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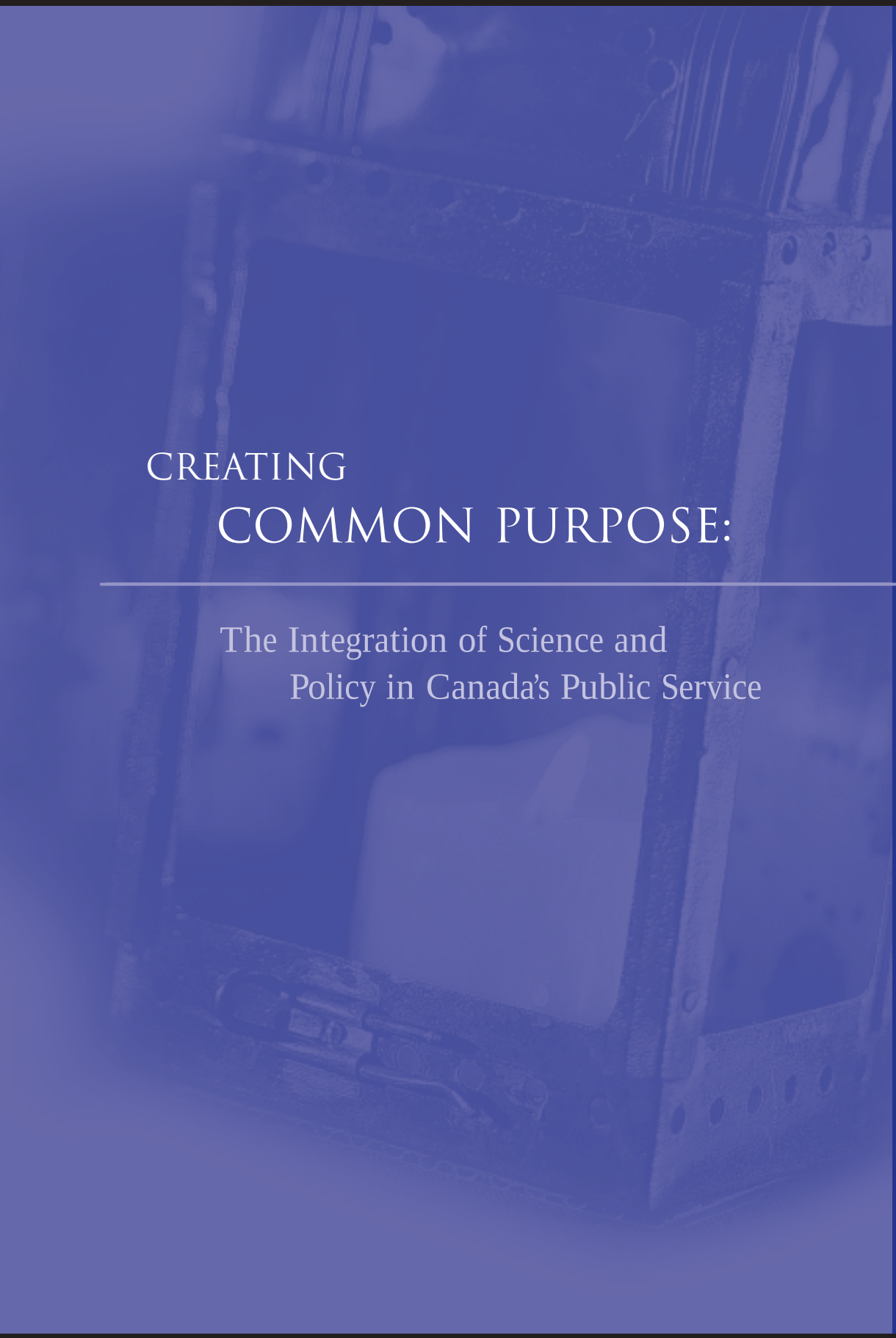

# CREATING COMMON PURPOSE:

## The Integration of Science and Policy in Canada's Public Service

CCMD Roundtable on Science and Public Policy

CHAIRED BY ARTHUR MAY

BY L. SARAH WREN

FOR ALL THOSE WHO BELIEVE IN EXCELLENCE
POUR CEUX ET CELLES QUI CROIENT EN L'EXCELLENCE

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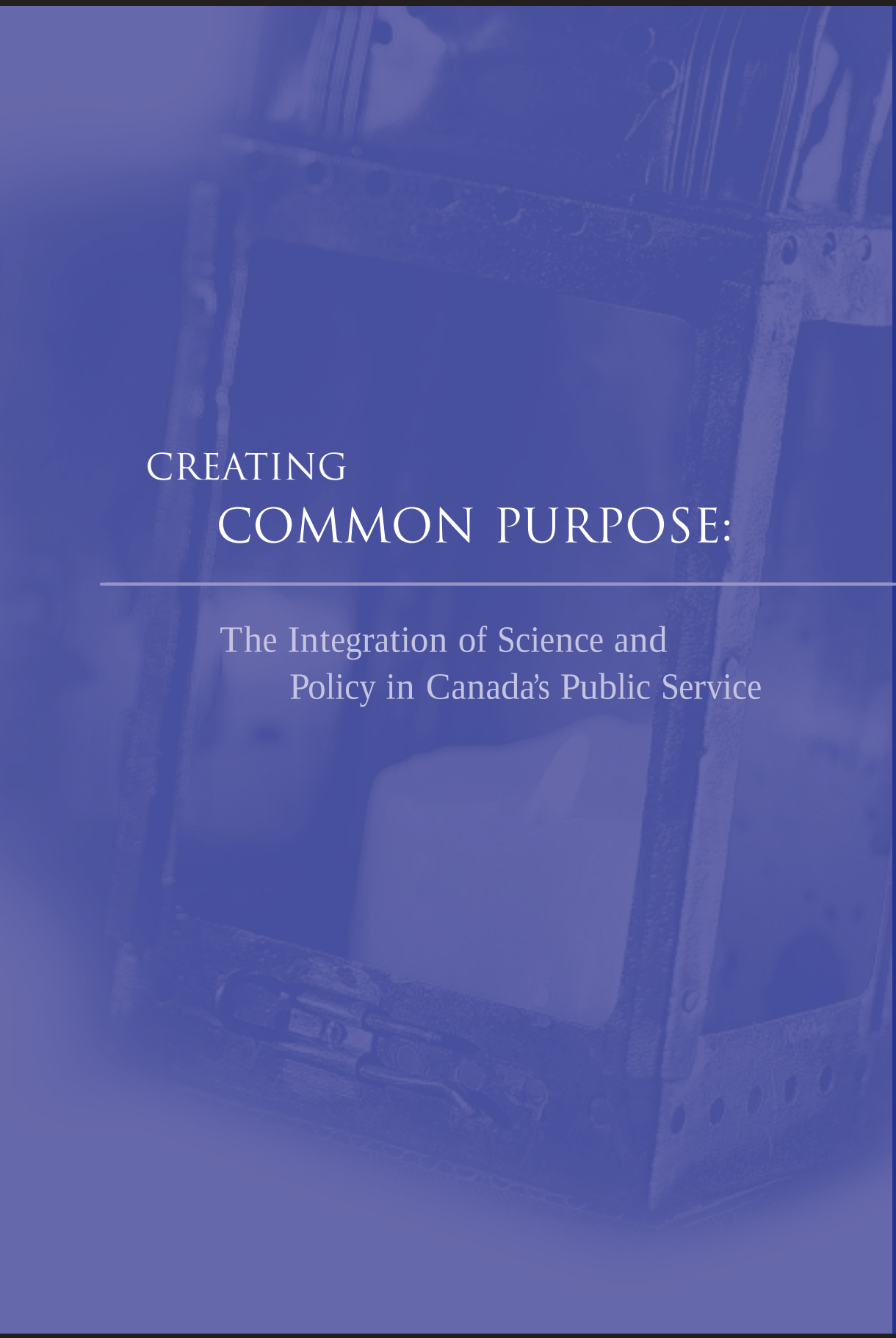

