International Institute for Sustainable Development
Institut international du développement durable
http://www.iisd.org

Discussion Paper on an Environment Outlook for Canada

Dale S. Rothman

June 2007

Prepared for Environment Canada by the International Institute for Sustainable Development

Published by the International Institute for Sustainable Development

The International Institute for Sustainable Development contributes to sustainable development by advancing policy recommendations on international trade and investment, economic policy, climate change, measurement and assessment, and natural resources management. Through the Internet, we report on international negotiations and share knowledge gained through collaborative projects with global partners, resulting in more rigorous research, capacity building in developing countries and better dialogue between North and South.

IISD's vision is better living for all—sustainably; its mission is to champion innovation, enabling societies to live sustainably. IISD is registered as a charitable organization in Canada and has 501(c)(3) status in the United States. IISD receives core operating support from the Government of Canada, provided through the Canadian International Development Agency (CIDA), the International Development Research Centre (IDRC) and Environment Canada; and from the Province of Manitoba. The institute receives project funding from numerous governments inside and outside Canada, United Nations agencies, foundations and the private sector.

International Institute for Sustainable Development
161 Portage Avenue East, 6th Floor
Winnipeg, Manitoba
Canada R3B 0Y4
Tel: +1 (204) 958–7700
Fax: +1 (204) 958–7710

E-mail: info@iisd.ca
Web site: http://www.iisd.org/

Discussion Paper on an Environment Outlook for Canada

By Dale S. Rothman
June 2007

This paper was prepared for Environment Canada by the International Institute for Sustainable Development. The views contained in this paper do not necessarily reflect those of Environment Canada.

Table of Contents

Introduction

In June 2006, the Environmental Foresight & Priorities Division (EFPD), now a component of the Knowledge Integration Strategies Division (KISD) of Environment Canada, initiated a multi-year project with the International Institute for Sustainable Development (IISD) to carry out research, methodology development, capacity building and pilot activities in support of the development of an Environment Outlook for Canada (EOC). The EOC will be tailored to Canadian conditions and priorities, while learning from UNEP's Global Environment Outlook processes as well as other relevant international and national outlooks and assessments.

As part of the Annual Work Plan for 2006–2007 for "Project 4: Environment Outlook for Canada" agreed to by Environment Canada (EC) and IISD, the latter agreed to produce a "concept paper on the development of an Environment Outlook for Canada (EOC) report." This was to include discussions around the following issues:

a) Rationale for an Environment Outlook for Canada. (What is an Environment Outlook? For what it is used? By whom? Assessment of its effectiveness for environmental decision-making. Discussion of other jurisdictions' experiences with outlook processes and report development.)
b) Review of other methodologies and implementation, e.g., the United Nations Environment Programme's Global Environment Outlook (UNEP GEO).
c) EOC report development framework (including the linkages to indicators work and national environmental objectives).
d) Assessment of relevance of GEO and other scenarios for Canada, and discussion of adaptation or potential for development of domestic scenarios.
e) Breakdown of GEO data/findings for Canada (where possible).
f) Discussion of models and data for Canada, including how best to present the data (e.g., regional, ecosystems, by provinces, etc.) and identification of possible data gaps).
g) Discussion of information challenges (issues pertaining to data access, compatibility, manipulation, etc.).
h) Strategies for and feasibility of connecting an EOC to the UNEP GEO and other outlook processes.
i) Proposed outlook development process for Canada (including, identification of potential partners, possible timeline, possible costs and resources requirements, proposed governance structure for the project, proposed evaluation of EOC impact for decision-making).
j) Proposed outline for the EOC report structure.

Due to a significant shift in time and effort towards consultative scoping during this period, not all of the issues outlined above are addressed in this paper in the depth originally expected. Topics a, b, c, d and i receive relatively more attention than do the others. In the upcoming work plan for 2007–08, particularly the exploration of the feasibility of an EOC and development of a formal project proposal, scheduled for spring/summer 2007, the remaining issues will be emphasized and those covered in this report will be further addressed.

This document provides background information on the concept of an environment outlook and its potential value for Canada. Specifically, it considers the purposes and value of an environment outlook in general, reviews the impetus for an Environment Outlook for Canada, and discusses the possible processes and products associated with such an endeavour. Earlier versions of this report were used in bilateral discussions with potential collaborators in, and users of, an Environment Outlook for Canada and as the main background document for a Consultative Scoping Workshop on an Environment Outlook for Canada held on March 1–2, 2007, in Montreal. The objective of the discussions and the workshop was to clarify the structure of, and gauge the overall interest in, an Environment Outlook for Canada. We will have occasion to refer to these activities at several points in this document.

Environment Outlooks: Concept, Purpose and Value

The fundamental goal of any environment outlook is to ensure that environmental problems and emerging issues of significance receive appropriate, adequate and timely consideration by governments and other stakeholders. An environment outlook is a specific type of integrated environmental assessment, where the latter is defined as the process of producing and communicating a comprehensive, reliable and scientifically credible, policy-relevant and legitimate assessment of the interaction between environment and society. Following the definition used by UNEP in its Global Environment Outlook project, *an environment outlook is both a process and a series of reports, analyzing environmental change, causes, impacts, and policy responses.*[1]

Box 1. Defining assessment and outlook

- *Integrated environmental assessment:* the process of producing and communicating a comprehensive, reliable and scientifically credible, policy-relevant and legitimate assessment of the interaction between environment and society.
- *Environment outlook*: a form of integrated environmental assessment that considers past, present and plausible future interactions between environment and society.

