

Putting Canada Back on the Map:

The Need for Updated Maps of Canada

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In Association with

Canadian Association of Research Libraries /

Association des bibliothèques de recherche du Canada

(CARL / ABRC)



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POLICY BRIEF

SUPPORTING ACCESS TO AND PRESERVATION OF MAP DATA IN ALL FORMATS

February 2007

Putting Canada Back on the Map: The Need for Updated Maps of Canada

The Government of Canada must ensure current base geographic information to support critical services to Canadians.

Canadians, through government as well as the private sector, need quality map data for responsible decision-making to defend our sovereignty, to support our search and rescue teams, to know our changing landscape resulting from global environmental change, to ensure our economic competitiveness, and to monitor and manage our resources. "... Note that the status quo is not an option. If the federal government does not make a new substantial commitment to . . . (map) ... the existing information base will degrade to the point where it becomes irrelevant" *

GIS technology and the term itself are Canadian inventions. The first fully operational GIS was the Canada Geographic Information System (CGIS) developed for Natural Resources Canada in the 1960s. The CGIS was invented by necessity to automate the mapping and analysis of land capabilities for agriculture, forestry, recreation, and wildlife for the purpose of regional planning.[†]

Cutting-edge mapping software was developed by a Canadian company to help military troops and relief organizations ... (in)... Afghanistan ... (producing) ... three-dimensional maps using one-dimensional satellite photos of terrain.[‡]

To support current policy imperatives such as environment and national security, the government of Canada must revive and restore Canada's ability to provide high quality maps. Natural Resources Canada is the key government institution in providing the map base required to

* The Case to Upgrade the National Geospatial Information Base. Hickling Arthurs Low. 2001.

† Research Perspectives. <http://www.research.uottawa.ca/perspectives/>, Fall 2004

‡ CBC website <http://www.cbc.ca>, Oct. 2001



improve our economic competitiveness and government's ability to respond to crises within our borders.

Once a leader, Canada is now falling behind

The map of Canada is a concept as old as Canada. In 1906, Canada was the second country in the world to develop a national atlas. A world leadership was established in 1963 by Natural Resources Canada with the CGIS. GIS and the term itself are a made-in-Canada solution. Overall, Canadians' historical leadership has made them invaluable contributors to the mapping activities of developing nations, such as Indonesia and Tanzania. In technical terms, Canada has today developed an impressive program to develop a spatial data infrastructure, but lacks a long term commitment and plan to sustain this.

Canada started as a world leader in mapping and GIS, but has not maintained its efforts in this area. While the rest of the world has, in recent decades, pushed forward with mapping legislation, policies and programs, Canada since the 1980s, has fallen seriously behind.

Over half of the country's print topographic maps are now between 20 and 63 years old, lacking current and critical information. Fewer than 1% have been updated in the last 10 years. Owing to insufficient funding of mapping programs and activities at the national level in Canada, today less than 10% of the mapping information from printed topographic maps, continues to be updated. **For instance, cultural and environmental map information data changes most rapidly and is most critical, yet Canada no longer invests in this information.**

