



Natural Resources
Canada

Ressources naturelles
Canada

CanTopo

Data Product Specifications

Edition 1.1

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**Natural Resources Canada
Earth Sciences Sector
Centre for Topographic Information**

2144, King Street West, Suite 010
Sherbrooke, Québec, Canada
J1J 2E8

Telephone: +01- 819-564-4857 (International)
Telephone: +01-800-661-2638 (Canada and USA)
Fax: +01-819-564-5698
E-mail: topo.maps@NRCan.gc.ca
URL: www.GeoGratis.gc.ca



Canada

Notices

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RELEASE HISTORY

Date	Version	Description
2009-05-31	1.0	Initial version
2010-06-30	1.1	Addition of GeoTIFF as an output format and minor editing of text.

These specifications are produced in accordance with *International Standard ISO/TC 211, 19131: 2007 Geographic Information / Geomatics – Data Product Specification*, which refers in particular to standard *ISO 19115: 2003 Geographic information – Metadata*.

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1 OVERVIEW

1.1 Title

CanTopo: Data Product Specifications

1.2 Reference date

2010-06-30

1.3 Responsible party

Natural Resources Canada
Earth Sciences Sector
Centre for Topographic Information
2144 King Street West, Suite 010
Sherbrooke, Québec, Canada
J1J 2E8

Telephone: +01-819-564-4857
Telephone: +01-800-661-2638 (Canada and USA)
Fax: +01-819-564-5698
E-mail: topo.maps@NRCan.gc.ca
URL: www.GeoGratis.gc.ca

1.4 Language

eng – English
fra – French

1.5 Abbreviations and acronyms

CDB Cartographic Data Base
CGNDB Canadian Geographical Names Data Base
CGVD28 Canadian Geodetic Vertical Datum of 1928
CSRS Canadian Spatial Reference System
CTI Centre for Topographic Information
EPSG European Petroleum Survey Group
ESS Earth Sciences Sector
GeoPDF Georeferenced Portable Document Format
GeoTIFF Georeferenced Tagged Image File Format
GIS Geographic Information System
GPS Global Positioning System
NAD83 North American Datum of 1983
NRCan Natural Resources Canada
Centre for Topographic Information (NRCan, ESS)

NTS	National Topographic System
OGP	International Association of Oil & Gas Producers
PDF	Portable Document Format
TIFF	Tagged Image File Format

1.6 Informal description of the data product

CanTopo is the next generation of topographic maps being produced by Natural Resources Canada (NRCan). This digital cartographic product originates from the best available data sources covering the Canadian territory and offers a quality cartographic product in vector and raster format that complies with international geomatics standards. CanTopo digital maps are multipurpose and can be utilized in a multitude of scenarios ranging from emergency response and natural resource management, to geographical education and planning a safe backcountry camping expedition. Plotted versions of CanTopo can also be used along with Global Positioning System (GPS) receivers as an additional aid or digital files can be integrated into some receivers using independent software.

CanTopo is a multi-source product generated from the Cartographic Data Base (CDB) described in the document *Cartographic Data Base: Data Product Specifications*. Data within the CDB comes mainly from the GeoBase initiative (www.geobase.ca), NRCan digital topographic data and data from national initiatives. Data from authoritative sources, such as other government agencies both federal and provincial, are identified, and used.

CanTopo aims to provide digital topographic maps for the Canadian landmass. As a minimum, all titles published will include new roads, hydrology, metric contours, and updated toponyms and administrative boundaries. Special effort will be made to update “limited access” roads in defined areas. Higher levels of map revisions will be undertaken only with a partnership agreement with other government departments or agencies for specified areas.

Titles in CanTopo are scheduled to be published quarterly. CanTopo data will be freely accessible through the GeoGratis Web portal according to the terms of the GeoGratis License Agreement for Unrestricted Use (www.GeoGratis.gc.ca) in output file formats PDF (Portable Document File), GeoPDF (Georeferenced Portable Document File), TIFF (Tagged Image File Format), and GeoTIFF (Georeferenced Tagged Image File Format).

