GeoConnections Annual Report 2008–2009

Mapping the Future Together Online

GeoConnections GéoConnexions

Canadian Geospatial Data Infrastructure



Infrastructure canadienne de données géospatiales

Canada

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Message from the Director

It is my pleasure to present the 2008–2009 annual report of the GeoConnections program, a Canadian initiative to increase the use of integrated location-based or geospatial reference information to support decision making on priority issues.

GeoConnections continued its work to ensure that users of the Canadian Geospatial Data Infrastructure (CGDI) have applications and services to support decision making. The CGDI brings order to many different kinds of geospatial information being collected across the country, helping Canadians find and access data directly at source. In the 2008–2009 fiscal year, GeoConnections committed to supporting 75 new projects that address requirements of CGDI priority user communities; 73 co-funded projects were completed.

With few exceptions, GeoConnections met its performance targets in 2008–2009. It progressed towards making the CGDI an effective resource for decision makers in public safety and security, public health, environment and sustainable development, and matters of importance to Aboriginal communities. The survey conducted for this report showed that community stakeholders are buying into the CGDI with enthusiasm.

A highlight for the public safety and security community during 2008–2009 was completion of an architecture for the Multi-Agency Situational Awareness System, which supports a standards-based approach for information sharing to facilitate inter-agency situational awareness. In the environment and sustainable development domain, GeoConnections focussed on integrated landscape management with an emerging national community of practice, which included facilitating the sharing of best practices and evaluating the activities of regional projects. The Geospatial Foundation for Public Health was initiated, outlining an approach to addressing the barriers to using geospatial information faced by the public health community. GeoConnections began communications initiatives to assist those involved with matters of interest to Aboriginal communities, including funding the documentation of geospatial needs for Aboriginal land-use and sponsoring regional conferences to build Aboriginal practitioner networks.

The GeoConnections User Capacity team shifted during this fiscal year from smaller projects to large, integrated projects as part of the effort to ensure the sustainability of investments in geomatics within the targeted communities. The Content team contributed to enriching the data available through the CGDI by providing matching funding to publish dozens of thematic datasets from authoritative, closest-to-source suppliers. The Policy Coordination and Communications team sponsored several policy research initiatives and guides, and worked with data providers to streamline the data licensing process by encouraging them to adopt standard data licensing. The Standards and Architecture group continued to develop and advocate for national technical standards to ensure the interoperability of CGDI data and applications, and had a notable success in coordinating the CGDI Interoperability Pilot Project, involving four federal departments, seven provinces, and five private sector companies.



The Government of Canada approved a one-year extension to the current second phase of GeoConnections to March 2011. The extension allows GeoConnections and its partners to continue evolving the CGDI into a valuable online resource for Canadians. One of the goals for the remainder of GeoConnections' mandate is to ensure the sustainability of the CGDI and of the expertise developed through GeoConnections projects. To this end, the Policy Coordination and Communications team drafted a policy framework within which to pursue a strategy to make the CGDI sustainable.

Preliminary results of an evaluation of GeoConnections within a wider examination of Natural Resources Canada's work on infrastructure became available at the end of the period covered by this report. The evaluation concludes that there is a continuing need for GeoConnections, and that the program is successful and cost effective. As you read this annual report, you will find ample evidence supporting these conclusions.

Sylvain Latour, Director GeoConnections Division

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Introduction

GeoConnections is a national program housed within Earth Sciences Sector (ESS), Natural Resources Canada (NRCan). The program helps decision makers use online, location-based (geospatial) information, such as maps and satellite images, to tackle some of Canada's most pressing challenges. GeoConnections works with partners in four priority user communities—public safety and security, public health, the environment and sustainable development, and Aboriginal communities—and with the private sector to further the development of geomatics technology.¹

GeoConnections was originally launched to build and operate the Canadian Geospatial Data Infrastructure (CGDI), which is a mechanism for sharing geospatial information over the Internet. Now in its second phase, GeoConnections continues to work to ensure that decision makers in key areas benefit from the CGDI.

GeoConnections helps Canadians use geospatial information to improve our international competitiveness, our environment and our quality of life

Program Description

GeoConnections uses a shared-cost co-funding model to support projects that encourage decision makers in four priority user communities to work with the Canadian geomatics sector in developing solutions that meet the specific needs of these user communities. Funding from the program is distributed through five functional program areas:

- User Capacity is responsible for collaborating with the priority user communities to help them apply geospatial information in support of decision making;
- **Content** collaborates with geospatial data suppliers to maintain and expand framework² and thematic data sets available through the CGDI;
- Standards and Architecture collaborates with national and international bodies to develop relevant standards, and with Canadian privatesector geomatics firms to ensure the technological stability and robustness of the CGDI;
- Policy Coordination and Communications is responsible for identifying and developing strategies to address issues related to geospatial data sharing and management, and for the development of best practices guides; and

¹ To find out more about GeoConnections, visit our website at www.geoconnections.org/en/aboutGeo.html.

² Framework data layers are national in scale and are the set of geospatial data that provides the reference framework for all other CGDI-compliant geospatial data.



• The Value Management Office oversees administrative and financial matters, including those relating to the administration of contractual relations with stakeholders and partners.

In the 2008–2009 fiscal year, GeoConnections committed to supporting 75 new projects that address requirements of CGDI priority user communities; 73 co-funded projects were completed.

Program History

GeoConnections was launched in 1999 as a five-year, \$60-million national program to build and operate the CGDI. The system of model partnerships pioneered during the first phase of GeoConnections leveraged the initial investment into a total investment of \$170 million from all levels of government, the private sector, academia, and non-governmental organizations. The result was the creation of the CGDI and many strong partnerships that have endured to the present.

Based on the successes of the first five years, in Budget 2005 the Government of Canada agreed to invest another \$60 million over another five years to maintain and expand the use of the CGDI by decision makers. The focus shifted from building the CGDI to ensuring its usefulness to and use by decision makers in the four priority communities. This shift in focus has important implications for GeoConnections' relations with existing partners and introduces new stakeholder groups, which the program must understand and engage.

In March 2009, the Government of Canada extended the second phase of GeoConnections by one year. As a result, the program will continue to March 2011. The extension will allow GeoConnections and its collaborators to further develop the CGDI.

Priority User Communities

The following sections summarize GeoConnections activities with partners in its four priority user communities in 2008–2009. Since 2006, external advisory committees drawn from the four communities have identified priority issues and provided guidance on how GeoConnections can best support each community.

Public Safety and Security

The public safety and security community has become further engaged with geospatial information. Stakeholders in this community recognize that geospatial information is a key resource for coordinating and helping agencies make crucial decisions that are related to public safety and security.

In the critical infrastructure domain of public safety and security, GeoConnections supported critical infrastructure identification projects. These projects were based on the Critical Infrastructure Identification project completed in 2009. This project was a national consultation with emergency managers, public safety and security decision makers, academic experts and infrastructure owners to prioritize information requirements based on Public Safety Canada's ten critical infrastructure sectors. This project resulted in an awareness of the role of geospatial information in critical infrastructure identification, an identification of authoritative suppliers of location-based infrastructure data, and a National Infrastructure Data Model (NIDM) to support strategic situational awareness in the context of emergency management.

In the situational awareness domain, GeoConnections has worked with provincial emergency management agencies to build capacity and develop provincial situational awareness systems. GeoConnections' work in situational awareness provided a foundation for the Multi-Agency Situational Awareness System project (MASAS). MASAS is an approach for integrated federal/provincial/territorial (FPT) location-based public safety and security incident information sharing. A key output from the MASAS initiative in 2008–2009 was an architecture built from FPT consultation, which describes a standards-based approach for incident information sharing.





Public Health

In 2008–2009, the use of geomatics data in the public health community was at a less mature level than in other communities, but public health officials and professionals were enthusiastic about what could be accomplished.

Through GeoConnections' funded projects, practitioners within the public health community are beginning to recognize and adopt geospatial elements in their work. As this recognition and adoption continues to grow, so too does the use and knowledge of the Canadian Geospatial Data Infrastructure (CGDI). However, geospatial analysis is still new to the public health community and a number of barriers, including the protection of individuals' privacy, need to be addressed to facilitate the full adoption and acceptance of this type of analysis within public health. Taking into consideration the input and feedback gathered from GeoConnections' Public Health Advisory Committee and other public health stakeholders, GeoConnections has proposed a strategy to develop a geospatial foundation for public health. This strategy outlines an approach that will address or initiate solutions to the barriers faced by the public health community with respect to using geospatial information and the CGDI. The strategy proposes, over the years 2008–2010, completion of a user readiness guide, a data study, and an analytical framework.

The importance of using geospatial information in understanding the health of populations is increasing. *Survey respondent*



Environment and Sustainable Development

The environment and sustainable development community was arguably the most mature user of geospatial information at the start of the second phase of GeoConnections, and it has made the most progress towards integrated, large-scale projects that are potentially sustainable over the longer term.

In 2008–2009, GeoConnections supported Environment Canada's Integrated Land Management program in coordinating an emerging national community of practice. GeoConnections' support included facilitating the sharing of best practices and evaluating the activities undertaken through pilot studies. GeoConnections helped fund regional pilot projects that will use integrated approaches to enhance their information management capacity to influence regional land, watershed or ocean planning. GeoConnections also assisted the International Institute of Sustainable Development to undertake complementary activities, including background research and development of a rigorous reporting and evaluative framework to better understand the integrated land management process from issue identification through to influencing decisions.

GeoConnections also helped fund the Coastal and Ocean Information Network Atlantic (COINAtlantic) project. This multi-agency project will provide one-window discovery and access to a variety of distributed geospatial data and other related information held by federal and provincial agencies operating in watershed, coastal and ocean regions of Atlantic Canada.



Matters of Importance to Aboriginal People

In Aboriginal communities, leaders, managers and land planners require improved planning tools and information to manage treaty and settlement lands and co-managed lands and resources in a sustainable and effective manner. GeoConnections addresses this requirement by supporting Aboriginal leaders, managers and land planners, governments and industry to share locationbased information for improved partnerships and better land and resource co-management.

GeoConnections is focused on enhancing awareness of geomatics and the CGDI among Aboriginal communities. In 2008–2009, the program helped fund several geomatics strategic and business planning projects, a study of geospatial data needs for Aboriginal land-use planning, development of a best practices guide and community workshops. In 2008–2009, GeoConnections supported the First Nations Technology Council in British Columbia to develop a strategy and action plan for the First Nations Information Support Services project. Working in partnership with key government departments, First Nation organizations and other stakeholders, this initiative aims to improve information management/information technology support for First Nations natural resource management. This strategy will leverage previous investments by GeoConnections and its partners to enhance their impact and broaden their appeal.

Functional Program Areas

The following sections summarize activities of the four functional program areas of the GeoConnections program in 2008–2009. The supporting administrative activities of the Value Management Office have not been described.

Content

During 2008–2009, the Content team helped to maintain essential framework content and connect further thematic content through the CGDI. The team facilitated the development of the land cover framework dataset that is now available on GeoBase. It monitored four agreements for the maintenance of national framework datasets to which GeoConnections contributes, two for the National Road Network, and one each for digital elevation mapping and for the provision of satellite imagery. The team monitored agreements for the National Hydrographic Network with GeoBase and for the National Road Network with Statistics Canada. An agreement has been signed for bathymetry data with the Department of Fisheries and Oceans. The Content team managed the integration of 48 new thematic datasets into the CGDI. It also made significant progress on agreements to develop the municipal boundaries data model and to make the First Nations and Aboriginal lands layer available through GeoBase.

Standards and Architecture

During the past fiscal year, the Standards and Architecture team maintained and expanded the standards, policies and technical components that support the CGDI. At the fall 2008 meeting of the Canadian Council on Geomatics (CCOG), the land cover data model and standards championed by the Standards and Architecture team were accepted as national standards.

The Standards and Architecture team, in collaboration with the Content team, achieved a major success in coordinating the CGDI Interoperability Pilot Project, which culminated with a national demonstration that drew the interest of geomatics professionals in Canada, the United States and Australia. The project proved that the CGDI could be maintained and accessed in real-time using available technologies. It brought together five federal departments, government organizations in seven provinces, the Open Geospatial Consortium (OGC) and five private sector companies.

User Capacity

The User Capacity team in 2008–2009 continued to partner with user communities to apply the CGDI in support of a range of policy and decisionmaking priorities. The team supported through to completion two federal and interprovincial infrastructure projects with national extents: the



RADARSAT-1 Mosaic of Montréal

new datasets of elevation in Nunavut and the Northwest Territories, and the bird biodiversity geomatics data for decision making. A total of 34 single-agency infrastructure projects were completed during 2008–2009 and the same number of pre-CGDI readiness projects.

The User Capacity team refined the focus on making location-based data and technologies accessible and useful to key decision makers. The public safety and security user community focussed on critical infrastructure identification and situational awareness as two emergency management priorities for which geomatics data can provide support. Within the public health community, efforts aimed to support decision makers on population health surveillance and health emergency response. Several projects that provide support in these areas—the New Brunswick Multi-Agency Situational Awareness System (MASAS), Infection Watch Live and the ICES inTool—were completed in 2008–2009 (see pp. 26–29 below). The team is supporting other projects at various stages of completion.

