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Ecosystem Effects of Novel Living Organisms (EENLO) – Governance Model

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ECOSYSTEM EFFECTS OF NOVEL LIVING ORGANISMS (EENLO) –GOVERNANCE MODEL

REPORT TO ENVIRONMENT CANADA



**Environment
Canada**

**Environnement
Canada**

OCTOBER, 2003

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1 Context¹

1.1 INTRODUCTION

Environment Canada is taking the lead on behalf of federal departments in developing Ecosystem Effects Of Novel Living Organisms (EENLO)², a federal program whose purpose is to:

Generate the knowledge necessary to ensure that development and use of novel living organisms (such as microorganisms, plants, trees, insects, animals and fish) occurs in an environmentally sustainable way. This will be accomplished through long-term research and monitoring of biodiversity/wildlife, biogeochemical cycling, and other ecosystem components and processes.

EENLO will be a horizontal initiative, led by Environment Canada. It will require partnerships with other government departments and outside experts, who have already participated in pinpointing key areas of research and monitoring directions. Government departments include: Agriculture and Agri-Food Canada (AAFC), the Canadian Food Inspection Agency (CFIA), the Canadian Museum of Nature, Fisheries and Oceans Canada (DFO), Health Canada (HC), the National Research Council of Canada (NRC), Natural Resources Canada, and Parks Canada. Outside experts will be drawn from Academia, Industry and Special Interest Groups.

EENLO's responsibility will be knowledge coordination and communication, not regulatory. Departments and Agencies such as CFIA, HC, and EC already possess the responsibilities for the approval, management and/or use of NLOs. In effect, EENLO must become an interdepartmental resource for the management of knowledge issues associated with novel living organisms (NLOs).

The implementation strategy involves three components: first, there would be a strengthening of core *in-house* capacities in Environment Canada and in other key departments and agencies, to ensure that government authorities

¹ This discussion document was commissioned by the Science Policy Branch, Environment Canada, on behalf of the EENLO interdepartmental working group. The purpose of the document is to provide background material and suggestions. As such, the opinions expressed within the text do not necessarily reflect federal nor departmental policy, but are intended to inform discussions.

² We use the term "novel living organism" to refer to a living organism whose genetic make-up has been influenced by any of a variety of means known as "biotechnology" (as per the Canadian Environmental Protection Act, 1999). Our research will focus on novel living organisms that exhibit traits that are likely to have ecosystem effects.

have their own independent research capacity as the foundation for their science-based management of NLOs. Second, a complementary *directed research partnership* element would support collaborative research involving government agencies working directly with universities and other centres of excellence on topics of priority concern to the government. Third, there would be strategic investments in *external* research networks, capacity building and research initiatives, to engage the broader academic and non-government research/scientific community in independent exploratory research requirements.

1.2 EENLO: A PRESSING NEED

Two independent domestic expert panels have recommended that research into long term ecosystem effects of GMOs³ be performed. In 2001, the Royal Society of Canada Expert Panel report *Elements of Precaution: Recommendations for the Regulation of Food Biotechnology in Canada* recommended that a national research program be established to monitor the long-term effects of GMOs on the environment, human health and animal health and welfare. The panel asserted that "...the research capability required to answer satisfactorily the questions raised by the environmental community and the general public is at present severely compromised".

More recently, in August 2002, the Canadian Biotechnology Advisory Committee (CBAC) published a report to the Biotechnology Ministerial Co-ordinating Committee entitled *Improving the Regulation of Genetically Modified Foods and Other Novel Foods in Canada*. In the report, CBAC recommended establishing a continuing program of research to improve knowledge about the long-term effects of GMO and other novel plants and crops on agricultural and unmanaged ecosystems. They also suggested that this research effort involve a strong international collaboration component.

Numerous respected international scientific forums, including United States National Research Council scientific committee reports (2000 and 2002) and OECD scientific conferences (1999, 2001, 2001) have also concluded that there is a strong need for improved capacity to anticipate, detect, assess and respond to potential ecosystem effects of GMOs being introduced to global environments.

³ GMOs, defined as organisms whose genetic makeup have been modified through recombinant DNA techniques, are a subset of « NLOs », whose members also include organisms whose genetic makeup have been modified by means such as chemical or irradiation-based mutagenesis, somatic cell hybridization, and other methods.

Concerns regarding the long-term effects, both to ecosystem and human health, have also been noted as important to the general public. Government-sponsored opinion polling has shown that these issues are both important to the public and have been persistent important concerns over the last two years.

2 Key Challenges in Developing and Implementing a Strong Governance System for EENLO

2.1 FUNDING

As is usually the case, money is a key driver affecting attitudes to collaboration. New money for interdepartmental activity would certainly spur action. Stakeholders have pointed out that departments run on tight budgets and are highly accountable for spending to central agencies. In the absence of new money they are not likely to surrender precious A-base funds to the control of interdepartmental groups without strong incentives.

One incentive might be leverage. Departments might surrender some funds if they were to be matched or exceeded by new money from central agencies. Another might be achieving an important policy or regulatory objective that requires the collaboration of another department.

In the absence of new money, departments are most likely to use bilateral agreements to work collaboratively. In this mode, each department will use its own A-base funds for internal purposes but will optimize efficiency by sharing work and results with another.

EENLO may be able to exert tighter control by obtaining solid funding and by contracting out work with clearly defined deliverables. This will function reasonably well for outsiders when EENLO picks up the full cost of the work. However, if EENLO is only paying partial costs, control will be weaker.

Interestingly, the National Research Council has been able to establish a program that runs across its institutes. NRC has established a Genomics and Health Initiative. Its key institutes in biotechnology contributed funds to a central pot, which has been topped up with outside money. Institutes have then competed for those funds by proposing projects that have been subject to peer review. Clearly, NRC has been able to do this because its management had the authority to demand a levy from key institutes. In principle, the same approach could be applied to departments of the federal government but this would require a decision of central agencies.

In short, collaboration of the kind required by the scheme presented above is likely to work more smoothly with new or levered money.

2.2 THE NEED FOR COLLABORATION

Science-based departments and agencies (SBDAs) see an increasing need to work together. Policy issues related to topics such as the environment, climate change and sustainable development impacts a variety of departmental mandates. A holistic and collaborative approach is required in order to deal with them.

While departments appreciate the need for collaboration, both within and outside government, mechanisms for achieving it have proved to be difficult to implement. Funds are in short supply and departments need to spend prudently in order to fulfill mandates. Any activity that threatens to weaken financial control (e.g. investments in interdepartmental projects) is therefore viewed with caution.

As discussed earlier, the EENLO program may not have fully independent funding. As a consequence, participants may owe their allegiance to other bodies. For example, scientists making contributions from federal departments and agencies outside Environment Canada will need to support their departmental mandates as a primary obligation. Working on EENLO projects will only be carried out to the extent that it supports the objectives of each department. Building cohesive projects and managing them may be quite difficult. EENLO's control will be limited. The same will be true for outside participants such as university researchers.

Under the circumstances described above, governance cannot be tight but has to be built on a loose consortium of stakeholders with like interests who come together in a temporary alliance to tackle problems. Governance will not be rule driven but will tend to depend on program and project champions who are able to build and manage consortia.

2.3 LACK OF CAPACITY IN INTERNAL DEPARTMENTS

Government agencies and departments lack a certain level of capacity to tackle the issues relative to the EENLO initiative. A foundation of knowledge should be created through a combination of building and reinforcing:

- Internal S&T capacity within government; and
- Alliances with external S&T suppliers.

While external suppliers could make a very strong contribution, government ought to maintain sufficient internal expertise to manage effectively and to ensure that research is carried out appropriately.

2.4 IDENTIFICATION OF THE EXTERNAL PEOPLE AND FACILITIES REQUIRED TO DO THE WORK

The identification of people and facilities is somewhat complex. Most techniques in biotechnology can be deployed to look at GMO research. Thus, Canadian capability is likely to be good but capacity may be weak unless funds are specifically directed to the GMO activities that are aligned with the objectives of this program.

A listing of potential resources described by sector of research and geographic area can be found in the accompanying document.

2.5 RESEARCH AGREEMENTS WITH OUTSIDE AGENCIES

Two concerns arise when working with outside agencies: 1) ensuring that research is aligned with EENLO's objectives and 2) developing intellectual property agreements.

Ensuring that the research is aligned with EENLO's objectives is essential for the success of this initiative. Academia is used to working with the grant system, which allows for great leeway in the research performed. Although some flexibility is necessary, too much would lead to results that would not add value to the initiative. Different options are available, namely contribution agreements and more formal contracts.

