



Canadian Digital Elevation Data Level 1 Product Specifications

Edition 3.0

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GeoBase®

REVISION HISTORY

Date	Ed	Section/sub-section	Description
January 2003	1.0	<i>Title: GeoBase Canadian Digital Elevation Data Level 1 Product Specifications</i>	Original version
April 2004	2.0	<i>Title: GeoBase Level 1, Canadian Digital Elevation Data Product Specifications</i>	Former title: <i>GeoBase Canadian Digital Elevation Data Level 1 Product Specifications</i>
April 2004	2.0	<i>Acronyms for CDED Responsibility Centres</i>	Inclusion of a new title, <i>Acronyms for CDED Responsibility Centres</i> .
April 2004	2.0	<i>Terms and Definitions</i>	Additional definitions have been added for clarification purposes. Other definitions have been moved to the Canadian Digital Elevation Data Technical Specifications.
April 2004	2.0	<i>1. Overview</i>	Definitions for GeoBase and U.S. Federal Geographic Data Committee (FGDC) added.
April 2004	2.0	<i>2.8.1 Elevations</i>	Formerly under <i>2.7 Extent</i>
April 2004	2.0	<i>2.8.2 Water Areas</i>	Formerly under <i>2.7 Extent</i> and <i>7.4 Logical Consistency</i> Inclusion of one elevation per lake/interpolation of unknown water body/continuous drainage and descending order of z-value for drainage.
April 2004	2.0	<i>2.8.3 Void Areas</i>	Formerly under <i>2.7 Extent</i> Inclusion of the GeoBase portal's administrative boundaries for the purpose of clipping/merging of CDED Second inclusion: CDED Logical Record A showing 'void areas' and 'percent void' flags. Third inclusion: CDED are clipped within ± 1 pixel of resolution along the international boundary.
April 2004	2.0	<i>2.8.4 Quality Control</i>	Formerly under <i>7.4 Logical Consistency</i>
April 2004	2.0	<i>2.8.5 Exceptions</i>	Formerly under <i>2.7 Extent</i> Inclusion of the Nova Scotia coastline depicted at the Mean High Water Level (MHWL)
April 2004	2.0	<i>Comparison of CDED to Existing DTED</i>	Formerly under <i>2.8 Comparison of CDED to existing DTED</i> Table has been omitted.
April 2004	2.0	<i>3.3 Coverage and Continuity</i>	Figure 1/Table 1/Table 2 formerly under 2.1 Spatial Resolution
April 2004	2.0	<i>3.2 Spatial Representation</i>	Information concerning the grid spacing, formerly under <i>7.5 Positional Accuracy</i> , has been moved to this section.
April 2004	2.0	<i>6.0 Coordinate Reference System</i>	Amendment: the (X, Y, Z) value has been changed to (longitude, latitude and Z).

April 2004	2.0	6.1.2 Unit of measure	Correction: removal of entire second line (Coordinates are expressed in real values...)
April 2004	2.0	7.4.1 Physical Structure of the CDED File	Formerly under <i>Appendix B: CDED1 File Format/B.1 Physical Structure of the CDED File</i> : Inclusion of conventions 1, 2, 4 and 7 and additional information to convention 6.
April 2004	2.0	7.4.2 Type A Logical Record	Formerly under <i>Appendix B: CDED1 File Format/B.2 Type A Logical Record</i>
April 2004	2.0	7.4.2 Type A Logical Record	Amendment: see header. <i>Fortran</i> has been omitted and <i>Comments</i> has been changed to <i>Domain of Values/ Explanations</i> .
April 2004	2.0	7.4.2 Type A Logical Record, Element 1 CDED Responsibility Centre	Previously <i>Producer of Data</i> : renamed <i>CDED Responsibility Centre</i> . Under 'Domain of Values/Explanation': <i>Data producer</i> has been changed to <i>CDED responsibility centre</i> . First inclusion: the descriptor is now split into four sub-fields. Second inclusion: a note.
April 2004	2.0	7.4.2 Type A Logical Record, Element 1 Process Code	Under 'Domain of Values/Explanation': inclusion of a definition
April 2004	2.0	7.4.2 Type A Logical Record, Element 5	Inclusion of the 1:250 000 scale
April 2004	2.0	7.4.2 Type A Logical Record, Element 12	Inclusion of the -32767 value when the entire profile is void
April 2004	2.0	7.4.2 Type A Logical Record, Element 15	Correction: <u>1:50 000 CDED</u> 1.5, 0.75, 1 (Area B) 3, 0.75, 1(Area C) <u>1:250 000 CDED</u> 6, 3, 1 (Area B) 12, 3, 1 (Area C)
April 2004	2.0	7.4.2 Type A Logical Record, Element 25	Amendment: This field is set to "0" or "2".
April 2004	2.0	7.4.2 Type A Logical Record, Element 28	Inclusion of an explanation and example for the data edition/version/specifications edition/version
April 2004	2.0	7.4.2 Type A Logical Record, Element 28	Amendment: Element name changed to Data edition/version, specifications edition/version
April 2004	2.0	7.4.2 Type A Logical Record, Element 29	Amendment: this field has been activated.
April 2004	2.0	7.4.2 Type A Logical Record, Element 30	Amendment of the following: 3 No match required Inclusion of the following for future use: 4 Edge not matched

April 2004	2.0	<i>7.5 Positional Accuracy</i>	Information concerning the grid spacing has been moved to <i>3.2 Spatial Representation</i> . Inclusion of a CDED definition.
April 2004	2.0	<i>7.6 Temporal Accuracy</i>	Amendment: the GeoBase portal URL has replaced the reference to the source data capture date.
April 2004	2.0	<i>8.1 Collection Level Metadata</i>	Inclusion of additional collection (fixed) metadata requirements for CDED partners.
April 2004	2.0	<i>8.2 Product/Data Set Metadata</i>	Inclusion of additional product/data set (source) metadata requirements for CDED partners.
April 2004	2.0	<i>10.1 Format Information</i>	Inclusion of the USGS and GeoBase portal URL.
April 2004	2.0	<i>10.2 CDED Directory and File Name Conventions</i>	Formerly <i>Appendix A: CDED Directory and File Name Conventions</i> : inclusion of new naming convention for first and second case, now referred to as <i>CDED Responsibility Centre</i> and <i>CDED Data Purchasers</i>
April 2004	2.0	<i>10.3 Medium Information</i>	Formerly <i>10.2 Medium Information</i> : inclusion of the GeoBase portal URL.
October 2005	2.1	<i>Acronyms for CDED Responsibility Centre</i>	Addition of ASRD, CTI, OMNR, and YEIM Removal of EYG
October 2005	2.1	<i>7.4.2 Type A Logical Record, Element 1</i>	Addition of Process Code Z Addition of 3-D Analyst to Code A Corrected explanation of Process Code
October 2005	2.1	<i>7.4.2 Type A Logical Record, Element 2</i>	Addition of Origin Codes ASDB and RS
June 2007	3.0	<i>List of Acronyms for CDED Responsibility Centres formerly on page vii</i>	Moved to 7.4.2, Element 1, CDED Responsibility Centre.
June 2007	3.0	<i>Page viii Acronyms</i>	Removed CTI, FTP, GIS, and MBR Added FGDC, GDB, and MHWL.
June 2007	3.0	<i>Page ix Terms and Definitions</i>	Added definitions for CGVD28, MHWL, MSL, metadata, NAD83, NTS System, orthometric height. Removed definitions for drain line, lake, ridge line, and source data set.
June 2007	3.0	<i>1. Overview</i>	Added reference to reflective surface and other sources of data.
June 2007	3.0	<i>2.1 Spatial Resolution</i>	Removed ("scale") from title and revised definition.
June 2007	3.0	<i>2.4 Topic Category</i>	Deleted statement on elevations/heights. Added GCMD thesauri for CDED1.

June 2007	3.0	<i>2.7 Extent</i>	Removed reference to temporal extent and added note regarding ground elevations with negative values.
June 2007	3.0	<i>2.8.1 Elevations</i>	Added information about reflective surface elevations.
June 2007	3.0	<i>2.8.2 Water Areas</i>	Added NS coastlines measured at MHWL and water bodies in reflective surface CDED may have a small slope.
June 2007	3.0	<i>2.8.4 Quality Control</i>	Removed reference to purpose of CDED and digital exchange format.
		<i>2.8.5 Exceptions</i>	Section deleted, information moved to 2.7 Extent.
June 2007	3.0	<i>7.1 Scope</i>	Revised to N/A.
		<i>7.2 Lineage</i>	Added references to GDB and remotely sensed imagery.
June 2007	3.0	<i>7.3 Completeness</i>	Revised to N/A.
June 2007	3.0	<i>7.4.1 Physical Structure of the CDED Cell</i>	Added information about Logical Record A and revised Item 5.
June 2007	3.0	<i>7.4.2 Type A Logical Record Data Element 1</i>	Revised file naming convention. Acronyms for CDED Responsibility Centres moved here from page vii.
June 2007	3.0	<i>7.4.2 Type A Logical Record Data Element 2, Origin Code</i>	Added GDB and Z.
June 2007	3.0	<i>7.5 Positional Accuracy</i>	Removed reference to grid and profiles.
June 2007	3.0	<i>8.0 Metadata</i>	Revised explanation.
		<i>8.1 Collection Level Metadata</i>	Removed
		<i>8.2 Product/Data Set Level Metadata</i>	Removed
June 2007	3.0	<i>10. CDED Delivery</i>	Title revised from Data Delivery.
June 2007	3.0	<i>10.1 Format Information</i>	Removed reference to physical structure of CDED.
June 2007	3.0	<i>10.2. Medium Information</i>	Formerly CDED Directory and File Name Conventions.
June 2007	3.0	<i>10.2.1 CDED Responsibility Centres</i>	Removed
June 2007	3.0	<i>10.2.2 CDED Purchasers</i>	Removed
June 2007	3.0	<i>10.3 Data Use and Restrictions</i>	Renamed and revised – amalgamated information from former Sections 10.3 Medium Information and 10.4 Constraints Information.

