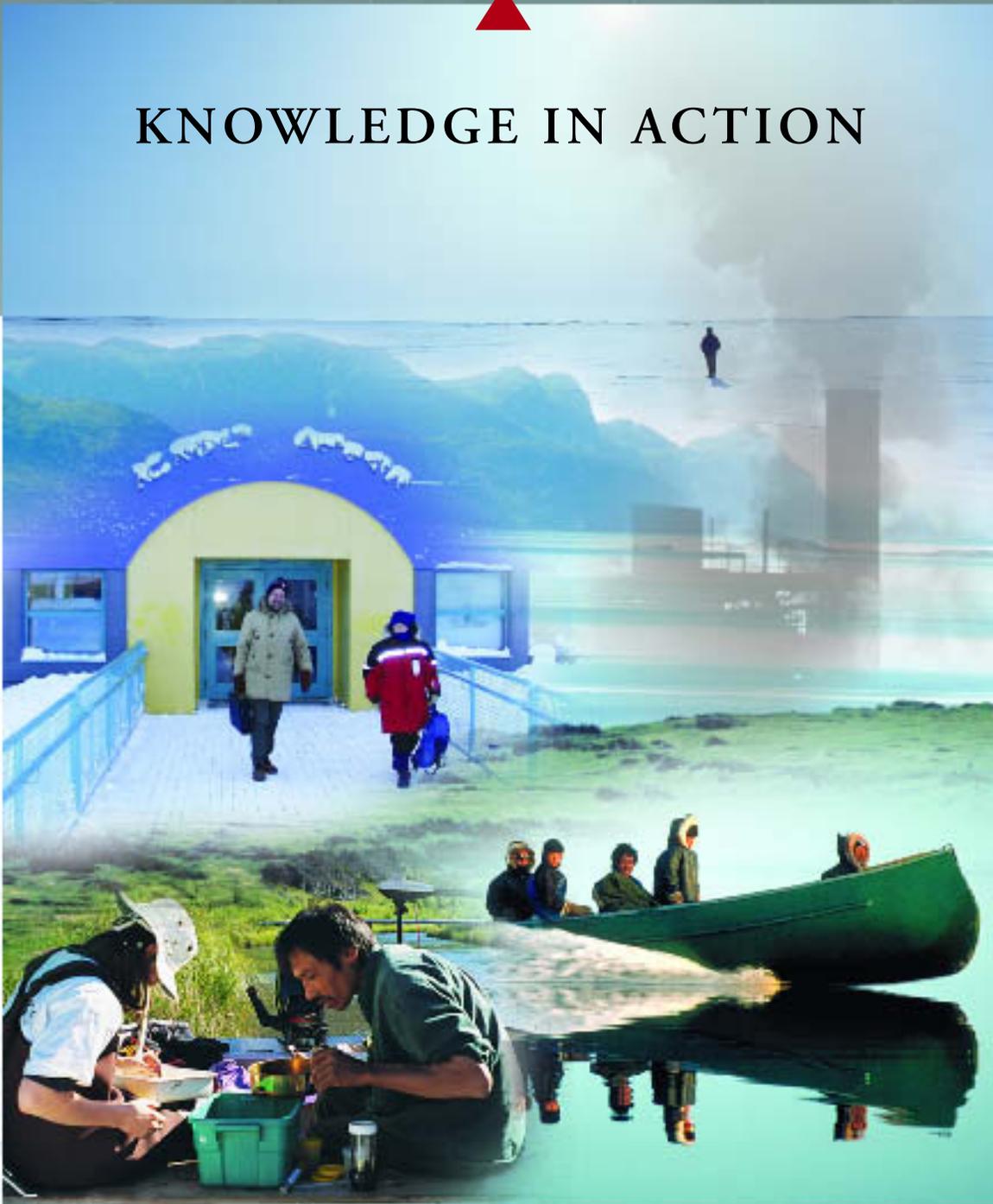


NORTHERN CONTAMINANTS PROGRAM

CANADIAN ARCTIC CONTAMINANTS
ASSESSMENT REPORT II

KNOWLEDGE IN ACTION



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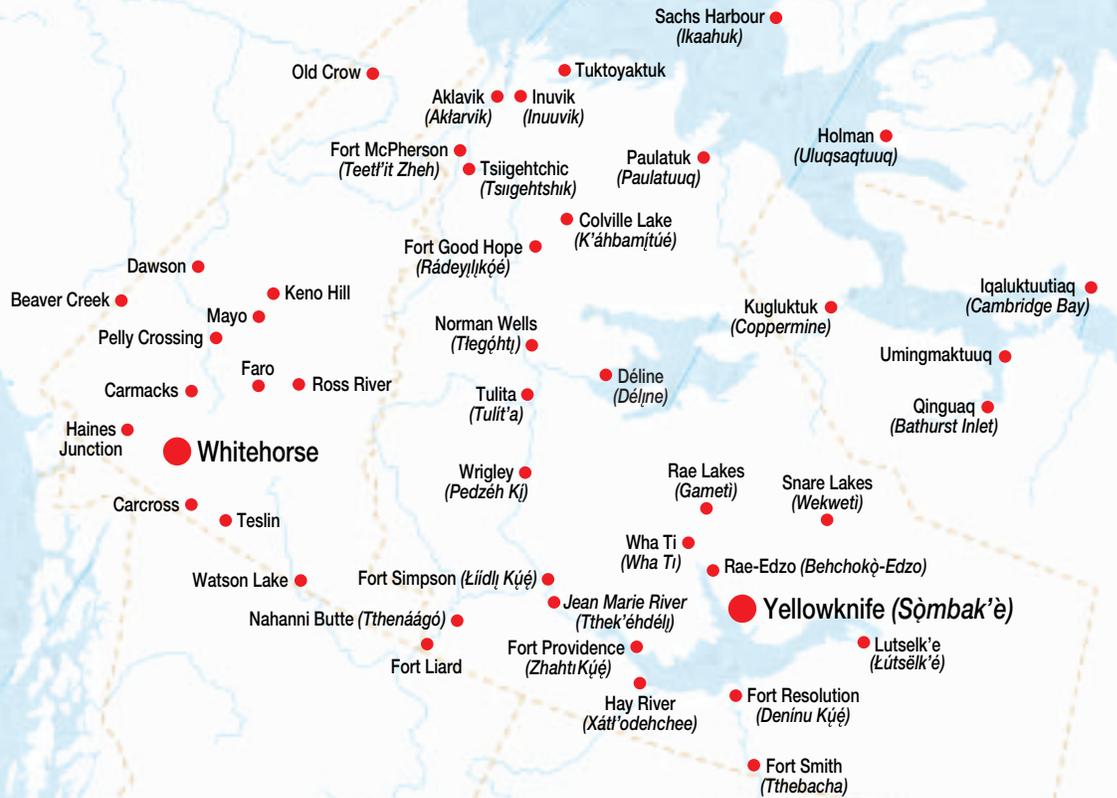
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Canada

Chukchi Sea

Arctic Ocean

Beaufort Sea



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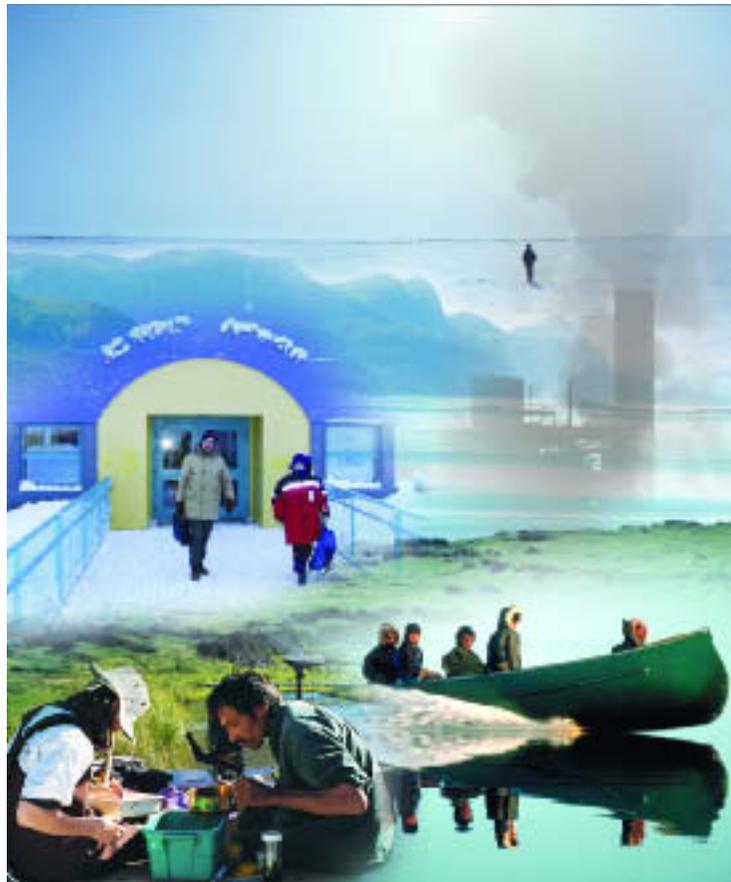
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Executive Summary

The Northern Contaminants Program (NCP) was established in 1991 in response to concerns about human exposure to elevated levels of contaminants in fish and wildlife species that are important to the traditional diets of northern Aboriginal peoples. Early studies indicated that there was a wide spectrum of substances — persistent organic pollutants, heavy metals, and radionuclides — many of which had no Arctic or Canadian sources, but which were, nevertheless, reaching unexpectedly high levels in the Arctic ecosystem.

Under the first phase of the NCP (NCP-I), research was focussed on gathering the data required to determine the levels, geographic extent, and source of contaminants in the northern atmosphere, environment and its people, and the probable duration of the problem. Results generated through NCP-I were synthesized and published in 1997 in the Canadian Arctic *Contaminants Assessment Report (CACAR)*.

In 1998, the NCP began its second phase (NCP-II), which will continue until March 2003. NCP-II focussed upon questions about the impacts and risks to human health that may result from current levels of contamination in key Arctic food species as well as determining the temporal trends of contaminants of concern in key indicator Arctic species and air. It addressed these issues under a number of subprograms: human health; monitoring the health of Arctic peoples and ecosystems and the effectiveness of international controls; education and communications; and international policy.

The CACAR-II series consists of a Highlights report and four technical reports: human health, biological environment, physical environment and knowledge in action. This report, Knowledge in Action, examines each step in the NCP process — from problem identification and priority setting, to addressing questions through responsible research, to interpreting results and making decisions



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within a benefit-risk framework, to communicating sensitive information with northern communities, to contributing to and driving political action on local, regional, national and international levels. Further, the report also examines the supporting infrastructure of the program through which these activities operate.

The NCP Today

Much of the strength of the NCP is derived from the partnership approach that forms the basis of its management structure and process. The NCP is directed by a management committee, which is chaired by DIAND, but also includes representatives from northern Aboriginal organizations, territorial governments, and federal departments. Through the partnership between the NCP and its Aboriginal Partners, including the Council of Yukon First Nations (CYFN), the Dene Nation, Inuit Tapiriit Kanatami (ITK), and the Inuit Circumpolar Conference (ICC), internal capacity to work on contaminants issues and other important environmental issues has been developed within and among these organizations.

The long-term vision, strategic direction and priorities of the NCP are laid out in a series of “blueprint” documents. They outline the objectives, goals and priorities for research and activities that support the overall aim of the NCP, and serve as a guide to annual funding decisions. Additionally, the Program has developed and implemented a proposal review process to ensure that work conducted under the Program is scientifically defensible, consistent with the vision and priorities set out in the blueprints, and socially and culturally responsible in a northern context.

Responsible Research

Research supported by the NCP covers a broad range of types, all aimed at gaining a better understanding of the issue of contaminants in the Arctic and how this issue can be addressed. The research consists of: laboratory and modelling studies; abiotic and biotic monitoring including the use of new and/or archived samples; epidemiology research; health and nutrition surveys; and social science studies. Depending on its particular focus and design, a study may be carried out in the North or elsewhere (e.g., southern-based laboratories).

From the perspective of Arctic Aboriginal peoples, the conduct of scientific research in the North can be a highly visible, yet often misunderstood process. From the perspective of a scientist trained in the South, the conduct of research in the North presents its own unique and unfamiliar challenges. The NCP has established a wide range of measures and mechanisms to ensure “responsible research” in all its fields of interest, with particular

emphasis on studies conducted in the North (both in communities and in the surrounding environments). Responsible research involves elements such as consultation, community participation, partnership, communications, and appropriate and timely data reporting. It calls for a high level of coordination, consultation, cooperation and capacity-building among the relevant regions and players. The NCP has made these aspects of the research process a priority in its approach to northern research.

The NCP *Guidelines for Responsible Research* (whose development was led by the Aboriginal Partners) and accompanying consultation requirements are used to involve northern communities as partners in research activities, from the beginning stages of project design to integrating communications in all stages of the research process. These guidelines provide direction and a framework for a community and researcher to agree upon their mutual obligations and to foster an equitable and beneficial relationship.

Risk Management

The NCP approach to risk management involves the balancing of both benefits and risks. This is done through a cooperative, multi-agency approach, whereby the problem is considered in its ecological and public health context, and those who are effected by the risk management decisions are involved to varying degrees in the decision making process. For example, in 2001, the decision of a benefit/risk assessment of consumption of northern waterfowl livers was to not issue advice to limit consumption despite elevated levels of Hg, but rather to update current communication materials on the issue and draft a fact sheet reflecting this new information and the benefits and risks of consuming these foods. This was despite the fact that, if taken at face value and consideration of the risks alone, these levels would warrant the release of a health advisory to reduce consumption. The decision taken was made based on consideration for the actual and regular consumption of these items which was lower in frequency and quantity than the advisory restriction that would have been issued. This was particularly the case among children and women of child-bearing age. The decision also considered the potential unintended effects on peoples’ diet and behaviour resulting from an advisory that was solely risk-based.

To date, no simple formula or equation exists with which to simplify this process of balancing benefits and risks of consuming traditional/country foods. Instead, processes have developed under the NCP to address the need to resolve the various perspectives and deal openly with the complexities of the problem.



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Communications and Education

Critical to the success of the NCP is its ability to communicate complex information to northerners to support their informed decision-making on food use. Recognizing this, the NCP invests significant time and resources into communications and education in the North and elsewhere on the issue of contaminants in the North.

To facilitate two-way communication and exchange, a network has developed under the NCP within each of the regions and territories, linking communities and individuals to the regional/territorial level and then to the national program structure and beyond. Regional Contaminants Coordinators (RCCs) are a new and valuable addition to the communications network under NCP Phase II. RCCs act as community and regional coordinators of some research activities, communicators and program representatives for projects and the program at the community level among other things.

In order to deliver messages to specific target audiences identified by the program, the NCP has developed and adapted a number of different processes of communication. These processes rely on the existence of the communications network. Different processes of communication are

used at different times depending on the local context, message content, and goals of the activity. “Community Tours” were a new and well-received mode of communication during NCP Phase II. They brought a team of experts to many communities in the NWT, Nunavut, and Labrador between 1999 and 2002 to present information about contaminants and related topics. Additionally, Frontline training courses were offered in the Yukon, NWT, Nunavut and Labrador in an effort to increase understanding of contaminants issues among health care and environment professionals at the grass roots level to whom community members turn for information about environmental health related concerns. Educational materials have been developed to fit into the school curricula in the Yukon, NWT, and Nunavut, which have enabled teachers to educate children and youth about contaminants in the North using the most northern-relevant information and examples.

Both formal and informal communications evaluations used by researchers, individuals and committees in the NCP have been invaluable in supporting informed decision-making and action regarding these issues in the Canadian North. There is a need for more formal evaluation of some communication activities conducted

under the NCP, however even the informal assessments conducted to date have been able to inform researchers, communicators and program representatives of the efforts that have been received well in the North.

National and International Action

The NCP has enabled Canada to produce world class science aimed at identifying and assessing past and current sources of POPs and metals, and in predicting global movement through the atmosphere. The results of NCP studies have provided the basis for policy decisions and action in Canada and on the international stage.

While the efforts and successes of NCP Phase II have been focused on international activities, there are numerous nationally-based activities in which the NCP has played a pivotal role. For example, the NCP has played a valuable role in the Toxic Substances Management Policy (TSMP), the Pest Management Regulatory Agency (PMRA) special review of lindane, and the Toxic Substance Research Initiative (TSRI).

Science conducted under the auspices of the NCP was successfully translated into international policy. The NCP has had a marked influence on the conclusion of international agreements to significantly reduce emission to the environment of key POPs. That international agreements, including the Stockholm Convention, single out the Arctic and Aboriginal peoples is testament to this fact. It took less than 15 years — extremely quick for international diplomacy — to move from initial research that identified a POPs-related problem in the Canadian Arctic to a global convention that addressed the issue. The role played by the NCP in this period has been crucial. Not only did it generate scientific data to convince skeptics of the nature of the problem, but it has supported a process to educate and equip Aboriginal peoples so that they could effectively represent their interests on the international stage.

Assessment and Conclusions

The intent of the NCP has been to generate knowledge in order to incite and support action at various levels. The “action” refers to decisions made by individuals and northern communities about their use of traditional/ country foods as well as policy decisions made within Canada and in international forums about contaminant levels, pathways, trends and effects. Between these extremes lie a series of actions taken by the NCP and its participants to make research in the North more responsible and to make complex information more accessible to relevant audiences.

Based on the scope and experience of the NCP, some general themes have emerged as ‘facilitators’ of the process of generating information and moving knowledge to action. These inter-related themes include:

- a strategic yet balanced and flexible program design with a basis in sound science and responsible research;
- partnerships that form links across conventional boundaries;
- open communication networks that get information to those who need it the most, and are able to listen to concerns and needs at various levels;
- ongoing processes of capacity-building using a variety of approaches; and
- a commitment of resources to support these activities.

The second phase of the NCP ends in March, 2003. Many of the program’s objectives have been accomplished to date. However, much remains to be done on the issues related to Arctic contaminants and country food, both in the Canadian North and at the international level. Although the Stockholm Convention has been established, it remains to be seen whether countries will ratify the agreement and if levels of contaminants in the Arctic will decrease as a result of this international initiative. These objectives require work in the areas of monitoring and surveillance of the environment and health, a greater understanding of the effects of contaminants on northern wildlife and human health, as well as clear and ongoing communication. While many aspects of the NCP have been successful in facilitating movement from the collection of data, through individual research projects, to implementing national and international actions to address these issues at various levels, much remains to be done.

Résumé

Le Programme de lutte contre les contaminants dans le Nord (PLCN) a été créé en 1991 par suite des inquiétudes que soulevaient les concentrations élevées de contaminants dans les poissons et les autres espèces sauvages qui jouent un rôle important dans le régime alimentaire traditionnel des Autochtones du Nord. Des premières études avaient révélé, en effet, que les concentrations d'un large éventail de substances — polluants organiques persistants, métaux lourds et radionucléides — ne provenant pas, dans bien des cas, de l'Arctique ou du Canada étaient étonnamment élevées dans l'écosystème arctique.

Au cours de la première phase du PLCN (Phase I), les recherches ont été axées sur la collecte des données nécessaires pour déterminer les concentrations, la répartition géographique et les sources des contaminants présents dans l'atmosphère et l'environnement nordiques et chez les habitants du Nord, de même que la durée probable du problème. Les résultats de la Phase I ont été présentés dans le *Rapport de l'évaluation des contaminants dans l'Arctique canadien* (RECAC) qui a été publié en 1997.

La deuxième phase du PLCN (Phase II) a débuté en 1998 et s'étendra jusqu'en mars 2003. Elle met l'accent sur les conséquences et les risques éventuels pour la santé humaine des concentrations actuelles de contaminants chez les principales espèces consommées, de même que sur les tendances temporelles des contaminants en cause chez des espèces indicatrices et dans l'air de l'Arctique. Divers aspects ont été pris en considération : santé humaine, surveillance de la santé des habitants et des écosystèmes du Nord, efficacité des mesures internationales de réglementation, éducation et communication, et politique internationale.

La série RECAC II comprend la Synthèse ainsi que quatre rapports techniques, dont celui-ci, portant respectivement sur la santé humaine, l'environnement biologique, l'environnement physique et la mise en application des connaissances acquises. *Savoir en action* examine chacune des étapes du processus du PLCN — de la définition du problème et de l'établissement des priorités à l'étude des questions dans le cadre d'une recherche responsable, à l'interprétation des résultats et à la prise de décisions mettant en rapport les risques et les avantages ainsi qu'à la transmission de renseignements délicats aux collectivités

nordiques et à la mise en œuvre d'une action politique aux niveaux local, régional, national et international. Ce rapport fait également état de l'infrastructure du programme qui soutient la réalisation de ces activités.

Le PLCN aujourd'hui

La force du PLCN vient en grande partie de la démarche axée sur le partenariat qui est à la base de la structure administrative et du fonctionnement du programme. Le PLCN est dirigé par un comité de gestion présidé par AINC. Il réunit également des représentants des organisations autochtones du Nord, des gouvernements territoriaux et des ministères fédéraux. La collaboration entre le PLCN et ses partenaires autochtones, y compris le Conseil des Premières Nations du Yukon, la Nation dénée, l'Inuit Tapiriit Kanatami et la Conférence circumpolaire inuite, a développé la capacité individuelle et collective de ces organisations d'aborder le problème des contaminants et les autres questions environnementales.

La vision, les orientations stratégiques et les priorités à long terme du PLCN sont énoncées dans une série de documents directeurs. Ces documents exposent les objectifs, les buts et les priorités des recherches et des activités menées à l'appui du plan global du PLCN et guident les décisions qui sont prises chaque année en matière de financement. En outre, l'élaboration et la mise en œuvre d'un processus de révision des propositions de recherche garantit que les travaux menés dans le cadre du PLCN se justifient sur le plan scientifique, s'harmonisent avec la vision et les priorités définies dans les documents directeurs et respectent les réalités sociales et culturelles du milieu nordique.

Recherche responsable

Les recherches effectuées dans le cadre du PLCN sont très diverses et visent toutes à mieux comprendre les enjeux liés aux contaminants dans l'Arctique et à déterminer les mesures à prendre. Les travaux comprennent les volets suivants : études en laboratoire et modélisation, surveillance des milieux biotique et abiotique au moyen notamment de nouveaux prélèvements et d'échantillons archivés, épidémiologie, enquêtes sanitaires et nutritionnelles et études en sciences sociales. Selon leur méthode

et leur objet, les études peuvent être menées dans le Nord ou ailleurs (comme dans des laboratoires situées au Sud).

Chez les Autochtones de l'Arctique, les études effectuées dans le Nord peuvent beaucoup retenir l'attention, mais sont souvent mal comprises. Pour le scientifique formé dans le Sud, de tels travaux présentent des défis uniques et mal connus. Des mesures et des mécanismes du PLCN visent à garantir que la recherche effectuée dans tous ses champs d'intérêt est « responsable », particulièrement lorsque les travaux sont menés dans le Nord (au sein des collectivités et dans leurs milieux). La recherche responsable suppose notamment la consultation, la participation de la collectivité, le partenariat, les communications et la transmission appropriée et opportune des données. Elle exige un degré élevé de coordination, de consultation, de coopération et de renforcement des capacités parmi les régions visées et les participants. Le PLCN fait de ces aspects des impératifs des recherches nordiques.



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Les Lignes directrices sur la recherche responsable du PLCN (dont l'élaboration a été dirigée par les partenaires autochtones du programme), et les exigences en matière de consultation qui les accompagnent, visent à permettre aux collectivités nordiques de participer à part entière aux activités de recherche, de la conception d'un projet jusqu'à la coordination des communications à toutes les étapes du processus. Ces lignes directrices fournissent des orientations et un cadre au chercheur et à la collectivité, de façon à leur permettre de s'entendre sur leurs obligations réciproques et de développer une relation équitable et avantageuse.

Gestion des risques

En matière de gestion des risques, le PLCN met en balance les avantages et les risques. Pour ce faire, il privilégie la collaboration de plusieurs organismes, afin que le problème soit envisagé sur le plan écologique et dans un contexte de santé publique et que les personnes touchées par les décisions participent à des degrés divers au processus décisionnel. En 2001, par exemple, la décision prise relativement aux foies de saumonneau n'a pas consisté à émettre un avis limitant la consommation en raison des concentrations élevées de mercure, mais plutôt à mettre à jour le matériel d'information et à rédiger un feuillet présentant les nouveaux renseignements ainsi que les risques et les avantages de consommer cet aliment, et ce, malgré le fait que les concentrations et les risques à eux seuls auraient justifié la publication d'un avis sanitaire visant à réduire la consommation des foies. La décision a été prise en tenant compte de la consommation réelle et habituelle de ces aliments, des points de vue de la fréquence et des quantités consommées, qui était plus faible que celle qu'aurait préconisé l'avis, en particulier dans le cas des femmes en âge de procréer et des enfants. La décision tenait compte également des répercussions sur l'alimentation et le comportement des personnes touchées qu'aurait pu avoir un avis faisant état uniquement des risques.

À ce jour, il n'existe pas de formule ou d'équation simple pour mettre en balance les risques et les avantages de la consommation des aliments régionaux et traditionnels. Des mécanismes ont plutôt été élaborés dans le cadre du PLCN qui visent à tenir compte de la nécessité d'harmoniser les divers points de vue et de prendre en considération le problème dans toute sa complexité.



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Communication et éducation

La capacité de transmettre une information complexe qui aide les habitants du Nord à prendre des décisions éclairées en matière d'alimentation est cruciale au succès du PLCN. Beaucoup de temps et de ressources sont donc consacrés à l'information et à l'éducation dans le Nord et ailleurs en ce qui concerne la présence de contaminants en milieu nordique.

Pour favoriser le dialogue et les échanges, le PLCN a contribué au développement d'un réseau dans chaque région et territoire, qui relie les collectivités et les individus à l'échelon régional/territorial, puis au programme national et au-delà. L'arrivée de coordonnateurs régionaux des contaminants (CRC) a enrichi ce réseau pendant la Phase II du programme. Les CRC jouent le rôle de coordonnateurs dans les collectivités et les régions pour certaines activités de recherche ainsi que d'agents des communications et de représentants du programme pour des projets menés notamment à l'échelle des collectivités.

Dans le but de livrer des messages à des groupes-cibles précis, un certain nombre de méthodes de communication ont été élaborées et adaptées qui mettent à profit le réseau existant. Les moyens de communication varient selon le moment, le contexte local, le contenu du message et les objectifs visés. Les « visites des collectivités » sont un nouveau moyen de communication qui a été mis en oeuvre et bien accueilli pendant la Phase II du PLCN. Entre 1999 et 2002, des groupes d'experts se sont rendus dans de nombreuses collectivités des T.N.-O., du Nunavut et du Labrador pour renseigner les habitants du Nord sur les contaminants et les questions connexes. Des cours de formation de première ligne ont également été offerts au Yukon, dans les T.N.-O., au Nunavut et au Labrador à l'intention des professionnels de la santé et de l'environnement qui travaillent sur le terrain et qui sont les personnes auxquelles les membres des collectivités s'adressent lorsque les questions environnementales suscitent des inquiétudes. Au Yukon et dans les T.N.-O. (ainsi qu'au Nunavut), on a élaboré du matériel éducatif adapté au programme scolaire qui a permis aux enseignants de renseigner les enfants et les jeunes sur les contaminants présents dans le Nord en faisant appel à des exemples particulièrement pertinents dans le contexte nordique.

Les évaluations formelles et informelles des moyens de communication utilisés par les chercheurs, les autres personnes et les comités ont été très précieuses pour la prise de décisions éclairées et l'adoption de mesures dans le Nord canadien. Certaines des activités de communication menées dans le cadre du PLCN nécessitent d'être mieux évaluées, mais les évaluations informelles ont néanmoins permis jusqu'ici d'informer les chercheurs, les agents des communications et les représentants du programme au sujet des interventions qui ont été bien accueillies dans le Nord.

Interventions nationales et internationales

Grâce au PLCN, le Canada a produit d'excellentes connaissances scientifiques sur les sources passées et actuelles de POP et de métaux lourds ainsi que sur le déplacement prévu de ces contaminants dans l'atmosphère. Les résultats des études du PLCN sont à l'origine de décisions et d'interventions politiques au Canada et sur la scène internationale.

Les efforts et les réussites de la Phase II ont surtout touché des activités internationales, mais le PLCN a joué un rôle fondamental par rapport à de nombreuses activités de portée nationale. Par exemple, le PLCN a joué un rôle précieux dans l'élaboration de la Politique de gestion des substances toxiques (PGST), l'étude spéciale sur le lindane menée par l'Agence de réglementation de la lutte antiparasitaire (ARLA) et l'Initiative de recherche sur les substances toxiques (IRST).

Les recherches scientifiques parrainées par le PLCN ont mené à l'adoption de mesures internationales. Le PLCN a eu une influence déterminante sur la conclusion d'accords internationaux visant à réduire considérablement les émissions de POP clés dans l'environnement, et le fait que ces accords, dont la Convention de Stockholm, mentionnent particulièrement les Autochtones et les habitants de l'Arctique en témoigne. Il a fallu moins de 15 ans — ce qui est extrêmement rapide en diplomatie internationale — pour passer des premières recherches, qui ont mis en lumière les problèmes causés par les POP dans le Nord du Canada, à une convention mondiale sur la question. Durant cette période, le rôle du PLCN a été crucial : il a produit non seulement des données scientifiques pour convaincre les sceptiques de la nature du problème, mais il a également éduqué et préparé les Autochtones à défendre efficacement leurs intérêts à l'échelle internationale.

Évaluation et conclusions

Le PLCN visait produire des connaissances qui favoriseraient et appuieraient l'action à divers niveaux. Cette « action » renvoie aux décisions qui sont prises par les gens et les collectivités du Nord quant à la consommation d'aliments régionaux et traditionnels ainsi qu'aux décisions politiques qui sont prises au Canada et sur les tribunes internationales par rapport aux concentrations, aux voies de transport, aux tendances et aux effets des contaminants. Mais il y a aussi une série de mesures intermédiaires prises par les responsables du PLCN et les participants au programme de façon que les recherches menées dans le Nord soient plus responsables et qu'une information complexe soit davantage accessible aux groupes concernés.

Dans le cadre du PLCN, l'expérience a dégagé certains thèmes généraux qui « facilitent » l'information et l'application du savoir. Citons notamment les éléments suivants :

- un programme stratégique mais équilibré et souple qui se fonde sur des principes scientifiques objectifs et une recherche responsable;
- des partenariats qui créent des liens qui vont au-delà des limites habituelles;
- des réseaux de communication ouverte qui offrent de l'information à ceux et à celles qui en ont le plus besoin, et qui tiennent compte des inquiétudes et des besoins exprimés aux divers niveaux;
- un renforcement des capacités qui fait appel à diverses approches;
- l'allocation de ressources à l'appui de ces activités.

La deuxième phase du PLCN se termine en mars 2003. Beaucoup des objectifs du programme ont été atteints à ce jour, mais il reste beaucoup à faire en ce qui concerne les contaminants présents dans les aliments traditionnels, tant dans le Nord canadien qu'à l'échelle internationale. On ignore encore si la Convention de Stockholm sera ratifiée par les pays et si les concentrations de contaminants dans l'Arctique diminueront par suite de cette intervention internationale. Les objectifs exigent une surveillance et un contrôle de l'environnement et de la santé, une meilleure compréhension des effets de contaminants sur la nature dans le Nord et la santé humaine ainsi que des communications claires et permanentes. Bien que, sous de nombreux aspects, le PLCN ait contribué à faire avancer les choses depuis la collecte des données dans le cadre de travaux de recherche jusqu'à la mise en œuvre de mesures nationales et internationales, le chemin à parcourir est encore long.



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Introduction

1.1 Canadian Arctic Contaminants Assessment Report II

The Canadian Arctic Contaminants Assessment Report II (CACAR II) summarizes the research, monitoring, and related activities carried out by the Northern Contaminants Program (NCP) during its second phase (NCP Phase II: 1998–2003). A similar assessment (CACAR) was conducted at the end of NCP Phase I (1991–1997). The following five reports in the CACAR II series cover the breadth of the program, from environmental research and monitoring to human health-related studies, communications, and policy initiatives:

- Toxic Substances in the Arctic and Associated Effects: Human Health
- Contaminant Levels and Trends in the Abiotic Environment
- Contaminant Levels, Trends and Effects in the Biological Environment
- Knowledge in Action
- Highlights of the Canadian Arctic Contaminants Assessment Report

1.2 The Knowledge in Action Report

“As scientists continue to unravel the mystery of how chemicals impact our environment and our health, this knowledge must be put into action. Global action must be accompanied by action at the regional and local levels.”

– The Honourable David Anderson, Minister of the Environment

The NCP is innovative, and perhaps unique, in the many ways in which it generates and uses data, information, and results from its environmental, toxicological and health research and monitoring studies to support and drive activities on fronts ranging from remote northern communities to the international arena.

This report, the fourth in the series of five that make up CACAR II, examines each step along the way — from problem identification and priority setting (Chapter 2), to addressing questions through responsible research (Chapter 3), to interpreting results and making decisions within a benefit-risk framework (Chapter 4), to communicating sensitive information with northern communities (Chapter 5), to contributing to and driving political action on national and international levels (Chapter 6) — and describes the supporting infrastructure of the program itself. A review of the cross-cutting elements involved in each of these stages demonstrates how a variety of critical aspects of the program contribute to an iterative process of translating knowledge into action (Chapter 7).

This report focuses on NCP Phase II and the way the program currently operates. However, the present *modus operandum* is still evolving and is a result of progressive modifications in response to circumstances, challenges, opportunities and lessons along the way. Therefore, historical context and perspective are used to cast light upon the dynamic nature of the contaminants issue, our understanding of it, and the NCP approach to addressing it.

This report is intended primarily for all those who have been — and still are — involved in any stage of the process of generating information and putting knowledge into action on the issue of northern contaminants. In particular, this includes residents of the North, researchers, managers, policymakers, and Aboriginal organizations. Through this assessment, they may clearly see how their role, and that of others, contributes to a broad and successful initiative.

This report is also intended for a wider audience of managers, policymakers, researchers, and citizens’ or public interest organizations, whose interests may be focused on other environmental health-related issues in the North or elsewhere. They may wish to look upon the experience of the NCP as a large case study for consideration when moving an issue to action on a variety of levels. In particular, it may be used as a guide to considerations for partnership management approaches, responsible research, benefit-risk assessment, communication of sensitive environmental health information with northern Aboriginal audiences, and steps in moving knowledge into action in the international arena.

