



Government of Northwest Territories  
Gouvernement des Territoires du Nord-Ouest

# **NWT CIMP Scientific Proposal Guide**

**For 2021-2022 Funding  
September 2020**

**Northwest Territories Cumulative Impact Monitoring Program**



# Table of Contents

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<b>COVID-19 Information for NWT CIMP APPLICANTS .....</b>	<b>4</b>
<b>1. About NWT CIMP .....</b>	<b>4</b>
1.1 NWT CIMP OBJECTIVES .....	4
1.2 NWT CIMP SCIENCE PRIORITIES.....	5
1.3 AVAILABLE FUNDING .....	5
1.4 KEY DATES.....	6
<b>2. Eligible Recipients and Costs.....</b>	<b>7</b>
2.1 ELIGIBLE RECIPIENTS .....	7
2.2 ELIGIBLE COSTS .....	7
2.3 DISTRIBUTION OF FUNDS .....	8
<b>3. Applicant Responsibilities.....</b>	<b>9</b>
3.1 SCIENTIFIC METHODOLOGY .....	9
3.2 RELEVANCE TO NWT DECISION-MAKERS.....	9
3.3 COMMUNITY SUPPORT AND ENGAGEMENT .....	9
3.4 REPORTING RESULTS .....	10
3.5 COMMUNITY CAPACITY BUILDING .....	12
3.6 HUMAN HEALTH.....	12
<b>4. Request for Proposal Process.....</b>	<b>13</b>
4.1 PROPOSAL PROCESS AT-A-GLANCE.....	13
4.2 LETTER OF INTENT .....	13
4.3 PROPOSALS.....	14
4.3.1 How Proposals are Evaluated.....	15
<b>5. Project Reporting.....</b>	<b>18</b>
5.1 PROJECT REPORTING AT-A-GLANCE .....	18
5.2 ANNUAL REPORTS .....	19
5.2.1 How Annual Reports are Evaluated.....	19
5.3 FINAL REPORTS.....	20
5.3.1 How Final Reports are evaluated.....	21
<b>Appendix A: Pathways Approach.....</b>	<b>22</b>
<b>Appendix B: NWT CIMP Community-Based Monitoring Guidance.....</b>	<b>24</b>
1. PURPOSE .....	24
2. PARTNERSHIPS .....	25
3. STUDY DESIGN .....	25
3.1 General Considerations .....	25
3.2 Standardized data .....	26
3.3 Recommended Protocols .....	26
3.5 Frequency and Timing of Sampling .....	27
3.6 Sampling Locations .....	27
3.7 Quality Assurance/Quality Control (QA/QC).....	28
3.8 Safety Plan .....	28

3.9 Long-term Plan .....	28
4. TRAINING.....	28
<b>Appendix C: Data Collection Protocols .....</b>	<b>30</b>
Caribou .....	30
Water Quality and Aquatic Health.....	30
Fish.....	30
Vegetation .....	30
<b>Appendix D: Mackenzie Data Stream .....</b>	<b>32</b>
Current DataStream data themes .....	32
When to upload.....	32
How to upload .....	32
Format and organization of the data/metadata.....	33
<b>Appendix E: Key NWT Decision-Makers .....</b>	<b>35</b>
<b>Appendix F: Caribou Blueprint.....</b>	<b>36</b>
<b>Appendix G: Water Blueprint.....</b>	<b>41</b>
<b>Appendix H: Fish Blueprint.....</b>	<b>43</b>
1. Compile and analyze existing Data .....	44
2. Develop and validate standards and protocols (includes models).....	44
4. Collect baseline data on fish ecology in areas of past, current, or future development interest	
44	
5. Assess contaminants in fish .....	44
<b>Appendix I: Scientific Letter of Intent Submission Form .....</b>	<b>46</b>

# COVID-19 Information for NWT CIMP APPLICANTS

The Government of the Northwest Territories (GNWT) recognizes that research, including fieldwork and various monitoring initiatives, have been and will continue to be impacted due to COVID-19. The GNWT, at the request of the Chief Public Health Officer, has taken steps to protect our communities and prevent the potential spread of the virus. This is our primary objective during this health emergency. For this reason there have been some impacts to the NWT Cumulative Impact Monitoring Program (NWT CIMP) and associated funding.

**In the Letter of Intent project applicants are required to read and acknowledge GNWT's [GNWT's Emerging Wisely - Continued Public Health Response to COVID-19 in the NWT](#). If invited to submit a proposal, the proposal in its entirety must include COVID-19 considerations. At a minimum, COVID-19 control measures and considerations must be clearly stated in each of the Study Design, Community Support and Engagement, Decision-maker Engagement, and Deliverables and Communication sections. NWT CIMP encourages applicants to consider where training and capacity development, related to cumulative impact monitoring, can occur to increase the ability of the project to proceed during the COVID-19 pandemic.**

For up to date information, please visit <https://www.gov.nt.ca/covid-19/>

## 1. About NWT CIMP

The Northwest Territories Cumulative Impact Monitoring Program (NWT CIMP) is a source of environmental monitoring and research in the Northwest Territories (NWT). NWT CIMP coordinates, conducts and funds the collection, analysis and reporting of information related to environmental conditions, particularly cumulative impacts and environmental trends, in the NWT. The goal is to produce information that supports better resource management decision-making and sustainable development.

Since 1999, NWT CIMP has been guided by a Steering Committee of Indigenous, Inuvialuit, Métis, federal and territorial government representatives. The program is administered by the Department of Environment and Natural Resources (ENR), Government of the Northwest Territories (GNWT). This Guide outlines how applicants can apply for funding for science-focused projects through the annual Request for Proposals (RFP) process to address our monitoring priorities. A Traditional Knowledge (TK) Proposal Guide is available for TK focused projects. Projects that involve the collection or the analysis and/or synthesis of existing of both TK and scientific data are required to address all aspects of both the TK Proposal Guide and the Scientific Proposal Guide, in one application.

### 1.1 NWT CIMP OBJECTIVES

The NWT CIMP vision is: *To watch and understand the land so that it can be used respectfully forever.*

*Watching* implies research and monitoring, while *understanding* suggests the addition of value to information through analysis and communication of knowledge. The idea “*using the land respectfully forever*” reminds us that that the knowledge generated through NWT CIMP is intended to inform

regulatory decisions that will support the sustainable use of NWT resources.

NWT CIMP supports research and monitoring using science and/or TK that addresses:

1. Cumulative impacts of human activities and natural disturbances on the environment;
2. Environmental trends, their potential causes, and significance; and
3. Baseline environmental conditions.

## 1.2 NWT CIMP SCIENCE PRIORITIES

NWT CIMP targets funding of science projects that are aligned with priority research areas agreed to by NWT land and water regulators, subject-matter experts, and reviewed by the NWT CIMP Steering Committee. Since 2011, NWT CIMP has focused on three main valued ecosystem components based on the priorities of NWT decision makers: 1) **caribou**, 2) **water**, and 3) **fish**. Specific research and monitoring priorities for each of these valued components have been identified in Blueprints appended to the Scientific Proposal Guide (Appendices [E](#), [G](#) and [H](#)). The Blueprints inform funding applicants of NWT CIMP funding priorities, as well as guide the NWT CIMP Steering Committee and staff in determining how funds should be allocated.

NWT CIMP views the increased use of TK for environmental research and monitoring as a high priority and encourages, although does not require, projects with aspects of both science and TK. Projects that include both types of knowledge should address specific research and monitoring priorities in the NWT CIMP Blueprints. For example, NWT CIMP is particularly interested in the collection and analysis of TK to complement the scientific analysis of water quality and quantity trends, as recommended in the [2015 NWT Environmental Audit](#). The program also recognizes the holistic nature of TK. Funding is available for TK projects that address a broad range of environmental questions, beyond Blueprint priorities. More information is available in the [TK Proposal Guide](#).

To make the best use of funding, NWT CIMP is focused on geographic areas of past, current or proposed development where cumulative impacts of development are most likely to occur. Decision makers are most likely to be interested in the results from these areas. A useful tool to identify possible geographic areas of past, current or proposed development in the NWT is the [Inventory of Landscape Change](#) web-viewer using the Human Development layer.

NWT CIMP is requesting Letters of Intent (LOI) for 2020/21 funding to fill key knowledge gaps identified in the [Caribou](#), [Water](#), and [Fish](#) Monitoring Blueprints.

It is expected that proposed scientific monitoring projects will collaborate with existing programs to agree upon the use of standardized data collection and analysis protocols. NWT CIMP recommends several monitoring protocols listed in [Appendix C](#). This will help ensure the compatibility of datasets for use in regional cumulative impact assessment. LOI's must show evidence of standardization with current NWT CIMP-funded and other projects in the region. Current NWT CIMP-funded project details are available by request and are on the [NWT Discovery Portal](#).

## 1.3 AVAILABLE FUNDING

NWT CIMP supports research and monitoring of cumulative impacts and environmental trends in the NWT by providing funding to partners through an annual Request for Proposal (RFP) process. The program considers both single-year and multi-year proposals. Long-term monitoring projects are encouraged, but will be reviewed annually and approved in 3-year increments. Generally, long-term

monitoring projects begin with a larger funding amount then are reduced to a smaller amount unless unexpected results or new questions are encountered that require more equipment, sampling, or analysis.

The maximum amount of funding considered per project is **\$60K** per year, though additional funding may be considered for larger collaborative projects. Projects with smaller budgets are also eligible to apply.

NWT CIMP will **not** provide support for research or monitoring where it is clearly the responsibility of another organization. For example, NWT CIMP will not provide support for programs with secured, established funding or support collection of baseline data for a specific proposed or on-going development. However, NWT CIMP may support baseline data collection when the data being collected spans a greater geographical area, or is beyond the scope of the baseline data required for a particular proponent.

## **1.4 KEY DATES**

### **For 2021/22 Proposals**

- Letter of Intent Issued: **September 24, 2020**
- Letter of Intent Deadline: **October 19, 2020** (4:00pm MST)
- Call for Proposals Issued (to successful LOI applicants): **November 6, 2020**
- Proposal Deadline: **December 14, 2020** (4:00pm MST)
- Announcement of Project Funding: **April 2021**

### **For 2020/21 Project Reporting** (i.e. projects receiving funding in 2010/21)

- Annual Report and budget (multi-year projects): **February 5, 2021**
- Final Report and budget (final and single year projects): **April 30, 2021**
- Financial Report (all projects): **June 30, 2021**

### **For 2021/22 Project Reporting** (i.e. projects receiving funding in 2021/22)

- Annual Report and budget (multi-year projects): **February 4, 2022**
- Final Report and budget (final and single year projects): **April 29, 2022**
- Financial Report (all projects): **June 30, 2022**

## **Submit to NWT CIMP Contact**

NWT Cumulative Impact Monitoring Program  
Department of Environment and Natural Resources, GNWT

Email: [nwtcimp@gov.nt.ca](mailto:nwtcimp@gov.nt.ca)

Phone: (867)767-9233 ext 53084

**If you do not receive a confirmation email within 24 hours of submitting, please call the number above to ensure that your document has been received.**

**Late submissions will NOT be accepted.**

## 2. Eligible Recipients and Costs

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### 2.1 ELIGIBLE RECIPIENTS

The following groups/individuals are eligible for funding, including:

- NWT communities and regional Indigenous governments or organizations;
- Indigenous, federal and territorial government departments and agencies;
- Academic institutions; and
- Non-government organizations.