As an integrated environmental assessment, an environment outlook, in its broadest sense, attempts to provide answers to the five key questions illustrated in Figure 1. Perhaps the key distinction of an outlook is the greater attention paid to the future-oriented aspects of the assessment. Thus, an environment outlook goes beyond a traditional state of the environment (SoE) report, which primarily deals with the first few questions that focus on the past and present situation, to examine the medium- to long-term impact of current trends as well as present and future policy choices.

[1] More information on the GEO project can be found at http://www.unep.org/geo/.

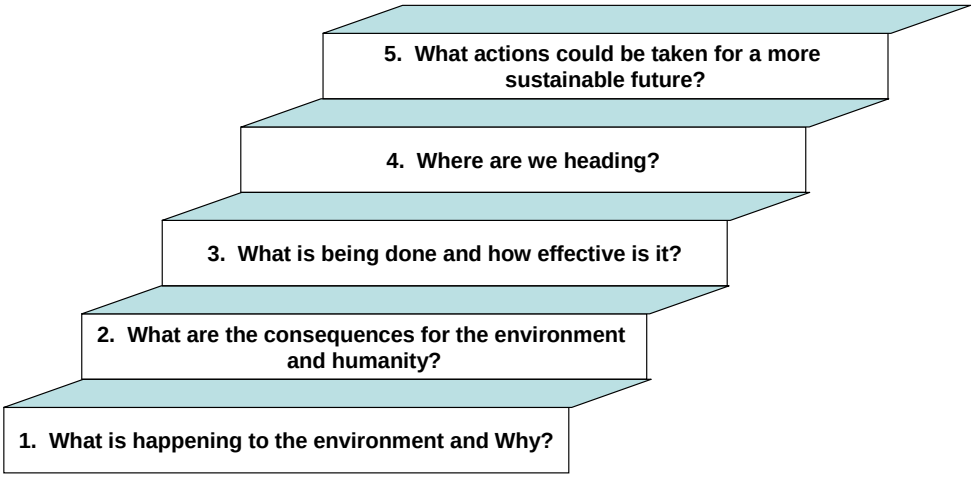

Figure 1. Range of key questions to be addressed by an environment outlook

Many ideas have been expressed concerning the logic behind, and value of, environment outlooks. Environment outlooks seek to serve a number of purposes: providing information for decision-making; supporting early warning efforts related to environmental change; and building capacity of researchers and practitioners. In this way, they contribute to the identification and management of environmental risk. They force decision-makers to recognize that decisions made today have a long-term impact, the outcomes of these decisions will be influenced by many factors, and factoring the future into decision-making is important to ensure performance and effectiveness. Undertaking an environment outlook enables a rigorous analysis of environmental and environmentally significant decisions, i.e., those that have a considerable impact on the environment. In short, their ultimate value is to contribute to the formulation of more effective and proactive policy responses and decision-making.

The Global Environmental Assessment Project[2] has explored in detail the effectiveness of a number of environmental assessments, including outlooks, at various scales. The researchers in the project found, among other things that "(an) assessment('s) influence with any audience depends on that audience seeing the assessment as salient, credible and legitimate" and "audiences tend to see those assessments as salient, credible and legitimate in which they have been able to participate in a process of co-production of knowledge."[3]

Box 2. How an audience must see the assessment

- *Salient*: relevant to potential users.
- *Credible*: based on authoritative, believable and trusted information.
- *Legitimate*: having considered the values, concerns and perspectives of a variety of actors.

[2] See Mitchell, Clark, Cash and Dickson (eds.) (2006). *Global Environmental Assessments: Information and Influence*. Cambridge MA: MIT Press and Farrell and Jäger (eds.) (2006). *Assessments of Regional and Global Environmental Risks: Designing Processes for the Effective Use of Science in Decisionmaking*

[3] Mitchell, Clark, Cash and Dickson p.309.

These lead to a number of important considerations for developing an environment outlook. Specifically, the process needs to emphasize:

- providing access to the best scientific knowledge to allow for effective policy-making and environmental governance, and to promote the mainstreaming of environmental concerns into social and economic sectors;
- facilitating the interaction between science and policy through multi-scaled and multi-dimensional integrated assessment processes and products of high legitimacy, credibility and utility; and
- building geographic and gender-balanced partnerships and capacity for environmental assessments.

During the consultation workshop, participants expressed views on what they felt would be the value of an EOC to the country as a whole and to their organization in particular. At the more practical level, the process of developing an EOC would provide a means to integrate data/information and build capacity for greater interoperability. At a policy level, some organizations felt that an EOC would provide the strategic direction needed to better plan organizational work in a way that would make them more focused and effective in their policy responses. It was generally agreed that such an outlook could contribute significantly to evidence-based policy development, including policies needed to meet international commitments. Overall, the participants highlighted the potential value of an EOC in the following areas:

1. **Engagement:** An equal weighting was seen in the value of the process itself and its report(s)/related product(s). Scalability (local-regional-national-continental-global) of the outlook process was highlighted as a valued attribute given the broad engagement of various sectors and the public, and the multiple scales they represent. Credible, vetted, participation-driven environmental information to be used by a large audience was highlighted. A process that provides coherence to numerous existing programs, projects, and research and policy initiatives was noted as a unique and needed value that an EOC could fulfill. Through the identification of areas of concern and information gaps, an EOC could contribute to strengthening and developing partnerships across government, the private sector, the scientific community, universities and civil society. An EOC process could assist in building a cross-government environmental intelligence network as well as potentially engaging high-level decision-makers in scenario development, helping to reframe possibilities and shape future policy.
2. **Harmonization:** An EOC could be instrumental in enhancing cooperation and further collaboration among provinces/territories by facilitating cross-jurisdictional dialogue on environmental and sustainable development issues. An EOC could help prioritize national scale issues, and reconcile different cultural and regional perspectives in Canada. In addition, an EOC could help set the national context for policy development of organizations operating at local and sub-national levels. By prioritizing national scale issues and linking to other initiatives, an EOC could also assist and support an environmental planning mechanism at a national level and

provide a context for national, sub-national and sector-specific reporting commitments.