1.3 Contaminants in the North: Understanding the issue

Through their close relationship with the environment and the teachings that have been handed down from generation to generation, Aboriginal peoples in northern Canada have a vast and intricate knowledge and understanding of the lands, waters, plants, and animals that have sustained them for thousands of years. They are acutely aware of how their environment functions and changes and consequently are often the first to identify the significance of any change.

In recent decades, however, a new kind of change has been taking place in the once thought to be “pristine” Arctic environment. It is a largely invisible, imperceptible change. Contaminants, at least those of a long-range transboundary nature, which are the focus of the NCP (see Box 1: *Contaminants of Concern*), appear in remote northern areas, far from their agricultural and industrial sources, and often in places where they have never been used. They are now found in the environment, wildlife, and in the people who live there. These contaminants arrive unseen and are undetected without the aid of technology. Potential changes resulting from their presence in the environment at current levels may also be below human detection levels. Persistent organic, metal, and radionuclide contaminants were not discovered in the North until scientists first began to measure long-range transported atmospheric contaminants in the Arctic ecosystem in the early 1970s.

Since then, these two sources or foundations of knowledge — Traditional Knowledge (see Section 3.3) and western science — have made valuable and complementary contributions to understanding the issue of contaminants in the Arctic, shaping the issue in all its complexity.

Environmental contaminants are not a problem unique to the Arctic. In fact, contaminants are found virtually everywhere on the planet, often at environmental levels far exceeding those in northern Canada. However, there are characteristics of the human-environment relationship and other circumstances that make this an issue of greater significance in the Arctic than in other regions. The combination of the chemical properties of these substances (i.e., toxicity, resistance to biological or chemical degradation, semi-volatility, lipophilicity), characteristics of the Arctic environment (i.e., long periods of cold temperatures, long-lived lipid-rich species), and various dimensions of the human relationship with traditional/country food sources (i.e., nutritional, social, cultural, spiritual), create a situation in which contaminants may bioaccumulate and biomagnify to levels of concern for human health. Animals at the top of the food chain with

high levels of contaminants, especially predatory fish and marine mammals, are often the same animals that are significant components in the diets of many Arctic residents. These traditional/country foods thus provide a critical path of contaminant transfer to human consumers, particularly northern Aboriginal peoples. Therefore, the potential for human exposure to environmental contamination is far greater in the Arctic than in other regions of the world.

The presence of contaminants in the North raises many questions. First, it poses some basic and fundamental scientific research questions such as: what contaminants are there? where in the ecosystem? at what levels? where do they come from? how did they get there? and how do we get rid of them? There are also questions of a very immediate environmental public health nature, since it remains to be determined with certainty the implications of these findings for the health of people who hunt and consume numerous terrestrial, freshwater, and marine species. In essence, are traditional/country foods still safe and healthy to eat? Finding answers to these questions is a major focus of the NCP. Some of the key findings that shape our current understanding of contaminants in the North are highlighted in Box 2: *The Current State of Knowledge*. The issue presents the further concern of how this information can be best communicated to Northern Aboriginal peoples whose diet and its associated way of life are as integral to their social fabric and cultural identity as to their good nutrition and overall health and economic well-being.

Both the issue and any potential solution are complex. Human exposure to these contaminants cannot be limited simply by recommending changes in individual behaviour since feasible and healthy dietary alternatives in remote northern communities are lacking. In addition, such changes would not be socially and culturally acceptable. The main sources of these human-made contaminants are all outside the Arctic, and eliminating these sources would mean changes in societal and economic behaviour on a large scale elsewhere. Moreover, while the potential effects of current levels of contaminants in the Arctic food chain are of concern, the use of many of these same substances serves essential needs in other parts of the world, e.g., application of DDT for malaria control. Therefore, concerted and cooperative global action is required in order to resolve the issue of environmental contaminants in the Arctic.



Box 1 Contaminants of Concern

There are three main classes of contaminants of concern in Canada's North that are persistent, toxic, bioaccumulative, and prone to long-range transport. These contaminants, which are the focus of the Northern Contaminants Program, are persistent organic pollutants (POPs), heavy metals, and radionuclides.

POPs

POPs are a large group of mostly human-made chemicals, including organochlorines, that originate from industrial processes (e.g., PCBs, HCB, dioxins and furans) and pesticide use (e.g., DDT, toxaphene, chlordane, HCH, aldrin, and dieldrin). While the most significant sources are outside the North, some local sources have been identified. POPs have been detected in all components of the northern ecosystem, including in people. They tend to build up in fatty tissues. There are limited data directly linking POPs in the North to adverse effects in wildlife or people. Evidence from laboratory studies and accidental high exposures in other parts of the world suggest that potential effects include reproductive and immune disorders, neurological and developmental effects, and some cancers. It remains to be determined, however, the extent to which these and other effects result from the low levels found in the North.

Under NCP Phase I, the sources, transport, spatial, and temporal trends in biota, and potential effects of POPs on people were studied. Under Phase II, attention has been focused more on determining temporal trends in biota, levels of "new" contaminants (e.g., PBDEs, PCNs), and human health effects. Continued monitoring is necessary to detect changes in levels, particularly in response to recent international controls on these substances.

Heavy Metals

The heavy metals of greatest concern in the North are mercury, cadmium, lead, and to a lesser extent, arsenic and selenium. They have been found in all components of the northern ecosystem, including humans. Mercury and lead are prone to long-range transport; the primary pathway to the North is via the atmosphere. Heavy metals occur both naturally and as a product of human activity (e.g., mining and smelting operations, burning of fossil fuels, waste incineration, automobile exhaust, lead shot distribution from hunting, metal production). Natural sources include local geology, volcanoes, and windblown dust. Heavy metals accumulate mostly in the liver and kidneys of animals and people, which can lead to disorders in these organs. A biologically available form of mercury, methylmercury, is a neurotoxin that can be readily taken up by plants, animals, and people, and is not easily broken down.

In NCP Phase I, the sources, transport, spatial and temporal trends in animals and levels of heavy metals in people were studied. In Phase II, attention has been focused more on determining the spatial and temporal trends of mercury in air, animals, and people, and determining potential human health effects. Mercury continues to be a major contaminant of concern in the North.

Radionuclides

A host of radionuclides has been found throughout Canada's North, including radioisotopes of strontium (^{90}Sr), cesium (^{137}Cs , ^{134}Cs), polonium (^{210}Po), and plutonium (^{238}Pu , $^{239,240}\text{Pu}$). They occur both naturally (e.g., ^{210}Po) and as a result of human activity (e.g., nuclear weapons testing, nuclear accidents [i.e., Chernobyl, 1986], and waste dumping and discharges from nuclear power and reprocessing plants), reaching the North via the atmosphere, ocean currents, and north-flowing rivers. Levels of radionuclides in Arctic air and wildlife have declined to near natural levels as a result of restrictions on nuclear weapons testing, adopted in the 1960s. Radionuclides are well-known for their carcinogenic effects.

Under NCP Phase I, radionuclides were studied, assessed, and deemed not to cause any impacts on the ecosystem and people of the North due to the low levels found throughout the northern environment. As a result of these findings, very few studies on radionuclides were undertaken in Phase II, with only some work on natural sources of exposure to wildlife and people.

For detailed information on these contaminants of concern, please refer to the companion reports of CACAR II.

Box 2 The Current State of Knowledge

The current knowledge of contaminants (POPs, heavy metals, radionuclides) in the Canadian Arctic and their implications for northern ecosystems and peoples is largely due to work conducted under the NCP. The information is provided in detail in the first CACAR (covering results generated during NCP Phase I) and in the technical companion reports of CACAR II (focusing on results generated during NCP Phase II). These should be referred to for specific information. The points below highlight some of the key findings that shape our current understanding of the issue.

Sources and Pathways

Human activities in the South are responsible for most of the contaminants in northern Canada. Contaminants enter the Arctic through long-range transport on air and ocean currents. While the atmosphere is the primary pathway, ocean transport is becoming increasingly important, at least for some contaminants.

Many contaminants are pesticides and industrial chemicals that are no longer used in Canada, and which have been banned or restricted for use by many other nations. However, their use continues in some countries and contaminants may continue to volatilize from formerly treated soil in regions of banned use.

Most heavy metals in the air over northern Canada are thought to come from natural sources in the Canadian Arctic islands and western Greenland and human sources in western and northwest Europe, and in Asia and Russia. Another possible source of mercury is related to climate change, as more mercury is released into the environment when permafrost melts and as more organic matter enters lakes and rivers.

Scientists working in the Northern Contaminants Program have discovered that atmospheric levels of mercury in the North suddenly drop in the spring, just as the sun reappears following months of darkness. This has led to subsequent discoveries about how mercury is transformed and deposited in the North.

Levels in the Abiotic Environment

Contaminants have been detected throughout the northern environment, including in the air, water, soils, sediments, snow, rain, and ice. The contaminants present in the physical environment are at such low levels that they pose no direct risk to human health. Climate change holds the potential to alter Arctic environmental contaminant levels and behaviour.

Levels of most POPs in the atmosphere are slowly declining across the North in response to restrictions on their use, with the exception of dieldrin and endosulfan. Similarly, levels of POPs found in sediments in virtually all Yukon lakes have been declining while POPs levels vary a great deal across the Arctic Ocean.

It is too early to state yet whether atmospheric mercury levels are increasing or decreasing. In lake sediments, mercury levels appear to be increasing in Nunavut south of 80°N and possibly in other areas as well.

Several new contaminants not previously studied under the NCP are now being found in the atmosphere. These include brominated flame retardants, chlorinated paraffins, and chlorinated phenols. It is too early to state whether atmospheric levels of these contaminants are increasing in the North; although levels of chlorinated paraffins found in marine sediments paralleled their use in southern regions.

Very few radionuclides being released from European nuclear plants are reaching the Canadian Arctic Ocean, although they are significant locally.

Levels and Effects in the Biotic Environment

Contaminants have been detected in all components of northern food chains, including in plants, fish, seabirds, marine mammals, caribou, and other terrestrial animals. Animals high in the food chain and high in fat, such as marine mammals, generally have the highest levels of contaminants.

Levels of POPs in marine mammals have been found to be either decreasing, staying the same, or increasing, depending on the species, location, and the particular contaminant in question. With the exception of a few locations, levels of POPs in freshwater fish are below consumption guidelines and declining, although there is considerable variability among stocks. Decreasing levels are often associated with POPs whose use is now limited or restricted. Levels in marine arctic char are very low. Similarly, levels in land animals are quite low. New POPs have been detected in freshwater fish, seabirds, and marine mammals. While not currently a concern, these levels are increasing and may prove to be a concern in the future.



There is no evidence yet of a general increase in levels of mercury or other heavy metal levels in fish and wildlife. However, some seabirds and some marine mammal populations near the mouths of large rivers do show an increase in mercury and cadmium levels. Mercury levels in beluga whale populations have shown significant increases. Levels of mercury and other heavy metals in walrus are remaining about the same over time. The only potential concern among land mammals is the fairly high levels of cadmium found in the kidneys and livers of Yukon caribou.

There are limited data that directly link contaminants to adverse effects in wildlife. Scientists are most concerned about polar bears, a top predator that biotransforms many POPs into other more toxic forms. Polychlorinated biphenyls (PCBs) are known to cause problems with levels of both vitamin A and the thyroid hormone in polar bears. The extent to which these and/or other effects result from the low levels being found in other Arctic animals remains to be determined.

Levels and Effects in People

Contaminants have been measured in the blood and hair of women from across the Canadian Arctic. Levels of some POPs in Canadian Inuit populations are among the highest observed in the world, 5 to 8 times higher than women in southern Canada. Ten percent of mothers in Baffin region and 16% of Nunavik mothers have mercury blood levels that fall within Health Canada's "increasing risk" category. Elevated levels of chlordane, toxaphene, PCBs, and mercury are related to a diet rich in marine mammals.

Most communities consume heavy metals and POPs in traditional/country foods within levels that are known to be quite safe (the tolerable daily intake or TDI level). Fewer than 5% of people in Labrador, Kitikmeot, and Inuvialuit are consuming levels of mercury that exceed the TDI. In most Kivalliq and Baffin communities, however, more than one-quarter of the population is consuming levels of mercury above the TDI. Similarly, consumption levels of chlordane and toxaphene by mothers from Kitikmeot, Kivalliq, and Baffin regions are higher on average than the TDIs. In the Baffin region, PCBs are also consumed at a higher level than the TDI.

In studies in other regions of the world, elevated levels of some of these contaminants have been associated with neurobehavioural effects on children. Other health concerns include potential effects on reproduction, development, and immune system functioning. The extent to which these effects result from chronic exposure to the relatively low levels being found in Arctic biota, however, remains to be determined and is currently the subject of major investigation. The greatest concern is with exposure of the fetus and infant to the mother's accumulated concentrations of contaminants that can be transferred to her offspring during pregnancy and through nursing. Northerners are exposed to higher levels of radionuclides compared to people who live in the South. These radionuclides occur naturally and for thousands of years have been reaching humans at approximately the same levels through the lichen-caribou-human food chain. To date, no significant health risks have been associated with radionuclides in Northerners.

Diet and Nutrition among Northerners

Much has been learned about the health-giving aspects of traditional/country foods. These foods are very nutritious and provide many benefits not available from other foods. Dietary surveys show that more than 250 different species of fish and wildlife, including plants, are consumed by Aboriginal peoples in northern Canada. As much as 91% of Aboriginal households consume traditionally harvested meat and fish, and 22% have reported that all their meat and fish are obtained through harvest. The majority of these households state that they would not be able to feed their families based only on store-bought food. More traditional/country food is eaten in remote communities than in regional centres; people over 40 years old tend to eat it more than young people; and men consume it more than women. Moose, caribou, and whitefish are eaten most often among Yukon First Nations and Dene/Métis; caribou and Arctic char most frequently among Inuit in Inuvialuit, Kitikmeot, and Kivalliq; Inuit in Baffin eat caribou, Arctic char and ringed seal most often; and among Labrador Inuit, caribou and trout are eaten most often. The benefits of consuming traditional/country foods are numerous and varied (physiological, social, cultural, economic, and spiritual).

Overall

The overall message of the NCP has been consistent: traditional/country foods are healthy foods. While contaminants may sometimes be present in fish and wildlife at levels that cause concern for human health, the currently known health risks are outweighed by the benefits of continuing to harvest, prepare, and consume traditional/country foods.

1.4 Diverse and changing face of the North

For most Canadians, “the North” is simply a vast wilderness that figures prominently, if only symbolically, in the Canadian identity. Yet, as northerners themselves are well aware, the North is not one, but many regions. It is a non-homogeneous and dynamic expanse, particularly in terms of geography, ecology, culture, language, demography, economy and politics. This diversity presents opportunities and challenges for a research-based program operating across all northern regions and calls for a certain flexibility and adaptability in the program’s operations.

Canada’s North comprises the Arctic and sub-Arctic area north of 60° latitude, occupying 40% of Canada’s land mass. The arctic region of northern Quebec (Nunavik) and the northern coastal Inuit region of Labrador are also included as part of the North for the purposes of this assessment because they fall within the geographic scope of the NCP. Northern ecosystems range from the boreal forests of the Yukon in the west, across inland rivers, lakes, deltas and estuaries of the Northwest Territories, the arctic islands of Nunavut in the far North and the tundra of Nunavik, to the fiords of Labrador (Figure 1.1). A broad variety of species is found in each of these terrestrial, freshwater, estuarine,

marine and sea-ice environments. Today, the physical and biological landscape of the North is changing rapidly. For example, increased human activity and economic development are creating some highly visible impacts, and climate change is observed to be influencing such things as length of seasons, migration patterns, wildlife health and contaminant levels in the Northern regions.

Similarly, the peoples of the North are diverse and distinct. They number approximately 114,000 in total (Yukon: 31,000; NWT: 39,000; Nunavut: 27,000; Nunavik: 11,000; coastal Labrador: 5,500) and are located in some 112 communities scattered across this vast area. Most northerners are of Aboriginal descent, including Inuit, First Nations and Métis, but this varies regionally, from about 90% in Nunavik, to 85% in Nunavut, 49% in the Northwest Territories, and to 22.5% in the Yukon (Figure 1.2). Non-Aboriginal people reside mostly in the larger population centres. Each culture holds a particular system of knowledge and way of understanding that is based upon a history that is unique to each region. Many languages are spoken across the North, with different languages and dialects spoken and written even within similar cultural groups (Figure 1.3). This cultural and linguistic diversity translates into differing issues, needs and concerns among the various peoples and regions and necessitates distinct approaches to address them.



ITK/Eric Loring





Ecozone	Landforms	Climate	Vegetation	Wildlife
Arctic Cordillera	Massive icefields and glaciers cap the rugged mountains	Very cold and arid	Largely absent due to permanent ice and snow	Polar bear, walrus, seals, narwhal, whales
Northern Arctic	Lowland plains with glacial moraines in the West, and uplands with plateaux and rock hills in the East	Very dry and cold	Dominated by herbs and lichen	Caribou, muskox, wolf, arctic hare, lemmings
Southern Arctic	Broadly rolling upland and lowland plains	Long, cold winters and short, cool summers	Dwarf shrubs that decrease in size to the North	Moose, muskox, wolf, arctic fox, grizzly and polar bear, caribou
Taiga Plains	Broad lowlands and plateaux, incised by major rivers	Semi-arid and cold	Dwarf birch, labrador tea, willows and mosses	Moose, woodland caribou, wolf, black bear, marten
Taiga Shield	Rolling terrain with uplands, wetlands and innumerable lakes	Subarctic continental climate, with low precipitation	Open forests and arctic tundra	Caribou, moose, wolf, snowshoe hare, black and grizzly bears
Taiga Cordillera	Steep, mountainous topography with sharp ridges and narrow valleys	Dry, cold winters and short, cool summers	Shrubs, mosses, lichens, dwarf birches, willows	Dall's sheep, caribou, lynx, wolverine
Boreal Plains	Level to gently rolling plains	Moist climate with cold winters and moderately warm summers	Spruce, tamarack, jack pine, white birch, balsam, poplar	Woodland caribou, mule deer, coyote, boreal owl
Boreal Cordillera	Mountain ranges with high peaks and extensive plateaux	Long, cold, dry winters and short, warm summers	Spruce, alpine fir, trembling aspen, white birch	Woodland caribou, Dall's sheep, mountain goat, marten, ptarmigan

FIGURE 1.1.

Eco-regions of the Canadian North. Northern ecosystems are diverse and dynamic. The physical and biological landscapes influence the specific characteristics of the contaminants issue in different northern regions.



FIGURE 1.2

Communities and political boundaries of the Canadian North. The majority of people in the North are of Aboriginal descent, including Inuit, First Nations and Métis, living in 112 communities scattered across three territories and northern coastal regions of two provinces. Alert is included here even though it is not so much a community as a research station used by the NCP and others.

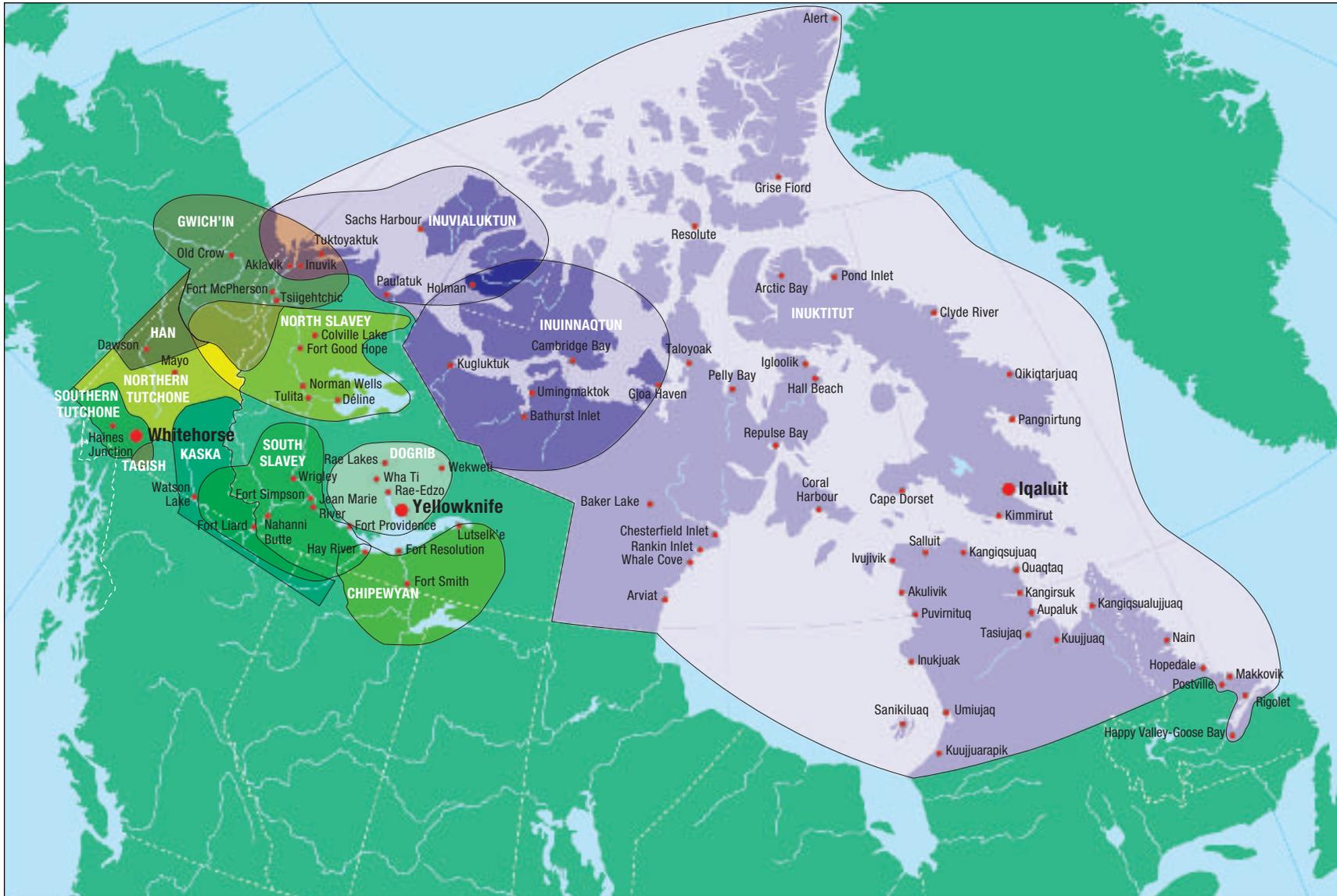


FIGURE 1.3

Aboriginal languages spoken in the Canadian North. Linguistic diversity in Northern Canada creates a challenge for communicating with many Northerners about technical and sensitive environmental health information. Data for this figure comes from CYFN, Dene Nation, ITK, and the Office of the Languages Commissioner of the NWT.



ITK/Eric Loring

These peoples experience a broad spectrum of socio-economic realities, with a mix of wage-earning and traditional economies forming the basis of most communities. Economic change continues to take place across the North, with general trends toward increased wage-labour and resulting increased access to store-bought items and market foods. The demographics of the North show a considerably large young population (45% of the population is under the age of 25), with a large number of young mothers, making education and training important considerations for all sectors, including health and the environment, in the present and near future. The priorities, interests and needs of this growing demographic must be considered in any approach to inform and educate tomorrow's decision-makers.

The North is also a land of political diversity, marked by traditional Aboriginal boundaries, legal boundaries of three territories (Nunavut was created in 1999) and regions of two provinces, and land claims in various stages of settlement. In most cases, these political regions are governed by layers of Aboriginal, regional, territorial/provincial, and federal governments, each with its own mandate and priorities when it comes to dealing with the issue of contaminants.

Across these diverse and changing landscapes, cultures, languages, and socio-economic and political realities, the importance of traditional/country foods is shared among peoples of the North, particularly among Aboriginal peoples. Traditional/country foods and activities related to its consumption (i.e., hunting, fishing, collecting, distribution, preparation) continue to play a central and valuable role in everyday life in many northern communities due to their social and cultural importance, formal and informal economic value, and contributions to physical and mental well-being.

The Northern Contaminants Program conducts research and related activities within this diverse and dynamic span of regions collectively referred to as “the North” or “the Arctic”. This diversity has implications for the way in which the program is managed and how it operates, as is highlighted in various chapters of this report. For example, the structure of various NCP committees embraces this diversity. Research priorities and process are influenced by it, as is the assessment of results. Communications efforts adapt to meet these diverse needs by using translation and presentation styles that are most meaningful to the particular knowledge systems and ways of understanding of each audience.



1.5 Summary of key points

- The *Knowledge in Action* report, one of five in the series that makes up the *Canadian Arctic Contaminants Assessment Report II*, assesses the ways in which the Northern Contaminants Program generates and uses data, information and results from its research and monitoring studies to support and drive communication and policy activities.
- Contaminants are a complex issue in the Canadian North because the diet of traditional/country food and its associated way of life creates a potential for high exposure to environmental contaminants, but is also integral to their good nutrition, social fabric, cultural identity, and overall health and well-being of northern Aboriginal peoples.
- To reduce or eliminate contaminants in the North requires concerted and cooperative global action.
- The three main classes of contaminants of concern in Canada's North, which are the focus of this assessment, are POPs, heavy metals and radionuclides.
- The North is dynamic and diverse in terms of geography, ecology, culture, language, demography, economy and politics. Despite this, traditional/country foods continue to play a central and valuable role in the health, livelihoods, and way of life of Aboriginal peoples in all regions of the North.
- All of this holds implications for the way in which the Northern Contaminants Program is managed and how it operates.

1.6 Key references and suggested readings

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Addressing the Contaminant Issue

2.0 Introduction

As information about contaminants in the Canadian Arctic has unfolded, the manner in which the issue is being addressed has evolved. The approach taken by Canada up until 1997 is detailed in the first CACAR. This chapter focuses on how and why the NCP has developed its current broad, multidisciplinary approach, which establishes a framework for action on many levels. In particular, this report demonstrates the interplay between science, social factors, and parallel historical developments and circumstances, and how these have influenced the focus and management of the Program.

2.1 History of dealing with contaminants in the North

While scientists have been monitoring contaminants in the Canadian Arctic since the 1970s, some disturbing findings in the 1980s heightened concern about the issue.

Increasing evidence that Aboriginal traditional/country foods contained contaminants in some regions of the country raised questions about resulting contaminant levels in northern Aboriginal peoples. Concern for the potential effects of elevated mercury exposure through fish consumption in the community of Salluit, Nunavik, provided the rationale for research on this subject in the late 1970s. The Medical Services Branch of Health Canada found high levels of mercury in Inuit residents of this community and in some marine species and fish regularly being consumed by them.

From 1985 to 1987, PCBs were measured in the blood of Inuit from the community of Qikiqtarjuaq (formerly Broughton Island), Nunavut, known to have a relatively high per capita intake of traditional/country foods, particularly marine mammals. Results showed that PCBs in blood exceeded the tolerable levels set by Health Canada in the majority of residents under 15 years of age and in nearly two out of every five women of child-bearing age. This study also revealed elevated methylmercury levels in some individuals.

Another study in the late 1980s showed that PCB levels in the milk of Inuit women from the east coast of Hudson Bay in Nunavik were approximately five times higher than among women of southern parts of Quebec. The elevated levels were attributed to their consumption of marine mammal tissues.

In response to these incidences, in 1985, an ad hoc committee of federal and territorial researchers, coordinated by the Department of Indian Affairs and Northern Development (DIAND), began to collaborate on the issue. The committee first conducted a baseline literature review and determined that there was a definite need to assess the extent of fish and wildlife contamination in Canada's North and to determine the implications for the health of Northerners, particularly Aboriginal peoples. The main conclusion was that contaminants were a serious and widespread issue in the North, and that it was highly unlikely that small quantities of PCBs found at military distant early warning (DEW) line sites were the root cause. Subsequently, a cooperative program was designed around an integrated ecosystem approach comprised of monitoring, research and evaluation, with the main priority being to assess the extent of contamination of traditional/country foods used by Northern people. Using results of the program, the Committee prepared a benchmark report, published in 1992 as a special issue of the journal *Science of the Total Environment*, summarizing the current state of knowledge on the subject and the gaps that remained to be filled.

Once the results of these initial studies were publicly released, the communications and education aspects of the program consisted largely of "fighting fires" in response to inflammatory and sensationalistic media articles. In the North, reactions to the information were sometimes extreme, such as people ceasing to eat traditional/country foods or to breast-feed their infants.



TABLE 2.1 Chronology of major events and milestones in the development and evolution of the Northern Contaminants Program

Date	Event	Date	Event
Early 1970s	Scientists begin measuring long-range transported atmospheric contaminants in Canada's North.	1994	Guidelines for Responsible Research, developed by the Aboriginal Partners, are implemented.
1985	PCB cleanup begins on DEW line sites. DIAND establishes an inter-agency working group on contaminants in native diets and conducts a baseline literature review. It is concluded that contaminants in the North are serious and widespread and it is highly unlikely that small quantities of PCBs found at DEW line sites are the cause. A "cooperative program" is put in place with monitoring, research and evaluation elements, with the first priority being to assess the extent of contamination of local food sources used by northern people. By 1989, the scope of contaminants widens to include organochlorines, metals and radionuclides.	1995	Canada co-hosts with the Republic of the Philippines an International Experts Meeting on POPs in Vancouver.
		1996	The Arctic Council is established among the eight Arctic countries in Ottawa. The Canadian Polar Commission holds "For Generations to Come: Contaminants, the Environment and Human Health in the Arctic" conference in Iqaluit. An NCP Consultation and Strategy Meeting "The Ideas Workshop" is held in Yellowknife.
1989	Results of a study showing elevated PCBs, other POPs and mercury in Inuit residents of Nunavik are published. Scientific Evaluation Meeting, held in Ottawa, summarizes the present state of knowledge concerning contaminants in northern Canada. Approximately 50 scientists are in attendance representing a broad spectrum of interests, including representatives from two Aboriginal organizations and the other seven circumpolar nations. An integrated ecosystem approach is adopted for assessment of the issue. Strategy meeting in Toronto to set a long-term northern contaminants research and monitoring plan including representatives of federal, provincial and territorial governments, universities and northern Aboriginal organizations leads to the development of the 5-Year Strategic Action Plan on Northern Contaminants.	1997	The <i>Canadian Arctic Contaminants and Assessment Report (CACAR)</i> and <i>Highlights Report</i> are released. The <i>AMAP State of the Arctic Environment Report</i> is released.
		1998	The NWT Environmental Contaminants Committee (NWT-ECC) is established. NCP Phase II begins. NCP blueprints are developed and implemented. The <i>AMAP Assessment Report: Arctic Pollution Issues</i> is released The UN-ECE Convention on Long-range Transboundary Air Pollution - POPs and Heavy Metals Protocols is signed by 36 countries including Canada. Canada ratifies both Protocols this same year. Regional Contaminant Coordinator positions are established within the NCP. The proposal review process of the NCP is revamped to include external peer reviewers and technical and social/cultural review teams. A strategy meeting the following year results in further modifications including the establishment of the education and communications review team.
1991	The Northern Contaminants Program (NCP) established under the Green Plan's Arctic Environmental Strategy (1991-1997). In addition to a Technical Committee, a Science Managers Committee, which includes five Aboriginal Partners, is struck to oversee the program's policy and funding issues. The Arctic Monitoring and Assessment Programme (AMAP) is established under the circumpolar Arctic Environmental Protection Strategy (AEPS). Canada and the seven other Arctic countries sign the Declaration on Protection of the Arctic Environment in Rovaniemi, Finland which adopts the AEPS. A Task Force on POPs, led by Canada and Sweden, is established under the United Nations Economic Commission for Europe's Convention on Long-Range Transboundary Air Pollution (UN-ECE Convention on LRTAP). The first annual NCP Results Workshop is held.	1999	NCP community communication tours begin. The Nunavik Nutrition and Health Committee (NNHC) is formally included in the NCP Management Committee.
		2000	The Nunavut Environmental Contaminants Committee (NECC) is formally established.
		2001	UNEP Stockholm Convention on POPs is signed by 151 countries including Canada. Canada is the first country to ratify the Convention in 2001. A Strategy Meeting is held in Edmonton, which leads to replacing the written consent requirements with a process for consultation with communities and Aboriginal organizations as a condition of funding.
		2002	The NCP contributes data and information to the UNEP global mercury assessment, to be completed by 2003.
1992	Scientists publish a benchmark study on the state of knowledge of contaminants in the Canadian Arctic in a special issue of the international research journal <i>Science of the Total Environment</i> . The Yukon Contaminants Committee is established to deal with the broader issue of contaminants related to the health advisory issued as a result of elevated levels of toxaphene and PCBs in lake trout and burbot from Lake Laberge. The Rio "Earth Summit" (World Summit on Sustainable Development) brings to global attention the role of Indigenous peoples in addressing environmental issues.		

The Department of Indian Affairs and Northern Development chaired a workshop in December 1989 to develop a long-term inter-agency research and monitoring strategy to deal with the issue. This strategy was unique among federally run initiatives of the time, as it was broadly collaborative and multidisciplinary in its approach from the start. The initiative was designed in collaboration with Aboriginal organizations, four federal

departments, and the two territorial governments, and encompassed the government's responsibilities of delivering advice to Northerners concerning the health aspects of their traditional/country food diets and pursuing contaminant sources and emission controls in the international forum. This strategy provided the foundation for what would become the Northern Contaminants Program.



2.2 Phase I of the Northern Contaminants Program

With its establishment in 1991, the Northern Contaminants Program (NCP) embarked upon a more comprehensive and coordinated multi-disciplinary approach to addressing the issue of Arctic contamination. The broader context within which the NCP was established is described in Box 3: *Setting the Scene for the Northern Contaminants Program*. The first phase of the program continued until 1997 with funding made available under the Federal Government's Green Plan/Arctic Environmental Strategy. The Program assessed the risks to northern ecosystems and human health from the long-range transport of persistent contaminants to the Arctic. It worked toward understanding the source, geographic extent, scope, magnitude and duration of the problem, which would identify and support whatever actions were necessary for moving toward viable solutions.

NCP Phase I was guided by the *Five Year Strategic Action Plan for the Arctic Environmental Strategy/ Northern Contaminants Program*. This research plan and the priorities it outlined focused on:

- 1) identifying contaminant sources and their transport to the Arctic;
- 2) assessing contaminant levels in fish and wildlife;
- 3) assessing effects of contaminants on the health of northern ecosystems including human health;
- 4) providing timely health advice to northern people; and
- 5) establishing international controls through agreements and cooperation with other countries and the circumpolar community.