Please do not underestimate the value of GeoConnections to those companies that are truly trying to export in what we see as the new age of geomatics. *Survey respondent*



Policy Coordination and Communications

The Policy Coordination and Communications team identified key issues relating to the sustainability of the CGDI beyond the current funding commitments, undertook extensive consultation with stakeholders to secure their input on these issues, and developed key messages for communicating the ongoing need for the CGDI. The team initiated in-depth research into a number of sustainability issues:

- The impact of mass market geomatics companies like Google Earth on the government provision of geospatial data, finding that public and private mapping organizations benefit from each other;
- The international imperatives that drive the need for different federal departments to share geospatial data; and
- The CGDI's economic impact.

Based on initial findings, the Policy team developed a conceptual framework for defining and sustaining the CGDI. The team also coordinated first steps toward the renewed Canadian Geomatics Accord, the framework for cooperation and data sharing between the federal and provincial and territorial governments. It also began work on a National Mapping Strategy, which will serve as a framework for defining the objectives, roles and responsibilities of industry, government, producers and consumers of geospatial information.

The Policy Coordination and Communications team initiated best-practice guides for the use of geospatial data for emergency management and public safety, for implementing a geographic information system (GIS) in Aboriginal communities, for anonymizing geospatial data for public health applications, and for sharing sensitive



geospatial data in the environment and sustainable development community. These guides were part of the team's work with other program areas, which included implementing systems for working more closely in support of the Content and User Capacity teams. The team also supported the external evaluation and audit of GeoConnections, and helped secure a sixth year of operations by preparing material for the Treasury Board Secretariat.

The Evaluation Framework

Building on the work of evaluators of spatial data infrastructures in the international academic community, GeoConnections established a comprehensive evaluation framework to accurately capture the program's performance in terms of outputs and planned impacts. The evaluation framework was presented to the Treasury Board Secretariat and accepted by the GeoConnections Management Board in November 2007.

Implementing the Performance Evaluation Framework

This 2008–2009 annual report includes output performance metrics from GeoConnections' Results-based Management Accountability Framework (RMAF) and performance indicators intended to assess progress towards the immediate, intermediate and final outcomes of the Program Logic Model (see Annex 6, Program Logic Model). Three methodologies are applied to assess progress towards outcomes:

• Quantitative metrics derived from program and project activities: these measures address immediate outcomes 2, 4, 7, 8 and 10, and intermediate outcome 17 and 18 from the GeoConnections Logic Model. They are summarized in Annex 3, Evaluation via Program and Project Analysis.

- Quantitative analysis of the results from a survey of current and potential GeoConnections stakeholders: the survey addresses immediate outcomes 3, 9 and 14, and intermediate outcomes 16 and 20 from the GeoConnections Logic Model. Highlights of the survey appear in Section 5, User Survey, while detailed findings are presented in Annex 4.
- Qualitative analysis of selected case studies: the case studies address immediate outcomes 5, 11, 13 and 14, and intermediate outcomes 15 and 19 from the GeoConnections Logic Model. The case studies are included in Section 6, Case Studies.
- Final outcomes 21 to 24 will be addressed in the annual report for 2009–2010. Outcomes 1, 6 and 12 are not tracked because the program's design assures success in these areas:

You are doing a good job and play an important role in Canada and internationally. *Survey respondent*

 Outcome 1, User requirements are well known before technology and data investments are made. This outcome was addressed during 2005–2007 by focus groups and a user needs assessment survey. The GeoConnections governance structure ensures ongoing consultation with stakeholders. Applicants for many types of projects must undertake user needs assessments.

- Outcome 6, Users recognize framework data as an authoritative geomatics construct to enable priority applications. This outcome is addressed by requiring projects to meet this criterion before they receive funding.
- Outcome 12, Stakeholders recognize the value of and apply national and international technical standards for access and use of geospatial data through technical infrastructure. This outcome is supported by making adherence to CGDI standards a condition of funding.

The key performance indicators supporting the RMAF outputs are addressed by quantitative data summarized in Annex 2, RMAF Indicators.

Data Collection and Parsing

GeoConnections project tracking software provided a substantial portion of the data collected for this report.³ The software has been programmed to produce discrete reports related to performance metrics. Case study information was also derived from interviews with project proponents.

The project start date is used to identify which projects are reported as initiated in the fiscal year (Annex 1). Projects reported against the RMAF indicators are reported in the fiscal year in which they end (Annex 2). Calculations of financial ratios in the performance metrics are based on the full budget of the project recorded, regardless of actual expenditures to date. Annex 3, Evaluation via Program and Project Analysis, reports on non-financial, quantitative outcomes from the GeoConnections program logic model, the results in 2008–2009 and cumulative progress. The financial data in Annex 5, 2008–2009 Financial Reports, record actual expenditures during the reporting period.

As a result of external audits and evaluations undertaken on GeoConnections over the past 18 months, staff has made a concerted effort to update and ensure the accuracy of data in the project tracking system that is used to generate data for monitoring overall program performance. These updates and verification have resulted in some minor adjustments to prior year data. For the 2008–2009 annual report all performance metrics for all years of the program were recalculated and the numbers reported here represent the most up-to-date figures available.

With the exception of Annex 4, wherever this report refers to "total GeoConnections spending" or "total GeoConnections program spending," these figures refer only to the money GeoConnections invest in partners through contracts, contribution agreements, Letters of Agreement and Memoranda of Understanding. These figures do not include any operational or salary spending. Neither do they include any funds spent on information technology, communications support or rental of office space.

The project tracking software from which the financial information in this report is derived is not comparable with financial information derived from Government of Canada (GOC) financial accounting systems for several reasons. As noted above, the software does not record salaries and operating costs, which the GOC financial accounting systems do. The software does not distinguish spending in one fiscal year from spending in another. The software records total funds committed at the start of a project and

³ GeoConnections uses a commercial, off-the-shelf project tracking software package.



total funds expended at the end, whereas GOC financial accounting systems record expenditures as they occur throughout the life of a project.

An online survey of actual and potential stakeholders provided another portion of the data analyzed for this report. The survey results are provided and analyzed later in the report.

External Evaluation

During 2007–2008, NRCan's Strategic Evaluation Branch began an assessment of GeoConnections as part of a wider examination of NRCan's work on infrastructures. The preliminary results of that assessment became available within the current reporting period. The results were based on a review of over 90 documents and interviews with 28 stakeholders, but did not include the analysis of project data, which will be included in the final report.

In terms of its relevance and rationale, the assessment found that there is a continuing need for the GeoConnections program. It responds to stakeholder needs and none of its activities can or should be transferred to stakeholders. Its leadership in the use of geomatics, the development of framework data and the implementation of standards is essential. The role of the federal government in these areas is legitimate and expanding, particularly in light of the sensitivity of some of the data in areas such as health and security. The program's greatest success has been in developing geospatial data systems that cross national, provincial and municipal boundaries. The assessment found that GeoConnections has been successful in encouraging decision makers to use more geospatial information and in addressing user needs. Nevertheless, overall awareness of GeoConnections and the CGDI could be improved, especially in terms of communicating the potential benefits of the CGDI to senior decision makers.

An assessment by the NRCan Strategic Evaluation Branch concluded that there is a continuing need for GeoConnections and none of its activities can or should be transferred to other stakeholders.

The assessment also found that stakeholders view GeoConnections as cost-effective and that Canadians are receiving value for their tax dollars spent on the program. GeoConnections exceeded its target of leveraging one dollar of additional investment for every dollar invested by the program. However, some stakeholders consider the administrative burden involved in the proposal submission and approval process to be excessive.

Some stakeholders expressed a need to see long-term federal commitment to the development and use of geospatial data. The fact that GeoConnections has a limited mandate suggested a lack of such commitment. GeoConnections will examine mechanisms to ensure that the local expertise currently under development can be sustained and transferred to a broader provincial or federal level. Other recommendations were for improvements to the usability of the GeoConnections Discovery Portal and the development of a communications strategy to ensure that the CGDI brand is clearly understood by all stakeholders.

In the coming fiscal year, the assessment will be completed through analysis of project data, reviewed by GeoConnections for factual verification, and reviewed by the Strategic Evaluation Division. When finalized, it will be presented to the NRCan Departmental Evaluation Committee.

Alignment with NRCan Program Activity Architecture

In the NRCan Program Activity Architecture developed in 2007–2008, GeoConnections falls under sub-activity 3.2.4.2 in the following hierarchy:

- Activity 3: Safety, Security and Governance
- Sub-activity 3.2: Natural Resource Landmass and Knowledge for Canadians
- Sub-activity 3.2.4: Basic Infrastructure is Provided to Support the Governing of Canada
- Sub-activity 3.2.4.2: Canada's Geographic Foundation

Management Changes, Reporting and Accountability Structures

Organizationally within NRCan, Mapping Services and Mapping Information have been amalgamated into the new Mapping Information Branch with GeoConnections as one of the divisions within this branch.



Risk Monitoring and Mitigation

Some of the risks associated with the GeoConnections program can be grouped around the issue of sustainability and its implications. Will the experience and skills that developers acquire through participation in GeoConnections be sustained once funding from the program is no longer available? Will decision makers in the priority user communities continue to take advantage of the availability of geospatial data once their use of that data is no longer subsidized? Will the CGDI be able to develop beyond locally or regionally focussed projects to encompass data structures at the provincial and national levels? Will the CGDI as a whole be able to survive once it no longer has the governance and support of the GeoConnections program?

The risks that generate the first two questions may be mitigated by market forces. Decision makers have found integrated geospatial data to be useful in addressing complex issues related to key economic, social, and environmental priorities. That usefulness exists independent of the GeoConnections program and will survive it, presumably generating demand for the experience and skills developers acquire through the program. Hence decision makers and developers may continue in a mutually beneficial and supportive relationship beyond the life of GeoConnections.

Lack of an effective federal-provincial-territorial governance structure for geomatics technologies, standards, framework data, and policies could result in a leadership vacuum that would allow the CGDI to dissolve as a national infrastructure. The current GeoConnections governance model seeks to mitigate this risk. In 2005–2006, GeoConnections invited four members each from the Inter-Agency Committee on Geomatics (IACG) and the Canadian Council on Geomatics (CCOG) to sit on the GeoConnections Management Board. The IACG includes 12 agencies that



collaborate to guide development of geomatics in the federal government. The CCOG is a federal-provincial-territorial group dedicated to building geomatics partnerships, and sharing information and data. Eight out of the 18 seats on the Management Board continue to be reserved for individuals who are engaged with either the IACG or CCOG. The two national coordinating bodies for geomatics could assume a more central governance role once the program is complete.

Keep funding the program, keep working on removing barriers to access, keep promoting the use of standards to enhance sharing and keep up the good work. Survey respondent

Summary of User Survey

Eight hundred and sixty-two potential stakeholders from four sectors (federal government; provincial, territorial and municipal governments; academia; and private sector) and four user communities (public health; public safety and security; environment and sustainable development; and matters of importance to Aboriginal communities) were invited to participate in an online survey as part of the development of this report. The survey results can be generally be compared with the User Needs Assessment survey conducted in 2006, although the method of identifying survey participants differs from that survey so a direct comparison is not possible. For full results, see Annex 4.

The high response rate of 21% suggests the importance of GeoConnections to its stakeholders. Findings from the survey indicate that geospatial data is being integrated into the business processes of responding organizations and GeoConnections and the CGDI are important factors in this trend.

Most survey respondents know of GeoConnections and the CGDI (70%).⁴ Over half of them gain access to the CGDI through a federal government portal (56%). They use the GCDI to gain access to the GeoConnections Discovery Portal, GeoBase, GeoGratis and the Atlas of Canada (47%); geospatial data, maps and imagery (47%); and CGDI-endorsed standards and guidance documents (32%). Relatively few use it to share data and maps, or to find policy advice or geospatial services.

GeoConnections and the work it has done have allowed us to almost quadruple our sales from three years ago. Over 80% of our 2009 sales are export and without the reputation of GeoConnections and the people involved, we would not be able to point to success within Canada in policy, approaches to framework data and the like. *Survey respondent*

Users get their data mainly from federal (77%) and provincial/territorial (76%) government sources, although many generate data internally (67%). The largest percentage of users requires regional (30%) or provincial (25%) scale data, while few require national, municipal or international data.⁵

Most respondents reported that they share geospatial data either internally or externally (86%). Two-thirds of respondents said their

⁴ The result establishes the success of GeoConnections in addressing Logic Model Immediate Outcome 3: Users are aware of a prepared to leverage the CGDI.

⁵ The results suggest that users may be integrating regional with provincial data, which addresses Logic Model Immediate Outcome 9: Users are aware of the value of integrating regional information in provincial/territorial and national information systems.



organizations share geospatial information with other organizations more frequently than they did five years ago. Barriers to sharing were, in order of frequency, privacy and confidentiality, licensing and ownership, political and liability issues, standardization and inability to recover costs.

The most frequently cited barrier to using data was the expense of data that had to be licensed. The expense of software and of training staff was another often-noted barrier. Data that did not meet users' needs or conform to the standards they followed were also cited as difficulties. The most frequently cited options for overcoming barriers were more funding or free access to data, and more training and experience.⁶ The majority of respondents reported that their organizations use geospatial information more frequently now than they did five years ago (72%) and they expect this trend to continue (73%).⁷ One third of respondents said that staff members spend over 35 hours a week using geospatial data (32%). The main drivers for increased use are accessibility (56%), organizational capacity (54%) and changes in business processes (34%). The answers to these two questions suggest that the increasing accessibility of data and organizational changes among user communities have combined to increase the use of geomatics data by decision makers. Organizations are transforming their businesses to include the use of geospatial information.⁸

⁶ The awareness by users of barriers to using the CGDI, combined with the general increase in their use of it, address Logic Model Immediate Outcome 14: Stakeholders are aware of key decision/business areas where the CGDI can benefit them, key policy/ cultural barriers to its uptake and potential approaches to overcoming these barriers.