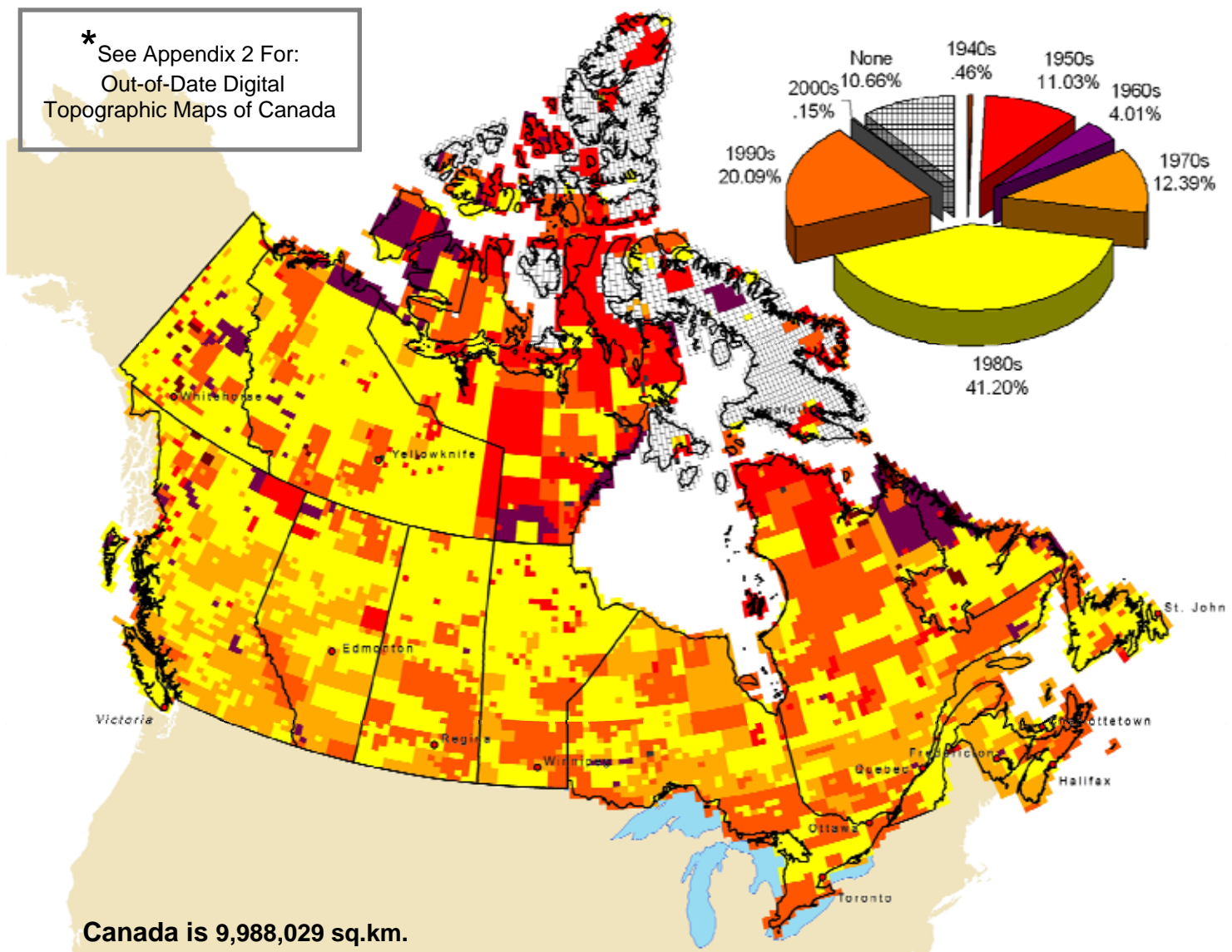
Google Maps, Google Earth and similar initiatives may be considered a possible substitute to topographical maps. Their role was not to replace detailed mapping initiatives but rather they provide road maps, directions, and show basic satellite images. However, these Internet-based popular mapping sources would never be used by search and rescue teams, to show environmental changes, or to locate natural resources, and dependence on them by Canadian decision makers or the general public for such uses would be unwise. High quality topographic maps are essential for these services.

Unlike other western countries, Canada lacks national mapping legislation. Technological innovations in the form of hardware, software and data currently allow countries to be mapped more easily and more cost effectively than ever before. Nevertheless, in Canada remote-sensed data obtained from an increasing variety of sophisticated satellite systems, is rarely put to effective use. These satellite systems provide real time data which can be used to update maps. There is no plan to apply either this information or current technology to improve the situation.

Out-of-Date Printed Topographic Maps of Canada

1:50,000 Scale*

* See Appendix 2 For:
Out-of-Date Digital
Topographic Maps of Canada



Canada is 9,988,029 sq.km.

Canada south of 49°00' North Latitude is 940,820 sq.km.

Canada north of 49°00' North Latitude and south of 60°00' North Latitude is 5,049,772 sq.km.

Canada north of 60°00' North Latitude is 3,997,437 sq.km.

Canada north of the Arctic Circle is 1,824,921 sq.km.

--Dimensions and Areas of Maps of the National Topographic System of Canada by L.M. Sebert and M.R. Munro, 1972

Putting Canada back on the map!

