Catalogue No. 92F0170GIE

Census Forward Sortation Area Boundary File 2001 Census

Reference Guide

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Statistics Canada

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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

- New methodology used to delineate Forward Sortation Area boundaries - Thiessen Polygons.

- 100% digital coverage of Canada which brings together: roads and other cartographic features from the National Topographic Data Base (NTDB) and Digital Chart of the World; streets and address range updates from Elections Canada; and the boundaries and related attributes of the geographic areas from Statistics Canada.

- Increased hydrographic detail from the National Atlas and the National Topographic Data Base as reference to support the boundaries. These digital topographic data are provided by Geomatics Canada, Natural Resources Canada.

- The national road coverage and related geographic attributes permit the creation of a new basic geographic unit—the block. A block is an area bounded on all sides by roads and/or boundaries of selected standard geographic areas.

- All the spatial information is now based in the North American Datum of 1983 (NAD83).

Table of Contents

1. About this guide

This reference guide is intended for users of the Census Forward Sortation Area (FSA) Boundary File. It provides general information about the product, including a description and the general methodology used to create it.

Section 4, Data Quality, gives a detailed description of the various steps in the creation of the product. This section also provides information to evaluate the suitability of the data for a particular use.

Technical specifications in Section 5 include system requirements, installation guidelines, record layout, item descriptions and file sizes (in megabytes).

Geographic terms and concepts in this document are described in the glossary in summary form only. More details can be found in the 2001 Census Dictionary (Catalogue number 92-378-XIE). Supplementary information is provided in the appendices with a list of related products and services.

This reference guide does not provide details on specific software packages that are available for use with the product. Users are advised to contact the appropriate software vendor for information. Please contact your nearest Regional Reference Centre for further information.

This reference guide is based on the best information available at the time of its release. It in no way constitutes a warranty of the data in the event that users may observe characteristics that deviate from those stated in this document. Many geographic codes and numbers presented in this guide have been transcribed from computer screens and internal written reports and then key-entered. All efforts have been made to ensure a thorough verification of this product, however, there is no guarantee that the data are 100% accurate.

2. Overview

The 2001 Census Forward Sortation Area (FSA) Boundary File contains the boundaries of 1,577 forward sortation areas (the first three characters of a postal code) derived from postal codes captured from the 2001 Census of Population questionnaires. Through analysis of the postal codes reported by Census households, a single Forward Sortation Area was assigned to each reported block based on the most frequently reported Forward Sortation Area for the block. Unreported blocks were assigned a Forward Sortation Area based on proximity to reported blocks in the same province or territory.

The product consists of two separate layers:

- a boundary file whose extents are those of the National Geographic Base, and
- a cartographic boundary file which incorporates hydrography (the shoreline around Canada) with the Forward Sortation Area boundaries.

The co-ordinates are in latitude/longitude and are based on the North American Datum of 1983 (NAD83). The product is available in ARC/INFO® interchange format and MapInfo® interchange format. Please see the technical specifications (section 5) for more details on record layouts and file formats.

Reference dates

The postal code reference month is the month of the Canada Post Corporation postal code update used to validate postal codes reported on Census questionnaires. The postal code reference month for the 2001 Census, and therefore for the forward sortation area boundaries is May 2001.

The geographic reference date is a date determined by Statistics Canada to finalize the geographic framework for which the Census data will be collected, tabulated and reported. The geographic reference date for the 2001 Census, and therefore for the geographic area boundaries used in the production process, is January 1, 2001.

3. How to use this product

Purpose of the product

The 2001 Census Forward Sortation Area Boundary File product is released as a geographic reference tool for 2001 Census data, providing a spatial representation of Forward Sortation Areas as reported by Census respondents. The product, in conjunction with Statistics Canada data, can be used for applications such as site location analysis, planning of service delivery and various types of data analysis and mapping.

This product is based upon reported postal codes[1] rather than the postal code assigned to the address by Canada Post Corporation. As a result, differences in the Forward Sortation Area (FSA) structure will be noted when compared to *The Canadian FSA Map Book* published by Canada Post Corporation. These differences should not be construed as one product being more or less accurate than the other. Rather they should be interpreted as places where respondents reported a postal code other than the one assigned by Canada Post Corporation.

Other differences may arise from the methodology used to delineate the forward sortation area boundaries. As described in Section 4, Data quality, the method used for the product relies on the properties of Thiessen polygons, while those of Canada Post Corporation are a result of the assignment of postal codes for use as a delivery mechanism.

The 2001 Census Forward Sortation Area Boundary File product contains two coverages: a boundary coverage and a cartographic coverage.

The boundary coverage extends to the limits of the National Geographic Base which means it extends into the oceans surrounding Canada's landmass. There is no hydrography incorporated in this coverage. This makes the boundary coverage well-suited for spatial analysis because no points can land in a water polygon, assuming the points fall within the limits of the coverage.

The cartographic coverage is derived by the boundary coverage. It contains polygons which are forward sortation areas. This makes the product ideal for visualization purposes, especially when the user does not have their own hydrographic information to clip the boundary coverage with (see Appendix B).

Limitations

The Forward Sortation Areas contained within this product are those reported by Census respondents for their place of residence. The postal code provided by a respondent may not be the same postal code as the one assigned to their dwelling by Canada Post Corporation. For instance, some respondents reported the postal code of a business building, possibly their work address.

