

Country Profile: Canada

Country Profile (PDF)

Country Resources

Topographic

Series	Publisher	Scale	Years	Sheets
Canada 1:250,000 Scale Topographic Maps	DEMRC	1:250,000	1949 - 1996	914
British Columbia 1:20,000 Scale Topographic Maps		1:20,000	2013	7,015
Canada 1:50,000 Scale Topographic Maps	NRCAN	1:50,000	1970 - 2003	13,373

Nautical

Series	Publisher	Scale	Years	Sheets
Canada Nautical Charts (ENCs)	CHS	Varies	2017	564
Canada Nautical Charts (All Scales)	CHS	Varies	1969 - 2025	1,602
EVMaritime Vector Data: Canada - Not for Navigation (EVMV)	EVG	Varies	2010 - 2023	509
EVMaritime Vector Data: Canada (Collections) - Not for Navigation (EVMV)	EVG	Varies	2023	9

Aeronautical

Series	Publisher	Scale	Years	Sheets
Canada 1:1,000,000 Scale World Aeronautical Charts (WAC)	CCM	1:1,000,000	1993 - 1998	18
FAA IFR Enroute High Altitude Aeronautical Charts	FAA	1:37,000	2016	12
Canada 1:250,000 Scale Aeronautical Charts	NAVCAN	1:250,000	2015 - 2017	7
Canada 1:500,000 Scale Aeronautical Charts	NAVCAN	1:500,000	2006 - 2017	52

Thematic

Series	Publisher	Scale	Years	Sheets
The World 1:30,000,000 Scale Topographic Map Series 1145 (NGA)	DMA	1:30,000,000		2
Canada Indigenous Peoples Demographic Maps	ISC	N/A	2019 - 2024	16

Global Census Archive: GIS Census Data

East View Geospatial has an ongoing effort to add GIS census data to our Global Census Archive program. Please contact us for the status and availability of Canada census resources.

Global Resources

Topographic

Series	Publisher	Scale	Years	Sheets
Soviet Military City Plans	VTU GSh	Varies	1944 - 2003	3,020
Soviet Military 1:100,000 Scale Topographic Maps	VTU GSh	1:100,000	1947 - 1999	24,897
Soviet Military 1:200,000 Scale Topographic Maps	VTU GSh	1:200,000	1949 - 2009	17,799
Soviet Military 1:500,000 Scale Topographic Maps	VTU GSh	1:500,000	1953 - 1998	3,093
Soviet Military 1:1,000,000 Scale Topographic Maps	VTU GSh	1:1,000,000	1948 - 1994	1,089

Nautical

Series	Publisher	Scale	Years	Sheets
NGA Nautical Charts POD Certified (All Scales)	NGA	Varies	1943 - 2013	4,517

Aeronautical

Series	Publisher	Scale	Years	Sheets
Joint Operations Graphic (JOG 1501A) 1:250,000 - Aeronautical	DMA	1:250,000	1958 - 2007	6,380
Tactical Pilotage Chart (TPC) 1:500,000 Scale - Aeronautical	DMA	1:500,000	1967 - 2006	618
Operational Navigation Chart (ONC) 1:1,000,000 Scale - Aeronautical	DMA	1:1,000,000	1969 - 2001	248
Jet Navigation Chart (JNC) 1:2,000,000 Scale - Aeronautical	DMA	1:2,000,000	1971 - 1999	117
Global Navigation and Planning Chart (GNC) 1:5,000,000 Scale - Aeronautical	DMA	1:5,000,000	1981 - 1999	27

Note: East View Geospatial is continuously sourcing new resources that may not yet be listed in Global Explorer. Please contact us if you have geodata needs beyond what is listed above and we will be happy to discuss available off-the-shelf and custom solutions.

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Topographic

In Canada mapping is undertaken by agencies of both federal and provincial governments. In topographic surveying and mapping, the federal government is responsible for the first-order geodetic network and for mapping at scales of 1:50,000 and smaller. Provincial governments and metropolitan authorities take on the tasks of more detailed mapping, usually at 1:20,000 scale or larger, as required for resource development, cadastral purposes and for urban planning. Similarly, much thematic mapping, including mineral, soil, land use and forest surveys, is carried out by provincial agencies, with or without federal cooperation. Since the first edition of the book, all these agencies have begun to digitize their map data, to build databases and implement geographical information systems, and to develop instruments and protocols for the distribution of data in digital formats. An umbrella organization, the **Canadian Council on Geomatics (CCOG)**, has provided a forum for federal and provincial agencies to discuss problems of common interest, and together with the **Inter-Agency Committee on Geomatics** has guided the development of common standards for the exchange of geographical data.

Most federal mapping in Canada falls within the ambit of **Natural Resources Canada (NRCan)**. Beginning in 1992, **NRCan** has undergone restructuring, and in 1994 its Surveys, Mapping and Remote Sensing Sector became **Geomatics Canada (GC)**. Together with the **Geological Survey of Canada** and the Polar Continental Shelf Project, they form the Earth Science Sector of **NRCan**. The mission of **Geomatics Canada** is to maintain the national survey and mapping databases, and to produce both digital and paper-based products, including topographic maps, aeronautical charts, aerial photographs and satellite imagery. **Geomatics Canada** is divided into a number of services and divisions, which include the **Legal Surveys and International Boundary Commission**, the **Geodetic Survey Division**, **Cartographic Services** and the **Canada Center for Remote Sensing**. Topographic mapping is managed by the **Canada Center for Topographic Information (CTI-O)**, Ottawa, which incorporates the Canada Map Office. A further **Center for Topographic Information (CTI-S)** is located at Sherbrooke, Quebec, and this is concerned with producing and maintaining the **National Topographic Data Base (NTDB)** and other digital data sets, and for creating the **CGDI** data alignment layer.