The October 2006 decision by the Honourable Gary Lunn, Minister of Natural Resources to keep the Canada Map Office open was an important first step in ensuring that Canada's mapping needs would be met. However, only a renewed commitment to Canadian mapping can provide critical information to support the current need as well as reinstate Canada's place as a leader in the mapping world. Topographic maps are central to every rural, remote and urban community in Canada. Maps contribute to effective emergency and disaster response, the development of the recreation and tourism industry, and efficient use of natural resources. Maps are central to current policy priorities, such as the defence of the country's sovereignty, ensuring continued economic prosperity, and the quality of Canadian air and water, and other pressing environmental challenges caused by global warming. Maps are critical to public infrastructure renewal and economic development. They provide the base knowledge for good public policy and good government.

Maps define Canada

Every country has an event that defines their identity. For the United States, it was the Revolution and their Civil War; for France, the French Revolution; for Canada, the intertwined surveying and mapping of the country with the building of the Canadian Pacific Railway. Mapping and the resulting immigration to the West are an integral part of our heritage and of Canada's future. Who Canadians are is a product of where we are.

Border disputes and control over the Northwest Passage in the Arctic require maps for proof of sovereignty. With the receding of the Arctic ice the islands of the Arctic Archipelago, which now are part of Nunavut, are under new dispute as is control of the Northwest Passage. On traditional maps, these islands are shown as belonging to Canada. The dispute over Hans Island, claimed by both Denmark and Canada, illustrates the importance of keeping maps current. Canada is at a distinct disadvantage in border discussions with our continental neighbour. The United States has excellent and current map coverage to support its positions; Canada does not.

Maps support search and rescue

Search and rescue (SAR) is about finding and helping people who are lost and/or injured, typically in isolated or remote areas, and oft-times about

saving lives. Given that topographical maps are the type of map most frequently used by SAR teams, out of date maps threatens the effectiveness of SAR.

Maps support Canada with environmental challenges

Now more than ever, Canadians are focused on ensuring a safe and sustainable environment for future generations and on living up to the country's global environment commitments. Geographical boundaries of Canada, continually affected by rapid global environmental changes, do not remain constant. A map is the most effective means of demonstrating the catastrophic effects of global warming and helping to formulate responses to both natural and man made disasters. To do so however, maps, both in digital and printed form must be of high quality and above all up-to-date.

Maps make Canada more competitive

Other countries including the United States, Australia, and Portugal have recognized the economic value provided by accurate, current and publicly accessible digital and paper maps. In Canada, however, the lack of a coherent, active mapping program imperils the nation's international competitiveness. The natural resource industries—oil and gas, mining, forestry—have an urgent need for topographic, geophysical, biophysical and socio-economic data for regions. Mapping is a key tool for finding a balance between continued economic competitiveness and the high quality of Canada's rich natural environment. In such rapidly paced industries, the delays required to compile this information are often more costly and harmful to competitiveness than the costs of the mapping itself.

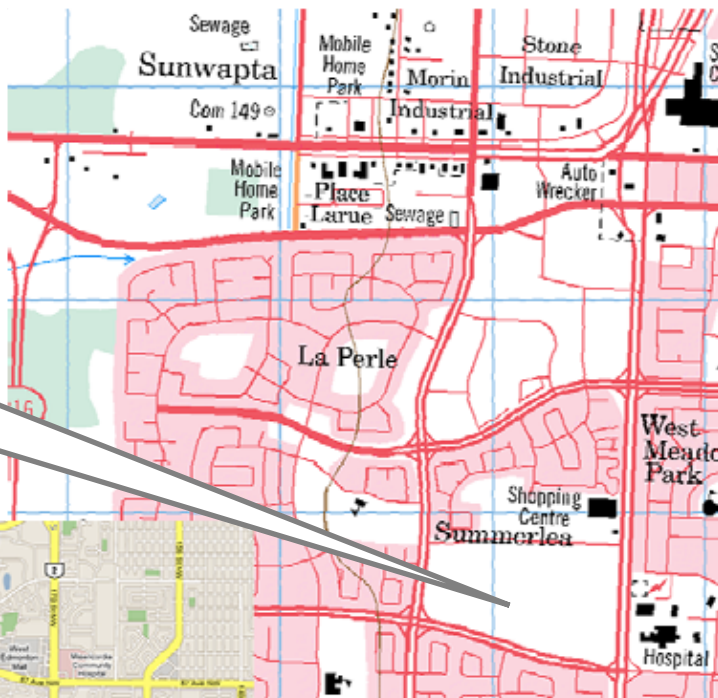
The Government of Canada must ensure that the country can remain an environmental model to the world, economically competitive, so that it can be prepared for future emergencies and disasters.