3. **Credibility:** An EOC could provide an authoritative source for a variety of uses including but not limited to: communications (media); research (academic and government institutions); and policy development. However, this depends highly on the credibility of the information and the process used to produce it.
4. **Capacity Development:** Both through the process and the reporting products, an EOC could help build capacity and awareness at various scales and among various groups. Participation in an EOC could build capacity for provincial/territorial Environment Outlooks. An EOC could provide a practical yet rigorous science-policy interface and assist in developing policy supported by scientific analysis.
5. **Data Integration:** In order to meet the demand for accurate knowledge for environmental and sustainable development policy, an EOC could contribute to, and provide a mechanism for, the sharing and interoperability of data, models and information—potentially providing a legacy of data integration if undertaken as a national process. As an integrative assessment, an EOC could also consolidate and showcase the solid basis of existing research and partnerships while identifying data gaps/priorities at various scales and potentially stimulate better data acquisition where necessary.
6. **International Commitments:** There are several international outlook initiatives to which Canada contributes. At least two initiatives (UNEP's Global Environment Outlook and the OECD's Environmental Outlook) have required large investments from EC to provide input. Having an EOC could facilitate and strengthen Canada's contributions to these initiatives.
7. **Mainstreaming Environment and Sustainable Development:** An EOC could direct/guide EC policy and potentially "tug" towards a national sustainable development strategy which currently does not exist. An EOC could help clarify environmental and sustainable development goals and targets and the need for them by emphasizing the interdependence of environment and sustainable development in a retrospective and futures context. Finally, an EOC could provide a basis for Canadians to understand the breadth of policy needs, and influence/inform public debate.

An Environment Outlook for Canada: Impetus and Objective

The impetus behind an Environment Outlook for Canada has evolved out of a number of discussions centring on issues such as the need to complement state of the environment reporting with a forward-looking perspective, in much of the same way we look at economic outlook or energy outlook to guide economic and energy decisions made today. There is an increasing awareness in Canada of existing and ongoing international environment outlooks (see Box 3 for examples). Through the participation of both individuals and organizations, Canada has made strong contributions to these outlook processes. At the same time, their value in the Canadian context has been limited by their larger geographical scope and the fact that Canada is generally represented as part of a larger geographic or socio-political

region, i.e., North America. Besides benefiting from the knowledge gained in past activities, an EOC would better position Canada to contribute to, and be better represented, in future international initiatives.

There are also a number of activities within Canada that have relevance for, and could benefit from, integration through an EOC (see Box 4). An EOC process can provide an integrating framework tying these together, informally or formally as is appropriate. Furthermore, participants at the workshop felt strongly that an EOC, as a unique and integrated assessment, would contribute value above and beyond what could be attained from the mere sum of these and other contributions.

Thus, from both perspectives, there is strong logic for a national Environment Outlook for Canada. It will learn from and complement activities from outside the country, while being tailored to Canadian conditions and priorities. Though many issues are of global and regional concern, some take on special relevance or sharper focus when viewed at a national or smaller scale such as provincial, municipal or eco-region. At the same time, while more local or sector-specific assessments can provide greater detail on certain issues and certain locations, an integrated national assessment is needed to provide a holistic picture of Canada's environment—past, present and possible futures.

The following three sections of this report address three issues related to these objects: the nature of the content, products and processes associated with an EOC.

Box 3. Examples of environment outlooks

Global

- Global Environment Outlook
- Millennium Ecosystem Assessment
- Intergovernmental Panel on Climate Change
- OECD Environmental Outlook

Regional

- Africa Environment Outlook
- Asia-Pacific Environment Outlook
- GEO Latin America and the Caribbean
- North America's Environment
- The North American Mosaic
- European Environment Outlook
- Caucasus Environment Outlook
- Pacific Environment Outlook
- Andean Environment Outlook
- Caribbean Environment Outlook
- Atlantic and Indian Oceans Environment Outlook
- Western Indian Ocean Environment Outlook
- Pacific Islands Environment Outlook

National

- GEO Barbados
- GEO Mexico
- Estado del Medio Ambiente en Chile
- Estado del Ambiente en Nicaragua
- Brazil Environment Outlook

Sub-national

- Sub-global assessments of the Millennium Ecosystem Assessment
- GEO Ciudad de Mexico
- GEO Bogota

"Sectoral"

- World Energy Outlook
- Agriculture Toward 2015/2030
- Global International Waters Assessment
- International Assessment of Agricultural Science and Technology for Development

Box 4. Examples of research and reporting activities within Canada with relevance for an environment outlook

- Environmental Signals
- Canadian Energy Outlook
- Ecosystem Status and Trends Assessment
- Canadian Environmental Sustainability Indicators
- Human Activity and the Environment
- Integrated Monitoring, Assessment and Prediction Network for Canada
- Federation of Canadian Municipalities Quality of Life in Canadian Communities
- Northern Ecosystem Initiative
- National Agri-Environmental Standards Initiative
- GeoConnections – CARTS
- Canadian Climate Change Impacts and Adaptation Assessment
- Global Earth Observation System of Systems
- Conference Board of Canada Economic Trends Reports
- Canadian Index of Well-Being
- Canadian Boreal Initiative
- Atlantic Canada's Community Accounts
- Arctic Marine Shipping Assessment
- International Polar Year
- Arctic Monitoring and Assessment Programme
- Circumpolar Biodiversity Monitoring Program
- WWF Canada – The Nature Audit
- Policy Research Initiative – project on Sustainable Development
- AAFC Agricultural Policy Framework – environment chapter
- State of the Great Lakes Ecosystem Reports and conferences
- Reporting on the State of the North American Environment (CEC)

An Environment Outlook for Canada: Content

Perhaps the first question to pose about an Environment Outlook for Canada is what will be the nature of its content? This addresses directly the issue of the salience of the process. We can think of this in terms of three areas: issues, time and space.

