

Georeferencing Soil Maps in ArcMap 10.x: Basic procedures to download, open, manipulate and print spatial data

These procedures outline:

- A. Obtaining soil maps.
- B. Downloading boundary files.
- C. Uncompressing the downloaded file.
- D. Opening the boundary file and soil map in ArcMap 10.x.
- E. Georeferencing the soil map.
- F. Saving.
- G. Preparing the layout for printing and exporting the map into various file formats.

In order to use these instructions, you must have ArcMap 10.x. In this example, we are going to use a soil map of Peel County obtained from The National Land and Water Information Service via the library catalogue. In addition, a Toronto GTA boundary file will be downloaded from the Ryerson University Library website.

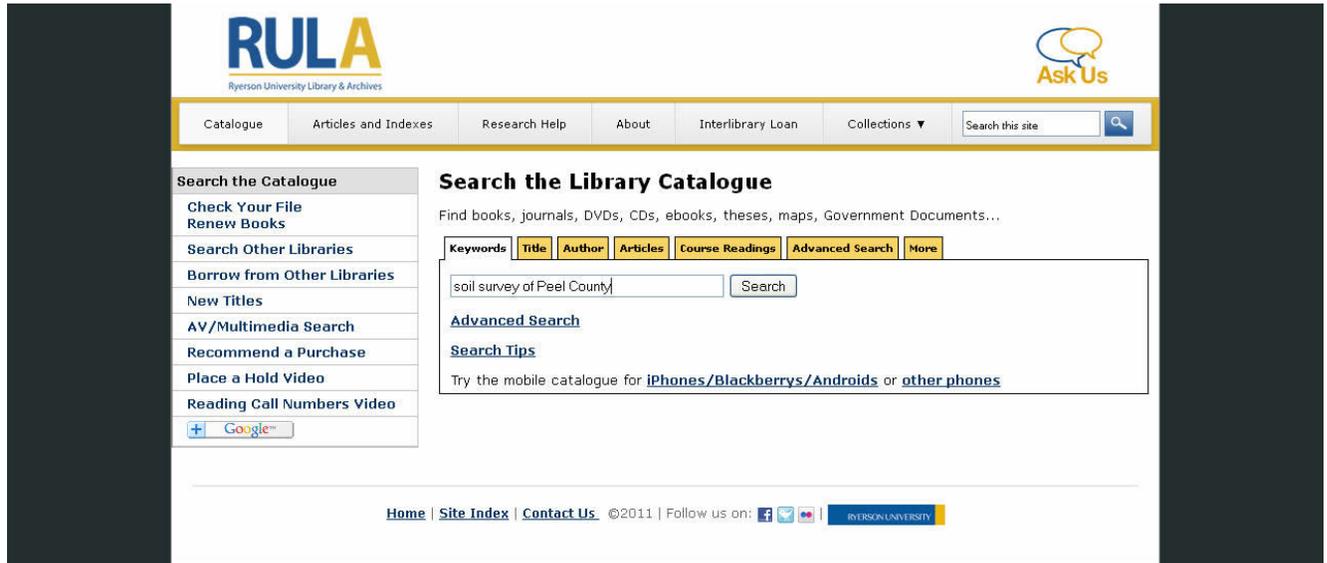
A. Obtaining the Soil Map

The soil map used in this procedure will be obtained from The National Land and Water Information Service. The Ryerson University Library has various soil survey maps in the Geospatial Map and Data Centre map cabinets as well as on reserve. The soil maps that are catalogued are searchable through the use of the Ryerson Library website. Some of the records within the catalogue have a direct link to The National Land and Water Information Service where users can view online versions of soil reports or download digital versions of soil maps. This procedure will outline the latter.

1. Browse to the Ryerson University Library website (www.ryerson.ca/library) and **click Catalogue**. This will take you to the catalogue search page.

