Nunavut Research Institute

License Holder Reporting requirements

For research undertaken in the 2025 calendar year (commencing January 01, 2025 and ending December 31, 2025)

Project Title:

Monitoring Seasonal Environmental Change in Rivers of the Kitikmeot Region

Project Leader(s): Full name, affiliation, and contact information (address, phone number, email) of each project leader (principle investigator and co-investigators)

Kristina Brown
Department of Environment and Geography
University of Manitoba
530 Wallace Building, 125 Dysart Rd. Winnipeg MB, R3T 2N2
Phone: (778) 835-8374
Email: kristina.brown@umanitoba.ca

Project Team: Full name, affiliation, and address (name of city/community and province/territory/state) of each member of the project team

Bill Williams, Research Scientist, Fisheries and Oceans Canada, Institute of Ocean Sciences, Email: Bill.Williams@dfo-mpo.gc.ca

Donald McLennan, COENOSIS
Email: coenosis@gmail.com

Abstract: A concise summary of what was done, found, and concluded to date, and how the results/information will be used. This summary must be translated into the appropriate dialect of Inuktut. Suggested length: 250-300 words. ***This section will be published in the NRI's annual compendium of licensed research and made available through the Isirvik research portal**

Rivers directly link the land and the ocean by delivering freshwater, heat, nutrients, and carbon to the coastal system. Observing river systems is therefore key to understanding the impacts of terrestrial environmental change on Arctic ocean health. This project aims to enhance our capacity to directly observe the physical and biogeochemical characteristics of rivers across the Kitikmeot Region by developing in-situ observational systems ("river moorings") to carry out these measurements continuously. These river moorings will provide the first time series observations of river physical and biogeochemical parameters in the Kitikmeot Region, observations that are crucial to understanding and predicting the impacts of terrestrial change on the Kitikmeot marine system.

This project proposes to deploy autonomous observational systems (moorings) in rivers throughout the Kitikmeot Region for the continuous measurement of physical and biogeochemical properties of these rivers over the summers. Moorings will record measurements of the river's physical conditions, including temperature, conductivity, and water level, as well as biogeochemical parameters, including dissolved oxygen content, turbidity (cloudiness), and coloured dissolved organic material (CDOM) concentration.

A primary goal of this project is to develop observational arrays that can be used by community-directed research programs in Kugluktuk and Cambridge Bay to inform community concerns around environmental stewardship. Lessons learned during the development, deployment, and recovery of the river mooring arrays will be discussed with local community groups to develop river mooring systems that directly meet community monitoring needs.

This project contributes directly to Polar Knowledge Canada's research priorities to collect observations on the present state of the Kitikmeot Marine Region. Results from this project will be shared with the communities of Kugluktuk and Cambridge Bay, as facilitated through local contacts such as the Kugluktuk HTO, Cambridge Bay HTO, and Canadian High Arctic Research Station.

Key messages: Concise, plain language summary of key take-away messages of work to date, findings and conclusions. Preferably 3-5 points, in bullet form.

- Rivers directly link the land and the ocean by delivering freshwater, heat, nutrients, and carbon to the coastal ecosystem. Observing river systems is key to understanding how changes on the land impact coastal ocean health.
- Four river sensor packages fixed to bottom mounted moorings were deployed in the Kitikmeot in 2025: Coppermine River (June 30 - Sept 23), Freshwater Creek (July 4 - Oct 10), and two new moorings in the Kitigak River (July 29- Oct 13) to support a study on river turbidity lead by the Ekaluktutiak Hunters and Trappers Organization.
- All four moorings held their location for the entire deployment and sensors successfully recorded water temperature, salt content, and total dissolved solids in each river over the summer season.

Objectives: Project objectives, preferably in bullet form.

The goal of this project is to enhance our capacity to directly observe physical and biogeochemical characteristics of rivers across the Kitikmeot through the use of in-situ observational systems ("river moorings") to collect measurements continuously over the deployment period. These river moorings provide time series observations of river physical and biogeochemical parameters, observations that are crucial to understanding and predicting the impacts of terrestrial change on the Kitikmeot marine system.