This strategy was designed to be flexible and iterative so that the program itself could respond to emerging contaminants issues. If necessary, its direction would shift with new results and information, and would be flexible enough to accommodate the changing political and constitutional environment of the Arctic.

The formal partnership approach to management, which included federal and territorial governments and Aboriginal organizations, was established right from the beginning of the NCP. At the time, it was quite a feat to get all these groups to take the first steps toward working collaboratively together. The NCP remains the sole environmental health initiative in the North to have brought together such diverse interests in a partnership management framework.

The key findings of the leading-edge research conducted under the NCP during Phase I were published in the *Canadian Arctic Contaminants Assessment Report* (CACAR) and an accompanying *Highlights Report* in 1997. This information then fed into domestic initiatives on persistent toxic substances as well as into the international Arctic Monitoring and Assessment Programme (AMAP), the circumpolar environmental monitoring activity of the Arctic Council that also began in 1991. NCP results substantiated the theory that contamination of the Canadian Arctic is due to sources outside the Arctic and that the main transport pathway is the global atmosphere. Much of the world's early scientific data demonstrating contaminant movement to the North, and behaviour of chemicals in and between various components of the environment, came from NCP-funded research.

The results were also directly relevant to northern people, particularly Aboriginal northerners. Therefore, an underlying principle of NCP policy and activity emerged: the need to generate relevant information and communicate it in a way that best allows northerners to make informed decisions about contaminants, nutrition and consumption of traditional/country foods. Intensive deliberations conducted in 1993 laid the foundations for the NCP's continuously evolving strategies for communications, community involvement and capacity-building.

Box 3 **Setting the Scene for the Northern Contaminants Program**

When contaminants in the Arctic began to emerge as an important issue, a number of changes on the national and global environmental, social, economic and political fronts prompted the evolution of the Northern Contaminants Program and may have facilitated rapid action on the issue. In many ways, the timing was right for an ecosystem-based, partnership-managed, multi-disciplinary program to develop and address an Arctic environmental health issue in the global domain. However, even with such favourable circumstances, such a program would have to be innovative, even groundbreaking among large-scale federal science programs, in its approach to research, management and political action.

The 1980s was a period of economic growth as well as growth in interest in environmental issues. The Canadian public was in an economically comfortable position to shift its focus toward the emerging awareness of human-induced environmental degradation. It did so with an accompanying sense of responsibility to act in response to the impact of this degradation. The federal government responded by dedicating financial and human resources to addressing environmental issues through efforts such as “The Green Plan” and its northern equivalent, the “Arctic Environmental Strategy” (1991–1997), of which one of the four main foci was contaminants.

Contaminants now known as persistent organic pollutants (POPs) were already a “hot” topic for local and regional consideration in Canada, and some political awareness and interest in addressing the issue. For example, south of 60, the Great Lakes Health Effects Research Program was beginning to address the issue of industrial impacts on the environment and health in and around the Great Lakes, while in the North, cleanup of PCBs at abandoned Distant Early Warning (DEW) line sites had begun.

The potentially harmful effects to the environment of pesticides, particularly DDT, were well documented in the scientific literature by the 1970s and were well recognized by the public, thanks to media coverage of the publication of Rachel Carson’s Silent Spring, which sounded the alarm. Although DDT was banned from use in Canada in 1970, public concern over environmental contaminants generally took the form of the local, “not-in-my-backyard” approach, and politically was still generally dealt with through “end-of-the-pipe” controls.

A shift in environmental perception was well underway by the early days of the NCP. The global nature of environmental issues and the need to address them on an international basis were increasingly recognized. Issues such as acid rain and ozone depletion were taking centre stage. With Arctic haze being observed since the 1950s and the ozone hole first detected over the Antarctic in 1985 — clear manifestations of pollution extending far beyond the unguarded boundaries of their sources — the world was becoming increasingly aware that the atmosphere over polar regions was not immune to pollution from activities in industrialized areas.

When human-made contaminants — with no Northern sources or uses — were found in the Arctic environment, wildlife, and people, particularly in the milk of Inuit mothers, it became clear that people in polar regions were already being affected by activities occurring in industrialized areas. This was appalling to the many Canadians who viewed the Arctic as one of the last pristine bioregions on earth, and who were increasingly voicing their environmental sense of responsibility. It was most alarming to the people living in the North who were informed by the media and some scientists communicating with a sensationalist tone, that the food they were eating, which was central to their cultural, economic and physical well-being, was in fact “poisoning” them and their children. Arctic contamination was clearly a global problem that required global action.

In the late 1980s, it was also recognized that environmental issues involved human health, economic systems, cultural identity and social behaviour. The contaminants issue in the North exemplified all of these aspects. The potential threat that contaminants posed to northerners’ primary food source and ecosystem, their health and that of their children and future generations, as well as to aspects of their economy, culture and social fabric put a human face to what previously had been understood as solely a physical environment issue. Any efforts to address the issue properly would have to be dealt with through an interdisciplinary approach.

The fact that the issue of contaminants in the North primarily affects Aboriginal people who consume food from the land, water and sea is critical to the manner in which it would be addressed. Among Aboriginal people throughout the North, and in government-Aboriginal relations, there was a growing trend of self-determination and involvement in decisions that affected them. This was backed by an international movement towards preserving the cultural integrity of Indigenous peoples, which strongly influenced the 1992 Earth Summit and Agenda 21 (Principle 22). The United Nations recognized that Aboriginal people would have an integral role to play in addressing any issue that affected their land and people. When the NCP began, however, there were few, if any, models of this being put into practice through research programs operating in the North.



Technical aspects of the contaminants problem may have contributed to making it interesting and attractive to the policy community. This was a rare example of a large-scale environmental challenge in which the environmental outcome and the source of the problem could be clearly linked. POPs are purely anthropogenic and thus their limited sources (i.e., producers and users) could be identified relatively easily. The problem could therefore be potentially dealt with at-source. The environmental, and, in a somewhat less advanced way, the health aspects of the problem could be measured with current technology, so that the extent of the problem and trends could be defined with reasonable clarity. Various solutions, in the form of technologies, policies and agreements were being developed, providing examples and options for dealing with contaminants in the North. Furthermore, there were less persistent, less bioaccumulative, alternative substances on the market to serve the same purpose as most POPs¹. In fact, by the time international negotiations on POPs and metals were underway, regulatory measures were already in place in Canada on most of the proposed substances being considered. Armed with its considerable data from programs such as the NCP and the voice of its Aboriginal people, Canada would have to convince other nations to follow its example.

These characteristics of the nature of the problem of contaminants in the North, and the environmental, social, economic and political context in which the issue arose may have influenced the manner in which the NCP was designed to address the issue. They may have also contributed to facilitating the pace of the movement from knowledge to international action. However, circumstances alone do not explain how the NCP achieved its present form and successes.

The NCP took its initial form through the commitment and leadership of a core group of people who were prepared to take a multi-disciplinary approach to the issue of contaminants in northern Canada and who recognized that the issue could not be addressed without the direct involvement of northern Aboriginal organizations. There was not a particular vision of an ecosystem-based, partnership-managed, multi-disciplinary program right from the start, but a program that was open to new approaches and viewpoints, and flexible enough to evolve and adapt. The program was to be based on solid, focused, leading-edge science from its beginning. The partnership management structure, the participation of Northerners, and the attention given to education and communication activities became essential aspects of the program during Phase I of the NCP and have continued to evolve throughout Phase II.

¹An exception is the use of DDT to control malaria in some of the world's poorest countries. These countries continue to use DDT because it is the most cost-effective chemical for the prevention of malaria and they cannot afford reliable alternatives or do not have the capacity to develop them.

2.3 Phase II of the NCP

Results reported in CACAR provided a starting point for extensive consultations conducted from 1996 to 1998 throughout the North with Aboriginal organizations, northern communities, researchers, program managers and other stakeholders. The consultations aimed at finding the common elements between the concerns of northern communities and priorities with respect to contaminants and the scientific needs identified as critical to addressing the issue of contamination in Canada's Arctic. Through a series of workshops, including the 1996 "Ideas Workshop," the 1997 Annual NCP Results Workshop, and the Eastern Arctic Workshop held in Iqaluit in 1998, the NCP developed future priorities. The outcome of these deliberations was a second phase of the program, NCP Phase II, which began in 1998 and continues until 2003.

NCP Phase II builds on the foundation of knowledge generated under Phase I, following its renewed objective:

"to reduce and wherever possible eliminate contaminants in traditionally harvested foods, while providing information that assists informed decision-making by individuals and communities in their food use".

Objective of the Northern Contaminants Program

To reduce and wherever possible eliminate contaminants in traditionally harvested foods, while providing information that assists informed decision-making by individuals and communities in their food use.



ITK/Eric Loring

While Phase I focused on the basic sources, pathways and fate of contaminants, Phase II focuses on addressing the immediate health and safety needs of Northerners relating to contaminants in traditional/country foods. Research is geared towards answering questions about the impacts on, and risks to, human health that may result from current levels of contamination in key Arctic food species. To ensure a balanced assessment of the risks, however, the benefits associated with traditional diets are also identified and quantified. Priorities for research, monitoring and communications under Phase II are based on an understanding generated through Phase I of the species that are most relevant for human contaminant exposure, and geographic locations and populations that are most at risk or most in need of information.

Phase II also builds on the management structure, partnerships, and multidisciplinary approach to research, monitoring, communications and policy that were established and evolved through Phase I. These elements are the basis for the four main interlinked components of the NCP Phase II:

- human health research;
- monitoring the health of Arctic peoples and ecosystems and the effectiveness of international controls;
- education and communications;
- and international policy.

2.3.1 Shared management and innovative partnerships

The issue of food chain contamination in the Arctic is multi-jurisdictional, involving federal, territorial and Aboriginal governments. The issue must also be addressed through cooperation from the international community on a global scale. The needs and the concerns that must be addressed require information that meets internationally

acceptable scientific standards. At the same time, research must also respond to the needs expressed by the community by individual consumers of traditional foods.

A program that addresses such scientifically and politically complex issues requires well developed structures and strategies for management, planning and implementation. The multi-disciplinary nature of the NCP has allowed it to develop such structures and strategies. Much of the strength of the NCP is derived from the partnership approach of its management process. This encompasses representatives of the key areas of Arctic contaminants research, northern community concerns, and the international and domestic agendas for the control of toxic substances.

NCP Phase II is directed by a management committee, chaired by DIAND, that includes representatives from:

- five northern Aboriginal organizations (Council of Yukon First Nations, Dene Nation, Métis Nation-NWT (up until its dissolution in 2000), Inuit Tapiriit Kanatami [formerly Inuit Tapirisat of Canada] and Inuit Circumpolar Conference Canada);
- Yukon, Northwest Territories and Nunavut Territorial Governments;
- four federal departments (Environment, Fisheries and Oceans, Health and DIAND); and
- chairs of three Territorial Environmental Contaminants Committees (TECCs) in the Yukon, Northwest Territories and Nunavut (formally established in 2000) and the Nunavik Nutrition and Health Committee (NNHC) (formal member since 1999).

The management committee is responsible for establishing NCP policy and research priorities and for final decisions on the allocation of funds. The TECCs and the NNHC support this national committee. Figure 2.1 shows the series of inter-related committees that provide the overall management of the NCP.

2.3.1.1 Territorial Environmental Contaminants Committees

The TECCs and NNHC are the central coordinating, review and advisory committees under the NCP in each of the northern regions involved in the program. They are critical to the successful review and selection of projects appropriate for the regions and communities they represent, for the development, coordination and release of communication messages at the regional and community levels and for the identification and inclusion of regional concerns and priorities within the program processes and structures.



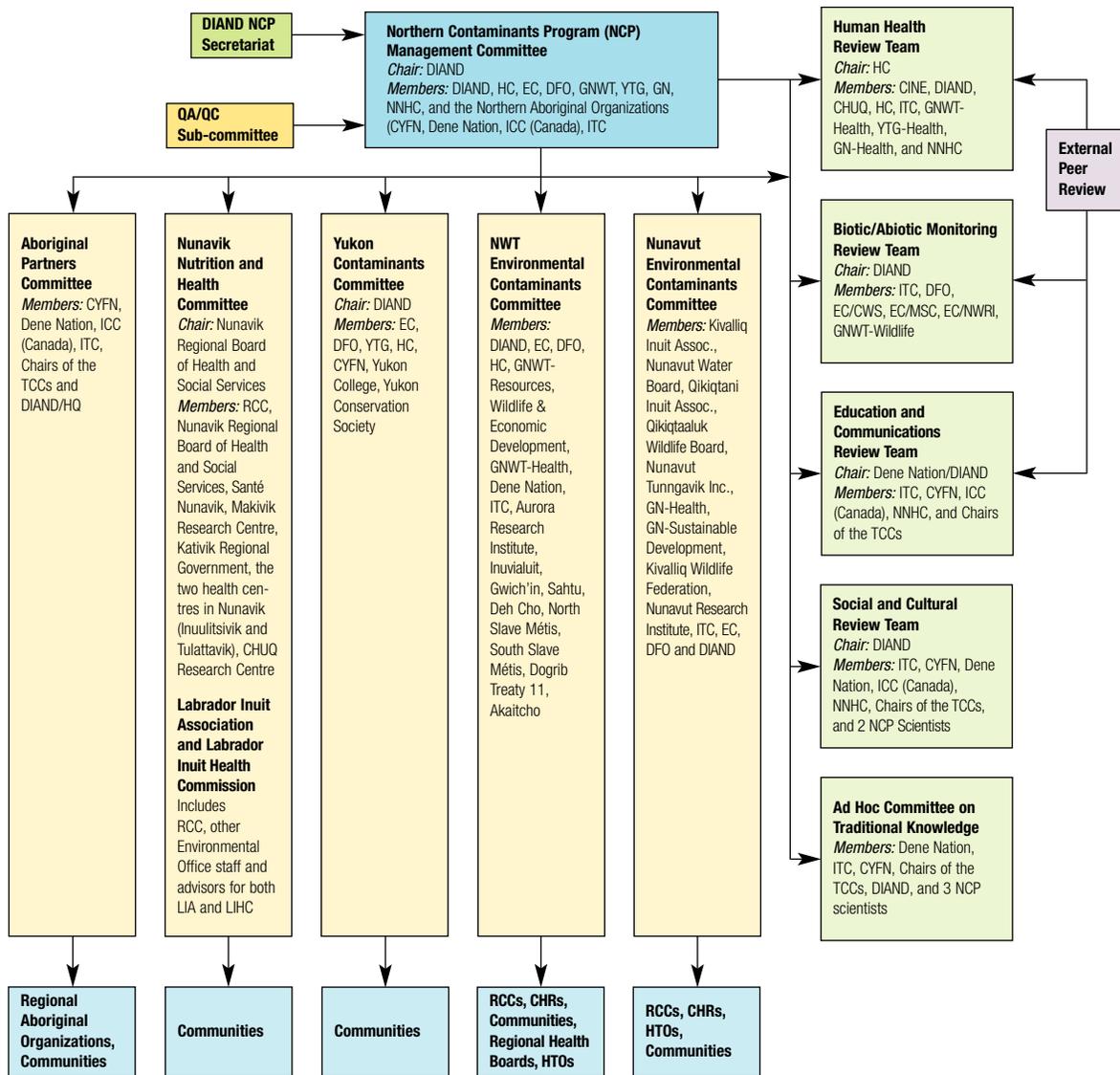


FIGURE 2.1

NCP Management Structure. The management process of the NCP is based on partnerships among multiple stakeholders. The multi-agency, multi-disciplinary management structure at the national level is linked with territorial/regional committees of equally diverse membership. Much of the strength of the program is derived from the partnership approach. ITC, the Inuit Tapirisat of Canada, has changed its name to Inuit Tapiriit Kamatami (ITK).

On a regional basis, the Territorial Environmental Contaminants Committees (TECCs) include the appropriate representatives of regional government departments as well as the Aboriginal Partners involved in the program from that area (see Figure 2.2 for names and membership on the TECCs, and Box 4: *Evolution of a Regional Committee: NNHC*). These committees have adapted in each region to reflect the needs and structures in that region over the course of Phase II of the NCP.

One such example of this is the region of Nunavik. With the growing involvement of Nunavik in the NCP, a regional committee from that area was incorporated into the Program. This has since significantly enhanced the Program’s ability to communicate with Nunavik communities, and to learn from them about the issues they face related to contaminants and the environment (see for example the discussion of Hg in Salluit in *CACAR II — Toxic Substances in the Arctic and Associated Effects: Human Health*).

Box 4 Evolution of a Regional Committee: NNHC

In Nunavik, a first step toward community-based environmental risk management and communication was undertaken after a preliminary survey in the region in 1988 found distressing levels of PCBs in women's breast milk. To investigate this issue, a project was initiated to measure levels of contaminants in Inuit women in the region, assess the risks to infants from breast-feeding, and make proper public health recommendations for breast-feeding. Because of the sensitive nature of the project, and the identified ethical obligation of the health authorities to return and discuss results with the population in a timely and responsible manner, the regional health board established a resource committee to support this process.

Referred to as the "PCB Committee" and comprised of researchers, health, and environment workers, the group was established to initiate and maintain an ongoing relationship with the population about the project. They were mandated to provide regular updates to the population on the progress of the research and general information on the issues of traditional/country food consumption, organochlorine contaminants, and health. The committee was also mandated to develop and implement a communications strategy to inform and educate residents about the issues and identify and address population concerns. The committee was set up to ensure that these issues were dealt with in a well coordinated manner and that responsibilities were not spread throughout the many organizations and agencies in the region. This coordinated approach was meant to minimize the release of conflicting messages from different organizations and the ensuing confusion this may cause.

Realizing the value in this approach, regional health authorities reinstated the committee again in 1994, amidst a number of contaminant-related studies and concerns in the region. The committee was renamed the "Food, Contaminants and Health Committee" to reflect its broad approach to contaminant issues. This included the consideration of risks and benefits, and social, economic and cultural values. Again, the committee primarily filled a communications role, developing and disseminating information and results obtained from various sources on food, contaminants and health in its more holistic sense (physical, mental, socio-cultural, and economic aspects). This information included not only research on risks, but also different levels of benefits and health issues associated with the various foods or food preparation and transformation (e.g., fermentation) practices in Nunavik.

Realizing the benefits of this committee and its role in supporting the empowerment of Nunavimmiut with regards to environmental health issues in the region, the regional Health Board then formalized the committee, which is now known as the "Nunavik Nutrition and Health Committee".

The committee is now a permanent regional advisory committee which supports the conducting of benefit-risk management processes in the region relating to issues of health, nutrition and contaminants. Committee members define and promote policies and programs on nutrition and health including aspects related to physical, emotional, spiritual and mental well-being. The committee's main foci are health and nutrition issues in a broad sense (including culinary practices, economy, nutrients, contaminants, safe handling procedures, resource availability, and social considerations), but more specifically in relation to the quality of the environment.

A key component in the success of this and other territorial/regional committees is the diversity of the committee's membership and the partnerships developed. Today, the committee's membership consists of representatives from Makivik Corporation (Nunavik Research Centre), Kativik Regional Government, Ungava Tulattavik Health Centre, Inuulitsivik Health Centre, Nunavik Regional Board of Health and Social Services, and the Quebec Public Health Centre. Individuals represented include health and environment officials, doctors, nurses, midwives, researchers. Many of these individuals are Inuit, and are resource harvesters and consumers. It is a forum that merges many views, worlds, and approaches to problem-solving and communication, and is building partnerships to address issues in a way that is in the best interests of Nunavimmiut. In 1999, this committee became the official committee for the region's involvement in the Northern Contaminants Program.



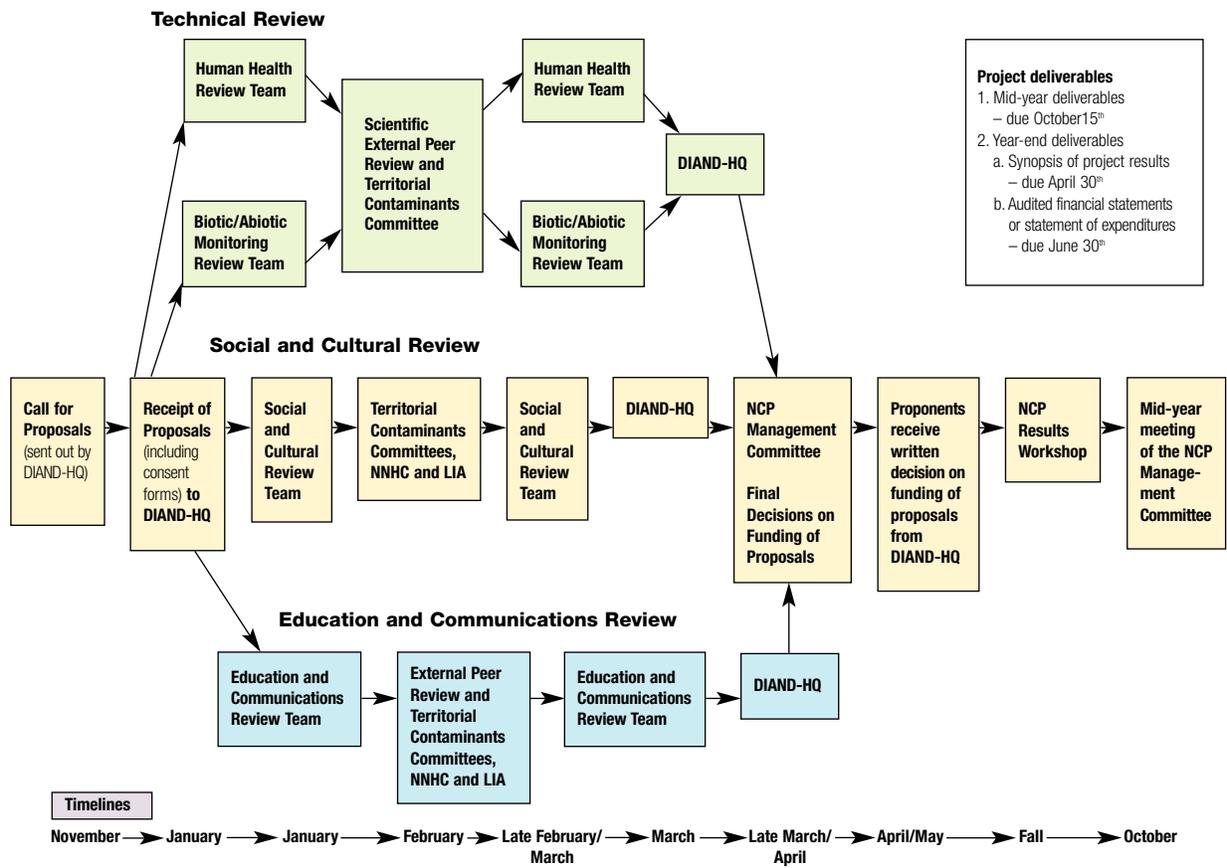


FIGURE 2.2

NCP proposal review process. This thorough review process ensures that work conducted under the program is scientifically defensible, consistent with program priorities and socially and culturally responsible in a northern context. The unique aspects of the NCP process include the review of all proposals from a social/cultural perspective by a designated review team and by regional committees.

2.3.1.2 Regional Contaminants Co-ordinators (RCCs)

The development of the position of Regional Contaminants Coordinators (RCCs) has been critical to the success of many communication activities in the program. They are the “eyes and ears” of the program at the community level, being in contact with communities regularly and making community needs and concerns known at the regional and national levels. Initially, RCC positions were developed in response to the need for regional assistance in communicating contaminants-related information and activities to individual community residents. This need was predicted before the 1997 release of CACAR I, because of the expected flood of contaminants-related information that would reach communities.

While the Aboriginal Partners had experience and expertise in communicating with their communities, it was a significant challenge (in terms of time and resources)

to meet the demands placed on them by the regional committees and program researchers. Thus, it was initially decided to create half-time, one-year positions in regions where there was a high concern for human safety relating to NCP priority food chain contaminants and where there was an “urgent” contaminant issue.

The regional Aboriginal organizations hosted these positions, providing for them office space and some financial support. It was a priority to have local Aboriginal people filling these positions wherever possible to both communicate effectively and build local expertise related to these initiatives. Within the first year of the existence of the RCCs, the ongoing need for these positions was quickly realized. Formal guidelines and duties associated with these positions were established in 1998.

Based on the criteria used to identify priority locations for RCC placement, not all regions are included in this component of the program. In these areas, a greater

reliance and emphasis is placed on the roles of “front-line workers” as communicators and the other roles played by RCCs elsewhere. In some cases, RCCs and their analogous representatives have been involved in identifying and addressing complementary environmental and health issues in the region and communities (e.g., some RCCs are involved in initiatives related to climate change).

One challenge the NCP has faced with respect to the RCC positions has been in retaining individuals in successive years. Quite often, dynamic and effective RCCs are developed through the program with the provided training and experience. Based on the skills these individuals have brought to the position and acquired as an RCC, they are sometimes offered other full-time positions within or outside the region or have gone on to pursue higher levels of formal education. Although this presents a challenge within the program, in a larger sense, it contributes to regional capacity for addressing these issues.

Where they have been effective, RCCs have contributed significantly to the capacity of the communities and region in accessing and understanding contaminants information, and in raising community concerns and perspectives to the various NCP committees and representatives.

2.3.1.3 Aboriginal Partnerships

Since the beginning of the Arctic Environmental Strategy (AES) in 1991, Aboriginal organizations (Inuit Tapiriit Kanatami, Inuit Circumpolar Conference, Dene Nation, Metis Nation, and the Council of Yukon First Nations) were brought into the process of managing and advising the NCP. Unique at the time, these partnerships began to flourish in Phase I of the NCP, and by Phase II became instrumental in the overall operation of the program. The development of the program blueprints, the consultation process, ethical guidelines, review process, dissemination of data, and overall program direction were all a direct response to the involvement of Aboriginal partnerships.

During Phase II of NCP, blueprints were developed as a major step in guiding the program. The involvement of the Aboriginal partners in blueprint development guaranteed that community concerns would be incorporated. Similarly, the review process developed during Phase II included Aboriginal representation to ensure relevance for Aboriginal people. The Aboriginal Partners also began to work closely with many of the scientific partners involved in Arctic research, advising them on issues such as methods for improving community involvement, appropriate contacts in regions and communities, and specific communications problems related to their work.

The Aboriginal Partners were able to bring forth grassroots concerns from each of their respective regions in Phase II of the NCP. By participating in the NCP management structures, Inuit, First Nations and Metis could provide advice and represent northern Aboriginal interests to DIAND and other NCP government partners, contributing input on communications as well as research priorities. The spectrum of committees that were developed under Phase II (management, review teams, ad hoc committees, workshop and symposium development, research analysis, review teams, and ethical committees) all had Aboriginal representation. Every step of the Program was influenced by northern Aboriginal concerns.

Another crucial element of the Aboriginal Partners’ work with respect to the NCP has been in developing communications links. During Phase II, substantial effort went into communicating information about contaminants back to communities and regions. It became the responsibility of the Aboriginal Partners to ensure that this information got back to northerners in a meaningful way. By working to improve and systematize communications with their own constituents at the regional level, they have become better able to represent those priorities within the NCP. Equally important, the Aboriginal Partner organizations and communities have been able to make better use of NCP information and opportunities for funding.

In Phase II, the Aboriginal Partners submitted more projects than they had in the previous phase. Such projects contribute to technical as well as administrative capacity at the community level. They range from specific scientific studies of contaminants to communication projects by local environment committees. These projects have been largely responsible for incorporating traditional knowledge (TK) into the NCP. A good example of this has been the Dene Nations’ Elder/Scientists Retreats as well as the Council of Yukon First Nations’ (CYFN) development of documentation on TK, and its incorporation in project work.

Before NCP and its investment of core dollars, these Aboriginal organizations were significantly challenged in their ability to deal with contaminants and other environmental issues. Through the partnership with the NCP, these organizations were able to develop their own internal capacity to work on contaminants and other important environmental issues with their constituents. This has allowed them to participate at the national and international levels to ensure Aboriginal positions are considered in policy development, including arguments for control of contaminants. This is well illustrated by their active participation in the Arctic Council, as well as their important role in pushing the UN ECE Executive Body to move forward with a protocol for Persistent Organic Pollutants and the UNEP POPs global agreement.





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Northern Aboriginal organizations worked closely with one another and with the federal government through a coalition called the Canadian Arctic Indigenous Peoples Against POPs (CAIPAP) during the UNEP POPs negotiations. This partnership is a potential model for their participation in other health and environmental issues. Within Canada, the Aboriginal organizations' increased ability to address the contaminants issue has enabled them to have a stronger voice at national consultations.

The involvement of the aboriginal partners has led to many of the milestones developed by this program, including:

- NCP Blueprints;
- consultation process with communities;
- the Education/Communication funding envelope;
- ethical guidelines for research;
- incorporation of TK;
- social/cultural components of the review teams and process;
- development of trust between communities and scientists;
- aspects of working responsibly;
- development of a high level of responsible research;
- releasing balance messages on benefits and risk of traditional/country foods;
- development of a network of communication;
- TECCs;
- RCCs;
- development of school curriculum on contaminants; and
- Canada's ratification of the Global POPs Convention.

The NCP is better able to respond to the needs and wishes of northerners when designing and delivering programs and projects with the involvement of the established Aboriginal Partners. The vision in the early days of the AES has been justified; investing in the Aboriginal Partners may have seemed costly initially, but in the end, it was

an investment critical to both the success of the Program and to the success of these Aboriginal organizations to respond to these issues.

2.3.2 Blueprints

Two major initiatives were undertaken for Phase II to ensure that the NCP remains scientifically defensible and socially and culturally aware, while at the same time, achieving real progress in terms of the Program's broad objectives. These initiatives were: 1) developing "blueprints" that document the long-term vision and strategic direction for NCP Phase II, and 2) implementing a more open and transparent proposal review process. Under the leadership of the northern Aboriginal organizations, the dialogue between northerners and the scientific community, which was initiated in Phase I, continues to build awareness and an understanding of contaminants issues, and helps to support the ability to deal with specific contaminant issues at the local level.

The NCP blueprints are a series of documents that provide the long-term vision, strategic direction, and goals for NCP Phase II. They also serve in the short term as a guide to the specific gaps and priorities for research and activities and as a basis for annual funding decisions. The blueprints grew out of the strategic action plan that had guided NCP Phase I, the results of and gaps identified in the first CACAR, and the extensive consultations held during the development of Phase II. Blueprints exist for each area of research and activity of interest to the NCP (see Box 5: *NCP Blueprints*). Together, these four blueprints document the intended direction of the program as a whole.

By directing research to known areas of concern, there are risks that the blueprints could be too restrictive or that emerging issues potentially of major importance could be filtered out. As a result, research and related activities can only be as relevant as the blueprints themselves. What keeps the blueprints relevant is that they are evolving documents that are reviewed annually so as to ensure they remain current with the latest data and information collected by the NCP and resulting new knowledge gaps.

A recent independent evaluation of research results and work in progress credited the blueprints with giving the program direction and focusing NCP-funded research in key areas of policy interest. These blueprints have proven valuable in providing the necessary guidance to project leaders for developing proposals for funding. They have also helped peer reviewers, review teams and the NCP Management Committee to evaluate proposals for their relevance to the NCP and its current gaps and directions. The blueprints keep the program focused, while moving it toward its overall objective.

Box 5 NCP Blueprints

The NCP blueprint documents provide the long-term direction for the program and outline the specific gaps and priorities for research and activities under each sub-program. The goal and focus of each sub-program, as detailed in the blueprints, are briefly outlined below.

Human Health

Goal: to determine the risks to humans, particularly on the developing fetus, from contaminant exposure by consuming traditional/country foods, as well as to characterize the benefits associated with this diet.

Focus: exposure assessment, toxicology, epidemiology, and characterization of risk/benefits.

Monitoring the Health of Arctic Peoples and Ecosystems and the Effectiveness of International Controls

Goal: to collect physical and biological data necessary to support human health risk assessments and international controls, such as information on temporal and spatial trends.

Focus: abiotic monitoring and modeling, biotic monitoring, and local contaminant concerns.

Education and Communications

Goal: to provide Northerners with the information needed to make informed decisions on their food use.

Focus: public awareness, directed communications, resource materials, infrastructure, and evaluation.

International Policy

Goal: to control the input of contaminants to the Arctic through coordination on international monitoring programs and participation in international negotiating sessions leading to regional and global agreements.

Focus: incorporation of NCP scientific information, involvement of northern Aboriginal peoples, and international collaboration.

2.3.3 Review Process

The current proposal review process ensures that work conducted under the program is scientifically defensible, consistent with the vision and priorities set out in the blueprints, and socially and culturally responsible in a northern context.

The NCP Technical Committee of Phase I, which provided a technical review of all science proposals, was replaced in Phase II with a thorough, more transparent process. The new process involves a scientific review by external peer reviewers, facilitated by technical review teams with specific expertise in the respective fields of study (human health, and biotic and abiotic monitoring) using an established set of criteria. This is generally consistent with the review process of most major scientific funding programs.

The unique aspect of the NCP review process, however, is the additional review of all proposals from a social/cultural perspective, using a set of criteria specific to social and cultural concerns of northerners. A Social/Cultural Review Team made up of the Aboriginal Partners, representatives from each of the three Territorial Environmental Contaminants Committees (TECCs), the Nunavik Nutrition and Health Committee (NNHC), a representative of DIAND, and two research scientists facilitates this review.

The review team comments on whether the proposed project would address a question of priority to northerners. They also consider whether there are appropriate planned communication activities associated with a proposed project, whether the project would provide or promote opportunities for local or northern training and capacity building, and whether it makes appropriate use of traditional knowledge. Opportunities to incorporate traditional knowledge into a research project are often identified through this review process, if this has not been previously done. Through this review team, the program also ensures that the NCP Guidelines for Responsible Research are adhered to and that written approval of consultation is obtained from the appropriate northern community authority or national-level Aboriginal organization for all projects involving northern field work and/or analyses of samples from the North.

Proposals submitted to the Education and Communications subprogram are evaluated against a set of criteria by a separate review team, composed of the Aboriginal Partners, the TECCs and a representative of DIAND, with assistance from peer reviewers as necessary. These criteria cover technical aspects related to project design, team, methodology, deliverables and budget, as well as aspects relevant to a social/cultural perspective, as described above.





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A formal review process also occurs in each territory, undertaken by the TECCs, and in Nunavik, by the NNHC. This ensures that each region has an opportunity to evaluate and comment on proposals of relevance to that region. The Management Committee, in making final funding decisions on each project, considers recommendations and comments from all reviews.

