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Postal Codes by Federal Ridings File (PCFRF) 2003 Representation Order, Reference Guide

September 2007 Postal codes

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Note of appreciation

Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued cooperation and goodwill.

What's new?

- The postal code reference date for this update is September 2007. This is the same as for the Postal Code Conversion File (PCCF). The Postal Code by Federal Ridings File (PCFRF) refers to the federal electoral districts (FED) based on the 2003 Representation Order.

- The 'unique link' variable indicates if the postal code is linked to one or more FEDs.

- The PCFRF now includes the variable 'weight'. The 'weight' estimates the proportion of the population of a postal code that resides within each FED.

- The names of 38 Federal Electoral Districts were changed through legislation on September 1, 2004. These changes are reflected in the Federal electoral district names file – 2003 Representation Order (FED03_CEF03.dat).

- Since the last release of the PCFRF, the names of two federal electoral districts were changed (back to their original names in the 2003 Representation Order) through legislation on February 24, 2005. These changes are also reflected in the Federal electoral district names file – 2003 Representation Order (FED03_CEF03.dat).

- The boundaries between the Federal Electoral District of Miramichi (13006) and the Federal Electoral District of Acadie-Bathurst (13001) in New Brunswick were changed through legislation passed on February 24, 2005. The following three CSDs which belonged to Miramichi are now part of Acadie-Bathurst: 1315006 (Allardville, P), 1315008 (Bathurst, P), and 1315010 (Pabineau 11, IRI).

Table of contents

1. About this guide

This reference guide is intended for users of the Postal Codes by Federal Ridings File (PCFRF). The guide provides an overview of the file, the general methodology used to create it, and important technical information for users.

Geographic terms and concepts are briefly described in the glossary (Appendix A). More details can be found in the *2006 Census Dictionary* (Catalogue no. 92-566-XWE). Supplementary information is provided in the appendices.

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2. Overview

The Postal Codes by Federal Ridings File (PCFRF) is a digital file which provides a link between the six-character postal code and Canada's federal electoral districts (which are also known as federal ridings). The current version of the PCFRF links 822,852 active postal code records, existing as of September 2007, to the 308 federal electoral districts.

Elections Canada defines a federal electoral district as any place or territorial area entitled to return a Member of Parliament (MP) to serve in the House of Commons. Federal electoral district (FED) legal limits and descriptions are the responsibility of the Chief Electoral Officer, and are usually revised every 10 years after the results of the decennial census. There are 308 FEDs in the 2003 Representation Order, the most recent revision of the federal electoral districts limits. The FEDs are based on the 2001 Census population data.

Reference dates

The reference date is September 2007 for postal codes contained in the PCFRF. This is the same date as the postal codes contained in the Postal Code Conversion File (PCCF) product released in January 2008.

The geographic reference date is a date determined by Statistics Canada to finalize the geographic framework for which the census data are collected, tabulated and reported. The geographic reference date for the 2006 Census is January 1, 2006.

3. How to use this product

Purpose of the product

The Postal Codes by Federal Ridings File (PCFRF) was conceived as a tool for use with files containing postal codes. By using the postal code as a link, data from files may be organized and/or tabulated by federal electoral district.

Limitations

Some postal codes straddle one or more federal electoral district (FED) boundaries. The 'unique link' variable indicates if the postal code is linked to one or more federal electoral districts (FEDs).

Users often link the postal code in their data set to the FED in the PCFRF. When performing this link, users should be aware that the postal code in their data set may represent a mailing address used by a person, not necessarily where the person actually resides. Similarly, a postal code in a business-based mailing address may not necessarily indicate where the business activity took place.

Limitations of the relationship between postal codes and geographic areas are described in Section 4, Data quality. Before using this file, users should first familiarize themselves with the information provided in this section.

Content

The PCFRF contains a total of 814,534 postal codes. The number of postal codes by FED is provided in Appendix B.

Each record of the file contains the following:

- six-character postal code
- federal electoral district code – 2003 Representation Order
- federal electoral district name – English
- federal electoral district name – French
- unique link – an indicator of whether the postal code is linked to more than one electoral district
- weight – for use in proportional allocation

Please see section 5, Technical Specifications for the data descriptions and definitions.

Comparison with other products

Linkage of postal codes to more detailed geographic areas, such as dissemination area or dissemination block, is available in the Postal Code Conversion File (PCCF).

4. Data quality

Linkage data quality elements provide information on the fitness-for-use of a spatial database by describing why, when and how the data are created, and how accurate the data are. The elements include an overview describing the purpose and usage, as well as specific quality elements reporting on the lineage, attribute accuracy, logical consistency and completeness. This information is provided to users for all linkage data products disseminated for the census.

Postal code characteristics

Before using the Postal Codes by Federal Ridings File (PCFRF) with administrative files containing postal codes, users should be aware of some characteristics of postal codes that may affect their linkage to federal electoral districts on the PCFRF.

Postal delivery areas do not respect federal electoral district boundaries

A postal delivery area (as represented by the six-character postal code) may straddle one or more federal electoral district boundaries. This means that, in the Postal Code Federal Riding File, the same postal code may be linked to two or more (adjacent) federal electoral districts. Most federal electoral districts are affected in this way in both urban and rural areas. Refer to Logical consistency later in this section for further details.

Postal codes may be associated with post office boxes at a postal station that is not in the same federal electoral district as the client using the post office box

The postal code associated with a lock box (post office box) may be geocoded to the physical location of the associated postal installation (post office). This could be located in a federal electoral district that is different from the ultimate destination of the mail delivery – the residential, industrial, or commercial location of the client renting the lock box.

Canada Post Corporation (CPC) regularly retires postal codes and may also reactivate retired postal codes for use again

Users of the PCFRF must keep in mind that the file contains only the postal codes from CPC that are active as of September 2007.

If the addresses of postal codes in a user's administrative file are not updated to September 2007, there may be non-matches with the PCFRF because some of the postal codes in the user’s file may have been retired, or may even have been reactivated and re-assigned by CPC to another range of addresses outside the riding where they had previously been used.

Statistics Canada maintains an audit trail of the birth dates and retirement dates of postal codes in the PCCF. Users may wish to consult the *Postal Code Conversion File (PCCF), Reference Guide* (Catalogue no. 92-153-GWE), available on the Statistics Canada website. An updated version of the file including September 2007 postal codes is released in January 2008.

Lineage

Lineage describes the history of the linkage data, including descriptions of the source material from which the data were derived, and the methods of derivation. It also contains the dates of the source material, and all transformations involved in producing the final digital files.

Sources

The sources used to derive the PCFRF are as follows:

- The January 2008 PCCF links postal codes (provided by CPC on the Address Lookup File updated to September 2007) to geographic codes for all 2006 Census geographic areas, including province and federal electoral district 2003 Representative Order codes. It also provides the geographic point coordinates representing the postal codes. The January 2008 PCCF contains over 1.6 million postal code records linked to the geographic areas used in the 2006 Census. These geographical areas have a reference date of January 1, 2006, except for the Federal electoral district – 2003 Representation Order.
- The PCFRF contains postal code data under license from Canada Post Corporation. The most recent Canada Post Corporation file from which this data is copied is dated September 2007.
- Federal electoral district names are derived from Geography Division's Spatial Data Infrastructure. The source of the geographic names and codes of federal electoral districts is the 2003 Representation Order of the Chief Electoral Office, Elections Canada. The Spatial Data Infrastructure contains a table with the name of each federal electoral district and its associated identification code. This table is updated based on name changes provided by Elections Canada. Where changes to the electoral boundaries have been provided by Elections Canada, the correspondence between the federal electoral district and postal codes is updated.
- The 2006 Census of Population is used as a source for deriving the weights. When a postal code is linked in the PCFRF to more than one FED, the number of persons reporting the postal code in the census may be used to derive the weights.

Method of derivation

The PCFRF is created by extracting the active postal codes and the related FED codes included in the January 2008 PCCF, containing September 2007 postal codes. Each FED code in this file is linked to the list of federal electoral districts – 2003 Representation Order codes and names. The linkage to the FED on the January 2008 PCCF is based on the dissemination block or dissemination area geocode in the PCCF.

The resulting PCFRF file contains 822,852 active postal code records of which 807,116 are unique links to one federal electoral district. In total, 6,725 active postal codes (13,450 records) are linked to more than one federal electoral district (further details are provided in Logical consistency later in this section). The number of postal code records by federal electoral district is provided in Appendix B, Postal codes by federal electoral districts.