⁷ This result addresses Logic Model Intermediate Outcome 16: Priority user communities have increased their capacity to use the CGDI to meet their decision-making requirements.

⁸ Logic Model Immediate Outcome 20: As benefits outweigh costs, organizations transform businesses processes, including policies and culture to adopt the CGDI.

Case Studies

Case studies provide effective narrative evidence that GeoConnections is achieving many of the outcomes described in the Program Logic Model. As GeoConnections matures, an increasing number of completed projects are becoming available that help to describe the value of GeoConnections and the CGDI.

Although key elements in each of the case studies reported below relate to the specific outcome that precedes it, many of these case studies could be taken as illustrative of more than one outcome. For example, COINAtlantic is cited as a case to illustrate Outcome 11. However, it also represents an instance of organizations cooperating for data production (Outcome 5); of business transformation (Outcome 13); and even of stakeholders championing the CGDI (Outcome 15).

Logic Model Immediate Outcome 5: Agencies cooperate for data production, reducing duplication.

Canadian Land Cover Data Project

Land cover is the biophysical cover on the earth's surface, ranging from forests to farmlands to urban structures. Individual organizations have mapped Canada's land cover in response to their specific needs, producing land cover data in varying forms and for various regions. Up to now, there has been no integrated and continuous depiction of land cover for the entire country at a high resolution. Such a depiction of national land cover is required to meet a broad range of user needs, including the provision of a national standard to harmonize regional needs. In April 2007, the Canadian Council on Geomatics (CCOG) decided that land cover should be added to GeoBase, a federal, provincial and territorial government initiative the Council oversees. GeoConnections provided funding for the first phase of a project to achieve this goal.

As a first step, the federal community of practice on land cover assessed user needs. Building on past needs assessments, literature reviews and consultations, they distributed a national questionnaire. The questionnaire was followed up with discussion groups in seven regions across the country. The assessment found a high level of interest in the planned GeoBase land cover product and a requirement that it be developed in coordination with the provinces and territories. Potential users wanted assurances about the consistency and accuracy of the product and thorough documentation of data sources and other details.

The second phase of the project involved defining data sources and products to address user needs. This work also identified features of interest, a classification legend, a data model, standards and format, and data update and maintenance strategies. The legend corresponds to the Land Cover Classification System, issued by the United Nations Food and Agricultural Organization



(2005), and provides a common foundation upon which users can build to meet their specific needs. Natural Resources Canada's (NRCan's) Centre for Topographic Information (CTI) took the lead in developing a data model and standards, based on the standards used for the CGDI. The project addressed the evolving nature of the data by adopting international standards and developing an open approach with a flexible data model to accommodate emerging datasets as they are made available from multiple sources.

Using Landsat imagery, NRCan (Canadian Forest Service, the Canadian Centre for Remote Sensing) and Agriculture and Agri-Food Canada had already produced land cover mapping for the majority of the country. Other federal and provincial organizations have also worked on operational land cover activities. This Canada Land Cover Project was a tremendous opportunity to further the coordination of these organizations and work with stakeholder communities beyond specific sectors with the goal of developing integrated products to meet broad community needs.

Background technical work on the implementation phase, led by NRCan-CTI, was underway during the first two phases, and continues beyond the current project. This phase involves defining and developing an integrated, harmonized depiction of Canadian land cover for distribution through GeoBase.

The land cover framework data layer will enable better land use decision making and monitoring, environmental planning, development of agrienvironmental health indicators and climate change monitoring, and will facilitate other contextual mapping and analysis applications. The land cover framework data layer is now freely available through GeoBase (www.geobase. ca/geobase/en/data/landcover/index.html). Updates will be determined according to user needs assessments and will be facilitated by the land cover community of practice, in collaboration with appropriate stakeholders. The community of practice will continue to coordinate future activities of the project, ensuring successful and sustainable operations over the long term. Ongoing work on the Canadian Land Cover Data project illustrates how federal, provincial and territorial agencies cooperate to produce data and reduce duplication of effort.

National Road Network Provincial and Territorial Maintenance Pact

The first version of the National Road Network (NRN), a set of digital map data for publicly accessible roads in Canada, was released nationally in 2003 on GeoBase, the federal, provincial and territorial government collaboration overseen by the CCOG. By March 2005, the NRN included data for more than 1.1 million kilometres of Canadian roads. The NRN is an effective resource for a wide variety of activities, including managing road operations, business development and marketing, and transportation and government services such as the census and elections. But roads change. For the NRN to remain current, participating provinces and territories need to update their road network data.

To ensure that provincial and territorial data custodians have the capacity to properly update the NRN, CCOG established a long-term maintenance pact. Through the pact, GeoConnections supported the establishment of funding agreements with participating provinces and territories to keep their road data current and accurate. GeoConnections also coordinates the maintenance of data and helps the road network community work together. Using national data standards developed as part of the CGDI, the NRN project focusses the road network community on building a national dataset that is consistent, even though the data is collected from 13 difference provinces and territories. Closestto-source maintenance of the NRN is a process that cuts duplication and cost because the project money enables the provinces and territories to acquire local data themselves and verify the information, for example, by going out in the field to make sure that a road has changed from unpaved to paved.

The maintenance agreements also require provinces and territories to update their sections of the NRN on a regular schedule. Updated NRN data is sent to NRCan, the host of the GeoBase portal, at regularly scheduled intervals. The content of NRN data depends on the agreements that have been signed with each province and territory.

Once NRCan receives the data, staff validates them to make sure they fit the data model and standards. Then the data is published on the GeoBase portal and made available to all users without cost or restrictions under a common licensing agreement. NRCan is responsible for administering aspects of the GeoConnections maintenance pact, such as coordinating negotiations of agreements, as well as supplying some technical support.

The first set of agreements—for the first version of the NRN—were for the geometrical location of the road networks and was signed with Ontario, Nova Scotia, Alberta, British Columbia, Prince Edward Island, Manitoba, Saskatchewan, Newfoundland and Labrador, the Northwest Territories and the Yukon. The second set of agreements required provinces and territories to provide additional content such as street names, place names and address ranges. Agreements to provide this information have been signed with Ontario, Nova Scotia, Alberta, British Columbia, Prince Edward Island and the Yukon.



COIN Atlantic Map Combining NRCan and Fisheries and Oceans Data

By including information on road names and address ranges, road surfaces and number of lanes, the NRN benefits stakeholders involved with national defence, statistics, elections, housing, the postal service, agriculture, public works, natural resources, policing and public safety. The NRN is a collaborative undertaking between the federal government and the provinces and territories. Each province and territory has an NRN authority. Departments and municipalities feed data into the provincial and territorial road network datasets, which is then fed into the NRN.

The NRN maintenance pact has required ongoing knowledge transfer as a continuous exchange of information and expertise takes place between the provinces, territories and federal government departments. The maintenance pact is a key step toward future development of the NRN. The project ensures that the NRN is updated and maintained on schedule and in compliance with NRN standards. The NRN maintenance pact also offers a strong illustration of federal, provincial and territorial agencies cooperating to produce data and reduce duplication. **Logic Model Immediate Outcome 11:** Stakeholders are able to achieve operational efficiencies resulting from use of existing and evolving technical infrastructure services.

COINAtlantic Development and Implementation, Phase I

A new interactive web site that is built on existing technologies is challenging data providers to think in new ways. The Coastal and Ocean Information Network Atlantic (COINAtlantic) enables decision makers responsible for managing coastal and marine waters in the Atlantic region to share their databases and find relevant information more easily than ever.

Developed with financial support from GeoConnections, the web site (coinatlantic. ca) is based on the concept of information retrieval from web-accessible sources using the GeoConnections Discovery Portal (GDP) and its metadata catalogues. Users can find, evaluate, access, visualize and integrate geospatial data, information and web mapping applications from a number of providers through the COINAtlantic utility and easy-to-use interface.

"We've been able to gather available technologies to do what is basically a simple task technically, but conceptually very hard for people to get their minds around," said project manager Paul Boudreau. "By taking the Google search mentality and applying it to the GeoConnections metadata catalogues and getting organizations to put their data in web mapping service (WMS) format, we've been able to do great things."

Although COINAtlantic combines four distinct technologies, including an open-source web mapping application, the system works primarily through old-fashioned cooperation. Organizations with maps and geo-referenced data can convert their data to images on the Internet using WMS specifications developed by the Open Geospatial Consortium (OGC). Once the information is web accessible, the organization must register with the GDP to enable COINAtlantic to find the data products. It is an extra step that requires organizations to rethink their role as service providers rather than just as managers of their own raw data, and to recognize the value of making their data available and accessible to a wider audience.

"If data managers convert their data to WMS format and register it with the GDP then all of a sudden we can build it into our network that allows people to search and find and overlay information," explained Mr. Boudreau. Currently, several agencies are collaborating with COINAtlantic to publish and register their data, among them NRCan, the Department of Fisheries and Oceans, and the Province of Nova Scotia. COINAtlantic clearly illustrates how this group of stakeholders has been able to achieve operational efficiencies as a result of evolving technical infrastructure services.

"With the system operational, the focus now is to get more databases online so that COINAtlantic is more useful," said Mr. Boudreau. "The biggest challenge is trying to promote culture change to encourage organizations to publish WMS products."

A key part of that effort is to grow the network to include all stakeholders involved in the integrated coastal and ocean management community, not only the federal and provincial government policy makers and managers responsible for conserving and sustaining coastal and ocean resources and space. The goal is to include people who use or are concerned with the coastal environment, from Aboriginals and fishermen to oil operators and environmental groups, and the scientific community who studies it. This goal is the reason why project manager Paul Boudreau has delivered training about COINAtlantic and how it works to about 85 representatives of non-governmental organizations (NGOs). It is also why COINAtlantic provides the integrated coastal and ocean management community with an online forum and bulletin board through Facebook and the Plone open-source content management system.

COINAtlantic is the brainchild of the Atlantic Coastal Zone Information Steering Committee (ACZISC). ACZISC members represent eleven federal departments, the four Atlantic provinces, academia, the private sector and NGOs who meet three times a year in all four Atlantic provinces. Working together, members foster the cooperation needed for integrated coastal and ocean management in Atlantic Canada.

"The ACZISC has been looking at how to solve the key problem of sharing information with people making decisions on aquaculture, tidal power—all those sorts of things that have gone on in coastal zones long before the information technologies existed," reported Mr. Boudreau.

Now with COINAtlantic up and running and Phase 1 coming to a close, the ACZISC has the infrastructure in place to enable a decision-making process that takes into account information from all sectors (e.g., fisheries, oil and gas production, water quality) and works to ensure that decisions are harmonized with Canada's coastal policies.

CGDI Interoperability Pilot Project

Access to current, standardized and national geospatial data can be critical. For example, emergency measures personnel responding to an industrial accident involving a toxic plume need access to up-to-date data to develop evacuation plans for the affected areas. GeoConnections, along with federal and provincial partners, collaborated with the OGC to test mechanisms for distributing and updating framework data so as to achieve operational efficiencies.

The CGDI consists of the technology, standards, access systems and protocols required to harmonize all of Canada's geospatial databases and make them accessible through the Internet. The main objective of the CGDI Interoperability Pilot Project was to test the feasibility of using technology based on open standards to improve the management and dissemination of CGDI data. This project demonstrated that technology from multiple vendors based on the OGC's standard for Web Feature Service (WFS) could interoperate to provide access to the most current and authoritative data. The project achieved a further objective of developing a collaborative technical network of partners to advance the overall development of the CGDI.

Users of geospatial data require access to authoritative information directly from its source. For this project, all of the provincial and federal partners implemented the WFS standard. Using this specification enabled the partners to exchange and interact with geospatial information on the web. The WFS enabled users to access the most current and authoritative data, avoiding version disparities and minimizing duplication. By keeping data closest to source, data providers can maintain control over their data while making it accessible to users.

Public sector participants came from Natural Resources Canada, Statistics Canada, Environment Canada, Elections Canada and government organizations in Newfoundland and Labrador, Nova Scotia, Quebec, Ontario, Saskatchewan, Alberta and British Columbia. OGC and five private sector companies also participated. The national scope of the project was itself significant. The project focused on three types of framework data: geographic names, the national road network and administrative boundaries. The functional scope of the project was demonstrated by the discovery, access and download of closest-tosource data by users; real-time updates of provincial databases; and access to distributed information to support an emergency response situation.

The CGDI pilot project was demonstrated successfully in November 2007 to a national audience, with significant interest from the United States and Australia. During the demonstration, a large number of participants separated by vast distances were able to access and maintain data in real time over the Internet using a wide array of technologies. The project proved that the CGDI could be maintained and accessed in real-time using available technologies.

The project identified a number of interoperability issues that need to be addressed and made recommendations for best practices in the implementation of a distributed WFS network. It produced feedback into the OCG specifications, practices and test bed planning. But the standards implemented for the CGDI Interoperability Pilot Project will serve the Canadian public for a long time to come.

The project clearly demonstrated that multivendor technology solutions based on open standards can be used by federal, provincial and territorial organizations to update their data and automatically make the up-to-date data available online in real time anywhere in Canada. The project also succeeded in building a collaborative team of CGDI partners to advance its development. As one participant said, "Interoperability is not just a question of technology, but a question of good will among participants." The CGDI Interoperability Pilot Project clearly demonstrates how evolving the technical infrastructure services of the CGDI can lead to operational efficiencies. **Logic Model Immediate Outcome 13:** Stakeholders are aware of time, effort and cost savings relative to business transformation using the CGDI approach.

