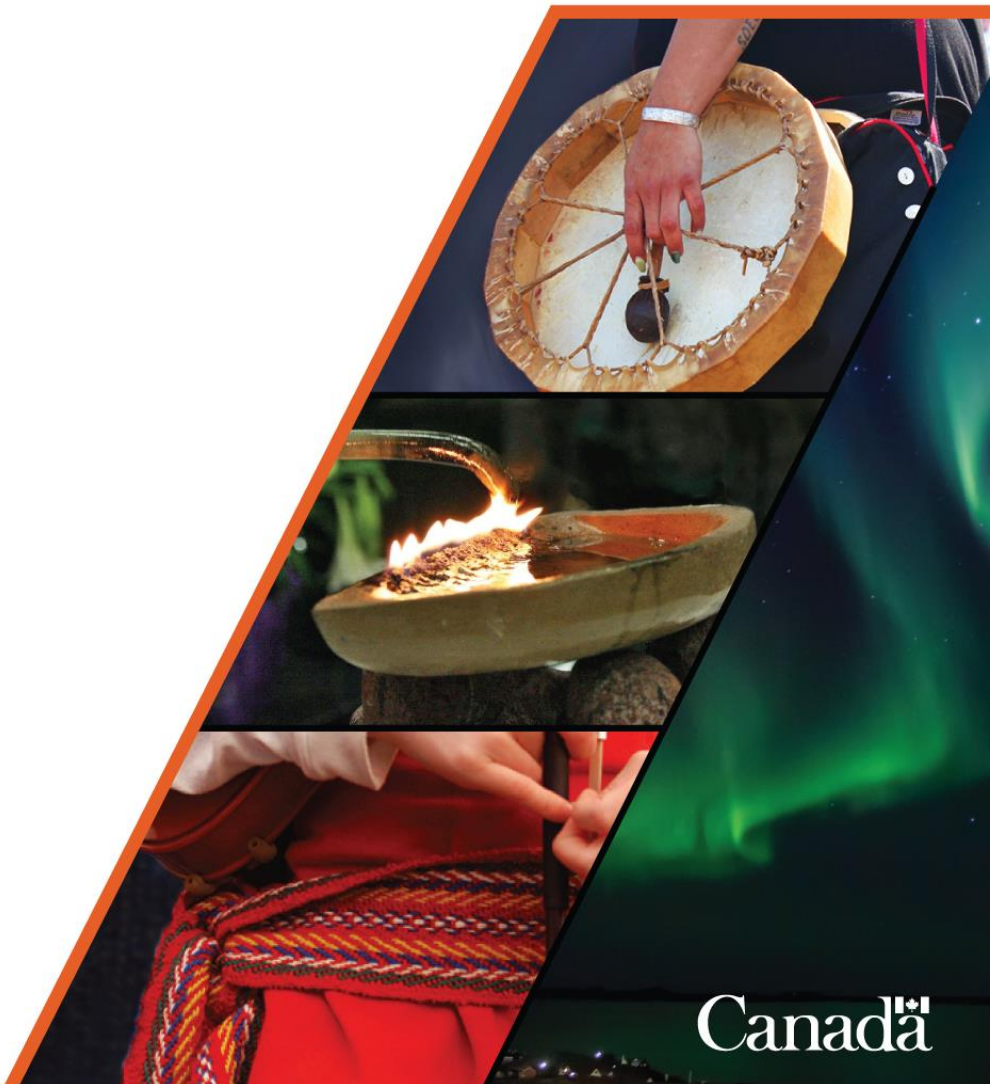
Crown-Indigenous Relations and Northern Affairs Canada
Relations Couronne-Autochtones et Affaires du Nord Canada

NORTHERN CONTAMINANTS PROGRAM

Call for Proposals 2026



Canada

The Northern Contaminants Program (NCP) engages Northerners and scientists in research and monitoring of long-range contaminants in the Canadian Arctic, that is, contaminants that are transported to the Arctic through atmospheric and oceanic processes from other parts of the world and which remain in the Arctic environment and build up in the food chain.

The data generated by the NCP is used to assess ecosystem and human health, and the findings of these assessments are used to address the safety of traditional country foods that are important to the health and cultural practices of Northerners and northern communities, particularly Indigenous Peoples. The findings also inform policy, resulting in action to eliminate contaminants from long-range sources.

The NCP is committed to scientific excellence and northern engagement on the issue of long-range contaminants and plastic pollution in the Arctic.

Through this Call for Proposals, the NCP is seeking proposals for new activities in the following subprograms: Human Health; Environmental Monitoring and Research – Research projects (1-year plastic pollution projects only); and Community-Based Monitoring and Research.

NCP is now accepting proposals for projects beginning in 2026, for up to 3 years of funding unless otherwise indicated.

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1 – GENERAL INFORMATION

1.1 Timelines for the Northern Contaminants Program Call for Proposals

The Northern Contaminants Program (NCP) issues an annual Call for Proposals. The NCP is now accepting funding proposals for projects beginning in 2026-2027. **The deadline for proposal submissions is 11:59 PM Eastern Standard Time, Tuesday, January 20, 2026.**

Table 1.1 Timelines for the 2026 NCP Call for Proposals

MILESTONES / TASKS	DATE
Call for Proposals issued	Late October 2025
Proposal co-development by, and in consultation with, communities, researchers, Regional Contaminants Committees, Research Advisors, etc.	November-December 2025
NCP Proposal Seminar #1: Introduction and essential requirements of a NCP proposal and budget. Note: Includes practical examples of how to fill in the proposal and budget templates	November 12, 2025
NCP Proposal Seminar #2: Best practices for preparing a Community-Based Monitoring and Research and Communications, Capacity and Outreach Proposal Note: Includes practical examples of how to fill in the proposal and budget templates	November 26, 2025
NCP Proposal Seminar #3: Best practices for preparing a Human Health or Environmental Monitoring and Research Proposal. Note: Includes practical examples of how to fill in the proposal and budget templates	December 10, 2025
Deadline for submission of proposals	January 20, 2026
Deadline for submission of *Community Engagement* forms	February 6, 2026
Applicants apply for research licences and ethics review, as applicable	Spring 2026
Proposal Review Period - proposals are reviewed by peer reviewers, technical review teams and Regional Contaminants Committees	February-March 2026
NCP Management Committee meets to make final funding decisions	April 2026
Notification sent to applicants on the status of their proposal(s)	May 2026
Funding Agreements prepared and signed	beginning June 2026

1.2 Available Funds

Projects funded by the NCP fall under five subprograms each with its own funding envelope. See Table 1.2 for the funding available in 2026-2027 to 2028-2029 under this Call for Proposals by subprogram. Funding envelope amounts are approximate and may be subject to change. Since 2020-2021, the NCP has been supporting multi-year projects. As a consequence, a significant portion of NCP funds are already committed to

projects extending to 2026-2027. Therefore, under this year's Call for Proposals, the NCP is seeking proposals for new activities in the following subprograms only: Human Health; Environmental Monitoring and Research – Research projects; and Community-Based Monitoring and Research.

NCP supports the coordinated generation, collection and management of scientific and environmental data and Indigenous knowledge pertaining to plastic and microplastic pollution in the environment and wildlife, with a budget of approximately $875,000 annually to 2026-2027 as part of Canada's Zero Plastic Waste initiatives. Please consult Table 1.2 when considering new project submissions.

Applicants should consult the NCP Blueprints (see Sections 6-10) for a description of the subprograms and their priorities for funding, when preparing a proposal. Applicants may request funding for up to 3 consecutive years, unless indicated otherwise.

Leaders of ongoing multi-year projects must submit annual proposal updates to report on progress and identify any potential adjustments. Templates and instructions will be supplied separately by the NCP Secretariat.

Table 1.2 NCP Funding available by subprogram for projects beginning in 2026-2027

NCP Subprograms & Annual Funding Envelopes	Funding Available for new projects through this Call for Proposals		
	2026-2027 (April 1, 2026 to March 31, 2027)	**2027-2028** (April 1, 2027 to March 31, 2028)	**2028-2029** (April 1, 2028 to March 31, 2029)
Human Health (Total **$1,075,000 Annually**)	$600,000	$600,000 See Note B	$600,000 See Note B
Environmental Monitoring & Research (Total **$1,700,000 Annually**)			
Core monitoring projects: Support for ongoing core monitoring projects (project leaders identified in the EMR Blueprint) ($1,000,000 per annum)	See Note A	See Note A	See Note A
Research projects: Support for research projects that address priorities identified in the EMR Blueprint ($225,000 per annum)	See Note A	See Notes A and B	See Notes A and B
Plastic pollution: Dedicated support for projects and activities that address plastic pollution priorities identified in the EMR Blueprint ($475,000 per annum ending in 2026-2027)	$130,000	See Note C	See Note C

NCP Subprograms & Annual Funding Envelopes	Funding Available for new projects through this Call for Proposals		
	2026-2027	**2027-2028**	**2028-2029**
Community-Based Monitoring & Research (Total **$430,000 Annually**)			
Support for projects that address priorities identified in the CBMR Blueprint ($230,000 per annum)	$85,000	$120,000	$120,000
Plastic pollution: Dedicated support for projects and activities that address plastic pollution ($200,000 per annum ending in 2026-2027)	$125,000	See Note C	See Note C
Communications, Capacity & Outreach (Total **$700,000 Annually**)			
Core projects: Support for Regional Contaminants Committees and Inuit Research Advisors (project leaders identified in the CCO Blueprint) ($500,000 per annum, includes $50,000 per annum plastics funding ending in 2026-2027)	See Note A	See Notes A and C	See Notes A and C
Other/new projects (General): Support for projects and activities that address priorities identified in the CCO Blueprint ($200,000 per annum, includes $50,000 per annum plastics funding ending in 2026-2027)	See Note A	See Notes A, B and C	See Notes A, B and C
Program Coordination & Indigenous Partnerships (Total **$1,090,000 Annually**)			
Core projects: Support for projects and activities as identified in the Program Coordination & Indigenous Partnerships Blueprint (Includes $100,000 per annum plastic funding ending in 2026-2027)	See Note A	See Notes A and C	See Notes A and C
SUBTOTAL - NCP Funding (General - $4,120,000 per annum)	**$685,000**	**$720,000**	**$720,000**
SUBTOTAL - NCP Funding (Plastics - $875,000 per annum)	**$255,000**	See Note C	See Note C
TOTAL AVAILABLE THROUGH THIS CALL FOR PROPOSALS	**$940,000**	**$720,000**	**$720,000**

[A] Funds already committed through multi-year projects and/or directed funding

[B] The program also reserves some funds to be made available for new projects through the annual Call for Proposals in 2027 and/or 2028

[C] Dedicated funding for plastics research, monitoring, and related activities in 2027-2028 and beyond is not yet confirmed

1.3 Geographic focus of the NCP

The geographic focus of the NCP is Yukon, Northwest Territories, Nunavut, Nunavik and Nunatsiavut. This includes the traditional territories of Yukon First Nations and of the Dene and Metis of the Northwest Territories, and all of Inuit Nunangat (including Inuvialuit Settlement Region). Proposals for work to be conducted outside these regions will be considered on a case-by-case basis according to their relevance to the various NCP Blueprints.

1.4 Changes to the NCP Call for Proposals 2026

Please note the following important changes and updates in this year's Call for Proposals:

- **Funding for plastics-related projects:** Please note that dedicated funding for plastics-related projects is only available for 1-year (2026-2027). This year, there is funding for these projects in the Environmental Monitoring and Research – Research subprogram, and the Community-Based Monitoring and Research subprogram.
- **Community-Based Monitoring and Research:** The Community-Based Monitoring and Research Blueprint (section 8 of this document) underwent a major review and revision in 2025, as per the NCP's 6-year schedule for review of its strategic documents. Please consult the renewed Blueprint for funding priorities in this subprogram.
- **Results Workshop:** NCP-funded project leaders are expected to attend the NCP Results Workshop in years when they occur. The next Results Workshop will be held in person in November 2027 (location TBD). If travel support is required, applicants should include a budget item of up to a maximum of $3,000 for travel to attend the workshop in the 2027-2028 fiscal year.
- **Proposal template:** There is a section of the proposal template related to project challenges/risks. Applicants are asked to identify factors that may negatively impact their project or its funding, across five categories: Logistical/Operational (e.g., travel, scheduling, shipping); Human Resources (e.g., ability to find/hire the right personnel for the project, obtain proper clearances); Financial (e.g., timing of funding, increasing costs, unexpected expenses); Environmental (e.g., weather, climate-related impacts, migration patterns, extreme events like floods and fires); and, Health and Safety (e.g., communicable disease, accidents).
- **Open Access Journal Fees:** The NCP will provide support to cover/offset the fees associated with open access to NCP-related journal articles on a separate limited prioritized basis. Do not include these fees in your project proposal budget request. If leaders of supported projects plan to publish an article in an academic journal between April 1, 2026 and March 31, 2027 and require funds to support open access publication, they are asked to contact the NCP Secretariat at plcn-ncp@rcaanc-cirnac.gc.ca.

1.5 Proposal Requirements

Proposals must demonstrate that the proposed work will comply with the requirements outlined below.

1.5.1 Partnerships

The NCP requires that all funded projects be carried out in partnership with Northerners. Scientists are encouraged to work with community leaders, Elders, hunters, and other knowledgeable individuals to engage Indigenous Knowledge in the design and conduct of the study. Community input to the research is important, as are sensitive and sound researcher–community relations; all must be clearly demonstrated in project proposals. The Regional Contaminants Committees and the Inuit Research Advisors play a particularly important role in this respect and are to be involved in any steps taken to work with the communities. See (Appendix B) for contact information.

The NCP supports interdisciplinary studies that advance general knowledge related to contaminants, including projects that address the interactions between climate change and contaminants. Applicants are encouraged to seek opportunities to combine NCP activities with those funded by other programs such as ArcticNet and the Indigenous Community-Based Climate Monitoring Program to explore interdisciplinary questions. Project leaders may also wish to consider applying for an Alliance Advantage grant through the Natural Sciences and Engineering Research Council of Canada (NSERC). Alliance grants encourage researchers to collaborate with partner organizations, which can be from the public or not-for-profit sectors. Please consult NSERC's eligibility requirements for more information.

Project leaders are encouraged to seek co-funding from other programs that support community-based research and monitoring in the North and the Arctic. Two such programs that operate in the Northwest Territories and Nunavut, respectively, are the Northwest Territories Cumulative Impact Monitoring Program (NWT CIMP) and the Nunavut General Monitoring Plan (NGMP). For more information, please contact NWT CIMP by e-mail at nwtcimp@gov.nt.ca or call 1-867-767-9233 ext. 53084, and for NGMP, please e-mail ngmp-psgn@rcaanc-cirnac.gc.ca or call 1-855-897-6988.

1.5.2 Training the next generation of Arctic and northern scientists

The NCP recognizes the importance of training the next generation of Arctic and northern scientists, which includes training researchers from the North. Research funded by the NCP is often well suited for graduate level research projects. The involvement of students of all academic levels in NCP projects is strongly encouraged. Project leaders are encouraged to develop links with Northern and Arctic Colleges and other educational institutions to enhance the training and education of Northern students by including them in the project work.

1.5.3 Northern engagement and informed consent

All applicants are asked to review the C*ommunity Engagement Requirements for Northern Contaminants Program Projects* carefully; this specifies engagement requirements for **all** project proposals, see section 3. Applicants must demonstrate, in writing, appropriate engagement as per the above-mentioned requirements, ensure that they allow enough time to complete this process, and are strongly encouraged to discuss their engagement plans with the appropriate Regional Contaminant Committee(s) and/or Inuit Research Advisor(s), see Appendix B – Contact Information.

For projects involving the collection of personal information and/or samples from people, informed consent must be obtained prior to final approval of the project. Additionally, agreements must be established with First Nations, Métis, and Inuit governments or organizations with respect to ownership, control, access, and possession of data and information collected from individuals, as described by OCAP® and the National Inuit Strategy on Research.

1.5.4 Licensing, ethics review and health and safety

All research taking place in the North and Arctic requires a scientific research licence. Please consult the websites of the licensing authorities or research institute in the region of study, and/or contact the Regional Contaminants Committee coordinators or Inuit Research Advisor for guidance, see Appendix B – Contact Information.

- Yukon: Government of Yukon Department of Tourism and Culture
- Northwest Territories: Government of Northwest Territories
- Nunavut: Nunavut Research Institute
- Nunavik: Nunavik Research Centre
- Nunatsiavut: Nunatsiavut Research Centre

Every project involving the collection of personal information and/or samples from people will be required to provide proof to the NCP Secretariat of approval from all relevant ethics review boards/committees, before the project is given final approval.

The health and safety of NCP project teams, including northern community members who assist/participate in the research in any way, is of paramount importance. NCP Project Leaders should be aware of their responsibilities with respect to ensuring the health and safety of their teams, particularly when carrying out project activities in remote northern locations. All work carried out with the support of the Northern Contaminants Program will be expected to comply with any and all relevant public health requirements.

NCP researchers must familiarise themselves with requirements relating to health, safety, insurance, training, licensing, and other aspects of working in the North and Arctic; share relevant information with members of the project team; and incorporate appropriate measures into project plans. For useful information, see Conducting Research in Canada's North.

For research involving students in Nunavut, the Research in Nunavut Schools Policy aims to establish clear procedures and guidelines for researchers who request to conduct research in Nunavut schools; and ensure that research is relevant, respectful, transparent and fair to students and school staff and that appropriate ethical standards of research are upheld. Researchers wishing to engage Nunavut schools for research or research-related activities (including outreach, etc.) need to contact the Government of Nunavut, Department of Education, Partner Relations Division at info.edu@gov.nu.ca.

1.5.5 Project communications

The NCP places an emphasis on the importance of clear and appropriate communications during all phases of a project's lifecycle, from planning and development, to the dissemination of results, and all of the stages in-between. Proposals must present a communications plan/strategy that is acceptable to the relevant Regional Contaminants Committee, First Nations, Métis, Inuit governments and organizations and regional health authorities (where applicable).

The NCP **requires** that successful applicants work in partnership with relevant local/regional organizations and the NCP Secretariat to develop any messaging related to contaminants exposure to human populations. Regional health authorities and Indigenous governments in areas with settled land claims bear the ultimate authority to approve and release public health messages.

Communication initiatives in the North need to be appropriate to how knowledge is normally shared in a particular region or community. Applicants are strongly advised to contact the appropriate Regional Contaminants Committee and Research Advisor for advice and guidance on communications planning during the development of their proposal, and throughout all stages of project implementation.

1.5.6 Data management

The integrity and long-term stability of sample archive and data management is very important for meeting the long-term science and policy objectives of the NCP. Therefore, the NCP, in collaboration with other partners, has developed the Data Management Principles and Guidelines for Polar Research and Monitoring in Canada, which outlines the expectations and responsibilities of the NCP and of project teams regarding data, metadata, and other information generated from NCP-funded research and monitoring projects. To meet the objectives laid out in the document, the NCP has partnered with the Canadian Polar Data Network - Polar Data Catalogue to ensure long-term access and availability of data, and to promote collaboration among researchers.

- All NCP project leaders **must use the Polar Data Catalogue to create a full set of metadata that completely document and describe the data collected as part of their NCP projects**. In 2026-2027, training and technical support will be offered to project leaders on how to create meta data and upload associated data files through webinar presentations.
- Applicants must describe their data management plans in their proposals.
- Upon approval of funding each project leader will be required to complete and sign the NCP Data Deposit Agreement.
- Where possible, Global Positioning System (GPS) coordinates should be recorded at sample locations.

The NCP Secretariat will review entries in the Polar Data Catalogue to ensure that NCP projects are reporting their metadata. Since metadata can be created before analysis is complete, the deadline for completion is March 31, 2026. Any holdback or further installment of funds including funding for the subsequent year will be contingent upon the creation of a new metadata record or update to an existing record.

1.5.7 Sample archiving

It is important that all tissue samples collected during NCP studies be properly archived for future use, as appropriate. For example, the collection and archiving of tissues from important traditional/country foods is of particular importance. Archived tissues can be used in future studies to assess dietary exposure of Northerners to contaminants. Special considerations are necessary for archiving samples from human biomonitoring. If the project will be using archived samples from previous research or samples from another project, the communities involved in the original collections may need to be re-engaged and confirm their participation in the new proposal and the analyses.

1.5.8 Quality assurance and quality control

A quality assurance and quality control (QA/QC) program has been established to assess the performance of all laboratories carrying out contaminant analyses under the NCP and to ensure inter-comparability of data. The QA/QC program is also designed to meet the diverse QA/QC needs of the researchers and analysts by providing them with appropriate diagnostic tools for their analyses and by offering guidance and support in taking corrective measures if needed. Further information on the NCP QA/QC program can be found in a detailed QA/QC report available upon request by e-mail to the NCP Secretariat. To ensure the continued success of the QA/QC program, **all laboratories performing analyses for NCP research are required to participate in the program**. Applicants are required to report on laboratory QA/QC performance in their proposals, including their performance in past NCP QA/QC Interlaboratory studies if applicable (see "The Proposal" in Section 2).

1.5.9 Reporting

Funding recipients are responsible for submitting the following project reports to the NCP Secretariat, in accordance with the deadlines outlined in Table 1.3 (and similar deadlines for subsequent years). Please incorporate these reporting requirements into work plans.

Table 1.3 NCP Reporting Requirements (2026-2027)

Type of Reporting Requirement	Federal Government funding recipients	All other funding recipients
Mid-year report and Data Deposit Agreement	September 15, 2026	
Final financial report	March 13, 2027	July 31, 2027
Project metadata input in the Polar Data Catalogue	March 31, 2027	
End of year synopsis of research report	April 30, 2027	

NCP funded project leaders are expected to attend the NCP Results Workshop in years when they occur. The next NCP Results Workshop will be held in person in fall 2027 (location TBD). Applicants should budget a maximum of $3,000 for travel for a project team member to attend the workshop in 2027.