### 2.2 ELIGIBLE COSTS

Costs that are eligible under NWT CIMP funding are outlined below:

- **Professional Fees and Services**
  - Wages of people working on the NWT CIMP-funded project (i.e. employees, including students, Indigenous and/or local employment).
    - Double counting of contracted employees must not occur. This category should not include the salaries of full-time, continuous or term employees participating in the proposed project who have not been hired specifically for the project. However, any applicant from an Indigenous or community organization may request a salary replacement stipend for employees participating in the proposed project to buy release time from duties to their organization.
    - It is important that the professional fees and services outlined in the budget include the final analysis of the data collected over the course of the project.
- **Equipment and Facilities**
  - Equipment costs (purchase, lease and maintenance).
    - Only equipment that is specifically purchased, leased or developed for the particular project can be funded. **Note:** The maintenance cost of equipment already owned by the government or other organization and used as part of the project is considered in-kind support.
  - Facilities costs.
    - Hall rental.
    - Laboratory use.
- **Travel**
  - Travel, accommodation and meals associated with the project;
    - It is important that the budget include the costs required to report project results to communities that participated (sec. 3.3).
  - The cost of establishing and operating field camps, vehicle and aircraft rental, gas purchase and shipping (i.e. freight) charges. Note that NWT CIMP intends for local communities to benefit from project funding. Though we recognize that travel is a necessary part of project budgets, budgets will be scrutinized to minimize travel costs from outside of the NWT and maximize benefits to local residents.
  - Applicants have to abide by the CPHO's travel restrictions

- **Other Costs**
  - Miscellaneous costs, such as office supplies and operating expenses (e.g., office space, rental, phone, printing, computer time, fax, photocopying and postage).
- **Administration Fee (excluding federal and territorial governments)**
  - Administrative expenses associated with the project activity (must not exceed 15% of the amount funded).
  - The 15% administration fee cap applies to all organizations that receive NWT CIMP funding.
  - Voluntary lowering of administration fees by participating institutions is encouraged to ensure that funds used for monitoring and research are maximized.
- **Copyright for publications (public)**
  - NWT CIMP encourages recipients to publish findings in open journals. In cases where this is not possible, an additional amount can be added to the project budget (no greater than \$5,000) to allow the author to purchase distribution rights to the paper.

## 2.3 DISTRIBUTION OF FUNDS

Recipients may request that a portion of their funding be distributed to another organization involved in the project. NWT CIMP will determine if the request can be accommodated. The minimum amount that NWT CIMP will distribute is \$10,000.

Note that NWT CIMP cannot distribute funds to private businesses. Eligible funding recipients are listed in Section 2.1.

Recipients will receive project funding by entering into a Contribution Agreement (CA) with ENR, GNWT. The GNWT policy on CA's is that an initial payment of 90% of the approved amount is paid at the beginning of the fiscal year. The remaining 10% is released on receipt and approval of a signed financial statement from the recipient by June 30<sup>th</sup> of the following year.



### 3. Applicant Responsibilities

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In addition to the applicant responsibilities listed below, please be aware that all successful applicants are responsible for obtaining any and all applicable permits through the Aurora Research Institute related to their project prior to the start of any research. Please refer to the following website for further information:

- [nwtresearch.com/licensing-research](http://nwtresearch.com/licensing-research)

Applicants should consider the following to ensure a competitive proposal:

#### 3.1 SCIENTIFIC METHODOLOGY

Proposals are assessed based on a well-developed study design. Clear description of the study area, the number and location of proposed sampling sites, methods, protocols and approaches that will be used to collect and analyze the data is required. Anticipated lab and statistical analyses of data must be described. Projects that are multi-disciplinary in nature and address cumulative impacts directly will be scored higher.

To ensure the compatibility of datasets for use in regional cumulative impact assessments, standardized data collection and analysis protocols must be followed. Refer to [Appendix C](#).

#### 3.2 RELEVANCE TO NWT DECISION-MAKERS

Within the lens of caribou, water, and fish in geographic areas of past, current or proposed development where cumulative impacts of development are most likely to occur, NWT CIMP has a focus on the monitoring priorities of co-management boards and key regulators who make or influence key land and water use decisions. Proposals must clearly show this association. Relevant letters of support from key regulators to show their support or involvement in the project strengthen an application. For a list of key NWT Decision-Makers, refer to [Appendix E](#).

#### 3.3 COMMUNITY SUPPORT AND ENGAGEMENT

Community engagement and support for the proposed monitoring project is an important element of NWT CIMP-funded projects. Ideally, northern community members, local decision-makers, and Indigenous organizations are involved in defining the purpose of the monitoring, the project's design and how it will be implemented. NWT CIMP support is more likely when a project will build long-term capacity within NWT communities or Indigenous organizations. Relevant letters of support from community, local decision makers, and/or regional organizations to show their support or involvement in the project strengthen an application.

NWT CIMP has developed the [Pathway Approach](#) to describe a shared approach to research and monitoring that involves NWT communities. Where appropriate, use of the Pathway Approach will help applicants design a better study in collaboration with communities and decision-makers. The Pathway Approach also provides a good framework from which to develop monitoring and research projects. For more detail, refer to [Appendix A](#).

### 3.4 REPORTING RESULTS

Reporting results is an important element of NWT CIMP-funded projects. Proposals **must** contain a reporting and communications plan that indicates how results will be delivered and conveyed to NWT CIMP, involved communities and decision-makers.

The **mandatory** reporting requirements are:

- **Final publications** – Results from NWT CIMP-funded projects, including peer-reviewed reports, non-peer reviewed reports, posters, maps, and data must be submitted to NWT CIMP staff even after project funding is complete. It is the responsibility of the Project Lead to send publications to NWT CIMP. This information will be loaded on to the [NWT Discovery Portal](#), an online electronic library of reports, data and information operated by NWT CIMP. Results from all NWT CIMP-funded projects are publically available on the site.
- **Northern Meeting** - Recipients are required to present their key results to at least one relevant northern meeting within the funding year. Local meetings without an admission fee that involve Indigenous organizations, community members, and northern regulators are required. When working with communities, the recipient should seek opportunities to provide project findings. As a result of COVID-19, we understand that there is uncertainty about being able to attend such meetings in 2021-22. Recipients must identify realistic alternatives (e.g., video conferencing, northerners presenting in a northern meeting) and include anticipated costs within the proposal budget. NWT CIMP hosts one regional results workshop each year and a territorial results workshop approximately every five years. The aim is to bring together researchers, NWT community members and decision-makers to discuss current research results, priorities and collaborations. If invited, funding recipients are encouraged to participate in the workshop especially if the project work is taking place in the region chosen for that year. It is an opportunity for recipients to present results and gather feedback on the project. Contact NWT CIMP to determine if a results workshop will be held in your region(s) in the funding year.

Recipients can arrange their own northern meeting with an involved community or collaborate with others to attract a wider audience. Plain language presentations, handouts and posters are helpful community and decision-maker deliverables. Recipients of funding are strongly encouraged to consider the use of translation when reporting results back to communities. For example, in consultation with communities you may be asked to provide translated summaries of research, or plain language results. When considering how to report results back to northern partners, discuss what format (e.g., video conference, pre-recorded video, conference call, poster) works best for your northern partners.

**Data Management Plan** – Recipients will be asked to submit a Data Management Plan (DMP) before funds are transferred. The DMP describes how the data generated by the project will be stored, managed, accessed and disseminated.

NWT CIMP promotes the [Portage DMP Assistant](#) as an online tool for preparing DMPs. Project leads register to use the site and create their own DMP. A series of questions prompt responses which will generate a DMP that is exportable. Each question has guidance information and the process ensures all aspects of a DMP have been considered. Additionally PI's must post a full set of metadata on the NWT Discovery Portal that completely documents and describes the data collected as part of their project. Metadata records must be created in the first year of the project and updated annually.

Projects that include water quality data are required to create a metadata record on the NWT Discovery Portal using the *NWT CIMP Metadata Standards for Reporting Water Quality Information in the NWT* template. NWT CIMP has a specific requirement that scientific water quality be made publicly available via electronically posting to the Mackenzie DataStream, an online data sharing portal. A review of the following [Mackenzie DataStream User Guide](#) will aid those with water quality data in preparing their data for upload to the site. For more detail refer to [Appendix D](#). Other data should be posted to the NWT Discovery Portal unless there is a more suitable public location, such as the CABIN database for benthic invertebrate data, or it is confidential, such as specific traditional or local knowledge.

- **TK Data Sharing Agreement** – If recipients are collecting TK, they may be required to submit a TK Data Sharing Agreement before funds are transferred. This would be considered on a case by case basis to be discussed with NWT CIMP staff. The agreement should clearly describe what TK data will be collected and how it will be used, stored and shared between parties. A required template can be found in the [Traditional Knowledge \(TK\) Proposal Guide](#).
- **Annual NWT CIMP Report** (multi-year projects) - An annual report must be submitted to NWT CIMP staff by **all** funding recipients with ongoing multi-year projects. The content of these reports help technical reviewers to determine if a project is on track and **if it should be supported for another year**. Failing to meet the annual summary report deadline may result in the delay or loss of funding for the following year. The annual report will be reviewed by subject-matter experts both internal and external to the GNWT. NWT CIMP will provide correspondence outlining comments and any recommended changes.
- **Final NWT CIMP Report** - All funding recipients must submit a final report to NWT CIMP staff by the end of April of the last year a project is funded. In addition to final reports, NWT CIMP funding recipients are required to submit all publications and data resulting from NWT CIMP-funded projects. This includes publications that are completed after NWT CIMP funding is complete (e.g. a journal publication).
- **Accounting of Funds** - Funding recipients must account for monies received by submitting a project financial statement/audit by June 30 of the following fiscal year.
- **NWT Environmental Research Bulletin (NERB)** – Recipients are required to use this plain language reporting template near the end of their project to generate a publication that can be used for communication with communities and decision-makers. ([NWT Environmental Research Bulletin](#))

**Failure to comply with the mandatory funding requirements will affect future program funding.**

The **Voluntary** (and encouraged) reporting options include:

- **State of Environment Report** – If the project involves the tracking of an environmental trend, NWT CIMP suggests the completion of the Environmental Trends template in the final project year as a useful way of communicating project results to communities and regulators. Contributions may be published in the GNWT State of Environment Report. ([State of Environment Report](#))

### 3.5 COMMUNITY CAPACITY BUILDING

NWT CIMP supports community capacity building and community-based monitoring. However, projects **must** primarily generate scientific or TK information that furthers the understanding of cumulative impacts and environmental trends. Projects that focus solely on community capacity building will not be funded. **NWT CIMP encourages applicants to consider where training and capacity development, related to cumulative impact monitoring, can occur to increase the ability of the project to proceed during the COVID-19 pandemic.**

The ultimate goal of providing funds for capacity building is self-sustaining communities with community members that have the skills to fill available jobs, leading to better socio-economic outcomes. Funds for capacity building should increase the ability of community members to continue long-term monitoring and encourage young people to build careers related to the environment. To those ends, NWT CIMP gives preference to formal, accredited, short-term training opportunities with a higher likelihood of generating future employment opportunities. For more detail, refer to [Appendix B](#).

NWT CIMP will provide additional funding beyond the maximum \$60,000 limit for projects that make the effort to integrate these types of training programs.

Examples of capacity building and training activities that could be a component of a scientific cumulative impact monitoring project are:

- Monitoring-specific, certified training for a group of community members through a Building Environmental Indigenous Human Resources (BEAHR) course.
- Field opportunities where skills learned in the BEAHR course are used.
- Community members conduct benthic macroinvertebrate sampling following Environment and Climate Change Canada – Canadian Aquatic Biomonitoring Network (CABIN) training.