Comprehensive intellectual property agreements must also be included early in the process, as this is an issue of great concern for both Industry and Academia.

3 Fit of EENLO Within The Governance Of Federal S&T

3.1 INITIAL APPROACHES TO SCIENCE AND TECHNOLOGY INTEGRATION

Senior officials from departments involved in science and technology (S&T) held a workshop during the summer of 2003 to address means of collaborating. The group called for:⁴

- A fundamental shift on how S&T of national importance is formulated;
- A governance body of Assistant Deputy Ministers (ADMs) to guide oversee and assess S&T;
- Mechanisms to build interdepartmental programs and project teams; and
- An action plan.

Based on previous experience, the group identified key success factors for the development of collaborative initiatives:

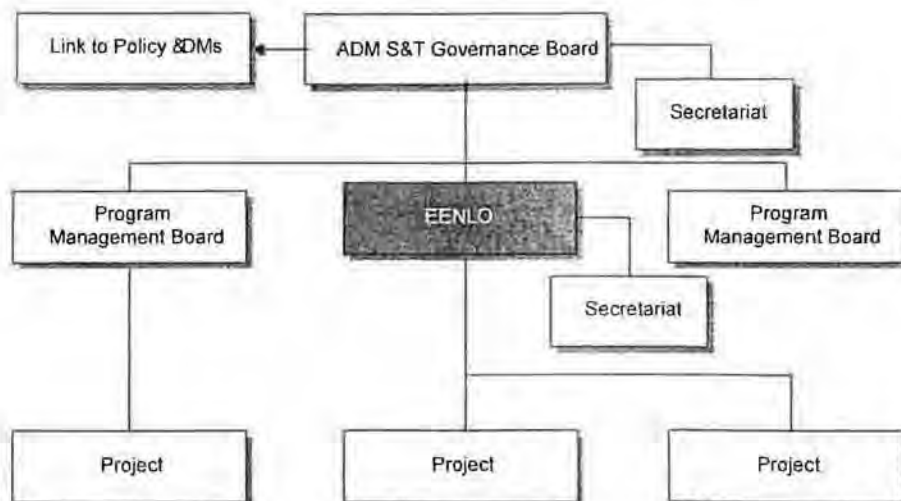
- Initiatives should have clear visions and goals;
- Funds to support them should be unencumbered;
- Program areas would respond to the policy and regulatory needs of departments. Projects within programs would be selected by peer review;
- The need for proposed initiatives must be pressing – timing must be right;
- Having the best people is essential – a champion to lead, strong project managers to execute with the support of the finest scientists and with senior officials to provide strategic guidance;
- Processes must be transparent and must include all stakeholders;
- Governance has to be simple;
- Communications must be effective and regular;
- Initiatives must be flexible and must be given time to evolve at a rational pace.

Participants also defined a series of operating and governance principles (see Appendix 4). One of the key decisions made was to form a governance board of ADMs to oversee horizontal programs. This board would report to the Deputy Ministers' policy committee. Each program or activity would have its

⁴ Based on information provided in a draft report of the meeting by Dr. William Doubleday.

own management board and secretariat and each management board would be responsible for the development of projects as shown in the schematic below. The EENLO activity is represented as one of the programs.

FIGURE 1: SCHEMATIC OF GOVERNANCE SYSTEM



3.2 EXISTING GOVERNANCE STRUCTURES

Within the federal system, biotechnology is coordinated by the Canadian Biotechnology Strategy (CBS). The secretariat for the strategy is located in Industry Canada. The CBS reports to the Assistant Deputy Ministers' Science and Technology Committee.

CBS does obtain and distribute additional funds for biotechnology work to various departments involved in the field. The ADM's committee acts as a venue for sharing information. At present neither body is actively managing or governing biotechnology activities across federal departments.

The roles of each group are:

- **ADM Governance Board** sets priorities/themes and links to DMs. Also two way links to policy/Central Agencies/Stakeholders/Regional Bodies via annual meetings. Has a small Secretariat.
- **Program Management Boards** each develop strategy that describes outcomes, objectives and projects; decide on outputs that will be tracked and

measured for performance. A larger Secretariat for each program keeps all projects on track and supports the Board.

- **Projects** are each managed by a project team from participating research organizations.

4 Proposed Governance System

As multiple horizontal initiatives have already been implemented, much knowledge about what works and what does not resides with participants from the various stakeholder agencies and organizations. Key interviews were performed with people with different levels of responsibility (ADMs, directors, chairs of committees, technical review committee members, board members...), and from different organizations and agencies (Health Canada, Environment Canada, the National Research Council, Universities...) to obtain opinions on the subject. A listing of the people interviewed can be found in Appendix 5. The information gathered in interviews was supplemented with the results of the workshop held on June 10-11 for S&T performing departments and agencies to discuss their experiences, as well as best practices from governance structures in the private sector⁵ and a detailed review of the following three government initiatives:

- The Toxic Substances Research Initiative (TSRI);
- The Northern Contaminants Program (NCP); and the
- The Chemical, Biological, Radiological Nuclear (CBRN) Research and Technology Initiative (CRTI)⁶.

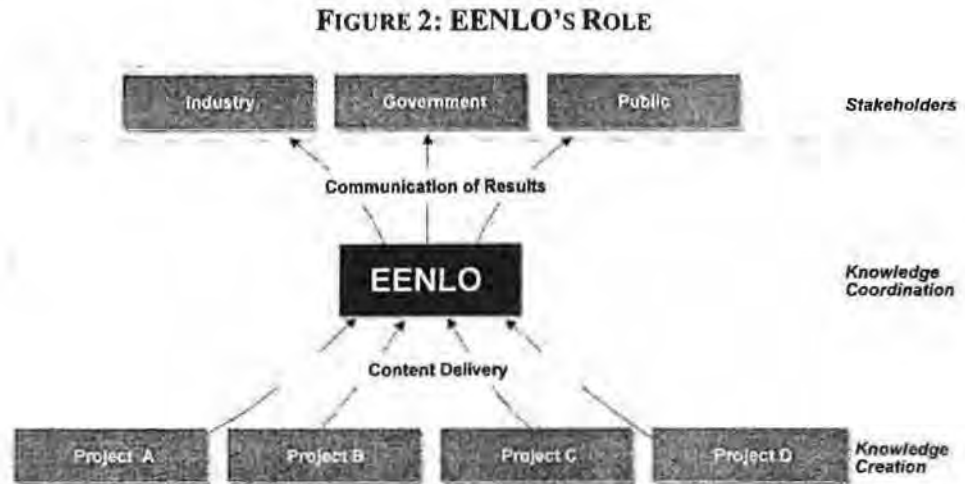
The proposed governance structure is based on the above research, and a description of best practices can be found in Appendix 1.

⁵ Sources : "Ten Steps to a Governance Checkup for Boards of Crown Corporations and Government Agencies" by the Public Policy Forum; "Corporate Governance and the Board - What Works Best" by PriceWaterhouseCoopers, sponsored by The Institute of Internal Auditors Research Foundation; and SECOR analyses.

⁶ See Appendix 2 for initiative descriptions and Appendix 3 for comparison tables.

4.1 WHAT EENLO NEEDS TO DO

The goal of the EENLO initiative is to generate and communicate the knowledge and independent scientific advice to ensure that biotechnological development occurs in an environmentally sustainable manner, as shown in the following diagram:



The EENLO program will be an interdepartmental initiative that will have the capacity to:

- Develop strategy;
- Acquire resources;
- Set priorities;
- Allocate funds;
- Oversee the management of projects; and
- Implement the strategy to ensure that the vision of knowledge generation is achieved.

Many downstream issues flow from this consideration relating to authority and accountability. The governance structure that is created must conform to all of the normal requirements of audit, evaluation and Treasury Board guidelines. While research-focused, the program must also interface with:

- Policy setting, regulation development and enforcement;
- Public (and international) scrutiny of the use of NLOs in agriculture, aquaculture and resource management;

- Mixed federal/provincial jurisdiction; and
- Public confidence in developments regarding the use of NLOs in agriculture, aquaculture and resource management – under public (and international) scrutiny.

As well, the needs of EENLO's key stakeholders must be addressed. They include government departments, special interest groups, academia and industry.

4.2 EENLO GOVERNANCE STRUCTURE: SIMILAR TO THAT OF A SUBSIDIARY COMPANY

As we saw in the previous section, the EENLO program will be similar to a subsidiary company in a conglomerate from a governance perspective. The ADM S&T Governance Board will be the equivalent of the board of a holding company responsible for all the subsidiaries.

