Government of Canada | Gouvernement du Canada
Policy Research Initiative | Projet de recherche sur les politiques

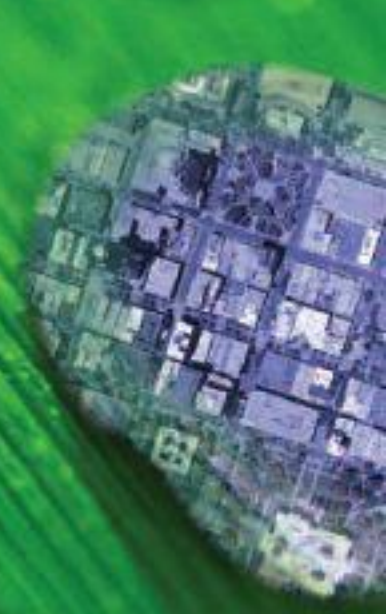
POLICY RESEARCH INITIATIVE

HORIZONS

10th Anniversary

March 2010 Volume 10 Number 4

Sustainable Places



www.pri-prp.gc.ca

PUBLICATIONS MAIL AGREEMENT
NO. 40560504

RETURN UNDELIVERABLE
CANADIAN ADDRESSES TO:
Policy Research Initiative
56 Sparks Street, 1st Floor
Ottawa, ON K1P 5A9

Canada

POLICY RESEARCH INITIATIVE
HORIZONS

TABLE OF CONTENTS

Overview

Integrated Place-Based Approaches for Sustainable Development

Bernard Cantin

Executive Brief

Articles

ISSN 1487-7090

The Policy Research Initiative (PRI) conducts research in support of the Government of Canada's medium term policy agenda. Its core mandate is to advance research on emerging horizontal issues, and to ensure the effective transfer of acquired knowledge to policy-makers. As a peer-reviewed journal targeting the federal policy community, *Horizons* publishes high-quality policy research papers from researchers across federal departments and from external experts. For more information on the PRI or to consult previous issues of *Horizons*, please visit <www.pri-prp.gc.ca>.

All web sites referred to in this issue were confirmed as of December 2009 unless indicated otherwise.

Any comments or questions? Requests for subscription or change of address?

E-mail: horizons@pri-prp.gc.ca
Phone: 613-947-1956
Fax: 613-995-6006

Alternative format: available on demade

Jean Thie
President
Ecoinformatics International Inc.

Issue-Driven Integrated Landscape Management and Innovation in Canada

Canada- Striking the Balance Between Opportunity and Limitation

Canada is a land of extremes and contradictions that have set the stage for a series of unique initiatives and world-leading innovations in the science, technology, practice, and policy associated with ecosystem surveys. The second largest country in the world, with the longest shoreline and the largest wetland (Hudson Bay Lowlands), Canada actually has a very small land resource base suitable for agriculture; its climate and physiography severely restrict the capacity of its land for agriculture and forestry. Only five percent of the almost 10 million km^2 of land area in Canada is suitable for crop production (CLI, 1976) and only 25 percent is covered by commercially viable forests.

Land, water, and climate-based issues have driven Canada's evolution from sectoral to integrated resource management and sustainable development, and made it a leader in geographic information, monitoring, and decision support systems.

Widespread conflicts over the sustainability of land and resource use sparked the federal and provincial governments to initiate the first wave of major programs and acts that used what we now call integrated ecosystem-based approaches. This paper provides thumbnail sketches of some of *past and present* "horizontal" policy and program initiatives and their impact, and explores future opportunities. All these initiatives use horizontal integration approaches enabled through a combination of:

- interdisciplinary ecosystem science;
- location-based integrated monitoring, assessment, and information systems;
- integrated policy and program management focused on national issues and results; and
- cross-sectoral and multi-stakeholder involvement.

Our core competencies and leadership in these key areas, combined with online knowledge management and social participation tools enable the next wave of innovation including broad-based societal initiatives like an integrated landscape management-based Sustainable Development Knowledge Commons.