Moorings record measurements of the river's physical conditions, including temperature, conductivity, and water level, as well as biogeochemical parameters, including dissolved oxygen content, turbidity (cloudiness), and coloured dissolved organic material (CDOM) concentration.

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Annual activities: A description of activities and methods carried out during the current reporting period. This section should answer the questions: What? Where? When? Who? How? Include dates team members conducted research at remote field sites or collected data (including interviews) in communities; append a map with locations and/or coordinates of remote field sites, if applicable.

Four successful river mooring deployments were carried out in 2025, including two deployments in a new location (Kitigak River). In the Coppermine River, members of the Kugluktuk Hunters and Trappers Organization deployed a river mooring on June 30, 2025 using a small aluminum boat. The mooring was recovered again by boat on Sept 23, 2025. This is the longest successful deployment we've had in the Coppermine River, almost three whole months! The mooring was positioned in the same location as in 2019, 2021, 2023, and 2024 (see Figure in Appendix 1a), in the lee of a small island to keep it out of the main channel boat traffic. The mooring successfully recorded water temperature, conductivity (salinity), water level, turbidity (cloudiness), as well as dissolved oxygen concentrations from the date of deployment until recovery. This was the fifth community-directed deployment and recovery carried out in Kugluktuk completely independently of the southern science team and it was another success!

In Freshwater Creek members of Viventem Science Support, guided by a member of the Ekaluktutiak Hunters and Trappers Organization, deployed a river mooring on July 4, 2025 using a canoe. The mooring was recovered again by boat on Oct 10, 2025. The mooring was positioned in a location that was chosen by the EHTO and Fisheries and Oceans collaborators who are also conducting research in the Freshwater Creek system (see Figure in Appendix 1b). The mooring successfully recorded water temperature, conductivity (salinity), water level, coloured dissolved organic material, as well as dissolved oxygen concentrations from the date of deployment until recovery. This was the third community-directed deployment and recovery carried out in Cambridge Bay, which was also a great success!

In 2025 we also deployed two additional river moorings in the Kitigak River on Victoria Island (see Appendix 1c). These moorings were deployed in support of the project entitled "Assessing the role of thawing permafrost on contaminant loads in Arctic char and their critical habitats" led by Dr. Bonnie Hamilton (University of Ottawa) in collaboration with the Ekaluktutiak Hunters and Trappers Organization and Fisheries and Oceans Canada. This study will assess the role of permafrost thaw to river water changes and their impact on char within the Kitigak River system, an important fishing river for the community of Cambridge Bay. Moorings were deployed initially on July 29, 2025 in a location determined by members of the Ekaluktutiak Hunters and Trappers Organization, and later recovered on Oct 13, 2025 just before freeze up. As the research question under investigation in Kitigak River involves river turbidity, it is no surprise that the river moorings suffered from an extensive accumulation of sediment during their deployment. While the temperature and conducitivty instruments worked, the optical instruments were fouled by the sediment, so no data were retrieved. With this high turbidity water in mind, we are updating our mooring design to incorporate wipers so that the optical sensors can operate as intended, in spite of the turbid waters.

We anticipate deploying river moorings in the Coppermine River, Freshwater Creek, and in the Kitigak River again this year, in collaboration with the Kugluktuk HTO and the Ekaluktutiak HTO, details of our request for renewal for 2026 can be found in Appendix 1.

Results and Achievements: Findings and results to date of the above activities, highlighting any key research achievements (see guide below for formatting tips regarding tables and figures).

Results from this research are currently being compiled. We anticipate sharing the results with community partners in Kugluktuk and Cambridge Bay in summer 2026.

Challenges/Obstacles: In this section, please comment on any challenges/obstacles (if any) that you experienced during this project year. If there were any actions to mitigate or resolve these challenges, please list them here. Were any concerns raised regarding the conduct of research team members or the impacts of the project?

N/A

Expected Project Completion Date: Provide month and year of expected completion date of the project.

on-going

Project website (if applicable): If your project has a presence on the internet, including a website and/or social media page, please provide the link and/or account handle.

coming soon!