The end of year synopsis of research report enables the NCP Secretariat to make research results and other project information available to the public, including Northerners and the scientific community, in a timely manner. Short versions of the reports are posted on the NCP website. The complete Synopsis Report of NCP research is published in electronic format in September of each year. The contents of the Synopsis Report are also widely accessible to the public through the NCP Publications Database.

1.5.10 Publications, Products and Acknowledgments

Project leaders are expected to publish their results in peer-reviewed literature in a timely manner. Open access to journal articles is encouraged. The NCP will provide support for the publication of selected open access journal articles through a separate process. To request funding to support open access publication, you are asked to contact the NCP Secretariat at plcn-ncp@rcaanc-cirnac.gc.ca.

Project leaders are **required** to provide the NCP Secretariat with an advance copy of any materials being developed for communication with the public that is related to or resulting from work carried out with the support of the NCP.

Project leaders and all team members are **required to acknowledge funding from the NCP in any publications, presentations, print, and electronic communications** related to and/or resulting from work carried out with the support of the NCP. Subject to requirements for confidentiality, publications should give appropriate credit to all individuals and organizations, particularly Indigenous and northern organizations, that contribute to the research.

For guidance and/or instructions on the proper acknowledgment of the NCP funding, and/or logos to use, please contact the NCP Secretariat at plcn-ncp@rcaanc-cirnac.gc.ca.

2 – PREPARING A PROPOSAL SUBMISSION

A complete proposal submission to the Northern Contaminants Program (NCP) includes: a detailed proposal (see section 2.1); detailed budget tables (see section 2.2); and, as applicable, signed Community Engagement forms and/or letters of support (see section 3.1).

If applying for multi-year funding, the proposal, budget tables and Community Engagement forms/letters of support should reflect the full duration of funding support being requested (maximum up to 3 years). A request for multi-year funding does not guarantee that funding will be approved for the full duration requested, i.e. the NCP Management Committee reserves the right to approve single year funding.

If your proposal was previously submitted and approved for multi-year funding, you will receive a personalized proposal update template from the NCP Secretariat in December 2025. Some content in this template will be pre-populated from your previously-approved proposal, and some sections will require updating. These templates will be due on the same date as new proposals, as outlined in Table 1.1.

2.1 The Proposal

All proposals submitted to the NCP must include a detailed proposal following the general format outlined below. To request a sample proposal, please contact the NCP Secretariat. A fillable template is available that should be used for the proposal.

Multi-Year Funding Requests: Details provided in the proposal must reflect the full funding period proposed.

YEARS OF FUNDING REQUEST: (*check all that apply*)

□ 2026-2027 □ 2027-2028 □ 2028-2029

REGION(S) OF PROPOSED ACTIVITIES: (*check all that apply*)

□ NORTHWEST TERRITORIES (MACKENZIE VALLEY) □ NORTHWEST TERRITORIES (INUVIALUIT SETTLEMENT REGION)

□ YUKON □ NUNAVUT □ NUNAVIK □ NUNATSIAVUT □ OTHER (Please specify) _____

1. PROJECT TITLE:

The project title should provide an indication of the nature and location of the work being proposed. Please also provide an alternate short title for use in plain language communications.

2. PROGRAM CATEGORY:

A project under one subprogram can be linked to priorities under other subprograms or can be a standalone project. A project that links two or more subprograms are encouraged. Indicate which of the following five subprograms the project falls under as its primary subprogram:

- *Human Health* (***new submissions invited***)
- *Community-Based Monitoring and Research* (***new submissions invited; plastics-related submissions invited***)
- *Environmental Monitoring and Research* (***new submissions invited only for 1-year plastics-related research projects***)
- *Communications, Capacity and Outreach (no new submissions; directed projects only)*
- *Program Coordination and Indigenous Partnerships (no new submissions; directed projects only)*

3. PROGRAM PRIORITY:

Indicate the key priority/priorities addressed by the proposed work, as per the relevant subprogram Blueprint(s).

4. PROJECT LEADER, AFFILIATION, AND CONTACT INFORMATION:

Include name, title, affiliation, mailing address, telephone #, and e-mail address. No more than three individuals should be identified as Project Leaders. The Project Leader(s) will be the main contact(s) on the project and will be responsible for the overall project implementation and for meeting all NCP reporting requirements.

5. PROJECT TEAM MEMBERS AND THEIR AFFILIATIONS:

List names of all the project team members, their affiliations, and their role in the project. All team members listed must be actively involved in the project. For ongoing/multi-year projects please ensure that the list of project team members is still valid. By listing members of the project team, the applicant (or Project Leader) is confirming that these individuals have agreed to be included as members of the project team in 2026-2027 and have been granted an opportunity to review and/or provide input on this project proposal.

6. PLAIN LANGUAGE SUMMARY:

In a maximum of 200 words (narrative or bullet-form), provide **a clear and concise summary** of the project and its proposed activities using non-technical plain-language so that it can be understood by a non-scientific audience. The summary will be used in the review process, particularly by the Regional Contaminants Committees during their social/cultural review of proposals, as well as by the NCP Management Committee. These plain language summaries will also be used on the NCP website to provide a brief description of NCP-funded projects.

The summary should provide an overview of the proposed work by addressing the following:

- What is the proposed work?
- What questions does the project attempt to answer and why?
- Where and when will the work be done?
- How will the project involve/help Indigenous peoples and other Northerners?
- What are the expected results and the results to date, and how will results be communicated back to the community?

7. PROJECT DESCRIPTION

a) Objectives:

Provide well-defined short-term and long-term objectives for the overall project in relation to the applicable NCP Blueprint.

b) Rationale:

Describe the rationale for the project in relation to the applicable NCP Blueprint. This should be a detailed section that clearly lays out the scientific basis for the proposed project. It is this section that will convince reviewers that the proposed project addresses the needs described in the Blueprint in a way that is scientifically defensible.

c) Progress to Date:

Describe the results of any work completed to date so that the project can be properly and fully evaluated. This should include any work carried out in related NCP projects as well as non-NCP funded projects whose

results are specifically relevant to the proposed work. This section should also include information on any progress in the areas of capacity building, communications, and/or the use of Indigenous Knowledge.

d) Proposed Work:

Provide a brief description of activities, including project design and methodology, where and when the work will be carried out over the lifetime of the project. Include a more detailed description of planned activities in the year(s) for which funds are being requested.

e) Deliverables:

Specify the deliverables to be submitted to the NCP Secretariat over the lifetime of the project, as well as for the year(s) for which funding is requested. Include data reports, open literature publications, reports, workshops, and items for communications initiatives, etc.; please refer to Table 1.3 for reporting requirements.

8. CLIENTS/PARTNERS:

List the departments, agencies, Indigenous organizations, communities, and other countries, along with the corresponding contact persons, involved in the project and/or who could make use of the results (**for the requested funding year(s) only**). List any other projects that are related to the proposed work and indicate any shared costs and/or sample archival possibilities.

9. COMMUNICATIONS, CAPACITY BUILDING, AND INDIGENOUS KNOWLEDGE:

Under sections (a) Communications, (b) Northern Capacity Building and Training, and (c) Indigenous Knowledge, below, please indicate any activities that have shared responsibilities (presentations, reports, workshops, etc.) with other NCP-funded projects. For these, please specify which proposal and project leaders are directly responsible for the activities and related deliverables.

a) Communications

Describe in detail (**for the requested funding year(s) only**) any communications activities planned as part of the proposed project, including the names of people and organizations that have been or will be contacted. Note that it is a requirement of all NCP-funded projects to provide the relevant Regional Contaminants Committee(s) with draft communications materials for review, prior to translation and/or communication activities in northern communities.

b) Northern Capacity Building and Training:

Capacity building is defined, for the purposes of the NCP, as activities that improve an individual's, organization's, or community's ability to engage in contaminants issues. Describe the capacity building efforts planned for the year(s) for which funding is requested. Some examples of capacity building include (but are not limited to):

- Formal training programs (one-on-one or small group training with the researcher)
- Community or target-group workshops
- Presentations to, and engagement of, science classes (promoting student involvement)
- Hiring and engagement of local individuals in research projects

c) Indigenous Knowledge:

Explain how the proposed project will engage with local knowledge and/or Indigenous Knowledge and create bridges between Indigenous Knowledge and Western knowledge (**for the requested funding year(s) only**). The NCP promotes the engagement of Indigenous Knowledge holders throughout all project stages, including project development, sample collection, data analysis, conclusions, and communication of results. This informs, for example, appropriate sample collection timing, improves understanding of changes in migration patterns,

changes in populations, and changes in habitat. Indigenous engagement aids in overall results interpretation, formulating new research questions, identifying knowledge gaps, and improving communication with local communities. Please contact the appropriate NCP Research Advisor and/or Regional Contaminants Committees to discuss the potential for collaborative application of Indigenous Knowledge in your project.

See Contacts in Appendix B.

10. COMMUNITY ENGAGEMENT:

This section must be completed for all projects, including ongoing multi-year projects for which any part of the project in any year of the study was conducted in the North or made use of samples from the North. For projects that have no northern component at any stage, a brief statement explaining why there has been no northern community engagement may be sufficient; project leaders should confirm that engagement is not required with the appropriate Regional Contaminants Committee(s). If the project will be using archived samples from previous research or samples from another project, the communities involved in the original collections may need to be re-engaged and confirm their participation in the new proposal and the analyses. Please consult the appropriate Regional Contaminants Committee or Inuit Research Advisor for advice on appropriate engagement in these circumstances.

Describe the specific details of the community engagement that has occurred thus far, including efforts and successes from the previous year's project (if applicable) and specific plans for future community engagement (e.g. what was discussed, with whom and when).

Signed C*ommunity Engagement* form(s) and/or letters of community consent must be submitted with project proposals. The community engagement forms are considered, along with the proposal, as part of the social/cultural review of proposals carried out by the five Regional Contaminants Committees and are requirements for funding approval from the NCP.

Please include a list of the expected engagement forms that includes the organization, the signing representative of that organization (if possible), and whether it has been submitted with the proposal or is expected at a later date.

a) Ethics review:

Proposals for human health research and social science research (i.e. Indigenous Knowledge) must include information about the relevant ethics review, which ethical review board has or will review the proposal and the status of the review. A copy of the relevant consent form should also be included. It should be noted that NCP access to project data should be recognized in this documentation, where appropriate.

11. LABORATORY ANALYSIS:

Please provide the following:

- The necessary information for the laboratories that will be used to conduct contaminant and related analyses, including:
    - Laboratory name and whether this is your laboratory, a contract laboratory, or a paid or in-kind contribution from a team member
    - The ISO/IEC 17025 Accrediting Body & Client ID (if applicable)
    - The NCP laboratory ID number If the laboratory has previously participated in the NCP QA/QC program, as well as a report on the performance of the laboratories in the most recent NCP QA/QC interlaboratory tests
    - The contact information for the manager of the laboratory performing the processing/analyses

- List the contaminants being analyzed and matrices (e.g. environmental media or tissue), the type of processing, extraction and analyses being conducted, and the cost of analysis per sample for each class of contaminant
- The quality assurance/quality control (QA/QC) methods and recent results. If a project will use a laboratory new to the NCP that has yet to participate in the NCP QA/QC program, performance in other QA/QC programs should be reported that demonstrate a high quality of analytical performance.
- If the laboratory does not currently participate in the NCP QA/QC program, state if they are willing to do so (**for the requested funding year(s) only**). If you indicate that the laboratory is not planning to participate in the program, an explanation is required
- For laboratories that analyze air extracts or human tissues, a report on the performance in QA/QC programs specifically developed for those matrices

12. DATA MANAGEMENT PLAN:

Describe the project data management plan. Detail where and when data will be captured and when the metadata records will be created in the Polar Data Catalogue. Provide the link to the project metafile(s) and data file(s) if they already exist. Note that project leaders are still required to create metafiles in the Polar Data Catalogue even if data are housed in a separate repository. If the data are housed in another data repository such as Environment and Climate Change Canada's Data Portal, provide the link to that as well. Project leaders will be requested to complete and sign the NCP *Data Deposit Agreement Form* upon approval of funding.

13. POTENTIAL PROJECT CHALLENGES/RISKS:

NEW THIS YEAR: Please identify any foreseen challenges/risks that may negatively impact your project and its funding. You may use any of the following five categories, and provide additional challenges/risks that may not fit within these categories:

- Logistical/Operational (e.g., travel, scheduling, shipping)
- Human Resources (e.g., ability to find/hire the right personnel for the project, obtain proper clearances)
- Financial (e.g., timing of funding, increasing costs, unexpected expenses)
- Environmental (e.g., weather, climate-related impacts, migration patterns, extreme events like floods and fires)
- Health and Safety (e.g., communicable disease, accidents)

14. RELEVANT PUBLICATIONS / PRESENTATIONS:

Include publications and presentations by project team members relevant to the proposed project (2 pages maximum). Include a list of the references cited in the text of the proposal.

15. SUPPORTIVE INFORMATION ON EXPERTISE:

Attach résumés/CVs to demonstrate the scientific excellence, experience and/or expertise of the project leader(s) (maximum two pages per individual).

2.2 Budget Tables

Proposals submitted to the NCP for funding must include budget tables prepared using templates available from the NCP Secretariat:

- Use Budget Table 1 to identify the budget request for 2026-2027, 2027-2028, and 2028-2029, as needed, i.e. depending on whether funding request is for a single year or multi-year
- Budget Table 2 automatically summarizes the monetary requests by category
- Use Budget Table 3 to identify any other anticipated and/or confirmed sources of funds that are/ may be available for the project, including in-kind support as well as cash contributions.

For any questions or issues pertaining to the budget table templates, please contact the NCP Secretariat.

BUDGET TABLE 1: DETAILED BUDGET INFORMATION FOR NCP SUPPORT

Please follow the instructions outlined within the Call for Proposals 2026 budget template. Please note that some columns are auto-calculated and thus are locked for editing (i.e. you will not be able to delete or enter information directly into these cells). Applicants are asked to indicate what expenses are plastics-related using the appropriate columns and pull-down menus in the budget tables.

BUDGET TABLE 2: BUDGET SUMMARY INFORMATION

If your project received funds in 2025-2026, please enter those amounts in the cells provided. The remainder of Budget Table 2 is auto-filled from the inputs in Budget Table 1 and Budget Table 3.

BUDGET TABLE 3: OTHER SOURCES OF FUNDS

Please indicate other funding sources in Budget Table 3. Other funding sources include in-kind contributions such as staff salaries, services, facilities, and operating funds as well as the estimated value, status, and source of other known or potential contributions to the project (e.g. Natural Sciences and Engineering Research Council of Canada (NSERC), ArcticNet, other government departments (OGDs), Canada Foundation for Innovation, etc.). Please also include funds received for all other funded projects under the NCP and indicate the project number.

CLASSES OF EXPENDITURES

The following provides further detail on the Classes of Expenditures that are to be used in the budget tables.

1. Professional Fees and Services:

This category includes wages of people hired specifically for the project (i.e., non-federal employees including students, Indigenous and/or local employees), honoraria, and contracted services (e.g. translation).

- Indicate the total estimated value of each contract to be let under the project, the contractor name (if known) and purpose of the contract. Contractors must provide justification of their fees.
- Caution should be exercised to ensure that double counting of contracted employees does not occur.
- If funding is requested for student stipends, it must be used for tasks directly related to the project.
- In the case of contracted laboratory services, indicate the cost of analysis per sample, as well as the type of analysis and number of samples. If a student is to conduct any of the analyses or sample preparation, the analysis costs should be reduced as appropriate.
- This category should not include the salaries of full-time indeterminate or term federal employees participating in the proposed project. The latter salaries are government A-base and are to be covered by the particular department. Such salaries should be reported in Budget Table 3 “Other sources of funds”.

2. Equipment and Facilities:

This category includes equipment and supplies that are specifically purchased, leased or developed for the particular project, rentals, and other analytical costs.

- Specify the type of equipment, equipment costs (purchase, lease or maintenance) and the extent to which the equipment will be used in NCP contaminants projects. Only equipment that is specifically purchased, leased or developed for the particular project should be reported in this category. General purpose personal gear and items that are required as basic necessities for Northern work and that are purchased for individuals (parkas, boots, etc.) are generally not eligible for NCP funding. Other personal expenses that are generally considered personal expenses such as personal computers, phones and tablets are also generally not eligible for NCP funding, though there can be exceptions if they relate to specific objectives of a project and are not general equipment for an employee or graduate student, for example.
- The maintenance cost of equipment already owned by the federal government and used as part of the project should be reported in Budget Table 3 "Other sources of funds".
- Indicate the cost of any laboratory analysis per sample, the type of analysis and the number of samples to be analyzed. Only the cost of the sample analysis and/or the development of specific analytical techniques for an NCP project are appropriate.
- Identify any costs of shipping equipment.

3. Travel:

This category includes a variety of travel-associated expenses.

- Include costs for travel, accommodation and meals (research-related, workshops, consultations, meetings, and NCP Results Workshop*)
- The cost of establishing and operating field camps, aircraft rental and shipping (i.e., freight)
- Ship time should be reported under this category only when the use of the ship will be charged directly to the project or when smaller vessels are rented for the express purpose of conducting the project. If ship time is considered government A-base (i.e., the project manager is not charged for time on board) then such costs should be reported in Budget Table 3 "Other sources of funds".

**Budget requests may include up to $3,000 (plus administrative fees) for the NCP Results Workshop in November 2027. For multi-year requests, please include this amount in 2027-2028.*

4. Other Costs:

Other costs include miscellaneous costs such as office supplies and operating expenses (e.g. office space, rental, phone, printing, computer time, fax, photocopying and postage). Costs that do not fit in any of the above categories are included here.

5. Administration Fee:

All administrative expenses associated with the project activity may be included in this category. This may include, for example, payroll or accounting services. Administrative expenses shall not exceed 15% of the total project budget. Organizations that are eligible to include administrative expenses in their budget include, but are not limited to, Indigenous organizations and governments, universities, private companies, and other non-government organizations. Federal departments are ineligible to request these funds.

3 – COMMUNITY ENGAGEMENT REQUIREMENTS FOR NCP PROJECTS

3.1 Guidelines for Working with Northern Communities

GUIDELINE 1

All recipients of NCP project funding are expected to meet the Northern Contaminants Program (NCP) standards for carrying out research in the North, as outlined in the NCP's *Guidelines for Responsible Research*. These *Guidelines* provide direction to project leaders and scientists for planning communications, and in developing research agreements with communities (see Appendix C).

GUIDELINE 2

All project applicants must contact the relevant Regional Contaminants Committee (RCC) or Inuit Research Advisor (IRA) during the proposal development stage to discuss consultation requirements.

Applicants should then include in the "Community Engagement" section of the proposal a summary of their discussions with the RCC/IRA. During these discussions, RCCs/IRAs may advise the applicant to undertake specific actions before the NCP Management Committee makes its funding decisions in April.

GUIDELINE 3

The Regional Contaminants Committees will determine the appropriate engagement needed for projects in their regions, but there is recognition that not all projects require the same level of engagement (e.g. human health projects vs. computer modelling projects). With this difference in mind, the following is a guideline for minimum levels of engagement required. The RCCs may recommend further engagement in addition to the minimum.

a) Human Health projects (active or archived samples): engagement needed with the regional health authority and/or the appropriate health centre, and Inuit organization/government for work within Inuit Nunangat

b) Biotic/Wildlife projects (active sampling): engagement needed with the community and the Hunters and Trappers Organization/Committee at the appropriate level (regional and/or local), and Inuit organization/government for work within Inuit Nunangat

c) Biotic/Wildlife projects (archived samples): engagement not necessarily needed if the original sampling agreement covered further analysis

d) Abiotic projects (active sampling): engagement needed with communities close to the sampling sites. If there is no nearby community, engagement should only be with the RCC

e) Abiotic projects (archived samples): engagement not necessarily needed

f) Laboratory-based/Modelling projects: engagement not necessarily needed, except where specified by RCCs

GUIDELINE 4

For every project involving community engagement (as directed by the RCCs), project applicants must ensure that signed C*ommunity Engagement* forms or equivalent letters of support (e.g. HTO motion) are submitted to the Secretariat by the appropriate bodies with whom community engagement has taken place. This assures the NCP that the community engagement for any particular proposed project is satisfactory.

GUIDELINE 5

Due to the different nature of NCP projects, the "appropriate" Indigenous organization or regional/community body to engage with will vary, and applicants will be guided by the relevant RCC. For instance, a project that intends to sample at a remote location may require engagement with the appropriate Indigenous organization(s) represented on the NCP Management Committee (Council of Yukon First Nations, Dene Nation, Inuit Tapiriit Kanatami) and with the relevant land claim rights-holder organization. A project to be conducted within or near a community or on Indigenous Traditional Territory or Settlement Land will require community engagement with a community-level organization. Even if project members stop only briefly in a community on route to a sampling site, community engagement may still be required. In addition, projects involving the use of archived samples may also require community engagement since the proposed use may differ from that which had been originally approved. Such cases will be advised by the appropriate RCC on an individual basis. Please note that engagement may be necessary at both the community and regional level for some projects.

Note that the Regional Contaminants Committees and Indigenous partners that help govern the Northern Contaminants Program do not complete engagement forms, but can help guide applicants to the appropriate organizations and communities where they are required.

4 - PROPOSAL REVIEW PROCESS

The steps involved in the Northern Contaminants Program (NCP) proposal review process are described in the following subsections.

4.1 Relevance Review

Submitted proposals are distributed to one of five review teams. The review teams are comprised of representatives from northern organizations, other government departments, academia, and other areas of expertise. These teams are:

- *Human Health* review team
- *Environmental Monitoring* review team
- *Environmental Research* review team
- *Community-Based Monitoring and Research* review team
- *Communications, Capacity and Outreach* review team

The review team's role is to assess the merit of the project and its relevance to the NCP. They assess relevance by reviewing how the proposal addresses the priority areas identified in the relevant NCP Blueprint and other NCP strategic priorities, using the criteria in Table 4.1.