The First Climate Crisis Adaptation and Mitigation

Most settlement in Canada has taken place in the last 120 years. Accessibility by water and railway was the dominant factor in selecting land for use, and if settlement occurred on good agricultural land it was more often by

Figure 1
Principle Zones of Soil Limitations for Agriculture in Canada

Source: "....for land's sake" by David M.Welch, Lands Directorate, Environment Canada, Supply and Services Canada. 1980, Catalogue No.En 72-6/1980E: ISBN 0-660-10544-6. Page 12

accident than design (Coombs and Thie, 1979). The drought of the 1930s and the associated wind erosion converted much of the short grass prairie, which had been placed in cereal production during settlement, into a vast dust bowl. This "climate" crisis during the Great Depression, and related farm abandonment resulted in the *Prairie Farm Rehabilitation Act* (PFRA) of 1935. A land capability survey formed part of the PFRA program to provide the first ecological knowledge base for the conversion of cultivated semi-arid lands to ecologically more sustainable grasslands and community pastures. This initiative ensured more sustainable use by adapting land use practices to inherent climate and soil capabilities.

Non-Sustainable Land Use, Rural Poverty, and Farm Abandonment

Rural areas continued to pay a high price for the settlement of marginal lands. The 1940s, '50s, and '60s were characterized by the use of science-based technologies, increased mechanization, and changes in market patterns that made only larger farms on good soils sustainable. A new round of farm abandonment started (in the 1960s at a rate of 10,000 per year), and poverty conditions emerged in rural Canada. In 1957, the Senate Committee on Land Use argued for an inventory of land classified with regards to its suitability for particular uses. Further impetus was provided by the Resources for Tomorrow Conference of 1961, which focused on regional approaches to economic development and stressed the interdependence of the use, development, and conservation of renewable resources (Rees, 1977), and recommended that a comprehensive land capability survey was a necessary prerequisite for the sound future management of Canada's land resources and the evolution of policy for economic and social development in all regions of Canada. The federal government responded with the *Agricultural Rehabilitation and Development Act* (ARDA) of June 1961 that provided the framework for federal-provincial agreements to co-operate in rural resource management and research projects to facilitate land use adaptation to improve social and economic conditions. While the title of the ARDA shows a continued agricultural land use bias, the programs and projects implemented under the Act reflect a systematic strategy toward integrated landscape planning, multiple use, and sustainable development.

> Horizontal issues and solutions need compatible, horizontally integrated knowledge bases.

The Canada Land Inventory: Accelerating Integrated Landscape Management for Rural Development

In 1963, the federal government in consultation with the Canada Council of Resource Ministers approved the undertaking of the Canada Land Inventory (CLI). The CLI challenge was formidable.

It was to provide a comprehensive survey of land capability and use designed to provide a basis for integrated resource and land use planning, within

5 years, for the settled portion of Canada, approximately 2.5 million km^2. It included cross sector assessment of land capability for agriculture, forestry, recreation, wildlife (waterfowl and ungulates), present land use, sport fish as well as pilot integrated land use planning projects in each province.

The CLI can be acclaimed as the single most significant federal influence on rural land use.

Guidelines for biophysical land classification were developed (Lacate, 1969) to provide the ecological framework and basis for the capability classification of the landscape. In addition, present land use was mapped as a baseline for regional planning and to measure land use change over time. This knowledge base would be summarized in over 30,000 land capability maps at scales varying from 1:1,000,000, (for strategic analysis and policy applications) to 1:250,000 (to support regional planning and analysis) and 1:50,000 (to support integrated land use planning and zoning).

