ESTIMATES

Natural Resources Canada

Performance Report

For the period ending
March 31, 2002

Canada

The Estimates Documents

Each year, the government prepares Estimates in support of its request to Parliament for authority to spend public monies. This request is formalized through the tabling of appropriation bills in Parliament.

The Estimates of the Government of Canada are structured in several parts. Beginning with an overview of total government spending in Part I, the documents become increasingly more specific. Part II outlines spending according to departments, agencies and programs and contains the proposed wording of the conditions governing spending which Parliament will be asked to approve.

The *Report on Plans and Priorities* provides additional detail on each department and its programs primarily in terms of more strategically oriented planning and results information with a focus on outcomes.

The *Departmental Performance Report* provides a focus on results-based accountability by reporting on accomplishments achieved against the performance expectations and results commitments as set out in the spring *Report on Plans and Priorities*.

The Estimates, along with the Minister of Finance's Budget, reflect the government's annual budget planning and resource allocation priorities. In combination with the subsequent reporting of financial results in the Public Accounts and of accomplishments achieved in Departmental Performance Reports, this material helps Parliament hold the government to account for the allocation and management of funds.

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Foreword

In the spring of 2000, the President of the Treasury Board tabled in Parliament the document "Results for Canadians: A Management Framework for the Government of Canada". This document sets a clear agenda for improving and modernising management practices in federal departments and agencies.

Four key management commitments form the basis for this vision of how the Government will deliver their services and benefits to Canadians in the new millennium. In this vision, departments and agencies recognise that they exist to serve Canadians and that a "citizen focus" shapes all activities, programs and services. This vision commits the Government of Canada to manage its business by the highest public service values. Responsible spending means spending wisely on the things that matter to Canadians. And finally, this vision sets a clear focus on results – the impact and effects of programs.

Departmental performance reports play a key role in the cycle of planning, monitoring, evaluating, and reporting of results through ministers to Parliament and citizens. Departments and agencies are encouraged to prepare their reports following certain principles. Based on these principles, an effective report provides a coherent and balanced picture of performance that is brief and to the point. It focuses on outcomes - benefits to Canadians and Canadian society - and describes the contribution the organisation has made toward those outcomes. It sets the department's performance in context and discusses risks and challenges faced by the organisation in delivering its commitments. The report also associates performance with earlier commitments as well as achievements realised in partnership with other governmental and non-governmental organisations. Supporting the need for responsible spending, it links resources to results. Finally, the report is credible because it substantiates the performance information with appropriate methodologies and relevant data.

In performance reports, departments and agencies strive to respond to the ongoing and evolving information needs of parliamentarians and Canadians. The input of parliamentarians and other readers can do much to improve these reports over time. The reader is encouraged to assess the performance of the organisation according to the principles outlined above, and provide comments to the department or agency that will help it in the next cycle of planning and reporting.

This report is accessible electronically from the Treasury Board of Canada Secretariat Internet site:
http://www.tbs-sct.gc.ca/rma/dpr/dpre.asp

Comments or questions can be directed to:

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Natural Resources Canada

Performance Report

For the period ending
March 31, 2002

Herb Dhaliwal
Minister of Natural Resources Canada

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Strategic Outcome 4: To provide Canadians with safety and security in the natural resources sector.

Strategic Outcome 5: To provide Canadians with a department that is efficiently and effectively managed.

I Minister's Message

Herb Dhaliwal
Minister of Natural Resources

I am pleased to present the Performance Report for Natural Resources Canada (NRCan) for the period ending March 31, 2002.

Natural resources are fundamentally important to Canadians. They are a major part of our national economy and our exports. In fact, strong exports of natural gas, electricity, wood and primary metals helped to boost Canada's economic performance over the past year.

We must work to ensure that our natural resources will continue to provide benefits and enhance the quality of life of future generations. As Minister, I am committed to ensuring that our natural resources are developed and used in a way that strikes the right balance between our environmental and social responsibilities and our economic objectives. I am pleased that our industry stakeholders are embracing corporate social responsibility as a way to improve Canada's economic prosperity, environmental performance and social well-being.

The natural resources sector contributes significantly to communities across Canada, and NRCan helps shape these contributions. To do so, we work in close partnership with Canada's resource industries, other levels of government, the private sector, educational institutions, Aboriginal groups, communities and individual Canadians. Of particular note in 2001–02 was the renewal of our very successful Model Forest Program, which other countries have copied.

The Government of Canada is committed to supporting research, development and innovation to make Canada a world leader in the knowledge-based economy. NRCan conducts and helps fund groundbreaking research to generate and transfer ideas, knowledge and technologies. For instance, an NRCan-led consortium discovered a unique microorganism that helps heavy oil flow more easily through pipelines.

My department also works with the international community to help Canada maintain and expand our competitive position in export markets, including geomatics. In addition, by assisting with policy development and technology transfer, we can promote sustainable resource development in developing countries. For example, we are taking the lead, with South Africa, in organizing a first-ever global dialogue among governments to address such issues as the development of sustainable communities, the contribution of minerals and metals to poverty alleviation, and measures to protect the environment.

Our commitment to sustainable development extends to the most important challenge that our globe has ever faced — climate change. NRCan is involved in research to transform how we produce and use energy to reduce greenhouse gas emissions. For example, we are working to increase the use of clean renewable and non-traditional sources of energy.

This report will help Canadians learn more about the strengths of our organization, the challenges we face and the innovations we are bringing to our operations. I am proud of what we have achieved and I am particularly gratified by the Department's more notable successes which are presented on the following page. As we help to ensure the sustainable development of Canada's natural resources, NRCan will continue to work with all Canadians to enrich our way of life and enhance our place in the world.

Performance Highlights - Notable Successes*

Developed an effective approach for improving key provisions in the mining tax regime, with Finance Canada, allowing the mining industry to share in income tax rate reductions.	Page 16
With partners, developed a hydrogen fuel cell mine locomotive, the world's first industrial vehicle powered by hydrogen.	Page 17
Encouraged exploration through the Targeted Geoscience Initiative. Within five days of releasing information on a discovery of minerals pointing to possible diamond discoveries near Lac Bienville, Quebec, 500 exploration claims had been acquired by industry.	Page 18
Succeeded in changing the 1998 Council of Europe's resolution that requested European companies to rescind any contract with Canadian producers using wood from non-sustainable timber forests.	Page 19
Enhanced the capability of First Nations to benefit more fully from forest-based opportunities through the First Nations Forestry Program.	Page 20
Enabled Northern Saskatchewan communities to take better advantage of economic and community development opportunities in the natural resources sector.	Page 22
Encouraged, with partners, investment in innovative technology to reduce greenhouse gas emissions through Technology Early Action Measures (TEAM) – total investment of $915 million based on a TEAM investment of $83 million, and other federal funding of $92 million over four years.	Page 27
Through the Industry Energy R&D Program, developed an energy-efficient septic tank service truck that will achieve lifetime savings of more than 70,000 litres of fuel, 400 litres of lube oil, and 20 tires, per truck.	Page 30
Conducted R&D to deliver technology for building, operating and managing thermal networks. It is estimated that 35,000 tonnes of carbon dioxide emissions are saved annually by the communities directly impacted by this work.	Page 31
Supported policy positions on sound science and sustainable development concepts through the Metals in the Environment (MITE) initiative. Results of MITE have been communicated, so far, in more than 60 scientific publications.	Page 33
Conducted world-class forest research into the conservation and protection of Canada's forest ecosystems and enhancing timber supply.	Page 33
Provided space satellite imagery for search and rescue-related activities and emergency planning.	Page 39
Initiated the development of a system to strengthen the control of the acquisition, possession, importation, exportation and transportation of explosives, within Canada, and the purchase of components of explosives, such as ammonium nitrate in response to the events of September 11, 2001.	Page 40
Improved its human resources, financial risk management and information technology tools through the Modern Comptrollership initiative.	Page 43
Played a key role in government-wide efforts to reduce greenhouse gas emissions from federal operations through the House in Order Initiative.	Page 49

* delivered in partnership with Canada's resource industries, other levels of government, the private sector, educational institutions, Aboriginal groups, communities and individual Canadians

II - Raison d'être

A Vision for Canada's Natural Resources Sector

"Quality of life through sustainable resource development"

A 21st Century Sustainability Agenda for Canada's Natural Resources Sector

NRCan has a legislated mandate to promote the sustainable development of natural resources, meeting the needs of the present without compromising the ability of future generations to meet their own needs. Balancing the perspectives on natural resource development and use – economic, social and environmental sustainability – requires a clear vision and a strategy to advance it.

While opportunities abound, Canada is facing increasingly complex challenges, including:

- challenges to trade and market development relating to market access issues and intensifying competition for investment and markets;
- the impact of uncertainty on the domestic investment climate due to the evolving environmental regulatory process, Aboriginal litigation and unsettled land claims;
- meeting international commitments under the Kyoto and Biodiversity protocols, among others;
- the sustainability of rural, Aboriginal and Northern communities because of limited infrastructure, capital, skills and capacity to diversify economies;
- public safety and security related to terrorist threats and natural hazards, including the need to protect the economic security of Canadians and Canada's critical infrastructure; and
- globalization of the economy and deregulation of financial markets leading to the need to strengthen the global system of governance – laws, conventions, treaties, institutions and other mechanisms to develop partnerships and strengthen networks among stakeholders.

NRCan has identified four strategic directions, under the theme of *A Sustainability Agenda for the 21st Century*, that derive from consultations with stakeholders in preparing NRCan's Sustainable Development Strategy, and the priorities established by the Government of Canada. The Agenda contributes to an improved quality of life for Canadians as well as to their safety and security. It builds on the Department's strategic outcomes and encompasses four mutually reinforcing and complementary pillars:

- creating and sharing **knowledge** for balanced decisions on Canada's landmass and resources and enhanced security;
- strengthening the economic performance of Canada's natural resources sector through **innovation**;

- advancing excellence in resource **stewardship**; and
- turning the potential of the resource sector into new social and economic opportunities for all Canadian **communities**.

Knowledge – Creating and sharing integrated knowledge for balanced decisions about Canada's landmass and resources is central to ensuring the viability of social, economic and environmental benefits from one generation to the next. This pillar is aligned closely with Strategic Outcome #1, starting on 7.

Knowledge is re-setting the limits of sustainable economic growth in the natural resources sector and provides a competitive advantage to our industries. NRCan creates, disseminates and shares integrated information and knowledge in support of the sustainable development of Canada's natural resources and the international competitiveness of our resource sector.

Innovation – Positioning Canada's natural resources sector as a world leader in innovation will sustain our comparative global advantage in natural resources products and services. This pillar is aligned closely with Strategic Outcome #2, starting on page 15.

Innovation remains the best route to improving the economic performance of the natural resources sector and attaining economic, social, environmental and security objectives. NRCan is focusing on research and development (R&D), skills, diffusion of knowledge and technology, investment climate and market development and access – with emphasis on areas where Canada can be the first in the world to develop and capitalize on emerging sustainable development technologies.

Stewardship – Establishing Canada as an international model for resource stewardship and environmental responsibility encompasses global obligation, sustainable resource management and health, safety and security. This pillar is aligned closely to Strategic Outcomes #3 and #4, beginning on pages 26 and 39 respectively.

Stewardship embodies understanding and communicating the importance of Canada's land, water, air and biological resources to the economy, environment and society. It demands an open, multi-disciplinary approach to decision-making that encourages cooperation among stakeholders, considers new governance models and develops innovative partnerships among governments. Key areas of challenge and opportunity for NRCan include natural resource management, climate change, conservation and biodiversity, and international leadership.

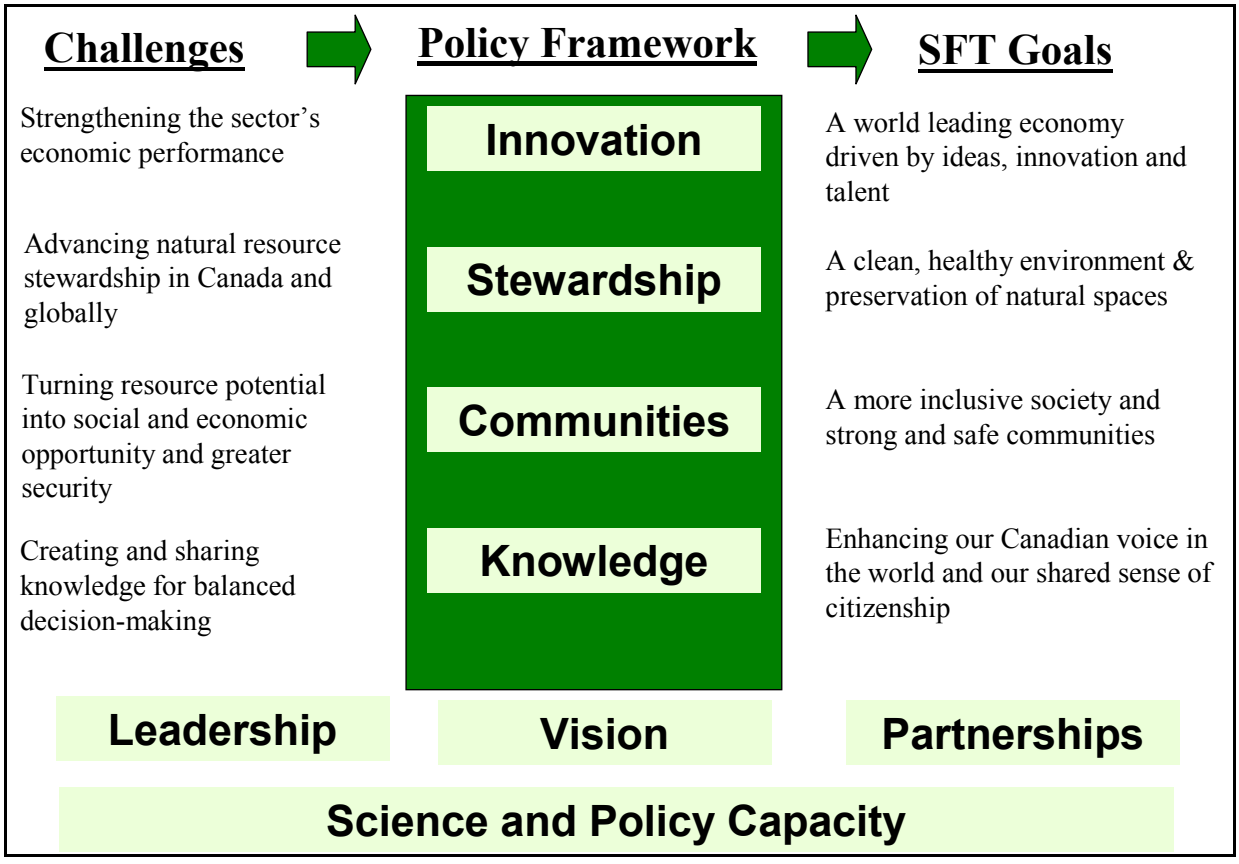
Communities – Strong, secure communities are an integral component of Canada's competitiveness and an indicator of our quality of life. This pillar is aligned to Strategic Outcomes #2, #3 and #4, starting on pages 15, 26 and 39 respectively.

NRCan is advancing community sustainability, strengthening partnerships, including those with Canada's Aboriginal communities, enhancing NRCan's on-line initiatives that are linked to broad government priorities, expanding renewable energy and energy efficiency community

initiatives as well as green infrastructure, and leading horizontal efforts to coordinate federal activities to foster community sustainability.

Governance
Success in implementing the *Sustainability Agenda* and achieving NRCan's strategic outcomes requires a firm foundation, innovative management practices, a clear vision, and implementation of the principles of good governance. These include the democratic principles of adherence to the rule of law, transparency, accountability, effectiveness and efficiency and the participation of all stakeholders.

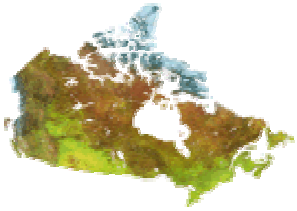
The Department's greatest asset is its skilled and committed people. NRCan's capacities in science and technology (S&T), policy and programs are complemented by the resources and ideas of our partners in other governments, communities, non-government organizations and industry. Strategic partnerships in pursuit of shared goals form the backbone of the Department's ability to further the public good and the quality of life.



III Departmental Performance by Strategic Outcome

Section III summarizes NRCan's key accomplishments by the Department's five strategic outcomes. It also reflects accomplishments from NRCan's Sustainable Development Strategy which is aligned with the same reporting structure.

In the spirit of better communicating our performance, the Department is providing an analysis of our actual expenditures for 2001-02 and an overall performance assessment by strategic outcome. This should help the Department demonstrate its good faith in providing full disclosure along with evidence of value for money to Canadian taxpayers. Information about accomplishments not appearing in this report can be found on the Department's main web site at http://www.nrcan.gc.ca or at the various web sites shown on pages 69-71.



Strategic Outcome #1 - To provide Canadians with information to make balanced decisions regarding natural resources.

Short to medium-term objectives	Performance Indicators
Easily accessible and integrated knowledge on the state of Canada's landmass and natural resources, and the economic, environmental, and social dimensions of their use.	• User satisfaction with relevance, accessibility and quality of information. • Public awareness of the importance and relevance of the natural resources sector, its issues, and NRCan's S&T. • Adoption of NRCan-supported technology and practices.*
Greater national and international cooperation and consensus on sustainable development issues, policies, goals and actions.	• Participation in, and influence on, national and international multi-stakeholder approaches to sustainable development issues. • Degree of leveraging by NRCan from shared S&T projects.
Fiscal, regulatory and voluntary approaches that encourage the sustainable development of natural resources.	• Participation in, and influence on fiscal, regulatory and voluntary sustainable development initiatives.* • Influence of NRCan's S&T-based recommendations on regulatory regimes.

* Performance information on these specific indicators is presented in a quadrant format on pages 13 and 14.

Actual Expenditures for 2001-02

NRCan's total net expenditures for 2001-02 were $818 million. $189.9 million (or 23 percent) was spent on this strategic outcome. Initiatives relating to geospatial knowledge alone were $104.1 million. More details on major expenditure areas for this strategic outcome can be found on pages 56 and 57.

Key accomplishments

The power of creating and sharing knowledge – NRCan On Line (NOL) is about the integration and dissemination of information and knowledge across scientific and policy disciplines, across government departments, and across jurisdictions. It is the Department's response to citizen and client demands for high quality, comprehensive and accessible information and services. The vision focuses on innovation through improved access to quality information thereby enabling better decision making around sustainable resource development leading to a higher quality of life for Canadians.

The year 2001-02 was a time of restructuring for NOL. Considerable resources were invested in developing a new charter, a governance structure and a risk analysis to provide a strong foundation for the program. This resulted in more measured progress.

Furthermore, although the Department's implementation plan conformed to the initial objectives of Government On Line (GOL), NRCan recognized the need to realign the departmental GOL plans to reflect the available funding, the change in target to 2005, the integration of the service improvement/multi-channel strategy and GOL agenda, and the identification of most commonly used services (http://www.nrcan.gc.ca/nrcanonline/gol).

During 2001-02, the following key deliverables have advanced NOL while supporting the GOL agenda:

- delivered the Regional Lens of Canada's Land and Resources Pilot Project on schedule and within budget; this project allows users to appreciate the spatial dimensions of issues that were, in the past, very difficult to access ($100,000) (http://www.regionallens.nrcan.gc.ca);

- delivered Forest Eco-Systems On-Line; this project is unique in that it brings together information from different areas (such as insects from one site and diseases from another) and integrates them to give the user a better understanding of all aspects of forest-ecosystems in Canada; also delivered on schedule and within budget http://www.cfl.scf.rncan.gc.ca/Ecosystemes-ecosystems/ and http://www.cfl.scf.rncan.gc.ca/collections-cfll;
- in partnership with other government departments, provided on-line access to S&T information and knowledge through the Gateways and Clusters on the Canada Site;

- developed a conceptual framework for consultation with federal partners for a Federal Government Science and Technology Cluster on the Canada Site ($50,000); linkages with this and other clusters provide multiple on-line access points to information to help ensure the sustainability of social, economic and environmental benefits from one generation of Canadians to the next;
- initiated the implementation phase of the departmental Discovery Search Engine ($200,000 approximately);
- sponsored the first phase of the departmental Internet revitalization project ($150,000 approximately) and the Access to Knowledge Policy; and
- continued support for the implementation of Common, Look and Feel ($135,000).