June 2007	3.0	<i>10.4 File Naming Conventions when Delivering CDED files to NRCan.</i>	Renamed and content changed – formerly Section 10.4 Constraints Information, content formerly under 10.2.1 CDED Responsibility Centres.
June 2007	3.0	<i>10.4.1 File Name in Logical Record Type A and the Physical File</i>	Formerly under 10.2.1 CDED Responsibility Centres.
June 2007	3.0	<i>10.4.2 File Name for the Zip File Containing the Compressed East and West Cells</i>	Formerly under 10.2.1 CDED Responsibility Centres.
June 2007	3.0	<i>10.5 Downloading CDED files from GeoBase</i>	Formerly under 10.2.2 CDED Purchasers.
June 2007	3.0	<i>11.0 Data Capture and Maintenance</i>	Revised to N/A.
November 2007	3.0	<i>10.5 Downloading CDED Files from GeoBase</i>	Changes in metadata files naming convention

FUTURE WORK

Keyword	Ed/Vs	Section/sub-section	Description

ACRONYMS

CDED	Canadian Digital Elevation Data
CVGD28	Canadian Vertical Geodetic Datum of 1928
DEM	Digital Elevation Model
FGDC	U.S. Federal Geographic Data Committee
GDB	Geospatial Data Base
MHWL	Mean High Water Level
MSL	Mean Sea Level
NAD83	North American Datum of 1983
NTDB	National Topographic Data Base
NTS	National Topographic System
USGS	United States Geological Survey

TERMS AND DEFINITIONS

Canadian Vertical Geodetic Datum of 1928 (CGVD28)

Official height reference system in Canada The reference frame for the CGVD28 is the mean sea level at six tide gauges during 1928. These tide gauges were located on both the Pacific and Atlantic Oceans as well as on the St-Lawrence River. The datum is propagated across Canada (mostly southern Canada) by a first-order levelling network and is accessible to users through some 80,000 federal benchmarks.

Cell

Each CDED cell corresponds to half an NTS tile, which means there is always an eastern and western CDED cell to an NTS tile.

Contour line

An imaginary line on the ground connecting an infinite number of points of equal elevation recorded in metres or feet relative to mean sea level based on the North American Datum 1983 horizontal reference datum.

Digital Elevation Model (DEM)

A numerical representation of the Earth's surface based on a collection of ground or reflective surface elevations.

Edge matching

A process of matching elevation values along edges of the CDED.

Mean high water level (MHWL)

The Nova Scotia coastline, oceans, and estuaries are depicted at the MHWL which has varying elevations across the province. All MHWL elevation values are with reference to the Canadian Vertical Geodetic Datum 1928.

Mean sea level (MSL)

The average sea level for a particular geographical location, obtained from numerous observations, at regular intervals, over a long period of time.

Metadata

Information about the source data set used to produce CDED. The information is formally structured according to the U.S. Federal Geographic Data Committee approved standard FGDC-STD-001-1998.

North American Datum 1983 (NAD83)

The horizontal control datum for the U.S., Canada, Mexico and Central America, based on the Geodetic Reference System 1980 (GRS80) geocentric reference ellipsoid.

National Topographic System (NTS)

The National Topographic System provides general-purpose topographic map coverage of Canada. These maps depict in detail ground relief (landforms and terrain), drainage (lakes and rivers), forest cover, administrative areas, populated areas, transportation routes and facilities (including roads and railways), and other man-made features.

NTS tile

The organizational unit of the National Topographic System.

Orthometric height

Height of a point related to the geoid, generally presented as an MSL elevation.

TABLE OF CONTENTS

REVISION HISTORY	i
FUTURE WORK	v
ACRONYMS	vi
TERMS AND DEFINITIONS	vii
1 Overview	11
2 Data Identification	11
2.1 Spatial Resolution.....	11
2.2 Language.....	11
2.3 Character Set	12
2.4 Topic Category	12
2.5 Geographic Box.....	12
2.6 Geographic Description	12
2.7 Extent	12
2.8 Supplemental Information	12
2.8.1 Elevations.....	12
2.8.2 Water Areas	12
2.8.3 Void Areas.....	13
2.8.4 Quality Control	13
3 Geospatial Characteristics.....	13
3.1 Spatial Representation Type.....	13
3.2 Spatial Representation	13
3.3 Coverage and Continuity	14
3.4 Data Segmentation.....	15
4 Data Model.....	15
5 Data Dictionary/Feature Catalogue	15
6 Coordinate Reference System.....	15
6.1 Horizontal Reference System.....	15
6.1.1 Horizontal Coordinate System	16
6.1.2 Horizontal Unit of Measure (coordinate system axis units).....	16
6.2 Vertical Reference System.....	16
6.2.1 Vertical Unit of Measure (coordinate system axis units).....	16
7 Data Quality	16
7.1 Scope	16
7.2 Lineage.....	16
7.3 Completeness.....	16
7.4 Logical Consistency.....	16
7.4.1 Physical Structure of the CDED Cell.....	16
7.4.2 Type A Logical Record.....	18
7.4.3 Type B Logical Record.....	24
7.5 Positional Accuracy	24
7.6 Temporal Accuracy.....	25
7.7 Thematic (attributes) Accuracy.....	25
8 Metadata	25
9 DATA Portrayal/Data Transfer Format/Physical Model	25

10	CDED Delivery	25
10.1	Format Information	25
10.2	Medium Information.....	25
10.3	Data Use and Restrictions.....	25
10.4	File Naming Conventions when Delivering CDED Files to NRCan.....	25
10.4.1	File Name in Logical Record Type A and the Physical File:.....	26
10.4.2	File Name for the Zip File Containing the Compressed East and West Cells:.....	26
10.5	Downloading CDED Files from GeoBase	27
11	Data Capture and Maintenance	27
Appendix A – Sample metadata record for a CDED file.....		28
Canadian Digital Elevation Data, Level 1 (CDED1) 082J11		28
Identification Information:		28
Data Quality Information:.....		31
Spatial Data Organization Information:.....		42
Spatial Reference Information:		42
Entity and Attribute Information:		43
Distribution Information:		43
Metadata Reference Information:		44

1 Overview

GeoBase is a portal providing access to various geospatial data sets, collected closest to the source and covering the Canadian landmass. The data that is currently available is of regional resolution, representing an average scale of 1:10 000 to 1:250 000 and is referred to as GeoBase Level 1. These product specifications apply to GeoBase, Canadian Digital Elevation Data (CDED1) Level 1 only.

The Centre for Topographic Information (CTI) jointly produces CDED with federal, provincial and territorial government agencies as well as the private sector.

A CDED consists of an ordered array of ground or reflective surface elevations recorded in metres, at regularly spaced intervals. The source digital data for CDED is extracted from the hypsographic and hydrographic elements of the National Topographic Data Base (NTDB) at scales of 1:50 000 and 1:250 000, the Geospatial Database (GDB), various scaled positional data acquired by the provinces and territories, or remotely sensed imagery.

The tile reference scheme for CDED models the National Topographic System (NTS) mapping series. The coverage for each CDED corresponds to half an NTS tile, which means there is always a western and eastern CDED cell to a whole NTS tile. Cell coverage varies according to three geographic areas (see Section 3.3 for further details). The North American Datum 1983 (NAD83) is used as the reference system for planimetric coordinates. Elevations are orthometric and expressed in reference to mean sea level, Canadian Vertical Geodetic Datum 1928 (CVGD28).

CDED play the same role as contours and relief shading on conventional paper maps. CDED serve as key primary data in a range of applications critical to achieving sustainable development. These applications include environmental and ecological impact assessments, water flow and water quality analysis, climate change studies, forest regeneration planning and wildlife habitats. In addition, CDED can be used in the generation of three-dimensional graphics displaying terrain slope, profiles and line of sight. Non-graphic applications include geoid calculations, terrain modelling, flood simulations and telecommunication studies.

2 Data Identification

2.1 Spatial Resolution

Post spacing within the CDED varies according to the geographic location of the cell. The delineation and identification of the three geographic areas is shown in Section 3.3, Figure 1.

For the 1:50 000 scale CDED, the post spacing is always 0.75 arc seconds along a profile in the south-north direction and varies from 0.75 to 3 arc seconds in the west-east direction, depending upon the geographic location of the cell. (Please see Section 3.3, Table 1 for further details).

For the 1:250 000 scale CDED, the post spacing is always 3 arc seconds in the south-north direction along a profile and varies from 3 to 12 arc seconds in the west-east direction, depending upon the geographic location of the cell. (Please see Section 3.3, Table 2 for further details).

2.2 Language

The language used within the data set is English.