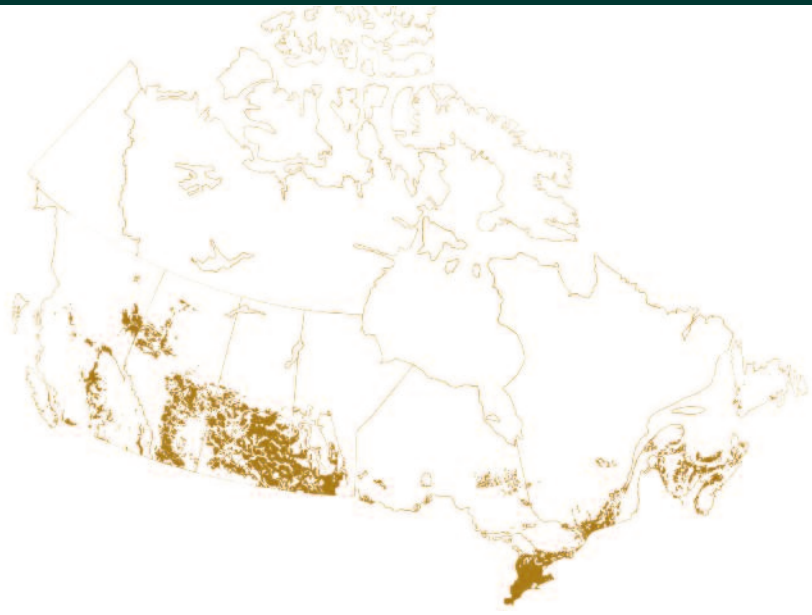
The Federal Role in, and Impact of, the Canada Land Inventory

The rapid program implementation required significant innovation in federal-provincial program co-operation, organization, and horizontal program integration strategies to allow for a "scale down" from national to provincial and regional perspectives. The federal government role (in addition to financing) focused on four goals.

- Develop a horizontally compatible and ecologically based classification and national survey standards. Impact: The CLI capability classes 1 (best) to 7 (poorest) have become part of the land resource planning vocabulary.
- Facilitate and correlate national communities of practice in land capability classification and land use planning. Impact: The over 1,500 professional and technical staff involved in the CLI moved on after its completion to influential roles in regional planning, environment, and research, and facilitated its application in policy, programs, and projects.
- Provide national co-ordination of the survey and pilot land use planning projects. Impact: This accelerated the development of provincial institutions and programs for integrated resource planning.
- Publish maps and reports, and create a national digital land resource database and system. Impact: The Canadian Geographic Information System (CGIS) designed for the CLI became the world's first GIS. Its digital maps are still accessible through the GeoGratis component of the Canadian Geospatial Data Infrastructure.

The provinces were responsible for implementation; they established the survey and land use planning teams and, ultimately, integrated the results in forward-looking, land resource management strategies, policies, and programs. Some provinces, such as Manitoba, established integrated teams

Figure 2
Canada's Cropland CLI Class 1,2,3



Canada Land Inventory, Report No. 10. 1976. *Land Capability for Agriculture.* Page 7. Lands Directorate, Fisheries and Environement Canada, Ottawa

of agrologists, ecologists, biologists, economists, foresters, recreation specialists, land use experts, and planners to carry out the survey. British Columbia established the Land Use Committee and Secretariat to guide implementation. In all cases, these provincial solutions ensured the effective completion of the program and an unusually rapid integration of the results in policy, legislation, and planning.

The Canada Council on Land Use summarized progress:

> The CLI can be acclaimed as the single most significant federal influence on rural land use. In sum, it would seem that "information" as a federal activity is more appropriate than "development" in contributions to joint Federal/Provincial efforts. The role of information has not been given the weight it should be. It is neutral, value-free as much as anything can be, and is available to all.[1]

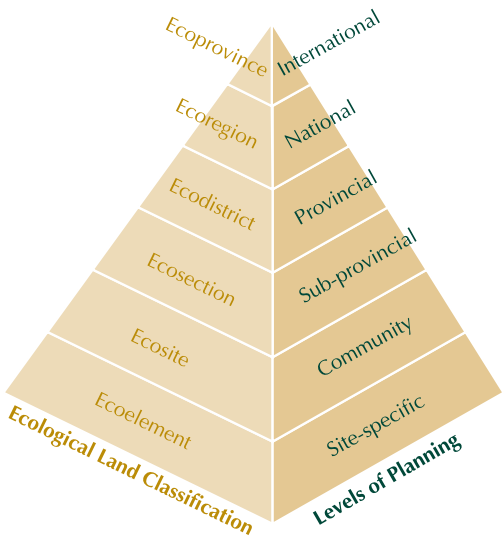
By that time, CLI ratings of land capability had become common. The protection of Canada' prime lands became the focus of the federal policy on land use, and of provincial policies and legislation. The scarcity of prime agricultural lands influenced protective policies, legislation, and zoning in British Columbia, Ontario, Quebec, Prince Edward Island, and Newfoundland and Labrador. In these cases, the CLI helped set the agenda for the policy and legislative initiatives, but it also provided the implementation framework.