Meeting Canada's geospatial challenge – GeoConnections is a government, industry, and academic partnership initiative to make Canada's world-class geographic information accessible on the Internet by developing the Canadian Geospatial Data Infrastructure (CGDI) (http://cgdi.gc.ca) ($60 million over 5 years starting in 1999).

This initiative is an important component of the Government of Canada's knowledge and innovation strategy and Connecting Canadians/ GOL agendas. It supports vital operations such as: emergency/911 services, disaster management, resource management, transportation, business development, communities, and many others. Moreover, it strengthens partnerships; encourages the growth of high-tech geomatics jobs and industries; and empowers Canadian rural, remote and aboriginal communities.

March 2002 marked the mid-point of GeoConnections' mandate. Currently, more than 190 experts from across Canada are participating in program delivery and 75 organizations are involved in partnership projects. Moreover, the Canadian Geomatics Accord – which was developed over the past l8 months by the Canadian Council on Geomatics – has been signed by nine provinces/territories while other organizations have expressed an interest in collaborating.

More than 7 million people have accessed GeoConnections – through the award-winning Discovery Portal/CEONet web site – to search more than 10,000 products, 380 services and connections to 270 remote databases from more than 1,700 suppliers. In addition, in 2001, more than 60,000 maps were made by visitors to the web site each month which is a 30 percent increase over the previous year. Nine partner organizations are using GeoConnections infrastructure services and tools to avoid duplication and service development costs.

> ***Did you know?*** First published in 1906, the *National Atlas of Canada*'s last paper edition was printed in 1993. The National Atlas Online – one of the first interactive Internet atlases in the world – was developed in response to changing technologies and communications avenues. As an example, the success of the Atlas' near-real time creation of the 2000 Federal Election Map was demonstrated when 80,000 maps were accessed by Internet users within 24 hours.

GeoConnections is also making excellent progress in empowering stewardship and sustainable development in rural, remote and aboriginal communities through the Sustainable Communities Initiative (SCI). SCI community projects involves geographic-info, tools and training to build capacities to address local sustainable development and land

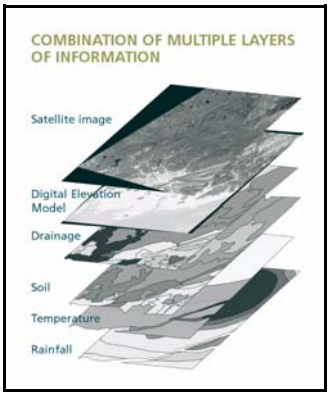
resource issues. SCI now has 55 projects currently underway or completed, 12 new projects under discussion and is expected to exceed committed project goals.

The GPS Corrections service is used by the Canadian Hydrographic Service in the production of Arctic marine navigation charts.

Last fall, the Canadian Council on Geomatics – a federal-provincial-territorial consultative body – endorsed the GeoBase national initiative to provide governments, industry and communities with quality base geospatial information. As a first step, NRCan realigned its own mapping resources to effectively and efficiently enable GeoBase in the short and long term. This is important because GeoBase will enable users to pool their resources to make better-informed decisions, provide free and unrestricted access to all Canadians, and eliminate duplication while ensuring sustainability. In addition, this initiative is critical to support immediate and emerging security requirements at the national level. More information on safety and security can be found in Strategic Outcome #4, starting on page 39.

NRCan met requirements for the collaborative development of the Canada-wide Differential Global Positioning System (GPS) program, a service designed to improve GPS-derived positions to metre level or better positioning accuracy. While delays with technical developments have occurred, access is anticipated for fall 2002 and a demonstration service is presently operational.

Improving the Department's capacity to report on Canada's forests – The Department is committed to improving its capacity to report on the sustainability of Canada's forests and forest management practices. Unfortunately, the ability to report on Canada's forests in a comprehensive manner is beyond the capacity of current federal-provincial, territorial and non-government information systems. This operational reality, combined with increasing public demands for more social and environmental information, and criticism over Canada's limited ability to report in these areas, has led the Department to develop a National Forest Information System (NFIS).



Under the auspices of the Canadian Council of Forest Ministers (CCFM), the NFIS is currently being developed to provide ready access to the most current, consistent, timely, and reliable forest resources information. It will enhance the capability to present an accurate picture of Canadian forest practices and provide a strategic context for participating parties and agencies to address regional, national and international challenges to Canadian forest management practices. One of the primary features of the system will be its ability to bring together volumes of spatial and non-spatial information now being collected at the national, provincial and local

levels. The information will be aligned to defined descriptions and interpreted through tools designed for analysis.

Progress over the past fiscal year included: the development of a systems architecture to define the scope of the NFIS and pilot testing in three provinces (British Columbia, Ontario, Newfoundland/Labrador); providing a national portal; evaluating a number of governance structures for the effective management and delivery of the system; and providing opportunities for other government and non-government parties to participate in the system's development. NRCan also provided secretariat support to the NFIS Steering Committee. In September 2001, the CCFM endorsed the NFIS Phase I development activities, the completion of the Phase I reports, and the continued development of the NFIS over the next two years. The total CCFM 2001-02 budget for this project was $400,000 including the federal share of $133,200.

A new vision for Canada's forest sector: Forest 2020 – In August 2000, the Department, under the auspices of the CCFM, proposed a solution-based concept to address proactively the cumulative economic, social and environmental pressures being exerted on Canada's forests. The concept, known as Forest 2020, focuses on ensuring Canada's future competitiveness as a major supplier to the world's growing demand for fibre while addressing increasing demands for conserving its natural forests and for greater community stability grounded in the wise use of all forest resources. It would allow for more wood to be grown in Canada's second growth forests and support the creation of a new forest asset through the establishment of fast growing, high quality fibre, tree plantations. Thus, the increase in wood fibre production would be achieved from a relatively small land base.

In 2001-02, an extensive dialogue process with a wide variety of stakeholders was initiated. This included: a meeting involving four CCFM ministers and representatives from forest products, environmental and international communities; discussions with the National Advisory Board on Forests; presentations to the Forest Products Association of Canada; focus group testing with the public; sponsoring three workshops organized by the National Aboriginal Forestry Association and by the Sierra Club of Canada; a presentation to the Canadian Federation of Woodlot Owners; and a teleconference involving mayors and executive directors of federations representing ten forest communities from seven provinces.

The Forest 2020 principles were endorsed by CCFM Ministers in September 2001 and augmented by a Vision Statement, defining all of the components of Forest 2020. As well, a stakeholders' conference was held on February 27th, 2002 to update them on the results of the dialogue process and to present the agenda for the (May 2002) Forest 2020 National Think Tank initiative involving representatives of the environmental community, academia, the finance and investment community, research, labour, resource-dependent communities and private woodlot owners. The stage would then be set for the CCFM's annual meeting in September 2002 when a decision on whether to proceed with the initiative is expected. The Department's expenditures related to Forest 2020 totalled $585,000 in 2001-02.

Performance Assessment for Strategic Outcome 1

The year 2001-02 confirmed NRCan's need to restructure its NOL initiative and considerable resources were devoted to developing a new charter, a governance structure and a risk analysis to provide a strong foundation for the program. Moreover, although departmental plans conformed to the initial objectives of GOL, it now is necessary to realign the departmental GOL plans to reflect changes in funding, target dates and GOL agenda. A realignment of resources was also necessary for GeoBase to make it more efficient in both the short- and long-term.

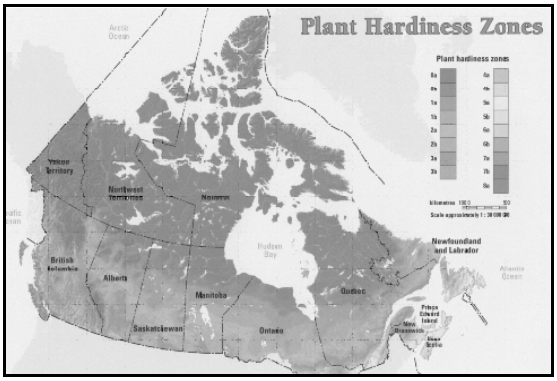
Moreover, the Department recognizes that the ability to report on Canada's forests in a comprehensive manner is beyond the capacity of current federal-provincial, territorial and non-government information systems. NRCan is addressing this gap through the development of the National Forest Information System.

On consensus building, Sustainable Development Strategy (SDS) consultations with clients and stakeholders revealed that 80 percent of respondents thought NRCan was meeting or exceeding expectations with regard to achieving SDS targets; 85 percent of respondents also indicated that the Department was meeting or exceeding expectations with regard to reporting on progress. NRCan will validate this data through another round of consultations expected to be held in early 2003.

Adoption of NRCan-supported technology and practices

Objective: Creating easily accessible and integrated knowledge on the state of Canada's landmass and natural resources, and the economic, environmental, and social dimensions of their use.
Performance indicator: Adoption of NRCan-supported technology and practices (selected example: Plant Hardiness Zone Map).

Plant Hardiness Zones



NRCan's Contribution

- The digitally based statistical process used to generate the plant hardiness map allows rapid and efficient revision of climatic variables required for determination of plant hardiness zones.
- The new map demonstrates environmental variation over time and, with each revision, will continue to act as a climatic reference point for gardeners, agriculturalists and urban foresters.
- The statistical methodology employed in producing the map has broad application beyond plant hardiness; it can be used to generate climate-determined actual and potential habitat range for any biological population of interest, including plant pathogens, native wildlife and invasive alien species.
- The new hardiness zones map was a highly successful venture resulting in its use by professional landscapers and gardeners throughout Canada.
- It is a collaborative effort by scientists of various components of NRCan, Environment Canada and Agriculture and Agri-Food Canada.
- NRCan's Digital Elevation Model (DEM) was used to capture the topography and its mapping services component produced the high quality final version.
- DEM is a computer-based grid of the latitude, longitude and elevation of all of Canada.
- More information on this initiative can be found at http://www.nrcan-rncan.gc.ca/cfs-scf/index_e.html.

What does the graph mean?

- Hardiness zones are geographic areas associated with the probability of plant survival in relation to the average climatic conditions present.
- This new map is based on data sets from 1930-1960 and 1961-1999.
- Since 1960, hardiness zones in Eastern Canada have declined slightly or remained stable, suggesting that conditions are slightly less hospitable for plants.
- Conversely, hardiness zones in Western Canada have generally increased, suggesting more hospitable conditions.
- Comparison of the zones between the two time periods are consistent with what is known about climate change in Canada.

Next Steps

- NRCan will continue to collect species-specific data; a Web site has been developed where professional landscapers and horticulturalists submit data on what they are growing and where.
- NRCan will combine this data with the plant hardiness zone map; this data will then be used to generate hardiness zone maps for individual plant species throughout Canada.
- The individual maps will be compiled into an atlas of Canadian natural and urban forest plant species and hardiness zones.

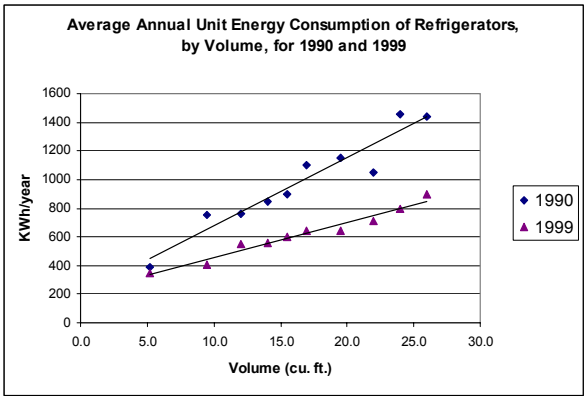
Participation in, and influence on, fiscal, regulatory and voluntary sustainable development initiatives

Objective: Developing and promoting fiscal, regulatory and voluntary approaches that encourage the sustainable development of natural resources.

Performance indicator: Participation in, and influence on, fiscal, regulatory and voluntary sustainable development initiatives (selected example: energy efficiency).

Target: Maintain or improve participation and influence.

Average Annual Unit Energy Consumption of Refrigerators, by Volume, for 1990 and 1999



NRCan's Contribution

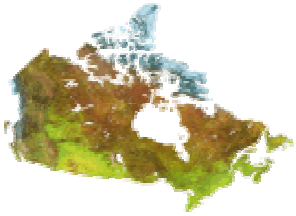
- In 1992, the *Energy Efficiency Act* was passed and, shortly thereafter, NRCan's *Energy Efficiency Regulations* were introduced. Since then, NRCan has been working closely with manufacturers to improve the energy efficiency of equipment in the residential (e.g., major household appliances), commercial (e.g., lighting, air conditioning) and industrial (e.g., motors) sectors.
- NRCan has applied its expertise to provide and support the various analyses associated with both current and prospective regulations. For example, since 1996, NRCan's National Energy Use Database has arranged with the Canadian Appliance Manufacturers Association (CAMA) for the annual collection of shipment data for the six major household appliances. The graph on the left is just one example of the types of analyses that typically are conducted using this data, in order to track the efficiency improvements of appliances on the market. NRCan publishes a document every two years entitled Energy Consumption of Major Household Appliances Shipped in Canada to report on these improvements available at http://oee1.nrcan.gc.ca/neud/dpa/data_e/publications.cfm.
- NRCan programs such as the Energy Efficiency Regulations and EnerGuide for Equipment and its work with external partners, coupled with the significant R&D carried out by the appliance manufacturers, has contributed significantly to the improvements shown in the graph, and in most other household appliances.

What does the graph mean?

- The graph shows the average annual energy consumption for refrigerator units, by volume, for 1990 and 1999.
- Between 1990 and 1999, the energy performance of refrigerators improved remarkably. In 1990, a 12 cubic foot refrigerator consumed, on average, approximately 740 kWh of electricity per year. By 1999, the same sized refrigerators required only 550 kWh per year, a 25% improvement.
- The improvement is even more significant for larger refrigerators. In 1990, a 25 cubic foot refrigerator consumed, on average, 1,400 kWh of electricity per year. By 1999, the same sized refrigerators required 900 kWh per year, an improvement of 36%. As the graph indicates, the larger the refrigerator volume, the greater the decrease in average annual unit energy consumption from 1990 to 1999.
- By 1999, the difference between the average annual energy consumption of the largest and smallest refrigerator units had narrowed considerably, relative to the gap in 1990. In 1990, the difference between the average annual energy consumption of the largest (26.4 ft^3) and smallest units (4.5 ft^3) was about 1000 kWh per year; that difference shrank to about 650 kWh in 1999, despite the fact that the size of the largest refrigerators (30.4 ft^3) increased considerably over this time.

Next Steps

- NRCan will work with appliance and other equipment manufacturers to continually improve energy efficiency.
- In particular, NRCan will continue to work with CAMA to increase the market coverage for the annual collection of the shipment data. Through this data collection and analyses, NRCan will continue to monitor the trends in energy efficiency for the six major household appliances, and will continue to inform the analysis and development of future regulations.
- Furthermore, NRCan recently became Canada's official proponent of the international Energy Star Program and is endorsing the Energy Star qualifying levels for a range of products including major household appliances. There are a number of market transformation projects being developed to promote Energy Star-qualifying products, and NRCan will be tracking their effectiveness in the marketplace.



Strategic Outcome #2 - To provide Canadians with sustainable economic, social and environmental benefits derived from natural resources for present and future generations.

Short to medium-term objectives	Performance Indicators
Greater economic opportunities and encouraging investment in innovative and higher value uses of natural resources.	• Economic influence of NRCan S&T.* • Employment levels and productivity in resource and resource-related industries. • Contribution of the natural resources sector to the GDP. • Capital investment in resource and resource-related industries.*
Expanded access to international markets for Canadian resource-based products, knowledge, technologies and services.	• Value and percent of exports of resource-based products.
Increased capacity of Aboriginal, rural and northern communities to generate sustainable economic activity based on natural resources.	• Number of shared projects and funds leveraged with rural, Aboriginal and northern communities. • Employment level of Aboriginal people and northern residents in resource sectors.

* Performance information on these specific indicators is presented in a quadrant format on pages 24 and 25.

Actual Expenditures for 2001-02

NRCan spent $173.3 million (or 21 percent) of a total net expenditures of $818 million in support of providing economic, social and environmental benefits to Canadians. Major expenditures for this strategic outcome were related to resource exploration and industry support ($27.7 million) and offshore regulatory, development and revenue sharing ($50.3 million). More details on major expenditure areas for this strategic outcome can be found on pages 56 and 57.

Key accomplishments

Energy: supporting diversity and market access through policy and technology – NRCan is active in several multilateral and bilateral international energy relationships, promoting Canadian industry access to foreign markets, Canadian approaches to energy policy, sustainable development, and technological cooperation.

During the past year, North American energy market issues have received a heightened emphasis, driven largely by the high importance given to energy policy by the new administrations in the United States (U.S.) and Mexico. Against this backdrop, NRCan has promoted Canada's interests in North American energy markets through the enhancement of our cooperative ties and efforts, including:

strengthening our Canada-Mexico and Canada-U.S. official consultative fora; furthering Canada's interests in the U.S. Administration's National Energy Policy and in comprehensive energy legislation in the U.S. Congress; and establishing the North American Energy Working Group in June 2001.

Furthermore, the Minister's trade mission to Mexico in October 2001 strengthened Canada's relationship with Mexico and offered Canadian businesses an opportunity to familiarize themselves with the promising Mexican energy market and to meet directly with potential business partners. It also gave the Minister the chance to meet with several of Mexico's key energy policy makers – including his unprecedented address to a joint session of the Mexican Congress – to share Canadian perspectives on energy sector reform and explore issues of mutual interest.

Diversifying Canada's oil and gas – As Canada and the world will continue to utilize hydrocarbon-based fuels for the foreseeable future, it is important to help ensure a safe, efficient, reliable and increasingly environmentally clean mix of energy options. Canada's oil sands and heavy oil deposits represent one third of the world's useful petroleum resources. Production levels from these sources are expected to surpass conventional light and offshore oil production by the year 2010. New technologies will be key to the economically and environmentally sound commercial development of these valuable energy resources. Through its facility in Devon, Alberta, NRCan fosters the development of hydrocarbon supply technologies and related environmental technologies, with an emphasis on oil sands and heavy oil (http://www.nrcan.gc.ca/es/etb/cwrc/english/cwrc/cwrchome.htm).

In 2001-02, an NRCan-led consortium of government, university and private sector scientists in Alberta discovered a unique micro-organism that upgrades heavy oil. The organism breaks the chemical linkages that hold large oil molecules together, thereby reducing the viscosity of the heavy oil and enabling it to flow more easily in pipelines. Producers currently mix light oil with heavy oil to help the latter flow more easily; this breakthrough discovery may have the potential to significantly reduce upgrading costs. Further research on this leading-edge process is necessary before an assessment can be made of its potential cost benefits.

Improvements in the mining tax regime – Canada's mining industry is suffering from a decline in the reserves of most major metals. Current levels of spending on exploration appear to be insufficient to replace the depleted reserves. As a consequence, the remaining lives of a number of producing mines may be shortened, raising concerns in the communities that they support. During the reporting period, the federal and provincial governments recognized the urgency of the situation and introduced a mixture of tax incentives for explorers and tax relief for producers.

On the federal side, NRCan played a key role in defining the expenses that are eligible for the 15 percent Investment Tax Credit for Exploration (ITCE) and in providing rulings and interpretations on the eligibility of these expenses to the mining industry and the Canada Customs and Revenue Agency. In partnership

with the Prospectors and Developers Association of Canada, the Department also held seminars in the major financial centres across Canada to raise awareness of the application and advantages of the ITCE for funding exploration projects. As well, the Department led an intergovernmental working group in analyzing the effectiveness of the tax credit and identifying future options. The group will report on its findings to the Mines Ministers' Conference in September 2002 and will make recommendations to the federal Minister of Finance by the end of 2002.