2 SPECIFICATION SCOPE

2.1 Scope identification

Global

2.2 Level

006 – series

2.3 Level name

Global scope of CanTopo

2.4 Extent

2.4.1 Description

Selected areas of the Canadian landmass

2.4.2 Vertical extent

2.4.2.1 Minimum value

0

2.4.2.2 Maximum value

5959

2.4.2.3 Unit of measure

Metre

2.4.2.4 Vertical datum

Elevations are orthometric and expressed in reference to mean sea level Canadian Geodetic Vertical Datum of 1928 (CGVD28).

2.4.3 Horizontal extent

2.4.3.1 West bound longitude

-141.0 (141 degrees west of Greenwich)

2.4.3.2 East bound longitude

-52.0 (52 degrees west of Greenwich)

2.4.3.3 South bound latitude

+41.0 (41 degrees north of Equator)

2.4.3.4 North bound latitude

+84.0 (84 degrees north of Equator)

2.4.4 Temporal extent

2.4.4.1 Beginning date

1945

2.4.4.2 Ending date

Today

3 DATA PRODUCT IDENTIFICATION

3.1 Title

CanTopo

3.2 Abstract

CanTopo is the next generation of topographic maps being produced by NRCan. This digital cartographic product originates from the best available data sources covering the Canadian territory and offers a quality cartographic product in vector and raster format that complies with international geomatics standards.

CanTopo is a multi-source product generated from the CDB described in the document *Cartographic Data Base: Data Product Specifications*. Data within the CDB comes mainly from the GeoBase initiative (www.geobase.ca), NRCan digital topographic data and data from national initiatives. Data from authoritative sources, such as other government agencies both federal and provincial, are identified, stored, and used.

3.3 Purpose

CanTopo aims to provide digital topographic maps for the Canadian landmass. Output file formats include PDF, GeoPDF, TIFF, and GeoTIFF. CanTopo digital maps are multipurpose and can be utilized in a multitude of scenarios ranging from emergency response and natural resource management, to geographical education and planning a safe backcountry camping expedition. Plotted versions of CanTopo can also be used along with GPS receivers as an additional aid or digital files can be integrated into some receivers using independent software.

As a minimum, all titles published will include new roads, hydrology, metric contours, and updated toponyms and administrative boundaries. Special effort will be made to update “limited access” roads in forested areas. Higher levels of map revisions will be undertaken only with a partnership agreement with other government departments or agencies for specified areas.

3.4 Topic category

- 002 – biota
- 006 – elevation
- 007 – environment
- 010 – imageryBaseMapsEarthCover
- 011 – intelligenceMilitary
- 012 – inlandWaters
- 013 – location
- 017 – structure
- 018 – transportation
- 019 – utilitiesCommunication

3.5 Spatial representation type

- 001 – vector

3.6 Spatial resolution

10 000 – 50 000

3.7 Geographic description

3.7.1 Authority

International Organization for Standardization (ISO)

3.7.1.1 Title

ISO 3166-1:1997 Codes for the representation of names of countries and their subdivisions – Part 1: Country codes.

3.7.1.2 Date

1997-10-01

3.7.1.3 Date type code

002 – publication

3.7.2 Code

CA – Canada

3.7.3 Extent type code

1 – inclusion

3.8 Reference to specification scope

Global

4 DATA CONTENT AND STRUCTURE

4.1 Description

CanTopo is derived from the CDB as described in the documents *Cartographic Data Base: Data Product Specifications* and *Cartographic Data Base: Feature Catalogue*. Information in the surround is comprised of information derived from the metadata of the geospatial entities and graphical components stored internally within the Centre for Topographic Information (CTI). The CDB is a multi-source database with data coming mainly from the GeoBase initiative (www.geobase.ca), NRCan digital topographic data and data from national initiatives. Data from authoritative sources, such as other government agencies both federal and provincial, are identified and used.

These data sources are integrated and processed to provide the cartographic representations required for the CanTopo product according to the document *CanTopo: Standards and Specifications (in work)* and will be available freely through the GeoGratis Web portal (www.GeoGratis.gc.ca) in output file formats PDF, GeoPDF, TIFF, and GeoTIFF.