As a complement to the CLI, the Northern Land Use Information Series (NLUIS) was developed in 1971 by the Lands Directorate and Indian and Northern Affairs as a rapid environmental and social reconnaissance mapping program for Yukon and the Northwest Territories. The map series included integrated information on wildlife, fish resources, Native land use, ecological land classification, and socio-economic and cultural data. The maps assist with identifying potential land use conflicts, processing land use permit applications, and preliminary screening of the environmental and social dimensions of exploration programs and northern development.

Ecoregions and Integrated Land Management - An Ecological Framework for Canada

The CLI did not cover two thirds of Canada. In 1976, to fill the gap, federal and provincial governments established the Canada Committee on Ecological Land Classification (CCELC) to continue development and use of a uniform ecological (biophysical) approach to land classification for resource planning, management, and environmental impact assessment. Over 600 specialists representing various governments, academia, the private sector, and non-governmental organizations contributed to its working groups and special products including the following:

Figure 3
Ecological Classification Linked to Levels of Planning



Thie, J., E.B.Wiken, and C.D.A. Rubec. 1986. *Ecological land Survey as Basis for Land resource Planning and Management in Canada.* In *Land and its Uses – Actual and potential.* NATO Conference Series 1: Ecology Volume 10. Pages 437-452 Plenum Press. New York and London.

1. <http://geogratis.cgdi.gc.ca/CLI/council.html>, Council on Rural Development Canada 1979.

Figure 4
Ecoclimatic Regions of Canada

Ecoregions Working Group, Canada Committee on Ecological Land Classification (CCELC) 1989 S.C. Zoltai, Chair. *Ecoclimatic Regions of Canada.* Ecological Land Classification Series No. 23. Canadian Wildlife Service, Environment Canada.

Figure 5
North American Ecoregions

Commission on Environmental Cooperation (CEC) 1997. Ecological Regions of North America. Secretariat CEC, Montreal, Canada. ISBN 2-922305-18-X, Page 9
<http://www.cec.org/files/pdf/BIODIVERSITY/eco-eng_EN.pdf>

- The Canadian Ecological Land Classification System and Survey was established to map and describe ecologically significant parts of the landscape and organize this in a format suitable for planning and management scaled from global to local levels.
- In 1989, the Ecoclimatic Regions of Canada project mapped broad areas of the Earth's surface characterized by distinctive ecological responses to climate, as expressed by vegetation and reflected in soils, wildlife, biodiversity, and water. This map is one of the most powerful tools available to develop ecosystem-based climate change adaptation strategies and scenarios for Canada.
- The Wetland Classification System and National Map provided the basis for monitoring wetland loss and the formulation of the federal policy on Wetland Conservation in 1991.
- Ecoregion and ecodistrict mapping for most of Canada was started, but terminated in 1988 when the Lands Directorate was reorganized into a sustainable development and a state of the environment reporting branch.

The Ecological Land Survey approach was applied in most of Canada's national parks, in major environmental assessments, and in developments, such as the James Bay hydro-electric project. In the mid-1980s, acid rain sensitivity in Eastern Canada was assessed using terrestrial ecoregions and districts.

In 1991, in support of the Green Plan and state of the environment reporting, the federal-provincial Ecological Stratification Working Group was formed to develop a national ecological framework for Canada, which was published in 1996. It is now widely used nationally and internationally as a strategy framework for policy, research, monitoring, assessment, and reporting.

