



NIRB Application for Screening #125612 HEALY2021 Transit

Application Type: New

Project Type: Scientific Research

Application Date: 5/10/2021 11:39:16 AM

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

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

Project Proponent: Larry Mayer
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DETAILS

Non-technical project proposal description

English: This is a multi-disciplinary research project that will take advantage of the Healy transiting the Northwest Passage from Alaska to Baffin Bay and collect underway data that will contribute to our understanding of the depth of the seafloor (bathymetry) and make measurements that will help us better understand climate change and changes in productivity in through the NWP and the Arctic. All measurements will be made while vessel is underway. No samples of the seafloor will be taken. Water and air samples will be taken by flow-through systems while the vessel is transiting. The ship will take advantage of the HEALY's transit from Alaska to Nuuk, to fill critical bathymetric gaps and add to the growing effort of complete seafloor mapping. We will make carbon isotope measurements through the NW Passage and in Baffin Bay to help better understand ocean-atmosphere-ice-land interactions using water and carbon (CO₂ & CH₄) isotope measurements of marine air and sea water. We will measure particulate organic matter distributions in surface waters across Northwest Passage- High resolution collection of suspended particulate samples through Healy's surface underway seawater system along the ship's track. We will collect gravity data across the Arctic Basin. We will look at net community productivity in surface waters across the Northwest Passage through sampling of Healy's underway science seawater line for dissolved gases. The data will be used to calculate high-resolution rates of biological production rate (net community production) every ~2 minutes along the cruise track. We will collect Environmental DNA (eDNA) and do optical sampling in Arctic Seas and Northwest Passage to determine the community composition (eDNA), net community production of the mixed layer (PIGI), surface chlorophyll content for satellite intercomparison/calibration. A shipboard hydrographic/velocity survey will be carried out. The main objectives are to determine the fate of the fresh water 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. The work has been, and will be, coordinated with scientists from the Geological Survey of Canada. Our colleagues from the GSC made initial community engagement visits in 2013. In May 2015 and in March 2016, community engagement sessions were held in Clyde River, Qikiqtarjuaq, Pangnirtung and Iqaluit. In 2018 and 2019, community consultations were held in Pangnirtung and Qikiqtarjuaq. COVID prevented such visits this year. Research results will be reported back during community visits about six months after the conclusion of the field season 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: Il s'agit d'un projet de recherche multidisciplinaire qui profitera du passage du Healy par le passage du Nord-Ouest de l'Alaska à la baie de Baffin et recueillera des données en cours qui contribueront à notre compréhension de la profondeur du fond marin (bathymétrie) et effectuera des mesures qui nous aideront mieux comprendre le changement climatique et les changements de productivité dans le PTN et l'Arctique. Toutes les mesures seront effectuées pendant que le navire est en route. Aucun échantillon du fond marin ne sera prélevé. Des échantillons d'eau et d'air seront prélevés par des systèmes «à circulation» pendant le transit du navire. Le navire profitera du transit du HEALY de l'Alaska à Nuuk pour combler les lacunes bathymétriques critiques et ajouter à l'effort croissant de cartographie complète des fonds marins. Nous effectuerons des mesures des isotopes du carbone dans le passage NW et dans la baie de Baffin pour aider à mieux comprendre les interactions océan-atmosphère-glace-terre en utilisant les mesures isotopiques de l'eau et du carbone (CO₂ et CH₄) de l'air marin et de l'eau de mer. Nous mesurerons les distributions de matière organique particulaire dans les eaux de surface à travers le passage du Nord-Ouest - Collecte à haute résolution d'échantillons de particules en suspension à travers le système d'eau de mer en surface de Healy le long de la trajectoire du navire. Nous collecterons des données gravimétriques dans le bassin arctique. Nous examinerons la productivité nette des communautés dans les eaux de surface du passage du Nord-Ouest en échantillonnant la conduite d'eau de mer scientifique en cours de Healy pour les gaz dissous. Les données seront utilisées pour calculer les taux à haute résolution du taux de production biologique (production communautaire nette) toutes les ~ 2 minutes le long de la piste de croisière. Nous collecterons l'ADN environnemental (ADNe) et effectuerons un échantillonnage optique dans les mers arctiques et le passage du Nord-Ouest pour déterminer la composition de la communauté (ADNe), la production communautaire nette de la couche mixte (PIGI), la teneur en chlorophylle de surface pour l'intercomparaison / l'étalonnage des satellites. Un levé hydrographique / de vitesse à bord sera effectué. Les principaux objectifs sont de déterminer le sort de l'eau douce transportée dans la baie de Baffin par le courant de frontière ouest du Groenland, et d'établir les voies par lesquelles la chaleur du courant est détournée vers les glaciers de la région d'Uummannaq. Les travaux ont été et seront coordonnés avec des scientifiques de la Commission géologique du Canada. Nos collègues du SGC ont effectué les premières visites d'engagement communautaire en 2013. En mai 2015 et en mars 2016, des séances d'engagement communautaire ont eu lieu à Clyde River, Qikiqtarjuaq, Pangnirtung et Iqaluit. En 2018 et 2019, des consultations communautaires ont eu lieu à Pangnirtung et Qikiqtarjuaq. COVID a empêché de telles visites cette année. Les résultats de la recherche seront communiqués lors des visites communautaires environ six mois après la fin de la saison sur le terrain et seront rendus publics. Les résultats seront également présentés lors d'ateliers dans le Nord, lors de conférences scientifiques et se traduiront par des publications dans