Geospatial Mapping of Respiratory and Gastrointestinal Hospital Visit Data (Infection Watch Live)

Infection Watch Live is a geospatial decision support system that helps health officials in three eastern Ontario public health units track the spread of respiratory and gastrointestinal diseases so they can respond quickly and effectively. This project has helped to limit the spread of disease, protect vulnerable populations, reduce the impact an outbreak has on hospital emergency departments and contribute to a better understanding of the spread of disease. Systemically, it is also raising stakeholder awareness of the time, effort and cost savings that can be achieved by using the power of the CGDI to transform business processes.

Gastrointestinal and respiratory illnesses can spread rapidly, creating a heavy burden on communities. Without a comprehensive way to share information, health practitioners, longterm care centres and other facilities such as schools may miss opportunities to learn of and quickly respond to these illnesses. In particular, the threat of a pandemic raises significant concern, making the early spatial detection of an outbreak necessary to protect public health.

The real-time tracking of diseases using easy-toread, web-based maps is the most comprehensive way to alert and inform the health community and the general public about disease activity. This project complements an existing surveillance system, Emergency Department Syndromic Surveillance (EDSS), in Kingston, Ontario, to make more and better geographic data available, as well as provide simplified maps that the public can view. Infection Watch Live capitalizes on a wide variety of data leveraging the CGDI, including those pertaining to public health unit boundaries and the location of long-term care facilities, hospitals, medical clinics, family physician offices, schools, day-care centres and water treatment plants.

The Infection Watch Live system receives data from the emergency departments of nine hospitals in the public health units of Kingston, Frontenac and Lennox & Addington; Hastings and Prince Edward Counties; and Leeds, Grenville and Lanark District. When ill people come to the hospitals' emergency departments, health workers record their age, the reason for their visit and the first three digits of their postal codes in the Infection Watch Live system. The data is analyzed and a map is generated showing illness activity in the area over the last 24 hours. No data that could identify patients are collected in this process.

The project shares geospatial health data among public health departments and the community to detect disease outbreaks as well as trends or clusters of illness. Infection Watch Live is available on the website of the primary partner, the Kingston, Frontenac and Lennox & Addington Public Health Unit (www.kflainfectionwatch.com).

By involving GeoConnections in the project, the partners aimed to make the application available to a broader community so other CGDI partners could benefit from their work. GeoConnections funding was distributed over four phases of the project, including project and communications planning, the analysis of business and technical requirements, the development and testing of the data model, and quality assurance and marketing efforts.

Project partners will continue their support of Infection Watch Live through their ongoing information technology budgets. They will



seek to expand the application within the public health community by approaching other jurisdictions and by widening its use to include other diseases. Formal protocols for communication and alert investigation have been developed in collaboration with stakeholders.

Geospatial Application to Report the ICES's Disease Surveillance and Population Health Measures

Researchers at the Institute for Clinical Evaluative Sciences (ICES) in Toronto can now respond more quickly and easily to requests for population-based health information and disease surveillance with a new CGDI-compliant reporting application called inTool. With information presented in a reliable and standardized manner, health professionals and researchers dependent on this information have an easier job influencing the progress of health surveillance and the geographic allocation of health resources.

ICES conducts research on the organization and delivery of health care in Ontario that encompasses a variety of topics. For example, research on diagnostic imaging, diabetes and access to health care services (e.g., cardiac procedures, hip and knee replacement and diagnostic imaging) are used to guide policymakers, managers, planners, practitioners and other researchers. These evaluations have contained information for defined geographic areas (province, city, neighbourhood) in a number of separate, hard-copy reports, journals, atlases, bulletins, slides and so on. The reporting format makes it difficult for staff from ICES, Local Health Integration Networks (LHINs), the Ministry of Health and Long-Term Care (MOH-LTC) and others to have a comprehensive view of population health or disease surveillance.

ICES has already realized the importance of visually and comprehensively representing the prevalence of health measures using spatial analyses. ICES initially published and shared these as static maps. However, creating these visual representations in a static view was labour intensive. As a result, ICES was able to produce only a few views of a map with an all inclusive (i.e., all LHINs) set of information. ICES staff soon realized that much more information could be provided. For example, it is useful to see the location of hospitals and diabetic clinics overlaid on top of maps of the prevalence of diabetes. This level of detail would require publishing hundreds of static maps or, more efficiently, using interactive maps. Having details such as these may help support LHINs and others in making decisions about allocating resources to improve the management of diseases. A comprehensive view of information for the end user will also make it easier to identify potential relationships between health, disease and related conditions (e.g., diabetes and cardiac disease, stroke or dialysis).

With financial support from GeoConnections, ICES's Monitoring and Reporting Department, in collaboration with the Toronto Community Health Profiles Partnership and the Centre for Research on Inner City Health, developed inTool, enabling ICES to respond to user requests for information, with the option of displaying results on a map, graph or table. Following extensive research, the project team developed a prototype for the reporting tool and populated it with LHIN-specific information. ICES staff then tested the prototype and provided feedback on how easy it was to use and interpret.

The ICES team will continue to consult testers and external users from various healthcare organizations for feedback on inTool. The needs, limitations and preferences of end-users will be



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considered throughout all stages of development to ensure that the maps, graphs and tables are easy to understand and that the application is easy to use and effective in supporting decision making.

Logic Model Immediate Outcome 14: Stakeholders are aware of key decision/business areas where CGDI can benefit them, key policy/ cultural barriers to its uptake and potential approaches to overcoming those barriers.

The Dissemination of Government Geographic Data in Canada: Guide to Best Practices, Version 2

An updated guide is helping to demystify the complex world of geographic data licensing in Canada. As geographic data becomes more widely available through the Internet, and products to disseminate the data become more sophisticated, coordinating and streamlining data distribution, procurement, exchange and development among governments and the private sector is now more important than ever.

In 2005, the GeoConnections Data Licensing Guide Working Group produced a guide to best practices for the licensing and dissemination of geographic data in Canada. This guide set out an integrated framework for three types of models, based on what was prevalent at the time.

The 2005 licensing framework fell out of alignment with current developments as a result of changing technology and user demands. New distribution models had evolved because of advances in webbased services, distributed computing and other user applications. In addition, the variety of terms, fee structures and acknowledgment of source and termination clauses used across government was complicating the use of government data, potentially driving clients away. Changes in government policies for data dissemination and privacy legislation also made it necessary to review the existing frameworks for currency, relevance and comprehensiveness. "Government departments were licensing data under many different business models and using a wide variety of templates. There was not a lot of consistency," said Kara John, Vice President of Intellectual Property and Privacy at DMTI Spatial, who worked on both versions of the guide. "There were a lot of questions."

The inadequacy of the first licensing guide was highlighted by a user needs assessment (UNA) undertaken by GeoConnections in 2006. Respondents to this UNA cited data licensing as a key barrier to data sharing. The development of an updated version of the data licensing guide was therefore a priority for GeoConnections so as to ensure stakeholders would be aware of potential approaches to overcoming data licensing as a barrier to data sharing. In 2007, a sub-committee of the GeoConnections Policy Working Group began work on Version 2 of the guide with the IACG and CCOG. They based their work not only on the geomatics industry, but on research and consultation with users of government geographic data and licensing practitioners in federal, provincial and municipal governments.

Version 2 sets out a revised integrated framework for four types of licencing models for government geographic data: the unrestricted use model; the end-user model; the reseller model; and the valueadded reseller model. It provides clear guidance to assist licensing practitioners in selecting the most appropriate model and licence agreement with the help of model templates. Each model is described in terms of how it builds on common structures and the guide outlines their inter-relationships. The guide also includes policy directives currently in force across federal departments and agencies, and provides details on the recommended approaches to ownership of intellectual property, liability, duration and termination.

Version 2 of the guide has been distributed widely and has generated interest in the United States. "People are already asking us when we're coming out with version three," Ms. John said. "As technology continues to advance, the demand for geospatial web services and commercial services, such as Google Maps, is on the rise. This evolution will continue to affect the models of distribution adopted by the government for the dissemination of its geographic data."

Sharing knowledge and best practices is crucial to ensuring that government practices for geographic data licensing continue to benefit data users and licensing practitioners. According to Ms. John, "The work is part of a trend of federal, provincial and private organizations working together on licensing issues." Project partners are continually seeking information from the geospatial data licensing community—including industry, government and academic sectors—to help improve subsequent versions of the guide.

Logic Model Intermediate Outcome 15: Due to the success and relevance of operational CGDI systems, champions in key priority areas transfer knowledge of the CGDI in their community to encourage take-up.

New Brunswick Emergency Measures Organization Multi-Agency Situational Awareness System

A new web-based application that enables personnel in emergency management agencies to share geospatial incident information is gaining followers. Developed initially to enable New Brunswick's Emergency Measures Organization (EMO) to respond to the annual flooding of the 673-kilometre long St. John River, the GeoConnections-funded provincial Multi-Agency Situational Awareness System (MASAS) uses web-based tools to generate a common operating picture and to facilitate shared situational awareness. A common perspective enables the multiple agencies involved in responding to natural and man-made disasters to collaborate and communicate more effectively.

The success of the New Brunswick MASAS depends on multi-jurisdictional agencies opening their vaults and sharing their data. For the original group of agencies, municipalities and emergency response organizations that came together under the leadership of the New Brunswick EMO, the lure to participation was two-fold: the potential of the application to simplify information sharing through a common user interface and web services, and the guarantee to address security concerns.



"Security was a primary concern," explained project executive Ernie McGillivray, then Director of the New Brunswick EMO. "We made sure to build a system where only non-restricted, public information goes to the public and restricted, official-use information doesn't go anywhere because it can be accessed only by authorized users with a personal account." Restricted information includes resource requirements and deployments, while publicly shared information include public alerts, event data, shelter locations and road closures. In the event of a flood, for example, participating agencies will be able to receive flood warnings, visualize flooded areas and evacuation routes, and locate reception centres.

To encourage broad use and to enable interoperability with other web-based tools, the application is based on open standards for exchanging, merging and mapping location-based information. Information gets pushed to users using Really Simple Syndication (RSS) feeds. Users can pull information into their systems without having to change what they are doing.

The 10-month-long project to develop the New Brunswick MASAS was completed and deployed in time for the province's annual spring floods in 2009. But for the New Brunswick EMO there is still work to do, spreading the word among individuals at different levels of government to help them understand the application and how it operates, and integrating streamed content from partners, such as road condition information from Transport Canada and wild fire data from NRCan.

With support from GeoConnections, Public Safety Canada is leading a parallel project to develop a federal MASAS that will link to provincial systems, thus creating a national MASAS. Additional projects are underway in Alberta and British Columbia with the participation of the New Brunswick EMO and federal partners to develop the protocols that will enable different MASASs to work together. "We painted a picture for people," said Mr. McGillivray. "We recognized that people would become engaged only when they actually saw the MASAS in action."

Mr. McGillivray will continue his campaign to demonstrate the MASAS, taking the system to Maine for a cross-border hurricane exercise with the New England states and eastern provinces and to the 6th Canadian Risk and Hazard Network Symposium in Edmonton. The reason for his devotion is clear.

"Today the biggest challenge is not a lack of information but too much. An emergency manager may receive hundreds of urgent e-mails but will not have time to read them all. We need to be able to somehow filter that data to derive information from it. The MASAS aggregates information across levels and jurisdictional boundaries and presents it visually. This improves situational awareness and understanding, enables better informed decisions and should contribute to better outcomes." Mr. McGillivray has emerged as a true champion of the CGDI, his efforts contributing significantly to the transfer of knowledge about the potential of the CGDI within the public safety community. Logic Model Intermediate Outcome 19: Stakeholders evolve their business processes by sharing, jointly developing and using common services, tools and standards of the CGDI as part of their operations.

Geospatial Portal for Eeyou Istchee, Phase 2

The core objectives of the project were to help Aboriginal communities better manage land and resources, and more particularly to improve tourism planning throughout the traditional Cree territory of Eeyou Istchee, an area covering approximately 350,000 sq km in northern Quebec.

Phase 1, led by the Cree Outfitting and Tourism Association (COTA) partnering with the Cree Trappers Association (CTA), saw the creation of a user-friendly web-based portal and application to make geospatial information accessible to Cree communities. These communities use this information to support research, discussion, planning and decision making related to resource management and tourism development.

The Eeyou Istchee GeoPortal (www. creegeoportal.ca/geoportal/) attracted two new project partners, the Cree Nation of Mistissini and the Niskamoon Corporation, as well as interest among other Cree communities and organizations. Hence it became important to expand the functionality of the portal to meet the developing needs of new and existing users.

A user needs assessment of the Eeyou Istchee GeoPortal was conducted with the four project partners from December 2007 to April 2008. Its goal was to identify the additional needs of COTA and CTA, as well as a full range of geospatial needs for the new partners. Consultations were held with the board of


directors of each organization and other end users, and included a web survey used primarily to reach CTA local fur officers. Though data will be shared primarily among project proponents, potential datasets were identified for sharing with a larger community of Cree organizations, the Cree public and non-Cree organizations.

Phase 2 of the project is currently underway and aims to expand the range of applications available, as well as to broaden the community of practice through information sharing and training. The results of the user needs assessment are guiding this phase and will see the development of tools for the management of trails and tourism packages for COTA, and an expansion of the range of application for CTA by publishing the harvest database. It will improve the existing project database and develop an online application system for project funding for the Niskamoon Corporation. It will also see the development of the tools necessary for resource management and knowledge transfer for the Cree Nation of Mistissini, which manages the Albanel-Temiscamie-Otish Park.