2.4 Summary of key points

- Although scientists have been monitoring contaminants in the Canadian Arctic since the 1970s, concern over this issue heightened in the 1980s with some disturbing findings.
- With its establishment in 1991, the Northern Contaminants Program embarked upon a comprehensive and coordinated multi-disciplinary approach to addressing the issue of Arctic contamination.
- When contaminants in the Arctic began to emerge as an important issue, a number of changes occurred on national and global environmental, social, economic and political fronts. This prompted the evolution of the NCP as an ecosystem-based, partnership-managed, multi-disciplinary program and may have facilitated rapid action on the issue. Even with the favourable circumstances, however, the NCP had to be innovative, even groundbreaking among large-scale federal science programs, in its approach to research, management, and political action.
- The long-term vision, strategic direction and priorities of the NCP are laid out in a series of “blueprint” documents. These blueprints outline the objectives, goals and priorities for research and activities that would support the overall aim of the NCP and serve as a guide to annual funding decisions.

- The NCP proposal review process ensures that work conducted under the program is scientifically defensible, consistent with the vision and priorities set out in the blueprints, and socially and culturally responsible in a northern context.
- Much of the strength of the NCP is derived from the partnership approach that forms the basis of its management process.
- Through the partnership between the northern Aboriginal organizations (Métis Nation-NWT, CYFN, ITK, ICC, and the Dene Nation), these organizations have been able to develop their own internal capacity to work on contaminants and other important environmental issues with their constituents.

2.5 Key references and suggested readings

- Jensen, J., K. Adare, and R. Shearer (Eds). 1997. *Canadian Arctic Contaminants Assessment Report*. Indian and Northern Affairs Canada, Ottawa, ON. 460 p.
- Han, S.-L. and K. Adare. 1997. *Highlights of the Canadian Arctic Contaminants Assessment Report: a community reference manual*. Indian and Northern Affairs Canada, Ottawa, ON. 83 p.
- NCP. 2001. *Operational Management Guide, NCP*. 2001. Northern Contaminants Program, Department of Indian and Northern Affairs, Canada. www.ainc-inac.gc.ca/ncp.



The NCP Approach to Research

3.0 Introduction

Research supported by the NCP covers a broad range of types, all aimed at gaining a better understanding of the issue of contaminants in the Arctic and how to address it. This research consists of: laboratory and modelling studies; abiotic and biotic monitoring including the use of new and/or archived samples; epidemiology research; health and nutrition surveys; and social science studies. Depending on its particular focus and design, a study may be carried out in the North or elsewhere. For those studies that are conducted in northern regions, the diversity and nature of the North presents special considerations for planning and conducting studies.

From the perspective of Arctic Aboriginal peoples, conducting scientific research in the North can be a highly visible, yet often misunderstood process. Small northern communities see, or are otherwise aware of, the comings and goings of scientists with their equipment and gear. Who these scientists are, what they do, why they do it, and what benefits their work might bring to the North, is often unknown.

Conducting research in the North presents its own unique and unfamiliar challenges to scientists trained in the South. Planning for and working in remote northern locations presents significant added financial demands, logistical difficulties and cultural considerations for which a formal science education provides little, if any, preparation. Northern research requires travel with personnel and equipment over great distances, in often unpredictable or harsh weather. Support — in the form of scientific facilities and trained personnel — to facilitate research, is comparatively limited. Scientists need to communicate and collaborate in a culturally sensitive manner with Northern Aboriginal peoples for whom English may be a second or third language, whose education and training varies greatly from their own, and who hold a unique world view and perception of the environment.

To bridge the gap between these contrasting perspectives and diverging needs is a challenge in and of itself. It calls for a high level of coordination, consultation, cooperation and capacity-building among the relevant regions and players. The NCP has made these aspects of the research process a priority in its approach to northern research.

3.1 Working Responsibly

The Northern Contaminants Program has established a wide range of measures and mechanisms to ensure “responsible research” in all its fields of interest, with particular emphasis on studies conducted in the North. Responsible research involves elements such as consultation, community participation, partnership, communications, and appropriate and timely reporting of data. The NCP recognizes that practising responsible research is first and foremost an ethical responsibility, yet there are also very practical and mutually beneficial aspects to fostering effective scientist-community partnerships in research. Among these aspects are capacity-building, and knowledge- and information-sharing, which could lead to improved studies and a better overall program.

While NCP-funded researchers and northern communities generally have strong working relationships today, this is the result of years of learning and adapting. Experience has shown that, in northern communities, the mystery surrounding the scientific process holds the potential to breed apprehension and suspicion about research and the researchers themselves. Unfavourable perceptions today are often a legacy of past experiences marred by communication failures between researchers and communities and misunderstandings about both the nature of the research and the communities’ role. One bad experience can have repercussions across disciplines, regions, and programs.

The groundrules for conducting scientific research in the North have changed profoundly in recent decades, alongside the struggle for self-determination among Inuit and northern First Nations, which involves striving to take control of the issues that affect them and activities taking place on their land. Guidelines for ethical research established by agencies who conduct or fund research, or who issue research licences or permits, attempt to promote greater awareness of and responsiveness to northern concerns by scientists, and to ensure that it is no longer justifiable to conduct research in the North without consulting and taking into account the interests and concerns of northerners. Indeed, there are many recent examples of northerners being directly involved in various aspects of scientific research in or near their communities.

3.1.1 Guidelines for Responsible Research

The Northern Contaminants Program has its own set of guidelines, *The Guidelines for Responsible Research*, and accompanying consultation requirements. These guidelines provide direction and a framework for a community and researcher to agree upon their mutual obligations and to foster an equitable and beneficial relationship. The latter ensures that communities are fully aware and approve of research to be conducted in or close to their community on a project-by-project basis. Together, these are used to involve northern communities as partners in research activities, from the beginning stages of project design to integrating communications in all stages of the research. While fulfilling these guidelines and requirements necessitates time and effort on the part of both the researcher and the northern Aboriginal organizations, they are not intended to discourage or impede Northern research but rather to enhance its effectiveness and utility.

The NCP Aboriginal Partners led the development of *The Guidelines for Responsible Research* as an important step toward addressing the concerns of Northerners with respect to the conduct of science in their communities, and assisting researchers to conduct science in an informed and responsible way (see Table 3.1). The Guidelines originally arose out of need, since problems had been identified in community-researcher relationships and the manner in which research was conducted and communicated or not communicated in the North. While some communities were at times reluctant to participate in or have anything to do with research in their communities, (particularly when it was perceived as personally invasive or obtrusive, such as with the NCP-supported Maternal Cord Blood Study), the NCP and its Aboriginal Partners wanted research to be done to answer the pressing human and environmental health questions related to contaminants in the North. The Partners gained community consensus to move forward with research with the agreement that community needs would be respected. Working through NCP channels, the Partners seized the opportunity to define what would be the elements of responsible research in their regions, and to inform and educate scientists and Northerners alike about the unique requirements for working responsibly in the North. They faced a challenge of striking a delicate balance between making the guidelines effective for the communities but not overly cumbersome for researchers.

TABLE 3.1 Development of the NCP *Guidelines for Responsible Research and Consultation Requirements*

Date	Event
1993	Inuit Tapirisat of Canada prepares an issues paper to stimulate discussion on negotiating research relationships in the North. NCP conducts a workshop on community-researcher relationships under the NCP. Participants include representatives from northern Aboriginal organizations, NCP researchers, federal and territorial governments, and the NWT Science Institute. This leads to the development of <i>Researcher Guidelines for Planning Communications and Community Participation</i> .
1994	The NCP Management Committee endorses the Guidelines and issues them as part of the proposal application package; approval for funding becomes contingent upon adherence to these Guidelines.
1998	Consent forms and Guidelines for obtaining Informed Consent are included in proposal application package.
1999	The Guidelines undergo revision and are renamed <i>Guidelines for Responsible Research</i> .
2001	The NCP Social/Cultural Review Committee develops the new <i>Consultation Requirements for Northern Contaminants Program Projects</i> to replace the consent forms and related guidelines for obtaining informed consent.

The guidelines are thus designed to be practical, non-prescriptive and flexible. They provide a general framework that is adaptable by project and by community, and provide both researchers and communities with a sense of what might be expected of them in terms of consultation, research obligations, developing research relationships, and communicating results (see Box 6). For each type of research conducted under the NCP (i.e., human health, environmental, or laboratory or analytical research), the guidelines advise project leaders on whom to contact and at what stage in the proposal/funding cycle, what types of matters to discuss, and reasons for each step.



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Box 6 Basic Principles of the Guidelines for Responsible Research

The Guidelines for Responsible Research are one of several tools to assist project leaders in the Northern Contaminants Program to initiate community contacts, build research relationships, plan communications, and, in some instances, develop research agreements with communities. According to the guidelines, responsible research includes the following elements.

Consultation — Appropriate consultation is required before any research can be conducted under the NCP. Researchers are responsible for explaining any potential beneficial and/or harmful effects of the research on individuals, communities and the environment. Greater consideration must be placed on the risks to cultural values rather than on potential contributions of the research to knowledge.

Community Participation — Research projects must include community participation in planning and implementation, as well as in identifying research topics and priorities. Research must be responsive to local or regional needs and must respect sacred sites, cultural materials and properties. Where practical, local Aboriginal researchers and assistants are to be employed and trained, and all those who contribute to the project are to be acknowledged in any publications resulting from the research.

Partnership — Researcher-community relationships are ideally established early on in the project planning process. It is recognized that these relationships are dynamic and will evolve throughout a project's duration. In some circumstances, researchers and communities may wish to set out the parameters of their agreements, including such details as "mutual obligations" for each partner, in a Memorandum of Understanding. An individual may exercise his/her right to refuse participation at any point in any study.

Communications — Leaders of all NCP projects, with advice from Aboriginal organizations and territorial contaminants committees, are responsible for ensuring that the most timely and appropriate forms of communications planning, materials and methods are incorporated into their project. Translation of summary reports into Aboriginal languages is critical and should be done wherever possible/appropriate.

Data Reporting — Researchers must ensure the accuracy of their results since these results may influence decisions and policies that can directly affect individuals and communities. The existing NCP protocols for dissemination of information are to be followed.

3.1.2 Consultation requirements for NCP projects

Once the *Guidelines for Responsible Research* were in place, there needed to be a way of monitoring their use to ensure that participation and communications planning were an integral part of research proposal development. Beginning in 1998, researchers were required to obtain informed written consent from communities close to or in which research was planned. A consent form was to be submitted along with their funding application. Additional guidelines were developed to assist researchers in obtaining this written consent. This was a start in ensuring community consultation, awareness and participation in northern research. In its initial form, however, the process was confusing and cumbersome for researchers, Aboriginal organizations and communities alike.

In 2001, a consultative process (Figure 3.1) was developed by the Social/Cultural Review Team to replace the previous consent process. This process respects the fact that developing researcher-community relationships is a dynamic, iterative and evolving process, which requires time to make initial contacts, to build community-researcher relationships, and to agree upon appropriate communications.

The new process helps foster a relationship between communities and researchers from the start of the project development.

The nature and degree of involvement by northern communities in research will vary according to project type, regional differences and community interest. Projects with direct community involvement are required to have a greater level of consultation than laboratory-based or modeling studies, which may have little or no direct community involvement. Mechanisms are built into the consultative process to allow for review and input from the communities and various NCP review committees.

The new process clearly demonstrates to researchers the importance of ongoing consultation throughout the full duration of a project and of allowing the relationship to develop and change as needed. It should provide all concerned committees and organizations with a better indication of whether the consultation is appropriate and satisfactory to the communities. It is too soon to determine if this new process has indeed led to improved and ongoing consultation, and thus responsible research. Early feedback from researchers and Aboriginal organizations, however, indicates that the changes made are being welcomed.

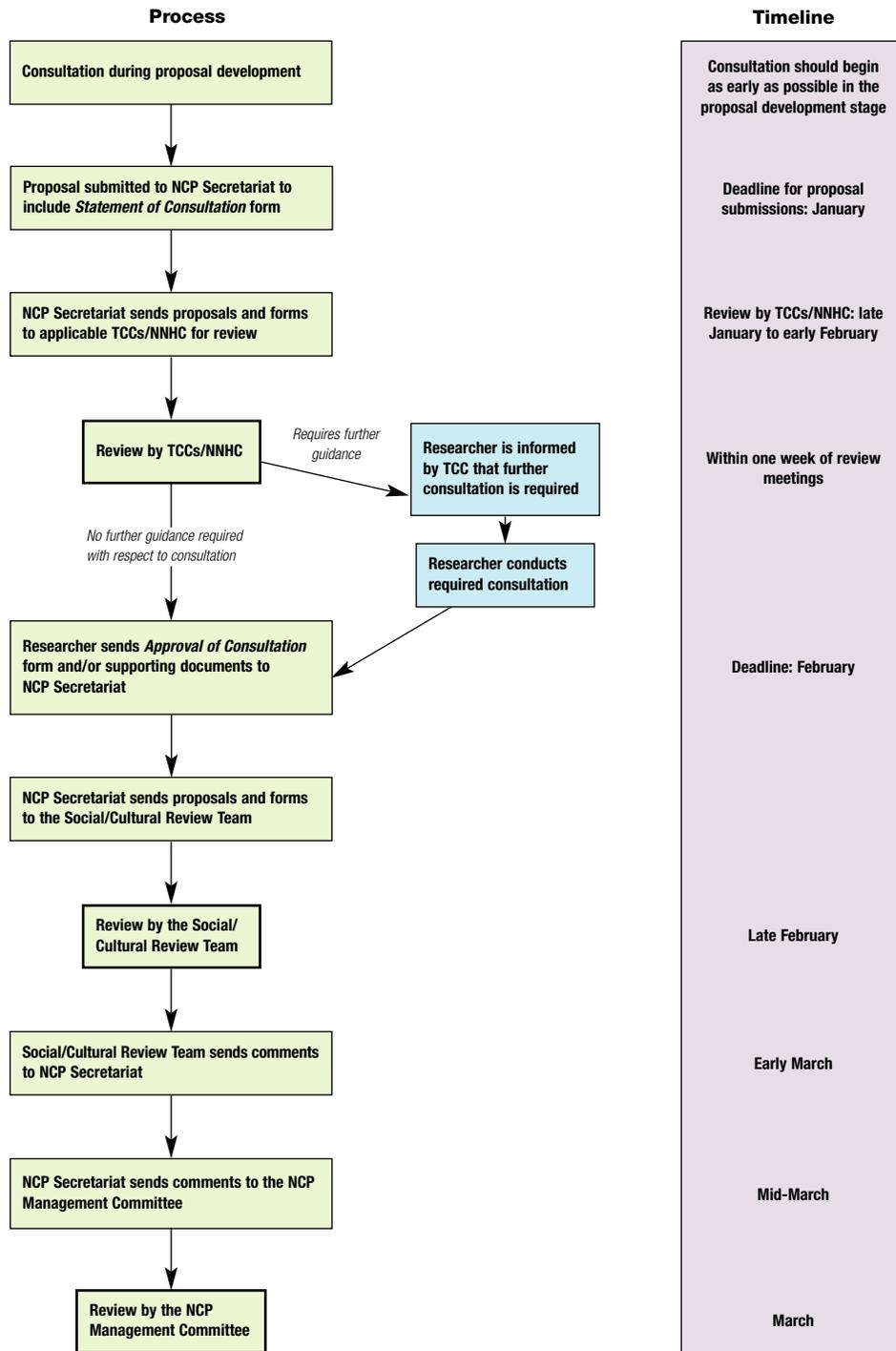


FIGURE 3.1
 Consultation requirements for NCP proposals: Process and timelines.

3.1.3 Supporting responsible research and community consultation

A number of committees, initiatives and products established under the NCP support the guidelines and consultation requirements. Territorial Environmental Contaminants Committees and their equivalents in Nunavik and Labrador, Aboriginal partners, Regional Contaminants Co-ordinators, and the ad hoc Committee on Traditional Knowledge all facilitate the process by liaising with and advising researchers and communities alike.

The annual proposal review process supports and provides a check on responsible research and community consultation. In addition to the technical review of each proposal, which is typical of many research funding programs (i.e., expert review panel, peer reviewers), NCP proposals undergo a further review by a designated social/cultural review team. A review by territorial/regional contaminants committees ensures that local concerns and perspectives are considered and addressed. These additional review components are unique to the NCP. However, some other research programs (e.g., Northern Ecosystem Initiative and programs under Canadian Institutes for Health Research — Institute for Aboriginal Peoples' Health) have recently adopted components of such a social-cultural review at the request of Aboriginal groups, some of whom have been involved in the development of the process under the NCP.

A number of communication activities and materials, including annual reports such as the *Summary of NCP Projects* booklet and the *Synopsis of Research* provide timely information in plain language and more technical language, respectively, about current projects to communities across the North and to all program participants. Communication initiatives, as described in Chapter 5, attempt to return results and information to communities in a responsible way.

3.1.4 Summary of working responsibly

The relationship between northerners and scientists has evolved throughout the duration of the NCP, and the *Guidelines for Responsible Research* and consultation requirements have both resulted from and fueled that growth. Where there was once reluctance in communities to participate in NCP projects such as the Maternal Cord Blood Study, those same communities reversed their stance and requested to be involved. Upon hearing of the results of that study, other regions not included in the original study even requested that such a study be done in their region. Despite the added effort required to meet the guidelines and fulfill the requirements, there has generally been a strong professional commitment from all parties to address the spirit of the guidelines for

responsible research. With the leadership of the Aboriginal Partners and researchers who embraced responsible research from the start, closer ties are being forged between researchers and communities. As a result, these communities are gaining confidence in NCP research.

3.2 Identifying and addressing community concerns

Since individuals and communities in the North are ultimately the ones to make informed decisions about their food use, their interests and concerns about contaminants, their food sources, and their health and environment must feature prominently in setting the NCP agenda. Bringing this grassroots perspective into the process — connecting with people in communities who make decisions about what they eat, addressing their concerns, and conducting research that will provide them with answers about the traditional foods that are so important a part of Aboriginal cultures — has been a learning process for the program overall and has shaped what the NCP and its findings are today.

Communities did not have concerns about contaminants specifically until it was brought to their attention by scientists and the media, although some already held concerns about the health of certain fish and animals in which they were observing abnormalities that could not be explained via their traditional knowledge. Persistent organic pollutants, heavy metals and radionuclides have become more of a learned concern.

As a science-based program, projects conducted under the NCP collect information and generate knowledge to support action on contaminants and “informed decision-making” in the North. These science questions are aimed at identifying such things as the types of contaminants in the environment, their sources, modes of transport, fate in the Arctic environment and effect on people. At the same time, as the program aims at supporting informed decision-making in the North, it is critical to consider the concerns of northern communities and residents in conducting this work so as to best meet the needs of both the scientific and northern community in addressing this issue.

These community concerns include, but are not limited to, such things as: whether or not the traditional/country foods upon which they rely are safe to eat; having to live with the implications of environmental pollution from outside their region; how research is conducted to investigate these issues; how they are consulted and involved in making decisions on these issues that affect them; and how their knowledge of the environment and changes they observe are utilized and valued alongside the western scientific information on this issue.

Addressing community concerns is a complex process that must involve first, hearing the concerns, second, enabling the concerns to influence the projects and how they are conducted, and third, returning relevant conclusions to community members in a meaningful way.

The NCP has established a variety of formal mechanisms at the local, regional and national levels, creating venues to ensure that community concerns are heard. Yet informal mechanisms also exist and these play an important role in feeding community concerns into the process. Although some community members may voice concerns at large meetings and workshops, others need to develop confidence and trust in a visitor before they are willing to voice certain concerns. The Program has addressed this reality by encouraging contact between researchers, northern community residents, and the TECCs, as well as by hiring and educating local residents as Regional Contaminants Coordinators (RCCs) to facilitate the flow of information between the community and the NCP (see sections 2.3.1 and 5.3.2).

Once the concerns of the community are recognized, the NCP strives to ensure that those concerns influence the projects at every stage of their development. Researchers are required to consult communities directly before even submitting a proposal for project funding. At this stage, the community is informed of the researcher's intentions and is given the opportunity to voice concerns. From advice obtained through the Aboriginal Partners and the TECCs, scientists working within the NCP are becoming increasingly aware of community concerns and are willing and able to build them into the design of studies that meet the scientific rigor that their own community demands. An additional incentive is that projects proven to address local concerns are generally highly recommended by the Social/Cultural Review Team, which assesses all project proposals.

Community concerns or interests have been incorporated into scientific projects conducted under the Program. For example, they have directed which species in which to measure contaminant levels to ensure that these are locally relevant and harvested species, identified sampling locations for monitoring programs so that traditionally utilized harvest areas and populations are the focus of this work, and ensured the use of contaminant mixtures that are relevant to the North in laboratory exposure experiments attempting to identify the effects of contaminants on specific health parameters.

Even after a community's concerns have influenced the design of a research project, the community's involvement in that project is not finished. Researchers are required to return the results of their projects to the community. This means effectively communicating technical information to the local population that most likely does not have a scientific background. Therefore, it is not sufficient for researchers to simply fax a copy of a published paper based on the research data to the community. The paper would not be widely circulated or understood, and would be of limited value to community members inquiring about the project they had been consulted about months before. The NCP recommends that researchers get advice and direction from the TECCs before returning any results. The TECC then reviews the project results and recommends the most efficient and effective way of communicating with the relevant northern communities.

3.2.1 Local Contaminants Concerns (LCC)

Northern communities' concerns regarding contaminants are often of a local nature and not related to the long-range contaminant issues outlined in the NCP blueprints. These local concerns sometimes do not relate to a specific contaminant source, and often fall outside federal and territorial mandates.

Through the NCP network of committees, communities express local concerns about contaminant issues each year. These issues include such things as concern for the quality of local drinking water, local sources of food chain contamination, and other forms of environmental pollution. These concerns were addressed in the past as part of the Arctic Environmental Strategy (AES). With this program ended in 1997, however, there was no alternate federal funding source.

Although many of these local concerns did not fit under the NCP mandate of addressing issues relating to long-range contaminants, the NCP recognized a void in addressing northern community concerns and developed a small funding envelope to deal with these community-based interests. This fund, called the Local Contaminants Concerns (LCC) envelope, is designed to respond to community concerns about contaminant issues that may affect the consumption of local traditional/country foods. LCC studies focus on such things as the safety of eating fish at a specific location downstream from an industrial site or identifying arsenic levels in country/traditional food sources, such as berries around an abandoned mine site. Concerned members of the public have also requested a number of projects to the LCC through direct calls or visits to regional DIAND offices. Responding to these walk-in visits has helped the program connect with northerners at the local level.



Managed by the three Territorial Environment Contaminant Committees (TECCs), the demand for LCC projects has grown each year during NCP Phase II. Accordingly, the NCP created a section in the annual project blueprints (see section 2.3.2) to specifically address and manage the LCC process. This blueprint identifies the following criteria for LCC project consideration.

- The focus of the study is problem definition/assessment, with priority given to local contaminant issues, identified by communities, that potentially affect the consumption of traditionally harvested foods.
- The study focuses on a single site.
- The study incorporates community involvement.

The goal of the LCC envelope is to provide northerners with an opportunity for immediate response to a local concern. Although they are often small, these studies are able to determine if there is a larger problem requiring further, more intensive investigation. If LCC studies reveal a significant problem (i.e., high level of contaminants at a local source), the study is referred to larger funding programs or regulatory agencies such as the DIAND Waste Program, or other envelopes of the NCP. The results of the initial LCC project then provide the supporting rationale for a larger proposal.

Examples of previous LCC projects that have led to larger studies and action have included the identification and eventual cleanup by the Department of National Defence of undetonated explosives in Lake Lebarge, Yukon. In the past, LCC projects have been diverse in what they have addressed, can be seen in Table 3.2.

Results of LCC projects are reported to the appropriate persons or community/regional agencies for community dissemination. Also, as the community has had substantive involvement with the study (as required by the program criteria), results are often trusted and accepted by community members. By emphasizing a high degree of community involvement in these projects, each LCC initiative carries with it significant capacity-building opportunities for northern individuals and communities in all aspects of research, from design, to reporting, to project management and administration.

Currently, this program is applicable only in the Territories, with residents of Nunavik and Labrador having to search for other sources of funding to address similar local concerns in their regions. LCC proposals are accepted year-round, making this fund more responsive to local concerns than the larger general NCP funds. This allows decisions to be made regionally/locally, and in some cases, enables these decisions to more specifically reflect local northern priorities and needs.

TABLE 3.2 Local Contaminants Concerns Projects. Examples of issues investigated under the LCC envelope during Phase II of the NCP

Region	Issue
Yukon	Contamination from Arctic Gold and Silver Mine
	Contamination of Ross River sites (Whiskers Lake, Jackfish Lake, Dump and Sewage pit)
	Carcross pentachlorophenol from rail tie treatment plant
	Coal Lake contamination
	MacMillan Pass (Tom Mine property)
	Lake Laberge contamination
Northwest Territories	Metal concentrations in vegetation of the North Slave Region
	Contaminant levels in berries in the Akaitcho region
	Baseline arsenic levels in Yellowknife area
	Fish collection and analysis for contaminants (Peel River)
Nunavut	Contaminants survey and assessment of Nottingham Island radio station

Although the cost of funding these projects is small (with an average cost of \$7K to \$15K), the benefits in terms of addressing community concerns, confirming the safety of traditional foods and building local capacity are disproportionately large. Often, simply knowing that such a program oriented towards community concerns exists is reassurance enough to raise local confidence in traditional/country foods. Thus, these projects provide potentially significant benefits to communities and northerners at a relatively small cost and in a timely manner. They ultimately add to the achievement of the primary objectives of the NCP to support informed decision-making in the North.

3.3 Incorporating traditional knowledge

“Without TK and the ability to observe changes from historical patterns, it is likely that some very good research projects might have been delayed or reduced in scope.”

(T.K. Gussman and Associates Inc., 2002)

In the Blueprint for Education and Communications (see Section 2.3.2), the NCP describes Traditional Knowledge (TK) as an “existing Aboriginal knowledge system of lands, water, climates, seasons, and related animal behaviours in an Aboriginal territory, based on ancestral experiences, oral history, and subsistence harvesting and traditional use of plants and animals, as well as the use of historical waterways, trails, and other nomadic travel paths.” It must be added, however, that traditional knowledge is unique to each Aboriginal culture, community, and individual.

Northern contaminants research is unique in that both western scientific research and TK can mutually benefit each other. Northern Aboriginal peoples can recognize the ways in which science can help them with their concerns about contaminant issues. Conversely, research scientists recognize the value of the knowledge of local people, giving a perspective on wildlife and environmental systems that can assist in scientific research. For example, in a recent project assessing dietary benefits and risks in Inuit communities, local hunters noticed that the recorded levels of contaminants for walrus in their area were quite high, and questioned the researchers about which population of walrus they had sampled. The Inuit identified that the sampled walrus lived in deep water, feeding on seals and fish, and was not consumed by locals.

Researchers subsequently returned to the community to consult with local hunters and sample the walrus that were being eaten. This new sample yielded lower contamination levels than those found in the original samples. This is a prime example of TK influencing ongoing projects.

In the second phase of the NCP, TK has become increasingly important to the Program. Investigating ways in which people could use TK in identifying problems associated with contaminants in northern foods, the NCP struck an *ad hoc* working group to discuss the integration of TK into the Program. Traditional Knowledge as subsequently incorporated into the blueprints of its sub-programs, and has become a criterion for the review and approval of all NCP proposals.

This focus on TK enabled the production of a document entitled *Traditional Knowledge Research Guidelines: A Guide for Researchers in the Yukon*, by the Council of Yukon First Nations. It has also led to a booklet called “*TK for Dummies: The Dene Nation guide to Traditional Knowledge*” This booklet was based on discussions between Elders, scientists, and youth at the Dene Elder/Scientist Retreat III (see Box 7), which was sponsored by the NCP.

In recent years, some NCP Education and Communication projects have focussed solely on the relationship between western science and TK, such as *Incorporation of scientific knowledge into Inuit (traditional and lay) knowledge in Nunavik*, in 2001. Despite this, a recent evaluation of the program has shown that opinions of people involved in the program differed on the priority that should be given to TK. Most respondents acknowledged the usefulness of empirical observations that make up part of TK, but questions were raised about the extent to which scientific inferences could be drawn from this observation-based data.



ITK/Eric Loring



Box 7 Elder/Scientist Retreats

"A perfect setting for thought-provoking discussions on how traditional knowledge is being applied to environmental contaminant crises. It gave me an opportunity to experience Dene culture first-hand, and consequently has changed the way that I implement southern standards in the North." (Anonymous participant, written evaluation of the 1999 Elder/Scientist retreat)

As northern communities in the NWT became more involved in the planning and implementation of research in their region, there was still a gap between western science and Dene knowledge. The Dene Nation realized that in order for these two groups to benefit from each other, a relationship of trust and respect was needed among researchers and Dene Elders, and that familiarity was the key to building this relationship. The idea of retreats was developed as a way for elders and scientists to gain a better understanding of each other, thus laying the groundwork for effective two-way communication. Additionally, many researchers expressed the wish to involve communities and incorporate traditional knowledge in their research, and saw the retreats as an opportunity to learn more about TK.

In total, four elder-scientist retreats have been conducted to date, each entitled "Strengthening the Ties" (after the goal of establishing and enhancing a relationship between the two groups). The first took place in February of 1997, with subsequent retreats held approximately one year apart. The retreats were meant to have an informal atmosphere in which elders, scientists, and youth could all spend time together and form personal relationships. Retreat locations, timeframes, and activities combined to contribute to building trust and respect between elders and scientists.

Retreats were loosely structured around sets of small discussion groups. These smaller groups allowed better dialogue among and between groups of participants. Plenty of free time was scheduled into the retreats, allowing elders, scientists, and youth to interact on a more personal level.

Communication was identified as a key factor in developing trust and respect between community members and scientists. To this end, time was devoted in each retreat to addressing ways of improving communication between groups. Elders commented that scientists needed to know how to make initial contact with a community about proposed research.

The Elder/Scientist retreats have proven to be a valuable experience for all those involved and represent the beginning of relationships that will enable the gaps between TK and western science to become better understood and addressed.

3.4 Responsible research in practice

The partnership between technical experts and community residents is an important element in eliminating of contaminants from traditional foods in the North. Scientists traveling to the North bring with them a research question and a western knowledge base. Local community members possess local knowledge, and a world view that differs from southerners. Both of these groups can learn from each other within the scope of an NCP project. Researchers sometimes need information on the best location, timing, and method of sample collection to achieve the goals of the research project. Often, only local community members can provide this type of information. Similarly, through working with researchers, northerners learn what scientific research methods can tell them about contaminants.

Of particular interest is the assertion that employing the same local liaison people and samplers over a long period of time fosters a relationships of trust and cooperation with communities. These people can then act as an informal conduit of information to other community members, educating them on the researcher's activities. Repeated contact over the course of a few years the liaisons and the researchers to build strong professional and personal relationships. One challenge of conducting research in the North, however, is the high turnover rate of liaison workers, creating a lack of continuity that makes long-term projects and the maintaining local expertise difficult.

In practice, the principles of responsible research take on a variety of forms depending on the nature of a specific study, the region in which it is conducted, and the experience and commitment of individuals involved. The following select case studies demonstrate responsible research in action.



Marlene Evans

FIGURE 3.2

Northern peoples and researchers working together. Local guide assisting researcher with sampling.

3.4.1 Case Study 1: Community-based monitoring of abnormalities in wildlife

In 1997, a multi-year project was undertaken by the Government of the Northwest Territories to collect and organize information from harvesters and Elders on unusual changes observed in land animal populations. The project developed a community-based system to collect and investigate hunter observations, including collecting samples of deformities or disease. Samples were evaluated and tested by wildlife veterinarians and scientists. Surveys were also conducted in the communities to detect disease and abnormalities in wildlife based on Traditional Ecological Knowledge.

The project illustrates several key facets that are integral to the NCP objectives. It relied heavily on both community involvement and science to assess changing conditions and the reasons for observed changes. Instruction could easily be conducted on the land, during harvesting. Community members viewed the project as a valuable means of addressing their concerns and providing a link with scientists who could diagnose observed abnormalities. This project illustrated the strength of the partnership between harvesters, community members, and scientists and their ability to address concerns of people for whom traditional/country foods continue to provide a major part of their diet.

3.4.2 Case Study 2: Monitoring contaminant levels in ringed seals

During a Community Tour in the Fall 2000 (see Section 5.5.2), NCP scientists presented data on contaminants in ringed seals from Holman (Uluqaqtuuq) to northern residents in Ausuittuq (Grise Fiord), Qausuittuq (Resolute Bay), Mittimatalk/Tununiq (Pond Inlet), and Kangiqtugaapik (Clyde River). People in these High Arctic communities were very interested in the information and wanted to learn whether contaminant levels were going up or down in the local seals. A project was started to address the concerns of these communities, as well as a knowledge gap in the NCP on temporal trends in marine mammals from different regions.

Community people, in particular the local hunters and trappers committees (HTCs), are central to the work and have been involved from the start. The Qausuittuq (Resolute) HTC, Ikajutit (Arctic Bay) HTC, Panniqtuuq (Pangnirtung) HTC, and Mittimatalk/Tununiq (Pond Inlet) HTCs helped to design the project along with Environment Canada scientists in Burlington, Ontario and the Nunavik Research Centre (NvRC) in Kuujuaq. Hunters in some of these communities were already familiar with the practice of providing animals to scientists for the purposes of research, but were frustrated by the lack of results being returned to them. Therefore, for this project, timely and appropriate communication would be essential.

With the assistance of the Inuit Tapiriit Kanatami, the communities were consulted and consented to the work, as per the NCP Guidelines for Responsible Research. Consultation and communication between researchers and communities/HTCs is primarily by telephone, fax and where possible, email, since the cost of in-person meetings — recognized to be the most effective channel of communication — is prohibitive. In total, 14 communities are participating in this study.

During the project itself, the HTCs liaise between scientists and community residents. Hunters are provided with a kit and video providing instructions for sampling, prepared by the Nunavik Research Centre (NvRC) in both English and Inuktitut. During the regular spring/summer hunt, hunters collect samples of blubber, liver, muscle, kidney and tooth/lower jaw from about 25 seals and send them for contaminants analyses by NvRC. They also measure key characteristics of each seal sampled (i.e., length, girth, blubber thickness, and gender). Monthly contact is maintained on a monthly basis between the scientists and hunters during the hunting season. These communications take place in both English and Inuktitut, sometimes using Inuktitut speakers at the NvRC.