The unique link variable is derived based on the postal code and FED codes in the PCFRF. If the postal code is linked to only one FED, the unique link is assigned a value of 1, otherwise it is assigned a value of 2.

The 'weight' estimates the proportion of the population of a postal code that resides within each FED. If a postal code is linked to only one FED in the PCFRF, the weight is equal to 1. If the postal code is linked to more than one FED and is reported in the 2006 Census, the weight is equal to the proportion of the population that reported the postal code in each of the FEDs. If the postal code was not reported in the census, the weight is estimated using the address ranges in

the service area of the postal code as found in the Address Lookup File from Canada Post Corporation. If necessary, the weights for a postal code are normalised and adjusted using the Single Link Indicator variable in the PCCF so that the sum of weights equals 1.0.

Attribute accuracy

Attribute accuracy refers to the accuracy of the quantitative and qualitative information attached to each feature (such as population for an urban area, street name, census subdivision name and code).

The attribute accuracy of the PCFRF is dependent on the accuracy of the geocodes for the dissemination blocks and dissemination areas in the PCCF. The linkage of the dissemination blocks or dissemination areas to the FEDs is based on the boundaries of the FEDs as found in the Spatial Data Infrastructure.

The accuracy of the weight variable is based on the linkage to the FED in the PCFRF, the population reporting the postal code in the census as well as address range data in Canada Post's Address Lookup File.

The population on which the weight variable in the PCFRF is based was derived from the total population data of the 2006 Census. Population counts are determined according to the 'de jure' method. This means that people are enumerated at their usual place of residence, regardless of where they may have been on Census Day, May 16, 2006. See Appendix E for notes on the quality of the 2006 Census data.

If a postal code is linked to more than one FED in the PCFRF and was not reported in the census, address range data from the Address Lookup File is used to estimate the weight. This is the case for 0.78 % of the postal codes. Because large populations residing in apartments or collective dwelling units may be represented by only one address, this method can underestimate the weight associated with these populations.

Logical consistency

Logical consistency describes the fidelity of relationships encoded in the data structure of the digital linkage data.

Of the 822,852 active postal code records found on this file, there are 807,116 active postal codes uniquely linked to one federal electoral district and 6,725 active postal codes that are linked to two or more federal electoral districts. The following table summarizes them.

Table 4.1 Count of postal codes linked to federal electoral districts (FEDs)

Number of federal electoral districts	Active postal codes	Number of records
1	807,116	807,116
2	6,725	13,450
3	555	1,665
4	93	372
5	27	135
6	13	78
7	4	28
8	1	8
Total	**814,534**	**822,852**

Consistency with other products

Data contained in the PCFRF are consistent with all 2006 Census related geographic products with the exception of the 2006 Census Forward Sortation Area Boundary File (Catalogue no. 92-170-XWE, XCE), which represents only the forward sortation areas reported in the 2006 Census. The PCFRF is derived from the Postal Code Conversion File (PCCF), and is consistent with that file.

Completeness

Completeness refers to the degree to which geographic features, their attributes and their relationships are included or omitted in a dataset. It also includes information on selection criteria, definitions used, and other relevant mapping rules.

Completeness in the context of the PCFRF is the degree to which all valid postal codes are accounted for. All postal codes, valid and active as of September 2007 according to CPC, have been linked to census geography.

There are 308 FEDs in the 2003 Representation Order of the Chief Electoral Office, Elections Canada. All of these FEDs are included in the PCFRF.

The data files are named using a file naming convention described in Section 5, Technical specifications. Each file contains the following number of active postal code records:

Table 4.2 Number of postal code records per region in Postal Codes by Federal Ridings File (PCFRF) data files

File name	Number of records
pcfrfEastFED2003_SEPT07_fcpcefEstCEF2003.zip	98,369
pcfrfQueFED2003_SEPT07_fcpcefQuéCEF2003.zip	206,725
pcfrfOntFED2003_SEPT07_fcpcefOntCEF2003.zip	275,354
pcfrfWestFED2003_SEPT07_fcpcefOuestCEF2003.zip	126,641
pcfrfBCFED2003_SEPT07_fcpcefCBCEF2003.zip	115,763
pcfrfNatFED2003_SEPT07_fcpcefNatCEF2003.zip	822,852

Table 4.3 lists abbreviations for the region names used in the data file names and the province and territories that they represent.

Table 4.3 Region abbreviations and associated province and/or territory in Postal Codes by Federal Ridings File (PCFRF) data files

English abbreviation - region name	Associated province and/or territory - English	French abbreviation - region name	Associated province and/or territory - French
East	Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick	Est	Terre-Neuve-et-Labrador, Île-du-Prince-Édouard, Nouvelle-Écosse, Nouveau-Brunswick
Que	Quebec	Qué	Québec
Ont	Ontario	Ont	Ontario
West	Manitoba, Saskatchewan, Alberta, Northwest Territories, Nunavut	Ouest	Manitoba, Saskatchewan, Alberta, Territoires du Nord-Ouest, Nunavut
BC	British Columbia, Yukon Territory	CB	Colombie-Britannique, Territoire du Yukon
Nat	Canada	Nat	Canada

5. Technical specifications

File specifications

The current version of the Postal Codes by Federal Ridings File (PCFRF) is an ASCII file and does not include any software or instructions on how to use the product within specific Geographical Information Systems (GIS) or mapping packages.

Record layout

Table 5.1 Postal Codes by Federal Ridings File (PCFRF) record layout

Position	Size	Type[1]	Description
1	6	C	Postal code
7	5	C	Federal electoral district code
12	56	C	Federal electoral district name - English
68	56	C	Federal electoral district name - French
124	1	C	Unique link
125	3	C	Weight

1. The field type 'C' refers to both alphabetic and numeric characters.

Data descriptions

Postal code
The postal code is a six-character alphanumeric code defined and maintained by CPC for the sortation and delivery of mail.

The alphanumeric characters are arranged in the form ANA NAN, where 'A' represents a letter of the alphabet and 'N' a numeric digit. The first character of a postal code (allocated in alphabetic sequence from east to west across Canada) represents a province or territory or a major sector entirely within a province.

The first three characters represent a set of well-defined and stable areas known as the forward sortation area (FSA). Rural FSAs are identifiable by the presence of a '0' in the second position of the FSA code.

The last three characters identify the local delivery unit (LDU). In established urban areas, the LDU can specify a small and easily defined area within an FSA such as block-face (one side of a city street between consecutive intersections with streets), an apartment building, an office building, or a large firm or organization which does large volume business with the post office. In rural areas, the LDU denotes a service area – the area serviced by rural route delivery from a post office or station (e.g., a rural route, general delivery, or post office box).

Federal electoral district code
A federal electoral district (FED) is any place or territorial area entitled to return a member to serve in the House of Commons. FED legal limits and descriptions are the responsibility of the Chief Electoral Officer, and are usually revised every 10 years after the results of the decennial census. The 2003 Representation Order is the most current revision, and is based on 2001 Census population data. This code uniquely identifies a federal electoral district – 2003 Representation Order. The first two digits identify the province or territory.

Federal electoral district name – English
This contains the English name of the federal electoral district from the 2003 Representation Order.

Federal electoral district name – French
This contains the French name of the federal electoral district from the 2003 Representation Order.

Unique link
The unique link value given in the file can be either '1', which indicates the postal code is linked to one FED, or '2', which indicates that the postal code is linked to two or more FEDs.

Weight
The 'weight' estimates the proportion of the population of a postal code that resides within each FED. If postal code is linked to only one FED in the PCFRF, the weight is equal to 1. When a postal code is linked to more than one FED, the sum of weights for that postal code equals 1.0.

File naming convention

The naming convention for PCFRF data files is bilingual and reflects the reference date of the CPC data used in the release.

Data files in this release are:

National file

pcfrfNatFED2003_SEPT07_fcpcefNatCEF2003.zip

Regional files

pcfrfEastFED2003_SEPT07_fcpcefEstCEF2003.zip
pcfrfQueFED2003_SEPT07_fcpcefQuéCEF2003.zip
pcfrfOntFED2003_SEPT07_fcpcefOntCEF2003.zip
pcfrfWestFED2003_SEPT07_fcpcefOuestCEF2003.zip
pcfrfBCFED2003_SEPT07_fcpcefCBCEF2003.zip

Table 5.2 File name structure of Postal Codes by Federal Ridings File (PCFRF)

Name component	Description
pcfrf	file name - english
region – english (Nat, East, Que, Ont, West, BC)	english abbreviation of region (see Table 4.3 for region definitions)
FED2003	FED representation order - english
SEPT07	reference date of CPC postal code data (month, year)
fcpcef	file name - french
region – french (Nat, Est, Qué, Ont, Ouest, CB)	french abbreviation of region (see Table 4.3 for region definitions)
CEF2003	FED representation order - french

Appendix A Glossary

Adjusted counts
'Adjusted counts' refer to previous census population and dwelling counts that were adjusted (i.e., recompiled) to reflect current census boundaries, when a boundary change occurs between the two censuses.

