



NIRB Application for Screening #125618

Healy Baffin Bay Survey

Application Type: New

Project Type: Scientific Research

Application Date: 6/10/2021 3:14:09 PM

Period of operation: from 0001-01-01 to 0001-01-01

Proposed Authorization: from 0001-01-01 to 0001-01-01

Project Proponent: Robert S Pickart
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DETAILS

Non-technical project proposal description

English: This is a multi-disciplinary research project that will take advantage of the US Coast Guard Cutter Healy operating in Baffin Bay in September/October 2021. There will be science teams aboard from various institutions, as detailed below. We will depart from Nuuk, Greenland on 17 September, and disembark in Boston, Massachusetts, USA on 15 October. The ship will take measurements in central/southern Baffin Bay, extending from just offshore the Greenland coast to just offshore the coast of Baffin Island. The following is a brief summary of the 8 projects, including the main scientific objectives and measurements being collected. A total of 14 scientists will participate on the cruise. 1. Scientists from the Woods Hole Oceanographic Institution, USA will conduct a survey of the water properties and water velocity in Baffin Bay. The water properties are measured using an instrument package lowered over the side of the ship. The velocity is measured using an acoustic current profiler situated in the hull of the ship. The main objectives are to determine the fate of the freshwater carried into Baffin Bay by the West Greenland Boundary Current, and to establish the pathways by which heat from the current gets diverted to the Uummannaq region glaciers of West Greenland. 2. Scientists from the Bedford Institute of Oceanography, Canada will carry out seafloor mapping and sub-bottom profiling in designated areas adjacent to Baffin Island. The main objectives are to map the distribution of underwater landslides on the continental slope of Baffin Bay, assess the relative age of underwater landslides, and identify possible trigger mechanisms for these landslides. 3. Scientists from the University of Alaska, USA will collect carbon isotope measurements in Baffin Bay, both in the water and in the air. The main objective is to quantify ocean-atmosphere-ice-land interactions using these quantities. 4. Scientists from the University of Bergen, Norway will deploy an underwater autonomous vehicle, known as a “sea glider”, in the vicinity of Jakobshavn glacier, West Greenland to measure water properties. The vehicle will be recovered later in the fall by the Canadian Coast Guard Ship Amundsen. The main objective is to map the detailed pathways by which heat is brought to the glacier, and estimate small-scale variations in this process. 5. Scientists from NORCE Research Center, Norway will collect water samples to measure oxygen isotopes and nutrients in Baffin Bay. The main objective is to distinguish the sources of freshwater between meltwater from the Greenland ice cap and outflow from the Arctic Ocean. 6. Scientists from the University of Windsor, Canada will attach an acoustic receiver to the package lowered over the side of the ship. The receiver records signals from fish (Greenland Halibut) that have been previously tagged. The main objective is to track the whereabouts of the fish. 7. Scientists from the National Oceanography Center, UK will deploy satellite-tracked surface drifters that measure surface water properties and barometric pressure (a subset of the drifters will also measure wind speed). These will be launched at various locations in Baffin Bay. The main objective is to track the movement and evolution of the water, and provide atmospheric information. 8. Scientists from the Woods Hole Oceanographic Institution, USA will collect water samples to measure biochemical properties of the water (oxygen, dissolved inorganic carbon, and total alkalinity) in Baffin Bay. The main objective is to identify the origin and transformation of the water. The work has been, and will be, coordinated with scientists from the Geological Survey of Canada (GSC). Our colleagues from the GSC made initial community engagement visits in 2013. In May 2015 and in March 2016, 2018 and 2019, community engagement sessions were held in Clyde River, Qikiqtarjuaq, Pangnirtung and Iqaluit. COVID prevented such visits in 2020. Research results will be reported back during community visits following the cruise and will be made publicly available. Results will also be presented at workshops in the North, at science conferences, and will result in publications in various scientific journals, reports, and plain language documents over the months and years following the project.

