

Copyright Notice

© Her Majesty the Queen in Right of Canada, Department of Natural Resources. All rights reserved.

GeoBase®

REVISION HISTORY

Date	Version	Description	
January - 2003	1.0	Original version	
2004-05-28	1.1	Corrections to the content, to spelling and to the text format	

FUTURE WORK

Key word	Description

TABLE OF CONTENTS

1		OVERVIEW	1
2		DATA IDENTIFICATION	1
	2.1 2.2 2.3 2.4 2.5 2.6 2.7	SPATIAL RESOLUTION ("SCALE") LANGUAGE CHARACTER SET. TOPIC CATEGORY GEOGRAPHIC BOX GEOGRAPHIC DESCRIPTION. EXTENT	1 1 2 2 2 2
3		GEOSPATIAL CHARACTERISTICS	3
	3.1 3.2 3.3 3.4	SPATIAL REPRESENTATION TYPE SPATIAL REPRESENTATION COVERAGE AND CONTINUITY DATA SEGMENTATION	3 3 3 3
4		DATA MODEL	4
	4.1		4
E	4.Z		4
5		DATA DICTIONART / FEATURE CATALOGUE	4
6		COORDINATE REFERENCE SYSTEM	5
	6.1 6.1. 6.1. 6.2 6.2.	HORIZONTAL REFERENCE SYSTEM 1 Horizontal coordinate system 2 Unit of measure (coordinate system axis units) 2 VERTICAL REFERENCE SYSTEM 1 Unit of measure (coordinate system axis units)	5 .5 .5 .5
7		DATA QUALITY	6
	7.1 7.2 7.3 7.4 7.5 7.6 7.7	SCOPE LINEAGE COMPLETENESS LOGICAL CONSISTENCY POSITIONAL ACCURACY TEMPORAL ACCURACY THEMATIC (ATTRIBUTE) ACCURACY	6 6 6 7 7 7
8		METADATA	8
9		DATA DELIVERY	9
	9.1 9.2 9.3	FORMAT INFORMATION MEDIUM INFORMATION CONSTRAINTS INFORMATION	9 9 9
1(0	DATA CAPTURE AND MAINTENANCE	9
A	APPENDIX A: ATTRIBUTES IN GML AND IN SHAPE FORMATS		
A	PPE	NDIX B: EXAMPLE OF CGB1 DATASET IN GML FORMAT	11

2004-05-28

ACRONYMS AND ABBREVIATIONS

ASCII	American Standard Code Information Interchange
CGB1	Canadian Geopolitical Boundaries, Level 1
ESRI	Environmental System Research Institute
GDF	Geographic Data File
GIS	Geographic Information System
GML	Geography Markup Language
ISO	International Standards Organisation
ISO/TC	ISO Technical Committee
NAD83	North American Datum of 1983
UML	Unified Modeling Language
WGS84	World Geodetic System of 1984
XML	Extended Markup Language

TERMS AND DEFINITIONS

ASCII

Simple text system file exchange standard, coded with 256 characters (including the characters A-Z, a-z, the numbers, the punctuation, ...).

Perceptory

An application software developed by Laval University (Québec, Canada) to produce feature catalogues.

Shape file

One of the ESRI file format widely used in the geomatics industry. Compatible with most GIS software products.

1 Overview

This dataset is one of the GeoBase series of products. It contains current International, Economic Exclusion Zone and inter-provincial / territorial boundaries of Canada, plus the corresponding geopolitical areas.

It should be used for cartographic purposes only, not for legal purposes.

The dataset contains a number of files: an administrative boundary file, administrative areas files and a metadata file.

The administrative boundary file contains non-overlapping, topologically correct (connected) simple features, with no overshoots and undershoots. An administrative boundary is a line that bounds two adjacent administrative areas. In the dataset, an administrative boundary may be split into several smaller segments, due to changes in attribute information.

The administrative areas files contain adjacent (contiguous) polygons. The polygon boundaries exactly align with the corresponding features in the administrative boundary file.

The delivery format for this dataset can be either GML ASCII or ESRI Shape file.