Managing Declining Migratory Bird Populations

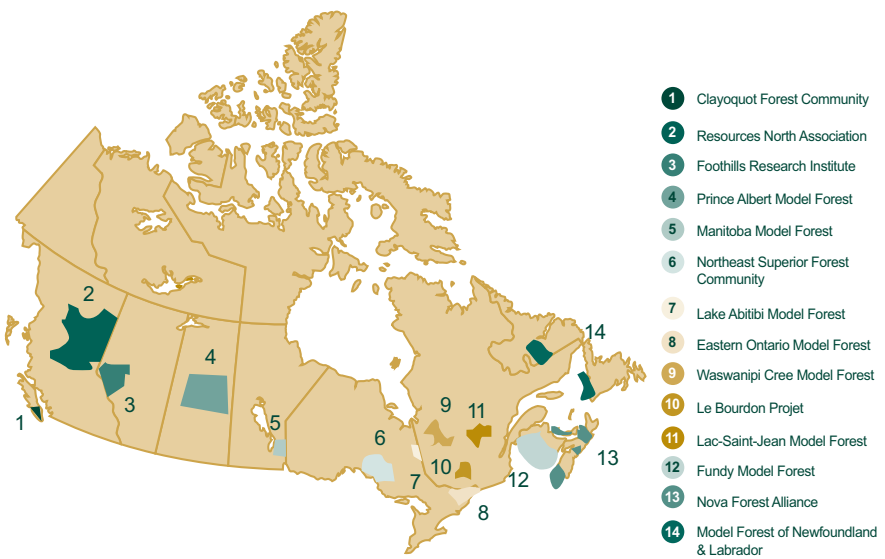
The North American Waterfowl Management Plan (NAWMP) shows how integrated landscape management can be applied to continental issues and implemented locally, if supported by a credible knowledge base for multi-stakeholder partnership negotiations, setting strategic objectives, and developing implementation plans. The decline in migratory bird populations in the 1980s was linked to the loss of habitat (wetlands) in the critical flight ways in Western and Eastern Canada. In 1986, Canada and the United States signed the NAWMP agreement; Mexico joined in 1988. The Plan provides a policy framework for analyzing North American waterfowl issues and sets out a number of objectives relating to waterfowl habitat and populations. Joint ventures and financing from national and provincial/state governments, and substantial financial flows (almost $300 million) from non-government and not-for-profit organizations in Canada and the United States were directed to wetland preservation and habitat improvement. This included financial support to farmers to maintain critical prairie pothole habitat as part of the Prairie Habitat/Pothole Joint Venture.

Sustainable Development and the Green Plan: Integrated Science Monitoring and Assessment, and Action Plans

In response to interest in the environment and sustainable development created by the Brundtland Commission Report, Our Common Future, the late 1980s and early '90s saw the development of significant integrated initiatives, some of which were reinforced by the 1990 Green Plan.

- **Integrated science and monitoring.** The Ecological Monitoring and Assessment Network (EMAN) was part of a comprehensive strategy to integrate terrestrial, aquatic, and atmospheric monitoring networks, sites, and research across Canada. The goal was to provide a national perspective on how Canadian ecosystems are affected by the many environmental stressors, give scientifically defensible rationales for pollution control and resource management policies, evaluate and report to Canadians on the effectiveness of resource management policies, and identify new environmental issues at the earliest possible stage.
- **Sustainable landscape and forest management.** The Canadian Model Forest Network (CMFN) includes 14 model forest sites across Canada.

Figure 6
Model Forest NetworK



Source : <http://www.modelforest.net/cmfn/en/forests/>

Each site involves numerous partners working toward sustainable forest and landscape management. Partners include forest companies, Aboriginal communities, private citizens, parks, environmental groups, governments, and universities. Model forests can be seen as test beds for interdisciplinary ecosystem science and participatory planning at the forefront of sustainable forest management. They provide a standard and window on sustainable forest management (SFM) practices in Canada and together with criteria and indicators of SFM provide public and international credibility to the Canadian forest management certification process. This effective Canadian initiative has been expanded globally in the International Model Forest Network involving over 20 countries and covering most continents.

