Data Library Guide: Census Mapping (CSDs by DA using CHASS)

Note: This activity works best using **Firefox**. Also, to force Firefox to always ask where to save data you want to download, in Firefox, click on the icon that looks like **three horizontal lines** (top right) and select **Options**. Under **Downloads**, select **Always ask me where to save files** and then close the tab to save the changes.

Finding, Downloading, and Mapping Census Data

The goal of this exercise is to get you familiar with obtaining Canadian Census Data and Geospatial Data and visualizing this information. For this example, you will be mapping the percentage of small children living in the Prince George area by dissemination area (DA) based on the 2011 Census Data. *Note: Cities normally equate to census subdivisions (CSDs); however, for this exercise, we will also need to know that Prince George is in the Fraser-Fort George region (i.e., the larger, census division (CD)). You can find this information out from the census program website, if you quickly look up the "Prince George" to get its census profile data.*

In this exercise, you are going to:

A. Download the census data
B. Download the census boundary files needed (dissemination areas)
C. Match the two datasets (data and dissemination areas) together in ArcMap
D. Extract only the Prince George dissemination areas
E. Colour code the data to create a thematic map

A. Download the census data

1. Let's start by going to the library website: http://www.library.ubc.ca. Click on the **Indexes & Databases** tab, and then search for **Canadian Census Analyser**. Click on its title to take you to it – you may be prompted to log in with your CWL first to access it.
2. Here we can start to filter our search. First under *Starting Points, Census Profile Tables, by Census Year*, click on **2011** (not 2011 NHS). Next click on **Profile of Dissemination Areas (cumulative).**
3. Step 1 on this page lets us select the Census Division we're interested in (as we can't narrow it down to Census Subdivision here), for this example, Fraser-Fort George. Under *Locate census geography, by Name*, deselect the letter **A** and select instead the letter **F.** Select **Fraser-Fort George.**
4. Step 2 on this page lets us select the variables we're interest in, for this example, total number of small children and total population (in order to calculate a percentage). Under

Data Library Guide: Census Mapping (CSDs by DA using CHASS)

Select the Census Profile Variables to include in your search, select the **Age Characteristics Total** sub-tab, and then select these two variables:

   a. **Total population by age groups; Both sexes (v5)**
   b. **0 to 4 years; Both sexes (v6)**

5. Step 3 on this page lets us select the output format we need, for this case, DBF format. At the bottom of the page, under Download to a file, select **dBase (DBF) file** and then click on **Submit Query.**
6. Download the dbf and text files from the links provided (right click and select **Save Link As…**) and save them to C:\Temp. The dbf file will have your data and the text file will contain information about what the column headers mean.

B. Download the census boundary file

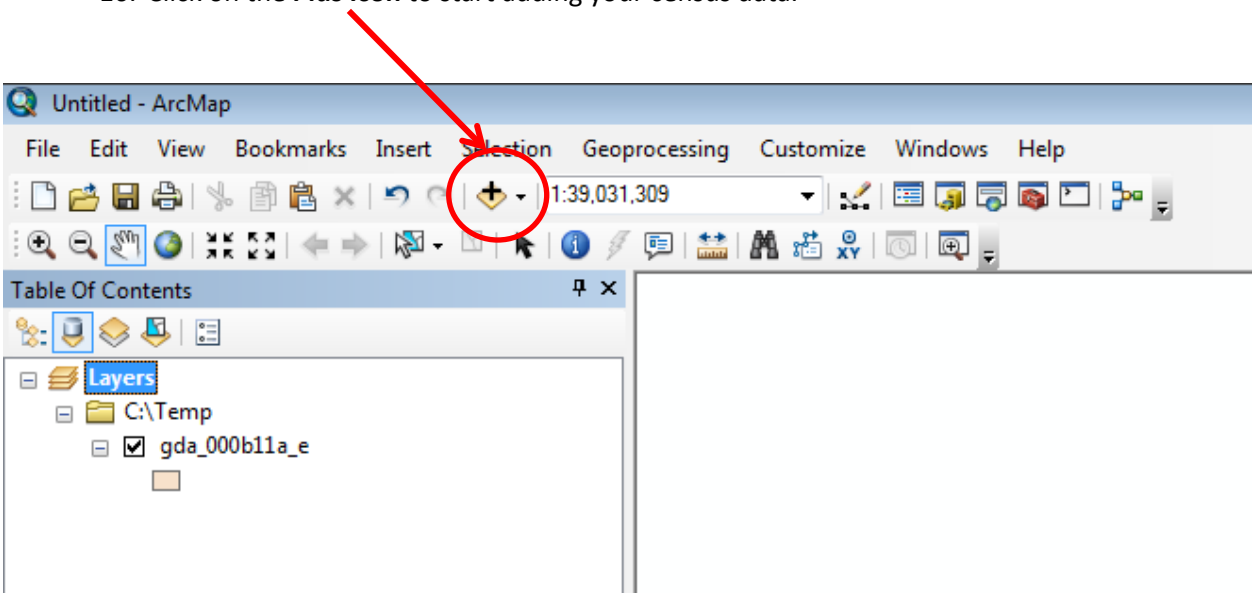
7. Let's get this from the Census Geography website. Go to the **Statistics Canada** website – google it. Under the right-side *Features* menu, click on **Census Program.** Scroll down to the **Information and Services** section and click on **Geography**.
8. Under *Spatial information products*, click on **Boundary files**.
9. Under *Census year*, click on **2011**.
10. For the download form, select **English, ArcGIS (.shp),** and **Cartographic Boundary File** next to **Dissemination Areas**. Then click on **Continue** at the bottom of the page.
11. Download the zip file from the link provided and save it to C:\Temp.
12. Geospatial data often comes in a zip file as it is made up of a collection of files. You'll need to unzip it before you can use it in ArcMap. To do so in the computer lab, go to C:\Temp and right click on the zip file. Select **PeaZip** and then **Extract here**.

