



NIRB Application for Screening #126250

Why is mercury rising in some northern lakes?

Application Type: New

Project Type: Scientific Research

Application Date: Tuesday, November 18, 2025

Period of operation: from 2025-10-05 to 2025-10-16

Project Proponent: Jennifer Galloway
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DETAILS

Non-technical project proposal description

English: Non-technical Project Description English Why is mercury rising in some northern lakes and not others? Activity lead: Jennifer Galloway, Geological Survey of Canada Summary of project background Increases in mercury (Hg) concentrations have been widely reported in lake sediments, peat, surface waters, and fish throughout northern Canada (e.g., the Deh Cho region of the Northwest Territories, the Kivalliq region of Nunavut). Rising Hg is a concern for communities that rely on the land for sustenance and for industry that must follow strict environmental permitting conditions because Hg can be toxic. Anthropogenic emissions of Hg to the atmosphere combined with continued input of Hg from watershed reservoirs (e.g., soil, wetlands) and climate-induced changes (e.g., increased primary production in surface waters, permafrost thaw, changes in fire regime) have increased Hg flux to some environments. This study seeks to understand processes that are affecting Hg concentrations in northern lake sediments. We have conducted analyses on an existing dataset from 60 near-surface lake sediment samples collected from the central Northwest Territories, and we are herein aiming to conduct targeted studies on specific lakes of concern in the Kivalliq region of Nunavut. Justification for the study This project seeks to study the behaviour of Hg in lake sediments over hundreds to thousands of years in the Kivalliq region of Nunavut. By using a long-time perspective, we can better understand the cumulative effects of climate change and anthropogenic stressors affecting the accumulation of Hg in lakes. By determining the factors that have caused increases in Hg concentration in lake sediments, people can be better positioned to mitigate exposure and make informed land use decisions. Where, when, and how long the field research will take place We seek to sample the sediment from 4 lakes in the Kivalliq region of Nunavut. The lakes have been identified in consultation with the community of Rankin Inlet (HTO) and the Kivalliq Inuit Association. The timing of the field research has been determined through consultation with community members of Rankin Inlet and the KIA. It will take place during 7-10 days in August 2026 from a helicopter equipped with floats. We would like to employ 1 or 2 wildlife monitor(s) at the daily rate set by the Kangiqliq HTO for approx. 7-10 days. We would also like to hire a local interpreter, based on fair rates for their time and expertise. We will seek to rent a local venue space for use in public consultation and results-sharing sessions when results are ready. Methods Sampling of the lake-bed will occur using a gravity corer. The gravity corer is a 5 to 10 cm diameter wide by 0.5 to 1 m long open-tubed core that is lowered into the sediment. When drawn up, the corer takes the intercepted lake sediments with it (like a straw). We may also employ a freeze corer, which is a metal triangular tube about 30 cm in diameter in total and up to 1 m long. It freezes about 3 cm thick of sediment onto the surface of 1 or 2 metal faces. The retrieved lake sediments are then sub-sampled on site (gravity corer) or in a lab (freeze corer). The resulting lake sediment sub-samples are then sent to laboratories for various analyses, including determination of the age of the sediment, concentration of Hg and other elements, determination of the type of organic matter, and sediment grain size. How, when, and with whom research results will be shared in Nunavut The communication strategy will be developed with community members of Rankin Inlet and will occur throughout 2025 and 2026 (when our funding will end) by means of community visits and community-based workshops. We will try our best to address any other knowledge transfer activities requested by community members. Data produced by this project will be numerical and will be repositied in the POLAR Data Catalogue, an online and open -source database hosted by the Government of Canada (Polar Data Catalogue).

