

# The GSDNR Communicator

*The Geomatics for the Sustainable Development of Natural Resources (GSDNR) Program's Newsletter*



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Since its inception, the GSDNR program has invested considerable time and effort in establishing projects that meet the needs of geospatial information users. GSDNR's portfolio of projects was developed following consultations with organizations involved in natural resource management.

Once the program and its projects were underway, we felt the need to further examine the relevance of basic geospatial information for natural resource management. Thus, over the past few months an impact assessment of the program's products and activities was undertaken. Information received through this exercise is not only enabling the program to make adjustments to various projects but is also spurring the evolution of the program to better align it with user needs and government priorities.

Much work still needs to be done with respect to impact assessment, but results to date look promising. It is in this context that the current edition of The GSDNR Communicator offers you some interesting examples of the applications of products and services produced by the program. As our impact assessment progresses, we will be able to provide a more detailed picture of the importance of GSDNR's information to ensure the sound management of Canada's natural resources.

Enjoy your reading!

**Éric Loubier**

Program Manager, GSDNR

## Outreach at GSDNR

The GSDNR program has recently re-designed its website to make geomatic information related to the sustainable development of natural resources more accessible to institutional decision makers at the federal, provincial, and regional level. As part of a major outreach initiative, the revised site is designed to help decision makers make more informed choices about the natural resources they manage.

## New faces and places at GSDNR

The GSDNR program has recently undergone a few changes. Specifically, the Geographical Names project has been divided into two projects to distinguish between the secretariat and the applications roles. **Kathleen O'Brien** will therefore lead the Geographical Names Board of Canada (GNBC) Secretariat project, while **André Mainville** will lead the GeoNames - Applications project. The GeoBase - Altimetry and Hydrography project has also been split into two separate projects. The National Elevation Data project will remain under the direction of **Gilles Auger**, while the National Hydro Network project is now being led by **Yves Belzile**, formerly a CIT-Sherbrooke director.

**Paul Jolicoeur**, a new face in GSDNR, will coordinate all data production partnerships for the various GSDNR projects. Regrettably, **Barbara MacIntosh** will leave the GSDNR program to replace Hocine Abid at the National Air Photo Library in the Canada Map Office.

For more information on who's who in GSDNR, please visit our web site at:

[gsdnr.nrcan.gc.ca](http://gsdnr.nrcan.gc.ca)



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## DEMs for Sustainable Forest Management

**F**orests make up a significant part of Canada's economy and play an important role in our social and environmental heritage. Without them, Canada would not be the prosperous and biologically diverse nation that it is today. The sustainable management of Canada's forests is key to ensuring the continuation of this prosperity and diversity.

NRCan's GSDNR program is contributing to the sustainable management of Canada's forests in collaboration with the Canadian Forestry Service (CFS) through its national 1:50 000 scale digital elevation model (DEM) project.

This project evolved from the success of the 1:250 000 DEM, which was the first regular grid DEM model for Canada and which contributed to a national hydrologically corrected and connected stream and river network. Because climate and topography (elevation) are the primary environmental drivers for forest productivity and species diversity, the CFS needed this DEM to better spatially model the influence of climate on terrain attributes for further forest research and analyses.

The 1:250 000 DEM is now available on GeoBase. ([geobase.ca](http://geobase.ca))

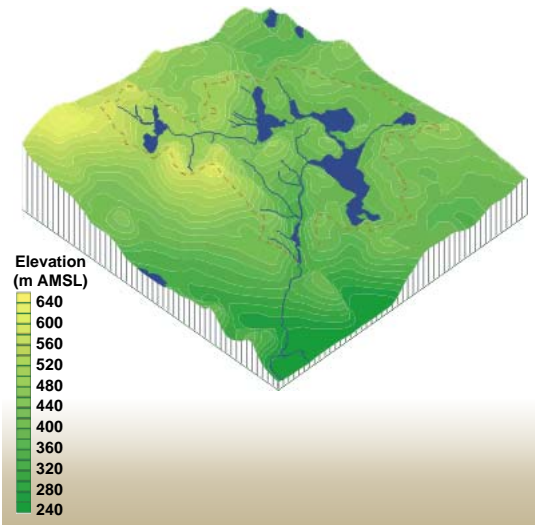
Although this model was a huge success, the CFS needed higher resolution DEMs so as to more closely examine various terrain attributes, their influence on the movement of soil and nutrients, and the resulting effect on forest, plant, and wildlife productivity and distribution.