Block-face
A block-face is one side of a street between two consecutive features intersecting that street. The features can be other streets or boundaries of standard geographic areas.

Block-faces are used for generating block-face representative points, which in turn are used for geocoding and census data extraction when the street and address information are available.

Cartographic boundary files
Cartographic boundary files (CBFs) contain the boundaries of standard geographic areas together with the shoreline around Canada. Selected inland lakes and rivers are available as a supplementary layer.

Census agricultural region
Census agricultural regions (CARs) are composed of groups of adjacent census divisions. In Saskatchewan, census agricultural regions are made up of groups of adjacent census consolidated subdivisions, but these groups do not necessarily respect census division boundaries.

Census consolidated subdivision
A census consolidated subdivision (CCS) is a group of adjacent census subdivisions. Generally, the smaller, more urban census subdivisions (towns, villages, etc.) are combined with the surrounding, larger, more rural census subdivision, in order to create a geographic level between the census subdivision and the census division.

Census division
Census division (CD) is the general term for provincially legislated areas (such as county, *municipalité régionale de comté* and regional district) or their equivalents. Census divisions are intermediate geographic areas between the province/territory level and the municipality (census subdivision).

Census metropolitan area and census agglomeration
A census metropolitan area (CMA) or a census agglomeration (CA) is formed by one or more adjacent municipalities centred on a large urban area (known as the urban core). A CMA must have a total population of at least 100,000 of which 50,000 or more must live in the urban core. A CA must have an urban core population of at least 10,000. To be included in the CMA or CA, other adjacent municipalities must have a high degree of integration with the central urban area, as measured by commuting flows derived from census place of work data.

If the population of the urban core of a CA declines below 10,000, the CA is retired. However, once an area becomes a CMA, it is retained as a CMA even if its total population declines below 100,000 or the population of its urban core falls below 50,000. The urban areas in the CMA or CA that are not contiguous to the urban core are called the urban fringe. Rural areas in the CMA or CA are called the rural fringe.

When a CA has an urban core of at least 50,000, it is subdivided into census tracts. Census tracts are maintained for the CA even if the population of the urban core subsequently falls below 50,000. All CMAs are subdivided into census tracts.

Census metropolitan area and census agglomeration influenced zone
The census **m**etropolitan area and census agglomeration **i**nfluenced **z**one (MIZ) is a concept that geographically differentiates the area of Canada outside census metropolitan areas (CMAs) and census agglomerations (CAs). Census subdivisions outside CMAs and CAs are assigned to one of four categories according to the degree of influence (strong, moderate, weak or no influence) that the CMAs and/or CAs have on them.

Census subdivisions (CSDs) are assigned to a MIZ category based on the percentage of their resident employed labour force that has a place of work in the urban core(s) of CMAs or CAs. CSDs with the same degree of influence tend to be clustered. They form zones around CMAs and CAs that progress through the categories from 'strong' to 'no' influence as distance from the CMAs and CAs increases.

Census subdivision
Census subdivision (CSD) is the general term for municipalities (as determined by provincial/territorial legislation) or areas treated as municipal equivalents for statistical purposes (e.g., Indian reserves, Indian settlements and unorganized territories).

Census tract
Census tracts (CTs) are small, relatively stable geographic areas that usually have a population of 2,500 to 8,000. They are located in census metropolitan areas and in census agglomerations with an urban core population of 50,000 or more in the previous census.

A committee of local specialists (for example, planners, health and social workers, and educators) initially delineates census tracts in conjunction with Statistics Canada. Once a census metropolitan area (CMA) or census agglomeration (CA) has been subdivided into census tracts, the census tracts are maintained even if the urban core population subsequently declines below 50,000.

Coordinate system
A coordinate system is a reference system based on mathematical rules for specifying positions (locations) on the surface of the earth. The coordinate values can be spherical (latitude and longitude) or planar (such as Universal Transverse Mercator).

Cartographic boundary files, digital boundary files, representative points and road network files are disseminated in latitude/longitude coordinates.

Datum
A datum is a geodetic reference system that specifies the size and shape of the earth, and the base point from which the latitude and longitude of all other points on the earth’s surface are referenced.

Designated place
A designated place (DPL) is normally a small community or settlement that does not meet the criteria established by Statistics Canada to be a census subdivision (an area with municipal status) or an urban area.

Designated places are created by provinces and territories, in cooperation with Statistics Canada, to provide data for submunicipal areas.

Digital boundary files
Digital boundary files (DBFs) portray the boundaries used for 2006 Census collection and, therefore, often extend as straight lines into bodies of water.

Dissemination area
A dissemination area (DA) is a small, relatively stable geographic unit composed of one or more adjacent dissemination blocks. It is the smallest standard geographic area for which all census data are disseminated. DAs cover all the territory of Canada.

Dissemination block
A dissemination block (DB) is an area bounded on all sides by roads and/or boundaries of standard geographic areas. The dissemination block is the smallest geographic area for which population and dwelling counts are disseminated. Dissemination blocks cover all the territory of Canada.

Economic region
An economic region (ER) is a grouping of complete census divisions (CDs) (with one exception in Ontario) created as a standard geographic unit for analysis of regional economic activity.

Ecumene
Ecumene is a term used by geographers to mean inhabited land. It generally refers to land where people have made their permanent home, and to all work areas that are considered occupied and used for agricultural or any other economic purpose. Thus, there can be various types of ecumenes, each having their own unique characteristics (population ecumene, agricultural ecumene, industrial ecumene, etc.).

Federal electoral district
A federal electoral district (FED) is an area represented by a member of the House of Commons. The federal electoral district boundaries used for the 2006 Census are based on the 2003 Representation Order.

Forward sortation area
The forward sortation area (FSA) is identified by the first three characters of the postal code. FSAs are associated with a postal facility from which mail delivery originates. The average number of households served by an FSA is approximately 8,000, but the number can range from zero to more than 60,000 households. This wide range of households can occur because some FSAs may serve only businesses (zero households) and some FSAs serve very large geographic areas.

Geocoding
Geocoding is the process of assigning geographic identifiers (codes) to map features and data records. The resulting geocodes permit data to be linked geographically.

Households, postal codes and place of work data are linked to block-face representative points when the street and address information is available; otherwise, they are linked to dissemination block (DB) representative points. In some cases, postal codes and place of work data are linked to dissemination area (DA) representative points when they cannot be linked to DBs. As well, place of work data are linked to census subdivision representative points when the data cannot be linked to DAs.

Geographic code
A geographic code is a numerical identifier assigned to a geographic area. The code is used to identify and access standard geographic areas for the purposes of data storage, retrieval and display.

Geographic reference date
The geographic reference date is a date determined by Statistics Canada for the purpose of finalizing the geographic framework for which census data will be collected, tabulated and reported. For the 2006 Census, the geographic reference date is January 1, 2006.

Land area
Land area is the area in square kilometres of the land-based portions of standard geographic areas.

Land area data are unofficial, and are provided for the sole purpose of calculating population density.

Locality
'Locality' (LOC) refers to the historical place names of former census subdivisions (municipalities), former designated places and former urban areas, as well as to the names of other entities, such as neighbourhoods, post offices, communities and unincorporated places.

Map projection
A map projection is the process of transforming and representing positions from the earth's three-dimensional curved surface to a two-dimensional (flat) surface. The process is accomplished by a direct geometric projection or by a mathematically derived transformation.

The Lambert conformal conic map projection is widely used for general maps of Canada at small scales and is the most common map projection used at Statistics Canada.

National Geographic Database
The National Geographic Database (NGD) is a shared database between Statistics Canada and Elections Canada. The database contains roads, road names and address ranges. It also includes separate reference layers containing physical and cultural features, such as hydrography and hydrographic names, railroads and power transmission lines.

The NGD was created in 1997 as a joint Statistics Canada/Elections Canada initiative to develop and maintain a national road network file serving the needs of both organizations. The active building of the NGD – that is, integrating the files from Statistics Canada, Elections Canada and Natural Resources Canada – occurred from 1998 to 2000. Thereafter, Statistics Canada and Elections Canada reconciled their digital boundary holdings to the new database's road network geometry so that operational products could be derived.