4.2 Feature information

4.2.1 Application schema

The application schema for the CanTopo product has not been modeled because of the high quantity of entities and the complexity of the numerous relationships and associations that exist between those entities. However, for some of the CanTopo product entities that are issued from GeoBase initiatives, an application sub-schema might exist (e.g.: Segmented Conceptual Data Model of National Road Network, Canada, Level 1 (www.geobase.ca)).

The document *CanTopo: Feature Catalogue* contains the pertinent information about the data structure and the content of the product.

The document *CanTopo: Product Distribution Formats* also shows the way the conceptual model of the feature catalogue is materialized in the physical data model of the CanTopo product according to the distribution formats PDF, GeoPDF, TIFF, and GeoTIFF.

4.2.2 Feature catalogue

The complete document *CanTopo: Feature Catalogue* can be found on the GeoGratis Web site (www.GeoGratis.gc.ca).

4.3 Reference to specification scope

Global

5 REFERENCE SYSTEMS

5.1 Spatial reference system

Spatial data are expressed in Universal Transverse Mercator (UTM) coordinates in reference to the North American Datum of 1983 (NAD83) in the Canadian Spatial Reference System (NAD83CSRS).

5.1.1 Authority

5.1.1.1 Title

EPSG Geodetic Parameter Registry

URL: <http://www.epsg-registry.org>

5.1.1.2 Date

2008-11-12

5.1.1.3 Date type code

002 – publication

5.1.1.4 Responsible party

OGP – International Association of Oil and Gas Producers

URL: <http://www.epsg.org>

5.1.2 Code

2955 to 2962, 3154 to 3160 and 3761

Note: Each code represents one of Canada's 16 UTM (7 to 22) zones.

5.1.3 Code space

EPSG – European Petroleum Survey Group

5.1.4 Version

6.18

5.2 Reference to specification scope

Global

6 DATA QUALITY

6.1 Completeness

The data quality assessment (integration) is carried out during the data production process. The integration required depends on the data source used. CanTopo is a multi-source product generated from the CDB described in the document *Cartographic Data Base: Data Product Specifications*. Data within the CDB comes mainly from the GeoBase initiative (www.geobase.ca), NRCan digital topographic data and data from national initiatives. Data from authoritative sources, such as other government agencies both federal and provincial, are identified and used.

During data integration, the datasets that are produced are grouped into National Topographic System (NTS) tiles. Data for each NTS tile is inspected prior to processing to ensure the vertical fit between datasets.

CanTopo aims to provide digital topographic maps for the Canadian landmass. As a minimum, all titles published will include new roads, hydrology, metric contours, and updated toponyms and administrative boundaries. Special effort will be made to update “limited access” roads in defined areas. Higher levels of map revisions will be undertaken only with a partnership agreement with other government departments or agencies for specified areas.

6.1.1 Commission

Quality control is performed on 100% of the output files. During this step, issues with vertical integration, symbolization and toponymic conflicts are resolved to ensure that features are represented cartographically according to the document *CanTopo: Standards and Specifications (in work)*.

6.1.2 Omission

The methodology described to evaluate the commissions is also applied to verify the omissions in the CanTopo product.

6.2 Logical consistency

6.2.1 Conceptual consistency

The rules of the CanTopo conceptual schema are all recorded and validated in the source database containing the CanTopo product. This approach ensures the conceptual consistency between the conceptual schema and the CanTopo product.

6.2.2 Domain consistency

The domain of values included in the feature catalogue are all recorded and validated in the source database containing the CanTopo product. This approach ensures the domain consistency between the feature catalogue and the CanTopo product.

6.2.3 Format consistency

The use of well-established commercial software to generate distribution formats ensures format consistency for CanTopo product distribution.

6.2.4 Topological consistency

Topological relationships between (and within) entities are all recorded and validated in the source databases for each CanTopo dataset. This approach ensures topological consistency between the feature catalogue and the CanTopo product.

6.3 Positional accuracy

6.3.1 Absolute external positional accuracy

The CanTopo product comes from multiple data sources. The dataset positional accuracy assessment is related to these data sources therefore, the overall dataset positional accuracy cannot be assessed. The maximum and the minimum horizontal accuracy values extracted from all sources in the dataset are provided when available.