2 Data identification

2.1 Spatial resolution ("scale")

This dataset was made from the best available data on administrative boundaries. The accuracy of the data varies a lot, depending on the type of boundary. Below is a general indication of scale, per type of boundary. More detailed information on accuracy is available as attribute of each boundary segment.

- Economic Exclusion Zone: 1:10 000
- Inter-provincial/territorial boundary: 1:20 000
- International boundary: 1:10 000

2.2 Language

The languages used in the dataset are english and french.

2.3 Character set

The character coding standard used for the dataset is 8859part1.

2.4 Topic category

According to the GCMD¹ (Global Change Master Directory) thesauri, CGB1 can be classified into science keywords structured using a 4 levels hierarchy: category > topic > term > variable. The following list indicates which have been retained for the Canadian Geopolitical Boundaries, Level 1.

CATEGORY > TOPIC > TERM > VARIABLE

- Earth sciences > Human dimensions > Boundaries > Administrative divisions
- Earth sciences > Human dimensions > Boundaries > Political divisions

Other topics related to CGB1 are: Geopolitical boundaries, Administrative boundaries, and Base map data.

2.5 Geographic box

The geographic box or minimum-bounding rectangle (MBR) delineating the coverage of all existing CGB1 boundaries in Canada is:

- West Bounding Coordinate: 141° West (or -141°)
- East Bounding Coordinate: 47.5° West (or -47.5°)
- North Bounding Coordinate: 86.5° North (or 86.5°)
- South Bounding Coordinate: 40° North (or 40°)

2.6 Geographic description

The dataset covers the entire country of Canada.

2.7 Extent

The dataset was produced on January 15, 2003.

The most recent data in the dataset was produced in January 2003.

The oldest data in the dataset was produced in 1995.

¹ Information about the NASA Global Change Master Directory (GCMD) can be found at: http://gcmd.nasa.gov.

3 Geospatial characteristics

3.1 Spatial representation type

The method used to spatially represent CGB1 is vector data.

3.2 Spatial representation

Number of dimensions: 2.

First axis: latitude, in decimal degrees.

Second axis: longitude, in decimal degrees.

3.3 Coverage and continuity

This dataset covers the entire country in a seamless manner, without any tiling (one spatial coverage).

3.4 Data segmentation

Administrative boundaries

There are two segmentation levels.

Administrative boundary level: Line features are first segmented at the intersection of administrative boundaries.

Administrative boundary segment level: Line features may be split into smaller segments when a change in the following attributes occurs: status, source agency, source description, accuracy.

The original administrative boundary data came from different source agencies and had to be adjusted for undershoots and overshoots. In all cases, less accurate boundaries were adjusted to more accurate boundaries.

Relationship with administrative area polygons

The administrative area polygons vertically align exactly with their corresponding administrative boundary segments. No explicit topology is maintained between the polygon and line features.

4 Data model

4.1 Data modelling schema used

The data-modelling schema used is UML. The data model was inspired from the GDF standard.

4.2 Application schema (conceptual model)

ADMINISTRATIVE AREA		ADMINISTRATIVE BOUNDARY SEGMENT
UNIVERSAL UNIQUE IDENTIFIER TYPE NAME SOURCE AGENCY LAST UPDATE DATE LAST UPDATE TYPE PREVIOUS UPDATE DATE	Is bounded by ►	UNIVERSAL UNIQUE IDENTIFIER TYPE STATUS SOURCE AGENCY SOURCE DESCRIPTION ACCURACY LAST UPDATE DATE LAST UPDATE TYPE PREVIOUS UPDATE DATE

The diagram above describes the physical data model that applies to the product.

The administrative area polygons exactly vertically align with their corresponding administrative boundary segments.

5 Data dictionary / Feature catalogue

The complete feature catalogue is available as a separate document: "Canadian Geopolitical Boundaries, Level 1 – Feature Catalogue"².

The feature catalogue was produced using Perceptory, which is compatible with the ISO feature catalogue standard (ISO/TC 211:19110 Geographic information – Methodology for feature cataloguing).

² This document can be found at <u>http://www.geobase.ca/</u> - in the Data section.