French: Aperçu du projet de l'USCGC Healy dans la Baie de Baffin. Il s'agit d'un projet de recherche multidisciplinaire qui prendra avantage du navire de la garde côtière américaine Healy opérant dans la baie de Baffin en septembre/octobre 2021. Il y aura à bord des équipes scientifiques de diverses institutions, comme détaillé ci-dessous. Nous partirons de Nuuk, au Groenland, le 17 septembre, et débarquerons à Boston, Massachusetts, États-Unis, le 17 octobre. Le navire prendra des mesures dans le centre et le sud de la baie de Baffin, s'étendant juste au large de la côte du Groenland jusqu'au large de la côte de l'île de Baffin. Ce qui suit est un bref résumé des 8 projets, y compris les principaux objectifs scientifiques et les mesures recueillies. Au total, 14 scientifiques participeront à la mission scientifique. 1. Des scientifiques de l'institut océanographique de Woods Hole, aux États-Unis, effectueront une étude sur les propriétés de l'eau et de la vitesse des courants dans la baie de Baffin. Les propriétés de l'eau sont mesurées à l'aide d'un ensemble d'instruments abaissé sur le côté du navire. La vitesse est mesurée à l'aide d'un profileur de courant acoustique situé sur la coque du navire. Les principaux objectifs sont de déterminer le sort de l'eau douce transportée dans la baie de Baffin par le courant de l'ouest du Groenland et d'établir les voies par lesquelles la chaleur du courant est détournée vers les glaciers de la région d'Uummannaq, dans l'ouest du Groenland. 2. Des scientifiques de l'Institut océanographique de Bedford, Canada, effectueront une cartographie du fond marin et un profilage du sous-sol dans des zones désignées adjacentes à l'île de Baffin. Les principaux objectifs sont de cartographier la répartition des glissements de terrain sous-marins sur le talus continental de la baie de Baffin, d'évaluer l'âge relatif des glissements de terrain sous-marins et d'identifier les mécanismes déclencheurs possibles de ces glissements de terrain. 3. Des scientifiques de l'Université d'Alaska, aux États-Unis, recueilleront des mesures d'isotopes de carbone dans la baie de Baffin,

à la fois dans l'eau et dans l'air. L'objectif principal est de quantifier les interactions océan-atmosphère-glace-terre.4. Des scientifiques de l'Université de Bergen, en Norvège, déploieront un véhicule autonome sous-marin, connu sous le nom de «planeur marin», à proximité du glacier Jakobshavn, dans l'ouest du Groenland, pour mesurer les propriétés de l'eau. Le véhicule sera récupéré plus tard à l'automne par le navire de la Garde côtière canadienne Amundsen. L'objectif principal est de cartographier les voies détaillées par lesquelles la chaleur est amenée au glacier et d'estimer les variations à petite échelle de ce processus.5. Des scientifiques du Centre de recherche NORCE, Norvège, recueilleront des échantillons d'eau pour mesurer les isotopes de l'oxygène et les nutriments dans la baie de Baffin. L'objectif principal est de distinguer les sources d'eau douce entre l'eau de fonte de la calotte glaciaire du Groenland et l'écoulement de l'océan Arctique.6. Des scientifiques de l'Université de Windsor, au Canada, fixeront un récepteur acoustique au colis abaissé sur le côté du navire. Le récepteur enregistre les signaux des poissons (flétan du Groenland) qui ont déjà été marqués. L'objectif principal est de suivre les allées et venues du poisson.7. Des scientifiques du National Oceanography Center du Royaume-Uni déploieront des dériveurs de surface suivis par satellite qui mesureront les propriétés de l'eau de surface et la pression barométrique (un sous-ensemble de dériveurs mesurera également la vitesse du vent). Ceux-ci seront lancés à divers endroits dans la baie de Baffin. L'objectif principal est de suivre le mouvement et l'évolution de l'eau, et de fournir des informations atmosphériques.8. Des scientifiques de l'institut océanographique de Woods Hole, États-Unis, recueilleront des échantillons d'eau pour mesurer les propriétés biochimiques de l'eau (oxygène, carbone inorganique dissous et alcalinité totale) dans la baie de Baffin. L'objectif principal est d'identifier l'origine et la transformation de l'eau. Les travaux ont été et seront coordonnés avec des scientifiques de la Commission géologique du Canada (CGC). Nos collègues de la CGC ont effectué les premières visites d'engagement communautaire en 2013. En mai 2015 et en mars 2016, 2018 et 2019, des séances d'engagement communautaire ont eu lieu à Clyde River, Qikiqtaaluk, Pangnirtung et Iqaluit. La COVID-19 a empêché de telles visites en 2020. Les résultats de la recherche seront rapportés lors des visites communautaires après la mission scientifique et seront rendus publics. Les résultats seront également présentés lors d'ateliers dans le Nord, lors de conférences scientifiques et donneront lieu à des publications dans diverses revues scientifiques, des rapports et des documents en langage simple au cours des mois et des années suivant le projet.