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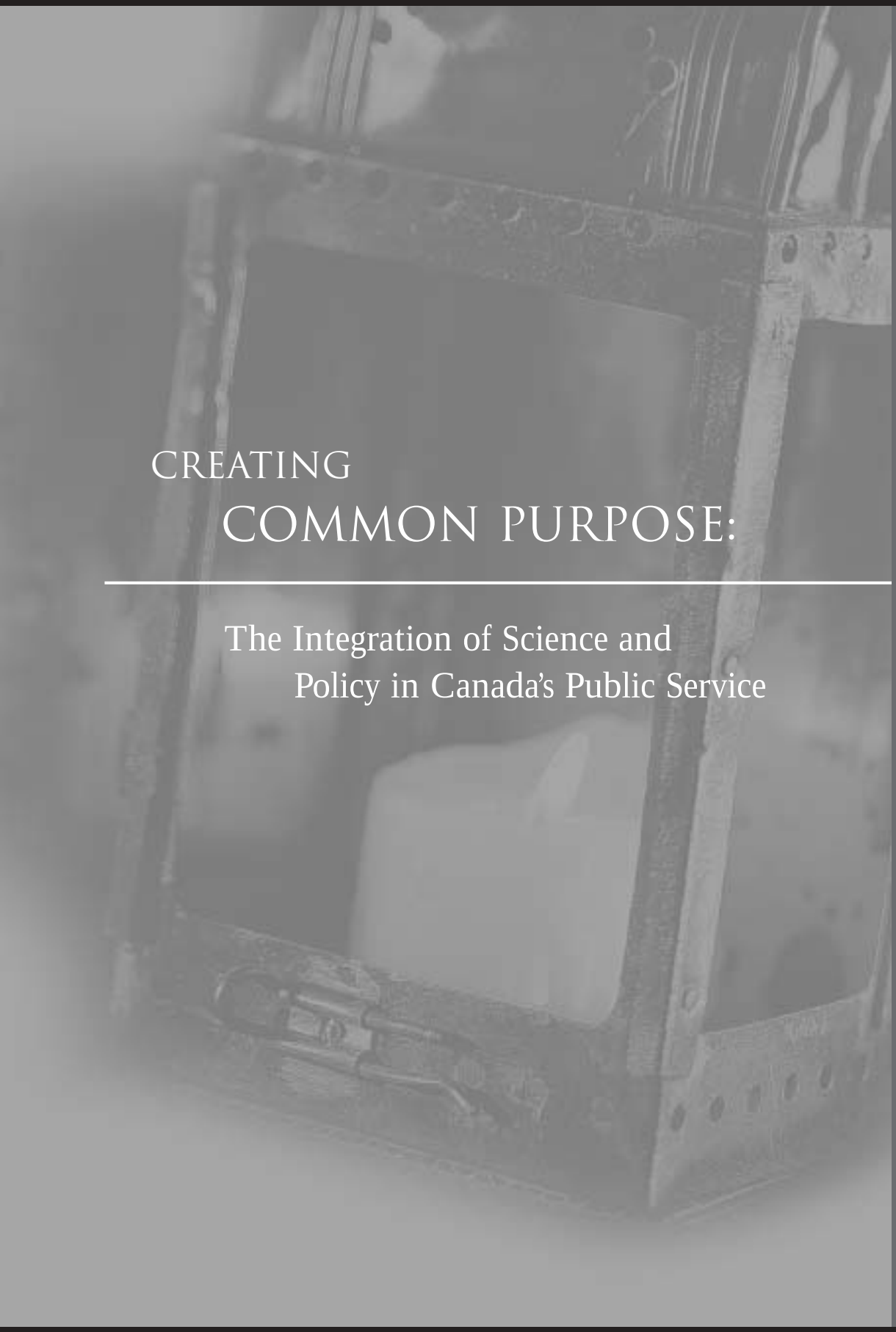

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# A WORD FROM CCMD

A Public Service that continually learns is better equipped to seize the fleeting opportunities found in our rapidly evolving economy and society. Research is a crucial vehicle for learning, but not just any kind of research will do. Research needs to be timely, relevant; it must offer practical advice. This is precisely the focus of CCMD's Action-Research Roundtable process.

This is the second wave of research we have conducted in this highly successful format. Our consultations with managers have identified five topics that require immediate attention:

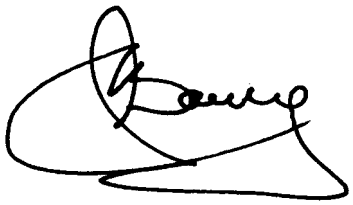
- Workplace Well-Being
- Internal Service Delivery
- Public Service Innovation
- Horizontal Mechanisms
- Science and Public Policy

These topics are of strategic importance for Canada's Public Service as a whole, and also speak to the daily experience of our fellow managers and their staff.

The Action-Research Roundtable on Science and Public Policy produced this research report. It is the result of the dedication and contribution of the Roundtable members and dialogue event participants who considered this issue to be important, and took the time from their busy schedules to contribute to this project.

I would especially like to thank the Chair of this project, Dr. Arthur May, who volunteered his time to lead this work. As a former Research Scientist, a Federal Deputy Minister, a Granting Council President, and University President, his unique qualifications and leadership skills proved invaluable.

Jocelyne Bourgon



President

Canadian Centre for
Management Development

## Action-Research

CCMD's action-research process brings together practitioners and experts from both inside and outside government to develop practical advice for dealing with pressing management challenges. The research process revolves around the deliberations of a diverse Roundtable – an ideal forum for rapidly pooling and scrutinizing knowledge, insights and experiences. The research is conducted over a one-year period.

The management challenges are selected by managers and senior executives according to their urgency and importance to the Public Service as a whole. The objective is to provide leading-edge, focused and practical products that public managers genuinely value and actively use in their work.

The Roundtable is supported by a secretariat composed of scholars and public service researchers.

# A WORD FROM THE CHAIR

Science is playing an increasingly important role in government decision-making. A key challenge for government, therefore, is to optimize how its science and scientific advice are used in the creation of public policy and in support of the public interest.

There can be a broad mix of players in the policy creation process, including scientists, managers, politicians, stakeholders, the media, and of course citizens. Of particular interest are scientists and policy analysts since their cultures, roles and responsibilities are somewhat distinct. Science cannot be optimally used in the decision-making process unless there is an effective and symbiotic relationship between the scientific and policy communities. It was with this in mind that our Roundtable met to develop a practical resource to help scientists and policy analysts work more effectively together, and ultimately improve how science is used in public policy.

Some work has already been undertaken to strengthen the provision of formal scientific advice. Especially noteworthy is the government's new *Framework for Science and Technology Advice*, which has been supported by interdepartmental work, including the creation of a checklist, evaluation framework and training course. There has also been some progress on the less formal but equally important cultural dimension of the science/policy interface. By culture, we mean what these two communities see as important and how they conduct their work. However, progress has not been steady; nor have the various lessons learned and good practices from across the public service been captured and shared for the benefit of all. This document is an attempt to help do this.

In order to gain a better appreciation of the issues facing those involved in science and policy in the federal public service, the Roundtable researched the issues and met several times to debate and discuss them. It also organized regionally hosted dialogue events (in the National Capital Region, Dartmouth, Nova Scotia and Victoria, British Columbia) that brought together small groups of people from both the policy and science communities. (See the appendix for a full list of participants). These informative sessions explored the nature of the science/policy interface, as well as lessons learned, good practices and potential strategies for enhancing it. This paper summarizes what we learned about strengthening linkages and improving how science is used in public policy.

What this document does not do, and what the Roundtable process is not designed to achieve, is explore broader issues that arose on the periphery of our discussions. These included: 1) the integration of science into the broad plans and strategic directions of departments at the highest levels of departmental activity; 2) whether or not a focus on science in government, as an integral feature of government organization, as well as formalized interdepartmental cooperation, is desirable; and 3) the role of government science in the innovation agenda, noting the greatly increased support provided for science from outside government (especially the higher education sector) in recent years. We believe that the "Cornerstones" and "Suggestions for Action" presented on p. 21 of this report will inevitably raise these further issues.

Arthur May

Chair, CCMD's Roundtable
on Science and Public Policy

# ACKNOWLEDGEMENTS


| | | |
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The Roundtable members would like to thank the many individuals who helped prepare this paper. This includes resource persons, focus test participants, and the people involved in the publication process. Their contributions helped ensure that this product will be useful to managers throughout Canada's public service.

A man in a hot-air balloon is floating along and gets lost in a cloud. When there is finally a break in the cloud he sees a person on the ground and decides to descend to ask for directions.

The balloonist descends and hovers over the man on the ground and asks him where he is. The man on the ground shouts back, "You are at 45 degrees, 25 minutes, 29 seconds north, and 75 degrees, 42 minutes, 20 seconds west. I am standing at 100 metres above sea level, so you must be at about 120 metres."

The man in the balloon replies, "You must be a scientist. I ask you a simple question, and you give me too much information and I'm still lost."

The man on the ground calls back to the man in the balloon, "You must be a policy analyst. You came out of nowhere with your questions, I give you the most accurate and precise answer I can, you're still lost, and you blame me!"

*Joke told by a Dialogue Event participant to illustrate differences in perception between the science and policy communities.*

# TABLE OF CONTENTS

# EXECUTIVE SUMMARY

The Government of Canada plays the fundamental role of using scientific knowledge and information to inform its public policy and decision-making. In order for this to be done efficiently and effectively, a strong relationship must exist between the science and policy decision-making capacities within government.

To best achieve this strong relationship, a new paradigm is required which integrates science and policy functions around key issues, and provides the common purpose of working together to solve problems. At present, several issues at the interface of science and policy hinder integration between science and policy workers within the public service.

This document seeks to explore these issues (as listed in the summary chart hereafter under the heading “Present”), provides cornerstones and approaches to working towards better integration and common purpose between science and policy (listed under “Transition”), and indicates benefits that will arise from making that transition (listed under “Ideal”).

# An Overview of Moving from the Present to the Ideal

**PRESENT** — **TRANSITION** — **IDEAL**

## Issues at the Interface of Science and Policy

Conflicting science and public service value systems and differences in conceptual models between the groups.

Communication barriers resulting from differences in language and lack of opportunities for dialogue between science and policy.

Misunderstanding surrounding the science and policy processes.

Difficulties in sustaining team and multidisciplinary work resulting from limitations in science capacity.

## Cornerstones to Common Purpose and Integration

Informing about roles and fostering a common purpose for science and policy communities.

Organizing science/policy work teams around the resolution of key issues.