GNWT/RWED/R. Popko

Preliminary results become available 6 months after the samples are collected. These results are faxed to the communities, as well as to the Northwest Territories and Nunavut Environmental Contaminants Committees and regional contaminants coordinators. Reports are tailored to the needs of each community and discussions often follow.

This ongoing project has proven to be highly successful, from both a scientific and community perspective. The skills and traditional knowledge of local hunters have been invaluable in obtaining seal samples and measurements, and they are compensated for this at rates determined through the consultation process. Data derived from each seal in this study, together with data collected from earlier studies in the 1970s, 1980s and 1990s, is piecing together an understanding of temporal trends in different Arctic regions. Communities and scientists continue to work together to answer questions about change in contaminant levels in local ringed seals. Through this working partnership, a relationship of trust continues to be built up between the scientists and the community members. The unique NCP cooperative model was seen as extremely valuable it created a win-win situation for both scientists and community members and none would hesitate to work together again.

3.4.3 Case Study 3: Health effects research in Nunavik

Investigations during the Maternal Cord Blood monitoring program conducted in Nunavik (1993 to 1996) found that Inuit infants were being exposed to elevated levels of PCBs, mercury and lead, both pre- and post-natally. Scientific studies conducted elsewhere in the world to date at the time, had found some neurodevelopmental effects in children from pre- and post-natal exposure to these contaminants. Researchers involved in this Nunavik cord blood study, however, thought that the high levels of omega-3 fatty acids and selenium in participants, primarily from the consumption of marine mammal and fish species in the Inuit diet, could be protecting these children from the negative effects of this identified contaminant exposure.

For these reasons, a project was co-funded under NCP to investigate the developmental effects of pre- and post-natal exposure to organochlorines, mercury and lead in Nunavik communities. The resulting project has exemplified the importance and value of a high level of community involvement, ongoing communication, and the need for developing a relationship of trust between community and researcher to support the ethical and responsible conduct of successful research in the North.

From the outset of this project late in 1996, the researchers began meeting with the regional and community-based organizations, as well as the residents to establish a relationship and best adapt the proposed scientific study to the region. A study taking a slightly wider context focused not only on contaminants and child development, but also on biological and psychosocial determinants (including contaminant exposure, tobacco, alcohol and drug use by mothers during pregnancy) of child development and health was of great interest to regional and community representatives. Such an approach was therefore taken for the current work.



ITK/Eric Loring

It was of utmost importance to the communities involved (Kuujjuarapik, Puvirnituk and Ivujivik) that the researcher invest the time required to develop a relationship with the communities and that this person be the main contact who would not only be directing the work, but who the community could trust to return results in a responsible way when the investigation was completed. After meetings between the researcher, municipal councils, community health committees, regional hospital representatives and Inuit organization representatives, support was given to the project and the researcher leading the work.

Although this agreement was made before the current NCP Guidelines for Responsible Research were in the currently developed state, components of the agreement comply with, if not go beyond, the requirements existing

in the guidelines. The research team had extensive experience in the region and with these communities previously through their involvement in the Cord Blood Program and other research. This experience, the community interests, and the sensitive nature of the clinical psychological work to be conducted with the children (neurodevelopmental assessments with children up to 12 months of age) determined the approach for the project by the team and communities.

Throughout the project, members of the research team were regularly visible in communities, conducting assessments with mothers and children, recruiting new participants and communicating about the status of the work to date. During community visits, meetings were held with the municipal councils, and nursing station staff and information was communicated via the local radio in addition to the activities related to the collection of data. This regular contact and visibility of the research team in the 3 communities helped build recognition for the work and a relationship with the community and study participants. This was especially important during times when the municipal councils changed due to local elections and the project needed to be introduced and supported by a new group of municipal officials.

To ensure the satisfaction of participants in the study and build the confidence of the local, regional and scientific communities in the conduct of the work, the research team, with the help of the regional contaminants committee in Nunavik (the Nunavik Nutrition and Health Committee) conducted a satisfaction survey among participants in 1999/2000. The high ratings of support, confidence and satisfaction from greater than 90% of respondents further enhanced the relationship of trust among those involved.

The project involved a number of individuals in each community including the nurses, doctors, midwives, other medical staff, interpreters and the mother-children participants. The cooperation of all those involved helped the successful recruitment of participants and collection and storage of samples and data. The high level of cooperation and involvement was indicative of the support for the project. Additionally, interpreter/translators were trained throughout the project to help in the child assessments. Many of the interpreters engaged in the later years of data collection were actually study participants from earlier years. The project team also trained Inuit midwives to conduct the laboratory analysis of the samples to facilitate the efficient processing of data. These individuals were the first Inuit technicians to work in the laboratory in the Puvirnituk hospital.



The project is now (Fall, 2002) in the stages of planning the communication of results related to environmental contaminant exposure and child development and health. The research team is closely cooperating with the regional committee (NNHC) in the development and eventual dissemination of these results, relying on their expertise in communicating with the communities and contextualizing this information in the general health picture for the region. Similarly, the committee and its coordinator, which fills the position of the RCC in Nunavik, have provided support and guidance in communication and other aspects of the project throughout its progress.

The research team is now moving on to conduct analyses on other factors associated with child development and health in these communities. The relationship between researcher and communities and the high level of community involvement in this project have made the proposed future work possible. The work continues to address important scientific and community concerns in a context and manner that is both culturally and locally appropriate.

3.5 Summary of key points

The following developments under the NCP in supporting and directing the responsible conduct of research have proven to be critical in the success of projects to date:

- promoting and supporting responsible research through a process that calls for local involvement and partnership in the development of projects;
- developing comprehensive guidelines and requirements for consultation;
- developing and implementing formal process for identifying and incorporating community concerns in research projects;
- addressing local contaminants issues through regionally managed funds, such as the LCC;
- developing practical guidelines for incorporating Traditional Knowledge in northern contaminants and health research.

3.6 Key references and suggested readings

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The Practice of Balancing Benefits and Risks

4.0 Introduction

Balancing detailed information on the risks and benefits associated with consuming traditional/country food and developing meaningful, easily understood, and effective messages for the public and policy decision-makers alike has been a challenging task for the NCP. What makes it particularly challenging are the uncertainties associated with the data and the different units and forms of measurement involved in the characterization of both risks and benefits. Despite these uncertainties, the resulting messages are of utmost importance because they are part of the basis upon which northern consumers of traditional/country foods make daily decisions on their food use.

To date, no simple formula or equation exists with which to simplify this process of balancing benefits and risks of consuming traditional/country foods. Instead, processes have developed to address the need to resolve the various perspectives and deal openly with the complexities of the problem. This chapter describes the processes developed under the NCP for considering and weighing the many pieces of relevant information in benefit-risk assessments and coming up with balanced and informative messages to pass on to northern audiences.

4.1 The NCP approach

The NCP does not have the authority or responsibility to provide health advice or advisories to northern residents. This responsibility lies with the appropriate territorial and regional health agencies throughout the North. However, a significant amount of health data related to the consumption of traditional/country foods has been gathered under the NCP, and with that has come the ethical responsibility to communicate this information to the public.

Early on in the program, it became evident that there was a need for a process to review and release this information in cooperation with the responsible health and wildlife authorities. Therefore, a cooperative process was developed for the consideration and release of health and harvest data in the territories. This multi-stakeholder decision-making process involved the various groups who would be affected by any benefit-risk management decisions: northern and national Aboriginal organizations, health authorities and program committees with interests related to the issue. The process has adapted during Phase II to include the regions of Nunavik and Labrador and the new territory of Nunavut (Figures 4.1, 4.2).



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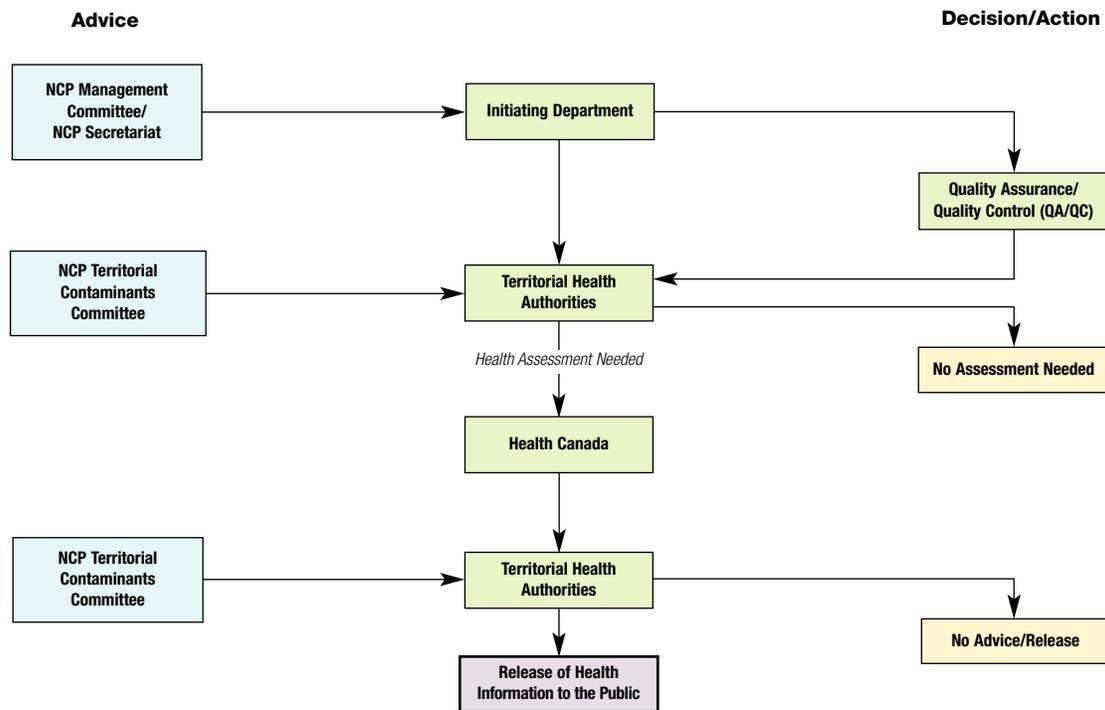


FIGURE 4.1
Protocol for dissemination of health information in the territories.

The current process begins with the initiation of a review of data by an organization or individual based on the concern of a potential health risk related to the consumption of traditional/country foods containing elevated levels of a certain contaminant. It then identifies the stages at which aspects of the assessment and balancing of risks and benefits take place and who is involved in these deliberations. The “balancing” of information and decision of what, if any, action to take on the issue is made at the territorial environmental contaminants committee level. The NCP protocol has simply established the network to support and help facilitate this process.

The processes followed by each territorial or regional committee may vary, depending on their membership and the established territorial or regional process in place for the release of health messages to the public. Despite any regional differences in who is involved or what weight is given to certain pieces of information, however, some basic steps have emerged as a result of similar experiences with these issues across the North.

The processes that have developed in each region include the use of a cooperative, multi-agency approach, whereby the problem is considered in its ecological and public health context. Those affected by the risk management decisions are also involved in the decision-making process. The approach taken in each region developed from the need to manage and communicate information on environmental contaminants and health related to ongoing research projects and the need to return these results to participants and communities in a responsible, ethical and culturally appropriate way. The basic steps involved in the consideration of balancing benefits and risks are described in Box 8, and an example of the process in practice is provided in Box 9.



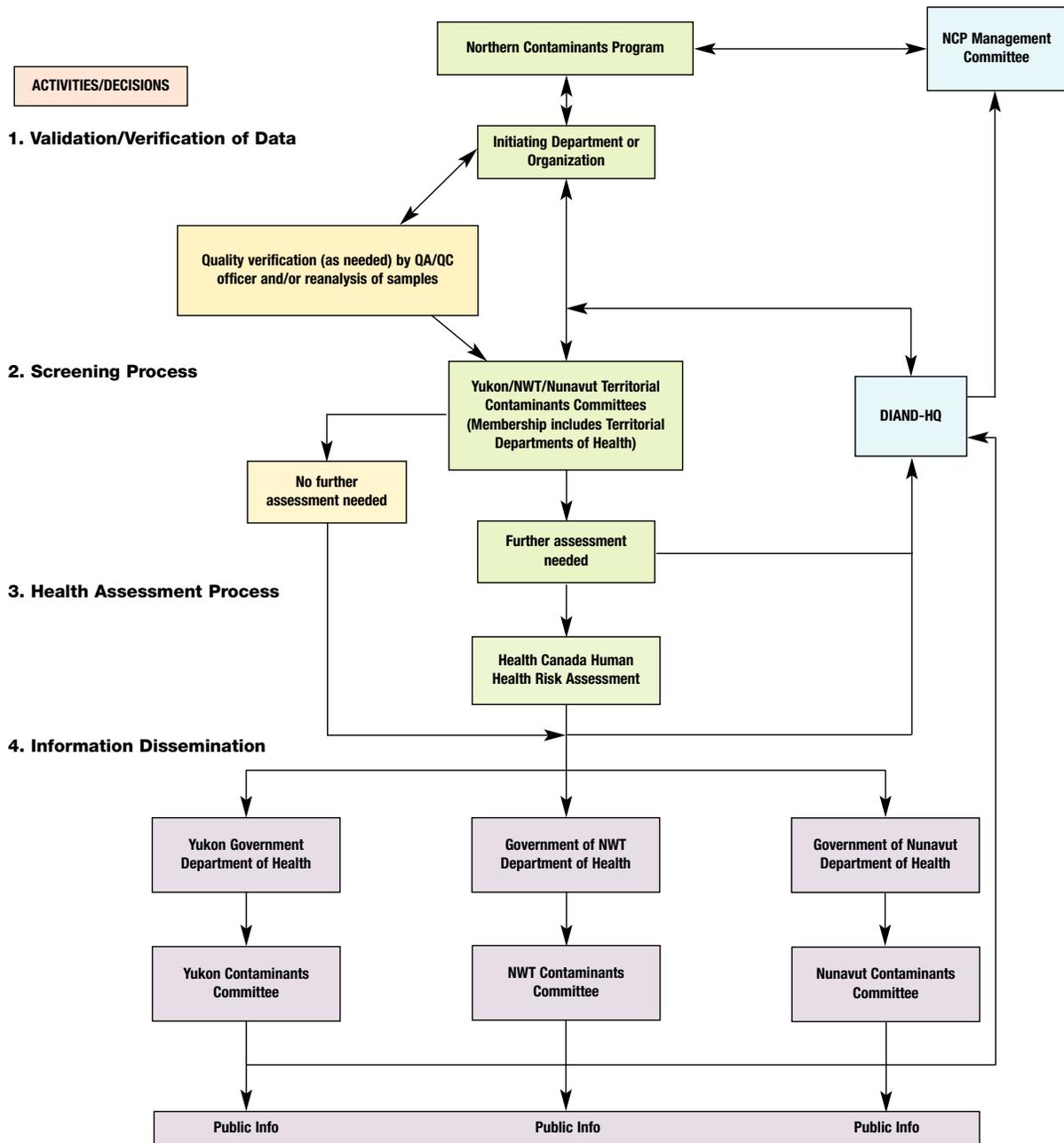


FIGURE 4.2
Protocol for contaminants health and harvest information release in the Yukon, Northwest Territories and Nunavut.

Box 8 **Basic Steps in the Benefit/Risk Management Process: The NCP Experience**

The following are the basic steps adopted and promoted by the NCP for considering the benefits and risks associated with contaminants in traditional/country food. The coordination of this process is outlined in Figures 4.1 and 4.2.

Problem Identification and Contextualization

Potential risks to human health posed by consumption of wildlife species containing contaminants are identified by researchers or health authorities. Risks are identified based on data for contaminant levels in traditional/country food items and levels of consumption of these items. Concerns are brought forth to Program committees (e.g., TECCs and Management Committee) and the aspects of the problem (biological, health, social, cultural, economic) are described. The outcome of this stage is: a) a description of the factors involved in the problem, and b) the data needed to assess the benefits and risks to the affected population.

Risk Assessment

Information is gathered and analyzed to determine the likelihood that a specific adverse health effect will occur in an individual or population following certain levels of exposure (amounts consumed) to the identified hazard (contaminant in traditional/country food). This is usually conducted by Health Canada, the national health department. It assesses the risks only, not the benefits, involved in the problem. This assessment often establishes a best estimate of the risk involved, as there may be gaps in available information. The three key sources of information required to assess the risks include: levels of contaminants in food species; amount consumed (level of exposure); and health guidelines (e.g., tolerable daily intake [TDI], recommended maximum weekly intake [RMWI]). The risk calculation is expressed as the probability that an individual will experience negative effects from the estimated level of exposure. The estimated level of exposure is compared with government standards or health guidelines to indicate whether individuals are above or below an established level of "safe exposure". The eventual outcome of this stage is advice on consumption of this food item which is then provided to the appropriate agency and committee (e.g., territorial health department and TECCs).

Benefit Assessment

Benefits associated with this same activity (i.e., consuming a specific food item) are assessed both quantitatively and qualitatively. The nutritional and/or physiological benefits associated with consuming a specific traditional/country food item (e.g., level of omega-3 fatty acids in marine mammal fat, which is known to provide a protective effect against heart disease) are assessed by the territorial or regional health departments or a consulted expert (e.g., Health Canada). These types of benefits may be compared to government standards of recommended levels of consumption for these elements. However, benefits of traditional/country foods also include social, cultural and spiritual aspects that are often difficult to measure. These aspects are considered through the consultation and involvement of Aboriginal representatives in this process. The outcome of this stage is a listing of nutrients and other beneficial elements contained in the food item compared with established guidelines (where possible), as well as a description of the social, cultural, and spiritual importance of these foods to the relevant community and individuals.

Benefit and Risk Balancing

This is an informal stage of multi-agency and stakeholder discussions and deliberations of the identified benefits and risks. It is the most critical stage in making sense of the combination of data, yet the least understood. No mandated process or calculation exists to weigh the many sides of this equation and thus the input of many different perspectives is critical. The forum at which this process occurs involves the participation of the appropriate TECC(s), risk assessors (e.g., Health Canada representative), risk managers, health authorities (e.g., territorial health department), Aboriginal organizations, community or regional representatives (e.g., RCC), territorial and federal government and researchers. This stage aims to develop consensus among the participating agencies and individuals on whether consumption of the identified food item at the estimated levels of intake is more of a benefit or a risk to the affected population. Ultimately, this is the decision of the responsible territorial and regional authorities (e.g., Health and Wildlife Departments).

Option Identification

If action is necessary to minimize or reduce the risk to the exposed population, a series of options are identified. If no action is deemed necessary, the process proceeds to the development of information messages for release as described below. Potential options for action might include health advisories to reduce consumption or provision of advice to continue eating a particular food item. The feasibility, potential effectiveness, and potential impacts of each option are among the aspects considered.



It is critical to consider public perceptions about such things as the cultural and social importance of the specific food item, fear of contamination, understanding of the general issues of environmental pollution, any uncertainties related to the data collected and guidelines or safety standards used to make the decision, and the likely social, economic and cultural consequences of each option. At this stage of identifying what action to take-or not to take-the regional context of the issue often bears heavily on decisions.

Information Dissemination — Communication

Ultimately, the resulting message and supporting information is released to communities. This stage involves developing the appropriate messages, using the best known materials for this information and the targeted audience(s), and identifying the relevant pathways and processes for its release.

The messages released are comprised of the results of the benefit/risk deliberations (supporting information on benefits, risks, guidelines, data limitations, uncertainties etc.) and synthesized “Advisory” and/or “Advice” message. The communication efforts are led by the TECC(s) and their participating agencies as they include the responsible authorities for releasing this advice and the key communicators for the local populations. The outcome of this stage is information delivery to the community about the consumption of the identified traditional/country food species.

4.2 Early and ongoing involvement of multiple perspectives

The process that has evolved under the NCP in each region for considering both benefits and risks has recognized the importance of engaging all affected and concerned groups and individuals early on. As illustrated in the case of wildfowl livers and mercury contamination in the North (see Box 9), direct involvement of Aboriginal partners, individuals from the community, science managers, environment and health officials and scientists in the program structure ensures that many strengths of the process, which have developed over time, are protected as they are based on the existence and need for input and interpretation from many perspectives.

The strength of the process lies in this involvement of many views at all stages from problem identification to the communication of results. This involvement supports the accurate definition of the problem, which is influenced by individual perceptions, and identification of the ‘hazard’. It also helps ensure that data collected is most relevant to the concerns and needs of local populations (e.g., locally consumed species are sampled from local harvesting areas, social and cultural importance of food item are considered). It also helps ensure that proposed actions are most appropriate for the local audience and that they include consideration for the potential indirect impacts of the chosen action (e.g., consideration of the availability of healthy food alternatives). Finally, it supports the communication of results in the most appropriate way for the target audiences (e.g., communication by local people in local languages).

The TECCs, with their varied membership including representatives from regional and local organizations and community members, are central in coordinating and conducting this benefit/risk management process. However, this coordination also requires a certain degree of unilateral cooperation and clarification among several government agencies at the federal, territorial and provincial levels, as well as groups with a responsibility to represent their membership interests and concerns in the North (e.g., Aboriginal organizations). Without this cooperation and agreement, the process is of little support to local decision-makers. As the authority for the release of official health advice and advisories lies not with the NCP but with territorial and regional agencies, the process outlined here only applies to data collected under projects in the program. Therefore, this cooperation among many groups and organizations is essential to the success of the process.

4.3 Challenges of balancing benefits and risks

The process of balancing the benefits and risks associated with the consumption of traditional/country foods in light of the presence of environmental contaminants in the Arctic is challenged by certain aspects of the problem. In response to some of these challenges the process which has developed under the NCP has evolved and shown strength. Some of the challenges and work conducted under the NCP to overcome these challenges are outlined in greater detail below (Table 4.1).

Box 9 Benefit/Risk Management in Practice

Mercury Levels in Waterfowl Livers (2001)

In the summer of 2001, Health Canada released a health hazard assessment for mercury and selenium levels in livers from waterfowl harvested in Northern Canada. The livers had been collected from communities across northern Canada from 1988 to 1994. The Canadian Wildlife Service originally analyzed only muscle and some eggs for contaminant levels, and those results were communicated in 1995. The message at that time was that the muscle tissues and eggs from most birds were safe to eat. In response to concerns raised by community members that livers were also important food items, the Canadian Wildlife Service analyzed the livers from birds they had previously collected and submitted the data to Health Canada, Food Protection Branch to complete a health hazard assessment.

The following are the results of this assessment.

"...Based on the mercury levels reported, the consumption of the liver of Greenwinged Teal, Northern pintail and White-winged Scoter ducks would not pose a health hazard to consumers. However, it would be considered prudent to limit consumption of the livers of Barrows Goldeneye, Bufflehead, Common Eider, Common Goldeneye, King Eider, Oldsquaw and Surf Scoter ducks harvested from these various northern locations to an average of 7 ounces per week for adults, 4 ounces per week for women of childbearing age and 1 ounce per week for children."

Traditionally, these results would warrant the release of a health advisory to the affected population to reduce consumption of these items. This decision is based solely on the results of this risk assessment. However, today under the process outlined by the NCP (see Figures 4.1 and 4.2), such assessments must be considered by Territorial/Regional committees before release.

These results were received directly by the Canadian Wildlife Service, who then upon consultation with NCP-DIAND Secretariat in Ottawa, forwarded the results to the chairs of the Yukon Contaminants Committee, NWT Contaminants Committee, Nunavut Contaminants Committee, Nunavik Nutrition and Health Committee, Labrador Inuit Association, and later, the NCP Management Committee. This initial flow of information deviated from the NCP protocol for the Release of Health and Harvest information, as results did not go directly back to the local Health Authorities and/or Committees. Although discussions surrounding risk management of the assessment were delayed, the appropriate bodies did receive the results. In this case, it was critical that the results of the health hazard assessment were discussed before being released to the public as is described below.

The diverse membership of the Environmental Contaminants Committees enabled the inclusion of many perspectives to balance the discussion about what the results meant for northern consumers. In the NWT, the Chair of the NWT Contaminants Committee forwarded the results of the assessment to GNWT Health, who has the mandate for releasing health information about contaminants in the NWT. The results were then briefly presented at the next NWT ECC meeting (which conveniently was only several days later) and committee members were informed of a working group meeting where the results would be discussed in more detail.

Participants in the northern working group included representatives from Aboriginal organizations (ITK), Regional Contaminants Coordinators (RCCs), Chairs of the Territorial/Regional Environmental Contaminants Committees (NWT, Nunavik), NCP Secretariat, Health Canada Food Directorate, Canadian Wildlife Service (researcher), Environment Canada, GNWT Health (Contaminants Consultant, Nutritionist, Environmental Health Officers).

Before the working group meeting, GNWT Health contacted the principle researcher (CWS) to get more background about the study and inquire about whether it was possible to represent the results in more relevant units for the population (ounces/week to number of livers per week or year). This required data on liver weights. In this case, the primary researcher (who has been involved in the NCP for several years) had anticipated the need for this community-relevant information and had already begun collecting of the data. Prior information on mean liver weights was then distributed along with the conversion of ounces per week (in Health Canada's assessment results) to number of livers consumed per week. Other information collected before discussion of the results was data on the levels of consumption of waterfowl livers by Aboriginal people in the North. These reports (from CINE Dietary information) supplied information on frequency and seasonal consumption of duck livers, as well as on the economic, spiritual, cultural and social benefits of these food items.



The meeting allowed the primary researcher to provide background on the collection of this data and the links to previous studies assessing levels of contaminants in muscle tissue and birds' eggs. The information on liver weights was also discussed and related to the consumption advice provided by Health Canada. Health Canada were then asked about assumptions used in the assessment of risk, which included daily, not seasonal consumption, average body weights, and the fact that no consumption information was used in the assessment. Therefore, the advice was issued as maximum weekly intakes based on levels of mercury in the liver tissues.

Working group discussions then covered the following topics:

- Characterize exposure (How much were people eating? Who was eating?)
- Identify and discuss benefits (nutritional, cultural, spiritual).
- Consider risk perceptions.
- Identify risk management options.
- Consider unintentional adverse effects of options.
- Consider other health risks.
- Put this advisory into perspective with other health risks.

Through the involvement of these various individuals, the following conclusions were reached.

- Actual consumption provided by aboriginal representatives, was lower than advice issued.
- Consumption was seasonal, not daily.
- Women of child-bearing age and children were not high consumers of duck livers.
- Issuing an advisory for the species of concern could have unintended effects such as:
 - People stop consuming bird livers entirely.
 - People limit consumption of bird livers of all species.
 - People stop consuming, or limit consumption of bird/duck muscle tissue.
 - People may question the safety of other traditional foods.
 - Other health risks associated with not consuming traditional foods.
 - People will have to choose from a limited source of nutritious, economic alternatives.

Authorities were still responsible for providing people with complete information. Based on the discussions, the group therefore made the risk management decision not to issue advice to limit consumption of waterfowl livers, but instead to update current communication materials and draft a fact sheet reflecting this new information about mercury in wildfowl livers. Two fact sheets were then drafted: one with key messages and one with greater detail, sent to group members for comments, and then sent to the Territorial Contaminants Committees for final comments, local contacts, and consideration of how the fact sheets would be used in each region. The fact sheets contained a balanced message with information on both benefits and contaminant levels found in bird tissues in the North.

The conduct of this comprehensive process, led by the NWT Contaminants Committee, facilitated fast and relatively easy decisions by other committees. The review and decision taken by the NWT committee supported similar action in Nunavut and Nunavik where the communication materials were simply adopted and used by the committees as was necessary. In some regions, the issue was not relevant as these birds were not consumed in significant amounts to warrant any further review and deliberation.

TABLE 4.1 Common challenges to the process of balancing benefits and risks and their implications on the decision-making process

Challenges	Impact on the process
Availability of information	Lack of information introduces uncertainty as it requires assumptions; can lengthen process while required information is located.
Time constraints	Can challenge public trust in the process if process is too long; can restrict inclusion of required information if too short.
Resource limitations (human and financial)	Can limit perspectives involved; can take longer to complete process without required elements; can limit access to required data and increase uncertainty.
Quantitative vs Qualitative data	Difficult to compare, incorporate and weigh against each other; risk of subjective weighting of one over the other; risk of discounting or disregarding qualitative elements because of lack of knowledge of how to treat them.
Uncertainties	
1. Assumptions in calculations of exposure	Can over or underestimate real exposure; over estimation may result in early action (advisory) creating potential fear.
2. Assumptions in calculations of standards/guidelines	Can act at level where population is at little or no risk and cause unintentional adverse reaction (fear, anxiety, etc.).
3. Risks of low level chronic exposure	Difficult to accurately assess the real risk.
4. Complexities of chemical mixtures	Difficult to assess real risk of mixtures.
Indirect risks	
1. Loss of benefits	Unknown risks arise when advising to restrict previously beneficial behaviour; difficult to know end result in terms of real risk.
2. Impact of communications	Can have unintended effects of creating anxiety, fear, confusion, and mistrust among public; adverse reaction to communication can induce exposure to other hazards (e.g. poor quality alternate foods).

4.3.1 Data challenges: The availability of qualitative and quantitative information

Due to the sensitive nature of these issues (risks to human health) and the ethical requirements to return results to participants involved in studies, the pressure to do so in a short and reasonable period of time is often very strong. The required quantitative analyses take a certain length of time to conduct, however, and the number of individuals conducting these analyses is limited.

There is also the challenge of data availability. Researchers and environmental health authorities often require or desire more extensive information or detail to increase the levels of certainty in the assessment of potential risks and the desired information is not always immediately available. In some cases, more time is required to collect the needed information to provide the most accurate assessment possible in a timely manner. Through its very

nature, the NCP has addressed the issue of data availability on these issues in the North. The collection of information on contaminant levels, trends, consumption levels and northern perceptions of these issues has added significantly to the database of existing information on these subjects for current and future assessment processes.

Much of the information that must be considered in this balancing of benefits and risks takes a variety of forms. Some originates from toxicological or epidemiology studies and is quantitative in nature, while other important information comes from more qualitative work in other disciplines and from the perspectives of the population involved. In some cases, projects under the NCP have made concerted efforts to collect both quantitative and qualitative information on these issues to be made available for potential benefit/risk exercises. Projects such as the Centre for Indigenous Peoples' Nutrition and Environment (CINE) Inuit dietary surveys have included both forms of information in order to document, for example, the toxicological risks as well as the perceptions of risk and benefit within the population. As some of this information is qualitative, and not often documented to the same extent as the physiological knowledge of risks and benefits of traditional/country foods (e.g., toxicological risks and nutritional benefits), it is often difficult to combine and compare these forms of information in this process despite its availability. This remains an ongoing challenge in the field of benefit-risk management.

4.3.2 Calculating benefits vs risks: Uncertainties and estimations

Currently, there is no simple calculation for balancing or weighing both benefits and risks associated with contaminants in the food chain. The human health hazard assessment process conducted by Health Canada and others calculates only risks from one contaminant for the exposed population, with no consideration or inclusion of benefits. No assessment or integration of information on chemical mixtures, chemical-chemical or chemical-nutrient interactions is possible in this calculation with our current state of knowledge. To this end, recent NCP projects have been funded for researchers from Health Canada and CHUL (Public Health Research Unit, Laval University Hospital), among others, to investigate the effects of exposure from relevant contaminant mixtures found in the North and also to look specifically at some interactive effects that complicate the assessment process (e.g., mercury and selenium).

The standards of safety (e.g., TDI, RMWI) to which the quantitatively assessed risks or benefits are compared all include some form of estimations or assumptions (e.g., extrapolations from laboratory studies to human





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populations) and thus inherently involve a certain degree of uncertainty as well. A few NCP-funded projects have begun to clarify some of these standards for certain chemicals (e.g., toxaphene) using lab-based approaches. Similarly, accurate assessments of levels of exposure depend on comprehensive data on current consumption behaviour and levels in locally consumed wildlife tissues. This data is sometimes not available and extrapolations are made from nearby wildlife populations or historical consumption data in the population of concern. These uncertainties and required estimations have, at times, delayed swift decisions being made at the local, national and international levels on these issues as the situation requires interpretation from stakeholders' and experts' perspectives.

As stated earlier, the NCP, and specifically dietary work conducted by groups such as CINE and wildlife research conducted by federal scientists and others, has added significantly to our ability to minimize uncertainty resulting from estimations by gathering significant amounts of data on these issues for the Canadian North (see Box 9). The uncertainties, as well as the benefits (qualitative or quantitative), public perceptions, and social, economic and cultural consequences of the resulting messages among the affected population have significant bearing on the reception and appropriateness of potential options and therefore must be considered as is now done through the established protocol coordinated under the NCP.

4.4 Releasing balanced messages on contaminants, health and harvest information

The results of the deliberations and consideration of information described in this chapter are the context of messages released through the NCP to individuals, communities and organizations at the local, territorial, national and international levels. The intent of the coordinated process for balancing risk and benefit data is to be able to deliver balanced, understandable and relevant information to these various audiences. Ongoing, open and two-way risk communication is an extremely important part of managing risks and benefits and thus an integral part of the NCP (*For a full description and discussion on risk communication see the CACAR II Toxic Substances in the Arctic and Associated Effects: Human Health Report*).

Some messages released through the program take the form of general information on the issue of contaminants and health and traditional/country foods to inform individuals and agencies of what research is being done, what the current state of knowledge is on the issues, etc. Other communications may take the form of messages aimed at individuals to adjust consumption of specific traditional/country food items (“health advisory”), to minimize population exposure to an environmental contaminant, or a suggestion for health promotion related to traditional/country food consumption (“health advice”).

All communications are aimed at providing sound, balanced, understandable and culturally appropriate information which individuals and groups can use to make informed decisions and take action regarding traditional/country foods, contaminants and human health. As outlined in Figures 4.1 and 4.2, the NCP has included the release of information in its protocol for the consideration of health and harvest information. The standardization of the process for consideration of data and release of information is intended to coordinate activities and efforts and thus minimize confusion resulting from the release of multiple and potentially mixed messages on the same data, and avoid missing key agencies in the process.

This more comprehensive, inclusive, multi-stakeholder approach, which can be partially attributed to the existence of infrastructure such as the Territorial and regional committees, results in more balanced and informed decisions and actions being taken at the regional levels in response to these issues (see Box 8). Fewer “advisories” (restrictive information) and more messages of “advice” (promotion and assurance messages) are being provided because of this evolution in approach. The provision of health advice assumes a more comprehensive, contextualized, and balanced approach to benefit/risk management and health promotion. The processes of turning data and information into appropriate and informative messages for public dissemination and use under the NCP are discussed in Chapter 5.