There are some Forward Sortation Areas that cross provincial boundaries. Thus, care should be exercised when comparing provincial-level rollups with other data such as the 2001 Census Forward Sortation Area Population and Dwelling figures. For example, the town of Flin Flon

[1] All reported postal codes are subject to some basic checks to ensure that they are syntactically correct and were in existence in the postal code reference month. As well, reported postal codes were required to be valid for the respondent's census subdivision. Postal codes that failed any of these criteria were imputed.

straddles the Manitoba-Saskatchewan border. Households in Flin Flon are assigned an Forward Sortation Area of R8A by Canada Post Corporation, regardless of which side of the provincial border they are located on and this is reflected in the Forward Sortation Areas reported by residents of Flin Flon. However, all of the population and dwellings were allocated to Manitoba in the Forward Sortation Area Population and Dwelling figures, so population rollups created using this product may not exactly match the provincial rollups created from the Forward Sortation Area Population and Dwelling figures.

The product was created to support the analysis of data from the 2001 Census of Population. It may not be adequate for other purposes, especially if users are interested in business postal codes or linking information from other administrative sources.

As for all other boundary files, these Forward Sortation Area boundaries will not be precise if plotted at a larger scale than the scale of the source material used in their creation. In particular, the shorelines originally digitized at a scale of 1:1,000,000 (outside Census Metropolitan Areas and Census Agglomerations) will not support large scale mapping.

Due to slight differences between the generalized shoreline and the block boundaries derived from the National Geographic Base (NGB), some extremely small polygons ("slivers") exist in the cartographic boundary portion of the product along some provincial boundaries and shorelines. These slivers have attribute values for the Census FSA and the province code, however care should be exercised because slivers from one province may be contiguous with the mainland of another province, even though the two provincial borders are aligned on the shoreline itself.

General methodology

The Census Forward Sortation Area Boundary File (FSA) contains the boundaries of 1,577 forward sortation areas derived from postal codes captured from the 2001 Census questionnaires. By analysing the postal codes reported by census households, a single FSA was assigned to each block (most often the FSA reported by the largest number of census households). FSA polygons were formed by grouping blocks.

The postal code is a six-character code defined and maintained by Canada Post for the purpose of sorting and delivering mail. The first three characters of the postal code identify the FSA. Individual FSAs are associated with a postal facility from which mail delivery originates. For the census, the postal code is captured for all households from the address information provided by the respondent on the front page of the 2001 Census questionnaire on May 15, 2001.

Content

The product contains boundaries for 1,577 forward sortation areas. In total, Census respondents reported 1,591 Forward Sortation Areas, 14 of which are not represented given the methodology described below. The 1,577 Forward Sortation Areas portrayed on the file cover the entire country of Canada.

A breakdown of the number of Forward Sortation Areas and polygons by province/territory is provided below:

Province/Territory	Forward Sortation Areas[2]	Polygons	Forward Sortation Areas with multiple polygons
Canada	**1,589**	**4,376**	**886**
Newfoundland and Labrador	33	102	22
Prince Edward Island	7	21	3
Nova Scotia	74	190	51
New Brunswick	109	197	45
Quebec	394	845	194
Ontario	510	1,256	275
Manitoba	65	209	38
Saskatchewan	49	382	36
Alberta	151	642	107
British Columbia	187	516	112
Yukon Territory	3	6	2
Northwest Territories	3	6	1
Nunavut	4	4	0

The boundary product contains twelve Forward Sortation Areas which are represented in more than one that one province/territory. These Forward Sortation Areas are listed in the following table:

FSA	Provinces and/or Territories
R0L	Manitoba, Saskatchewan
R8A	Manitoba, Saskatchewan
S0A	Saskatchewan, Manitoba
S0L	Saskatchewan, Alberta
S0M	Saskatchewan, Alberta
S9V	Saskatchewan, Alberta
T0B	Alberta, Saskatchewan
T0C	Alberta, Saskatchewan
T0H	Alberta, British Columbia
T0J	Alberta, Saskatchewan
T5J	Alberta, Nunavut
X0E	Northwest Territories, Alberta

Consistency with other products

The 2001 Census Forward Sortation Area Boundary File is the only product available from Statistics Canada that provides a spatial distribution of the use of Forward Sortation Areas by Census respondents.

The 2001 Census Forward Sortation Area Boundary File product is consistent with other Statistics Canada spatial data products, including the Road Network File, the Skeletal Road Network File and the standard 2001 Census boundary files.

[2] Includes the following FSAs which exist in more than one province: R0L, R8A, S0A, S0L, S0M, S9V, T0B, T0C, T0H, T0J, T5J and X0E.

Two standard data products will be available for Forward Sortation Areas from the 2001 Census. In particular, the Statistics Canada website carries tables featuring population and dwelling counts for Forward Sortation Areas as reported by Census respondents. These tables are available free of charge from http://www.statcan.ca. Standard profiles and cross-tabulations of the population, by forward sortation area, will also be available and users will be able to order custom tabulations.

4. Data quality

The purpose of this data quality statement is to provide detailed information for users to evaluate the suitability of the data for a particular use. The five fundamental components of a data quality statement are lineage, positional accuracy, attribute accuracy, logical consistency, and completeness.

Lineage

Describes the history of the spatial data, including descriptions of the source material from which the data were derived and the methods of derivation, including the dates if the source material and all transformations involved in producing the final digital files or map product.

Sources

The product was derived from the 2001 Census Postal Code Variable and the National Geographic Base. Reported postal codes were processed through a series of edit operations that identified missing or invalid responses and replaced them with a valid response to produce the 2001 Census Postal Code Variable.

The 2001 Census Population and Dwelling Counts for Forward Sortation Areas are available on the Internet (see http://www.statcan.ca).

Method of derivation

Steps 1 through 5 were performed for each province and territory individually.

Step 1: Creation of the dominant reported point layer
The dominant Forward Sortation Area of all households associated with a block is assigned to the representative point for the block. Representative points for unreported blocks are not included in this layer. In Figure 1, the reported blocks are shaded grey.