Geomatics ranks in the top three most important and rapidly growing professional fields in the global market. Its products and services are estimated to be between US\$30- and US\$40-billion.

Geomatics industry:
Number of
Establishments: 2,215
Number of Employees:
27,300
Revenue: \$2.8 billion
Exports: \$497 million
Value Added: \$2.4 billion.
In 2004, Canada
exported approx. \$497
million in Geomatics
products and services,
mostly to the United
States.

— Natural Resources
Canada website
In The Hill Times 2006
Natural Resources Canada
Policy Briefing, Dec. 4th 2006

The Need for Up-to-Date National Topographic Maps of Canada



West Edmonton Mall is Missing

Edmonton's Most Known Landmark

NTS sheet, 83H12:
Boundaries and toponyms current as of 2000; road network current as of 1996; all other information current as of 1977. Map Published in 2001.



Section from Cole Harbour, Nova Scotia, sheet 11/D11 shown in the late 1960's

Cole Harbour, N.S. sheet 11/D11 shown in 1988: shows significant changes in the landscape and a new park

Same area in Google map: image very generalized, no date information



Google Maps Satellite Image - cloud cover obscures the Cole Harbour area

Canadians value topographic maps

Canadians have clearly demonstrated that they value maps of their country and support the government's efforts to ensure all Canadians have access to maps. During the fall of 2006, the *Maps for Canadians* website www.mapsforcanadians.ca received a resounding 51,000 hits in less than three months. The public campaign against discontinuing the printing of Canadian topographical maps and closing the Canada Map Office received widespread support from Canadians from all regions and walks of life. The Ministry of Natural Resources Canada was inundated by letters asking the government to continue its involvement in mapping. Most significantly, those in remote and rural areas and those potentially hardest hit by climate change, such as the North, were among the most outspoken.

Limited access to reliable paper maps will compromise public safety.

– Boone Bay Search and Rescue, Labrador

NRCAN is the national agency responsible for coordinating mapping across the country... However, there is no clear policy on keeping maps current and accurate. If you look at our available topographic mapping resources for Canada you will find maps that were last updated in the 1950's or 1960's. With the technology available today, there is no excuse for not having accurate maps that are no more than 10 or at worse 20 years old and this does not include hydrological mapping some of which goes back almost 100 years.

– National Director for the Civil Air Search & Rescue Association

I am active in Orienteering and Army Cadets, so I use topo maps on a regular basis. Map reading and navigation are HUGE parts of Army Cadet training, as it teaches them to think for themselves and apply problem solving techniques.

– Aimee Procyk, a Canadian

YMCA of Greater Toronto, specifically YMCA Camp PineCrest has been using paper topographic maps for many years to support our vast out-tripping program for over 900 children a year.

– Andrea Balmer, Manager, Camp PineCrest

CONCLUSION AND RECOMMENDED COURSE OF ACTION

Despite the international prominence of our mapping sector, Canada is one of only a few countries without a commitment to a long-term mapping approach. While other countries forge ahead enhancing their mapping activities, and attracting and retaining creative workers, Canada lacks a cohesive mapping approach to ensure critical government services to Canadians, national defence, adequate search and rescue, to meet environmental challenges, and to manage natural resources.

The Ministry of Natural Resources funds in whole the topographic mapping of Canada. Maps are used by many other government departments, yet as users, the latter do not provide funding for topographic mapping.