diverses revues scientifiques, des rapports et des documents en langage clair au cours des mois et des années suivant le projet.

Inuktitut: See attached document

Personnel

Personnel on site: 104

Days on site: 7

Total Person days: 728

Operations Phase: from 2021-08-25 to 2021-09-13

Activities

Location	Activity Type	Land Status	Site history	Site archaeological or paleontological value	Proximity to the nearest communities and any protected areas
f2021343448216-HEALY_USCG_INITIAL_TRACK_TEST	Marine Based Activities	Marine	N/A	N/A	N/A

Community Involvement & Regional Benefits

Community	Name	Organization	Date Contacted
Information is not available			

Authorizations

Indicate the areas in which the project is located:

Transboundary
Kitikmeot
North Baffin

Authorizations

Regulatory Authority	Authorization Description	Current Status	Date Issued / Applied	Expiry Date
Information is not available				

Project transportation types

Transportation Type	Proposed Use	Length of Use
Water	Research transit of USCG Icebreaker HEALY	

Project accomodation types

Other,

Material Use

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

Equipment Type	Quantity	Size - Dimensions	Proposed Use
3.5 kHz echo-sounder	1	attached to ship	seabed imaging
multibeam echo-sounder	1	attached to ship	bathymetric data collection
USCG Icebreaker HEALY	1	420'x82'x29.3'	Research Vessel
CTD	1	6' x 3'	measure temperature, salinity of water
XBT	100	1'x3	measure water temperature profile while underway
XCTD	85	1'x3	measure temperature and salinity profile while underway
gravimeter	1	3'x3'x3'	Device to measure the earth's gravity field
Flow-through sensors	4	3'x2'1'	Several devices to monitor the properties of the seawater and air by passing seawater (or air) through them as vessel is underway. A detailed list of these sensors if provided in the documentation at the end of the application.
underwater glider	1	5'x3"11	IF time permits an autonomous glider will be launched in Baffin Bay towards the end of the leg. This glider will be retrieved by the scientific party of the next leg. The glider will be measuring water properties.

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 has Diesel Electric propulsion and carries all fuel it needs
Bleach	hazardous	1	5	5	Liters	cleaning sample holders
Ethanol	hazardous	1	5	5	Liters	Sample preservation

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
Information is not available				

Environmental Impacts:

None. The vessel will be transiting. It will only stop to launch one glider (if time permits) in deep offshore waters mid-Baffin Bay that will be recovered on a subsequent leg. There will be no samples taken except of water and air using flow-through systems on board the vessel. It is self-contained with respect to waste disposal and meets all national and international environmental standards. Measurements made of bathymetry, air and water properties as well as productivity and eDNA records will be made publicly available when analyses are completed and will aid in better understanding for the environment of the region.