6 Coordinate reference system

6.1 Horizontal reference system

The horizontal reference system for spatial data is NAD83 (North American Datum of 1983).

The reference ellipsoid is WGS84 (World Geodetic System of 1984).

6.1.1 Horizontal coordinate system

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

6.1.2 Unit of measure (coordinate system axis units)

Coordinates are expressed in real values, decimal degrees.

6.2 Vertical reference system

NOT APPLICABLE

6.2.1 Unit of measure (coordinate system axis units)

NOT APPLICABLE

7 Data quality

7.1 Scope

Data quality information scope is the entire dataset.

7.2 Lineage

Sources of data depend on the type of administrative boundaries, as identified in attribute information of features.

Economic exclusion zone boundary: Source data were provided by the Fisheries and Oceans Canada.

International boundary: Source data were provided by the International Boundary Commission.

Inter-provincial/territorial boundaries: Data were derived from data provided by Elections Canada and the provinces/territories.

Each type of source data was provided by the source agencies to Natural Resources Canada, who made the integration into one dataset. To ensure correct topology, i.e. proper intersection of line feature at junctions, less accurate data was adjusted to more accurate data, according to accuracy attribute value.

Some portions of boundaries are officially recognised, while other portions are not. This information is indicated in the "Status" attribute of features.

The original data was provided to the integrator in Shape file format and processed in the ArcGIS environment. Source data providers only provided polyline features, with attribute information. The integrator snapped the lines at intersections. From the polyline layer, a polygon layer was produced. The polygons were tagged manually, considering the few number of them. Administrative area polygon attributes were also entered manually by the integrator.

7.3 Completeness

The completeness of the dataset in terms of features and their attributes has been verified manually.

7.4 Logical consistency

Conceptual consistency:	All features in the dataset adhere to the conceptual model rules.	
Domain consistency:	The adherence of attribute values of features in the dataset to the corresponding domain has been verified manually.	
Format consistency:	The data is stored in accordance with the physical structure of the dataset.	
Topological consistency:	All polyline features in the dataset respect the topological connectivity rules. There is no explicit topology between polygons and polyline features, but polygons have been generated from the polylines. Thus, areas in the polygon layer align with their corresponding administrative boundaries in the polyline layer.	

7.5 **Positional accuracy**

Absolute accuracy of feature: This information is provided for each administrative boundary segment in terms of a category (range) of circular planimetric accuracy.

The accuracy category may vary along a given administrative boundary. The accuracy was determined by the source agencies, based on the methodology used to produce the source data (land surveying, map source, etc.).

7.6 Temporal accuracy

Accuracy of time measurement:	Time accuracy is equal to time resolution: one day.
Temporal consistency:	All date attributes of features are temporally consistent.
Temporal validity:	All date attributes of features are temporally valid.

7.7 Thematic (attribute) accuracy

Classification correctness:	Classification correctness of attribute values has been verified manually.
Non-quantitative attribute correctness:	Non-quantitative attribute correctness of attribute values has been verified manually.
Quantitative attribute accuracy:	Not applicable.

8 Metadata

There are usually 2 levels of metadata to describe a product as shown in the following figure: collection and product/dataset. The higher level of metadata covers the entire data collection: it applies to the series of available datasets (group of features), database, etc. The other level is called product level metadata and it gives specific information about each dataset.



Figure 1: Metadata Levels

CGB1 collection level metadata are available via GeoBase Portal (in the Data section at <u>http://www.geobase.ca</u>) and GeoConnections Discovery Portal (in the Data section at http://geodiscover.cgdi.ca).

CGB1 product level metadata are provided with the dataset in XML format.

9 Data delivery

9.1 Format information

The available output file formats for the product are: GML (Geography Markup Language) in ASCII and SHAPE (ESRITM). Appendix A presents the name and data type of each attribute in both formats. An example of a dataset in GML (ASCII) format is presented in Appendix B.

The dataset is delivered in a compressed format (zip).

The compressed (zip) files contains two ESRI Shape files or GML ASCII files, plus metadata in XML format.

9.2 Medium Information

Type of media: direct computer linkage (on line).