Table 4.1 Review Criteria – NCP Relevance

Weighting	Criteria
Y/N	Does the research proposal address one of the key research needs outlined in the Blueprint? If so, which one(s)?
Y/N	Does the proposed work have relevance and applicability in addressing other issues of importance to Northerners (e.g. climate change, food security)?
Y/N	Does the team have the necessary capacity and/or track record to conduct described research, and the potential to deliver results that reflect scientific excellence?
Y/N	Where appropriate (e.g. community-based monitoring and research proposals), is co-production of knowledge/Indigenous Knowledge included in the proposal and does the project use participatory research methods?
Y/N	Does the proposal include educational/training elements?
Y/N	If this research project directly impacts northern communities or Indigenous groups, have they been engaged and do they support this research? Have the applicants addressed the NCP *Guidelines for Responsible Research* and obtained written consent (where applicable)?

4.2 Technical and External Peer Review

All proposals undergo a technical review. This review covers the scientific expertise of the project team, the clarity and scope of objectives, the adequacy of methodology, suitability of project design, and appropriateness of time frame and budget. Proposals are rated and ranked and operational and funding recommendations are made to the NCP Management Committee. Proposals for new projects submitted under

the Environmental Monitoring and Research, and Human Health subprograms will undergo an external peer review. Other review teams may request an additional external peer review, for example if more technical expertise is required. Upon receipt of the external peer reviews, the teams are reconvened to take the reviews into account and finalize their recommendations to the NCP Management Committee.

Table 4.2 Review Criteria – Technical and External Peer Review

Weighting	Criteria
20	Scientific excellence/expertise of principal investigator and team (including consideration of relevant publications)
15	Clarity and scope of objectives
15	Clarity, adequacy and inter-comparability of methodology
15	Suitability of proposal design for meeting the objectives (e.g. sample size, etc.)
10	Appropriateness of time frame (e.g. can the project results be delivered within the time frame specified in the proposal and within a time frame appropriate to the NCP?)
10	Appropriateness of budget (e.g. charges for sample analysis)
15	Overall clarity and organization of proposal
Written Assessment	Peer reviewers are asked to provide a brief written assessment of the proposal, including an assessment of the importance of the proposed project with respect to the priority areas identified in the relevant NCP Blueprint.

4.3 Social/Cultural Review

Regional Contaminants Committees (RCCs) conduct a social/cultural review of the proposals. This review assesses aspects in the proposal such as communications, northern priorities, capacity building and training, Indigenous Knowledge, and northern consultation. Each proposal is rated, and recommendations are made to the NCP Management Committee on funding and how the proposals could be improved in these areas.

Table 4.3 Review Criteria – Social/Cultural Review

Criteria	Attributes
Communications	How complete are the planned communications activities: - prior to project implementation? - during project execution? - after project results are received? Are there plans to communicate results to the RCCs and regional health authorities? Are communications activities budgeted in their proposal?
Northern Priority	Does the project address a question that is important to Northerners? *(Note: Proposal must also meet a priority outlined in the Blueprints.)* Has similar work been done already? Recently? Does the proposal build on existing data?
Capacity Building/Training	Does the proposal provide local or northern training opportunities? Does the proposal promote capacity building in the North?
Indigenous Knowledge	Does the proposal make use of appropriate Indigenous Knowledge? Have the relevant communities been consulted on how Indigenous Knowledge could be incorporated into the project? Are there plans to communicate Indigenous Knowledge and incorporate it into project results?
Past Experience in the Region	Has the project team established and/or previously demonstrated good working relationships with the relevant communities? Does the project team have a satisfactory track record of delivering on social/cultural aspects of project plans?
Other	Additional comments on technical and logistical aspects, budget and other considerations.

Regional Contaminants Committees will provide a review of each proposal that is relevant to their region, using the above criteria as guidance.

The review will also include:

(a) an overall rating of the proposal (High, Medium-High, Medium, Medium-Low, Low) for its social/cultural aspects;

(b) a recommendation (Support, Do Not Support, Conditional Support); and

(c) specific conditions of funding recommended by the Regional Contaminants Committees, if applicable.

4.4 NCP Management Committee

The NCP Management Committee meets in April of each year to review and consider all the recommendations from the review teams and Regional Contaminants Committees. The NCP Management Committee makes the final funding decisions for the year. In some cases, funding approval may be conditional on specific follow-up.

5 - PROPOSAL SUBMISSION CHECKLISTS

5.1 Before Submitting the Proposal

Completion of this checklist ensures that the applicant has read and understood the NCP proposal requirements.

- ☐ Timeline for the NCP Call for Proposals and Review Process (Section 1.1)
- ☐ Proposal Requirements (Section 1.5)
- ☐ Proposal and Budget Formats (Section 2)
- ☐ The objectives identified in the relevant Blueprint(s) for the current funding year.
- ☐ *Guidelines for Working with Northern Communities* (Section 3.1) *and Guidelines for Responsible Research* (Appendix C)

5.2 Submitting the Proposal

- ☐ Complete proposal packages must be submitted by email (maximum size: 10 MB) to the NCP Secretariat at plcn-ncp@rcaanc-cirnac.gc.ca using the following text as the Subject: NCP Proposal 2026-2027 – [*insert name of Project Leader*]. The proposal is consistent with the current proposal format as an MS-Word file, while Budget Tables are prepared and submitted using the Excel-based templates. Please note, compressed files cannot be submitted.
- ☐ All project team members identified in the proposal are to be copied on the email submission. Proposal submissions that do not copy project team members on the submission will be requested to re-submit.
- ☐ The Signed C*ommunity Engagement* form(s) and/or letters of community support are submitted by the applicant or directly by the northern community organization(s) by email to the NCP Secretariat at plcn-ncp@rcaanc-cirnac.gc.ca. Signed Community Engagement forms are due by February 6, 2026.
- ☐ The budget information is appropriate, realistic, complete and correct for all funding years.
- ☐ The deadline for proposal submission is **January 20, 2026 at 11:59 PM Eastern Standard Time.**

6 – BLUEPRINT FOR HUMAN HEALTH

6.1 Purpose

The purpose of the Human Health subprogram of the Northern Contaminants Program (NCP) is to work in partnership with Indigenous Peoples in the Arctic and northern Canada to:

- Monitor contaminant levels and trends in Arctic and northern Indigenous communities.
- Conduct research into factors influencing levels and trends of long-range contaminants in Arctic and northern Indigenous communities.
- Conduct research into the effects of contaminants on the health of Arctic and northern Indigenous peoples.
- Produce evidence to support risk/benefit evaluation of traditional/country foods in Arctic and northern Indigenous communities.
- Support, through collaboration and mentorship, projects that are funded under Community Based Monitoring and Research, and other NCP subprograms.
- Provide evidence (scientific information and Indigenous Knowledge) to support domestic and international chemical management initiatives.
- Produce evidence to support actions to manage health risks posed by exposure to contaminants in Arctic and northern Indigenous communities.

The annual funding for Human Health projects under the NCP is currently set at $1,075,000. The total amounts of funding available in the Human Health subprogram through this Call for Proposals in the 2026-2027, 2027-2028, and 2028-2029 fiscal years, after considering multi-year funding commitments, are shown in Table 1.2.

6.2 Introduction

This Blueprint outlines the research issues and questions to be addressed by the Human Health subprogram of the NCP so that Northerners and decision-makers can assess, understand and better manage the health risks in Northern Canada related to the long-range transport of contaminants in the environment and their presence in people and traditional/country foods. This is closely aligned with the goals of Inuit, Métis, and First Nations organizations that have a shared objective to improve overall health and wellness among their communities across the North. The scope of this Blueprint provides a continuing opportunity for northern health authorities and/or First Nations, Métis, and Inuit governments and organizations to take the lead on projects within their own regions, enabling Northerners to control and increase their own research capacity more directly. Priorities also align with the goal of reducing/eliminating contaminants in traditional/country foods, by supporting national and international chemicals management initiatives, international working groups (e.g. Arctic Monitoring and Assessment Programme), and providing critical information to support international conventions, such as the United Nations Stockholm Convention on Persistent Organic Pollutants (POPs), and Minamata Convention on Mercury.

Contaminants proposed for analysis should be those that are delivered to the North primarily through long-range transport and not from local sources (as per the NCP mandate). These chemicals have been prioritized into three general groups: Schedule A and Schedule B POPs, and Schedule C chemicals of emerging Arctic concern (CEACs) (see Appendix A). Schedule A contaminants includes “legacy” POPs (e.g., PCBs, organochlorine pesticides) and heavy metals. Speciation of metals is important for interpreting the results of human biomonitoring and health studies. Schedule B POPs (“new” POPs) and Schedule C CEACs are contaminants that are known to fall within the NCP’s mandate and need assessment and monitoring to determine if they are present in the Arctic environment and in human tissues given their persistent and bioaccumulative properties and

ability to be transported long distances into the Arctic environment. Efforts should be made to include these contaminants in studies, where possible, if methods are available. Details about the methods, laboratory work, and laboratory participation and performance in the quality assurance and quality control (QA/QC) program must be described (see Section 1.5.8).

NCP-funded projects under the Human Health subprogram studies are often holistic in nature and these types of studies are encouraged. Studies may include several key areas of research, including human biomonitoring, dietary exposure assessment, dietary transitions and adaptations, human health effects research, benefit/risk evaluation and risk/benefit communication. These projects provide critical information, through co-production of knowledge with scientific information and Indigenous Knowledge, on the exposures of northern populations to environmental contaminants. These projects can fill in regional gaps, establish baseline exposures and time trends, identify contaminants of emerging concern, and improve our understanding of how diet is associated with contaminant exposures and the impacts of dietary changes. Data from these studies can also assist informed decision-making by individuals and communities in their food use to support Indigenous self-determination and cultural well-being along with physical health considerations.

6.3 Background

Successful collaborations and co-development with Arctic and northern peoples (including Inuit, Metis, and First Nations communities) have generated many research studies. These studies have been conducted to investigate the presence and changing concentrations of contaminants in humans, dietary exposure to these contaminants, the human health impacts associated with these exposures, and have evaluated the risks and benefits associated with the consumption of certain parts of some food species from some locations. NCP funded research and monitoring has shown elevated concentrations of POPs and metals, particularly mercury, in human samples (i.e., blood, milk, hair) in certain northern and Arctic regions. Research has shown that the primary source of exposure for many of these contaminants is the consumption of certain traditional/country foods, although this dietary exposure varies by region.

These data have informed and supported regional decision making, as well as national and international chemicals management activities. For more than twenty years, national and international assessments, such as Canadian Arctic Contaminant Assessment Reports from the Northern Contaminants Committee and Human Health Assessment Reports from the Arctic Monitoring and Assessment Programme, have highlighted the results of NCP funded research. These assessments, which are produced periodically as knowledge on the presence and impacts of contaminants in Arctic populations continues to grow, summarize the state of knowledge regarding contaminants and human health in the Arctic and northern region.

6.4 Important considerations for human health research

Several aspects of research projects related to human health require special consideration – . This includes:

- Partnerships (6.4.1)
- Informed consent, research ethics, and data ownership (6.4.2)
- Project communications (6.4.3)

6.4.1 Partnerships

As outlined in Section 1.5.1, all NCP projects must be carried out in partnership with or led/co-led by Northerners. Project leaders should include Indigenous Knowledge holders as part of their projects at all stages including project development, sample collection, data analysis/interpretation and communication of results when possible. Respect for and acknowledgement of the value of Indigenous Knowledge not only in community contexts, but to the scientific research process via harvesting knowledge, sample collection, and historical trends, is also a key component of building relationships and developing a comprehensive understanding of community research needs.

The research goals of projects funded under the Human Health subprogram should be aligned with the goals of northern communities and organizations. Co-production of scientific and Indigenous Knowledge leads to more holistic, collaborative, equitable, and inclusive projects. This is essential for developing sustainable and successful research collaborations and addressing the complex research priorities and key issues around contaminants exposures in Arctic and northern regions.

Due to the sensitive nature of human health research, northern health authorities and First Nations, Métis, and Inuit governments and organizations should be invited partners or co-leaders on human health proposals. Understanding that there are many demands placed on their limited resources and response times may be delayed, northern health authorities can gauge their level of involvement based on internal capacity and interest. Their involvement can ensure any health messaging needed for the project will be addressed for the communities in the most appropriate health context.

Risk/benefit communication messaging requires ongoing engagement and approval by the appropriate regional health authorities and regional contaminants committees before any information is disseminated. Partnerships with the health authorities as well as community partners and organizations will make this communication easier and ensure that it is appropriate, as it requires careful consideration of the risks/benefits of traditional/country foods, clear language and trusted sources to deliver the information. .The resources required to develop the appropriate tools and documents, tailored to the target audiences, to disseminate the results of human health studies need to be described in project proposals.

Human health applicants are encouraged to collaborate with project leaders in the *Environmental Monitoring and Research* and *Community-Based Monitoring and Research* subprograms when data on biota or environmental compartments are needed as part of the study.

Applicants are encouraged to consider working on common issues across communities in different regions. Multi-community studies across regions may be appropriate if community research questions are similar, or if communities share resources (e.g., country food freezers) or food sources from the same or similar wildlife populations. Communities may also share preferred methods of communication, so using similar methods can strengthen messaging across studies. Applying the same or complimentary approaches to research can also help with comparability of results across regions. New projects should consider the methodologies of past projects, and where possible and appropriate, follow those to maximize comparability of results. New applicants may also want to reach out to senior NCP researchers as potential partners, collaborators or mentors.

6.4.2 Informed consent, research ethics, and data ownership

Projects funded under the Human Health subprogram must meet all requirements for NCP projects as outlined in Section 1.5. Applicants should refer to this section for full details and also refer to Appendix C (Guidelines for Responsible Research). This includes that all projects involving the collection of personal information and/or samples from people, must establish agreements with First Nations, Métis, and Inuit governments or organizations with respect to ownership, control, access, and possession of data and information collected from individuals, as described by OCAP® and the National Inuit Strategy on Research (Section 1.5.3). For these projects, informed consent must be obtained from participating individuals and along with the required research licenses (Section 1.5.4), applicants will need to provide the NCP Secretariat of proof of approval of these projects from all relevant ethics review boards and/or committees. Data management plans must be described in the proposal (Section 1.5.6) and although sample archiving for future research is encouraged, special considerations are needed when developing biobanks from human biomonitoring projects (Section 1.5.7). Biobanks from human biomonitoring projects must be developed in partnership with the support of communities involved in the project and informed consent must be obtained from individuals for the biobanking of their samples.

6.4.3 Project communications

Project communications are also a required component of all NCP funded projects and a communication plan/strategy must be included in proposals (Section 1.5.5). Knowledge translation is a critical component of human health projects and any messaging related to contaminants exposure to human populations must be

developed in partnership with local/regional organizations and the NCP Secretariat. **Regional health authorities and Indigenous governments in areas with settled land claims bear the ultimate authority to approve and release public health messages.**

6.5 Funding Parameters

Overall, projects may be funded for one to three years in duration. Requests for funding should include all aspects of a project, including communication materials, travel and resources necessary to return and communicate results to participants.

6.5.1 New researcher funding for relationship building

To encourage the development of projects in under-represented regions, broaden the number of applicants to the human health envelope, and support the development of new research relationships, $50,000 of this envelope will be reserved to support new researchers. These funds will be available in the amount of $10,000 to $15,000 per year for one to three years, from 2026 to 2029. These funds will be directed to new researchers, particularly those within the under-represented regions, or researchers new to northern research to help them develop connections and the networks necessary to propose a seed funding proposal or full human health proposal to the NCP. This funding will allow for activities that are smaller than seed funding for a pilot project. By making sufficient funds available, more than one recipient could be awarded funding. Applicants who receive new researcher funding would not be eligible for seed funding in the same year.

Eligibility

- Applicants must not have been the lead principal investigator on a previous Northern Contaminants Program proposal.
- Applicants may be southern or northern based.
- Applicants must have demonstrated experience and/or education in a relevant human health field.

Unlike Seed Funding, these proposals are not intended to support study design or preliminary research. These funds can be used for travel, community meetings and capacity sharing directed at developing the relationships necessary to build a human health proposal. This funding may also support collaboration and mentorship, leading to new proposals under other NCP subprograms, such as Community Based Monitoring and Research. Applicants must demonstrate regional or community support for the commencement of these activities. A list of Regional Contaminant Committee Chairs and Co-Chairs can be found in Appendix B.

6.5.2 Seed funding

In order to commence studies in regions or communities not currently part of long-term NCP funded biomonitoring work, interested parties may apply to the Call for Proposals for seed funding to establish partnerships with regional health authorities, First Nations, Métis and Inuit governments or organizations, academia/federal scientists and local community organisations. Seed funding may be used to support travel and facilitate meetings in northern communities with all of these key potential partners. Seed funding may also be used for preparatory work on research design, survey development or other pertinent preliminary work. Seed funding will be of a limited amount and will be scaled according to the scope of the proposed work. In addition, seed funding will be provided for one year only. Applicants who receive seed funding are not guaranteed to receive long-term funding for future work and must submit proposals to NCP for subsequent years of funding.

6.6 Areas of Research

NCP Human Health Projects are often holistic and touch on several key areas of research including:

- Human biomonitoring (6.6.1)

- Dietary exposure assessment and dietary transitions and adaptations (6.6.2)
- Human health effects research (6.6.3)
- Benefit/risk evaluation and risk/benefit communication (6.6.4)

These projects are often multidisciplinary and can often include research in more than one of these key areas of research. For example, carrying out human biomonitoring and dietary assessments in parallel can be particularly valuable. These projects may also examine contaminants in country foods and it is also often advantageous for these projects to coordinate with other subprograms, such as the *Environmental Monitoring and Research* subprogram in these cases. Further information on these key research areas is included in Sections 6.6.1 – 6.6.4. In these studies, study leaders should also carefully consider the collection of relevant sociodemographic, anthropometric, and lifestyle factors, as these factors may affect the exposure of sub-populations to contaminants and may also influence the health effects resulting from exposure to these contaminants. This includes, for example, factors such as age, sex, gender, smoking status, occupation or water source. Along with diet, collection of additional information can be useful for identifying sources of exposure, including aiding in differentiating between long-range and short-range sources of exposure, and for understanding implications for health.

6.6.1 Human biomonitoring

Human biomonitoring studies funded by the NCP characterize exposures of Arctic and northern peoples to contaminants, support the development of time trends of these contaminants, fill regional gaps, are used to screen for emerging contaminants of concern and can support evaluations of messaging. These data may be collected as components of studies that address different community research questions (i.e., contaminants, climate, nutrition, etc.). Studies that use comparable methods make it possible to create comprehensive datasets covering all regions of Canada's Arctic and northern subpopulations (including priority subpopulations that may be disproportionately impacted). Human biomonitoring studies that build on pre-existing biomonitoring datasets and provide for periodic re-sampling from a similar location and population make it possible to make meaningful trend analyses. Several decades of continuous biomonitoring of Inuit in Nunavik, for example, has identified declining exposures to several POPs, initial declines in mercury exposure before stabilizing over the past decade, and increasing exposures to several emerging contaminants (e.g., Per- and polyfluoroalkyl substances) that require further attention. It should be noted that findings from one region may not be consistent and/or applicable across all other regions.

Due to the effort, cost and value associated with the collection of samples from participants in biomonitoring studies (e.g., blood, hair, milk, urine samples), applicants are encouraged to develop and maintain these samples in a biobank for future analysis (and include this in their project proposal). However, biobanks must only be developed with the support and partnership of regional partners and participating communities. As with any human health projects, agreements must be established with respect to ownership, control, access, and possession of data and information collected from individuals, as described by OCAP® and the National Inuit Strategy on Research (Section 1.5.3) and it must be ensured that privacy and confidentiality is maintained, and the necessary reporting protocols are followed. Appropriate informed consent must have been received for biobanking of samples. In some cases re-engagement of participants may be needed to confirm their participation in new proposals and/or analyses (Section 1.5.7). Biobanking of samples will allow for the opportunity to conduct additional analyses (including future contaminants of emerging Arctic concern), as per the policies associated with any given biobank.

Biomonitoring data are most valuable when studies also include contaminant levels in traditional/country foods. When possible, this type of work should be carried out in cooperation with project leaders from the *Environmental Monitoring and Research* subprogram who may collect samples from traditional/country foods as part of environmental or wildlife monitoring. These results can provide a clearer understanding of how diet affects contaminant concentrations in northerners. Seasonality should be considered when planning a study. Some contaminant levels may fluctuate across seasons in different species and traditional/country foods. In addition, differences in dietary habits throughout the year may affect exposure to certain contaminants.

6.6.2 Dietary exposures, transitions and adaptations

Dietary exposure assessments, particularly food choice and dietary surveys, should be carried out in parallel with human biomonitoring studies. This will allow valuable comparisons of dietary exposure assessments to contaminant concentrations in human samples and will facilitate the development of effective dietary intervention strategies. Dietary surveys include 24h dietary recall surveys, Food Frequency Questionnaires, or new and innovative methods. Qualitative and mixed methods approaches can support these quantitative tools. Food choice studies provide information about the factors affecting the dietary choices of Northerners and the perception of contaminants in making those choices. Community partners and Indigenous organizations as project leads, co-leads, and research partners can provide guidance on the inclusion and application of Indigenous Knowledge throughout this work.

Dietary exposure assessments need to be coupled with an assessment of nutrient intake, which is essential for evaluating dietary risks and benefits. Research has shown that some essential nutrients can have important interactions with contaminants, in some cases reducing contaminant levels in the body and/or offering partial protection from some of the adverse effects associated with contaminant exposures. Additionally, some nutrient deficiencies can increase contaminant levels in the body and/or be associated with increased risk of adverse effects from contaminant exposures. These nutrients should be considered when planning projects.