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

The Coast Guard Cutter HEALY (WAGB - 20) is United States' newest and most technologically advanced polar icebreaker. On this expedition the HEALY will be transiting from Seward Alaska to Nuuk Greenland through the NWP and will be collecting bathymetric data, and sampling water and air using flow-through systems. When crossing Baffin Bay, the HEALY will make a number of CTD casts (measuring salinity, temperature and depth). The HEALY is classified as a medium ice-breaker designed to conduct a wide range of research activities, providing more than 4,200 square feet of scientific laboratory space, numerous electronic sensor systems, oceanographic winches, and accommodations for up to 50 scientists. HEALY is designed to break 4.5 feet of ice continuously at three knots and can operate in temperatures as low as -50 degrees F. Length, Overall 420'0 (128 meters) Beam, Maximum 82'0 (25 meters) Draft, Full Load 29'3 (8.9 meters) Displacement, Full Load 16,000 LT Propulsion Diesel Electric, AC/AC Cycloconverter Generating Plant Drive Motors 4 Sultz 12Z AU40S2 AC Synchronous, 11.2 MW Shaft Horsepower 30,000 Max HP Propellers 2 Fixed Pitch, 4 Bladed Auxiliary Generator EMD 16-645F7B, 2400kW Fuel Capacity 1,220,915 GAL (4,621,000 liters) Cruising Speed 12 knots @ 105 RPM Max Speed 17 knots @ 147 RPM Icebreaking Capability 4.5 ft @ 3 knots (continuous) 8 ft (2.44 m) Backing and Ramming Science Labs Main, Bio-Chemical, Electronics, Meteorological, Photography Accommodations 19 Officer, 12 CPO, 54 Enlisted, 35 Scientists, 15 Surge, 2 Visitors For this expedition there will be 104 scientists and crew aboard the vessel. The vessel will leave Seward Alaska on 25 August and arrive in Nuuk Greenland on 13 Sept. The ship track is presented as a map in The Waste management plan is provided in the Documents section. As a Coast Guard cutter, HEALY is also a capable platform for supporting other potential missions in the polar regions, including logistics, search and rescue, ship escort, environmental protection, and enforcement of laws and treaties. Ballast water: Ballast operations are conducted in accordance with the Vessel Environmental Manual. Healy has segregated ballast tanks, so operations are conducted outside of 200 nautical miles as far as practicable. Healy has a ballast capacity of 1,000,000 gal. Ballast is untreated. If ballast is taken on within 200 NM, the water is exchanged outside 200 NM and the tanks are flushed. • Bilge water: Bilge water is put into the Oily Water Holding Tank (9,000g). The bilge water is process through the Oily Water Separator and only discharged overboard if it contains less than 15ppm. The OWS is only operated outside 12NM. Any bilge water that is not processed is held until return to port where it is offloaded and disposed of commercially. The oil removed via the OWS is stored in a separate Waste Oil tank. • Deck Drainage: Deck drains on the weather decks and in the Hangar drain directly overboard. Internal Deck drains from machinery spaces are routed to the Oily Water Tank, and non-machinery drains go to the Grey Water Tank. • Grey and black water: Healy utilizes a vacuum eductor system to collect black water in the Black Water Tank (1000g). The Grey water system is gravity drained, and is collected in the Grey Water Tank (13,300g). The Black water is pumped into the Grey Water tank automatically when the Black Water Tank reaches 800g. The Grey Water tank is pumped overboard manually by the engineering watch stander. No treatment chemicals are added to either tank. Healy pumps roughly 6,000g of grey/black water overboard each day underway (high end estimate with full science party). Dumping of grey/black water is only conducted outside of 12NM from land. • Solid waste: Food waste is ground up in a food disposal system, and added to the grey water tank, where it is pumped overboard. Solid waste such as cardboard and trash is stored for disposal in port. • Waste oil: Waste oil is stored in the Waste Oil tanks (combined 17,000g) and is kept until it can be offloaded to a commercial disposal company. • Hazardous or toxic waste: Hazmat is contained in a designated and secure locations throughout the ship. The crew includes three Marine Science Technicians who are US Coast Guard career hazmat specialists and responsible for Healy hazmat. Detailed information on protocols, storage locations, and crew responsibilities is contained in the attached Hazmat Program. • List all applicable regulations concerning management of wastes and discharges of materials into the marine environment Per the Commanding Officer's Standing Orders, Healy does not discharge sewage inside of 12 NM from land regardless of operating area in order to comply with the highest standard set by international regulations. Trash is stored in a shipping container on the weather decks and is not dumped overboard outside of exceptional circumstances. Healy does not discharge wastes within designated Marine Sanctuaries. • Provide detailed Waste Management, Emergency Response and Spill Contingency Plans See Attached. • Does the vessel(s) possess an Arctic Pollution Prevention Certificate? If yes, indicate the date of issue and the name of the classification society. No. • Describe the source of fresh water and potable water. Healy operates two flash-type distilling units to create potable water. The distillers are not operated within 12 NM of land, nor within harbors, rivers, inlets, bays, or landlocked waters. • Indicate whether ice-breaking will be required, and if so, approximately where and

when? No ice operations are planned for the Northwest Passage Transit. • Discuss any possible impacts to caribou migration, Inuit harvesting or travel routes, and outline proposed mitigation measures. No impacts anticipated. • Indicate whether the operation will be conducted within the Outer Land Fast Ice Zone of the East Baffin Coast. For more information on the Outer Land Fast Ice Zone, please see the Nunavut Land Claims Agreement (NLCA), Articles 1 and 16.14. Healy will transit outside the Outer Land Fast Ice Zone. • Describe whether any part of the project will be located outside of the Nunavut Settlement Area and whether any other regulatory requirements must be met (e.g. CEAA). Healy's Northwest Passage transit will include both the Inuvialuit Settlement Region and Nunavut Settlement Area. Vessel complies with all international and national regulations -- Waste disposal management plan is provided in Documents section.