9.3 Constraints information

The constraints information for data access and data use are defined in the GeoBase Unrestricted Use Licence Agreement (<u>http://www.geobase.ca/</u> - in the Data section).

Use constraints: For cartographic purposes only, not legal.

10 Data capture and maintenance

The objective is to update the dataset twice a year.

Scope of update: Entire dataset.

APPENDIX A: Attributes in GML and in SHAPE Formats

ADMINISTRATIVE AREA

CGB1	GML ³	SHAPE	SHAPE
ATTRIBUTE NAME	ATTRIBUTE NAME	ATTRIBUTE NAME	DATA TYPE
UNIVERSAL UNIQUE IDENTIFER	universalUniqueIdentifier	UUID	char(36)
TYPE	type	TYPE_E	char(10)
NAME	name	NAME	char(50)
SOURCE AGENCY	sourceAgency	SRC_AGENCY	char(10)
LAST UPDATE DATE	lastUpdateDate	L_UPD_DATE	date
LAST UPDATE TYPE	lastUpdateType	L_UPD_TYPE	char(2)
PREVIOUS UPDATE DATE	previousUpdateDate	P_UPD_DATE	date

ADMINISTRATIVE BOUNDARY SEGMENT

CGB1	GML⁴	SHAPE	SHAPE
ATTRIBUTE NAME	ATTRIBUTE NAME	ATTRIBUTE NAME	DATA TYPE
UNIVERSAL UNIQUE IDENTIFER	universalUniqueIdentifier	UUID	char(36)
TYPE	type	TYPE_E	char(10)
STATUS	status	STATUS	char(10)
SOURCE AGENCY	sourceAgency	SRC_AGENCY	char(10)
SOURCE DESCRIPTION	sourceDescription	SRC_DESC	char(254)
ACCURACY	accuracy	ACCUR	char(7)
LAST UPDATE DATE	lastUpdateDate	L_UPD_DATE	date
LAST UPDATE TYPE	lastUpdateType	L_UPD_TYPE	char(2)
PREVIOUS UPDATE DATE	previousUpdateDate	P_UPD_DATE	date

³ For GML format data type is always TEXT (STRING).

⁴ For GML format data type is always TEXT (STRING).