### 3.6 HUMAN HEALTH

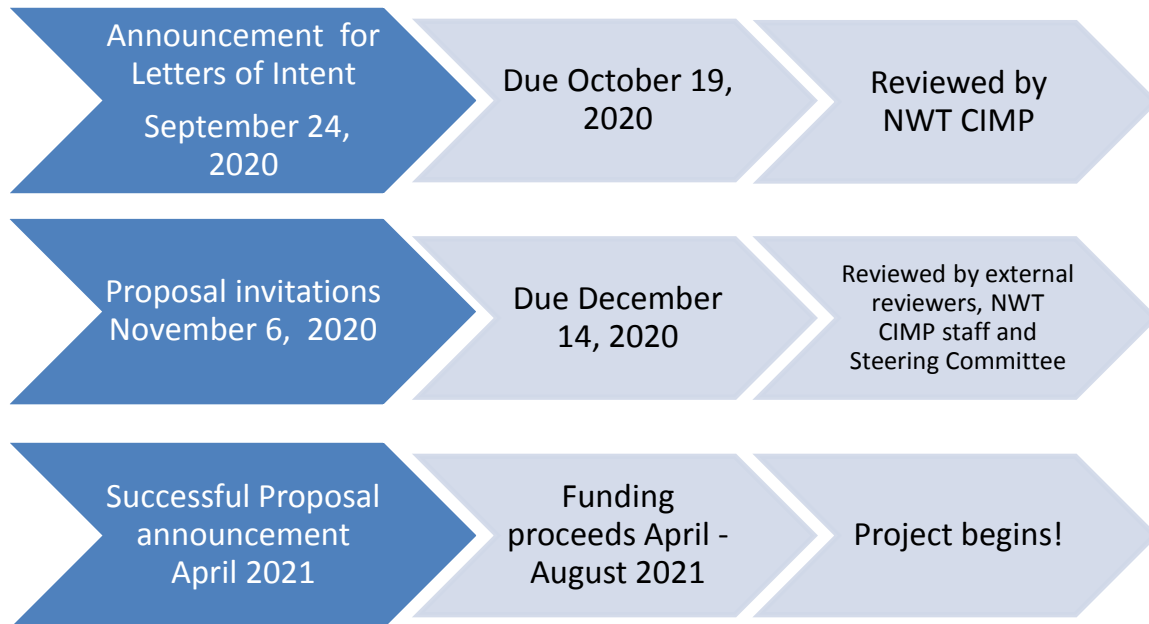
Projects that focus on contaminants and/or human health must include expertise to produce an analysis of the findings and advice regarding human health implications. The reporting and communications plan (Section 3.3) should include how the health implications of this work will be communicated to the GNWT's Department of Health and Social Services (HSS). The reporting and communications plan should also include a communications protocol detailing how researchers propose to communicate results to affected communities in conjunction with HSS.

When studying heavy metals in fish tissue, provision of the results to NWT CIMP and HSS in a timely manner is required in addition to identifying any potential concerns for human health (e.g. total arsenic concentration exceeds 3.5 ppm, or total mercury concentration exceeds 0.5 ppm wet weight in fish tissue).

## 4. Request for Proposal Process

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### 4.1 PROPOSAL PROCESS AT-A-GLANCE



### 4.2 LETTER OF INTENT

To apply for NWT CIMP funding, applicants must first submit a LOI ([Appendix I](#)). The LOI is a short description of the proposed project that will allow NWT CIMP to assess if the project is of interest.

**Applicants must read and will be asked to clearly acknowledge GNWT's [GNWT's Emerging Wisely - Continued Public Health Response to COVID-19 in the NWT](#), within the LOI.**

Specifically, the LOIs for science projects or TK projects with a science sub-component must address the following questions:

- i. Does the proposed project address a NWT CIMP monitoring priority outlined in a monitoring and research Blueprint?
- ii. Does the proposed project have a robust study design that will contribute to our understanding of cumulative impacts in the NWT?
- iii. Does the proposed project involve NWT community members, decision-makers and/or Indigenous organizations in its design and implementation?
- iv. Does the project have a strong project team who will be able to conduct and complete the proposed project?

In the event that your project incorporates the collection of both TK and science data, your LOI should also address the questions outlined in the NWT CIMP Traditional Knowledge Proposal Guide. **You only need to submit one Letter of Intent.**

LOIs must identify if members of the project team have received NWT CIMP funding in the past. If so, the

LOI must state the status of past NWT CIMP deliverables and identify if the project(s) was conducted as proposed; if not, details must be provided. Past performance will be considered in assessing if the project is of interest.

NWT CIMP encourages multidisciplinary, collaborative studies. LOIs will be used to connect and encourage collaboration among researchers who are working in similar locations or addressing similar questions. NWT CIMP may make suggestions to the applicant to help improve the proposed project's relevance to the program.

Once the LOI review is completed, applicants will receive one of the following responses:

- i. The project is eligible for funding, and the applicant is encouraged to submit a full proposal under the RFP process;
- ii. The project is eligible for funding, if suggested changes or collaborations with other applicants are made. The applicant is encouraged to submit a full proposal addressing the suggested changes; or
- iii. The project is not eligible for funding because it does not meet the funding criteria or is not of interest to the program at this time.

**Letters of Intent are due by 4:00pm MST, October 19<sup>th</sup>, 2020.**

A confirmation email will be issued upon receipt of the LOI.

**If you do not receive a confirmation email within 24 hours of submitting please call (867) 767-9233 ext. 53084 to ensure that the LOI has been received.**

**Late submissions will NOT be accepted.**

## **4.3 PROPOSALS**

Applicants will be invited to submit a full proposal using the Proposal Submission Form based on NWT CIMP's acceptance of their LOI. Proposals will not be accepted without a prior-approved LOI. If the application is for multi-year funding, the project description and budget must be detailed for each year. A budget template in Microsoft Excel will be distributed to applicants with the invitation to submit a proposal. Incomplete applications will not be considered.

If your project incorporates the collection of both TK and science data you should consult both Proposal Guides; however, you only need to submit one proposal. Either of the Proposal Submission Forms can be used; however, the study design must be robust and detailed for both the science and TK portions of the project. Use Section 4, Other Relevant Information, of the Proposal Form to include further information if needed.

**Proposals must, in their entirety, consider COVID-19. At a minimum, COVID-19 control measures and considerations must be clearly stated in the each of the Study Design, Community Support and Engagement, Decision-maker Engagement, and Deliverables and Communication sections.**

**Proposals are due by 4:00pm MST, December 14<sup>th</sup>, 2020.**

A confirmation email will be issued upon receipt of the proposal. **If you do not receive a confirmation email within 24 hours of submitting please call (867) 767-9233 ext. 53084 to ensure that the proposal has been received.**

**Late submissions will NOT be accepted.**

### **4.3.1 How Proposals are Evaluated**

Proposals are reviewed and evaluated using the criteria set out in Table 1. Evaluators include both GNWT and non-GNWT subject-matter experts. Evaluations are then discussed and recommendations are made by the NWT CIMP Steering Committee. The GNWT considers both the evaluations and Steering Committee recommendations when making final funding decisions.

Evaluation criteria are provided to give project proponents an indication of where to allocate their efforts and resources when developing a project and proposal. Project proposals should demonstrate how each of the review criteria is addressed. **Please contact NWT CIMP staff for further clarity on the review criteria or advice on how to address the criteria.** Community support and decision-maker engagement are two criteria that may be unfamiliar to new applicants. NWT CIMP staff are available to help establish linkages with these groups. It is advised that applicants contact NWT CIMP staff well in advance of proposal submission.

**Table 1: Proposal Evaluation Criteria**

Review Criteria	Proposal Section	Description
Scientific Research Priorities <b>(Pass/Fail)</b>	2	Proposals <i>must</i> identify which specific aspects of NWT CIMP's priorities, as stated in Section 1.2 and the Monitoring Blueprints of the Scientific Proposal Guide, will be addressed.
Project Purpose and Objectives <b>(Pass/Fail)</b>	3a	Proposals <i>must</i> clearly describe the purpose, objectives and deliverables of the project. Research/monitoring questions should be clearly identified.
Study Design <b>(Pass/Fail)<sup>1</sup></b> (30%)	3b	Proposals <i>must</i> clearly describe the study area, the number and location of proposed sampling sites, methods, protocols and approaches that will be used to collect data. Anticipated lab and statistical analyses of data must also be described. Projects that are multi-disciplinary in nature may be scored more highly. It should be noted if the study design was developed with input from community members, decision-makers or others currently undertaking NWT CIMP monitoring projects.
Community Support and Engagement (10%)	3c	Proposals <i>must</i> describe the level of community engagement and support for the proposed monitoring project. Proposals should also describe if the project builds long-term capacity, training or employment opportunities within NWT communities or Indigenous organizations.  Proposals should consider: how community contributions will be acknowledged, how data will be

<sup>1</sup> Where 'Pass/Fail' and (x %) is indicated, proposals must meet the criteria for this section in order for a full review to occur. In the review, this section will then be evaluated and be weighted as indicated in brackets to contribute to a final score.



		<p>shared or given back to participating communities, incorporating a community member to interpret scientific findings into plain language and presenting them to the community and requesting funds to communicate results to northerners. Consider identifying the community or regional Indigenous government or organization as the project lead or a named project partner.</p> <p>Relevant letter(s) of support from community and/or regional organizations that clearly identify their support and level of their participation must be included in the application.</p>
Decision-maker Engagement (10%)	3d	<p>Proposals <i>must</i> identify how results can be used by those who make key decisions regarding how NWT resource development is carried out. Projects should clearly describe how the data and knowledge generated from the project could be used to make effective resource management decisions. Relevant letter(s) of support from the decision-maker(s) that <u>clearly identify their support</u> and level of participation must be included in the application.</p>
Human Resources and Project Team Experience (10%)	3e	<p>Proposals <i>must</i> clearly identify all members of the team actively working on the project, as well as clearly state roles and contributions to the project.</p> <p>Evidence that a technical expert(s) is actively participating in the development of the proposal and that the proposed team includes a balance of technical experts and northern experience (ie. community members, regulators, boards) strengthens the application. Do <i>not</i> pad project teams with members that are not active participants. These can be documented in the “Supporting Organizations” section.</p>
Supporting Organizations	3f	<p>Proposals <i>must</i> clearly identify any individuals and/or organizations that support the project, but are not actively working on the project. Also, indicate reasons for support (e.g. project addresses a need of theirs) and the type of support (e.g. they are contributing funds and/or in-kind support).</p>
Deliverables and Communications (Pass/Fail) <sup>1</sup> (30%)	3g	<p>Proposals <i>must</i> include a Deliverable and Communication Plan that clearly lists all expected deliverables from the project and identifies how these deliverables will be made available to the intended users. The Deliverable and Communication Plan must address the following requirements:</p> <ul style="list-style-type: none"> <li>i. Describe the communication tools (e.g. posters, annual and final reports, government reports, peer-reviewed journal articles) to be used and</li> </ul>



		<p>to whom they will be provided for each year of funding applied for and after funding has ceased.</p> <ul style="list-style-type: none"> <li>ii. Describe how the results of the project will be provided to NWT CIMP (e.g. GIS layers, datasets, government or peer-reviewed journal articles) and involved communities.</li> <li>iii. Identify all northern meetings and northern conferences where results from the project will be provided each year and indicate how the results of your project will be communicated (e.g. presentation, poster, plain language report). More weight will be given to those presenting results to the involved communities.</li> <li>iv. Identify that NWT CIMP's Annual and Final Reports and any subsequent publications will be submitted to NWT CIMP.</li> <li>v. Identify any additional deliverables of the project, and how they will be provided and communicated to NWT CIMP, involved communities and decision-makers; even after funding is complete (e.g. scientific papers, government reports, plain language reports, models, datasets, and GIS layers).</li> <li>vi. If relevant, identify how the human health implications, related to environmental contaminants, of this work will be considered and communicated to the GNWT's Department of Health and Social Services (e.g. Risk Communication Plan) and Communities.</li> <li>vii. Identify that a data management plan will be submitted to NWT CIMP.</li> <li>viii. If relevant, identify that a TK data-sharing agreement will be submitted to NWT CIMP.</li> <li>ix. Identify a plain language Northern Environmental Research Bulletin (NERB) will be submitted in the final year of funding.</li> <li>x. Identify if an environmental trend form will be submitted. This would be applicable if the project is amenable to medium or long term temporal trend analysis.</li> </ul>
Budget (10%)	5	Proposals <i>must</i> be accompanied by a completed budget for every year of funding being requested, using the template provided to the project lead. The proposal budget <i>must</i> be appropriate (e.g. reasonable charges for sample analysis, etc.). All other sources of funding and in-kind support must be clearly identified. The level of funding requested should be appropriate for the size and complexity of the project. Leveraging of funds from other sources is

highly encouraged. Minimize costs for travel from out of territory destinations and maximize benefits to NWT communities.