C. Match the two datasets together in ArcMap

13. Open up ArcMap by clicking on the **ArcMap 10.3.1** shortcut on the desktop.
14. Double click on the **Blank Map** template to start with a blank map.
15. Drag the **gda_000b11a_e.shp** file on to the ArcMap blank map space to add the dissemination area boundaries.

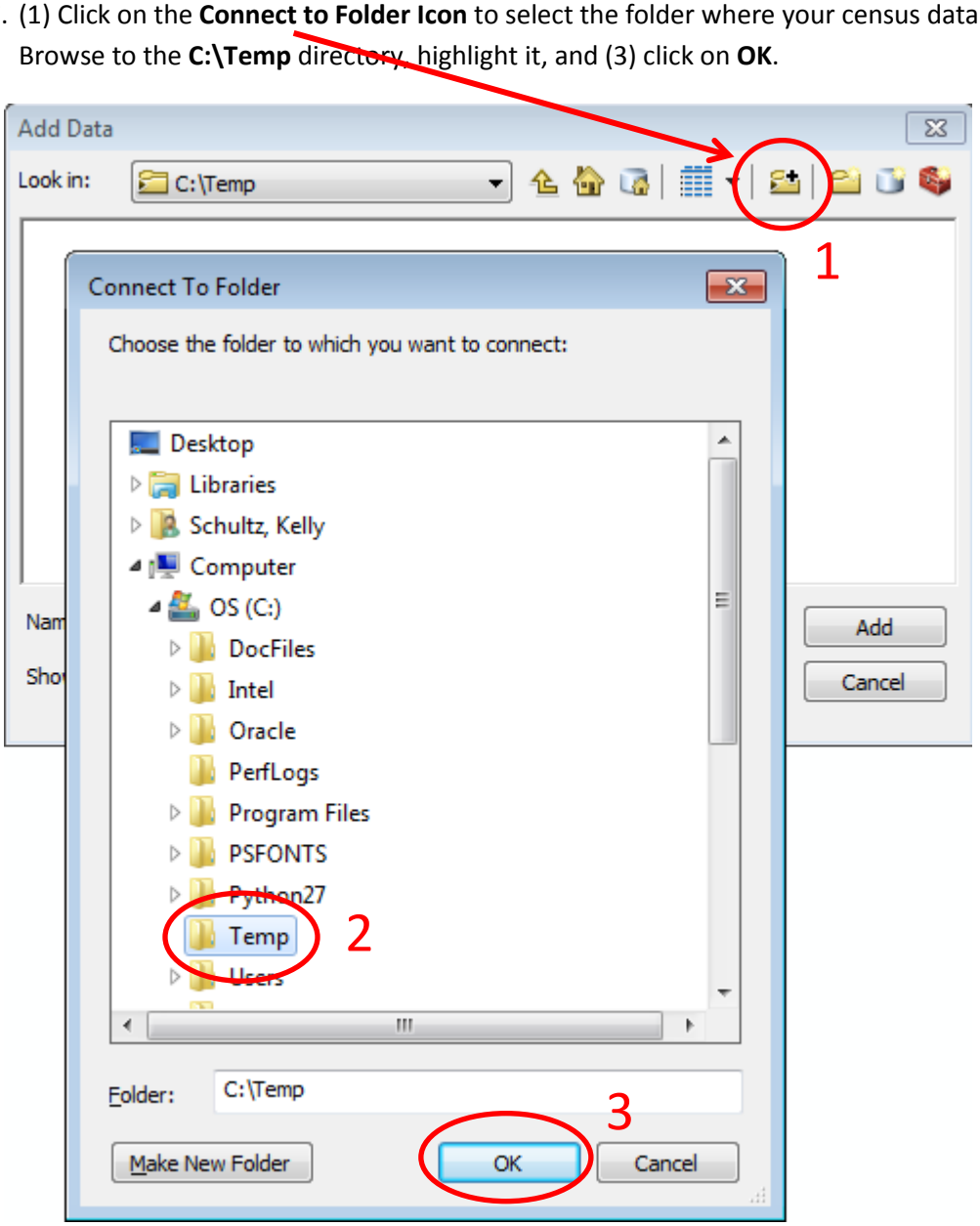
Data Library Guide: Census Mapping (CSDs by DA using CHASS)

16. Click on the **Plus Icon** to start adding your census data.



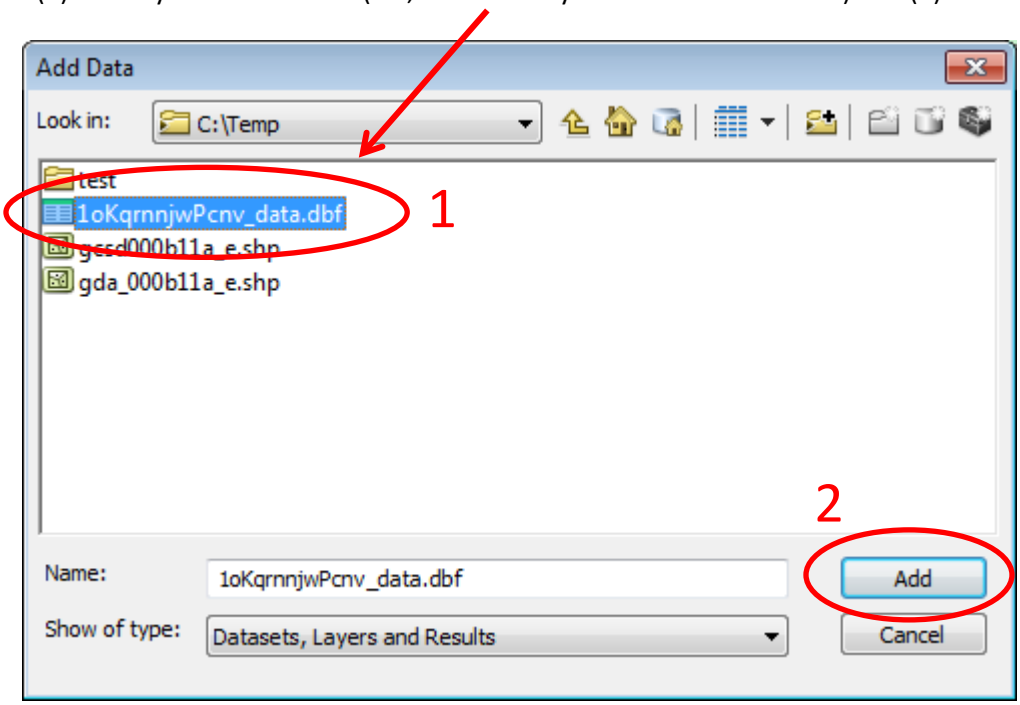
Data Library Guide: Census Mapping (CSDs by DA using CHASS)