In cooperation with Finance Canada, the Mining Association of Canada, and other mining groups, NRCan took significant steps over the past year to develop an effective approach for improving key provisions in the mining tax regime so that the mining industry could share in the income tax rate reductions that have been accorded to other industries in recent federal budgets. More information on mining taxation can be found at http://www.nrcan.gc.ca/ms/efab/tmrd.

Advanced technology in mining industry – During the reporting period, NRCan developed advanced, innovative technology for use in the mining industry around the globe. For example, in cooperation with mining companies, manufacturers of mining equipment, labour unions and other research organizations, NRCan embarked upon a study on the replacement of diesel engines by hydrogen fuel cells in underground mining vehicles. As an initial step, the Department participated in the development of a hydrogen fuel cell mine locomotive – the world's first industrial vehicle powered by hydrogen. The development of the prototype vehicle cost $1.4 million and was financed jointly by the Industry Energy Research and Development Program, the U.S. Department of Energy, three manufacturers of mining equipment, and four Canadian mining companies. Currently, NRCan is refining the prototype at its experimental mine near Val-d'Or, Quebec. The vehicle will undergo operational testing shortly at a mine in northern Ontario.

Canadian-built locomotive – the world's first fuel cell industrial vehicle.

NRCan is planning further studies on the application of the fuel cell technology in underground mining vehicles, including the impact of the technology on the environment and underground ventilation, the development of hydrogen filling systems, and the costs and benefits of the technology. These projects are expected to cost $19 million over three years.

If the application of hydrogen fuel cell in underground mining vehicles is successful, the vehicles are expected to be manufactured in Canada for export around the globe. The commercialization of this innovative technology is expected to generate significant economic benefits for Canadians.

Water - a precious resource for Canadians –The lead federal role in groundwater science is shared by NRCan and Environment Canada, who have renewed a Memorandum of Understanding on

groundwater. This has clarified respective roles as renewed efforts to address national groundwater issues are being launched.

NRCan is playing a leadership role in promoting the development of a Canadian Framework for Collaboration on Groundwater. Shared objectives identified during consultations in 2001 included a national inventory of groundwater vulnerability and sustainability, and a national groundwater quantity and quality monitoring system (http://cgq-qgc.ca/cgsi/). A permanent advisory council, presently being formed, will encourage optimal coordination of groundwater-related activity, oversee the implementation of a groundwater strategy, and raise public awareness.

As part of the framework process, NRCan hosted a September 2001 national workshop that was attended by over 70 federal, provincial, academic, and industry stakeholders. The workshop identified priority actions needed to improve the management and protection of Canada's groundwater resources.

To fulfill the NRCan role in this program, a new groundwater science program has been approved for the next three to five years. The program will focus on mapping, monitoring, standards, synthesis, and research. There has been strong interest from provincial agencies to partner in the fulfilment of shared objectives.

Also in the field of water resources, NRCan analysed the potential of using Radarsat and Radarsat 2 space imagery to extract information on soil moisture in the Mississippi River watershed of eastern Ontario. With respect to water-related hazards, NRCan and partners have worked on mapping resources required for Red River flood protection, including framework datasets for two transboundary tributaries of the Red River; the Pembina River, and the Roseau River (both in southern Manitoba). NRCan also contributed to the development of a Flood Management Information System.

An extensive report on the state-of-the-art in oil sands tailings management and reclamation technologies was prepared by NRCan specialists. An essential aspect of management and reclamation is addressing the long-term seepage of saline water into reclamation systems. NRCan scientists are also involved in providing computer models to the oil sands industry that allow the prediction of the effect of oil sands production on recycled water quality. With these tools, the producers can better manage their extensive water recycle systems as well as provide reclamation groups with critical water quality information. The report and the modelling tools were well received by the industry.

Stimulating new investment in mineral exploration – In its second year, NRCan's three-year $15 million Targeted Geoscience Initiative (TGI) saw 22 field projects being conducted in all regions of Canada to improve the geoscience knowledge of areas with high mineral potential. This knowledge is used by Canada's mineral exploration industry to help determine future exploration programs and to focus the resulting prospecting activities. Seven new projects were added in 2001-02 to the rota of the 22 that were approved and commenced in TGI's initial year, while seven of the original group of projects were completed as planned. As well, TGI funds provided major support to the Canadian Geoscience Knowledge Network that facilitates awareness of, and access to, this new knowledge and to the geoscience information of all Canadian geological surveys.

Preliminary results from all 29 TGI field projects were released in 2001-02, and many have already generated considerable interest from exploration companies.

> ***Did you know?*** In the summer of 2001, sampling of glacial deposits near Lac Bienville, Quebec resulted in the discovery of minerals pointing to possible diamond discoveries. Within five days of this information being released publicly, more than 500 exploration claims had been acquired by industry in the surrounding terrane.

On a related topic, the EXTECH III and IV projects continued in 2001-02. These address declining gold production in the Yellowknife mining district, and exploration in the uranium-rich Athabasca Basin, respectively. Both were augmented through TGI funding that allowed additional components to be pursued. An important product from the EXTECH III studies is a 3D model incorporating structural elements and geochemical and geophysical ore signatures which are directing exploration to new targets in the Con and Giant mines. In the Athabasca Basin, EXTECH IV activities have resulted in a much improved, detailed, basin-wide stratigraphic and structural framework that has enhanced consistency between exploration projects and improved confidence in prospectivity models. One measure of the usefulness of these projects is that 395,000 hectares of the Athabasca Basin were staked in 2001 by two exploration companies, so that the entire Alberta portion of Athabasca Basin is now staked.

Positioning Canada's forest sector on the international scene – NRCan ensures that Canada continues to maintain and enhance its competitive position in export markets through a variety of venues.

For example, under the auspices of the Canadian Council of Forest Ministers (CCFM), the International Forestry Partnerships Program enabled Canada to change the Council of Europe's (COE) 1998 resolution requesting European companies to rescind any contract with Canadian producers using wood from non-sustainable timber forests. The new resolution stresses the importance of promoting cooperation and collaboration between Canada and the COE and its member states, particularly at the parliamentary level, in forest management policy and related forest science and technology matters.

In April 2002, the Minister headed Canada's delegation to the 6th Conference of the Parties to the Convention on Biological Diversity (CBD) in the Hague, Netherlands, where more than 120 ministers and heads of delegations adopted the "Hague Declaration". It recognizes the progress made by countries in implementing the CBD, and the priority that Canada attaches to halting global deforestation and the loss of forest biodiversity in all forests. In addition, NRCan officials worked with other like-minded countries and other interested participants in supporting the adoption of a new work program on forest biodiversity that provides flexibility for parties to address the most relevant activities to achieve their own biodiversity goals.

As Chair of the 2002 G8 Summit, NRCan prepared the final report of the *G8 Action Programme on Forests* and accompanying backgrounder document on behalf of G8 forest experts. The G8 Action Programme focuses on five themes: monitoring and assessment; national forest programmes; protected areas; private sector; and, illegal logging. The inclusion of illegal logging has helped to move this issue into the international spotlight. Responding to the Programme's mandate,

G8 members undertook to work in these five areas individually and collectively, both at home and abroad. The final report and background document chronicles work undertaken, highlights results and presents challenges for the future.

NRCan continued to support Canada's defence of its softwood lumber industry in the current trade dispute with the U.S. in three overlapping phases. In Phase 1, the Department supported Canada's vigorous defence during the U.S. countervailing duty investigation. In Phase 2, NRCan supported Canada's attempt to negotiate a fair and durable trade solution with the U.S. In Phase 3, NRCan supports Canada in its pursuit of legal challenges posed by the U.S. trade actions through the World Trade Organization and the North American Free Trade Agreement.

NRCan continued to pursue economic opportunities for manufacturers of Canadian forest products and technology in emerging markets through existing international agreements. For example, under the auspices of bilateral agreements between Canada and China, NRCan funding enabled the Canadian wood frame construction technology to be included in the proposed revision of the Chinese building codes. NRCan also organized and participated in seminars with Chinese specialists interested in learning of Canadian forest fire management technology and products.

The Department also monitors industry-led national and international certification trends designed to demonstrate that wood and wood products originate from sustainably managed forests. As of June 2002, more than 18 million hectares, or approximately 15 percent of Canada's 119 million hectares of managed forest land (representing about 16 percent of Canada's annual harvest of approximately 180 million cubic metres), have been certified under one of the three forest specific certification systems in use in Canada. Based on an industry survey, by the end of 2005, the area of certified forest in Canada is expected to rise to about 64 million hectares, or 54 percent of our commercial/ managed forest land. In addition, 109.5 million hectares of forest land (about 95 percent of Canada's managed forest lands) have been certified under the internationally recognized ISO 14001 Environmental Management System Standard. This generic system is a leading indicator of company intentions to pursue certification under a forest specific program.

Providing opportunities for partnerships and involvement in sustainable forest development – NRCan is highly committed to programs that enable Aboriginal self-reliance through capacity building for sustainable forest development. The First Nation Forestry Program (FNFP) is a capacity-building program that enhances the capability of First Nations to participate in, and benefit more fully from, forest-based opportunities both on- and off-reserves. The program supports projects that assist sustainable forest management knowledge and technology transfer, work experience, forest protection and business planning. This increased capacity, in turn, positions First Nations to meet increasing forestry management opportunities and governance responsibilities.

Did you know? In terms of the FNFP's operations, 182 projects were funded in 2001-02 related to forest management training, developing industry partnerships, business plan development, forest management plan development, silviculture work, forest protection, and technology transfer. Its 2001-02 accomplishments continued to grow with 10,108 person weeks of work experience being created directly across the country involving 842 First Nation workers, the transfer of Geographic Information System (GIS) and Global Positioning System technologies, and support for 55 training workshops, 13 business plans and the preparation of 18 forest management plans.

During the transition year, NRCan and Indian and Northern Affairs Canada (INAC) received a one year Treasury Board renewal for 2002-03 for the $4.5 million cost-shared program. Initial work was also begun on developing options for a renewed multi-year program. Moreover, in 2001-02, industry partners made direct contributions of $3.7 million and in-kind contributions of $184,000. First Nations made direct contributions of $6.25 million and in-kind contributions of $575,000. The result of the FNFP's results-based measurement and accountability framework, which was completed in June 2002, revealed that it is the only Canadian program that focuses exclusively on First Nation forestry. The program identifies forestry institutional development and recognizes the expanding reach of First Nations land and forest management requirement as a consequence of comprehensive land claims.

As well, Canada's Model Forest Program is an innovative partnership program which encourages the development and application of new sustainable forest management practices and tools through local partnerships. There are eleven model forests across Canada. Partnerships are broadly based, and depending on local circumstances, include a mix of participants representing various levels of government, community groups, researchers, industry, community, environmental and Aboriginal groups.

In 2001-02, model forest partnership achievements included, for example, the development and application of GIS technologies for forest management and resources scenario planning; leading edge wildlife research; delineation of indicators for sustainable forest management at the local level; carbon accounting modelling; alternative silviculture practices; innovative land tenure models; and codes of conduct for woodlot managers and contractors. Over the past year, individual model forests also continued to build stronger links by working together as a network, and pursued opportunities to share innovations and applications in such areas as local level indicators, private woodlots management, and Aboriginal ecological knowledge. In effect, the Program continued to build on its track record as an effective partnership vehicle to promote Canada's sustainable forestry agenda and adoption of sustainable forest management practices.

The Department is actively involved in the delivery of the Waswanipi Cree Model Forest (WCMF), the unique Aboriginal-led model forest which joined the program in Phase II. The $3.4 billion, 48-year Quebec-Cree hydro-electric development agreement, signed in February 2002, is an opportunity for the WCMF to provide leadership in sustainable forestry management as the Cree assume increased forest management responsibilities and pursue opportunities. This will be a key challenge and opportunity as the WCMF enters the next phase of the program.

The Program's authorities for a third, five year phase (2002-07) were renewed by Treasury Board in March 2002 based on existing reference level funding of $8 million per year. Partners are forecasted to contribute approximately $6 million in cash and in-kind support. The focus of Phase III will be on strengthening network level cooperation and sharing between the individual model forests in the development and dissemination of knowledge on innovative sustainable forest management practices. Moreover, a key requirement for the next phase will be for individual model forests to "go beyond their boundaries" in broadening partnerships and project cooperation beyond the physical territorial boundaries of existing model forests. Promising examples of potential "beyond boundary" initiatives include cooperation between Nova Forest Alliance and PEI model forest project proponents, Prince Albert Model Forest and Métis project proponents, and Western Newfoundland Model Forest and Innu proponents in Labrador.

Resource opportunities for Northern Saskatchewan communities pilot program – In 2001-02, NRCan undertook a pilot program to assist Northern Saskatchewan communities to take better advantage of economic and community development opportunities in the natural resources sector. In total, the program funded 16 pilot projects for a total investment of $609,000. NRCan provided $459,000 for 13 projects and Western Economic Diversification Canada contributed $150,000 for 3 projects. With support from existing federal programs, the Government of Saskatchewan, Aboriginal organizations, the private sector and communities themselves, the total investment in Northern Saskatchewan for these projects amounted to $3.8 million.

In one project, the Metis Nation of Saskatchewan looked into maximizing local benefits from sustainable forest management in the Cumberland/Creighton and La Ronge regions. In another, the Meadow Lake Tribal Council and the Prince Albert Grand Council conducted research to create land-base maps using GIS technology. The North West Metis Council carried out an innovative traditional land use mapping project that was also supported by NRCan's Sustainable Communities Initiative. Another project involved determining the skills required for employment in Alberta's oil sands and was linked to the Aboriginal Human Resources Development Council of Canada's "Northern Neighbours-Partnership for Jobs" project. Other projects included the assessment and use of forest biomass (organic plant and wood matter) as an alternative source of energy; identification of job and business opportunities; small business management training; market studies; and training and work experience related to the natural resources sector.

An internal evaluation of the Northern Saskatchewan pilot program noted that NRCan was successful in designing and delivering a fair and effective pilot program, and that community residents in Northern Saskatchewan – that participated in the program – reported that it enhanced their capacity to take advantage of resource-based opportunities.

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Performance Assessment for Strategic Outcome 2

The natural resources sector is a high-tech, knowledge-based sector which has adapted and transformed to succeed in the global economy. The sector is a leader in productivity growth and technology intensity, and unparalleled technological advances through public-private sector partnerships. It is also Canada's largest investor in high-technology equipment, spurring growth in important new sectors such as geomatics and climate change technologies. However, Canada's natural resources sector needs to improve its innovative performance relative to its competitors, including the U.S., U.K., Germany, Sweden, Finland and Australia. These countries are making significant investments in areas such as non-conventional oil and gas, lightweight materials for next-generation vehicles, fuel cells, mining automation and intensive forestry. Evidence suggests that we are not laying a sufficient foundation for technological and knowledge innovation for Canada's future. We need to address skills issues to meet ever-increasing demands for knowledge and technology workers. Just to match our competitors' efforts, Canada's natural resources sector must accelerate the pace of innovation and invest more in R&D.

NRCan has been very active on the international front, working with energy officials in the United States and Mexico, and conducting a trade mission to Mexico. As well, the Department continues to work hard in positioning Canada's forest sector internationally through initiatives described on pages 19 and 20. These ongoing actions are essential for Canada to continue to maintain and enhance access to foreign markets and maintain its competitive position. Our success is demonstrated through our positive working relationships in the energy sector and though our success in helping the government maintain access to U.S., European and Japanese markets for Canada's wood and paper products.

It is equally important to foster a healthy domestic natural resource sector. This is particularly true for mining where there has been a decline in the reserves in recent years. NRCan has helped improve this situation by playing a key role in helping implement the 15 percent Investment Tax Credit for Exploration and through the Targeted Geoscience Initiative (TGI), which is working to improve geoscience knowledge of areas with high mineral potential. TGI, along with NRCan's EXTECH III and IV projects (addressing declining gold production in the Yellowknife mining district and exploration in the Athabasca Basin) are showing results as evidenced by the increased staking of claims by exploration companies and their interest in this work. NRCan has also been successful in helping the natural resource sector stay innovative through its work in reducing the viscosity of heavy oil and through its work in the development of a hydrogen fuel cell mine locomotive. This work has the potential to save lives, costs and reduce greenhouse gas emissions.

NRCan is demonstrating leadership in collecting essential scientific knowledge on groundwater issues from federal/provincial/territorial jurisdictions. As Canada is facing difficult decisions regarding water supply, governments are now working closer in sharing this data as a need to understand the national situation and to minimize future impacts. A new groundwater science program has been approved for the next three to five years to enable the government and Canadians to improve its knowledge in this vital area.

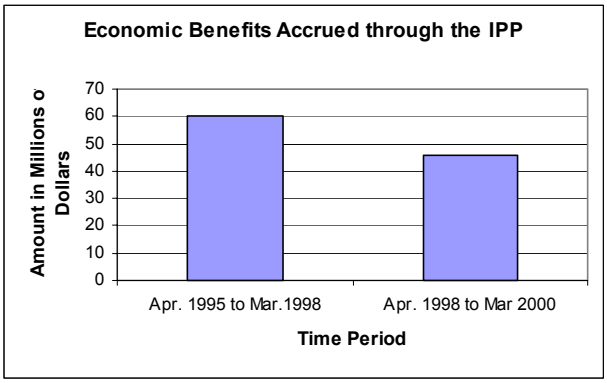
While Canadian communities have made significant progress over the last decade in adopting sustainable features and practices, a truly integrated model of community sustainability, which systematically addresses the social, economic and environmental considerations of the community over the long term, has yet to be realized. NRCan is working hard to develop programs, services and technologies in support of sustainable communities. For example, the Department recently increased its R&D funding by 20 percent ($583,000/year) to further help Canada's remote communities reduce their reliance on oil for heating and electricity via the use of renewable energy technologies and integrated systems.

Economic influence of NRCan S&T

Objective: Creating economic opportunities and encouraging investment in innovative and higher-value uses of natural resources.

Performance indicator: Economic influence of NRCan S&T (economic impact of the Industrial Partners Program (IPP) - Impact Study).

Target: Trend analysis and monitoring.



NRCan's Contribution

- NRCan is one of the federal government's largest science and technology organizations with an annual S&T budget of over $380 million.
- Almost all partners (93%) reported that IPP enabled them to do R&D work that would not otherwise have been done, and that participation of the Department was critical or very critical to the success of their projects.
- The IPP helped the Department to expand its ties and contacts with industry; to identify IPP projects with shorter-term deliverables and impacts; and to optimize its use of A-base funding.
- Partner-reported impacts included:
  - revenue generation from new product/service development project is $4.7 million;
  - cost reductions for exploration-related research projects are $31.5 million;
  - attribution for new mineral and hydrocarbon discoveries is $58.3 million; and
  - economic benefits from environmental impact-related IPP projects are $11.3 million.

What does the graph mean?

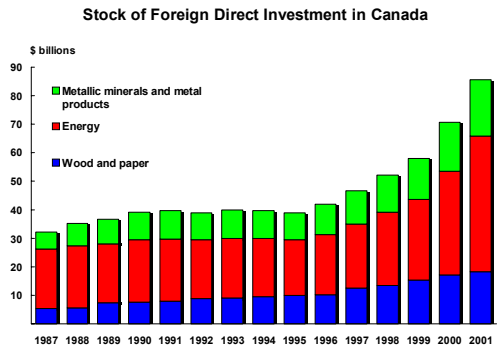
- The graph reports on 26 IPP impact studies that were conducted with 28 industrial partners.
- For the two time periods that were assessed between April 1995 to March 2000, a total of $105.8 million in benefits were accrued among the 28 partners.
- NRCan's contribution to the program was approximately $4 million. This strong leverage ratio is an indication of the success of the partnership approach.

Next Steps

- Although discontinued as a formal program, the IPP "approach" to partnering with industry is now used as a model for other NRCan initiatives.
- In 2001, NRCan initiated a study of NRCan's S&T, and in June 2002, an analysis and recommendations concerning the future vision, organization, and delivery of S&T at NRCan were made.
- NRCan will now proceed to the implementation of these recommendations.

Capital investment in resource and resource-related industries

Objective: Creating economic opportunities and encouraging investment in innovative and higher value uses of natural resources.
Performance indicator: Capital investment in resource and resource-related industries.
Target: Trend analysis and monitoring.