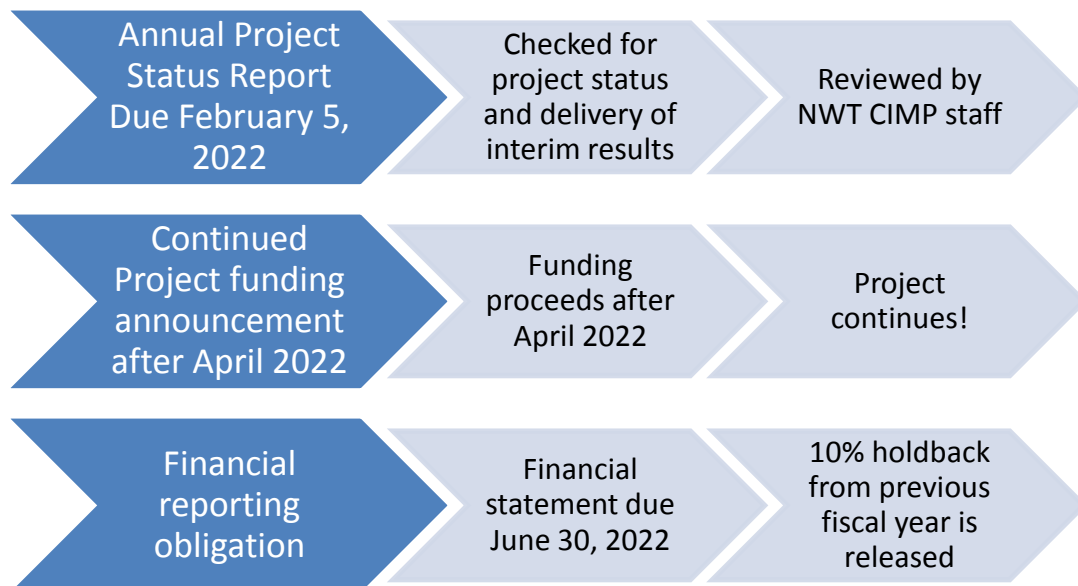
## 5. Project Reporting

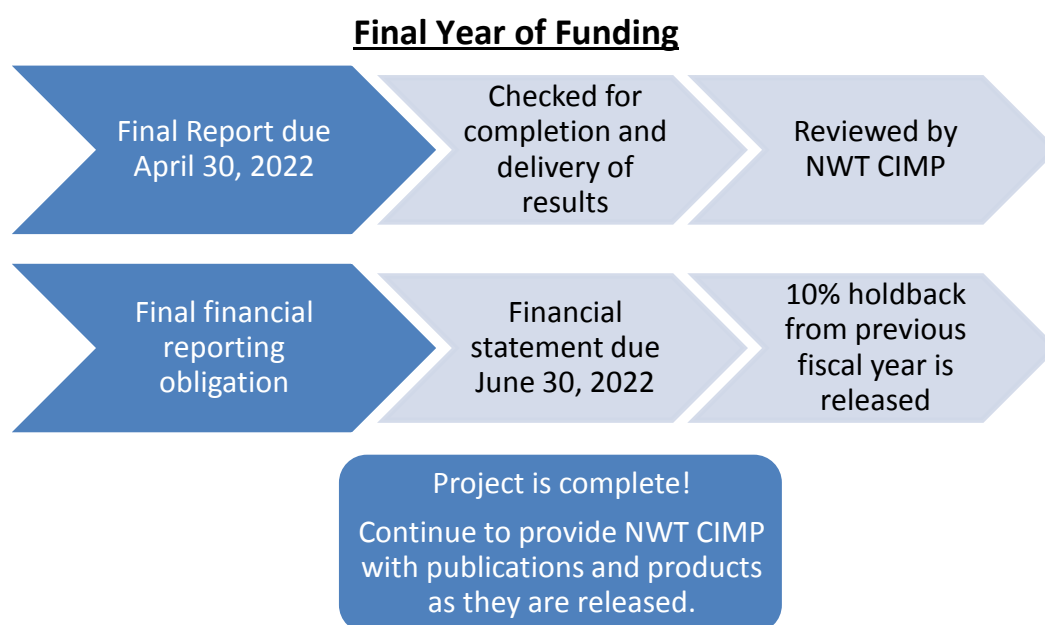
Project Reports play an important role in our funding cycle. This information allows NWT CIMP to report on our mandate, and facilitates the continued funding of approved multi-year projects.

**All submitted reports will be evaluated and decisions regarding future funding will be determined in part on the results and quality of Annual and Final Reports.**

### 5.1 PROJECT REPORTING AT-A-GLANCE

#### Ongoing (for multi-year projects)





## 5.2 ANNUAL REPORTS

The annual project reporting process runs at the same time as the project proposal process. This enables the reviewers to have a full picture of all the ongoing and new NWT CIMP funded projects. Having the two processes coincide also assists in budgeting. Project leads may be requested to provide revisions or clarifications prior to receiving funding for the next fiscal year.

All multi-year projects must provide NWT CIMP with an Annual Report . A budget template will be sent by email to project leads in January.

### 5.2.1 How Annual Reports are Evaluated

**For the majority of projects, progress is demonstrated in the annual report, and funding continues for the full term of the project.** NWT CIMP Annual Reports are reviewed and evaluated by GNWT subject-matter experts using the criteria set out in Table 2. If issues are raised they may be discussed and a recommendation will be made by the NWT CIMP Steering Committee. The GNWT considers both the evaluations and Steering Committee recommendations when making final decisions to continue funding.

Annual Reports should demonstrate how each of the review criteria is addressed. **Please contact NWT CIMP staff for further clarity on the review criteria or advice on how to address the criteria.** It is advised that applicants contact NWT CIMP staff well in advance of report submission.

**Table 2: Annual Report Criteria**

Review Criteria	Annual Report Section	Description
Project Objectives and Rationale	3	The annual report <i>must</i> clearly summarize the purpose, objectives and deliverables of the project. Research/monitoring questions should be clearly identified.
Project Progress	4	The annual report <i>must</i> clearly identify how the

		project has progressed as compared to the project timeline as approved in the original proposal.
Changes to the Project	5	The annual report <i>must</i> identify any substantial changes to key activities, timelines (completion dates) and funding arrangements for the project as approved in the original proposal. If there are delays in the project timelines they should be explained.
Key Outputs/Deliverables	6	<p>The annual report <i>must</i> identify each key output or deliverable for <b>the reporting year</b> as approved in Communication and Reporting Plan in the original proposal.</p> <p>If there are changes to the Communication and Reporting Plan, such as additional deliverables produced or delays in the production of planned deliverables, these should be explained.</p>
Contribution to Understanding	7	The annual report <i>must</i> clearly identify how, if applicable, the project has contributed to better understanding of cumulative impacts and/or environmental trends <b>in the reporting year</b> , through each activity that applies.
Key Messages	8	The annual report <i>must</i> provide concise bullets that provide key messages and/or preliminary results for the reporting year.
Key Tasks for the next year	9	The annual report <i>must</i> provide a concise list of key activities planned for the next funding year.
Budget	Budget template spreadsheet	<p>The annual report <i>must</i> be accompanied by a completed budget spreadsheet that indicates:</p> <ol style="list-style-type: none"> <li>1. the original funds requested from all sources, and their purpose; and</li> <li>2. the financial requirements for the next subsequent fiscal years from all sources and their purpose.</li> </ol>

### 5.3 FINAL REPORTS

The Final Project report provides an overview of the work completed over the course of the entire project. Project results, resource management implications and contributions to further understand cumulative impacts are a few of the key messages expected in a final report. Project leads are given additional time to complete this report and may be requested to provide revisions or clarifications as this is the final text that will be posted online on the NWT Discovery Portal. The format is similar to that of a traditional scientific paper.

All projects in the final year of funding must provide NWT CIMP with a Final Report. A budget template will be sent by email to project leads in January.

### 5.3.1 How Final Reports are evaluated

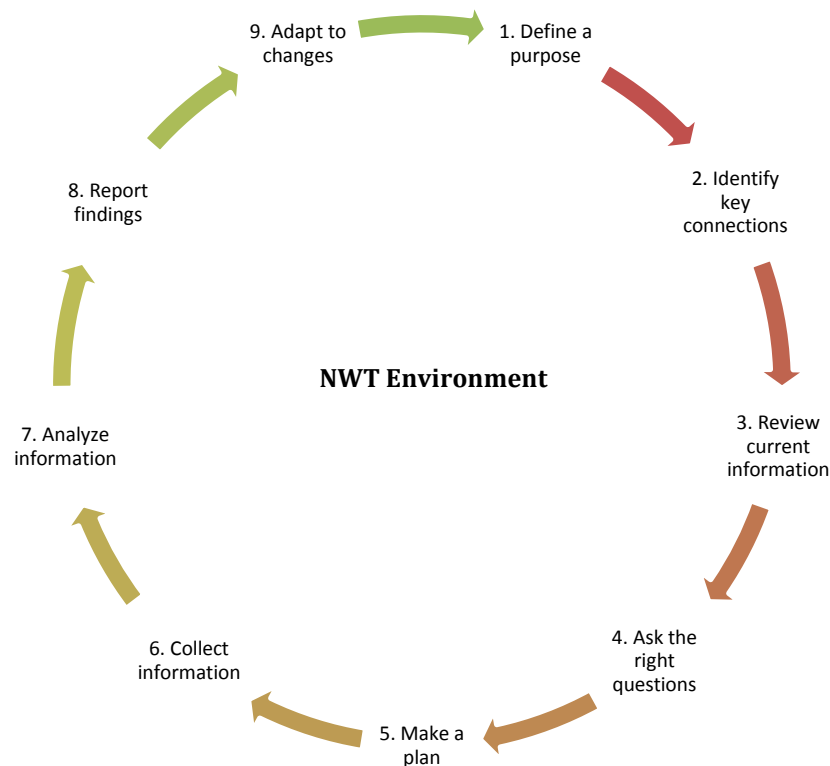
NWT CIMP Final Reports are reviewed and evaluated by GNWT subject-matter experts using the criteria set out in Table 3.

**Table 3: Final Report Criteria**

Review Criteria	Report Section	Description
Introduction	3	The final report <i>must</i> clearly summarize the purpose, objectives and rationale of the project.
Methods	4	The final report <i>must</i> clearly identify the study area, and methods used to collect and analyze the data.
Results	5	The final report <i>must</i> identify the results of the project. Appropriate values for all statistical tests, if applicable, must be reported. Figures and tables should be included where appropriate.
Discussion	6	The final report <i>must</i> explain the results of the project and clearly articulate how the results of this project advance the understanding of cumulative impacts in the NWT.
Resource Management Implications	7	The final report <i>must</i> describe how the results will apply to northerners, particularly environmental regulators, Indigenous organizations, and community members.
Project Linkages	8	The final report <i>must</i> state how NWT decision-makers and communities engaged in the project. Identify any new linkages that have emerged during the project and the value of the new linkages.
Contribution to Understanding	9	The final report <i>must</i> clearly identify how, if applicable, the project has contributed to better understanding of cumulative impacts and/or environmental trends, through each activity that applies.
Recommendations	10	The final report <i>must</i> provide recommendations regarding how the results of the project can be applied to advance the understanding of cumulative impacts in the NWT or how NWT CIMP can help to continue the transfer of this knowledge to NWT decision-makers and communities.
Key Messages	11	The final report <i>must</i> provide concise bullets that provide <u>a minimum of 3</u> key messages. These are high level summary points regarding the results.
Budget	Budget template spreadsheet	The final report <i>must</i> be accompanied by a completed budget spreadsheet that indicates the funding sources for all project years combined.

## Appendix A: Pathways Approach

NWT CIMP has developed the [Pathways Approach](#) to describe a shared approach to research and monitoring that involves NWT communities. Where appropriate, use of the Pathways Approach will help applicants design a better study in collaboration with communities and decision-makers. The Pathways Approach also provides a good framework from which to develop monitoring and research projects. Further information on collaborative monitoring among communities and subject-matter experts is available in the NWT CIMP/Aurora Research Institute guidance document [“Working Together: Towards relevant environmental monitoring and research in the NWT”](#). Figure 1 shows the main steps of the approach.