Since 2001, the focus of the NGD has been on intensive data quality improvements, especially regarding the quality and currency of its road network coverage. There has been considerable expansion of road names and civic addresses ranges, as well as the addition of hydrographic names. Priorities were determined by Statistics Canada and Elections Canada, enabling the NGD to meet the joint operational needs of both agencies in support of census and electoral activities.

Place name
'Place name' refers to the set of names that includes current census subdivisions (municipalities), current designated places and current urban areas, as well as the names of localities.

Population density
Population density is the number of persons per square kilometre.

Postal code
The postal code is a six-character code defined and maintained by Canada Post Corporation for the purpose of sorting and delivering mail.

Province or territory
Province and territory refer to the major political units of Canada. From a statistical point of view, province and territory are basic areas for which data are tabulated. Canada is divided into 10 provinces and three territories.

Reference map
A reference map shows the location of the geographic areas for which census data are tabulated and disseminated. The maps display the boundaries, names and codes of standard geographic areas, as well as major cultural and physical features, such as roads, railroads, coastlines, rivers and lakes.

Representative point
A representative point is a point that represents a line or a polygon. The point is centrally located along the line, and centrally located or population weighted in the polygon.

Representative points are generated for block-faces, dissemination blocks, dissemination areas, census subdivisions, urban areas and designated places.

Households, postal codes and place of work data are linked to block-face representative points when the street and address information is available; otherwise, they are linked to dissemination block (DB) representative points. In some cases, postal codes and place of work data are linked to dissemination area (DA) representative points when they cannot be linked to DBs. As well, place of work data are linked to census subdivision representative points when the data cannot be linked to DAs.

Road network file
The road network file (RNF) contains roads, road names, address ranges and road ranks for the entire country. Most commonly, address ranges are dwelling-based and are mainly available in the large urban centres of Canada.

Rural area
Rural areas include all territory lying outside urban areas. Taken together, urban and rural areas cover all of Canada.

Rural population includes all population living in the rural fringes of census metropolitan areas (CMAs) and census agglomerations (CAs), as well as population living in rural areas outside CMAs and CAs.

Spatial Data Infrastructure
The Spatial Data Infrastructure (SDI), formerly known as the National Geographic Base (NGB), is an internal, maintenance database that is not disseminated outside of Statistics Canada. It contains roads, road names and address ranges from the National Geographic Database (NGD), as well as boundary arcs of standard geographic areas that do not follow roads, all in one integrated line layer. The database also includes a related polygon layer consisting of basic blocks (BB) (basic blocks are the smallest polygon units in the database, and are formed by the intersection of all roads and the arcs of geographic areas that do not follow roads), boundary layers of standard geographic areas, and derived attribute tables, as well as reference layers containing physical and cultural features (such as hydrography, railroads and power transmission lines) from the NGD.

The SDI supports a wide range of census operations, such as the maintenance and delineation of the boundaries of standard geographic areas (including the automated delineation of dissemination blocks, dissemination areas and urban areas), and geocoding. The SDI is also the source for generating many geography products for the 2006 Census, such as cartographic boundary files and road network files.

Spatial data quality elements
Spatial data quality elements provide information on the fitness for use of a spatial database by describing why, when and how the data are created, and how accurate the data are. The elements include an overview describing the purpose and usage, as well as specific quality elements reporting on the lineage, positional accuracy, attribute accuracy, logical consistency and completeness. This information is provided to users for all spatial data products disseminated for the census.

Standard Geographical Classification
The Standard Geographical Classification (SGC) is Statistics Canada's official classification for three types of geographic areas: provinces and territories, census divisions (CDs) and census subdivisions (CSDs). The SGC provides unique numeric identification (codes) for these hierarchically related geographic areas.

Statistical Area Classification
The Statistical Area Classification (SAC) groups census subdivisions according to whether they are a component of a census metropolitan area, a census agglomeration, a census **m**etropolitan area and census agglomeration **i**nfluenced **z**one (strong MIZ, moderate MIZ, weak MIZ or no MIZ), or the territories (Yukon Territory, Northwest Territories and Nunavut). The SAC is used for data dissemination purposes.

Thematic map
A thematic map shows the spatial distribution of one or more specific data themes for standard geographic areas. The map may be qualitative in nature (e.g., predominant farm types) or quantitative (e.g., percentage population change).

Urban area
An urban area has a minimum population concentration of 1,000 persons and a population density of at least 400 persons per square kilometre, based on the current census population count. All territory outside urban areas is classified as rural. Taken together, urban and rural areas cover all of Canada.

Urban population includes all population living in the urban cores, secondary urban cores and urban fringes of census metropolitan areas (CMAs) and census agglomerations (CAs), as well as the population living in urban areas outside CMAs and CAs.

Urban core, urban fringe and rural fringe
'Urban core, urban fringe and rural fringe' distinguish between central and peripheral urban and rural areas within a census metropolitan area (CMA) or census agglomeration (CA).

'Urban core' is a large urban area around which a CMA or a CA is delineated. The urban core must have a population (based on the previous census) of at least 50,000 persons in the case of a CMA, or at least 10,000 persons in the case of a CA.

The urban core of a CA that has been merged with an adjacent CMA or larger CA is called the 'secondary urban core'.

'Urban fringe' includes all small urban areas within a CMA or CA that are not contiguous with the urban core of the CMA or CA.

'Rural fringe' is all territory within a CMA or CA not classified as an urban core or an urban fringe.

Urban population size group
The term 'urban population size group' refers to the classification used in standard tabulations where urban areas are distributed according to the following predetermined size groups, based on the current census population.

1,000	to	2,499
2,500	to	4,999
5,000	to	9,999
10,000	to	24,999
25,000	to	49,999
50,000	to	99,999
100,000	to	499,999
500,000	and over	

Tabulations are not limited to these predetermined population size groups; the census database has the capability of tabulating data according to any user-defined population size group.

Appendix B Postal codes by federal electoral district

Table B.1 Number of postal codes by federal electoral district

FEDCODE	Federal electoral district name	Number of postal codes
10001	Avalon	666
10002	Bonavista - Gander - Grand Falls - Windsor	873
10003	Humber - St. Barbe - Baie Verte	1,618
10004	Labrador	373
10005	Random - Burin - St. George's	912
10006	St. John's East	3,584
10007	St. John's South - Mount Pearl	2,660
11001	Cardigan	386
11002	Charlottetown	1,765
11003	Egmont	1,021
11004	Malpeque	34
12001	Cape Breton - Canso	3,241
12002	Central Nova	1,303
12003	Dartmouth - Cole Harbour	3,237
12004	Halifax	3,532
12005	Halifax West	2,284
12006	Kings - Hants	1,539
12007	Cumberland - Colchester - Musquodoboit Valley	1,935
12008	Sackville - Eastern Shore	1,959
12009	South Shore - St. Margaret's	1,244
12010	Sydney - Victoria	5,121
12011	West Nova	699
13001	Acadie - Bathurst	4,982
13002	Beauséjour	8,300
13003	Fredericton	4,620
13004	Fundy Royal	6,889
13005	Madawaska - Restigouche	4,270
13006	Miramichi	4,712
13007	Moncton - Riverview - Dieppe	4,717
13008	New Brunswick Southwest	7,927
13009	Saint John	4,499
13010	Tobique - Mactaquac	7,467
24001	Abitibi - Témiscamingue	2,538
24002	Ahuntsic	2,268
24003	Alfred-Pellan	3,418
24004	Argenteuil - Papineau - Mirabel	1,943
24005	Beauce	2,658
24006	Beauharnois - Salaberry	2,429
24007	Beauport - Limoilou	3,645
24008	Berthier - Maskinongé	2,345
24009	Bourassa	2,144
24010	Brome - Missisquoi	2,920
24011	Brossard - La Prairie	2,787
24012	Chambly - Borduas	3,442
24013	Charlesbourg - Haute-Saint-Charles	3,811

Table B.1 Number of postal codes by federal electoral district (continued)