Modern topographic mapping of Canada dates from 1922, when a **Board of Topographic Surveys and Maps** was established to coordinate the rather haphazard situation that had resulted from the activities of three major mapping authorities which then existed. The Board set out to ensure the adoption of uniform mapping standards and to devise a national topographic system of scales and sheet lines. The projection eventually adopted in 1946 was the Universal Transverse Mercator with the Clarke 1866 ellipsoid. Sheet lines for the

topographic series are graticule-based, and are broken down from primary quadrangles each covering 8° longitude and 4°. This sheet system is officially known as the National Topographic System or NTS, and it is important to note that it differs from the *International map of the World (IMW)* system which is used by many countries, and which is based on a 6° division of longitude. IMW sheet lines are used in Canada only for the 1:1,000,000 IMW maps themselves, for some thematic maps at this scale, and for 1:250,000 *Joint Operations Graphic (JOG)* charts.

The scales of early NTS series of maps were based on imperial units, but these were later phased out in favor of the ratios 1:50,000, 1:125,000, 1:250,000 and 1:500,000. In 1953, 1:25,000 scale maps were also added to this family.

Only two federal series now survive, the basic scale 1:50,000, and the 1:250,000 national series. A set of 1:1,000,000 sheets in *International map of the World* specification was published in the 1960s and 1970s, and some sheets were revised in the 1980s, but the series is no longer maintained. Although the 1:500,000 scale topographic map has also been discontinued, aeronautical charts are still published at this scale.

The 1:250,000 scale series was completed in 917 sheets in 1970. It had originated in 1923 as a four miles to the inch (1:253,440) map, the present scale ratio being introduced in 1950. The series progressed rapidly during the 1950s and 1960s, following a complete trilateration of the country and the provision of a comprehensive air photographic cover, from which maps could be compiled by photogrammetry. As is common with long-lived series, there have been a number of specification changes to the 1:250,000 scale series, and because some sheets have been revised more frequently than others, there are dissimilarities between sheets of different areas. The modern sheets are printed in six colors with contours ranging in interval from 20 m to 200 m according to the prevailing terrain. A red stipple is used for built-up areas. Roads are shown in color and classified according to suitability for traffic. The UTM grid is shown in light blue at 10 km intervals. Several revision cycles have been established to satisfy differing rates of landscape change, with a 10-year cycle for the most settled areas.

The 1:50,000 scale was adopted in 1950, replacing the inch to the mile (1:63,360) series, and all subsequent new maps were published at this scale, while others were progressively converted by photographic enlargement. Other elements of metrication, contours and distances, were not introduced until 1975. Since 1977, all new maps have also been fully bilingual in English and French. About 13,000 sheets are required for complete cover of Canada, and with the exceptions of some areas of the Arctic, principally Baffin Island and Ellesmere Island, this basic scale map is now practically complete.

The standard 1:50,000 map is in six colors, but a substantial number of sheets in the wilderness areas of the north have been published only in monochrome or as photomaps. Over 12,000 published sheets now exist in this series. The sheets are of a common 15 minute by 30 minute format (until 1967, a half-sheet format had been used in the south), and all sheets have the UTM grid usually printed in blue or purple. Information content includes much attention to road classification (on the colored sheets) while the northern sheets take account of the variety of swamp types, and of special relief forms such as eskers and pingos, which have their own symbols. Contour interval varies with the type of relief from 5 m in flat areas to 40 m in very rugged ones. A new specification for the 1:50,000 scale map has recently been designed, and a prototype sheet was issued in 1996. Sheets are to be revised and digitized, and printing will in future use the four colour process. New image maps of northern Canada are being published in color.

Soviet military topographic mapping of Canada is available at the following scales: 1:1,000,000 (86 sheets, complete coverage, published 1961-1993); 1:500,000 (306 sheets, complete coverage, published 1962-1995) and city (1:25,000) topographic mapping of Calgary, Edmonton, Montreal, Ottawa, St. John's, Toronto and Vancouver published between 1973 and 2003. These products are available in print, digital raster and digital vector GIS formats from **East View Geospatial**.

Provincial mapping

Although substantial mapping programs are carried out by federal agencies, as described above, all the provinces also have their own mapping agencies. Most operate large scale provincial topographic and cadastral programs. Many of these organizations have been restructured, and in some cases partially privatized, to accommodate a wider remit, including digital mapping and the implementation of GIS.

Alberta

Responsibilities for provincial mapping in Alberta were reorganized in 1995 with the creation of a **Resource Data Division** within the **Land and Forest Service of Alberta Environmental Protection**. The Division comprises a Data Acquisition, a Data Management and a Director of Surveys Branch. This new structure reflects the change of focus from paper map production to the production and

management of digital spatial data for the GIS environment, and to the commodification of this data. The Division is currently involved in developing a new series of GIS mapping, including a *Base features* program and the *Alberta vegetation inventory* program.

The **Director of Surveys Branch** has responsibility for the **Alberta Survey Control Network**, and a provincial readjustment to the new Canadian Spatial Reference System is under way. Previously, several provincial digital data sets had been developed, including a 1:20,000 scale digital base map series completed in 1996, which provides full coverage of the province except for the national parks, and incorporates a 10 m or 20 m contour interval. With the completion of this series, the Alberta Government decided to cease direct funding of this spatial data infrastructure, and a nonprofit company. The **Spatial Data Warehouse (SDW)** was established as a government/private partnership to take over the storage and maintenance of digital mapping. Subsequently, a private company **AltaLIS Ltd** was contracted to assist **SDW**.

