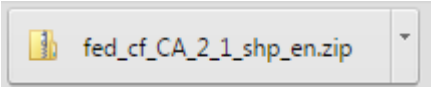
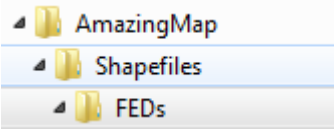
## 1. Download Federal Electoral Districts and add to map document

Federal Electoral Districts (FEDs) are the geographic areas for which one Member of Parliament is elected. It is downloaded as a shapefile which can then be viewed in QGIS.

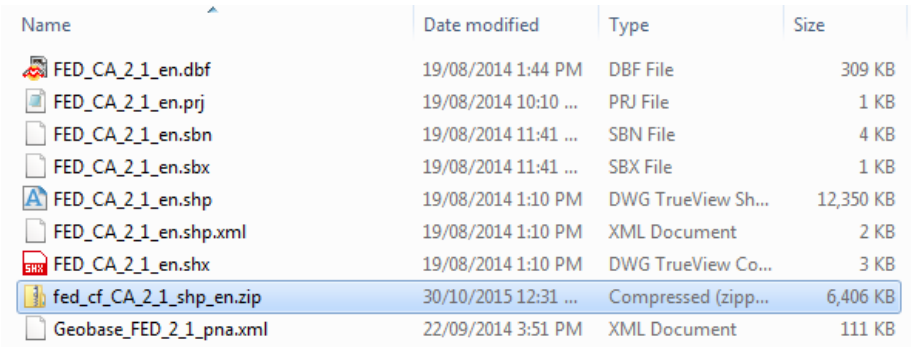
1) In an internet browser, go to geogratis.gc.ca.
2) After you've selected English, click ***GeoGratis Catalogue***
3) Type **federal electoral districts** in the search box and click Search
4) Click on **GeoBase – Federal Electoral Districts** and then on ***Federal Electoral Districts – Canada 2013***
5) Scroll down and click on the SHP button underneath ***Download English file in SHAPE through HTTP***
6) Wait a moment for it to download. Spend that time trying to make sense of the gobbledygook name. Or not. We don't care.




7) Once it has downloaded, copy the ZIP folder into the project folder for today's class. We suggest a hierarchy like this, but we're particular about this stuff:



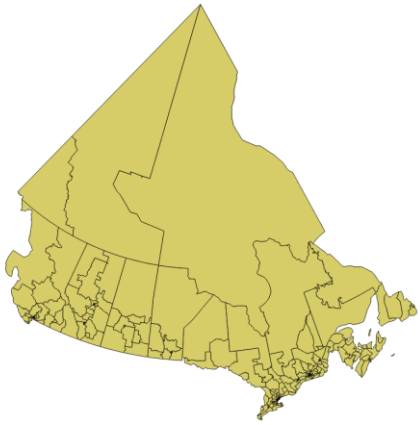

8) Unzip the file. If you don't, you may get an error when you try to import it into QGIS.
9) Once unzipped, your folder should look something like this:



| Name | Date modified | Type | Size |
|---|---|---|---|
| FED_CA_2_1_en.dbf | 19/08/2014 1:44 PM | DBF File | 309 KB |
| FED_CA_2_1_en.prj | 19/08/2014 10:10 ... | PRJ File | 1 KB |
| FED_CA_2_1_en.sbn | 19/08/2014 11:41 ... | SBN File | 4 KB |
| FED_CA_2_1_en.sbx | 19/08/2014 11:41 ... | SBX File | 1 KB |
| FED_CA_2_1_en.shp | 19/08/2014 1:10 PM | DWG TrueView Sh... | 12,350 KB |
| FED_CA_2_1_en.shp.xml | 19/08/2014 1:10 PM | XML Document | 2 KB |
| FED_CA_2_1_en.shx | 19/08/2014 1:10 PM | DWG TrueView Co... | 3 KB |
| fed_cf_CA_2_1_shp_en.zip | 30/10/2015 12:31 ... | Compressed (zipp... | 6,406 KB |
| Geobase_FED_2_1_pna.xml | 22/09/2014 3:51 PM | XML Document | 111 KB |

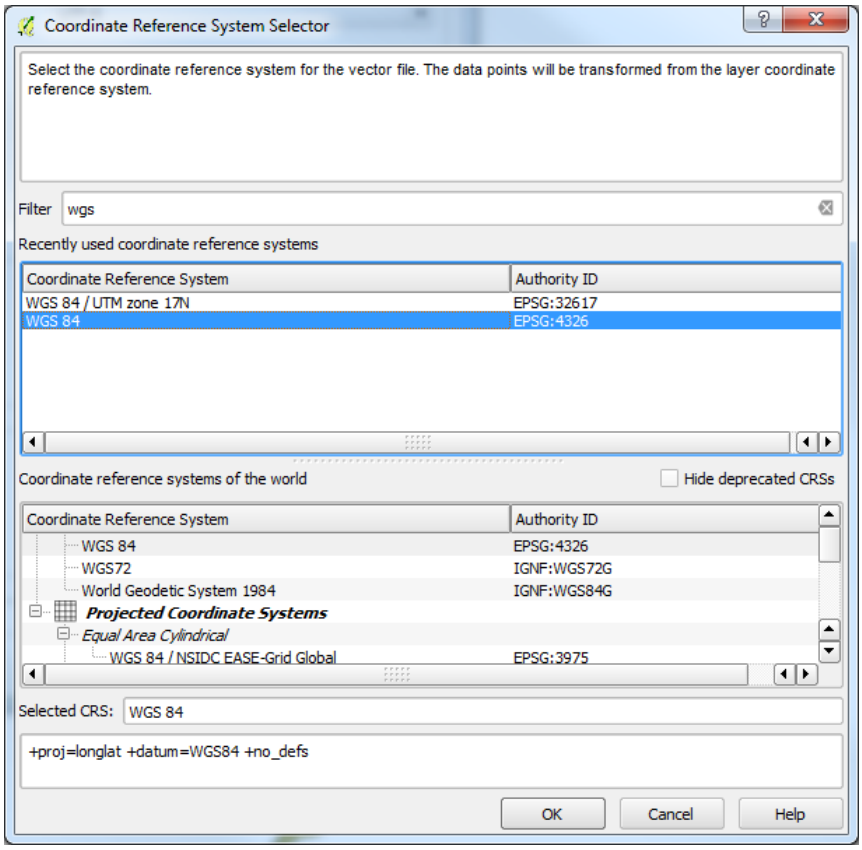
This is as good a time as any to note that shapefiles look like multiple different files when you view them in Windows Explorer. If you ever copy and paste them somewhere, you need to have all the parts (e.g.: all the files that have the same name before the file extension – there may be up to 8 of them).

10) You're done the download! Yay! Give yourself a pat on the back!
11) Open QGIS. Once QGIS opens, add the dataset by clicking on ***Layer > Add Layer > Add Vector Layer…*** Browse to the project's folder and find the shapefile. Click on the .shp and click ***Ok*** to add the shapefile to QGIS.
    a. You could also have the project folder open in Windows Explorer and just drag and drop the file in. Either way works!



12) Click ***View >Panels*** and make sure ***Browser*** and ***Layers*** are both selected.
13) In the Layers panel, right click on the FED layer and click ***Properties***. In the General tab you'll notice that the shapefile has a coordinate system of ***NAD83 / Statistics Canada Lambert***. Click ***Ok*** to close the dialog box.


14) Because the next step involves displaying latitude and longitude points in a specific projection (WGS 84), we need to save the FEDs in that projection as well. Right click and select **Save As…**
15) In the **Save vector layer as…** dialog box:
    a. Make sure the format is **ESRI Shapefile**
    b. Browse to your project folder and save as **FEDs_WGS84**
    c. Click the **Selected** CRS button  located after the CRS dropdown menu.
    d. In Filter textbox, type **WGS**. Select **WGS84 / EPSG:4326** from the results below. Click OK.




e. Make sure **Add saved file to map** is clicked. Click OK.