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4.5 Summary of key points

- The NCP has developed a protocol to coordinate the consideration and release of NCP collected health and harvest data in the territories.
- This protocol relies on the coordination and cooperation of agencies and committees at both the national and territorial levels and is led by the Territorial Contaminants Committees.
- The process in each region includes the use of a cooperative, multi-agency approach, whereby the problem is considered in its ecological and public health context. Those who are affected by the risk management decisions are involved in the decision-making process.
- The protocol attempts to minimize the uncertainty involved in the process by involving these different perspectives throughout the process.
- Currently no calculation exists to balance benefits and risks on traditional/country food consumption.
- Challenges to the process of balancing benefits and risks originate in the availability of data, difficulties comparing qualitative and quantitative information, application of safety standards to the decision-making process, difficulties assessing risks from chemical mixtures and interactions and complexities of comparing benefits and risks.
- The NCP is addressing many of these challenges through the coordinated process which relies, to some extent, on the NCP infrastructure, and through the conduct of specific research projects to increase our understanding of these issues.
- Benefit/risk communications under the NCP are aimed at providing sound, balanced, understandable, and culturally appropriate information which individuals and groups use to make informed decisions and take action regarding traditional/country foods, contaminants and human health.

4.6 Key references and suggested readings

- NCP Operational Management Guide —
http://www.ainc-inac.gc.ca/ncp/opmgmgui_e.html
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- Krewski, D., Hrudey, S., Jardine, C., Shortreed, C., Craig, L., and Furgal, C. 2000. *Review of Risk Management Frameworks for Environmental, Human Health and Occupational Risks*. Report Prepared for Risk Management Strategy Working Group of the Federal/Provincial/Territorial Committee on Environmental and Occupational Health. Submitted on behalf of the Network for Environmental Risk Assessment and Risk Management (NERAM). Departments of Medicine and Epidemiology and Community Medicine, Faculty of Medicine, University of Ottawa, Ottawa, ON.
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Communications: Messages, Networks, Materials and Processes

5.0 Introduction

Northern residents need to have the best information presented in an accessible, balanced and meaningful way in order to support their decisions related to consumption of traditional/country foods and their health. Similarly, health and environment professionals, government departments and Aboriginal organizations need to have access to the most recent information on these issues to support actions that help protect the public from the potential risks of contaminant exposure, and to minimize, and where possible eliminate, these substances from the environment.

These communication goals have required the development and dissemination of clear, understandable and meaningful messages and the identification and development of pathways and processes for their release. During Phase II of the NCP, a significant amount of program resources and efforts has been devoted to communicating this information to residents of the North and elsewhere.

This chapter outlines the communication-related components and activities of the program, how they have developed, and how they function today to support both understanding and individual and collective action.

5.1 Evolution of communications under the NCP

At the completion of NCP Phase I, a great deal of information had been collected that needed to be delivered to northern residents. People needed to be informed about these issues to support their individual decision-making and to fulfill the responsibility of the program to return research results to participants and involved communities. This provided the impetus for the creation of the “Communications and Community-based Research” component (which later evolved to become the “Education and Communications” envelope) of NCP Phase II, led by the Aboriginal Partners.

The strengthened commitment to communications was required as disseminating information about and supporting the understanding of these issues among northerners was, and will continue to be, challenged on a number of fronts. The complexities of the issue (e.g., uncertainty, terminology, sensitivity of the issue, potentially complicated and conflicting messages) and the nature of northern communities (culturally, linguistically, technologically and geographically different) makes communications a formidable task and necessitated a coordinated effort on the part of the program. This has required the identification and utilization of existing communication networks and the further enhancement of these networks by developing and implementing an NCP communications network or infrastructure. These networks have used a number of different methods to develop and disseminate materials through which to interact with communities in the North and beyond.

5.2 Messages for key audiences

5.2.1 Northern communities

The NCP is responsible for communicating and interacting with a variety of groups. Each of these groups or audiences, has their own specific interests, perceptions and concerns related to the contaminants issue. These characteristics influence their specific needs and preferences for information, content, delivery and detail. The primary audience is consumers of northern traditional/country foods, and who are predominantly Aboriginal people of the North. This includes women of child-bearing age, Elders, youth, country food consumers, community health workers, wildlife coordinators, and other key regional/community individuals (see Table 5.1).



Through communication activities under the NCP, these groups have requested specific, clear and balanced messages on the benefits and risks of traditional/country foods. These subgroups within northern communities have been identified by the NCP as the “key target audiences” because of their direct relationship to the issue and unique concerns, questions, information needs, or roles in educating the community about these matters (e.g., community health representatives and wildlife officers).

TABLE 5.1 Key Audiences in the NCP. These groups are not mutually exclusive. For example, Community Leaders may also be Hunters and Elders, and a woman of childbearing age may also work for a local Aboriginal organization.

<p>Traditional/country food consumers *</p> <ul style="list-style-type: none"> Pregnant women, and women of child-bearing age Hunters Children and youth Elders All frequent consumers of traditional/country foods
<p>Key communicators and People with public responsibility *</p> <ul style="list-style-type: none"> Researchers Media Community leaders Public interest groups Community health representatives Teachers and educational institutions Local and regional Aboriginal organizations Regional contaminants coordinators Wildlife/Water/Resource workers

* These groups are not mutually exclusive. For example, community leaders may also be hunters and elders, and a woman of child-bearing age may also work for a local Aboriginal organization.

Based on the same basic premise (e.g., “the benefits of traditional/country food consumption outweigh the risks”), different forms of this message, with varying levels of detail are required for individuals in northern communities. For example, hunters in a community are more interested in information related to their daily activities on the land and their level of experience with Arctic wildlife. They would be provided with more detailed information on the specific levels of contaminants in wildlife species and whether these levels are increasing or decreasing. Similarly, women often request more detailed information on specific contaminant risks or nutrient benefits in traditional/country food and potential pre- and post-natal risks to children from a mother’s consumption of these foods, as well as general information

on health and nutrition. Finally, community health representatives or wildlife officers demand a higher level of detail about current levels, trends, potential effects and activities underway to further understand and address these issues so that they can respond to questions from residents in the community and speak to the various aspects of the issue. Simply stated, a single northern community is made up of groups requiring slightly different communication methods and levels of detail in information, but all having the same basic information needs (see Table 5.2).

TABLE 5.2 Useful information about target audiences to consider in communication activities

<p>Basic socio-demographic characteristics</p> <ul style="list-style-type: none"> Age Gender Education Literacy Cultural and ethnic background
<p>Experience with contaminant and traditional/country food issues</p> <ul style="list-style-type: none"> Community and personal historical and current situation with contaminant-related issues (e.g. large development projects, cancer, DEW line situated near community, other clean-up operations in immediate area, etc.) Familiarity with scientific and traditional knowledge concepts Attitudes toward contaminants issues Perceptions of the benefits and risks associated with contaminants
<p>Personal behaviours</p> <ul style="list-style-type: none"> Harvesting and consumption patterns Personal reported benefits derived from traditional/country foods

These varying audience characteristics and information needs have been critical when health advisories or health advice have been released as a result of NCP-collected information. The more balanced, comprehensive approach taken to the development and delivery of this information has resulted in fewer “advisories” (restrictive information) and more messages of “advice” (promotion and assurance messages) being provided (see Box 9, Chapter 4).



5.2.2 The national community

The NCP also communicates to a significant degree with the greater national community interested in the issue of contaminants in the Arctic. This group is made up of researchers, NGOs, academics, the media, educators, civil servants, and others. The goal of these communications is to inform, educate and support action on these issues to reduce, and where possible eliminate, the production and use of these substances. Just as the various sub-groups within northern communities have specific information needs, so do individuals outside of the program at the national level. The NCP must similarly tailor messages relating to the basic information gathered under the program to address these needs.

5.2.3 International audiences

Finally, the NCP is involved in communication activities at the international level targeted at government, policy and Aboriginal representatives involved in international negotiation processes. These activities attempt to achieve similar goals to those identified at the national level, but in the global context. The information needs, concerns and interests at this level are similarly important to identify and understand as it is at this level that international action is influenced by the knowledge generated through programs such as the NCP. Without the communication material provided by NCP, representatives to international processes would not be able to present key research results on the significance of contaminants in the Arctic or have the justification to take action on an international scale. Although the messages delivered at this level provide the same basic information used to inform communities that, for example, “the benefits of consuming traditional/country foods outweigh the risks”, very different final messages could potentially be developed for use at this level to drive international action (for example, “contaminants in the Arctic are a significant threat to the health and wellbeing of Aboriginal people”).

The need to develop and appropriately disseminate messages to meet the needs and interests of specific audiences has necessitated the development of a network linking those involved in the program in order to facilitate this exchange of information and ideas.

5.3 Regional networks for communication

A network of relationships based on the NCP program structure (see Figure 2.2 and Section 2.3) has evolved to help facilitate communications, linking communities and individuals, regional/territorial committees, the national program structure and beyond. This network forms the backbone of NCP communication activities at, and between, each of these levels. Each individual and group in this network plays a critical role in these activities and the flow of information, ideas and concerns.

This network has facilitated the development and adaptation of messages and materials oriented towards specific regions, communities and audiences. It has supported the identification and use of the most appropriate pathways through which to disseminate information and provided a method through which communities can raise concerns at the regional and national levels. The communications network also increases the ability to share “lessons learned” or best practices among regions through the membership of regional committee representatives on the national management committee. It is important to note, however, that a complex informal network exists within and between communities and regions that either existed before the implementation of the NCP or have since evolved in relationship to NCP activities (e.g., the role of “front-line” workers in communications at the community level). Wherever possible, the program has identified and incorporated these relationships in its structure in order to better support effective communications with communities.

5.3.1 Territorial Environmental Contaminants Committee (TECC)

The Territorial Environmental Contaminants Committees (TECCs) are central to the development, review and flow of communications between the community and the regional and national levels within the program. Members of the TECCs often act as key communicators and continuously liaise with communities, either directly or through their local staff. Many of the members of these committees are also residents in northern communities.

The TECCs frequently act as developers, reviewers and distributors of communication messages and materials in the region and as a conduit through which communities can raise concerns and perspectives to the national management levels of the program (See Box 8, Chapter 4). This has supported the development of appropriate and effective messages under the NCP. As described in CACAR I, these committees attempt to provide a “one window” approach to communications on these issues in

the region, coordinating and working with communities to ensure that the information they need is delivered, received and understood.

5.3.2 Regional Contaminants Coordinator (RCCs)

RCCs are officially tasked with bridging the gap between community members, NCP scientists and the various committees within the program. They act as community and regional coordinators of some research activities, key communicators and program representatives at the community level. As these individuals are often local residents, they have been able to forge a relationship of trust with communities, which in turn, has facilitated more meaningful exchanges between communities and program representatives. The network of RCCs across the North helps support the timely, local delivery of NCP messages via an effective and accepted communicator in many communities. With the support of the Aboriginal Partners (through the provision of training, guidance, review and advisory support) these people play a critical role in communications activities under the NCP.

5.3.3 Frontline workers

At the regional and local levels in the North, a number of individuals deal with contaminant-related issues on a daily basis through the nature of their jobs. These individuals, referred to by the NCP as “frontline workers”, include such people as local Community Health Workers, Wildlife Officers, Fisheries Officers, Renewable Resource representatives, regional and local Aboriginal organization representatives, Elders etc. They are regarded as key resource and contact personnel in communities on these issues and are frequently communicate this information locally. The NCP has dedicated some resources to mobilizing these individuals to support NCP activities at the local level. They are key links between communities, researchers and program committees. In support of their role as local communicators, the program has conducted a number of workshops aimed at informing, educating and learning from these individuals about contaminant issues, how they pertain to their local environment, and how best to interact with communities on these issues.

In 1997, a training course for northern “front-line workers”, Elders and youth was initiated to discuss contaminants. The first Front-line Training Manual was developed by the Metis Nation (NWT) and was based on educational materials previously developed for northern schools. Designed to be a hands-on interactive workshop, the course was later adapted to be used in the formal training provided for RCCs.

To date, frontline training courses have been held in the Yukon, NWT, Nunavut and Labrador and have included over 100 participants (see Figure 5.1 and Table 5.3). The basic course materials were revised by each Aboriginal Partner for their specific region. The course has increased awareness and understanding of contaminant issues at the grass roots level among key individuals in the community. When more than one participant from each community has attended a regional course, the knowledge gained has been disseminated informally throughout the region.

The effectiveness of training and using frontline workers as key communicators is, however, challenged on a number of fronts. These workshops, which require significant resources, deliver a large amount of information to an already very busy group with many other responsibilities than contaminant and pollution issues. In addition, many of these positions experience high turnover rates, making the communication benefits of training an individual short-lived as they may not be in the position long.

TABLE 5.3 Frontline training workshop participants by region

Region	Date	Location	No. of participants
Baffin	Feb. 1998	Iqaluit	32
Mackenzie Delta	Mar. 1998	Aklavik	11
Kitikmeot	Nov. 1998	Yellowknife	24
Kivalliq	Jan. 2000	Rankin Inlet	21
Labrador	Mar. 2000	Nain	18
Yukon	Dec. 1999	Whitehorse	20
Total			126





FIGURE 5.1

Map of Frontline Training Workshops during Phase II.

5.4 Materials for communication

To reach the many target audiences across the North, the NCP has developed and/or adapted a variety of communication materials (see reference table at end of chapter). Through informal feedback and review by TECCs and community residents, by trying a number of different materials, and drawing on previous experience of communicating on other issues in the North, members of the NCP communications network have learned and adopted whatever forms of media are most appropriate for certain messages, in certain regions or communities, and to reach specific groups within a population. Often, a number of different forms of the same message are required in order to reach all intended communities and individuals.

The content, scientific accuracy, ease of understanding and appropriateness of the message for the intended audience are of utmost importance. Without the delivery of these messages in the form of effective materials, they are often not seen, heard or remembered by community residents. Under NCP Phase II, a variety of information packages has been developed to communicate on different issues.

Retrospective summaries, such as the “*Contaminants in the Deh Cho: A Summary of Five Years of Research Under the NCP*” package produced by the Dene Nation (1997 to 98) have provided long-term regional updates or state-of-the-knowledge on contaminant, wildlife and health issues. This has been done in a balanced way, using a variety of appropriate formats (e.g., question–answer, fact sheet, visual and written). Similarly, information packages on contaminants and cancer produced in the NWT/Nunavut (1998 to 99) and Yukon (1999 to 2000) in response to regional concerns expressed at workshops and community meetings, have been able to respond to community information needs through the use of a variety of formats.

Responding to basic questions in the form of fact sheets, newsletters, pamphlets and short research-based reports has been helpful in providing information to address community perceptions and meet information needs on known diet changes and their relation to cancer, known causes of cancer, and the relationship with contaminants. It is important to note that these packages were developed



FIGURE 5.2

Winning entries from the Contaminants in the North Poster Contest.



based on regional input in two different forms: the Yukon material consisted primarily of print and visual materials, while the NWT/Nunavut material was produced in the form of a CD-ROM.

Visual tools for communication have been especially powerful in the NCP. A variety of posters and other visual tools have been developed using the basic messages developed under the program to inform people of such information as the benefits of eating traditional/country foods and to promote the activities of the NCP in the North. The “*Contaminants in the North Poster Contest*” (2000 to 01), in which grade school and high school students were invited to draw posters on a variety of issues including contaminants in the environment, was conducted to educate students on contaminant issues and allow them to express what they had learned to date on the topic. The results of this contest (see Figure 5.2) showed that some basic messages on these topics were reaching these students through the school curricula and other means. The three winning posters were made into a single poster, which has been distributed throughout the North.



Similarly, the project “*Communication through fabric art: Bear Coming Undone*” (2000 to 2001) developed a visual tool, in this case a quilt, to illustrate how contaminants affect the Arctic marine food chain (see Figure 5.3). It was produced to encourage dialogue on contaminant issues, especially in cross-cultural situations. The quilt now travels to communities, national and international meetings, and NCP workshops and events.

Materials produced by northerners have proven especially effective in gaining attention and conveying messages in communities throughout the North and elsewhere. The video produced about the Elders/Scientist retreats, produced by the Dene Nation in 1998, (*Strengthening the Ties*) has been used to inform other Elders as well as youth and people outside the North of the knowledge exchanged during these retreats. Production by northerners has helped ensure that the material is presented in an appropriate manner and from a local or regional viewpoint which has increased its effectiveness as a communications tool.

The strength of many of the materials developed under the NCP has been their ability to easily be used or adapted for use in other regions around the North. Materials such as the nutrition fact sheets, produced by the Government of the Northwest Territories, on the health aspects of traditional/country foods and basic information on contaminants have been invaluable in raising awareness in regions across the North and beyond.

In all cases, effective materials have had to follow the guidelines of providing simple, easy-to-understand messages, in culturally appropriate and sensitive ways. This includes ensuring community access to these media (e.g., not all communities and homes have access to internet) and the use of local Aboriginal languages and names for species. The NCP project *Country Food, Nutrition and Health: Developing effective communication strategies in Labrador* (1998 to 2000) involving local communicators and community residents developed guidelines for producing “effective” communication materials specific to their region. Many of the principles that make communication materials eye-catching, easy to remember, and effective in conveying simple messages were outlined by participants in this project (see Box 10).

FIGURE 5.3

Bear Coming Undone. Quilt produced under NCP Phase II to communicate about contaminants and their effects on the Arctic marine food chain.

Box 10 Guidelines for Producing Effective Communication Materials in Labrador

General Guidelines for all Media (print, radio and video)

- *Include contact information for further inquiries and feedback.*
- *Provide an explanation or definition for technical terms in plain language (this applies to Inuktitut translated text as well).*
- *Answer basic questions: “How will this affect the country food I eat ?” “What does this mean to me ?” “Should I be concerned?”*
- *Include comparisons with other regions of the North where possible.*
- *Proofread Inuktitut translations by more than one translator for verification.*
- *Consider variations of the Labrador Inuktitut dialect between communities or settlements of origin in translations.*
- *Include both risk and benefit information.*
- *Provide information in clear and concise language (plain language).*

Guidelines for Print Media (posters, fact sheets, etc.)

- *Posters for public should provide one main message, and limited text.*
- *Use eye-catching headlines on posters and newsletters.*
- *Use local photographs and maps where appropriate and highlight the region/community; use colour if possible.*
- *Include cartoons and drawings if targeting youth and/or students.*
- *Use bullet-points or short sentences.*
- *Use question and answer format.*
- *Highlight the summary points.*
- *Ensure that logos of organizations involved are visible.*
- *Consider that not all segments of the population understand graphs, e.g., Elders.*
- *If research results are presented for a specific area or community, explain why only this area was chosen.*
- *Detailed research results are best for scientific or open house meetings, not for posting in the community.*
- *Provide Inuktitut and English versions in the same document if possible.*

Guidelines for Videos

- *Involve local people in presenting information.*
- *Use videos to communicate with youth.*
- *Youth prefer “people” issues more than “environmental” issues.*
- *Film footage should not take away from the message but should help highlight the information being presented.*
- *Make copies available for people to borrow and view on their own time; promote their availability.*
- *State in the introduction what kind of information will be presented and a summary at the end of the program should highlight the information presented.*
- *Film footage of the local environment and people is appealing. The more familiar it is, the better it is in getting the message across.*
- *Announce the program in advance through a variety of formats so that people know what kind of information will be presented and when.*
- *Upon release, inform individuals or groups who could use the video for educational purposes and make it available, e.g., to public school teachers.*

Guidelines for Radio Newscasts or Briefs

- *Use all possible radio stations to reach a large number of people. These include:*
 - *OKalaKatiget Radio — regional.*
 - *Local radio station — e.g., for Nain, it is CITN Radio.*
 - *Regional radio: CBC Radio, either from Goose Bay, Labrador; St. John's, Newfoundland; or Iqaluit, Nunavut (Inuktitut)*
- *The timing of the broadcast determines audience and numbers.*
- *Radio is not effective for targeting youth.*
- *Local project staff should present the information.*
- *Scripted interviews or reading is viewed as boring.*
- *Give background information on organizations involved that are based outside of the region.*
- *Use format appropriate for the information being presented. For example, use a news clip instead of an interview when informing public about an ongoing project.*
- *Provide specific examples to illustrate the point being made.*



With the arrival of electronic technology in the North, yet another form of media is available through which to communicate these issues. The use of the internet by the NCP to reach communities and schools in the North has been a new development during Phase II.

In the 1999-2000 funding year, Inuit Tapiriit Kanatami (ITK) embarked on a project to develop an Inuit-specific website (www.itk.ca) and traditional knowledge database (both web and CR-ROM accessible) under the NCP. The intent was to use the website and electronic material as a tool to share Inuit knowledge and ideas on contaminants with both the North and South. The Council of Yukon First Nations then developed their website (www.contaminants.ca) in 2000-2001 to target children and others inside and outside the North with information developed by the NCP, CYFN and CINE on contaminants, their potential effects, what's being done, and the current state of the knowledge on these issues. Electronic materials (CD-ROM) have also been developed on specific issues such as cancer and contaminants by ITK under the project *Development of a Communication Package on Cancer and Inuit in Relation to Northern Contaminants and the NWT Cancer Registry*.

Despite these developments, the use of electronic technology to communicate under the NCP is still in its infancy and a better understanding of the level of access to and use of these tools is needed before further exploiting this form of communication.

While dissemination of materials to national and international audiences has required different approaches than those used in northern communities, the same communications network has been used. Many of the materials used in the North are equally effective in conveying these messages to national and international audiences, although other formats can also be used. These include electronic formats (e.g., websites, listservers), which are more widely accessible and accepted in many regions outside the North.

Communication support materials like those discussed here run the risk of being mistaken for solutions to communication problems. Effective communication under the NCP has involved the exchange of information, ideas and feelings. Media products have been used as tools to compliment or help facilitate dialogue and exchange, learning and action. Furthermore, the development and delivery of these materials has been critical in supporting awareness and understanding of these issues in northern communities. Unless a poster is put up in a location where it is seen by many or a pamphlet is distributed in a manner appropriate to ensuring its reception, these messages have not reached their intended audiences. Attention has been paid at the local level to this issue; yet more work remains to be done to learn more about

the most effective pathways of disseminating effective materials both in the North and elsewhere.

5.4.1 Curriculum development in the NCP

The responsibility to communicate with and educate youth to support the capacity of communities and regions to deal with these issues for years to come was stressed by both the NCP and the Aboriginal Partners. This responsibility identified the need to incorporate the lessons being learned through the NCP into the existing northern school curriculum. At the same time, teachers in the North have been interested in, and looking for ways to include more northern-specific lessons in their curriculum.

To address this point, the Metis Nation-NWT proposed a three-phase "curriculum development" project entitled *Integrated Contaminant Education program for Northerners*. This involved developing materials that would enable teachers to work within existing curriculum, while using information that related to the NCP. The model for program development devised by the Metis Nation-NWT with direction and input from teachers, school boards, and the GNWT Department of Education was directly linked to the existing NWT curriculum. Materials subsequently developed for use in the Yukon were adapted to reflect the differences in their school curricula and the context of their region (See Table 5.5).

TABLE 5.5 Curriculum material developed under the NCP

NWT materials

Teachers' Guide and Lesson Plans for Grade 7
 Teachers' Guide and Lesson Plans for Grade 8
 Teachers' Guide for Grades 7, 8, 9
 Teachers' Guide NWT Science 15, 25
 CD-ROM version school materials
 CD-ROM NCP graphics and clipart

Yukon materials

"Contaminants Found Me: A Science Curriculum for all Yukoners"
 Book One: Grades 3 – 6
 Book Two: Grade 7
 Book Three: Grades 8 – 10
 Monty the Moose (series of three posters)
 "Contaminants Found Me", music compact disc and video



Through drafting and reviewing lesson plans by various individuals and organizations [Science Institute of the NWT, Canadian Polar Commission, Department of Renewable Resources (NWT), Yellowknife Education District #1, and the Department of Education (GNWT) Social Studies and Science Coordinators], as well as by class pilot testing, a number of “user-friendly” materials were produced. A similar process was followed to develop regionally specific material of the same nature for the Yukon. In the Yukon, students were actively involved in developing the classroom materials, including the production of a music recording about contaminants entitled *Contaminants Found Me* and a common character (Monty the Moose) to lead students through materials for the project (see Figure 5.4: “*Monty the Moose*”). By March of 2000, multi-media classroom tools (posters, a music CD, a video, curriculum resource books) had been produced through this NCP-funded work.



FIGURE 5.4
“Monty the Moose”, from Yukon educational material

The material has received interest and support in both the NWT and Yukon has been requested by Nunavut educators. This level of interest indicates the need for such material and its high quality. In 2001, the Dene Cultural Institute evaluated the materials and their use. This involved interviews with science teachers in Yukon

and the NWT. Recommendations to improve the materials and the need to provide more graphics, hands-on activities and text in plain language was identified. Further recommendations to redraft materials to make them more compatible with existing curricula, provide in-service training for teachers to introduce them to the material, republish and distribute more of the materials due to their demand, and to provide materials in digital format were also reported.

These ‘curriculum’ projects have brought the contaminant issue into northern classrooms where they will continue to be revisited beyond the life of the NCP. The materials produced have been instrumental in reaching youth across the North with this information.

5.5 Processes of communication

The NCP has used a number of different processes of communication to deliver messages to specific target audiences identified by the program. These processes rely, to varying degrees, on the existing NCP communications network and its members. The network has facilitated the conduct of the processes or activities described in this section.

5.5.1 Workshops in the NCP

Among the ways that the NCP communicates with community residents, one-on-one, face-to-face dialogue and small group discussions have proven to be efficient ways to hear people’s concerns and provide relevant and meaningful information. They have provided people who do not normally meet with a means of sharing information, asking questions, and talking to one another about contaminant issues. The flexibility they provide is vital, since the NCP covers many cultural and linguistic regions, each one requiring its own approach. More than over 35 workshops have taken place in Phase II of the NCP. Most of these were focused on communicating about traditional/country food consumption (Figure 5.5).

Three workshop formats have been used (Community/Regional Workshops, Multi-Regional Workshops, and Symposia). As more project results became available throughout the program and as communities began to demand more information, many of the NCP workshops took on a more “community-specific” approach. Information specific to that region and/or community was synthesized and presented, often upon request. For example, many communities have been interested in hearing the results of projects conducted in their geographic region concerning contaminant levels, trends and potential effects on wildlife because of their concerns and preoccupations with these issues.





FIGURE 5.5

Map of Workshops held during NCP Phase II.

Similarly, communities have often requested workshops to learn about and discuss results of projects that have been going on in their area for several years. This was the case with the project *Avatipinnit Niqittiavait — Good Food in the Environment* which consisted of a series of community-specific workshops and community-based dialogues to communicate, in a balanced and focused way, the results of the CINE dietary study conducted over a 3-year period in 18 Inuit communities. As these smaller community workshops are attended by more people from the same community and with similar specific interests, they create a better environment for focused discussions.

Multi-regional workshops have also taken place in the program. These events have tended to be much larger gatherings, at which important information has been provided to individuals coming from a variety of backgrounds (e.g., hunters, local health representatives, etc.). In 1998, the *Eastern Arctic Contaminants Workshop* held in Iqaluit brought together representatives from all northern regions to discuss contaminant issues and research needs. Participants made recommendations on the need for social and cultural criteria to be used in the review of projects and recommended the use of community-based workshops for contaminant issues in order that material could be geared towards a specific community as opposed to being generic and potentially less meaningful to participants from many different communities assembled together.

The *Yukon First Nations Dietary Conference* held in 1999 entitled *Traditional Food: Is it Safe?* is another example of a regional workshop. This gathering brought together between 70 and 80 people from all Yukon communities to discuss both the benefits and risks of consuming traditional/country foods. A smaller gathering held in Moose Creek, Yukon, brought together 30 Elders and youth from communities across the territory for a workshop entitled *State of the Environment 2000 — A First Nations Perspective on the Land and Environment for 2000*. This workshop, co-funded by the NCP, presented information directly and indirectly related to contaminants and the environment in the context of sustainable communities. It included presentations by Elders on traditional practices and their perspectives on current and future generations.

These regional-based workshops have been effective in communicating with larger audiences although they have not provided community-specific feedback or led to wider discussion and dissemination of the presented information in small communities. These larger workshops have involved individuals with wide-ranging interests and levels of education. As a result, they have been less conducive to the active participation and interaction of community residents.

Finally, the NCP has held a number of Symposia at locations in southern Canada. These much larger events, such as the *Annual Results Workshops* of the NCP, provide scientists with a venue to deliver and discuss their results with peers, generate new ideas and network with other researchers in their own and related fields. Northerners, including RCCs have regularly participated in this annual event which brings together scientists, Aboriginal organization and government and program representatives, and representatives from the North. It is more technical in nature, however, and not necessarily oriented towards a northern audience. This event has also invited international guests interested in learning more about the NCP and thus been able to expand its audience to reach other circumpolar countries. For example, Alaskan participants came to the 2001 Results workshop in Calgary to learn about the NCP in order to develop an Alaskan Contaminants Program.

5.5.2 Contaminants tours in the North

I am really glad that you are here today because before this meeting I've been concerned about eating country foods because of contaminants. This meeting put a smile back on my face and now I can continue eating country food again.

(Elders, Hunters and Trappers Association, NCP Contaminants Tour in Grise Fjord Nunavut, December 1, 1999)

Contaminants tours conducted through the NCP have proven to be a powerful way of communicating with many northern communities in a relatively short period of time. They are designed to take advantage of the opportunity provided through the NCP to simultaneously involve various experts on specific subjects in the same communication event in the North. The tours have consisted of a group of experts traveling sequentially to a number of northern communities. In each community the group has conducted a variety of communication activities (such as, community meetings, school classroom visits, phone-in radio shows, face-to-face committee meetings) on the topics of contaminants, traditional/country foods, and health.

The traveling group has consisted of scientists conducting research under the program, regional health officials, Aboriginal Partners and NCP Secretariat representatives. The selection of communities to visit has been based on Aboriginal Partners' identification of key areas/communities where information was required, where there has been a high level of concern about contaminant issues, and where few communication events have taken place previously. In the last few years of Phase II (1999 to 2002), community tours visited 32 of 52 Inuit communities,





FIGURE 5.6
Contaminants Tours in the North.



ITK/Eric Loring

7 Dene/Metis communities, and 4 Gwich'in communities (see Figure 5.6). An unexpected benefit of these tours has been that they have provided scientists with an understanding of the importance and relevance of what NCP is doing at the community level. In some cases, they have been the source of ideas for future projects on issues of concern to the community (See Chapter 3, Case Study 2).

The contaminant tours have been successful on a number of levels. Logistically, the tours have been very challenging to organize and conduct and competing social events and community schedules have often complicated scheduling. They have been very effective, however, at reaching a large and diverse audience in a short time and providing an opportunity for community residents to exchange information on a one-on-one or face-to-face level. Residents have gained a better understanding of contaminant issues from scientific experts and local communicators. Dynamic, flexible and trusted personnel have been key to the success of these tours.

5.5.3 Informal processes of communication

In addition to the formal, planned activities for communication in the NCP, there have been a number of important informal opportunities for interaction, exchange and learning. Communities often get together for feasts and communal events. Placing an RCC in a northern community, the NCP has been represented indirectly at many of these gatherings. Issues related to food safety and contaminants have sometimes been discussed and people have had the opportunity to learn more about contaminants and what is being done in the North or to voice concerns and needs in relation to this topic via local representatives such as these RCCs.

When scientists visit in the North to conduct work, they have sometimes stayed in a community or passed through on their way to field sites. Some of these scientists have worked in the North for years, and have built relationships with northerners. Whether at the airport, dropping by the local office of Hunters and Trappers Association, or through an impromptu presentation to the local health committee, researchers involved in the program have often taken the opportunity to discuss NCP-related research, results and issues, and in turn, clarify messages going to the community, or listen to community observations, concerns and preoccupations on these topics.

Similarly, any gathering bringing scientists within the program together has fostered this opportunity for exchange and has been equally important to the communication efforts of the NCP (e.g., international conferences on specific disciplines — *Society for Environmental Toxicology and Chemistry*, *International Congress for Circumpolar Health*).

5.6 Assessing communications in the NCP

The importance of both positive and potentially negative impacts of messages on the issue of contaminants in traditional/country foods emphasizes the need to understand the success of communication efforts on these issues. The current understanding of the success of these efforts comes from both extensive informal, and in some cases, formal reviews or assessments of effectiveness conducted under the NCP.

Activities such as contaminant tours and informal discussions between scientists and northerners have provided a valuable way of informally assessing the success of communication efforts under the NCP. These processes of informal feedback have improved understanding of individuals' awareness, comprehension, and reception of messages and the ways in which they have been delivered. Call-in radio shows involving key communicators and TECC representatives have provided feedback on the content of basic messages, the way the issues are being presented, as well as providing a venue for collecting further community perspectives and concerns.

Informal feedback has been used to adapt messages and communication techniques for future activities in the same or other locations. The ongoing two-way communication activities under the program have allowed regions and communities to “learn-by-doing”, and to develop an understanding of “what works best” in communicating with specific regions, communities and individuals. The lessons learned from these informal evaluations have proven invaluable in the ongoing delivery and exchange with northern residents on these issues.





ITK/Eric Loring

Other lessons about communicating “effectively” in the North on contaminants and health have come from direct and indirect forms of formal evaluation. Yet, as some researchers have noted, little formal evaluation has been conducted previously on these communication efforts and more is still needed. Some indirect indications of message comprehension, such as social expressions of message comprehension and interpretation, and impacts on hunting behaviour have been, or are currently being, conducted under the NCP.

Through interviews on traditional knowledge of wildlife, reviews of contaminants communication in the community, and an investigation of hunting behaviour related to a local contaminated site, the project *Inuit Response to Environmental Contaminants Information: the Cape*

Christian-Clyde River Case (1999 to 2000) showed that communications on health and contaminants was sporadic in the community. While released information was effective in communicating about the risks associated with the former long-range navigation site at Cape Christian, it was less successful in informing people about the risks of consuming traditional/country foods, notably ringed seal, from the waters adjacent to the site. Evidence from this project supported the need for improved communications to dispel or correct erroneous hypotheses related to contaminants and wildlife health.

An ongoing project, *Incorporation of Scientific into Inuit Knowledge in Nunavik* (2000 to 2001), has been using the idea of social representations to assess the comprehension and use of information released in the community

of Salluit, Nunavik on contaminants and health. Potential confusion between mercury poisoning and the *Trichinella* worm responsible for trichinosis (found in uncooked walrus meat) and an investigation into current-day health behaviours among residents is improving understanding of the impact and interpretation of past contaminant-related communications in this community.