British Columbia

In recent years, the BC **Ministry of Environment, Lands and Parks (MELP)** has adopted a totally digital production of maps and related materials. **Geographic Data BC (GDBC)** is responsible for this digital program, and \$10 million have been invested in developing the system. The aim is to encourage the sharing of data between the various ministries of the provincial government and industrial organizations. The *BC Digital Atlas* provides a common framework for the various data sets. An impressive suite of digital products has been developed. These include vector data at 1:2,000,000, 1:250,000 and 1:20,000 scales. The capture of the 1:20,000 scale base mapping, known as TRIM (Terrain Resource Information Management program), was completed in 1996 and represents no fewer than 7,027 sheets, each covering 12 minutes of longitude by 6 minutes of latitude. The projection is UTM, NAD83 datum, and contouring is at 20 m intervals.

Manitoba

The **Manitoba Land Information Center (LMIC)**, was established in 1993, bringing together the Manitoba Government's mapping and land management interests in order to promote a more integrated approach to the provision of land related data. There is a 1:20,000 scale topographic mapping program for the more populous southern part of the province, and also a program of orthophoto mapping with a scale resolution of 1:10,000 for agricultural areas. A 'spatial data warehouse' has been established under the **Manitoba Land Related Information System (MLRIS)** and this is managed for the province by a private company, **Linnet**, as the **Land Information Navigator**.

New Brunswick

In 1989, the Provincial Government established a corporation (initially called the **New Brunswick Geographic Information Corporation**) to manage cadastral survey and registration, land valuation, topographic mapping and to deal with GIS requirements. In 1996 its remit was broadened, with a change of name to **Service New Brunswick (SNB)**. Cadastral maps of the entire province have been converted to digital format and hard copy property maps are available. **SNB** is also developing an online land records management system, **PLANET**.

Topographic mapping is available in digital format at scales of 1:10,000, 1:50,000 and 1:250,000. This data together form the Enhanced Topographic Database of 1996 (ETB96). Conversion of this data to the NAD83 (CSRS) datum is in progress. The basic scale resource map at 1:10,000 scale is available both digitally and as color orthophoto maps with 5 m contours.

A recent project has been the production of 326 coastal zone sheets in the form of digital color orthophotos with 1 m ground resolution. A coastal topographic and a coastal lands database are also in preparation from this photography, which was flown in 1996-97.

Newfoundland-Labrador

The topographic base mapping of the province of Newfoundland and Labrador now falls under the remit of the **Surveys and Mapping Division (SMD)** of the **Lands Branch of the Government Services and Lands Department**, created in 1996. The division is also responsible for geodetic survey, aerial photography, property mapping, the development of digital data standards, and for the provincial Geographical Names Board. **SMD** has produced community mapping at scales of 1:2,500 or 1:5,000 for most of Newfoundland and parts of Labrador. Nearly 4,000 of these maps have been produced, and in 1992 specifications were developed for digital map production.

1:50,000 and 1:250,000 scale NTS maps have also been digitized through a cost-sharing program with the federal government. **SMD** has also produced small scale wall maps of Newfoundland and Labrador, and electoral boundary mapping.

Northwest Territories

Detailed community mapping is undertaken by the **Surveys and Mapping Branch** within the **Department of Municipal and Community Affairs**, Whitehorse. Maps at 1:2,000 scale are available, usually with 1 m contours, and new digital mapping is being prepared from recent air photography of the communities.

Nova Scotia

Topographic mapping is a responsibility of the **Land Information Services Division** of the Nova Scotia **Department of Housing and Municipal Affairs**. The division has three sections, of which the **Nova Scotia Geomatics Centre (NSGC)** at Amherst is directly responsible for creation and maintenance of the *Nova Scotia Topographic Database (NSTDB)*. This includes provincial orthophoto, planimetric and contour mapping at 1:10,000 scale, mapping of urban centers at scales of 1:1,000, 1:2,000 or 1:5,000, and the NTS 1:50,000 and 1:250,000 scale mapping. **NSGC** also manages the provincial coordinate system, property records and air photography. The province has a corporate strategy for the overall development, coordination and standardization of geographical information which operates under the name of **GeoNOVA**.

Nunavut

The new territory of Nunavut was created in 1993, and achieved self-government in 1999. It is covered by the **NRCan** map of *Northwest Territories and Yukon Territory* (Map MCR 36) on which the new boundary was overprinted in 1994. Another map of Inuit owned lands is available. An atlas was published in 1992 by the **Canadian Circum Polar Institute**, Edmonton, which includes material collected to support the land claims agreement reached in 1991 and on which the establishment of the territory is based. A **Nunavut Planning Commission** was established in 1996 and is preparing land use plans for the territory and mapping its wildlife resources, areas of human impact, waste sites and relicts of the cultural heritage of the population. Much attention has been given to the collection and reinstatement of Inuit place names as a means of maintaining the cultural identity of the people. Initially this took place around the Inuit settlement of Nunavik at the instigation of the **Avataq Cultural Institute**, and a series of 1:50,000 topographic map sheets has been in progress consisting of the official NTS base maps to which the Inuit names have been added. Currently a **South Baffin Place Names Project** is underway by the **Nunavut Research Institute**, and the names collected will be printed on 1:250,000 scale topographic map sheets.

Ontario

Ontario's basic mapping program (OBM) was begun in 1976 and is carried out by the **Ontario Ministry of Natural Resources (OMNR)**. OBM maps have been published at 1:10,000 scale with 5 m contours for the south of the province, and at 1:20,000 with 20 m contours for the near north. The projection and grid are UTM with a standard 50 × 50 cm sheet format. The production of these printed paper maps continued until 1988 when the specification was modified to accommodate the requirements of the Provincial Digital Topographic Database. The digital OBM program was completed in 1998, providing large scale data for all of southern Ontario and the near north. A project to digitize the 1:50,000 NTS maps covering the area north of latitude 50° is under way with joint provincial and federal funding, and there are plans also to create digital maps for the Hudson Bay Lowlands presently covered only by photomaps. Planimetric mapping of urban areas has been undertaken at 1:2,000 scale with a 1 m contour interval, but this mapping is now produced by the municipalities.