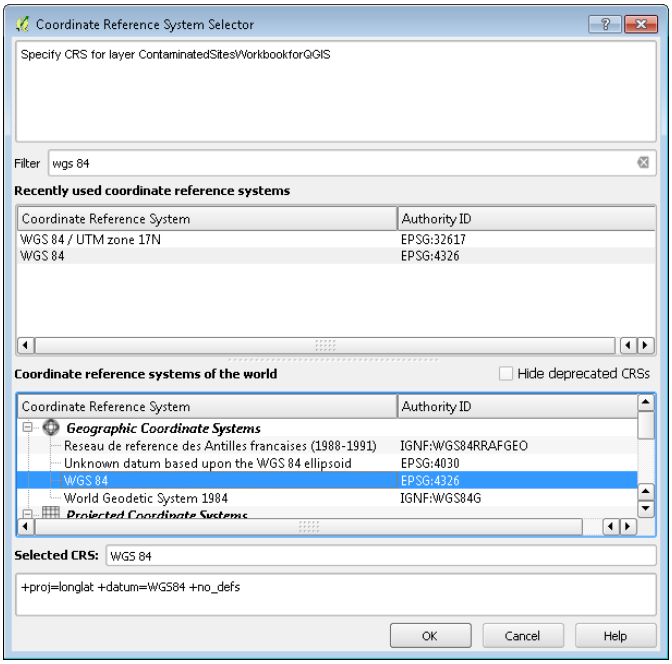
16) Right-click on FED_CA_2_1_en in the Layers panel and select **Remove**.

## 2. Add and Display Federal Contaminated Sites

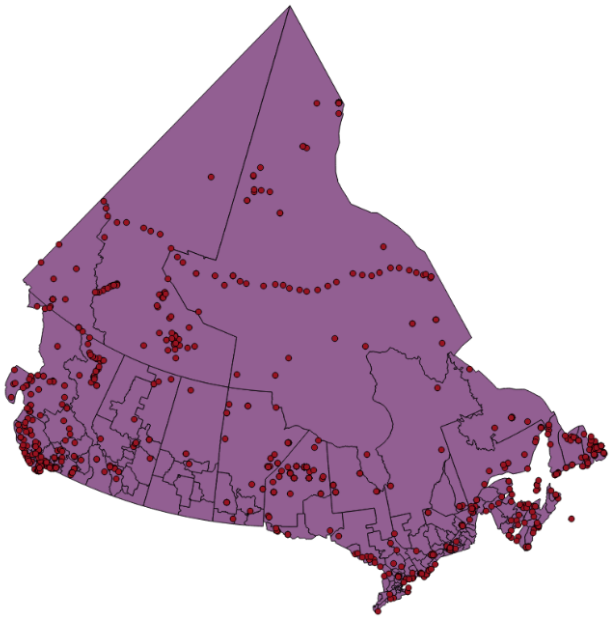
The Federal Contaminated Sites was downloaded as an Excel file and converted to CSV. Included in the data of this CSV file are rows for latitude and longitude, which we'll use to display in QGIS. If you don't have this file, go to http://madgic.library.carleton.ca/deposit/GIS/temp/2016/ and download it.

1) Go to ***View > Toolbars*** and make sure that the **Manage Layers** toolbar is selected.
2) Click the ***Add Delimited Text Layer*** button. 
3) A dialogue box will pop up. Fill it in accordingly:
    a. Browse to the **ContaminatedSitesWorkbookforQGIS.csv** file in your project folder
    b. Make sure **CSV** is selected as the file format
    c. Geometry definition is **Point coordinates** with X field as Longitude and Y field as Latitude
        i. If you get an error message about six missing records, close the dialog box and keep going.

4) Click ***OK***. In the following Coordinate Reference System Selector dialog box, type “wgs 84” in the filter text box and select **WGS 84 / EPSG:4326** from under **Geographic Coordinate Systems**.



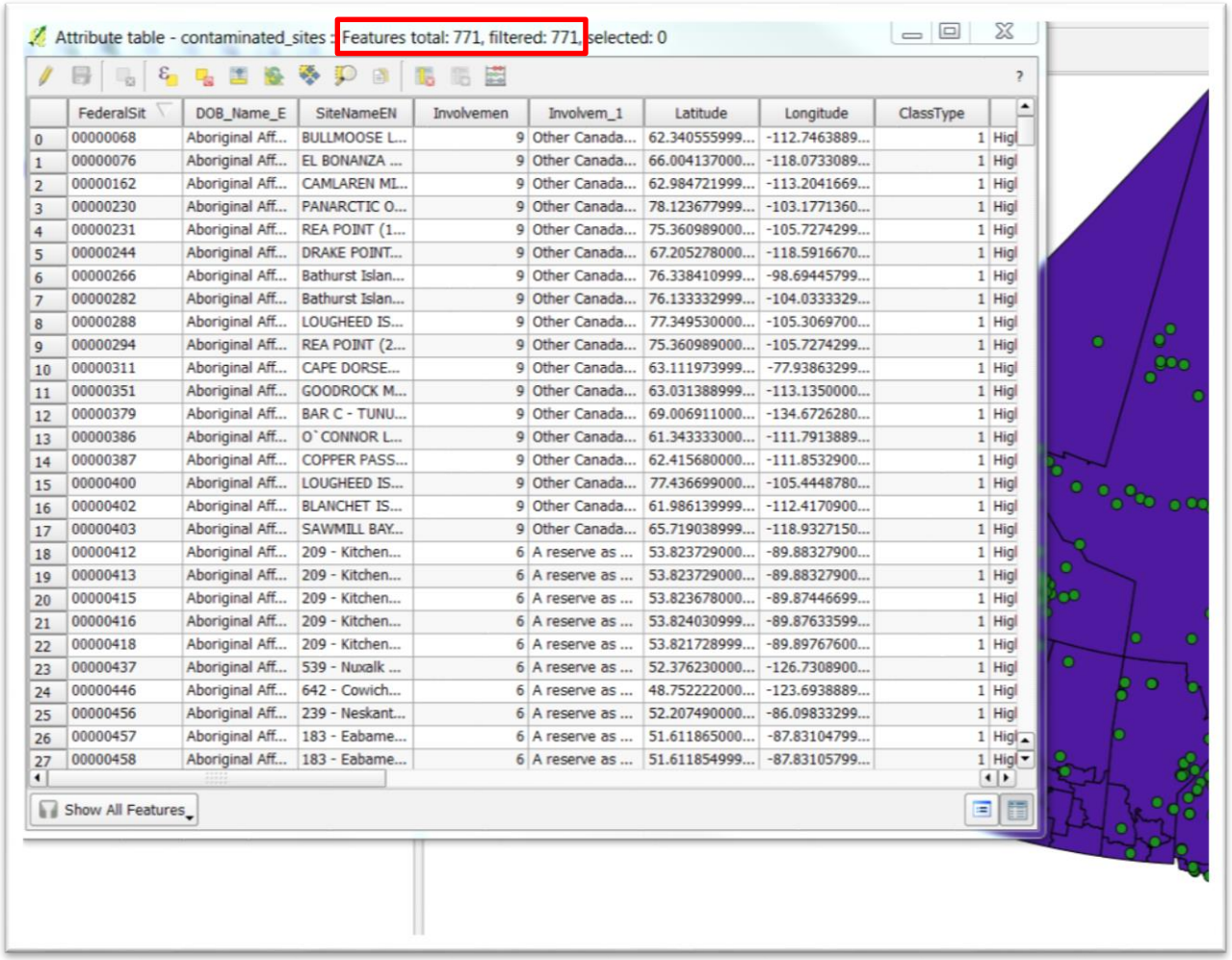

5) Click ***OK*.** This will display the longitude and latitude of each contaminated sites record for Canada. Hooray!
6) We need to save the file as a shapefile in order to keep the display and not have to do it each time. In the Layers panel, right click on **ContaminatedSitesWorkbookforQGIS > Save As…**
    a. Format: ESRI Shapefile
    b. Browse to your AmazingMap > Shapefile folder and name it **contaminated_sites.shp**.
    c. Ensure CRS is **EPSG:4326, WGS 84**
    d. Make sure **Add saved file to map** is selected
    e. Click OK
7) You should now have 3 layers in QGIS. Right click on **ContaminatedSitesWorkbookforQGIS** and select Remove.
8) The 2 layers now in the QGIS Layer panel should be ***contaminated_sites.shp***, which is on top of the ***federal electoral district*** boundary.



## 3. Querying and Extracting

When confronted with a large dataset you may want to use the querying capabilities of QGIS to extract one or more subsets.

1) Right click on the ***contaminated_sites.shp*** and select ***Open Attribute Table***.
2) You will note that there are 771 features in the dataset.