The project's four milestones are:

- Developing and providing training workshops to engage end users in the design of new components, tools and applications for the portal;
- 2. Developing the technical specifications for the system based on consultation and feedback;
- 3. Obtaining approval for the specifications and building the test application; and
- 4. Testing the application to finalize the system.

Maintaining the visibility of the portal is essential for building confidence and expanding the diversity of Cree users. This confidence and use, in turn, are fundamental for ensuring a long-term commitment to sustain the portal and the value of the geospatial data delivered through it. Strong partnerships and attention to users' needs have enabled the traditional Cree territory of Eeyou Istchee to evolve their business processes and jointly develop the portal as a community resource that uses the CGDI in a range of operations.



Candice Champagne (centre) accepting the URISA Award on behalf of GeoConnections from Catherine Baldelli, President, URISA-OC, and Tim Hu, Past President

Awards and Recognition

Nominated by the Province of Ontario, GeoConnections was chosen from among many other nominees to receive the Innovation in GIS, Gold Award, from the Urban and Regional Information Systems Association's (URISA's) Ontario Chapter. The Gold Award was presented to GeoConnections for its involvement in the CGDI Interoperability Project. The award was presented at the URISA–OC event in May 2008, an event attended by many CGDI stakeholders.

Many GeoConnections projects received attention at numerous conferences in Canada and abroad, and in industry newsletters and websites. This was especially the case for public safety applications, like the New Brunswick Emergency Measures Organization Multi-Agency Situational Awareness System, and public health applications, such as the disease surveillance and population health measures reporting tool of the Institute for Clinical Evaluative Sciences and Infection Watch Live from the Kingston, Frontenac and Lennox & Addington Public Health Unit. Infection Watch Live was mentioned in several articles in the Kingston *Whig Standard*, was the subject of a feature article in south-eastern Ontario community newspapers and received national coverage in *The Globe and Mail*.

Plans and Priorities for 2009–2010

Building on the progress and successes described in this report, GeoConnections' four functional program areas have established plans and priorities for 2009–2010.

The Content team is focused on defining the municipal boundaries data model in order to support the development of an agreement with stakeholders to create the framework data layer for municipal boundaries. This work is being undertaken in consultation with other federal departments and agencies, provincial and territorial governments and CCOG. The completion of a contract the design the municipal boundaries data model and the planning for the production of the data layer itself will mark two important milestones for this common data initiative.

Dissemination of distributed thematic content continues to be a key activity for the Content team. New agreements related to the publication of thematic data layers available through the CGDI are planned for 2009–2010. Promotion and collaborative development of data content standards are also ongoing. Communication and outreach activities will engage the team in a dialogue with users and decision makers on the benefits of using regionally integrated information from the CGDI to address a range of inter-jurisdictional issues. The Content team will produce a promotional brochure intended to raise awareness about geospatial information and the CGDI. The team will also be leading a project to produce a framework data guide and complementary workshops to promote awareness and use of framework data.

Building collaboration in the priority user communities is a priority for the User Capacity team which will continue to develop and support initiatives involving cooperation amongst multiple agencies. The team continues to create awareness of the value of geospatial information within the user communities and to support community-level capacity building activities. Further communication of project and community activities and successes, targeted both within the user communities and to external audiences, is under way.

The Standards and Architecture team, having released the beta version of the GeoConnections Discovery Portal for use by the geomatics community in late 2008, will continue to test and develop it, as well as generally support the application development community. The team has contracted a private company to update the Discovery Portal and another initiative is underway to improve the usability of the GeoBase Portal and accessibility to the GeoBase data. The team will investigate cloud computing with respect to GeoConnections' web service delivery; and the Canadian Health Infoway standards with respect to GeoConnections standards. The team is also working with the Policy Coordination and Communications team on the development and implementation of further technical and policy standards to promote interoperability.

The Policy Coordination and Communications team is developing a business case for sustaining the CGDI and exploring governance models for its continued management and ongoing collaborations.



The team is continuing to develop and promote best practices through guides and workshops, including guidelines for maintaining anonymity in geospatial data for public health applications, and a workshop on sharing sensitive environment and sustainable development data. For Aboriginal communities, the team is arranging the translation of a guidebook on making better use of geospatial information, and developing a how-to guide for implementing geographic information systems. The Policy team continues to support other teams in their completion of key program deliverables and to work on issues relating to geospatial privacy. The team is holding ongoing meetings with two privacy advisory groups, one for federal departments and the second for other stakeholders, conducting an international literature scan and analysis of policies related to geospatial privacy, and undertaking public opinion research on Canadians' expectation of privacy related to geospatial information.

Annex 1: List of Projects Funded in 2008–2009

The 75 projects listed in the following table were started during 2008–2009. Some will not be completed until after the end of the

current reporting period. Details of most completed projects can be found at www. geoconnections.org/en/aboutGeo/projects.

Table 1: List of Projects Initiated in 2008–2009

| Project Name | Thematic Area |
|---|---------------|
| Collections Online (COL) WMS Nunavut | Aboriginal |
| Développement stratégique de la géomatique pour le Conseil des Montagnais du Lac St-Jean | Aboriginal |
| GeoBC First Nations Gateway | Aboriginal |
| Geographic Information System (GIS) Workshop for First Nations in Ontario | Aboriginal |
| Geospatial Approach to Communicating Nazko First Nation Values for Land and Resource Management Decisions | Aboriginal |
| Geospatial Portal for Eeyou Istchee, Phase 2 | Aboriginal |
| Lil'wat Nation Geospatial Technology Strategy and Business Plan | Aboriginal |
| Moose II | Aboriginal |
| Next Steps Toward Implementing a First Nations Shared Information Service | Aboriginal |
| Nuu-chah-nulth Community Land and Water Planning Atlas | Aboriginal |
| Okanagan Nation Alliance Capacity Building Opportunity | Aboriginal |
| Strategy and Action Plan Development for First Nations Shared Information Services in BC | Aboriginal |
| The Traditional Knowledge Data Model | Aboriginal |
| Yukon Land Use Planning Content | Aboriginal |
| A Catalogue Service for Google Earth Enterprise | Common |

| Project Name | Thematic Area |
|--|---------------|
| Advancing the CGDI in Action | Common |
| Analysis of the International Imperatives for Canadian Geomatics | Common |
| Collaborative Stereo Mapping Over the Web | Common |
| Consolidation Report CGDI Sustainability Analysis | Common |
| CubeWerx solution for Access Control and Authentication | Common |
| Framework Data Guide | Common |
| GeoBase First Nation and Aboriginal Lands Product | Common |
| GeoSynchronization Service | Common |
| GeoWeb 2008 | Common |
| Integrated Bathymetry-Topography Digital Elevation Mapping | Common |
| Mapping Service for CGDI Resources | Common |
| Metadata Promotional Campaign | Common |
| Municipal Boundaries Data Model Design | Common |
| Open Web Services (OWS) Proxy and Catalogue (OWSPC) | Common |
| Plan for the Standardization of Five Layers of GeoBase Framework Data | Common |
| Promoting CDGI in Action | Common |
| Public Protection and Ethical Dissemination of Geospatial Data | Common |
| Researching the Impact of Mass Market Geomatics | Common |
| SensEarth Project Proposal | Common |
| Service de liaison des données géospatiales corporatives vers les applications de marketing de masse | Common |
| Service sémantique de découverte de données géospatiales | Common |
| The Impact of Web 2.0 Technology | Env/Sust-Dev |
| Arctic Seabird Colony Condition Portal | Env/Sust-Dev |

Table 1: List of Projects Initiated in 2008–2009 (continued)

| Project Name | Thematic Area |
|--|---------------|
| Best Practices Guide for Sharing Sensitive GeoSpatial Data | Env/Sust-Dev |
| CGDI Enablement of WILDSPACE | Env/Sust-Dev |
| Collaborative Land Management Portal | Env/Sust-Dev |
| Ecosystem-based Geospatial Planning Tools for Canada's Inland Sea | Env/Sust-Dev |
| Foothills Model Forest Regional Online Sustainable Land Management Atlas—User Needs Assessment | Env/Sust-Dev |
| Geospatial Data Standards Inventories for Environment and Sustainable Development and Matters of Importance to Aboriginal Communities | Env/Sust-Dev |
| Integrated Land Management to Sustain and Enhance Our Natural Infrastructure | Env/Sust-Dev |
| Modélisation des lacs en vue d'un développement judicieux du territoire | Env/Sust-Dev |
| Six Geomatics Learning Sessions to Community Organizations in the SGSL | Env/Sust-Dev |
| Yukon Land Development Decision Support Web Portal: Online Socio-economic Indicators—User Needs Assessment | Env/Sust-Dev |
| Advancing Health Geomatics Analysis Capacity for BC Researchers | Public Health |
| Community Information and Mapping System | Public Health |
| Georeferenced Air Quality Data | Public Health |
| GIS Capacity Building and User Needs Assessment Project | Public Health |
| Guidelines for Anonymizing Geospatial Data for Public Health Applications | Public Health |
| Mapping of Air Quality Health Index and Associated Health Risk Factors in Ontario | Public Health |
| Mapping the Relationships between Neighbourhoods, Poverty and Population Health | Public Health |
| Public Health Mapping for Interior Health Region | Public Health |
| Strategic Planning for Capacity Development in Public Health Geospatial Information Systems | Public Health |
| User Needs Assessment for GIS Web-enabled DSS for Animal Emergencies | Public Health |

Table 1: List of Projects Initiated in 2008–2009 (continued)

| Project Name | Thematic Area |
|---|---------------|
| User Needs Assessment for Mapping of Air Quality Health Index in Ontario | Public Health |
| Using CDGI Products and Services to Geo-enable Food Safety Information Services | Public Health |
| Vancouver Coastal Health GIS Infrastructure | Public Health |
| Canadian Profile of the Common Alerting Protocol and Related Geomatics Initiatives | Public Safety |
| CBOC—Transforming Emergency Management Through Geo-Spatial Information Exchange: A Practical Guide | Public Safety |
| Cobourg and Area Public Safety Atlas (CAPS Atlas), User Needs Assessment | Public Safety |
| Critical Infrastructure Data Module for Emergency Management System | Public Safety |
| Cross-Border Content and Services for Critical Infrastructure Identification | Public Safety |
| Decision Support System Emergency Event MapViewer (E2MV) | Public Safety |
| Emergency Management Geo-News | Public Safety |
| Inventory of Geospatial Data Standards for Public Safety and Security | Public Safety |
| New Brunswick Emergency Measures Organization Multi-Agency Situational Awareness System (MASAS) | Public Safety |
| OGC Web Services-6 | Public Safety |
| Public Safety Canada—MASAS Project Management Services 2 | Public Safety |
| Region of Peel Spill Response Decision Support System, User Needs Assessment | Public Safety |
| Situational Awareness Project NRCan EoC | Public Safety |
| User Needs Assessment for Operational Situational Information for River Ice Systems (OSIRIS) | Public Safety |

Table 1: List of Projects Initiated in 2008–2009 (continued)

Annex 2: RMAF Indicators

The table in this annex is derived from the GeoConnections Result-based Management Accountability Framework (RMAF). The data in the tables are based on projects completed by March 31, 2009, and derive from the program's project tracking software. Quality assurance of data entry to the project tracking software is ongoing, resulting in some discrepancies between numbers given in previous annual reports and numbers in this report. All reporting information for all years was recalculated for the current annual report, which information should be considered as the most up-to-date available.

Table 2: GeoConnections Performance Framework for Indicator 1 (Outputs)

Output: Federal and interprovincial infrastructure projects (national extents)9

Indicator: Number / proportion of projects completed

Annual Target / Program Target: 1 / 5

2008-2009 Results

Substantial progress was made towards establishing multi-agency systems (MASs) for the environment and sustainable development priority user community:

- GeoConnections supported Bird Studies Canada in the organization and publication of bird monitoring data through a web-based infrastructure to provide critical information on birds to users and decision makers across Canada and elsewhere.
- GeoConnections partnered with Indian and Northern Affairs Canada, the Government of the Northwest Territories and Fisheries and Oceans Canada on a web-based document and geospatial data discovery portal to share data and information generated through environmental monitoring of the Mackenzie Gas Project. The portal supports the information management requirements for the effective stewardship of the lands and resources in the Northwest Territories.
- GeoConnections partnered with Environment Canada to establish the Integrated Landscape Management Secretariat. The objective was to create a central secretariat to coordinate activities to strengthen the scientific and technical capacity for integrated landscape management across Canada through the use of the CGDI

⁹ This indicator is taken to refer to the creation of multi-agency systems (MASs) of significant regional or national scope. GeoConnections defines MASs as large, enterprise-wide or multi-agency systems that harvest, analyze, and present geospatial information from a number of distributed sources to support decision making within a specific line of national business. MASs include hardware, software applications and data resources. As components of the CGDI, MASs are based on standards and support the integration of multiple resources.