Scope of issues to be covered

The range of issues, from scientific and policy perspectives, that could be included in an EOC is almost limitless. Outlooks differ in the degree to which they consider the full cycle of environmental issues, i.e., going from root causes through to societal responses to address undesirable effects of environmental change. Almost all deal to some degree with *pressures* on the environment, e.g., air emissions, levels or resource extraction; changes in the *state* of the environment, e.g., air quality, land cover, biodiversity loss; and *impacts* on the environment and human well-being, e.g., biodiversity, health, economic sectors and other social and cultural aspects. In the interest of relevance to decision-making, most recent assessments also address issues related to fundamental *drivers*, e.g., demographic changes and overall economic activity, and human *responses*, particularly past, present and proposed government policies. Outlooks also differ as to whether they primarily focus on a specific "sector," e.g., energy, agriculture or water or attempt to provide a more holistic picture that relates to the environment.

The interviewees and participants in the workshop were asked to reflect upon the key scientific and policy issues that should be emphasized in an Environment Outlook for Canada. The responses covered a wide range of topics (see Boxes 5 and 6), many of which interact, indicating interest in a vast number of issues that could be covered in an EOC.

Given finite levels of resources, in terms of time, skills and knowledge, it is important in developing an environment outlook to identify those issues with the highest significance and priority. This is not to imply that other issues would be ignored in an EOC; rather they would receive somewhat less attention. Furthermore, an environment outlook is ideally seen as an evolutionary process that endures; UNEP's GEO process, for example is now in its second decade and its fourth Global Environment Outlook will be published in the fall of 2007. As such, while an initial EOC may not cover all desired issues, it will set the groundwork for further explorations in the future.

The challenge of narrowing the scope of an initial EOC was recognized in the scoping workshop. This calls for the development of criteria for prioritizing the list of themes and policy instruments presented in Boxes 5 and 6. Potential criteria for prioritizing could include:

- relevance to policy priorities;
- Canadian-ness;
- data and modeling availability and interoperability;
- known expertise;
- time required for analysis; and
- resources required for analysis.

This includes looking more closely at those issues that are already being dealt with adequately in other activities. On the one hand, these issues will likely score high on the criteria for inclusion, and the associated activities should be seen as valuable sources of information for the process. At the same time, an EOC should aim to enhance, and not duplicate previous and ongoing efforts.

Refining these criteria and using them to identify the priority issues will be a key aspect of the next steps in preparing an EOC, which are the exploration of the feasibility of an EOC and development of a formal project proposal. These activities are scheduled for the spring and summer of 2007.

Box 5. Topical issues to be potentially addressed in an Environment Outlook for Canada

- Water, both quality and quantity
- Air quality, including stratospheric ozone and smog
- Land use
- Agriculture, including food safety and security
- Forestry
- Fisheries, both marine and freshwater
- Energy, including alternative sources: biofuels/wind/solar, oil sands, hydro development, nuclear, and general resource extraction
- Human health and the environment, including toxic substances and new substances
- Issues specific to the North, including climate, contamination, development, increased environmental risk and mining
- Glacial/sea ice and permafrost
- Pests and disease
- Poverty as a factor in environmental change
- Waste, including solid and nuclear
- Ecosystems and biodiversity, including invasive species, migratory species, ecosystem integrity and protected areas
- Climate change, including mitigation and adaptation
- Urban design, including sprawl and infrastructure
- Transportation

Box 6. Policies to potentially be addressed in an Environment Outlook for Canada

- Great Lakes Water Quality Agreement
- Alberta Water Act
- National Forest Strategy
- Canadian Boreal Initiative
- Species at Risk Act
- Canadian Environmental Assessment Act
- Canadian Water Quality Guidelines
- Invasive Alien Species Strategy for Canada
- North American Waterfowl Management Plan
- Montreal Protocol
- Convention on Biological Diversity
- Kyoto Protocol

Temporal scope

Referring to Figure 1, an EOC is likely to consider the past, present and potential future environments of Canada. This raises questions in terms of how far back and how far forward it should look.

The question of how far back raises again the subject of the distinction between an environment outlook and a more traditional State of the Environment report. It also raises the basic question of how an EOC should relate to previous and ongoing SoE activities in Canada. As noted earlier, the strong desire is for an EOC to be primarily forward-looking and not to duplicate an SoE. Thus, this issue is not particularly relevant for planning an EOC.

When looking to the future, different issues take a more central focus depending upon the length of the horizon. For example, whereas the impacts of climate change may not play a key role in an outlook to 2015, they will be central to an outlook to 2100. The recently completed Energy Outlook for Canada goes to 2020; the latest World Energy Outlook and the forthcoming 2nd OECD Environmental Outlook go to 2030; the Millennium Ecosystem Assessment and GEO-4 scenarios go to 2050; and the scenarios of the Intergovernmental Panel on Climate Change go to 2100. Thus, the time horizon, or horizons, for an EOC will fundamentally depend upon the issues to be addressed.

The interviews and participants in the workshop expressed a clear preference for a forward-looking emphasis in any Environment Outlook for Canada. As far as the time horizon for the outlook, opinions varied, mostly in relation to specific issues and the geographic scale. At a minimum it should look 10 years ahead for some local and regional issues, e.g., local air quality, but should look out as far as 50 years for more national and international issues, e.g., climate change and its impacts. Twenty to 30 years forward, with an indication of longer-term effects for certain issues, could provide a reasonable compromise. From a policy development perspective, this provides sufficient time to develop, implement and assess results of policy but is not so distant in the future that it allows procrastination. From a business perspective, it provides sufficient time for company to plan their capital investments in relation to their capital turn over.