2.3 Character Set

Data is written as ANSI Standard ASCII characters and recorded in IBM Standard fixed-block format.

2.4 Topic Category

According to the Global Change Master Directory thesauri CDED1 can be classified into science key words structured using a 4-level hierarchy: Category>Topic>Term>Variable

CDED are classified by:

Earth Science>Land Surface>Topography>Contours

Earth Science>Land Surface>Topography>Terrain Elevation>DEM

Earth Science>Land Surface>Topography>Topographic Relief>DEM

Earth Science>Land Surface>Topography>Topographic Effects

2.5 Geographic Box

The geographic box or minimum-bounding rectangle delineating the coverage of all existing and planned CDED in Canada is:

- West-bounding coordinate: 141° West (or -141°)
- East-bounding coordinate: 52° West (or -52°)
- North-bounding coordinate: 84° North (or 84°)
- South-bounding coordinate: 41° North (or 41°)

2.6 Geographic Description

The geographic area comprises lands and waters falling under Canadian jurisdiction.

2.7 Extent

The vertical domain of the data set identifies the lowest and highest vertical extent contained within the data. The vertical extent is expressed in metres and can vary from zero metres (MSL) to 5,959 metres (Mount Logan) in Canada. Exceptions are: ground elevation data having negative values may be found in certain areas of Canada that naturally lie below mean sea level.

2.8 Supplemental Information

2.8.1 Elevations

Elevations are orthometric and expressed in reference to mean sea level (Canadian Vertical Geodetic Datum 1928 (CVGD28)). CDED elevations are recorded as either ground or reflective surface elevations. To determine if the elevations are reflective surface or ground, please see the CDED metadata record under Identification Information, Supplemental Information. A metadata record accompanies each CDED obtained from the GeoBase portal.

2.8.2 Water Areas

Canada's coastline, oceans and estuaries at mean sea level, are assigned an elevation value of zero metres.

However, the Nova Scotia coastline, oceans, and estuaries are depicted at the mean high water level which has varying elevations across the province. All mean high water level elevation values are with reference to the Canadian Vertical Geodetic Datum 1928 (CVGD28).

For CDED produced using ground elevations, water bodies are naturally occurring areas of constant elevation (lakes) or having a small slope (rivers). Water bodies are assigned their known elevations or estimated values. Lakes are represented flatter and lower than the surrounding terrain (one elevation per lake) and the shore must be clearly discernible. A water body of unknown elevation is assigned an interpolated elevation that is at least one metre lower than the contour elevation surrounding its shores. Drainage (rivers and streams) must be continuous (no gaps), have constant water flow and a descending order of z-values.

For CDED produced using reflective surface elevations, water bodies (lakes) may not have a constant elevation. They may have a small slope to indicate the direction of the water flow.

2.8.3 Void Areas

Void areas (areas where there is no data) are represented by elevation values of -32767. However CDED produced before April 2004 will show the void values as -32767 or zero.

CDED will contain void areas when they include lands or waters outside Canada's borders.

CDED will be clipped to within plus or minus one (± 1) pixel of resolution along the international boundary.

The administrative boundaries, available on the GeoBase portal, are used for the purpose of clipping or merging CDED cells.

2.8.4 Quality Control

Quality control must assure that the CDED is smooth within the grid and continuous from node to node, except at natural break points such as streams, cliffs, and craters.

The CDED quality control process ensures that the CDED producers take into consideration the watercourse direction of flow and the flatness of the water surface and surrounding area. In addition, quality control is carried out to eliminate anomalies with regards to drainage.

3 Geospatial Characteristics

3.1 Spatial Representation Type

A grid format is used to represent the elevation data.

3.2 Spatial Representation

All cells contain the same number of nodes (elevations). Each cell holds 1201 profiles. All profiles are oriented south-north and contain 1201 elevation points. Therefore, each cell contains 1201 profiles by 1201 points, for a total of 1 442 401 elevation points.

Post spacing within the CDED varies according to the geographic location of the cell. The delineation and identification of the three geographic areas is shown in Section 3.3, Figure 1.

For the 1:50 000 scale CDED, the post spacing is always 0.75 arc seconds along a profile in the south-north direction and varies from 0.75 to 3 arc seconds in the west-east direction, depending upon the geographic location of the cell. (Please see Section 3.3, Table 1 for further details).

For the 1:250 000 scale CDED, the post spacing is always 3 arc seconds in the south-north direction along a profile and varies from 3 to 12 arc seconds in the west-east direction, depending upon the geographic location of the cell. (Please see Section 3.3, Table 2 for further details).

3.3 Coverage and Continuity

The 1:250 000 CDED provide a complete coverage of the entire Canadian landmass. The 1:50 000 scale coverage is almost complete. A graphical representation of the extent of the 1:50 000 coverage is available on the GeoBase portal under Digital Elevation Data, Download Data, Option 1 - Graphical Search.

For each NTS tile, there is always an eastern and a western CDED cell.

Each profile has one point of overlap with the cell above it (to the north) and one with the cell below it (to the south). The first profile of the CDED cell coincides with the last profile of the adjacent CDED cell.

Figure 1: The Three Geographic Areas

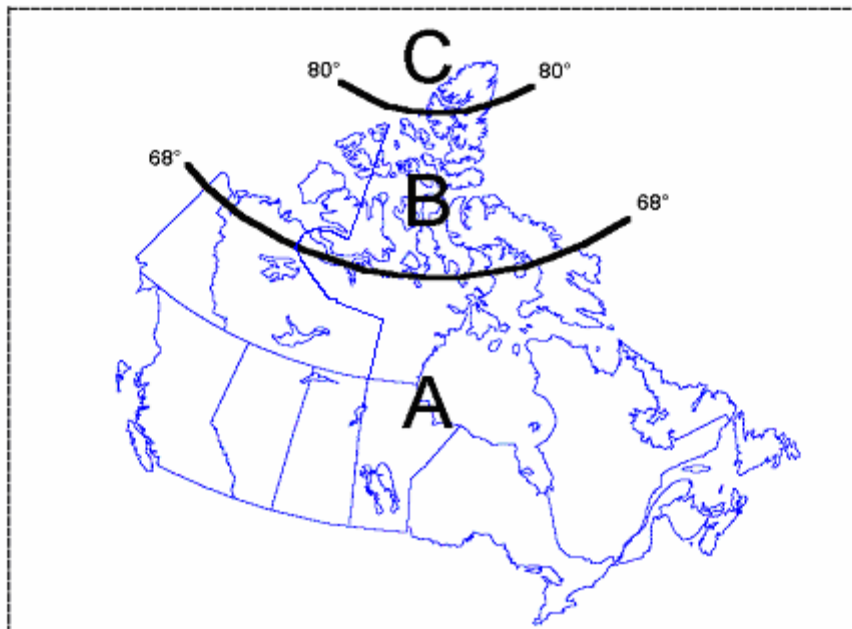


Table 1 – 1:50 000 CDED post spacing and cell coverage based on geographic area

GEOGRAPHIC AREA	LATITUDE		POST SPACING (latitude and longitude in arc seconds)		POST SPACING (in metres, approximate)		CELL COVERAGE (latitude - longitude)	
	from	to	lat.	long.	N.-S.	E.-W.		
A	—	68°	0.75"	x 0.75"	23 m x	16-11 m	15'	x 15'
B	68°	80°	0.75"	x 1.5"	23 m x	17-8 m	15'	x 30'
C	80°	90°	0.75"	x 3"	23 m x	17-8 m	15'	x 1°

Table 2 – 1:250 000 CDED post spacing and cell coverage based on geographic area

GEOGRAPHIC AREA	LATITUDE		POST SPACING (latitude and longitude in arc seconds)		POST SPACING (in metres, approximate)		CELL COVERAGE (latitude - longitude)	
	from	to	lat.	long.	N.-S.	E.-W.		
A	—	68°	3"	x 3"	93 m x	65-35 m	1°	x 1°
B	68°	80°	3"	x 6"	93 m x	69-32 m	1°	x 2°
C	80°	90°	3"	x 12"	93 m x	65-32 m	1°	x 4°

3.4 Data Segmentation

NOT APPLICABLE

4 Data Model

NOT APPLICABLE

5 Data Dictionary/Feature Catalogue

NOT APPLICABLE

6 Coordinate Reference System

CDED uses a Geocentric 3-dimensional reference system (longitude, latitude and Z).

6.1 Horizontal Reference System

North American Datum 1983 (NAD83)

6.1.1 Horizontal Coordinate System

Data is stored in geographic coordinates (longitude (λ) and latitude (Φ)).

6.1.2 Horizontal Unit of Measure (coordinate system axis units)

The unit of measure for storing horizontal data is arc seconds, given to 4 significant digits after the decimal (1×10^{-4}).

6.2 Vertical Reference System

Elevations are orthometric and expressed in reference to mean sea level (Canadian Vertical Geodetic Datum 1928 (CVGD28)). Exception: Nova Scotia shoreline as noted in section 2.8.2 Water Areas.

6.2.1 Vertical Unit of Measure (coordinate system axis units)

The unit of measure for storing vertical data is the metre (m). Coordinates are expressed as integers.

7 Data Quality

7.1 Scope

NOT APPLICABLE

7.2 Lineage

The source digital data for CDED is extracted from the hypsographic and hydrographic elements of the NTDB at scales of 1:50 000 and 1:250 000, the GDB, various scaled positional data acquired by the provinces and territories, or remotely sensed imagery.