Providing training and development opportunities with exposure to science or policy processes and issues.

Recognizing and rewarding science contributions to policy work, and policy contributions to science work.

## Tools, Strategies and Approaches

Review, discuss and publicize roles for science and policy.

Share information in an iterative process between science and policy.

Communicate around specific issues in an institutionalized process.

Reallocate staff capacity to new teams and research areas using incentives.

Promote development such as job shadowing for science and policy positions.

Educate scientists about the policy process and issues, and vice versa.

Provide opportunities and incentives for work exchanges between science and policy.

Interpret research scientist promotion requirements to recognize contributions to policy development.

Communicate expectations to science and policy groups.

## Benefits

**For the science community:**
Increased credibility
Increased recognition
Increased trust in policy people
Improved morale
Increased satisfaction

**For the policy community:**
Increased trust and understanding of science
More proactive policy decisions
More timely policy responses
More effective, robust solutions

**For organizations:**
Better workplace atmosphere
Increased value for money on science investments
Increased relevance of science
Better public policy

**For the public:**
Increased credibility of science
Increased confidence in government decision-making
Increased support of federal science

# INTRODUCTION



## A New Paradigm of Common Purpose and Integration

The science content of public policy decisions is growing rapidly (think climate change, environmental toxicity, surveillance and defence, and genetically modified foods). Within this new environment, advances in science are emerging at an increasing pace, driving a demand on the part of policy-makers for information and advice.

Up to now, science and policy have operated largely as two separate communities, some would say with unique values. But we can no longer work as if in a relay race — a scientist completes a piece of work and then passes it off to a policy person to run the next leg of the race. More like a rugby team, scientists and policy analysts must run the field together, supporting each other as they go, and achieving goals as a united team.[i] To address challenges, we must bring together all our talents and knowledge for the betterment of Canada and Canadians.

Doing this will require more than building linkages and bridges to cross "gaps" between the two communities. It will require going back to basics — to our common purpose: to provide the best possible advice to the government and the best possible service to Canadians. Fulfilling this purpose in the knowledge age will mean fundamentally changing how scientists and policy analysts work with and relate to each other.

Approaches must be fostered to unite scientists and policy analysts in this common purpose. The process of using science information to inform decision-making should shift into one where science/policy communication is regular and informative, teamwork and multidisciplinary initiatives are the norm, and science and policy staff work together in pursuit of shared objectives. This needs to become the standard expected and how work gets done.

### *A new paradigm is needed in order to integrate science and policy and achieve common purpose.*

While recent studies and reports have examined several facets of the relationship between science and policy in Canada's federal public service, none have looked at how science and policy people can integrate their work. This is the goal of the present document, i.e., to provide advice and guidance in order to achieve common purpose and the integration of the science and policy communities. First, the importance of and need for science in the federal government will be briefly examined, as well as the benefits inherent in achieving greater integration between science and policy. Second, key issues that exist between science and policy communities will be explored. Third, cornerstones for resolving those issues (as well as suggestions and best practices for implementing the cornerstones) will be presented. Finally, conclusions and solutions for achieving common purpose and integration, and advice on creating dialogues between managers and science and policy workers, will be presented.

## Setting the Context: The Importance of Science in the Federal Government

The federal government plays a fundamental role in the delivery of science[1] activities in Canada. Federal science-based departments and agencies are involved in scientific activities (through funding, facilitating, and/or performing) when organizational mandates explicitly require such activities, when the public rate of return exceeds the private, and when marketplace failures make the federal government the only body that could perform the science.[iii]

As identified by the Council of Science and Technology Advisors, there is the need for a wide range of federal science functions and activities. Science capacity in the federal government must be able to fulfil several key roles, including[iii]:

- Support for decision-making, policy development and regulations (e.g. fish stock assessment for fisheries management)
- Development and management of standards (e.g. contribution to resolving issues such as the pinewood nematode dispute with the European Union in Canadian softwood lumber shipments)
- Support for public safety, health, environmental and/or defence needs (e.g. independent food safety research)
- Enabling economic and social development (e.g. research into sustainable farming practices).

As a result of these broad roles, federal science must meet the needs of a wide range of clients: government decision-makers, internal and external stakeholders, and Canadians in general (although scientific activity in the federal government is usually not aimed at all of these clients at once).[iv]

### Key Definitions[ii]

**"Science** is one form of knowledge or way of knowing. It is a form of knowledge that is empirical, specific, replicable, verifiable, and often quantifiable. Science is closely tied to, but often separate from, technology, the latter involving the application of knowledge as a means or technique for achieving largely predetermined purposes."

**"Scientists** are individuals who develop and interpret knowledge using scientific methods involving norms and activities such as empiricism, control, quantification, replication, verification, and peer review. They are variously educated and trained in scientific disciplines, sub-disciplines, and interdisciplinary approaches."

**"Science and technology advisors** are scientists and other knowledge intermediaries who offer advice (written and verbal) to other skill and expertise groups and individuals within government, as well as to generalists, about the implications of S&T [science and technology] knowledge for policy and decision making."

"A **public policy** in a simple overall sense is a basic statement of purpose and approach enunciated by a governmental authority."

"A **policy and decision-maker** in government is a person or group of persons at different levels of rank and authority who make policies or closely advise those who make policy and decide. These include elected ministers, senior officials, and arms-length regulators and advisory bodies. Some of these players may be scientists themselves but typically these are non-scientists."

"A **policy advisor** in government is an analyst or manager who is responsible for preparing written policy proposals or documents emanating from varied sources of knowledge, including S&T advice or incorporating S&T information."

**"Science and technology-based policy and decision-making** can be defined as policy and decision-making where S&T knowledge and personnel constitute significant or effective inputs into, or are distinctive features of, the relevant decision process."

1. In this document, "science" is meant to include the natural and health sciences, as well as mathematics, engineering and technology. In work by the Council of Science and Technology Advisors (such as the 1999 SAGE report), "science" is more broadly construed to also include the social sciences.

In order to fulfil these roles, and be relevant to a broad client base, the science base behind government science-based policy and regulation is diverse. It includes a variety of tasks that include both research and development and related scientific activities such as:

- Research, model building, and analysis
- Monitoring, data gathering, and assessment
- Technology and indicators for research and development
- Performance measurement and reporting activities
- Priority setting and foresight in science and technology
- Acquisition of best available science advice, drawing upon a wide range of expert sources and institutional arrangements both within and outside government
- Publication of scientific advice and analysis underlying policy and regulatory decisions as well as the associated research findings of scientists[v]
- Participation in national and international science programs
- Scientific assessment (including risk assessment) of policy options or alternatives
- Research in support of government regulatory functions
- Pre-competitive research and technology development

## *Science/Policy Integration and the Federal Framework for Science Advice*

Within federal science-based departments and agencies (SBDAs), some of the exchange of scientific information that takes place on a regular basis falls under the scope of science advice. [To ensure that government decisions are informed by sound science advice, a government-wide set of principles and guidelines was put forth in the Council of Science to ensure that government decisions are informed by sound science advice was put forth in the Council of Science and Technology Advisors' 1999 report, *Science Advice for Government Effectiveness*[vi] (the SAGE report)]. The federal government subsequently adopted these principles for the provision of science advice as *A Framework for Science and Technology Advice*.

**Framework Principles for Science Advice:**[vii]

**Early Issue Identification** — The government needs to anticipate, as early as possible, those issues for which science advice will be required, in order to facilitate timely and informed decision-making.

**Inclusiveness** — Advice should be drawn from a variety of sources and from experts in relevant disciplines, in order to capture the full diversity of scientific schools of thought and opinion.

**Sound Science and Science Advice** — The government should employ measures to ensure the quality, integrity and objectivity of the science and science advice it uses, and ensure that science advice is considered in decision-making.

**Uncertainty and Risk** — Science in public policy always contains uncertainty that must be assessed, communicated and managed. Governments should develop a risk management framework that includes guidance on how and when precautionary approaches should be taken.

**Transparency and Openness** — The government is expected to employ decision-making processes that are both open and transparent to stakeholders and the public.

**Review** — Subsequent review of science-based decisions is required to determine whether recent advances in scientific knowledge have an impact on the science advice used to reach the decision.

The six principles for effective science advice set forth in the federal framework are intended to ensure that the best available science is brought to bear on relevant issues, and that the integrity and the effective use of science and science advice is maintained. The federal science-based departments and agencies have recently undertaken reviews of their science advice processes and are creating plans to implement the federal framework in order to strengthen the formal mechanisms that exist for providing advice from their science to their policy capacities. The Government of Canada's new Innovation Strategy sets forth the government's commitment to fully implement the federal framework by 2004.[viii]

Some progress has also been made, although less systematic attention has arguably been given, to the equally important cultural elements that underlie the interactions between the science and policy communities.[ix] These elements play a role in the formal and informal flow of science advice that occurs within SBDAs on a regular basis (among scientists, among policy-setters, and between scientists and policy-setters). Gaps occur at the interface of science and policy when there are cultural boundaries between the groups.