Inuktitut:

Personnel

Days on site: 24

Total Person days: 2496

Operations Phase: from 2021-09-17 to 2021-10-10

Activities

Location	Activity Type	Land Status	Site history	Site archaeological or paleontological value	Proximity to the nearest communities and any protected areas
Line 1. This is a transect along which the ship will take measurements of the water.	Marine Based Activities	Marine	The transect has not been occupied previously.	Not Applicable.	We will take measurements no closer than 3 nautical miles from shore.
Line 2. This is a transect along which the ship will take measurements of the water.	Marine Based Activities	Marine	The transect has not been occupied previously.	Not Applicable.	We will take measurements no closer than 3 nautical miles from shore.
Line 3. This is a transect along which the ship will take measurements of the water.	Marine Based Activities	Marine	The transect has not been occupied previously.	Not Applicable.	We will take measurements no closer than 3 nautical miles from shore.
Line 4. This is a transect along which the ship will take measurements of the water.	Marine Based Activities	Marine	The transect has not been occupied previously.	Not Applicable.	We will take measurements no closer than 3 nautical miles from shore.
Line 5. This is a transect along which the ship will take measurements of the water.	Marine Based Activities	Marine	The transect has not been occupied previously.	Not Applicable.	We will take measurements no closer than 3 nautical miles from shore.
Line 6. This is a transect along which the ship will take measurements of the water.	Marine Based Activities	Marine	The transect has not been occupied previously.	Not Applicable.	We will take measurements no closer than 3 nautical miles from shore.
Line 7. This is a transect along which the ship will take measurements of the water.	Marine Based Activities	Marine	The transect has not been occupied previously.	Not Applicable.	We will take measurements no closer than 3 nautical miles from shore.
Line 8. This is a transect along which the ship will take measurements of the water.	Marine Based Activities	Marine	The transect has not been occupied previously.	Not Applicable.	We will take measurements no closer than 3 nautical miles from shore.
Line 9. This is a transect along which the ship will take measurements of the water.	Marine Based Activities	Marine	The transect has not been occupied previously.	Not Applicable.	We will take measurements no closer than 3 nautical miles from shore.
Line 10. This is a transect along which the ship will take measurements of the water.	Marine Based Activities	Marine	The transect has not been occupied previously.	Not Applicable.	We will take measurements no closer than 3 nautical miles from shore.

Community Involvement & Regional Benefits

Community	Name	Organization	Date Contacted
Qikiqtarjuaq	Geela Kooneeliusie	Senior administrative officer	2019-03-15

Authorizations

Indicate the areas in which the project is located:

Transboundary
North Baffin
South Baffin

Authorizations

Regulatory Authority	Authorization Description	Current Status	Date Issued / Applied	Expiry Date
Nunavut Research Institute	Applied for a permit for scientific research in Baffin Bay.	Applied, Decision Pending		

Project transportation types

Transportation Type	Proposed Use	Length of Use
Water	US Coast Guard Cutter Healy	

Project accomodation types

Other,

Material Use

Equipment to be used (including drills, pumps, aircraft, vehicles, etc)

Equipment Type	Quantity	Size - Dimensions	Proposed Use
Conductivity-Temperature-Depth (CTD)	1	6' x 3'	To collect vertical profiles of temperature, salinity, oxygen, fluorescence, and beam transmission at specified locations.
Niskin bottles	24	3' x 0.5'	To collect water samples for measuring chemical properties.
Flow-through sensors	4	Attached to ship	Several devices to monitor the properties of seawater/air by passing seawater/air through them as the vessel is underway. A detailed list of these sensors is provided in the documentation at the end of the application.
12-kHz echosounder	1	Attached to ship	Bathymetric data collection.
150-kHz acoustic Doppler current profiler (ADCP)	1	Attached to ship	To collect vertical profiles of water velocity.
75-kHz ADCP	1	Attached to ship	To collect vertical profiles of water velocity.
Autonomous glider	1	5' x 1.5'	This will be launched near Jakobshavn glacier, West Greenland to collect measurements of temperature, salinity, velocity, and turbulence. It will be recovered by CCGS Amundsen later in the fall.
Surface velocity drifter	30	2' x 2'	These will be deployed from the vessel at various locations in Baffin Bay. They drift with the surface currents and transmit their data to satellite. The sensors on the drifters are described in the documentation at the end of the application.
USCGC Healy	1	420' x 82' x 29.3'	Research vessel.
3.5-kHz echosounder	1	Attached to ship	Seabed imaging.
multi-beam echosounder	1	Attached to ship	Bathymetric data collection.