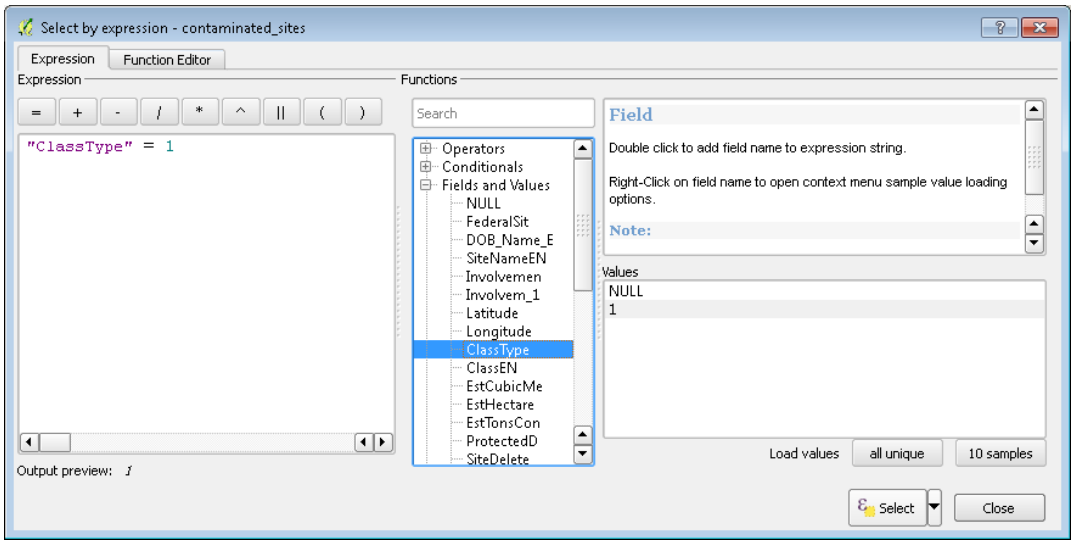

| | FederalSit | DOB_Name_E | SiteNameEN | Involvemen | Involvem_1 | Latitude | Longitude | ClassType | |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 00000068 | Aboriginal Aff... | BULLMOOSE L... | 9 | Other Canada... | 62.340555999... | -112.7463889... | 1 | Higl |
| 1 | 00000076 | Aboriginal Aff... | EL BONANZA ... | 9 | Other Canada... | 66.004137000... | -118.0733089... | 1 | Higl |
| 2 | 00000162 | Aboriginal Aff... | CAMLAREN MI... | 9 | Other Canada... | 62.984721999... | -113.2041669... | 1 | Higl |
| 3 | 00000230 | Aboriginal Aff... | PANARCTIC O... | 9 | Other Canada... | 78.123677999... | -103.1771360... | 1 | Higl |
| 4 | 00000231 | Aboriginal Aff... | REA POINT (1... | 9 | Other Canada... | 75.360989000... | -105.7274299... | 1 | Higl |
| 5 | 00000244 | Aboriginal Aff... | DRAKE POINT... | 9 | Other Canada... | 67.205278000... | -118.5916670... | 1 | Higl |
| 6 | 00000266 | Aboriginal Aff... | Bathurst Islan... | 9 | Other Canada... | 76.338410999... | -98.69445799... | 1 | Higl |
| 7 | 00000282 | Aboriginal Aff... | Bathurst Islan... | 9 | Other Canada... | 76.133332999... | -104.0333329... | 1 | Higl |
| 8 | 00000288 | Aboriginal Aff... | LOUGHEED IS... | 9 | Other Canada... | 77.349530000... | -105.3069700... | 1 | Higl |
| 9 | 00000294 | Aboriginal Aff... | REA POINT (2... | 9 | Other Canada... | 75.360989000... | -105.7274299... | 1 | Higl |
| 10 | 00000311 | Aboriginal Aff... | CAPE DORSE... | 9 | Other Canada... | 63.111973999... | -77.93863299... | 1 | Higl |
| 11 | 00000351 | Aboriginal Aff... | GOODROCK M... | 9 | Other Canada... | 63.031388999... | -113.1350000... | 1 | Higl |
| 12 | 00000379 | Aboriginal Aff... | BAR C - TUNU... | 9 | Other Canada... | 69.006911000... | -134.6726280... | 1 | Higl |
| 13 | 00000386 | Aboriginal Aff... | O`CONNOR L... | 9 | Other Canada... | 61.343333000... | -111.7913889... | 1 | Higl |
| 14 | 00000387 | Aboriginal Aff... | COPPER PASS... | 9 | Other Canada... | 62.415680000... | -111.8532900... | 1 | Higl |
| 15 | 00000400 | Aboriginal Aff... | LOUGHEED IS... | 9 | Other Canada... | 77.436699000... | -105.4448780... | 1 | Higl |
| 16 | 00000402 | Aboriginal Aff... | BLANCHET IS... | 9 | Other Canada... | 61.986139999... | -112.4170900... | 1 | Higl |
| 17 | 00000403 | Aboriginal Aff... | SAWMILL BAY... | 9 | Other Canada... | 65.719038999... | -118.9327150... | 1 | Higl |
| 18 | 00000412 | Aboriginal Aff... | 209 - Kitchen... | 6 | A reserve as ... | 53.823729000... | -89.88327900... | 1 | Higl |
| 19 | 00000413 | Aboriginal Aff... | 209 - Kitchen... | 6 | A reserve as ... | 53.823729000... | -89.88327900... | 1 | Higl |
| 20 | 00000415 | Aboriginal Aff... | 209 - Kitchen... | 6 | A reserve as ... | 53.823678000... | -89.87446699... | 1 | Higl |
| 21 | 00000416 | Aboriginal Aff... | 209 - Kitchen... | 6 | A reserve as ... | 53.824030999... | -89.87633599... | 1 | Higl |
| 22 | 00000418 | Aboriginal Aff... | 209 - Kitchen... | 6 | A reserve as ... | 53.821728999... | -89.89767600... | 1 | Higl |
| 23 | 00000437 | Aboriginal Aff... | 539 - Nuxalk ... | 6 | A reserve as ... | 52.376230000... | -126.7308900... | 1 | Higl |
| 24 | 00000446 | Aboriginal Aff... | 642 - Cowich... | 6 | A reserve as ... | 48.752222000... | -123.6938889... | 1 | Higl |
| 25 | 00000456 | Aboriginal Aff... | 239 - Neskant... | 6 | A reserve as ... | 52.207490000... | -86.09833299... | 1 | Higl |
| 26 | 00000457 | Aboriginal Aff... | 183 - Eabame... | 6 | A reserve as ... | 51.611865000... | -87.83104799... | 1 | Higl |
| 27 | 00000458 | Aboriginal Aff... | 183 - Eabame... | 6 | A reserve as ... | 51.611854999... | -87.83105799... | 1 | Higl |

In order to query the data, click on the ***Select features using an expression*** button  on the attribute table toolbar.

3) The ***Select by expression*** dialog box will appear. It allows you to create a query statement that will select features that conform to the parameters you set. In this example, we will search for only ***high priority for Action*** sites, which have a value of 1 in the **ClassType** field.
    a. Start off by making the ***Select by expression*** dialog box wider. It will make sense shortly.
    b. In the middle window, **click the + sign** beside **Fields and Values** to see all the fields in the attribute table.
    c. Double-click **ClassType**. It will show up in the Expression window.
    d. Above the Expression window, **click the = button** so it shows up after ClassType.

e. On the right, beside ***Load values*** click the ***all unique*** button. The result will be NULL and 1. **Double-click 1**.

f. Your Select by expression dialog box should now look like this:




g. Click the **Select** button. Note that many contaminated sites points are now yellow.

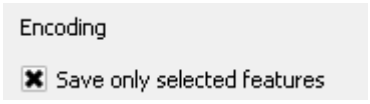
h. Click **Close**.

i. Close the attribute table as well.

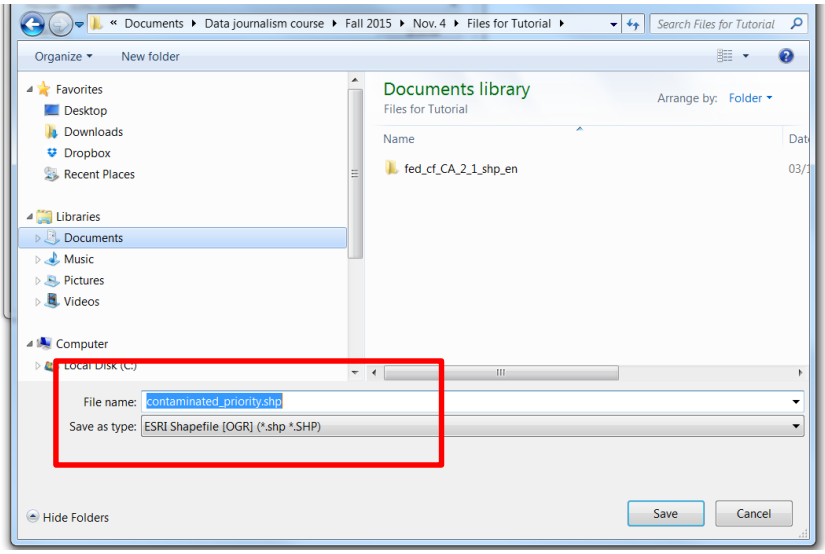
4) The selected features are only temporary and we want to deal ONLY with the high priority sites, so we'll export the currently-selected sites to a new shapefile.