The ADM S&T committee will ensure that the programs deliver according to predetermined objectives and will make structural changes as and when necessary to achieve this but it will not delve into the fine details of management and operations.

The EENLO program as a “subsidiary” will have its own board that will be responsible for appointing management and will be responsible for performance.

Other federal programs have tried to achieve similar objectives i.e. that they require multi-stakeholder collaboration to achieve an important “public good”. Their governance structures, therefore, serve as potential models for the EENLO initiative.

4.3 THE RECOMMENDED MODEL

A general tendency is to try to make governance structures as rigid and complex as possible, which can lead to difficulties upon implementation. In EENLO's case a more straightforward structure is proposed. This governance model uses the TSRI structure as a template, with important modifications developed to conform to EENLO's objectives and gleaned from key learnings from the various research performed. The following model covers:

1. The composition of the committees and the rationale for appointing members;

2. The roles and responsibilities of the committees;
3. Project approval methodology and peer review;
4. Mechanisms to help ensure continued viability of the initiative/ organization.

The responsibilities described for each committee are not exhaustive lists, but comprise a good starting point. The chairperson and their representatives must have input and flexibility in setting the responsibilities of the committee in order to ensure buy-in for themselves and from the different members. As EENLO is a cross-departmental initiative, the different partner organizations must have representation in the decision-making process. Members should be of equal standing whenever possible, and chaired by a well-respected figure from the lead government body.

4.3.1 THE LEAD GOVERNMENT ORGANIZATION

EENLO has already stated that Environment Canada plans on leading the initiative. The fact that only one government organization is in charge reduces ambiguity and the potential for diverging objectives. However, the other organizations involved must be active partners throughout the endeavour.

4.3.2 LINKAGES WITH EXTERNAL EXPERTS/STAKEHOLDERS

Having the best people available is essential for EENLO's success. This is applicable to the research projects that are to be undertaken as well as the governance committees. From the research performed, different agencies and private organizations are able to work extremely well together as long as there is a common thread between the participants (scientific, well-respected in their field).

To increase the collaboration between organizations for research projects, the TSRI program included "merit points" for collaborating with multiple institutions, with mixed results. This meant that added weight would be given to proposals submitted that had multiple organizations participating. Though an intriguing idea, this was taken to the extreme in some cases, and guidelines would have to be included to ensure that it would not be misused.

4.3.3 EENLO GOVERNANCE STRUCTURE

As is shown in the following schema, the EENLO structure would be divided into three distinct groups:

- EENLO Steering Committee;
- Technical Review Committee; and the
- Secretariat.

FIGURE 3: PROPOSED EENLO GOVERNANCE STRUCTURE



4.3.4 THE EENLO STEERING COMMITTEE

This group will be the main governing body for the EENLO initiative, with members selected from the different key stakeholder groups. The chairperson would be a representative from Environment Canada, the lead organization. The importance of a strong chair cannot be overstated. This person must be a well-respected, committed individual who is able to build consensus and deliver results.

The responsibilities of the Governance Board would include:

- Establishing priority research areas that are aligned with EENLO's objectives;

- Reviewing and approving final reports of research projects that are short-listed by the Technical Review Committee;
- Providing strategic direction to the Secretariat;
- Finalizing EENLO funding decisions; and
- Communicating the findings to the proper bodies in question.

The chairperson and ADMs would select the different members, with input from the active partners and key stakeholders. Members must be well respected, and qualified to make the types of decisions necessary to ensure that the objectives of EENLO are met.

4.3.5 THE TECHNICAL REVIEW COMMITTEE

The Technical Review Committee will be responsible for ensuring that the knowledge gained from the research projects is aligned with EENLO's objectives and that only scientifically and technically sound projects will be considered for funding. This will be done through the selection process, in which the Technical Review Committee will short-list and rank the potential research initiatives, as well as through scientific peer reviews.

The Technical Review Committee would be divided into four groups, one for each of the relevant segments: Forestry, Fisheries and Oceans, Agriculture and Environmental Health and Ecosystem Function. Each group would have a chair selected by the EENLO steering committee and members from the different stakeholders.

The number of members should be correlated with the number of projects being reviewed to ensure the proper care is taken in selecting and monitoring the scientific research. This could range from 5-8 people (or even more) depending on the level of work and number of proposals involved.

4.3.6 THE SECRETARIAT

The importance of the Secretariat is often overlooked, however EENLO must allocate sufficient resources and funds for this group. An excellent secretariat is a key component of ensuring proper implementation of EENLO's mandate. It is also recommended that relevant scientific expertise be included in the secretariat.

Roles would include:

- Provides support to the responsible Ministers, the Science Management Committee and the Technical Review Committees;
- Managing all aspects of the Initiative including:
 - *The coordination and call for research proposals*
 - *The tracking of research funding expenditures*
 - *Providing assistance to research applicants*
 - *Coordinating proposal evaluations; and*
 - *Developing the terms and conditions of the project funding agreements.*

4.3.7 PROJECT APPROVAL METHOD

The process for approving projects would be four-fold:

1. The Technical Review Committee would assess the extent to which the proposed research advanced the scientific knowledge in each priority research area and made use of the set criteria related to technical and scientific merit. Multiple committee members should analyze each project proposal and external reviewers should be involved, if feasible, to improve impartiality.
2. A ranking would be assigned to the proposals in each priority research area, and strong proposals considered for funding by the Steering Committee, provided the financial resources allowed.
3. A chairperson from each of the sub-committees would present the funding recommendations to the Steering Committee, who would then be responsible for finalizing all funding decisions.
4. The Steering Committee would allocate funding based on an overview of the Technical Review Committees' recommendations, as well as the degree to which each specific proposal addressed the aims, criteria and priorities of EENLO.

4.3.8 PROJECT FUNDING

Three types of funding exist:

- Grants: Most universities are used to this method of funding, and it is the simplest way to give money to the approved projects. However, because the agreement is not highly structured and there are no controls built in, researchers can easily stray from the objectives of the initiative.
- Contribution Agreements: These agreements help ensure that the type of research being done is aligned with the objectives of the initiatives but also incorporate flexibility, since the research may change scope during the course of the project. The approach was used in the TSRI initiative. In the beginning, this was a controversial method for universities, as clauses were included in the agreements that made the structure unwieldy. As well, universities were used to the more informal grant systems. These difficulties, which caused a great deal of concern early on, were worked out over time.
- Contracts: These are highly rigid agreements, and are being used by the CRTI to fund aspects of its research. The contracts are the easiest way to ensure that the research will remain true to the objectives of the initiative, however there is great concern over bureaucracy/paperwork and pushback from the university researchers, who are used to a less structured system.

4.3.9 BUILDING INTERNAL CAPACITY

As described earlier, the need to build internal capacity is real. To ensure this, a specific percentage of the funding can be allocated to internal resources, with other funding going towards external or government/external collaborative research. The allocation would be decided on by the lead agency, the chairperson, and representatives of the key stakeholders to ensure buy-in at all levels. As well, the agreement and the internal funding objectives would have to be clearly defined to ensure that the investment is adding value to the process.

4.3.10 ACCOUNTABILITY

Accountability mechanisms must be incorporated in the process. These include:

- Peer reviews;

- Clearly articulated agreements between the different parties;
- Clearly defined deliverables;
- Performance measurements that focus on intended outcomes;
- Follow up to determine whether results are reaching the policymakers and to keep the program on a strategic path;
- Audits to ensure that research is executed as planned and is being funded properly.

The frequency and timing of the above mechanisms should be developed by the steering committee, taking into account the available resources and the number of research projects being performed.

Accountability is complicated to some extent by the three streams of expenditures that would be made within EENLO. These are:

1. Projects funded by EENLO but executed outside government by, for example, universities;
2. Joint projects involving government and an external organization; and
3. Projects carried out within government.

The governance mechanism proposed for EENLO would be entirely appropriate to set these projects within an overarching strategic framework, to define priorities and to allocate funds for projects.

However, we have to differentiate between a project, which, by definition, has a defined starting point and end-point and an ongoing program.

Part of the thinking behind EENLO is to build ongoing capacity within departments to carry out work related to NLOs. For example, a department might want to build a laboratory facility and staff it on an ongoing basis. This would constitute a new program. The facility would require “A-base” funding since the department concerned would seek an increase in its ongoing budget to cover the cost.