Detail Fuel and Hazardous Material Use

Detail fuel material use:	Fuel Type	Number of containers	Container Capacity	Total Amount	Units	Proposed Use
Diesel	fuel	1	12202915	12202915	Gallons	Vessel had Diesel Electric propulsion and carries all fuel it needs.
Chloroform	hazardous	1	1	1	Liters	Used for

						measuring nutrients in water samples.
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Water Consumption

Daily amount (m3)	Proposed water retrieval methods	Proposed water retrieval location
0		

Waste

Waste Management

Project Activity	Type of Waste	Projected Amount Generated	Method of Disposal	Additional treatment procedures
Marine Based Activities	Hazardous	1 Liter	Will stay on ship and be disposed after reaching home port.	N/A

Environmental Impacts:

There are no predicted environmental impacts.

Additional Information

SECTION A1: Project Info

SECTION A2: Allweather Road

SECTION A3: Winter Road

SECTION B1: Project Info

SECTION B2: Exploration Activity

SECTION B3: Geosciences

SECTION B4: Drilling

SECTION B5: Stripping

SECTION B6: Underground Activity

SECTION B7: Waste Rock

SECTION B8: Stockpiles

SECTION B9: Mine Development

SECTION B10: Geology

SECTION B11: Mine

SECTION B12: Mill

SECTION C1: Pits

SECTION D1: Facility

SECTION D2: Facility Construction

SECTION D3: Facility Operation

SECTION D4: Vessel Use

SECTION E1: Offshore Survey

SECTION E2: Nearshore Survey

SECTION E3: Vessel Use

SECTION F1: Site Cleanup

SECTION G1: Well Authorization

SECTION G2: Onland Exploration

SECTION G3: Offshore Exploration

SECTION G4: Rig

SECTION H1: Vessel Use

We will use the United States Coast Guard Cutter Healy to conduct an interdisciplinary research cruise in Baffin Bay. The scientific objectives and activities being carried out on the ship are detailed in the Project Overview. The particulars of the vessel are included in the Project Documents section.

SECTION H2: Disposal At Sea

The vessel complies with all international waste management guidelines and is self-contained with respect to waste. The vessel management plans are included in the Project Documents section.