Prince Edward Island

In Prince Edward Island the topographic base mapping is the responsibility of the **Department of the Provincial Treasury, Geomatics Information Center, Information Technology and Geomatics Services Section**. Digital and hard copy *Enhanced topographic base mapping* at 1:10,000 scale is maintained for the whole province together with cadastral mapping at 1:5,000 scale and larger scale mapping of the urban centers of Charlottetown (1:2,000) and Summerside (1:1,000). The 1:10,000 scale map was derived initially from 1985 and 1988 aerial photography, and contours are being added to the series with a 2 m interval. Many additional layers of graphical information have also been captured, mostly of administrative boundaries. A new high precision GPS network has been developed as part of the **Canadian Spatial Reference System**.

Quebec

Topographic mapping of Quebec is published by the province's **Ministère des Ressources Naturelles (MRN), Secteur des Terres**. The principal topographic series is the 1:20,000 scale base map, covering Quebec south of latitude 51° N. Sheets are indexed on the

Système québécois de référence cartographique (SQRC), and are available in both printed and in structured digital vector format, forming the *Base de données topographiques du Québec (BDTQ)*. The digital program was completed in 1999. A cadastral version of the 1:20,000 scale map is also published. A *Base des données topographiques et administratives (BDTA)*, scale 1:250,000, has been constructed from topographic data contained in the federal 1:50,000 scale series and administrative boundaries from a digital boundaries data set, the *Fichier informatique des limites administratives (FILA)*. Smaller scale databases are being constructed at scales of 1:1,000,000 *Base de données géographiques et administratives (BDGA)* and 1:8,000,000 *Base générale et administrative du Québec (BGAQ)*.

Saskatchewan

SaskGeomatics Division of Saskatchewan Property Management Corporation, has replaced the former **Central Survey and Mapping Agency** and is developing *SaskGIS*, a provincial database providing topographic, cadastral and small scale mapping in digital format. It will also include a road network database linked to an address and property register, and digital orthophotos and satellite imagery. A *SaskGIS data directory* is being prepared. **SaskGeomatics** is also responsible for the coordination of GIS implementation throughout the province, and works with both government and private sector to this end. Other responsibilities include management of the provincial legal survey system, geodetic control, and the production of provincial topographic and cadastral maps.

Since 1997, the province has been fully covered by topographic maps at scales of 1:50,000 and 1:250,000, completed under a joint federal-provincial program. These topographic maps are being captured as structured digital data. For larger scale cover, new orthophotos are being produced at 1:20,000 or 1:15,000 scale, funded through private-public partnerships. A 24-class land cover map of the province is being prepared from LANDSAT imagery.

Yukon

In 1992, the **Yukon Geographic Information System Coordinating Unit (YGISCU)** was established with the support of the **Yukon Territorial Government**, the **Federal Government** and the City of Whitehorse. Its remit is to investigate the Yukon's requirements for spatial data and to establish common data standards and information management. There is a particular interest in developing a **Land Interest Management System (LIMS)** for the Territory. The **Department of Renewable Resources** is also developing a Renewable Resources GIS to manage its land use, recreational and wildlife interests.

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GIS/Vector

A structured *National topographic data base (NTDB)* in vector format is being compiled from the 1:50,000 and 1:250,000 scale mapping, and will eventually cover the whole Canadian land mass.

Several specialized databases have been derived from the national topographic series. A digital terrain data set (DTED) has been compiled, partly by the **Department of National Defense** and partly by the **Department of Communication**, while the *Canadian road network Version 1* has been produced by a mixture of scanning from 1:50,000 and 1:250,000 scale maps and partly from stereo-digitizing at 1:50,000 scale.

Nova Scotia

An *Atlantic coastal zone database directory* has been prepared by the **Atlantic Coastal Zone Information Steering Committee (ACZISC)**. Version 3, released in 1996 contains 608 databases. An *Inventory of Atlantic coastal mapping projects* has also been prepared.

Ontario

Beginning in 1992, maps have been released in digital format. Initially these were captured from paper originals, but increasingly the data is collected digitally in the field, and all publications are now processed digitally.

Quebec

MRN also publish diverse large scale planimetric maps, and a series of digital orthophotomaps at 1:40,000 scale. 1:250,000 scale satellite

image maps, *spatiocartes régionales* are based on LANDSAT TM data, captured since 1989 and adjusted to fit the *Base des données topographiques et administratives (BDTA)*. Several administrative maps are published at the scale of 1:1,250,000.

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Nautical

Canadian waters are charted by the **Canadian Hydrographic Service (CHS), Fisheries and Oceans Canada**, founded in 1883. About 1,000 charts are available covering Canadian waters. Nautical charts have been raster scanned at a resolution of 254 dpi by **Nautical Data International Inc (NDI)**. These are distributed on CD-ROM and cover all Canadian waters except for the Arctic. The CDs include software for viewing the charts, and for locating features by latitude and longitude and measuring the bearing and range of features one from another. **CHS** has been active in the development of vectorized *Electronic navigation charts (ENCs)*, for use in **Electronic Chart Display Information Systems (ECDIS)**, and ultimately these may largely replace the paper charts.

Additionally, **CHS** has a bathymetric mapping program, the products of which include 1:250,000 scale *Natural resource maps (NRM)*, the *National earth science series (NESS)* at 1:1,000,000 and *Regional bathymetric maps (RBM)* at 1:2,000,000. A seamless digital **NRM** database is being developed.