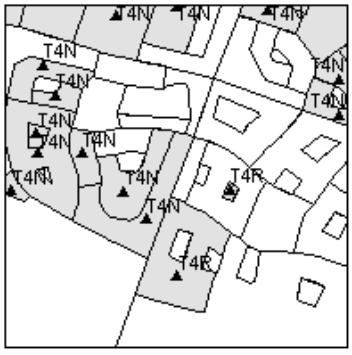


Figure 1. Dominant reported point layer

Step 2: Creation of the Forward Sortation Area Thiessen layer
The Forward Sortation Area Thiessen (FSAT) layer was created by performing a Thiessen polygon operation on the point layer from Step 1 (see Figure 2) and dissolving the resulting polygons based on the Forward Sortation Area of the polygons (see Figure 3).

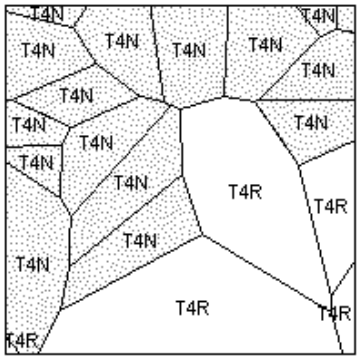


Figure 2. Thiessen polygons

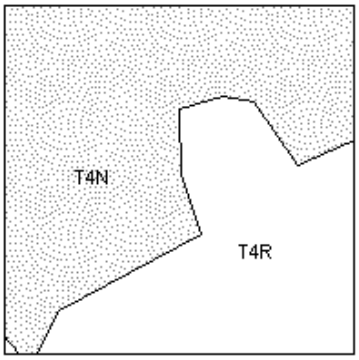


Figure 3. FSAT

Step 3: Integration of the FSAT and the blocks
The FSAT layer from Step 2 and the Block coverage were intersected (see Figure 4). Blocks that were split by the intersection operation were resolved by assigning the forward sortation area of the largest piece of a split block to all of the pieces of the block (see Figure 5).

Figure 4. Intersection of blocks and FSAT

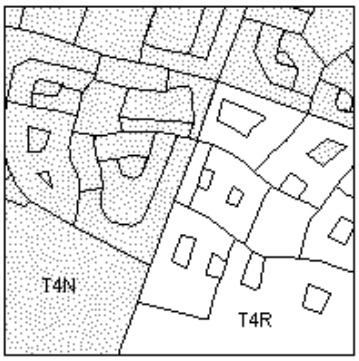


Figure 5. Resolution of split blocks

Step 4: Preservation of dominant reported forward sortation areas
The dominant Forward Sortation Areas for those blocks that were reported were imposed on the coverage from Step 3. This ensures that 100% of reported blocks have their dominant Forward Sortation Area assigned to them.

Step 5: Creation of the provincial/territorial forward sortation area piece
The layer created in Step 4 was dissolved on the forward sortation area. This resulted in a provincial Forward Sortation Area piece (see Figure 6).

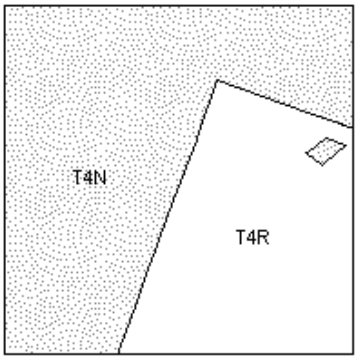


Figure 6. Provincial FSA piece

Step 6: Integration of provincial and territorial pieces
The various provincial and territorial pieces were appended into a single coverage, producing a national Forward Sortation Area boundary layer.

Step 7: Integration of hydrography
The Canadian landmass polygon from the hydrography layer created for the Road Network File (Catalogue No. 92F0157XCE) was used to clip the Forward Sortation Area boundary layer created in Step 6. This produced the Census Forward Sortation Area Boundary File.

Positional accuracy

Refers to the absolute and relative accuracy of the positions of geographic features. Absolute accuracy is the closeness of the coordinate values in a dataset to values accepted as or being true. Relative accuracy is the closeness of the relative positions of features to their respective relative positions accepted as or being true. Descriptions of positional accuracy include the quality of the final file or product after all transformations.

The boundaries are derived from the National Geographic Base (NGB). The data in the NGB are stored in double precision. However, the positional accuracy of the features in the NGB varies. The data storage precision allows features that are next to each other on the ground to be placed in the correct position on the map, relative to each other, without overlap.

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 data associated with the polygons in the 2001 Census Forward Sortation Area Boundary File are derived from postal codes captured from the 2001 Census of Population

questionnaires. Edit procedures verify that a reported postal code was valid and consistent with neighbouring postal codes. Postal codes which failed these checks were imputed, thus ensuring that 100% of the reported postal codes were valid postal codes according to Canada Post Corporation as of the postal code reference month.

It is important to note that postal codes were not verified against Canada Post Corporation's address information, merely that the postal code was considered valid by Canada Post Corporation.

The following table shows the percentage of Census households that are in a Census Forward Sortation Area polygon that matches the code reported on the Census questionnaire:

Province/Territory	% of Households
Canada	**98.0%**
Newfoundland and Labrador	97.8%
Prince Edward Island	97.5%
Nova Scotia	97.4%
New Brunswick	98.0%
Quebec	98.5%
Ontario	97.8%
Manitoba	98.1%
Saskatchewan	98.6%
Alberta	98.0%
British Columbia	97.7%
Yukon Territory	99.6%
Northwest Territories	100.0%
Nunavut	100.0%

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.

The product contains boundaries for 1,577 Forward Sortation Areas. In total, 1,591 Forward Sortation Areas were reported by at least one household in the 2001 Census.