Dietary transitions need to be taken into consideration when planning studies and interpreting results. Changes in diet, in particular changes in the types and amounts of traditional/country foods consumed, can impact northern communities' exposure to both environmental contaminants and essential nutrients. Continued dietary change in Arctic and northern regions is likely the result of the complex interaction of many different factors. This includes climate change, which has the potential to impact both the availability of traditional/country foods and concentrations of contaminants and nutrients in these foods, and can have important implications for food security in these regions. Due to the significant impacts that dietary transitions can have on the contaminants exposures of northern communities, it may be necessary to conduct additional dietary exposure studies to take into account changing exposure patterns.

6.6.3 Human health effects research

Human health research, both epidemiological and laboratory-based, may be funded under the Human Health subprogram. Our understanding of the health effects of chemicals is contaminant-dependent; direct relationships between human chemical concentrations and health effects have only been established for a few chemicals. Since the 1990s, several epidemiological studies have been conducted to evaluate possible health impacts of contaminants exposure on the health of northern Indigenous peoples. Some of these studies have looked at the long term effects of contaminants on children's growth and development, while others have examined the associations between contaminant exposures and various health outcomes, such as cancer and cardiovascular disease, and markers of immune function.

For consideration under the Human Health subprogram, laboratory based studies must use existing, validated methods (e.g., valid biomarkers, -omics, mixture approaches). Research that focusses on method development is beyond the scope of the NCP. Applicants must demonstrate relevance of their health effects project (methods, exposure(s), and outcome(s)) to the Northern context. For example, the mixtures of contaminants and nutrients to be examined in these projects should typify those found in traditional/country food diets or northern human biomonitoring, and should take into consideration the actual range of exposure levels (e.g. frequency distributions of exposure) observed in the North. Applicants should take care to clearly articulate the limitations of these studies. Proposals for epidemiological studies should address limitations in their ability to draw conclusions from small populations and proposals for toxicological studies should address limitations in drawing conclusions for northern communities.

6.6.4 Benefit/risk evaluation and risk/benefit communication

Standard risk assessment methodologies used to assess the potential risks to human health of various contaminants are, in general, well known and have been used for many years. However, these methodologies

focus on questions of toxicity and potential health effects, and their application to populations dependent on the use of traditional/country foods can be problematic because there is little consideration given to the benefits of these foods. Health Canada maximum levels for chemical contaminants in retail foods may not be appropriate comparators to determine unacceptable risks to human health, as these values were not derived using consumption patterns for traditional/country foods. Common metrics to compare multiple risk/benefit scenarios is also lacking. Therefore, it can be very difficult to evaluate the benefits against the risks, or vice versa. These benefits pertain to overall well-being and can be nutritional, physical, social, spiritual and economic. Consideration of the risks and benefits of dietary alternatives is also important. For example, the benefits and risks associated with retail foods are very different from those associated with traditional/country foods, and many of the benefits of the latter would be lost by switching to a retail food diet. Understanding these complex risk/benefit relationships may require multi-disciplinary studies of health and well-being. Funding from the NCP may support contaminants components of such larger studies, which are much broader in scope than NCP's focus on chemicals capable of long-range transport.

Messaging and communication of results is an essential part of all studies and a project communication component must be included in all projects (see Section 6.4 for more information). It is important to consider populations that may be the most disproportionately impacted. Because the fetus, infants and children are often most at risk from contaminants, benefit/risk evaluations and communication should take this into consideration if it applies to a given study. This may require special communication efforts for pregnant women and women of child-bearing age. Studies that include risk/benefit communication activities should include follow-up work that evaluates the effectiveness of those risk/benefit communication tools and activities. There is currently limited information on the success of risk/benefit communications, and the measure of success cannot be based solely on declining contaminant levels in the target populations. Additionally, increased knowledge of local risk perception and how people make dietary choices is necessary to determine an effective way to decrease barriers to message comprehension. The complexity of evaluation study should not be underestimated. It may be a component of a study, or a stand-alone study on its own, with input and participation from regional health authorities, communities and Indigenous organizations.

6.7 Priorities

Overarching priorities for the human health subprogram are to:

- Fill spatial and temporal gaps especially for human biomonitoring and dietary assessments in regions where data is very limited or out of date (6.7.1)
- Provide information about the contaminants levels and health impacts of these exposures in subpopulations that may be disproportionately impacted (6.7.2)
- Conduct holistic research to understand interactions between contaminants and nutrients that are relevant for human health and support benefit/risk assessments and communications (6.7.3)
- Further the understanding of changing dietary patterns in northern populations and how this is changing contaminants exposures (6.7.4)

These priorities must be considered in the context of regional and community research needs and capacity. Region and community specific priorities should be discussed with research partners from these regions, including Regional Contaminants Committees (see Contacts in Appendix B), prior to and during project development. Some regions may be looking for partners to develop projects with to address their specific regional and community priorities.

6.7.1 Spatial and temporal biomonitoring

It is a priority to address temporal and spatial gaps in our understanding of contaminant levels in the Canadian North, especially for human biomonitoring and dietary assessments in regions were data are not currently available, or are outdated. Recent assessments of contaminants in the Arctic have revealed that knowledge gaps remain in many regions, including many Inuit regions, for which there has not been a biomonitoring study since 2007-2008, and much of the Yukon. To date, only in Nunavik have sufficient data been generated to

assess exposure to contaminants in a cross section of the population over multiple time points, and to establish time trends among pregnant women (a disproportionately impacted population). Many Indigenous populations across the Canadian North rely on the consumption of traditional/country foods which may (some parts of some species in some locations) contain elevated concentrations of contaminants. Therefore, there is a concern that regions which have not participated in biomonitoring studies in recent years may have populations experiencing elevated exposures to contaminants. Due to changing diets, climate change, and contaminants of emerging Arctic concern in northern environments, it is even more important that biomonitoring studies are conducted with regular frequency (e.g., every ten years at a minimum).

6.7.2 Populations who may be disproportionately impacted

It is a priority to develop projects that can inform decision making for populations who may have elevated exposures to contaminants or who may have the potential to experience greater health risk as result of exposure to contaminants. The priority populations for biomonitoring studies and/or other human health studies under the NCP are presented as follows, in order of importance:

1. Pregnant women and women of childbearing age
2. Children
3. Individuals and families who consume high levels of traditional/country foods.

Pregnant women and women of child-bearing age are the highest priority due to the sensitivity of the developing fetus to contaminant exposure (pre-natal exposure). Information on parity and breast feeding history should be included as these are known to impact contaminant levels. Data for pregnant women are relatively limited. Children are also a disproportionately impacted population and the next priority as they are susceptible to the adverse health effects resulting from exposure to contaminants, and relatively high concentrations of some contaminants have been found in Inuit children in Nunavik. Other subpopulations may not be as susceptible to the effects of contaminants exposure, however they may experience higher contaminant burdens as a result of their dietary intake levels and are therefore also a priority group of interest. For example, studies have shown that older adult populations, likely due in part to higher historical and current consumption of traditional/country foods, can have higher levels of contaminants than children and pregnant women or women of child-bearing age. Due to the persistent, bioaccumulative nature of legacy POPs, older adults may also have higher concentrations due to cumulative lifetime exposure, especially from exposure prior to the phase-out of these legacy POPs. Other groups may have higher contaminant burden because of greater access to traditional/country foods (e.g., harvesters and their families). Therefore, individuals and families who consume high levels of traditional/country foods (including older adults) are a potentially disproportionately impacted population and priority. There is also a need for further mechanistic studies in order to find causal explanations for the associations with adverse health effects that have been observed, as well as further explorations of windows of vulnerability in the pre- and post-natal periods. Proposals under the Human health subprogram should have a special emphasis on the most highly exposed communities and disproportionately impacted populations (e.g. pregnant women, children, consumers of high levels of traditional/country foods).

6.7.3 Interactions between contaminants and nutrients

It is a priority to understand biomonitoring results in the context of overall health. Biomonitoring data for Schedule 1 contaminants continue to be a top priority as these data contribute to trends analyses, and national and international chemicals management. Projects should include legacy and emerging contaminants of potential concern where there is the potential for exposure from traditional/country foods. However, studies should also include other contaminants/nutrients that are relevant to understanding overall health. There is increasing evidence showing beneficial interactions between some nutrients and contaminants (e.g., selenium and methylmercury) and protective effects of nutrients on some health endpoints (e.g., omega-3 fatty acids and neurobehavioural health). The inclusion of nutrients in studies helps to elucidate risk/benefits and communicate results that contextualize contaminants. There is also evidence for potential beneficial interactions between contaminants and nutrients. Special interest should be devoted to characteristics of the diet of First Nations,

Métis and Inuit peoples where evidence exists for potential protective strategies such as specific micronutrient intake. This can include research into the interactions between nutrients and contaminants, particularly in the area of lifestyle, nutritional status and contaminant-related health effects. As well, this can include research to better our understanding of the beneficial contributions of increasing traditional/country food consumption on long-term and/or chronic health outcomes while also examining changes in contaminant exposure profiles.

Funding for nutrient analysis is dependent on the study objectives and budget constraints. Co-funding should be sought where possible. Although it is recommended that human health studies should also investigate chemicals that northern populations are exposed to through local use and exposure (e.g., retail foods, the preparation and preservation of traditional/country foods, drinking water, and consumer products) to fully understand the exposure profile of northern populations, applicants are expected to seek alternate funding sources for these analyses. Bearing in mind that holistic health studies can be long, complex, and multi-disciplinary, NCP funding under the Human Health subprogram could support contaminant-specific portions of larger health studies.

6.7.4 Dietary transitions

It is a priority to understand changing dietary patterns in northern populations as diet is the primary source of many contaminants and dietary transitions are changing contaminant exposure patterns. The collection of information on dietary choice and food consumption frequencies in human health studies is important to further elucidate contaminant exposures from traditional/country foods and better understand modern dietary transitions in the North. Information derived from dietary studies is lacking for several northern regions including Nunavut and Nunatsiavut and much of the Yukon, and it has been noted that there has been inadequate national monitoring of diet over time among Canadian Northern populations. Only a few longitudinal studies (e.g., the Inuit Health Survey) have been conducted to examine long-term dietary and lifestyle changes, and the resulting impacts on health and wellbeing. Further information on gender and age-based differences in consumption patterns is necessary. There is also a lack of standardization of methods for assessing dietary intake, food security, health outcomes, and northern food environments, to enable more accurate comparisons across populations and over time.

Further information is also needed on the potential impact of climate change and how it may influence access and availability of traditional/country food sources, and change contaminant levels. Additionally, research on the factors influencing Northerners' choice of food and the extent to which contaminants factor into these choices, with particular emphasis on pregnant women and women of child-bearing age, is a priority. Research is needed to evaluate food substitution and other management programs that aim to reduce contaminant exposure in high risk regions but still encourage consumption of highly valued traditional/country foods and other nutritional food sources. This requires an understanding of actionable risk-benefit analyses for traditional/country foods versus retail foods while considering health, cost, local contexts, and sustainability.

7 – BLUEPRINT FOR ENVIRONMENTAL MONITORING AND RESEARCH

7.1 Purpose

The purpose of the Environmental Monitoring and Research subprogram of the Northern Contaminants Program (NCP) is to:

- Monitor NCP priority contaminant levels and trends in multiple compartments of the Arctic environment.
- Conduct research into the influence of environmental change on concentrations and trends of contaminants in the Arctic environment.
- Conduct research into the effects of contaminants on the health of Arctic ecosystems.
- Support the assessment of human health risks using information on levels and trends of contaminants in traditional/country foods and in Arctic ecosystems.
- Through collaboration and mentorship, support projects that are funded under Community-Based Monitoring and Research, and other NCP subprograms.
- Produce scientific information in support of domestic and international chemical management initiatives.

The annual funding for Environmental Monitoring and Research projects under the Northern Contaminants Program is set at $1,700,000 with $1,000,000 committed to ongoing core monitoring projects, $225,000 for general contaminants research projects and $475,000 for research specifically related to plastic pollution. The total amounts of funding available in the 2026-2027, 2027-2028, and 2028-2029 fiscal years, after considering multi-year funding commitments, are shown in Table 1.2.

7.2 Introduction

This Blueprint outlines Environmental Monitoring and Research priorities for NCP. Priorities for monitoring and research are described separately for the Atmosphere and three major ecosystem types: Terrestrial, Freshwater, and Marine. The majority of ecosystem monitoring and research is to be carried out in a limited number of defined "focal ecosystems" so that the activities are closely related and complementary. By concentrating monitoring and research on focal ecosystems, the NCP hopes to develop detailed conceptual models of contaminant dynamics for these ecosystems. Monitoring plans have been designed for optimal detection of temporal trends and to build on ongoing monitoring projects, with robust time series datasets and sample archives. Research priorities and knowledge gaps are identified to improve our understanding of contaminant-related ecological risks, including: how contaminants enter Arctic ecosystems and cycle within them, how contaminant cycling is influenced by environmental change and the resulting effects on biological exposure, and the combined biological effects of contaminants, climate change and other factors on Arctic wildlife.

It is important that researchers recognize the link between contaminants in wildlife and human health, especially when monitoring and research is being carried out on species that are frequently harvested by Indigenous communities. The link to human health should be reflected in proposals, and especially in sections related to engagement and communications where regional health authorities have an important role. It is intended that dietary exposure assessments under the Human Health subprogram be carried out cooperatively by the Environmental Monitoring and Research, Community-Based Monitoring and Research, and Human Health NCP subprograms. Doing so will strengthen the links between the work of these three subprograms and ensure that

knowledge about contaminants in Arctic ecosystems will be transferred to the assessment of human health risks. A One Health approach taking into account a wider range of factors affecting the health of wildlife and people is also strongly encouraged, however external funding should be sought to support the aspects of proposals that are not specifically related to contaminants.

In 2023-2024 the analytical schedules of NCP's long-term environmental monitoring projects (described in the "Monitoring" subsections of Section 7.5 and Section 7.7) were evaluated to ensure that they remained appropriate for the different contaminants and species. Priority Schedule A POPs (see Appendix A) will continue to be measured on a biennial basis (i.e. every other year) by NCP's core ecosystem-based wildlife monitoring projects, however, some with consistently decreasing trends and low concentrations will move to a triennial schedule. Schedule B POPs, and other select Schedule C chemicals of emerging Arctic concern (CEACs) (see Appendix A) will be analyzed on different schedules depending on levels and trends observed in the focal ecosystems and species, with some being on an annual schedule to ensure the rapid detection of trends, while others that have consistently decreased and/or remained at low concentrations will move to biennial schedules of analysis. Annual analysis of some Schedule B POPs and Schedule C CEACs, i.e. new POPs and those not yet considered POPs by the Stockholm Convention, is important for demonstrating their presence in the Arctic in the least number of years possible. **Note that these schedules do not apply to "research" project submissions**.

Found in even the most remote environments, plastic pollution of various size ranges, including microplastic pollution, continues to establish itself as a global concern. The NCP has identified the need to improve the detection, sampling and analysis of plastic pollution types and sizes, with a focus on macro and microplastics (pieces less than 5 mm), in Arctic and Northern atmospheric, terrestrial, freshwater, and marine environments and associated wildlife. These research and monitoring activities will contribute to Canada's Plastics Science Agenda (CaPSA), furthering our understanding of the fate and transport of plastic pollution in Arctic ecosystems. International initiatives such as the Arctic Council have also recently focused more attention on litter and microplastics in the marine and terrestrial environments including through the development of the AMAP Litter and Microplastics Monitoring Plan and Monitoring Guidelines. Compared to known and monitored POPs, plastic pollution, and specifically microplastics appear to exhibit similar characteristics of persistence and bioaccumulation in some species. Given that plastic pollution is comprised of dozens of polymers and additives, studies to date indicate that microplastics can act as delivery vectors for chemical contaminant exposure, making them a potential exposure risk to Arctic ecosystems and possibly people. The NCP is taking a stepwise approach to assessing microplastics in the Canadian Arctic as outlined in Section 7.3.

This Environmental Monitoring and Research Blueprint specifies some regional priorities for contaminants measurements in the environment and in certain wildlife species that represent important traditional/country foods but for which there is little recent data on contaminant residues. These regional priorities are specified under Section 7.5, Ecosystem-Based Monitoring and Research and are applicable to the Blueprint for Community-Based Monitoring and Research.

7.3 Background

The Arctic is a remote environment, far from major emission sources, with environmental characteristics that make it particularly sensitive to long-range contamination by POPs and heavy metals. Furthermore, some Indigenous Peoples in the Arctic who rely on traditional/country foods, particularly marine mammals, as an essential part of their diet are exposed to elevated levels of contaminants in a scenario that is unique to the Arctic. NCP's contaminants of concern include POPs, mercury, and other chemicals categorized as CEACs for which there is a reasonable probability of Arctic contamination resulting from long-range atmospheric and oceanic transport (see Appendix A for more information on the NCP contaminants of concern). Information related to temporal trends of contaminants in traditional/country food species can be used to forecast potential changes in dietary exposure to contaminants. Similarly, the identification of new chemical contaminants in the environment provides

an indication of possible future risks to human health and may lead to preliminary screening of human tissues (e.g. blood) and assessment of dietary exposure.

The successful implementation of international conventions to reduce contaminant emissions is the best method available for reducing contaminant exposure of humans and ecosystems in the Arctic. Arctic monitoring and research are among the most important sources of information for supporting current agreements, including the Stockholm Convention on POPs and the United Nations Economic Commission for Europe (UNECE) Convention on Long-Range Transboundary Air Pollution (CLRTAP) Protocols on POPs and heavy metals, as well as the more recent Minamata Convention on Mercury, which was formally adopted in 2013 and entered into force in August 2017. Each of these international and global agreements have requirements for ongoing monitoring and research, with a particular need for Arctic data and information. Results from NCP monitoring and research will be particularly important for the global monitoring plan established under the Stockholm Convention and being proposed within the Minamata Convention, and for periodic effectiveness evaluations of both Conventions.

One of the main objectives of monitoring contaminants in the Arctic is to assess how the environment is responding to actions taken under the Stockholm and Minamata Conventions and to assess the effectiveness of those actions. Because the Arctic accumulates contaminants primarily from long-range transport, monitoring data on new chemicals in the Arctic are regarded as critical evidence when assessing the need to add new substances to the Stockholm Convention. The NCP needs to ensure that it can provide the most comprehensive and up-to-date datasets possible for substances being considered within the frameworks of these Conventions (see Appendix A for more information on the NCP's contaminants of concern).

The NCP Environmental Monitoring and Research subprogram is also intended to support ongoing assessments of human health risks, and global assessments of contaminants including POPs and mercury under the Arctic Council's Arctic Monitoring and Assessment Programme (AMAP, www.amap.no). The NCP is Canada's main contributor of contaminants-related science to AMAP and works very closely with other Arctic nations through AMAP on circumpolar collaborative monitoring and research activities, as well as on the preparation of scientific assessments. Thus, it is highly encouraged that NCP project leaders and teams participate in circumpolar monitoring networks and collaborate with other Arctic nations on research priorities for both NCP and AMAP.

Interpreting temporal variability in monitoring data and explaining the potential causal influence of global contaminant emissions and their sources can be very difficult. Contaminant concentrations in environmental media may be influenced by numerous factors in addition to global emission sources. For example, environmental changes brought on by climate shifts have been shown to influence temporal trends of contaminant levels quite dramatically. For instance, discerning the sources (anthropogenic or natural) and understanding the dynamic processes responsible for contaminant uptake and accumulation in Arctic food webs presents a particular challenge to the interpretation of trends in mercury. Source apportionment and consideration of changing environmental processes (e.g. with the use of environmental models) for all contaminants will continue to be important topics for NCP research and monitoring.

Levels of contaminants reported in Arctic wildlife can exceed reported thresholds for effects that were established mainly through laboratory-based dosing studies. Since the last time risks to wildlife associated with contaminants were reported in the Canadian Arctic Contaminants Assessment Report III a number of important considerations have come to light which may warrant additional assessment. As already noted, climate change can influence contaminant pathways and processes that will result in modulating levels of exposure among Arctic wildlife. Wildlife are also being put under increasing stress because of climate-related changes in their environment and in food webs that may make them more vulnerable to the potential risks posed by exposure to contaminants. Comparison of tissue residues to published guidelines and thresholds for effects will continue to be an important aspect of NCP assessment reports; however, it is recognized that these comparisons are of limited value given the lack of thresholds developed specifically for Arctic species. The direct investigation of toxic effects in Arctic wildlife (i.e., toxicological studies) is, therefore, an important element in the ongoing

assessment of contaminant-related ecological risks. Submission of research proposals that address these gaps and other priorities listed in subsections of Section 7.5 are encouraged, however new methods for effects assessment need to be well supported by prior proof of concept work (i.e., work funded elsewhere prior to submitting a proposal to NCP) and information from the scientific literature.

Plastic pollution, and microplastics (pieces <5 mm) specifically, are global pollutants. Plastic pollution particles vary in size from mega (>200 cm) to nano (<1 µm). Depending on the size and type, plastic pollution can travel long distances through the atmosphere, rivers, and oceans. In addition, depending on the polymer type and additives, plastic pollution can be extremely persistent in the environment, accumulate in some marine organisms, and can be transferred from prey to predator. Ingested plastic pollution can inflict physical damage and/or deliver toxic chemicals, including POPs, to organisms. It has been demonstrated that microplastics can act as vectors for chemical contaminant exposure, therefore, plastic pollution represents a direct exposure risk to Arctic ecosystems and people from the plastic polymer itself as well as posing potential risks due to contaminants that are attracted to and adsorbed by plastic from the ambient environment, though more data are needed on these latter topics.