Geographic scope

Environmental issues manifest themselves at multiple spatial scales, ranging from the global to the very local. Decisions potentially affecting environmental change and its impacts on human well-being are also taken at multiple scales. Ideally, an EOC would cover the entire country, but this may not be feasible for all issues. Furthermore, it is desirable that certain issues be addressed at lower levels. These can be defined by biological (e.g., eco-zone, eco-region and eco-district); physical (river basins, drainage areas, sub-drainages); or political (e.g., region, province, municipality) characteristics. The analyses need not be the same level throughout the outlook nor need to cover all aspects of the entire country. They should, however, contribute to the overall outlook. There can be a tricky balance between allowing flexibility and, at the same time, providing a consistent picture.

Even where they emphasize a single scale, most environment outlooks do present some of their information at smaller scales. For example, UNEP's Global Environment Outlook

explores the global environment from the perspective of seven regions and 23 sub-regions, providing data and analyses at these scales. In the case of Canada, it is, in general, grouped with the U.S. as part of the North American region, which does not have a sub-regional breakdown. Furthermore, many key issues for Canada are dealt with as part of the Arctic, one of the Polar sub-regions. The situation is similar in other global assessments, which obviously reduces their salience to decision-making at the Canadian scale. UNEP has attempted to improve the multi-scalar aspects in its global reports by increasing the involvement of regional actors over time. Its real impact across scales, though, has come from the development of regional, national and even city-level outlooks following the general GEO process. Similarly, a number of sub-global assessments have taken, and continue to take, place under the auspices of the Millennium Ecosystem Assessment. More locally, as noted previously, the Canada Country Study on climate change produced specific reports for regions within Canada.

As with the temporal horizon, the interviewees and participants in the workshop indicated that any Environment Outlook for Canada would ideally consider a number of geographic scales. This reflects, in part, the variety of environmental issues to be covered. Issues such as climate change mitigation should be viewed nationally; others, such as sea ice, should be viewed on a sub-national basis; still others, such as water quality and smog, need to be looked at a local scale. Furthermore, from a policy-making perspective, consideration needs to be given to the range and complexity of federal, provincial/territorial and local legislation for many environmental issues and natural resources coupled with inter-provincial, bi-national and multinational agreements.

These challenges should not be considered insurmountable. Possibilities do exist to scale down to the national level data that have been derived from models used in global assessments, in particular since many of these do produce results at the national or sub-national level before they are aggregated to the desired international regions. Other activities, such as the Ecosystem Status and Trends Assessment and the Canadian Climate Change Impacts and Adaptation Assessment are already grappling with how to provide a national assessment for issues with sub-national particularities. Furthermore, interest has also been expressed in several provinces for carrying out state of the environment and/or outlook work (including Alberta, Manitoba, Ontario and Quebec[4]). All of these provide opportunities to demonstrate the usefulness of outlook processes at multiple scales and at lower cost by partnering with those that are keen to champion an EOC. As such, the geographic scope for an EOC should be strategically driven by the opportunity to build synergies with existing processes with the highest environmental policy relevance possible at the national level.

[4] This manifest just recently published for comments, calls for the development of a state of the environment report. http://www.unisfera.org/IMG/pdf/Manifeste_pour_un_Quebec_durable_-_FINAL_rev1.pdf

An Environment Outlook for Canada: Products

Flagship and related publications

Environment outlooks and assessments are most often identified with a set of tangible products, usually one or more official reports, summaries for decision-makers, synthesis reports and background technical documents. Some, such as the OECD Environmental Outlook, consist of a single volume with some background technical documents available to the interested reader. Others produce a wider range. The Canada Country Study: Climate Impacts and Adaptation (from the late 1990s), for example, published six regional volumes, a national sectoral volume, a cross-cutting issues volume and seven plain language documents, one for each region and one at the national level, along with a national summary for policy-makers.

One of the main products of an Environment Outlook for Canada would be a flagship publication, similar to UNEP's fourth Global Environment Outlook or the OECD's second Environmental Outlook. Boxes 8 and 9 present the contents for these two reports, respectively. Based upon the feedback received to date, the latter might be a better model for an Environment Outlook for Canada given the desired emphasis on the forward-looking component, which is limited principally to one chapter in the former. In any case, it will be necessary to tailor the outline more specifically to what is appropriate for an EOC. This publication, which would be an integrated, national report, would also provide a springboard for more focused provincial, territorial and thematic reports.

Capacity and network building

Other products of an environment outlook are somewhat less tangible, but can be just as important. Perhaps most significantly in this respect are activities related to capacity and network building. Through its set of Collaborating Centres and capacity building programs, UNEP's Global Environment outlook process has significantly contributed to the ability of groups around the world to undertake integrated environmental assessment. The Millennium Ecosystem Assessment is also in the process of developing a formal handbook for policy-makers and methodology manual for practitioners to both better understand and potentially apply the tools and techniques used in that assessment. Finally, many integrated assessment projects in the European Union have included training courses and professional exchanges as key elements in their work programs.[5]

Looking back at the seven areas in which the participants in the Consultative Scoping Workshop highlighted the potential value of an EOC, two of these—engagement and capacity building—directly reflect these aspects of an environment outlook. Most of the others, particularly harmonization and data integration, are also very dependent upon activities related to capacity and network building. Thus, in planning for an EOC, these need to be considered from the earliest stages.