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Aeronautical

Aeronautical charts are produced by the **Aeronautical Charts Service** within **Geomatics Canada** and include: *enroute charts*, *VFR navigation charts* (1:500,000 scale, 52 sheets in the series), *VFR terminal area charts* (1:250,000 scale, 5 sheets in the series) and *World aeronautical charts (WAC)* (1:1,000,000 scale, 18 sheets in the series). The Service has set up a **Canadian Aeronautical Charts (CANAC)** system, and has digitized most of its products for automated production within this system. The sheet lines and layout of the enroute charts were redesigned prior to the automation of the series. There are 18 charts in this series, with a 56-day revision cycle.

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Geological/Scientific

The federal earth science program is the responsibility of the **Geological Survey of Canada (GSC)**, founded in 1842 and achieving permanent status in 1877. In 1995, **GSC** as a sector within **NRCan**, was joined with **Geomatics Canada** to form a new earth sciences sector, but retains its own identity and programs. The **Geological Survey** has always had a primary interest in mapping, and was initially involved in topographic as well as geological survey, retaining a topographic division until 1936. It has published a number of small-scale general maps on earth science topics (mainly dating from the 1960s and subsequently) and geological maps of regions and provinces, and has also compiled some incomplete series mapping of the country at scales of 1:1,000,000, 1:500,000 and 1:250,000, as well as much detailed mapping. In 1991, **NATMAP**, Canada's **National Geoscience Mapping Program**, was launched. This coordinates and provides funding for collaboration with provincial surveys, universities and industrial concerns to carry out projects designed to extend geological knowledge of the country. Several major projects have been supported, such as the **Shield Margin Project** in Manitoba and Saskatchewan, and the **Southern Alberta NATMAP** 1:50,000 scale mapping. A general overview of Canadian geology, including many large maps, is provided by the *The geology of Canada*, a five-volume contribution to the Decade of North American Geology.

The **Geophysical Data Center** of **GSC** holds national cover of aeromagnetic and gravity data. A *Canadian geophysical atlas* was published in 1990 and includes a number of 1:10,000,000 scale aeromagnetic, gravity, geomagnetic and seismicity maps of the country.

Alberta

Earth science mapping is undertaken by the **Alberta Geological Survey (AGS)** which has been recently transferred to the **Alberta**

Energy and Utilities Board. The *Geological atlas of the Western Canada Sedimentary Basin*, published by the **Canadian Society of Petroleum Geologists (CSPG)** is available in printed form and also as a digital version.

British Columbia

Earth science mapping is undertaken by the **BC Geological Survey Branch (BCGSB)**, formerly under the **Ministry of Employment and Investment**, but now under the **Ministry of Energy and Mines**. Following a cross-government program review, a number of changes to **BCGSB** were implemented in 1997. **BCGSB** was to be restructured into sections dealing respectively with Mapping and Resource Evaluation, Economic and Mineral Inventory, and Exploration Services and Information.

Manitoba

Earth science mapping is undertaken by the **Manitoba Geological Services Branch (MGS)**. A 1:1,000,000 scale multi-colored geo-scientific series gives an overview of specific earth-science related subjects, and a 1:250,000 scale *Bedrock geology compilation map series* in 57 sheets is still in progress. **MGS** has also participated in the NATMAP Shield Margin and Southern Prairies Projects, which resulted in the production of maps and digital databases with an emphasis in engineering geology, hydrology and environmental themes.

New Brunswick

The **Geological Surveys Branch (GSB)** of the New Brunswick **Minerals and Energy Division** is responsible for the geological mapping program and has produced mineral occurrence maps and a large amount of geophysical and geochemical mapping. Detailed surveys at 1:50,000 scale or larger have been completed for more than half the province and surficial geology and geochemical surveys for less than half.

Newfoundland-Labrador

Earth science maps are produced by the **Geological Survey of Newfoundland and Labrador (GSNFL)**, a branch of the Newfoundland **Department of Mines and Energy**. Bedrock geological maps at scales of 1:50,000 for Newfoundland and 1:100,000 for Labrador are available for about 60 percent of the province. Maps of surficial deposits have been published at 1:500,000 scale for Newfoundland and 1:1,000,000 for Labrador.

Northwest Territories

Earth science mapping is undertaken by the **NWT Geological Division (NWTGD)** of the **Department of Indian and Northern Affairs**. A major project has been carried out at part of the **NATMAP Program**, and the results have been released on CD-ROM.

Nova Scotia

Earth science mapping is undertaken by the **Minerals and Energy Branch, Nova Scotia Department of Natural Resources (NSDNR)**. In addition to numerous small-scale thematic maps of the province, now available in both printed and digital format, detailed bedrock and quaternary mapping has been undertaken at scales of 1:50,000, and regional maps at 1:100,000, 1:125,000 or 1:250,000, and most of the province has now been covered. There is also a series of 1:250,000 scale peatland maps, and a series of *Mineral resource land use maps (MRLUs)* by county at 1:50,000 scale, designed to support strategic land and resource planning in the province. Recent mapping activity has concentrated on the central Meguma Zone.

Ontario

Provincial geological mapping is carried out by the **Ontario Geological Survey (OGS)**, a branch of the Ontario **Ministry of Northern Development and Mines**. **OGS** collects, analyses and disseminates geoscience data and provides services to the minerals industry. A huge range of maps has been published over a period of more than 100 years. The Sedimentary Geosciences Section has compiled, quaternary geological mapping and geochemical mapping at 1:50,000 scale, Palaeozoic and Mesozoic bedrock mapping, and a series of *Aggregate resource inventory maps (ARIMs)* with accompanying reports. Geological and geophysical mapping of the Precambrian basement is undertaken by the **Precambrian Geoscience Section**.

Prince Edward Island

Geological survey is managed by **Energy and Minerals**, Charlottetown, and a map of surficial deposits has been published by the

Geological Survey of Canada.