The horizontal reference system is North American Datum 1983; the vertical reference system is Canadian Vertical Geodetic Datum 1928 (CVGD28).

Metadata describing the process steps and source data files is available for each CDED dataset on the GeoBase portal (<http://www.geobase.ca>).

7.3 Completeness

NOT APPLICABLE

7.4 Logical Consistency

NOT APPLICABLE

7.4.1 Physical Structure of the CDED Cell

Data is written as ANSI Standard ASCII characters and is recorded in IBM Standard fixed-block format.

Logical record size is 1024 bytes. No more than one logical record type (A or B) can be recorded in any 1024 byte record. However, more than one 1024 byte record is usually required to store a single record type B. Logical records are padded with blanks if necessary to fill to the end of the logical record.

There is only one Type A Logical Record for each CDED file, and it appears as the first record in the data file. The Type A Logical Record contains general information about the CDED such as:

CDED Responsibility Centre, software used to create the CDED, origin code, geographic coordinates of the four corners of the CDED, minimum and maximum elevations for the CDED, CDED edition/version, CDED Product Specifications edition/version. Please see Section 7.4.2 for complete information about the content of Type A Logical Record.

The Type B Logical Record contains elevation data and associated header information. All Type B records of the CDED files are made up of data from one-dimensional bands called profiles. Therefore, the number of profiles covering the CDED area is the same as the number of Type B Records in the CDED.

The number of elevation points per profile and the number of profiles per cell are constant for all CDED files (1201 x 1201). Please see Section 7.4.3 for complete information about the content of Type B Logical Record.

The following conventions will be observed for the population of data fields in the Type A and B Logical Record elements:

1. All fields that are left empty must be blank, ASCII space (binary 0010 0000);
2. All character fields of no data value must be blank, ASCII space (binary 0010 0000);
3. All integer or character flagged fields of no data value but which default to zero must be ASCII zero (binary 0011 0000);
4. All integer fields of no data value but which default to zero must be ASCII zero (binary 0011 0000);
5. All real (non-integer) numeric fields must be populated. Default zero fill will respect the convention as shown below in Table 3. Exception: Data element 31, vertical datum shift, is left empty.
6. All character fields must be in upper case, except for 'File name' and 'CDED Responsibility Centre' in Data Element 1 which uses a combination of upper and lower case. See section 10.4 for CDED file naming convention.
7. **All fields are right justified, except for the 'Origin Code', which is left justified.**

Table 3

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	Byte position	
				.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	D	+	0	0	Standard format specified is D24.15. Zero values listed are common machine dependant numeric default for real zeros.	
			0	.	0																				
			0	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	D	+	0	0		
				.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						

7.4.2 Type A Logical Record

Data Element	Contents	Format Type	ASCII	Domain of Values/ Explanation
1	<p>File names for complete and interim CDED</p> <p>Interim CDED straddle a provincial or territorial boundary. The file name contains the provincial or territorial acronym to indicate the province that produced the CDED.</p> <p>Data element 1 file name must match the file name of the compressed CDED cell. See section 10.4.1 for more information.</p>	ALPHA	A40	<p>Examples:</p> <p>For complete CDED files: NTS tile number, underscore, e or w cell designation, followed by the suffix .dem 031a01_e.dem 031a01_w.dem</p> <p>For interim CDED files: NTS tile number, underscore, provincial code, underscore, e or w cell designation, followed by the suffix .dem 031a01_on_e.dem 031a01_on_w.dem</p>
1	<p>CDED Responsibility Centre (The name of the organization that produced the CDED).</p> <p>Free format text When there is only one CDED producer, the producer's full name is used in this 60 character field. When there is more than one producer the field is divided into 4 subfields and the acronyms of all CDED producers that produced a portion of the CDED are listed within the first 3 subfields which are 18 characters long. The fourth subfield is only 6 characters in length and is reserved for the acronym CTI-O when the CDED has been clipped or merged by CTI-O. All subfields are right justified.</p>	ALPHA	A60	<p>Alberta Sustainable Resource Development - AB Gov - Edmonton (ASRD)</p> <p>Base Mapping and Geomatic Services - B.C. Gov. – Victoria (BMGS-BC)</p> <p>Landscape Analysis – Can. Forest Serv - Sault Ste. Marie (CFS-SSM)</p> <p>Centre for Topographic Information, Geomatics Canada (CTI)</p> <p>Centre for Topographic Information, Geomatics Canada, Ottawa (CTI-O)</p> <p>Ontario Ministry of Natural Resources (OMNR)</p> <p>Water Resources Information Program, OMNR (WRIP)</p> <p>Yukon Environment Information Management & Technology (YEIM)</p>
1	Filler		9 bytes	Blank fill
1	SW geographic corner	INTEGER*2 REAL*8	2(I4,I2,F7.4)	SW geographic coordinates of NTS tile:

Data Element	Contents	Format Type	ASCII	Domain of Values/ Explanation
				Longitude SDDMMSS.SSSS Latitude SDDMMSS.SSSS
1	Process code Indicates the software used to create the DEM	ALPHA	A1	8 ANUDEM™ 9 FME™ for LINUX, build 842 A TopoGrid™/3-D Analyst Z See the CDED Process Description in the CDED metadata file, available on the GeoBase portal, for information on the process code. http://www.geobase.ca
1	Filler		1 byte	Blank fill
1	Sectional indicator	ALPHA	A3	Not used in this case.
2	Origin code This field lists the acronym of the province or territory where the source data originates, or, it lists the acronym of the source data used to produce the CDED. This field is left justified.	ALPHA	A4	Acronym of the province or territory where the source data originates: AB Alberta BC British Columbia MB Manitoba NB New Brunswick NL Newfoundland & Labrador NS Nova Scotia NT Northwest Territories NU Nunavut ON Ontario PE Prince Edward Island QC Quebec SK Saskatchewan YT Yukon Acronyms for source data used to produce CDED: ASDB Aerial Survey Data Base GDB Geospatial Data Base NTDB National Topographic Data Base RS Remote Sensing Data MULT Indicates more than one source of data. Z See CDED metadata record for source data origin. For MULT and Z see the CDED metadata record under Section 2, Data Quality Information, Lineage, Title, for details on the

Data Element	Contents	Format Type	ASCII	Domain of Values/ Explanation
				data sources. This field is left justified.
3	DEM level code	INTEGER*2	I6	1 DEM-1 2 DEM-2 3 DEM-3 <i>This field is set to "1" for 1:50 000 and 1:250 000 CDED</i>
4	Code defining the elevation pattern (regular or random).	INTEGER*2	I6	1 regular 2 random <i>This field is set to "1"</i>
5	Code defining the planimetric reference system.	INTEGER*2	I6	0 Geographic 1 UTM 2 state plane (USA) <i>This field is set to "0"</i>
6	Code defining the zone in the planimetric reference system.	INTEGER*2	I6	<i>This field is set to "0" for 1:50 000 and 1:250 000 CDED.</i>
7	Map projection parameters	REAL*8	15D24.15	All 15 fields of this element are set to "0" and should be ignored when geographic.
8	Code defining the unit of measure for the planimetric coordinates throughout the file.	INTEGER*2	I6	0 radians 1 feet 2 metres 3 arc seconds <i>This field is set to "3".</i>
9	Code defining the unit of measure for the elevation coordinates throughout the file.	INTEGER*2	I6	1 feet 2 metres <i>This field is set to "2".</i>
10	Number (n) of sides in the polygon that defines the coverage of the CDED file.	INTEGER*2	I6	<i>"n" is set to "4".</i>
11	A 4,2 array containing the geographic coordinates of the four corners of the CDED.	REAL*8	4(2D24.15)	The coordinates of the NTS tile corners are ordered clockwise beginning with the southwest corner. The array is stored as pairs of longitude and latitude in arc seconds.

Type A Logical Record (Continued)

Data Element	Contents	Format Type	ASCII	Domain of Values/ Explanation
12	A two-element array containing minimum and maximum elevations for the CDED.	REAL*8	2D24.15	The values are in the unit of measure given by data element 9 (metres). This field does not consider -32767 (void area) as a value, except when the entire profile value is -32767.
13	Counter clockwise angle (in radians) from the primary axis of the planimetric reference to the primary axis of the CDED local reference system.	REAL*8	D24.15	Set to "0", to align with the coordinate system specified in element 5. Expressed in radians.
14	Accuracy code for elevations	INTEGER*2	I6	Set to "0" as no Type C Record exists for this product.
15	A three-element array containing CDED spatial resolution (x, y, z). Units of measure for these resolution elements are consistent with those indicated by data elements 8 and 9 in this record.	REAL*4	3E12.6	<p>These elements are set to the following depending on latitude:</p> <p><u>1:50 000 CDED</u> 0.75, 0.75, 1 (Area A) 1.5, 0.75, 1 (Area B) 3, 0.75, 1 (Area C)</p> <p><u>1:250 000 CDED</u> 3, 3, 1 (Area A) 6, 3, 1 (Area B) 12, 3, 1 (Area C)</p> <p>These units should not be confused with data accuracy.</p>
16	A two-element array containing the number of rows and columns (m, n) of profiles in the CDED.	INTEGER*2	2I6	The row value m is set to "1". Thus, the n value describes the number of columns in the CDED file (1201).
17	Largest primary contour interval	INTEGER*2	I5	Present only if two or more primary intervals exist. <i>This field is left empty.</i>