**Figure 1: Pathways Approach**

Here are step-by-step instructions for how to use the Pathways Approach:

### **Step 1: Define a purpose. Why is monitoring needed?**

The first and most important step in the Pathway is to clearly define the purpose for monitoring. This may be broad – *Is water quality changing?* – or specific – *Is seismic activity altering woodland caribou habitat?* A shared understanding of the purpose will help shape all other steps along the Pathway, from identifying what indicators you should monitor to how the information will be used.

### **Step 2: Identify important connections. How do things connect and what should we track?**

A clear purpose to your monitoring program will help you identify exactly what you should track. In turn, by bringing partners together to discuss key connections between different parts of the environment, you can identify additional indicators and stressors to include in your study.

**Step 3: Review current information. What is already known?**

This step involves reviewing traditional and scientific knowledge about the issue you want to monitor. It will help you identify similar studies, existing information sources, and appropriate methods to collect and analyze data. It may also help refine study ideas about how things connect – “conceptual model” – and sharpen the study’s purpose.

**Step 4: Ask the right questions. What needs to be answered?**

At this point you should have a clear purpose, know what you want to monitor and have a good sense of available information. Building on this foundation, you can now define specific research questions that will guide the collection and analysis of information.

**Step 5: Make a plan. How will we find answers?**

This step is all about finding ways to answer the questions posed in step 4. It results in a detailed plan, or study design, that spells out how, where, when, and by whom information will be collected, stored, analyzed and reported. Logistics for transportation, equipment, safety, and environmental protection are an important part of the planning process.

**Step 6: Collect Information. How do we gather the observations or data?**

Data collection is typically the most costly step in northern monitoring. This makes it critical that the methods to gather observations – whether through field work or interviews – be clearly defined, well understood, and carried out by a well-trained team.

**Step 7: Analyze Information. How can we turn observations into useful knowledge?**

Analysis is the key that unlocks the knowledge contained within the observations (or data) that has been collected. Statistical tests, graphs, and other analytical methods help researchers reveal changes and trends in what is being tracked which might otherwise remain hidden. Such insights can go a long way in answering key monitoring questions.

**Step 8: Report findings. How should we tell our story?**

The “story” revealed by the monitoring efforts needs to be told in the right way to the right people. Know the target audience. Decide on what key messages should be delivered. Most importantly, report on how the results shed light on better ways to manage the land.

**Step 9: Adapt to changes. What has changed? Should we adjust our monitoring program?**

Keeping an eye on change is at the heart of monitoring. But it’s not only the environment that may be changing. As time goes on, the original monitoring partners, team leaders, funding levels, community values, or government priorities might change too. These changes need to be tracked and, where necessary, the monitoring program adjusted to stay relevant and effective.

# Appendix B: NWT CIMP Community-Based Monitoring Guidance

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## 1. PURPOSE

The purpose of this section is to provide guidance to applicants that propose community-based water monitoring projects to produce high quality, long-term data that addresses both local and regional water variability concerns. This section refers to the establishment of long-term water monitoring projects. NWT CIMP also supports water quality research.

### What is the difference between monitoring and research?

**Monitoring** = conducting sampling with the aim of examining long-term, temporal or spatial trends. For example, what is the change in temperature in stream A over many years?

**Research** = conducting sampling in order to answer one or more specific question(s). For example, what is the impact of temperature changes on fish in Stream A?

Increasingly, communities are interested in understanding local water quality and quantity and are involved in community-based water monitoring. NWT CIMP is specifically mandated to understand long-term water quality trends at both local and regional-scales. With mindful planning, community-based water monitoring projects can address both local and regional-scale water monitoring objectives, thereby increasing the likelihood of NWT CIMP support.

### What is the difference between local and regional-scale monitoring?

**Local** = monitoring sites located close together, often they are nearby a community

**Regional** = monitoring sites are more spaced out and representative of a broader area

NWT CIMP aims to provide water information that is useful for environmental decision-makers such as Land and Water Boards and the Mackenzie Valley Environmental Impact Review Board. It is important that data collected by NWT CIMP-funded projects be of high quality and statistically significant. This means the number and location of sampling points is an important consideration. Appropriate methods and study design are key elements of a successful funding proposal (refer to section 3).

Finally, NWT CIMP is committed to building community capacity through meaningful and practical education or employment opportunities. The ultimate goal is self-sustaining communities with members that have the skills to fill available jobs that lead to better socio-economic outcomes. To that end, NWT CIMP gives preference to formal, accredited, short-term training opportunities with a higher likelihood of generating future employment opportunities. Capacity building activities must be undertaken in the context of a project where data is being collected and/or analyzed.

With good planning, community-based water monitoring provides a unique opportunity for NWT communities to build long term capacity and gather much needed monitoring information. NWT CIMP



project proposals that keep this guidance document in mind have a greater chance of meeting funding criteria and developing a successful monitoring program.

## 2. PARTNERSHIPS

NWT CIMP has learned through experience that community water monitoring partnerships with government, private or academic experts have a greater chance of successfully collecting useful information and building community capacity. The success of the partnership approach is that each group in the partnership builds on the varied strengths of the other groups and is able to contribute in multiple ways.

If you are applying for NWT CIMP funding for a science-based community water monitoring project, it is **highly recommended** that you partner with a government, private or academic group that has scientific expertise and knowledge. Establishing strong and effective partnerships strengthens community water monitoring programs and enables them to answer local, regional and long-term water questions. Collaboration with scientific expertise is particularly encouraged for study design, statistical analysis and interpretation of results.

NWT CIMP and the Aurora Research Institute have developed a step-by-step resource for communities to engage with partners and set up community-based monitoring programs called [Working Together Towards Relevant environmental Monitoring and Research in the NWT](#) (2013).

## 3. STUDY DESIGN

A well thought-out study design is essential for a project's success. Keep in mind that though community questions may be local, NWT CIMP is also interested in the regional watershed perspective over the long term. It is useful to identify the geographical monitoring limits, the present and planned water uses and the expected pollution sources. The monitoring study needs to be designed so that factors contributing to water variability can be understood. These factors may be different depending on scale. Many descriptions and examples of effective study design exist and should be investigated and considered. Some examples include:

- [A Guide to Designing and Conducting Water Quality Monitoring in Northern Canada](#) by the Northern Ecological Monitoring and Assessment Network;
- [Water Quality Monitoring System](#) by the International Institute for Sustainable Development;
- [A Practical Guide to the Design and Implementation of Freshwater Quality Studies and Monitoring Programs](#) by the World Health Organization.

### 3.1 General Considerations

Good monitoring projects are designed around well-defined, clear questions. These questions will determine the parameters to measure, spatial extent of sampling, intensity and duration of the measurements and the usefulness of data.

***Remember...***  
expert water partners and other helpful resources are available  
to help guide the study design.

When starting the design, look at the ‘big picture’ questions which often arise from community concerns. Consider what component is the best place to start addressing the larger question and build from there. Start small and focus the study in order to collect data within a particular scope and budget. It is better to have consistent data in a few key areas that can be analyzed for trends than to collect data inconsistently at a number of locations that is inadequate for spatial or temporal trend analysis.

### **3.2 Standardized data**

Parameters to be monitored will depend on the projects’ purposes and objectives. All water quality monitoring projects will include some or all of the following parameters:

- *chemical* (pH, dissolved oxygen, metals)
- *physical* (temperature, colour, conductivity, turbidity)
- *biological* (algae, benthic macro invertebrates, phytoplankton)

Data from a community-based water monitoring project is most useful if it can be compared with data from other monitoring sites in the watershed, region and territory. NWT CIMP recommends contacting researchers, agencies, and non-government organizations who are collecting water data in your watershed and region. This will help to understand their approach and program, standardize sampling and analysis methods, and potentially connect projects. Potential monitoring contacts include government, such as the GNWT-ENR Water Resources Division, industry, academic, and other community-based projects. Projects that show evidence of efforts to standardize data collection and analysis with existing projects stand a higher chance of being funded.

### **3.3 Recommended Protocols**

There are several data collection protocols for water quality and fish sampling that are required by NWT CIMP. For a full list of recommended data collection protocols, refer to [Appendix C](#).

### **3.4 Data Management**

NWT CIMP is committed to a principle of timely and open access to data. As such, NWT CIMP requires a data management plan (DMP) for all funded projects. NWT CIMP promotes the [Portage DMP Assistant](#) as an online tool for preparing DMPs. Project leads register to use the site and create their own DMP. A series of questions prompt responses which will generate an exportable DMP. Each question has guidance information and the process ensures all aspects of a DMP have been considered. Additionally Project Lead’s must post a full set of metadata on the NWT Discovery Portal that completely documents and describes the data collected as part of their project. Metadata records must be created in the first year of the project and updated annually.

#### **Water Quality Data**

Projects that include water quality sampling are required to create a metadata record on the NWT Discovery Portal using the NWT CIMP Metadata Standards for Reporting Water Quality Information in

the NWT template. NWT CIMP has a specific requirement that scientific water quality be made publicly available via electronically posting to the Mackenzie DataStream, an online data sharing portal. A review of the following Mackenzie DataStream User Guide will aid those with water quality data in preparing their data for upload to the site. For more detail refer to [Appendix D](#). Other data should be posted to the NWT Discovery Portal unless there is a more suitable public location, such as the CABIN database for benthic invertebrate data, or it is confidential, such as specific Traditional or local Knowledge.

### ***3.5 Frequency and Timing of Sampling***

How often a sample is taken and timing depends on many factors including the project objectives, the water body of interest (e.g. lake, river), type of samples (e.g. water, sediment) and what is being measured. For example, stations where water quality changes often should be sampled more often than at stations where quality remains similar over time.

To ensure comparability of data, it is important to sample each site at the same season (and same time period for biological parameters) of each year. Most community-based water monitoring projects focus on summer sampling due to ease-of-access. Single season sampling is acceptable, but there are limitations of the data that must be acknowledged in the analysis. For community water monitoring, it is less likely that sampling will occur in winter due to on-ice safety concerns. If the study questions involve seasonal effects or questions on winter conditions, then significant safety planning and training are likely required before conducting winter field sampling.

When determining the frequency of sampling, consider several questions: How many samples are needed to be able to detect and understand trends? Will there be enough data to provide an understanding of natural variability? Ensure that there is consideration for statistical power to determine statistical significance of the data. By ensuring the study design is appropriate, you can determine statistical relationships between two or more things, and the data is stronger, useful and more defensible for decision-making.

### ***3.6 Sampling Locations***

Selecting the right sampling location is important to the success of the project and should not be done randomly. Think about the questions you are trying to answer and talk to an expert.

It is important to know where other monitoring sites are. The GNWT-ENR has compiled a list, the [NWT Water Monitoring Inventory](#), of all monitoring sites in the territory. Various resources on NWT water monitoring networks and surveys are also available. Where possible, locate sites near long-term monitoring sites so that you may assess temporal trends. Know where point source and non-point source impacts may be (e.g., effluent from a mining site).

Sites should be located so that variability in water quality can be more easily explained. For instance, it would be difficult to explain water monitoring results from one site in the middle of the Mackenzie River because it is influenced by such a large upstream area. But monitoring a number of smaller nearby tributaries and/or along the Mackenzie at various points would provide a better understanding of local or regional water quality and the factors that influence them.

Start by focusing on a smaller geographical area and if possible, gradually increase the number of sampling locations over time. This will increase your chances of success and your ability to explain your data. It is important to consider drivers of water quality and how they would be measured or modeled to

explain changes in water quality data. It is important to think about how the data will be analyzed at the end of the project in order to determine what needs to be collected at the beginning.

### **3.7 Quality Assurance/Quality Control (QA/QC)**

Sample collection and measurement should be rigorous, repeatable and use acceptable methods. By strictly following sampling protocols, such as described in Section 3.3, you will collect and maintain good quality and consistent data.