[5] See in particular the set of activities under the general rubric of Marie Curie Actions. http://cordis.europa.eu/mariecurie-actions/

Scenarios

Since it is expected to form the bulk of an EOC, it is useful to look more closely at the prospective aspects of environment outlooks. These are intended to explore key trends and how these might play out over time. A common approach for doing so is scenario analysis. By exploring future scenarios, today's decision-makers can get a clearer picture of what tomorrow might bring and what the impact of their decisions is likely to be.

In general, the goal of a scenario exercise is to assist individuals and groups in thinking more carefully about how it might be possible to encourage or counteract particular events and trends. In this way, decision-makers can explore more formally what it would take—and what they can do—to create a more desirable future. As explained by Jan Bakkes at the Consultative Scoping Workshop, however, not all scenario exercises will have the same purpose. In particular, he discussed the distinction between scenario exercises for policy optimization, advocacy and vision-building, and strategic orientation (see Table 1). The general discussion to date around an EOC has tended to favour the latter purpose. Since these different archetypes can entail fundamentally different approaches to scenario development, however, it is important that a final decision be made early in the process of developing an EOC.

Irrespective of the choice of approach, a few aspects need to be explored early in the process of scenario development for an EOC. The first is the availability and interoperability of data and models. Most recent scenario exercises have emphasized the value of combining qualitative narratives and quantitative numbers in scenario development and presentation. The credibility of the latter is very dependent upon the quality of the data and quantitative modelling tools used in their production. As the participants in the Consultative Scoping Workshop noted, data and modelling integration as part of an EOC would also provide direct benefits.

Box 7. What is a scenario?

Scenarios have been defined in various ways. For the purposes here, a scenario is a coherent and plausible story, told in words and numbers, about a possible future for a specified socio-ecological system. It will generally include a definition of the system and problem boundaries, a characterization of current conditions and trends and the processes driving change in the system, an identification of the key driving forces, critical uncertainties, and system relationships, a coherent and internally consistent set of assumptions about driving forces, critical uncertainties, and system relationships, conditional projections of the behaviour of the system based on these assumptions on the rest of the system, and an image of the future.

The second aspect is related to the need to consider Canada not only as a nation of its own, but as an entity that both influences and is influenced by the rest of the world. What assumptions should be made about developments occurring outside of Canada that are of relevance to the issues of interest in the EOC? To what degree are these assumed to be independent of the developments in Canada? As a starting point, the scenarios work of the IPCC, OECD, GEO-4 or the Millennium Ecosystem Assessment could provide the basic assumptions for developments outside and, to a certain extent, within Canada. This will require an exploration of these and possibly other scenarios in order to assess what information is available and how appropriate it is for the scenario activities within an EOC.

Table 1: Archetypes of scenario analysis				
Purpose of analysis	**Question**	**Scenario type**	**Time horizon**	**Examples**
Policy optimization	What policy variant is most effective, cost efficient, fast, acceptable, etc.?	Baseline with variants	15 years ahead or less	• OECD Environment Outlook; • GEO-2000 for Europe; • air pollution in Europe (UNECE Convention on Long-Range Transboundary Air Pollution; Clean Air For Europe process)
Advocacy, vision-building	What are the positive changes for which we are going to fight? (Structural changes, value changes.)	Reference case and fully developed alternative scenario(s), e.g., "good" and "bad." Or: backcast, exploring how to get to the target.	Not limited, can be generations	• "Bending the Curve"(GSG) • some African development scenarios • World Business Council for Sustainable Development
Strategic orientation	For what alternative worlds do we need to prepare ourselves? What if our current assumptions were wrong? What would be robust strategies?	Sets of rich, contrasting futures. Mix of storylines and data.	Required for everything beyond 20 years.	• Shell planning • IPCC Special Report on Emissions Scenarios (SRES)
From a presentation by Jan Bakkes (MNP) at Consultative Scoping Workshop on an Environment Outlook for Canada held on March, 1–2, 2007 in Montreal.				

Box 8. Contents of UNEP's Fourth Global Environment Outlook

FRONT MATTER
- TABLE OF CONTENTS
- FOREWORD: Executive Director

SECTION A: OVERVIEW
- INTRODUCTION: GEO process, scope and orientation
- POLICY MAKERS' SUMMARY
- CHAPTER 1: Environment for Development

SECTION B: STATE AND TRENDS OF THE ENVIRONMENT: 1987-2007
- OVERVIEW
- CHAPTER 2: Air
- CHAPTER 3: Land
- CHAPTER 4: Water
- CHAPTER 5: Biodiversity
- CHAPTER 6: Regional
- SECTION B SUMMARY

SECTION C: ENVIRONMENTAL CHANGE, HUMAN DIMENSIONS
- CHAPTER 7: Vulnerability of People and the Environment: Challenges and Opportunities
- CHAPTER 8: Interlinkages – Governance for a Sustainable Earth

SECTION D: THE OUTLOOK – TOWARDS 2015 AND BEYOND
- CHAPTER 9: The Future Today

SECTION E: ENVIRONMENT FOR DEVELOPMENT: OUR COMMON FUTURE
- CHAPTER 10: Policy Options

END MATTER
- ACKNOWLEDGEMENTS
- GLOSSARY OF TERMS

INDEX

Box 9. Contents of OECD's Second Environmental Outlook

EXECUTIVE SUMMARY
INTRODUCTION
PART 1: THE WORLD TO 2030
- 1.1 DRIVERS OF ENVIRONMENTAL CHANGE
  1. Population dynamics and demographics
  2. Economic development
  3. Globalisation
  4. Consumption, production and technology
  5. Waste and material flows
- 1.2 ENVIRONMENTAL CHALLENGES
  6. Climate change and air pollution
  7. Biodiversity and land use
  8. Water and sanitation
  9. Health and environment
  10. Urbanisation
- 1.3 REGIONAL IMPLICATIONS AND KEY VARIANTS
  11. Regional environmental implications
  12. Key variants to the standard expectation to 2030