- **Drainage basin action plans** like those for the Fraser River, Great Lakes, and St. Lawrence River provide effective mechanisms for horizontal integration of federal and provincial programs through cooperative and integrated management objectives and methods based on principles of sustainability. The concentration of significant financial flows, with a focus on clear results, have made these integrated action plans very effective.

Integrated Land Management and Location-Based Information

The **Canada Geographic Information System (CGIS)**. The CLI generated over 30,000 maps! Traditional manual analysis, overlays, and presentation would significantly limit use of the data. Roger Tomlinson, universally considered the "father of GIS" worked with Spartan Air Services in Ottawa and explored with IBM in the early 1960s the link between maps, location-based information, and computers. A chance airplane encounter with Lee Pratt, the first Chief of the CLI led to a feasibility study for a geo-information system for the CLI.

Land, water, and climate-based issues have driven Canada's evolution from sectoral to integrated resource management and sustainable development, and made it a leader in geographic information, monitoring, and decision support systems.

- In 1963, the design work started for the Canada Geographic Information System.
- In 1965, the CGIS delivered the world's first optical scanner capable of reading 1:30,000 maps into a digital form (now in the Museum of Science and Technology, Ottawa).
- In 1971, the CGIS became the world's first fully operational GIS. It has a unique ability to overlay all CLI maps, integrate socio-economic layers, build continent-wide databases, and provide analysis at the national, provincial, regional, and local levels.
- In 1975, the CGIS became the first GIS to offer nationally remote access to interactive graphic analysis of its integrated databases.

Typical applications and use of the CGIS, combining CLI and many other data sets included (Thie et al., 1982) federal land use and wetland policy development; the North American Waterfowl Management Plan, supporting Canada-US negotiations; biophysical/ecological databases for national parks planning and management; land use monitoring (e.g., loss of high capability agriculture and wetlands around urban areas); mapping terrestrial sensitivity to acid rain; and spruce budworm damage monitoring and assessment.

The **Canadian Remote Sensing Program**. Parallel in time to the development in early GIS in Canada, the new field of airborne and satellite remote sensing emerged. In 1970, the Interdepartmental Planning Office on Remote Sensing obtained approval to modify the satellite receiving station in Prince Albert, Saskatchewan, to receive data from NASA's Earth Resources Technology Satellite (ERTS). Exploration and increased environmental awareness moved the federal government to fund this initiative and ensure that Canadians would have equal or better access than their neighbours to this new

source of information about Canada's land and water, and forest and mineral resources. The first objective was to produce the remotely sensed data and information needed for natural resource and environmental management quickly and efficiently, and support research and development on the collection, processing, and interpretation of data.

The intelligent use of Canada's private-sector capabilities (including Computing Devices of Ottawa and MacDonald-Dettwiler and Associates Ltd.) enabled Canada to receive and process the first ERTS satellite images a week before NASA was able to do so. This achievement provided the foundation for MacDonald-Dettwiler and Associates to corner the global market in ERTS/ LANDSAT and SEASAT receiving stations. Through the Canadian Advisory Committee on Remote Sensing (CACRS), a loosely integrated federal-provincial program was developed that resulted in the establishment of provincial remote sensing interpretation centres, and centres of excellence at Canadian universities.

The early successes of Canadian technology at home and globally provided the basis for the successful development of the RADARSAT program and launch of Canada's all-weather radar satellites 1 and 2. Again, the first steps to a radar satellite were taken through an interdepartmental planning office. The Canadian geomatics industry received another boost in its competitiveness in global markets, exemplified by the global leadership position of MacDonald-Dettwiler and Associates

Figure 7
Leaf Area Index from SPOT Satellite – Indicator of Carbon Absorbtion

< http://ess.nrcan.gc.ca/ercc-rrcc/proj3/theme6/images/index_11.jpg >
< http://ess.nrcan.gc.ca/ercc-rrcc/proj3/theme6/index_e.php >

in building on its success in the convergence of remote sensing systems, GIS, and resource management.