FEDCODE	Federal electoral district name	Number of postal codes
24014	Montmorency - Charlevoix - Haute-Côte-Nord	1,813
24015	Châteauguay - Saint-Constant	2,822
24016	Chicoutimi - Le Fjord	3,627
24017	Compton - Stanstead	1,661
24018	Drummond	3,740
24019	Gaspésie - Îles-de-la-Madeleine	1,422
24020	Gatineau	3,451
24021	Hochelaga	2,055
24022	Honoré-Mercier	2,546
24023	Hull - Aylmer	4,030
24024	Jeanne-Le Ber	2,787
24025	Joliette	1,521
24026	Jonquière - Alma	4,594
24027	Lac-Saint-Louis	3,843
24028	La Pointe-de-l'Île	2,947
24029	LaSalle - Émard	1,773
24030	Laurentides - Labelle	1,950
24031	Laurier - Sainte-Marie	2,495
24032	Laval	2,978
24033	Laval - Les Îles	3,039
24034	Lévis - Bellechasse	2,608
24035	Longueuil - Pierre-Boucher	2,736
24036	Lotbinière - Chutes-de-la-Chaudière	2,188
24037	Louis-Hébert	3,717
24038	Louis-Saint-Laurent	3,468
24039	Manicouagan	2,239
24040	Marc-Aurèle-Fortin	3,612
24041	Haute-Gaspésie - La Mitis - Matane - Matapédia	2,394
24042	Mégantic - L'Érable	3,115
24043	Montcalm	2,442
24044	Mount Royal	2,424
24045	Notre-Dame-de-Grâce - Lachine	2,958
24046	Abitibi - Baie-James - Nunavik - Eeyou	1,476
24047	Outremont	1,501
24048	Papineau	1,730
24049	Pierrefonds - Dollard	2,822
24050	Pontiac	2,491
24051	Portneuf - Jacques-Cartier	2,466
24052	Québec	4,223
24053	Repentigny	3,931
24054	Bas-Richelieu - Nicolet - Bécancour	3,046
24055	Richmond - Arthabaska	3,103
24056	Rimouski-Neigette - Témiscouata - Les Basques	2,282
24057	Rivière-des-Mille-Îles	2,556
24058	Montmagny - L'Islet - Kamouraska - Rivière-du-Loup	1,723

Table B.1 Number of postal codes by federal electoral district (continued)

FEDCODE	Federal electoral district name	Number of postal codes
24059	Rivière-du-Nord	3,365
24060	Roberval - Lac-Saint-Jean	2,813
24061	Rosemont - La Petite-Patrie	1,761
24062	Saint-Bruno - Saint-Hubert	3,016
24063	Saint-Hyacinthe - Bagot	2,469
24064	Saint-Jean	2,900
24065	Saint-Lambert	2,825
24066	Saint-Laurent - Cartierville	2,649
24067	Saint-Léonard - Saint-Michel	1,902
24068	Saint-Maurice - Champlain	4,049
24069	Shefford	2,458
24070	Sherbrooke	3,752
24071	Terrebonne - Blainville	2,621
24072	Trois-Rivières	4,333
24073	Vaudreuil-Soulanges	2,239
24074	Verchères - Les Patriotes	1,490
24075	Westmount - Ville-Marie	3,390
35001	Ajax - Pickering	2,565
35002	Algoma - Manitoulin - Kapuskasing	1,066
35003	Ancaster - Dundas - Flamborough - Westdale	2,722
35004	Barrie	2,835
35005	Beaches - East York	2,281
35006	Bramalea - Gore - Malton	2,996
35007	Brampton - Springdale	1,993
35008	Brampton West	2,746
35009	Brant	4,243
35010	Burlington	3,906
35011	Cambridge	3,756
35012	Carleton - Mississippi Mills	2,032
35013	Chatham-Kent - Essex	2,604
35014	Durham	1,851
35015	Davenport	1,678
35016	Don Valley East	1,602
35017	Don Valley West	2,596
35018	Dufferin - Caledon	2,741
35019	Eglinton - Lawrence	2,382
35020	Elgin - Middlesex - London	2,732
35021	Essex	2,483
35022	Etobicoke Centre	2,862
35023	Etobicoke - Lakeshore	3,439
35024	Etobicoke North	1,935
35025	Glengarry - Prescott - Russell	1,018
35026	Bruce - Grey - Owen Sound	1,746
35027	Guelph	3,580
35028	Haldimand - Norfolk	1,901
35029	Haliburton - Kawartha Lakes - Brock	1,010

Table B.1 Number of postal codes by federal electoral district (continued)

FEDCODE	Federal electoral district name	Number of postal codes
35030	Halton	2,723
35031	Hamilton Centre	3,890
35032	Hamilton East - Stoney Creek	3,804
35033	Hamilton Mountain	3,509
35034	Huron - Bruce	1,037
35035	Kenora	1,220
35036	Kingston and the Islands	3,770
35037	Kitchener Centre	3,157
35038	Kitchener - Conestoga	2,478
35039	Kitchener - Waterloo	3,704
35040	Lanark - Frontenac - Lennox and Addington	2,724
35041	Leeds - Grenville	1,567
35042	London - Fanshawe	2,527
35043	London North Centre	3,758
35044	London West	3,108
35045	Markham - Unionville	2,708
35046	Lambton - Kent - Middlesex	1,673
35047	Mississauga - Brampton South	2,749
35048	Mississauga East - Cooksville	1,708
35049	Mississauga - Erindale	2,285
35050	Mississauga South	3,129
35051	Mississauga - Streetsville	1,997
35052	Nepean - Carleton	2,733
35053	Newmarket - Aurora	2,893
35054	Niagara Falls	4,333
35055	Niagara West - Glanbrook	1,469
35056	Nickel Belt	1,150
35057	Nipissing - Timiskaming	2,219
35058	Northumberland - Quinte West	2,551
35059	Oak Ridges - Markham	3,004
35060	Oakville	3,940
35061	Oshawa	3,538
35062	Ottawa Centre	4,183
35063	Ottawa - Orléans	2,679
35064	Ottawa South	3,377
35065	Ottawa - Vanier	3,276
35066	Ottawa West - Nepean	3,112
35067	Oxford	3,034
35068	Parkdale - High Park	1,745
35069	Parry Sound - Muskoka	1,097
35070	Perth - Wellington	1,949
35071	Peterborough	3,074
35072	Pickering - Scarborough East	2,223
35073	Prince Edward - Hastings	1,702
35074	Renfrew - Nipissing - Pembroke	3,007
35075	Richmond Hill	2,473

Table B.1 Number of postal codes by federal electoral district (continued)

FEDCODE	Federal electoral district name	Number of postal codes
35076	St. Catharines	4,470
35077	St. Paul's	2,219
35078	Sarnia - Lambton	2,862
35079	Sault Ste. Marie	2,936
35080	Scarborough - Agincourt	1,641
35081	Scarborough Centre	2,127
35082	Scarborough - Guildwood	1,797
35083	Scarborough - Rouge River	1,917
35084	Scarborough Southwest	2,212
35085	Simcoe - Grey	1,539
35086	Simcoe North	2,307
35087	Stormont - Dundas - South Glengarry	2,177
35088	Sudbury	3,207
35089	Thornhill	3,210
35090	Thunder Bay - Rainy River	2,677
35091	Thunder Bay - Superior North	2,532
35092	Timmins - James Bay	1,942
35093	Toronto Centre	2,627
35094	Toronto - Danforth	2,154
35095	Trinity - Spadina	3,125
35096	Vaughan	2,716
35097	Welland	4,414
35098	Wellington - Halton Hills	1,932
35099	Whitby - Oshawa	3,480
35100	Willowdale	2,504
35101	Windsor - Tecumseh	3,312
35102	Windsor West	4,287
35103	York Centre	2,249
35104	York - Simcoe	1,865
35105	York South - Weston	2,137
35106	York West	1,493
46001	Brandon - Souris	2,128
46002	Charleswood - St. James - Assiniboia	2,239
46003	Churchill	778
46004	Dauphin - Swan River - Marquette	719
46005	Elmwood - Transcona	2,230
46006	Kildonan - St. Paul	2,065
46007	Portage - Lisgar	1,312
46008	Provencher	488
46009	Saint Boniface	2,461
46010	Selkirk - Interlake	885
46011	Winnipeg Centre	2,847
46012	Winnipeg North	2,158
46013	Winnipeg South	1,881
46014	Winnipeg South Centre	2,171
47001	Battlefords - Lloydminster	1,141
47002	Blackstrap	1,777

Table B.1 Number of postal codes by federal electoral district (continued)