Source: Natural Resources Canada, using data from Statistics Canada.

NRCan's Contribution

NRCan contributes in several ways to enhancing Canada's ability to attract the investment needed to allow Canadians to benefit from their resource wealth.

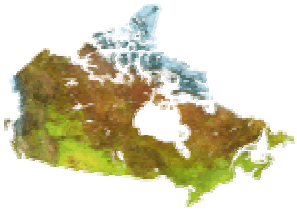
- NRCan's knowledge of international conditions and specialized analysis ensures government decisions are sensitive to the need to maintain an internationally competitive business climate.
- NRCan is active in a number of international fora to foster the development and adoption of sound policies and practices by proposing and advocating approaches and regulatory models that promote environmental, health and other key objectives without creating barriers to trade or unnecessarily restricting access to the benefits of natural resource products. These activities help attain a level playing field for trade and investment, which will allow Canada's natural resources to achieve their potential in creating jobs and fostering economic growth.
- NRCan works to ensure that the international investment community is aware of the benefits of investing in Canada's resource sector.
- NRCan's S&T programs and baseline data on Canada's landmass help investment by contributing to high levels of performance in Canada's resource industries, resulting in improved productivity, safety and environmental results.

What does the graph mean?

- The graph shows the trend of foreign direct investment (FDI) in Canada's resource industries. It includes investments by foreigners in Canada's resource sector where at least 10% of the voting equity is foreign owned.
- Recent growth in FDI in Canada's resource sector has gone hand-in-hand with the trend towards globalization. For example, mining companies - including Canadian mining companies - operate on a global scale, and large resource projects with development costs in the billions of dollars can be expected to have international financing with participants from several countries. The growth in FDI in Canada's resource industries indicates that our resource projects are able to compete successfully for investment capital with similar investments in other countries.

Next Steps

NRCan will continue to promote Canada's natural resource potential in key financial markets around the world, as well as facilitate the competitiveness of Canadian resource industries, including the providers of specialized equipment and services to resource producers.



Strategic Outcome #3 - To provide Canadians with strategies that reduce the environmental impacts in the natural resources sector.

Short to medium-term objectives	Performance Indicators
Canada addressing its international Kyoto commitment to reduce greenhouse gas (GHG) emissions.	• GHG emissions compared to Kyoto protocol; and GHG emissions to GDP ratio compared to other countries. • Trends in use of renewable energy.* • Trends in energy efficiency. • GHG emissions from federal operations. • Progress towards the identification of impacts and adaptation measures.
Scientific research, technologies and stewardship practices that reduce environmental impacts, conserve biodiversity, and increase the efficiency of resource development and use.	• Environmental influence of NRCan's science, technology and stewardship practices.
Canada's environment safeguarded from the risks associated with natural resource development and use.	• Progress towards addressing hazards associated with resource development and use.*

* Performance information on these specific indicators is presented in a quadrant format on pages 37 and 38.

Actual Expenditures for 2001-02

Of NRCan's total net expenditures of $818 million, $344.2 million (or 42 percent) were applied to reducing environmental impacts in the natural resources sector. Both *Action Plan 2000* ($21.2 million) and the Climate Change Action Fund ($23.8 million) contributed to tangible results under this strategic outcome. Major investments included the Program of Energy Research and Development ($45.2 million), the Green Municipal Enabling/Investment Funds ($62.5 million administered by NRCan), the Sustainable Development Technology Fund ($50 million administered by NRCan), and energy efficiency and alternative energy activities ($36.3 million). More details on major expenditure areas for this strategic outcome can be found on pages 56 and 57.

Key accomplishments

Addressing the climate change challenge – Climate change is a global problem that requires global action. NRCan has a lead role in both policy development and implementation of specific measures to reduce emissions of greenhouse gases (GHGs). To fulfill both of these roles, NRCan has committed substantial resources, and it is working closely with other federal departments, governments and stakeholders.

Reducing GHG emissions is a challenge for Canada, from an environmental, economic and social perspective. Achieving Canada's Kyoto

Protocol target of reducing GHG emissions to 6 percent below 1990 levels by 2010 will require an approximate 30 percent reduction in emissions from the projected business as usual case.

Did you know? In May-June 2002, the Government of Canada released a discussion paper and began stakeholder consultations on four possible options for addressing Canada's climate change commitments.

On the policy side, NRCan has the lead role in the economic modeling of various policy scenarios for Kyoto ratification. NRCan also plays an important role along with Environment Canada in the development of climate change and Kyoto-related policies.

In November 2001, the Government of Canada began implementing key policies and measures contained within its cornerstone five-year $500 million *Action Plan 2000* on climate change (AP 2000). NRCan is central to many of these AP 2000 efforts.

http://www.climatechange.nrcan.gc.ca

Taking action on climate change – The Technology Early Action Measures (TEAM) initiative is a highly coordinated interdepartmental effort that provides incremental financing and networking support to encourage additional investment in innovative technologies to reduce GHG emissions. TEAM accelerates the development of new technologies for early entry in the marketplace, ensuring Canadian competitive advantage in GHG reduction technologies across all sectors of the economy. TEAM currently has 87 domestic and international projects, representing a total investment of $915 million based on a TEAM investment of $83 million and other federal funding of $92 million over four years.

In 2001-02, TEAM continued to support government policy goals on climate change and Canadian business opportunities by investing in 17 new projects. TEAM's $17.7 million investment in these projects leveraged more than $214 million from partners representing a diverse range of industrial sectors.

Did you know? The Weyburn Carbon Dioxide (CO_2) Monitoring Project is an NRCan-led International Energy Agency project aimed at enhancing the understanding of geological storage of carbon dioxide associated with enhanced oil recovery.

Understanding and adapting to climate change – Continuing to refine our knowledge of how climate has changed is fundamental to future strategy development. Canadians need and want information to understand and adapt to the consequences of climate change, and to make well informed decisions about their use of energy. NRCan co-manages the Public Education and Outreach component of the Climate Change Action Fund (CCAF-PEO) with Environment Canada. Outreach activities on climate change have increased across the country. More than 150 outreach projects have been funded, with an additional 30 projects funded in 2001-02. Several new climate change outreach centres or "hubs" were established in partnership with provincial and territorial governments in most provinces/territories, for a total of 10 centres.

Did you know? In spring 2001, NRCan scientists led an international team to drill and extract a 173-metre core from the high altitude ice fields of Mount Logan. The core will provide critical information on long-term climate changes in northwest Canada, an area of relatively little long-term study.

With the support of AP 2000, the Department increased the number of permafrost monitoring sites and upgraded access to Web-based data. This information is critical to tracking the effects of climate change in northern Canada and for examining the implications for northern infrastructure.

Working in conjunction with federal and university colleagues and provincial stakeholders, NRCan coastal researchers published an integrated study of the impacts of sea level rise on Prince Edward Island (P.E.I.). This information will help municipal and provincial planners better assess the risks of sea level rise and develop mitigation strategies on P.E.I.'s coasts.

In 2001-02, the Climate Change Impacts and Adaptation Program established the Canadian Climate Impacts and Adaptation Research Network (C-CIARN). Consisting of 13 regional and sectoral nodes, the national network brings together diverse researchers and stakeholders to exchange information on the latest research results and techniques and to identify gaps and priorities for future research. NRCan is leading work with other provincial and territorial governments and federal departments to develop a national approach to climate change impacts and adaptations.

The Program also funded 20 new research projects to build the foundation of knowledge about how climate change will affect water resources management and food supply.

Furthermore, the findings of a team of Canadian and U.S. scientists shows that climate change will have a large influence on North American forests. Fire frequency and intensity will likely increase, as will drought episodes, insect and pathogen outbreaks. The frequency and severity of natural atmospheric events, such as hurricanes, ice storms and landslides will have some variable impact on the net primary productivity of forest and on the carbon cycle and species regeneration potential and forest succession. The team also examined historical data on boreal forest fires, including annual fire incidents and area burned, in North America, Scandinavia, and Russia. The results show that in North America and Russia, recent climate warming has brought warmer spring and winter temperatures in west-central and north-western Canada, in Alaska, and in most of Siberia. The warming is up to 2-3°C since the mid 1960s. Winter and summer temperatures over much of Canada and Russia are projected to increase by 6-10°C and 4-6°C respectively which, in turn, will offset minor projected increases in precipitation. Therefore, changing precipitation patterns are expected to bring extreme droughts and floods. In this warmer and dryer climate, the fire season is predicted to be significantly longer, lightning ignitions more frequent, resulting in increased fire danger. The predicted effects of increased fire activity will be the gradual shifting of current forest boundaries northward, greater carbon release and less storage, as well as regional plant extinctions.

NRCan climate change scientists developed a second generation of the Carbon Budget Model. This model has the potential to realistically predict the net primary production of forests, and to track future changes by stand age-class (the age of a particular type of forest) and forest type. The model is an ecosystem simulator that uses forest inventory data to estimate biomass accumulation, and to track carbon uptake and release over time. Comparisons between simulated and field-measured net primary

production showed that the model can reasonably estimate and track this variable by species, forest type, climate, and stand age. Such quantitative predictions will allow scientists to better understand the role of northern forests in the global carbon cycle, and will enhance the ability to manage these forests in a changing environment.

Energy efficiency, a key tool for action on climate change – About 80 percent of Canada's total GHG emissions are in the form of carbon dioxide (CO_2) mostly generated from the use of fossil fuels. Canadians spend almost $104 billion per year, approximately 10 percent of GDP, on energy to heat and cool homes and offices, to operate appliances and cars, and to power industrial processes. Improving the efficiency of energy use in Canada is a key component of AP 2000.

NRCan is a leader in practices, programs and developing and deploying technologies to improve energy efficiency. The House in Order Initiative (see Section IV, page 49) demonstrates federal leadership to other levels of government, to corporate organizations, and to private citizens. A series of market transformation programs target every economic sector, seeking to alter the behaviour of people and organizations.

For example, in the transportation sector, the FleetSmart program targets improved fuel efficiency and/or use of alternative fuels in non-federal vehicle fleets through training programs, demonstrations, and information materials. To date, 728 fleets representing 156,520 commercial vehicles have registered with the program, and close to 99,000 drivers have been trained.

Emissions from vehicles are the largest single source of GHGs in Canada. Consequently, under NRCan's leadership, the Canadian Lightweight Materials Research Initiative (CliMRI) was founded to coordinate research and development of materials and processes to reduce the weight of vehicles, thereby reducing energy consumption and GHG emissions. During the reporting period, CLiMRI made significant progress in the development of innovative lightweight advanced materials and manufacturing processes. For example, it:

- improved the resistance of magnesium (a lightweight metal) to corrosion in engine cradles in partnership with the U.S. Department of Energy;
- developed coatings for heat exchangers in hydrogen fuel cells in cooperation with a manufacturer of vehicle parts;
- developed a lightweight metals matrix composite for use in brake drums in trucks with the assistance of Transport Canada; and
- completed an extensive database on the mechanical and thermal properties of two magnesium alloys in collaboration with a mining company.

CLiMRI has also been instrumental in coordinating the lightweight materials industry response to the federal government's innovation strategy. Additional information on CliMRI is available at http://climri.nrcan.gc.ca.

In the industrial sector, by implementing more stringent standards through the administration of the *Energy Efficiency Regulations*, the efficiency standard for industrial motors has been raised by 5 percent which should see an aggregate annual energy savings of 16.3 petajoules by 2010.

Energy-efficient industry – During 2001-02, NRCan's Industry Energy R&D (IERD) program, undertaken through cost-shared projects with industry, added 14 projects to the 56 that were already active. Key achievements

during the year included the development of a high efficiency air-cooled refrigerant compressor (also with TEAM support) which achieved energy savings of more than 30 percent; the development of an electronic instant hot water heater, which achieves energy savings of 15 to 32 percent over conventional electric water heaters; the development of an energy-efficient septic tank service truck, which will achieve lifetime savings of more than 70,000 litres of fuel, 400 litres of lube oil, and 20 tires, per truck; and development of an energy-efficient process for exhaust treatment of marine power plants, with projected energy savings of up to 21 percent of fuel used on board ships. IERD expenditures have been $4.5 million annually since 1988, with supplementary funding beginning in 1998 from climate change/TEAM at a level of $2.5 million annually. A conservative estimate of the net benefits gives a benefit/cost ratio of about 2.3.

Tests of energy-efficient exhaust treatment of marine power plants have been conducted on the ferry 'Leif Ericson' (Nova Scotia-Newfoundland). Photo courtesy of Anthony DeHoog, Marine Atlantic.

Energy for sustainable communities – NRCan funds and undertakes scientific research and technology development, commercialization and deployment initiatives to promote the uptake and use of renewable energy. Information on trends in the use of renewable energy can be found in a quadrant format on page 37.

The Renewable Energy Deployment Initiative (REDI) was extended for a further three years starting in 2001-02 ($12 million for three years). The extension is a testimony to the early success achieved during the first three years at developing markets for cost-effective, reliable space and water heating and cooling. With respect to the financial incentive provided under this program, demand has increased substantially during the past two years. A June 2001 evaluation revealed that more data on reach and impacts is required to facilitate future evaluation of the program in 2003.

Did you know? Since the beginning of REDI, 249 applications had been received by March 31, 2002. Of these, 98 have been completed, representing $10.2 million in renewable energy systems; 96 projects are under way, with contribution agreements already signed or applications under technical review; 14 projects are on hold; and 41 applications have been either cancelled by the client or rejected by the program for not meeting the eligibility criteria. More information is available at http://www.nrcan.gc.ca/redi.

During 2001-02, green power purchasing made the transition from pilot stage to full blown program. The last of two pilot purchase agreements resulting from the February 2000 Budget was signed and announced in June 2001. Electricity from two new wind farms in Saskatchewan and Prince Edward Island started flowing to federal facilities in those provinces by February 2002. Meanwhile, significant support was given to Public Works and Government Services Canada for a commitment made as part of AP 2000 to purchase 20 percent of all federal electricity requirements from emerging renewable energy sources within five years.

The fastest growing source of renewable energy is wind power with more than 30 percent annual capacity growth globally. In the December 2001

Atlantic Wind Test Site, P.E.I. Photo courtesy of P.E.I. Energy Corporation.

federal budget, an incentive for wind power producers was announced at a cost of $260 million. In February 2002, NRCan initiated targeted consultations on the details of this program which will encourage the installation of 1,000 megawatts of new capacity during the next five years. The program was officially launched in May 2002. More information is available at http://www.canren.gc.ca.

Did you know? The purpose of the Canadian Renewable Energy Network (CanREN) is to increase the understanding of renewable energy to accelerate the development and commercialization of renewable energy technologies. It offers general information on renewable energy sources, and highlights the technologies and applications being developed to harness these sources. RETScreen, a complementary initiative, provides tools to analyse the technical and financial viability of possible projects (http://www.canren.gc.ca/aboutus/index.asp and http://132.156.62.20/ang/menu.php).

Two AP 2000 measures aimed at developing markets for on-site electricity generation using emerging renewable energy sources were implemented during 2001-02. As part of the first measure, the Department is working with several other partners to develop technical guidelines to facilitate the inter-connection of small distributed power systems with the electricity grid. The second measure is the installation of such systems on several federal buildings.

Did you know? NRCan conducts R&D to deliver technology for building, operating and managing thermal networks that link cost-effective and environmentally sound heating or cooling sources to communities' space heating or cooling requirements. It is estimated that more than 35,000 tonnes of CO_2 emissions are saved annually by the communities directly impacted by this work.

Promoting Canada as an international model for sustainable development in minerals and metals – A vision of NRCan is that Canada will be a model to the rest of the world in applying sustainable development through the good stewardship of its minerals and metals resources. To make this vision a reality, NRCan encouraged the prudent stewardship and safe use of minerals and metals over the reporting period. In particular, NRCan continued to develop its life cycle assessment program to reduce the material and energy requirements and waste generation associated with the production and processing of minerals and metals. As well, the Department continued to work with other government departments to ensure that the use of materials such as chrysotile asbestos and road salt conforms to the safe use principle.[1]

NRCan undertook extensive environmental research into all stages of the production and processing of minerals and metals. For example, the Department undertook research on acidic

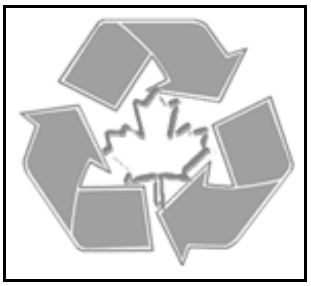
[1]The safe use principle incorporates risk assessment and risk management of the effects of minerals and metals on the health of users and the environment. Where risks are not properly controlled, the principle determines that specific uses should be prohibited.

drainage from mines and lightweight metals. The Mine Environment Neutral Drainage (MEND) program reduced the environmental liability associated with acidic drainage from mines, saving five mines a total of $340 million. NRCan's research and development of high performance materials under the Canadian Lightweight Materials Research Initiative (CliMRI) contributed to the enhanced fuel efficiency of vehicles and reduced greenhouse gas emissions in the transportation sector (see page 29).

In 2001, NRCan embarked on a multi-stakeholder process to develop indicators to measure the contribution of minerals and metals to sustainable development in Canada. The United States, the European Union, Australia and other countries have expressed an interest in the indicators.

Over the past year, NRCan fostered the sustainable development of minerals and metals around the globe through bilateral contacts and active participation in international and regional fora such as the Mines Ministries of the Americas Conference, the APEC-Expert Group on Mineral and Energy Exploration and Development, and the Non-Ferrous Metals Consultative Forum on Sustainable Development. The Department also prepared for the World Summit on Sustainable Development, which was held in South Africa in September 2002, to establish a global dialogue on the sustainable development of mining, minerals and metals. As well, the Department expanded the environmental expertise in the mining industries in several developing countries such as Brazil, Guyana and Zambia in cooperation with the Canadian International Development Agency.

Towards a national recycling strategy – NRCan considers that some materials, historically viewed as wastes, are valuable resources yielding substantial economic, health, environmental and social benefits. In addition, domestic and global demand for recycled products has been growing at a significant pace, and recent studies have indicated that resource recovery rates from post-consumer, institutional and industrial sources can be significantly increased. For example, Statistics Canada's 1998 Waste Management Survey reported that, on average, Canada's waste diversion rate is only 30 percent. Although some progress has been made since the survey, opportunities still exist for significant improvement in recovery rates for a broad range of materials.



To capitalize on these opportunities, NRCan led the development of the Canadian Resource Recovery Strategy (CRRS) to promote the sustainable economic recovery of materials and energy domestically and internationally over the reporting period. The Department completed cross-country consultations to identify resource recovery priorities, barriers to resource recovery in each region, and potential resource recovery demonstration projects in the post-consumer and industrial sectors. Approximately 200 experts attended seven consultations across Canada to discuss the importance of developing a strategy that will recover and recycle materials and energy in a sustainable manner. The experts included representatives from all levels of government, industry, Aboriginal groups and non-governmental organizations.

The consultations indicated that a clear need exists for a resource recovery strategy in Canada to address both regional and national requirements. The public has a relatively high level of awareness of the need to increase resource recovery and reduce our reliance on landfills but has little knowledge as to how this can be achieved. The federal government, in partnership with other levels of government, has an important role to play in facilitating the implementation of policies, practices and demonstration projects in all sectors of the economy. NRCan has taken the advice provided during the consultations and is further developing the CRRS to improve the quality of life of Canadians.

Understanding metals in the environment – The minerals and metals industry has long been vital to Canada's economic health and growth. However, environmental issues related to certain metals have global trade implications that could jeopardize these economic benefits. Scientific disagreement on environmental and health issues related to metals led Canada to undertake an initiative that would support related policy positions based on sound science and sustainable development concepts.

NRCan's five-year Metals in the Environment (MITE) initiative was designed to resolve these questions. It concentrates on four themes:

- impact of smelter emissions in different Canadian environments;
- comparisons of Arctic historical records from ice, sediments, peat and fossils;
- cycling processes and pathways of mercury; and
- geological sources of metals and their fate in the surficial environment.