French: Pourquoi le mercure augmente-t-il dans certains lacs nordiques et pas dans d'autres? Responsable de l'activité : Jennifer Galloway, Commission géologique du Canada Résumé du contexte du projet Des hausses des concentrations de mercure (Hg) ont été largement signalées dans les sédiments lacustres, les tourbières, les eaux de surface et les poissons dans tout le Nord canadien (par exemple, dans la région du Deh Cho aux Territoires du Nord-Ouest et la région de Kivalliq au Nunavut). L'augmentation du Hg est préoccupante pour les communautés qui dépendent du territoire pour leur subsistance et pour l'industrie qui doit respecter des conditions strictes de permis environnementaux, car le Hg peut être toxique. Les émissions anthropiques de Hg dans l'atmosphère, combinées aux apports continus de Hg provenant des réservoirs des bassins versants (p. ex., sols, milieux humides) et aux changements induits par le climat (p. ex., augmentation de la production primaire dans les eaux de surface, dégel du pergélisol, changements dans le régime des feux) ont accru le flux de Hg vers certains environnements. Cette étude vise à comprendre les processus qui

Activities

Location	Activity Type	Land Status	Site history	Site archaeological or paleontological value	Proximity to the nearest communities and any protected areas
Hg project geometry	Sampling sites	Inuit Owned Surface Lands	N/A.	N/A. Will be undisturbed if found.	Rankin Inlet is the nearest community.

Community Involvement & Regional Benefits

Community	Name	Organization	Date Contacted
Rankin Inlet	Mr. Luis Manzo	Kivalliq Inuit Association	2024-12-16
Rankin Inlet	Amy Kaludjak, Regional Coordinator	Kivalliq Wildlife Board	2024-12-16
Cambridge Bay	Jorgan Aitaok, Senior Advisor Minerals, Oil and Gas Management	Nunavut Tunngavik Incorporated	2024-12-16
Rankin Inlet	Andre Aokaut, Manager	Kangiqliniq Hunters and Trappers	2024-12-16
Rankin Inlet	Darren Flynn, Senior Administrative Officer	Hamlet of Rankin Inlet	2024-12-16
Rankin Inlet	Luis Manzo, Lands Director	Kivalliq Inuit Association	2025-10-06
Rankin Inlet	Andre Aokoat, HTO Manager	Kangiqliniq Hunters and Trappers	2025-10-06
Rankin Inlet	Darren Flynn, Senior Administrative Officer	Hamlet of Rankin Inlet	2025-10-06
Rankin Inlet	Harry Towtongie, Mayor	Hamlet of Rankin Inlet	2025-10-06
Rankin Inlet	8 community members, 1 interpreter Open House in Rankin Inlet	Community open house in Rankin Inlet	2025-10-06

Authorizations

Indicate the areas in which the project is located:

Kivalliq

Authorizations

Regulatory Authority	Authorization Description	Current Status	Date Issued / Applied	Expiry Date
Nunavut Research Institute	NRI license application number 150958	Applied, Decision Pending		
Nunavut Planning Commission	NRI license application number 150958. NPC determined activity required NIRB screening.	Applied, Decision Pending		

Project transportation types

Transportation Type	Proposed Use	Length of Use
Air	Helicopter, ~3 hours per day or less.	

Project accommodation types

Community

Other,

Material Use

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

Equipment Type	Quantity	Size - Dimensions	Proposed Use
helicopter	1	medium	lake sediment sampling
vehicle	1	truck	driving in town
sediment corer	3	10 cm	sediment coring

Detail Fuel and Hazardous Material Use

Detail fuel material use:	Fuel Type	Number of containers	Container Capacity	Total Amount	Units	Proposed Use
Aviation fuel	fuel	10	55	550	Gallons	Helicopter
Aviation fuel	hazardous	10	55	550	Gallons	Aviation, stored at pump

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:

Our sediment coring devices will remove a column of lake sediment of the following dimensions (0.5 m long; 5 to 10 cm wide). We will collect 3 cores per sampling site. Estimated 10-20 sampling sites. Access to sediment sampling sites will be by helicopter equipped with floats. Based on community input, we will limit flying time to ~3 hours per day and only to areas indicated by community organizations.