17. (1) Click on the **Connect to Folder Icon** to select the folder where your census data is. (2) Browse to the **C:\Temp** directory, highlight it, and (3) click on **OK**.



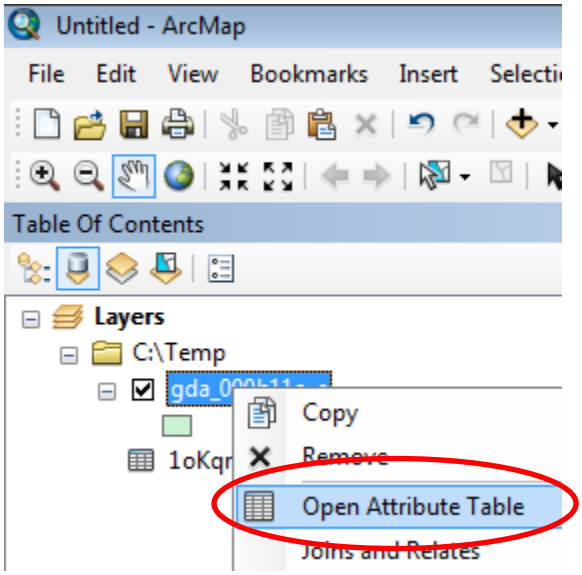
Data Library Guide: Census Mapping (CSDs by DA using CHASS)

18. (1) Select your census data (i.e., the **dbf** file you downloaded earlier) and (2) click on **Add**.



Data Library Guide: Census Mapping (CSDs by DA using CHASS)

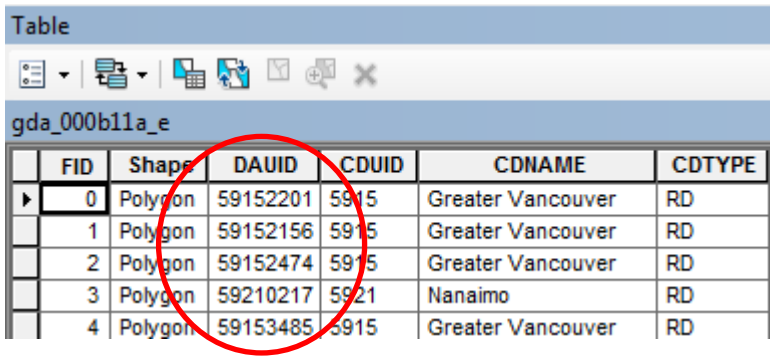
19. For each dataset added, you can view the underlying table of data by right clicking on each dataset name in the layers list on the left, and selecting either Open Attribute Table or just Open (depending on which file, shp vs dbf, you are looking at).



Data Library Guide: Census Mapping (CSDs by DA using CHASS)

20. If you take a look at each table, you'll notice that the column DAUID (i.e., Dissemination Area Unique ID) contains similar, corresponding information to COL0 (i.e., the GEOID or Geography ID). They both identify a specific area in the Fraser-Fort George region with its associated information.

    Table of attributes behind the boundary file:

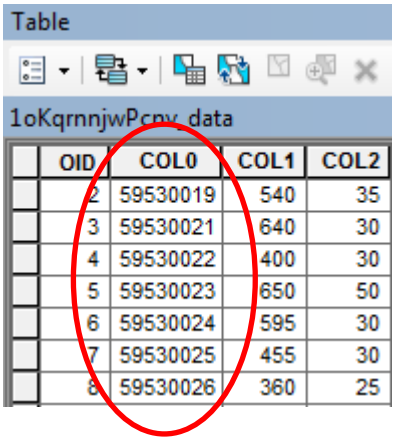


Table

gda_000b11a_e

FID	Shape	DAUID	CDUID	CDNAME	CDTYPE
0	Polygon	59152201	5915	Greater Vancouver	RD
1	Polygon	59152156	5915	Greater Vancouver	RD
2	Polygon	59152474	5915	Greater Vancouver	RD
3	Polygon	59210217	5921	Nanaimo	RD
4	Polygon	59153485	5915	Greater Vancouver	RD

    Table of attributes in the census data DBF file:



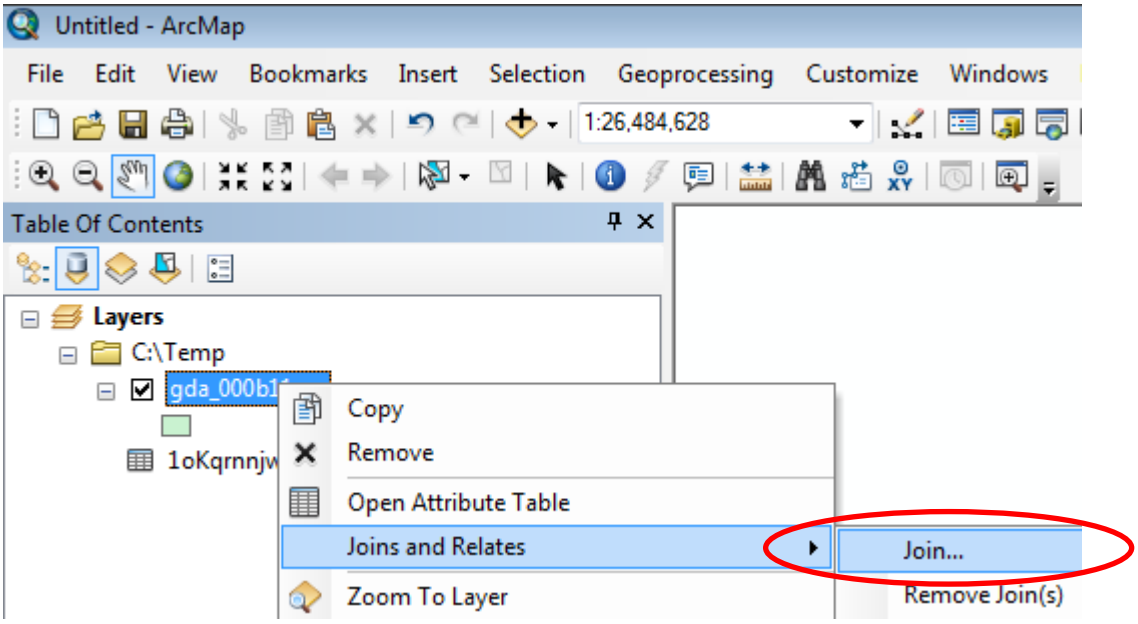
Table

1oKqrnnjwPcnv_data

OID	COL0	COL1	COL2
2	59530019	540	35
3	59530021	640	30
4	59530022	400	30
5	59530023	650	50
6	59530024	595	30
7	59530025	455	30
8	59530026	360	25

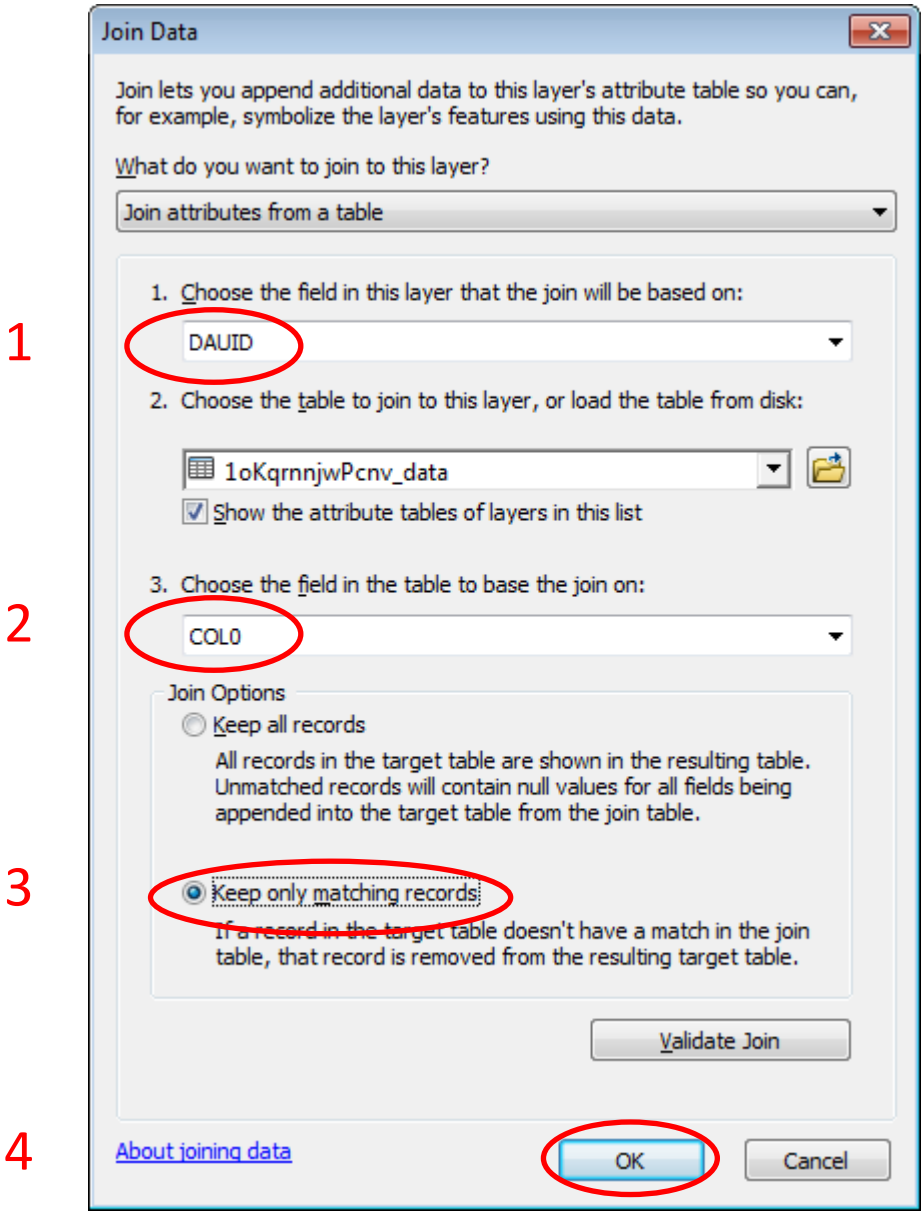
Data Library Guide: Census Mapping (CSDs by DA using CHASS)

21. So we can join the two tables of data together into one. Right click on the boundary dataset name in the layers list on the left (i.e., **gda_000b11a_e**), and select **Joins and Relates**, and then **Join…**