Quebec

Earth science mapping is carried out under the **Direction de la Géologie** of the **MRN**, by the **Service Géologique de Québec (SGQ)** and the **Service Géologique du Nord-Ouest (SGNO)**. There is a large range of geological, geochemical, geophysical and mineral occurrence mapping at scales mainly of 1:20,000, 1:50,000 and 1:250,000.

Saskatchewan

Saskatchewan Energy and Mines (SEM) is concerned with oil, gas and mineral resources in the province. Maps are published in its *Report series*, and include a compilation bedrock geology map series at 1:250,000 scale, and a series of metallogenic maps.

Yukon

The **Yukon Geology Program** is carried out jointly by the **Exploration and Geological Services Division** of the **Department of Indian and Northern Affairs** and the **Mineral Resources Branch** of the Yukon Territorial Government. The program includes geological mapping and mineral resource assessment, together with geochemical and geophysical investigations. A series of 1:250,000 scale maps of mineral occurrences forms part of the *Yukon Minfile* database. Numerous detailed maps of bedrock and surficial geology have been published.

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Imagery

The **Geodetic Survey Division** of **NRCan** is responsible for maintaining the **Canadian Spatial Reference System**, for geodetic standards, and for maintaining the national gravity and survey control networks. In 1994, the **Canadian Active Control System** was introduced, using GPS position fixing technology to improve the quality of the geodetic survey framework.

The **Canada Center for Remote Sensing (CCRS)** was founded in 1971. In collaboration with the **Canadian Forest Service**, **CCRS** has produced a land cover map of Canada generated from 1995 **NOAA AVHRR** (Advanced Very High Resolution Radiometer) data, on which 29 land cover classes are identified.

Northwest Territories

The **NWT Center for Remote Sensing** produces georeferenced satellite imagery in both hard copy and digital format, and this is used for a variety of *ad hoc* thematic mapping applications within the **Department of Resources, Wildlife and Economic Development**.

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Soil

Detailed soil mapping in Canada is carried out at the provincial level but is coordinated federally by the **Canadian Soil Information System (CanSIS)**, under the auspices of **Agriculture and Agri-Food Canada (AAFC)**, and based at one of the **AAFC** Research Centers. Surveys have been carried out in limited areas at scales ranging from 1:20,000 to 1:250,000. They are usually accompanied by monographs and in the eastern provinces they have been published on a county basis. Recently, most provinces have been developing or upgrading their soil mapping as digital soil inventories. **CanSIS** has developed a series of small-scale digital databases on soil-related themes covering the whole nation. These include the *Soil landscapes of Canada (SLC)*, GIS data at 1:1,000,000 scale, the *National ecological framework*, also at 1:1,000,000 and based on SLC polygons, *Agroecological areas (ARAs)* at 1:2,000,000, and the *Soil map of Canada/Land potential database* at the scale of 1:5,000,000, which supersedes the map published in 1980.

Alberta

Soil maps of Alberta are published by **Alberta Agriculture, Food and Rural Development**. A number of exploratory 1:250,000 scale, and more detailed 1:125,000 scale soil maps are available.

Manitoba

Soil mapping is the responsibility of **Manitoba Agriculture**, and an extensive range of soil reconnaissance and more detailed mapping has been compiled for the agricultural regions of southern Manitoba.

New Brunswick

Soil surveys have been undertaken in New Brunswick since 1938, and since 1975 the original reconnaissance surveys have been progressively replaced by detailed resurvey at 1:20,000 scale. Paper maps are accompanied by reports, and increasingly the data are also available in digital format. Data has also been incorporated in the 1:1,000,000 scale *Soil landscapes of Canada* database.

Newfoundland-Labrador

Exploratory soil survey of the province at 1:250,000 scale took place in the 1970s as part of the **Canada Land Inventory Program**. Subsequently, more detailed maps at scales of 1:50,000 to 1:25,000 were prepared for some of the agricultural areas. Currently soil survey is the responsibility of the **Soil and Land Management Division** of the **Department of Forest Resources and Agrifoods**. Mapping now mainly comprises the preparation of *On-farm maps* at scales of 1:2,500 and 1:5,000 as a free service to individual farmers. These maps are designed as base maps for crop planning and management; soil suitability maps may also be provided as part of the package.

Nova Scotia

A number of soils maps and accompanying reports have been produced by the **Nova Scotia Land Resource Unit**, Truro. Each report covers a county and the maps are mostly at the scale of 1:63,360. There is also more detailed mapping of some areas at 1:5,000 or 1:20,000. Digital versions of many of these soil maps have been incorporated in the national soil database, CanSIS.

Ontario

Soil and land capability maps of Ontario is published by the **Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)**. Some monochrome mapping at 1:50,000 scale is available showing the land capability classes of the Canada Land Inventory.

Saskatchewan

Soil survey began in Saskatchewan in the 1920s, and the province has the most complete soil inventory of all the provinces. In 1965, the **Institute of Pedology** was founded, later becoming the **Saskatchewan Center for Soil Research**. The latest comprehensive survey took place between 1958 and 1996. The scale of these surveys was 1:126,720 for the earlier sheets or 1:100,000 for more recent ones. Digital data at this scale resolution are also available for the whole of the province south of 55°N.

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Vegetation/Forestry

Canada has a long-established tradition of inventorying, mapping and monitoring land use and land cover. In 1963, the **Canada Land Inventory (CLI)** was set up under the Agriculture and Rural Development Act as a cooperative federal-provincial program to make a comprehensive reconnaissance-level survey of land use and land capability. Some 2.6 million 2 km were mapped, covering the Maritime Provinces and the southern agricultural areas of Quebec, Ontario, the Prairie provinces and British Columbia. From 1968, CLI maps began to be digitized and became part of a geographical information system, the Canada Land Data System (CLDS). In 1971, a series of land use maps to cover the Yukon and Northwest Territories was also initiated. Designated the *Northern land use information series*, it was federally funded by **Environment Canada** and the **Department of Indian and Northern Affairs**, and over 400 1:250,000 scale sheets were produced. A further project, the Canada Land Use Monitoring Program, recorded urban land use changes at three time intervals between 1966 and 1981. Data from these projects were all incorporated in the CLDS. By 1995 however, the system had become outdated, and its use by government was terminated. The data has subsequently been transferred to the **National Archives of Canada**,

and a project was carried out with support from **Statistics Canada**.