Canadian Geospatial Data Infrastructure (CGDI). The federal Interagency Committee on Geomatics (IACG) has worked for many years to improve the collection, management, and integration of location-based information to enable improved decision and policy making. However, the Internet drastically changed the dimensions of what was possible. Canada was an early adapter with innovative initiatives like SchoolNet and Community Access. In 1994, the National Atlas Information Service (Geomatics Canada) launched the world's first GIS capability on the Internet, providing wide public interactive access to national thematic, issue, and policy maps, and making maps from national databases, such as the National Pollutant Release Inventory, dynamic.

The launch of the GeoConnections Program in 1999 increased the accessibility and use of new technologies, like global positioning systems and web-based mapping. The CGDI was created to improve sharing, access, integration, and use of geographic information. The initial investment of $60 million (1999-2005) leveraged an additional $110 million to achieve these objectives. The second phase of the GeoConnections Program (2005-2011) has made integrated land management (ILM) one of its priority areas and

supported **IMAGINE Canada** (Integrated Management and Geospatial Information Network for the Environment) in facilitating the convergence of ILM knowledge bases, geospatial technologies, and decision support systems for national and regional applications. The **GEOIDE Network** (GEOmatics for Informed Decisions) funded by the Networks of Centres of Excellence Program (NCE) complements these initiatives by supporting innovative research and networking in geomatics across Canada. Its major thrusts include sustainable management of land and marine resources, natural hazards, and the environment.

The Future: A Sustainable Development Commons

The last 20 years have set the stage and built the technologies for the next wave of innovation in ILM. The next two decades will see a paradigm shift when converging strategic technologies, societal issues, and a knowledge-based economy accelerate the development of an ILM-based sustainable development knowledge commons (SDKC).

Like ILM, an SDKC would be based on integrating the best interdisciplinary ecosystem science with socio-economic knowledge, best practices (in planning and adaptive management), and best policy development in a transparent multi-stakeholder participation process. The potential of the Internet for sharing data, knowledge, and online analysis, and promoting participatory systems provides a unique opportunity for society to develop common solutions and renew interest in the old "commons" concept. The creative commons movement, and the **conservation commons** of the IUCN – The World Conservation Union – have set the stage for an ILM-based knowledge commons and infrastructure. IMAGINE Canada is a small strategic step in this direction.

The key components of the SDKC include a shared knowledge base, empowerment tools and best practices, and governance support tools and systems facilitating stakeholder participation and measuring performance.

The federal government should view the SDKC as a strategic opportunity to shift its role from traditional infrastructure to facilitating the new knowledge infrastructure critical for the new economy, sustainable development, and adapting to climate change. It should develop the strategic framework (perhaps through an interdepartmental planning office, which has been an effective vehicle for Canada's remote sensing programs) to set the stage for a national leadership role. Leadership in the age of the Internet is a series of small, smart investments, and a business model, which enables all stakeholders to participate, share, contribute, and benefit. Many federal programs and policy initiatives could directly benefit from the horizontal integration and multi-stakeholder knowledge provided by an SDKC. Many programs like GeoConnections or GEOIDE could make significant contributions in shifting the orientation from data (a concept of the 1990s) to knowledge infrastructure.

Just imagine Canada when the power of social networking tools transforms knowledge networking and the visualization power of video "gaming" built on geospatial modelling and decision support systems, which can then be used to visualize future policies or landscape adaptation scenarios.

References

Canada Land Inventory. 1976. *Land Capability for Agriculture.* Lands Directorate, Fisheries and Environement Canada, Ottawa. Report No. 10.

Canada Land Inventory. 1970. Objectives, Scope and Organization. Department of Regional Economic Expansion. Ottawa. Report No. 1.

Commission on Environmental Cooperation (CEC). 1997. Ecological Regions of north America. Secretariat CEC, Montreal, Canada. ISBN 2-922305-18-X, Page 9.