APPENDIX B: Example of CGB1 Dataset in GML Format

Extract from a GML file – CGB1 Prince Edward Island Polygon

```
<?xml version="1.0" encoding="UTF-8"?>
<CGB1:FeatureCollection xmlns:CGB1="http://www.geobase.ca/CGB1"
xmlns:gml="http://www.opengis.net/gml"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.geobase.ca/CGB1 CGB1 polygons EN.xsd">
<qml:boundedBy>
<qml:Box srsName=""><qml:coordinates>-141.002749999845,40.0434308311147 -
47.6975188899737,89.891999999186</gml:coordinates></gml:Box>
</gml:boundedBy>
<qml:featureMember>
<CGB1:CanadianGeopoliticalBoundariesPolygon>
<CGB1:type>PROVINCE</CGB1:type>
<CGB1:lastUpdateDate>20030120</CGB1:lastUpdateDate>
<CGB1:previousUpdateDate>20030120</CGB1:previousUpdateDate>
<CGB1:name>PRINCE EDWARD ISLAND</CGB1:name>
<CGB1:lastUpdateType>C</CGB1:lastUpdateType>
<CGB1:universalUniqueIdentifier>509</CGB1:universalUniqueIdentifier>
<CGB1:sourceAgency>NRCAN</CGB1:sourceAgency>
<gml:polygonProperty>
<qml:Polygon srsName="">
<qml:outerBoundaryIs><gml:LinearRing><gml:coordinates>-
64.0020904540773,47.0604438782693 -63.9916540012395,47.0469640217983 -
63.9940206061165,47.0331016696731 -63.9942749370648,46.9864993378179 -
63.9991475465115,46.9508059071916 -63.9858223042939,46.9116981668656 -
63.980388641332,46.880977630712 -64.0057632932082,46.8620458448986
64.0321390265933,46.8270148175291 -64.0355533799559,46.7932079845126
64.0191891412358,46.7663974458545 -63.9982719421125,46.7418136597657 -
63.9663227978027,46.7118178494472 -63.9369004703153,46.6972901169241
63.8909889636124,46.6664502022767 -63.8643811872306,46.6490024891489
63.8358657499578,46.6324029681399 -63.7552597869539,46.5929783134452 -
63.7199779977872,46.5744195927889 -63.6773958382662,46.5544945039542 -
63.6454519262981,46.5589286328619 -63.5918185350177,46.5463915484977 -
63.5443949107532,46.5361472384884 -63.4995158391117,46.5231593844109 -
63.4947208768711,46.5063897781226 -63.4470625221706,46.5047182198628 -
63.3232116698932,46.4894790650428 -63.3128003399248,46.4766496954716 -
63.2862811130828,46.4487569601405 -63.2546961326255,46.4376086038558 -
63.2184287663951,46.4288735901618 -63.1761183488182,46.427015664407 -
63.1332309189414,46.4256446551898 -63.0578758612625,46.4113141699355 -
63.0172674601842,46.414531300255 -62.959984971311,46.4191650469664 -
62.8724855280492,46.4303639389553 -62.8336906432807,46.4311790467341 -
62.7927910342198,46.4345909951097 -62.7338079118666,46.4436068376441 -
62.6928018620533,46.4545210823968 -62.6349619116426,46.4639313732236 -
62.563612935242,46.467321556428 -62.4903012092335,46.4733862449179
62.4531280910805,46.4696886307317 -62.383971757579,46.4632394963606 -
62.3437043405796,46.4692396257617 -62.2944952151987,46.4724431522868 -
62.2590756775038,46.4753329910181 -62.2085824672261,46.4821856690973
62.1723156825527,46.4823906076705 -62.0739188800436,46.4654662560093 -
62.0353076690982,46.4636489159034 -61.999968939389,46.4683101590371 -
61.9865303039241,46.4612083436112 -62.0003968440873,46.4452062105973 -
62.005480064873,46.4316247669683 -62.0291893720454,46.4168772260827 -
62.0594208500615,46.4052517128458 -62.1063117980644,46.3770866395099 -
62.1624841993628,46.3631930245649 -62.1763343810721,46.3517341614825 -
62.1910324096366,46.3452224732501 -62.2359695434257,46.3436470032793 -
62.284412384002,46.3319206238847 -62.3465996409873,46.3370344224688 -
```

Extract from a GML file – CGB1 Prince Edward Island Polygon (Continued)