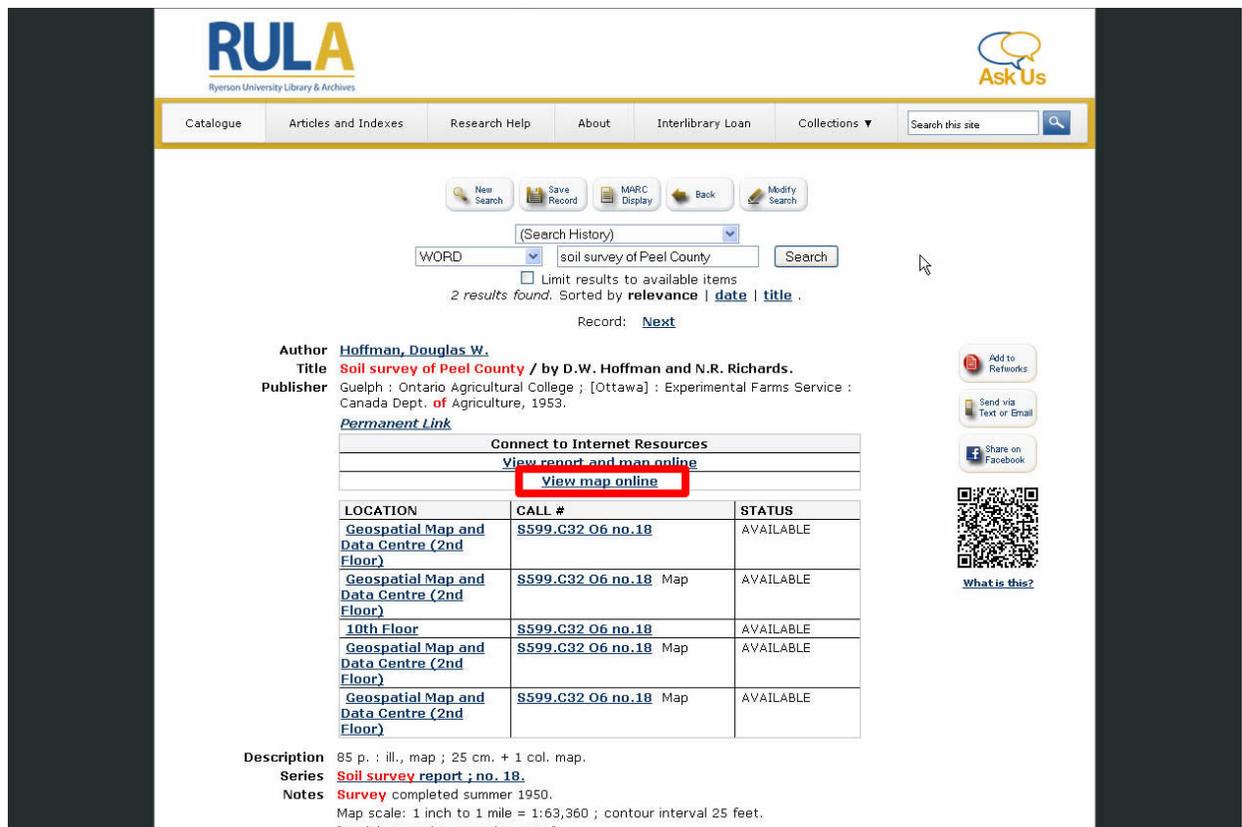


2. In the search box type in **soil survey of Peel County**.



Note: Soil maps in Ontario are published by county, if you would like to select another area type in **soil survey of (desired region) County**. *Click Soil survey of Peel County / by D.W. Hoffman and N.R. Richards.*

3. In the Connect to Internet Resources table *click View map online*.



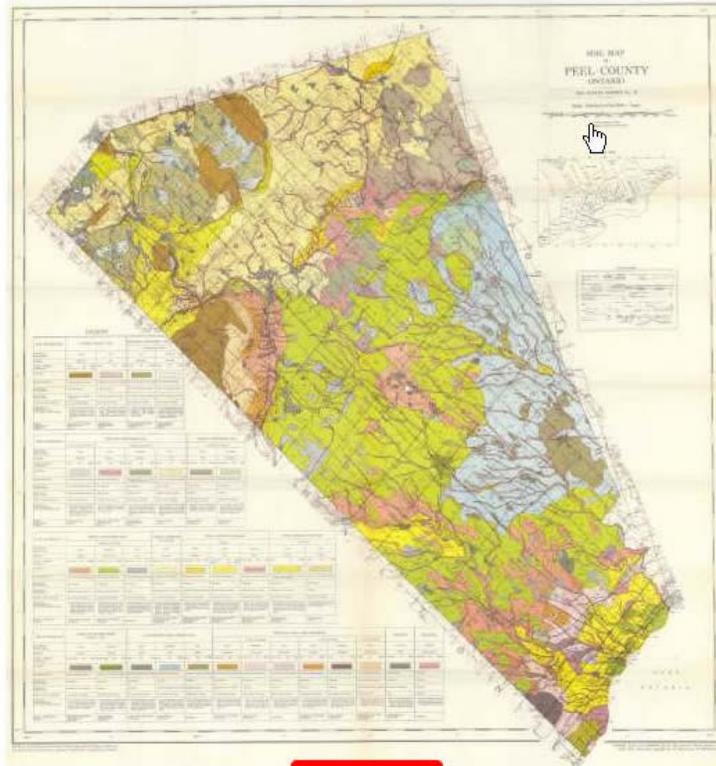
Scroll down below the map and *click Download*.