Alberta

The **Resource Data Division** has also been updating the 1:50,000 scale *Access series*, which covers the forested areas of the province, and is designed for forest fire control. This has been done using 5 m resolution Indian Remote Sensing (IRS) data in a contract with **Resource GIS and Imaging (RGI)**, Vancouver.

British Columbia

Forest resource inventory is undertaken by the **Resources Inventory Branch** of the **Ministry of Forests**.

Manitoba

A 1:1,000,000 scale *Wetlands map of Manitoba* has been published by the **University of Alberta** in cooperation with the **Canadian Forest Service** and **MGS**.

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Thematic

Ecological mapping and monitoring takes place under the umbrella of Directorates of **Environment Canada**. In 1976, the **Canada Committee on Ecological Land Classification (CCELC)** was formed to develop a uniform ecological approach to the classification of Canada's land resource base. The scheme was described in a report, *Ecological land classification series No. 19* published in 1986, and a map of ecoregions was published in 1987 in the *National atlas series*. Within the **CCELC**, a **National Wetlands Working Group** developed a map of *Wetland regions*, also published as part of the national atlas. Subsequently, in 1989, a map of *Ecoclimatic regions* was published accompanying Report No. 23 of the *Ecological Land Classification Series*. In 1991, a new collaborative project was initiated between **Environment Canada**, **AAFC** and the **Canadian Forest Service (CFS)** with the aim of revising and refining the ecological map unit boundaries, and to seek to incorporate and harmonize existing ecological maps, such as those produced by provincial authorities. Monitoring of ecological change is being undertaken by the **Ecological Monitoring and Assessment Network (EMAN)** established under the **Ecosystem Science Directorate of Environment Canada**.

Weather maps and climatic atlases, maps and data are published by the **Climate and Water Products Division** of the **Atmospheric Environment Service**. These include a five-volume *Climatic atlas of Canada*, containing more than 400 maps derived from the 1951-80 normals period, the *Canadian sea ice atlas*, *Great lakes climatological atlas* and a *Rainfall frequency atlas*. Digital maps of temperature and precipitation based climate normals for 1961-90 are also available.

British Columbia

Maps of biophysical and wildlife suitability and capability are prepared by the **Wildlife Inventory Section** of the **Resources Inventory Branch** within the **Ministry of Environment, Lands and Parks**. An ecoregion classification map is available at 1:2,000,000 scale, but more detailed mapping is undertaken on the 1:20,000, 1:50,000 and 1:250,000 scales. A provincial **Resources Inventory Committee** has been set up to establish standards for natural and cultural resources.

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Atlas

Canada's first national atlas was produced in 1906, and was followed by several further editions. The current, fifth edition *National atlas of Canada* began in 1978 and was completed in 1994 and the same year was it was launched in a digital version. It now forms part of a broader range of services managed by the **GeoAccess Division of CCRS**. The paper atlas comprises 93 sheets, available in English or French. The principal scale is 1:7,500,000, though some larger sheets use a 1:5,000,000 scale. Maps are also available in digital raster format, while the national atlas base map components are available digitally at five scales and in five data layers. Additional special maps

in the *National atlas series* are published from time to time, and a number of popular by-products have been produced in partnership with private organizations, such as the poster *Canada, a land of superlatives*, published with the **Royal Canadian Geographic Society** in 1995.

A number of provincial, regional and monothematic atlases have been published.

Geographical names are the responsibility of the **Canadian Permanent Committee on Geographical Names (CPCGN)**, except in Quebec, where the authority is the **Commission de Toponymie** of the Quebec government. Gazetteers of each province have been published in paper format, and are also now available as digital versions. **NRCan** publishes a *Gazetteer of undersea features*.

Alberta

A four-volume series of *Place names of Alberta*, published by the **University of Calgary Press**, includes information about the origin of the names as well as reference to the topographic maps on which they are found, latitude and longitude, and distance to the nearest populated center.

Nova Scotia

GSC Atlantic, formerly the **Atlantic Geoscience Center**, is based at the **Bedford Institute of Oceanography** at Dartmouth. It is publishing a series of five *East coast basin atlases*. The atlases outline the regional sedimentary stratigraphy, structure and geochemistry of the basins. Maps are at 1:2,000,000 scale, and the texts are in English and French.

Prince Edward Island

The **Department of Transportation and Public Works** has prepared a digital *Provincial highway network map*, and this was used to derive a printed 1:50,000 scale road atlas.

Quebec

A web-based *Atlas du Québec et ses régions* is being developed by academic staff in all the Québec universities, and several provincial government departments are partners in the enterprise. The atlas will comprise a general thematic atlas of the province and a series of locally produced, more detailed atlases for each of the 17 regions.

The provincial government's official publisher, **Les Publications du Québec**, issued a substantial gazetteer, *Repertoire toponymique du Québec* in 1987 with a supplement in 1993, and in 1994 an illustrated gazetteer, *Noms et lieux du Québec*.

Saskatchewan

An *Atlas of Saskatchewan* was published in 1969. In 1996, a new Saskatchewan Atlas Project began at the **Department of Geography, University of Saskatchewan**.

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Cadaster

Ontario

In 1998, **Land Information Ontario** was established within **OMNR** to develop a common framework for the production and supply of land information throughout the province. The office will work in cooperation with a large number of government and private organizations to standardize digital land data and make it more accessible to users. The program also includes the provision of metadata and the establishment of internet services for data acquisition.

