equipment. All instruments and poles will be towed back to our glacier camp and will be removed. Snow and ice core samples will be collected from the upper icefield (southern Prince of Wales ice divide) using a Kovacs ice auger. All samples will be wrapped and shipped out for analysis at the University of Calgary.

Data

Meteorological and snow chemistry data collected will be available on request and publicly available through publication(s).



Reporting

Publications in scientific journals are anticipated (e.g., *Journal of Glaciology*). Reports will be provided to PCSP and NRI, and our group would be delighted to speak on Arctic climate change with any interested communities (e.g. Grise Fiord, Resolute).

Infrastructure

No permanent structures are needed. We will establish a temporary (tent) camp on the glacier and all equipment and supplies will be flown in and out in May 2013. Camp will consist of three tents, we will cook from propane-burning Coleman stoves, and we will melt snow for drinking water. We will be using a portable backcountry toilet, and all waste will be flown out. Travel on-site will be on ski, pulling pulks to transport gear on and off the glacier site.

- TRANSLATIONS ATTACHED FOR THIS RESEARCH AND FOR THE 2012 PROGRESS REPORT -



<u>IMPORTANT:</u> IF THE PROPOSED ACTIVITIES REQUIRE SUBMISSION OF A NIRB PART 2 PSIR FORM, PLEASE COMPLETE SECTION 8 ONLY, OTHERWISE CONTINUE ON WITH SECTION 5.

SECTION 5: MATERIAL USE

1. List equipment to be used (including drills, pumps, aircraft, vehicles, etc.):

Equipment type and number	Size – dimensions	Proposed use
Twin Otter access to site		field crew dropoff, pickup
generator	1 kW	Recharge batteries, laptop
Weather stations	1 m2 (poles, with instruments)	Collect weather data
Ice auger/coring drill	20 m long	Collect shallow ice core sample

2a. Detail fuel and hazardous material use:

Fuel	Number of Containers and Capacity of Containers	Total Amount of Fuel (in Litres)	Proposed Storage Methods
Diesel			
Gasoline	2 x 20 L	40 L	Jerry cans, stored on plastic tarps
Aviation fuel			
Propane	3 x 20 lb	60 lb	Camp cache
Other			
Hazardous Materials and Chemicals		Total Amount of Hazardous Materials and Chemicals (in Litres)	

2b. Describe the proposed Spill Prevention Plan.

Gasoline (for generator) to be poured on tarps; any spill to be towel-wiped.

3a. Detail the anticipated daily water consumption rates

Daily amount (m³)	Proposed water retrieval methods	Proposed water retrieval location
20 L (0.02 m ³)	Snow melt	At glacier camp, surface snow
(drinking, cooking)		

3b. Have you applied for a water License with the Nunavut Water Board?

YES

If yes, what class of licence?

Inquiry in place on whether we require a Class B Licence (Miscellaneous) (renewal from 2012)



SECTION 6: WASTE DISPOSAL AND TREATMENT METHODS

1. List the types of waste associated with the proposed project activities:

Type of waste	Projected amount generated	Method of Disposal	Additional treatment procedures
Sewage (human waste)	20 kg	Portable toilet; flown out	
Greywater	100 L	Pour into snow pit or crevasse on the glacier surface	
Combustible wastes	20 kg	Flown out	
Non-Combustible wastes	10 kg	Flown out	
Overburden (organic soil, waste material, tailings)			
Hazardous waste			
Other:			

2. Describe the proposed Waste Management Plan.

All waste generated will be byproduct of camp activities (e.g. food preparation, packaging). Grey water from cooking/dishes will be disposed of on-site; all human waste and garbage will be flown out. The scientific activities do not generate waste: just data collection (weather, snow samples). Packaging will be flown out with the rest of our garbage.