There are a number of reasons why a reported Forward Sortation Area may not be represented in the Census Forward Sortation Area Boundary File. For example, a Forward Sortation Area may not be dominant on any block it is associated with. This would result in the Forward Sortation Area not appearing in the product.

5. Technical specifications

The Forward Sortation Area Boundary File product consists of two components: a boundary file and a cartographic file. Each component is available in both ARC/INFO® and MapInfo® formats.

File specifications

These are the standard formats in which 2001 Census digital spatial products are available from Geography Division.

Software formats

The product is available on CD-ROM in the following formats:

- ARC/INFO® interchange format version 8.2
  ASCII interchange file
  File extension: .e00 (spatial and tabular data)
- MapInfo® interchange format version 6.0
  ASCII interchange file
  File extension(s): .MIF (graphic data), .MID (tabular data)

Installation instructions

Both the ARC/INFO® and MapInfo® formats are compressed in self-executable WinZip® files (file extension .EXE). Users can uncompress these files by executing them in DOS, or selecting them in Windows® and double clicking the on the file icon or executing them in the RUN dialogue in Windows®.

File naming conventions

Coverage	ARC/INFO®		MapInfo®	
	File name	File size (MB)	File name	File size (MB)
Boundary	fsa_dbf_en.e00	53.4	fsa_dbf_en.mid fsa_dbf_en.mif	0.25 57.6
Cartographic	fsa_cbf_en.e00	85.7	fsa_cbf_en.mid fsa_cbf_en.mif	0.1 72.4

Data descriptions and record layouts

Geographic representation

All layers use the following geographic representation:

- Datum: NAD 83
- Projection: Geographic
- Co-ordinates: Latitude/Longitude (decimal degrees)

Record layout

The following table shows the format of the attributes contained on the boundary.

Item Name	Width	Output	Type	Decimals
AREA †	4	12	F	6
PERIMETER†	4	12	F	6
<File Name>#†	4	5	B	0
<File Name>-ID†	4	5	B	0
PR	2	2	C	n/a
CENSUS_FSA	3	3	C	n/a

† Items included with Arc/INFO® Interchange files only.

Item description

Item Name ARC/INFO®	Field Name MapInfo®	Description
AREA		Area of the polygon – maintained by ARC/INFO®
PERIMETER		Perimeter of the polygon – maintained by ARC/INFO®
<File Name>#		Maintained by Arc/INFO® for internal processing
<File Name>-ID		Maintained by Arc/INFO® for internal processing
PR	PR	Two digit province/territory code (see Table 1 for possible values)
CENSUS_FSA	CENSUS_FSA	Census Forward Sortation Area

Table 1. Values for PR attribute

PR	Official Province/Territory Name
10	Newfoundland and Labrador
11	Prince Edward Island
12	Nova Scotia
13	New Brunswick
24	Quebec
35	Ontario
46	Manitoba
47	Saskatchewan
48	Alberta
59	British Columbia
60	Yukon Territory
61	Northwest Territories
62	Nunavut

6. Glossary

Adjusted Counts
Adjusted counts refer to previous census population and dwelling counts that have been adjusted (i.e., recompiled) to reflect current census boundaries (such as when a boundary change occurs between two censuses).

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

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

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 is available.

Cartographic Boundary Files
Cartographic Boundary Files (CBF) contain boundaries of standard geographic areas, along with shorelines and lakes, at a level of detail appropriate for small-scale mapping.

Census Agricultural Region
Census agricultural regions (CAR) 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 grouping 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 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**). The census population count of the urban core must be at least 10,000 to form a census agglomeration and at least 100,000 to form a census metropolitan area. 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 the population of its urban core

population declines below 100,000. The urban areas that are located in the CMA or CA but 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 based on census counts, 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. The zones they form around CMAs and CAs 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 legislation) or areas deemed to be their equivalents (for example, Indian reserves, Indian settlements and unorganized territories) used for statistical reporting purposes.

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 (CMAs) and in census agglomerations (CAs) with an urban core population of 50,000 or more in the previous census.

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

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

The Cartographic Boundary Files, the Road Network Files and the representative points are disseminated in latitude/longitude co-ordinates.

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.

The spatial data disseminated for the 2001 Census are based on the North American Datum of 1983 (NAD83).

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 co-operation with Statistics Canada, to provide data for submunicipal areas.

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

Dominant Forward Sortation Area
An forward sortation area is dominant on a block if it is the most frequently reported in the block. In the event more than one forward sortation area in a block could be considered dominant (i.e. more than one occurred with the same frequency and this frequency is the highest), a forward sortation area was randomly assigned to the block.

Economic Region
An economic region (ER) is a grouping of complete **census divisions** (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 purposes. Thus, there can be various types of ecumenes, each having its own unique characteristics (population ecumene, agricultural ecumene, industrial ecumene, etc.).

Enumeration Area
An enumeration area (EA) is the geographic area canvassed by one census representative. An EA is composed of one or more adjacent blocks. EAs cover all the territory of Canada.

Enumeration areas are only used for census data collection. The dissemination area (DA) replaces the EA as a basic unit for dissemination.

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 2001 Census are based on the 1996 Representation Order.

Forward Sortation Area
The first three characters of the postal code identify the forward sortation area (FSA). Individual FSAs are associated with a postal facility from which mail delivery originates. The average number of households served by an FSA is approximately 7,000, but the number can range from zero to more than 50,000 households. This wide range of households occurs because some FSAs contain only businesses (zero households) and some FSAs serve very large geographic areas. Rural FSAs are identified by the presence of a zero in the second position of the FSA code. As of May 2001, there were approximately 1,600 FSAs in Canada.

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 and postal codes are linked to block-face representative points when the street and address information is available; otherwise, they are linked to block representative points.