PART 2: POLICY RESPONSES
- 2.1 SECTORAL DEVELOPMENTS AND POLICIES
  13. Agriculture
  14. Transport
  15. Energy
  16. Selected industries
  - fisheries & aquaculture
  - chemicals
  - steel and cement
  - pulp and paper
  - tourism
  - mining
- 2.2 PUTTING THE POLICIES TOGETHER
  17. Institutional responses and capacity
  18. Working together in partnerships
  19. Environmental policy packages
  20. Policy implementation
  21. Cost of policy inaction

POLICY CONCLUSIONS
ANNEXES
- A1. Modeling framework & assumptions
- A2. Assessment of uncertainties

An Environment Outlook for Canada: Process, Governance and Management

As important as the content of an EOC will be how it is undertaken. At a fundamental level, what principles should be adopted for carrying out an EOC? This goes back to the issues of salience, credibility and legitimacy. Closely intertwined with overall process is the governance and management of an EOC.

As noted in the introduction, the development of an EOC started as one component of a larger, multi-year agreement between Environment Canada's Policy Research and Intelligence Division (PRID) and IISD. PRID administers the contribution agreement and KISD is the departmental lead for this component. From the start, it was recognized that while these groups might form the core project team, such a project would need additional collaborators; furthermore, additional stakeholders' input will be sought throughout the project by means of various workshops and/or direct distribution of documents to validate assumptions; ensure accuracy of the information contained in the different documents produced; provide additional relevant information; and increase the usefulness and relevance of the final products.

Outlooks such as GEO and the OECD Environmental Outlook have successfully used an expert approach through which reporting is peer-reviewed. Participants suggested that such an approach would also assist the EOC in attaining credibility. At the same time, the desire for engagement as part of the process, as well as the lessons from past assessments, points to the need for and EOC to be as open and participatory as is feasible. To some extent, this blurs the distinction between the participants in an outlook and its targeted audience, which contributes in particular to salience and legitimacy.

With respect to the target audience/collaborators, the participants in the Consultative Scoping Workshop identified three broad, overlapping, categories: policy-makers; policy-shapers; and policy-takers (see Box 10). It was felt that the EOC process should include a broad base of participants from these categories. It was also suggested that it would be strategically valuable to include experts from international organizations who have experience in the development of outlooks to draw from a neutral source of expertise.

Box 10. Players in the policy process?

- *Policy-makers:* Those who make environmental policy nationally or at other levels. This category includes federal government, provinces and municipalities. It also includes the various government departments and central agencies that play a critical role in the development of environmental policies as well as their parliamentary committees.
- *Policy-shapers:* Those who are involved in the policy development process either as experts or as advocates for policy options. This category includes sector tables, academia/scientists, environmental non-governmental organizations (ENGOs), First Nations/indigenous peoples, intergovernmental organizations, the general public, voters, those involved in the consultation process, media, and other countries.
- *Policy-takers:* Those who are the recipient of the policy, i.e., those who will use it or implement it. The most important component of this category is the general public but it also includes more specifics groups such as: industry; researchers/academics; federal, provincial, municipal and territorial governments; and First Nations.

An initial proposal for the governance and management of an EOC was to

have an Environment Canada steering committee and a multi-stakeholder advisory committee. These would be used to ensure relevance to Environment Canada's mandate and provide guidance to the core project team. During the interviews and the Consultative Scoping Workshop, significant issues were raised concerning this proposed governance model. A single multi-stakeholder committee comprising external stakeholders as well as Environment Canada representatives was suggested to be more efficient and practical than having two separate committees.

More significant was the question of whether an EOC should be a federal or truly national initiative. There was a strong sense that distributing ownership across the federal, provincial and territorial governments, as well as other groups, e.g., ENGOs, aboriginal groups and academia, would generate greater buy-in. This would also provide the potential for sub-nationally based processes within the broader process. A high sense of ownership and a smaller geographic extent could potentially lead to reporting at a higher spatial resolution, which may be perceived as more credible and relevant. In contrast, a weakness of such a regional approach could be the danger of ownership overtaking a common, national approach in which regions end up doing their own unique outlook and, as a result, a national, common approach is lost.

It was suggested to explore the possibility of using an established or existing structure/organization to implement an EOC. This approach may be a more efficient and effective method of utilizing an organization that is already functioning. The challenge will be to find an organization/structure with a compatible mandate and with the availability to take on an EOC. Existing organizations noted include the Canadian Councils of Resource Ministers (CCRM); the National Round Table on the Environment and the Economy (NRTEE); and the Canadian Group on Earth Observations (CGEO).

Finally, coming out of the discussion around the acceptance of an EOC, a strong recommendation was to develop a secretariat outside government—a "safe space" hosted by an independent, credible organization, possibly an academic institution. Suggestions included the Centre for Applied Business Research in Energy and the Environment at the University of Alberta; the Institute for Sustainable Energy, Environment and Economy at the University of Calgary; and IISD. This could still include a governance structure within the federal government, with EC assuming the role of a coordinating body for federal departments.

Given this feedback, it is necessary to identify and further elaborate on the strengths and weaknesses of various approaches to the governance and management of an EOC. This will be a key aspect of the upcoming planning and feasibility phase.

Resource Requirements

The resources required—time, money, skills, information, models, etc.—for an Environment Outlook for Canada will be dependant upon the nature of the process to be undertaken. Similar exercises have required at least a small team whose members are able to dedicate much of their time to the process for the duration of the project, plus contributions, often in-kind, from collaborating partners. To date, Environment Canada's Knowledge Integration Strategies Division has provided coordination, networking and secretariat services in support of the project and, in collaboration with IISD, has carried out research, methodology development, and capacity building in support of the development of an EOC. The actual implementation of an EOC will necessarily require wider participation and more resources, as illustrated by estimates for two activities upon which an EOC can draw experience.