ACMLA recommends THAT the Government of Canada begin developing an action plan to improve critical services to Canadians, which includes:

- 1. Production of up-to-date topographic maps in both print and electronic format and providing easy access to these maps;**
- 2. A commitment to provide topographic maps in print format until the technology and support systems allow the transition to digital-only distribution;**
- 3. Access to archived versions of topographic maps;**
- 4. Working with all stakeholders to develop a concrete strategy that ensures the provision of quality geospatial base data both for the present and the future.**

Additional Information

Appendix 1

Definitions

Appendix 2

National Topographic Series, 1:50,000 Digital Editions, NTDB

Appendix 3

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Association of Canadian Map Libraries and Archives / Association des Cartothèques et Archives Cartographiques du Canada (ACMLA / ACACC)

Canadian Association of Research Libraries /

Association des bibliothèques de recherche du Canada (CARL / ABRC)

Appendix 1 Definitions

ACMLA / ACACC

Association of Canadian Map Libraries and Archives (ACMLA) / Association des cartothèques et archives cartographiques du Canada (ACACC) actively serves as the representative professional group for Canadian map librarians, cartographic archivists and others interested in supporting and preserving map data in all formats.

Archiving

Archiving (or preserving information for) maps of Canada is required to understand Canada, past present and future. Canada's maps, if taken over time, whether print or digital, show changes such as new roads and built-up areas, change in size or type of vegetation and wetlands, as well as abandoned mines and toxic waste sites, and changes in glacial extents, coastlines and borders. Only through planned archiving, will the maps be kept. While archiving has been established with print maps, major steps remain to be taken for digital maps. To preserve the unique versions of print NTS topographic maps, various NTS editions have been archived and maintained by Libraries and Archives Canada and other ACMLA libraries. A similar system of archiving has not been established for digital topographic map information. (For further reading on archiving issues, see the web document, Brown, Welch and Cullingworth, Archiving, Management and Preservation of Geospatial Data Summary Report and Recommendations, GeoConnections Policy Advisory Node, February 2005.)

CARL / ABRC

Canadian Association of Research Libraries (CARL) / Association des bibliothèques de recherche du Canada (ABRC): CARL is the leadership organization for the Canadian research library community.

CGIS

CGIS is the acronym for the Canada Geographic Information System, "the grandfather of all geographic information systems . . . to develop a land capability classification system and compile an inventory of all the potentially productive land of Canada . . . (through automated means because of . . . the volume of data to be analyzed". GCIS came into being at Natural Resources Canada in 1963 and was fully implemented in 1971. (http://nfi.cfs.nrcan.gc.ca/terms/appendix3_e.html)

GeoConnections

GeoConnections is a national partnership program under Natural Resources Canada to evolve and expand the Canadian Geospatial Data Infrastructure (CGDI). The CGDI provides Canadians with on-demand access to geographic information (including public maps and satellite images), standards, architecture, services and applications in support of sound decision-making. (Natural Resources Canada website)

Geomatics

Geomatics is a discipline, first coined as Geomatics in Canada to describe the science and technology of acquiring and managing data, particularly instrumental data, about the Earth. Geomatics, includes, in addition to GIS, such fields as positioning and navigation (example, GPS), geodesy and remote sensing.

GIS

GIS is the "acronym for geographic information systems. An integrated collection of computer software and data used to view and manage information about geographic places, analyze spatial relationships, model spatial processes." (ESRI Press, 2006)

NTDB

The NTDB is the acronym for the National Topographic Data Base, a set of digital data files which were developed from the NTS in the 1990's. It covers the entire Canadian landmass and contains the features normally found on topographic maps at the scales of 1:50 000 and 1:250 000. The NTDB provides a base of properly structured vector data (segmentation, mathematical closure, connection and sharing between entities) designed and suited for geographic information system (GIS) applications. It also can be used for preparing thematic maps. (GeoConnections; Discovery Portal; National Topographic Data Base (NTDB), Canada. <http://geodiscover.cgdi.ca/>)

The data from the NTDB Road Network, Roads and Toponymy themes are recognized as equivalent to those offered at no cost, since November 19, 2003, on the public GeoBase portal under the National Road Network and the Geographical Names of Canada themes. As GeoBase data are intended to replace equivalent Natural Resources Canada data, these NTDB themes could eventually cease to be distributed. The organizational unit for the NTDB is the National Topographic System (NTS), based on the North American Datum of 1983 (NAD83). Each file (data set) consists of one NTS unit at either the 1:50,000 or 1:250,000 scale. Furthermore, the data is now available by themes within a file. The ground data is depicted through points, lines, and areas.