The NCP began assessing microplastics as long-range pollutants in the Canadian Arctic in 2017-2018, focusing on measuring the presence and spatial distribution of microplastics in the marine environment via water, sediment and zooplankton samples, and evaluating long-range atmospheric transport through measurements in Arctic air. These continue to be priorities, along with additional measurements in the abiotic environment, invertebrates, fish and wildlife. The assessment of plastic pollution in seabirds has been supported by the NCP since 2017-2018 through projects that built on the Environmental Monitoring and Research core monitoring program for seabirds. The NCP continues to seek information on the presence, spatial distribution, abundance and types of plastic pollution in freshwater and terrestrial environments in order to comprehensively understand plastic pollution throughout the Northern and Arctic environments of Canada. AMAP has now developed a pan-Arctic Litter and Microplastics Monitoring Plan and Monitoring Guidelines. The NCP encourages projects to implement and adapt these approaches and robust QA/QC protocols to ensure that information on plastic pollution data is comparable across the pan-Arctic region, and with other global monitoring initiatives.

To the greatest extent possible, NCP monitoring and research projects must be carried out in cooperation and collaboration with northern communities, which should begin in the planning stage of the research. Pre-engagement prior to the initiation of any proposal is highly encouraged. Researchers are advised to contact Regional Contaminants Committee (RCC) members who can provide valuable feedback during project and proposal development, as well as contacts in the community/communities of interest. In the case of wildlife sampling, collections should be carried out in association with regular community harvesting. In cases where harvesting may have been limited because of concerns regarding regional population numbers (e.g. polar bears, barren ground caribou) the project leaders are encouraged to work with community members to develop or apply non-destructive techniques for sampling wildlife independently or in combination with approved tissue collections. Collection of fat biopsies or fur/hair (for example) in addition to tissue sampling in collaboration with subsistence hunters can provide valuable comparative information between sample types and methods.

Project leaders are asked to work with community members to utilize Indigenous Knowledge and have Indigenous Knowledge holders as part of their projects at all stages including project development, sample collection, data analysis/interpretation and in communicating results. The project leaders must provide results to the appropriate RCCs for review before disseminating any contaminant-related or health results and information to communities. If results indicate that any contaminants or other health indicators in wildlife are a concern or risk to the health of Northerners (i.e. if they exceed known effects thresholds), regional and territorial health authorities must be consulted in conjunction with the RCCs and NCP Secretariat before any information is communicated to communities to avoid miscommunication regarding food safety issues. NCP has a specific process that must be followed in these cases, which will be provided to project leaders as needed. This might,

for example, include the documentation of observations made through the course of sampling and related to the state of individual specimens being collected and the environment from which they are collected, including the Global Positioning System (GPS) coordinates of the sampling location. These observations must be reported and the information attributed to the individual person that provided it so follow up would be possible. Environmental Monitoring and Research project leaders are also encouraged to develop projects under the Community-Based Monitoring and Research Subprogram where possible, however these proposals must be led or co-led by local partners in Northern communities. Community-Based Monitoring and Research projects often utilize Indigenous Knowledge and can complement and enhance Environmental Monitoring and Research projects.

7.4 Atmospheric Monitoring and Research

Monitoring contaminant levels in the atmosphere over the Arctic continues to be a priority under the NCP. The NCP will participate in internationally coordinated air monitoring activities through the Arctic Council's AMAP. Air monitoring data collected at Alert and Little Fox Lake continues to be a major contribution to AMAP by the NCP. Data collected since 1992 will be used to evaluate temporal trends of atmospheric input of contaminants and to monitor current source regions and validate global long-range transport models. Monitoring will contribute key data to evaluate the overall effectiveness of the provisions outlined in the Stockholm Convention and the CLRTAP protocols on POPs and heavy metals, as well as those outlined in the Minamata Convention on Mercury. Another priority for atmospheric monitoring will continue to be measuring new substances that demonstrate a reasonable probability of Arctic contamination as a result of long-range transport. These data are critical to the assessment of potential new POPs and other CEACs (see Appendix A, Schedule B and C Contaminants) and their possible incorporation into international conventions. Temporal trend data will also be used to provide a general indication of whether or not contaminant input to the Arctic ecosystem is increasing or decreasing, a critical question for consumers of traditional/country foods.

The current NCP priorities incorporate continuous automated monitoring of mercury and active air sampling of POPs at Little Fox Lake, Yukon, and POPs and mercury at Alert, Nunavut, which is the longest running air monitoring station in the Arctic. Since 2014, the NCP has expanded the air monitoring network with the addition of 7 passive monitoring stations distributed across all 5 Arctic regions. This expansion will be extremely valuable in providing a more geographically complete picture of atmospheric contamination, including POPs and mercury, and assessing global transport pathways and sources. The NCP's passive sampling network complements the Global Atmospheric Passive Sampling (GAPS) network, which is one of the primary sources of POPs monitoring data to the global monitoring plan under the Stockholm Convention, by providing spatially-resolved POPs measurements in air in the Canadian Arctic. The use of models, or other methods, in collaboration with other programs/projects (e.g. ArcticNet), should be employed to evaluate global atmospheric pathways and potential sources associated with the trends observed at Alert and Little Fox Lake. Models may also be used to provide more detailed information on atmospheric contaminant distribution and deposition across the Canadian Arctic. These efforts should now be enhanced by integration of data from the 7 new passive monitoring stations being incorporated into the NCP air monitoring network. Snow is also collected at some air monitoring sites to assess deposition of contaminants in precipitation, which is an important pathway for contaminants to terrestrial, freshwater, and marine systems.

7.4.1 Priorities for atmospheric monitoring (directed funding, not open to general submissions)

The following priorities have been established for atmospheric monitoring:

- *Mercury in the atmosphere*: Monitoring of atmospheric concentrations and deposition of mercury at Alert and Little Fox Lake will allow assessment of the temporal trends for mercury deposition and advance our understanding of atmospheric processes that may influence levels and trends being observed throughout

the Arctic environment. There is a need for an additional site to assess the impact of permafrost degradation on the release of contaminants, particularly mercury, to the environment and atmosphere; identification of an appropriate site will require consultation with Regional Contaminants Committees and communities. This project is led by Alexandra Steffen, Environment and Climate Change Canada.

- *POPs in the atmosphere*: Monitoring atmospheric concentrations of contaminants, including POPs and CEACs (see Appendix A) at Alert will allow for the assessment of temporal trends and the advancement of our understanding of atmospheric processes that may influence levels and trends being observed throughout the Arctic environment. Samples should continue to be collected weekly; however, only one out of four weekly samples will be analyzed for routine trend analysis and the remaining samples will be archived. Air sampling at the Yukon site of Little Fox Lake is now performed with a high-volume air sampler (as of 2022), which can capture CEACs, including per- and polyfluoroalkyl substances (PFAS), to assess long-range transport from the Pacific Rim. This project is led by Hayley Hung, Environment and Climate Change Canada.

- *Passive air sampling*: This network expands the geographic coverage of the air monitoring program by developing, installing and operating passive air sampling devices capable of operating remotely under Arctic conditions. This is complementary to the work at Alert and Little Fox Lake. A network of passive air samplers in the Arctic can contribute to the global monitoring network that was established to provide monitoring data to the Stockholm Convention and CLRTAP, and play a role in the effectiveness evaluation for the Minamata Convention. The POPs samplers were installed in 2014 and the mercury samplers in 2018/2019. The mercury passive samplers are also part of the larger global passive sampling program aimed to fill in atmospheric monitoring gaps around the world. Passive air sampling can be used to determine latitudinal and longitudinal gradients in air concentrations from which empirical estimates of characteristic travel distances (CTDs) can be made. Such information can be used to verify and improve the CTD estimates of long-range atmospheric transport models. Currently, passive air sampling sites have been installed and are operating in Nunatsiavut (Nain and Northwest River), Nunavut (Iqaluit and Cambridge Bay), Nunavik (Kuujjuaq) and Northwest Territories (Inuvik and Fort Resolution). Future developments of the passive air sampling program will depend on the results of an evaluation of the effectiveness of this project in delivering contaminant information relevant for the NCP, which was undertaken by the project team throughout 2025.. This project is led by Hayley Hung and Alexandra Steffen, Environment and Climate Change Canada.

- *Plastics in the atmosphere*: Atmospheric circulation and wind represent a pathway for microplastics to enter the Arctic environment. Knowledge of microplastic contamination in air is limited and the presence of synthetic fibers in snow infers deposition by air currents. Deposition also represents a significant input into marine and freshwater systems. The identification and quantification as well as the occurrence, characteristics and distribution of airborne plastic contamination in Arctic and Northern regions remains a significant knowledge gap. Co-Monitoring POPs or CEACs along with microplastic pollution can also provide information on the sources, transport and fate of plastic-derived or associated contaminants.

- *The Global Atmospheric Passive Sampling Network (GAPS):* This network, which is partially supported by NCP, operates several long-term sites across the Arctic including several in Canada. In 2023, sampling was initiated at new sites operated by the International Network for Terrestrial Research and Monitoring in the Arctic (INTERACT), facilitated by AMAP. This further helps to improve spatial coverage across the North. The GAPS Network employs PUF-disk type passive air samplers which capture particulate matter in addition to gas-phase contaminants. This allows for the assessment of black carbon deposition, trace metals in air, and bioaerosols, which may be considerations for future analysis in the arctic region. This project is led by Tom Harner at Environment and Climate Change Canada.

7.4.2 Priorities for atmospheric research

- Assess long-range atmospheric transport of microplastics to the Canadian Arctic. This includes the identification and quantification as well as the occurrence, characteristics, distribution and deposition of airborne plastic contamination in Arctic and Northern regions, and the development of related standard protocols and approaches for research and monitoring. Some previous work has been addressing this priority. If you plan to submit a proposal on this topic, please follow up with the appropriate community organizations, regional contaminants committees (Appendix B) and/or the NCP Secretariat to ensure that you are not duplicating existing work.
- Assess how the changing ice and permafrost conditions in the Canadian Arctic affect mercury, POPs, CEACs, and microplastics deposition and cycling in the air-sea ice-water and air- permafrost system. This includes the investigation of the occurrence, distribution and transport pathways of these contaminants between the atmosphere, different types of ice/snow (multi-year ice, first-year ice, frost flowers and snow) and the sea water and permafrost. In addition, how the changing environment and biogeochemical cycle of the air-sea ice-water system affect the distribution and cycling of contaminants. Some previous work has been addressing this priority. If you plan to submit a proposal on this topic, please follow up with the appropriate community organizations, regional contaminants committees (Appendix B) and/or the NCP Secretariat to ensure that you are not duplicating existing work.

7.5 Ecosystem-based monitoring and research

Under the Blueprint, ecosystem-based monitoring and research will focus on several geographic areas encompassing locations of past monitoring and research activity on which the current Blueprint aims to build on. A number of focal ecosystems have been chosen among Arctic marine, freshwater and terrestrial environments. It is intended that monitoring and research in focal ecosystems will complement one another and will contribute to future synthesis and integration studies. This will further refine our understanding of contaminant cycling in these specific ecosystems and consider the influence of climate change. While much of the ecosystem monitoring and research should concentrate on the focal ecosystems, research at other locations that contributes to a general understanding of contaminant pathways, processes and effects will also be considered. This section describes monitoring and research priorities for each of the ecosystem types and specific focal ecosystems. There are, however, a number of common elements to monitoring and research across all ecosystem types which are described below. Note that research related to wildlife often requires specific permits from the territory where the study is taking place. Please ensure that these are in place prior to any work commencing. For information on requirements for wildlife and other scientific permits, contact the appropriate territorial government authority and the relevant RCC if guidance is needed. When planning to sample wildlife tissues for contaminant analysis, researchers are asked to consult with communities and RCCs to assess which tissues are the most relevant for consumption and include those in the study.

Monitoring (directed funding, not open to general submissions)

The focus of the current ecosystem monitoring plan is to measure long-term trends and variability in contaminant concentrations in Arctic biota. The plan builds on projects to monitor temporal trends established in 2004 whereby samples from a number of key species at several locations across the Canadian Arctic are collected and analyzed annually to maximize the statistical power of the temporal datasets. Species were selected based on the important role they play in their respective ecosystems and their importance to Indigenous Peoples and communities (see Section 7.7).

As the temporal datasets become longer and more robust, the monitoring objective has been improved from the detection of a 10% change over 10 to 15 years, to detection of a 5% change over a 10 to15-year period with a power of 80% and confidence level of 95%, which is a common objective of monitoring under NCP and

AMAP. The annual collection and analysis of 10 samples per species and location is felt to be sufficient to achieve this goal; however, the inclusion of more samples may be acceptable if it significantly improves the trend analysis and is economically feasible (e.g. mercury). For the assessment of temporal trends in biota every effort should be made to explain, and control for, variance components by considering confounding factors such as age, sex, and time of collection. Ancillary data such as lipid content, stable isotope ratios, fatty acid profiles, and body condition should be included as needed to help explain and correct for confounding variance in the data.

Along with monitoring contaminant trends in biota, the long-term monitoring plan for marine ecosystems includes annual monitoring of seawater for POPs and mercury. Vertical profiles are collected for contaminant concentrations and include standard oceanographic data (e.g. salinity, temperature, nutrients, particulate organic carbon (POC), dissolved organic carbon (DOC), $\partial^{18}O$, tracers such as SF6, and inorganic carbon), as well as data for zooplankton and forage fish, where possible. In the case of mercury, data collection should include full speciation (Hg(II), methylmercury, particulate mercury) and for POPs, it should include the full suite of POPs and CEACs when possible.

The CACAR III POPs report (2013) and more recent assessments of POPs and mercury through AMAP have demonstrated that most of the monitoring projects have produced some statistically significant trends for POPs. The results show that most Schedule A contaminants (Appendix A) covered by international regulations have been decreasing in environmental compartments, wildlife, fish and humans. It was therefore decided that the frequency of Schedule A POPs analysis would be decreased to every other year (biennial). This decrease in monitoring frequency will have a minimal impact on the program's ability to measure temporal trends of Schedule A POPs based on the last statistical assessment of the program. Since sampling will continue on an annual basis for some of the POPs listed in Schedule B and CEACs in Schedule C (Appendix A), sample archives could be used in future years on a case by case basis to investigate certain trends with annual data, this could include research on climate related drivers of contaminant trends. The analysis of POPs listed in Schedule A is also staggered among the different monitoring projects to even out the analytical budget. Many of the Schedule B POPs require annual monitoring to quickly detect trends and changes in those trends. In the case of Schedule C CEACs, annual monitoring aids in definitively establishing their presence in Arctic ecosystems over several consecutive years. Mercury continues to be a high priority and a concern for wildlife and people across the North and will continue to be monitored annually.

Research

Ecosystem-based contaminants research is intended to improve our understanding of contaminant pathways, processes and the effects of contaminants on the health of Arctic wildlife. Research projects should be formed around a set of clearly rationalized hypotheses related to the priorities described in this Blueprint. Results of this research will contribute to our interpretation of temporal trends and/or variability, particularly as they relate to the influence of climate change throughout the northern environment and food webs and/or changing sources (i.e., global emissions). While building on our current understanding of POPs listed in Schedule A and mercury remains a priority, there is also a need to learn about recently regulated or CEACs, such as halogenated organic chemicals such as fluorinated (e.g. PFAS), brominated (e.g. polybrominated diphenyl ethers (PBDEs) and PBDE replacements), and chlorinated (e.g. current-use pesticides) contaminants that have the potential for long-range transport and Arctic contamination. Studies related to ecosystem pathways and processes are required in each of the ecosystem types (i.e., terrestrial, freshwater and marine).

There is still a need for more field data on microplastics in Arctic environmental media and biota, so the NCP has identified assessing the presence and distribution of microplastics in terrestrial, freshwater and marine ecosystems as an ongoing priority. Potential matrices for long-term monitoring have been identified as: freshwater fish, marine fish, seabirds (e.g. northern fulmars, thick-billed murres, common eiders, black-legged

kittiwakes), and mammals (e.g. beluga, polar bears, ringed seals), as well as air, snow, ice, fresh water, seawater, and sediments. From an international monitoring perspective, the AMAP Litter and Microplastics Monitoring Plan prioritizes annual monitoring in the following environmental compartments: Priority 1: beaches/shorelines, water, sediments and seabirds; Priority 2: air, invertebrates and fish; and Priority 3: snow/ice, seabed, terrestrial soils and mammals. Applicants should keep these priorities in mind when designing their research proposals.

The investigation of contaminant-related effects in wildlife should focus on those species that, based on the best available information, represent a gap in knowledge, are at greatest risk and/or may be significant to human exposure. The most important considerations should be the current level of exposure, the expected changes in exposure (i.e., are levels increasing or expected to increase), the potential vulnerability of a given population to toxic effects (e.g. some species may have diminished health status as a result of climate-related stresses), and whether or not the species is consumed by people and whether their health is a concern for the region/communities. Based on these considerations, species that might be considered for effects studies include polar bear, beluga, seabirds and ringed seal.

Wildlife effects studies should include the measurement of a suite of endpoints designed to provide a comprehensive assessment of contaminant related biological effects. These endpoints should be designed to detect changes in key biological systems (e.g. immune, reproductive, metabolic and neurological) that could be compromised by contaminant exposure. It is recognized that studies on wildlife in their natural environment can at best establish associations between contaminant exposure and effects. A weight-of-evidence approach, which considers multiple lines of evidence from both wildlife studies and laboratory studies where causative relationships between contaminants and effects can be established, is a sound approach to assess the impact of contaminants on wildlife and ecosystem health. Proposals that study cumulative effects of contaminants and other stressors (e.g. climate change, disease, parasites) on the health of wildlife such as omics (metabolomics, transcriptomics, genomics) and One Health approaches are also strongly encouraged, but methods, objectives and value of the research to Northerners should be thoroughly described. Note that the NCP will fund contaminants-related components of these studies, but additional sources of funding should be included to address the other factors. Ultimately, the health, food safety and security of Northern Indigenous populations are intimately linked to the health of Arctic ecosystems which represent a source of traditional/country foods and social and cultural well-being.

RCCs have identified the need for new information on contaminant levels in certain wildlife species that are important to the traditional diet of Indigenous Peoples. These priority species are identified in the following sections.

7.5.1 Terrestrial ecosystems

The focal ecosystems for the purpose of research are the ranges of the Porcupine and Qamanirjuaq caribou herds.

Terrestrial Monitoring Priorities (directed funding, not open to general submissions)

The Porcupine caribou herd (sampled in Yukon) and the Qamanirjuaq Caribou herd (sampled in Nunavut from Arviat) are monitored annually for mercury and inorganic elements in kidneys. Liver samples will be analyzed annually for PFAS categorized as perfluoroalkyl acids (PFAAs, see Appendix A, Schedule B) and selected precursors. Caribou liver also provides an opportunity to assess temporal trends of Schedule B and C POPs and CEACs in an important terrestrial species with an archive of samples for retrospective analysis if merited. High priority Schedule A and additional Schedule B contaminants will also be spot-checked on pooled samples from the focal herds as well as those selected for periodic monitoring on a 4-5 year rotation to identify any changes that require further investigation. This monitoring is led by Mary Gamberg of Gamberg Consulting.

In order to update contaminant information on caribou herds and reindeer herds (where applicable) from across the Canadian Arctic, the Blueprint provides for periodic monitoring of the 12 herds that are not routinely monitored for temporal trends. One or two additional caribou herds will be sampled each year as part of the NCP core program when the budget allows for it. The choice of herds will be determined in consultation with RCCs and based on 1) level of use/regional and community priorities, 2) length of time since the last sampling campaign and 3) ease of sampling. Ideally, sampling would occur as part of ongoing body condition or community monitoring programs (i.e. supported by territorial governments), which would minimize the cost to NCP.

Terrestrial Research Priorities

The following bullets outline research priorities and knowledge gaps identified in terrestrial ecosystems:

- Uptake and accumulation of contaminants in terrestrial food webs with a focus on new contaminants (e.g., CEACs, Schedule B and C POPs) that display a high potential for bioaccumulation in terrestrial food webs. Proposals addressing this priority should avoid duplication of the existing caribou monitoring project (described in the section above).
- Studies that include rootless vegetation (e.g. lichens and moss) are useful for the investigation contaminant deposition from air and entry into the terrestrial food web – these should focus on CEACs and/or those contaminants for which this information does not exist or is outdated. No recent projects have addressed this priority in any region.
- Influence of climate-induced changes on terrestrial ecosystem contaminant cycles.
- Physical-chemical processes related to mercury in Arctic soils, with a focus on fluxes to and from the atmosphere from different media (soils, permafrost, snow, ice), and characterization of soils as a source or sink in the Arctic mercury cycle under a variety of climatic conditions.
- Assess contaminant concentrations at regular intervals in species and locations where health messaging has previously been issued. If you have led a project that resulted in health messaging for the communities/regions, you can contact the appropriate territorial/region health authority, regional contaminants committee(s), and/or the NCP Secretariat to discuss appropriate follow-up timeframes.
- Nunavut and the Yukon have expressed an interest in contaminant levels in edible plants. These investigations could also be appropriate for submission to the Community-Based Monitoring and Research subprogram given that edible plants are easily harvested by community members. These proposals should primarily focus on contaminants delivered by long range transport (see Appendix A), and not those originating from local sources, where possible. Two current community-based research projects in the Nunavut are addressing this priority in the Kivalliq and Kitikmeot Regions. If you plan to submit a proposal on this topic, you should contact the Nunavut Environmental Contaminants Committee (Appendix B) and/or the NCP Secretariat to ensure that it is not duplicating this work.

Priorities for Plastic Pollution and Plastic-Derived Contaminants in Terrestrial Ecosystems:

- Development of standard protocols with robust QA/QC methods and approaches for research and monitoring of plastics in terrestrial ecosystems and species. One current research project is addressing this priority in caribou in Nunavut and Yukon caribou – If you plan to submit a proposal on this topic in these regions, you should contact the Nunavut Environmental Contaminants Committee (Appendix B) and/or the NCP Secretariat to ensure that it is not duplicating this work.

7.5.2 Freshwater ecosystems

The focal ecosystems are: Kusawa Lake, Yukon; Great Slave Lake, NWT; and High Arctic lakes on Cornwallis and Ellesmere Islands, Nunavut.