Note: If Download button does not appear, click image to initiate download.

Experimental Farms Service, Canada Department of
Agriculture and the Ontario Agricultural College

- or -

MAP



[\[REPORT\]](#)

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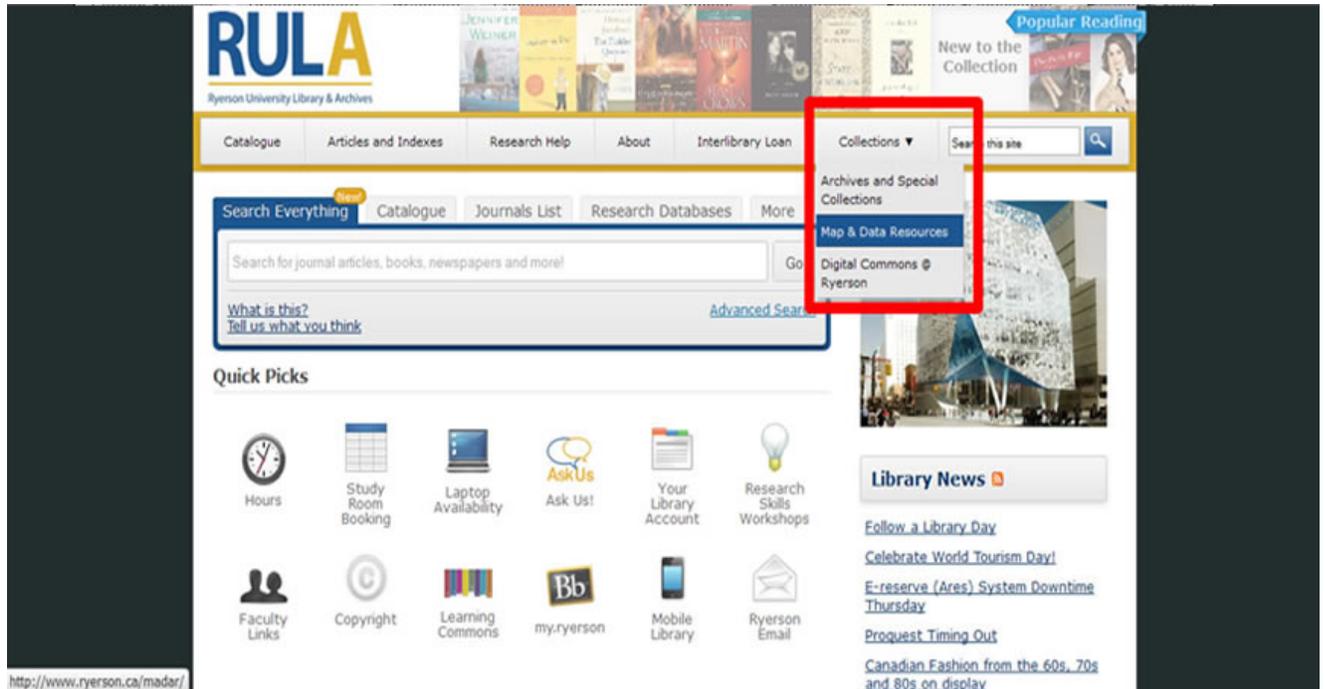
[Important Notices](#)

4. **Save** the file in an appropriate location on your hard drive that is easily accessible.