Type A Logical Record (Continued)

Data Element	Contents	Format Type	ASCII	Domain of Values/ Explanation
18	Largest source contour interval unit	INTEGER*1	I1	Corresponds to the unit of the source data's largest primary contour interval 0 NA 1 feet 2 metres <i>This field is left empty.</i>
19	Smallest primary contour interval.	INTEGER*2	I5	Smallest or only primary contour interval. <i>This field is left empty.</i>
20	Smallest source contour interval unit	INTEGER*1	I1	Corresponds to the unit of the source data's smallest primary contour interval: 1 feet 2 metres <i>This field is left empty.</i>
21	Data source date	INTEGER*2	I4	YYMM: two-digit year and two-digit month. MM is "00" for source having year only. <i>This field is left empty.</i>
22	Data inspection/revision date	INTEGER*2	I4	YYMM: two-digit year and two-digit month. <i>This field is left empty.</i>
23	Inspection/revision flag	ALPHA*1	A1	"I" or "R". <i>This field is left empty.</i>
24	Data validation flag	INTEGER*1	I1	0 No validation performed. 1 RMSE computed from test points, no quantitative test, no interactive CDED editing or review. 2 Batch process water body edit and RMSE computed from test points. 3 Review and edit, including water edit; no RMSE computed from test points. 4 CDED reviewed and edited. Includes water body editing RMSE computed from test points. <i>This field is left empty.</i>
25	Suspect and void area flag	INTEGER*1	I2	0 none 1 suspect areas 2 void areas 3 suspect and void areas <i>This field is set to "0" or "2".</i>

Type A Logical Record (Continued)

Data Element	Contents	Format Type	ASCII	Domain of Values/ Explanation
26	Vertical datum	INTEGER*1	I2	1 local mean sea level (MSL) 2 National Geodetic Vertical Datum 1929 (NGVD29) 3 North American Vertical Datum 1988 (NAVD88) <i>This field is set to "1".</i>
27	Horizontal datum	INTEGER*1	I2	1 NAD27 2 WGS72 3 WGS84 4 NAD83 <i>This field is set to "4".</i>
28	CDED edition/version, Product Specifications edition/version	INTEGER*2	I4	1020 represents the CDED edition version, and the CDED Product Specifications edition version. Two first digits = CDED edition version (e.g. 10 means edition 1 version 0) Two last digits = Product Specifications edition version (e.g. 20 means edition 2 version 0 of the Product Specifications)
29	Percent void	INTEGER*2	I4	This field contains the percentage of nodes set to void (-32767) in the CDED. If there are no void values the percentage of voids should be reported as 0.
30	Edge-match flag	INTEGER*1	4I2	Edge-match status flag. Ordered west, north, east, and south. Explanation of codes: 1 Edge-matched 3 No match required 4 Edge not matched <i>This field is left empty.</i>
31	Vertical datum shift	REAL*8	F7.2	<i>This field is left empty.</i>

7.4.3 Type B Logical Record

Data Element	Contents	Format Type	ASCII	Domain of Values/ Explanation
1	A two-element array containing the row and column identification number of the CDED profile contained in this record.	INTEGER*2	2I6	The identification number ranges from 1 to m (rows) and from 1 to n (columns or profiles). Rows are normally set to "1". The column identification is the profile sequence number.
2	A two-element array containing the number of rows and columns (m, n) of elevations in the CDED profile.	INTEGER*2	2I6	This first element in the field corresponds to the number of rows or nodes in the profile (1201). The second element in this field is set to "1", specifying 1 column per profile.
3	A two-element array containing the horizontal coordinates of the first elevation in the profile.	REAL*8	2D24.15	Planimetric coordinates (longitude and latitude) in arc seconds according to element 8 in Type A Logical Record
4	Elevation of local vertical datum for the profile.	REAL*8	D24.15	The values are in the units of measure given by data element 9 in Logical Record Type A. <i>Set to "0" for 1 degree CDED</i> (reference is MSL).
5	A two-element array of minimum and maximum elevations for the profile.	REAL*8	2D24.15	The values are in the units of measure given by data element 9 in Type A Logical Record.
6	The array of m x n elevations for the profile. Elevations are expressed in units of resolution elements (metres).	INTEGER*2	mn (I6)	A value in this array would be multiplied by the spatial resolution value and added to the elevation of the local elevation datum for the profile to obtain the elevation for the point.

7.5 Positional Accuracy

Please see the CDED metadata record, on the GeoBase portal, for the horizontal and vertical positional accuracy reports under Section 2, Data Quality Information, Positional Accuracy.

7.6 Temporal Accuracy

NOT APPLICABLE

7.7 Thematic (attributes) Accuracy

NOT APPLICABLE

8 Metadata

Each CDED 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 zip file as the east and west cells of the CDED. Files can be downloaded from the Digital Elevation Data section, found under the Data section at www.geobase.ca

The following metadata is available for each CDED 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

See Appendix A for a sample record.

9 DATA Portrayal/Data Transfer Format/Physical Model

NOT APPLICABLE

10 CDED Delivery

10.1 Format Information

The digital data exchange format for CDED is based on the USGS Standards for Digital Elevation Models. These standards can be obtained from:
<http://rockyweb.cr.usgs.gov/nmpstds/demstds.html>.

The files are compressed and are available via the GeoBase portal at <http://www.geobase.ca>

10.2 Medium Information

NOT APPLICABLE

10.3 Data Use and Restrictions

Information regarding the use of the data is defined in the GeoBase Unrestricted Use Licence Agreement which can be found on the GeoBase portal under Site Map / License Agreement at <http://www.geobase.ca>.

10.4 File Naming Conventions when Delivering CDED Files to NRCan

This section describes the file naming conventions to be used by CDED producers when delivering CDED to NRCAN.

File names are used in 3 places:

- 1) In Logical Record Type A data element 1.
- 2) To identify the compressed east and west CDED cells.
- 3) To identify the Zip container holding the compressed east and west CDED cells during delivery.

The file name in Logical Record A, data element 1, and the name of the corresponding compressed east and west cells should be exactly the same.

10.4.1 File Name in Logical Record Type A and the Physical File:

- a) When the CDED is a **complete file** (all of the elevation points fall within the same province or territory) the file naming convention is:
- The NTS tile number 6 alphanumeric characters in length.
 - The first three characters are numeric values. If the number is less than 100 the first character is padded with a zero.
 - The fourth character is a lowercase letter from a to p.
 - The fifth and sixth characters are numeric values identifying the 1:50k tile numbers 1 to 16. The fifth character is padded with a zero when the tile number is less than 10.
 - The 6 character NTS tile number is followed by an underscore and the cell designation e or w, in lowercase, followed by the file extension .dem in lowercase. e.g.

east cell: 092j14_e.dem west cell: 092j14_w.dem

- b) When the CDED is an **interim or partially completed file**, (the file straddles a provincial or territorial boundary and the CDED producer has populated the land outside his jurisdiction with void values in order to fill the CDED), the file naming convention is:

The 6 character NTS tile number as described in 10.4.1, a, followed by an underscore and the abbreviation of the province or territory that produced the CDED, in lowercase, followed by an underscore and the character e or w to indicate if the cell is the east or west half of the CDED file, followed by the file extension .dem in lowercase letters. e.g.:

east cell: 092h16_bc_e.dem west cell: 092h16_bc_w.dem

10.4.2 File Name for the Zip File Containing the Compressed East and West Cells:

- a) When the CDED is a **complete file** (all elevation points are within the same province or territory) the file naming convention is:

The 6 character NTS tile number, as described in 10.4.1, a, followed by the file extension .zip, in lowercase letters. e.g.: 092j14.zip

- b) When the CDED is an **interim or partially completed file**, (the file straddles a provincial or territorial boundary and the CDED producer has populated the land outside his jurisdiction with void values in order to fill the CDED), the file naming convention is:

The 6 character NTS tile number, as described in 10.4.1, a, followed by an underscore and the provincial abbreviation for the province that produced the CDED, in lowercase, followed by the file extension .zip, in lowercase. e.g.: 092h16_bc.zip

CDED files at the 1:250 000 scale are named similarly. For example, cells 031k_e.dem and 031k_w.dem cover east and west cells of the NTS tile 031k at the scale of 1:250 000.

10.5 Downloading CDED Files from GeoBase

CDED files and their corresponding metadata files are downloaded from GeoBase in a single Zip file. e.g. WinZip – 074M14.zip

The Zip file contains the compressed east and west CDED cells, and metadata files in both XML and HTML format.