SECTION 7: COMMUNITY INVOLVEMENT & REGIONAL BENEFITS

1. List the community representatives that have been contacted and provide the minutes of the meetings if available:

None – we are not working near any communities, or on traditional lands, and most of our work is on the glacier, where Innuit don't traditionally travel and where specialized training is required.

Community	Name	Organization	Date Contacted

SECTION 8: GENERAL QUESTIONS

1. Will you be disturbing any known archaeological sites?

NO

SECTION 9: APPLICANT SIGNATURE

an Rul		
		Professor, University of Calgary
Feb 11, 2012		
Signature	Title	Date



APPENDIX A Project Type Definitions

- **Access Trail**: A project proposal with the objective of providing vehicular access to an area of interest involving minimal alteration to the terrain.
- **Advanced Exploration:** A project proposal with the objective of identifying size, grade, and physical characteristics of a mineral occurrence and to assess the economic and technical feasibility of developing the mineral deposit into a producing mine
- **All-Weather Road:** A project proposal with the objective of road construction for use in all seasons.
- **Bulk Sampling:** A project proposal with the objective of extracting of large samples of mineralized material involving hundreds to thousands of tonnes. Samples are selected as representative of the potential mineral deposit being sampled. May involve crushing/milling (on small-scale)
- **Harvesting activities:** A project proposal with the objective of harvesting animals, marine mammals and/or fish from their natural habitats by means of hunting or trapping for traditional and commercial use.
- **Marine Based Activities:** Any activity occurring in the marine environment, such as vessel use associated with land-based activities or disposal at sea.
 - *Please note that normal community re-supply or individual ship movements not associated with land-based project proposals shall not be screened by NIRB (Section 12.12.2 of NLCA).
- **Mine Development:** A project proposal with the objective of extracting broken rock with mineralization of sufficient grade and tonnage to sustain commercial mining operations (ore). Mining a body of ore can be achieved by either open pit and/or underground development. Mine development may involve milling. Milling involves treatment of the extracted ore through a combination of mechanical and chemical processes to selectively recover the valuable mineral.
- **Mineral Exploration:** A project proposal with the objective of exploring an area to find geological anomalies. It involves site reconnaissance (ground and/or air) to locate broad and fiscal mineral deposits.
- **Offshore Infrastructure:** A project proposal with the objective of building off loading facilities constructed off the shoreline and connected to the mainland of the marine or freshwater environment. Examples include a jetty, dock, or port facility.
- **Oil and Gas Exploration/Activities:** A project proposal that includes 1) exploration, such as seismic or geological mapping, 2) drilling of oil and gas wells, 3) construction and operation of a pipeline, a gas processing plant or any oil and gas facility within Nunavut.
- **Pits and Quarries:** A project proposal with the objective of pitting, which involves the extraction of granular material (i.e. sands and gravels) and quarrying, which involves the removal of consolidated rock (i.e. bedrock, frozen soil).
- **Scientific Research:** A project proposal with the objective of implementing a series of site activities comprised of observation of phenomena, measurement and collection of data necessary for scientific investigation in designated areas within a limited time period.
- **Seismic Survey:** A project proposal with the objective of conducting a survey to map the depths and contours of rock strata by timing the reflections of sound waves released from the surface. Survey site locations may be offshore (not within 12 nautical miles of any coast), near shore, and extended onshore.
- **Site Cleanups:** A project proposal with the objective of site cleanups (includes DEW line site cleanups), which focuses on the remediation of chemically contaminated soils, stabilization of landfills and dumps, demolition/disposal of infrastructure and debris and monitoring after cleanup is completed.



- **Tourism Activity:** A project proposal with the objective of conducting travel predominantly for recreational, sport or leisure purposes within a designated area and limited time period.
- **Winter Road:** A project proposal with the objective of building a road for winter use by leveling and compacting surface snow and ice. Winter road is removed at end of season.
- **Winter Trail:** A project proposal with the objective of building a trail for winter use by a single pass of a tracked vehicle using a blade, if necessary.