The 1:50K DEM model provides information on the relationships between solar radiation, topography, and the production of crops and trees. This will in turn enable more accurate mapping of soil properties, moisture regimes and salinity.

This more detailed DEM will also be used to model species diversity, species at risk, and afforestation as part of Canada's Kyoto commitments.

The CFS will use the 1:50 000 DEM to meet government S&T priorities for sustainable forest management.

The majority of CFS' terrain analysis efforts are located at the Turkey Lakes Watershed, a research study area north of Sault Ste. Marie. For more information on how the CFS is currently using DEMs for terrain analysis, please see the Turkey Lakes website at: [www.tlws.ca/index2.shtml](http://www.tlws.ca/index2.shtml)



### GSDNR's DEMs, Kyoto, and Afforestation


A sample project that links the biology and economics of the afforestation of marginal agricultural lands in Canada for the purposes of carbon sequestration is already underway at the Great Lakes Forestry Centre. This project is part of the Feasibility Assessment of Afforestation for Carbon Sequestration program, which examines options to support Canada's position on Kyoto. The aim of the project is to develop a spatially explicit cost/benefit information system that includes wood production and below- and above-ground carbon sequestration. The system would also calculate "break-even carbon prices" that are inclusive of an opportunity cost for agricultural production values.

Fine-scaled terrain analyses from the 1:50K DEM project will be part of this research as the DEM project evolves.

For more information on this project visit: [www.glfcc.forestry.ca/landscape/feasibility\\_e.html](http://www.glfcc.forestry.ca/landscape/feasibility_e.html)

# National Atlas Frameworks Project Releases North American Database and Map





## National Atlas Frameworks and the CEC

The CEC recently underwent a ten-year review in which it was recommended that the organization continue to examine the key issues related to ecologically sustainable development in North America, notably in the areas of energy and water management and the conservation of biodiversity. There is therefore the opportunity for the National Atlas Frameworks, in collaboration with the USGS and INEGI, to help the CEC present these issues to the public in the form of harmonized electronic maps that can be made available on the Internet.

For more information concerning the CEC's review, visit:  
[http://www.cec.org/pubs\\_docs/documents/index.cfm?varlan=english&ID=1522](http://www.cec.org/pubs_docs/documents/index.cfm?varlan=english&ID=1522)

In June 2004, GSDNR's National Atlas Frameworks project saw the release of the first harmonized map of North America. The project worked in collaboration with the **Atlas of Canada**, the **Atlas of the United States** and the **National Institute of Statistics, Geography, and Informatics (INEGI)** of Mexico.

The harmonization project consisted of two components - the creation of eight harmonized frameworks at the scale of 1:1M, and the distribution of these frameworks to end users in hard copy and electronic format.

The harmonisation of the North American map refers to the accurate geometric fit and uniform taxonomy of geometric attributes of the map across national boundaries. In other words, geographical features such as coastlines, rivers, and roads are contiguous from one country to the next, and these features are described according to a consistent classification system. The North American map was developed by harmonising eight base layer maps at a scale of 1:1M. These layers include:

1. Hydrology,
2. Roads,
3. Railroads,
4. Administrative boundaries,
5. Populated places,
6. Glaciers (terrestrial ice),
7. Sea ice, and
8. Bathymetry (ocean depth).

GSDNR's National Atlas Frameworks project compiled these base layers at the appropriate scale and collaborated with the other two countries to ensure a seamless fit. Each of these layers can be integrated with other North American thematic data.

Hard copies of the map are now being distributed through the "Connecting Canadians" program. In addition, in August the Atlas of the United States will distribute copies of the map printed in Mexico at the 2004 ESRI International User Conference - the largest GIS conference in the world. Electronic plot-ready files have also been distributed to other partners.

The geographical components from the three countries were also assembled into an electronic database, allowing distribution of the map on the Internet for both visualisation and download. This distribution is free of charge from mirror servers in each of the three countries. In Canada, each thematic layer can be viewed and downloaded at [geogratis.gc.ca](http://geogratis.gc.ca).

This new "living" map has the advantage that it is electronic and can be updated to reflect changes in geographical features (new roads, for example) and political boundaries as new information is available.

The harmonized North American framework was designed for the analysis and reporting of transnational issues such as water and energy management, transportation, trade, and biodiversity conservation. The increased accessibility of a current, accurate base map of North America will also help to inform decision-makers, promote the environment, and advance scientific research. Local and regional governments, community groups, NGOs, institutions and individuals can all use the map free of charge.