If data is to be used in a legal context, or compared with data collected by industry, a 'chain of custody' approach and rigorous QA/QC procedures (e.g. travel blanks, field blanks) are required. The chain of custody provides a record of everyone who had a hand in collecting and analyzing a sample, and gives an assurance that proper procedures were followed. Recommended resources include CCME's [Protocols Manual for Water Quality Sampling in Canada](#) and the Government of British Columbia's [Water Quality Procedure Guides and Sampling Manuals](#).

### **3.8 Safety Plan**

When collecting samples, everyone's safety is top priority. Being well-prepared and documented in case of an emergency is a must. Regular scheduled 'check-ins' help ensure safety. Equipment, training, job hazard assessments, field safety plans and journey management plans are some tools that are available to increase worker's safety.

### **3.9 Long-term Plan**

With community-based monitoring projects, it is useful to think of the long-term plan at the beginning. If the goal is to support a long-term monitoring program then there are several questions to consider: How will this project be supported over the long term? Where will project funding come from? Can project partners provide funding? Generally, NWT CIMP expects start-up costs to be highest in the first three years of a project. Higher costs are normally associated with purchasing equipment, providing training and addressing short-term questions. For example, the first three years of a project could focus on a comprehensive assessment of a watershed. In later years, monitoring could be scaled back to several key sites of interest, and would require a much lower maintenance-level of funding.

## **4. TRAINING**

A key principle of NWT CIMP is to support capacity building in NWT communities. The ultimate goal is self-sustaining communities with community members that have the skills to fill available jobs, leading to better socio-economic outcomes. Participation in community monitoring is one way for community members to gather experience that can lead to future employment. NWT CIMP encourages community members to obtain standardized training certifications. Not only will this promote the collection of high quality, scientific data, but certifications will also provide the additional benefit of transferability between different employers such as government, industry and academic researchers. Community members will be more qualified to take advantage of multiple job opportunities throughout the year.

In addition to providing funding for community members to gather experience collecting water data, NWT CIMP can also provide funds for community members to participate in certified training opportunities as part of a community-based water monitoring project. NWT CIMP specifically endorses the [Building Environmental Aboriginal Human Resources](#) (BEAHR) training provided by EcoCanada:

- Environmental monitoring coordinator (2 - 4 weeks)
- Local environmental coordinator (4 weeks)
- Certificate of applied environmental techniques (15 weeks)
- Certificate of environmental planning and administration (16 weeks)

Other training opportunities will be considered as proposed.

**NWT CIMP encourages Project Leads to consider where training and capacity development, related to cumulative impact monitoring, can occur to further increase the ability of the project to proceed in light of the COVID-19 pandemic.**

# Appendix C: Data Collection Protocols

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## ***Caribou***

If your proposed work involves monitoring caribou behaviour, please contact NWT CIMP for a draft monitoring protocol.

## ***Water Quality and Aquatic Health***

For data collection protocols NWT CIMP highly recommends use of the Community-Based Water Monitoring Protocol developed by GNWT-ENR. Contact [nwtcimp@gov.nt.ca](mailto:nwtcimp@gov.nt.ca) for a copy of the protocol. It is currently being used to collect water quality data in 22 NWT communities mainly along the Mackenzie River. Complementary [Standardized Water Sampling Instructions](#) are available from the Government of the Northwest Territories Taiga laboratory.

The [Mackenzie DataStream\(accessible through Chrome\)](#) has several water quality data collection templates: grab samples and sondes.

For northern water quality study design NWT CIMP recommends the Northern Ecological Monitoring and Assessment Network's 2005 guidance document [Northern waters: a guide to designing and conducting water quality monitoring in northern Canada](#). Generic guidance for all of Canada is available from the Canadian Council of Ministers of the Environment (CCME) [Protocols Manual for Water Quality Sampling in Canada](#).

For projects that aim to collect benthic invertebrates as a measure of stream health, NWT CIMP recommends Environment Canada's [Canadian Aquatic Biomonitoring Network \(CABIN\) Protocol](#).

## ***Fish***

For projects designed to detect occupancy of salmonids in northern mountain streams, NWT CIMP recommends users seek study design guidance using the [Native Stream Occupancy Monitoring Protocol](#).

For the collection of detailed information about fish species and fish communities, physical and chemical water characteristics, aquatic invasive species, and fishing effort for lakes, NWT CIMP recommends the use of the Broad Scale Fish Community Monitoring Protocol available at [Broad Scale Fish Community Monitoring Protocol](#).

## ***Vegetation***

The [NWT CIMP community-based vegetation monitoring protocol](#) and [data templates](#) are intended to capture the range of natural variability in the vegetation of different site types. Once this baseline has been established, it can be used as a means to assess the effects of disturbance and other environmental changes. Template data sheets are available for active layer, berries, community composition, functional groups, sample collection, site description and tree measurements.

To better understand natural variability in time and space in berry productivity across the Canadian Arctic and Sub-Arctic, NWT CIMP recommends the [Berry Monitoring Protocol](#). It is meant to be easy and fast. Berries can easily be picked at a site where you are already measuring vegetation.

For vegetation and active layer data collection protocols for Seismic Line Recovery, refer to the GNWT Forest Management Division [Data Collection Manual & Methods](#).

*NWT CIMP will add additional recommended protocols to this list annually as they are adopted.*

## Appendix D: Mackenzie Data Stream

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The [Mackenzie DataStream \(accessible through Chrome\)](#) is an open access platform for sharing water data in the Mackenzie Basin and throughout the NWT. The DataStream's mission is to promote knowledge sharing and advance collaborative, evidence-based decision-making in the region. The site provides open access to posted water, fish and air quality datasets. The site was developed by the [Gordon Foundation](#), who has a long history of supporting water policy in the north, in collaboration with GNWT's Department of Environment and Natural Resources (ENR) as a means to provide accessible water quality data to citizens and decision-makers. ENR is committed to ensuring open access to NWT CIMP-funded projects and the Mackenzie DataStream is the chosen means to achieve this goal. Data is housed on a secure, cloud-based platform. The Gordon Foundation is committed to the long-term success of Mackenzie DataStream.

### ***Current DataStream data themes***

Currently, NWT CIMP requests the following data themes be uploaded to DataStream:

#### *Water quality data*

- Grab sample (nutrients, ions, pH, turbidity, conductivity, chlorophyll-a, and total and dissolved metals)
- Sonde (pH, turbidity, dissolved oxygen, conductivity and temperature)
- Diffusion Gradients in Thin-Films passive samplers - DGTs (dissolved metals)
- Polyethylene Membrane Devices - PMDs (polycyclic aromatic hydrocarbons)

### ***When to upload***

Researchers generally have an interest in the use of data they have collected, both in terms of ensuring the quality of data, as well as the timeliness of access. Generally, if your data has undergone QA/QC to address your requirements and is ready for your own analysis to be undertaken, it is ready (in terms of quality) for uploading to the DataStream. However, we recognize that there may be publications produced from the data and that process takes time. NWT CIMP may agree to delay upload to DataStream. This timing will be discussed and agreed to with your program liaison but generally should not exceed two years from collection to online submission.

### ***How to upload***

The upload templates can be downloaded from the website after you are registered as a user. Once the templates are populated with data, they are submitted electronically, in .csv format. The site administrator (DataStream@gordonfn.org) can be contacted through a link on the site and will assist with ensuring your data is properly formatted for upload.

Future data can be added to the site in the same templates, if in a large batch, or line by line through the sites data upload page. Program data is only required on the initial upload or if there are changes, such as an expanded research program. Likewise, location data is a one-time upload unless new sites are added to the project.

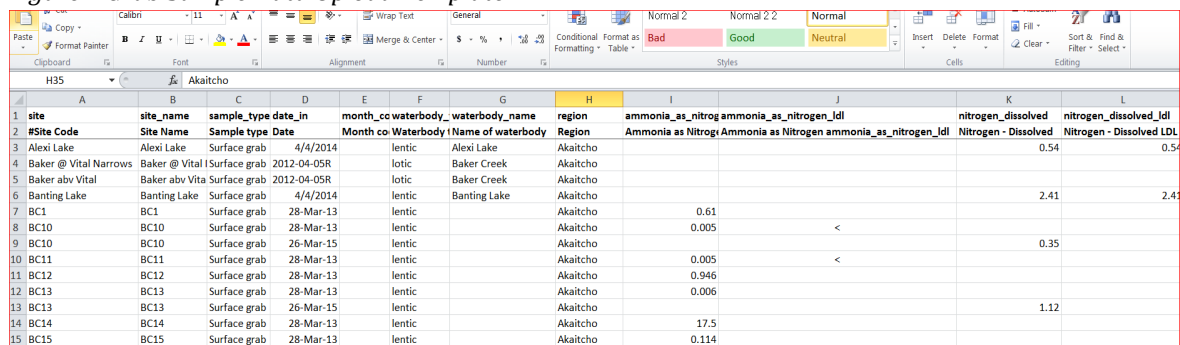


## Format and organization of the data/metadata

Upload are available on the DataStream website and consist of .csv files. You must register as a user to access the upload data section. Apart from the respective data templates for grab samples, PMD , DGT, Sonde data, fish, and air quality data, there are also program and location templates to be completed. The program template only has to be completed with the initial upload. After the initial upload of location data, only new locations would need to be added in the future.

Figure 1 shows the first 12 columns of the **Grab Sample Data** template, which has more than 80 columns that run through parameters including nutrients, ions, physical parameters, and dissolved and total metals. In this case, the site name and site code are the same. Data that is not collected is left blank, the “ldl columns” (less than detection limit) is to flag when readings are returned for values that are less than the laboratory method’s minimum detection level (highlighted by a < symbol in the column).

Figure 1 Grab Sample Data Upload Template



1	2	3	4	5	6	7	8	9	10	11	12
site	site_name	sample_type	date_in	month_cc	waterbody	waterbody_name	region	ammonia_as_nitrogen	ammonia_as_nitrogen_ldl	nitrogen_dissolved	nitrogen_dissolved_ldl
#Site Code	Site Name	Sample type	Date	Month	cc	Waterbody Name of waterbody	Region	Ammonia as Nitrogen	Ammonia as Nitrogen	ammonia_as_nitrogen_ldl	Nitrogen - Dissolved
3	Alexi Lake	Surface grab	4/4/2014			Alexi Lake	Akaicho				0.54
4	Baker @ Vital Narrows	Surface grab	2012-04-05R			lotic Baker Creek	Akaicho				
5	Baker abv Vital	Surface grab	2012-04-05R			lotic Baker Creek	Akaicho				
6	Banting Lake	Surface grab	4/4/2014			lotic Banting Lake	Akaicho			2.41	2.41
7	BC1	Surface grab	28-Mar-13			lotic	Akaicho	0.61			
8	BC10	Surface grab	28-Mar-13			lotic	Akaicho	0.005	<		
9	BC10	Surface grab	26-Mar-15			lotic	Akaicho			0.35	
10	BC11	Surface grab	28-Mar-13			lotic	Akaicho	0.005	<		
11	BC12	Surface grab	28-Mar-13			lotic	Akaicho	0.946			
12	BC13	Surface grab	28-Mar-13			lotic	Akaicho	0.006			
13	BC13	Surface grab	26-Mar-15			lotic	Akaicho			1.12	
14	BC14	Surface grab	28-Mar-13			lotic	Akaicho	17.5			
15	BC15	Surface grab	28-Mar-13			lotic	Akaicho	0.114			

The **Program Information** template (Figure 2) has the following headings;

- Name of the project.
- DOI, or digital object identifier - enter if you already have a DOI. If you don't have a DOI leave it blank and one will be assigned.
- Citation - your preferred citation.
- Character set - leave blank.
- Abstract - a short summary of the project (less like an abstract for a journal and more like a description)
- Purpose - what question are you trying to answer?
- Info - Additional information that may be beneficial but not appropriate for abstract such as specifics on instrumentation.
- Constraints - List any constraints for data use (E.g. not for commercial use).
- ISO Category - current datasets would either be inland waters, environment, or biota, or a combination of these.
- PDC keywords - leave this blank.
- Bounding box - latitude and longitude coordinates in Decimal degrees (DD) format.
- Start date - start date of dataset.
- End date - end date of dataset.
- Disclaimer - any legal language you or your institution prefers for liability of data use.