FEDCODE	Federal electoral district name	Number of postal codes
47003	Desnethé - Missinippi - Churchill River	271
47004	Cypress Hills - Grasslands	1,066
47005	Palliser	2,742
47006	Prince Albert	1,490
47007	Regina - Lumsden - Lake Centre	1,797
47008	Regina - Qu'Appelle	1,839
47009	Saskatoon - Humboldt	1,465
47010	Saskatoon - Rosetown - Biggar	1,990
47011	Saskatoon - Wanuskewin	1,717
47012	Souris - Moose Mountain	1,204
47013	Wascana	2,737
47014	Yorkton - Melville	823
48001	Fort McMurray - Athabasca	1,394
48002	Calgary East	3,785
48003	Calgary Centre-North	4,250
48004	Calgary Northeast	2,632
48005	Calgary - Nose Hill	2,160
48006	Calgary Centre	4,879
48007	Calgary Southeast	2,953
48008	Calgary Southwest	2,863
48009	Calgary West	3,233
48010	Crowfoot	1,411
48011	Edmonton - Mill Woods - Beaumont	2,812
48012	Edmonton Centre	5,280
48013	Edmonton East	4,638
48014	Edmonton - Leduc	3,433
48015	Edmonton - St. Albert	3,551
48016	Edmonton - Sherwood Park	3,374
48017	Edmonton - Spruce Grove	2,929
48018	Edmonton - Strathcona	4,723
48019	Lethbridge	3,651
48020	Macleod	1,079
48021	Medicine Hat	2,961
48022	Peace River	2,083
48023	Red Deer	2,849
48024	Vegreville - Wainwright	1,559
48025	Westlock - St. Paul	1,105
48026	Wetaskiwin	1,267
48027	Wild Rose	1,912
48028	Yellowhead	919
59001	Abbotsford	2,882
59002	Burnaby - Douglas	3,456
59003	Burnaby - New Westminster	3,102
59004	Cariboo - Prince George	3,965
59005	Chilliwack - Fraser Canyon	2,095
59006	Delta - Richmond East	3,549

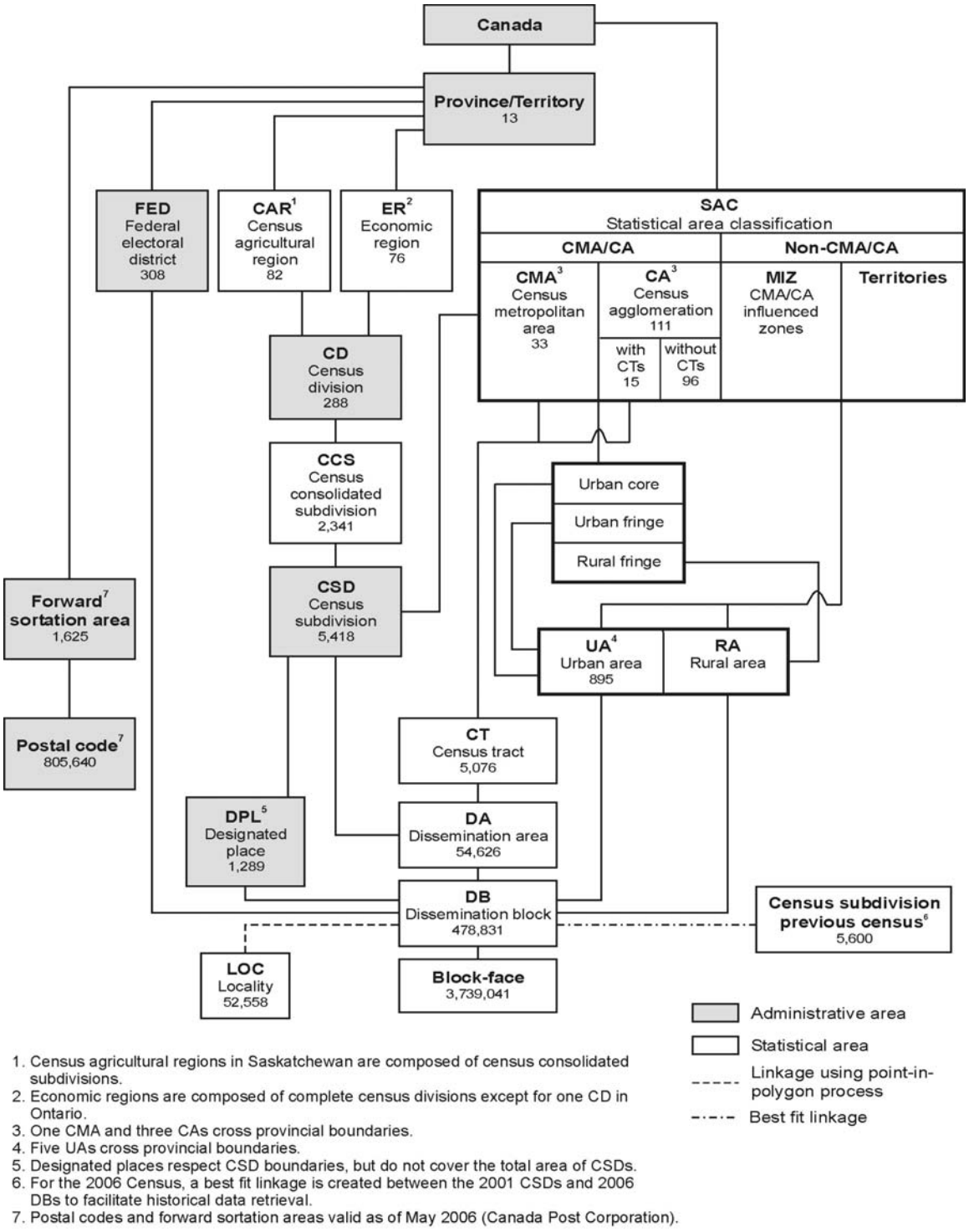
Table B.1 Number of postal codes by federal electoral district (continued)

FEDCODE	Federal electoral district name	Number of postal codes
59007	Pitt Meadows - Maple Ridge - Mission	3,604
59008	Esquimalt - Juan de Fuca	3,784
59009	Fleetwood - Port Kells	2,612
59010	Kamloops - Thompson - Cariboo	2,974
59011	Kelowna - Lake Country	4,011
59012	Kootenay - Columbia	1,534
59013	Langley	3,177
59014	Nanaimo - Alberni	3,691
59015	Nanaimo - Cowichan	2,983
59016	Newton - North Delta	3,100
59017	New Westminster - Coquitlam	3,844
59018	Okanagan - Shuswap	2,810
59019	North Vancouver	4,037
59020	Okanagan - Coquihalla	2,410
59021	Port Moody - Westwood - Port Coquitlam	2,691
59022	Prince George - Peace River	3,410
59023	Richmond	2,514
59024	Saanich - Gulf Islands	4,018
59025	Skeena - Bulkley Valley	1,799
59026	British Columbia Southern Interior	2,433
59027	South Surrey - White Rock - Cloverdale	3,387
59028	Surrey North	3,240
59029	Vancouver Centre	2,971
59030	Vancouver East	3,318
59031	Vancouver Island North	3,223
59032	Vancouver Kingsway	3,200
59033	Vancouver Quadra	4,094
59034	Vancouver South	3,072
59035	Victoria	4,636
59036	West Vancouver - Sunshine Coast - Sea to Sky Country	3,192
60001	Yukon	945
61001	Western Arctic	506
62001	Nunavut	29
Total		**822,852**

Sources: Statistics Canada, 2006 Census of Population; Canada Post Corporation, May 2006.

Appendix C Hierarchy of standard geographic units for dissemination, 2006 Census

Figure C.1 Hierarchy of standard geographic units for dissemination, 2006 Census



Sources: Statistics Canada, 2006 Census of Population; Canada Post Corporation, May 2006.