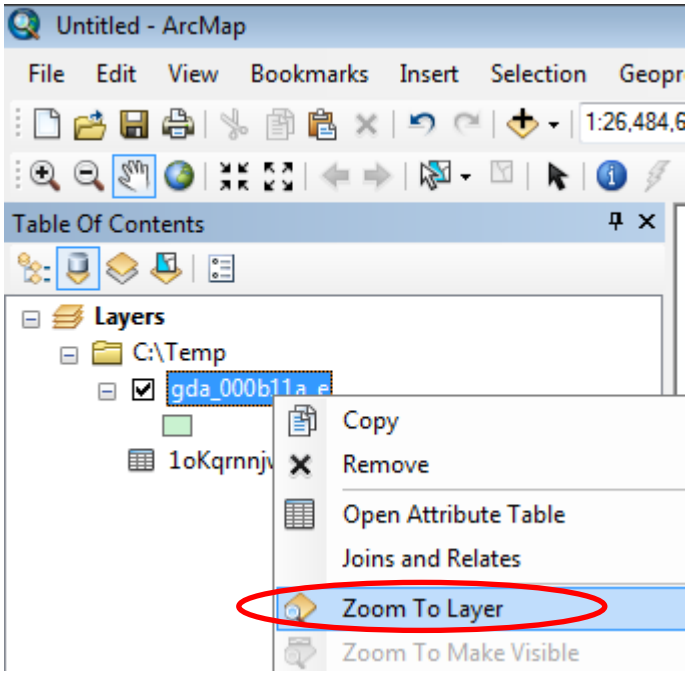
Data Library Guide: Census Mapping (CSDs by DA using CHASS)

22. (1) In Step 1, pick the column name we want to match in the boundary file, **DAUID**. Step 2 should be automatically filled in. (2) In Step 3, pick the column name we want to match in the DBF file, **COL0** (if it has not been filled in automatically), (3) and select **Keep only matching records** (so that we only display areas with data on our map), (4) and then finally click on **OK**.



Data Library Guide: Census Mapping (CSDs by DA using CHASS)

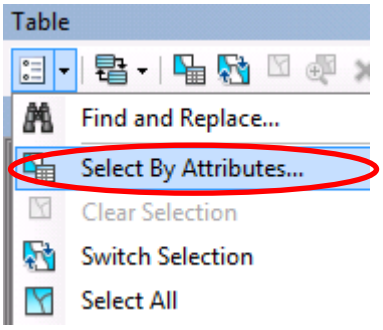
23. Let's take a look at what we have now. Right click again on **gda_000b11a_e**, and this time select **Zoom To Layer**. Your map should now just show you the Fraser-Fort George Region. (Note: if you now went back in and opened the attribute table of the boundary dataset, you would notice that your columns of census data have now been appended (i.e., joined) to the end of the table. We've consolidated the data all in one place.



Data Library Guide: Census Mapping (CSDs by DA using CHASS)

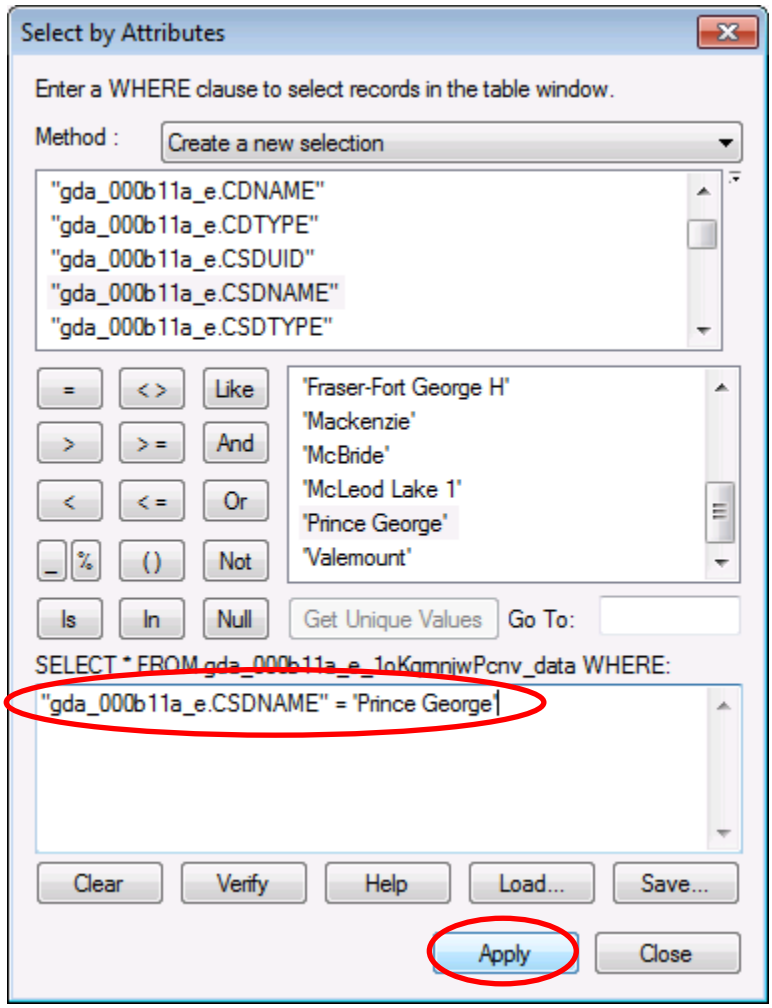
D. Extract only the Prince George dissemination areas

24. Open up the attribute table again, as we did back in Step 19, by right clicking on **gda_000b11a_e**, and selecting Open Attribute Table.
25. Click the drop-down arrow in the top left corner, and then click on **Select By Attributes…**