In the example presented above, the EENLO governance mechanism could advise the managers of the laboratory, provide guidance on priorities and allocate additional funds for specific projects. However, the final accountability for the new program would rest with the department concerned since it would be responsible for the A-base funds.

Crudely put, EENLO could govern projects and exercise firm control over them but not programs. It could influence departmental programs but cannot control them completely because departments would be accountable for their use of funds.

Many problems could, however, be overcome in the Treasury Board submission that will be required to obtain funding for EENLO. In the submission, and in subsequent operational plans, departments would have to describe how they intend to collaborate in EENLO and how funds would be used for programs and projects. The description would be further detailed in operating plans to explain the use of funds. Thus, if A-base money is required to build program capacity in various departments, the precise rules of the game could be spelled out in these Treasury Board documents. Although departments would be ultimately be accountable for the use of funds, they would be restricted in the way that the funds could be used. In this way, EENLO would exert a measure of control over programs funded through the A-base..

4.3.11 CONTINUED VIABILITY OF THE INITIATIVE

Continued viability of the initiative will be imperative for EENLO. Buy-in must be achieved with decision-makers from the outset and status updates with key leaders must be performed to keep the momentum and to ensure that they are informed of the progress being made. As well, funding groups must be continuously informed, including stakeholders such as the Treasury Board and Industry Canada.

Appendix 1: Best Practice Governance Components

KEY LESSONS LEARNED FROM HORIZONTAL S&T INITIATIVES

<p>A CLEAR VISION AND GOAL STATEMENT</p>	<ul style="list-style-type: none"> □ The statement should explain clearly what is mutually beneficial for participants and what can be achieved through collaboration; □ If possible, the greatest number of stakeholders should participate in the vision and goal statement process to create buy-in from the outset.
<p>A LONG TERM PERSPECTIVE WITH A RATIONAL PACE</p>	<ul style="list-style-type: none"> □ Developing trust in interdisciplinary teams and stakeholder networks can take considerable time before everyone is comfortable in communicating effectively, sharing results, and applying them; □ Teams cannot function effectively if they are in a mode of continual crisis. This may be the reality at first but the program must move quickly to an effective operational mode.
<p>A PROPER FUNDING STRUCTURE FOR PROJECTS</p>	<ul style="list-style-type: none"> □ Unencumbered funds are essential to allow projects to be selected according to peer review recommendations. Encumbering funds can lead to limiting the scope of projects or project teams; □ Funding for external research is extremely complex. Funding can be provided in three ways: Grants, Contribution Agreements and Contracts. The methods vary in complexity, with Grants being less structured, and Contracts being highly rigid agreements. <ul style="list-style-type: none"> ▪ Grants: Most universities are used to this method of funding, and it is the simplest way to give money to the approved projects. However, because the agreement is not highly structured and there are no controls built in, researchers can easily stray from the objectives of the initiative. ▪ Contribution Agreements: These agreements help ensure that the type of research being done is aligned with the objectives of the initiatives but also incorporate flexibility, since the research may change scope during the course of the project. The approach was used in the TSRI initiative. In the beginning, this was a controversial method for universities, as clauses were included in the agreements that made the structure unwieldy. As well, universities were used to the more informal grant systems. These difficulties, which caused a great deal of concern early on, were worked out over time. ▪ Contracts: These are highly rigid agreements, and are being used by the CRTI to fund aspects of its research. The contracts are the easiest way to ensure that the research will remain true to the objectives of the initiative, however there is great concern over bureaucracy/paperwork and pushback from the university researchers, who are used to a less structured system.

<p>REVIEW COMMITTEES FOR PROJECT SELECTION</p>	<p>□ One of the key issues is determining which projects to advance, and how to ensure that the research aligns with EENLO's objectives. Strong review committees were deemed a key success factor from the respondents. Some key factors that must be included:</p> <ul style="list-style-type: none"> ▪ Have a set criteria on the types of projects to be approved; ▪ Have multiple committee members analyze each project proposal; ▪ Ensure proper expertise on the committees as well as in the Secretariat, if possible; ▪ Use external reviewers, to improve impartiality.
<p>TIMING IS IMPORTANT FOR PROJECT APPROVAL</p>	<p>□ An issue that is already on the radar screen provides compelling reasons for people to work together, e.g.</p> <ul style="list-style-type: none"> ▪ TSRI – Resulted from a Redbook commitment; ▪ CRTI – Responded to the terrorism agenda following the 9/11 attacks; ▪ Northern Contaminants Program – Addressed Aboriginal health and security issues. <p>The importance of timing and having buy-in from people in policy setting was reiterated throughout the interviews. In addition, for successful renewal momentum and a compelling rationale must be maintained. For example, the TSRI has been approved twice at the highest level but failed despite approval because funds were not allocated by central agencies.</p>
<p>THE RIGHT PEOPLE ARE CRITICAL</p>	<ul style="list-style-type: none"> □ A strong chair is essential: a well respected, committed individual who is able to build consensus; □ A champion at an appropriate level of seniority helps achieve buy-in; □ Continuous engagement at the most senior level helps ensure success; □ Scientists recognized in their field should be implicated, regardless of institution; □ Strong project managers need to be included as part of the team.

<p>ACCOUNTABILITY MECHANISMS MUST BE INCORPORATED</p>	<ul style="list-style-type: none"> □ Peer review ensures quality and credibility; □ Clearly articulated agreements between parties help delivery of results; □ Clear contractual deliverables help get the outputs required; □ Performance measurements must focus on intended outcomes; □ Follow up must determine whether results are reaching the policymakers and keeps the program on a strategic path; <ul style="list-style-type: none"> ▪ Audits should be performed to ensure that research is executed as planned and is being funded properly.
<p>KEEP GOVERNANCE MECHANISMS AS SIMPLE AS POSSIBLE</p>	<ul style="list-style-type: none"> □ The governance model must be directly linked with the goals of the problem at hand. As the questions for EENLO are not specific in nature, the structure should allow for flexibility; □ Sharing responsibility among participating agencies is key for project success; □ Reporting needs to be thorough but not overly bureaucratic.
<p>THE SECRETARIAT IS ESSENTIAL</p>	<ul style="list-style-type: none"> □ The importance of a strong secretariat that is adequately funded with the right resources cannot be understated. “A strong secretariat is key in ensuring that things get done” was a common theme.
<p>HAVE STRONG LINES OF COMMUNICATION</p>	<ul style="list-style-type: none"> □ Keep senior people engaged; □ Communicate progress to the policy level and public; □ Develop momentum and linkages among researchers through workshops; □ Help leverage other funds; □ Virtual centres and/or research clusters can facilitate horizontality and encourage flexibility.

COMPONENTS OF "BENCHMARK" GOVERNANCE SYSTEMS

The "benchmark" governance systems have two major components:

- A high-level management committee that sets strategic directions and defines the main operational areas for the program; and
- Project selection committees for each of the operational areas.

Given these components, the governance system must cover:

- Composition of the committees and the rationale for appointing members;
- Roles and responsibilities of the committees;
- Project approval methodology and peer review;
- Buy-in to program goals by the committee members who necessarily reflect the interests of various stakeholders;
- Mechanisms to ensure continued viability of the initiative/ organization.

COMPOSITION OF THE GOVERNANCE STRUCTURE AND APPOINTMENT OF VARIOUS MEMBERS

Governance includes:

- The government organization that will manage the initiative;
- Structure of the governance system;
- Appointment of the various members; and
- Sources of funding.

The Lead Government Organization

EENLO has already stated that Environment Canada plans on leading the initiative. The fact that only one government organization is in charge reduces ambiguity and the potential for diverging objectives. However, the other organizations involved must be active partners throughout the endeavour. In terms of the three initiatives analyzed, the TSRI was led by two organizations, the NCP by one and the CSRI is managed by one.

TABLE 1 : LEAD GOVERNMENT BODY BY ORGANIZATION

ORGANIZATION	LEAD GOVERNMENT BODY
TSRI	1) Environment Canada, 2) Health Canada
NCP	Department of Indian Affairs and Northern Development
CSRI	Department of National Defense / Defense R&D Canada

Structure of the Governance System

As EENLO is a cross-departmental initiative, the different partner organizations must have representation in the decision-making process. Members should be of equal standing whenever possible, and chaired by a well-respected figure from the lead government body. A general tendency is to try to make governance structures as rigid as possible. However as stated earlier a straightforward structure is best. This is exemplified by the TSRI structure.