**Figure 2** Program Upload Template

NWT Cumulative Impact Monitoring Program									
name	doi	citation	character abstract	purpose	info	constraints	iso	category	pdv keywords
NWT Cumulative Impact Monitoring Program		NWT CIMP	NWT CIMP funds research projects that support cumulative impact monitoring, research and analysis. With a primary focus on water, fish and caribou project leads provide data and analysis to further our understanding of human-caused and natural disturbance on the environment. A CIMP goal is to ensure that results are communicated back to decision-makers and the public. Peer reviewed literature, plain language reports, and open access data sharing contribute to implementing this goal. This data set understanding consists of multiple research projects driven by government, agencies and academics with a common focus on understanding cumulative effects on the environment. <b>An NWT CIMP funded project.</b>	Research projects contributing to the monitoring and				Inland	Water Quality, S
Changing hydrology in the Taiga Shield:		Aboriginal Affairs and Northern Development	Determining the changes in winter streamflow on the North Slave Taiga Shield; the drivers of these recent changes; the impacts of these changes on the environment; and D) the implications to water quality. This project will focus on a region which contains the greatest concentration of people and infrastructure in the NWT and has pressing water management and contaminant related concerns. It is imperative that resource managers have knowledge of the current state and trends of water quality and quantity in this region to properly predict cumulative impacts of anthropogenic activities and to effectively plan and manage northern development. <b>An NWT CIMP funded project.</b>	To describe and understand the consequences of recent changes in streamflow and geochemical regimes in the North Slave Taiga				Waters Inland	Metals Water Quality, S
Geochemical and resource management implications		Canada (AANDC) - Water Resources Division							

**Location Data** is uploaded on the final template (Figure 3) and includes, site ID, site name, region, latitude and longitude coordinates in (DD format), and discontinued (for sites that you are no longer collecting data). It is important to use the regions listed on the DataStream website as this provides the proper link in the site's search modes. The regions are; Inuvialuit Settlement Region (ISR), Dehcho, Sahtu, Akaitcho, South Slave, Peace-Athabasca Delta, and Tlicho.

**Figure 3** Location Upload Template

Clipboard		Font		Alignment				
C31		f <sub>x</sub>						
	A	B	C	D	E	F	G	H
1	id	name	site_code	region	latitude	longitude	discontinued	
2	BCR-04	BCR-05		Akaitcho	62.530297	-114.35165	yes	
3	BCR-07a	BCR-07a		Akaitcho	62.543164	-114.352419	yes	
4	BCR-07b	BCR-07b		Akaitcho	62.542683	-114.349253	yes	
5	BCR-08	BCR-08		Akaitcho	62.5432	-114.377928	yes	
6	BCR-13	BCR-13		Akaitcho	62.571433	-114.367528	yes	

## Appendix E: Key NWT Decision-Makers

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The purpose of this list is to assist applicants in identifying key organizations that have a role in northern resource management decision-making and is not meant to be exhaustive.

NWT CIMP is particularly focused on the monitoring needs of co-management boards of the *Mackenzie Valley Resource Management Act* (MVRMA) because of our mandate to monitor the cumulative environmental impacts of concurrent and sequential uses of land and water and deposits of waste. NWT CIMP is focused on conducting monitoring that addresses the priorities of co-management boards of the MVRMA (e.g. Land and Water boards, Mackenzie Valley Environmental Impact Review Board, Renewable Resource Boards). NWT CIMP encourages all applicants to become familiar with the mandates and roles of decision-makers in the region in which applicants work, in order to design monitoring and research studies that promote informed decision-making.

### **Indigenous Governments/Organizations**

Akaiicho Territory Government  
Dehcho First Nations  
Inuvialuit Joint Secretariat  
Inuvialuit Regional Corporation  
Tłı̨chǫ Government

Gwich'in Tribal Council  
North Slave Métis Alliance  
Northwest Territory Métis Nation  
Sahtu Secretariat Incorporated

### **Northern Resource Management Boards**

Environmental Impact Review Board  
Gwich'in Land and Water Board  
Gwich'in Land Use Planning Board  
Gwich'in Renewable Resources Board  
Wek'èezhìi Land and Water Board  
Mackenzie Valley Environmental Impact Review Board

Mackenzie Valley Land and Water Board  
Inuvialuit Water Board  
Sahtu Land and Water Board  
Sahtu Land Use Planning Board  
Sahtu Renewable Resources Board  
Wek'èezhìi Renewable Resources Board

### **Government of Canada**

Transport Canada  
Department of Fisheries and Oceans  
Environment and Climate Change Canada  
Indigenous Affairs and Northern Development Canada

National Energy Board  
Natural Resources Canada  
Parks Canada

### **Government of the Northwest Territories**

Executive and Indigenous Affairs  
Infrastructure  
Industry, Tourism and Investment (NWT Geological Survey)  
Education, Culture and Employment (Prince of Wales Northern Heritage Centre; Aurora Research Institute)

Environment and Natural Resources  
Lands  
Municipal and Community Affairs

# Appendix F: Caribou Blueprint

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## **Objective 1: Develop a cumulative impacts monitoring approach for barren-ground caribou**

### *Background*

Traditional and scientific knowledge suggest that barren-ground caribou herds have fluctuated widely in abundance over time scales of decades, although these fluctuations are not necessarily predictable in duration or extent. It is possible that the current low numbers and declining trends in several herds in the NWT are unprecedented and that climate change may be contributing to these trends. The listing of barren-ground caribou in 2016 by COSEWIC (Committee on the Status of Endangered Wildlife in Canada) as Threatened, and a similar listing by the NWT Species at Risk Committee (SARC) in 2017 underscore the current vulnerability of these populations.

Management actions to conserve barren-ground caribou herds when they are at low numbers are generally directed at those factors that people have some control of; these can include harvest, human disturbances on the landscape, predator numbers, and to a limited extent, fire suppression. These actions may reduce caribou mortality rates (harvest or predator reduction) or minimize changes in caribou health and condition (limited disturbance). However, a number of other factors have been suggested as driving population trend in barren-ground caribou, such as changes in weather and range condition, and fire on the winter range. Participants at various meetings and hearings in recent years have accepted that the caribou declines are real, but have expressed a desire for a better understanding of the underlying drivers of change.

The GNWT and co-management partners believe that a regionally-based cumulative impact monitoring and research approach is necessary to assess human and natural factors that affect barren-ground caribou populations and their habitat, and to improve our understanding of their significance. Research is needed on how these factors may be linked to demographic indicators like adult survival, pregnancy rate, and calf survival. The influence of these factors will vary among herd ranges and within them.

A cumulative impact monitoring and research approach is necessary to determine how the effects of development combine with other factors, such as fire, predation, environmental variability, harvesting, wildlife, or climate change, to affect barren-ground caribou. This may include use of integrative models for an assessment of their relative importance and projections of likely future trends. Understanding the relative contribution of each factor and their systemic dynamics will help decision-makers to understand what factors most affect caribou, where information gaps remain, and where management efforts should be best focused.

Components of a cumulative impact approach for barren-ground caribou should include a comprehensive understanding of how NWT barren-ground caribou herds are doing in terms of size and trend, monitoring of key factors that affect caribou status and trend, combined with an understanding of how natural and human factors affect herd dynamics across their historic range. Currently, the GNWT has a lead role in demographic monitoring programs for five NWT barren-ground herds (Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, Bluenose-East, and Bathurst), with a supporting role in collaboration with Alaska and Yukon for the Porcupine herd, and Nunavut for the Beverly/Ahiak and Qamanirjuaq herds. The GNWT barren-ground caribou program was peer-reviewed in 2008-2009 and includes information on herd size and trend, calf recruitment, estimated cow survival, and fall sex ratio,

and periodic monitoring of health, disease, and condition. What is lacking is a full understanding of how factors such as fire, predation, environmental variability, harvesting, wildlife, or climate change affect the size and trend of the herds, including potential interactions among factors. NWT CIMP seeks to fill those gaps through monitoring and research.

#### NWT CIMP Funding Priorities

The **four** funding priorities for Objective 1 of the Caribou Blueprint are listed below.

- a. Develop methods and approaches to calculate and track landscape metrics in barren-ground caribou range (e.g. amount of human and natural disturbance, type of disturbance including fire, human development, road access, and range condition). This includes considerations of scale, shape of disturbance, use of composite indicators, and ease of administration.
- b. Identify species appropriate indicators, thresholds of disturbance, and actions and limits of acceptable change.
- c. Determine the relative impact and relationships among human and natural factors that influence barren-ground caribou herd demographics and/or habitat, including:
  - Industrial activity/disturbance. For example:
    - standardize methods of current monitoring between industry and government
    - innovative approaches to monitoring using remote sensing and emerging technologies
    - identify potential mechanisms of zone of influence of development on caribou
    - novel approaches to mitigate the effects of industry on caribou
    - measure habitat fragmentation and connectivity
  - Predation. For example:
    - changes in predator numerical and functional responses, and whether predators are limiting recovery of caribou herds
    - abundance of predators
    - predation rates on adult and calf caribou, and where and when these are most significant
  - Health, condition, and disease. For example:
    - measures of insect harassment and trends by season and year
    - pregnancy rates over time
    - caribou condition and changes over time
    - incidence and prevalence of emerging pathogens and parasites, their causal factors, and significance to caribou demography
  - Range condition. For example:
    - habitat quality and/or quantity (e.g. vegetation classification, resource selection function models) over time
    - seasonal changes in vegetation biomass and trends over time
    - fire impacts on the winter range and likely trends in future
    - changes in vegetation over time and relations to climate change
    - effects of snow conditions (depth, ice layers and timing of melt) on caribou
    - estimation of how changes in vegetation, climate and range conditions are affecting caribou

- Behaviour. For example:
    - activity budgets both within and outside development Zones of Influence (ZOI), and implications to caribou energetics and demography
    - seasonal diets and feeding rates, and changes over time
  - Harvest. For example:
    - accurate and complete reporting of harvest on all herds
    - significance of harvest to declining herds, particularly in relation to increased road access
- d. Integrate existing information on barren-ground caribou and their ranges:
- a. Collate historical monitoring data, including industry data and traditional knowledge, to determine if they can be used in regional cumulative impact assessments.
  - b. Population modeling that integrates demographic data and assesses the impacts of various factors on population trend.
  - c. Cumulative effects modeling that assesses effects of development and natural factors.
  - d. Research that helps to explain current and recent demographic trends in barren-ground caribou herds.

## **Objective 2: Develop a cumulative impact monitoring approach for boreal caribou**

### Background

Boreal caribou are a priority Valued Component that are listed as threatened under the federal Species at Risk Act and under the Species at Risk (NWT) Act. Local studies indicate that boreal caribou in the northern NWT may be self-sustaining, while those in the southern NWT may be declining.

Declines in the southern NWT may be attributed to the cumulative impact of human and natural disturbance on the landscape, which, based on extensive research in southern Canada, increases predation pressure on boreal caribou. Based on the National Recovery Strategy for Woodland Caribou, boreal population in Canada, maintaining or recovering boreal caribou requires that at least 65% of boreal caribou range remain free of human or natural disturbances. As defined in the Strategy, disturbed habitat is habitat showing i) anthropogenic disturbance (e.g. linear features) visible on Landsat at a scale of 1:50,000, including habitat within a 500 m buffer of the disturbance and ii) fire disturbance for the last 40 years. As of fall 2015, roughly 34% of boreal caribou range in the NWT is considered disturbed. Most disturbances are driven by fire (28%), although there is some human disturbance as well (8%).

There are concerns about how fire, in combination with new human development, such as commercial timber harvesting in the South Slave region, oil and gas exploration and development in the Sahtú region, and major infrastructure projects such as the Mackenzie Valley Highway and Tłı̨chǫ all-season road, will impact boreal caribou across their NWT range.

The GNWT and Environment and Climate Change Canada believe that regionally-based cumulative impact monitoring approaches are necessary to assess and monitor how human and natural factors affect

the size and trend of the NWT's boreal caribou population. Knowing this will help decision makers to understand what management actions are most crucial in order to protect boreal caribou. For example, this information can be used as inputs in cumulative impact models that can help guide management actions related to land use activities and fire management.