Citations: Please append a complete reference list if citations are used anywhere in the document.

POLICY RELEVANCE

Does this research support policy development or decision-making in Nunavut? If yes, please describe.

The development of research capacity in local Nunavut communities is a major priority of this project. Observational data generated in this study will be made available to the communities of Kugluktuk and Cambridge Bay, hopefully by summer 2026. In addition, interpretation of the observations will be discussed at the local Hunters and Trappers Organization meetings, with students at Kugluktuk and Cambridge Bay High Schools, and during other community meetings as opportunity allows.

Observations generated in this project will contribute directly to a larger campaign to collect marine and terrestrial observations on the present state of the Kitikmeot Marine Region and directly inform Polar Knowledge Canada's research priorities in this region. This project represents the first steps to develop in-situ observational arrays for future use by local communities to continue monitoring local rivers. Lessons learned during the development, deployment, and recovery of the river mooring arrays will provide crucial information to develop more sophisticated in-situ observational platforms with direct input by the community data users. Future applications will include other communities in Nunavut, as well as more remote locations through the Canadian high Arctic.

RESEARCH OUTCOMES: BENEFITS

Community engagement: Briefly list and describe any community consultation, engagement, collaboration and outreach activities that you have undertaken for the project; describe the role(s) that community members and/or specific organizations have played in research co-design and activities.

This research is carried out in collaboration with the Kugluktuk Hunters and Trappers Organization and the Ekaluktutiak Hunters and Trappers Organization. Decisions on mooring location, as well as methods for deployment and retrieval of the systems are determined exclusively by community partners. Data generated from this research will be made available to each community, both digitally and through reporting products like posters and reports. Communications products will be designed in collaboration with each HTO.

Youth engagement: Briefly list and describe any outreach, school or classroom activities that you have undertaken for the project; describe the role(s) that youth have played in your research activities.

Youth engagement was not specifically undertaken in 2025.

Training and Employment:

How many Nunavummiut received training from team members? Please describe training and/or compensation provided.

Nunavummiut involved in this research program determined the best way to deploy and recover river moorings based on their knowledge of the river, safe access, and written instructions provided by the lead researcher. No direct training was necessary.

How many team members received training from Nunavummiut? Please describe training received and/or what knowledge sharing and/or skills exchange took place.

The research team has had the opportunity to learn from the experience of community partners in deploying and recovering these systems. Future mooring design will include the suggestions that Nunavummiut team members have made to improve the design and make deployment/recovery more efficient.

How many Nunavummiut received employment? Please describe employment type and length, role(s) and responsibilities, and compensation provided.

Three Nunavummiut received employment through this research program. Mooring deployment (1 day wage), mooring recovery (1 day wage), shipping/receiving equipment (1 day wage).

How many Nunavummiut received honoraria as research participants? Please describe method of participation (interview, observation, sample, survey, etc.), including compensation provided.

zero

Please explain how the project directly benefited Nunavut organizations and/or businesses (e.g., through contract services, local purchases, equipment donations, etc.)

This research supports local HTO and research support organizations (Viventem) through contract services.

OPTIONAL: Nunavut Team Members, hires, and/or trainees (excluding research participants e.g., interviewees)

The NRI is creating an inventory of Nunavummiut who are skilled and/or interested in research. The information provided below will not be shared publicly but will support long-term capacity sharing by connecting local and visiting researchers with research talent in each community.

Name	Expertise/skills	Training/interest areas	Contact Info	Community

Academic Mobility

If you are affiliated with an academic institution, please answer the following question: For which Level of Project(s) will the data be used? (Check all that may apply)

- [x] Research
- [ ] Post-Doctoral Research
- [ ] PhD Thesis
- [ ] Masters (Major Research Paper)
- [x] Masters (Thesis)
- [ ] Graduate Course Project
- [ ] Staff/Administration Research
- [x] Undergraduate Honours Thesis

Other

BUDGET

Please complete the table below to detail your projected and actual research expenditures during the reporting period.