Formal evaluations of communication materials or activities have increased the understanding of how messages are perceived, received, and understood. For example, work conducted in Labrador under the NCP project *Country Food, Nutrition and Health: Developing Effective Communication Strategies in Labrador* (1998 to 2000) found that the degree of synthesis and condensation (i.e., simplification to 'basic or key messages') of information needed to be far greater than usual under the program to support comprehension among northerners. Also, previously used pathways and modes of dissemination, which were thought to be effective in the test community and region, were not successful in delivering messages to specific audiences. Similarly, evaluations of the curriculum material developed in the NWT and Yukon (*Evaluating Contaminants Curriculum Materials*) indicated its level of use and made recommendations for its improvement as previously discussed. In general, the results of these evaluative efforts further support the need for regional and community specific evaluation exercises to ensure that communication objectives are being met.

Evaluations conducted to date show that informal indications of success cannot be used alone as reliable indicators of such goals as reception and comprehension. Despite this, the various forms of informal evaluation that have taken place across the North are not to be discounted. Both formal and informal processes used by various researchers, individuals and committees in the NCP communications network have been invaluable in supporting informed decision-making and action regarding these issues in the Canadian North.

5.7 Summary of key points

- The NCP has invested significant resources and efforts into communicating contaminant issues with communities and audiences both in and outside the North.
- The NCP network has been critical to the delivery of messages.
- A variety of formats including print, audio/visual and digital formats have been used to disseminate messages.
- Communication materials have been used as tools for communication and have not replaced face-to-face meetings for information exchange with target audiences.
- Two-way methods of communication including workshops at the local, regional and national levels, contaminant tours (which include community meetings, radio shows, and school visits), and informal meetings have been used to engage communities on these issues.
- Much of the information learned about what has worked in communicating with communities comes from informal assessments under the program. There is a need to conduct more formal evaluations of materials and processes for communicating on these issues in the North.

5.8 Key references and suggested readings

- Jensen, J. (Ed.). 1999. *Environmental Studies No. 75. Synopsis of Research Conducted under the 1997/98 Northern Contaminants Program*. Indian and Northern Affairs, Canada. Northern Development. Ottawa. ISBN: 0-662-27561-6. 434 p.
- Kalhok, S. (Ed.). 1999. *Synopsis of Research Conducted under the 1998/99 Northern Contaminants Program. Northern Affairs Program*. Indian Affairs and Northern Development, Canada. Ottawa. ISBN: 0-662-28151-9. 367 p.
- Kalhok, S. (Ed.). 2000. *Synopsis of Research Conducted under the 1999-2000 Northern Contaminants Program*. Indian Affairs and Northern Development, Canada. Ottawa. ISBN: 0-662-29320-7. 339 p.
- Kalhok, S. (Ed.). 2001. *Synopsis of Research Conducted under the 2000-2001 Northern Contaminants Program*. Indian and Northern Affairs, Canada. Ottawa. ISBN: 0-662-30872-7. 371 p.



REFERENCE TABLE Types of communication materials developed in NCP Phase II

Material	Common applications to date in the NCP	Examples	Target audience reached	Common pathway of dissemination	Strengths and weaknesses in conveying message to variety of key
Research Reports	Provide information on project activities and results.	<p>NCP Synopsis Reports</p> <p>CACAR I, II</p> <p>Maternal and Cord Blood Monitoring for Environmental Contaminants—Revised Report</p> <p>The Keewatin Environmental Health Project: Contaminants and People Final Regional Report</p> <p>Summary Report—Human Contaminants Monitoring Inuvik Workshop, Inuvik</p> <p>Preliminary results presented at: 31st Annual Symposium of the Society of Toxicology of Canada</p> <p>Assessment of dietary benefit: risk in Inuit communities</p> <p>Standard edible weights of harvested species in the Inuvialuit Settlement Region</p>	<p>Community members</p> <p>Hunters (wildlife reports)</p> <p>Community Health Centres, workers, pregnant women and traditional/country food consumers (health reports)</p> <p>Researchers</p>	<p>Aboriginal Partners and TCCS advise researchers on returning results to community.</p> <p>Wildlife studies are usually delivered to the Hunters and trappers organization.</p> <p>Health information given back to the Hamlet and Health boards.</p> <p>Distribution of reports at major workshops and symposia.</p>	<p>Strengths:</p> <ul style="list-style-type: none"> • Easily distributed • Quick • Detailed • Required by program <p>Weaknesses:</p> <ul style="list-style-type: none"> • May be delivering a complicated message • Basic literacy • Must be translated • May reach only one person/ organization • Non-interactive • Often too technical for many audiences
Workshop Reports	Provides information from a workshop forum.	<p>The Arctic Archipelago Project Workshop Proceedings and Recommendations</p> <p>Eastern Arctic Contaminants Committee Workshop</p> <p>Community concerns regarding decommissioning of Pine Point Mine</p> <p>Abstract submitted to 5th Intl Conf. on Hg as a Global Pollutant, Rio de Janeiro</p> <p>Elders/Scientists retreat Feb. 11–12 '97</p> <p>Human Health and Wildlife Monitoring Workshop</p>	<p>Program managers</p> <p>Regional workers FLT/RCC's</p> <p>Community representatives</p>		
Pamphlets/ Brochures	<p>Used mainly by TECCs for providing overviews and contact information.</p> <p>Used for giving guidance and direction on issues.</p>	<p>NCP program brochure</p> <p>NNHC committee pamphlet</p> <p>TK for Dummies</p> <p>Recruitment pamphlet for Inuit cohort study</p> <p>Field Guide to Common Diseases and Parasites of Wildlife in the NWT and Nunavut</p>	<p>Frontline workers, RCCs, TECCs, public</p> <p>Wide audience, from local to international levels</p>	<p>Often developed by TCCs and then distributed at workshops and during community tours.</p> <p>Distributed to public through various means.</p>	<p>Strengths:</p> <ul style="list-style-type: none"> • Easily accessible if in common location • Easily distributed • Very portable • Variable in cost <p>Weaknesses:</p> <ul style="list-style-type: none"> • Limited in detail • Dated, not always current • May be mistaken as for solutions to communication problem
Fact Sheets	<p>Provide medium to high detail on single specific topics (e.g. Contaminants in Caribou).</p> <p>Provide information on a related series of topics (e.g. different species of traditional/country foods).</p>	<p>YCC or NWT Nutrition Fact Sheets</p> <p>Transplacental exposure to PCBs and infant development/ human exposure assessment</p> <p>Country food nutrition and health: developing effective communication strategies in Labrador</p>	<p>Hunters, elders, youth, frequent consumers of country foods, health professionals</p>	<p>Developed by TCCs, commonly distributed through community tours, workshops etc.</p> <p>Often given to media personnel.</p>	<p>Strengths:</p> <ul style="list-style-type: none"> • Very visible • Focused on one topic • Very portable • Easily distributed • Useful format (basic messages) • Low cost <p>Weaknesses:</p> <ul style="list-style-type: none"> • Limited in detail • Need to be continually updated to remain current

REFERENCE TABLE continued

Material	Common applications to date in the NCP	Examples	Target audience reached	Common pathway of dissemination	Strengths and weaknesses in conveying message to variety of key
Newsletters	Provide medium amount of detail on activities, research results, and general messages.	ITK Newsletter CINE Newsletter LIA Newsletter Inuvik regional human contaminants monitoring program	Reaches all target groups.	Often developed by Aboriginal organizations and distributed through established mailing lists (including HTO/CHR/schools/community Hamlets/wildlife offices).	Strengths: <ul style="list-style-type: none"> • Often recent information • Provides brief basic messages Weaknesses: <ul style="list-style-type: none"> • Limited in detail • Translation cost • Distribution costs
Newspaper Inserts	Provide medium amount of detail on program and project results or basic messages on contaminant issues.	NWTECC insert on contaminants Summary Report—Human Contaminants Monitoring Inuvik Workshop, Inuvik (articles in local newspapers)	All audiences are reached that have access to the chosen newspaper (various).	Developed by TCCs prior to large communications event to supplement message dissemination (e.g., CACAR I).	Strengths: <ul style="list-style-type: none"> • Circulation can be very large • Can reach multiple audiences Weaknesses: <ul style="list-style-type: none"> • Translation • Needs updating • Literacy • Sending information or advisories to the general public is likely to be ineffective because each segment of the population has its own needs and interest.
Posters	Convey basic message from projects or program (e.g. "Country foods are safe to eat").	ITK Country Food Poster Series Northern contaminants poster contest Contaminants in the Inuvialuit Settlement Region Raise awareness of NCP programs and committees Eastern Arctic Contaminants Tour-posters Arctic Animal and Nutrition Posters	If visually attractive, can reach wide audience depending on distribution and posting location. All target audiences (pregnant mothers, elders, youth, hunters, national and international audiences)	Current posters have been designed with feedback from regional workers, and distributed in northern communities for local posting. Some posters (e.g., ITK) have been sent to southern audiences such as schools, universities, researchers, internally like POPS conventions, WSSD, etc. A good forum for RCC's to develop input into the communication process.	Strengths: <ul style="list-style-type: none"> • Can attract significant attention • Easily distributed • Can appeal to many audiences at same time Weaknesses: <ul style="list-style-type: none"> • Cost efficient on item/individuals reached • Little detail communicated, therefore not ideal for complex messages
Other Art	Convey concepts related to the topic and program in a visually manner.	"Bear Coming Undone" quilt	Reaches key communicators like international negotiators.	Effective communication tool at workshops and meetings to generate discussion and interest.	Strengths: <ul style="list-style-type: none"> • Can attract significant attention • Can appeal to many audiences • Easily transported and posted Weaknesses: <ul style="list-style-type: none"> • Costly to have many original items (some not reproducible) • Difficult to communicate specific message well
Radio Program	Either announcements or call-in shows are used to provide varying levels of detailed information on projects (results or activities) and basic messages on the program or to discuss issues in an interactive call-in show.	Local radio call-in programs during Contaminant Tours under NCP Avatipinnit Niqittivait Project	Local radio is one of the best ways to reach all key audiences in a particular community.	An important tool to utilize when in communities to announce researchers presence, study results and future activities.	Strengths: <ul style="list-style-type: none"> • Can be current, live information • Can provide clarification of messages through call-in option • Can provide and gather information (two-way) Weaknesses: <ul style="list-style-type: none"> • Depends on good communicator and timing of program
Videos	Used in the NCP to communicate messages on a specific theme from the program (e.g. traditional/country food consumption) or project results on a regional basis.	"Contaminants and Your Health" (CINE) "Strengthening Ties" video of Elder-Scientist Retreat (Dene Nation) "Acid Rock!" video. A science curriculum for Yukon "Environmental Contaminants in the North" video	Important communication tools to reach a variety of audiences and key communicators, very effective at reaching youth.	Many have been developed by Aboriginal organizations and then aired regionally and distributed to schools, health centres, Arctic College locations, and to researchers developing workshops/tours.	Strengths: <ul style="list-style-type: none"> • Can be seen by many people at one time-reach large audience • Cost effective on person/item basis • Can deliver information in local context with local people and footage Weaknesses: <ul style="list-style-type: none"> • Must be translated into Aboriginal languages • Not all regions have capacity to produce videos • Takes significant time for production • Can be expensive

REFERENCE TABLE *continued*



Material	Common applications to date in the NCP	Examples	Target audience reached	Common pathway of dissemination	Strengths and weaknesses in conveying message to variety of key
CD-ROMs	Used to provide various information on program results and basic information on issues related to contaminants.	ITK Cancer CD ROM Integrated contaminant education program for Northerners RCC/Frontline training Development of a 3-day capacity building course for front-line professionals on contaminants and research issues	A tool for key communicators, effective at reaching youth.	Distributed to all regional offices and schools.	<p>Strengths:</p> <ul style="list-style-type: none"> • Easily distributed • Inexpensive • Can take variety of forms and levels of detail <p>Weaknesses:</p> <ul style="list-style-type: none"> • Current computer use and proficiency in some regions, and among some audiences, limits the efficiency of this item.
Websites	Provide basic and detailed information for specific or general audiences on research results, general contaminant concepts and program findings.	CYFN Contaminants Web site (www.contaminants.ca) ITK Environment Department Web site (www.itk.ca) NCP Web site (www.ainc-inac.gc.ca/ncp/)	Intended for all key audiences in North and South.	Developed by various groups (Aboriginal, researchers, program committees) and access is made available to anyone with Internet access.	<p>Strengths:</p> <ul style="list-style-type: none"> • Can reach many people • Inexpensive • Can be easily updated therefore current <p>Weaknesses:</p> <ul style="list-style-type: none"> • Current Internet infrastructure challenges efficiency of this method in many regions of the North • Technological proficiency limits audiences reached (e.g., elders)
Face to Face Communication	Allows for two-way interaction which is essential if communication is to educate and empower people. The preferred method of Communication Provide information on project activities and results.	Community tours Elder Scientist retreats Training workshops at CINE for 6 project field coordinators (research-trained health specialists, dieticians)	Northern residents	Contaminants Tours Workshops Retreats Community Visits	<p>Strengths:</p> <ul style="list-style-type: none"> • There is no substitute for face to face communication • Provides opportunities at the community level to specify, simplify and personalize as well as respecting local social. Cultural and economic traditions. <p>Weaknesses:</p> <ul style="list-style-type: none"> • It is slow, labour intensive and expensive



NCP at the National and International Level

6.0 Introduction

The results of NCP studies and the work of NCP representatives and others have provided the basis for policy decisions and action towards reducing contaminants in Canada's North, both in Canada and on the international stage. Many actions at the national level then precipitate action at the international level. This chapter outlines these actions that the NCP has influenced both on the domestic and international stages.

6.1 Action at the national level

Canada's negotiating positions in the international arena are heavily influenced by national activities such as CEPA Assessments. Other nationally based activities in which the NCP has played a pivotal role are outlined in this section. This does not include the numerous national activities that the NCP has either directly or indirectly influenced, resulting in a need to take action. Here, the focus is on highlights and key initiatives that the NCP has been directly involved in which have clearly influenced national activities and policies related to toxic substance management in Canada.

6.1.1 Toxic Substances Management Policy (TSMP)

The NCP has played an influential role in providing the impetus to develop the government-wide Toxic Substances Management Policy (TSMP). Under the TSMP, toxic substances that are determined to be persistent, bioaccumulative and resulting primarily from human activity are designated as Track 1 substances, and targeted for virtual elimination from the environment. The 12 substances subject to the UNEP POPs Convention, the so-called "Dirty Dozen" (See Section 6.2.4 and Table 6.1), were already being managed domestically through the *Canadian Environmental Protection Act (CEPA)* and the *Pesticide Control Products Act*, well before the TSMP was developed. These 12 substances, however, are now considered Track 1 substances as defined by the TSMP.

The NCP was influential in identifying a need within Canada to produce and implement a toxic substances management policy that used scientific criteria, including substances prone to long-range transport, in order to identify toxic substances of concern that warrant management measures. The TSMP was particularly useful in developing Canada's position to take action in the international stage on specific toxic substances of concern domestically. It is no coincidence that the substances targeted for control under the UN Global Convention on Persistent Organic Pollutants (the Stockholm Convention) and the UN Economic Commission for Europe Convention on Long-Range Transboundary Air Pollution (CLRTAP) POPs Protocol and TSMP are the same substances that are the main contaminants of concern in the Canadian Arctic.

6.1.2 Canadian Environmental Protection Act (CEPA) — Priority chemical assessments

The Canadian Environmental Protection Act (CEPA) requires that reporting requirements for new substances and industries be evaluated. Existing substances that are specified under the Domestic Substances List (DSL) and the Priority Substance List (PSL) undergo an extensive assessment process. For example, 23,000 substances listed on the DSL inventory of substances in commerce in the 1984-86 period are being assessed to identify those which are persistent and bioaccumulative. The ones that are identified as persistent and bioaccumulative then go to a more in-depth analysis, called a screening level risk assessment, to determine whether the substance is "toxic" or capable of becoming "toxic" as defined under CEPA. If a substance is considered "toxic" as defined under CEPA, management measures are then proposed to reduce the impacts of the substance on the environment and/or human health. During these risk assessments, extensive scientific information is reviewed by Environment Canada and Health Canada. The production of results through NCP projects provides significant scientific information, which assists in conducting these risk assessments.

Canada is currently setting priorities for future POP assessments to be conducted under CEPA. As a number of POPs are emerging as international priorities, it is important to ensure that domestic strategies are in place for these substances. Canada's negotiating positions related to the addition of new substances to international POPs agreements will be based on CEPA assessments.

The NCP has been instrumental in identifying many of these emerging substances of concern through its ongoing work to identify "new" persistent substances in the Arctic environment and their potential impacts on people and ecosystems. Polybrominated flame retardants such as polybrominated diphenyl ethers (PBDEs), short-chain chlorinated paraffins (SCCPs) or short chain polychlorinated n-alkanes (PCAs), and polychlorinated naphthalenes (PCNs) are substances that are likely to undergo CEPA assessments, partly due to information provided by the NCP.

6.1.3 Pest Control Products Act — Lindane assessment

Lindane [99% or more of the gamma isomer of 1,2,3,4,5,6- hexachlorocyclohexane (HCH)] is an organochlorine insecticide that has been registered in Canada since 1938. Lindane is under national and international scrutiny as a result of its persistence, potential for long-range transport, and widespread occurrence in the environment.

In March 1999, the Pest Management Regulatory Agency (PMRA) began a special review of lindane, under Section 19 of the Pest Control Products Regulations, following Canada's commitment to the United Nations Economic Commission for Europe — Persistent Organic Pollutant (UNECE-POP) Protocol under the Convention on Long-Range Transboundary Air Pollution (CLRTAP). This Protocol established obligations aimed at restricting or eliminating chemical substances that contribute to transboundary pollution. Even though lindane did not meet the POPs criteria for bioaccumulation, it was listed in Annex II of the Protocol, which committed all parties to restrict the uses of lindane and to reassess those uses within two years of the Protocol coming into force.

The NCP played a significant role in initiating the processes that led to the PMRA special review of lindane. The NCP reported results of HCH levels in humans as well as in animals that are important in the diets of northerners, such as marine mammals, that warranted concern.

6.1.4 Toxic Substance Research Initiative (TSRI)

Since its inception in 1998, the TSRI has funded cutting-edge research required to strengthen and accelerate the delivery and contribution of science to national policies and priorities associated with toxic substances.

The Initiative has targeted five priority research areas: cumulative effects of toxic substances; persistent organic pollutants (POPs); specific forms of metals in the environment; endocrine disrupting chemicals (EDCs); and urban air quality and exposure to airborne pollutants and cardio and respiratory effects.

The NCP Managers provided significant input to the creation of the TSRI by assisting with the establishment of the above scientific priorities, based on NCP results, and in developing the management regime based on lessons learned in developing an effective shared management approach under the NCP.

6.1.5 Children's environmental health

The particular vulnerability of children to a wide range of environmental contaminants has been gaining recognition recently in Canada and throughout the world. Results and data from NCP studies on contaminants and their effects on the developing fetus, infants and preschool-age children have influenced and assisted in setting the federal agenda on children's environmental health. As a result, distinct recognition has been given to the routes of exposure, contaminant levels and effects among northern Aboriginal children. This information also feeds into a tri-lateral initiative under the Commission for Environmental Cooperation (CEC) on North American Children's Health and the Environment, which considers chemical pollutants, pesticides and toxic metals among the key environmental threats to children's health.

6.2 The impact of the NCP: International actions

It is a truism that data, in and of itself, counts for little until it is brought to bear on an issue or problem. Unfortunately, it is rarely easy to trace and/or definitively explain the way in which data influences decision-making. This is particularly true in the international negotiating environment.



Notwithstanding these caveats, it is fair to suggest that the NCP has had a marked influence on the conclusion, in 1998 and 2001 respectively, of international agreements to significantly reduce emission to the environment of key POPs. That both international agreements single out the Arctic and Aboriginal peoples is testament to this fact. In short, science conducted under the auspices of the NCP was successfully translated into international policy.

While Arctic data played a significant role in persuading states to negotiate the 1998 and 2001 POPs agreements, insofar as they operationalize the precautionary approach, their genesis lies in Agenda 21 and the Rio Declaration, concluded at the 1992 Earth Summit in Brazil. The Arctic was virtually ignored in Agenda 21, but themes of great relevance to this region, including management of chemicals, sustainable development, and rights of Aboriginal peoples, were prominently featured.

6.2.1 Early action: The arctic environmental protection strategy

By the late 1980s, several Arctic countries were detecting certain POPs in the Arctic. As a result of studies initiated by Health Canada in the mid-to-late 1980s, Canada took particular notice of elevated levels of PCBs in Inuit women in northern Quebec and southern Baffin Island. The fact that many Inuit in the Arctic still living traditional lifestyle, thousands of kilometres away from POPs-producing industrial and agricultural areas in the South, had elevated levels of certain POPs in their bodies attracted media interest and galvanized public and political attention. It was appreciated that the only possible explanation of the presence of POPs in the Arctic was by long-range transport through atmospheric and ocean currents. It was also clear that international emissions control agreements linking source and receptor regions was the only long-term solution.

From a decision-making perspective, the unwelcome revelation of POPs in the Arctic was well timed. These findings, highlighted in Canada's first national state of the environment report in 1991, were raised by northerners in Canada's domestic consultations that preceded and shaped the 1991 Green Plan, which itself gave birth to the Arctic Environmental Strategy (AES) and the NCP.

In 1989, discussions began among the eight Arctic states to increase environmental cooperation and exchange information. At this time, "perestroika" and "glasnost" were still fresh concepts in the Soviet Union where very worrying data were emerging about environmental contamination and public health. Transboundary contamination in the Arctic, including that from sources far to the South, was easily factored into these discussions. A

paper prepared in 1990 effectively summarizes all that was then known about POPs in the circumpolar Arctic.

On June 14 1991, after nearly two years of negotiations, political representatives of the eight Arctic states signed a declaration in Rovaniemi, Finland to protect the Arctic environment, and agreed upon a 45-page Arctic Environmental Protection Strategy (AEPS) to implement the declaration. Monitoring and assessment of contaminants — one of four AEPS Ar themes — became the responsibility of the Arctic Monitoring and Assessment Programme (AMAP). AMAP was instructed to examine six pollution issues including POPs.

The Rovaniemi Declaration was a milestone. It brought together all eight Arctic states in an expansive program of work and promised to promote the results of this work. Importantly, it acknowledged:

... growing national and international appreciation of the importance of Arctic ecosystems and an increasing knowledge of global pollution and resulting environmental threats ...

and resolved:

... to pursue together in other international environmental fora those issues affecting the Arctic environment which require broad international co-operation ...

Continued recognition of the need for international action to protect the Arctic was included in subsequent political declarations issued by AEPS Ministers every two years. For example, in 1993, AEPS ministers meeting in Nuuk, Greenland undertook to:

consider the development of regional instruments concerned with the protection of the Arctic environment.

This statement referred to a potential POPs protocol to the Convention on Long-range Transboundary Atmospheric Pollution (CLRTAP) soon to be considered by countries represented in the United Nations Economic Commission for Europe (UN/ECE), including Europe, North America, and countries of the former Soviet Union. Commitments to promote international action to protect the Arctic were continued by the Arctic Council which subsumed the AEPS in 1996.

6.2.2 NCP and the Arctic Monitoring Assessment Programme (AMAP)

Established in 1991 and publishing major reports in 1997 and 1998 respectively, NCP and AMAP were two sides of the same coin. From 1991 to 1996, AMAP designed and implemented a co-ordinated program to monitor levels of pollutants in all compartments of the Arctic environment — atmospheric, terrestrial, freshwater, and marine — and in human populations. It also coordinated an Assessment Steering Group (ASG) — a clear indication of the applied nature of the research exercise — and in light of AEPS political declarations was committed to present policy recommendations to ministers.

AMAP drew heavily on NCP-sponsored research in northern Canada and elsewhere in the circumpolar Arctic. Furthermore, until the completion of its assessment, by ministers in 1997 and published in 1998, AMAP was chaired by a civil servant from the Canadian Department of Indian Affairs and Northern Development who was heavily involved in and later chaired the NCP. Sweden provided a vice-chair and Norway contributed a secretariat.

Northern Aboriginal people have been active participants in the NCP since its inception. The Inuit Circumpolar Conference (ICC), representing the Inuit, was well integrated into the AEPS by 1993 and in 1996 became a “permanent participant” in the Arctic Council. In 2000, the ICC was joined at the Arctic Council by two new international Aboriginal peoples’ organizations — the Arctic Athabaskan Council and the Gwich’in Council International. Canadian members of these organizations included Dene and Yukon First Nations already active in the NCP.

Armed with data generated by the NCP, often published in journals the Canadian Arctic Contaminants Assessment Report (CACAR) was published in 1997, Canadian delegates made significant contributions to AMAP. The many Canadian references in the chapters on POPs, Heavy Metals, Acidifying Pollutants, Human Health and other chapters of AMAP’s major 1998 report: (The AMAP Assessment Report: Arctic Pollution Issues) is ample testament to this fact.

Canadian involvement was further enhanced by the absence of comparable research programs in other parts of the Arctic, most notably Alaska and Russia. Indeed, Canada’s contribution to AMAP’s assessment was out of all proportion to the very limited number of people living in its Arctic compared with those in Scandinavia, Alaska and Russia.

Both the 1997 CACAR and the 1998 AMAP assessment report stressed the need for international action to reduce emission of POPs. AMAP recommended:

The AMAP countries, all being parties to the Convention on Long-range Transboundary Air Pollution (CLRTAP), should work vigorously for the expeditious completion of negotiations for the three protocols [including POPs] presently being prepared ... These protocols should apply throughout the full extent of the geographic areas covered by the Convention ... the AMAP countries should strongly support the work of the international negotiating committee, to be established early in 1998 following a decision of the Governing Council of the United Nations Environment Programme (UNEP), to prepare an international, legally-binding global agreement on controls for twelve specified POPs.

Representatives of ICC Canada attended meetings of AMAP and assisted in crafting the following policy recommendations which drew heavily upon NCP experience.

To ensure the interest and active knowledge of Arctic Aboriginal peoples and other Arctic residents, the Arctic countries should:

- improve the use of Aboriginal knowledge in environmental research, including local participation and policy;
- establish a long-term communication program to provide public information about environmental contaminants, linked to AMAP, which gives access to sound and regularly updated information in understandable language;
- integrate contaminant issues for different educational levels in order to raise general environmental and scientific literacy among Arctic residents, including Aboriginal peoples.

At Alta, Norway in 1997, ministers attending the final AEPS meeting took to heart AMAP’s recommendations and committed:

... to increase our efforts to promote international co-operation in order to address the serious pollution risks reported by AMAP. We will draw the attention of the global community to the content of the AMAP reports in all relevant international fora, particularly at the forthcoming Special Session of the General Assembly, and we will make a determined effort to secure support for international action which will reduce Arctic contamination.





6.2.3 International controls: Convention on Long-range Transboundary Air Pollution (CLRTAP)

The CLRTAP was signed in 1979 and ratified in 1983. The first internationally legally-binding instrument to deal with air pollution on a broad regional basis, it was originally designed to address sulphur emissions in western Europe and resulting acidification of Scandinavian lakes.

Reflecting upon the preliminary POPs research in northern Quebec and southern Baffin Island sponsored by Health Canada, the federal government prepared a report on POPs in the Arctic. This was presented in 1989 to the CLRTAP Working Group on Effects and the convention's Executive Body was convinced to include this issue on the working group's work plan. Together, Sweden and Canada persuaded the convention's Executive Body in 1990 to set up an Intergovernmental Task Force on POPs to meet under the auspices of the convention's Working Group on Technology.

In April 1994, the task force concluded that the weight of evidence “clearly indicates that action to address POPs is warranted now.” In December 1994, the Executive Body established a Preparatory Working Group on POPs to assist the Working Group on Strategies to prepare a draft text of a POPs protocol. This was completed in late 1996.

Five negotiating sessions involving the UN/ECE countries were held in Geneva in 1997 and 1998 to develop a protocol addressing Heavy Metals and 16 POPs, all of concern in the Arctic. Both protocols were signed in Aarhus, Denmark, on June 28, 1998 by representatives of 36 countries. They will enter into force when ratified by 16 Parties. As of June 15, 2002, the POPs and Heavy Metals protocols had been ratified by nine and ten countries respectively. Canada ratified the protocols on December 18, 1998.

The objective of the POPs protocol is “to control, reduce or eliminate discharges, emissions and losses” of POPs — 11 pesticides, two industrial chemicals, and three by-products. The protocol bans outright the use of some, while others are scheduled for elimination in the future. Severe restrictions are placed on the use of DDT, HCH, including Lindane, and PCBs. Parties are required to reduce their emissions of dioxins, furans, PAHs and HCB below their levels in 1990, or an alternative year between 1985 and 1995.

States are required to develop strategies and programs to implement obligations within six months of the Protocol entering into force. States are also required to exchange information on the production, use, and release of POPs; to promote public information on POPs and alternatives; to encourage research on all aspects of POPs; and to report to the Executive Body on measures taken to implement the protocol.

In relation to stockpiles and wastes, the protocol requires sound destruction or disposal in conformity with regional or global regimes, such as the Basel Convention. While not specifying means to add new substances, the protocol refers to Executive Body decision 1998/2 which outlines information requirements should a state wish to do so.

In its preamble, the protocol repeatedly singles out the Arctic and Aboriginal peoples.

Recognizing that emissions of many persistent organic pollutants are transported across international boundaries and are deposited in Europe, North America and the Arctic, far from their site of origin, and that the atmosphere is the dominant medium of transport;

Aware that persistent organic pollutants resist degradation under natural conditions and have been associated with adverse effects on human health and the environment;

Concerned that persistent organic pollutants can biomagnify in upper trophic levels to concentrations which might affect the health of exposed wildlife and humans;

Acknowledging that the Arctic ecosystems and especially its Aboriginal people, who subsist on Arctic fish and mammals, are particularly at risk because of the biomagnification of persistent organic pollutants;

Mindful that measures to control emissions of persistent organic pollutants would also contribute to the protection of the environment and human health in areas outside the United Nations Economic Commission for Europe's region, including the Arctic and international waters.

6.2.4 UNEP Global POPs Convention

In 1995, the Governing Council of UNEP invited the Intergovernmental Forum on Chemical Safety and other international bodies to assess 12 POPs — the dirty dozen as they were colloquially named — with the aim of making a case for global action. These chemicals are listed in Table 6.1. The UN/ECE process, already underway, was specifically referred to. Having reviewed and accepted the assessment, the Governing Council in 1997 requested its Executive Director to convene an Intergovernmental Negotiating Committee (INC) with a mandate to prepare an international legally-binding instrument to address the identified POPs and to identify additional candidate substances for future action.

TABLE 6.1 The UNEP “Dirty Dozen” POPs

POP	Date of introduction	Definition and use
Aldrin	1949	Insecticide
Chlordane	1945	Insecticide
DDT	1942	Insecticide
Dieldrin	1948	Insecticide
Endrin	1951	Rodenticide/Insecticide
Heptachlor	1948	Insecticide
Hexachlorobenzene	1945	Fungicide
Mirex	1959	Insecticide
Toxaphene	1948	Insecticide
PCBs	1929	Commercial Applications
Dioxins	1920s	Combustion byproduct
Furans	1920s	Byproduct

Global negotiations concerning POPs were held in Montreal, Nairobi, Geneva, Bonn, and Johannesburg. The resulting convention was signed in Stockholm on May 23, 2001 by 114 countries. As of October, 2002, 151 countries had signed, with 23 parties ratifying. Canada was the first country to ratify the convention.

The purpose of the convention is to eliminate or severely restrict production and use of certain POPs, ensure environmentally sound management and disposal of POPs waste, and prevent the emergence of new chemicals with similar characteristics. The convention's first Article draws attention to the Precautionary Approach and states its objective, “to protect human health and the environment from POPs.” The preamble acknowledges:

... Arctic ecosystems and Aboriginal communities are particularly at risk because of the biomagnification of persistent organic pollutants and that contamination of their traditional foods is a public health issue.

Governments are obliged to restrict, phase out and ban the production and use of POPs pesticides and industrial chemicals; minimize releases of POPs as unwanted by-products, and where feasible, prevent or avoid their generation; and clean up and properly destroy obsolete stocks of POPs. Developing countries and those with economies in transition will receive technical and financial assistance to help them implement the convention.

Criteria and a procedure for expanding the list of POPs that will become subject to the convention are included and both reflect the Precautionary Approach. Parties are required to develop plans for identifying stockpiles of POPs pesticides and industrial chemicals and to produce inventories of sources of unwanted by-product POPs. National implementation plans are to specify measures to implement the convention and to restrict and ultimately ban the production, trade, and use of POPs pesticides and industrial chemicals. When used for disease control or crop production, provision will first have to be made to assure the availability of effective and affordable alternatives.

A special fund to encourage action in developing countries and those with economies in transition on POPs has been set aside by international donors through the Global Environment Facility (GEF). Recognizing that adequacy, predictability, and timely flow of funds are essential, the convention calls for regular reviews by the Conference of Parties (COP) of both the level of funding and the effectiveness of performance of the institutions entrusted with the convention's financial operations. Acknowledging that many countries have limited technical as well as financial capacity, the convention establishes a



Capacity Assistance Network (CAN) to help countries implement the convention by strengthening their regulatory, monitoring, and enforcement procedures.

6.2.5 The role of Aboriginal peoples in translating science into international policy

By participating in the NCP in the early 1990s, Inuit, Dene, Metis, and Yukon First Nations found themselves on a steep learning curve. By the mid-1990s they understood the need for international action to effectively “turn off the POPs taps” and were keen to bring their concerns directly to the attention of appropriate international institutions.

In March 1997, the Inuit Circumpolar Conference Canada, Inuit Tapirisat of Canada, Dene Nation, Metis Nation, and Council for Yukon First Nations formed a coalition called CAIPAP: Canadian Arctic Indigenous Peoples Against POPs to influence Canada’s position in the ongoing CLRTAP negotiations and the proposed global POPs negotiations. That CAIPAP successfully participated in the global POPs negotiations is widely appreciated. Their participation was possible, in part, due to the intellectual and financial support provided by the NCP.

Canadian research, sponsored by the NCP and referenced in the AMAP assessment report, showed that by eating traditional/country food, up to 20% of Inuit women on southern Baffin Island were exceeding the tolerable daily intake (TDI) of Lindane with unknown, but worrying, public health implications. Aboriginal peoples were perplexed and concerned that the Canadian delegation did not push for vigorous controls through CLRTAP and the Pest Management Regulatory Agency refused to provide the public health assessment of Lindane to either ICC Canada or the Department of Indian Affairs and Northern Development, its sister agency on the Canadian delegation.