6.3.2 Relative internal positional accuracy

Positional accuracy is obtained through examination of the metadata records for each dataset. The maximum and minimum horizontal accuracy values are extracted when available.

6.4 Temporal accuracy

6.4.1 Accuracy of a time measurement

Not applicable

6.4.2 Temporal consistency

Not applicable

6.4.3 Temporal validity

Not applicable

6.5 Thematic accuracy

6.5.1 Thematic classification correctness

Not applicable

6.5.2 Non quantitative attribute accuracy

Not applicable

6.5.3 Quantitative attribute accuracy

Not applicable

6.6 Reference to specification scope

Global

7 DATA CAPTURE

7.1 Description

The CanTopo product is created by extracting the geospatial data for a specific NTS tile from the CDB which is described in the documents *Cartographic Data Base: Data Product Specifications* and *Cartographic Data Base: Feature Catalogue*. Information in the surround is comprised of information derived from the metadata of the geospatial entities and graphical components stored internally within CTI.

7.2 Reference to the specification scope

Global

8 PORTRAYAL

8.1 Title

CanTopo: Standards and Specifications (in work)

8.2 Date

2010-06-30

8.3 Date type code

002 – publication

8.4 Reference to specification scope

Global

9 DATA PRODUCT DELIVERY

9.1 Delivery format information PDF

9.1.1 Format name

PDF – Portable Document Format

9.1.2 Version

1.5 (August 2003)

9.1.3 Specification

PDF Reference, Fourth Edition, version 1.5
(http://partners.adobe.com/public/developer/en/pdf/PDFReference15_v6.pdf - accessed 21 June 2010)

9.1.4 Language

eng – English

9.2 Delivery format information GeoPDF

9.2.1 Format name

GeoPDF – Georeferenced Portable Document Format

9.2.2 Version

2.2 (2009-04-18)

9.2.3 Specification

GeoPDF Encoding Best Practice (OGC 08-139r2)
(<http://www.opengeospatial.org/standards/bp> - accessed 21 June 2010)

9.2.4 Language

eng – English

9.3 Delivery format information TIFF

9.3.1 Format name

TIFF – Tagged Image File Format

9.3.2 Version

6.0 (3 June 1992)

9.3.3 Specification

<http://partners.adobe.com/public/developer/en/tiff/TIFF6.pdf> (accessed 21 June 2010)

9.3.4 Language

eng – English

9.4 Delivery format information GeoTIFF

9.4.1 Format name

GeoTIFF – Georeferenced Tagged Image File Format

9.4.2 Version

1.8.2 (28 December 2000)

9.4.3 Specification

<http://www.remotesensing.org/geotiff/spec> (accessed 21 June 2010)

9.4.4 Language

eng – English
fra - French

9.5 Delivery medium information

9.5.1 Units of delivery

Tiles of the National Topographic System (NTS)

9.5.2 Transfer size

The estimated size of a dataset varies from 2 MB to 10 MB for PDF files and 10 MB to 50 MB for TIFF (LZW compressed) files.

9.5.3 Medium name

GeoGratis Web Site (<http://www.GeoGratis.gc.ca>)

9.5.4 Other delivery information

The document *CanTopo: Product Distribution Formats* describes the file naming system, the entities, and their attributes according to available distribution formats (<http://www.GeoGratis.gc.ca>).

9.6 Reference to specification scope

Global

10 METADATA

Each CanTopo file has a corresponding metadata record that complies with the U.S. Federal Geographic Data Committee Standard FGDC-STD-001-1998. The records are available in xml or html format.

Metadata files are stored in the same compressed file as the CanTopo file and are available for download in the same output file formats (PDF, GeoPDF, TIFF, and GeoTIFF).

Files can be downloaded from the GeoGratis Web portal (<http://www.GeoGratis.gc.ca>).

The following metadata is available for each CanTopo record.

1. Identification Information
2. Data Quality Information
3. Spatial Data Organization Information
4. Spatial Reference Information
5. Entity and Attribute Information
6. Distribution Information
7. Metadata Reference Information

10.1 Reference to specification scope

Global