Freshwater Monitoring Priorities (directed funding, not open to general submissions)

The following freshwater ecosystems areas are the priority areas being monitored:

- Kusawa Lake and Lake Laberge:[1] lake trout are monitored annually for mercury, inorganic elements and PFAS. Biennial monitoring of Schedule A POPs and PBDEs will take place during even numbered sampling years (i.e. 2026, 2028,...). This project is led by Mary Gamberg of Gamberg Consulting, Pascale Savage of Mackinaw Consulting, and Bonnie Hamilton of the University of Ottawa on behalf of the Yukon Contaminants Committee.
- Great Slave Lake: lake trout and burbot are monitored annually for mercury, inorganic elements, and select Schedule B contaminants. Biennial monitoring of Schedule A POPs and PBDEs will take place during odd numbered sampling years (i.e. 2027, 2029...). This project is led by Marlene Evans of Environment and Climate Change Canada, Heidi Swanson of Wilfried Laurier University and Ken Drouillard of the University of Windsor.
- Fort Good Hope: burbot are monitored annually for mercury and PFAS. Biennial monitoring of Schedule A POPs and PBDEs will take place during odd numbered sampling years (i.e. 2027, 2029...). This project is currently led by Feiyue Wang of the University of Manitoba.
- High Arctic lakes: land-locked Arctic char are monitored annually for mercury, inorganic elements, and select Schedule B POPs. Biennial monitoring of Schedule A POPs and PBDEs will take place during odd numbered sampling years (i.e. 2027, 2029...). A site change for one lake where fish are now rarely caught is underway with the new lake to be sampled in 2026, based on community and regional consultations in 2025. This project is led by Jane Kirk, John Chételat, and Gerald Tetreault of Environment and Climate Change Canada.

Freshwater Research Priorities

The following bullet outlines research priorities and knowledge gaps identified in freshwater ecosystems:

- All regions have identified the need for information on mercury concentrations in predatory fish species (e.g. lake trout) from lakes and rivers where these fish are commonly harvested. Some previous work has been addressing this priority. If you plan to submit a proposal on this topic, please follow up with the appropriate community organizations, regional contaminants committees (Appendix B) and/or the NCP Secretariat to ensure that you are not duplicating existing work.
- Updates to mercury assessments for lakes in all regions where consumption advice has previously been issued and for which communities have requested additional study. Impacts of high mercury concentrations on fish health based on these assessments would also be useful. If you have led a project that resulted in health messaging for the communities/regions, you can contact the appropriate territorial/region health authority, regional contaminants committee(s), and/or the NCP Secretariat to discuss appropriate follow-up timeframes.

[1] Continuation of monitoring at Lake Laberge and Fort Good Hope aims to build on long existing time series, although neither of these are considered focal ecosystems for the purpose of ecosystem research.

- The potential impact of expanding species ranges of temperate species on contaminant pathways, e.g. the expansion of Pacific salmon into the Mackenzie River via the Arctic Ocean.
- Assessing contaminant (and particularly mercury) fate and pathways in the Mackenzie Delta, a highly productive system that transports large volumes of water and organic matter into larger water bodies such as lakes and the Beaufort Sea. Estuaries could also merit attention, e.g. the Husky Lakes (Inuvialuit Settlement Region).
- Ecosystem changes in lakes and rivers and impacts of these changes on contaminant dynamics in the system, particularly how climate change and permafrost degradation might influence concentrations and trends in key monitoring species (i.e. lake trout, char and burbot).
- Given the importance of nutrient enrichment and food web transfer of methylmercury in freshwater systems, more information is needed on mercury and nutrient pathways through freshwater food webs.
- Identification of methylmercury hotspots within a given ecosystem and subsequent identification of factors affecting mercury methylation rates and spatial variability within and between lakes, rivers and delta ecosystems.
- Sediment cores can provide useful information on contaminant deposition and the impacts of environmental processes (e.g. climate change), but if proposed these should be well contextualized considering NCP's overarching goal of reducing/eliminating and providing information on contaminants in traditional food sources.
- The influence of forest fires on contaminant levels in freshwater ecosystems and species is of interest – refer to Appendix A for guidance on contaminants of interest and note that inclusion of contaminants not listed in the tables requires thorough background and justification.

Priorities for Plastic Pollution and Plastic-Derived Contaminants in Freshwater Ecosystems:

- There is a need for information on the distribution, sources, transport and fate of microplastics in Arctic freshwater ecosystems. Some previous work has been addressing this priority. If you plan to submit a proposal on this topic, please follow up with the appropriate community organizations, regional contaminants committees (Appendix B) and/or the NCP Secretariat to ensure that you are not duplicating existing work.

7.5.3 Marine ecosystems

The Focal ecosystems are: Beaufort Sea/Amundsen Gulf, Barrow Strait/Lancaster Sound, Cumberland Sound/Davis Strait, Hudson Bay, Labrador Sea (coastal waters), and the Dease Strait/Queen Maud Gulf.

Marine Monitoring Priorities (directed funding, not open to general submissions)

The following bullets outline species and sampling locations for monitoring in marine ecosystems.

- Ringed seal: Sachs Harbour (Beaufort Sea/Amundsen Gulf), Resolute (Barrow Strait/Lancaster Sound), Arviat (Hudson Bay), and Nain (Labrador Sea) are monitored annually for mercury, PFAS and CEACs. Biennial monitoring of Schedule A POPs and chlorinated alkanes/paraffins will take place during even numbered sampling years (i.e., 2026, 2028, ...), PBDEs and other select Schedule B POPs as well as inorganic elements will be analyzed in odd years (i.e., 2027, 2029 …), and PCDD/PCDFs will be analyzed triennially (i.e., 2027, 2030, …). Consultations have begun to add ringed seal monitoring in Nunavik in conjunction with regional wildlife organizations. . This project is led by Magali Houde of Environment and Climate Change Canada and Steve Ferguson of Fisheries and Oceans Canada.

- Beluga: Hendrickson Island (Beaufort Sea/Amundsen Gulf), Pangnirtung (Cumberland Sound), and Sanikiluaq (Hudson Bay) are monitored annually for mercury PFAS, and other select Schedule B and C POPs. Biennial monitoring of Schedule A POPs will take place during odd numbered sampling years (i.e., 2027, 2029...), PBDEs and other flame retardants will be analyzed in even years (i.e., 2026, 2028, …), and PCDD/PCDFs will be analyzed triennially beginning in 2025-2026 (i.e., 2025, 2028, …). This project is led by Lisa Loseto and Cortney Watt of Fisheries and Oceans Canada.
- Polar bear: Hudson Bay populations (Hudson Bay) are monitored annually for mercury, inorganic elements, , PFAS and other select Schedule B POPs and CEACs. Biennial monitoring of Schedule A POPs will take place during even numbered sampling years (i.e. 2026, 2028, ...), and biennial monitoring of PBDEs and other flame retardant chemicals will take place in odd years (i.e., 2027, 2029…). Samples from the High Arctic Baffin Bay subpopulation are also collected and archived annually for potential retrospective studies and are spot-checked for priority contaminants on a rotational basis. This project is led by Robert Letcher of Environment and Climate Change Canada and Amelie Roberto-Charron of the Nunavut Department of Environment.
- Seabird eggs: thick-billed murres and northern fulmars from Prince Leopold Island (Barrow Strait/Lancaster Sound), thick-billed murres from Coats Island (Hudson Bay) are monitored annually for mercury, PFAS, and select Schedule B and C POPs and CEACs. Biennial monitoring of Schedule A POPs and PBDEs will take place during even numbered sampling years (i.e. 2026, 2028...), PCNs will be analyzed in odd years (i.e., 2027, 2029…), and PCDD/PCDFs will be analyzed triennially beginning in 2025-2026 (i.e., 2025, 2028, …). This project is led by Jennifer Provencher of Environment and Climate Change Canada and Mark Mallory of Acadia University.
- Sea-run Arctic char: Cambridge Bay (Beaufort Sea/Amundsen Gulf) are monitored annually for mercury. Fish (e.g., lake trout, Arctic char) in nearby lakes will also be monitored for mercury and periodically for POPs along with the searun char. This project is led by Marlene Evans of Environment and Climate Change Canada and Heidi Swanson of Wilfred Laurier University.
- Community centred monitoring of POPs and mercury in seawater. Currently based in Resolute, Nain, and Cambridge Bay. This project is led by Amila De Silva, Jane Kirk, and Amber Gleason of Environment and Climate Change Canada.

Marine Research Priorities

The following bullets outline research priorities and knowledge gaps identified in marine ecosystems.

- Collaborations between wildlife research project leaders and health experts to include biological information about diseases, parasites, etc. in addition and in relation to contaminant levels (e.g. cumulative effects or a One Health approach) are strongly encouraged. Note that the NCP will fund contaminants-related components of these studies, but additional sources of funding should be included to address the other factors.
- Contaminant distribution in marine food webs with a focus on marine fishes and other species that represent food sources for Indigenous Peoples and/or represent forage for key monitoring species. These are particularly useful for CEACs and POPs in Schedule B or C for which these data do not exist.
- Nunavut has identified the need for updated information on contaminant levels in killer whales, narwhal, walrus, and harp seals. Narwhal are currently being investigated by one project in Nunavut. If you plan to submit a proposal on this topic, please follow up with the appropriate community organizations, Nunavut Environmental Contaminants Committee (Appendix B) and/or the NCP Secretariat to ensure that you are not duplicating existing work.

- Nunatsiavut has identified the need for information on contaminant levels in porpoise, known locally as jumpers.
- Nunavik is interested in PFAS measurements in wildlife and the environment in the Hudson Bay area. This is currently being addressed by several monitoring and research projects, you should contact the Nunavik Nutrition and Health Committee and other RCCs (Appendix B) to discuss the highest priorities that remain unaddressed before writing your proposal.
- Contaminant levels in shellfish (e.g. bivalves, sea urchins, crustaceans, etc.) are of interest, particularly from areas where they are commonly harvested.
- Ecosystem changes in focal marine areas and the impact of these changes on contaminant dynamics in the system, particularly how changes might influence levels and trends in key monitoring species (e.g. ringed seal).
- Contaminant-related effects in wildlife with a focus on those species that, based on the best available information, are at greatest risk or may serve as early warning indicators of effects in humans. Important considerations should be: the level of contaminant exposure and expected changes in exposure, and the potential vulnerability of a given wildlife population to potential effects (e.g. diminished health status as a result of climate-related stresses).
- Assess contaminant concentrations at regular intervals in species and locations where health messaging has previously been issued. If you have led a project that resulted in health messaging for the communities/regions, you can contact the appropriate community/regional organizations, regional contaminants committee(s), and the NCP Secretariat to discuss appropriate follow-up timeframes.
- Comparison of mercury methylation and bioavailability of methylmercury at sites with large tidal ranges (e.g. Hudson Bay, Frobisher Bay) compared with those with low tidal ranges.

Priorities for Plastic Pollution and Plastic-Derived Contaminants in Marine Ecosystems:

- Assess the presence and distribution of plastic pollution in the abiotic environment of marine (as well freshwater and terrestrial) ecosystems to advance understanding of the sources (long range vs. local), pathways, and environmental fate of plastic pollution in northern ecosystems, via the implementation of standard protocols and harmonized approaches for research and monitoring plastic pollution Some previous work has been addressing this priority. If you plan to submit a proposal on this topic, please follow up with the appropriate community organizations, regional contaminants committees (Appendix B) and/or the NCP Secretariat to ensure that you are not duplicating existing work.
- Assess the presence, abundance, and type of plastic pollution in invertebrates, pelagic and benthic fish, seabirds and marine mammals to further describe the fate of plastics in the environment and gauge potential risks to wildlife health.
- Evaluate the environmental fate and transformation processes (e.g. fragmentation, degradation, and adsorption/leaching of contaminants) of plastic pollution in the ocean under Arctic conditions.
- Measure the levels of plastic associated contaminants (additives) in the Arctic environment and biota, specifically marine mammals, birds and fish. Some previous work has been addressing this priority. If you plan to submit a proposal on this topic, please follow up with the appropriate community organizations, regional contaminants committees (Appendix B) and/or the NCP Secretariat to ensure that you are not duplicating existing work.

7.6 Contaminants of Interest

Researchers are asked to rationalize an analytical program and schedule that best suits the proposed project. Substances that are either currently included in or are being considered for inclusion in international conventions are identified and discussed in Appendix A. An important function of the NCP is to provide monitoring data on substances that are already covered by these conventions. However, the NCP needs to ensure that it can provide the most complete dataset possible for substances under consideration, particularly those substances that are chemicals of emerging Arctic concern (CEACs). The NCP prioritizes contaminants primarily delivered through long-range transport processes rather than those with a largely local source, so analytical programs should be reflective of this priority. Plastic pollution may be an exception to this, as sources of plastics in the North are currently not well understood. Samples should also be screened for CEACs that demonstrate the potential for Arctic contamination but have yet to be identified in the Arctic environment. Because the presence of a chemical in a remote environment such as the Arctic automatically implies that it is persistent and subject to long-range transport, this evidence is critical to domestic and international chemical assessment activities. **Analytical proposals to measure new contaminants should be well justified, using physicochemical properties, modelling results and existing data to demonstrate the potential for long-range transport, Arctic contamination, and bioaccumulation and should not be "fishing expeditions" for a large array of contaminants that have little chance of accumulating in the North.** Plastic pollution and plastic-derived contaminants are now also included as CEACs, as they exhibit similar characteristics of POPs and have been detected in environmental media and Arctic species occupying most trophic levels.

7.7 Selection of Species for Long-Term Trend Monitoring

It should be noted that the vast majority of samples collected for NCP research and monitoring are collected by hunters from nearby communities as part of their subsistence hunting activities. When possible, GPS coordinates should be captured when samples are collected. Morphometric and condition information (length, girth, fat thickness, weight), as well as overall health and behaviour if possible, should also be included as these have been identified by RCCs as important to Northern communities as well as to contaminant data interpretation by researchers. Project leaders for these long-term trend monitoring projects have already been identified, and funding has been committed for this work.

7.7.1 Ringed seal

Ringed seal, a widely distributed species found throughout the circumpolar Arctic, is an important traditional/country food species for Inuit. Contaminants have been measured in samples of ringed seal collected near Arctic communities, such as Resolute, over the past twenty-five years and represent an excellent opportunity to study temporal trends. A number of other Arctic countries also maintain ringed seal monitoring programs which provides the opportunity for international comparisons, particularly through the NCP's participation in AMAP. Ringed seals will be sampled annually under this program with the help of hunters from the communities of Sachs Harbour, Resolute, Arviat, and Nain. These four locations represent very different regions in the Canadian Arctic that are experiencing varying degrees of climate change and contaminant input. The addition of a new site providing coverage in Nunavik is currently under consideration.

7.7.2 Beluga whales

Beluga whales are an important traditional/country food species for many Arctic communities. Samples of beluga are collected from the Mackenzie Delta, Hudson Bay and Cumberland Sound at various times over the past twenty-five years and analyzed for contaminants. The existing temporal datasets for this species will be augmented with annual sampling at Hendrickson Island in the Mackenzie Delta, Cumberland Sound and Hudson Bay by hunters from Tuktoyaktuk, Pangnirtung, and Sanikiluaq. This monitoring plan will allow researchers to

compare beluga from the western and eastern Arctic as well as Hudson Bay. These areas have regional differences with respect to the impacts of climate change and contaminant inputs. In the coming years, more efforts will be made to include a more holistic assessment of factors that can affect the health of the whales in the Nunavut populations, as is already undertaken for the Hendrickson Island beluga.

7.7.3 Polar bear

Polar bears are the top predators in the Arctic marine food chain and have the highest concentration of some contaminants found in the Arctic. Polar bear meat is consumed by Inuit and the animal has special socio-cultural and economic importance (through commercial hunts) to Inuit communities. As with other species, polar bears have been sampled periodically in the past and analyzed for contaminants. The most extensive temporal dataset for contaminants in polar bear has been collected for Hudson Bay (Western and Southern Hudson Bay subpopulations), which is Canada's most southerly Arctic sea and has experienced heightened impacts from climate change compared to some High Arctic locations. Recent results from ongoing monitoring of polar bear in Hudson Bay over the last few decades have suggested that the dietary habits of polar bear have already changed and continue to change as a result of climate change, and that this affects contaminant dynamics in these animals substantially. Samples from polar bears from the Baffin Bay subpopulation are archived annually and should be assessed for a broad range of metals and POPs on a rotational basis in order to compare a High Arctic population with those from the Hudson Bay.

7.7.4 Seabird eggs

The eggs of seabirds have contributed to the long-term monitoring of contaminants since the 1970s. The Arctic is an important breeding ground for a large number of seabirds that nest on the rocky shores and cliffs of Arctic islands. During the nesting season seabird eggs are a popular food item for Inuit, for whom collecting and consuming eggs is an important spring tradition and source of nutrition. Since 1975, eggs have been collected periodically from Prince Leopold Island and Coats Island by Environment and Climate Change Canada and represent one of the best temporal contaminant datasets. Eggs of thick-billed murre and northern fulmar are collected once a year from each of these colonies to build on the past data and improve our assessment of temporal trends. Eggs are ideal for monitoring because they are relatively easy to collect and do not involve killing an adult bird. Seabird eggs are also collected as part of monitoring programs in other Arctic countries, allowing for international comparisons. The two colonies selected for monitoring are located in the High Arctic: Prince Leopold Island and, further south in the mouth of Hudson Bay, Coats Island. These two sites provide opportunities to examine changes over time in two different ecosystems undergoing varying degrees of change. This program samples eggs for three additional species (black-legged kittiwake, black guillemot, glaucous gull) every five years, and adult birds of four species (thick-billed murre, northern fulmar, black-legged kittiwake, black guillemot) every ten years.

7.7.5 Sea-run Arctic char

This type of Arctic char is widely distributed throughout the Arctic and is one of the most important traditional/country food species for Arctic people. Char represent a widely available and highly nutritious source of food and is promoted by public health authorities. Char is promoted because contaminant levels tend to be relatively low in char compared with other traditional/country foods, and it is an excellent source of protein, polyunsaturated fatty acids and other micronutrients. Sea-run char have been collected from communities across the Canadian Arctic and the results confirm that contaminant levels are quite low, particularly in comparison with marine mammals. One location in the central/western Arctic (Cambridge Bay), has been selected for continued annual monitoring to ensure that contaminant levels remain low. The scope of this project is expected to expand in future years pending consultation with the community and Nunavut Environmental Contaminants Committee to include contaminant analysis, with a focus on mercury and periodic monitoring of

POPs (along with periodic POP spot-checks in the searun char), in fish (e.g. lake trout and Arctic char) in lakes near Cambridge Bay. This will provide additional temporal trends in freshwater fish in Nunavut, as well as address community concerns about mercury levels in these fish.

7.7.6 Land-locked Arctic char

This species of char is also widely distributed in Arctic lakes and rivers. The NCP has been monitoring land-locked char in High Arctic lakes around the community of Resolute on Cornwallis Island and on Ellesmere Island for more than twenty years and has built strong temporal datasets on contaminant levels. The lakes receive contaminants from the atmosphere and are therefore good indicators of changing atmospheric inputs of contaminants. High Arctic lakes are also undergoing significant changes related to climate change which also influence contaminant concentrations in the fish. A potential site change is being investigated as fish are no longer caught regularly/in large enough numbers at one of the ongoing monitoring sites. This will require consultation with the community and Nunavut Environmental Contaminants Committee.

7.7.7 Lake trout and burbot

Lake trout and, to a lesser extent, burbot are also important traditional/country food species for many northern communities and like char both are excellent sources of nutrition. Lake trout and burbot can contain high concentrations of mercury, especially older fish, which can be a significant source of mercury to people who consume it frequently. Trout have been monitored for over twenty years in Yukon and the NWT and burbot are monitored in the NWT only, both of which represent valuable temporal trend datasets. The program will continue to monitor lake trout and burbot annually in the important fishery of Great Slave Lake, burbot caught in the Mackenzie River near Fort Good Hope, and lake trout in Lake Laberge and Kusawa Lake in Yukon.

7.7.8 Caribou

Caribou were selected for temporal trends monitoring because of their importance as a traditional/country food and because there is good historical information on contaminant levels in some herds with most contaminant levels being among the lowest of any traditional/country food species. Two caribou herds were selected for continued annual monitoring of heavy metals and POPs listed in Appendix A, Schedule B: the Porcupine herd and the Qamanirjuaq herds. The range of the Porcupine herd is northern Yukon and Alaska; these areas may be exposed to atmospheric deposition of contaminants originating in Asia, whereas the range of the Qamanirjuaq herd is from eastern NWT to southern Nunavut and the shores of Hudson Bay, which is more likely to receive atmospheric contaminant input from North America. Spot checks on additional priority Schedule A and B contaminants will be performed every 4-5 years on samples from the annually monitored herds as well as herds selected to cover a broader geographic range on a rotational basis.

8 – BLUEPRINT FOR COMMUNITY-BASED MONITORING AND RESEARCH

8.1 What This Blueprint is About

This blueprint outlines the priorities for projects funded under the C*ommunity-Based Monitoring and Research* (CBMR) subprogram of the NCP, and is intended to help applicants prepare a successful proposal submission.

The goal of the CBMR subprogram is to address questions and northern communities' concerns about long-range contaminants and plastic pollution in ways that **support community priorities, perspectives, and leadership** in monitoring and research work.

The amount of funding available to all new CBMR projects through this Call for Proposals (for projects beginning in 2026 and lasting up to 3 years) is shown in Table 1.2 of the Call for Proposals. Specifically, a total of **$210,000** is available for projects starting in 2026, with **$125,000** for **single year** projects focused on plastic pollution. The NCP is already funding some multi-year CBMR projects that will be continuing their work in 2026-2027. You can find out more about them here.