Geographic Code
A geographic code is a unique number 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 2001 Census, the geographic reference date is January 1, 2001.

Household
Refers to a person or a group of persons (other than foreign residents), who occupy the same dwelling and do not have a usual place of residence elsewhere in Canada.

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

The land area measurements 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.

Local Distribution Unit
The last three characters of the postal code identify the local delivery unit (LDU). Each LDU is associated with one type of mail delivery (for example, letter carrier delivery, general delivery) and it represents one or more mail delivery points. The average number of households served by an LDU is approximately 15, but the number can range from zero to 7,000 households. This wide range of households occurs because some LDUs contain only businesses (zero households) and some LDUs serve large geographic areas. As of May 2001, there were more than 750,000 local delivery units.

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 Base
The National Geographic Base (NGB) is a new database that contains roads and boundaries of standard geographic areas in one integrated layer with other physical and cultural features (such as hydrography, railroads and power transmission lines) stored as separate layers.

The NGB is an internal maintenance database that is not disseminated. It supports a wide range of census operations, such as geocoding, updating the road network and address ranges, supporting the block program and delineating the boundaries of standard geographic areas (including the automated delineation of enumeration areas, urban areas and dissemination areas). As well, the NGB is the source for generating many geography products for the 2001 Census, such as reference maps and Cartographic Boundary Files.

Place Name
Place name (PN) 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.

Postal Code Reference Month
The month of the Canada Post Corporation postal code update used to validate Census of Population reported postal codes. The postal code reference month for the 2001 Census, and therefore for the forward sortation area boundaries in the Census FSA Boundary files, is May 2001.

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 ten 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.

Reported block
A block for which at least one Census questionnaire was completed.

Reported Postal Code
The postal code entered on a 2001 Census of Population questionnaire by a Census respondent.

Representative Point
A representative point is a single point that represents a linear or areal feature. The point is centrally located along the linear feature or centrally within the areal feature.

Representative points are generated for block-faces, blocks, enumeration areas, dissemination areas, census subdivisions and designated places. The block-face and block representative points support the geocoding of households and postal codes.

Road Network Files
The Road Network Files (RNFs) provide national coverage of roads, province / territory boundaries and other visible features such as hydrography, as well as attribute information (for example, street names and address ranges for streets with assigned addresses). The RNFs replace the Street Network Files (SNFs), which were a similar product previously available only for 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 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 metropolitan area and census agglomeration influenced zone (strong MIZ, moderate MIZ, weak MIZ or no MIZ), or the territories (Northwest Territories, Yukon Territory 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).

Thiessen Polygon
A spatially compact polygon describing the area of influence of a member of a set of points. See Appendix A for more information.

Urban Area
An urban area (UA) 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 100,000 persons in the case of a CMA, or between 10,000 and 99,999 persons in the case of a CA.

Urban fringe includes all small urban areas (with less than 10,000 population) that are located within a CMA or CA but are not contiguous with the urban core of the CMA or CA.

Unreported block
A block for which no Census questionnaires were completed.

Rural fringe comprises all territory that is located within a CMA or CA but is not classified as an urban core or an urban fringe.

Urban Population Size Group
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	–	2,499
2,500	–	4,999
5,000	–	9,999
10,000	–	24,999
25,000	–	49,999
50,000	–	99,999
100,000	–	249,999
250,000	–	499,999
500,000	–	999,999
1,000,000 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 A: Thiessen polygons

Thiessen polygons, also referred to as Voronoi networks, assign a space that is closest to each of a set of points [Chrisman 1997]. They have been used in a wide variety of fields from climatology to hydrology to various economically based activities [DeMers 1997].

Boots [1987] formally describes Thiessen polygons thus:

Consider a set, S, of n labelled points in the plane where

$$S = \{ p_1, p_2, \ldots p_n \}$$

With each point, p_i, in S we associate all locations, x, in the plane which are closer to p_i than to any other point, p_j, in $S(j \neq i)$. The result is to create a Thiessen polygon, P_i. More formally, if $d(x,i)$ is the euclidean distance from x to p_i then

$$P_i = \{ x | d(x,i) \leq d(x,j);\ j \in S,\ j \neq i \}$$

It is possible that x is equidistant from a pair of points in which case it will lie on the boundary of P_i. In addition, x may be equidistant from three or more points so that it forms one of the vertices of P_i.

If Thiessen polygons are created for all points in S the resulting set of polygons,

$$\{ P_1, P_2, \ldots P_n \},$$

forms a unique, contiguous, space-exhaustive tessellation known as the Thiessen (Voronoi) diagram of S, $V(S)$.

In other words, the area contained in a Thiessen polygon is likely to be more representative of the point the polygon is based on than of any other point in the set.