Results of MITE science have been communicated so far in more than sixty scientific publications and numerous presentations at scientific fora in North and South America, Europe and Africa. The success of the initiative can be judged by the fact that MITE science now supports national risk assessment and risk management decision-making undertaken by other federal departments and international organizations (i.e., Environment Canada, Organization of Economic Cooperation and Development, United Nations).

As well, NRCan contributed to the establishment of the Toxic Substances Research Initiative (1999-02), and assisted in founding the Industry-NSERC-Federal Department Research Network.

Conserving and protecting Canada's forest ecosystems while enhancing timber supply – NRCan conducts world-class forest research into the conservation and protection of Canada's forest ecosystems and in enhancing timber supply. Expenditures related to all of the Department's forest science research activities is estimated at $41.2 million in 2001-02.

In terms of recent scientific advances, NRCan successfully developed a number of genetic research techniques to rapidly screen spruce for its resistance to the white pine weevil – a significant destroyer of spruce in British Columbia (B.C.). This project, which is the most comprehensive genetic resistance-screening program in forestry in the world, resulted in the identification of a pool of spruce genotypes with heritable resistance to the white pine weevil. Project benefits are being

experienced in all regions of B.C. As well, the restoration of Sitka spruce in coastal habitats enhances environmental values by enabling foresters to meet current biodiversity guidelines. Prior to this advancement in genetics research, no pest resistant spruce was available in Canada.

Although chemical herbicides have been effective in controlling unwanted vegetation in areas such as rights-of-way, strict environmental regulations on their use is resulting in fewer tools available to users and higher costs. In developing biological alternatives to chemical herbicides, NRCan, in collaboration with the forest industry, and B.C. Hydro, has successfully field-tested an environmentally safe alternative for the control of hardwood brush species. NRCan discovered that a specific fungus infects woody plants and is an effective biological control agent in preventing the re-sprouting of hardwood species from stumps. At the pre-commercial stage, this technology is poised to become Canada's first bio-control agent for the use in controlling unwanted vegetation. With data currently being collected in national field trials, NRCan, in collaboration with Mycologic Inc. has submitted the fungus to the Pest Management Regulatory Agency and the Environmental Protection Agency for final registration.

NRCan, in collaboration with Agriculture and Agri-Food Canada, has developed a biological way to stunt the growth of "bluejoint" grass, a species that infests approximately one quarter of the forested mixed boreal stands in western Canada. This grass thrives after a stand is harvested and quickly chokes out slower-growing tree seedlings.

Field experiments have demonstrated that snow mould, a native fungus, can slow down the growth of bluejoint grass enough to allow vulnerable seedlings to survive. Field trials at Millar Western Industries show a 50 per cent reduction in grass biomass on white spruce sites. Two major forest companies have expressed interest in participating in further testing of this promising control agent.

NRCan also developed a computer-based "decision support system" that allows forest managers to use harvest schedules and silviculture to reduce losses to spruce budworm. This technology has been implemented on all of New Brunswick's (N.B.) crown licenses as part of a five-year management planning process. NRCan has established partnerships with members of the forest industry who manage large forest areas outside N.B. in order to implement the technology in other parts of Canada. In addition, the technology is being enhanced to deliver decision support for jackpine budworm management, and for optimization of forest values other than timber.

Did you know? The federal government's role in pest management research will help reduce the 60 million cubic metre a year in fibre loss to pests by optimizing forest protection against insects. Losses to insects and disease from 1984 to 1998 were estimated at almost 1 billion cubic metres.

Radioactive waste management – Radioactive waste generated by the nuclear energy option can be grouped into three categories: nuclear fuel waste, low-level radioactive waste, and uranium mine and mill tailings. NRCan works with industry,

government officials and other Canadian stakeholders to develop policies to ensure that radioactive waste is managed in a safe, environmentally sound, comprehensive, cost-effective, and integrated manner.

Aerial view of the municipalities of Port Hope, Hope Township and Clarington, Ontario.

In the past year, much progress was made on the clean-up of Port Hope area low-level radioactive waste. In March 2001, NRCan, on behalf of the federal government, signed a Legal Agreement with three communities to commence the Port Hope Area Initiative. The agreement outlines the terms under which the Government of Canada is now proceeding with the clean-up of more than one million cubic metres of low-level radioactive waste and contaminated soil in the Port Hope area in southeastern Ontario.

In November 2001, the groundwork to deliver this long-term initiative was set through the launch of the environmental assessment under the *Canadian Environmental Assessment Act* (CEAA). NRCan, as the lead responsible authority, oversaw the development of project descriptions and led the development of the scoping document for the assessment.

Technical studies also began to better define the volume and concentration of contaminants at the various industrial and non-industrial sites. In addition, a Property Value Protection program for local residents was established, and negotiations for the acquisition of lands required to site the proposed facilities, needed in Phase II, have been initiated. This first phase of the project, including regulatory review, is expected to last five years. The second phase, expected to take a further five to seven years, will involve the actual cleanup and construction of the long-term waste management facilities, after which a monitoring and maintenance phase will begin.

Did you know? NRCan was one of the primary departments involved in an extensive five-year review of the CEAA. This work resulted in unprecedented additional funding for all involved departments to implement changes to the Act.

On a related file, the *Nuclear Fuel Waste Act* received Royal Assent on June 13, 2002. This legislation provides a framework for the government to make a decision on the long-term management of nuclear fuel waste that is based on a comprehensive, integrated and economically sound approach for Canada. This is an important piece of legislation since the management of nuclear fuel waste is a major undertaking that could cost up to $12 billion, over a span of 70 to 100 years. NRCan, on behalf of the Minister, will be responsible for exercising appropriate oversight and ensuring compliance. The *Nuclear Fuel Waste Act* is complementary to the *Nuclear Safety and Control Act* which oversees the health, safety, security and control aspects of radioactive waste management. More information on nuclear issues can be found at http://nuclear.nrcan.gc.ca.

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Performance Assessment for Strategic Outcome 3

NRCan has been given a mandate to respond to the climate change issue, especially as it relates to the emissions associated with the production and use of energy. Since carbon dioxide – which accounts for about 80 percent of Canada's total GHG emissions – is generated mostly by the use of fossil fuels, increasing the efficiency of energy use is a key tool for action on climate change. Many of the GHG mitigation initiatives led by NRCan are presently in the trend analysis and monitoring stage on a project-by-project basis. Over time, this will help to develop the capacity to determine how the various individual climate change initiatives supported by NRCan have affected Canada's overall GHG emissions.

Evaluation of current energy R&D programs and a response to emerging priorities have resulted in continuing work by NRCan and its partners to reduce the environmental impacts of resource production and use. This includes R&D to support cleaner transportation, better energy efficiency in buildings, communities and industry, and the regulation of offshore oil and gas exploration and production in eastern and northern Canada.

The Department has responded to the results of program evaluations and, in 2001-02, it implemented a number of adjustments to three measures, which included:

- expansion of the reach of the EnerGuide for Houses initiative to all regions and through licensing of additional delivery agents, such as qualified home inspection services and utilities;
- improvements to the Energy Innovators Initiative's information gathering and, for small building portfolios, its replication requirements; and
- enhancements to the awareness, training, and for small commercial projects, software components of the Commercial Buildings Initiative.

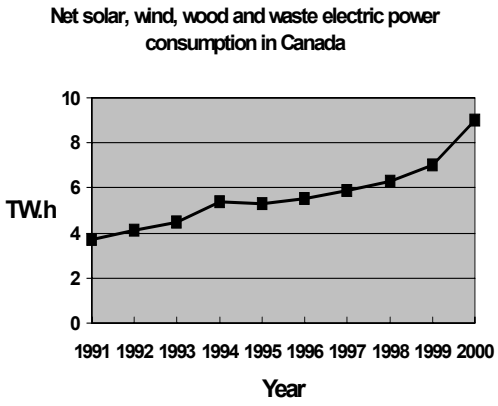
In 1997, the Office of the Auditor General made a number of recommendations concerning the performance assessment of the Department's market transformation measures to encourage greater energy efficiency in the Canadian economy. In 2001, the Commissioner of the Environment and Sustainable Development's Progress Report on Energy Efficiency concluded that, since these 1997 recommendations, the Department had:

- identified and adopted performance indicators to measure progress toward clearly stated expectations and to support ongoing improvement in performance;
- significantly increased its efforts to link changes in energy use to changes in GHG emissions by analyzing trends in energy use and by monitoring performance; and
- made satisfactory progress in enhancing its reporting to Parliament, in particular through the annual *Report to Parliament under the Energy Efficiency Act*, which now describes more fully the relationship between energy use and GHG emissions and presents performance data for almost all of its market transformation programs.

With respect to addressing hazards associated with resource development and use, NRCan is particularly pleased that the Port Hope project has been initiated and that the *Nuclear Fuel Waste Act* received Royal Assent in June 2002. The Department must now ensure that these two initiatives remain on schedule and continue to effectively involve all stakeholders.

Trends in use of renewable energy

Objective: Helping limit and adapt to climate change.
Performance indicator: Trends in use of renewable energy.
Target: Trend analysis and monitoring.



(Preliminary estimate for year 2000)

Note: TW.h = billions of GW.h
Source: US DOE: International Electricity Information (a compilation of national data)
http://www.eia.doe.gov/emeu/iea/table17.html

NRCan's Contribution

NRCan funds and undertakes scientific research and technology development, commercialization and deployment initiatives to promote the uptake and use of renewable energy, other than conventional hydro-electricity, at industrial, institutional and individual levels. Initiatives include the following.

- Fostering, through cost-shared activities and technical assistance, the development and deployment of renewable energy technologies, including small hydro, active solar, wind energy and bioenergy. A strong focus is on the deployment of renewable energy technologies in the more than 300 remote Canadian communities that are not connected to the main electricity grid or to natural gas networks.
- RETScreen, a decision support software tool developed by NRCan in collaboration with external experts, is widely used – currently by more than 21,000 people in 185 countries – for evaluating the feasibility for particular uses of various types of renewable energy technologies.
- The Renewable Energy Deployment Initiative (REDI), a 6-year, $24 million market development program, stimulates the demand for renewable energy systems for space and water heating and cooling.
- Conducting R&D to improve the economics and efficiency of converting renewable energy to electricity, including overcoming technical barriers that limit the introduction of renewable energy technologies.

What does the graph mean?

- The graph shows the trends in the use in Canada of electricity generated from wind, solar and biomass. From 1991 to 2000, the use of renewable energy increased from almost 4 billion gigawatts (GW) to approximately 9 billion GW, an increase of more than 140%.
- Although representing only a small component of overall electricity use, the proportion of electricity generated from renewables increased from 1.1% to 1.6% over the period, representing a 45% increase.
- The graph does not include hydro, either conventional or small (less than 20MW). The former accounts for approximately 60% of electricity generated in Canada; installed capacity is more than 67 GW. There are more than 230 small hydro installations in Canada, with a total capacity of approximately 1500 MW.
- Overall, renewable energy currently represents about 17% of total primary energy supply in Canada.

Next Steps

National GHG emission reduction targets will provide an impetus for accelerating the use of renewable energy sources as a way to meet new energy demand and replace existing energy production. Through its R&D and deployment activities, in partnership with its clients and key stakeholders, NRCan will continue to seek to significantly increase the contribution of renewable energy to Canada's energy mix, for electricity production, for transportation fuels, and for space heating and cooling. Key aims are to:

- double the contribution of biomass to Canada's energy mix by improved supply and conversion to electricity, fuels, heat and bio-products (target 2025); and
- increase by an order of magnitude the contribution of wind, solar, and small-scale hydro renewable energies to integrated Canadian energy systems.
- More information can be found at (http://www.nrcan-rncan.gc.ca/es/renewable_e.htm).

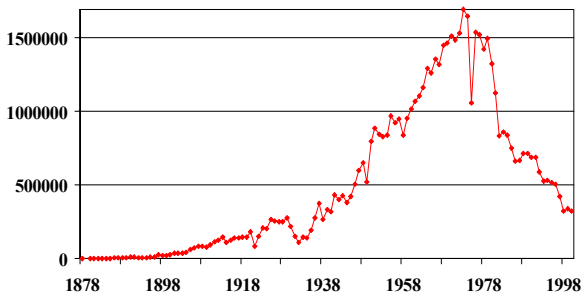
Addressing hazards associated with resource development and use

Objective: Safeguarding Canada's environment from the risks associated with natural resource development and use.

Performance indicator: Progress towards addressing hazards associated with resource development and use (selected example: asbestos).

Target: Maintain or improve safeguards - hazard specific.

History of Canadian Asbestos Production (t/yr)



NRCan's Contribution

Today, Canada's asbestos industry is one of the most stringently regulated in the world. Over the past three years, NRCan has been very active in defending the industry and promoting the safe use of asbestos. NRCan's recent activities include:

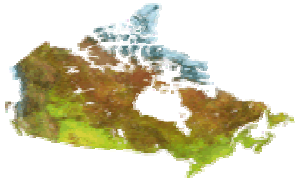
- the signing of a declaration on the safe use of minerals and metals, including chrysotile asbestos, at the Annual Mines Ministries of Americas Conference in Buenos Aries;
- challenging the ban on asbestos by France at the World Trade Organization;
- undertaking representations to the governments of the United Kingdom, the European Union, Brazil, the Philippines, Argentina and Vietnam to promote the safe use of chrysotile asbestos; and
- establishing a process with Chile to exchange information to address its decision to ban asbestos.

What does the graph mean?

- The graph shows the production of chrysotile asbestos since 1878 in Canada. Annual production reached a peak of 1.7 million metric tonnes in 1973, which was valued at more than $1 billion. In the mid-1970s, production fell dramatically because of the demonstrated risk of cancer associated with past exposure to high concentrations of asbestos dust for prolonged periods in the workplace. In 2001, 295 000 t of chrysotile asbestos, with a value of $132 million, were produced in Canada.
- The graph also shows the positive impact of Canadian action on the use of asbestos. The rate at which production fell slowed after the introduction of the controlled-use approach and the establishment of the Asbestos Institute in the mid-1980s.

Next Steps

- NRCan will continue to actively promote the safe-use of all minerals and metals, including chrysotile asbestos, both at home and abroad.
- NRCan has invited Chile to send a delegation to Canada this fall to observe occupational health and safety practices, the enforcement of regulations and other aspects of asbestos in Canada. Quebec's Worker Health and Safety Commission has also invited two Chilean occupational health and safety officers to participate in the Commission's training program of health and safety inspectors.
- During the visit of the Minister of Natural Resources to India this fall, NRCan will promote the safe use and ensure market access for chrysotile asbestos. The Department will also hold discussions on key policy issues relating to asbestos.



Strategic Outcome #4 - To provide Canadians with safety and security in the natural resources sector.

Short to medium-term objectives	Performance Indicators
Canadians safeguarded from natural hazards.	• Impact of NRCan's S&T on the identification, mitigation and response to natural hazards.
A national framework for spatial positioning, mapping and boundary maintenance.	• User satisfaction with aeronautical charts, the Canada Lands Survey System and the Canadian Spatial Reference System.
Safe use of explosives and pyrotechnics.	• Accident and incident rate in the explosives and pyrotechnic industries in Canada.*
Enhanced safety and security in Canada's natural resources sector.	• Impact of regulatory frameworks for energy transmission, offshore development, and Canada's uranium and nuclear industry.

* Performance information for this indicator was to be reported in a quadrant format as part of the NRCan Performance Measurement Framework. Data to report on this indicator was not available.

Actual Expenditures for 2001-02

NRCan spent $34.9 million (or 4 percent) of a total net expenditures of $818 million towards providing Canadians with safety and security in the natural resources sector. Major initiatives related to addressing natural hazards and emergencies ($13.9 million), and legal surveys ($5.2 million). More details on major expenditure areas for this strategic outcome can be found on pages 56 and 57.

Key accomplishments

Safeguarding Canadians from natural hazards – Safeguarding Canadians from natural hazards and securing our territorial and economic sovereignty requires an increasingly detailed knowledge of our country and its resources.

NRCan provides many timely products and services that support the institutions of public governance. These include scientific research and expertise regarding natural hazards (i.e., earthquakes, floods, forest fires, magnetic storms), aeronautical and topographical maps and charts, and space satellite imagery for search and rescue-related activities and emergency planning. More information on the Department's response system can be found at: http://www.seismo.nrcan.gc.ca and www.geolab.nrcan.gc.ca/geomag.

Through S&T, NRCan has been expanding its understanding of a range of natural hazards with the aim of reducing the potential loss from their small scale effects to more widespread

and severe natural disasters. For example, the use of new surveying technologies (multi-beam swath bathymetry) has provided increased resolution of sea floor features in the Georgia Basin, including identification of an active geological fault and a significant gas vent field; these hazards need to be considered in decision making related to resource development and infrastructure in the area. A doubling of funding from the Canadian Space Agency to NRCan's geomagnetism monitoring program has enhanced the capabilities for forecasting of disruptive magnetic disturbances that have consequences for electrical power transmission and satellite communications. In addition, new Program Integrity funding has allowed the upgrading of regional seismic monitoring stations with new sensors and improved data communications capabilities to ensure early and accurate information on earthquake intensity and locations. As well, the hiring of additional seismologists will ultimately permit a 24/7 on-call service to report felt earthquakes and receive advice. While urban Canada is not generally affected by landslides – these are often overlooked as a hazard – there is the potential for damage to infrastructure (pipelines, roads) in frontier areas under development. Program Integrity funds similarly allowed inauguration of a Canada Landslide Loss Reduction Program to assess the potential hazard and provide relevant information to agencies and industries responsible for siting and maintaining pipelines and roads and other infrastructure.

forest fire

The provision of a suite of quality topographical maps and aeronautical information and products for civil and military aviation in Canada contributes to efficient land and air navigation safety of Canadians. In times of emergencies on Canadian territory, these products and services assist rescue teams and emergency planners to respond in a timely manner and report to decision-makers. Following the September 11, 2001 terrorist attacks, NRCan was responsive in providing aeronautical charts for the operations of stranded airplanes. As well, all mapping-related systems were put on preparatory mode to meet emergency deadlines. Our ability to provide such information not only impacted on the government decision-making and aviation operations, but also on the well-being of the passengers affected by these situations. More information on geospatial information can be found in Strategic Outcome #1, page 9.

Securing public security through explosives regulations and research

Following the tragic events of September 11, 2001, public security has never been more important. In response, the Government of Canada introduced Bill C-55, the *Public Safety Act*, which includes key amendments to the *Explosives Act* to strengthen the control of the acquisition, possession, importation, exportation and transportation within Canada of explosives, and the purchase of components of explosives such as ammonium nitrate. The proposed amendments also include stronger fines and penalties to deter explosives-related activities that threaten the safety and security of Canadians. As well, the amendments will align Canada's legislation with the Organization of American States' convention against terrorism.

To develop the program required to implement the proposed amendments to the *Explosives*

Act, NRCan embarked upon ambitious consultations with industry, private stakeholders, other government departments, the provinces and the United States during the reporting period. In addition, the Department hosted a meeting of the International Group of Chief Inspectors of Explosives, in Ottawa, this past summer to share information on best practices and lessons learned regarding explosives regulations. The Department also led the development of the Global Explosives Regulatory Module – a secure Internet system to share information among explosive regulators around the globe.

NRCan has the only non-military public facility for undertaking scientific research on explosives in Canada. During the reporting period, NRCan continued to apply its scientific expertise and unique facilities to enhance the safety of workers and the public through work in the areas of explosives safety and counter-terrorism. The Department participated actively in the Canada/U.S. Counter-Terrorism Research and Development Program, which includes projects to enhance the detection and tracing of explosives. To improve the protection of the occupants of buildings against explosions, the Department also worked closely with industry and other federal departments to improve the resistance of windows to blasts. As well, the Department completed a three-year project to help reduce the risks associated with the transportation of explosives on roadways in cooperation with Transport Canada. The project was undertaken following a 1999 accident near Walden, Ontario, in which a truck carrying 20 tonnes of commercial explosives crashed, burned and detonated.