SECTION H2: Disposal At Sea

Ballast water: Ballast operations are conducted in accordance with the Vessel Environmental Manual. Healy has segregated ballast tanks, so operations are conducted outside of 200 nautical miles as far as practicable. Healy has a ballast capacity of 1,000,000 gal. Ballast is untreated. If ballast is taken on within 200NM from land, the water is exchanged outside 200 NM and the tanks are flushed. • Bilge water: Bilge water is put into the Oily Water Holding Tank (9,000g). The bilge water is processed through the Oily Water Separator and only discharged overboard if it contains less than 15ppm. The OWS is only operated outside 12NM. Any bilge water that is not processed is held until return to port where it is offloaded and disposed of commercially. The oil removed via the OWS is stored in a separate Waste Oil tank. • Deck Drainage: Deck drains on the weather decks and in the Hangar drain directly overboard. Internal Deck drains from machinery spaces are routed to the Oily Water Tank, and non-machinery drains go to the Grey Water Tank. • Grey and black water: Healy utilizes a vacuum eductor system to collect black water in the Black Water Tank (1000g). The Grey water system is gravity drained, and is collected in the Grey Water Tank (13,300g). The Black water is pumped into the Grey Water tank automatically when the Black Water Tank reaches 800g. The Grey Water tank is pumped overboard manually by the engineering watch stander. No treatment chemicals are added to either tank. Healy pumps roughly 6,000g of grey/black water overboard each day underway (high end estimate with full science party). Dumping of grey/black water is only conducted outside of 12NM from land. • Solid waste: Food waste is ground up in a food disposal system, and added to the grey water tank, where it is pumped overboard. Solid waste such as cardboard and trash is stored for disposal in port. • Waste oil: Waste oil is stored in the Waste Oil tanks (combined 17,000g) and is kept until it can be offloaded to a commercial disposal company. Hazardous or toxic waste: Hazmat is contained in a designated and secure locations throughout the ship. The crew includes three Marine Science Technicians who are US Coast Guard career hazmat specialists and responsible for Healy hazmat. Detailed information on protocols, storage locations, and crew responsibilities is contained in the attached Hazmat Program. • List all applicable regulations concerning management of wastes and discharges of materials into the marine environment Healy operates in accordance with the US Coast Guard Vessel Environmental Manual (COMDTINST M16455.1A), which ensures Coast Guard vessels are in compliance with The International Convention for the Prevention of Pollution from Ships (MARPOL), The Act to Prevent Pollution from Ships (APPS), The Clean Water Act, The Resource Conservation and Recovery Act, the Toxic Substances Control Act, CERCLA, the Occupational Safety and Health Act, and U.S. Department of Transportation Laws regulating the transportation of hazardous material. Healy does not discharge sewage inside of 12 NM from land. Trash is stored in a shipping container on the weather decks. Healy does not discharge wastes within designated Marine Sanctuaries. Below is a visual representation of Coast Guard discharge policy: • Provide detailed Waste Management, Emergency Response and Spill Contingency Plans See Attached. • Does the vessel(s) possess an Arctic Pollution Prevention Certificate? If yes, indicate the date of issue and the name of the classification society. No. • Describe the source of fresh water and potable water. Healy operates two flash-type distilling units to create potable water. The distillers are not operated within 12 NM of land, nor within harbors, rivers, inlets, bays, or landlocked waters. • Indicate whether ice-breaking will be required, and if so, approximately where and when? No ice operations are planned for the Northwest Passage Transit. • Discuss any possible impacts to caribou migration, Inuit harvesting or travel routes, and outline proposed mitigation measures. No impacts anticipated. • Indicate whether the operation will be conducted within the Outer Land Fast Ice Zone of the East Baffin Coast. For more information on the Outer Land Fast Ice Zone, please see the Nunavut Land Claims Agreement (NLCA), Articles 1 and 16.14. Healy will transit outside the Outer Land Fast Ice Zone. • Describe whether any part of the project will be located outside of the Nunavut Settlement Area and whether any other regulatory requirements must be met (e.g. CEAA). Healy's Northwest Passage transit will include both the Inuvialuit Settlement Region and Nunavut Settlement Area.

SECTION II: Municipal Development

Description of Existing Environment: Physical Environment

Vessel will transit through deepest waters of NWP and across Baffin Bay.

