

### **Modeling Postal Codes: Challenges and Issues**

The Nova Scotia Community Counts project team is developing a concordance file to allocate postal code based data to the various geographies within the Community Counts system (<http://www.gov.ns.ca/communitycounts>). Concordance files have been developed for each of the 1991, 1996, and 2001 Census periods. These files convert Statistics Canada standard geography based data to the Community Counts geographies on a consistent basis.

Statistics Canada's Postal Code Conversion File (PCCF) is often the tool of choice when assigning postal code based data to various geographic regions. While this works reasonably well for urban areas, there are many challenges when using this product for rural areas.

The following is an overview of some of the challenges and issues that have been encountered in developing the Community Counts postal code concordance file.

#### **Rural versus Urban Local Delivery Units (LDU):**

- Rural regions in Nova Scotia have much larger postal code coverage areas than urban regions. This is mainly because almost all of the homes receive their mail by rural route or general delivery. Most rural residents are required to travel a certain distance from their home to pick up their mail.
- Canada Post does not distribute geographic polygons that cover each 6-digit postal code. Statistics Canada has however assigned each postal code a "best fit" point location (or what they call Single Link Indicator, or SLI), which can be found in the Postal Code Conversion File.
- In an urban area, a 6-digit postal code may be assigned to one apartment building, or one side of a street, or even just a segment of a street. However, in rural regions a 6-digit postal code can cover many streets, neighborhoods, and can even cover more than one community. An initial approach to modeling postal codes was to attribute them to the location of the SLI (or best fit location), however this proved to be largely unsuccessful in rural areas. Within Nova Scotia, even at the county level errors are up to plus or minus 10%. For municipalities, within Nova Scotia, five towns end up with zero population and all of the cases are being designated to the neighbouring municipal government. For example, there are residences using the postal code 'B0V 1A0' in three municipalities: the Town of Digby, the District of Digby, and the County of Annapolis. The location of SLI falls within the District of Digby, therefore all of the people using the postal code 'B0V 1A0' are attributed to the District, and none to the Town of Digby or to the County of Annapolis.

#### **Postal Code Conversion File (PCCF) Anomalies:**

- The PCCF has 63,852 records which are made up of unique combinations of postal codes and census blocks. Generally a block is a geographic area bounded by intersecting streets or roads. There are 15,161 census blocks in Nova Scotia. There are 26,322 unique postal codes in the PCCF. This means that each postal code may be linked with several different census geographies. Statistics Canada designates the main link with a "single link indicator" value of 1 (zero for the others).

- One of the implications of the above is that the postal codes are placed based on the representative point for the single link indicator block. They are not placed based on the actual buildings to which they apply. For example, 3% of the postal codes are shown as being located in water bodies such as lakes, rivers, harbours and the ocean.
- The PCCF file also contains errors in the lat/long point coordinates representing a postal code relative to the Forward Sortation Area (FSA). For example, 'B1C 1A9' – a Louisburg postal code – is indicated by coordinates that place the code in North Sydney and Donkin, 56 km and 45 km away respectively. Further testing has shown that 13% of the PCCF postal codes are in a FSA other than that indicated by the first three characters of the postal code. Many of these points are close, but as in the case above some are wrong. Further work is underway to assess the extent of this.
- The PCCF has good representation of newer postal codes.

#### Postal Code Errors:

- Quality control checks ensure that all postal codes are comprised of a letter and number sequence in the proper order of ANA NAN (A = letter, N = Number). All Nova Scotia postal codes begin with the letter B. Rural postal codes are easily identifiable because they contain two zeroes. One zero must be in the second place of the FSA and the second zero must be the third place of the Local Delivery Unit (LDU), e.g. B0V 1A0. Urban postal codes do not contain zeroes.
- Certain letters are never used in a postal code: D, F, I, O, Q, or U.
- Typographical errors often occur. People may, on occasion, either refuse to give their postal code, enter an invalid postal code, or a typo is made. A common postal code reported, if the person doesn't know it, is B0B 0B0, which is non-existent.

#### Postal Code Changes:

- As rural areas urbanize, and cities continue to grow, Canada Post must make changes to their postal codes. When a particular postal code is retired, and a new postal code is assigned to that area, many people may continue to use the retired postal code.
- A 2001 postal code-based health administrative dataset contained 117 postal codes, reported as part of an address, which had been retired between 1984 and 2000. This is probably the result the postal code being changed and not being reported for health record purposes, probably because the address itself did not change.

#### Civic Address versus Mailing Address (from Property Records Database):

- To improve accurate placement, we are using mailing address postal codes from property records to assist in modeling the postal codes among the geographies used in Community Counts. The postal code for a given property is associated with the mailing address of the property owner for tax purposes and not necessarily the civic address. When dealing with rental properties and second homes/cottages, this causes problems.
- The incidence of postal codes for third party ownership results in over counting of the associated postal codes and contributes to missing over 2,350 codes used by the residents of the properties. For example, there is a property management company that owns apartments and mini-home parks across the province and their mailing address is the head office of the company, in Halifax. This not only means the postal code for the head office is highly over counted, it also means that we are missing the correct postal codes for all of the residents of those apartments and mini-home parks in our database.

This paper will be updated as our development work continues.