a. Right-click on ***contaminated_sites*** and select **Save As…** from the menu

b. **Before you do anything else**, select the ***Save only selected features*** option




c. Browse to where you would like to save your file. We recommend naming it something helpful, such as ***contaminated_priority.shp***. Ensure that you save as type **ESRI Shapefile**

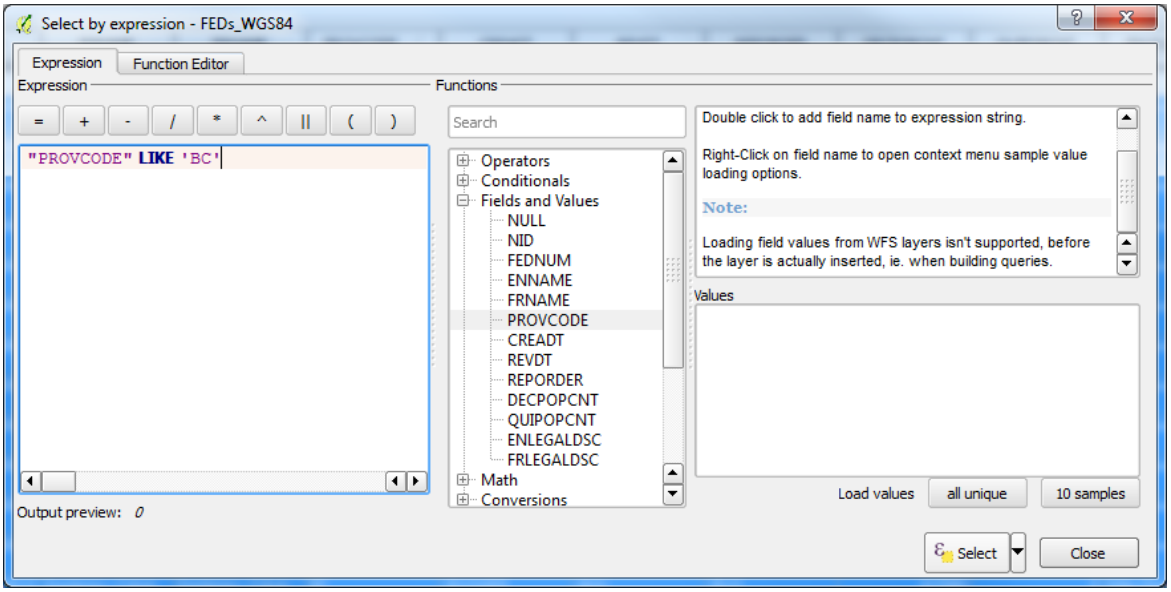


d. Click ***Save*** and then ***OK in the "Save vector layer as" dialog box***.
e. Wait a moment for it to export and add the file.
f. Click on the checkbox beside ***contaminated_sites*** to turn it off and view only your new layer.

## 5. Extracting British Columbia FEDs

Selecting features from a shapefile allows users to identify or more easily locate a subset of features on your map. You'll most likely work with selected features when you are querying, exploring, analyzing, or editing data. Applying a selection is also a way of specifying the features for which you want to calculate statistics, view attributes, move, export as a new layer, and so on.

1) Right-click on ***FEDs_WGS*** and select ***Open Attribute Table***
2) Click on the ***Select features using an express*** button  on the attribute table toolbar.
3) Like with the querying we did a moment ago, we will construct an expression to select only FEDs in British Columbia. In this case, the expression is **"PROVCODE" LIKE 'BC'**. (NOTE: You'll recognize this statement from your MySQL work)

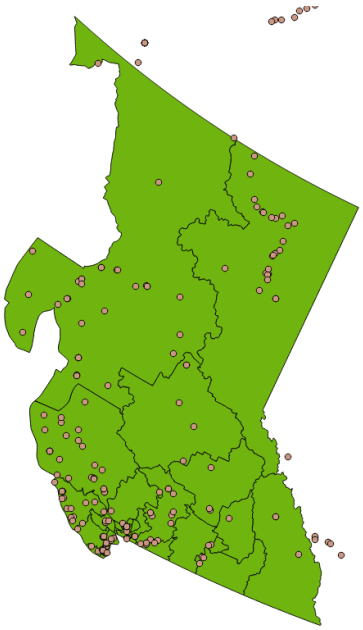



4) Click ***Select***. You should now have 43 of 347 selected in the attribute table.
5) Close the ***Select by expression*** window.
6) Click the **Toggle editing mode** button  . Close the attribute table.
7) We're now going to export ONLY the selected British Columbia FEDs. To do this, right click ***FEDs_WGS84*** and select ***Save As…***
8) In the dialog box, make sure that it says ***Save only selected features***.
9) Browse to your project folder and save the file. We saved it as ***FEDs_BC.shp***.
10) Unclick ***FEDs_WGS84*** and your map should have just BC and all the priority contaminated sites.

## 6. Calculate how many points are found in a polygon

Sometimes it is helpful to know how many instances of something (like priority contaminated sites) occur within a particular area (like FEDs in British Columbia).

1) Right click on the ***FEDs_BC*** and select ***Zoom to Layer*** to view it at its extents. It should look something like this with the ***contaminated_priority*** layer turned on as well.



2) We first need to delete all extraneous fields in ***contaminated_sites*** because QGIS is finicky about it (a.k.a. it refuses to join layers with null values). To do that, right click and select ***Open Attribute table***.

    a. In the attribute table, click the **Toggle editing mode** button 

    b. Then click the **Delete column** button. 

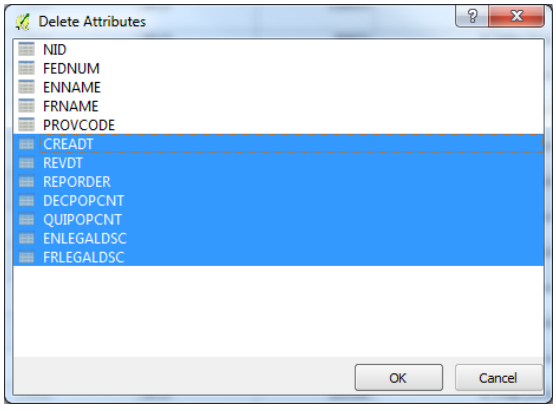
    c. In the **Delete Attributes** dialog box, scroll down then click and select everything from Involvem_1 to MediumName.

    d. Click **OK**.

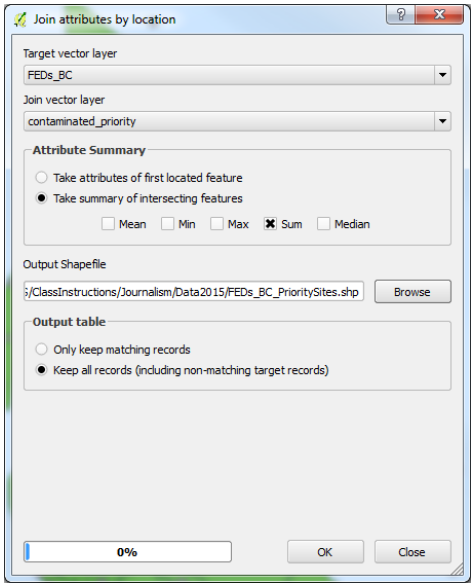
    e. Click the **Toggle editing mode** button again and save the changes when prompted.

    f. Close the attribute table.

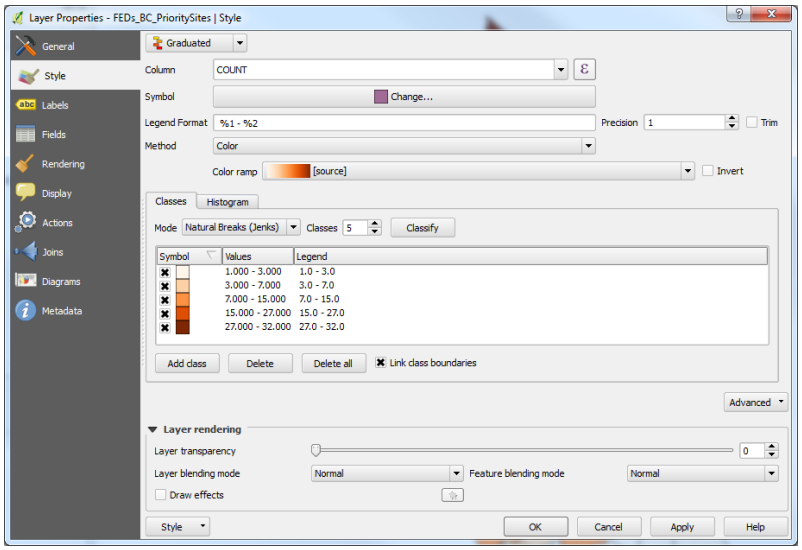
3) We need to do the same thing for ***FEDs_BC***. Repeat the steps above but select all the fields after PROVCODE, as shown:



4) In order to find out how many high priority contaminated sites are in each BC FED, we will perform a spatial join. In the menu bar, click ***Vector > Data Mangement Tools > Join attributes by location***.