Category	Planned/Approved Expenditure	Actual Expenditure
Travel and Accommodation	$0	$0
Equipment, Materials and Supplies	$1600	$1600
Salaries/Wages for Nunavut residents	$4800	$4800
Salaries/Wages for non-Nunavut resident researchers	$6200	$6200
Professional Fees and services in Nunavut	$315	$315
Professional Fees and Services outside of Nunavut	$2000	$2000
TOTAL EXPENDITURES	$14,915	$14,915

List the total $ amount of funding from each funding source for your full research program, including in-kind support

Wages = $4800
Rentals = $1200
Overhead (HTO) = $315
Shipping = $2000
Supplies = $400
Spring student (UM) to compile historical data = $2000
Technician support (UM) to prep equipment = $4200

RESEARCH OUTPUTS / REPORTING TOOLS

What research outputs were generated? Please list below and append copies of each. Specify which outputs (if any) may be made public on the NRI research licensing database.

Research outputs are still in progress. See details on data set availability below.

Have peer-reviewed manuscripts been published as a result of your project? If Yes,

complete the following table:

Full citation	Publicly accessible/ free to access (Y/N)	Link (if available) and DOI (if available)

If No, do you intend to submit a manuscript (or manuscripts) for peer reviewed publication?

Yes. However, we are not yet close to this outcome.

Were non-peer reviewed materials produced to either communicate or synthesize results to the public? Examples of these materials include (but are not limited to): websites, reports, brochures, podcasts, webinars, presentations, non-peer reviewed publications, etc.

If Yes, complete the following table:

Title	Description of Materials	Link (if available)	DOI (if available)

Did your project develop a communications plan? Please describe communications/reporting tools used, and list the target audience for each and/or who requested which.

Annual 1-page summaries will be distributed to community partners.

How were Nunavummiut credited and/or acknowledged in all project outputs, such as co-authorship, participant biographies, article acknowledgements, etc.

Nunavummiut partners will always be credited in publication acknowledgments. They will also have the opportunity to contribute as co-authors on publications if they choose.

DATA AND INTELLECTUAL PROPERTY

Did you enter into a research agreement, data-sharing agreement and/or intellectual property rights agreement with a community and/or designated Inuit organization (DIO)? If yes, please explain.

Do intellectual property rights apply to your research? If yes, please explain.

N/A

Who owns the data? Has the raw data been shared with the appropriate community and/or DIO? If yes, how? How is data security and storage handled by community-based co-owners?

Data compilation from all years is still in progress. Once completed, finalized data will be shared with community partners. Further details about data storage are included below.

Where is the data stored and will the data be destroyed within a set timeframe?

Once finalized, datasets generated from this research will be stored and published on the open source data repository CanWIN. The Canadian Watershed Information Network (CanWIN), is part of a global network of Arctic and sub-Arctic data management experts who collaborate to ensure Arctic data interoperability through the use of common data sharing standards. CanWIN, through the Canadian Consortium on Arctic Data Interoperability (CCADI) works with partners such as Polar Data Catalogue (PDC) and Canadian Integrated Ocean Observing System (CIOOS) to ensure the ethical, interoperable sharing of data according to the FAIR, CARE and TRUST principles. CanWIN also works with researchers in knowledge mobilization, supporting the creation of knowledge and information products summarizing key research results for communities in formats and language accessible to them.

Is the data trackable and/or available in a public data repository? If yes, please provide the appropriate information and/or link to ensure the findability and accessibility of the data.

See above.

Please append a copy of your data management plan.

CLIMATE CHANGE

Is your research about climate change (causes, impacts, mitigation, adaptation, etc.)? If yes, explain.

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PHOTOGRAPHS

If possible, please provide high-resolution photos of licensed research activities that NRI may use in communication materials, organizational reporting, and other promotional purposes. Please also complete the table below for each photo provided and submit to NRI along with all required NRI photo release forms. The photographer/owner will be credited in all uses of the photograph(s).

File Name	Location	Description	Subjects	Photographer/Owner	Date