62.3430442809745,46.3035392762285 62.3830508845893,46.2581696144289 62.4075358323083,46.1918622245576	-62.3615303039236,46.2754325867755 - -62.4131050109545,46.2124481202231 - -62.4042157265627,46.1815718880896 -
62.4729141775255,46.1439817283708	-62.4712404940584,46.121032830166 -
62.4632510974744.46.0810058511272	-62.45/53938/3223,46.0889835365002 -
62.4858644685227,46.0489861912573	-62.4598842017156,46.0188765053846 -
62.4672582657526,46.0040782536431	-62.4843723602618,45.9884376733464 -
62.5109633890361,45.9739390037845	-62.5345451866706,45.970723830907 -
62.6522157586913.45.9588985291165	-62.7043391736496.45.9585002568773 -
62.7454472803096,45.9467965220906	-62.7738517102421,45.9564228597089 -
62.8294287553119,45.9638214813216	-62.8592815907495,45.9756466022782 -
62.8942366989669,45.9974736707168	-62.9069940657695,46.0171296543569 -
62.9335486721789,46.0397083479773 62.9756817481294 46.0568450100211	-62.9580193708605,46.056692225391 -
63.2060369181479,46.1181505760152	-63.2356619420859,46.1323059769194 -
63.2602880513982,46.1320522782185	-63.306146001344,46.146847751466 -
63.3473771327888,46.1580564624373	-63.4075088500672,46.1695899964413 -
63.4607315063175,46.1860504151422	-63.5085039745102,46.2063734406244 -
63.5957679638469.46.209754840374 -	-63.6284370422066.46.2147865296435 -
63.6580156045257,46.2259904200845	-63.7126547996652,46.2523676243365 -
63.7042473594601,46.272198342691 -	63.7276088255845,46.2804285783944 -
63.7507068019983,46.2955582814034	-63.7651960304118,46.3059297397421 -
63.7867859713109,46.3153592451714	-63.8162406805683, 46.3155221431292 -
63 8188574691584 46 3687789054911	-63 8896522521689 46 3907203675322 -
63.9511718749717,46.3956108094265	-63.9667279579105,46.3931731173886 -
63.9916422415671,46.383789052699 -	64.023857339348,46.3860341704933 -
64.0557279828682,46.3932240956938	-64.0791927609666,46.3953036439463 -
64.1112623476881,46.3996803284453 64.1441288470424 46.4207282575852	-64.1388352510406,46.4060851667689 -
64.1114647847367.46.4908243926002	-64.1180850108276.46.5142017124034 -
64.0975934481954,46.5432812089287	-64.0806401582394,46.5578483471743 -
64.0704269019889,46.5797329365854	-64.0884288481054,46.5849325175396 -
64.1211471557347,46.5828781128915	-64.1341643706544,46.5854875670029 -
64.18/0841241/48,46.6085060/93321	-64.2130126952858,46.61311/2181156 -
64.3162082938079.46.6177356915756	-64.3541164055203.46.6173266027519 -
64.3925247192119,46.6134605408691	-64.401136689361,46.6337621639391 -
64.4120659925504,46.6481715179225	-64.4176935036536,46.6701067865005 -
64.4181518554429,46.6963996888176	-64.4109785529336,46.7152203953914 -
64.3997428972598,46.727144249743 -	-64.3790893554432,46.7473411561025 - -64.3096132154555 46.7941405703582 -
64.2824775289247,46.8148408298376	-64.2684610156233,46.8310069934402 -
64.2581308494271,46.8480893442834	-64.2437335266265,46.8687504272859 -
64.2291351754316,46.8984733260706	-64.2024153698984,46.9210796575083 -
64.1910380348331,46.9348629767753 64.1221010020068,46.0662027017754	-64.162928712425,46.9535064245539 -
64.1321919930068,46.9663037817754	-64.1086062923445,46.9793269233532 - .64 0507019349391 47 012674583695 -
64.0218197902886,47.0372455066629	-
64.0020904540773,47.0604438782693<	<pre></pre>
rBoundaryIs>	
<td>riesPolygon></td>	riesPolygon>

Extract from a GML file – CGB1 Prince Edward Island Line

<?xml version="1.0" encoding="UTF-8"?> <CGB1:FeatureCollection xmlns:CGB1="http://www.geobase.ca/CGB1" xmlns:gml="http://www.opengis.net/gml" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.geobase.ca/CGB1 CGB1 lines EN.xsd"> <qml:boundedBy> <qml:Box srsName=""><qml:coordinates>-141.002749999845,40.0434308311147 -47.6975188899737,89.891999999186</qml:coordinates></qml:Box> </gml:boundedBy> <gml:featureMember> <CGB1:CanadianGeopoliticalBoundariesLine> <CGB1:universalUniqueIdentifier>1</CGB1:universalUniqueIdentifier> <CGB1:lastUpdateDate>20030120</CGB1:lastUpdateDate> <CGB1:lastUpdateType>C</CGB1:lastUpdateType> <CGB1:previousUpdateDate>20030120</CGB1:previousUpdateDate> <CGB1:type>INTERN</CGB1:type> <CGB1:status></CGB1:status> <CGB1:sourceDescription>Sector Line</CGB1:sourceDescription> <CGB1:accuracy>UNKNOWN</CGB1:accuracy> <CGB1:sourceAgency>NRCAN</CGB1:sourceAgency> <gml:lineStringProperty> <qml:LineString srsName=""><qml:coordinates>-140.86779280448,89.891999999186 -60.4864839691579,89.8919999999087</gml:coordinates></gml:LineString> </gml:lineStringProperty> </CGB1:CanadianGeopoliticalBoundariesLine> </gml:featureMember>

</CGB1:FeatureCollection>