The **Ontario Ministry of Transportation** produces road network maps at 1:100,000 scale, and popular highway maps of the province at 1:250,000 scale.

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Tourist/Reference

Commercial mapping

There are still fewer commercial map publishers in Canada than in many Western countries. However, a number of small cartographic studios have begun to emerge in the last 20 years. Most of these, however, provide a bureau service to publishers and do not necessarily publish maps under their own imprint.

The **MapArt Publishing Corporation (MapArt)**, Oshawa, Ontario, is a custom mapping and publishing company, founded in 1978. Most of its output is now under its own name, although it still provides customized mapping and, for example, produced the maps in the *Reader's Digest atlas of Canada*. It now has an extensive product list of its own which includes high quality provincial road maps and 1:25,000 or larger scale maps of cities and urban areas. Among its products is a *Toronto and area CD-ROM atlas* of the whole province of Ontario.

Canadian Cartographics, located in Coquitlam, British Columbia, was founded in 1971, and began by preparing maps for government, education and other private sector organizations, but since 1983 has been building a list under its own imprint. It now publishes more than 180 titles, including maps of national and provincial parks in BC, county and electoral district maps, satellite image maps and street and road maps and atlases. A gazetteer atlas of British Columbia and a new street atlas of Vancouver were in preparation in 1999.

Allmaps Canada Ltd (Allmaps), based at Markham Ontario, is part of the **Rand McNally Publishing Group**, whose headquarters are in Chicago, and its maps carry the **Rand McNally** banner. **Allmaps** focuses on the production of maps for the Canadian market and provides an extensive list of street level city maps, regional maps and provincial highway maps.

Well-known for its extensive list of maps of overseas venues, **International Travel Maps (ITM)**, founded by the late Kevin Healey, began producing maps in 1987 and now has over 100 titles. In some instances **ITM** provides the best, sometimes the only, general map of a country where indigenous mapping is of poor quality or hard to obtain.

Several publishers in Québec province produce tourist and street maps of the eastern provinces, including **Cartes Géographiques C.P.**, **ENR** and **La Cartothèque Géo-Montages Ltée**. The latter has a series of 12 regional tourist maps covering most of Québec.

Pathfinder Maps of Carp, Ontario specialize in the production of street maps of cities in Ontario. Their list also includes a digital map of the Ottawa-Hull area. **Tapestry Graphics** produce bird's eye views of Ontario regions.

Recently several small publishers have begun to issue high quality topographic maps for the recreational market. **Gem Trek Publishing** uses federal topographic maps or map data for the base and adds up-to-date recreational information such as trails and camp sites. **Chrismar Mapping Services** in cooperation with **Harvey Maps**, Scotland, is producing a series of *Adventure maps*. **Harvey's** provide original photogrammetrically produced base maps to which Chrismar add data collected in the field.

Canadian Geographic Enterprises (CGE), which publishes the magazine *Canadian Geographic*, also publishes maps and atlases from time to time, usually through joint ventures.

Several Canadian universities have published maps and provincial or thematic atlases (discussed in the provincial section). The **University of Waterloo Cartographic Centre (UWCC)** can be singled out for its production of occasional and interesting innovative maps.

RADARSAT International (RSI) is a private corporation established in 1989 and is concerned with the processing, marketing and distribution of synthetic aperture radar (SAR) imagery captured by Canada's RADARSAT satellites. Among their many applications, SAR data have been used for the production of ortho-image maps, land cover and coastal zone mapping, and for geological exploration in various parts of the world. **WorldSat International Inc**, founded in 1986, acquires and processes satellite imagery and has produced a number of products for the mass market, including satellite image posters based on NOAA AVHRR, LANDSAT and SPOT imagery, and covering the world, continents, city regions and National Parks. Recent publications also include a *Cartographic satellite atlas of the World*, and the *Axion 3D world atlas* on CD-ROM.

Geomatics International Inc. is a private consulting company specializing in GIS and remote sensing applications.

DATAMAP Electronic Mapping provides desktop mapping software and also digital data such as lot polygon maps of Southern Ontario, digital postcode boundaries, and electronic street mapping of Canadian and United States cities. It also publishes the *Canadian atlas of FSA postal areas*.

A wide range of satellite image maps is published or distributed by **Map Appeal Inc** and includes images of Canada, the Great Lakes, British Columbia and the Toronto region in simulated true color.

Useful maps of Canada are also published by numerous overseas publishers, including **HarperCollins**, and the **National Geographic Society (NGS)**. The United States publisher **Trails Illustrated** has also extended its range of recreational maps into Canada. Street maps of Canadian cities are also published by some overseas publishers, including **Berdtson & Berdtson (B&B)**, and **GeoCenter**.

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Census/Demography/Statistics

Statistics Canada (STC) is the national statistical agency, responsible for collecting and disseminating demographic, social and economic statistical information. There is a five-yearly population census, and an agricultural census is also carried out in the same years. Large numbers of census division and enumeration districts maps have been issued. Thematic maps using data from **Statistics Canada** have been included in the National atlas series, as well as maps showing the results of Federal elections and the distribution of parliamentary seats. The 1981 and 1991 agricultural census data had been recompiled on to Soil landscapes of Canada polygons. **Health Canada**, together with **Statistics Canada**, has produced a multi-volume Mortality atlas of Canada.

The **Electoral Geography Division of Elections Canada (EC)** has built an Electoral Geography Data Base (EGDB) which can provide boundary data for electoral districts and polling divisions, and geocoded elector addresses within these units. A wide variety of maps are produced in support of the election process, and thematic mapping of electoral results is also undertaken. In 1995, **EC** formed a partnership with **Statistics Canada** to develop a National Geographic Database containing base data and boundaries which are of common interest to the two organizations.

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