Profile of the Digital NTDB Map Data 1:50,000 Scale

Average year: 1986

Oldest: 1944

Median Year: 1989

Latest: 2002

16.42% Never Published

11180 Files Published

13377 Total

The ACMLA has an agreement with Natural Resources Canada under the Depository Services Programme allowing access to the NTDB data files for students' educational and research needs at Canadian universities and colleges.

NTS

NTS is the acronym for the National Topographic System, which provides base topographic map coverage of Canada. The 1:50,000 map is considered to be the working scale for the development of Canada's natural resources, covering an area of approximately 1,000 square kilometers. A 1:250,000 NTS map series exists also.

Profile of the Printed NTS Map Sheets 1:50,000 Scale:

Average year: 1980

Median Year: 1986

Oldest: 1944

Latest: 2004

10.66% Never Published

1996–2006 <1% Updated

11,951 Sheets Published

13,377 Total

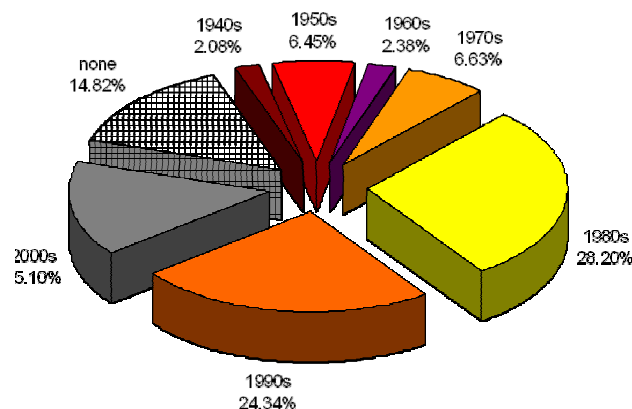
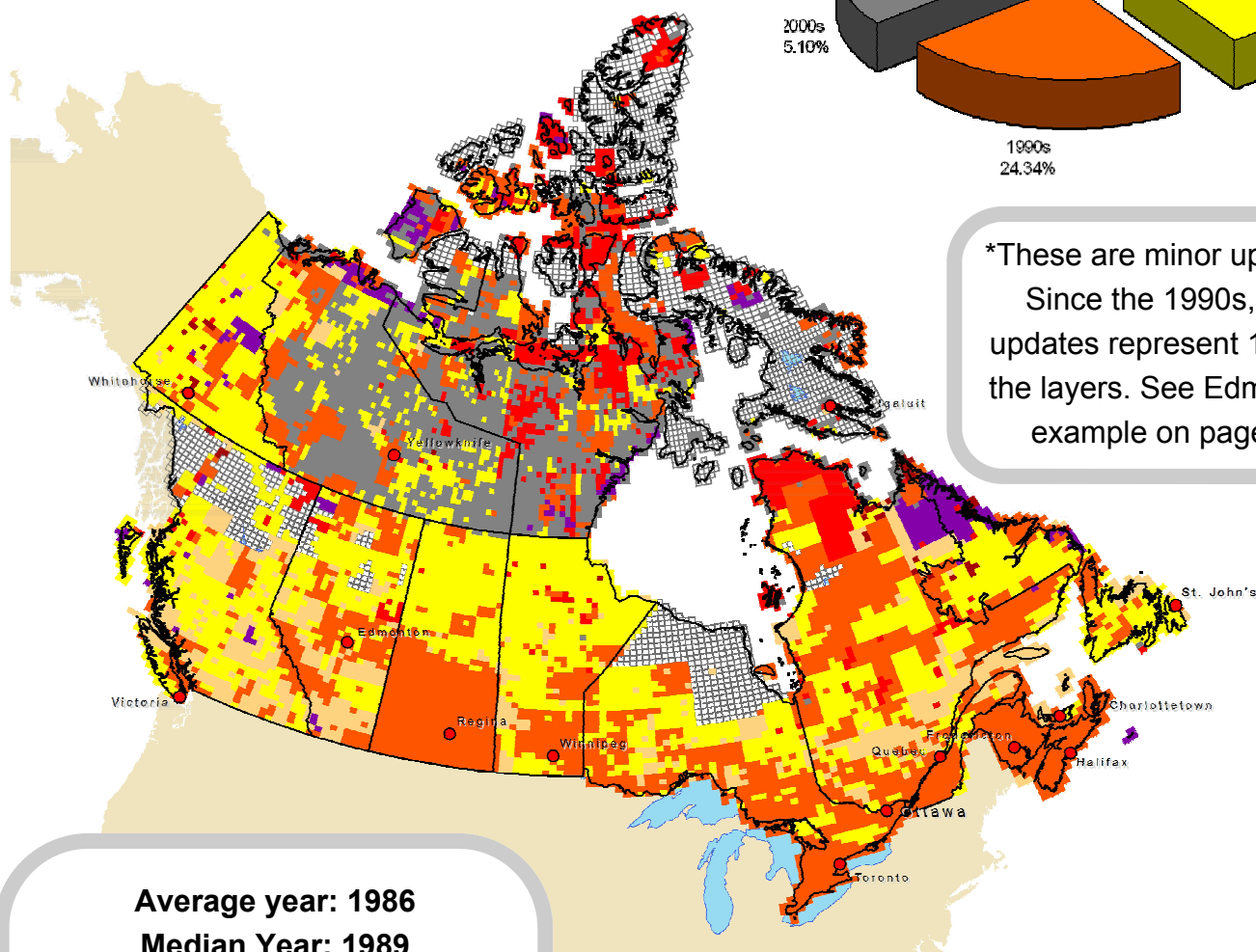
Topographic maps