Appendix D Geographic units by province and territory, 2006 Census

Table D.1 Geographic units by province and territory, 2006 Census

Geographic unit	Canada 2001	Canada 2006	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.	Nvt.
Federal electoral district (2003 Representation Order)	301[1]	308	7	4	11	10	75	106	14	14	28	36	1	1	1
Economic region	76	76	4	1	5	5	17	11	8	6	8	8	1	1	1
Census agricultural region	82	82	3	3	5	4	14	5	12	20	8	8	0	0	0
Census division	288	288	11	3	18	15	98	49	23	18	19	28	1	2	3
Census consolidated subdivision	2,446	2,341	89	68	43	151	1,008	316	127	300	77	156	1	2	3
Census subdivision (CSD)	5,600	5,418	377	113	100	276	1,294	585	297	984	453	836	35	37	31
CSD dissolutions (January 2, 2001 to January 1, 2006)	340	...	9	0	0	0	282	5	7	29	4	4	0	0	0
CSD incorporations (January 2, 2001 to January 1, 2006)	...	158	5	0	2	1	100	4	6	11	5	24	0	0	0
Designated place	1,261	1,289	182	0	49	167	83	88	58	159	262	240	1	0	0
Census metropolitan area	27	33	1	0	1	2	6[2]	15[2]	1	2	2	4	0	0	0
Census agglomeration (CA)	113	111	3	2	4	5[2]	26[2]	28[2]	3	7[2]	12[2]	22	1	1	0
CA with census tracts	16	15	0	0	0	1	3	4	0	0	3	4	0	0	0
CA without census tracts	94	96	3	2	4	4[2]	23[2]	24[2]	3	7[2]	9[2]	18	1	1	0
Census tract	4,798	5,076	46	0	88	99	1,289	2,136	168	105	491	654	0	0	0
Urban area	913	895	32	7	36	32[2]	226[2]	260[2]	38[2]	58[2]	107[2]	95	1	3	5
Locality	52,291	52,558	2,445	964	3,924	3,450	12,617	10,905	2,349	3,898	3,472	7,708	363	173	290
Dissemination area	52,993	54,626	1,062	292	1,633	1,439	13,408	19,177	2,152	2,431	5,357	7,471	78	84	42
Dissemination block	478,707	478,831	8,199	3,251	14,656	14,864	108,751	126,244	30,421	51,729	65,071	52,808	1,261	967	609
Block-face	3,764,232	3,739,041	78,376	26,190	154,564	132,873	835,458	942,567	198,063	361,069	507,859	473,418	11,888	11,620	5,096
Forward sortation area	1,595	1,625	35	7	76	110	415	522	64	48	150	189	3	3	3
Postal code	758,658	805,640	10,378	3,157	25,313	57,355	202,972	269,676	23,943	21,541	76,924	112,904	942	506	29

… not applicable

1. Federal electoral districts (1996 Representation Order).
2. Census metropolitan areas, census agglomerations and urban areas crossing provincial boundaries are counted in both provinces, and, therefore, do not add up to the national total.

Sources: Statistics Canada, 2006 Census of Population; Canada Post Corporation, May 2006.

Appendix E Data quality, sampling and weighting, confidentiality and random rounding

General

The 2006 Census was a large and complex undertaking and, while considerable effort was taken to ensure high standards throughout all collection and processing operations, the resulting estimates are inevitably subject to a certain degree of error. Users of census data should be aware that such error exists, and should have some appreciation of its main components, so that they can assess the usefulness of census data for their purposes and the risks involved in basing conclusions or decisions on these data.

Errors can arise at virtually every stage of the census process, from the preparation of materials through data processing, including the listing of dwellings and the collection of data. Some errors occur at random, and when the individual responses are aggregated for a sufficiently large group, such errors tend to cancel out. For errors of this nature, the larger the group, the more accurate the corresponding estimate. It is for this reason that users are advised to be cautious when using small area estimates. There are some errors, however, which might occur more systematically, and which result in "biased" estimates. Because the bias from such errors is persistent no matter how large the group for which responses are aggregated, and because bias is particularly difficult to measure, systematic errors are a more serious problem for most data users than the random errors referred to previously.

For census data in general, the principal types of error are as follows:

- coverage errors, which occur when dwellings or individuals are missed, incorrectly enumerated or counted more than once

- non-response errors, which result when responses cannot be obtained from a certain number of households and/or individuals, because of extended absence or some other reason or when responses cannot be obtained from a certain number of questions in a complete questionnaire

- response errors, which occur when the respondent, or sometimes the census representative, misunderstands a census question, and records an incorrect response or simply uses the wrong response box

- processing errors, which can occur at various steps including coding, when "write-in" responses are transformed into numerical codes; data capture, when responses are transferred from the census questionnaire in an electronic format, by optical character recognition methods or key-entry operators; and imputation, when a "valid", but not necessarily correct, response is inserted into a record by the computer to replace missing or "invalid" data ("valid" and "invalid" referring to whether or not the response is consistent with other information on the record)

- sampling errors, which apply only to the supplementary questions on the "long form" asked of a one-fifth sample of households, and which arise from the fact that the responses to these questions, when weighted up to represent the whole population, inevitably differ somewhat from the responses which would have been obtained if these questions had been asked of all households.

The above types of error each have both random and systematic components. Usually, however, the systematic component of sampling error is very small in relation to its random component. For the other non-sampling errors, both random and systematic components may be significant.

Coverage errors

Coverage errors affect the accuracy of the census counts, that is, the sizes of the various census universes: population, families, households and dwellings. While steps have been taken to correct certain identifiable errors, the final counts are still subject to some degree of error because persons or dwellings have been missed, incorrectly enumerated in the census or counted more than once.

Missed dwellings or persons result in undercoverage. Dwellings can be missed because of the misunderstanding of collection unit (CU) boundaries, or because either they do not look like dwellings or they appear uninhabitable. Persons can be missed when their dwelling is missed or is classified as vacant, or because the respondent misinterprets the instructions on whom to include on the questionnaire. Some individuals may be missed because they have no usual residence and did not spend census night in a dwelling.

Dwellings or persons incorrectly enumerated or double-counted result in overcoverage. Overcoverage of dwellings can occur when structures unfit for habitation are listed as dwellings (incorrectly enumerated), when there is a certain ambiguity regarding the collection unit (CU) boundaries or when units (for example, rooms) are listed separately instead of being treated as part of one dwelling (double-counted). Persons can be counted more than once because their dwelling is double counted or because the guidelines on whom to include on the questionnaire have been misunderstood. Occasionally, someone who is not in the census population universe, such as a foreign resident or a fictitious person, may, incorrectly, be enumerated in the census. On average, overcoverage is less likely to occur than undercoverage and, as a result, counts of dwellings and persons are likely to be slightly underestimated.

For the 2006 Census, three studies are used to measure coverage error. In the Dwelling Classification Study, dwellings listed as vacant were revisited to verify that they were vacant on Census Day, and dwellings whose households were listed as non-respondent were revisited to determine the number of usual residents and their characteristics. Adjustments have been made to the final census counts to account for households and persons missed because their dwelling was incorrectly classified as vacant. The census counts may also have been adjusted for dwellings whose households were classified as non-respondent. Despite these adjustments, the final counts still may be subject to some undercoverage. Undercoverage tends to be higher for certain segments of the population, such as young adults (especially young adult males) and recent immigrants. The Reverse Record Check Study is used to measure the residual undercoverage for Canada, and each province and territory. The Overcoverage Study is designed to investigate overcoverage errors. The results of the Reverse Record Check and the Overcoverage Study, when taken together, furnish an estimate of net undercoverage.

Other non-sampling errors

While coverage errors affect the number of units in the various census universes, other errors affect the characteristics of those units.

Sometimes it is not possible to obtain a complete response from a household, even though the dwelling was identified as occupied and a questionnaire was mailed out or dropped off. The household members may have been away throughout the census period or, in rare instances, the householder may have refused to complete the form. More frequently, the questionnaire is returned but no response is provided to certain questions. Effort is devoted to ensure as complete a questionnaire as possible. Once the questionnaires are captured, edit analysis are performed to detect significant cases of partial non-response and follow-up interviews are attempted to get the missing information. Despite this, at the end of the collection stage, a small number of responses are still missing, i.e., non-response errors. Although missing responses are eliminated during processing by replacing each one of them by the corresponding response for a "similar" record, there remain some potential imputation errors. This is particularly serious if the non-respondents differ in some respects from the respondents; this procedure will then introduce a non-response bias.

Even when a response is obtained, it may not be entirely accurate. The respondent may have misinterpreted the question or may have guessed the answer, especially when answering on behalf of another, possibly absent, household member. The respondent may also have entered the answer in the wrong place on the questionnaire. Such errors are referred to as response errors. While response errors usually arise from inaccurate information provided by respondents, they can also result from mistakes by the census representative who completed certain parts of the questionnaire, such as the structural type of dwelling, or who followed up to obtain a missing response.

Some of the census questions require a written response. During processing, these "write-in" entries are given a numeric code. Coding errors can occur when the written response is ambiguous, incomplete, and difficult to read or when the code list is extensive (e.g., major field of study, place of work). A formal quality control (QC) operation is used to detect, rectify and reduce coding errors. Within each work unit, a sample of responses is independently coded a second time. The resolution of discrepancies between the first and second codings determines whether recoding of the work unit is necessary. Census coding is now entirely automated, resulting in a reduction of coding errors.