8.2 What makes a strong CBMR Project

Community-Based Monitoring and Research (CBMR) projects supported by Northern Contaminants Program:

- **Bring together Indigenous Knowledge systems, Indigenous science and contaminants science to better understand long-range contaminants and/or plastic pollution** in the North and Arctic, and what this means for individuals and communities. This includes looking at contaminant levels in wildlife and the environment; links between contaminants and climate change; how dietary choices and risk perceptions shape food decisions; and plastic pollution in both the environment and traditional/country foods.

> **Long-range contaminants** are transported to the Arctic through atmospheric and oceanic processes from other parts of the world, remain in the Arctic environment and build up in the food chain, **as opposed to emissions originating from point sources in the North** (i.e. mining operations, diesel power generation, fuel and oil spills, construction and vehicle use). See *Annex A – NCP's Contaminants of Concern.*

- **Respect Indigenous self-determination**, which means that project ideas should come from community priorities and concerns and be guided by local leadership.
- **Are led or co-led by a northern community organization or institution**. Also, the majority of the project funds should be for **activities taking place in the North**, supporting work carried out by groups such as Hunters and Trappers Committees and Organizations, community research organizations, northern post-secondary institutions, territorial/northern regional governments, Indigenous organizations, and other community-based groups. Projects may also **include education and training opportunities** for local students and community members.

Projects may be stand-alone community-based monitoring and research initiatives. They can also be connected to other NCP projects funded under the environmental monitoring and human health subprograms, or to projects funded by other programs (e.g., ArcticNet, etc.).

8.3 Project Priorities and Examples

Priority areas for new projects, with examples of current or past NCP CBMR funded projects include:

- **Community knowledge, wildlife and contaminants**: documenting Indigenous science and Indigenous Knowledge about changes in the environment (see *7.4* and *7.5*), and wildlife (see *7.7*), in relation to contaminants.

  For example, **Understanding fish mercury concentrations in Dehcho lakes** (NCP Project CB-01). In the Dehcho region of the Northwest Territories, community members and researchers have monitored mercury in fish from 15 lakes over nearly a decade. This work has helped explain why some lakes have higher mercury levels than others and has supported updates to consumption advisories. Additional lakes have been added to this study, and recent sampling, even during a fire-affected season, shows that many fish species remain safe to eat. Findings are shared through posters, presentations, and community meetings to support safe harvest and cultural continuity.

- **Monitoring climate change impacts on contaminants**: tracking local environmental changes (in ice, permafrost, plants, animals, or weather events) that may affect contaminant levels and their movement in air water, soils and sediment (see *1.5.1 Partnerships*).

  For example, **Community-based climate monitoring of mercury and microplastics in seawater and sediments** (NCP Project CB-42). In Tuktoyaktuk, as part of the larger Nuna project, community-led research investigates how coastal erosion and river runoff affect mercury and other heavy metals in the Inuvialuit Settlement Region. By sampling water and sediments during key times of change, like storms or ice breakup, the project is building a clearer picture of how contaminants move through coastal ecosystems. Results are shared locally to support community decision-making in the face of rapid environmental change.

- **Diet choices and risk perception**: gathering community perspectives on traditional/country foods, dietary choices, research on how people understand or manage risks from contaminants (see *6.6.4 Benefit/risk evaluation and risk/benefit communication*). **Risk perception** refers to how people judge the presence, likelihood, and severity of contaminants, shaped by knowledge, experiences, and collective concerns. Understanding these perceptions, along with awareness of both risks and benefits, is important for designing effective health communication and for anticipating how environmental health initiatives will be received.

  For example, **Contaminants in Traditionally Harvested Berries from the Kivalliq Region** (NCP Project CB-45). In Arviat, the Hunters and Trappers Organization asked whether locally harvested berries are safe to eat. Cloudberries and blackberries from traditional sites were tested for mercury, legacy pollutants, and newer contaminants. Results are shared in plain language in English and Inuktitut, and if any health concerns arise, the community works with health authorities to decide on next steps. This project ensures local questions are answered directly, supporting confidence in traditional foods.

- **Plastic pollution**: shoreline surveys, beach monitoring programs, collection and analysis of plastics in the environment and wildlife (see *7.3* for more information on plastic pollution research under NCP). Plastic pollution funds are not currently available beyond the 2026-2027 fiscal year.

  For example, **Community monitoring of plastic pollution in wild food and environments in Nunatsiavut** (NCP Project CB-10). In Nunatsiavut, community members monitored plastics in Arctic char and ringed seal with support from Memorial University, helping identify local versus long-range sources of pollution. The results directly informed food safety communication with hunters.

- **Other community-based initiatives**: small-scale or short-term projects (up to 3 years) that address communities' long-range contaminant-related research questions.

If you are unsure whether your project idea fits under the NCP CBMR subprogram, contact your area's **Regional Contaminants Committee** or **Research Advisor** (see *Appendix B – Contact Information*).

Join the **CBMR NCP Proposal Seminar** (November 26, 2025) presented by the NCP Secretariat.

8.4 Connecting Knowledge Systems

The NCP acknowledges that communities hold deep knowledge about the land, water, animals, and foods that sustain them. This knowledge, passed down through generations and strengthened by lived experience, is essential for understanding contaminants and their impacts in the North.

Projects can bring together Indigenous Knowledge and science, local observations, and Western scientific methods in ways that respect each approach and make the results useful for communities. This might include:

- Documenting local Indigenous Knowledge/science about changes in wildlife, plants, or food safety;
- Combining community observations with scientific data to better understand contaminants;
- Creating tools or approaches that support knowledge sharing and decision-making;
- Involving hunters and community members in the collection and analysis of data.

It is important that all Knowledge Holders are recognized for their contributions to a project.

8.5 Education, Training and Community Involvement

Like all NCP projects, CBMR projects are encouraged to include activities that build skills and create opportunities for local students, youth, and community members. This may involve training in sample collection, data recording, or other research methods, as well as youth engagement with Knowledge Holders in their own communities. CBMR projects should contribute to enhancing local capacity so that communities benefit directly from monitoring and research. Capacity-building can mean developing knowledge, skills and resources that allow communities to carry out their own research in the future.

Examples from past NCP CBMR projects include: training community members to use and maintain research equipment; developing community-led research plans or protocols that continue beyond the life of the project; providing paid employment for local researchers and assistants; creating opportunities for youth and students to gain hands-on experience; hosting workshops that share results in accessible ways; and supporting locally led decisions on how findings are used to promote health and food security.

8.6 What Makes a Strong Proposal

A strong proposal will show:

- **Clear community leadership and participation** – Demonstrate how the project is led or co-led by the community and how members, youth, and partners will be engaged. Coordinate with your Regional Contaminants Committee and Research Advisor (see *Appendix B – Contact Information*), and where relevant, consult regional health authorities. **Health authorities must be involved** in project communication plans to flag results in traditional/country foods that may be of concern.
- **A clear contaminants-related research question or community concern** – Frame your project around long-range contaminants or plastic pollution issues. Build on what exists by connecting with ongoing NCP projects or other monitoring programs, rather than duplicating them. Regional Contaminants Committees, Research Advisors and the NCP Secretariat can help with links to other NCP projects. Territorial/regional lands departments may also be valuable partners.
- **Relevant expertise and detailed plans** – Use an approach that is proven and appropriate. Have a well-rounded team to address the question at hand, in the given location, and describe in as much detail as possible what you plan to do. Note that lab partners performing contaminant analysis need to follow strict quality assurance and participate in **NCP's QA/QC program** (see *1.5.8 Quality assurance and quality control*).

- **Knowledge transfer and exchange** – Describe how results will be shared, with whom, and how the project will benefit the community. Results should be shared both within the community and with relevant regional/national partners. Include plans for communicating, training, and educating community members, youth, and partners.

- **Expected benefits of the project for the community** – The proposal should describe how the community organization, government, or group expects to use the results of the project in the future. While outcomes cannot always be guaranteed, applicants should be able to outline how the project could support long-term community priorities and decision-making, ensuring that benefits are primarily geared toward community uptake rather than external or academic outputs alone.

- **A detailed itemized budget** – The proposal should provide a rationale or justification for all the items included in the project's budget.

Preparing a proposal can take time.

Start early! The deadline for this year's Call for Proposals is **January 20, 2026**.

9 – BLUEPRINT FOR COMMUNICATIONS, CAPACITY AND OUTREACH

9.1 Introduction

This blueprint outlines the funding priorities under the Communications, Capacity and Outreach subprogram of the NCP.

The total amounts of funding available through this Call for Proposals in the 2026-2027, 2027-2028, and 2028-2029 fiscal years, after considering multi-year funding commitments, are shown in Table 1.2.

9.2 Objectives

The objectives of the Communications, Capacity and Outreach subprogram are to support and facilitate activities and initiatives that:

(a) raise awareness of contaminants in the North from long-range sources and the work that is under way to address the issue;

(b) help to support food choice decisions among consumers of traditional/country foods; and

(c) build capacity in the North to participate in and/or contribute to addressing these issues.

9.3 Background

The NCP has been communicating about long-range contaminants and building capacity in the North for more than thirty years. In that time, much has been learned about the presence, trends, and health effects of contaminants in the North. Much has also been learned about how to communicate this complex information and how best to engage Northerners in research, monitoring, and outreach activities. There have been many outreach efforts to target audiences over the years using a variety of methods (e.g. posters, newsletters, development of school curricula, community tours, radio call-in shows, regional and community workshops, frontline training courses, and Elder–scientist retreats).

The presence and effects of long-range contaminants is one of several environmental, social, and health issues faced in the North. NCP-funded studies in which community members across the North were surveyed on the importance of contaminants information in their food choices have concluded that, in most cases, the contaminant issue is low on the list of driving forces for community members in choosing what to eat.

Given this finding, the NCP's approach reflects an understanding that information about contaminants is best shared with northern community members within the context of other relevant information and concerns. For example, instead of creating focused workshops and newsletters entirely devoted to the issue of contaminants, public health authorities have deemed it appropriate to insert contaminant messaging into existing public health messages and education efforts. This type of work is encouraged by the NCP. Wherever possible, NCP communications work should be integrated into already existing avenues for communication.

9.4 Project Opportunities

The NCP is seeking proposals for projects and activities that are cross-cutting and strategic, and that are broader in scope than project-specific results dissemination.

9.4.1 Assessment of Promising Practices in Communication and Engagement

NCP is seeking proposal applications that assess existing contaminants communication methods to provide recommendations on best practices for northern audiences. Past NCP communication and other northern program engagement methods would be assessed for their effectiveness. New approaches to communications (e.g. use of new technologies) may also be explored in a northern context. The goal of this priority is to provide evidence-based recommendations on improving contaminants communications and to make them readily available to NCP researchers and frontline communicators. Activities may include regionally-based projects, or projects centered on a particular type of research (e.g. human health communications, or methods of engagement around wildlife monitoring).

9.4.2 Delivery of Synthesized Contaminants Messages

This priority area supports the delivery of synthesized messages related to contaminants, particularly as presented in a regional context, bringing together information from several NCP projects, and building on the results and key messages from the most recent NCP and AMAP reports.

Note that delivery of individual project results falls under the responsibility of the Human Health, Community-Based Monitoring, or Environmental Monitoring and Research subprograms.

Activities may include:

- delivering a synthesis or compilation of the results of several projects on contaminants in one or more regions (e.g. regional results workshops, posters, newsletters)
- delivering a regionally-focused workshop, especially if there is significant co-funding and a demonstrated need to disseminate information (e.g. elevated levels of contaminants and a perceived health risk related to traditional/country foods)

9.4.3 Development and Assessment of New Tools and Resources for Communication and Engagement

The development and assessment of new tools and methods of communication and engagement are a priority in this subprogram. This priority promotes the assessment of the effectiveness of technologies like social media, webinars, and browser-based applications in communicating information about long-range environmental contaminants.

While there are many barriers in the North to extensive use of internet-based tools, projects under this priority could assess which regions would be best placed to use new communications technologies, and which methods would be most successful in reaching an audience to provide information that assists informed decision making by individuals and communities in their food use.

This priority could include development of tools for translators/interpreters to work with contaminants terminology.

9.4.4 Core Communications and Capacity Building

The NCP supports Regional Contaminants Committees in five regions (Yukon, Northwest Territories, Nunavut, Nunavik, Nunatsiavut), Inuit Research Advisors in four regions (Inuvialuit Settlement Region, Nunavut, Nunavik, Nunatsiavut), and a Dene Nation Research Advisor (Northwest Territories) all of which play a key role in the communications network of the NCP.

Proposals for Regional Contaminants Committees and Inuit Research Advisors are invited from the organizations listed as project leaders in Tables 9.1 and 9.2.

Table 9.1 Project Leaders for Regional Contaminants Committees

Project	Project Leader
Yukon Contaminants Committee	CIRNAC-Yukon
NWT Regional Contaminants Committee (including participation funds for members)	Chair of the NWT Regional Contaminants Committee and Dene Nation
Nunavut Environmental Contaminants Committee	CIRNAC-Nunavut and Nunavut Tunngavik Inc.
Nunavik Nutrition and Health Committee	Atanniuvik
Nunatsiavut Government Research Advisory Committee	Nunatsiavut Government

Table 9.2 Research Advisors

Region	Host Organization
• Inuvialuit Settlement Region • Nunavut • Nunavik • Nunatsiavut • Northwest Territories • Yukon	• Inuvialuit Regional Corporation (IRC) • Nunavut Tunngavik Incorporated (NTI) • Attaniuvik • Nunatsiavut Government • Dene Nation • Council of Yukon First Nations

9.5 Responsibilities and Activities of a Regional Contaminants Committee

Regional Contaminants Committees act as NCP representatives in the North, liaising with communities to inform them of NCP activities, but also to bring community concerns and issues back to the program. They support and assist NCP researchers to develop communications plans, build northern capacity within their projects, and consult with appropriate northern stakeholders. Activities include, but are not limited to:

- facilitating a contaminants communications network that ensures community members are informed and involved in contaminant related activities
- identifying regional and community priorities and information gaps related to environmental contaminants and human health research
- providing updates on research activities in the region that relate to environmental contaminants
- maintaining a current catalogue of contacts and resource materials regarding environmental contaminants
- assisting in the development of appropriate communication strategies to effectively relay information regarding contaminants
- reviewing NCP proposals, Blueprints and communication materials related to the region on an annual basis
- providing advice to contaminants researchers working in the region on matters related to community engagement, consultation, research permitting, results communication, and capacity building and training

9.6 Responsibilities and Activities of Research Advisors

In addition to the Inuit Research Advisors, the Northern Contaminants Program (NCP) now includes a Research Advisors hosted by the Dene Nation for the Northwest Territories and Council of Yukon First Nations for the Yukon. This further expands the representation of Indigenous perspectives in contaminant-related research. These advisors help to facilitate research in their region, ensuring that contaminants, climate change, and environmental health research reflects community priorities and engages Indigenous peoples in meaningful ways. These positions are supported by the NCP, ArcticNet, and the host organizations (see Table 9.2).

Activities to be undertaken in these positions include, but are not limited to:

- participating in meetings of Regional Contaminants Committees and informing committee of research activities in their region, as well as activities of their host organization
- communicating with researchers who have been funded about the communication of their findings and the need to build capacity in communities
- communicating with all NCP researchers working in their region to discuss their plans to communicate, to whom, and when, and present this information at Regional Contaminants Committee meetings
- reviewing and commenting on the messages being developed by NCP researchers (as part, or independent of Regional Contaminants Committees)
- tracking and reporting on support provided to NCP and other researchers

10 – BLUEPRINT FOR PROGRAM COORDINATION AND INDIGENOUS PARTNERSHIPS

This section describes how funding under the *Program Coordination and Indigenous Partnerships* subprogram is allocated.

The funding under this subprogram is for ongoing projects and is not open to general applicants.

10.1 Coordination and Administration of the Northern Contaminants Program

The NCP Secretariat prepares two proposals for review by the NCP Management Committee to cover the costs and expenses of: (1) administering the program; and (2) for coordination of NCP activities in related international initiatives, particularly the Arctic Monitoring and Assessment Programme (AMAP), a Working Group under the Arctic Council. These proposals include costs for NCP meetings, publications, website, program-wide communications, data management, and a quality assurance/quality control (QA/QC) program.

10.2 Indigenous Partner Capacity Building

The four northern Indigenous Partners (Inuit Tapiriit Kanatami (ITK), Inuit Circumpolar Council-Canada (ICC), Dene Nation, and Council of Yukon First Nations (CYFN)) are funded for their active participation in the management and implementation of the NCP and its activities, both nationally and in the region(s) for which they are the relevant Indigenous organization. This is to ensure that the NCP incorporates and addresses Indigenous specific concerns and needs into its planning and program delivery, and to facilitate the exchange of information and coordination of activities among and between the NCP community and Indigenous organizations at various levels and northern communities. Activities include, but are not limited to:

- participating in and preparing for Management Committee meetings (twice annually in-person plus by teleconference, as needed)
- participating in and preparing for Regional Contaminants Committee meetings
- participating in meetings of NCP subcommittees and/or task groups, and other related initiatives nationally or internationally
- reviewing regionally relevant NCP projects and consulting with project leaders and communities as necessary
- conducting outreach activities related to the NCP
- participating in the NCP Results Workshop and contributing to its success in part by assisting the NCP Secretariat in workshop planning and delivery
- providing timely input and feedback in the development of and/or revisions to key NCP documents

APPENDIX A – NCP'S CONTAMINANTS OF CONCERN

The Northern Contaminants Program (NCP) is concerned with persistent, bioaccumulative, and toxic contaminants that reach the Arctic via long-range transport from source areas around the globe. These include a large number of persistent organic pollutants (POPs) and heavy metals, particularly mercury. These contaminants can reach elevated concentrations in the tissues of Arctic wildlife and present a toxicological risk to wildlife and humans who consume them. The NCP has recently added microplastics, another emerging concern, to this list.

HEAVY METALS

The UNEP Minamata Convention on Mercury, a legally-binding agreement to cut emissions and releases of mercury to the environment, was formally adopted in October 2013 and entered into force on August 16, 2017, advancing an international effort to reduce global mercury pollution and protect the environment and human health. The NCP seeks **annual monitoring** of mercury from NCP projects as identified in the blueprints for Environmental Monitoring and Research, Human Health, and Community-Based Monitoring and Research. Cadmium and lead can be delivered through the atmosphere but may also have significant local sources, and **applicants are reminded that NCP research proposals should focus on contaminants subject to long-range environmental transport**.

Additional heavy metals and essential elements of interest (e.g. selenium) can provide valuable companion data for metals of concern and can potentially be analyzed together with the priority metals at reasonable costs in multielement analytical suites. If justified in the proposed matrix of study, the NCP will consider these analyses for support in environmental, biotic and human media.

Table A1. Metals of Concern for the NCP, in relation to long-range environmental transport (eligible for annual sampling)

Mercury
Cadmium
Lead

PLASTIC POLLUTION AND PLASTIC-DERIVED CONTAMINANTS

Plastic composition and use is varied and extremely broad. In the environment, it can be characterized as macroplastics (2.5 cm – 1 m), mesoplastics (0.5 mm – 2.5 cm), and microplastics (< 5 mm). In addition to the possible direct physical effects of exposure to plastic there is evidence that plastics may also act as vectors for contaminant exposure to both plastic-derived chemicals and POPs. Plastic-derived chemicals can be released to the environment during production and potentially during their degradation in the environment. Proposals that include plastic-derived contaminants such as synthetic phenolic antioxidants (SPAs) and benzotriazole UV stabilizers (BZT-UVs) or plastic-associated contaminants such as plasticizers, flame retardants and other POPs are welcome, but **sufficient justification for the type and number of samples and relevance of the proposed contaminant(s) to northern environments and people should be provided from applicable sources and literature**. Applicants focussing on plastic and microplastic pollution in their proposals should refer to the recent AMAP Litter and Microplastics Monitoring Plan and Monitoring Guidelines for information on pan-Arctic priorities, appropriate methods, sample sizes, etc.

PERSISTENT ORGANIC POLLUTANTS (POPs)

Most of the targeted POPs that have been found in the Arctic environment are managed through international agreements including the United Nations Environment Programme (UNEP) *Stockholm Convention on Persistent*

Organic Pollutants and the United Nations Economic Commission for Europe's *Convention on Long-range Transboundary Air Pollution* (*CLRTAP*). The Stockholm Convention routinely assesses candidate chemicals and, when faced with strong evidence to suggest that a certain compound should be considered a POP, they are added to the convention annexes and managed appropriately. These conventions rely heavily on NCP data to support the assessment of candidate POPs and to evaluate the effectiveness of the control measures at reducing POPs in the environment.

Researchers are asked to rationalize an analytical program and schedule that best suits their proposed project. Schedules A, B, and C identify POPs and some chemicals of emerging arctic concern (CEACs) that are of high priority and concern for the NCP, and are substances that are currently included in, or being considered by, international conventions. An important role for the NCP is providing monitoring data on substances that are already covered by these conventions. However, it is also very important that the NCP provide information on substances that are under consideration for inclusion in these conventions.

New chemicals are nominated by Parties to the Stockholm Convention for review by the technical committee, the POPs Review Committee (POPRC), which includes a member from Canada (currently from Health Canada's Pest Management Regulatory Agency). Additionally, the Inuit Circumpolar Council (ICC), who also have a representative on the Northern Contaminants Program Management Committee, regularly participate in annual meetings of the POPRC as observers.