TABLE 2: STRUCTURE AND REPRESENTATION OF THE GOVERNANCE SYSTEM

ORGANIZATION	STRUCTURE	REPRESENTATION	CHAIRPERSON(S)
TSRI	Divided into three groups: Science Management Committee; Technical Review Committee (one for each of the five key research areas) and Secretariat	SMC and TRC comprised of senior scientists from: industry, academia, private sector, non-government organizations and six federal departments Secretariat: Was housed within Healthy Environment and Consumer Safety Branch (HECSB), Health Canada. Now a part of Health Impacts Bureau, HECSB.	SMC: Co-chaired by representatives of each government body (Health Canada and Environment Canada) Technical Review Committees: Each committee has its own chairperson

The secretariat is often overlooked, however programs must allocate sufficient resources and funds for this group. An excellent secretariat is a key component of ensuring proper implementation of EENLO's mandate.

Appointment of Various Members

Appointment of the steering committee should be performed by the lead agency, with input from the active partners and key stakeholders.

Members must be well respected, and qualified to make the types of decisions necessary to ensure that the objectives of EENLO are met.

Sources of funding

As discussed earlier, sources of funding are one of the key components of a proper governance structure. Each funding body will wish to have some say over how the money will be spent, so funding bodies must buy into the initiatives and mission of the organization. Although not a true component of governance systems, the amount of funding cannot be underestimated, since it is an integral component of a successful operation.

TABLE 3: SOURCES AND AMOUNTS OF FUNDING

ORGANIZATION	SOURCE OF FUNDING	AMOUNT OF FUNDING
TSRI	Federal government	\$40 million over four years (1998-2002)
NCP	Treasury Board and the four participating federal departments - DIAND, Health Canada, Fisheries and Oceans and Environment.	\$5.4 million annual research budget for NCP II (from 98/99 to 02/03)
CRTI	Federal Government (budget 2001)	\$165 million spread over 5 years

ROLES AND RESPONSIBILITIES OF THE COMMITTEE

Roles and responsibilities of the committee as a whole and the committee members must be clearly established, including:

- Definition of mandate;
- Roles and responsibilities of each committee, chairperson and members.

Definition of the mandate

The mandate of the initiative must be clearly outlined to reduce ambiguity and create buy-in from the start. As the mandate for EENLO has already been

created, the stakeholders should agree that the mission aligns with the goals of their parent organizations. An ideal procedure would be to involve the key partners in the beginning of the process to define the mandate.

Roles and responsibilities of each committee and committee member

Clear descriptions of roles and responsibilities must be in-place from the outset, and reviewed at certain periods to ensure relevance in the present context. The TSRI committee roles are described in the following table:

TABLE 4: ROLES OF COMMITTEES FOR THE TSRI

COMMITTEE	ROLES
Science Management	<ul style="list-style-type: none"> ▪ Establish priority research areas ▪ Review and approve final reports of research projects ▪ Provide strategic direction to the Secretariat; and ▪ Finalize TSRI funding decisions
Technical Review	<ul style="list-style-type: none"> ▪ Five Technical Review Committees existed, one per priority research area ▪ Scientific peer review ▪ Ensure that only scientifically and technically sound projects were considered for funding by the SMC
TSRI Secretariat	<ul style="list-style-type: none"> ▪ Provides support to the responsible Ministers, the Science Management Committee and the five Technical Review Committees; ▪ Managing all aspects of the Initiative including: <ul style="list-style-type: none"> – <i>The coordination and call for research proposals</i> – <i>The tracking of research funding expenditures</i> – <i>Providing assistance to research applicants</i> – <i>Coordinating proposal evaluations; and</i> – <i>Developing the terms and conditions of contribution agreements</i>

PROJECT APPROVAL METHODOLOGY AND PEER REVIEW

Project approval is a key component of the governance system, especially in the case of EENLO, as it is a horizontal initiative with the potential concern of conflicting agendas among inter-departmental groups. It can be divided into two key sections:

- The decision making process and funding;

- Linkages with external experts and stakeholders.

Decision making process and funding

Selection and funding is the most important area. This includes defining the criteria behind the decisions and how much money will be allocated. EENLO has many similarities to the TSRI initiative, which uses a four-step approval process (see Appendix 2). In contrast, the NCP uses external teams to review the scientific portion of the requests, and due to the large number of parties and the complexity of the governance structure in place, the decision making process is equally complicated and somewhat unwieldy.

Linkages with external experts/stakeholders

Having the best people available is essential for the success of EENLO. This is applicable to the research projects that are to be undertaken as well as the governance committees. Having the right representation improved buy-in in other initiatives, including NCP and TSRI, as well as multiple private enterprises.

The experiences of the majority of participants interviewed was that as long as there was a common thread between participants (scientific, well-respected in their field) the different agencies and private organizations were able to work extremely well together.

With mixed results, the TSRI included “merit points” for collaborating with multiple institutions. This meant that added weight would be given to proposals submitted that had multiple organizations participating. This was taken to the extreme in some cases, and guidelines would have to be included to ensure that it would not be misused.

BUY-IN ACROSS ALL MEMBERS OF THE COMMITTEE

Creating buy-in across member of the committee will be essential for ensuring the success of EENLO. This includes:

- Creating accountability;
- Establishing rewards; and
- Building participation from the outset.

Accountability

If it defines clear objectives for each committee and committee member, EENLO will be able to have criteria with which to evaluate its members. The first step is to describe the structure, roles and responsibilities. However, these responsibilities must be communicated to the stakeholders and members to ensure they are clearly understood.

Rewards

One of the key factors to create buy-in will be to ensure that money is distributed fairly. As well, once the initiative begins to show results, and members of the board and committee realize that they are working for a leading initiative, the intrinsic rewards of being part of a leading team will also be felt.

Participation from the outset

With the process already underway, EENLO has already begun the steps necessary for buy-in by involving other key organizations in the process and asking for their opinions. These key stakeholders must remain part of the process to ensure that the initiative begins with each member understanding and undertaking their respective roles.

CONTINUED VIABILITY OF THE INITIATIVE

Continued viability of the initiative will be imperative for EENLO. Buy-in must be achieved with decision-makers from the outset and that status updates with key leaders are performed to keep the momentum and to ensure that they are informed of the progress being made. As well, funding groups must be continuously informed, including stakeholders such as the Treasury Board and Industry Canada.

Appendix 2: Descriptions of "Benchmark" Initiatives

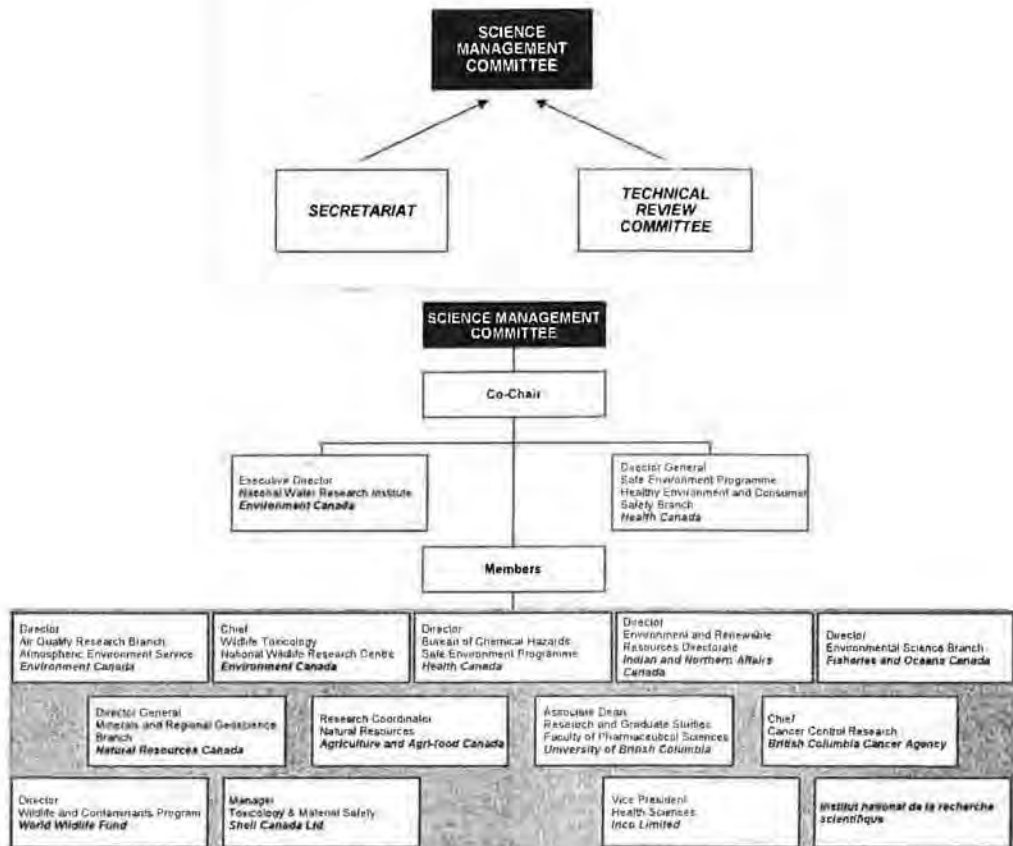
THE TOXIC SUBSTANCES RESEARCH INITIATIVE

Launched in 1998, the Toxic Substances Research Initiative (TSRI), was a \$40 million program managed by Health Canada and Environment Canada. The four-year program sunset as of March 31, 2002 and research sponsored by the program has been completed.