Examples of file names of the east and west cells within a Zip file:

074m14_0301_deme.dem represents edition 3, version 1 of the east cell of 074M14

074m14_0301_demw.dem represents edition 3, version 1 of the west cell of 074M14

The metadata files are identified by: <product name>_<CDED identifier>_< CDED edition number>_<CDED version number>_<metadata format>_<language code>_<.xml or .html>.

cded_074m14_3_1_fgdc_fr.xml (French version of the metadata record in XML format)

cded_074m14_3_1_fgdc_fr.html (French version of the metadata record in HTML format)

cded_074m14_3_1_fgdc_en.xml (English version of the metadata record in XML format)

cded_074m14_3_1_fgdc_en.html (English version of the metadata record in HTML format)

11 Data Capture and Maintenance

NOT APPLICABLE

Appendix A – Sample metadata record for a CDED file

Canadian Digital Elevation Data, Level 1 (CDED1) 082J11

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](#)

Identification Information:

Citation:

Citation Information:

Originator:

Base Mapping and Geomatic Services - British Columbia Government - Victoria, Alberta
Sustainable Resource Development - Alberta Government - Edmonton, Centre for
Topographic Information - Geomatics Canada - Ottawa

Publication Date:

2006-02-10

Title:

082J11

Edition:

Dataset: 1.0 Metadata: 1

Geospatial Data Presentation Form:

raster digital data

Series Information:

Series Name:

Canadian Digital Elevation Data, Level 1 (CDED1)

Issue Identification:

None

Publication Information:

Publication Place:

Sherbrooke, Quebec, Canada

Publisher:

Government of Canada, Natural Resources Canada, Centre for Topographic Information

Other Citation Details:

English, GeoBase

Online Linkage:

<http://www.GeoBase.ca>

Description:

Abstract:

The Centre for Topographic Information (CTI) jointly produces the CDED with federal, provincial and territorial government agencies as well as the private sector.

A CDED consists of an ordered array of ground or reflective surface elevations, recorded

in metres, at regularly spaced intervals. The source digital data for CDED is extracted from the hypsographic and hydrographic elements of the National Topographic Data Base (NTDB) at scales of 1:50 000 and 1:250 000, or the Geospatial Data Base (GDB), or various scaled positional data acquired by the provinces and territories, or remotely sensed imagery.

Purpose:

CDED plays the same role as contours and relief shading on conventional paper maps. CDED serves as a key primary data in a range of applications critical to achieving sustainable development.

These applications include environmental and ecological impact assessments, water flow and water quality analysis, climate change studies, forest regeneration planning and wildlife habitats.

In addition, CDED can be used in the generation of three-dimensional graphics displaying terrain slope, profiles and line of sight. Non-graphic applications include geoid calculations, terrain modelling, flood simulations and telecommunication studies.

Supplemental Information:

Minimum Elevation (Z): 1148 metres

Maximum Elevation (Z): 3427 metres

Elevation Type: ground

Time Period of Content:

Time Period Information:

Range of Dates/Times:

Beginning Date:

1985-08-01

Ending Date:

1996-06-04

Currentness Reference:

Ground condition and/or production

Status:

Progress:

Complete

Maintenance and Update Frequency:

As needed

Spatial Domain:

Bounding Coordinates:

West Bounding Coordinate:

-115.5

East Bounding Coordinate:

-115

North Bounding Coordinate:

50.75

South Bounding Coordinate:

50.5

Keywords:

Theme:

Theme Keyword Thesaurus:

GCMD

Theme Keyword:

EARTH SCIENCE > LAND SURFACE > TOPOGRAPHY > CONTOURS

Theme Keyword:

EARTH SCIENCE > LAND SURFACE > TOPOGRAPHY > TERRAIN ELEVATION > DEM

Theme Keyword:

EARTH SCIENCE > LAND SURFACE > TOPOGRAPHY > TOPOGRAPHIC RELIEF > DEM

Theme Keyword:

EARTH SCIENCE > LAND SURFACE > TOPOGRAPHY > TOPOGRAPHIC EFFECTS

Theme Keyword:

DEM

Theme Keyword:

DTM

Theme Keyword:

ELEVATION

Place:

Place Keyword Thesaurus:

CEONET

Place Keyword:

Continent > North America > Canada > Alberta

Place Keyword:

Continent > North America > Canada > British Columbia

Place Keyword:

KANANASKIS LAKES

Place Keyword:

082J11

Access Constraints:

Data are subject to the GeoBase Unrestricted Use Licence Agreement (<http://www.GeoBase.ca> - in the Data section).

Use Constraints:

Data are subject to the GeoBase Unrestricted Use Licence Agreement (<http://www.GeoBase.ca> - in the Data section).

Point of Contact:

Contact Information:

Contact Organization Primary:

Contact Organization:

Government of Canada, Natural Resources Canada, Centre for Topographic Information

Contact Person:

GeoBase Technical Support

Contact Address:

Address Type:

mailing and physical

Address:

2144, King Street West, Suite 010

City:

Sherbrooke

State or Province:

Quebec

Postal Code:

J1J 2E8

Country:

Canada

Contact Voice Telephone:

+01-819-564-4857 / 1-800-661-2638 (Canada and USA)

Contact Facsimile Telephone:

+01-819-564-5698

Contact Electronic Mail Address:

SupportGeoBase@NRCan.gc.ca

Hours of Service:

8:30 to 12:00 and 13:00 to 16:30 EST

Data Set Credit:

Base Mapping and Geomatic Services - British Columbia Government - Victoria, Alberta
Sustainable Resource Development - Alberta Government - Edmonton, Centre for
Topographic Information - Geomatics Canada

[Return to the top](#)

Data Quality Information:

Logical Consistency Report:

Canada's coastline, oceans and estuaries at mean sea level, are assigned an elevation value of zero metres. However, the Nova Scotia coastline, oceans, and estuaries are depicted at the mean high water level (MHWL), which has varying elevations across the province. All MHWL elevation values are with reference to the Canadian Vertical Geodetic Datum 1928 (CVGD28).

For CDED produced using ground elevations, water bodies are naturally occurring areas of constant elevation (lakes) or having a small slope (rivers). Water bodies are assigned their known elevations or estimated values. Lakes are represented flatter and lower than the surrounding terrain (one elevation per lake) and the shore must be clearly discernible. A water body of unknown elevation is assigned an interpolated elevation that is at least one metre lower than the contour elevation surrounding its shores. Drainage (rivers and streams) must be continuous (no gaps), have constant water flow and a descending order of z-values.

For CDED produced using reflective surface elevations, water bodies (lakes) may not have a constant elevation. They may have a small slope to indicate the direction of the water flow.

Quality control must assure that the CDED is smooth within the grid and continuous from node to node, except at natural break points such as streams, cliffs, and craters.

Completeness Report:

The content of the CDED1 data sets is constant since the number of elevation points per profile and the number of profiles per cell are constant for all CDED1 files (1201 x 1201).

Positional Accuracy:**Horizontal Positional Accuracy:****Horizontal Positional Accuracy Report:**

Accuracy evaluation is related to the data source(s) used to generate the CDED.

BC-TRIM Data Source:

Ninety percent of all well-defined planimetric features are coordinated to within 10 metres (0.5mm x 20,000) of their true position. This corresponds to the following:

Bivariate:

CMAS = $2.146\sigma_c \leq 10.00$ metres (90.00%)

CSE = $1.000\sigma_c \leq 4.66$ metres (39.35%)

MSEP = $1.000\sigma_{xy} \leq 6.60$ metres (63.21%)

MSEP = $1.000\sigma_{xy} \leq 10.03$ metres (90.00%)

Rejection (blunders):

MSEP = $2.47\sigma_{xy} \leq 16.31$ metres (99.78%)

CMAS = $3.5\sigma_c \leq 16.31$ metres (99.78%)

True position is defined as the coordinates which would be obtained from positioning with high order ground methods.

Alberta Base Features Data Source:

90% of all points and well-defined hydrographic features are coordinated to within 10 m of their true position. Tested using conventional survey methods with approximately 30 points. The RMSE was 3 m.

NTDB data in Banff and Jasper National Parks:

90% of all points and well-defined hydrographic features are coordinated to within 25 m of their true position

NTDB data in Wood Buffalo National Park (74L and 74M):

90% of all points are coordinated to within 125 m of their true position

90% of all well-defined hydrographic features are coordinated to within 25 m of their true position

Quantitative Horizontal Positional Accuracy Assessment:

Horizontal Positional Accuracy Value:

10

Horizontal Positional Accuracy Explanation:

Circular Map Accuracy Standards (CMAS) for ABBF sources from Alberta (in metres).

Quantitative Horizontal Positional Accuracy Assessment:

Horizontal Positional Accuracy Value:

100

Horizontal Positional Accuracy Explanation:

Circular Map Accuracy Standards (CMAS) for NTDB sources from Centre for Topographic Information (in metres).

Quantitative Horizontal Positional Accuracy Assessment:

Horizontal Positional Accuracy Value:

10

Horizontal Positional Accuracy Explanation:

Circular Map Accuracy Standards (CMAS) for TRIM sources from British Columbia (in metres).

Vertical Positional Accuracy:

Vertical Positional Accuracy Report:

Accuracy evaluation is related to the data source(s) used to generate the CDED.

BC-TRIM Data Source:

Ninety percent of all discrete spot elevations and DEM points are accurate to within 5 metres of their true elevation. This corresponds to the following:

Univariate:

LMAS = $1.640\sigma_c \leq 5.00$ metres (90.00%) probability

LSE = $1.000\sigma_c \leq 3.00$ metres (68.27%) probability,

NOTE: Linear Standard Error \leq Mean Standard Error in Height LSE = MSEH

Rejection (blunders):

Univariate = $3.0\sigma_z \leq 9.00$ metres (99.73%) probability,

True elevation is defined as the coordinates that would be obtained from positioning with high order ground methods.

Accuracies relating to elevations relate to ground not sufficiently obscured by vegetation or other features to cause significant error.

Alberta Base Features Data Source:

The original data is accurate within 5 m of their true elevations at 90%. Tested using airborne laser profiling system with 4456 points. The RMSE was 2 m.