References

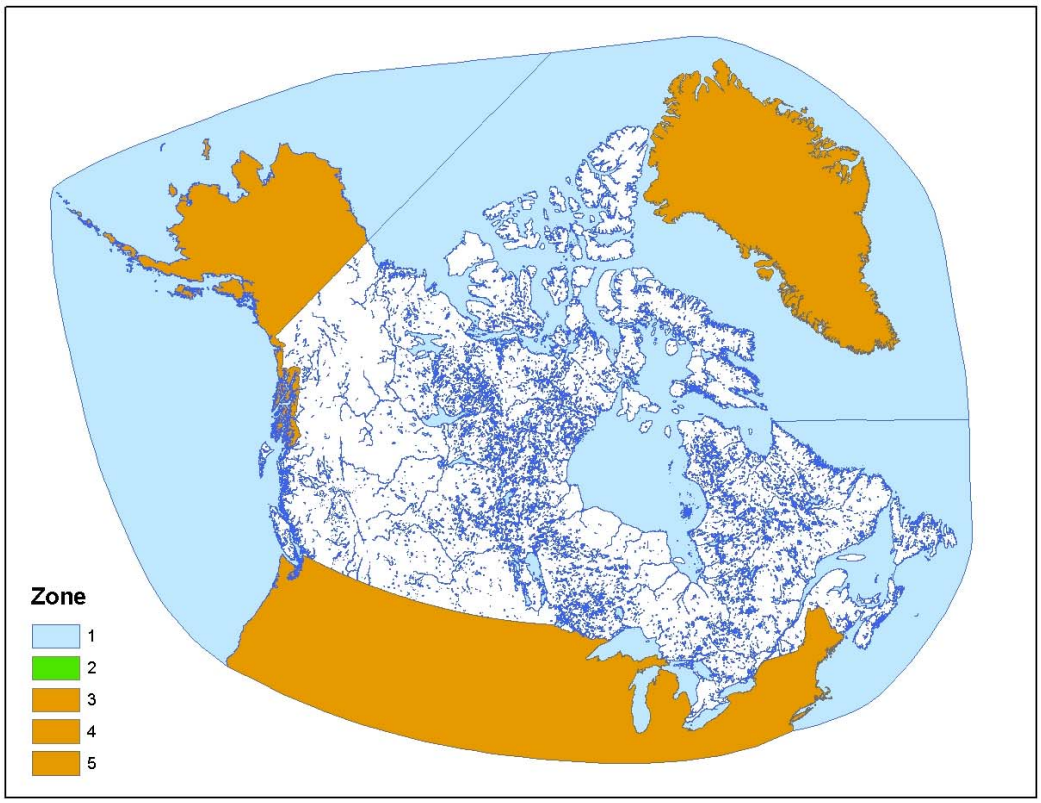
Boots, B. N. (1987). Quantitative analysis in geography, Waterloo lectures in geography; v.3 (Waterloo: University of Waterloo)

Chrisman, Nicholas R. (1997). Exploring geographic information systems (John Wiley & Sons, Inc.).

DeMers, Michael N. (1997). Fundamentals of geographic information systems (John Wiley & Sons, Inc.).

Appendix B: Supplementary hydrography coverage

The supplementary hydrography coverages are provided to allow for the mapping of interior water, oceans, Great Lakes, St. Lawrence River and land outside the Canadian land mass. These coverages contain some of the oceans surrounding Canada as well as the parts of the United States of America, part of Greenland and the islands of St-Pierre and Miquelon. These hydrography coverages would enable the shading of land and water appropriately. The following diagram illustrates the extent of the supplementary hydrography (surrounding United States, Greenland, Atlantic, Arctic and Pacific Oceans, Great Lakes, St. Lawrence River and interior water layers):



Record layout and item description

Supplementary interior hydrography record layout:

Item Name	Width	Output	Type	Decimals
AREA[1]	8	18	F	5
PERIMETER[1]	8	18	F	5
<File name> # [1]	4	5	B	0
<File name>-ID [1]	4	5	B	0
PRuid	2	2	C	0
ZONE	1	1	I	-

[1] Items included with ARC/INFO® Export files only.

Item Description

Item	Description
AREA	Area of the polygon - maintained by ARC/INFO® (item not included in MapInfo® files)
PERIMETER	Perimeter of the polygon - maintained by ARC/INFO® (item not included in MapInfo® files)
<File name> #	maintained by ARC/INFO® for internal processing (item not included in MapInfo® files)
<File name>-ID	maintained by ARC/INFO® for internal processing (item not included in MapInfo® files)
PRuid	uniquely identifies a province or territory
ZONE	value of “1” for water “0” for Canada (land), “3” for surrounding continental United States, “4” for France (St-Pierre-Miquelon) and “5” for Greenland.

File names and sizes for interior water: interior lakes and doubles rivers feature
File names are formatted in order to better indicate to the client the source of data, coverage, geographic area, language and file format of the data.

Coverage	ARC/INFO®		MapInfo®	
	File name	File size (MB)	File name	File size (MB)
Canada – full coverage	ghy_000h02a_e	33.42	ghy_000h02m_e	20.20

Geography products and services

This section provides brief descriptions of Geography products and services related to the 2001 Census. For additional details, consult the nearest Statistics Canada Regional Reference Centre.

1. Reference Maps

Reference maps show 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. Over 5,600 reference maps are available for the 2001 Census. Given the diversity in size of these geographic areas, different map scales and map coverages are required to show the appropriate level of detail. Descriptions of each series are provided with the individual catalogue entries below.

National Reference Maps

92F0172XCB Reference Maps – Complete Set, 2001 Census
92F0144XIB Census Divisions, 2001
92F0144XIB Economic Regions and Census Divisions, 2001
92F0144XIB Census Metropolitan Areas and Census Agglomerations, 2001
92F0144XIB Statistical Area Classification, 2001 Census Subdivisions
92F0152XPE Federal Electoral Districts (1996 Representation Order) Reference Map

92F0149XPB Census Division and Census Subdivision Reference Maps

The set of Census Division and Census Subdivision Reference Maps covers all of Canada, by province and territory. The maps show the boundaries, names and codes of census divisions (such as counties and regional districts) and census subdivisions (such as cities, towns, villages, other local municipal entities, townships and Indian reserves). The maps also show the boundaries of census metropolitan areas and census agglomerations. There are 22 maps that vary in scale (ranging from 1:310,000 to 1:3,500,000).