At the 20th POPRC meeting (September 2024), the committee adopted an addendum to the risk management evaluation for long-chain (C9-C21) perfluorocarboxylic acids, their salts and related compounds (LC-PFCAs), and agreed on refined recommendation to add LC-PFCAs to Annex A to the Stockholm Convention (for elimination) with a few time-limited use exemptions. The committee also adopted an addendum to the risk management evaluation for chlorinated paraffins with carbon chain lengths in the range C_{14-17} and chlorination levels at or exceeding 45 per cent chlorine by weight (MCCPs, also known as medium-chain chlorinated alkanes) and agreed on a revised recommendation to add MCCPs to Annex A to the Convention with several time-limited use exemptions. The risk management evaluation for the pesticide chlorpyrifos was adopted and the committee agreed to recommend listing the substance in Annex A to the Convention with time-limited use exemptions. Further, POPRC considered a proposal from Switzerland to list polyhalogenated-p-dioxins and dibenzofurans in Annex C to the Stockholm Convention. It was decided that **polybrominated dibenzo-p-dioxins and dibenzofurans and mixed polybrominated/chlorinated dibenzo-p-dioxins and dibenzofurans** fulfill the criteria of Annex D, a risk profile will be developed in the intersessional period and considered at POPRC-21 in 2025. Data on long-range environmental transport, persistence, bioaccumulation and toxicity will be important for this review stage. It can also be noted that the EU is currently discussing a proposal to recommend siloxanes (D4, D5, and D6) for listing in Annex B of the Stockholm Convention (https://echa.europa.eu/proposals-for-new-pop-s), however these are not currently nominated for inclusion in the Convention.

For more information on the Stockholm Convention on POPs and the work of the POP Review Committee (POPRC), please visit chm.pops.int.

Table A2 - Schedule A & B: POPs Listed in the Stockholm Convention on Persistent Organic Pollutants

Compound	DESCRIPTION OF USE/SOURCE
SCHEDULE A: ORIGINAL ("LEGACY") POPs – LISTED AS POPS IN 2001	
Polychlorinated biphenyls (PCBs) – HIGH PRIORITY	Used for a variety of industrial processes and purposes, including electrical transformers and capacitors, heat exchange fluids, paint additives, carbonless copy paper, and plastics.
Dichlorodiphenyltrichloroethane (DDT) – HIGH PRIORITY	Insecticide used on agricultural crops, primarily cotton, and insects that carry diseases such as malaria and typhus.
Hexachlorobenzene (HCB) – HIGH PRIORITY	Kills fungi (e.g. wheat bunt) that affect food crops. Also an industrial chemical used to make fireworks, ammunition, synthetic rubber, and other substances; a by-product of the manufacture of certain industrial chemicals; and an impurity in several pesticide formulations.
Aldrin	Pesticide applied to soils to kill termites, grasshoppers, corn rootworm, and other insect pests. Used on crops such as corn and cotton. Can also kill birds, fish, and humans.
Chlordane	Used extensively to control termites and as a broad-spectrum insecticide on a range of agricultural crops, such as vegetables, small grains, potatoes, sugarcane, sugar beets, fruits, nuts, citrus, and cotton.
Dieldrin	Used to control termites and textile pests. Also used to control insect-borne diseases and insects living in agricultural soils.
Endrin	Insecticide sprayed crops such as cotton and grains. Also used to control rodents such as mice and voles.
Mirex	Insecticide used to combat fire ants, termites, and mealybugs. Also used as a fire retardant in plastics, rubber, and electrical products.
Heptachlor	Insecticide used against soil insects and termites. Also used against some crop pests and to combat malaria.
Toxaphene	Insecticide used on cotton, cereal grains, fruits, nuts, and vegetables. Also used to control ticks and mites in livestock.
Polychlorinated dibenzo-*p*-dioxins (PCDD)	Produced unintentionally due to incomplete combustion, and during the manufacture of pesticides and other chlorinated substances. Emitted mostly from the burning of hospital, municipal, and hazardous waste; and from automobile emissions, peat, coal, and wood.
Polychlorinated dibenzofurans (PCDF)	Produced unintentionally from many of the same processes that produce dioxins, and also during the production of PCBs. Have been detected in emissions from waste incinerators and automobiles.
SCHEDULE B: MORE RECENTLY PRIORITIZED POPs – LISTED AS POPS BETWEEN 2009 – 2024	
alpha-Hexachlorocyclohexane (α-HCH)	Intentional use as an insecticide was phased out but this chemical is still produced as an unintentional by-product of lindane.
beta-Hexachlorocyclohexane (β-HCH)	Intentional use as an insecticide was phased out but this chemical is still produced as an unintentional by-product of lindane.
Lindane (gamma-hexachlorocyclohexane, γ-HCH)	Broad-spectrum insecticide for seed and soil treatment, foliar applications, tree and wood treatment, and against ectoparasites (e.g. fleas and lice) on people and other animals.
Chlordecone	Agricultural insecticide used to control pests on tobacco, ornamental shrubs, bananas, citrus trees, and in ant and roach traps. Chlordecone is chemically similar to the Schedule A POP mirex and is not currently used in any known applications.
Dicofol	An organochlorine pesticide that is chemically related to DDT. The substance is a miticidal pesticide and acaricide used in many countries around the world on a wide variety of fruit, vegetables, ornamental and field crops.

Endosulfan and its related isomers	Insecticide used since the 1950s to control crop pests, tsetse flies, ectoparasites of cattle, and as a wood preservative. As a broad-spectrum insecticide, endosulfan remains in use in some countries to control a wide range of pests on crops including coffee, cotton, rice, sorghum, and soy. Exemptions allow for continued use until viable alternatives can be adopted.
Hexachlorobutadiene (HCBD)	Mainly a by-product in the manufacture of chlorinated hydrocarbons like tri- and tetrachloroethene and tetrachloromethane and was/is used as a fumigant.
Methoxychlor	Broad-spectrum organochlorine insecticide that was used as a replacement for DDT. Agricultural and veterinary applications included use on field crops, vegetables, fruits, gardens, marshes livestock and pets in order to control flies, mosquito larvae, cockroaches, and other insect pests.
Pentachlorobenzene (PeCB)	Was used in PCB products, dyestuff carriers, as a fungicide, a flame retardant, and as a chemical intermediate. Also produced unintentionally during combustion, thermal and industrial processes, and present as impurities in products such as solvents or pesticides.
Pentachlorophenol (PCP) and its salts and esters	Used as a wood preservative in the 1930s and has had a variety of other applications (e.g. biocide, insecticide, fungicide, disinfectant, defoliant, anti-sapstain agent and anti-microbial agent). It has been also used in the production of textiles.
Polychlorinated naphthalenes (PCNs: di, tri, tetra, penta, hexa, hepta, octa)	Used in wood preservation, as an additive to paints and engine oils, and for cable insulation and in capacitors. PCNs have not been used in Canada in over 20 years, but can be produced unintentionally as a by-product of a number of industrial processes that contain chlorine particularly under heating or during combustion.
Tetrabromodiphenyl ether and pentabromodiphenyl ether (commercial pentabromodiphenyl ether mixture)	Used as additive brominated flame retardants, tetrabromodiphenyl ether and pentabromodiphenyl ether are the main components of the commercial pentabromodiphenyl ether mixture. Major applications included polyurethane foams and printed electronic circuit boards. Still present in many in use products and may be produced by debromination of more highly brominated congeners.
Hexabromodiphenyl ether and Heptabromodiphenyl ether (commercial octabromodiphenyl ether mixture)	Used as additive brominated flame retardants, hexabromodiphenyl ether and heptabromodiphenyl ether are the main components of the commercial octabromodiphenyl ether mixture. Used mainly in electrical and electronic housings in polymers and plastics such as acrylonitrile butadiene styrene (ABS), high impact polystyrenes (HIPS), polybutylene terephthalate (PBT), and polyamides. Still present in many in use products and may degrade to lower brominated PBDEs including penta- and tetraBDEs.
DecaBDE (commercial decabromodiphenyl ether mixture)	Used as an additive brominated flame retardant, and has a variety of applications including in plastics/ polymers/composites, textiles, adhesives, sealants, coatings and inks. Also used in housings of computers and TVs, wires and cables, pipes and carpets. It is used in commercial textiles, mainly for public buildings and transport, and in textiles for domestic furniture.
Dechlorane plus, *syn*- and *anti*-isomers and degradation products	Used as a chlorinated flame retardants in thermoplastics including nylon, rubber, acrylonitrile butadiene styrene (ABS), rubber, polypropylene. Dechlorane plus is also used in thermosetting resins such as epoxy and polyester resins, polyurethane foams, silicon rubber and neoprene. Dechlorination products and monoadducts of the *syn* and *anti* isomers are also of interest given their persistent, bioaccumulative, and toxic properties.
Hexabromobiphenyl (HBB)	Flame retardant also known as FireMaster BP-6 AND FireMaster FF-1. Was used primarily in thermoplastics (machine housings, radio and TV parts), in coatings and lacquers, and in polyurethane foam in upholsteries.
Hexabromocyclododecane (HBCDD)	Used as an additive brominated flame retardant, providing fire protection during the service life of vehicles, buildings or articles, as well as protection while stored. Main global use is in polystyrene foam insulation, and in textile applications and electric/electronic appliances.
Short-chain chlorinated paraffins (SCCPs), also known as short-chain chlorinated alkanes – HIGH PRIORITY	SCCPs can be used as a plasticizer in rubber, paints, adhesives, flame retardants for plastics as well as an extreme pressure lubricant in metal working fluids. Chlorinated paraffins are produced by chlorination of straight-chained paraffin fractions. The carbon chain length of SCCPs is between C_{10} and C_{13}. The production of SCCPs has decreased globally as jurisdictions have established control measures.

Perfluorohexane sulfonate (PFHxS), its salts and related compounds – HIGH PRIORITY	Past and current uses include addition to fire-fighting foams, as surfactants, in metal plating, cleaning, waxing, and polishing, water- and stain-protective coatings for carpets, paper, leather and textiles. PFHxS and related compounds have been used as replacements for perfluorooctane sulfonic acid (PFOS). These compounds can also be produced unintentionally during the production of other PFAS.
Perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOS-F) – HIGH PRIORITY	PFOS is both intentionally produced and an unintended degradation product of related manmade, perfluorinated chemicals. The current intentional use of PFOS is widespread and includes: electric and electronic parts, fire fighting foam, photo imaging, hydraulic fluids, and textiles.
Perfluorooctanoic acid (PFOA), its salts and related compounds – HIGH PRIORITY	Used in direct applications in the production of fluoroelastomers and fluoropolymers, with polytetrafluoroethylene (PTFE) being the most important fluoropolymer. PFOA-related substances are used in fire-fighting foams, wetting agents and cleaners, in textiles and leather, paper and cardboard (e.g. food packaging), paints and lacquers as well as other uses (non-woven medical garments, floor waxes and stone/wood sealants, thread sealant tapes and pastes, adhesives, products for apparel) where side-chain fluorinated polymers are used. Abiotic environmental measurements of PFOA are of interest in order to characterize exposure and bioaccumulation from the arctic environment.
UV-328, also known as 2-(2H-Benzotriazol-2-yl)-4,6-di-tert-pentylphenol (BDTP) and other benzotriazole UV stabilizers – HIGH PRIORITY	A benzotriazole used as an ultraviolet (UV) absorber/stabilizer in many applications, including automobile and industrial paints, coatings and plastics, and personal care products. UV-328 is also used as a printing ink additive in food contact materials.
Medium-chain chlorinated paraffins (MCCPs), also known as medium-chain chlorinated alkanes – HIGH PRIORITY	Medium-chain chlorinated paraffins (MCCPs) are chlorinated paraffins with carbon chain lengths in the range C_{14-17} and a chlorination level at or exceeding 45% chlorine by weight. MCCPs have a number of use such as a secondary plasticizer in polyvinyl chloride (PVC), adhesives, sealants, paints and coatings; a flame retardant in PVC and rubber compounds, adhesives, sealants, paints and coatings, and textiles; an extreme pressure lubricant and anti-adhesive for metal working fluids; a waterproofing agent for paints, coatings and textiles; and a carrier solvent for colour formers in paper manufacture.
Long-chain (C9-C21) perfluorocarboxylic acids, their salts and related compounds – HIGH PRIORITY	Long-chain PFCAs are used for surfactant applications and in the production of fluoropolymers. Precursors of long-chain PFCAs have been used in a range of applications, including use in coating products, fabric/carpet protectors, textile impregnation agents and firefighting foam. Long-chain PFCAs, their salts and precursors can also be produced unintentionally during the production of other PFAS.
Chlorpyrifos – HIGH PRIORITY	Chlorpyrifos is a broad-spectrum chlorinated organo-phosphate insecticide widely used in agriculture and as a biocide for non-agricultural pests. It has been used on various crops (corn, soybeans, alfalfa, oranges, wheat, and walnuts) as well as on lawns and ornamental plants. There are also public health uses, including adulticidal fogger treatments for mosquitoes, and the control of fire ants and certain species of ticks that may transmit diseases. It is released to the air, water and soil. Major health issues such as neurodevelopmental toxicity and neurotoxicity have been linked to chlorpyrifos exposure in humans. Uncertainty remains regarding its genotoxic potential. Chlorpyrifos is highly toxic to aquatic communities, early life stages of fish and aquatic invertebrates, bees, birds and mammals.

Table A3 - Schedule C: Chemicals of Emerging Arctic Concern (CEACs) and/or chemicals currently under review for listing as POPs in the Stockholm Convention on Persistent Organic Pollutants

COMPOUND	DESCRIPTION OF USE/SOURCE
Brominated and polyhalogenated dibenzo-p-dioxins and dibenzofurans (PBDD/Fs) – HIGH PRIORITY	Produced unintentionally from many of the same processes that produce chlorinated dioxins and furans during the production of PCBs and brominated flame retardants, particularly PBDEs. They have been detected in a number of biotic and abiotic matrices, as well as impurities of commercial mixtures of brominated flame retardants.

OTHER CHEMICALS OF EMERGING ARCTIC CONCERN (CEACs)

Other contaminants of emerging concern can be proposed, but these require additional justification for measurement in their proposed environmental or biotic matrix. Technical aspects such as sample numbers, cost per sample for analysis, and Quality Analysis and Quality Control should be described, as should the CEACs relevance and priority to the North and Northerners. Some examples of CEACs with a long-range origin that could be included with justifications include alternative halogenated flame retardants (e.g. PBDE and HBCDD replacements), long-chain chlorinated paraffins (also called long-chain chlorinated alkanes), organophosphate esters (flame retardants and plasticizers), short-chain (C4–C7) and ultra short-chain (C2–C3) PFAS, polycyclic aromatic hydrocarbons (PAHs), and some current use pesticides (CUPs).

Applicants can refer to the AMAP Assessment 2016: Chemicals of Emerging Arctic Concern as well as AMAP Assessment 2020: POPs and Chemicals of Emerging Arctic Concern: Influence of Climate Change for more information on CEACs that may be relevant to the NCP. When proposing CEACs in an analytical suite, they should be within the typical scope of the NCP and be delivered to the North via long range transport and not originate primarily from a local source.

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APPENDIX C – GUIDELINES FOR RESPONSIBLE RESEARCH

I. INTRODUCTION

The following document represents a guideline for communications planning to assist Northern Contaminants Program (NCP) project leaders in initiating community contacts and developing research agreements with communities. Ultimately, the objective is that communications/ participation planning will become integral to research proposal development.

II. KEY POINTS

The following are key points to consider when planning communications and community participation in NCP projects:

A. ENGAGEMENT

- Engage early with the Regional Contaminants Committees and Inuit Research Advisors, before and during the development of a proposal.
- During engagement, researchers should explain the potential beneficial and harmful effects of the research on individuals, communities and/or the environment.
- No undue pressure should be applied to obtain consent for participation in a research project.
- Greater consideration should be placed on the risks to cultural values than to potential contributions of the research to knowledge.

B. RESEARCH OBLIGATIONS

- Research should include community participation in the identification of research topics, Indigenous Knowledge and priorities.
- Community participation in project planning and implementation goes beyond "moral" obligations; rather it is a legal and constitutional requirement associated with land claims.
- For all parties to benefit from research, efforts should be made, where practical, to employ and train local (especially Indigenous) researchers and assistants.
- It is important to develop approaches to research that are responsive to local or regional needs. The Regional Contaminants Committees and Indigenous organizations are good mechanisms for achieving this.
- Research must respect sacred sites, cultural materials, and cultural properties.
- Subject to requirements for confidentiality, publications should give appropriate credit to everyone who contributes to the research.
- All project leaders are required to prepare a report on their project for inclusion in the annual NCP Synopsis of Research report to be used by the Regional Contaminants Committees for communications purposes.

C. RESEARCH RELATIONSHIPS

- Community-researcher relationships should be established early on in the project planning process, outlining details of "level of engagement" and "mutual obligations" for each partner. This will ensure a meaningful two-way exchange of information.
- Researchers and communities may wish to set out the parameters of their agreements and understandings in a Memorandum of Understanding.
- From the NCP perspective, development of researcher-community relationships is a dynamic and evolving process. As research projects progress, common elements will emerge regarding the perceptions, needs, and resource/capacity strengths of individual communities and researchers, including their criteria and preferred form of participation in scientific research projects.
- The right to refuse participation always rests with the individual at any point in any study.

D. COMMUNICATIONS

- Researchers are advised to contact the appropriate Regional Contaminants Committee and Inuit Research Advisor for advice on communications planning during the development of their proposal.
- Researchers should incorporate advice on communication into their proposal. Communication of results should include consideration of media other than printed reports. Examples of effective methods for information dissemination include: face-to-face discussion, local radio, DVD, pamphlets, videos and web sites. Many of these can successfully present highlights of several projects or categories of research activity over several years. Public presentations that allow for little interaction are seldom regarded as useful. Regional Contaminants Committees will direct the project leader if communication of results is required.
- Communication support materials, such as pamphlets, posters, videos, and posts on social media platforms such as Facebook, should not be seen as solutions to communications problems, but as tools to be used in combination with person-to-person communication. Communication support materials should be sent to the appropriate Territorial/Regional Contaminants Committee for review.
- Social media posts that are focused on experiences and/or non-sensitive information do not require approval from territorial health experts or Regional Contaminants Committees. However, posts that are health-related, refer to contaminant levels in subsistence animals, or that contain other potentially sensitive/concerning information generated from NCP-related work should be reviewed by the Regional Contaminants Committees and potentially territorial health authorities before posting.
- Translation of summary reports into local languages is recognized as critical and should be done wherever possible/appropriate.

E. REPORTING OF SPECIFIC HEALTH RISK RESULTS

- The existing protocol for reporting results from human health risk assessments (from analysis of fish/wildlife contaminants burdens) must be adhered to. The decision to conduct such assessments is part of this protocol.
- Researchers must ensure the accuracy of their results since these may influence decisions and policy that can directly affect individuals and communities.
- There is a process to prepare contingency plans if results are reported that require some form of intervention or action, in relation to reporting of individual human results. This is done by the responsible health authority (e.g. regional departments of health and social services) in consultation with the Regional Contaminants Committees, the four NCP Indigenous Partners, and the NCP Management Committee.

APPENDIX D – GLOSSARY OF ACRONYMS

I. ORGANIZATIONAL TERMS

AMAP Arctic Monitoring and Assessment Programme

CACAR Canadian Arctic Contaminants Assessment Report

CaPSA Canada's Plastics Science Agenda

CCGS Amundsen Canadian Coast Guard Ship Amundsen

CIRNAC Crown-Indigenous Relations and Northern Affairs Canada

CLRTAP Convention on Long-range Transboundary Air Pollution

CYFN Council of Yukon First Nations

ECCC Environment and Climate Change Canada

GAPS Network Global Atmospheric Passive Sampling Network

HTC Hunters and Trappers Committee

HTO Hunters and Trappers Organization

ICC Inuit Circumpolar Council

IRA Inuit Research Advisor

ITK Inuit Tapiriit Kanatami

NCP Northern Contaminants Program

- **CBMR** Community-based Monitoring and Research
- **CCO** Communications, Capacity and Outreach
- **EMR** Environmental Monitoring and Research
- **HH** Human Health

NGMP Nunavut General Monitoring Plan

NWT CIMP Northwest Territories Cumulative Impact Monitoring Program

RCC Regional Contaminants Committee

- **YCC** Yukon Contaminants Committee
- **NWTRCC** Northwest Territories Regional Contaminants Committee
- **NECC** Nunavut Environmental Contaminants Committee
- **NGRAC** Nunatsiavut Government Research Advisory Committee
- **NNHC** Nunavik Nutrition and Health Committee

Stockholm Convention on POPs related:

- **COP** Conference of the Parties
- **POPRC** Persistent Organic Pollutants Review Committee
- **POPRC-15** 15th POPRC meeting
- **POPRC-16** 16th POPRC meeting. January 2021.

UNECE United Nations Economic Commission for Europe

UNEP United Nations Environment Programme

II. CHEMICAL TERMS

∂ ^{18}O oxygen isotope 18

BDTP 2-(2H-Benzotriazol-2-yl)-4,6-di-tert-pentylphenol also known as **UV-328**

CEACs chemicals of emerging Arctic concern

SCCPs short-chain chlorinated paraffins

CUPs current-use pesticides

DDT dichlorodiphenyltrichloroethane

DOC dissolved organic carbon

HBCDD hexabromocyclododecane

PAHs polycyclic aromatic hydrocarbons

PBDEs polybrominated diphenyl ethers

- **PentaBDE** pentabromodiphenyl ether
- **OctaBDE** octabromodiphenyl ether
- **DecaBDE** decabromodiphenyl ether

PCB polychlorinated biphenyl

PFASs per- and polyfluorinated alkyl substances

- **PFCAs** perfluorinated carboxylic acids
  - **PFOA** perfluorooctanoic acid
- **PFOSF** perfluorooctane sulfonyl fluoride
- **PFSAs** perfluorinated sulfonic acids
  - **PFHxS** perfluorohexane sulfonate
  - **PFOS** perfluorooctane sulfonate

POC particulate organic carbon

POPs persistent organic pollutants

- **Schedule A POPs** formerly known as legacy POPs.
- **Schedule B POPs** new POPs and chemicals of emerging Arctic concern (CEAC)

SF_6 sulfur hexafluoride

UV ultraviolet

III. GENERAL TERMS

CTD characteristic travel distance

FY fiscal year

IK Indigenous Knowledge

QA/QC Quality Assurance/Quality Control

TDI Tolerable Daily Intake