A cumulative impacts monitoring approach for the NWT's boreal caribou population requires a comprehensive understanding of how the population is doing in terms of size and trend, combined with an understanding of how natural and human factors drive population dynamics across its range, as well as an understanding of the landscape and how changes to the landscape affect how caribou use it. This first requires establishment of robust approaches to monitoring boreal caribou across their range. It also requires more information on those natural and human factors that affect population size and trends in the NWT.

#### *NWT CIMP Funding Priorities*

The funding priorities for Objective 2 of the Caribou Blueprint are listed below.

- Contribute to the establishment of standardized monitoring methods that provides robust information on boreal caribou population size or trends across its range in NWT;
- Improve understanding of boreal caribou population structure, gene flow and connectivity both within the NWT range and with neighbouring ranges;
- Contribute to the establishment of a comprehensive, regionally-based cumulative impacts monitoring approach that tracks local boreal caribou population trends and those human and natural factors that affect them;
- Calculate and track landscape metrics in the boreal caribou range (e.g. amount of human and natural disturbance within the range, including fire, development, hunting access and other human activities);
- Determine rates of forest regeneration following fire or human disturbance in boreal caribou range;
- Improve and update land cover and habitat maps;
- Improve understanding of boreal caribou behaviour, including habitat selection, foraging and movement;
- Determine when disturbed habitat (human or natural) becomes functional again for boreal caribou and forecast future landscape condition;
- Improve our understanding of, or project the implications of, climate change on processes affecting boreal caribou habitat supply and boreal caribou population dynamics; and
- Determine the impact and relationships between a number of human and natural factors that influence boreal caribou demographics and/or habitat. For example:
  - a. Fire
  - b. Predation
  - c. Alternative Prey
  - d. Health, condition, and disease

- e. Climate change
  - f. Harvest, including the impacts of increased access
  - g. Range condition - habitat and forage quality and/or quantity
  - h. Development within the historic range of the herd – including both physical and functional habitat loss
- Synthesize existing information on boreal caribou and its range by:
  - a. Collating historical monitoring data, including industry data and Traditional Knowledge, to determine if they can be used in a regional cumulative impact assessment for boreal caribou; and
  - b. Identifying ways that past and current monitoring conducted by communities, industry and government can be standardized in methodology to improve population scale knowledge in the long term.



# Appendix G: Water Blueprint

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## Background

The Water Blueprint was developed to inform NWT CIMP funding applicants of priority water-related monitoring and research for the program. The Blueprint also guides the NWT CIMP Steering Committee and staff on the allocation of NWT CIMP funds.

The Blueprint describes information that is necessary to understand cumulative impacts on water. NWT CIMP has adopted the Canadian Council of Ministers of the Environment (CCME) definition of cumulative impacts as a change in the environment caused by multiple interactions among human activities and natural processes that accumulate across space and time. As a product of the *Mackenzie Valley Resource Management Act*, NWT CIMP is focused on monitoring cumulative impacts that are relevant to land and water management issues in the NWT.

NWT CIMP is currently focused on geographic areas of past, current or proposed development. These are areas where cumulative impacts from human activities are most likely, and decision-makers will be interested in the results. The Water Blueprint is aligned with the priorities of the 2017 [GNWT Knowledge Agenda](#) and the [Water Stewardship Strategy](#).

Along with “caribou” and “fish”, the theme of “water” was chosen as a key monitoring and research priority in a survey of NWT environmental decision makers and regulators in 2011. The Water Blueprint contains water monitoring and research priorities of NWT land and water regulators and subject-matter experts. NWT Land and Water Boards and the Mackenzie Valley Environmental Impact Review Board provided NWT CIMP with broad priorities for monitoring of cumulative effects of human and natural disturbance on water in 2011. These priorities were revisited in 2014 and reconfirmed by NWT regulators.

NWT CIMP engaged over 30 subject-matter experts with direct involvement in water research and management in the NWT to refine these priorities into specific monitoring and research themes that can be addressed via the proposal process. Experts included staff from Indigenous renewable resource and co- management boards, Federal and Territorial government scientists, university researchers, and environmental consultants. NWT CIMP staff assessed and compiled the responses into the Blueprint. NWT water regulators and subject-matter experts, and the NWT CIMP Steering Committee reviewed the draft Blueprint. The Blueprint is reviewed and updated annually.

## Water Monitoring Themes

Discussion as per the above resulted in three themes:

1. Compile and analyze existing data
2. Understand impacts of anthropogenic and natural disturbances on aquatic systems
3. Collect and analyze of baseline regional aquatic data in areas of development interest

Specific research priorities are listed under each theme. Some priorities could fall under more than one theme, but to minimize redundancy they are only listed once.

**1. Compile and analyze existing data**

- a. Compile and analyze existing long-term aquatic monitoring data to assess:
  - i. Cumulative impacts of natural and anthropogenic influences on aquatic systems
  - ii. Spatial and temporal trends
  - iii. Regional variability of aquatic health parameters
  - iv. Predominant drivers of variability

**2. Understand impacts of cumulative impacts of anthropogenic and natural disturbances on aquatic systems**

- a. Identify cumulative impacts of disturbances on aquatic health
- b. Identify links between terrestrial and aquatic systems in areas impacted by disturbances
- c. Identify key aquatic ecosystem indicators of stress
- d. Determine resilience and ecological thresholds of aquatic ecosystems
- e. Determine impacts of specific development activities on aquatic health
- f. Determine potential impacts to community drinking water supplies

**3. Collect and analyze baseline regional aquatic data in areas of past, current, or future development interest**

- a. Collect regional baseline aquatic health data in areas of past, current or future development interest/other priority areas. Focus on understanding the predominant drivers of variability.
- b. Develop an increased understanding of seasonal variability in aquatic health parameters

Note: NWT CIMP defines aquatic health parameters as physical measures of surface water and groundwater (including water quality and quantity) and of biotic elements (except fish, please see the Fish Blueprint).

# Appendix H: Fish Blueprint

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## Background

The Fish Blueprint was developed to inform funding applicants of priority fish monitoring and research for NWT CIMP. The Blueprint also guides the NWT CIMP Steering Committee and staff on the allocation of NWT CIMP funds.

The Blueprint describes information that is necessary to understand cumulative impacts of human and natural disturbance on fish. NWT CIMP has adopted the Canadian Council of Ministers of the Environment (CCME) definition of cumulative impacts as a change in the environment caused by multiple interactions among human activities and natural processes that accumulate across space and time. As a product of the Mackenzie Valley Resource Management Act, NWT CIMP is focused on monitoring cumulative impacts that are relevant to land and water management issues in the NWT.

NWT CIMP is currently focused on geographic areas of past, current or proposed development. These are areas where cumulative impacts from human activities are most likely, and decision-makers will be interested in the results. The Fish Blueprint is aligned with the priorities of the 2017 [GNWT Knowledge Agenda](#).

Along with “caribou” and “fish”, the theme of “water” was chosen as a key monitoring and research priority in a survey of NWT environmental decision makers and regulators in 2011. The Fish Blueprint contains water monitoring and research priorities of NWT land and water regulators and subject-matter experts. NWT Land and Water Boards and the Mackenzie Valley Environmental Impact Review Board provided NWT CIMP with broad priorities for monitoring of cumulative effects of human and natural disturbance on fish in 2011. These priorities were revisited in 2014 and reconfirmed by NWT regulators.

NWT CIMP engaged over 50 subject-matter experts with direct involvement in fish research and monitoring in the NWT to refine these priorities into specific subject areas that can be addressed via the proposal process. These experts included staff from Indigenous renewable resource and co-management boards, Federal and Territorial government scientists, university researchers, industry, and environmental consultants. NWT CIMP staff assessed and compiled the responses into this Blueprint. NWT water regulators, fish subject-matter experts, and the NWT CIMP Steering Committee reviewed the draft Blueprint. The Blueprint is reviewed and updated annually.

## Fish Monitoring Themes

The discussion described above resulted in the development of five themes:

1. Compile and analyze existing data
2. Develop and validate standards and protocols
3. Assess cumulative impacts of anthropogenic and natural disturbances
4. Collect baseline data on fish ecology in areas of development interest
5. Assess contaminants in fish

Specific research and monitoring priorities are listed under each theme. Some priorities could fall under more than one theme, but to minimize redundancy they are only listed once.

**1. Compile and analyze existing Data**

- a) Compile, analyze, and publish existing long-term fish monitoring data to assess:
  - i. Cumulative impacts
  - ii. Spatial and temporal trends
  - iii. Regional variability of fish, fish health and fish habitat
  - iv. Predominant drivers of variability

**2. Develop and validate standards and protocols (includes models)**

- a) Develop and validate standardized fish sampling protocols<sup>2</sup> that can be adopted by northern regulatory agencies for:
  - i. Using existing data to understand cumulative impacts on fish
  - ii. Collecting fish ecology, occupancy (i.e., presence/absence), population, and community data
  - iii. Developing northern species toxicity thresholds
  - iv. Assessing contaminant concentrations and transfer in fish
- b) Develop and/or validate models<sup>3</sup> that can predict:
  - i. Habitat use and critical habitat
  - ii. Spatial and temporal shifts in distributions and habitat use
  - iii. Fish community and population change

**3. Assess cumulative impacts of anthropogenic and natural disturbances**

- a. Assess cumulative impacts of disturbances on fish and fish health including:
  - i. Resilience and resistance of fish to disturbances
  - ii. Acclimatization and adaptation (e.g., assessing the capacity of fish species to acclimatize and adapt to disturbances)
  - iii. Determination of thresholds limiting abundance, distribution, or habitat use
  - iv. The rehabilitation and recovery of fish and fish habitats
  - v. Identification of critical habitat indicators
  - vi. Determination of the carrying capacity of critical habitat
  - vii. Threats to local fish harvesting

**4. Collect baseline data on fish ecology in areas of past, current, or future development interest**

- a) Collect data on fish ecology in areas of past, current or future development interest/other priority areas

**5. Assess contaminants in fish**

- a) Assess heavy metals and other contaminants in fish including:
  - i. Current and projected concentrations in the food web
  - ii. Changes in concentrations and bioavailability over time, geographical location, and environmental conditions
  - iii. Drivers of contaminants in northern food webs
  - iv. Mechanisms of contaminant movement through food web

Note: When studying heavy metals in fish tissue, if it is determined that total arsenic concentration exceeds 3.5 ppm or the total mercury exceeds 0.5 ppm in fish tissue, NWT CIMP requires that the waterbody be identified to NWT CIMP and HSS. Researchers who are interested in establishing the

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<sup>1</sup>Developed standards and protocols need to have the ability to effectively detect or measure effects or changes

<sup>2</sup>Predictive models must use standardized data collection methodologies to ensure future data can be added to models

relationship between total arsenic and the various species of arsenic within fish tissue should contact NWT CIMP for more information.

# Appendix I: Scientific Letter of Intent Submission Form

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## Instructions:

- Please read the *Scientific Proposal Guide (September 2020)* to assist in your completion of this form
- Maximum **14 page limit**. Convey your ideas briefly but meaningfully. Print is to be Cambria, font size 12. Additional pages will not be reviewed.
- If this is a multi-year funding request, please briefly provide details for each year. Remember that funding will only be approved in 3 year increments.
- Letters of intent must be submitted by email by **October 19, 2020** at 4:00pm MST to [nwtcimp@gov.nt.ca](mailto:nwtcimp@gov.nt.ca)
- An e-mail confirmation will be sent upon receipt of your LOI.
- **If you do not receive a confirmation email please call (867) 767-9233 ext. 53084 to ensure that your proposal has been received. Late submissions will not be accepted.**
- It is your responsibility to ensure that your letter is submitted on time and has been received.
- **Applicants must read and will be asked to clearly acknowledge GNWT's [GNWT's Emerging Wisely - Continued Public Health Response to COVID-19 in the NWT](#), within the LOI.**
- **To start filling out the template, go to [Scientific Letter of Intent](#).**