

One-stop access to environment and agriculture information



Agriculture and
Agri-Food Canada

Agriculture et
Agroalimentaire Canada

Canadians have one-stop access to information and decision support for agriculture and the environment through a new web portal developed by the Government of Canada. Online since 2006, the National Land and Water Information Service (NLWIS) provides interactive maps, planning tools, expertise, and geospatial data highlighting landuse, soil, water, climate, and biodiversity across the country.

NLWIS is being built on a foundation of partnership and collaboration between Canada's federal, provincial, territorial, and municipal governments, agricultural producers and industries, non-government organizations, and

pret the information for land management and landuse planning. Currently, 22 geospatial applications are available over the Internet in Canada's two official languages, most of which use ArcIMS. These applications were developed by AAFC, but numerous organizations contributed their expertise and geospatial data.

NLWIS has a wide range of interactive maps. They provide an effective way to visualize and explore the data created and/or maintained by AAFC and its collaborators. Some have broad public appeal, such as the Plant Hardiness Zones of Canada (joint with Natural Resources Canada) which is very popular with Canadian gardeners. Others are important frameworks,

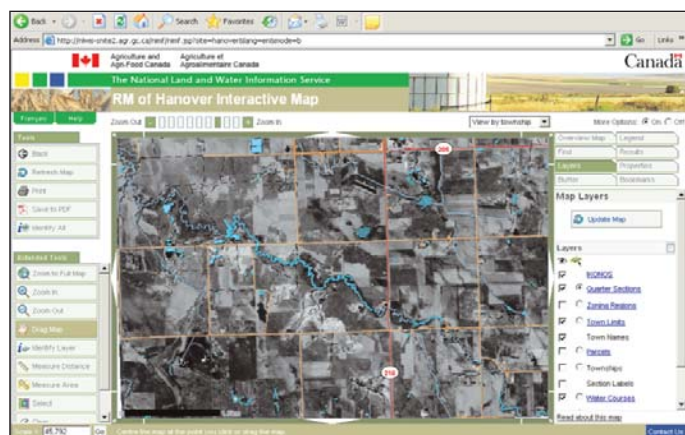
such as the Soil Landscapes of Canada which provides geospatial data to support research and modeling by a variety of users from high school students to journalists to scientists.

There are also a number of tools specifically tailored to land managers. For example, the Dugout Sizing application is an interactive worksheet enabling users to size their farm dugout. The first step is a volume calculation based on the amount of water required for use and the

agriculture industry, and all levels of government.

"GIS gives Canadians the power to think and plan geographically, as well as the valuable tools needed to model and map our country for better decision making," says Julie Leese, Director of NLWIS Client Relations. "This exciting technology is making a significant contribution to research, protection and management of agriculture, and the environment. GIS analysis can take an eight-week job and turn it into a job that is finished in just eight minutes."

NLWIS services, tools, and applications will all conform to the standards endorsed by the Canadian Geospatial Data Infrastructure (CGDI). They mirror many international geomatics standards. GeoConnections is a national partnership program, led by the federal department of Natural Resources Canada, which is mandated to evolve and promote the CGDI. This infrastructure provides standards, protocols, and specifications for NLWIS and other Canadian organizations to collect and exchange geographic information over the Internet. The standards allow the sharing of geospatial data across different systems, including the National Topographic Data Base, National Forest Information System, and those maintained by the provinces, and thereby avoid costly duplication. The owners of information retain "control" over their data, enabling them to keep it current and easily share it with others. Sharing geographic information from different sources



The Rural Municipality of Hanover Interactive Map application is useful for farmers who are completing nutrient management plans, realtors who require land parcel and zoning information, and landuse planners who are assessing a subdivision.

academic institutions. Spearheading these efforts is the federal department of Agriculture and Agri-Food Canada (AAFC). NLWIS is an investment in agri-environmental sustainability that will benefit more than just the agricultural sector. When it is fully operational in 2009, NLWIS will help transform the way landuse decisions are made all over Canada.

The NLWIS portal pulls together soil, water, and other agri-environmental data from dispersed sources by means of interoperable GIS technology, such as interfaces that use the OpenGIS® Web Map Service (WMS) Implementation Specification and the OpenGIS® Web Feature Service (WFS) Implementation Specification from the Open Geospatial Consortium, Inc. (OGC). It also provides users with expert help to apply and inter-

user's location. The geographic location of the user determines an average evaporation rate to calculate losses and to estimate the area of land required to provide sufficient runoff. Once the volume has been calculated, the worksheet allows the user to select dugout dimensions that best meet their water supply needs. In this application, GIS technology provides geographic information on soil and landscape features as well as climate.

The expanding suite of web-based products and services from NLWIS will serve a cross-section of Canadians involved in land management and landuse planning on a local, regional, or national scale. They include landowners and planners, community groups, universities and colleges, the



National Land and Water Information Service

can result not only in important efficiencies but also in better decision making.