Coombs, D.B., and J. Thie. 1979. "The Canada Land Inventory System." Pp. 909-933 in *Planning the Uses and Management of Land.* ASA, CSSA, Soil Science Society of America.

Council on Rural Development Canada. 1979. Report of the Council on Land use, Ottawa p. 10. <http://geogratis.cgdi.gc.ca/CLI/council.html >

Ecoregions Working Group, Canada Committee on Ecological Land Classification (CCELC). 1989. S.C. Zoltai, Chair. *Ecoclimatic Regions of Canada.* Ecological Land Classification Series No. 23. Canadian Wildlife service, Environment Canada.

Lacate, D.S., Chair Subcommittee on Bio-Physical Land Classification (comp.). 1969. *Guideline for Bio-Physical Land Classification.* National Committee on Forest Land, Canadian Forest Service, Publication No. 1264, Ottawa.

Rees, W.E. 1977. *The Canada Land Inventory in Perspective.* Canada Land Inventory Report No. 12. Ottawa: Lands Directorate, Fisheries and Environment Canada.

Thie, J., E.B.Wiken, and C.D.A. Rubec. 1986. *Ecological land Survey as Basis for Land resource Planning and Management in Canada. In Land and its Uses – Actual and potential.* NATO Conference Series 1: Ecology Volume 10. Pages 437-452 Plenum Press. New York and London.

Thie, J., W.A. Switzer, and N. Chartrand. 1982. *The Canada Land Data System and Its Application to Landscape Planning and Resource Management.*

Tomlinson, R.F. 1967. *An Introduction to the Geo-Information System of the Canada Land Inventory.* ARDA, Canada Department of Forestry and Rural Development.

United Nations, World Commission on Environment and Development. 1987. *Our Common Future.* Also known as the Brundtland Commission report. Oxford University Press.

Welch, D.M. 1980. *...for land's sake.* Lands Directorate, Environment Canada, Catalogue No. En 72-6/1980E: ISBN 0-660-10544-6. Page 12.

The GeoConnections Program and Place-Based Approaches to Landscape Management

GeoConnections is a national project currently being led by Natural Resources Canada that aims to help decision-makers tackle some of Canada's most pressing challenges through the use of geomatics. "Geomatics" refers to gathering, storing, processing, and delivering geographic information in sophisticated and interactive mapping systems. MapQuest™ and Google Earth™ are great examples of geomatics at work. GeoConnections advances the use of geomatics by supporting and expanding the Canadian Geospatial Data Infrastructure (CGDI), the system responsible for formalizing the structure and process for organizing, using and sharing geospatial data and services in Canada. To date GeoConnections has assisted decision makers with issues ranging from public safety and health, to the environment and sustainable development.

Governments at all levels are implementing comprehensive approaches to managing landscapes, ecosystems, watersheds, coastal zones, oceans, etc. Integrated landscape management (ILM) is often used to capture these holistic approaches. ILM is inherently a "place-based" approach that lends itself well to the use of use geospatial data and geomatics technologies, especially when used in conjunction with forecasting and modeling programs. Integrating the use of geomatics when dealing with place-based issues has contributed to better environmental assessment and land-use planning. For example the Nova Scotia Department of Environment has developed an online geomatics project-planning and decision-making tool to improve provincial environmental assessments (EAs). Similarly, Indian and Northern Affairs Canada in collaboration with the Government of the Northwest Territories have created the Mackenzie Gas Project (MGP) and the Mackenzie Gas Portal, making diverse government place-based data available to support decision-making associated with the pipeline development.

Geomatics technologies and geospatial data are key pillars to the successful delivery of place-based integrated management. As the use of placed-based approaches increases there will be a corresponding increase in expectation of accuracy, currency and reliability of geospatial data from authoritative sources. There will also be a demand that geospatial data be easily integrated and analyzed without specialized expertise making projects like GeoConnections and IMAGINE Canada all the more important.

A more detailed description of this initiative can be found on the Policy Research Initiative web site at <www.pri-prp.gc.ca>.