Table 2: GeoConnections Performance Framework for Indicator 1 (Outputs)

Output: Single agency infrastructure applications

Indicator: Number of projects completed

Annual Target / Program Target: 12 / 60

2008-2009 Results

A total of 28 user-capacity, single-agency-infrastructure projects were completed during the 2008–2009 fiscal year. The breakdown by user community is as follows:

- Aboriginal-7 projects
- Environment and sustainable development-5 projects
- Public health—9 projects
- Public safety—5 projects
- Common—2 projects

Output: Pre-CGDI user-readiness geomatics projects

Indicator: Number of projects completed

Annual Target / Program Target: 15 / 75

2008–2009 Results

A total of 26 capacity-building and user-needs-assessment projects were completed in the 2008–2009 fiscal year. The breakdown by user community is as follows:

- Aboriginal—5 projects
- Environment and sustainable development—4 projects
- Public health—11 projects
- Public safety—5 projects
- Common—1 project

Table 2: GeoConnections Performance Framework for Indicator 1 (Outputs)

Output: Maintained agreements for existing national framework dataset

Indicator: National completion of framework datasets

Annual Target / Program Target: 1 / 6

2008-2009 Results

GeoConnections is contributing financially to four maintenance agreements:

- Provincial and territorial maintenance pact for GeoBase National Road Network (NRNv1) (digital data transfer)
- Maintenance of the GeoBase NRNv1 (production environment and validation process of data delivered by partners)
- Digital Elevation Mapping (DEM) of Canada (south) for GeoBase
- Satellite imagery

The Canadian Digital Elevation Data (CDED) layer was completed during the 2008–2009 fiscal year. Canada Lands Administrative Boundary data on First Nation and Aboriginal Lands was converted from GeoGratis to GeoBase. Completion of other national framework datasets is ongoing.

Output: New framework datasets are integrated (Content)

Indicator: Additional datasets integrated

Annual Target / Program Target: NA / 4

2008-2009 Results

Development of new national framework datasets is a multi-year effort, with significant progress having been made during the reporting period, as follows:

- Launched a contract to develop the municipal boundaries data model. This model is in the process of being approved by the CCOG.
- An agreement was signed with Surveyor General Branch to have the First Nations and Aboriginal Lands layer available through GeoBase.
- Work continued under a multi-year agreement for \$1.2 million with GeoBase to establish Canada's first national framework data layer relating to surface water.
- Financial transfers to the provinces and territories continued under an agreement with Statistics Canada for the National Roads Network, version 2 (NRNv2).

- An agreement was signed with the Department of Fisheries and Oceans to put together a seamless land-water Digital Elevation Map.
- A land cover framework dataset is now available on GeoBase.

Table 2: GeoConnections Performance Framework for Indicator 1 (Outputs)

Output: Distributed thematic datasets closest to source available through CGDI

Indicator: Datasets available through CGDI

Annual Target / Program Target: 4 / 20

2008–2009 Results

A total of 63 new thematic datasets closest to source were integrated in 2008–2009. The breakdown by user community is as follows:

- Public health —0 dataset
- Public safety —14 datasets
- Environment and sustainable development -40 datasets
- Aboriginal -8 datasets
- Common —1 dataset

Output: Highly available core services

Indicator: Reduced frequency of failed access to Discovery and GeoBase portals

Annual Target / Program Target: Decrease of 20% / Decrease of 90

2008–2009 Results

Based on the March 2009 report, availability of the GeoBase Portal exceeded 97% during 2008–2009, except for two months when it dropped to 95.79% and 96.87%. Although exact figures are not available, uptime for the Discovery Portal (GDP) is close to 98%.

Output: Directed innovation technologies and tools

Indicator: Number / proportion of projects completed

Annual Target / Program Target: 3 / 15

2008–2009 Results

Five (5) directed innovation technologies and tools projects were completed in 2008–2009.

Table 2: GeoConnections Performance Framework for Indicator 1 (Outputs)

Output: % projects leverage including by partners

Indicator: Ratio of funds leveraged to funds invested

Annual Target / Program Target: 1 : 1

2008-2009 Results

Overall ratio: 1 to 1.76 (i.e., every dollar invested by GeoConnections resulted in \$1.76 invested by project proponents and partners, including in-kind contributions):

- User capacity: 1 to 1.59
- Content: 1 to 2.19
- Infrastructure: 1 to 1.87
- Policy: 1 to 0.84

Output: Best practices policy guides

Indicator: Number of guides produced

Annual Target / Program Target: NA / 3

2008–2009 Results

Work was initiated on best practices policy guides for the use of geospatial data for emergency management and public safety, for implementing geographic information systems (GIS) in Aboriginal communities, for maintaining anonymity in geospatial data for public health applications and for sharing sensitive geospatial data in the environment and sustainable development community.

Regional and Sectoral Funding Distributions

Program expenditures such as salaries, operations, and maintenance are excluded from the calculation of performance ratios, such as the geographic and sectoral distribution of funds. Project performance ratios are based on project expenditures only.

Data in Tables 3a, 3b and 3c are based on projects that ended by March 31, 2009. Ongoing efforts to ensure the accuracy of project reporting data have resulted in some adjustments to data reported in previous years¹⁰. To reconcile past annual reports with the present one, a break-down of funding by region and sector is provided for each year of the program so far.

The determination of regional funding is based on the postal address of funds recipients. However, the scope of a project may have an impact beyond the region noted in these funding distributions. For example, the funds received by a project proponent that has a Toronto mailing address will be shown below as part of the total funding for Ontario, even though the project may be of national scope.

Table 3a:GeoConnections Performance Framework for Indicator 2
(Regional Funding Distribution Targets)

| Distribution Target (project \$, excl. program operations) | Atlantic | Ontario | Québec | Prairies | BC & North |
|--|----------|---------|---------|----------|------------|
| Target funding | 10%-15% | 20%-40% | 10%-20% | 10%-20% | 20%-30% |
| 2005–2006 actual funding ¹¹ | 17.79% | 0% | 0% | 35.76% | 12.49% |
| 2006–2007 actual funding ¹² | 8.34% | 47.61% | 14.52% | 0% | 26.50% |
| 2007–2008 actual funding ¹³ | 8.25% | 31.45% | 16.21% | 16.17% | 21.78% |
| 2008–2009 actual funding ¹⁴ | 16.06% | 54.39% | 11.68% | 0.87% | 16.99% |
| Cumulative total to March 31, 2009 ¹⁵ | 12.61% | 33.36% | 10.60% | 13.20% | 19.44% |

¹⁰Discrepancies in reporting project data from one year to the next are generally attributable to one of the following: correction of data entry errors, including differing interpretations of how to categorize specific project characteristics (more than 30 people input data to GeoConnections project tracking software); slippage in the completion date of projects, resulting in a project being reclassified from one year into the next; and corrections to the amount of money being attributed to a project, as a result of recording actual versus estimated project costs. Except in the case of Table 3c, these year to year reporting discrepancies are minor, mostly less than one-half percent variance. However, much larger discrepancies appear in Table 3c, largely because over the past year GeoConnections staff has made a concerted effort to ensure the project proponents report all monies flowed through to the private sector, where previously some project proponents were not reporting these numbers.

¹¹One project, worth 34% (\$19,000) of total GeoConnections funding for 2005–2006 went to a contractor based outside Canada.

¹²One project, worth 3% (\$38,000) of total GeoConnections funding for 2006–2007 went to a project proponent based outside Canada.

¹³Three projects, worth 7% (\$399,780.00) of total GeoConnections funding for 2007–2008 went to a contractors based outside Canada.

¹⁴No funds recipients based outside Canada completed projects in 2008–2009.

¹⁵Between April 1, 2005, and March 31, 2009, GeoConnections funded five projects whose proponents were based outside Canada. These projects totalled 3.5% (\$456,780.00) of all project funding allocated during these four fiscal years

Table 3b:GeoConnections Performance Framework for Indicator 2
(Sectoral Funding Distribution Targets)

| Distribution Target | | Government | NGO & | International | |
|---------------------------------------|---------|------------|--------|---------------|---------------|
| program operations) | Federal | P/T | Local* | Academic | International |
| Target funding | 10%-20% | 10%-20% | 5%-10% | 10%-20% | 1%-5% |
| 2005–2006 funding distribution | 0% | 0% | 35.76% | 17.79% | 33.97% |
| 2006–2007 funding distribution | 19.16% | 17.10% | 16.80% | 14.47% | 3.04% |
| 2007–2008 funding distribution | 19.24% | 19.87% | 13.88% | 21.83% | 5.11% |
| 2008–2009 funding distribution | 22.14% | 18.56% | 19.96% | 25.82% | 0% |
| Cumulative total to March 31, 2009 | 20.45% | 18.94% | 16.97% | 22.91% | 2.75% |

Note: Table 3b excludes funds directly disbursed to the private sector. These are shown separately in Table 3c

*Funding to Local organizations includes monies contributed to projects run by municipal and Aboriginal band governments.

Funding Flowed Through to Private Sector

Project proponents are required to submit financial reports to GeoConnections, the format of which reports requires an explicit notation of funds received from GeoConnections that their projects "flow through to industry." The percentage of "flow through to industry" funds is calculated by dividing the total "flow through" dollars reported by project proponents by the total of dollars GeoConnections contributes to all projects in a given period. GeoConnections' performance targets require:

- That 20%–40% of funding directed to all projects undertaken by proponents at all levels of government (federal, provincial, territorial, and local) be flowed through to the private sector, and
- That the private sector receive 50%–60% of GeoConnections funding, either directly or from funds flowed to them from project proponents in other sectors.¹⁶ Table 3c illustrates the benefits that accrue to private industry as a result of GeoConnections funding.

¹⁶Other sectors are federal government agencies and departments; provincial and territorial agencies and departments; local government, including municipal and Aboriginal; non-governmental organizations and academia; and international organizations.

| Distribution Target (project \$, excl. program operations) | Direct to Private | G Federal | Governmer P/T | nt Local | NGO & Academic | Inter- national | Direct & Flow thro' to Private |
|---|-------------------------|--------------|------------------|-------------|-------------------|--------------------|--------------------------------------|
| Target funding | N/A | | 20%-40% | | N/A | N/A | 50%-60% |
| 2005–2006 funding | 12.49% | 0% | 0% | 0% | 0% | 100%17 | 46.45% |
| 2006–2007 funding | 29.43% | 88.55% | 77.77% | 71.43% | 57.27% | 100%18 | 83.02% |
| 2007–2008 funding | 20.07% | 62.32% | 67.38% | 67.30% | 63.86% | 90.07% | 73.34% |
| 2008–2009 funding | 13.52% | 60.66% | 54.06% | 60.86% | 40.76% | 0% | 59.66% |
| Cumulative total to March 31, 2009 | 17.98% | 63.82% | 62.41% | 63.69% | 51.60% | 91.62% | 68.00% |

Table 3c:GeoConnections Funding by Sector Flowed Through to
Private Sector

 $^{^{17}}$ This figure represents a single international project (ID#5016) that was let as a sole source contract to OGC Inc. The 2007-2008 AR reported this amount as N/A because dollars flowed through to the private sector had not been indicated in the project tracking software.

¹⁸This figure represents a single international project (ID#5015) that was let as a sole source contract to OGC Inc. The 2007-2008 AR reported this amount as N/A because dollars flowed through to the private sector had not been indicated in the project tracking software.

Annex 3: Evaluation via Program and Project Analysis

The data in Table 4 are based on projects commenced after March 31, 2008. The functional program area responsible for delivering each outcome is noted in parentheses after the description of the outcome.

Table 4: Evaluation via Program and Project Analysis

| Outcome | | 2008–2009 Results | Cumulative Progress |
|---------|---|---|---|
| 2. | New CGDI systems, portals and applications build awareness in decision- makers and other end-users of the benefits of the CGDI (User Capacity) | Twenty (20) new portals or systems resulted from the 75 projects that commenced during 2008–2009. | One hundred and three (103) new portals or systems resulted from the 237 projects that have been started since the beginning of GeoConnections, Phase II. |
| 4. | Increased awareness by data producing agencies of standard user centric design methodologies and user data requirements (Content) | Sixty (60) of the projects started during this reporting period explicitly incorporated standard user-centred design features. Compared to results from the previous reporting period, this represents an increase from 63% of projects to 80% of funded projects that were user driven. | One hundred and seventy- six (77%) of the 229 projects funded during this phase of GeoConnections explicitly incorporated standard user- centred design features. |
| 7. | Users are able to use processes to produce data that is derived from other scales or sources (Content) | Twenty-two (22) new guides or technical documents were produced by project proponents of projects whose funding commenced during this reporting period. In other words, 29 % of projects undertaken this year produced guides, compared to fewer than 22% of the projects funded during 2007–2008. | A total of 64 new guides or technical documents were produced by all project proponents of projects whose funding commenced prior to the end of the current reporting period. In other words, 28% of projects undertaken so far during GeoConnections II have produced a new guide or technical document. |

| Outcome | 2008–2009 Results | Cumulative Progress |
|--|---|---|
| 8. Users aware of / are able to use reusable, current and relevant data (Content) | The projects commenced during 2008–2009 resulted in 14 new data sets being integrated into CGDI- linked systems. The more strategic approach taken during this reporting year resulted in more emphasis on discovering data gaps and integrating existing data sets, rather than adding new ones. | Eighty-three (83) of the projects funded so far in this phase of GeoConnections have made their datasets available through the CGDI. In total GeoConnections funded publication of 456 new datasets, of which 227 are available through the CGDI. |
| Users recognize the value of regionally integrated information in addressing numerous inter- jurisdictional issues using the CGDI¹⁹ (Content) | Two projects contributing to new regional atlases were commenced during the reporting period, one was completed and several data integration studies were undertaken. | Thirty-nine (39) projects of federal-interprovincial extent, contributing to eleven (11) regional atlas projects have been funded since the start of GeoConnections II. |
| 17. Priority user communities are using relevant, authoritative geospatial data in operational CGDI systems from closest point to source (Content) | Twenty-one (21) of the projects initiated during 2008–2009 created closest-to-source datasets. | Of the 229 projects that commenced between April 1, 2005, and March 31, 2009, 75 created closest-to-source datasets. |
| Multiple CGDI operational systems access common regionally integrated information, reducing duplication and improving user effectiveness (Content) | The three new regional atlas projects completed during the reporting period resulted in five (5) new datasets being integrated into the CGDI. | The 11 regional atlas projects funded so far contributed a total of 96 new datasets that are now integrated into the CGDI. |

Table 4: Evaluation via Program and Project Analysis

¹⁹This measure relates to the creation of new "regional atlases." GeoConnections defines a regional atlas as a body of integrated information, built by multiple stakeholders, directed by the needs of a fully engaged user community, covering a user-defined, continuous piece of geography that feeds public awareness processes and that communicates issues and solutions with rich, contextual information that is relevant to many users of diverse background.