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

SECTION H2: Disposal At Sea

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

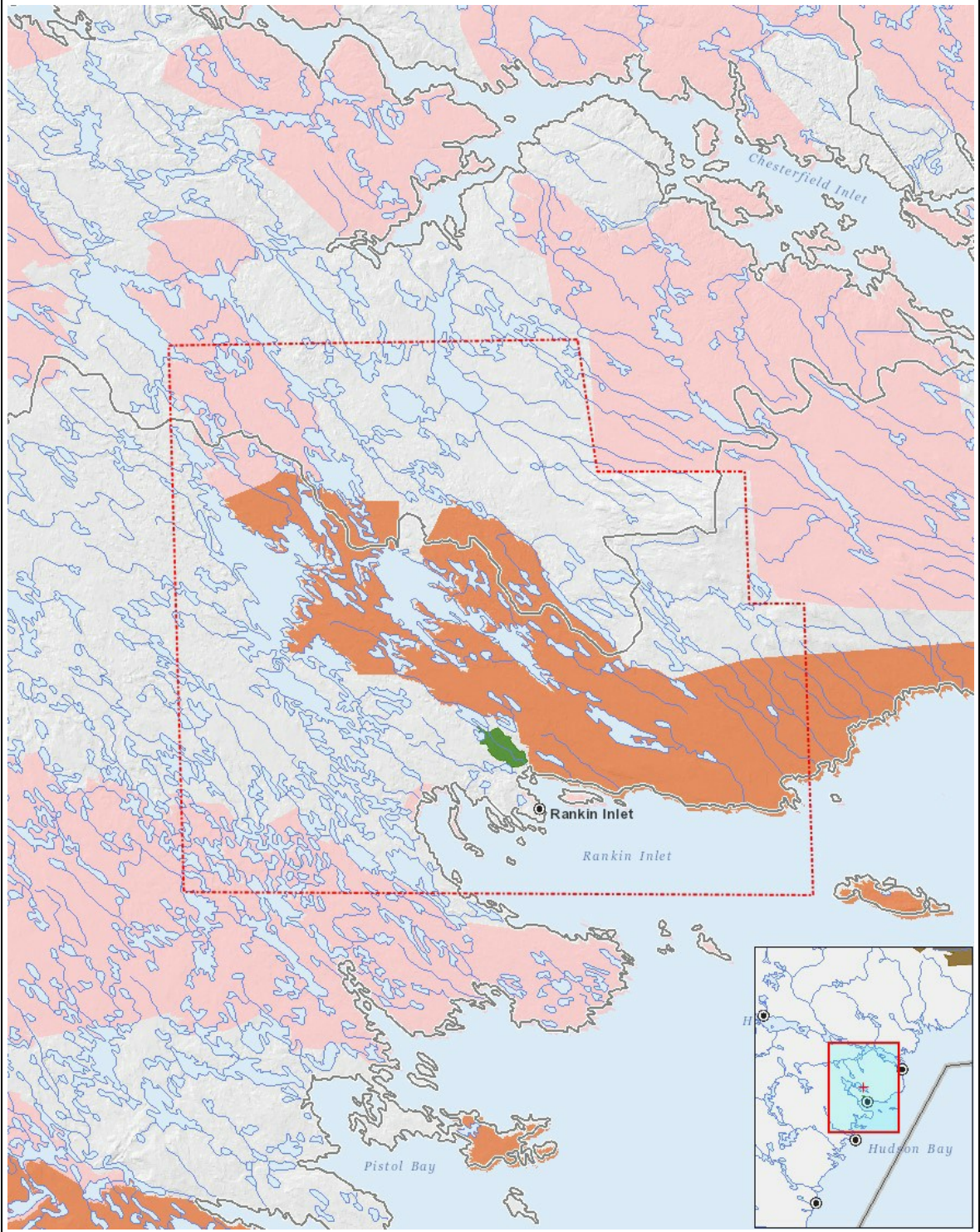
Impacts

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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operation																									
Sampling sites		-	-	-	-	-	-	-	N	-	-	N		-	N	N	N	M		-	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	Hg project geometry
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