A topographic map shows the natural and manmade features of the earth's surface. Features depicted include rivers, coastlines, wetlands, vegetation and landforms (represented through contour lines and spot heights), as well as roads, populated areas, power lines, oil and gas wells, political boundaries, and major buildings.

Appendix 2

National Topographic Series, 1:50,000 Digital Editions, Validity By Year

Out-of-Date National Topographic Data Base



*These are minor updates.
Since the 1990s, the
updates represent 10% of
the layers. See Edmonton
example on page 7.

Average year: 1986
Median Year: 1989
Oldest: 1944
Latest: 2002
16.42% Never Published
21.36% Updated 1996—2006
11180 Files Published
13377 Total

**Digital NTDB Files are for the
sophisticated user requiring
specialized technical knowledge
and software and not for the
average Canadian.**

Appendix 3 Why We Need Up To Date Topographic Maps: An Illustration

Cole Harbour in Nova Scotia 11/D11

National Topographic Map Edition 3



From detailed maps updated from aerial photographs taken in 1966-1967. Culture check 1969. Printed in 1972.



Thumbnail shows area in the late 1960's

National Topographic Map Edition 5



Information current as of 1988. Published in 1991.

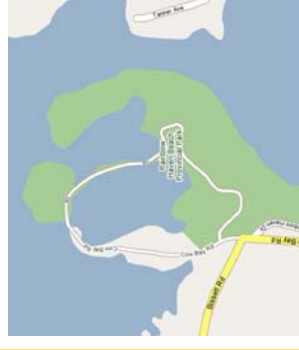


Thumbnail shows landscape changes and new park

No Topographic Map Available



Google does not provide any date information.



Google map image very generalized—not comparable

Appendix 4: International Context

The importance of geospatial information is being recognized around the world . . . Most of the countries reviewed have better quality base data than Canada, but most also have smaller geographic areas to cover and a larger population base to support the effort . . . Not surprisingly, the quality of a country's geospatial information tends to be inversely related to its size, and somewhat related to its wealth. The United Kingdom, France and Germany have relatively superior information. New Zealand and Sweden have good information. The United States and Australia, like Canada, have more difficulty keeping information current and comprehensive.