"Boundaries define physical units, groups, and, most importantly, cultural units. In the case of cultural units, the boundary is 'conceptual' in the sense that the shared tacit assumptions that make up a cultural unit define what words and actions mean. Members of the cultural unit understand each other because they share concepts and meanings."[x]

Stronger common purpose and the integration of science and policy will advance the principles of the government's Framework for Science Advice,[vii] by helping to:

- Enable decision-makers, policy advisors and scientists to communicate emerging issues requiring advice, and improve the connections between research and potential policy or regulatory issues (*Early Issue Identification*).
- Encouraging scientists and policy advisors to establish linkages with each other (*Early Issue Identification*).
- Allow departments to seek a wide range of inputs for science advice, and allow decision-makers to consider multiple viewpoints (*Inclusiveness*).
- Ensure that a strong link exists between science advisors and departmental policy advisors (*Sound Science and Science Advice*).
- Enable scientists and science advisors to assist decision-makers and science managers to set research priorities and design a research base that will support future science-based decision-making (*Sound Science and Science Advice*).
- Ensure that scientists and science advisors explicitly identify scientific uncertainty in scientific results and that they communicate such uncertainty directly in plain language to decision-makers (*Uncertainty and Risk*).

Efforts to improve relationships between science and policy communities will have the additional benefit of providing support for the identification and addressing of science capacity needs, the importance of which was highlighted in the Council of Science and Technology Advisers' (CSTA) report, *Building Excellence in Science and Technology* (BEST).[iii] Integration and common purpose between science and policy will also help to improve the excellence of federal science, as outlined in the framework of the CSTA report, *Science and Technology Excellence in the Public Service* (STEPS).[iv]

# IDENTIFYING THE NEED FOR A NEW PARADIGM

CHAPTER 2

Science and policy functions exist in the public service to provide advice to governments. To do this in the best manner possible, it is of paramount importance that science and policy work together in an integrated fashion. Progress has been made by building bridges and interfaces to better link these communities. But the present and emerging challenges are unlike those of the past — they require a fundamentally new approach, one of common purpose and integration.

As part of the Roundtable's research process, regional dialogue events were held in order to examine the nature of current interactions between science and policy in federal science-based departments and agencies. These events were also used as tools to seek out best practices and solutions for working towards what the Roundtable came to call common purpose and the integration of science and policy. During these dialogue events, participants brainstormed on key issues between science and policy communities, and then worked on approaches to resolve those issues.

While dialogue event participants highlighted a variety of issues, many similar issues were brought forth at more than one dialogue event. These key issues are presented below, grouped into four baskets: values and conceptual models; communication; understanding the processes; and science capacity.

## Values and Conceptual Models

Since the release of the 1996 report *A Strong Foundation*, discussions of the importance of values and ethics in the public service are being increasingly brought to the forefront. According to the report:

***Values are** enduring beliefs that influence attitudes, actions and the choices and decisions we make.*

***Ethics are** that dimension of human thought and behaviour which is guided by standards and principles of right conduct…ethics involve a commitment to do the right thing.*

### What we heard:

Public servant, or scientist? The core values are very different.

We should not confuse roles and people – if you are a scientist, is that your role, or your training?

Long-held research topic preferences do not always fit into current policy requirements.

Are scientists hired first and foremost as public servants?

Values and ethics can represent a major barrier to the effective integration of science and policy communities in the public service. People working in different science or policy positions, or those with differing backgrounds or training, may hold diverse value sets.

For example, some scientific values are that science is freely available public knowledge (communalism), there are no privileged sources of scientific knowledge (universalism), science is done for its own sake (disinterestedness), and nothing is

taken on trust (scepticism)[xii]. At the same time, public service also embody important principles such as loyalty to government and service to the public, as well as neutrality, integrity, speaking truth to power, and equity.[xiii, xiv]

Ethical dilemmas for scientists or policy-makers may arise when some of these values are in conflict within the process of using scientific knowledge to inform public policy. Dialogue event participants noted that it is essential to be able to reconcile the seemingly disparate values that exist in the science and policy communities. When ethical dilemmas arise, how are public service values and professional/scientific values considered and reconciled?

While it may be easy to conclude that scientific values are destined to conflict with public service values, this in fact is not the reality. There is a strong commonality between scientific and public service values, with perhaps the most important shared value being that of working towards the public good — their common purpose. Scientists achieve this by searching for solutions to complex questions or problems; policy-makers achieve this by implementing carefully researched and well thought out policies and regulations. Scientists and policy workers share other principles such as loyalty to government, non-partisanship, and integrity.

A further issue brought to light by dialogue event participants is the difference in conceptual models held by members of the scientific and policy communities. When they graduate from university, those trained in various disciplines (for example, social scientists, natural scientists and engineers) have specialized in a specific branch of knowledge. They have largely adopted the assumptions and principles that accompany their given discipline, which is natural after having spent an extended number of years studying in their field. But most students have no other background or models against which to challenge their learnings or broaden their experience. This can create potential difficulties, as the underpinnings of these disciplines are not left behind when a person enters the government work force, but instead travel with them. Further difficulties may arise due to differences in levels of training between people working together on science/policy issues.

For example, research scientists in an academic setting pursue research constrained primarily by funding restrictions and teaching obligations. Generally, these scientists will pursue research on self-identified issues, with a goal of generating answers to questions and identifying new research questions. In the public service, however, research must be relevant to departmental mandates, and support the decision-making process. Are such expectations, roles and purposes made clear to scientists when they enter the public service?

Similarly, policy workers striving to integrate scientific knowledge into decision-making are constrained by their previous experiences and backgrounds, which may not have involved much exposure to the process, products, and principles of scientific research. This creates a challenge for them to assimilate and understand key information and advice from the science community so that it may be effectively applied to policy decisions. This must be achieved without filtering out any of the important scientific information before it can be included in the decision-making process (i.e., scientific information must be assimilated and understood, and not revised or incorrectly interpreted).

A further issue between scientists and policy workers is that a scientist's community is usually defined not just by his or her organization, but by the general scientific field. For example, a whale research scientist at Fisheries and Oceans Canada may define his or her professional community not necessarily as other researchers or employees in the department or government, but as other whale researchers (both nationally and internationally). Those involved in policy work may not identify themselves as members of such broad, external communities. Thus, the identification of an individual's community may differ between science and policy workers. Scientists must have strong relationships with their colleagues in other sectors, and policy workers must be able to recognize those relationships in order to benefit from the broader perspective of those in the scientific community.

## Communication

Dialogue event participants working in both science and policy positions indicated that communication barriers represent a key gap in the integration of science information into policy work. Participants identified two major types of communication gaps: a lack of regular, formal and informal dialogue between scientists and policy groups; and difficulties arising both from differences in the languages in which science and policy information is transmitted, and difficulties in understanding the scientific content of the message.

### What we heard:

Scientists do not always communicate results well; managers do not always have the skills to correctly interpret the science.

Scientists and policy people live in different worlds with little exposure to each other's worlds.

More mechanisms are needed to connect science and policy communication.

### *Opportunities for Interaction*

There is much room for improvement in the quality of interaction between scientists and policy workers in their organizations. Dialogue event participants felt that while some formal mechanisms exist for the two communities to interact, there is little initiative to establish informal and on-going interaction and dialogue between the two groups. This lack of interaction was seen to result in policy makers who are not able to fully and accurately anticipate emerging science issues within their organizations, and science groups who are not equipped to tailor their research questions and directions with an up-to-date appreciation of the ongoing issues explored by those involved in policy and priority setting.

Limited opportunities for interaction between the science and policy communities is an issue not just for face-to-face meetings, but also for additional forms of information sharing between the two groups. For example, the traditional scientific system of publishing key findings in primary publications or scholarly journals has the potential to create an information-sharing gap with the policy community.[xv] It is sometimes perceived that there is little incentive for scientists to disseminate their findings in non-traditional fora that would be more accessible to the policy community. There may also be a similar lack of opportunities or interest for scientists to get acquainted with key policy documentation in their organizations. In reality, however, SBDAs are increasingly applying practices (such as "open files" and providing formal peer-reviewed scientific advice) that allow new and relevant scientific information to be rapidly transmitted to both scientists and decision-makers.

### *Understanding Language and Content*

Increasingly, federal science-based departments and agencies are making efforts to communicate the results of science to the public in easily understandable language. This open and accessible communication, however, does not always exist between scientists and policy-makers within organizations. In particular, jargon and writing styles differ greatly between the two groups. As a result, scientific knowledge is not always relayed to the policy side in a manner that is easy to understand. In particular, scientists who are not regularly exposed to the policy process may have difficulty presenting their science according to the framework and language of policy-makers. If this could be achieved, scientists' knowledge and information would get more attention from policy workers. Similarly, requests for science advice from policy workers may also be difficult for scientists to interpret.

Perhaps greater than the obstacles associated with understanding the unique languages of policy and science, however, are the inherent difficulties of relaying technical, specialized scientific information to the policy community in a form that will convey the important knowledge without oversimplifying the science,[xii] yet still be understood by non-scientists. One facet of this problem is that of conveying scientific uncertainty: policy-setters must be able to understand and weigh the uncertainty surrounding scientific findings so that clear decisions can be made.

Furthermore, when policy-makers ask scientists for their opinions concerning issues of scientific uncertainty, it must be clear throughout the decision-making process that those views are opinions only, and *do not* constitute scientific consensus or certainty.