Five priority research areas were supported by TSRI:

1. Persistent Organic Pollutants;
2. Metals;
3. Endocrine Disrupting Chemicals;
4. Urban Air; and
5. Cumulative Effects.

FIGURE 4: TSRI GOVERNANCE STRUCTURE



TECHNICAL REVIEW COMMITTEE				
Persistent Organic Pollutants	Metals	Endocrine Disrupting Chemicals	Urban Air	Cumulative Effects
Chairperson	Chairperson	Chairperson	Chairperson	Chairperson
Department of Resource and Environmental Management <i>Simon Fraser University</i>	Department of Land Resource Science <i>University of Guelph</i>	Department of Obstetrics and Gynecology <i>McMaster University</i>	Centre for Population Health Risk Assessment and Risk Management <i>University of Ottawa</i>	Department of Biology <i>Queen's University</i>
Members	Members	Members	Members	Members
<ul style="list-style-type: none"> • Public Health Research Unit <i>Laval University</i> • Department of Pharmaceutical Sciences <i>University of British Columbia</i> • Department of Pharmacology and Toxicology <i>University of Western Ontario</i> • Environmental Safety Department <i>Proctor and Gamble Company</i> • National Water Research Institute <i>Environment Canada</i> 	<ul style="list-style-type: none"> • School of Engineering <i>University of Guelph</i> • Geoscientific Research <i>Natural Resources Canada</i> • Wastewater Institute for Resources and Environment <i>University of British Columbia</i> • Environmental Department <i>Noranda Technology Centre</i> • Department of Biology <i>University of Ottawa</i> • Environmental Department <i>Noranda Technology Centre</i> • Environmental and Occupational Toxicology Division <i>Health Canada</i> • Department of Biomedical Science <i>University of Guelph</i> • Environmental Radiation Hazards Division <i>Health Canada</i> 	<ul style="list-style-type: none"> • Department of Physiology <i>University of Toronto</i> • Institut national de la recherche scientifique (INRS) <i>University of Quebec</i> • National Wildlife Research Centre <i>Environment Canada</i> • Department of Pharmacology and Therapeutics <i>McGill University</i> • Department of Biology <i>University of New Brunswick</i> • Growth and Development Section <i>Health Canada</i> • Toxicology <i>Environmental Consulting Ltd.</i> 	<ul style="list-style-type: none"> • Atmospheric Environmental Service <i>Environment Canada</i> • Policy and Planning Directorate <i>Health Canada</i> • Atmospheric Environmental <i>Environment Canada</i> • Service Département de médecine du travail et hygiène du milieu <i>University of Montreal</i> • Sage Occupational and Environmental Health Unit <i>University of Toronto</i> 	<ul style="list-style-type: none"> • Healthy Environment and Consumer Safety Branch <i>Health Canada</i> • Canadian Wildlife Service <i>Environment Canada</i> • Canadian Rivers Institute and Department of Biology <i>University of New Brunswick</i> • Department of Environmental and Occupational Health <i>University of Montreal</i> • Bedford Institute of Oceanography <i>Fisheries and Oceans Canada</i> • Golden Associates • Pest Management Regulatory Agency <i>Health Canada</i>

TSRI PROJECT APPROVAL METHOD

The TSRI initiative has a four-step process for approving projects:

- TRC's assessed the extent to which the proposed research advanced the scientific knowledge in each priority research area and made use of the criteria related to technical and scientific merit.
- The TRC's assigned a ranking to the proposals in each priority research area, and noted strong proposals which were considered for funding by the Science Management Committee, provided the financial resources allowed.
- A chairperson from each of the five Committees presented the funding recommendations to the Science Management Committee, who were then responsible for finalizing all funding decisions.
- The Committee allocated funding based on an overview of the Technical Review Committees' recommendations, as well as the degree to which each specific proposal addressed the aims, criteria and priorities of TSRI.

THE NORTHERN CONTAMINANTS PROGRAM

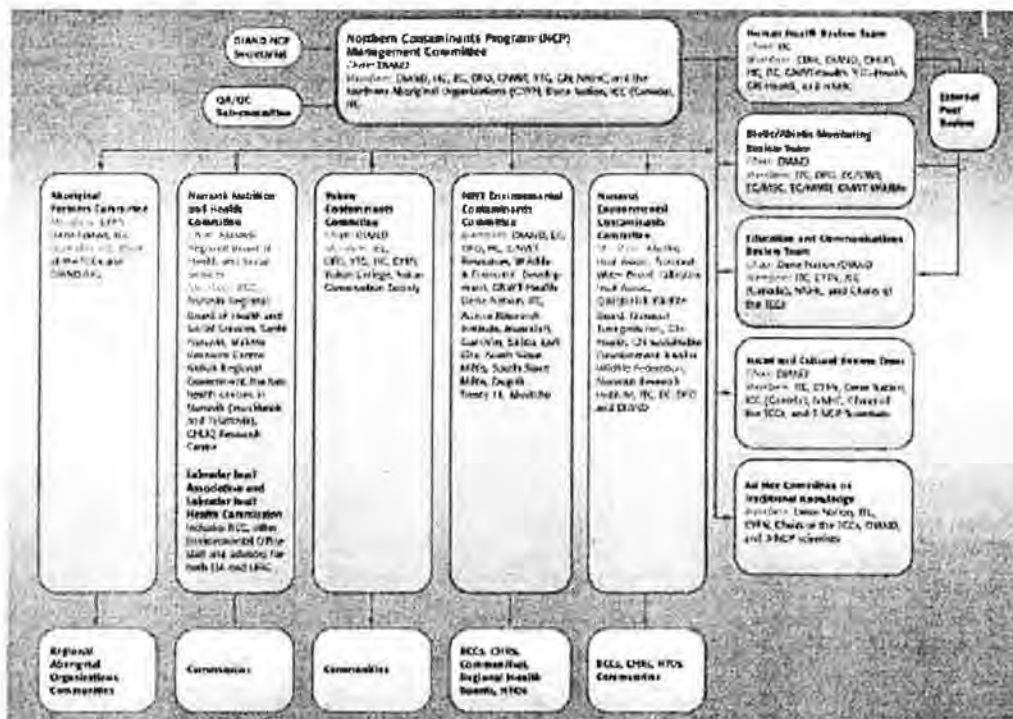
The Northern Contaminants Program (NCP) was established in 1991 in response to concerns about human exposure to elevated levels of contaminants in wildlife species that are important to the traditional diets of northern Aboriginal peoples.

NCP Objective: To reduce and, where possible, eliminate contaminants in northern traditionally harvested (country) foods while providing information that assists informed decision making by individuals and communities in their food use.

In 1998, the NCP Management Committee redesigned the NCP-Phase II for application under the 1999/2000 funding year. The two main initiatives undertaken were:

- 1) The development of blueprints that represent the long-term vision and strategic direction for NCP Phase II, and
- 2) Implementing a more open and transparent proposal review process.