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

We do not envision any adverse environmental impacts from the transit of the vessel.

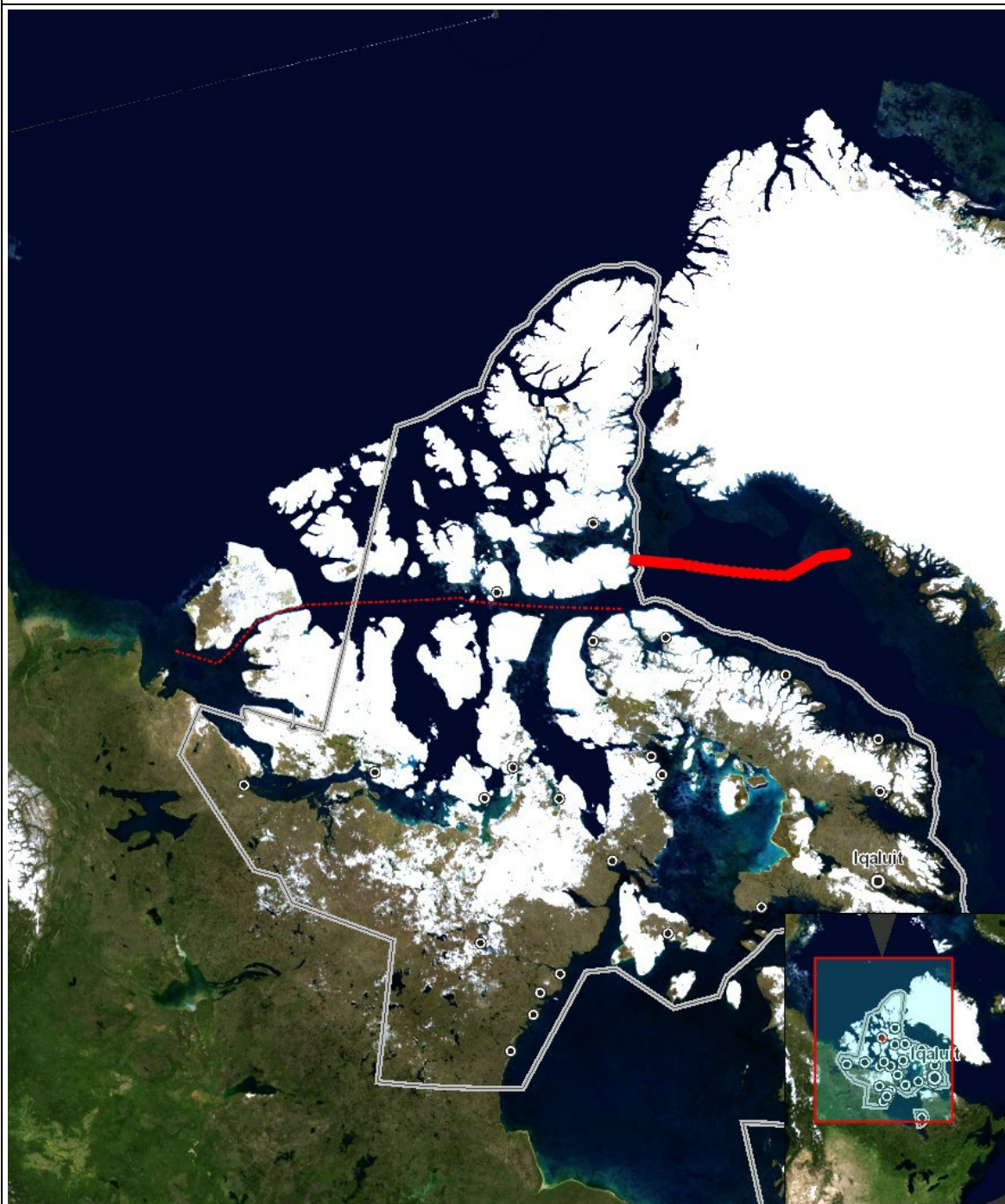
Impacts

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																										
-		-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-
Operation																										
Marine Based Activities		-	-	-	-	P	P	-	-	-	-	P	P	-		-	-	-	P	-		-	-	-	-	-
Decommissioning																										
-		-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-

(P = Positive, N = Negative and non-mitigatable, M = Negative and mitigatable, U = Unknown)

Project Location



List of Project Geometries

1	polyline	f2021343448216-HEALY_USCG_INITIAL_TRACK_TEST
2	point	f2021343599750-PICART_CTD_TRANSECT
3	point	f2021343599750-PICART_CTD_TRANSECT
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