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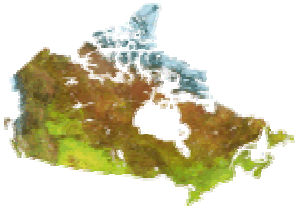
Performance Assessment for Strategic Outcome 4

The large number of visits to the NRCan earthquake hazards website (1,550 per day, an increase of 18 percent over last year) and less than 10 complaints over the last three years about the information contained on those sites, is a strong indication of the high level of satisfaction by the public, news media and emergency response agencies with NRCan's information. Similarly, for professional clients such as engineering companies, the provision and use of site-specific earthquake hazard calculations, and other information on seismicity and geohazards, have been without complaint regarding quality and turnaround.

A recent client satisfaction survey on NRCan's aeronautical charts – which contribute to the flying safety of Canadians – revealed that the Department met or exceeded expectations of 93 percent of users. There is more appreciation for this product, as well as the Department's scientific research on explosives safety and counter-terrorism, following the tragic events of September 11, 2001.



Strategic Outcome #5 - To provide Canadians with a department that is efficiently and effectively managed.

Short to Medium-term Objectives	Performance Indicators
Managing NRCan's resources responsibly.	• Employee satisfaction with NRCan management practices. • Progress towards maintaining and enhancing NRCan's program integrity. • Savings realized from streamlining administrative processes, innovative service delivery, electronic commerce, improved facilities management, and information technology bulk purchasing and contracts.
Continuous improvement of NRCan's products, services, and operations.	• Implementation of recommendations from audits, evaluations and other studies of NRCan management and operations. • Progress towards the implementation of leading-edge management practices.
Sustainable development in NRCan operations.	• Progress of the Department's Environmental Management System towards the implementation of ISO 14000 series of standards. • Progress towards the implementation of environmental health and safety audits and environmental assessment evaluation of NRCan operations. • Amount of solid non-hazardous waste from NRCan operations per capita per year.* • Portion of fleet converted to alternative fuels.* • Rate of purchasing by NRCan of green power.

* Performance information on these specific indicators is presented in a quadrant format on pages 47 and 48.

Actual Expenditures for 2001-02

Sound departmental management accounts for $75.7 million (or less than 10 percent) of NRCan's total net expenditures ($818 million). Program Integrity II initiatives supporting investment in information management and information technology account for $9.3 million in expenditures, and real property programs account for $28 million in expenditures. The remaining expenditures under this strategic outcome are attributed to all corporate services (including direction and coordination functions) and their support to all program areas of the Department. More details on major expenditure areas for this strategic outcome can be found on pages 56-57.

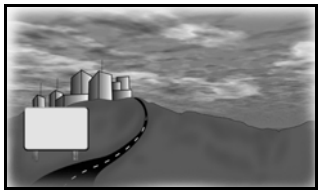
Key accomplishments

Moving towards modern management

NRCan has put in place a number of internal initiatives to strengthen its management practices. In 2001-02, the Department developed a priority-setting model to help it assess current and future management initiatives with a view to making choices on how far and how fast NRCan will deliver on

these initiatives. The model is currently being tested ($92,000).

Various sources over the past few years have indicated the need for more training for managers, functional specialists, administrative staff and professionals. Accordingly, the Department is developing a more holistic approach to the provision of financial management training which resulted in more effective product offerings, just-in-time training, mandatory financial training and identification of training priorities. This included the development of thirteen web-based training modules for the financial management function ($93,000).



Web-based training at NRCan

Regarding modern comptrollership, NRCan's experience has shown that it is better to move at a slower and more prudent pace to ensure that good quality products and services are maintained. For more information, NRCan's Modern Comptrollership Action Plan, entitled *Implementing Modern Comptrollership at NRCan,* can be found at http://www.nrcan.gc.ca/css/fmb/apsd/modcomp-e.pdf.

Recruitment, learning and workplace well-being – NRCan is committed to attracting and retaining a highly skilled, knowledgeable and diverse workforce, supporting employees in their continuous learning, and improving workplace well-being.

The Department was successful in improving its overall representation of employment equity designated groups in a number of professional categories. For example, to increase representation within the Executive cadre, four executives have been appointed to management positions through a special selection process and an additional four candidates were recruited in the Career Assignment Program for Visible Minorities. As well, throughout the reporting period, 832 NRCan employees received training on Employment Equity and Diversity Awareness.

After conducting a new Employment Systems Review and a Workforce Analysis, NRCan prepared a second Employment Equity Action Plan (2002-2005) which was found to be in compliance with the *Employment Equity Act* by the Canadian Human Rights Commission (subject to an on-site assessment later in 2002).

As all employees are important in ensuring the Department's success, NRCan reviewed its short-term hiring practices and subsequently converted many term employees to indeterminate status.

NRCan is also working to enhance workplace well-being and to create a vibrant work environment. To this end, the Department launched *Partnerships in Learning* "*A shared employee-employer investment*". This Learning and Employee Development Strategy provides a practical approach for the Department to become a "learning organization" in creating an inclusive, supportive work environment that promotes continuous learning, mobility and skill development.

The Department continuously strives to develop innovative ways to improve its support tools and streamline processes. For example, to assist managers in exercising their delegated staffing authority, the Department has put in place a *Staffing Made Easy* tool to simplify the staffing process. As well, an automated *On-Line Leave* system has been rolled out to all employees across the Department to allow leave requests to be managed more efficiently from their desktop.

Finally, improvements to services and programs would not be as effective without proper communication tools. In January 2002, the Department launched an electronic bulletin entitled, *Be Informed - It's All About You*. This e-bulletin is a new way for NRCan to keep its employees informed about all the different governmental and departmental policies, services and programs.

Strengthening our S&T capacity –

NRCan embarked on a departmental S&T Futures study in late 2001. The objective of the study is to provide senior management with analysis and options concerning the future vision, organization and delivery of S&T at NRCan to meet its S&T mandate while maximizing opportunities for S&T alliances and partnerships.

With respect to S&T human resources, NRCan led the Graduate Opportunities Strategy pilot, which provided funding of $520,000 to NRCan as bridge funding to hire 12 young scientists or technicians on an indeterminate basis. In addition, under NRCan's Geomatics Professional Development Program, seven new recruits were hired in 2001-02 (for a total of 12 participants) and have received training in various geomatics disciplines to increase their knowledge, skills and proficiency. This cost-sharing program continues to be successful in the preparation for job opportunities in Canada (NRCan $540,000; $37,500 cost recovered).

The completion of NRCan's Long Term Capital Plan (LTCP), approved by Treasury Board in July 2001, was another significant step in the Department's efforts to address its S&T capacity. The LTCP found that 77 percent of the real property space of the Department is more than 30 years old and less and less responsive to the evolving needs of science; and more than half of NRCan's existing property inventory will be candidates for total renovation or replacement in the next five to ten year horizon with an estimated replacement cost of $500 million. NRCan received $10 million to address its most pressing S&T capital and equipment needs. This recapitalization challenge can be viewed as an opportunity to better support S&T capacity at NRCan with new facilities and equipment aligned with the Department's functional, economic, and sustainability objectives of the future.

Over the reporting period, the Department continued to implement the essential

components of the NRCan Real Property Management Framework. Development of long-term asset management plans covering 92 percent of NRCan's national real estate holdings were completed. These plans provide life cycle planning tools for the largest asset base in NRCan, our real property holdings. A mid-term investment strategy continues to be implemented for holdings in the National Capital Region, focusing on rationalization and consolidation of NRCan's real property holdings. As part of the $49 million (2000-05) health and safety special effort, the Department has completed real property remediation projects totaling $22 million. NRCan continues to seek out opportunities for expanding enabling capacity, maximizing scarce resources, and mitigating risk to the Department.

NRCan will continue to explore internal options for strengthening the Department's core S&T competencies while partnering with other S&T organizations. It is doing so through the development of a new vision and forward looking plans that identify our S&T future priorities, as well as mechanisms to deliver S&T activities in support of these priorities.

Information management (IM)/information technology (IT) – As a result of Program Integrity funding, significant investments were made in the Department's IT infrastructure ($8.5 million), which resulted in improvements to the capacity, reliability, integrity and availability of NRCan's key systems and information. Further efforts went into the implementation of new IT and IT replacement projects in support of various business activities. As well, a Security Threat and Risk Assessment (TRA) was conducted to identify areas of the IM/IT infrastructure where the Department would benefit from further enhancements. The weaknesses and vulnerabilities identified through the TRA are being addressed as priority items.

Progress was made in the preparation to better manage the Department's information, whether electronic or paper-based. In this regard, a system was implemented to facilitate responses to access to information requests. A department-wide review of IM and IT governance identified areas where improvements will benefit the delivery of electronic services to all stakeholders.

Sustainable development in NRCan operations – NRCan is committed to programs that improve the overall efficiency of its operations. Information on this important issue is presented in a quadrant format on pages 47, 48 and in Section IV, page 49.

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Performance Assessment for Strategic Outcome 5

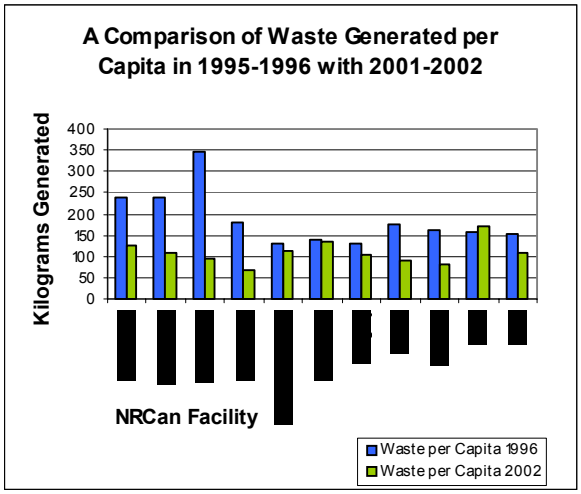
NRCan is proud of the progress it has made in providing Canadians with a department that is efficiently and effectively managed particularly in the areas of improving modern management practices, addressing S&T capacity issues, enhancing workplace well-being and helping to ensure that the right real property, IM/IT and equipment infrastructure is in place, at the right time, to meet the needs for the future.

However, today's climate of continual change has given rise to management and organizational challenges that need to be understood and properly managed. The Department recognizes that addressing the cumulative effect of increased pressures to deliver on the modern management agenda, increased Departmental service requirements, growing business demands, insufficient capital funding, and the erosion of the purchasing power of operating funds requires a better balance to be struck between overall demand for corporate services and the Department's capacity to deliver.

With respect to sustainable development in NRCan operations, the Department has done well in reducing the amount of solid non-hazardous waste per capita (from 170.6 kg in 1995-96 to 99.6 kg in 2001-02); it has also reduced its vehicle fleet size by 42 percent since 1995. Furthermore, the Department is helping other government departments and agencies to achieve their targets under the House in Order Initiative (31 percent below 1990 levels by 2010).

Amount of solid non-hazardous waste from NRCan operations per capita per year

Objective: Sustainable development in NRCan operations.
Performance indicator: Amount of solid non-hazardous waste from NRCan operations per capita per year.
Target: By 2000, 50 percent reduction in solid non-hazardous waste from level measured in 1995-96 audits.



Note: Booth Street facilities are in Ottawa

NRCan's Contribution

- NRCan has put in place a number of programs to reduce the amount of waste going to landfill.
- NRCan implemented an extensive recycling program for its National Capital Region facilities during the same period that initial audits were conducted.
- Tools were also provided to NRCan regional facilities to assist in the development of area-specific recycling programs.
- NRCan's green construction initiative was implemented to minimize construction waste and reuse of construction material.

What does the graph mean?

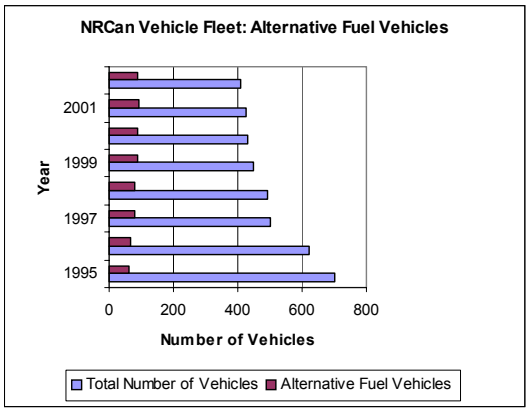
- Waste audits conducted for a number of NRCan's largest facilities in 1996 provided baseline data for this comparison.
- The 12 NRCan facilities shown above represent, in terms of occupants, 78% of the total number for the Department.
- The graph indicates, for those facilities, a comparison between the waste generated per capita per annum in the 1995-96 fiscal year with that of the 2001-02 fiscal year.
- The average waste generated per capita per annum for those facilities was 170.6 kg for the 1995-96 fiscal year, and 99.6 kg for the 2001-02 fiscal year, showing a 41.6 % reduction overall.
- Furthermore, despite a 40% increase in the number of occupants for these facilities, the total waste generated per annum decreased by 17.1 %.

Next Steps

- While NRCan has made significant progress towards the reduction of solid non-hazardous waste, the Department will continue to put in place measures to reach our 50% reduction target.
- These measures include the following:
  - review the current recycling program in the National Capital Region to identify opportunities for improvement;
  - continue to survey recycling programs at regional facilities;
  - monitor costs associated with waste diversion from landfill;
  - promote the reduction of fine paper use per capita; and
  - expand data collection to include all NRCan facilities.

Portion of fleet converted to alternative fuels

Objective: Sustainable development in NRCan operations.
Performance indicator: Portion of fleet converted to alternative fuels.
Target: By 2004, 75 percent of fleet converted to alternative fuels where technically and operationally feasible.



NRCan's Contribution

- NRCan, along with Environment Canada and Treasury Board Secretariat, co-chairs FleetWise, a comprehensive program aimed at increasing the operational efficiency of the federal government's fleets.
- NRCan's Fleet Program is committed to reducing the number of departmental vehicles through more efficient transportation strategies, such as pooling and sharing of fleet resources among federal departments.
- All new additions to NRCan's fleet inventory will be comprised of lower emissions, alternative fuel vehicles whenever possible. Over the last three years, NRCan has decreased its fleet size by an additional 6 percentage points from its total in 1999, and increased the overall percentage of alternative fuel vehicles in operation by an additional 2 percentage points from its total in 1999.

What does the graph mean?

- Since 1995, NRCan has reduced its vehicle fleet size from 700 vehicles to 407 vehicles. This is a reduction of 42 percent over the seven-year period.
- In addition, NRCan now has 89 vehicles (22 percent of the fleet) that run on alternative fuels as opposed to 7% of the fleet in 1995.

Next Steps

- NRCan has met its initial 40 per cent reduction target and will continue to make further reductions to the vehicle fleet.
- NRCan will continue to introduce new alternative fuel vehicle technology into its vehicle inventory. The target indicates that the Department will operate 75% of its fleet to alternative fuels *where technically and operationally feasible.* Departmental analysis of this feasibility indicates that NRCan will be able to operate 40% of its overall vehicle inventory on alternative fuel by April 1, 2005.
- As part of the federal government's vehicle fleet management – as outlined in the Sustainable Development in Government Operations (SDGO) initiative – NRCan is committed to reduce vehicle emissions to meet legislative and policy objectives, including Kyoto commitments; to cut by-products and waste from vehicle use, and to decrease costs.
- NRCan will continue to work with other departments to establish realistic targets and measures for the federal government as part of its continuing efforts under the SDGO initiative.

IV Government-Wide Initiatives and Management Issues

Sustainable Development Strategy

NRCan has made significant progress toward implementing and reporting on commitments made in its two sustainable development strategies: *Safeguarding our Assets, Securing our Future* (1997), and *Now and for the Future* (2001).

The Department has published a final report which presents the achievements of all action commitments contained in *Safeguarding our Assets, Securing our Future*. Key highlights of the progress report, which is available on the Department's Web site at http://www.nrcan.gc.ca/sd-dd/index_e.html, include:

- Canadian Geospatial Data Infrastructure;
- criteria and indicators for sustainable forest management;
- EnerGuide for Houses, Commercial Buildings Incentive Program and Energy Innovators Plus;
- international trade missions;
- inventory of mining industry practices to conserve wildlife and habitat in Canada; and
- a new departmental environmental policy.

In *Now and for the Future*, NRCan made a commitment to provide information against specific performance indicators in this year's Departmental Performance Report. This information is presented on pages 13, 14, 24, 25, 37, 38, 47 and 48 of this document. In addition, information on the status of all action commitments scheduled for completion by March 31, 2002 is provided in a progress report on the Department's Web site (noted above). Moreover, the progress report indicates how the implementation of the action commitments is helping to advance sustainable development.

Sustainable Development in Government Operations

NRCan plays a key role in government-wide efforts to reduce GHG emissions from federal operations. NRCan is taking a lead role in managing the interdepartmental House in Order Initiative, targeting a federal reduction in GHG emissions of 31 percent below 1990 levels by 2010. The task of target sharing is being handled by means of a rolling three-year action plan and entails assigning specific targets to key departments, who are required to report annually on their progress. The Department provides enhanced services to departments and agencies to help them achieve their targets. House in Order was launched in April 2001, and Memoranda of Understanding have been signed with 11 target departments (who together account for 95 percent of federal GHG emissions). Data on 2000-01 emissions has been collected and analysed, ready for reporting to the Voluntary Challenge and Registry Inc. in October 2002.

As well, NRCan is one of three co-champion departments for the Sustainable Development in Government Operations (SDGO) initiative working to achieve coordination of the federal effort to green government operations (http://www.pwgsc.gc.ca/rps/aes/es/content/purpose-e.html). Over the reporting period, this effort included: participation in the development of reporting guidelines, creation of a director general-level coordinating committee for strategic direction setting, and development of the next phase for progress and implementation. As part of this next phase, NRCan will produce the first government-wide SDGO report to Canadians.

Matériel Management

In July 2001, NRCan submitted its Long Term Capital Plan (LTCP) to Treasury Board for approval. The LTCP sets out the Department's asset-related challenges and its capital priorities and strategies for the next five years, to support its mission and strategic outcomes.

Part III of the LTCP provides substantive information on each of the Department's capital asset categories: real property, scientific and other equipment and information technology.
To date, mission critical assets and their life-cycle costs have been identified for information technology and real property; however, because of the diversity of scientific equipment, the work is still ongoing.

As outlined in the LTCP, to create a more effective framework for the management of assets within NRCan, the following measures and initiatives are being undertaken:

- development of a departmental capital asset management strategy or framework, which includes the application of life cycle management principles;
- establishment of an investment advisory board;
- strengthening of the asset category coordinating committees;
- provision of a more formal recognition to policy centre roles for each asset category;
- strengthening of the departmental annual capital planning cycle;
- development of guidelines for management of minor capital;
- development of an appropriate capital vote structure; and
- development of tools to support capital asset management.

As part of the LTCP exercise, a number of asset-related challenges have been identified, namely chronic under-funding, pressures on O&M budgets, obsolescent asset base, stakeholder pressures for higher performing science equipment, impacts on program delivery and services, limits to support for sustainable development, and opportunities for cost-effectiveness being missed.

As well, the Department has embarked on an initiative to develop a Business Continuity Plan which will include the assessment of the risks associated with information technology equipment. For scientific equipment, a risk management assessment will be an integral part of the departmental Integrated Risk Management Framework.

In parallel to the S&T Futures study, a resource analysis is being conducted which will provide the means to identify critical assets and their operational cost. This ongoing resource analysis is documenting the current status of scientific equipment on a program basis to provide a more specific assessment of the state of scientific equipment within NRCan and the financial impact on operational capabilities.

Procurement and Contracting

NRCan's contracting unit plays a central role in the program delivery of the Department. It is achieving socio-economic objectives by contracting with small, medium and Aboriginal businesses. The Department operates in a decentralized environment with procurement personnel at headquarters and in regional offices. A contracting authority of $5,000 for goods and service contracts is delegated in the same manner to all Responsibility Centre Managers (RCM) across the Department. Contracting responsibilities are conducted under the following legal framework and TB policies: the *Financial Administration Act*, the *Government Contract Regulations*, trade agreements, TB policy on contracting and TB contract directives.

Only the departmental contracting authority can award service contracts over $5,000. It also provides advice and guidance to RCMs and regional offices on policy procedures. The departmental contracting authority is not directly involved with contracts for which Public Works and Government Services Canada is the contracting authority.