Some dialogue event participants expressed the opinion that these problems are exacerbated by the inability of scientists to act as interpreters or translators of their information for policy people. Scientists may need assistance in communicating their knowledge to those involved in policy, and policy-makers may need assistance in interpreting the information that is provided by scientists.[xvi]

## Understanding the Processes

A significant gap between the federal science and policy communities is that policy people often misunderstand the scientific process, and scientists often misunderstand the policy-setting process. A significant part of this misunderstanding stems from the fact that researchers and policy-makers traditionally connect around end-products (either scientific information or finalized policies) and not during the process of developing questions and setting priorities.[xvii] Scientists have little opportunity for exposure to the policy-making process, and policy people have little exposure to the scientific process. As a result, scientists are unsure about just how their information is used to formulate policy, and policy people face challenges when trying to obtain the best possible scientific knowledge to inform their decisions.

### What we heard:

Timeframe differences exist between work that is urgent and work that is important.

At times, policy people need immediate information, and thus expect "tea-bag science" answers.

Policy has many non-science inputs that are not issues for scientists.

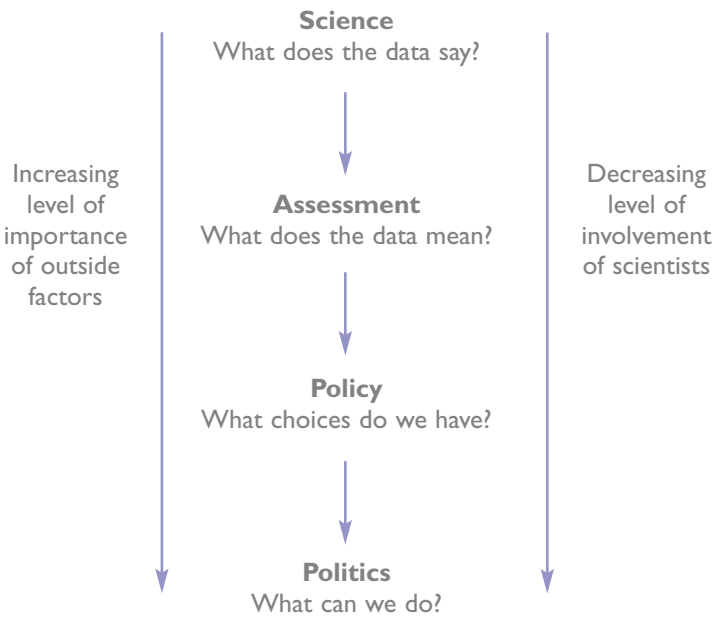
Science sometimes does not answer the key question for policy — 'so what?'.

### *The Policy Process*

"In an ideal world of rigorous evidence-based policy-making, policy analysts would depend primarily on research evidence to identify emerging trends and scope out the parameters of social needs."[xv] In reality, however, the level of contribution of scientific inputs into policy varies. In some cases, the interpretation of research may imply a course of action for policy-makers but policy does not seem to respond, and sometimes policy decisions are inconsistent with scientific knowledge.[xv] This may result in frustration on the part of scientists, which stems partly from a lack of understanding of the process of formulating policy from science.

The science/policy decision-making process can be seen as a continuum, starting with scientific information, leading to an assessment process, leading to policy choices and finally culminating in political decisions. Along this continuum, there is a decreasing level of involvement on the part of individual scientists and their knowledge, and an increasing level of importance of outside considerations such as economics and social issues.[xiii] Thus, because individual scientists are somewhat removed from the decision-making process, there may be ambiguity or misunderstanding concerning what kind of scientific information the policy community is requesting, or how that information will be used in assessment and policy formulation.

## The Science/Policy Decision-Making Process[xviii]




"The best thing that we could do would be when developing policy, as part of our policy of openness and transparency, is to be sure that we ascribe decisions based on what input went into that decision-making, and recognize that some of the inputs into that decision were based on values and ethics and dollars and economy and they are not just based on science data."[xix]

## *The Scientific Process*

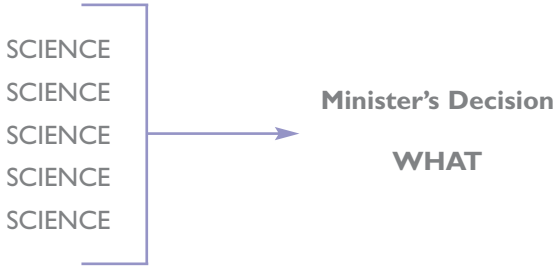
Policy-makers who request immediate end-products from researchers in order to inform decisions may not be fully aware that scientific products stem from an often lengthy process which includes setting priorities, framing scientific questions, choosing methodologies and securing funding.[xvii] One key cultural element that often creates a gap between policy-makers and scientists is the concept of different work timeframes[x]: policy managers often function on "planning time", which is a set of decisions about when things have to be accomplished, whereas scientists often function on 'development time', which is the length of time required to complete a scientific process. Furthermore, scientific exploration may involve discovery science, which is sometimes undervalued by the policy community. This type of science, however, has worth as 'not-yet-applied' science that may serve to inform future policy decisions.

The policy community must also be better informed of the uncertainty of scientific knowledge. In all scientific knowledge and information, there is an inherent level of uncertainty. "It is increasingly recognized that science, particularly at the frontiers of knowledge, is uncertain. This type of uncertain science may be the science that is of most relevance

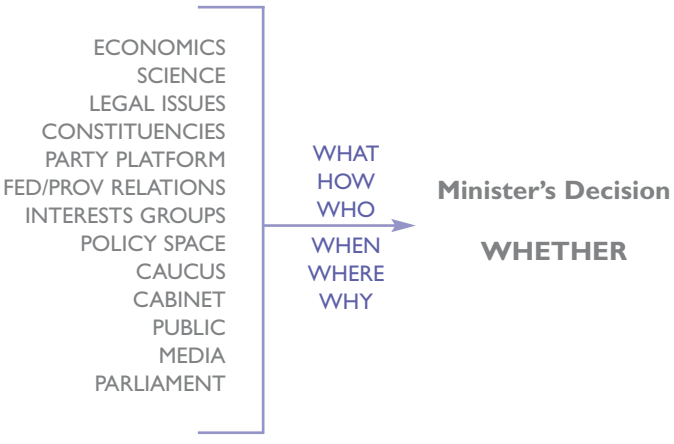
### *Differences in perspectives of the decision-making process* [xxi]

The view of the role of science inputs into the decision-making process may vary depending on an individual's perception. This is illustrated in the following, admittedly oversimplified, diagram:

### Perspective of Science Community




### Perspective of Ministers



to policy-makers."[xx] It is the challenge of the science community to be able to clearly express the meaning of the uncertainty of their science to policy people. It is the challenge of the policy community to be able to interpret the 'shades of grey' associated with uncertainty in scientific information, and translate that uncertainty into 'black or white' policy.

## Science Capacity

The final issue brought forth by science and policy participants at regional dialogue events is that of the impact of science capacity on the ability of science to efficiently and accurately inform federal public policy. The capacity issues discussed by participants involved both human resource and funding capacity concerns.

Increasingly, as Canada solidifies its base as a knowledge-based society, scientific information is being brought to the forefront. Thus, the demands for science advice to feed into public policy are continually increasing, but participants expressed the sentiment that there has not been a much-needed concomitant increase in resources to match these demands for advice.

### What we heard:

We are not flexible and nimble enough to reallocate human resources to meet the needs of new priorities.

Renewal of scientific capacity is slow and establishing scientific credibility is a long process, resulting in a potential generation gap for scientists.

Personal research issues need to be tied to departmental vision in order to make best use of science capacity.

On human resources issues, a growing level of new, complex science/policy issues with many stakeholders are necessitating multidisciplinary, broad-based science teams working on issue identification and problem solving. Dialogue event participants noted that science competency and capacity must be renewed in order to achieve this goal, and to allow for a higher level of integration of science and policy in federal science-based departments and agencies.

Re-evaluating personal research agendas to bring scientists' core research more in line with departmental priorities and vision is an important step which will help with human resources limitations at the interface of science and policy communities. Participants also expressed concerns that science-based departments and agencies are too compartmentalized and fragmented — they have many research groups and are spreading themselves too thin.

Federal SBDAs must be able to sustain science assessment and advice programs, and not just discovery science, due to their mandate requirements for science-based policies and regulations. As a result, in order to be effective in allocating funding, it is important that long-term research priorities are well connected to assessment, advisory and regulatory needs. Dialogue event participants noted that the federal government must have a science capacity that is nimble and responsive in the face of our rapidly shifting environment.

As discussed, many issues were identified by dialogue event participants as hindering integration and the establishment of common purpose between scientists and policy workers in the federal public service. They include: differences in values and conceptual models, communication difficulties, misunderstandings surrounding the scientific and policy formation processes, and science capacity issues.

When examining these issues, the key question to consider is *"What can be done to address these issues in order to achieve a common purpose and bring about new integration between science and policy communities?"*

The four cornerstones to making progress on this are presented below. These cornerstones emerged from Roundtable deliberations on the issues underlying science/policy relationships. They help to address many of the underlying problems and issues identified by dialogue event participants. Also presented are best practices and suggestions for working these cornerstones into departmental practices. While these cornerstones focus primarily on science/policy integration and common purpose *within* departments, it is also important to remember that many current science issues will be best solved with a horizontal, multidisciplinary approach. Thus, science/policy integration must ultimately occur between departments as well as within departments.