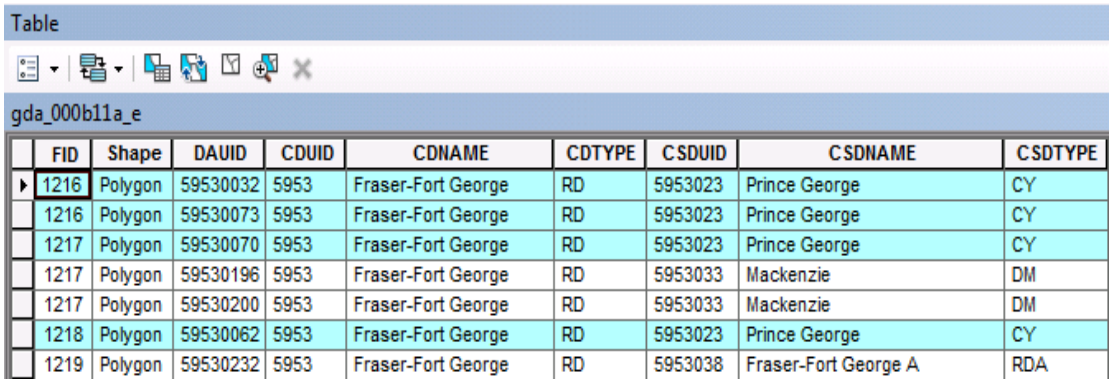
Data Library Guide: Census Mapping (CSDs by DA using CHASS)

26. Type in ***"gda_000b11a_e.CSDNAME"= 'Prince George'*** in the bottom box and then click on **Apply**. This is going to select all the rows in this table where the CSDNAME column has "Prince George" in it. (*Note: Alternatively, as a short cut, you can find the column name CSDNAME in the top list and double click on it to populate the box. You can also use the Get Unique Values button to get a list of options and again double click on the one you want to populate the box. But don't forget to include an equals sign between them.)*



Data Library Guide: Census Mapping (CSDs by DA using CHASS)

27. Only the Prince George entries should be highlighted. Close the table.

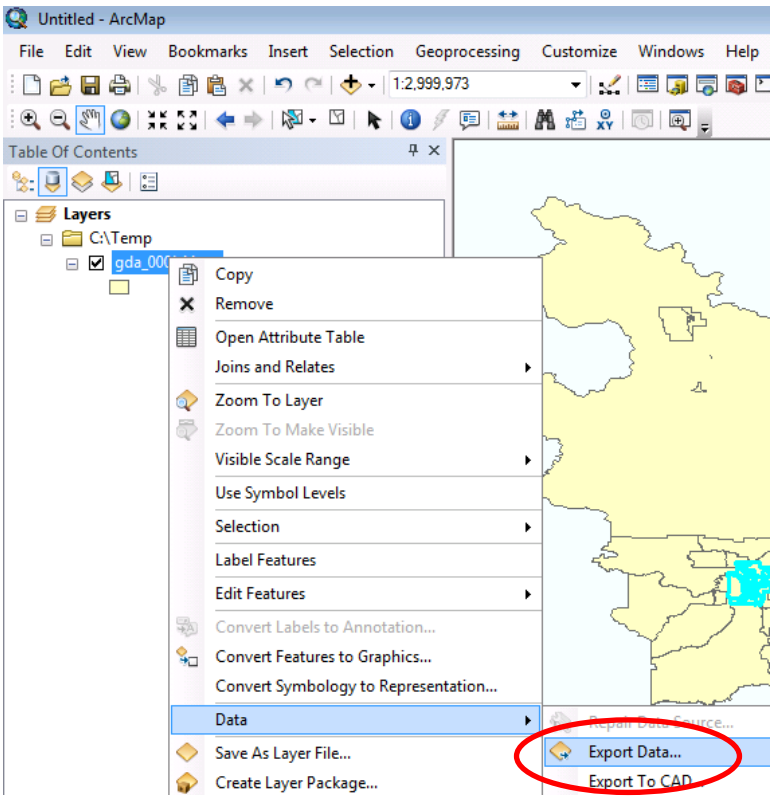


Table

gda_000b11a_e

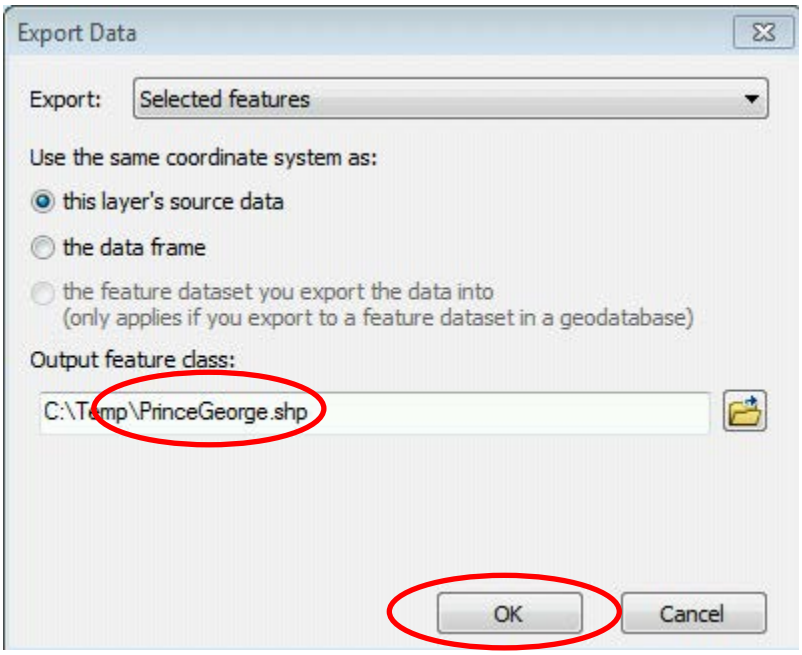
FID	Shape	DAUID	CDUID	CDNAME	CDTYPE	CSDUID	CSDNAME	CSDTYPE
1216	Polygon	59530032	5953	Fraser-Fort George	RD	5953023	Prince George	CY
1216	Polygon	59530073	5953	Fraser-Fort George	RD	5953023	Prince George	CY
1217	Polygon	59530070	5953	Fraser-Fort George	RD	5953023	Prince George	CY
1217	Polygon	59530196	5953	Fraser-Fort George	RD	5953033	Mackenzie	DM
1217	Polygon	59530200	5953	Fraser-Fort George	RD	5953033	Mackenzie	DM
1218	Polygon	59530062	5953	Fraser-Fort George	RD	5953023	Prince George	CY
1219	Polygon	59530232	5953	Fraser-Fort George	RD	5953038	Fraser-Fort George A	RDA