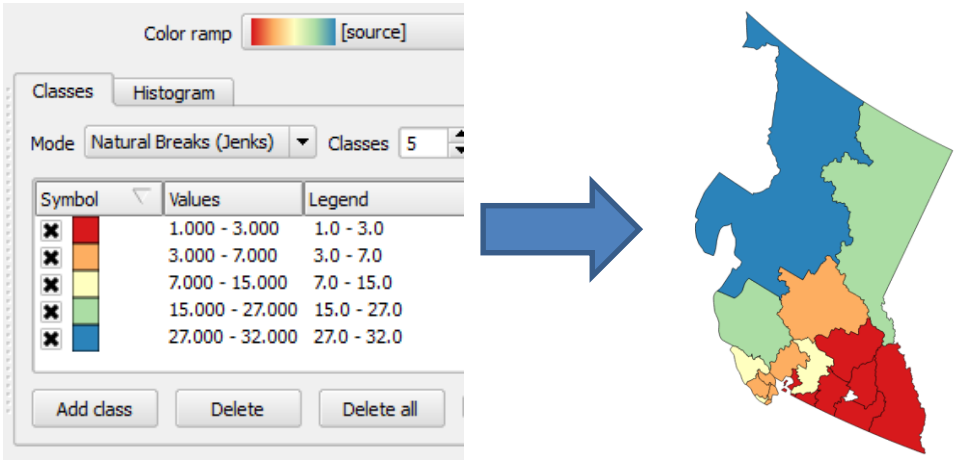



5) Fill out the Join attributes by location dialog box as seen here:
    a. Target vector layer: ***FEDs_BC***
    b. Join vector layer: ***contaminated_priority***
    c. Summarize by **Sum** (this will provide a total number of contaminated sit
    d. Browse to the location you wish to save your resulting shapefile, and name it something helpful like ***FEDs_BC_PrioritySites***.
    e. **Keep all records**.
6) Click ***OK***, and then close the ***Join attributes by location dialog box***
7) ***FED_PrioritySites*** will be added to your map. Right-click and **Open Attribute Table**.
8) Note the **COUNT** field. This gives a total of priority contaminated sites within each electoral district.
9) Double-click on the **COUNT** field name to sort it numerically (ascending). Double-click it again to sort descending.
10) To symbolize the ***FEDs_BC_PrioritySites*** shapefile based on the COUNT field, close the table and in the table of contents right-click ***FEDs_BC_PrioritySites*** and select **Properties.**
11) Click the **Style** tab in the Layer Properties dialog box.
12) Click **Graduated** in the drop-down box at the top
13) Fill it in as seen below (details on next page):

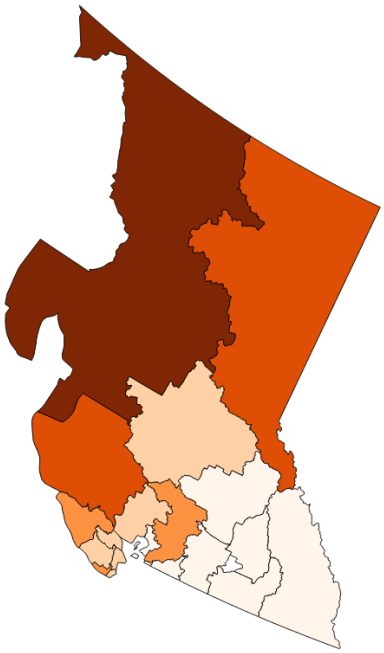



(NOTE: depending on your version of QGIS, your dialog box may look slightly different.)

a. Column should be ***COUNT***
b. Under the **Classes** tab, Mode should be **Natural Breaks (Jenks)** with 5 classes
    i. You can play around with this if you'd like
c. Pick your favourite colour ramp. As you are showing density, go with something that's the same hue but with varying intensity. If you go with a many-coloured ramp your map becomes meaningless, like so:




14) Your on-screen map should now look something like this, with the darker hues showing us which FEDs have the most contaminated sites.

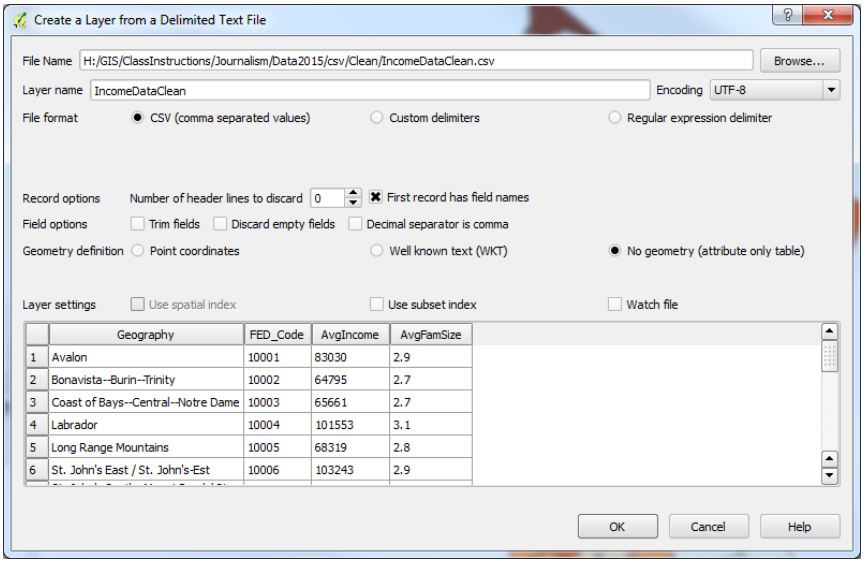


13) Let's not spend too much time here as sections 7 & 8 focus on creating our map layout and making sure that our map looks just right!

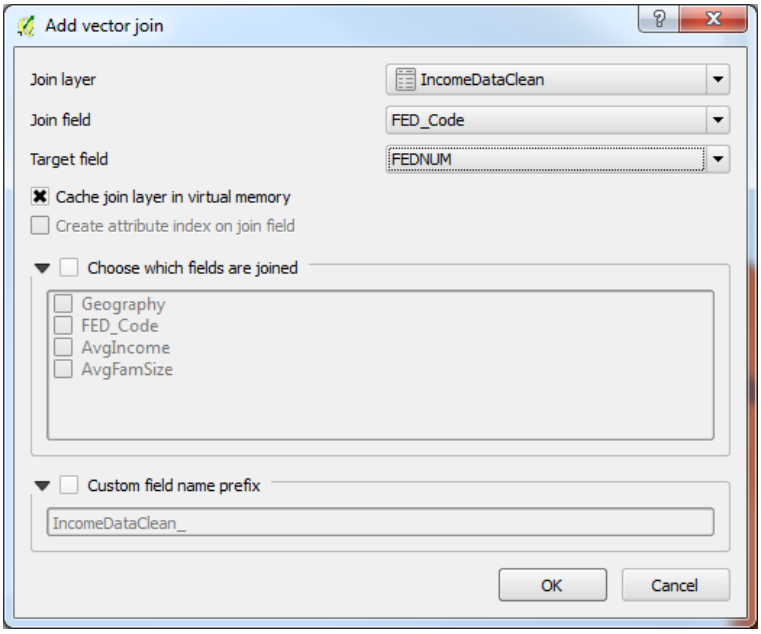
## 7. Downloading and Joining Census Data

We now want to look at the census data for the FEDs in British Columbia to perhaps find a pattern. The Census includes information about population & language while the National Household Survey (NHS) includes data about income, immigration, workplace, and more.