## Roles within Science and Policy Communities

Scientists (whether they perform research or not, or provide advice or management or not) and policy decision-makers all work in the federal public service with the primary goal of contributing to the mandates of their departments, and ultimately the public interest. These mandates can be as diverse as protecting the health of the public, managing natural resources, or regulating products in the marketplace.

### What we heard:

The objectives of science and policy are the same — to work in the public interest — but we do not always see them as being the same.

We hire scientists for their specific expertise, but we do not do a good job of connecting them to the bigger mandate of the organization.

One barrier to an effective relationship between science and policy in SBDAs is that employees do not always perceive their direct or indirect contributions to the 'bigger picture' of their departmental mandates, nor are they always made aware that these contributions are the reason why they are employed by the federal government.

It is essential that members of both the science and policy communities be made aware of their individual roles in contributing to the 'bigger picture' of their departments (as should any public servant). For example, dialogue event participants noted that scientists are traditionally hired as academics on individual, or small team, research projects. The expertise of these scientists is invaluable, but they must also be made aware that there is an expectation that they will play a role in

the development of policy in their organization. This role may be fulfilled simply by contributing their scientific knowledge or information to the decision-making process, or it may involve a more direct input into the policy development process in the form of furnishing scientific advice for decision-making.

Similarly, policy workers in federal SBDAs must be made aware that they will be expected to liaise with and seek advice from scientists or science groups in order to work in multidisciplinary teams on important science issues for their organization. These expectations should be conveyed at the time of hiring new recruits; renewed discussion on the subject of expectations and roles will help to bring about awareness for existing members of science and policy communities.

Science and policy are equal functions that contribute to the well-being of Canada and Canadians. Again, the **common purpose** shared between science and policy communities in the federal public service is that they are both **contributing to the public good.**

Increasingly, the Canadian public expects solutions from the government on science-based issues that affect them. By clearly understanding that science and policy workers alike share common purpose, the two groups will be better disposed towards working as teams in order to optimize how science informs decision-making and policy-setting.

**Dialogue event suggestions for aligning science and policy work with roles and purposes in organizations:**

- Conduct more formalized meetings of science and policy communities, at management and operational levels, for on-going review and discussion of roles.
- Encourage an iterative process of information sharing between the two communities, so that scientists understand the evolving needs of policy workers, and policy workers are kept up to date with science information.
- Aim for a bottom-up and horizontal process of sharing information between science and policy in order to facilitate the presentation of issues to higher management.
- Along with that bottom-up participation, ensure that top-down vision is brought to light on the interactions between science and policy communities.

Building awareness of the contributions of science and policy workers to the fulfilment of organizational mandates, and promoting a sense of common purpose within both communities will help to…

- assist science and policy public service workers in reconciling professional (scientific or otherwise) and public service **values**,
- allow the communities to overcome differences in backgrounds and **conceptual models** by promoting roles as team members,
- promote **communication** and interaction between science and policy.

## Organization of Work

A lack of integration between science and policy communities in federal departments may in many cases be due to the way work is organized. Traditionally, science and policy functions usually overlapped only on a limited number of discrete needs such as formalized requests for information or through the work of science advisory bodies. In some cases, the science and policy functions in an organization interact only on ad hoc, crisis bases when scientific information is urgently needed for decision-making, and little additional feedback is provided from either science or policy workers. In other cases, work is organized into parallel programing: distinct groups work separately, but in the same direction.

### What we heard:

We must work at capturing different perspectives in a synergistic way to get the best policy from the science — "none of us is as smart as all of us."

Communication is most effective when it is focused on long-term issues and not just crisis issues.

Working together must also include overcoming physical separation between science and policy communities.

It is becoming clear that this traditional organization, which contributes to segregation between the science and policy processes, has prevented integration between science and policy communities. In particular, it has entrenched barriers to on-going and informal dialogue between the two communities, and has resulted in misconceptions surrounding the processes involved in doing both science and policy work in the federal government. As one Roundtable member noted, "we have organized ourselves to have a gap between our policy and science groups."

Dialogue event participants pointed out that in order for science to inform public policy in the most effective manner possible, new synergies are needed between the groups that will allow the best scientific information to be translated into policy. Achieving this does not require a restructuring of science and policy functions in departments. With a constantly changing environment, science and policy cannot be effectively restructured to respond to every changing need. Instead, a fundamental *re-thinking* of the way work is organized in present structures is required.

The aim of this re-thinking is to eliminate previous reliance on organizing people merely around their functions and their communities, and instead to mobilize people around *specific issues*. This involves groups of people with both science and policy roots working together from the outset around key issues. This kind of collaboration entails moving beyond bringing science and policy groups together to interact in add-on events (such as occurs in fora like day-long workshops[2]), in order to **ultimately change how work is done on a day-to-day basis by achieving regular, and preferably institutionalized, collaboration and information sharing.**

This type of organization, based on grouping people together on a regular basis around issues, permits integration through reflective dialogue between science and policy groups separated by cultural differences. This approach of 'going slow to go fast' allows for conversation with an initial goal of mutual understanding, and not necessarily action. This helps both groups to fully define the issue in question, and to promote consensus on the meaning of important concepts.[x]

The traditional organization of discrete science and policy capacities in federal departments complicates the task of early issue identification.

"By treating policy as a discrete product rather than an extended process, researchers miss the opportunity to influence how issues are framed or even whether they make it on to the policy agenda. By treating research as a product instead of a process, decision-makers miss the opportunity to influence both the topics under investigation and the approaches adopted."[xvii]

Organizing science and policy workers around solutions to key issues allows for effective and expeditious early issue identification. Furthermore, policy workers are more likely to understand scientific information, and thus make use of it in future policy setting when they are better integrated with the science community from the early stages. Under these conditions, "familiarity breeds pertinence, not contempt."[xvii]

An additional noteworthy point with regard to organizing science and policy capacity around key issues is that these groups are often physically separated within departments (and may be located in different buildings, or even different regions). If integrating science and policy is to be achieved by focusing collaborative groups around issue resolution, then reducing or eliminating this physical separation, at least virtually, would be a concrete step towards that goal.

2. There are definite merits, however, to this type of interaction. For example, the format proved to be a successful step in the right direction at Natural Resources Canada's popular Science and Policy Linkages workshops. Such opportunities for interaction are one important approach towards increasing interaction and collaboration between science and policy communities.

**Dialogue event suggestions for organizing science and policy teams around issues:**

- Use incentives (like project funding) to reallocate staff to specific research needs in order to build capacity in new areas.
- Institutionalize a process for communication around specific issues.
- Encourage collaborations such as 'workout' groups, where informal meetings on specific issues result in recommendations that are acted on by managers.
- Facilitate science/policy collaborative ventures while still providing support for scientists' original and long-term research projects.

Several key science issues that are increasingly prominent for Canadians include security programs, climate change, genetically modified food, and toxins in the environment. Complex issues like these cannot be wholly addressed within the confines of traditional science/policy interactions in the federal government. Providing optimal scientific information on these issues to policy decision-makers must be achieved by multidisciplinary, cross-departmental teams that have full appreciation of the science and policy considerations relating to each issue. **The paradigm of common purpose and integration between science and policy must be realized in order to best address these complex science/policy issues.**

## Steps in the right direction – some examples:

Agriculture and Agri-Food Canada has recently undertaken a realignment of its work, through horizontal, interdisciplinary, and multi-branch teams. Moving away from traditional hierarchical approaches, the goal is to dramatically strengthen science/policy coordination, and the way the two communities work together. This shift is designed to move the department from a branch management approach, to a one-department management approach.

Successful joint science/policy initiatives in the federal government already exist around specific key science issues (for example, the Bovine Spongiform Encephalopathy (BSE) project operating at Health Canada).

Environment Canada has established four Business Lines mandated to provide a focus for priorities, strategies and results shared across business lines, resource issues that have impacts across business lines, and business-line based scientific issues. This structure has exposed regional managers to the science and policy rationale of important environmental issues within the department, and has facilitated intra-departmental knowledge sharing linkages.[xxii]

The creation of fisheries management plans at Fisheries and Oceans Canada is an example of a successful, and continually improving process that focuses science and policy workers around an important issue. The process is institutionalized within the department, it is organized around problems and solutions, and the science and policy participants have taken the time to get to know each other and become very familiar with the unique processes and problems of fisheries stock assessment and management.

Structuring departmental science and policy work around issue resolution, and not around functions or communities, will help to…

- promote regular **communication** and understanding between the groups,
- break down pre-existing **conceptual models** regarding set roles within the public service by focusing both scientists and policy workers around solving problems in the interest of the public good,
- overcome the **differences in processes** between science and policy work by providing a shared timeline for acquiring scientific information and applying it to policy decisions,
- create multidisciplinary teams with broad skill bases that are flexible and make effective use of funding and human **science capacity**.

## Training and Development

There is a need for training and development opportunities in order to more fully integrate scientists, and their scientific knowledge, into the decision-making and policy formation process in the public service. The focus of these opportunities should be the establishment of a solid core of communication between members of the two communities who may have been trained in different disciplines and may have different styles of learning and communication. Training and development would assist science/policy integration (for both scientists and policy workers) by providing a forum for both groups to come together to focus on understanding and resolving key science-based issues, and would help educate them on the nature of the policy formation and scientific processes.