The Commission for Environmental Cooperation (CEC), an international organization created by Canada, Mexico and the United States under the North American Agreement on Environmental Cooperation, facilitated the collaboration for this project. For more information on the North American Frameworks map contact:

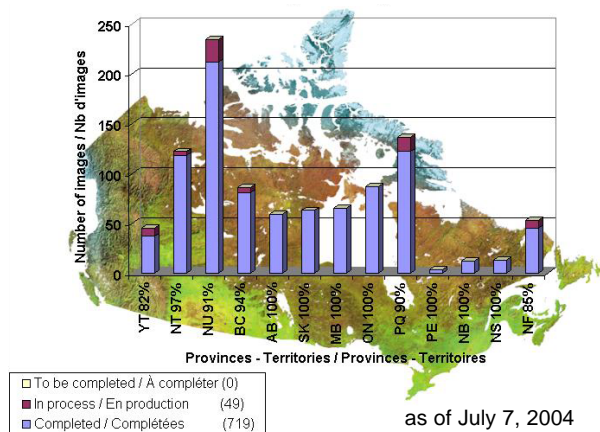
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## Who Else is Using GSDNR Info?

### National Atlas Frameworks

**Environment Canada** is evaluating the GSDNR program's National Atlas Frameworks data for use in several of their initiatives, including the National Pollution Release Inventory, a new 'Find Your Watershed Service', major dams and diversions, and a detailed study of cross-border watersheds. In these projects, the 1:1M GSDNR watershed framework will be used to show downstream effects of water-based pollution sources, to associate watershed boundaries with place names, social, economic and environmental factors, and to study continental water resources with respect to water availability (drought) and water quality. The framework will also support analysis and public communication of serious environmental consequences for areas that are flooded/depleted due to water diversions and dams, and will aid in the modeling of particular basins to resolve pollution, water diversion, water supply, and climate change questions.

### Landsat-7 National Imagery Coverage



The **Canadian Forest Service** is using GSDNR's Landsat-7 satellite images for the purposes of Kyoto reporting through the National Forest Carbon Accounting Program (NFCAP). Specifically, Landsat-7 images are enhancing the National Forest Inventory, a key component of the NFCAP. In particular, these images are being used to extend the inventory, to assess the accuracy of plot size and location, and to provide other area-based parameters such as forest condition.

**Parks Canada** is using Landsat-7 images for several initiatives, including the development of a national monitoring program to detect change in slope movement, shorelines, insect infestations, and vegetation. Landsat-7 images are also being used for the characterization of both specific ecosystems within national parks and the larger ecosystem of the whole park. The calculation of land fragmentation and vegetation indexes is also being done using Landsat-7 images.

Find out more on our website at: [gsdnr.nrcan.gc.ca](http://gsdnr.nrcan.gc.ca)

## User Group Survey for Earth Observation Calibration and Validation Activities

In March 2004, a user study was initiated to provide consultation on the alignment of Earth Observation (EO) calibration and validation activities with the GSDNR program. The consultation involved gathering information through a questionnaire, conducting interviews with key users, and Internet research on the current and potential use of satellite based earth observation data in Canada.

An integral part of the study was to seek answers from current users of satellite based earth observation data to the following questions: Is there a need for calibration/validation of EO data? What are EO data users' needs? How can these needs translate into project activities?

Based on the results of the survey, it was concluded that there is a definite need for the calibration and validation of earth observation data in support of sustainable resource management. The survey also indicated that there is an urgent need to communicate the values of satellite based earth observation data, as compared to non-satellite based alternatives, to natural resource managers working in sustainable development.

## GSDNR to the Rescue of Police Services

An employee of the GSDNR program recently received a call from an Ontario Provincial Police (OPP) officer who needed a topographic map as quickly as possible for the purposes of an investigation. The police officer was looking for a map that covered an area of about 400 km<sup>2</sup> in the centre of Ontario, which was surrounded by a swamp, a road, and a few other landmarks. The police officer could not offer any geographical coordinates. To accommodate this emergency request, the GSDNR employee used commercial mapping software, from which maps taken from the NTDB at the scale of 1:50 000 can be used seamlessly, to translate the police officer's landmarks into geographical coordinates. These coordinates were then used to select the appropriate Landsat-7 image from the Geogratis site ([geogratis.ca](http://geogratis.ca)).

The image was downloaded, enhanced, and cropped in order to produce a colour map covering the exact area of the investigation. Less than two hours after the call the police officer received the map by e-mail, produced thanks to the commercialization of mapping databases and the availability of free Landsat-7 images. The police officer's comment: "You are now on my list of best resources."