Over the past two years, NRCan has developed an Intranet Web site that posts the departmental manual on contracting, frequently asked questions, plus links to TB policies and publications, training documents, and other internal policies. Information sessions on contracting have been provided to more than 600 employees across the Department.

Next year, the Department will establish a Contracting Review Committee which will act as the first line of recourse to mitigate suppliers' complaints and become a platform to address high-profile, high-risk or potentially controversial procurement or contracting issues.

V Financial Performance

Financial Performance Overview

NRCan's financial information is presented by the strategic outcomes shown in Section III of this report.

Definitions

The financial tables in this section present financial information as planned spending, total authorities and actual spending. The definitions of these terms are:

Main Estimates:	These dollar figures match those in Part II Main Estimates as approved by Parliament.
Planned Spending:	These dollar figures match those shown in NRCan's 2001-02 Report on Plans and Priorities. They represent what the plan was at the beginning of the year, adjusted to include Federal Budget announcements.
Total Authorities:	These dollar figures include the main and supplementary estimates for NRCan and match the dollar figures shown in the Public Accounts for 2001-02. They represent what additional spending Parliament has approved for NRCan to reflect changing priorities and unforeseen events.
Actual Spending:	These dollar figures match those shown in the Public Accounts for 2001-02 for NRCan. They represent what was actually spent.

1. Summary of Voted Appropriations

Authorities for 2001-02 - Financial Requirements by Authority (millions of dollars)

Vote	Program	2001-02 Main Estimates	2001-02 Planned Spending	2001-02 Total Authorities	2001-02 Actuals
1	Operating Expenditures	446.1	502.9	523.8	496.4
5	Capital Expenditures	24.7	24.7	19.8	19.8
10	Grants and Contributions	110.1	204.1	228.0	200.6
(S)	Minister of Natural Resources - Salary and Motor Car Allowance	0.0	0.1	0.1	0.1
(S)	Contributions to Employee Benefit Plans	43.3	43.3	45.1	45.1
(S)	Canada-Nova Scotia Development Fund	1.5	1.5	4.3	4.3
(S)	Canada-Newfoundland Development Fund	2.3	2.3	3.0	3.0
(S)	Canada-Newfoundland Offshore Petroleum Board	2.5	2.5	1.8	1.8
(S)	Canada-Nova Scotia Offshore Petroleum Board	1.6	1.6	1.6	1.6
(S)	Payments to the Nova Scotia Offshore Revenue Account	6.2	6.2	18.4	18.4
(S)	Payments to the Newfoundland Offshore Petroleum Resource Revenue Fund	1.2	1.2	26.9	26.9
(S)	Geomatics Canada Revolving Fund	(1.1)	(1.1)	7.1	-
(S)	Nova Scotia Fiscal Equalization Offset Payment	0.4	0.4	-	-
	Total NRCan	**638.8**	**789.7**	**879.9**	**818.0**

2a. Departmental 2001-02 Main Estimates versus Actual Spending and Total Authorities by Strategic Outcome (millions of dollars) (Budgetary)

Strategic Outcomes	Operating	Capital	Grants & Contributions	Total Gross Expenditures	Less: Respendable Revenues *	Total Net Expenditures
Information dissemination and consensus building						
Main Estimates	148.0	7.7	13.0	168.7	(11.4)	157.3
Total *authorities*	179.2	0.6	15.1	194.9	(12.7)	182.2
Actuals	188.2	0.6	13.8	202.6	(12.7)	189.9
Economic and social benefits						
Main Estimates	132.8	7.6	77.8	218.2	(15.8)	202.4
Total authorities	93.0	0.8	116.5	210.3	(10.8)	199.5
Actuals	94.6	0.8	88.7	184.1	(10.8)	173.3
Environmental protection and mitigation						
Main Estimates	170.2	6.2	30.6	207.0	(9.4)	197.6
Total authorities	179.4	17.8	148.0	345.2	(4.7)	340.5
Actuals	181.3	17.8	149.8	348.9	(4.7)	344.2
Safety and security of Canadians						
Main Estimates	35.4	2.7	4.3	42.4	(4.8)	37.6
Total authorities	42.4	0.2	3.9	46.5	(6.9)	39.6
Actuals	37.7	0.2	3.9	41.8	(6.9)	34.9
Sound departmental management						
Main Estimates	43.4	0.5	0.1	44.0	(0.1)	43.9
Total authorities	117.2	0.4	0.5	118.1	-	118.1
Actuals	74.8	0.4	0.5	75.7	-	75.7
Total						
Main Estimates	529.8	24.7	125.8	680.3	(41.5)	638.8
Total authorities	611.2	19.8	284.0	915.0	(35.1)	879.9
Actuals	576.6	19.8	256.7	853.1	(35.1)	818.0
Other Revenues and Expenditures						
Less: Non-Respendable Revenues **						
Main Estimates						(12.1)
Total authorities						(55.9)
Actuals						(55.9)
Add: Cost of services provided by other departments						
Main Estimates						28.6
Total authorities						28.6
Actuals						31.1
Net Cost of the Program						
Main Estimates						655.3
Total authorities						852.6
Actuals						**793.2**

* Formerly “Revenues Credited to the Vote”
** Formerly “Revenues Credited to the CRF”

2b. Summary of 2001-02 Main Estimates versus Actual Spending and Total Authorities (millions of dollars) (Budgetary)

	2001-02 Main Estimates	2001-02 Total Authorities	2001-02 Actuals
Operating	529.8	611.2	576.6
Capital	24.7	19.8	19.8
Grants & Contributions	125.8	284.0	256.7
Total Gross Expenditures	**680.3**	**915.0**	**853.1**
Less: Respendable Revenues	(41.5)	(35.1)	(35.1)
Total Net Expenditures	**638.8**	**879.9**	**818.0**
Other Revenues and Expenditures			
Less: Non-respendable Revenues	(12.1)	(55.9)	(55.9)
Plus: Cost of services provided by other departments	28.6	28.6	31.1
Net Cost of the Program	**655.3**	**852.6**	**793.2**

3. Historical Comparison of Total Net Planned Spending to Net Actual Spending and Total Authorities by Strategic Outcome

Strategic Outcomes	2000-01 Actuals	2001-02 Main Estimates	2001-02 Planned Spending	2001-02 Total Authorities	2001-02 Actuals
Information dissemination and consensus building	198.2	157.3	157.3	182.2	189.8
Economic and social benefits	180.1	202.4	202.4	199.4	173.3
Environmental protection and mitigation	174.4	197.6	348.4	340.5	344.2
Safety and security of Canadians	28.4	37.6	37.6	39.7	35.0
Sound departmental management	65.9	43.9	43.9	118.1	75.7
Total Budgetary	**647.0**	**638.8**	**789.6**	**879.9**	**818.0**

4. Major Expenditure Areas for 2001-02 by Strategic Outcome

Major Expenditure Areas	Strategic Outcomes					Actual Expenditures
	Information Dissemination and Consensus Building	Economic, Social and Environmental Benefits	Environmental Protection and Mitigation	Safety and Security of Canadians	Sound Departmental Management	
Action Plan 2000 (Climate Change)			21.2			21.2
CFS S&T Programs Delivery and Coordination	19.7	22.6	14.5	2.6		59.4
CFS Economic Analysis, Policy Development, International Affairs and Program Management	10.7	8.6	0.1			19.4
CFS Regional Infrastructure, Policy and Liaison	6.9	3.7	4.3	0.8		15.7
CFS Transfer Payment Programs (Model Forest, FNFP, etc.)	9.4	10.0	1.8			21.2
Climate Change Action Fund			23.8			23.8
Comprehensive Test Ban Treaty				2.3		2.3
Corporate Financial Administration					6.5	6.5
Corporate Human Resources					10.3	10.3
Corporate Management and Administration					10.9	10.9
Efficiency and Alternative Energy Sunset Measures (Energy Innovators, Renewable Energy Deployment, Commercial Building Incentives and Energuide for Houses)			21.0			21.0
Energy Efficiency - A-Base Programs	2.7		15.3			18.0
Energy Policy and Miscellaneous Program Support	9.3	10.6	6.7			26.6
Energy Technology Programs & Support - A-Base		4.7	19.0			23.7
Environmental Stewardship			5.4			5.4
Explosives Regulation & Research		1.1	0.2	1.8		3.1
Geospatial Knowledge	104.1					104.1
Green Municipal Enabling / Investment Funds			62.5			62.5
Hibernia Interest Assistance Repayable Contributions		20.6				20.6
International Thermonuclear Experimental Reactor -Contribution		1.0				1.0
Legal Surveys				5.2		5.2
Minerals & Metals Policy	3.0	4.3	1.3			8.6
Minerals & Metals Technology	1.1	9.7	8.1	3.1		22.0
MMS Programs and Support	0.5	4.1	2.6	0.2		7.4

...Table 4, continued

Major Expenditure Areas	Strategic Outcomes					Actual Expenditures
	Information Dissemination and Consensus Building	Economic, Social and Environmental Benefits	Environmental Protection and Mitigation	Safety and Security of Canadians	Sound Departmental Management	
Natural Hazards & Emergencies				13.9		13.9
Navigation -Aeronautical Products				2.4		2.4
Office of Environmental Affairs			1.9			1.9
Offshore Regulatory, Development and Revenue Sharing		52.6		3.4		56.0
Port Hope Clean-up			5.3			5.3
Program Integrity - Health & Safety (Capital)			15.0			15.0
Program Integrity II - Information Management & Technology					9.3	9.3
Program of Energy Research and Development (PERD)		11.3	45.2			56.5
Real property programs in the National Capital Region					28.0	28.0
Resource Exploration & Industry Support		27.7				27.7
Rural, Remote & Aboriginal Communities and Northern Research		11.4				11.4
Sustainable Development Technology Fund			50.0			50.0
Other program expenditures[(1)]	35.2	(19.9)	23.7	6.1	10.7	55.8
Less: Respendable Revenues	(12.7)	(10.8)	(4.7)	(6.9)		(35.1)
Total Net Expenditures	**189.9**	**173.3**	**344.2**	**34.9**	**75.7**	**818.0**

Note: The expenditures reflected in this table represent an approximate distribution of major expenditure categories by strategic outcome. Totals are as reported by the Department in the Public Accounts.

[1] Other program expenditures encompass small initiatives, adjustments, and other program support costs not described elsewhere in this table.

5. Respendable Revenues by Strategic Outcome (millions of dollars)

(Includes the Geomatics Canada Revolving Fund)

Strategic Outcomes	2000-01 Actuals	2001-02 Planned Revenues	2001-02 Total Authorities	2001-02 Actuals
Information dissemination and consensus building	13.8	11.4	12.7	12.7
Economic and social benefits	10.5	15.8	10.8	10.8
Environmental protection and mitigation	4.1	9.4	4.7	4.7
Safety and security of Canadians	7.7	4.8	6.9	6.9
Sound departmental management	0.2	0.1	-	-
Total Respendable Revenues	**36.3**	**41.5**	**35.1**	**35.1**

6. Non-Respendable Revenues by Strategic Outcome (millions of dollars)

Strategic Outcomes	2000-01 Actuals	2001-02 Planned Revenues	2001-02 Total Authorities	2001-02 Actuals
Information dissemination and consensus building	2.2	0.1	3.2	3.2
Economic and social benefits	25.6	11.9	47.5	47.5
Environmental protection and mitigation	1.0	0.0	3.0	3.0
Safety and security of Canadians	1.5	0.0	1.1	1.1
Sound departmental management	1.9	0.1	1.1	1.1
Total Non-Respendable Revenues	**32.2**	**12.1**	**55.9**	**55.9**

Note: The increase from 2001-02 planned revenues to total authorities and actuals is due to increased receipts of offshore revenues and forfeitures in the Energy Sector. As conservative accounting practices do not permit the realization of contingent revenues, the actual results for 2001-02 non-respendable revenues have exceeded forecast receipts. These revenues result in a reciprocal increase in statutory payments (due to the flow-through nature of these funds) outlined in table 7.

7. Total Statutory Transfer Payments by Strategic Outcome (millions of dollars)

Strategic Outcomes	1999-00 Actuals	2000-01 Actuals	2001-02 Main Estimates	2001-02 Planned Spending	2001-02 Total Authorities	2001-02 Actuals
Information dissemination and consensus building	-	-	-	-	-	-
Economic and social benefits	9.1	23.6	11.6	11.6	52.6	52.6
Environmental protection and mitigation	-	-	-	-	-	-
Safety and security of Canadians	2.4	2.9	4.1	4.1	3.4	3.4
Sound departmental management	-	-	-	-	-	-
Total Statutory Payments	**11.5**	**26.5**	**15.7**	**15.7**	**56.0**	**56.0**

Note: The increase in actual statutory payments over main estimates is attributed to the Nova Scotia Offshore Revenue (increased by $12.2M to $18.4M) and the Newfoundland Offshore Petroleum Resource Revenue Fund (increased by $25.7M to $26.9M). These 'flow-through' statutory payments result from increased revenues from their respective sources described in table 6.

8. Transfer Payments (excluding statutory contributions) by Strategic Outcome (millions of dollars)

Strategic Outcomes	2001-02 Main Estimates	2001-02 Planned Spending	2001-02 Total Authorities	2001-02 Actuals
GRANTS				
Information dissemination and consensus building	0.2	0.2	0.9	0.9
Economic and social benefits	0.2	0.2	0.2	0.1
Environmental protection and mitigation	-	50.0	112.5	112.5
Safety and security of Canadians	-	-	-	-
Sound departmental management	0.1	0.1	0.1	0.1
Total Grants	**0.5**	**50.5**	**113.7**	**113.6**
CONTRIBUTIONS				
Information dissemination and consensus building	12.8	12.8	14.2	12.9
Economic and social benefits	66.0	66.0	63.7	36.0
Environmental protection and mitigation	30.6	74.6	35.5	37.2
Safety and security of Canadians	0.2	0.2	0.5	0.5
Sound departmental management	0.0	0.0	0.4	0.4
Total Contributions	**109.6**	**153.6**	**114.3**	**87.0**
Total Transfer Payments	**110.1**	**204.1**	**228.0**	**200.6**

9. Transfer Payments that exceeded $5 million/year in 2001-02

Information Dissemination and Consensus Building
Objectives: (i) easily accessible and integrated knowledge on the state of Canada's landmass and natural resources, and the economic, environmental, and social dimensions of their use; (ii) greater national and international cooperation and consensus on sustainable development issues, policies, goals and actions; and (iii) fiscal, regulatory and voluntary approaches that encourage the sustainable development of natural resources.

Transfer Payment	Key Accomplishments
Model Forest Program ($6.8 million)	Many Canadian communities depend on the forest environment for their social, cultural, and economic well-being. Canada's Model Forest Program is widely recognized for developing ongoing effective approaches to sustainable forest management. More information on accomplishments under this program can be found on page 21.

Economic and Social Benefits
Objectives: (i) greater economic opportunities and encouraging investment in innovative and higher-value uses of natural resources; (ii) expanded access to international markets for Canadian resource-based products, knowledge, technologies and services; and (iii) increased capacity of Aboriginal, rural and northern communities to generate sustainable economic activity based on natural resources.

Transfer Payment	Key Accomplishments
Nova Scotia Revenue Account ($18.4 million)	Pursuant to the revenue sharing provisions of the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act*, NRCan pays the Province of Nova Scotia monies equivalent to the federal offshore resource revenue as they are collected. These payments are made with respect to royalties, forfeitures, offshore taxes and miscellaneous fees.
Newfoundland Offshore Petroleum Resource Revenue Fund ($26.9 million)	Pursuant to the revenue sharing provisions of the *Canada-Newfoundland Atlantic Accord Implementation Act*, NRCan pays the Province of Newfoundland monies equivalent to the federal offshore revenue as they are collected. These payments are made with respect to royalties, forfeitures, offshore taxes and miscellaneous fees.
Hibernia Interest Assistance ($20.6 million)	In September 1990, the federal government and the Hibernia owners entered into legal agreements whereby the government granted concessions to the owners in order to develop an offshore oil industry in Canada. In return, the owners agreed to meet employment and industrial benefit targets.

Environmental Protection and Mitigation
Objectives: (i) Canada addressing its international Kyoto commitment to reduce greenhouse gases; (ii) scientific research, technologies and stewardship practices that reduce environmental impacts, conserve biodiversity, and increase the efficiency of resource development and use; and (iii) Canada's environment safeguarded from the risks associated with natural resource development and use.

Transfer Payment	Key Accomplishments
Climate Change Action Fund ($14.4 million)	Address Canada's Kyoto commitments to reduce greenhouse gas emissions to six percent below 1990 levels by the period 2008-12 (see Strategic Outcome 3).
Sustainable Development Technology Fund ($50 million administered by NRCan)	The *Canada Foundation for Sustainable Development Technology Act* received Royal Assent on June 14, 2001. In March 2002, the government appointed the Chairperson of the Foundation as well as the initial directors and members. The Foundation will stimulate the development and demonstration of Canadian technologies aimed at climate change and air quality. More information can be found at http://www.fsdtc.ca.
Green Municipal Funds ($62.5 million administered by NRCan)	In 2001, the Green Municipal Funds (GMF) Agreements were reopened to double the funding to the current total of $250 million – $50 million for the Green Municipal Enabling Fund (GMEF), and $200 million for the Green Municipal Investment Fund (GMIF). As of July 1, 2002, 149 feasibility studies under GMEF and 8 projects under GMIF have been approved, for a total of $12.4 million in loans and grants which have leveraged $55.4 million in total project value. The performance of funded projects and their contribution to environmental results will be monitored and reported regularly by the Federation of Canadian Municipalities. More information can be found at http://www.fcm.ca.
Energy efficiency and alternative energy ($15.7 million)	Improve energy efficiency and the adoption of alternative sources of energy which contributes to reducing greenhouse gas emissions (see Strategic Outcome 3)

10. Loans, Investments and Advances (millions of dollars)

	Opening April 1st 2000	Opening April 1st 2001	New loans issued	Repayments 2001-02	Outstanding Balance 2001-02
Loans					
Atomic Energy of Canada Ltd.					
Housing	0.1	0.1	-	-	0.1
Heavy Water Inventory	8.5	7.5	-	1.0	6.5
Loans to facilitate the implementation of the Hibernia Development Project	82.8	73.6	-	9.2	64.4
Nordion International Inc.	92.2	98.0	-	4.0	94.0
Total Loans	**183.6**	**179.2**	**0.0**	**14.2**	**165.0**
Investments and Advances					
Sunset / Special Programs	-	-	-	-	-
Lower Churchill Development Corporation	14.8	14.8	-	-	14.8
Atomic Energy of Canada Ltd.	164.2	164.2	-	-	164.2
DEVCO Working Capital Advance	-	10.0	-	10.0	10.0
Total Investments and Advances	**179.0**	**189.0**	**0.0**	**10.0**	**189.0**
Total	**362.6**	**368.2**	**0.0**	**24.2**	**354.0**

11. Geomatics Canada Revolving Fund Financial Summary

(thousands of dollars)	1999-00 Actuals	2000-01 Actuals	2001-02 Planned Spending	2001-02 Total Authorities	2001-02 Actuals
Revenues					
Products	10,264	10,839	14,900	14,900	10,606
Services	5,290	3,291	2,300	2,300	2,958
Consulting	537	255	100	100	837
Total revenues	16,091	14,385	17,300	17,300	14,401
Expenditures	16,710	14,423	16,700	16,700	13,896
Profit (Loss)	**(619)**	**(38)**	**600**	**600**	**505**
Changes in Working Capital	380	770	500	500	(235)
Capital acquisitions	(891)	(285)	(300)	(300)	(148)
Other items	536	609	300	300	603
Cash requirements	(594)	1,056	1,100	1,100	725
Cash at April 1st	(1,426)	(2,020)	(964)	(964)	(964)
Cash at March 31	(2,020)	(964)	136	136	(239)
Year end adjustments	(698)	96			(585)
Cumulative Net Authority Used	**(2,718)**	**(868)**	**136**	**136**	**(824)**

12. Contingent Liabilities (millions of dollars)

	Amount of Contingent Liability		
List of Contingent Liabilities	**March 31st 2000**	**March 31st 2001**	**Current as of March 31st, 2002**
Claims and Pending and Threatened Litigation	26.7	954.2	946.8
Total Contingent Liabilities	**26.7**	**954.2**	**946.8**

Annexes

A. External Recognition

Michelle C. Comeau Human Resources Leadership Award/Vision Award 2001

Statement of Qualifications (SofQ) Project Team – The SofQ Project Team received the Michelle C. Comeau Award which recognizes excellence and leadership within the Human Resources community of the federal public service. The Team was recognized for the significant contribution it made in creating an innovative electronic tool for assisting departmental managers in developing SofQ on-line. The Award Selection Committee referred to this product as being truly visionary for the Federal Public Service. This project, in conjunction with the Classification re-engineering Project, also won the Award for Leadership in Service Innovation from the Association of Professional Executives of the Public Service of Canada (APEX).