Annex 4: Survey Results

GeoConnections conducted an online survey of potential and actual stakeholders in the four priority user communities and four priority sectors, as reported in Section called "Summary of User Survey" above.

List of Potential Respondents

GeoConnections used detailed criteria to compile a list of potential respondents to the survey. The criteria identified organizations within the priority user communities that could benefit from geomatics data. The organizations were taken from four sectors: federal government; provincial, territorial and municipal governments; academia; and the private sector. Internet research was performed using online federal, provincial, territorial and municipal directories, and academic and industry association lists. Since the goal was, as much as possible, to draw on organizations that had not received GeoConnections funding, the lists of GeoConnections proponents were only used after other sources had been exhausted. An attempt was also made to ensure that the list of respondents was geographically representative.

Within each organization, an individual was identified who would have the experience and authority to respond to the questionnaire. A final criterion was that a valid e-mail address be available for the individual.

The table below provides the number of potential respondents who were contacted within each priority user community or priority sector.

| Community or Sector | Number |
|---|--------|
| Federal Government | 128 |
| Provincial, Territorial or Municipal Government | 112 |
| Academic and Non-governmental Organizations | 108 |
| Private Sector | 102 |
| Public Health | 89 |
| Public Safety and Security | 89 |
| Environment and Sustainable Development | 126 |
| Matters of Importance to Aboriginal Communities | 108 |
| Total | 862 |

Table 1: Potential Respondents by Community or Sector

Overall Results

Invitations to participate were sent via e-mail to 862 potential or actual stakeholders, all of whom are involved with geospatial data. Undeliverable e-mails were returned by 87 e-mail addresses and completed responses numbered 165. This response rate of 21% is high for such surveys and indicates the importance attached to GeoConnections by stakeholders. The survey provides quantitative data to establish the success of GeoConnections in meeting the outcomes in its logic model, as identified in the following summary of the overall results. The margin of error on the estimates for the overall sample is plus or minus 8%, 95 times out of a hundred.

Logic Model Immediate Outcome 3: Users are aware of and prepared to leverage the CGDI.

Among those who responded to the survey, 70% had heard of GeoConnections and the Canadian Geospatial Data Infrastructure (CGDI), and 42% were very familiar and 34% were somewhat familiar with GeoConnections and the CGDI. These figures are particularly important in that an effort was made to reach beyond organizations known to be GeoConnections stakeholders. Of those who reported on how they gain access to information through the CGDI, 56% gain access through a federal government portal, 23% through a provincial or territorial portal, and 8% through a portal run by a non-governmental organization (NGO).

Among users of GeoConnections or the CGDI, 48% use these services to access portals such as the GeoConnections Discovery Portal, GeoBase, GeoGratis, and the Atlas of Canada. Another 47% use it to access geospatial data, maps and imagery and 30% to share geospatial data, maps and imagery. Some respondents (33%) use GeoConnections to access CGDI-endorsed standards and guidance documents and 27% to find best practice guides and policy advice. A smaller group (25%) uses it to find geospatial services and 13% to use tools to disseminate their own geospatial information.²⁰

Logic Model Immediate Outcome 9: Users are aware of the value of integrating regional information in provincial/territorial and national information systems.

Users appear to get their data mainly from federal, provincial and territorial sources. When asked what scale of geographic coverage users usually require for geospatial information, the largest percentage of users answered the regional (30%) or provincial (25%) level. Fewer required information at the national (16%), municipal (12%), international (11%) or interprovincial (7%) levels. These results suggest that users may be integrating regional with provincial data, but not necessarily with national data.

Organizations that use geomatic data get their information from the following sources: the federal government (77%), provincial or territorial governments (76%), internally (67%), regional or municipal governments (60%), the geomatics industry (55%), mass market sources like Google (51%), not-for-profit organizations (30%) or international governments (23%).²¹

 $^{^{\}rm 20}$ Percentages add up to more than 100% because respondents could endorse multiple responses.

²¹ Percentages add up to more than 100% because respondents could endorse multiple responses.

Logic Model Immediate Outcome 14: Stakeholders are aware of key decision/ business areas where the CGDI can benefit them, key policy/cultural barriers to its uptake and potential approaches to overcoming these barriers.

Of the respondents to the survey, 86% reported that they share geospatial data either internally or externally. Of the few that did not share data, the reasons given were, in order of frequency, privacy and confidentiality, licensing and ownership, political or liability issues, standardization, and the inability to recover costs. A number of respondents said that their organizations simply do not have data to share. Two-thirds of respondents said that their organizations were sharing geospatial information with other organizations more frequently than they were five years ago. Only 3% who answered this question were sharing data less frequently.

When asked to explain what barriers exist to prevent their organization gaining access to geospatial information, the most frequent reasons cited had to do with cost, usually the expense associated with using data that had to be licensed. A related barrier was technical incapacity, either because the necessary software is too expensive or because staff members did not have the required training. Difficulties with the data itself were also a barrier for some respondents, either because the available data did not meet their needs or because the data did not conform to the standards they required. Only a few respondents answered that they did not know how geospatial data could be useful to them.

Not surprisingly, the most frequent option cited to overcome barriers is more funding or, alternatively, more agencies making their data available without cost. More training and experience were also mentioned as ways to overcome barriers. Some participants pointed out that data standards should be leveraged further to make data useful to more organizations.

Logic Model Intermediate Outcome 16: Priority user communities have increased their capacity to use the CGDI to meet their decisionmaking requirements.

On the evidence of the survey, expenditures on and the use of geospatial data to meet decisionmaking requirements has been steadily increasing over the past five years. On average, respondents reported that 36% of their organizations' budgets were devoted to activities involving geomatics. Just over half of the respondents (51%) said that their geomatics budget had increased in the last five years and 19% reported that it had decreased. The budgets of the remaining 31% had stayed the same.

Increased geomatics budgets have accompanied an increased use of geomatics data by 72% of respondents. This trend from the previous five years is likely to continue into the near future. Among respondents to the survey, 73% reported that they expect their organizations to use geospatial data more frequently in the next five years. A further 26% said that their organizations anticipate using geospatial information with about the same frequency over the next five years and only one respondent among the 148 who answered this question said that his or her organization anticipates using geospatial information less frequently.

Logic Model Immediate Outcome 20: As benefits outweigh costs, organizations transform businesses processes, including policies and culture to adopt the CGDI.

Despite the thorough penetration of geospatial information within the organizations surveyed, the amount of time spent per week searching for geospatial information was relatively low. Over half of respondents said that staff members at their organizations spend less than five hours a week searching for information and 23% spend five to ten hours. Perhaps surprisingly, 10% reported that employees spend over 35 hours a week searching for geospatial information. The relatively low amount of time spent searching for geospatial information suggests that the respondent organizations have identified their sources of information and do not have to spend time looking for it.

Staff at the respondent organizations spent much more time using geospatial information relative to searching for it. Nearly one third of respondents (32%) said that staff members spend over 35 hours a week using geospatial data. At the other end of the scale, 28% of respondents reported that employees spent less than five hours using this data. A majority fell in between, with 12% spending five to ten hours, 12% spending 10 to 20 hours and 16% spending 20 to 35 hours. These findings indicate that the use of geospatial information has been thoroughly integrated into the business processes of the responding organizations.

The frequency with which respondent organizations use GeoConnections and the CGDI to access geospatial data or services was not high. Only 6% reported using it daily, 19% use it weekly, 29% monthly and 46% less than once a month. The phrasing of the question may have had an affect on the responses. Respondents may not have understood that "geospatial information or services" included data, maps and imagery. They may also not have been aware that some of the services they use are supported by the CGDI.

A healthy 72% of respondents reported that their organizations use geospatial information more frequently now than they did five years ago, 26% say they are using geomatics information about the same and only 3% are using it less. When asked what the main driver is behind the increase or decrease in the use of geospatial information for their organization, the most frequently cited drivers were accessibility of data (56%), organizational capacity to use geospatial data (54%) and changes in business processes (34%). Cost of data and the implementation of standards were both cited by 23% of respondents. Taken together, the answers to these two questions suggest that the increasing accessibility of data and organizational changes among user communities have combined to increase the use of geomatics data by decision makers. Organizations are transforming their businesses to include the use of geospatial information.

Results by Sector and User Community

Survey respondents were asked to identify the sector to which their organization belonged and their organization's main area of focus. The following

tables show the results for these two questions compared to the invitations to participate that were sent to organizations by sector and user community.

Table 2: Responses by Sector

| Sector | Invited | Received |
|---|---------|----------|
| Federal Government | 128 | 30 |
| Provincial, Territorial or Municipal Government | 112 | 67 |
| Academic and Non-governmental Organizations | 108 | 35 |
| Private Sector | 102 | 33 |
| Total | 450 | 165 |

Table 3: Responses by User Community

| Sector | Invited | Received |
|---|---------|----------|
| Public Health | 89 | 21 |
| Public Safety and Security | 89 | 23 |
| Environmental and Sustainable Development | 126 | 44 |
| Matters of Importance to Aboriginal Communities | 108 | 14 |
| Other | 0 | 55 |
| Total | 412 | 157 |

On the basis of respondents' self-identification of their sector, respondents in provincial, territorial and municipal government were the most likely to respond to the survey by a factor of two to one over other sectors. According to user community, respondents in the environmental and sustainable development field were most likely to respond, again at least double the other three user communities. Respondents dealing with matters of importance to Aboriginal communities were least likely to respond. Under Other, there was a miscellaneous group, the largest component of which was made up of systems developers. Because of the small samples sizes by sector and user community, results should be interpreted with caution and may not be reliable.

Logic Model Immediate Outcome 3: Users are aware of and prepared to leverage the CGDI.

Within sectors, awareness of GeoConnections was greatest within the academic sector, with 81% of academic respondents stating that they had heard of the program prior to receiving the survey. The NGO sector was next in awareness, registering at 78%. Respondents from federal, provincial, territorial, municipal and Aboriginal governments and industry respondents registered levels of awareness between 67% and 69%.

Beyond simply having heard of GeoConnections, the NGO sector respondents reported the highest level of awareness of GeoConnections according to sector, 60% saying they were very familiar with the program, while 54% of academics reported the same. 44% of Aboriginal government respondents were somewhat familiar with GeoConnections and 25% very familiar. For the federal, provincial, territorial and municipal government respondents, 39% were very familiar and 36% somewhat familiar. The highest level of respondents saying they were not very familiar was with Aboriginal governments (19%, representing only two respondents).

Awareness of GeoConnections according to the focus of an organization was greatest for those in the environment and sustainable development community, 83% of respondents with this focus saying that they had heard of the program. Public health practitioners followed closely, with 79% of them reporting familiarity with the program. Nearly three quarters of Aboriginal respondents had heard of GeoConnections, but only 50% of public safety and security respondents had.

The academic sector was most likely to report using federal government portal to access the CGDI (71%). At 44% each, Aboriginal governments and NGOs were least likely to use a federal portal.

Analyzing the results by focus shows that most organizations among the priority user communities tend to use federal government portals to access the CGDI (55% to 69%). The exception is the public safety and security community, although only 11 of 24 respondents who identified themselves as belonging to this community answered this question. According to survey results, provincial, territorial and NGO portals are not used to any significant extent by any sector or user community, with the exception of the environmental community, a third of which said they used provincial or territorial government portals.

Members of the environmental and sustainable development and Aboriginal communities were more likely to use GeoConnections and the CGDI to share (41% and 40%) and use (64% and 60%) geospatial data, maps and imagery. Members of the public safety and security community were the least likely to use these services to gain access to other geospatial portals (17%), while 64% of the environmental and 61% of the public health communities did so. Members of the environmental community were also the most likely to use the services to access CGDI-endorsed standards and guidance documents (41%). GeoConnections and the CGDI are not heavily used by any user community to find geospatial services or use tools to disseminate their own geospatial information.

All sectors confirm the overall emphasis of going to GeoConnections and the CGDI to use geospatial data or access geospatial portals. Slightly more academics use it for the former (57%) and slightly more NGOs use it for the latter (56%). No sector uses these services heavily to find geospatial services or use tools to disseminate geospatial information. The range across sectors for those using GeoConnections and the CGDI to share geospatial data is from 27% (private sector) to 31% (both the Aboriginal government and NGO sectors). Few respondents in any sector reported using them to find best practice guides, with the exception of the private sector (40%). From 31% of NGO respondents to 36% of non-Aboriginal government respondents look for CGDI-endorsed standards and guidance documents, although only 13% of Aboriginal government respondents do so.

Logic Model Immediate Outcome 9: Users are aware of the value of integrating regional information in provincial/territorial and national information systems.