1) Go to www.Statcan.gc.ca
2) For Census Profile, go to **Browse by key resource** > **Census Profile**
3) For NHS, scroll to the bottom right, under the section **Other Links**, click on **2011 National Household Survey (NHS)**
4) At the right of the screen, you'll notice a section called **Download – Complete geographic level**
    a. Select the **IVT or XML (2011)**
    b. This will download the data in beyond 20/20 format, which can viewed in the free beyond 20/20 browser (windows-based computers).
        i. Download Beyond 20/20 browser - http://www2.beyond2020.com/SC/ProBrowser.exe
        ii. How to use Beyond 20/20 - https://library.carleton.ca/help/beyond-2020-how-use-beyond-2020
5) Since we don't have beyond 20/20 here, we've exported a .csv file from Beyond 20/20 for you to use. Open the .csv file in Excel. You'll need to perform the following clean-up on the data to extract the FED codes, which we'll use to join to the boundary file.
    a. Find & Replace " (" with a comma.
    b. Find & Replace ")  " with a comma.
    c. Run the **Text to Column** and separate based on the comma. This will separate out the FED codes, which we'll use to join to the boundary file.
    d. Remove the unwanted rows and keep only the 5 digit numerical codes.
6) In QGIS, go to **Layer** > **Add Layer** > **Add Delimited Text Layer…**
7) Fill in the following information then click OK
    a. File format: **CSV**
    b. Geometry definition: **No geometry (attribute only table)**



8) Right click on the **FEDs_BC_PrioritySites** polygon file and select **Properties**.
9) From the **Properties window**, select **Joins** and click on the green + button.
10) Ensure that join of the table data to the polygon is based on a common field.

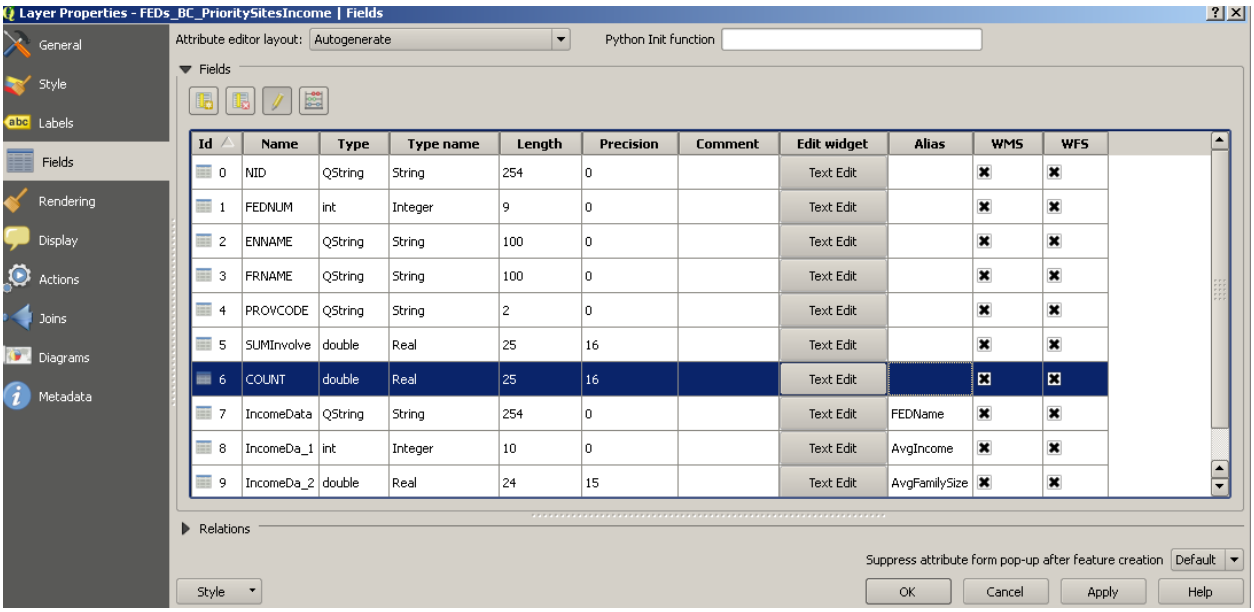



11) Click **OK**.
12) Right click on **FEDs_BC_PrioritySites** > **Save as…**Ensure that you set the **CRS** of the file as **WGS84** and save the file as **FEDs_BC_PrioritySitesIncome.** The join is now complete.
13) Open the attribute table of your newly saved file to see the NHS data.
14) Remove the **FEDs_BC_PrioritySites** from the table of contents – just so we don't get confused!

## 8. Symbology and labels

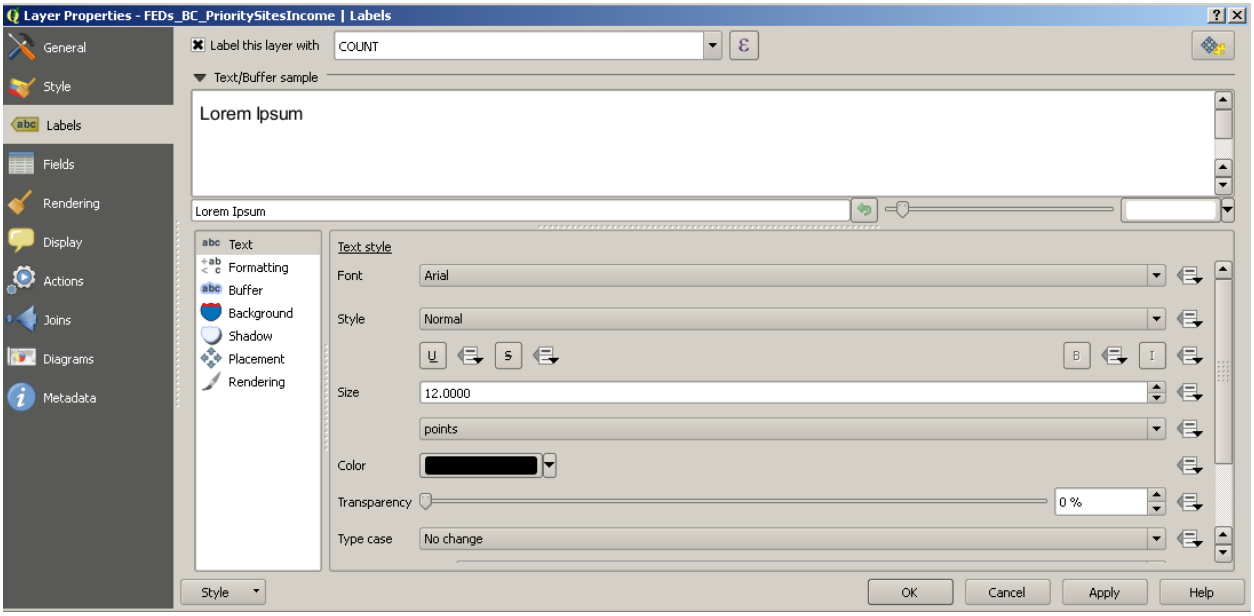
Let's take a look at how we can use symbology and labels to provide us with layers of information from the same shapefile.

1) Open the attribute table for **FEDs_BC_PrioritySitesIncome** to view the table with the NHS data joined to it. Note that the column names for the table are not helpfully named. We can change that!
2) Right click on **FEDs_BC_PrioritySitesIncome** and select ***Properties…***.
3) Click on the ***Fields*** tab
4) On the left you will see a list of all the fields. Scroll to the bottom to see IncomeData, IncomeData1, IncomeData2. On the right of the window, change the ***Alias*** to something helpful for each field. Click **Ok** when done.

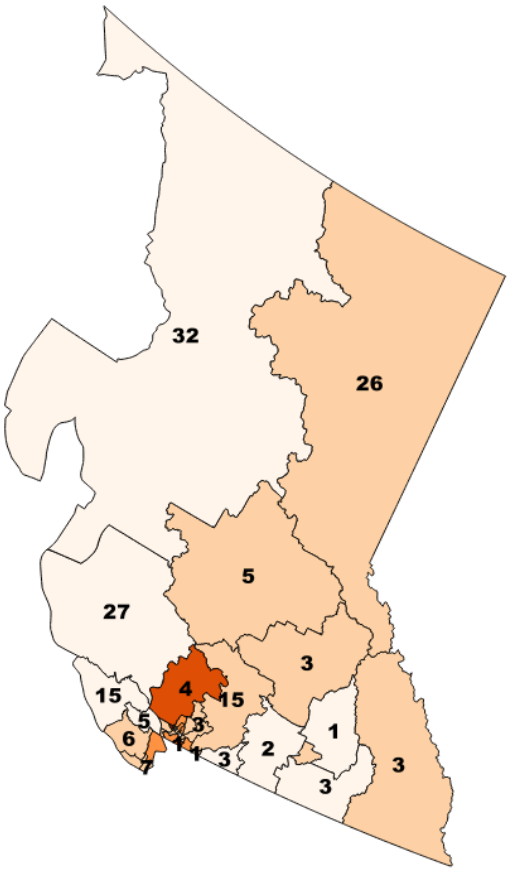



| | FEDNUM | ENNAME | FRNAME | PROVCODE | SUMInvolve | COUNT | FEDName | AvgIncome | AvgFamilySize |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 59014 | Kelowna--Lake C... | Kelowna--Lake C... | BC | NULL | NULL | Kelowna--Lake C... | 92447 | 2.900000000000... |
| 1 | 59017 | Mission--Matsqui-... | Mission--Matsqui-... | BC | 90.000000000000... | 15.000000000000... | Mission--Matsqui-... | 82764 | 3.300000000000... |
| 2 | 59020 | North Okanagan-... | North Okanagan-... | BC | 6.000000000000... | 1.000000000000... | North Okanagan-... | 75708 | 2.800000000000... |
| 3 | 59022 | Pitt Meadows--M... | Pitt Meadows--M... | BC | 18.000000000000... | 3.000000000000... | Pitt Meadows--M... | 94206 | 3.100000000000... |
| 4 | 59033 | Surrey--Newton | Surrey--Newton | BC | NULL | NULL | Surrey--Newton | 80638 | 3.900000000000... |
| 5 | 59034 | Vancouver Centre | Vancouver-Centre | BC | NULL | NULL | Vancouver Centr... | 104295 | 2.400000000000... |