The federal, provincial, and territorial governments are working together to make Canada a world leader in food safety, innovation, and environmentally responsible agriculture. Environmental components of this national agriculture policy include farm planning, farm stewardship, and beneficial management practices, monitoring and reporting, cover crop protection, water supply expansion, water quality surveillance, emergency preparedness, risk management, and traceability. The framework and infrastructure NLWIS is building will enhance the capacity to effectively monitor, forecast, and respond to the agricultural sector. Its online applications support AAFC policy and programs that contribute to a cleaner, healthier environment for all Canadians.

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NLWIS underpins the geographic information needs of AAFC by providing geospatial data, decision-support tools, and improvements in national data collection, analysis, and reporting. It allows for better management of geographic information the department creates, uses, and shares. This Internet-based service is contributing in a significant way to the federal government's vision of changing how it interacts with citizens by leveraging technology.

NLWIS is being implemented in four overlapping phases as a four-year major Crown project which started in 2005. Leading the project for AAFC is Dr. Susan Till, Assistant Deputy Minister. The launch of its web portal last year marked the successful completion of Phase 1. This work consolidated existing web-based applications within AAFC and provided a single point of access for the applications and data. Other efforts were directed to extending the use of national standards, adding a Help Desk, and introducing the Land Resource Viewer. This new mapping application combines general information on agricultural practices, water-

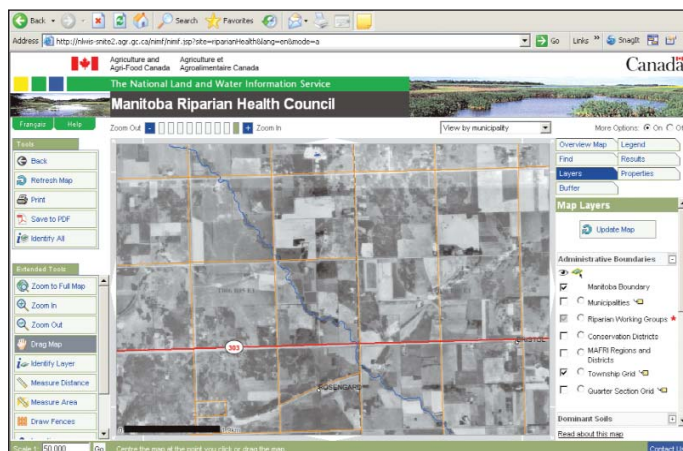
sheds, and dominant soils in Canada contributed by federal departments, such as AAFC, Environment Canada, and Statistics Canada; enhancements in subsequent versions will add more data.

Good progress is being made in Phase 2 to develop the Information Technology platform for NLWIS. “This platform will provide a new departmental enterprise system, increasing the service's GIS capacity,” says Dr. Till. It is scheduled to launch by the end of 2007. Specifically, the NLWIS enterprise system will have

- an environment to host applications composed of Linux and Windows servers on virtual machines
- a data warehouse to store and maintain AAFC data based on ArcSDE and Oracle
- processes and supporting tools to load, store, manage, access, and analyze geospatial data (ArcGIS and custom applications)
- access to geospatial data from collaborating organizations (using OpenGIS® WMS, and WFS)

Data in the data warehouse will be published to public data marts as part of Phase 3. Users will be able to access, analyze, and visualize the data as web maps, web pages, GIS datasets, or spreadsheets. Automated processes using ETL (extract, transform, and load functions) will be used to move the information from one structure where it's easy to maintain to others where it's easy to use.

The development team is building on commercial off-the-shelf technology and customized software to bring together distributed databases into a single integrated environment. The GIS environment was recently upgraded to ArcGIS 9.2. Citrix technology will be utilized, allowing data managers and users to manipulate large datasets over the department's wide-area network. Users will have fast, secure, and reliable access to applications and data.



This Manitoba Riparian Health web mapping application contains information and tools to help landowners manage livestock on land adjacent to streams, rivers, and lakes.

Phase 3 will deliver new applications and improve web services on the new enterprise system. NLWIS will have more tools and datasets available through partnerships and collaboration with the public and private sectors. Dr. Till explains, “We’ve laid the groundwork for working together to identify common interests and leverage our resources and now are on our way to delivering our products and services. Having databases and applications adhere to national standards endorsed by CGDI allows different layers of information to be combined seamlessly into one online map or other product.”

Phase 4 is designed to provide clients the ability to use their own data with NLWIS geospatial web services and applications so they can render the information they need and create their own interpretations. By the end of Phase 4, data access and linkages between collaborators will be enhanced and a new, capability-rich suite of web services and applications will have been introduced. Dr. Till adds, “The new geospatial web services that NLWIS is developing will help Canadians better understand their situations and challenges, as well as opportunities and possible solutions, vis-à-vis landuse decision making.”

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