92F0145XPB Census Tract Reference Maps, by Census Metropolitan Area or Census Agglomeration

The series of Census Tract Reference Maps covers all 27 census metropolitan areas (CMAs) and the 19 census agglomerations (CAs) with census tracts. The maps show the boundaries and names of census tracts and census subdivisions, as well as the urban core, urban fringe and rural fringe within the CMAs or CAs. The maps include background information such as rivers, lakes, railroad tracks and provincial boundaries, and other significant features. There are 85 maps in the series, with one to four maps covering each CMA or CA. The map scales range from 1:25,000 to 1:2,000,000, and the maximum map dimensions are approximately 91 cm by 101 cm (36 inches by 40 inches).

92F0146XPB Dissemination Area Reference Maps, by Census Tract, for Census Metropolitan Areas and Census Agglomerations.

The set of Dissemination Area Reference Maps by Census Tract covers all 27 census metropolitan areas (CMAs) and the 19 census agglomerations (CAs) that are part of the census tract program. Each map in the set covers one census tract (CT) and shows the boundaries and codes of dissemination areas within that CT. The maps also show census tract, census subdivision, and census metropolitan area or census agglomeration boundaries on a background of detailed street networks and other visible features such as rivers, lakes and railroad tracks.

There are approximately 4,800 maps in this set—generally one map per census tract. The dimensions of each map are approximately 27 cm by 43 cm (11 inches by 17 inches).

92F0147XPB Dissemination Area Reference Maps, by non-tracted Census Agglomeration
The set of Dissemination Area Reference Maps by Non-tracted Census Agglomeration covers the smaller census agglomerations that are not part of the census tract program. Each map in the set covers one census agglomeration (CA) and shows the boundaries and codes of dissemination areas within that CA. The maps also show the boundaries of census subdivisions (municipalities), as well as urban areas, and representative points for designated places. The maps include background information such as rivers, lakes, railroad tracks and provincial boundaries, and other significant features.

There are approximately 100 maps in this set—generally one map per census agglomeration (The maps vary in scale and size; the maximum map dimensions are approximately 91 cm by 101 cm (36 inches by 40 inches).

92F0148XPB Dissemination Area Reference Maps, by Census Division, for Areas Outside Census Metropolitan Areas and Census Agglomerations The set of Dissemination Area Reference Maps by Census Division covers areas outside census metropolitan areas (CMAs) and census agglomerations (CAs). Each map in the set covers one census division (CD) and shows the boundaries and codes of dissemination areas within that CD. The maps also show the boundaries of census subdivisions, census metropolitan areas and census agglomerations, as well as urban areas and representative points for designated places. The maps include background information such as rivers, lakes, railroad tracks and provincial boundaries, and other significant features.

2. Geographic Data Products

Geographic data products are those that contain 2001 Census population and dwelling counts.

93-360-XPB National Overview Tables, 2001 Census
The National Overview tables provide population and dwelling counts established by the 2001 Census of Canada. The levels of geography covered are Canada, provinces and territories, and other geographic areas including census subdivisions (municipalities), census metropolitan areas and census agglomerations. For selected geographies, the tables provide percentage change in the population and dwellings between 1996 and 2001. Data are also provided for land area and population density. Geographic Boundaries are those in effect on January 1, 2001.

92F0150XCB GeoSuite, 2001 Census
GeoSuite is a tool for data retrieval, query and tabular output, with software and data on a CD-ROM. GeoSuite allows users to explore the links between all standard levels of geography and to determine geographic codes, names, and population and dwelling counts. GeoSuite includes a dissemination area (DA) reference map listing that facilitates identification of appropriate DA reference maps.

3. Spatial Information Products

Spatial information provides the shape and location of geographic features. The boundaries, road network and other features of standard geographic areas are available in digital form for mapping and geographic information system (GIS) applications. These products include Cartographic Boundary Files (CBFs), Road Network Files (RNFs) and Skeletal Road Network Files (SRNFs).

Cartographic Boundary Files (CBFs), 2001 Census
Cartographic Boundary Files (CBFs) contain the boundaries of standard geographic areas together with the shoreline around Canada and the larger inland lakes, all integrated in a single layer. In the second edition (released October 8, 2002), the hydrography was generalized by removing small lakes from the file to reduce noise. Large rivers emptying into the oceans were closed off, then the interior hydrography (double line river and lake polygons) was extracted to create the supplementary hydrography. The coordinates are latitude/longitude and are based on the North American Datum of 1983 (NAD83). The Cartographic Boundary Files for 2001 replace the Digital Cartographic Files produced for the 1996 Census.

Cartographic Boundary Files can be used with Census of Population, Census of Agriculture or other Statistics Canada data for data analysis and thematic mapping (with appropriate software). Geographic codes provide the linkage between the statistical data and the geographic area boundaries. CBFs can also be used to create new geographic areas by aggregating standard geographic areas, and for other data manipulations available with the user's software. The CBFs can be used with the Road Network Files and Skeletal Road Network Files, which provide additional geographic context for mapping applications.

92F0160XCE Provinces and Territories Cartographic Boundary File
92F0163XCE Federal Electoral Districts (1996 Representation Order) Cartographic Boundary File
92F0161XCE Census Divisions and Economic Regions Cartographic Boundary File
92F0167XCE Census Consolidated Subdivisions Cartographic Boundary Files
92F0162XCE Census Subdivisions Cartographic Boundary Files
92F0165XCE Designated Places Cartographic Boundary File
92F0166XCE Census Metropolitan Areas/Census Agglomerations Cartographic Boundary File
92F0168XCE Census Tracts Cartographic Boundary Files
92F0164XCE Urban Areas Cartographic Boundary File
92F0169XCE Dissemination Areas Cartographic Boundary Files

92F0159XCE Population Ecumene Census Division Boundary File, 2001 Census
The Population Ecumene Census Division Boundary File contains a generalised population ecumene based on 2001 Census population density data with at least one ecumene polygon for every census division (CD). It can be used to produce small-scale thematic maps of statistical data.