FIGURE 5: NCP MANAGEMENT STRUCTURE

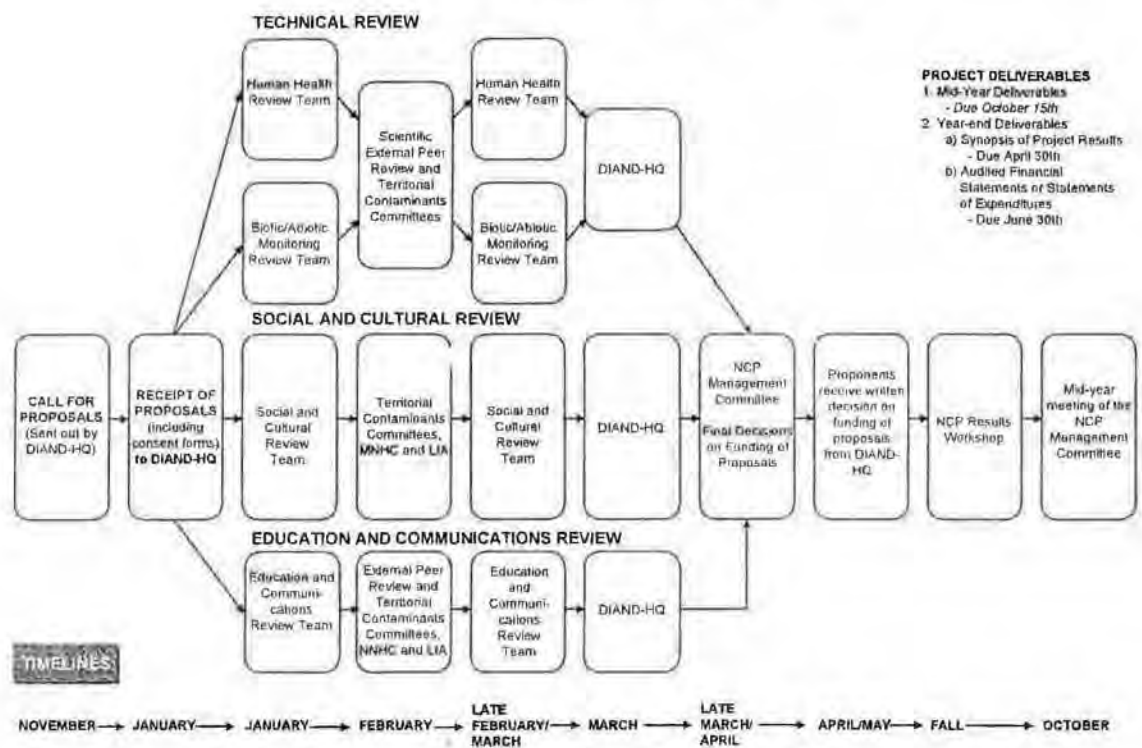


NCP PROJECT APPROVAL PROCESS

There are three major levels of project review, as outlined in the attached figure. External teams are used to analyse the scientific portion of the requests. Peer reviewers from outside the program provide technical comments on proposals according to a set of peer review criteria.

Also, a quality assurance and quality control (QA/QC) program was established to assess the performance of all laboratories carrying out contaminant analyses under the NCP and to ensure intercomparability of data. All laboratories that conduct contaminant analyses under the NCP are required to take part in this program.

FIGURE 6: NCP PROJECT REVIEW PROCESS



THE CBRN RESEARCH & TECHNOLOGY INITIATIVE (CRTI)

CRTI is mandated to strengthen Canada's preparedness for, prevention of and response to a CBRN attack by fostering new investments in research and technology. CRTI will generate knowledge and technology, and support their application, and harness existing capabilities by:

- Creating clusters of federal labs as elements of a federal laboratory response network that will build S&T capacity to address the highest risk terrorist attack scenarios;
- Establishing a fund to build capability in critical areas;
- Accelerating the delivery of technology to the first responders community and other operational authorities; and
- Providing funds to those areas where national S&T capacity is deficient owing to obsolete equipment, dated facilities or inadequately staffed scientific teams.

CRTI is a joint, interdepartmental initiative between: the Office of Critical Infrastructure Protection & Emergency Preparedness, Health Canada, Environment Canada, Agriculture and Agri-Food Canada, Canada Food Inspection Agency, Department of Fisheries & Oceans, National Research Council, Natural Resources Canada, RCMP, Solicitor General Canada, Canada Security and Intelligence Service, Treasury Board Secretariat, Privy Council Office and Defense R&D Canada.

THE CRTI STEERING COMMITTEE

The CRTI Steering Committee (SC) exercises the following responsibilities:

- Develops strategic directions and responses, based on advice, to CBRN challenges posed to the federal S&T response capability and capacity;
- Reviews and approves policies, programs and procedures;
- Approves CRTI projects and project categories and the allocation of funds to projects and project categories;
- Approves Lab Cluster Team Leaders;
- Approves the budget and the work plan for CRTI and its Secretariat;
- Monitors project implementation and progress and makes recommendations for corrections as required;

- Maintains ongoing communications with stakeholders and clients;
- Ensures reporting and accountability requirements for CRTI are met;
- Ensures development and implementation of appropriate evaluation and audit mechanisms, and the necessary commitment of related resources;
- Approves amendments and revisions to the CRTI Framework, or other procedures and guidelines as may be developed and adopted;
- Provides a forum for interdepartmental consultation on S&T directions related to CBRN and CRTI;
- Develops proposals and advice to Deputy Ministers, Central Agencies and Cabinet on further directions and initiatives related to CBRN and CRTI;
- Oversees the management of the CRTI Secretariat, and provides direction and guidance;
- Oversees the implementation and on-going preparedness of the lab clusters; and approves cluster implementation plans.

Steering Committee membership includes:

- Chair - DND ADM (S&T)
- Vice Chair - SC member chosen by membership
- Secretary - Director/CRTI Secretariat
- Members (ADM Level, or equivalent) from the following departments and agencies:
 - *AAFC Agriculture and Agri-Food Canada*
 - *AECL Atomic Energy of Canada Limited*
 - *CFIA Canada Food Inspection agency*
 - *CNSC Canadian Nuclear Safety Commission*
 - *CSIS Canadian Security Intelligence Service*
 - *DFO Department of Fisheries and Oceans*
 - *DND/DRDC Defence Research and Development Canada*
 - *DND/OCIPEP Office of Critical Infrastructure Protection and Emergency Preparedness*
 - *EC Environment Canada*
 - *HC Health Canada*

- *NRC National Research Council*
- *NRCan Natural Resources Canada*
- *PCO Privy Council Office*
- *RCMP Royal Canadian Mounted Police*
- *SolGen Solicitor General*
- *TB Secretariat Treasury Board Secretariat*

THE CRTI SECRETARIAT

The CRTI Secretariat discharges the following mandate:

- Develops, recommends and manages CRTI administrative and program policies and procedures according to the annual business cycle, including: project selection; financial management;
- Intellectual property (IP) management; communications; program performance evaluation; access to information program (ATIP);
- Co-ordinates the quality and relevance reviews of the project selection process;
- Prepares the annual report to Government and CRTI stakeholders;
- Provides liaison with departments, central agencies, other stakeholders and partners;
- Co-ordinates international agreements;
- Liaises and interfaces with Project Managers;
- Liaises with cluster teams and Cluster Team Leaders;
- Provides support to the Steering Committee;
- Identifies opportunities and issues for referral to the Steering Committee, and provides research, analysis, and other advice as requested by the SC;
- Co-ordinates communications and consultation events and is responsible for communications and publications;
- Co-ordinates and manages the CRTI Knowledge Management/ Information Management program; and
- Manages disputes at the program level, and brings unresolved issues to the Steering Committee for resolution.

CRTI Staff

To carry out its mandate, the CRTI Secretariat is staffed as follows:

- Director;
- 3 x CRTI Portfolio Managers;
- Knowledge Manager;
- Financial Officer;
- Senior Administrator; and
- Administrator.

DEPARTMENTAL INVOLVEMENT IN CRTI

The responsibilities of participating CRTI departments included:

- Membership in appropriate lab clusters, (including commitment of resources and support of cluster implementation and operations);
- Identification and support of Project Champions and Project Managers;
- Management of and accountability for provided funds in accordance with the CRTI framework and TB policies and guidelines; and
- Participation in Project Teams and Project Review Committees.