The information on the questionnaires is scanned and captured into a computer file. To monitor and to ensure that the number of data capture errors are within tolerable limits, a sample of fields are sampled and reprocessed. Analysis of the two captures is done. Unsatisfactory work is identified, corrected and appropriate feedback is done to the system in order to minimize their occurrence.

Once captured, the data are edited where they undergo a series of computer checks to identify missing or inconsistent responses. These are replaced during the imputation stage of processing where either a response consistent with the other respondents' data is inferred or a response from a similar donor is substituted. Imputation ensures a complete database where the data correspond to the census counts and facilitate multivariate analyses. Although errors may have been introduced during imputation, the methods used have been rigorously tested to minimize systematic errors.

Various studies are being carried out to evaluate the quality of the responses obtained in the 2006 Census. For each question, non-response rates and edit failure rates have been calculated. These can be useful in identifying the potential for non-response errors and other types of errors. Also, tabulations from the 2006 Census have been or will be compared with corresponding estimates from previous censuses, from sample surveys (such as the Labour Force Survey) and from various administrative records (such as birth registrations and municipal assessment records). Such comparisons can indicate potential quality problems or at least discrepancies between the sources.

In addition to these aggregate-level comparisons, there are some micro-match studies in progress, in which census responses are compared with another source of information at the individual record level. For certain "stable" characteristics (such as age, sex, mother tongue and place of birth), the responses obtained in the 2006 Census, for a sample of individuals, are being compared with those for the same individuals in the 2001 Census.

Sampling errors

Estimates obtained by weighting up responses collected on a sample basis are subject to error due to the fact that the distribution of characteristics within the sample will not usually be identical to the distribution of characteristics within the population from which the sample has been selected.

The potential error introduced by sampling will vary according to the relative scarcity of the characteristics in the population. For large cell values, the potential error due to sampling, as a proportion of the cell value, will be relatively small. For small cell values, this potential error, as a proportion of the cell value, will be relatively large.

The potential error due to sampling is usually expressed in terms of the so-called "standard error". This is the square root of the average, taken over all possible samples of the same size and design, of the squared deviation of the sample estimate from the value for the total population.

The following table provides approximate measures of the standard error due to sampling for census long form (2B) data. These measures are intended as a general guide only.

Table E.1 Approximate standard error due to sampling for 2006 Census sample data

Cell value	Approximate standard error
50 or less	15
100	20
200	30
500	45
1,000	65
2,000	90
5,000	140
10,000	200
20,000	280
50,000	450
100,000	630
500,000	1,400

Users wishing to determine the approximate error due to sampling for any given cell of data, based upon the 20% sample, should choose the standard error value corresponding to the cell value that is closest to the value of the given cell in the census tabulation. When using the obtained standard error value, the user, in general, can be reasonably certain that, for the enumerated population, the true value (discounting all forms of error other than sampling) lies within plus or minus three times the standard error (e.g., for a cell value of 1,000, the range would be 1,000 ± [3 x 65] or 1,000 ± 195).

The standard errors given in the table above will not apply to population, household, dwelling or family counts for the geographic area under consideration (see Sampling and weighting below). The effect of sampling for these cells can be determined by a comparison with a corresponding 100% data product.

The effect of the particular sample design and weighting procedure used in the 2006 Census will vary, however, from one characteristic to another and from one geographic area to another. The standard error values in the table may, therefore, understate or overstate the error due to sampling.

Sampling and weighting

The 2006 Census data were collected either from 100% of the households or on a sample basis with the data weighted to provide estimates for the entire population. The long form questionnaire (2B) information was collected on a 20% random sample basis of the households and weighted to compensate for sampling. All table headings are noted accordingly. Note that on Indian reserves and in remote areas all data were collected on a 100% basis.

For any given geographic area, the weighted population, household, dwelling or family total or subtotal may differ from that shown in reports containing data collected on a 100% basis. Such variations are due to sampling and to the fact that, unlike sample data, 100% data do not exclude institutional residents.

Confidentiality and random rounding

The figures shown in the tables have been subjected to a confidentiality procedure known as random rounding to prevent the possibility of associating statistical data with any identifiable individual. Under this method, all figures, including totals and margins, are randomly rounded either up or down to a multiple of "5", and in some cases "10". While providing strong protection against disclosure, this technique does not add significant error to the census data. The user should be aware that totals and margins are rounded independently of the cell data so that some differences between these and the sum of rounded cell data may exist. Also, minor differences can be expected in corresponding totals and cell values among various census tabulations. Similarly, percentages, which are calculated on rounded figures, do not necessarily add up to 100%. Order statistics (median, quartiles, percentiles, etc.) and measures of dispersion such as the standard error are computed in the usual manner. When a statistic is defined as the quotient of two numbers (which is the case for averages, percentages, and proportions), the two numbers are rounded before the division is performed. For income, owner's payments, value of dwelling, hours worked, weeks worked and age, the sum is defined as the product of the average and the rounded weighted frequency. Otherwise, it is the weighted sum that is rounded. It should also be noted that small cell counts may suffer a significant distortion as a result of random rounding. Individual data cells containing small numbers may lose their precision as a result. Also, a statistic is suppressed if the number of actual records used in the calculation is less than 4 or if the sum of the weight of these records is less than 10. In addition, for values expressed in dollar units, the statistic is suppressed if the range of the values is too narrow or if all values are less than, in absolute value, a specified threshold. Finally, again for values expressed in dollar units, the statistic is suppressed if there is a dollar value too large compared to all the others.

Users should be aware of possible data distortions when they are aggregating these rounded data. Imprecisions as a result of rounding tend to cancel each other out when data cells are re-aggregated. However, users can minimize these distortions by using, whenever possible, the appropriate subtotals when aggregating.

For those requiring maximum precision, the option exists to use custom tabulations. With custom products, aggregation is done using individual census database records. Random rounding occurs only after the data cells have been aggregated, thus minimizing any distortion.

In addition to random rounding, area suppression has been adopted to further protect the confidentiality of individual responses.

Area suppression is the deletion of all characteristic data for geographic areas with populations below a specified size. The extent to which data are suppressed depends upon the following factors:

- if the data are tabulated from the 100% database, they are suppressed if the total population in the area is less than 40

- if the data are tabulated from the 20% sample database, they are suppressed if the total non-institutional population in the area from either the 100% or 20% database is less than 40.

There are some exceptions to these rules:

- income distributions and related statistics are suppressed if the population in the area, excluding institutional residents, is less than 250 from either the 100% or the 20% database, or if the number of private households is less than 40 from the 20% database

- place-of-work distributions and related statistics are suppressed if the total number of employed persons in the area is less than 40, according to the sample database. If the data also include an income distribution, the threshold is raised to 250, again according to the sample database

- tabulations covering both place of work and place of residence along with related statistics are suppressed, if the total number of employed persons in the area is less than 40 according to the sample database, or if the area's total population, excluding institutional residents, according to either the 100% or the sample database, is less than 40. If the tabulations also include an income distribution, the threshold is raised to 250 in all cases and the tabulations are suppressed if the number of private dwellings in the place of residence area is less than 40

- same-sex couples' distributions and related statistics are suppressed if the population in private households in the area is less than 5,000, according to the 20% sample database

- if the data are tabulated from the 100% database and refer to six-character postal codes or to groups of either blocks or block-faces, they are suppressed if the total population in the area is less than 100

- if the data are tabulated from the 20% sample database and refer to six-character postal codes or to groups of either blocks or block-faces, they are suppressed if the total non-institutional population in the area from either the 100% or 20% database is less than 100

- if the data refer to groups of either blocks or block-faces, and cover place of work, they are suppressed if the total number of employed persons in the area is less than 100, according to the sample database

- if the data refer to groups of either blocks or block-faces, and cover both place of work and place of residence, they are suppressed if the total number of employed persons in the area is less than 100, according to the sample database, or if the area's total population, excluding institutional residents, according to either 100% or the sample database, is less than 100.

In all cases, suppressed data are included in the appropriate higher aggregate subtotals and totals.

The suppression technique is being implemented for all products involving subprovincial data (i.e., Profile series, basic cross-tabulations, semi-custom and custom data products) collected on a 100% or 20% sample basis.

For further information on the quality of census data, contact the Social Survey Methods Division at Statistics Canada, Ottawa, Ontario, Canada K1A 0T6, or by calling 613-951-4783.

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