SECTION I1: Municipal Development

Description of Existing Environment: Physical Environment

Description of Existing Environment: Biological Environment

Description of Existing Environment: Socio-economic Environment

Miscellaneous Project Information

Identification of Impacts and Proposed Mitigation Measures

Cumulative Effects

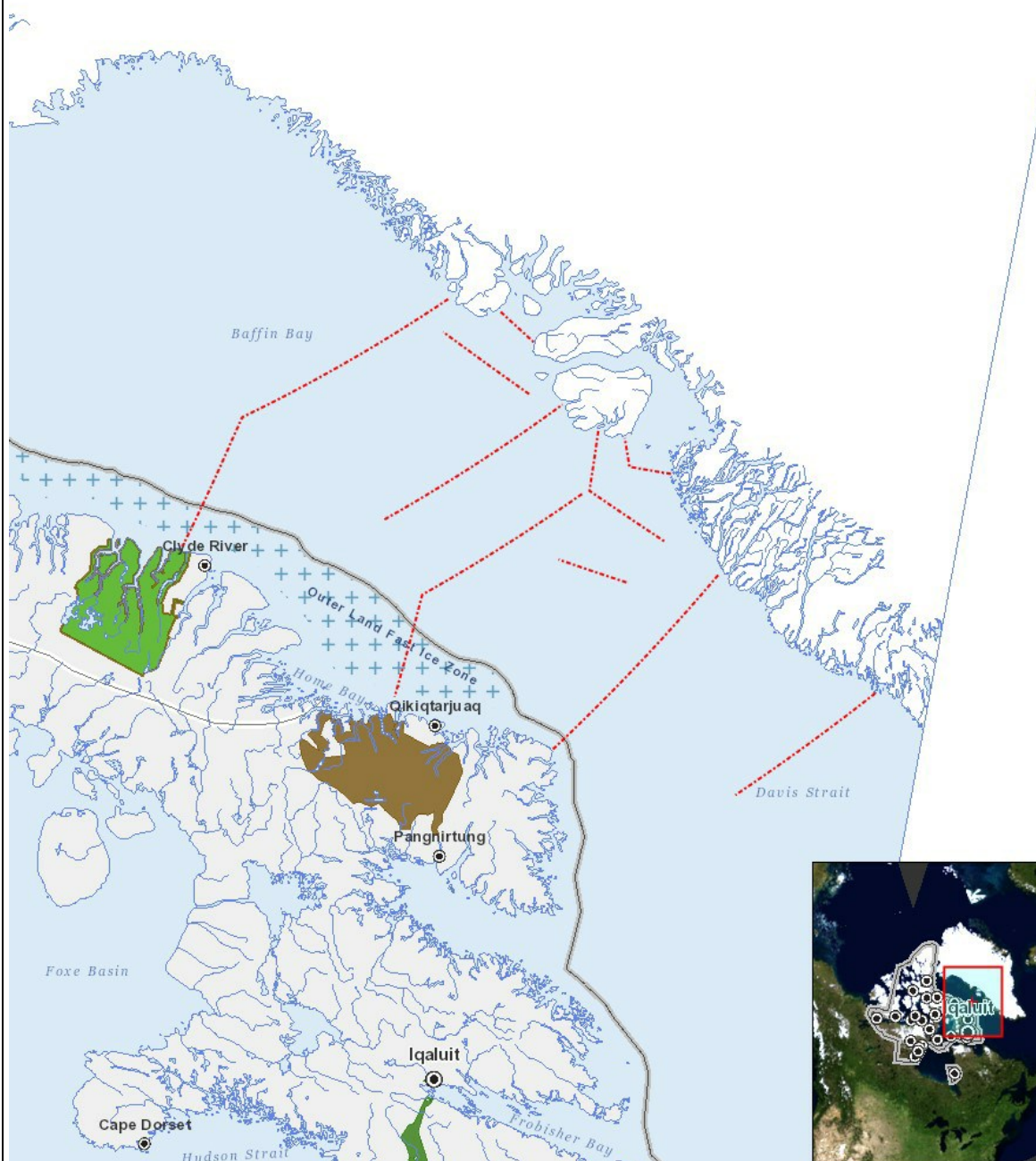
Impacts

Identification of Environmental Impacts

		PHYSICAL	Designated environmental areas	Ground stability	Permafrost	Hydrology / Limnology	Water quality	Climate conditions	Eskers and other unique or fragile landscapes	Surface and bedrock geology	Sediment and soil quality	Tidal processes and bathymetry	Air quality	Noise levels	BIOLOGICAL	Vegetation	Wildlife, including habitat and migration patterns	Birds, including habitat and migration patterns	Aquatic species, incl. habitat and migration/spawning	Wildlife protected areas	SOCIO-ECONOMIC	Archaeological and cultural historic sites	Employment	Community wellness	Community infrastructure	Human health
Construction																										
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Operation																										
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Decommissioning																										
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(P = Positive, N = Negative and non-mitigatable, M = Negative and mitigatable, U = Unknown)

Project Location



List of Project Geometries

- 1 polyline Line 1. This is a transect along which the ship will take measurements of the water.
- 2 polyline Line 2. This is a transect along which the ship will take measurements of the water.
- 3 polyline Line 3. This is a transect along which the ship will take measurements of the water.
- 4 polyline Line 4. This is a transect along which the ship will take measurements of the water.
- 5 polyline Line 5. This is a transect along which the ship will take measurements of the water.
- 6 polyline Line 6. This is a transect along which the ship will take measurements of the water.
- 7 polyline Line 7. This is a transect along which the ship will take measurements of the water.
- 8 polyline Line 8. This is a transect along which the ship will take measurements of the water.
- 9 polyline Line 9. This is a transect along which the ship will take measurements of the water.
- 10 polyline Line 10. This is a transect along which the ship will take measurements of the water.