For the 2001 Census, a population ecumene was defined based on population density criteria at the block level. The resulting detailed population ecumene polygons were generalised and small, non-contiguous ecumene pockets were aggregated to ensure visibility for small-scale thematic mapping at the census division level (see Figure 9). When ecumene boundaries are used for dot and choropleth mapping, they give a more accurate depiction of the spatial distribution of data within standard geographic areas.

The Population Ecumene Census Division Boundary File is available as a standard package for Canada free on the Internet or it can be purchased on CD-ROM through the nearest regional office. This file is not a Cartographic Boundary File and it has its own reference guide.

92F0157XCE Road Network Files (RNF), 2001 Census
Road Network Files (RNFs) contain a road layer for the entire country and a province/territory boundary layer. The road layer includes roads, with road names and address ranges (arc

attributes), and geographic codes to identify blocks, census subdivisions, census metropolitan areas/census agglomerations, and provinces/territories (polygon attributes). Address ranges are mainly available in the large urban centres of Canada. The province/territory boundary layer incorporates hydrography (the shoreline around Canada and the larger inland lakes) with the boundaries and the geographic codes. The digital coordinates are in latitude/longitude and are based on the North American Datum of 1983 (NAD83).

Road Network Files are available for Canada, for individual provinces and territories, and for census metropolitan areas (CMAs) and those census agglomerations (CAs) with census tracts.

92F0158XCE Skeletal Road Network Files (SRNF), 2001 Census
The Skeletal Road Network Files contain selected roads (with road names, but no addresses) that are derived from Road Network Files (Catalogue No. 92F0157XCE). The selected roads are ranked according to four levels of detail. The different levels of detail are suitable for mapping at small to medium scales. The SRNF can be used to provide some cartographic reference features when producing thematic maps with the Cartographic Boundary Files. The positional accuracy of the SRNF does not support cadastral, surveying or engineering applications. The SRNF does not include hydrography.

The Skeletal Road Network Files are available for Canada, provinces and territories, and census metropolitan areas (CMAs) and tracted census agglomerations (CAs).

4. Attribute Information Products

Attribute information products are those that give descriptive information about the features. The attribute files include Postal Code Conversion File (PCCF) and Postal Code by Federal Ridings File (PCFRF).

92F0153XCB Postal Code Conversion File (PCCF)
The Postal Code Conversion File (PCCF) provides a link between six-character postal code and standard 2001 Census geographic areas (such as dissemination areas, municipalities, census tracts). It also provides the x,y (latitude/longitude) coordinates for a point representing the approximate location of the postal code to support mapping.

The PCCF is available as standard packages for Canada, the provinces and territories, census metropolitan areas (CMAs) and some census agglomerations (CAs). A reference guide is included.

92F0154UCB Postal Code Conversion File (PCCF) – Update
The Postal Code Conversion File (PCCF) is updated with new postal codes on a semi-annual basis and is available in January and July. Clients must purchase the Postal Code Conversion File at the initial price; then subsequent updated files (92F0154UCB) may be purchased at the update or subscription rate. The update rate is a flat rate that in most cases is much lower than the initial purchase price. An additional 25% discount on updates is given to PCCF update subscribers. The subscription requires clients to pay in advance for at least one updated file per year until the PCCF reflecting the geography of the 2001 Census is released.

The PCCF Updates are available as standard packages for Canada and the provinces and territories. A reference guide is included.

92F0028XDB Postal Codes by Federal Ridings (1996 Representation Order) File

The Postal Codes by Federal Ridings File (PCFRF) provides a link between the six character postal codes and the federal electoral districts (1996 Representation Order). A federal electoral district (FED), commonly referred to as a federal riding, is an area represented by a Member of Parliament in the House of Commons.

The PCFRF is intended as a tool for use with administrative files containing postal codes. By using the postal code as a link, data from administrative files may be organised and/or tabulated by federal riding. This PCFRF allows a link of more than 680,000 postal code records to the 301 federal electoral districts.

The PCFRFs are available as standard packages for Canada and five regions. A reference guide is included.

92F0028XDB Postal Codes by Federal Ridings (1996 Representation Order) File (PCFRF) – Update
The Postal Code by Federal Ridings File (PCFRF) is updated with new postal codes on a semi-annual basis and is available in January and July. Updates released in July provide new postal codes effective January of the release year. Updates released in January provide new postal codes in use in July of the previous year. Clients who purchase the PCFRF (92F0028XDB) at the initial price may then purchase subsequent updated files (92F0028UDB) at the update rate (see Table 13 for details).

The PCFRF Updates are available as standard packages for Canada and five regions.

5. Geographic Services
A variety of services is available, including custom mapping, custom data extraction (geocoding) and the development of custom geography products.

97C0006 Geography Custom Service
If standard geography products do not satisfy a client's needs, the Geography Custom Service is available to produce non-standard geographic products. Examples include alternative packaging of geographic files, special data retrievals, manipulations or merges using any of the geography computer files (postal codes, attribute files, boundary files and road network files). Contact the nearest regional office for details.

97C0005 Custom Area Creation Service (formerly Geocoding Service)
The Custom Area Creation Service (formerly called Geocoding Service) allows users to define their own geographic areas of study (user-defined areas or aggregations of standard census geographic areas) for census data tabulations. This custom geography is produced from the aggregation of blocks, or where necessary, block-faces within the road network file coverage. The custom area files thus created are then passed to Census for data tabulation. Contact the nearest regional office for details.

97C0007 Geography Custom Mapping
Thematic maps and other maps, specially designed to meet customer needs, can be produced. Contact the nearest regional office for details.

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