28. Right click on **gda_000b11a_e** again, and this time select **Data**, and then **Export Data…**

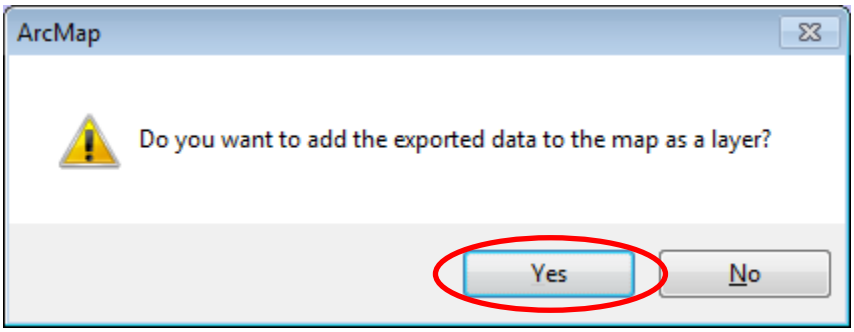


Data Library Guide: Census Mapping (CSDs by DA using CHASS)

29. Make sure you are only exporting the selected feature, and then give your exported shapefile an appropriate name, such as "PrinceGeorge.shp". Then click on **OK**.

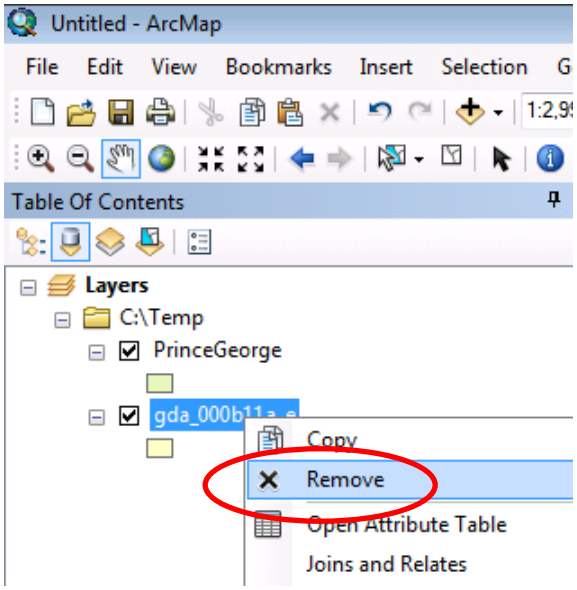


30. When asked if you want to add the exported layer to the map, say **Yes**.

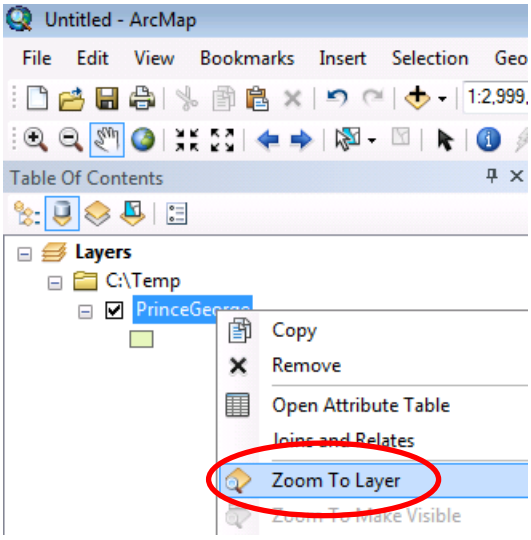


Data Library Guide: Census Mapping (CSDs by DA using CHASS)

31. Now, we no longer need the larger boundary file, so we can also remove that from our map. Right click on **gda_000b11a_e** again, and this time select **Remove.**



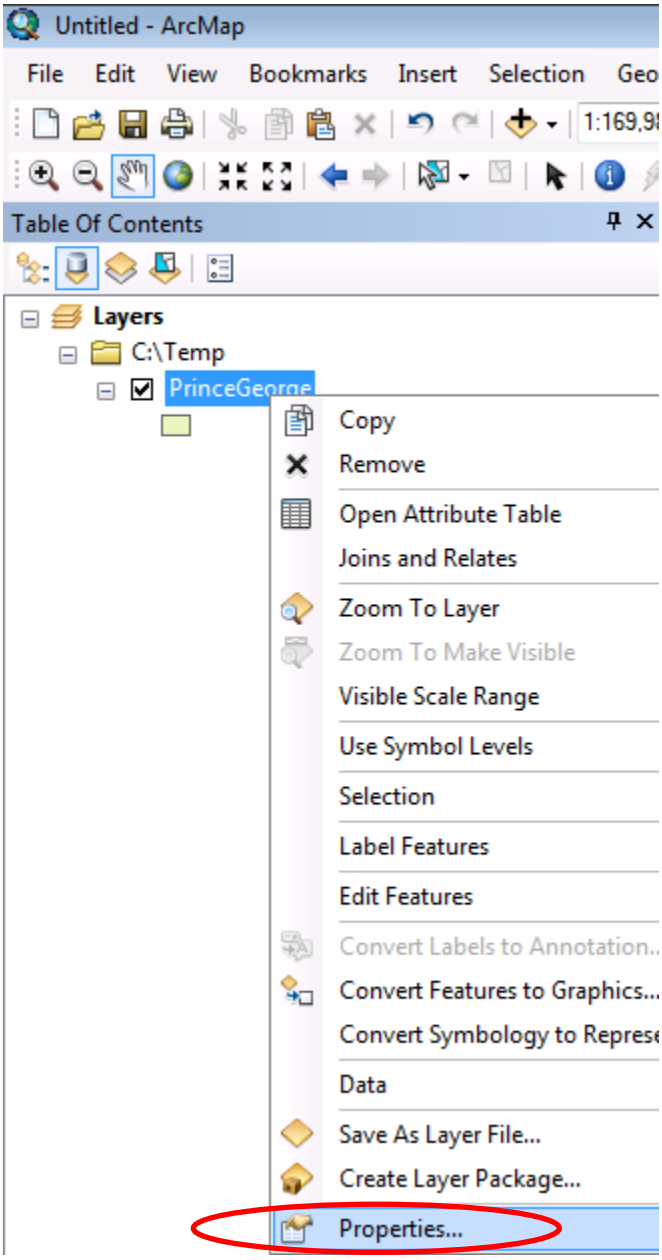
32. We now have the shapefile that contains the boundary of just Prince George. Right click on PrinceGeorge and select **Zoom to Layer** to zoom in, as we did in Step 23.