5) Change the symbology of **FEDs_BC_PrioritySitesIncome** to a colour ramp based on ***Average Income***. (Refer back to page 6 if you need a quick reminder on how to do that.) Click ***Apply***.
6) Now let's label each FED with the number of high priority contaminated sites! Whee!
7) In ***Properties***, select the ***Labels*** tab.
8) Check the ***Label this layer with*** box and set the label field to ***Count***
9) Choose your label font. In the example it's Arial, size 12, bold, white.
10) Click ***OK***.



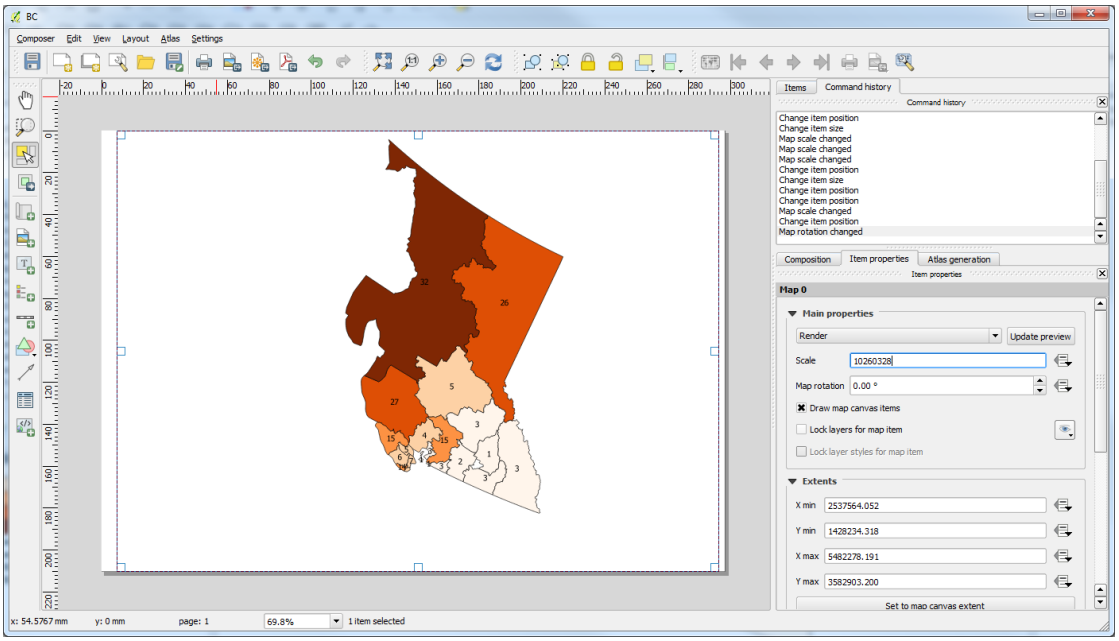
11) Your map should now look something like this:




## 9. Creating a Map Layout

To create a map layout in QGIS, you need to make a Composer. This will enable you to place and arrange map elements such scale bar, a legend, and a map title.

1) Start off by right-clicking the layer you want to create a layout for, and select **Zoom to layer**.
2) In the menu, select ***Project > New Print Composer***.
3) In the Composer title dialog box, give your new composition a name. Click **OK**.
4) A new Composer window will appear. To add your map of BC, click ***Layout > Add Map***, then draw a box that is just inside the perimeter of the page.



5) Under Extents, click the **Set to map canvas extent** button to centre the layer.
6) If BC is either too large or too small for your liking, fiddle with the **Scale** under **Item properties** on the right.
    a. A larger number will make BC smaller and a smaller number will make BC larger.
7) The QGIS composer is remarkably finicky. Maneuver (including deleting and re-adding) the map around until you're reasonably satisfied.

## Adding Other Map Elements

### Adding a Legend

1. In the menu, select ***Layout*** > ***Add Legend***.
2. Draw a box where you would like your legend to appear.
3. By default, all the layers on the map will appear as legend items in the legend.
4. To remove a legend item, you need to **uncheck the Auto update checkbox** and then manually remove the layers you don't want in your legend using the red minus button.

5. To change the name of a legend item as it shows up in the legend, click the legend item and then the **Edit** button to change its title in the legend.

6. If you would like to change the title of your legend (or prefer that it doesn't have a title at all), change it in the Title textbox under **Main properties**.
7. There are a lot of options in the Legend panel, from font selections to spacing to background colour.
8. You can click and drag the legend into place on your map.

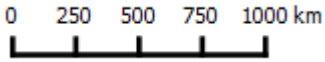
### Adding a North Arrow

1. In the menu, select ***Layout*** > ***Add Image***.

2. Draw a box where you would like to see your north arrow.
3. In the **Item properties** panel on the right, click on the **Search Directories** submenu, and under **Image search paths** find the one ending in **/arrows**.
4. Select an arrow that meets your needs. You could always design your own if you feel creative, or just go for a Star Trek vibe (never a bad idea):

**Adding a Scale Bar**

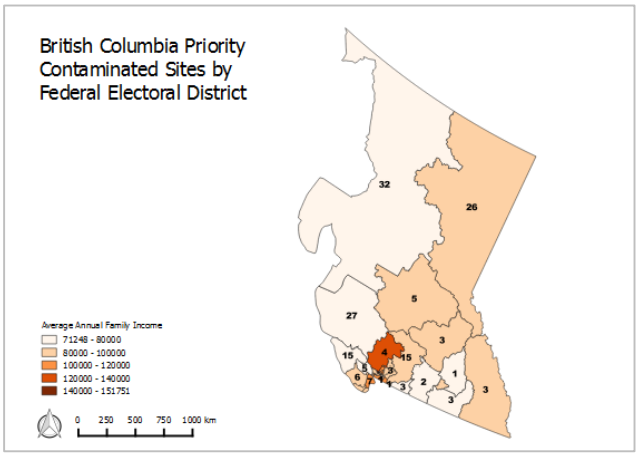
1. In the menu, select ***Layout*** > ***Add Scalebar***.
2. Draw a box where you would like to see the scale bar.
3. In the Item properties tab, you can select one of six styles under the **Style** dropdown.
4. Choose the units for the scale bar under **Units**.
5. Adjust the segments in the **Segments** area.
    a. E.g.: left 0 and right 4 on a Line Ticks Up style will look something like this:




6. Click and drag the scale bar into place on your map.

**Adding a Title to a Map**

1. In the menu, select ***Layout*** > ***Add Label***.
2. Draw a box where you'd like your title to be (you can move it later).
3. Type your title into the **Main properties** text box.
4. Adjust the font as you see fit and move it around until you resign yourself to the lack of design elements included in QGIS.




*This is not a very pretty map. You can make a nicer one.*

## 10. Geocoding

We've looked at a lot of files today, but most were already in a mapping format. The following section will describes the steps to geocode a file that only street addresses. We'll take a look at inspection violation file, from which we've extracted Tim Hortons stores. We'll explore two methods of geocoding as well as the format and cleaning-up process that's required.