This situation resulted in considerable advocacy and lobbying in Ottawa, which had the effect of embedding the concerns of northern Aboriginal peoples more firmly in the minds of Canadian negotiators and their political masters. A review of Lindane was eventually included in the Protocol, but at the insistence of Canada, existing uses were allowed to continue.

Having joined CLRTAP negotiations halfway through the process, CAIPAP attended and intervened in all global POPs negotiations, including the signing ceremony in Stockholm. At the beginning of this process, the coalition adopted a basic position seeking a comprehensive, verifiable, and rigorously implemented convention. These principles were supported by the coalition’s technical

analyses that the convention should commit to POPs elimination rather than perpetual management and that generous funding and technical assistance be provided to developing countries to enable them to live up to obligations and duties in the convention. As well, the coalition developed positions on destruction of stockpiles, import and export controls, and detailed other features of a “model” convention. CAIPAP suggested that, the convention needed strong language in order to be effective.

The chair of negotiations, a Canadian with the federal Department of the Environment who was fully aware of the Arctic dimension to POPs, proved skilled in environmental diplomacy. At the insistence of CAIPAP, an Aboriginal representative was invited onto the Canadian delegation. One nominee was chosen for her history on the contaminants file, association with all the members of CAIPAP, and skill as a negotiator. Although an employee of the Department of Indian Affairs and Northern Development, she took leave without pay to represent Arctic Aboriginal peoples on the delegation. Her tireless efforts were appreciated by the delegation and the CAIPAP members equally. With CAIPAP operating from the back of the room and allowed to make only general interventions in plenary sessions, the chair generously acceded to requests from the coalition to intervene at strategically important moments. The President of ICC Canada spoke convincingly on behalf of the coalition, as the following extract from her speech in Nairobi illustrates:

... imagine for a moment if you will the emotions we now feel; shock, panic, grief — as we discover that the food which for generations nourished us and keeps us whole physically and spiritually, is now poisoning us. You go to the supermarket for food. We go out on the land to hunt, fish, trap, and gather. The environment is our supermarket ... As we put our babies to our breasts, we feed them a noxious chemical cocktail that foreshadows neurological disorders, cancers, kidney failure, and reproductive dysfunction. That Inuit mothers — far from areas where POPs are manufactured and used — have to think twice before breast-feeding their infants is surely a wake-up call to the world.

The fact that Arctic Aboriginal peoples were “exotic” to most of the participating states and were listened to with curiosity added to the influence wielded by the coalition. A Chukchi medical doctor from Chukotka in the Russian Far East and Vice-President of the Russian Association of Indigenous Peoples of the North (RAIPON), a permanent participant to the Arctic Council, joined the coalition in Nairobi, Bonn, and Johannesburg. She spoke convincingly of the POPs-related health concerns of 200,000 Indigenous people in the Russian Arctic.

One event illustrated the informal influence exerted by the CAIPAP. During the negotiations in Nairobi, UNEP sponsored an evening reception at its headquarters. The President of ICC-Canada, on behalf of CAIPAP, spoke to the gathering, appealing to their good will, and presented the Executive Director of UNEP with a gift from CAIPAP of a carving of a mother and child. Visibly moved, the Executive Director suggested that Indigenous peoples symbolized by the carving were the “conscience” of the negotiations and that the world was obliged to take their concerns seriously. The carving sat on the chair’s table at all subsequent negotiations and now has pride of place at UNEP’s headquarters.

The coalition sought to link long-range transport of POPs to the Arctic, which resulted in chronic health concerns of Aboriginal peoples who eat traditional/country food, with acute health concerns of women, children, and workers in tropical and temperate countries from fields being sprayed with offending pesticides and insecticides. This outreach strategy proved very useful. At one stage, developing countries balked at DDT being included in the convention. While banned in Canada for many years, DDT is used in tropical and temperate countries as a vector control for malaria, saving the lives of thousands of people every year. Just as the issue threatened to destabilize negotiations along North-South lines, the President of ICC-Canada informed the negotiators that Arctic Aboriginal peoples would refuse to party to a convention that threatened the health of others. Such remarks bridged the North-South divide.

On December 5, the *Globe and Mail* published the following editorial written by Mr. Amir Attaran, a Canadian lobbyist at the negotiations, which bitterly criticized the Canadian delegation.

Yet not only is Environment Canada arguing in the Johannesburg treaty negotiations that DDT should be eliminated once and for all, it has also proposed that the treaty not include a financial aid mechanism to help poor countries finance the alternatives. Canada is alone among wealthy countries in advocating this parsimony. Such policies literally kill.

CAIPAP knew these criticisms were outrageous and wrong. Advising the Canadian delegation to remain focused on negotiations, the coalition replied through *The Globe and Mail*:

... nobody supports a ban [of DDT] that puts lives at risk. When this issue surfaced in 1999, Canadian indigenous peoples said they would be refuse to be party to an agreement that threatened the health of others, notwithstanding the threat of

POPs to their own health. [This] is also the fundamental position of all countries participating in the negotiations and all non-governmental organizations observing the debate Mr. Attaran’s contention that Canada refuses to help finance the convention including development of alternatives to DDT is demonstrably untrue. The Minister of Finance announced \$20-million in his February budget for exactly this purpose. Canada was the first nation to provide such support and is effectively advocating additional financial and technical assistance to developing countries and “economies in transition.”

That CAIPAP was prepared to publicly defend the honour of the Crown in a delicate situation illustrates the trust developed between them and the Canadian delegation. Without the NCP, this trust could not have been developed, nor could the Aboriginal people have participated so effectively in the negotiations.

6.2.6 Ratification and implementation of the Global POPs Convention

The politics of negotiating and signing conventions differ fundamentally from the politics of ratifying them. The latter process, often involving legislatures, is far less open to international pressure than the former. Some conventions take years to enter into force because countries fail to ratify them. Fortunately, this is unlikely to be the case with the Stockholm Convention. On May 24, 2001 Prime Minister Chretien wrote to Inuit leaders:

As you are aware, Canada is the first country to announce that it will both sign and ratify the UN Global Convention on Persistent Organic Pollutants in Stockholm on May 23. Canada’s leading role in concluding this treaty reflected the strong engagement of Northern Aboriginal leaders such as yourselves, early Arctic Council work and the importance of the Northern dimension of our foreign policy. We will promote the early entry into force of the Convention in the lead up to and at the Johannesburg Summit.

In June 2001 the UN/ECE countries hosted an international round table of eminent persons to discuss the summit, an event at which no new international agreements are to be signed. The ICC-Canada President pressed ratification of the global POPs agreement as a potential deliverable at the summit. In September 2001, ministers of the UN/ECE countries meeting in Geneva finalized their statement to the summit calling upon all to quickly ratify the Stockholm Convention. In part because of the good work of the Government of Finland, then the chair of the Arctic Council, this statement



includes three clauses dealing with the fragility and vulnerability of the Arctic and the need to take into account the interests of Aboriginal peoples in national and international decision-making.

6.2.7 Knowledge in action in the international sphere: Final words

It took less than 15 years — light speed for international diplomacy — to move from initial research that identified a POPs-related problem in the Canadian Arctic to a global convention that addressed the issue. The role played by the NCP in this period is crucial. Not only did it generate scientific data to convince skeptics of the nature of the problem, it educated and equipped Aboriginal peoples so that they could effectively represent their interests on the international stage. The availability of the AEPS and the Arctic Council to use NCP-generated information was fortuitous, even crucial.

The NCP model is now well-known and is being emulated in the circumpolar Arctic. A Global Environment Facility (GEF)-funded research and monitoring program on traditional/country food and Aboriginal peoples modeled on the NCP is currently being implemented in northern Russia through the co-operation of AMAP, RAIPON, and agencies of the Government of the Federation of Russia. The proposed Alaska Native Traditional Food Monitoring Program also draws heavily on the NCP and AMAP's recommendations. Both examples suggest that others see merit in the Canadian approach to research of transboundary contaminants in the Arctic.

6.3 Summary of key points

The Northern Contaminants Program has been directly involved and has had a clear influence on national activities and policies related to toxic substance management in Canada.

- NCP played an influential role in the impetus to develop the Toxic Substances Management Policy (TSMP).
- NCP has influenced and provided significant scientific results to assist in conducting assessments under the *Canadian Environmental Protection Act (CEPA)*.
- NCP played a significant role leading to the review of lindane.
- Results of NCP-funded studies have provided the basis for policy decisions and action in Canada and on the international scene.
- NCP has ensured effective support for national and international policy and implementation activities related to contaminants of concern in Canada's North.

- Global POPs negotiation was held in Montreal, Nairobi, Geneva, Bonn and Johannesburg. The resulting convention was signed in Stockholm on May 23, 2001. Thanks to the information provided by the NCP, Canada was the first country to ratify the convention.
- Aboriginal partners formed a coalition called CAIPAP: Canadian Arctic Indigenous Peoples Against POPs to influence Canada's position in the ongoing negotiations.
- NCP has supported the role of Arctic Aboriginal peoples in international negotiations and initiatives aimed at ensuring the quality of their traditional/country foods.
- The NCP model of operation is now being emulated in the circumpolar Arctic.

6.4 Key references and suggested readings

UNEP's Stockholm POPs website URL
<http://www.pops.int/>.

IPEN's URL <http://ipen.ecn.cz>

WWF URL <http://www.worldwildlife.org/toxics/>

Earth Negotiations Bulletin, International Institute for Sustainable Development, the latest is the report from INC 6 <http://www.iisd.ca/linkages/chemical/pops6/> however all reports and summaries are available here.

There have been many academic papers written on the POPs Process and these can be found in the following publication:

Northern Lights Against POPs: Combating Toxic Threats in the Arctic. Terry Fenge and David Downie (Eds.). McGill/Queens University Press, 2003.





Assessment and Conclusions

7.0 Introduction

The intent of the NCP has been to generate knowledge in order to incite and support action. The “action” refers to decisions made by individuals and northern communities about their use of traditional/country foods. It also refers to policy decisions made within Canada and in international forums about contaminant levels, pathways, trends and effects. Between these extremes lie a series of actions taken by the NCP and its participants to make research in the North more responsible and to make complex information more accessible to relevant audiences.

The successes and challenges in generating action at each level have been described in previous chapters. Significant and unique contributions made under the NCP are summarized in Table 7.1. Based on the scope and experience of the NCP, some general themes have emerged as ‘facilitators’ of the process of generating information and moving knowledge to action.

This chapter draws out the essential cross-cutting elements in this process. These inter-related elements include:

- a strategic yet balanced and flexible program design with a basis in sound science and responsible research;
- partnerships that form links across conventional boundaries;
- open communication networks that get information to those who need it the most;
- ongoing processes of capacity-building using a variety of approaches; and
- a commitment of resources to support these activities.

Together, these elements make up a conceptual framework for dealing with environmental health related issues in the North or elsewhere. In the view of the 1999 Report of the Commissioner for Environment and Sustainable Development, this framework and its accomplishments have made the NCP a model for scientific collaboration.

7.1 Framework for Knowledge in Action

7.1.1 Strategic design of the NCP

The structure and processes of the NCP have been strategic in that they have provided the required infrastructure, people and plans to gather essential data and move it through divergent channels to key audiences for directed purposes. The program has well-defined objectives set out in a series of blueprints, which are directed towards a common goal – eliminating contaminants from traditional/country foods and providing information that communities need to decide on their use of these foods. All fiscal decisions have been made in light of their relevance to these goals.

Individuals, committees and organizations that have formed the backbone of the program’s management structure have well-defined roles and responsibilities, as detailed in the program’s Operational Management Guide. Such a coordinated structure has been essential since managing the NCP has involved multiple interests from a vast and diverse region across multiple jurisdictions.

The program has also been well-connected, in that contacts have been established within northern communities, Aboriginal organizations, the research community, regional/territorial/federal governments, and international organizations. This network of contacts has been an efficient conduit for information flow and has supported the program’s endeavours at each of these levels.

7.1.2 Adaptability and flexibility

Adaptability and flexibility were built into the program’s design through its annual processes, which have helped to keep the program current. It has been open to new approaches and elements as the needs arose, formalizing changes within the structure and processes of the program. For example, from a management perspective, the blueprints have been reviewed annually to keep research and activities relevant and focused. Throughout this review, a streamlined consultation process replaced a more cumbersome process for obtaining consent from northern communities. A new Territorial Environmental



TABLE 7.1 Critical advancements in moving knowledge to action in Phase II of the NCP

Critical Advancements	Examples and Details
New standards for partnerships (Aboriginal, government, scientists, communities)	<ul style="list-style-type: none"> • New partnerships with Aboriginal organizations (Métis Nation-NWT, CYFN, ITK, ICC, and the Dene Nation), have supported the enhancement of their own internal capacity to work on contaminants and other environmental health issues with their constituents; • Aboriginal partners formed a coalition (CAIPAP: Canadian Arctic Indigenous Peoples Against POPs) to influence Canada's position in the ongoing contaminants negotiations; • Increased community involvement in project design, conduct and communication; • Establishment of new regional committees (NNHC, NECC).
Enhancement of northern capacity for dealing with environment and health issues	<ul style="list-style-type: none"> • Supporting of training and experience in research among northerners through RCC positions; • Committed resources for training and involvement of Aboriginal individuals in projects.
Development of innovative communication channels	<ul style="list-style-type: none"> • The development and support of the NCP network (including regional committees and regional contaminant coordinators) critical for the success in delivery, design and testing of messages; • Conduct innovative communication processes for exchange of information bringing individuals together to discuss contaminant issues (e.g. Elders and scientists); • Updated protocol for releasing health and harvest information through NCP and existing northern networks.
Contribution to the advancement and broadening of northern science and education	<ul style="list-style-type: none"> • Dietary and toxicological benefit and risk studies; • Development of guiding documents such as "TK for Dummies"; • Development of practical guidelines for the incorporation of traditional knowledge in northern contaminants and health research; • Addressed critical scientific questions on aspects of contaminant sources, transport, fate and human health effects in the Arctic.
Developing a model for interdisciplinary, multi-stakeholder research in the North	<ul style="list-style-type: none"> • Long-term vision, strategic direction and priorities of the NCP are outlined in "blueprints". Blueprints outline objectives, goals and priorities for research and activities that support the overall aim of the NCP, and serve as a guide to annual funding decisions; • Proposal review process ensures that NCP funded work is scientifically defensible, consistent with the vision and priorities set out in the blueprints, and socially and culturally responsible in a northern context; • Aspects of the NCP model of operation are now being emulated in the circumpolar Arctic; • Aboriginal groups have proposed the model for other northern issues (Biodiversity Conservation and Climate Change).
Strengthening and furthering the guidelines for responsible research in the North	<ul style="list-style-type: none"> • The development and implementation of formal process for the identification and incorporation of community concerns in research projects; • Revision of Consent Process to make it more straightforward for researchers, Aboriginal Partners, and community members alike; • Development of consultation process which supports early community involvement in planning of research projects and inclusion of TK in research conducted.
NCP has improved the information available for domestic regulation and international controls	<ul style="list-style-type: none"> • NCP has provided significant scientific results to assist the Canadian Environmental Protection Act (CEPA) conducting risk assessments; • Provide evidence and direction for the PMRA to review Lindane; • Influenced other federal contaminant program structures and priorities (e.g. TSRI); • NCP research contributed to the UN/ECE LRTAP convention protocols (Stockholm Convention); • NCP studies on contaminants and their effects on developing foetus, infants and preschool children has helped to shape the federal agenda on children's health; • AMAP results and recommendations have been strongly influenced by NCP results; • UNEP Global Mercury Assessment has been influenced by NCP funded research.

Contaminants Committee (TECC) was established in Nunavut in response to the changing political landscape and two additional northern regions (Nunavik and Labrador) were incorporated into the program in response to the value of work being conducted there to understanding contaminant issues across the North.

From a communications perspective, participants in the program have been encouraged to adapt the way that messages have been released and delivered, as greater understanding was gained about benefit/risk assessment and message perception. In terms of policy, the coordinated effort on the part of NCP's Aboriginal Partners (CAIPAP)

was strongly supported as a means of influencing international negotiations, even though such an approach and its resulting achievements were unprecedented.

7.1.3 Partnership building

The NCP has embraced partnerships in its management approach and through its operations, forming links across conventional geographical, cultural, disciplinary and political boundaries. It has done so in a manner that has been structured and organized, yet largely non-hierarchical and decentralized. This has allowed for broad access to the program and necessitated a sharing of power and



responsibility in making decisions. Strong partnerships have ensured that actions have been balanced and broadly supported and provided partner organizations with inroads to avenues of action that may not have been accessible to them otherwise.

Partnerships among organizations representing a range of interests and backgrounds, including Aboriginal organizations and federal/territorial/regional government departments representing all northern regions and southern-based agencies have been central to NCP management. Partners shared a common goal of dealing with contaminant issues, yet each brought to the program a unique and essential perspective, which assured a well-rounded and comprehensive approach to the issue. Each voice has been valued in this formal network. This partnership structure has faced the difficult task of balancing priorities among competing interests for limited resources. For example, federal science-based departments generally favour more scientific efforts, while Aboriginal organizations promote more community-based initiatives and communications programs. In the same way, Eastern Arctic priorities sometimes contrast with those of the Western Arctic. The commitment to shared decision-making and responsibility has sometimes called upon organizations to temporarily set aside personal and/or political agendas for the sake of moving forward with the program and the issue as a whole. Thus, this partnership has sometimes faced a difficult task of balancing priorities among competing interests for limited resources. In general, the partnership has operated smoothly.

The NCP has also encouraged the building of new partnerships in its operations, often forging new relationships among groups that have not worked together cooperatively before. These include scientists and the northern communities in which their studies take place; separate Aboriginal organizations whose priorities may sometimes differ; scientists from separate and distinct disciplines; and local people and national or international policy-makers whose perspectives differ. Through these partnerships, an informal network has been built whereby resources and knowledge are shared and working relationships are strengthened, maximizing the potential for tapping into the expertise of each partner and for building overall capacity. Organizations have thus been brought closer to the grass-roots perspective on northern research needs and vice versa.

Informal networks have been particularly suited for working with Aboriginal peoples, as this style is more in line with traditionally oral communication routes in northern communities. It has often been more effective where formal networks and communications traditionally fail. Informal partnerships and networks are viewed as one of several ways to improve community trust and

participation. In some cases, they have also made it easier to obtain reliable and useful data and increased the credibility of the research conducted.

Participation of the Aboriginal Partners in the managing and operating of the program has represented a form of meaningful involvement in a science- and action-based program not previously experienced in the North. The representation and balanced decision-making power among Aboriginal and non-Aboriginal groups has significantly influenced the direction taken by the program and established a benchmark for other northern science programs. Aboriginal Partners' direction of the Education and Communications sub-program and their leadership on the social/cultural review of projects represent the true partnerships which have enabled the program to function smoothly and efficiently.

7.1.4 Quality, leading-edge science

While partnerships have assured broad and balanced support for decisions under the NCP and enabled inroads for action, the sound, credible, leading-edge research conducted under the program has established the foundation for its decisions and its actions. This research has covered and bridged a wide range of disciplines, as called for by the nature of the contaminant issue, and has incorporated traditional knowledge as has called for by the nature of the Arctic environment and people involved. Important results of studies have been made available to northern audiences to inform and support them in their diet-related decisions. The results have also been made available to the world scientific and policy communities in a timely manner to guide future research and support positions for policy or help meet Canada's domestic and international commitments.

The rigorous and thorough review process established for NCP Phase II has ensured scientifically defensible studies. The NCP has benefitted from the work of numerous world-renowned scientists, leading in their fields, whose high quality research and results are trusted among their peers. Hundreds of peer-reviewed articles have been produced by Canadian scientists supported by the NCP, with data published in several instances in such prestigious journals as *Science* and *Nature*. The data has stood up to all levels of scrutiny.

The scientific information produced under the NCP and, on a circumpolar level through AMAP, has been a cornerstone for Canada's policy position on contaminants and a springboard for international agreements. It has substantiated action on contaminants resulting in the 1998 regional POPs and Heavy Metals Protocols (UN-ECE) and the 2001 Global Convention on POPs (UNEP). For example, the ongoing air monitoring strategy supported

by the NCP has generated a database of global importance, unique in its scope and depth and central to understanding the global impact of the long-range atmospheric transport of POPs. New information about mercury depletion events has changed the way scientists understand global cycling of this heavy metal, and is currently factoring into global initiatives to reduce environmental levels of this neurotoxic heavy metal. Health research conducted under the NCP has been equally important for determining Canada's international policy position and for clarifying advice and information on traditional/country foods that reaches northern communities.

Maintaining Canada's scientific and monitoring capacity and credibility over the longer term is essential for protecting the health and safety of northern consumers of traditional/country foods and for identifying and assessing any new areas of concern. It is also essential for ensuring that the international measures that Canada has worked hard to put in place are achieving their desired objectives. It is part of fulfilling a larger commitment by Canada to protect Arctic ecosystems and ensure their sustainability for generations to come.

7.1.5 Responsible research

Research conducted under the program has clearly met high scientific standards, but from the perspective of the NCP, it has also needed to meet additional standards of ethical and responsible conduct. This means it must have been carried out in a manner that is respectful and inclusive of Aboriginal perspectives, concerns and knowledge. While this has meant additional efforts on the part of the scientists, these efforts have paid off in several cases in terms of a refined study design or solid community cooperation during the conducting of studies.

For northerners, it has meant enhanced awareness of contaminants and related research in their region, or opportunities to become involved in the research activity itself — as a team member and/or participant rather than solely as a subject. The benefits of a researcher-community relationship based on trust and respect are far-reaching. As seen under the NCP, benefits have included the contribution to timely and high quality, credible scientific evidence for use by policy-makers, and increased understanding and receptiveness to information that might influence individual decision-making about food choices in northern communities.



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7.1.6 Meaningful participation

The NCP has encouraged participation and input from those people most affected by the issue, the program, and the information it generates. This has been mutually beneficial, allowing for more meaningful involvement particularly by local community members, and opportunities for exchanging information, as well as a heightened visibility of the program throughout the North.

First and foremost, this has meant participation and input from northern consumers of traditional/country foods. Several NCP initiatives have enhanced their participation in all aspects of the program. For example, the establishment of Territorial and Regional Environmental Contaminants Committees (TECCs) brought a formal NCP decision-making structure and communications network to each territory/region. These committees directly managed the Local Contaminants Concerns fund, which provided a mechanism through which to address local northern contaminant problems on a more flexible and timely basis than through the main NCP funding process.



Regional Contaminants Coordinators (RCCs) established a regional-based voice for the NCP and a mechanism for two-way transmission of information and concerns in regions where the health concerns of contaminants have been potentially the greatest. The new consultation process established to support responsible research has ensured that communities are aware and approve of work to be done nearby, or that they become directly involved in its conduct. A host of communication initiatives aimed at key audiences in the North have provided forums and mechanisms through which northerners could voice concerns and have them addressed. These initiatives have developed through the life of the program in response to identified needs.

Second, the NCP has looked to the researchers receiving funding for input over and above what is typical of other research funding agencies. While the NCP has asked a lot in terms of additional planning, application and reporting requirements from the scientists whose research it supports, it has also provided opportunities for researchers to enhance their experience within the program. For example, some researchers have been invited to participate in communications and information-sharing activities in the North (e.g., community tours, Elders-Scientists retreats), or in international initiatives to which their research has been relevant (e.g., key AMAP meetings). Many researchers have also provided input with respect to program processes and assessments. Few other funding agencies have such close ties with the researchers themselves. This has generally been viewed as a mutually beneficial arrangement under the NCP.

7.1.7 Open and ongoing communication

The NCP has dedicated significant resources and efforts to communicating the information gathered through its scientific programs and promoting open communication in all aspects of NCP research and activities. Effective communication is the vehicle that moves knowledge into action. It gets information to people who require it the most (e.g., consumers of northern traditional/country foods, international policymakers) and has been a cornerstone in building the relationships of trust and understanding essential to conducting research in the North.

The many challenges to communicating on the contaminant issue in the North have forced the development and adoption of diverse and innovative methods and tools. Clarity of the overall message has been of utmost importance when delivering sensitive and complex environmental health information. The formal and informal networks established through the NCP have maintained timely information flow back and forth between community members and policymakers, reaching several others in-between and moving closer towards keeping individuals informed.

The evidence for the success of NCP communications is largely anecdotal to date. It is understood that communication is most effective when it is ongoing, however, to focus future efforts, it would be timely to evaluate the effectiveness of the various past and current communication efforts in meeting the information needs of Northerners.

7.1.8 Commitment of resources

It is well recognized that scientific research particularly in a northern environment is a costly endeavour. Maintaining Canada's scientific and monitoring capacity and credibility requires an ongoing commitment of resources. Other non-scientific aspects of the NCP (i.e., communication, Aboriginal partnerships, partnership management, community participation, capacity-building, Aboriginal involvement in international policy negotiation) are also costly and have demanded significant time commitments from all participants. These aspects have flourished during NCP Phase II because resources were dedicated specifically to these initiatives.

Some may view the increased emphasis on communications as having taken away funds that would otherwise have been available for scientific research. The collective contribution of each aspect has been instrumental in meeting the objectives of the NCP and supporting its role in the recent international action on this issue. Since its beginning, the NCP has allocated funds strategically based on need (i.e., filling information gaps) and means (i.e., communication) to meet objectives. To continue along such a track of balancing priorities (with a re-focusing of efforts in light of new information and circumstances) requires a continued commitment of resources to all essential components of the program.

7.1.9 Capacity building

The capacity to deal with the issue of contaminants in the North was enhanced, in part, through NCP support. Since the inception of the NCP, opportunities, resources and training have been provided to Aboriginal and non-Aboriginal northerners and organizations. It has enabled them to be exposed to, and involved in, various aspects of the program operations and management. The establishment of RCC positions has given northerners more opportunities for hands-on experience and training in communications and the environmental and medical sciences. Many others have been directly involved in research projects by working on contaminant issues as field assistants or in aiding in communication efforts in the North. Training provided to "frontline workers" throughout the North has increased their understanding and awareness of the issues, which in turn, has enhanced the ability of communities to raise and address contaminant-related problems.



The establishment and coordination of territorial and regional committees involving many different organizations and individuals, including Aboriginal groups, has strengthened and further legitimized their role in addressing contaminant issues in the North. This has often resulted in a wider variety of perspectives being involved in the decision-making process on these issues and has resulted in more balanced and northern-specific actions. These committees have given a voice to communities and regions at the territorial and national (and to some degree international) levels on contaminant issues.

Providing resources to Aboriginal organizations to enable them to be engaged in the program has increased their ability to have an impact on the direction of the program. This has allowed these organizations to become more involved in other health and environment issues related to the northern and circumpolar regions. This is exemplified by the actions and involvement of Canadian Aboriginal organizations on the international level on contaminant issues (i.e., CAIPAP) and at the national and international levels on other emerging environmental issues such as global mercury and climate change.

In addition to capacity enhancement in the North, the program has made significant advancements in supporting capacity development among Canadian scientific, management and policy communities. The involvement of scientists in a unique and northern-specific program, training opportunities provided through graduate student research under the program, and the experience of environment and health managers and policymakers in different aspects of the program have increased their knowledge and understanding of the North and these issues, and hence their ability to better meet the challenges they present.

In general, the many aspects of the “framework” listed in this chapter have all supported the development and enhancement of capacity on many levels (individual, community and regional/territorial) in the North and beyond. The dedication of resources and provision of opportunities and training has further enhanced this capacity. It can therefore be argued that opportunities for northern individuals, communities, and the Canadian professional and political systems to address these Arctic environmental health issues have been enhanced as a result of the NCP.

7.2 Evidence of the success of the framework

It is difficult to evaluate the success of this assemblage of elements in the framework in influencing movement from knowledge to action on the issue of contaminants in the Arctic. It can be argued that the accomplishments achieved under the program speak for themselves. It is clear that there have been successes with respect to “action” in terms of achieving international agreements and that the information gathered under the program, and some key individuals involved in the program, have been very influential in this achievement. The *Commissioner of the Environment and Sustainable Development* has praised elements of this framework in a 1999 report:

The NCP uses a partnership structure involving other federal departments, territorial governments and Aboriginal groups in working to achieve their common objectives — eliminating contaminants from traditionally harvested foods and providing information that communities need to decide on their use of the foods. Involving Aboriginal organizations in setting priorities for research, reviewing study proposals, and allocating funds for research and reviewing the results is seen as a way to increase the credibility of the research and community trust and participation. It has made it much easier to get reliable and meaningful scientific data needed for research and to obtain a grass-roots perspective on the research needs of communities.

Many regard imitation as the highest form of flattery. If so, one only needs to look to other Arctic programs that have adopted components of the “NCP model” for an indication of the ability of the NCP to address multidisciplinary, multi-stakeholder issues in the North. Both the Russian initiative on contaminants and the Alaskan Food Safety Program have adopted elements of the NCP approach to address issues and involve their respective participants.

Within Canada, some current programs in the North have also adopted aspects of the NCP process. For example, the Northern Ecosystem Initiative (NEI), an Environment Canada-led program that funds basic environmental research, monitoring and some community outreach has adopted a social/cultural review of proposed research in a manner similar to that developed by the NCP. This process currently involves many of the same members of the same committee involved in this process in the NCP, many of whom are Aboriginal people from the North. Finally, Canadian northern Aboriginal organizations, pleased with their involvement and contributions to the contaminant issues through the NCP, are calling on the federal government to use a similar coordinated and multiparty approach for managing research and community outreach initiatives to address climate change in the North.



7.3 Looking ahead

The second phase of the NCP ends in March, 2003. Many of the program's objectives have been accomplished to date. However, much remains to be done on the issues related to Arctic contaminants and country food, both in the Canadian North and at the international level. Although the Stockholm Convention has been established, it remains to be seen whether countries will ratify the agreement and if levels of contaminants in the Arctic will decrease as a result of this international initiative. These objectives require work in the areas of monitoring and surveillance of the environment and health, a greater understanding of the effects of contaminants on northern wildlife and human health, as well as clear and ongoing communication. It is not yet clear what decisions or actions have been taken by northerners, who are consumers of traditional/country foods, in reaction to the messages and information that has been released on these issues to date.

In terms of research, future priorities have been defined and are discussed in detail in the other reports of CACAR II. These include further inquiry into the health effects of contaminants, increasing understanding about the effects and interactions of chemical mixtures, and an ongoing need for monitoring contaminant levels and trends in both biotic and abiotic components of the Arctic environment. Furthermore, emerging issues identified through research conducted under the NCP and elsewhere (new contaminants, contaminant mixtures, trends of Hg in the global environment) must garner scientific and policy attention and support.

Additionally, as outlined in this report, there is a need to further clarify routes and networks of communication particularly for new researchers entering the North to work on these and other environment and health issues. Northern residents must have access to this information in culturally appropriate and comprehensible forms in order to support their daily decisions on issues such as contamination of the food chain.

While many aspects of the NCP have been successful in facilitating movement from the collection of data, through individual research projects, to implementing national and international actions to address these issues at various levels, there is still much to do. This report has outlined and described the structures, processes and elements of the approach taken under the NCP that have helped facilitate this rapid progression from knowledge to action and shown the value of such an approach for dealing with this and other circumpolar environmental health issues in the future.



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7.4 Summary of key points

The unique infrastructure of the NCP provides support, exchange of ideas and information, and develops capacity. It has invested in local populations, and conducted world-class science.

The adaptability and flexibility of the program allow for shaping and moulding of issues on a regional basis to account for the complex diversity of Canada's Arctic.

The program has successfully incorporated world-class science with indigenous knowledge.

Successes of the program include an open communication infrastructure, and extensive partnerships from the local to international level. The program has contributed to the advancement of science, increased our understanding about the complexities of contaminants in the Arctic ecosystem, and developed capacity and interdisciplinary research, all of which lead to the international controls now placed on persistent organic pollutants (POPs).

7.5 Key references

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7.6 Recommendations

The following recommendations relate to research processes, training, education, capacity building, communications and international action that originate from experience under the NCP during Phase II. These recommendations would apply to future work under the NCP as well as to activities conducted in related northern environment and health fields.

- Maintain the focus and direction of contaminants-related research and activities through the use of strategic “blueprints” that are reviewed and revised annually.
- Maintain the integrity of the review process for project funding so that northern research continues to meet high scientific standards as well as criteria for social and cultural considerations.
- Maintain a broad perspective on the contaminant issue by addressing it through a multidisciplinary, ecosystem-based, partnership management approach.
- Continue to develop and strengthen partnerships with northern Aboriginal groups at the regional, territorial and national levels to enhance the processes of capacity development and meaningful involvement initiated under this program.
- Conduct a formal evaluation of the new NCP consultation process and adapt the process as appropriate.
- Continue to promote and support responsible research through the use and application of guidelines and requirements for consultation, as established under the NCP.
- Develop and implement a more formal process for identifying and incorporating community concerns in research projects on contaminants and health in the North.
- Continue to address local contaminant issues through regionally managed funds, such as the Local Contaminants Concerns (LCC).
- Develop practical guidelines for incorporating traditional knowledge into research on northern contaminants and health.
- Develop a more formal process/calculation for balancing quantitative and qualitative information in benefit-risk assessment and further strengthen and support the infrastructure on which the multi-stakeholder approach is based.
- Evaluate the impact of the current approaches used to deliver health advisories and advice on individual decision-making about food use.
- Continue to use a variety of methods to support ongoing and open communication with communities on contaminants and related environmental health issues.
- Develop a dictionary of northern Aboriginal languages on these issues for the use of translators.
- Explore and assess the feasibility of using new information technologies in the North and exploit them where appropriate in future activities.
- Revise NCP educational material to make it more compatible with existing curricula and useful for teachers and students. Provide in-service training for teachers to introduce them to the material and make it more widely available in print and digital format.
- Strengthen activities related to communicating to youth about these issues as they are the decision-makers of tomorrow in northern communities and regions.
- Conduct further research on the perception and understanding of risk among target audiences in the North (e.g., women of child-bearing age) so as to better tailor benefit-risk messages and communicate risk management options.
- Evaluate the effectiveness of specific communication activities under the NCP (e.g., Regional Contaminants Coordinators) in achieving goals of improving understanding of contaminants issues in northern communities and building capacity and communication networks.
- Ensure effective support for national and international policy and implementation activities related to contaminant of concern in Canada’s North.
- Support the role of Arctic Aboriginal peoples in international negotiations and initiatives aimed at ensuring the quality of their traditional/country foods.