According to sector, Aboriginal governments reported the highest interest in regional geospatial data (56%) and NGOs the next highest (41%). The same percentage of NGOs reported an interest in provincial data, as did 31% of Aboriginal respondents. Three out of ten respondents from federal, provincial, territorial and municipal governments were interested in regional data and 26% in provincial data. There were not an important number of respondents according to sector to report an interest in interprovincial, national or international data, with the exception of the academic and private sectors. One quarter of academics said they were interested in national and international data, while 21% of industry participants reported an interest in national data and 39% in international data.

Analyzed according to user community, public health practitioners and those working with matters of importance to Aboriginal communities were most likely to require geospatial information on a regional scale, 47% and 50%, respectively. Among environmental and sustainable development respondents, 30% were interested in regional data and 28% in provincial data. Public safety practitioners showed little interest in municipal or regional data (9% each) and a greater interest than any other user community in provincial data (36%). The academic and industry sectors were the only ones to report using international government sources of data, with 50% and 44%, respectively, of respondents from these sectors. However, 94% of academics and 78% of industry respondents also used federal government sources. Between 73% and 78% of respondents from other sectors used federal sources. The numbers reporting use of provincial government sources were slightly lower, on average, with 63% of Aboriginal government respondents using provincial data, up to a high of 79% of respondents from federal, provincial, territorial and municipal governments. Slightly more than half of respondents from all sectors used regional or municipal government sources, with the exception of respondents from the NGO (72%) and academic (69%) sectors. Academic and private sector respondents reported using massmarket sources more than other sectors (76% and 69%, respectively), while less than half of respondents from other sectors used mass-market sources. Roughly half of respondents from all sectors reported using geomatics industry data, with the exception of Aboriginal governments (38%) on the one hand and the private sector (69%) on the other. Approximately half of respondents from the NGO, academic and private sectors used data collected internally, while threequarters of government respondents did so. Few respondents reported using NGO data.

The environment and sustainable development user community was most likely to get their geomatics data from provincial or territorial governments (93%) or the federal government (90%). The environmental community was also the most likely to say they collected their geomatics data internally (76%) and was the only community to express significant interest in international data (28%). Respondents from the environmental community also showed the highest interest in NGO data (43%) and geomatics industry data (63%). Between 64% to 70% of respondents from other communities report that they collected data internally. While government sources were the most popular for all groups, the next highest rating after environmental groups was by those working in Aboriginal issues, 80% of whom got their geomatics data from the federal government. Most communities expressed less interest in mass-market geomatic sources (under 50%), with the exception of the public safety community (60%). All groups remained close to the average 60% in their interest in regional and municipal government data.

Logic Model Immediate Outcome 14: Stakeholders are aware of key decision/business areas where the CGDI can benefit them, key policy/cultural barriers to its uptake and potential approaches to overcoming these barriers.

A majority of respondents from most sectors reported that they were sharing data more frequently, from 63% for Aboriginal governments to 72% for the private sector, with the exception of academia, only 36% of the respondents from which said they were sharing data more frequently. The remaining respondents from the academic sector said they were sharing data with about the same frequency. Only a few respondents from federal, provincial, territorial and municipal governments (4%) and from the NGO sector (8%) said they were sharing data less frequently.

A majority of respondents from all user communities reported that they were sharing data more frequently, from 60% for the public health community to 72% for the environmental and public safety communities. A few respondents from the environmental community (8%) and the public health community (7%) said they were sharing data less frequently. Logic Model Intermediate Outcome 16: Priority user communities have increased their capacity to use the CGDI to meet their decisionmaking requirements.

Among sectors, 65% of industry respondents, 59% of NGO respondents and 50% of federal, provincial, territorial and municipal government respondents reported that their geomatics budget had increased in the past five years. Respondents from Aboriginal governments were most likely to say that their budgets had decreased (33%), followed by 29% of academics. By user community, 42% of Aboriginal respondents reported a budget decrease, higher than any other user community. Budget increases were reported by 78% of the public health community, 60% of the environment and sustainable development community and 54% of the public safety community.

An increase in the frequency with which geomatics data was used over the past five years was reported by the highest number of NGO (80%) and federal, provincial, territorial and municipal government respondents (77%), followed by 71% of private sector respondents, 56% of Aboriginal government respondents and 50% of academic respondents. A handful of Aboriginal, NGO and academic respondents reported using geomatics data less often than five years ago.

The public safety (83%) and public health (81%) user communities were the most likely to report an increase in the frequency with which they used geomatics data, followed by the environmental (72%) and Aboriginal (55%) communities. Once again, a handful of Aboriginal, environmental and public safety respondents said they used geomatics data less frequently.

The NGO sector was the most likely to predict an increase in the use of geomatics data over the next five years (88%), followed by federal, provincial,

territorial and municipal governments (78%), the private sector (68%), Aboriginal governments (63%) and academia (50%). According to user communities, the public safety (91%) and public health (72%) communities were most likely to predict increased use over the next five years, followed by the environmental (72%) and Aboriginal (55%) user communities. Only four respondents across all sectors and user communities predicted less use of geomatics data over the next five years.

Logic Model Immediate Outcome 20: As benefits outweigh costs, organizations transform businesses processes, including policies and culture to adopt the CGDI.

Over half of respondents in all sectors reported searching for geomatics data for less than five hours a week, with the exception of academics who were more likely to search for longer periods of time. 11% of federal, provincial, territorial and municipal government respondents spent over 35 hours a week searching for data, and a few respondents among the NGO, academic and industry sectors reported the same levels for searching. Respondents from public safety organizations were the least likely to report that they spent five hours a week or less searching for data (38%) and the most likely to say that they spent between 20 to 35 hours (13%) or over 35 hours a week (17%). Most organizations dealing with matters of interest to Aboriginal communities (70%) spent less than five hours per week.

In terms of use, roughly half of Aboriginal government respondents (50%) and NGO respondents (47%) spent less than five hours a week using geomatics data. Aboriginal government respondents were less likely than all other groups to spend more than 10 hours a week. At the other end of the usage scale, 38% of federal, provincial, territorial and municipal government respondents spent over 35 hours a week using geospatial data, as did 38% of academics and 33% of private sector respondents. Among user communities, those concerned with matters of interest to Aboriginal communities rated their usage of geospatial data along the same lines as the Aboriginal government sector. Public safety practitioners were more likely to spend five hours a week or less using data (46%), although 29% reported spending more than 35 hours. Usage among other user communities was evenly spread with the exception of the environmental community, 45% of which reported spending more than 35 hours a week and the public health community, 33% of which reported the same.

Despite the time spent weekly using geospatial data, only a small percentage of respondents from any sector said they use the GeoConnections website or the CGDI daily. Private sector (42%) and federal, provincial, territorial and municipal government respondents (18%) said they use them weekly, although 28% of the latter said they use them monthly and 51% less than once a month. NGOs (46%) use them monthly and the same number of NGO respondents reported using them less than once a month. Academics (36%) use them monthly and the same number less than once a month. 73% of Aboriginal respondents use them less than once a month.

Similar results are revealed by an analysis of the responses according to user community. Two thirds of the public safety and Aboriginal user groups said they use the GeoConnections web site or the CGDI less than once a month, as did 47% of environmental group respondents and 40% with public health. Public health groups (53%) use them monthly and 35% of environmental groups report doing so as well. The low numbers for frequency of use of the CGDI may be accounted for partly by a lack of awareness of how much the CGDI is involved in geomatics data delivery in Canada.

Cost was not a significant factor in determining the use of geospatial information, except for Aboriginal governments, 38% of which said that it was. Accessibility of data was important to 64% of federal, provincial, territorial and municipal government respondents, and 57% and 50%, respectively, of private sector and academic respondents. Organizational capacity to use geospatial data was an important barrier to 64% of federal, provincial, territorial and municipal government, 69% of NGO and 44% of aboriginal respondents. Changes in business process were a significant driver for 41% of federal, provincial, territorial and municipal government and 40% of private sector respondents.

In terms of user communities, again users who focus on matters of interest to the Aboriginal community were the only respondents who said that cost was a barrier to their use of geomatics data (40%). Accessibility of data was important particularly to public safety (71%) and environmental users (67%). Approximately half of all users said that organizational capacity to use geospatial data was a driver, with the exception of public health practitioners, 83% of whom said it was important.

Annex 5: 2008–2009 Financial Reports

| Amounts in Thousands of Dollars | Year 1 2005-2006 | Year 2 2006-2007 | Year 3 2007-2008 | Year 4 2008–2009 | Year 5 2009-2010 | Year 6 2010-2011 Extension ²² | Total |
|--|---------------------|---------------------|---------------------|---------------------|---------------------|--|--------------------|
| Approved by Treasury Board Secretariat. | \$11,000.00 | \$12,000.00 | \$12,000.00 | \$12,000.00 | \$13,000.00 | - | \$60,000.00 |
| Reprofile from Year 1 | (\$7,900.00) | \$1,500.00 | \$2,500.00 | \$3,500.00 | \$0.00 | - | |
| Adjustment ²³ | \$0.00 | \$0.00 | \$42.00 | \$0.00 | \$0.00 | - | |
| Budget after re-profiling Year 1 | \$3,100.00 | \$13,500.00 | \$14,542.00 | \$15,500.00 | \$13,000.00 | - | |
| Reprofile from Year 2 | - | (\$6,400.00) | \$1,300.00 | \$2,500.00 | \$2,600.00 | - | |
| Budget after re-profiling Year 2 | \$3,100.00 | \$7,100.00 | \$15,842.00 | \$18,000.00 | \$15,600.00 | - | |
| Reprofile from Year 4 ²⁴ | - | - | - | (\$3,280.00) | (\$3,300.00) | \$5,880.00 | |
| Employee Benefits & Pension (20%) | (\$165.70) | (\$169.40) | (\$172.80) | (\$182.10) | (\$182.40) | \$0.00 | |
| Actual Budget | \$2,934.30 | \$6,930.60 | \$15,669.20 | \$14,537.90 | \$12,117.60 | \$5,880.00 | |
| Actual Spending (Year to date) ²⁵ | \$2,878.70 | \$6,806.80 | \$14,167.20 | \$13,454.00 | \$3,486.00 | - | |
| Lapses | \$387.00 | \$123.80 | \$1,502.00 | \$1,083.90 | - | - | |

²²Program extension year approved by Treasury Board.

²³Adjustment can include carry-forward from previous years, loans, or money transfers for GeoConnections to administer.

²⁴Difference of \$700K will be allocated to Year 2011–2012.

²⁵As of November 2009

Budget 2008–2009

| | User Capacity | Content | Infrastructure & Architecture | Policy | Secretariat | Total |
|------------------------|---------------|-------------|----------------------------------|-------------|-------------|--------------|
| O&M (Operations) | \$1,199,846 | \$2,189,056 | \$1,880,720 | \$623,000 | \$2,367,144 | \$8,259,766 |
| Grants & Contributions | \$3,591,516 | \$1,238,139 | \$115,000 | \$340,644 | \$0 | \$5,285,299 |
| Salary | \$ 0 | \$ 0 | \$O | \$ 0 | \$992,835 | \$992,835 |
| Total | \$4,791,362 | \$3,427,195 | \$1,995,720 | \$963,644 | \$3,386,979 | \$14,537,900 |

Expenditures 2008–2009

| | User Capacity | Content | Infrastructure & Architecture | Policy | Secretariat | Total |
|------------------------|---------------|-------------|----------------------------------|------------|-------------|--------------|
| O&M (Operations) | \$633,660 | \$1,770,860 | \$1,296,083 | \$317,730 | \$355,092 | \$4,373,425 |
| Lapses, Taxes & Losses | \$0 | \$0 | \$0 | \$0 | \$1,857,514 | \$1,857,514 |
| Grants & Contributions | \$2,643,162 | \$737,855 | \$51,961 | \$ 418,906 | \$0 | \$3,851,884 |
| Salary | \$0 | \$ 0 | \$ 0 | \$0 | \$3,371,177 | \$3,371,177 |
| Total | \$3,276,822 | \$2,508,715 | \$1,348,044 | \$736,636 | \$5,583,783 | \$13,454,000 |

Annex 6: Program Logic Model



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Annex 7: Acronym Look-up Table

| ACZISC | Atlantic Coastal Zone Information Steering Committee |
|--------------|--|
| CGDI | Canadian Geospatial Data Infrastructure |
| CCOG | Canadian Council on Geomatics |
| CGDI | Canadian Geospatial Data Infrastructure |
| COINAtlantic | Coastal and Ocean Information Network Atlantic |
| СОТА | Cree Outfitting and Tourism Association |
| СТА | Cree Trappers Association |
| DEM | Digital elevation mapping |
| EDSS | Emergency Department Syndromic Surveillance |
| ЕМО | Emergency Measures Organization (New Brunswick) |
| ESS | Earth Sciences Sector |
| F/P/T | federal/provincial/territorial |
| GDP | GeoConnections Discovery Portal |
| IACG | Inter-Agency Committee on Geomatics |
| ICES | Institute for Clinical Evaluative Sciences |
| LHIN | Local Health Integration Network |
| MAS | Multi-Agency System |
| MASAS | Multi-Agency Situational Awareness System |
| NGO | non-governmental organization |
| NIDM | National Infrastructure Data Model |
| NRCan | Natural Resources Canada |
| NRN | National Road Network |
| OGC | Open Geospatial Consortium, Inc. |
| РНАС | Public Health Agency of Canada |
| RMAF | Results-based Management Accountability Framework |
| UNA | User Needs Assessment |
| WFS | Web Feature Service |
| WMS | Web Map Service |

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