The derived data is accurate with respect to the original data at one standard deviation as follows:

- 5 m for 50 ft or less contour interval as per 1:50K NTS
- 13 m for 20 m or greater contour interval as per 1:50K NTS

NTDB data in Banff and Jasper National Parks:

The original data is accurate within 20 m of their true elevations at 90%. The derived data is accurate with respect to the original data at one standard deviation as follows:

- 18 m for 40 m or less contour interval as per 1 :50k NTS
- 24 m for 50 m or greater contour interval as per 1 :50k NTS

NTDB data in Wood Buffalo National Park (74L and 74M):

The original data is accurate within 25 m of their true elevations at 90%. The derived data is accurate with respect to the original data at one standard deviation as follows:

- 17 m for 40 m or less contour interval as per 1:50K NTS
- 23 m for 50 m or greater contour interval as per 1:50K NTS.

Based on the average of standard deviations of the differences between the derived and original data computed for 83C as per the above groupings by contour interval.

Quantitative Vertical Positional Accuracy Assessment:

Vertical Positional Accuracy Value:

5

Vertical Positional Accuracy Explanation:

Linear Map Accuracy Standards (LMAS) for ABBF sources from Alberta (in metres).

Quantitative Vertical Positional Accuracy Assessment:

Vertical Positional Accuracy Value:

-1

Vertical Positional Accuracy Explanation:

The value "-1" is indicated when vertical positional accuracy is unknown.

Quantitative Vertical Positional Accuracy Assessment:

Vertical Positional Accuracy Value:

5

Vertical Positional Accuracy Explanation:

Linear Map Accuracy Standards (LMAS) for TRIM sources from British Columbia (in metres).

Lineage:

Source Information:

Source Citation:

Citation Information:

Originator:

Government of British Columbia

Publication Date:

2000-01-07

Title:

Terrain Resource Information Management Program, Edition 1.0 - 082J.053

Source Scale Denominator:

20000

Type of Source Media:

Digital

Source Time Period of Content:**Time Period Information:****Range of Dates/Times:****Beginning Date:**

1996-06-04

Ending Date:

1996-06-04

Source Currentness Reference:

publication date

Source Citation Abbreviation:

TRIM-BC - 082J.053

Source Contribution:

TRIM DEM mass points and breaklines were used to produce the BC CDED files. The

TRIM DEM data types used are:

Mass Points - definite/indefinite;

Breaklines - sharp/round - hypsographic/hydrographic/anthropogenic.

Source Information:**Source Citation:****Citation Information:****Originator:**

Government of British Columbia

Publication Date:

2000-01-07

Title:

Terrain Resource Information Management Program, Edition 1.0 - 082J.054

Source Scale Denominator:

20000

Type of Source Media:

Digital

Source Time Period of Content:**Time Period Information:****Range of Dates/Times:****Beginning Date:**

1996-06-04

Ending Date:

1996-06-04

Source Currentness Reference:

publication date

Source Citation Abbreviation:

TRIM-BC - 082J.054

Source Contribution:

TRIM DEM mass points and breaklines were used to produce the BC CDED files. The

TRIM DEM data types used are:

Mass Points - definite/indefinite;

Breaklines - sharp/round - hypsographic/hydrographic/anthropogenic.

Source Information:

Source Citation:**Citation Information:****Originator:**

Government of British Columbia

Publication Date:

2000-04-05

Title:

Terrain Resource Information Management Program, Edition 1.0 - 082J.055

Source Scale Denominator:

20000

Type of Source Media:

Digital

Source Time Period of Content:**Time Period Information:****Range of Dates/Times:****Beginning Date:**

1985-08-01

Ending Date:

1985-08-01

Source Currentness Reference:

publication date

Source Citation Abbreviation:

TRIM-BC - 082J.055

Source Contribution:

TRIM DEM mass points and breaklines were used to produce the BC CDED files. The

TRIM DEM data types used are:

Mass Points - definite/indefinite;

Breaklines - sharp/round - hypsographic/hydrographic/anthropogenic.

Source Information:**Source Citation:****Citation Information:****Originator:**

Government of British Columbia

Publication Date:

2000-01-07

Title:

Terrain Resource Information Management Program, Edition 1.0 - 082J.063

Source Scale Denominator:

20000

Type of Source Media:

Digital

Source Time Period of Content:**Time Period Information:****Range of Dates/Times:****Beginning Date:**

1996-06-04

Ending Date:

1996-06-04

Source Currentness Reference:

publication date

Source Citation Abbreviation:

TRIM-BC - 082J.063

Source Contribution:

TRIM DEM mass points and breaklines were used to produce the BC CDED files. The TRIM DEM data types used are:

Mass Points - definite/indefinite;

Breaklines - sharp/round - hypsographic/hydrographic/anthropogenic.

Source Information:**Source Citation:****Citation Information:****Originator:**

Government of British Columbia

Publication Date:

2000-04-05

Title:

Terrain Resource Information Management Program, Edition 1.0 - 082J.064

Source Scale Denominator:

20000

Type of Source Media:

Digital

Source Time Period of Content:**Time Period Information:****Range of Dates/Times:****Beginning Date:**

1985-08-01

Ending Date:

1985-08-01

Source Currentness Reference:

publication date

Source Citation Abbreviation:

TRIM-BC - 082J.064

Source Contribution:

TRIM DEM mass points and breaklines were used to produce the BC CDED files. The TRIM DEM data types used are:

Mass Points - definite/indefinite;

Breaklines - sharp/round - hypsographic/hydrographic/anthropogenic.

Source Information:**Source Citation:****Citation Information:****Originator:**

Government of British Columbia

Publication Date:

2000-04-05

Title:

Terrain Resource Information Management Program, Edition 1.0 - 082J.073

Source Scale Denominator:

20000

Type of Source Media:

Digital

Source Time Period of Content:**Time Period Information:****Range of Dates/Times:****Beginning Date:**

1985-08-01

Ending Date:

1985-08-01

Source Currentness Reference:

publication date

Source Citation Abbreviation:

TRIM-BC - 082J.073

Source Contribution:

TRIM DEM mass points and breaklines were used to produce the BC CDED files. The

TRIM DEM data types used are:

Mass Points - definite/indefinite;

Breaklines - sharp/round - hypsographic/hydrographic/anthropogenic.

Source Information:**Source Citation:****Citation Information:****Originator:**

Government of British Columbia

Publication Date:

2000-04-05

Title:

Terrain Resource Information Management Program, Edition 1.0 - 082J.074

Source Scale Denominator:

20000

Type of Source Media:

Digital

Source Time Period of Content:**Time Period Information:****Range of Dates/Times:****Beginning Date:**

1985-08-01

Ending Date:

1985-08-01

Source Currentness Reference:

publication date

Source Citation Abbreviation:

TRIM-BC - 082J.074

Source Contribution:

TRIM DEM mass points and breaklines were used to produce the BC CDED files. The

TRIM DEM data types used are:

Mass Points - definite/indefinite;

Breaklines - sharp/round - hypsographic/hydrographic/anthropogenic.

Source Information:**Source Citation:****Citation Information:****Originator:**

Government of Canada, Natural Resources Canada, Center for Topographic Information

Publication Date:

1998-04-06

Title:

National Topographic Data Base - 082J11-2.0

Source Scale Denominator:

50000

Type of Source Media:

Digital

Source Time Period of Content:

Time Period Information:

Range of Dates/Times:

Beginning Date:

1994-01-01

Ending Date:

1994-01-01

Source Currentness Reference:

publication date

Source Citation Abbreviation:

NTDB - 082J11

Source Contribution:

The hypsographic and hydrographic elements of the source NDTB were used to produce the CDED. Special care was taken with regard to watercourse direction of flow and the flatness of the water surface.

Source Information:

Source Citation:

Citation Information:

Originator:

Alberta Sustainable Resource Development - Alberta Government - Edmonton

Publication Date:

1990-09-01

Title:

Alberta Base Features - 82J11NE

Source Scale Denominator:

20000

Type of Source Media:

Digital

Source Time Period of Content:

Time Period Information:

Range of Dates/Times:

Beginning Date:

1990-09-01

Ending Date:

1990-09-01

Source Currentness Reference:

publication date

Source Citation Abbreviation:

Alberta Base Features - 82J11NE

Source Contribution:

Hypsography: Mass Points land/island. Hypsography and Hydrography: Breaklines soft/hard.

Source Information:

Source Citation:

Citation Information:

Originator:

Alberta Sustainable Resource Development - Alberta Government - Edmonton

Publication Date:

1990-09-01

Title:

Alberta Base Features - 82J11NW

Source Scale Denominator:

20000

Type of Source Media:

Digital

Source Time Period of Content:

Time Period Information:

Range of Dates/Times:

Beginning Date:

1990-09-01

Ending Date:

1990-09-01

Source Currentness Reference:

publication date

Source Citation Abbreviation:

Alberta Base Features - 82J11NW

Source Contribution:

Hypsography: Mass Points land/island. Hypsography and Hydrography: Breaklines soft/hard.