Jan Bakkes of the Netherlands Environmental Assessment Agency (MNP) has provided the following estimates for the type of national outlooks that his organization has been doing since the late 1980s:

- Duration of the project (after initial preparation and decision-making): 18 months on the calendar.
- Number of experts in the core team: 6–12 (for 50–75 per cent of their time for the duration of the project).
- Number of experts involved: 80–100 (mostly contributions in-kind from various other agencies).
- Total staff time at MNP used: 15–20 person years, including production of graphics, etc. Early editions took approximately 20 person years.
- *The current Sustainability Outlook does not involve original modeling; it has a core team of 6 people and will probably take something like 9 person years.*

Munyaradzi Chenje, the current coordinator of UNEP's GEO process, has provided the following indications of the requirements for a consultative outlook process, based upon his experience[6]:

- Consultative meetings (at the beginning and at the end): 6 days (each 3 days); a day's travel and accommodation costs.
- Team of writers x number of chapters and drafting (e.g., 6 x 10 x 20) = 1,200 days. This could be considerably lower if you have fewer authors and chapters. Even if this is in-kind time from other agencies, it still costs some money for them to focus on drafting and review of material
- Editing (2 editors x 10 x 5 each) = 100 days
- Design: 5 days
- Layout: 40 days

[6] Please note that these numbers are presented as ballpark figures to give an example of the potential costs to do an EOC, but should not be take as actual costs. A more thorough accounting will be done as part of the preparation of a formal proposal for an EOC.

- Translation: This depends on size of document and cost per page.
- Graphics/photos: $US50/photo, possibly rising as more are included and the more you use the more it costs
- Printing: $US80K
- Language version: US$60K
- Outreach: US$10K and about 14 work days.
- Distribution: Depends on how elaborate this is.
- Overheads: Office space, equipment, communication and incidentals
- *Overall, you need at least three key professional staff and two support staff. Taking all this into account, you would probably need between $US800–1,000K over 18–24 months excluding modeling. The second African Environment Outlook (AEO-2) cost $US800K, excluding staff costs.*

Recommendation for the Path forward: Feasibility Analysis and Proposal Development

The thinking about an Environmental Outlook for Canada assumes a four-year process dating back to the summer of 2006 and culminating in the release of the flagship report in 2010. This is in line with the framework agreement between Environment Canada and IISD, and is consistent with most other environment outlooks. ***It is recommended that the next steps in the development of an EOC be to undertake a more complete feasibility analysis and preparation of a formal proposal with one or more options.*** These should be targeted to be completed by fall 2007.

Several challenges and opportunities need to be addressed in the feasibility analysis and proposal development. A summary of the specific tasks to address these include the following:

- Feasibility analysis:
    - Preparation and/or updating of an inventory of key Canadian and international models, databases and other sources of information that have been used in similar outlooks and/or are potentially relevant to an EOC.
    - Breakdown of GEO and other international/national outlook data/findings for Canada where possible.
    - Identification of key modeling and data gaps potentially limiting an EOC.
    - Assessment of GEO and other international scenarios for relevance and adaptability to Canadian context.
    - Development of strategies for and feasibility of connecting an EOC to the UNEP GEO and other outlook processes.
    - Assessment of strategies for partnership/stakeholder engagement and development in the EOC process.
    - Assessment of how best to complement and build on the capacity from existing and ongoing state of the environment reporting and other assessment processes.

- Development of a proposal for an Environment Outlook for Canada with options, including among other aspects:
    - Indication of potential and supporting partners, possible costs and resource requirements, potential products, and proposed evaluation of EOC impact for decision-making and risk management.
    - Detailed work plan for EOC development.
    - Proposed outline(s) for EOC report structure.
    - Identification and compilation of data and indicators for potential use.
    - Proposed models and modeling strategy.

A number of these tasks will have benefits in their own right. A key message coming out of the consultations was, in fact, that a major contribution of an EOC could be a clearer overview, integration and showcasing of the available environmental data along with an identification of key gaps.

A certain amount of effort has already gone into several of these tasks. As an example, although a complete survey of potential modelling tools has not been undertaken, it is possible to identify several that are already being used by parts of Environment Canada and which could play a role in an Environment Outlook for Canada. These include:

- Informetrica – a macro-economic model
- Energy2020 – an integrated multi-region energy model
- AQVM – an air quality valuation model
- ReFSoRT – a simplified source-receptor model for estimating air quality impacts
- EcoTec – a version of the Statistics Canada inter-provincial input output model
- WUAM – a water use allocation model
- Modélisation environnementale communautaire – a set of environmental models focused on surface water and hydrology

In addition, under the auspices of the National Agri-Environmental Standards Initiative (NAESI), a recent survey has been undertaken of potential models, tools and approaches for developing habitat objectives to conserve biodiversity. Finally, it would also make sense to explore the feasibility of working with the modelling tools that have been used in other environment outlooks outside of Canada.

Summary

This document has provided background information on a proposed Environment Outlook for Canada coming out of a series of consultation activities and research, and has provided scoping results, conclusions and recommendations. At this point, it is clear that there is broad interest in some form of an EOC, in terms of both the products it could produce and the processes it would engender.

Still, a number of challenges and opportunities have been identified which need to be addressed in moving forward. These include the feasibilities, costs and risks of various options for an Environment Outlook for Canada. It is recommended that the next steps in the process of an EOC focus on continued discussions with potential collaborators within and outside of Environment Canada in order to further explore these issues, leading to the development of a formal proposal for consideration by the fall of 2007.