Data Library Guide: Census Mapping (CSDs by DA using CHASS)

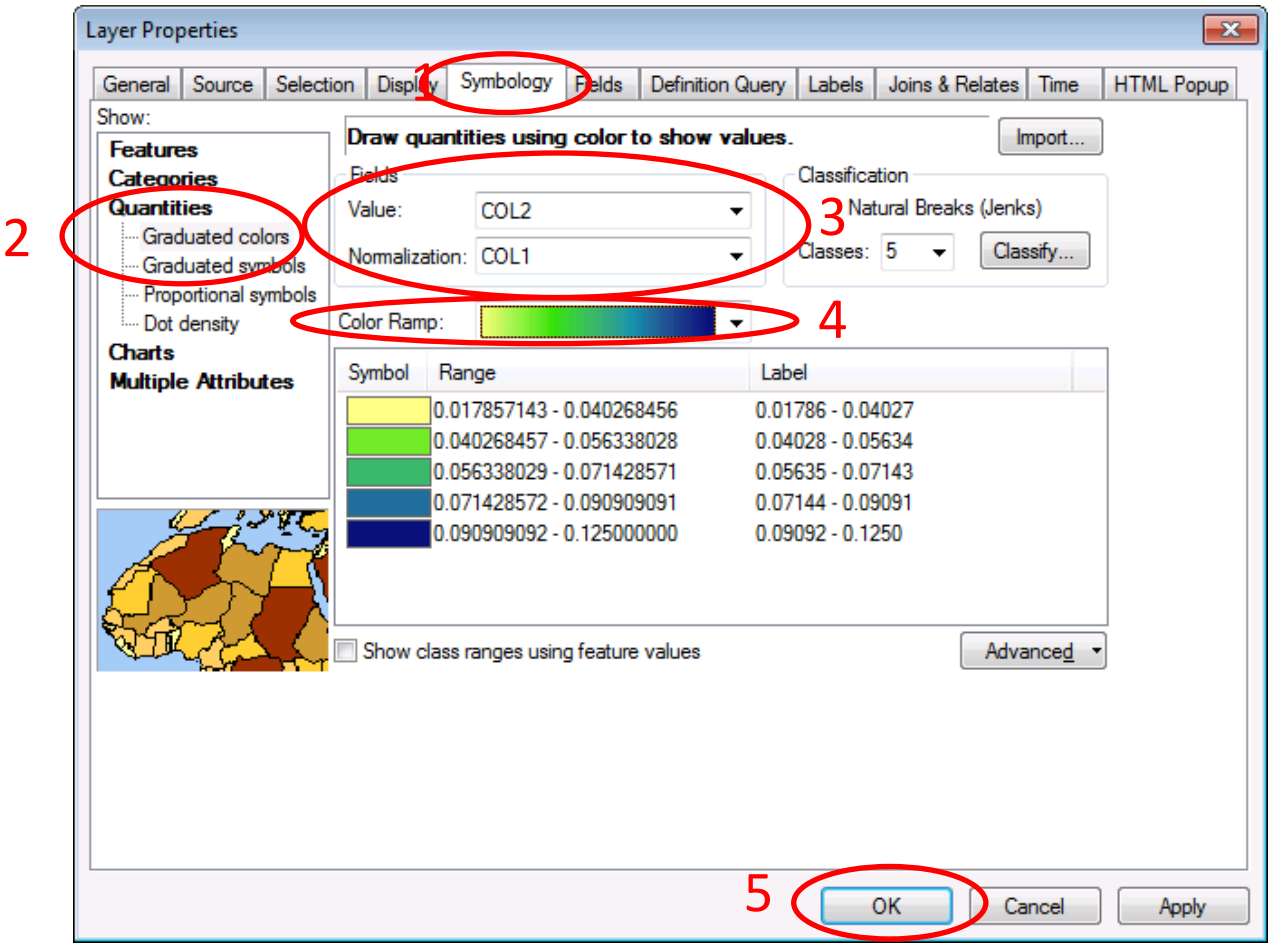
E. Colour code the data to create a thematic map

33. Right click on **PrinceGeorge** and select **Properties…**



Data Library Guide: Census Mapping (CSDs by DA using CHASS)

34. (1) Select the **Symbology** tab. (2) Click on **Quantities** and then click on **Graduated colors**. If you recall when we downloaded the DBF file, there was an associated text file telling us which column was which. In my example here, COL2 was the number of children, 0-4 years of age, and COL1 was the total population. Let's divide the number of children by the total to get the percentage of children living in each area (Note: Even if you follow these exact steps, the column headings are not always the same, so always check the text file to confirm). (3) Under Fields, for Value select **COL2,** and for Normalization select **COL1**. (4) Select a colour ramp. (5) Finally, click on **OK**.



Data Library Guide: Census Mapping (CSDs by DA using CHASS)

35. You should now see a thematic map of Prince George displaying colours representing a percentage of small children living in various dissemination areas based on 2011 Census Data. Visualizing data through GIS can help you see spatial patterns not obvious by viewing the data in a table.