### What we heard:

We must place more value on interpreters of science for the policy community, and people who will interpret policy requirements for scientists.

Implementing the precautionary principle and risk management are steps towards incorporating the science of dealing with uncertainty into regulations and policy.

An obvious area for the training of policy workers that would help eliminate differences between science and policy workers is education on basic issues in science, which are playing an increasingly prominent role in Canadian society. In a broader sense, training programs for the policy community could provide information on the nature of the scientific process. In particular, it is of paramount importance for decision-makers in the public service to fully understand how scientific uncertainty stems from science knowledge, and how that uncertainty should be sensibly interpreted in order to inform decision-making and allow risks to be appropriately managed. This is additionally relevant in light of the Federal Precautionary Approach Framework[xxiii] that is being developed to manage how the Government of Canada approaches science-based risk and uncertainty in decision-making.

Uncertainty in scientific advice and the risks associated with policy options should always be assessed by advisers and policy-makers, who must be candid about limitations of the scientific knowledge used to reach a decision.[xx] Learning opportunities for policy workers on the concept of uncertainty would help them thoroughly understand, and then adequately communicate, the impacts of uncertainty on scientific knowledge and on policy decisions. Equipping policy-makers to incorporate scientific uncertainty into their decision-making frameworks as elements of knowledge (instead of ignorance) will result in more robust and credible public policy.[xxiv]

"Should scientists who are to work [or do work] for the government be provided with training aimed explicitly at helping them understand the values and ethics of government and how they influence the obligations on and the operations of science in government?" [xii]

The answer to the above question is most likely yes (with even broader training and development probably needed). Learning opportunities are essential for scientists who are asked to contribute to the policy formation functions in their departments. Such sessions could incorporate discussions of scientists' roles in their organizations, examples of how to reconcile scientific and public service values, and education on how scientists' personal research fits into the larger mandate requirements of their organizations.

Furthermore, providing scientists with exposure to and education on the policy formation process will help them better understand the process involved when scientific information is used for assessment, advice, and decision-making. This will help establish scientists' trust in the policy formation process, by clearly and openly demonstrating how scientific information (and the associated uncertainty around the information) is fed into policy formation.

Lastly, additional training and development opportunities for scientists will provide communication skills essential for integrating science and policy. This may include providing development opportunities (through situated learning[x] such as work placement exchanges or additional liaisons with research teams, be they in government, academia, or industry) for scientists or policy workers who undertake the role of 'science/policy bridgers' by directly interpreting scientific information for decision-makers. This type of development will aid in creating science diplomats or champions within organizations, which will directly or indirectly influence the process of translating science into policy decisions. It may also result in more scientifically trained staff in decision-making roles, and will allow science and policy groups to achieve effective dialogue and mutual understanding on key issues.[x]

**Dialogue event suggestions for increasing learning, training and development opportunities for the science and policy communities:**

- Provide opportunities (and incentives) for scientists to spend time working in policy groups, or in headquarters.
- Facilitate job shadowing of both science and policy functions.
- Foster a better appreciation of science in the policy stream, possibly through education for policy people on key science issues.
- Foster a better appreciation of policy in the science stream, possibly through education for science people on key policy issues.
- Provide opportunities for training on policy and scientific processes.
- Have scientific people spend time on non-science issues, and vice versa.

## Steps in the right direction — some examples:

Environment Canada and Natural Resources Canada have developed a pilot training course designed to: inform both the science and policy communities on how science advice and decision-making interact in the policy process; provide analysis of science and policy linkages, including ethical issues, by examining key stages of policy development; and enhance understanding of the federal Framework for Science and Technology Advice with regard to various interactions between science and policy.

The Canadian Centre for Management Development's course Leading Policy provides managers with learning opportunities concerning current policy issues. This course centres around class discussions with key players in current controversial policy issues, as well as a live case study of an unresolved policy issue pulled from today's headlines (for example, East Coast Aboriginal fisheries).

Natural Resources Canada recently hosted an interdepartmental workshop on S&T advice, where science and policy staff from over fifteen federal departments and agencies shared case studies and best practices with regard to their experiences at the science/policy interface, and ways to improve the use of science advice. This followed an earlier pilot project by the Canadian Forest Service involving a series of workshops at each regional centre on "The Interface Between Science and Policy," which brought together scientists and policy advisors from headquarters and the regions to review the federal policy-making process, their roles and responsibilities and issues in the CFS.

Health Canada has developed a decision-making framework for identifying, assessing and managing health risks. This general guide is intended for managers and staff who are involved in various aspects of the risk-management decision-making process (including scientists and public health professionals).

In response to the need for formal and ongoing interaction between science and policy at the departmental level, Natural Resources Canada has introduced regular science/policy linkage or "SPLINK" events. These events bring together science and policy practitioners for open dialogue on a particular horizontal issue or theme (the most recent theme was sustainable resource development in the North).

Training and professional development opportunities for science and policy communities that provide insight into the science and policy processes will help to…

- break down barriers that exist between science and policy due to **differences in processes**; these barriers lead to unrealistic expectations among both groups, and the inability to accurately express and fully understand the uncertainty associated with science,
- promote understanding of the differences in **conceptual models** espoused by science and policy communities, and provide insight into their shared public service **values**,
- provide a forum for **communication** between science and policy communities, and provide essential skills and knowledge to ensure that communication is on-going,
- address **science capacity** limitations by equipping more people with the necessary skills to be successful conveyors or interpreters of scientific information at the science/policy interface.

## Rewards and Recognition

A strong interface between science and policy communities in federal science-based departments and agencies can only be fully achieved if there is incentive for scientists to spend time contributing to policy-setting or decision-making, and for policy workers to spend time becoming fully informed on scientific issues. While the outcome of such a strengthened interface — better public policy informed by strong science knowledge — is in the best interest of both science and policy groups, incentives and recognition for individuals and teams will further encourage interactions and reinforce the value of their work.

### What we heard:

It is important for scientists to balance the credibility they gain through primary scientific contributions with contributions that help drive policy objectives.

Cooperation and collaboration by scientists on policy issues are valuable efforts that should be rewarded.

Incentives could be institutionalized to encourage scientists to work on priority areas in departments.

One important aspect of this recognition is at the individual level: science workers and policy workers must be equally recognized and rewarded for contributions made to the integration of science/policy. Dialogue event participants expressed concern that this may not always be the case as regards career recognition and rewards for research scientists.

Specifically, research scientists' positions are incumbent-based. Career advancement is not achieved by competing for new positions, but by attaining a specific level of productivity and development as the basis for promotion. Research scientist classifications range from SE-RES-01 (junior research scientist) to SE-RES-05 (exceptional research scientist with outstanding cumulative achievements). Promotion criteria for research scientists are productivity, creativity, recognition, leadership, and scope of decision-making. Productivity is measured by primary publications and all other types of productivity, including innovation, co-operative research, technology transfer and reviews.

In the promotion criteria for research scientists, leadership is defined as exerting influence on the scientific community and directing scientific programs. It is broken down into scientific leadership, degree of influence, and program leadership. At the SE-RES-04 and SE-RES-05 levels only, the research scientist is expected to provide leadership in more than one field of specialization and exert significant influence on departmental plans, policies and operations.

It should be noted, however, that weighting of promotion criteria is subject to the individual interpretations of the science-based departments and agencies. This makes it possible for SBDAs to interpret the promotion criteria in such a way that provides new incentives (in the form of career advancement)

for research scientists to make increased contributions to policy and decision-making functions. For research scientists, there must be a clearly defined balance between scientific publication productivity and productivity that contributes directly towards advancing departmental missions. This is not an issue of changing the promotion criteria standards, but of shifting the emphasis in order to recognize and reward contributions that are made towards policy work.

It was noted at the dialogue events that scientists from the same departments (but in different regions) had differing impressions of the level of importance of their contributions towards policy work within their departments' interpretation of the SE-RES promotion criteria. This highlights the need for SBDAs to *fully communicate* to research scientists throughout departments and regions how promotion criteria will be weighted.

There are many more scientists in the public service than just research scientists, however. They, and most policy workers, are not promoted based on an incumbency basis. Thus, providing recognition and reward for scientists' individual contributions to policy work must extend beyond adjusting the emphasis of promotion criteria for research scientists. This can be accomplished by providing scientists with the opportunity to see the value of their work recognized (which may be achieved by facilitating participation in national and international science arenas, by providing certificates of appreciation for outstanding work, etc.). Most importantly, however, scientists will see the value of their work recognized through continued support for their research programs.

If science and policy are to become better integrated in the public service, then the importance of contributions to team work must also be considered. Beyond providing recognition for the contribution of individuals (be they scientists or policy workers) to integrating and collaborating, it is essential to reward people for being good team players, and to provide recognition for the contributions of entire science/policy teams.

**Dialogue event suggestions for providing career incentives and rewards to recognize contributions to science/policy integration:**

- Adjust the interpretation of the promotion requirements for research scientists in order to acknowledge and reward scientists' contributions to policy collaborations and policy development.
- Communicate to research scientists, in a clear and accessible manner, exactly how their work productivity (publications, other scientific contributions, and contributions to policy development) in the department will be assessed and weighted at promotion reviews.
- Continue to encourage scientists to disseminate their research findings in primary publications in order to foster a scientifically credible and internationally renowned research capacity.