### Method 1 – Using Google Maps / OpenStreetMap

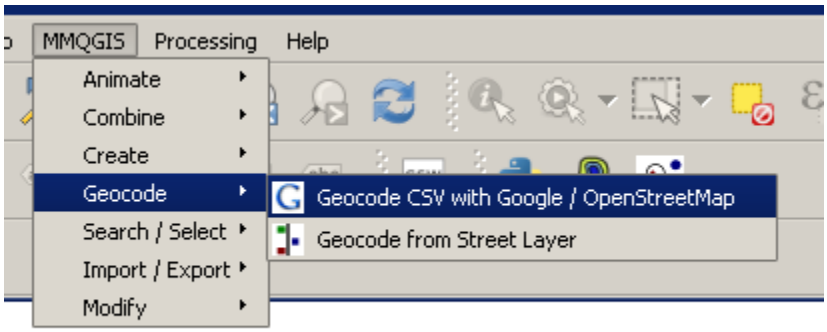
This method uses the Google Maps API or OpenStreetMap API to geocode the location of the points. This is optimal if you have a thousand points or less to geocode.

## Cleaning-up the data:

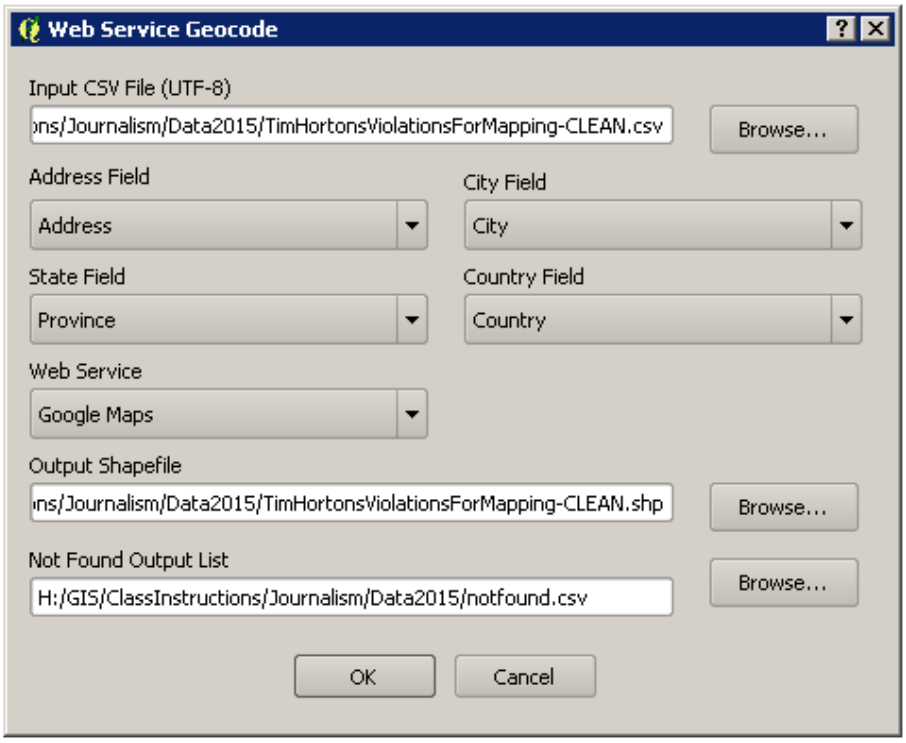
1) In Excel, open the Tim Hortons file - **TimHortonsViolationsForMapping.csv**.
2) Clean-up the file to have the address elements in separate columns.
    a. Move the content of **row C** to **row G**
    b. Highlight **Row B**, from **Find and Replace**, select **Replace**. Do the following Find & Replace
        i. Replace "**S** " (S with two spaces) with a S comma
        ii. Replace " , "(space comma space) with a comma
        iii. Replace ", " (comma space) with a comma
        iv. Replace "  " (two spaces) with one space
    c. Highlight **Row B**, click on **Text to Columns**
        i. Select Delimited, space as the delimiter.
    d. Scroll through your data to ensure that all data was changed properly. Line 87 has to be changed.
    e. Change the column headers to **Store, Address, Province, Country**
    f. Save as a new Excel file - **TimHortonsViolationsForMappingCLEAN.csv**

## Geocoding in QGIS

1) In **QGIS**, go to **Plug-ins** > **Manage and Install Plug-ins** and ensure that MMQGIS is selected.
2) In the menu, click on **MMQGIS** > **Geocode** > **Geocode CSV with Google / Open StreetMap**




    a. Ensure that the following is selected for the geocoding. You'll have to match the proper fields to the geocoding field. (ie. Address Field needs to correspond to the filed that has an address – 123 colonel by drive).




b. Click **Ok.** Geocoding will run.

### Method 2 – Using Street Layer

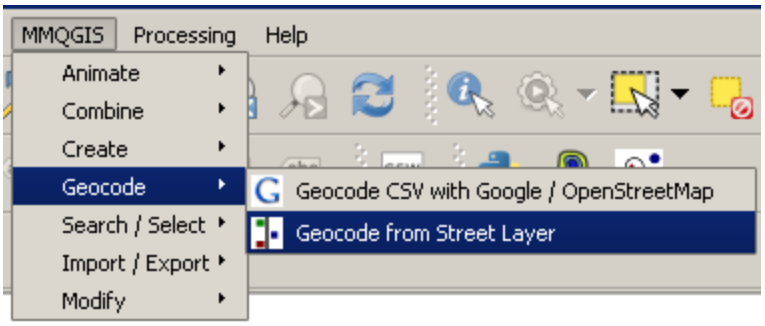
This method uses an existing street layer file to geocode your points. In this case, we've downloaded the street file from Ottawa Open data.

### Cleaning-up the data:

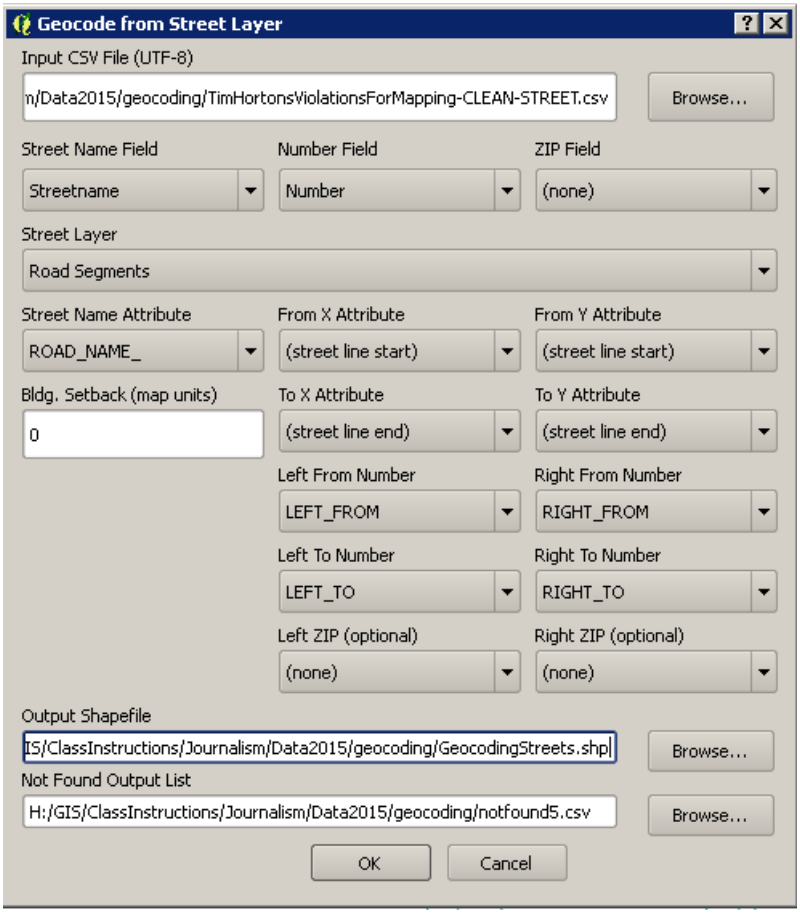
1) In Excel, open the Tim Hortons file - **TimHortonsViolationsForMappingCLEAN.csv**.
2) Clean-up the file to have the address elements in separate columns.
    i. Use **Find&Replace** and **TextToColumns** to separate address number and streetname into separate columns.
    ii. Use the **Find&Replace** function to change the street type suffix to the acronym. (ie.Road to RD, Street or ST, etc.)
    iii. Save the file as **TimHortonsViolationsForMapping-CLEAN-STREET.csv**

### Geocoding in QGIS

1) In QGIS, add the **Road_Segments.shp** to QGIS (this was downloaded from Ottawa OpenData)
2) Go to **MMQGIS** > **Geocode** > **Geocode from Street Layer**




3) Fill in the following information in the dialog box. Ensure that you select **ROAD_NAME_** and not **ROAD_NAME**




4) Click **Ok** to run the geocoding.
5) Once complete, you'll notice that it didn't geocode all of the files. Take a look at the notfound.csv file to see which records weren't geocoded. Can you tell us why?