The United States has recently announced an initiative very similar to the one described here called "The National Map". The vision of the U.S. Geological Survey (USGS), which houses that country's national mapping agency, is that by the year 2010, working with partners, it will provide the Nation with current, accurate, and nationally consistent basic spatial data, including digital data and derived topographic maps, and deliver spatial information that is not more than seven days old. The National Map is proposed as a database of basic spatial data that will provide a starting point for users to extend and enhance, and to which users could tie additional data, to meet business needs. USGS will provide the leadership needed to develop and continually maintain this data through partnerships among federal, state, local, and tribal governments, the private sector, other organizations, and volunteers . . . (*From The Case to Upgrade the National Geospatial Information Base; Hickling Arthurs Low. 2001)

Appendix 5: Current Canadian Legislation

Resources and Technical Surveys Act, R.S.C. 1985, c. R-7, s. 4.

An Act respecting resources and technical surveys.

POWERS, DUTIES AND FUNCTIONS OF THE MINISTER

Duties of the Minister

Surveys

4. The Minister may, for the purpose of obtaining a basis for the representation of the mineral and mining resources and of the geographical and geological features of any part of Canada, cause the measurements, observations, investigations and physiographic, exploratory and reconnaissance surveys to be made that are necessary for or in connection with the preparation of maps, sketches, plans, sections or diagrams.

Appendix 6: International Legislation: United States and United Kingdom

United States legislation

U.S.C. 43 §31a (1992)

The purpose of sections 31a to 31h of this title is to expedite the production of a geologic map data base for the Nation, to be located within the United States Geological Survey . . .

The Congress finds and declares that — (1) during the past 2 decades, the production of geological maps has been drastically curtailed; . . . (4) the combined capabilities of State, Federal, and academic groups are not sufficient to meet the present and future needs of the United States for national security, environmental protection, and energy self-sufficiency of the Nation.

United Kingdom legislation

Survey Acts, 1825, 1841, and 1870, (U.K.), 4 - 5 Vict. c. 30.

Be it therefore enacted by the Queen's most Excellent Majesty, by and with the Advice and Consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the Authority of the same, That from and after the passing of this Act, for the Purpose of enabling the Master General and Board of Ordnance to make and complete such Surveys and Maps of England, Scotland, Berwick upon Tweed, and the Isle of Man. (1841)

Appendix 7

Association of Canadian Map Libraries and Archives

The information in this Policy Brief was developed by the Association of Canadian Map Libraries and Archives (ACMLA) / Association des cartothèques et archives cartographiques du Canada (ACACC).

The Association of Canadian Map Libraries and Archives (ACMLA) actively serves as the representative professional group for Canadian map librarians, cartographic archivists and others interested in geographic information in all formats. Since its inception in 1967, the achievements of the Association have been notable, including a vigorous publishing program, development of professional standards and international cataloguing rules, and efforts to increase national awareness of issues concerning spatial information and recognition of the contribution of map libraries and cartographic archives.

The membership of the ACMLA is primarily drawn from those individuals and institutions in Canada who manage the map collections, libraries and archives that house the cartographic heritage of Canada. We are the individuals and institutions who provide reference, instruction, and public awareness programs relating to cartographic information in all its forms. We feel especially concerned about impacts upon those whom we serve in our libraries, collections and archives. We represent all those who use libraries and cartographic collections.

In Association with the Canadian Association of Research Libraries / Association des bibliothèques de recherche du Canada (CARL/ABRC)

Full copies of the document can be downloaded from:

www.acmla.org

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Canadian Association of Research Libraries (CARL) / Association des bibliothèques de recherche du Canada (ABRC)

CARL is the leadership organization for the Canadian research library community. The Association's members are the 27 major academic research libraries across Canada plus Library and Archives Canada, the Canada Institute for Scientific and Technical Information (CISTI) and the Library of Parliament. CARL members are the backbone of Canada's intellectual holdings in all disciplines, with an annual expenditure of over half a billion dollars (\$537,339,000), monograph holdings of over 75 million items and nearly half a million journals.

CARL is an affiliate member of the Association of Universities and Colleges of Canada (AUCC), and is incorporated as a non-profit organization under the Canada Corporations Act.

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	York University