Recipients:

Christine Arnott
Micheline Asselin
Julie Béland
Jason Bickerton
Pauline Brook
Timothy Ryan Caguiat
John Cruickshank
Lionel Dufour
Suzanne Gougeon
Maureen Hale-Meuser
Brenda Hayes
Dave LeBlanc
Alexandre Martin
Atulesh Nandi
Donna Richard
Sylvie Roussel
Heather Veltman

Award of Excellence – Diavik Diamonds Project Team – In December 2000, Diavik Diamond Mines Incorporated and Aber Diamond Corporation announced their decision to proceed with the construction of Canada's second diamond mine at Lac de Gras, Northwest Territories. For the previous two years, the Diavik Diamonds Project Team, representing seven federal organizations, two territorial governments, Aboriginal groups and other non-governmental organizations, completed environmental and regulatory reviews and approvals, developed a Comprehensive Study Report and secured permits and agreements. The 46-member team provided legal, technical, communications, administrative and policy expertise, and served in key leadership capacities.

The construction of the mine will provide substantial business and employment opportunities to people in the North. The mine is scheduled to be completed by mid-2003 and will have a life of 16 to 22 years. Employing between 350 and 450 people, the Diavik Diamonds Project has the potential to increase the Gross Domestic Product of the Northwest Territories by 20 per cent.

Recipients:
John Ramsey
Rob Johnstone

The Head of the Public Service Award – Renewable Energy Capacity Building Program (RECAP) Team – A premier accomplishment of the RECAP team was the RETScreen Renewable Energy Project Analysis Software. Representatives of the Department's Renewable Energy Deployment Initiative and of its CANMET Energy Technology Centre worked with a network of 89 experts from across Canada and around the world to produce this free software tool. It has become the international standard in helping planners and decision-makers consider renewable energy technology projects at the critical early planning stages. The software saves time and money, increasing the odds that good projects will be identified and implemented. Already more than 18,000 people around the world are using it with numbers growing by approximately 150 new users every week.

The associated RETScreen International Web site has had more than 200,000 visitors to date. The site was an early model of the way the government should provide information and services on-line, and the project is still several years ahead of the objectives of the Government On-Line initiative.

Recipients:

Ronald Alward	Richard Godin	Nathalie Meloche
David Burpee	Celia Kirlew	Alexandre Monarque
André Filion	Gregory J. Leng	Amélie Richard

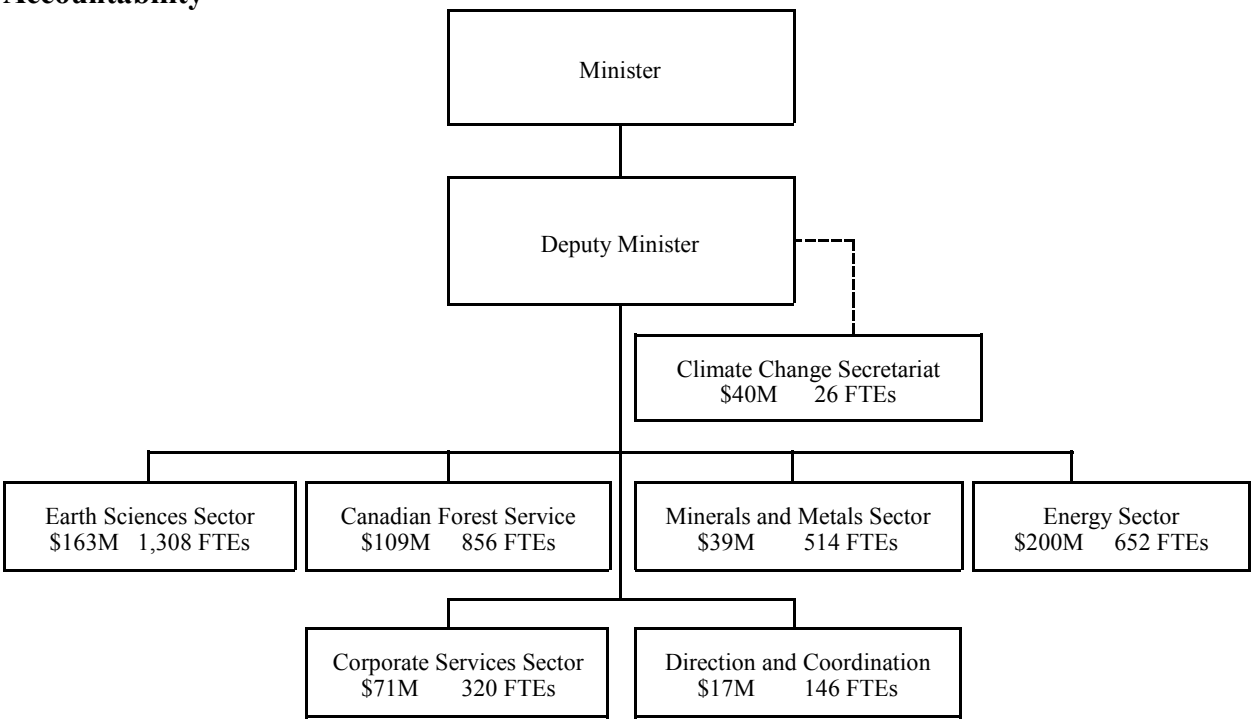
Canadian Institute of Forestry (CIF) – Presidential Award – The CIF Presidential Award was presented to Richard Macnaughton to recognize his outstanding service and commitment to the Canadian Institute of Forestry. Mr. Macnaughton exemplifies a devotion to and passion for the profession of forestry. The award was presented at the CIF Annual General Meeting and Conference "Inheriting the Future" held in Whistler, B.C. in August 2001.

Canadian Institute of Forestry (CIF) – 2001 Canadian Forestry Scientific Achievement Award – Research scientist Dr. Rene Alfaro was recognized by CIF for his outstanding and unique achievements in forestry research in Canada. CIF noted that the work of Dr. Alfaro is marked by visionary hypotheses, rigorous world-class experimentation and seamless technology transfer.

Western Forest Insect Work Conference (WFIWC) – Research scientist Dr. Les Safranyik, recently retired, was awarded the prestigious 2002 WFIWC Founders' Award. WFIWC is an organization committed to the science and practice of forest entomology in North America. The award is made for outstanding contributions to forest entomology in western North America and recognizes significant contributions in pest management, extension-consultation, research and teaching. WFIWC noted that Dr. Safranyik, widely acknowledged as one of the world experts on bark beetles (particularly the mountain pine beetle), has provided inspiration to many who now work actively in managing bark beetle situations and his research and perspectives have provided the basis of many management activities that would not otherwise have been possible.

B. Organization Chart

Accountability



The **Earth Sciences Sector** promotes the sustainable development of Canada's natural resources by providing comprehensive S&T related to geoscience and geomatics knowledge. This knowledge supports public sector activities in Canada, investment decisions, and operations by the Canadian private sector at home and overseas. It extends logistics support to Arctic science through the Polar Continental Shelf Project. Geomatics Canada, Canada's national mapping agency, provides geographic information of Canada's landmass and offshore including topographic maps and aeronautical charts, legal surveys of Canada Lands, geodesy for accurate positioning, and the archive and application of earth observation data. Through their offices and labs across Canada, the Geological Survey of Canada provides the framework for mineral and petroleum exploration, helps Canadians mitigate the impact of hazards such as earthquakes and toxic substances in the environment, and contributes to climate change science, impacts and adaptation. Policy analysis, development and coordination is provided to support the Sector's mandate.

The **Canadian Forest Service** promotes the sustainable development of Canada's forests and the competitiveness of the Canadian forest sector for the well-being of present and future generations of Canadians. As the premier forestry S&T research and national policy coordination agency in Canada, the Canadian Forest Service plays a pivotal role in building a consensus on key forest issues, shaping national and international forest agendas, and generating and transferring knowledge through its world-class forestry research. Its policy development and S&T research programs are delivered through a headquarters establishment and five national science research networks operating out of five forestry research centres located across Canada.

The **Minerals and Metals Sector** promotes the sustainable development of Canada's minerals and metals resource industries by integrating economic, social and environmental objectives. It provides policy advice, S&T, and commodity and statistical information to support decision-making. It is also the federal government's primary source of expertise on explosives regulations and technology. The sector promotes globally the safe use of minerals and metals, as well as the application of sound science to decisions involving minerals and metals, and facilitates the development of domestic and international partnerships to address important challenges concerning the responsible development and use of minerals, metals and their products.

The **Energy Sector** fosters the sustainable development and responsible use of Canada's energy resources to meet the present and future needs of Canadians. It focuses on S&T, policies, programs, knowledge and international activities in the areas of energy efficiency, renewable energy, alternative transportation fuels, and conventional energy to further sustainable development. Through its work, the sector helps address the climate change challenge, promotes better environmental and consumer choices, facilitates North American and international trade in energy, contributes to technical innovation, job creation and economic growth, facilitates environmental protection and increased public safety and security, and helps to ensure competitively priced, reliable and secure energy supplies for Canadians.

The Corporate Services Sector provides timely and reliable advice, products and services to support clients in achieving NRCan's objectives. The Sector is committed to providing leadership to the Department in the following functional areas of expertise: financial management; information management; human resources management; workplace well-being; environmental affairs; security, safety and emergency management; contracting and procurement; information technology; real property; and selected departmental services.

Direction and Coordination provides services to the Department's Executive Offices through the following branches. The **Corporate Policy and Portfolio Coordination Branch** provides a corporate policy and portfolio-wide coordination function which is responsive to evolving priorities thereby enabling it to provide timely and substantive advice to the Minister and Deputy Minister; it also enhances the contribution of the Natural Resources Portfolio within government and advances horizontal linkages across government with respect to the federal role in the sustainable development of natural resources. The **Audit and Evaluation Branch** provides senior management with independent, objective professional advice and assurances on the performance of management frameworks, departmental programs, policies and operations, and on risk management. The **Communications Branch** leads departmental communications in support of the Minister, government priorities and the natural resources sector; it provides advice for internal and external audiences. **Legal Services** provides day-to-day legal advice and guidance to ensure that NRCan's activities, policies and operations are consistent with the law, regulations and with high ethical standards.

The **Climate Change Secretariat**, in cooperation with the provinces and territories, coordinates the development of the National Implementation Strategy on Climate Change, acts as a focal point for coordinating the federal government's domestic policy and programming on climate change, and manages the Climate Change Action Fund. The Secretariat reports to the Deputy Ministers of NRCan and Environment Canada.

C. Internet Addresses and Statutory Annual Reports

Natural Resources Canada Statutory Annual Reports:

Headquarters Library
Public Enquiries
Main Floor, 580 Booth Street
Ottawa, ON, K1A 0E4
Telephone:(613) 995-0947
Fax: (613) 992-7211

1. **The State of Canada's Forests**
   http://www.nrcan.gc.ca/cfs/proj/ppiab/sof/

2. **Report to Parliament under the *Energy Efficiency Act***
   http://oee.nrcan.gc.ca/publications/infosource/PDFs/Report_to_Parliament.pdf

Headquarters and Sector Internet Sites:

Natural Resources Canada Home Page	http://www.nrcan.gc.ca
Aboriginal Portal	http://www.nrcan.gc.ca/aboriginal
Audit and Evaluation	http://www2.nrcan.gc.ca/dmo/aeb
Canadian Forest Service	http://www.nrcan.gc.ca/cfs
Climate Change – Government of Canada	http://climatechange.gc.ca/
Climate Change – NRCan	http://www.climatechange.nrcan.gc.ca/
Corporate Services Sector	http://www.nrcan.gc.ca/css
Earth Sciences Sector	http://www.nrcan.gc.ca/ess
Energy Sector	http://www.nrcan.gc.ca/es
Minerals and Metals Sector	http://www.nrcan.gc.ca/mms
NRCan On-Line	http://nrcanonline.nrcan.gc.ca/
S&T at NRCan	http://www.nrcan.gc.ca/dmo/scitech
Statutes and Regulations	http://www.nrcan.gc.ca/dmo/spcb/regiss_e.html
Sustainable Development	http://www.nrcan.gc.ca/sd-dd/

Canadian Forest Service Internet Sites:

CFS Atlantic Forestry Centre	http://www.fcmr.forestry.ca
CFS Great Lakes Forestry Centre	http://www.glfc.forestry.ca
CFS Laurentian Forestry Centre	http://www.cfl.forestry.ca
CFS Northern Forestry Centre	http://www.nofc.forestry.ca
CFS Pacific Forestry Centre	http://www.pfc.cfs.nrcan.gc.ca
Costa Rica-Canada Initiative	http://www.nrcan.gc.ca/cfs/crc/
Criteria and Indicators (C&I)	http://www.NRCan.gc.ca:80/cfs/proj/ppiab/ci/
First Nation Forestry Program	http://www.fnfp.gc.ca/
Model Forest Network	http://mf.ncr.forestry.ca/
Montreal Process C&I	http://www.mpci.org/
National Forest Strategy	http://www.nrcan.gc.ca/cfs/nfs/strateg/control_e.html
United Nations Framework Convention on Climate Change	http://www.unfccc.de/

Earth Sciences Sector Internet Sites:

Aeronautical and Technical Services	http://aero.nrcan.gc.ca
Canada Centre for Remote Sensing	http://www.ccrs.nrcan.gc.ca
Canadian Earth Observation Network	http://ceonet.cgdi.gc.ca
Canadian Geoscience Publications Directory	http://ntserv.gis.nrcan.gc.ca

Earth Sciences Sector (continued)

Canadian National Earthquake Hazards Program	http://www.seismo.nrcan.gc.ca
Canadian National Geomagnetism Program	http://www.geolab.nrcan.gc.ca/geomag
Centre for Topographic Information	http://maps.nrcan.gc.ca
Centre for Topographic Information-Sherbrooke	http://www.ccg.nrcan.gc.ca
Earth Sciences Information Centre	http://www.nrcan.gc.ca/ess/esic
GeoConnections	http://www.geoconnections.org
Geodetic Survey	http://www.geod.nrcan.gc.ca
Geological Survey of Canada	http://www.nrcan.gc.ca/gsc
Geomatics Canada	http://www.geocan.nrcan.gc.ca
Legal Surveys Division	http://www.geocan.nrcan.gc.ca/lsd
National Air Photo Library	http://airphotos.nrcan.gc.ca
National Atlas of Canada	http://www-nais.ccrs.nrcan.gc.ca
National Geoscience Mapping Program (NATMAP)	http://ntserv.gis.nrcan.gc.ca/natmap
Polar Continental Shelf Project	http://polar.nrcan.gc.ca
ResSources GSC	http://rgsc.nrcan.gc.ca

Energy Sector Internet Sites:

Auto$mart and EnerGuide for Vehicles	http://autosmart.NRCan.gc.ca/online_E.htm
CANMET Energy Technology Centre (CETC)	http://www.nrcan.gc.ca/es/etb
CETC Varennes	http://cedrl.mets.nrcan.gc.ca/
CETC Ottawa	http://www.nrcan.gc.ca/es/etb/cetc/
CETC Devon	http://www.nrcan.gc.ca/es/etb/cwrc/
Canadian Renewable Energy Network	http://www.canren.gc.ca/
EnerGuide for Houses	http://energuide.nrcan.gc.ca/houses/
Energy Innovators Initiative	http://oee.nrcan.gc.ca/eii
Energy Policy Branch	http://www.nrcan.gc.ca/es/new/enquir2.htm
Energy Resources Branch	http://www.nrcan.gc.ca/es/erb/erb/index.html
Energy Technology Data Exchange	http://nrcan.gc.ca/es/msd/cic/cdnetde.htm
Energy Technology Futures	http://www.nrcan.gc.ca/es/etf
National Energy Use Database	http://oee.nrcan.gc.ca/neud/
Nuclear energy, uranium and radioactive waste	http://nuclear.nrcan.gc.ca
Office of Energy Efficiency	http://www.oee.nrcan.gc.ca
Office of Energy Research and Development	http://www.nrcan.gc.ca/es/oerd/
Renewable Energy Deployment Initiative	http://www.nrcan.gc.ca/es/erb/reed/redi_e.htm
RETScreen™	http://132.156.62.20/
Technology Early Action Measures (TEAM)	http://climatechange.gc.ca/english/actions/action_fund/techno.shtml

Minerals and Metals Sector Internet Sites:

Applied Mineralogy	http://www.nrcan.gc.ca/mms/canmet-mtb/mineralogy
Aquatic Effects Program	http://www.nrcan.gc.ca/mets/aete/
Annual Conference of the Mines Ministries of the Americas (CAMMA)	http://www.camma.org
Biominet	http://www.nrcan.gc.ca/mets/biominet/
Business Climate for Mineral Investment	http://mmsd1.mms.nrcan.gc.ca/business
Canadian Explosives Research Laboratory	http://www.nrcan.gc.ca/mms/explosif/cerldireng.htm

Minerals and Metals Sector (continued)

Canadian Certified Reference Materials Project (CCRMP)	http://www.nrcan.gc.ca/mets/ccrmp
Canadian Lightweight Materials Research Initiative (CLiMRI)	http://climri.nrcan.gc.ca
Canadian Minerals Yearbook	http://www.nrcan.gc.ca/mms/cmy/index_e.html
Canadian Mining Technology Network (CMT-Net)	http://cmt-net.nrcan.gc.ca
CANMET Environment Laboratory	http://envirolab.nrcan.gc.ca
CANMET Experimental Mine (Val-d'Or)	http://www.nrcan.gc.ca/mms/canmet-mtb/valdor
CANMET Materials Technology Laboratory	http://www.nrcan.gc.ca/mms/canmet-mtb/mtl
CANMET Mineral Technology Branch	http://www.nrcan.gc.ca/mms/canmet-mtb
CANMET Mining and Mineral Sciences Laboratories	http://www.nrcan.gc.ca/mms/canmet-mtb/mmsl.htm
Certifying Agency for Nondestructive Testing	http://ndt.nrcan.gc.ca
Economic and Financial Analysis Branch	http://www.nrcan.gc.ca/mms/efab/
Explonet	http://www.nrcan.gc.ca/explonet
Explosives Regulatory Division	http://www.nrcan.gc.ca/mms/explosif/
Ground Control	http://www.nrcan.gc.ca/mms/canmet-mtb/bells/encorpge.htm
Inventory of Mining Industry Practices to Conserve Wildlife and Habitat in Canada	http://mmsd1.mms.nrcan.gc.ca/business/inventory/
MEND 2000	http://mend2000.nrcan.gc.ca
Mines Ministers Conference	http://www.nrcan.gc.ca/mms/mmc/index-e.htm
Minerals and Metals – A World to Discover	http://www.nrcan.gc.ca/mms/school/e_mine.htm
Minerals and Metals Fact Sheets and Information Bulletins	http://www.nrcan.gc.ca/mms/bulletin-e.htm
Minerals and Mining Statistics Division	http://www.nrcan.gc.ca/mms/efab/mmsd/
Mineral Industry Info-Guide	http://www.nrcan.gc.ca/mms/pubs/infoguide-e.pdf
Mining and Mapping MMS Knowledge	http://mmsd1.mms.nrcan.gc.ca/maps/
Mining Taxation World	http://www.nrcan.gc.ca/ms/efab/tmrd/
Recycling Technology Newsletter (R-Net)	http://RNET.nrcan.gc.ca