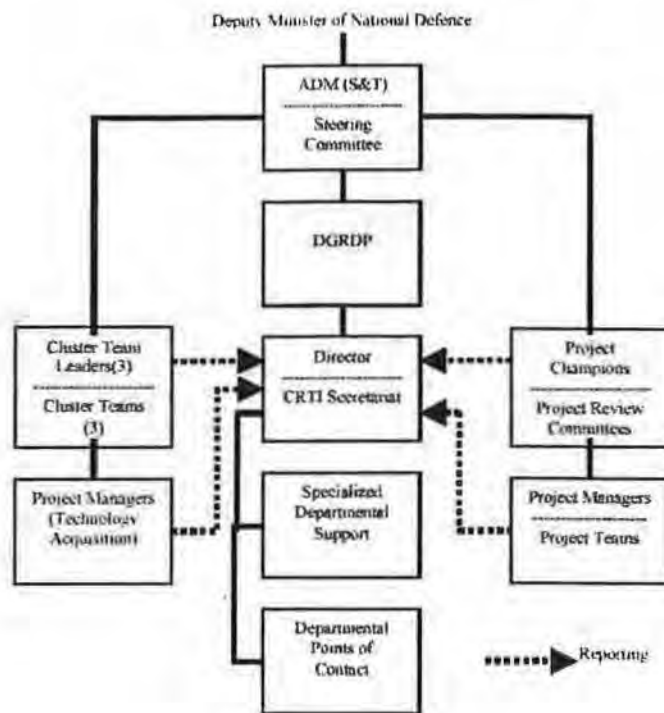
From time to time, Departments were requested by the CRTI Secretariat to provide in-kind support to CRTI in-year activities and to activities that support the CRTI Annual Business Cycle. Examples of envisaged support included:

- Interdepartmental CRTI Communications Committee;
- Participation in CRTI project selection and program evaluation activities; and
- Participation in the management of CRTI conferences, studies, and other in-year activities.

Departmental Points of Contact provided:

- Day-to-day liaison between the departments and the CRTI Secretariat;
- Facilitated the identification of specialized departmental support; and
- Supported their respective CRTI Steering Committee members.

FIGURE 7: CRTI GOVERNANCE FIGURE



Appendix 3: Comparisons of the Different Initiatives

TABLE 1: LEAD GOVERNMENT BODY BY ORGANIZATION

ORGANIZATION	LEAD GOVERNMENT BODY
TSRI	1) Environment Canada, 2) Health Canada
NCP	Department of Indian Affairs and Northern Development
CSRI	Department of National Defense / Defense R&D Canada

TABLE 2A: STRUCTURE AND REPRESENTATION OF THE GOVERNANCE SYSTEM

ORGANIZATION	STRUCTURE	REPRESENTATION	CHAIRPERSON(S)
TSRI	Divided into three groups: Science Management Committee; Technical Review Committee (one for each of the five key research areas) and Secretariat	SMC and TRC comprised of senior scientists from: industry, academia, private sector, non-government organizations and six federal departments Secretariat: Was housed within Healthy Environment and Consumer Safety Branch (HECSB), Health Canada. Now a part of Health Impacts Bureau, HECSB.	SMC: Co-chaired by representatives of each government body (Health Canada and Environment Canada) Technical Review Committees: Each committee has its own chairperson

TABLE 2B: STRUCTURE AND REPRESENTATION OF THE GOVERNANCE SYSTEM

ORGANIZATION	STRUCTURE	REPRESENTATION	CHAIRPERSON(S)
NCP	The NCP is managed on a partnership basis by a series of inter-related committees, including the NCP management committee; various regional committees; review committees and an aboriginal partners committee	Federal Departments of Health, Fisheries and Oceans, Environment and DIAND, representatives of the Yukon, Northwest Territories and Nunavut governments, and representatives from the four northern Aboriginal organizations are associated with each of the committees.	Management Committee: Chaired by representative from lead government body (DIAND) Review committees: Chaired by HC, DIAND and aboriginal organizations; Aboriginal Partners Committee: No chair Regional committees: various

TABLE 2C: STRUCTURE AND REPRESENTATION OF THE GOVERNANCE SYSTEM

ORGANIZATION	STRUCTURE	REPRESENTATION	CHAIRPERSON(S)
CRTI	Steering committee, secretariat, CRTI Lab Clusters (initially 8 persons). These positions are funded by CRTI and could include departmental assignments.	Steering committee : inter-departmental representation at the Assistant Deputy Minister (ADM) level Lab Clusters include multiple government organizations, such as: Health Canada, Canadian Food Inspection Agency, Environment Canada, Department of Transport, Department of Fisheries and Oceans and Department of Foreign Affairs and International Trade	Steering committee chaired by representative by ADM of lead government body (DND) Four lab cluster leaders represented by different canadian government organizations.

TABLE 3 : SOURCES AND AMOUNTS OF FUNDING

ORGANIZATION	SOURCE OF FUNDING	AMOUNT OF FUNDING
TSRI	Federal government	\$40 million over four years (1998-2002)
NCP	Treasury Board and the four participating federal departments - DIAND, Health Canada, Fisheries and Oceans and Environment.	\$5.4 million annual research budget for NCP II (from 98/99 to 02/03)
CRTI	Federal Government (budget 2001)	\$165 million spread over 5 years

Appendix 4: ADM Governance Principles

PRINCIPLES

1. Horizontal research and related scientific activities are a key dimension of the science mandate of every science department and agency
2. Departments and agencies should regard their participation in horizontal science projects as a normal part of their business, and should reflect this in performance accords and associated regimes for performance assessment and reward
3. Senior science managers have a responsibility to:
 - Identify problems and issues within their department's mandate where a horizontal approach is appropriate
 - See, and allocate the necessary resources – human, financial and physical – to support the participation of their department or agency in such projects
 - Play an appropriate role in the governance of such horizontal science projects and broader enterprises
 - Ensure that participating research personnel play an appropriate role in the management of individual projects
 - Involve external partners and stakeholders appropriately in such regimes of governance and management

MECHANISMS

1. Each horizontal research enterprise should include:
 - Participating departments and agencies (including, where appropriate, participation on an observer basis by interested central agencies)
 - External science partners (universities, other public research facilities such as hospitals, private sector research institutions or units, international partners)
 - Stakeholders from outside the federal government
 - A board consisting of representatives of the participating partners and stakeholders should govern each such horizontal research enterprise.
 - The board may be co-chaired by the lead department and another department, partner or stakeholder, or

- The board may be led by a designated “lead department or agency”
2. Each horizontal project should be managed by a project team consisting of representatives of participating research organizations, chaired (ideally co-chaired) by representatives of the departments or agencies with the most significant interest in the project

GUIDELINES

1. Each horizontal research project should be identified for consideration on the basis of an agreed set of policy and research priorities
2. Successful projects should be selected on the basis of clear criteria of relevance and scientific merit, as determined by a selection committee consisting of members of the board and after a peer review of scientific merit
3. No project shall be selected that is not defined by a clear statement of the relevant question(s) to be answered for policy or program purposes
4. Each participating entity (‘partner’) will commit itself to contributing resources for the duration of the project
 - The nature of such contribution may vary depending on the size and nature of the project, and the capacities of the partner
 - Federal departments and agencies will normally be expected to contribute at least some financial resources; it is expected that non-financial contributions (personnel, facilities) are more likely to be received from non-governmental partners
5. Obligations of non-governmental partners shall be set out clearly in contracts or contribution agreements
6. Every entity making a financial contribution shall contribute in part to the supporting infrastructure for the management team for the project
7. Every project shall have a fixed duration, which may be extended by the board
8. Every project shall be subject to periodic evaluation and the results of such evaluations shall be made known
 - To the board
 - To concerned deputies and heads of participating organizations

Appendix 5: Completed Interviews

Dr. John Carey

Co-chair TSRI, Executive Director
National Water Research Institute
Environment Canada

Dr. William Doubleday

Federal Innovation Network of Excellence
Environment Canada

Dr. Keith Marshall

Chief
Wildlife Toxicology
National Wildlife Research Centre
Environment Canada

Dr. Robert Matheson

Chief
Air pollutants
Health Canada

Dr. Steve Clarkson

Director
Bureau of Chemical Hazards
Safe Environment Program
Health Canada

Dr. Claire Franklin

Assistant Deputy Minister
Special Advisor to Deputy Minister
Health Canada

Dr. Loc Nguyen

Director
Research & Development
Environmental Contaminants
Health Canada

Dr. Pierre Ayotte

Technical Review Committee, persistent organic pollutants
Public Health Research Unit
Laval University

Dr. Peter Hackett

Vice President
Research
National Research Council

Dr. Richard Isnor

Director
Horizontal Biotechnology Initiatives
National Research Council

Dr. Jack Smith

Strategic Planning and Policy
National Research Council

Dr. Yvan Hardy

Assistant Deputy Minister
Natural Resources Canada

Dr. David Stone

Chair NCP, Director
Northern Science & contaminants Research
Northern Affairs Program, DIAND

Dr. Phil MacDonald

Chief
Environment Release Assessments
Canadian Food Inspection Agency (CFIA)
Plant Biosafety Office

Dr. Daniel Krewski

Chair, Technical Review Committee, Urban Air
Centre for Population Health, Risk Assessment and Risk Management
University of Ottawa

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