Source Information:

Source Citation:

Citation Information:

Originator:

Alberta Sustainable Resource Development - Alberta Government - Edmonton

Publication Date:

1990-09-01

Title:

Alberta Base Features - 82J11SE

Source Scale Denominator:

20000

Type of Source Media:

Digital

Source Time Period of Content:

Time Period Information:

Range of Dates/Times:

Beginning Date:

1990-09-01

Ending Date:

1990-09-01

Source Currentness Reference:

publication date

Source Citation Abbreviation:

Alberta Base Features - 82J11SE

Source Contribution:

Hypsography: Mass Points land/island. Hypsography and Hydrography: Breaklines soft/hard.

Source Information:

Source Citation:

Citation Information:

Originator:

Alberta Sustainable Resource Development - Alberta Government - Edmonton

Publication Date:

1990-09-01

Title:

Alberta Base Features - 82J11SW

Source Scale Denominator:

20000

Type of Source Media:

Digital

Source Time Period of Content:**Time Period Information:****Range of Dates/Times:****Beginning Date:**

1990-09-01

Ending Date:

1990-09-01

Source Currentness Reference:

publication date

Source Citation Abbreviation:

Alberta Base Features - 82J11SW

Source Contribution:

Hypsography: Mass Points land/island. Hypsography and Hydrography: Breaklines soft/hard.

Process Step:**Process Description:**

BC CDED files are derived in the following manner:

- TRIM DEM mass points and breaklines were used to build a TIN. Only the most current data was used. All retired features were removed before building the TIN. All duplicate features were removed before building the TIN.
- All points and breaklines were added to the TIN with zero tolerance. No features were discarded as unimportant.
- All mass points were added to the TIN model with equal weight. All Breaklines were added to the model as hard breaklines.
- Points were sampled from the TIN at 0.75" x 0.75" intervals using linear interpolation and written to CDED file format. Elevation value was sampled at the centre of each cell.

Process Date:

2006-02-10

Process Step:**Process Description:**

The Alberta DEMs were created as follows:

- 1) Aerial photography was flown at 1:60 000 scale using wide angle camera with panchromatic film.
- 2) Survey control was established at a spacing of 20 km (X) X 10 km (Y) using inertial survey systems with 2nd order horizontal accuracy and 4th order vertical accuracy.
- 3) Survey control was targeted and photographed individually at a scale of 1:20 000.
- 4) Targets on the 1:20 000 photography were transferred to the 1:60 000 mapping photography using Wild Pug 4 point transfer device.
- 5) The 1:60 000 photography was triangulated using Wild BC1 analytical stereoplotters and adjusted using SPACE-M (Spatial Photogrammetric Adjustment for Control Extensions using independent Models).
- 6) DEMs were compiled using analytical stereoplotters at a regular spacing of mostly 100 m. Sometimes up to 250 m in flat areas. Random points and breaklines were measured in addition to the regular grid points. All measurements were done in stationary mode.
- 7) DEMs were generated using ArcInfo TIN (Triangulated Irregular Network). Breaklines were reconciled with the hydrographic data also compiled from the same photography

using analytical stereoplotters. Any missing hydrographic features were copied from the hydrographic file in Base Features Hydrography and elevations were interpolated from the DEM.

8) In tiles with a mixture of NTDB and Alberta DEMs, the respective DEMs were combined seamlessly. The resolution of the Alberta DEM was 1 mm while that of the NTDB DEM was 1 m.

The NTDB DEMs in Banff & Jasper National Parks were created as follows:

- 1) 1:50 000 contours and spot elevations from NTDB were edge-matched with the adjoining Alberta DEMs.
- 2) DEMs were generated using ArcInfo TIN. The hydrographic data from NTDB were added as breaklines with elevations interpolated from the DEM.
- 3) In tiles with a mixture of NTDB and Alberta DEMs, the respective DEMs were combined seamlessly. The resolution of the Alberta DEM was 1 mm while that of the NTDB DEM was 1 m.

The NTDB DEMs in Wood Buffalo National Park (74L and 74M) were created as follows:

- 1) 1:50 000 contours, spot elevations and CDED data were edge-matched with adjoining Alberta DEMs.
- 2) DEMs were generated using ArcInfo TopoGrid. Hydrographic data from NTDB were added with elevations interpolated from the DEM.
- 3) In tiles with a mixture of NTDB and Alberta DEMs, the respective DEMs were combined seamlessly. The resolution of the Alberta DEM was 1 mm while that of the NTDB DEM was 1 m.

All of the DEMs were converted to CDED as follows:

- 1) Extracted the mass points and breaklines for each 1:20 000 file covering the entire 1:250 000 sheet including a buffer zone of one 1:20 000 file outside the mapsheet border.
- 2) Created ArcInfo TIN for each 1:20 000 file.
- 3) Created a 100 m ArcInfo GRID using linear interpolation.
- 4) Clipped each GRID file up to 100 m overedge.
- 5) Created a seamless ArcInfo GRID of all the files using ArcInfo MOSAIC command.
- 6) Converted the file to geographic coordinates.
- 7) Created a TIN file using ESRI 3D Analyst.
- 8) Interpolated the 0.75 X 0.75 second lattice.
- 9) Reformatted to CDED format.
- 10) A Gaussian smoothing filter was applied to the final CDED files (7 by 7 array).

Process Date:

2006-02-10

Process Step:

Process Description:

The steps undertaken by the Centre for Topographic Information-Ottawa to merge 1:50 000 CDED are:

In the situation where a CDED is partly covered by an adjacent province/territory, the two adjacent provinces/territories CDED files are merged in the following manner:

- 1) One province's CDED data is loaded and clipped according to the provincial/territorial, and international (if applicable), boundary lines found on the GeoBase Portal. All grid points outside this province are set to the void value of -32767. This CDED data set is updated.
- 2) This new CDED data set and the adjacent province/territory's CDED data set

corresponding to the same cell are loaded and merged together. The adjacent provincial/territorial grid values are overwritten by the first province/territory's grid values. Void values are ignored in this process. The result is saved as a new merged CDED data set.

3) An in-house program is run on the new merged CDED data set to modify the original CDED Type A Logical Record, changing the CDED Responsibility Centre, the process code, the origin code, data edition/version number, void flag, void percentage and the minimum and maximum elevation fields.

Process Date:

2006-02-10

[Return to the top](#)

Spatial Data Organization Information:

Direct Spatial Reference Method:

Raster

Raster Object Information:

Raster Object Type:

Grid Cell

Row Count:

1201

Column Count:

1201

[Return to the top](#)

Spatial Reference Information:

Horizontal Coordinate System Definition:

Geographic:

Latitude Resolution:

0.75

Longitude Resolution:

0.75

Geographic Coordinate Units:

Decimal seconds

Geodetic Model:

Horizontal Datum Name:

North American Datum of 1983

Ellipsoid Name:

Geodetic Reference System 1980

Semi-major Axis:

6378137

Denominator of Flattening Ratio:

298.257222101

Vertical Coordinate System Definition:

Altitude System Definition:

Altitude Datum Name:

Mean sea level (MSL) / Canadian Vertical Geodetic Datum of 1928 (CVGD28)

Altitude Resolution:

1

Altitude Distance Units:

metres

Altitude Encoding Method:

Implicit coordinate

[Return to the top](#)

Entity and Attribute Information:

Overview Description:

Entity and Attribute Overview:

See details citation

Entity and Attribute Detail Citation:

Canadian Digital Elevation Data, Level 1, Product Specifications, Edition 2.0, April 2004

[Return to the top](#)

Distribution Information:

Distributor:

Contact Information:

Contact Organization Primary:

Contact Organization:

Government of Canada, Natural Resources Canada, Centre for Topographic Information

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GeoBase Technical Support

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mailing and physical

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Quebec

Postal Code:

J1J 2E8

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+01-819-564-5698

Contact Electronic Mail Address:

SupportGeoBase@NRCan.gc.ca

Hours of Service:

8:30 to 12:00 and 13:00 to 16:30 EST

Distribution Liability:

Data are subject to the GeoBase Unrestricted Use Licence Agreement
(<http://www.geobase.ca> - in the Data section).

Standard Order Process:

Digital Form:

Digital Transfer Information:

Format Name:

CDED ASCII

File Decompression Technique:

WinZip compression software

Digital Transfer Option:

Online Option:

Computer Contact Information:

Network Address:

Network Resource Name:

FTP site

Fees:

Free

[Return to the top](#)

Metadata Reference Information:

Metadata Date:

2007-04-03

Metadata Contact:

Contact Information:

Contact Organization Primary:

Contact Organization:

Government of Canada, Natural Resources Canada, Centre for Topographic Information

Contact Person:

GeoBase Technical Support

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mailing and physical

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2144, King Street West, Suite 010

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Sherbrooke

State or Province:

Quebec

Postal Code:

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+01-819-564-4857 / 1-800-661-2638 (Canada and USA)

Contact Facsimile Telephone:

+01-819-564-5698

Contact Electronic Mail Address:

SupportGeoBase@NRCan.gc.ca

Hours of Service:

8:30 to 12:00 and 13:00 to 16:30 EST

Metadata Standard Name:

FGDC Content Standard for Digital Geospatial Metadata

Metadata Standard Version:

FGDC-STD-001-1998

Metadata Use Constraints:

Only the English XML metadata file is valid according to the XML (W3C) schema as defined by the Federal Geographic Data Committee (FGDC) (<http://www.fgdc.gov>). The French version of the XML metadata file does not respect the domain of values, which is only available in English in certain fields, and exists solely for the presentation of information.

Users must ensure that they use the FGDC XML schema with the English version of the XML metadata to validate the metadata.