## Steps in the right direction – an example:

Several SBDAs have re-interpreted their research scientist promotion criteria to recognize contributions to productivity other than primary publications. For example, Agriculture and Agri-Food Canada interprets its research scientists promotion criteria so that attaining the standard with respect to publication in primary journals is not always necessary if other aspects of productivity and research impact are strong.

Valuing the important contributions that scientists and policy workers make towards integration will help to…

- allow scientists to appreciate and develop strong public service **values** by encouraging them to spend more time integrating their research knowledge into policy and decision-making,
- promote **communication** between science and policy by encouraging collaboration and team work,
- address funding and human **science capacity** short-falls by encouraging research scientists to pursue multidisciplinary, solution-oriented research that is aligned with policy priorities in their department.

# BENEFITS OF SCIENCE/POLICY COMMON PURPOSE AND INTEGRATION



The four cornerstones presented in this document are intended to help address issues between science and policy by helping to achieve common purpose and integration. There are many possible impacts for organizations, policy, science and the public in implementing these cornerstones:

## Impacts for organizations

- Greater climate of collegiality, fostering a better workplace
- Increased value for money on investment in science and policy-making
- Enhanced horizontality by bridging departmental silos
- Better public policy as incentives are aligned with objectives
- Better recruitment and retention of skilled people
- Increased relevance of organization's science, leading to increased support for science in the organization, and ultimately increased prominence of the organization's role in science
- Increased ability to recognize current and future needs
- More cost-effective delivery of policies

## Impacts for the policy community

- Better understanding of the entire role of science in key issues
- More responsive science and more realistic expectations regarding science
- Better understanding of uncertainty in policy-making
- More proactive, rather than reactive, policy decisions
- Greater balance of short and long-term science and policy needs
- More timely policy responses to science issues leading to more effective, robust, multidisciplinary solutions
- Improved grounding of policy framework in science, with all expertise on an issue brought to bear up front, and less reworking of policies
- Better advice for ministers

## Impacts for the science community

- Improved morale for the scientific community
- Increased career satisfaction for scientists stemming from improved recognition and new job opportunities
- More satisfaction stemming from better recognition of scientists' direct and measurable contributions to policy, to the organization's mission, and to the public good
- Increased recognition of scientists as solvers of policy issues beyond the provision of science advice and creation of knowledge

## Impacts for the public

- Increased credibility of federally-performed science
- Increased public confidence in government policy-making
- More public support for federally-performed science
- Improved policies that optimize the public interest

# MOVING FORWARD: FINAL THOUGHTS AND ADVICE



This document has outlined many issues that are preventing the establishment of common purpose and the integration of the policy and science communities, as well as numerous approaches for overcoming these issues. Taking concrete action on the cornerstones is the challenge that must be met. Below are some concrete actions that can be taken for each cornerstone.

| Cornerstones | Suggestions for Action |
|---|---|
| **Roles:** Emphasizing that science and policy employees in the public service both share the role of advancing the mandates of their organizations, and that the two communities share the common purpose of working for the public good. | To promote the shared role of achieving mandates and working towards the common purpose of the public good, thoroughly review, communicate and discuss roles and expectations with science and policy workers, both at managerial and operational levels. |
| **Organization of Work:** Encouraging science and policy groups to come together in teams in order to work towards resolving science-based policy issues. | To promote science/policy synergies relating to issue resolution, set up regular and on-going opportunities for science and policy workers to communicate about key science issues that influence decision-making and policy. Be willing to listen to, and address, suggestions or recommendations that stem from these meetings. Group science and policy workers around important issues by using incentives like funding to reallocate staff, and allow scientists to carry on their research commitments while collaborating with the policy community. |
| **Training and Development:** Providing training and education on important elements of key science issues for non-scientists. Providing education on the science and policy-making processes. Fostering professional development for policy workers who spend time working on science issues, and for scientists who contribute to policy-making. | To promote training and development around science/policy issues by encouraging science and policy workers to learn more about each other's worlds, create informal learning opportunities such as lunch-time seminars. Disseminate information that summarizes both science and policy issues to both communities. Promote more formal training and education opportunities by encouraging science and policy workers to attend outside sessions that bring focus to science/policy issues. Provide for development opportunities such as job shadowing and work exchanges between science and policy groups. |
| **Rewards and Recognition:** Recognizing and rewarding the contributions that science workers make to policy groups, and that policy workers make to science groups. | To promote the recognition and reward of integration between science and policy groups, recognize those workers and teams that are successful integrators. Ask them to share their knowledge and expertise with other members of their community. Ensure that scientists know their contributions to the decision-making and policy-making processes are valuable. Be clear with research scientists on the proportion of promotion criteria to be based on their contributions to policy work, and assess those contributions in a fair and open manner. |

These suggestions provide some concrete starting points for implementing the four cornerstones. Acting on these suggestions will allow you to start working toward common purpose and the integration of science and policy in your organizations. However, trying to act on all these fronts at once could be overwhelming. Furthermore, because different organizations and different managers face unique issues and challenges, you may want to identify specific areas where you will take action — those areas that will provide you with the greatest return.

The process of identifying these areas can be undertaken on two levels: 1) asking yourself some key questions; and 2) involving your team.

Before taking action, ask yourself a few questions:

- Do my science and policy people share a clear common purpose?
- Do I encourage and support my staff in ways that will help advance common purpose and integration?
- Do my people understand and appreciate the importance of this issue? If not, why not, and what can I do to address this?
- Do they understand how the policy/science process works, and their role in it?
- Has their involvement in the science-based decision-making process been optimized?
- Am I really committed to doing something about this? If so, do I have a systematic, or at least deliberate, approach to advancing common purpose and integration?

Answering these questions honestly will start to sensitize you to the issues at hand and where your group is. But this is still just your perception of the problem. To get a better reading of where you are really at, and to improve your chances of making progress, you will need to involve your people from the beginning by identifying and prioritizing the issues, and then planning and taking action.

To start working with your team on this issue, we encourage you to have them read this report, and then engage them in a dialogue.[xxv] As William Isaacs points out, a dialogue is "a shared inquiry, a way of thinking and reflecting together. It is not something you do to another person. It is something you do with people . . . Dialogue is a living experience of inquiry *within* and *between* people."[xxvi] A dialogue is not about coming to decisions by using debate to beat others into submission, nor is it a formal process of polite diplomacy and negotiation. It is a candid conversation involving the respectful exchange of ideas, the suspension of knee-jerk judgements, and — above all — careful listening. To borrow Isaacs' phrase, dialogue is a "conversation with a center, not sides."[xxvi]

The virtues of dialogue include the ability to:

- bring together people with different experiences, ideas, expertise, and roles, place them on an equal footing, and solve problems jointly;
- identify and scrutinize deeply held assumptions, preconceptions, and received wisdom;
- unmask pretensions, eliminate social rituals that build walls between people, and change unproductive routines;
- come to collective judgements and, in so doing, generate trust and a shared commitment to act jointly; and,
- build the credibility and persuasiveness of those engaged in dialogue.

You will find that dialogues are best conducted in an environment where participants are afforded the freedom to speak candidly. They need to dispel their fears and feel comfortable contributing. It is important that dialogue not be focused on any one individual but rather on the subject matter. The group's moderator may choose to be highly active in the conversation or simply act as a facilitator — in either case, this role should be clarified at the beginning of the process.

*What should be the result?*

The end result of a dialogue will often depend on the challenges faced by your organization. Ideally, the process will do more than simply inform and sensitize your people to science/policy issues; it will generate two more specific outcomes:

1. **A list of key lessons learned** — The group should have some basic tabulation or recognition of the key lessons learned. This includes lessons about the challenges faced, obstacles and barriers encountered, and potential solutions adopted.
2. **A set of tangible actions** — The group should come up with a limited set of doable, tangible steps to improve your science/policy interface.

Whatever the outcome of this process, you must remember as a manager that your attitude and actions will influence how your people perceive this issue and conduct themselves. It is up to you to communicate the importance of the issue to your staff, to work with them to address the issue, and to ensure that strengthening linkages does not become an add-on to their present work, but is in fact considered an integral part of their day-to-day work.

By taking action and leading by example, you can measurably improve your staff's satisfaction with their work and the quality of the work they produce.

# APPENDICES

## Regional Dialogue Event Participants

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**Secretariat for Dialogue Events**

Geoff Dinsdale (Coordinator, CCMD's Action-Research Roundtables)
L. Sarah Wren (Research Assistant, Fisheries and Oceans Canada)
Hélène Maurais (Learning Specialist, CCMD)

## Further Reading on Science and Policy in Canada

### *Reports of the Council of Science and Technology Advisors:*

*Science Advice for Government Effectiveness* (SAGE). 1999.
**http://csta-cest.gc.ca/pdf/sage_e.pdf**

*Building Excellence in Science and Technology (BEST): The Federal Roles in Performing Science and Technology*. 1999.
**http://csta-cest.gc.ca/pdf/BEST-E.PDF**

*Science and Technology Excellence in the Public Service (STEPS): A Framework for Excellence in Federally Performed Science and Technology*. 2001.
**http://csta-cest.gc.ca/pdf/STEPS.pdf**

## *Research and Discussion Papers:*

Jarvis, B. 1998. *The Role and Responsibilities of the Scientist in Public Policy: A Discussion Paper on Science and Government*. Public Policy Forum.
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