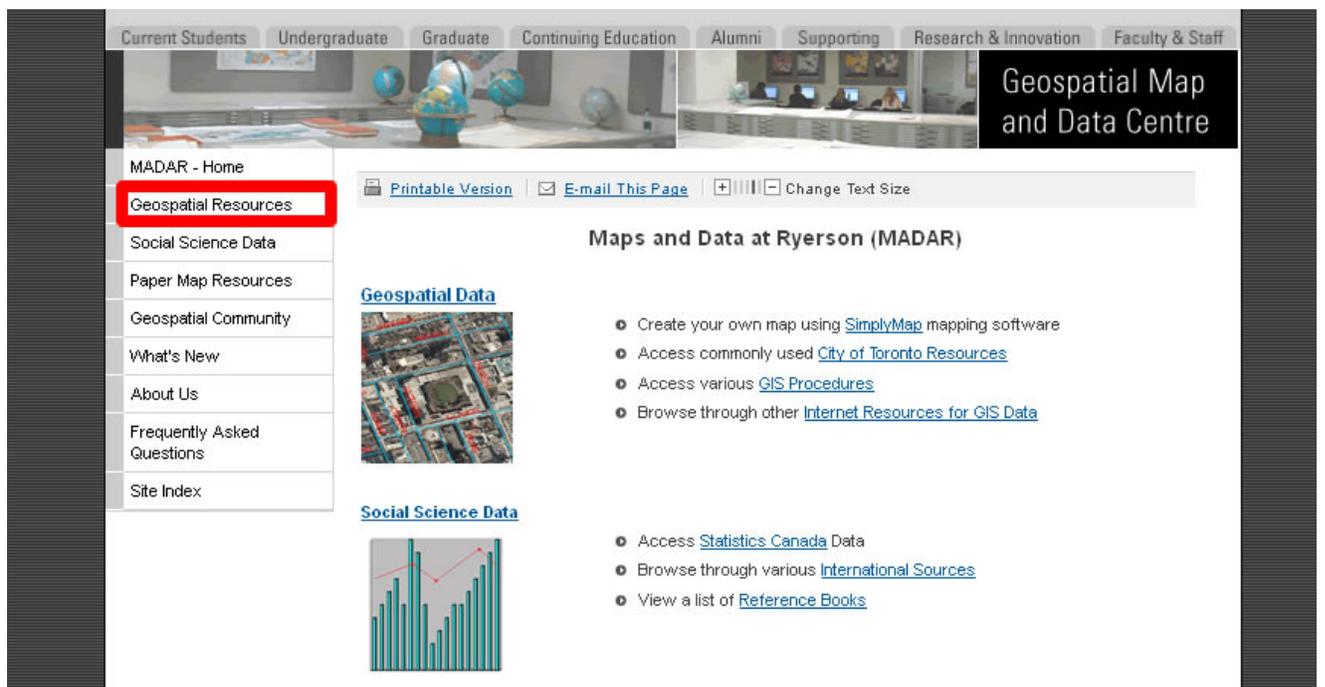
B. Downloading Boundary Files

The boundary file that will be used in this example is found on Ryerson University's Geospatial Map and Data Centre website. This particular Toronto GTA boundary file is part of a series of boundary files created from Statistics Canada census of 2001 cartographic files.

1. Browse to the Ryerson University Library website (www.ryerson.ca/library) and *click Collections* then **Map & Data Resources**. This will take you to the Geospatial, Map & Data Centre page.



2. *Click on Geospatial Resources*. This will take you to the Geospatial Resources page where you can read about and link to tutorials such as this one that give step by step procedures of how to use and manipulate various spatial data.



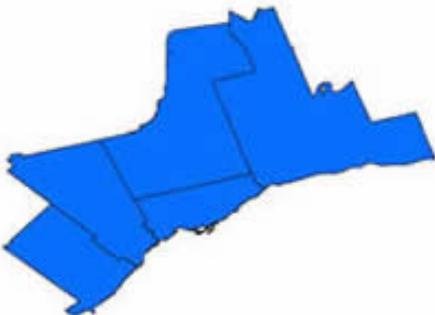
3a. In the search textbox, type in **Toronto CMA and GTA Boundary**. *Click Search*.

b. Scroll to and *click* the record titled **Toronto CMA and GTA Boundary Files**.

4. This is the record information page that gives detailed information about the data that you are about to download. *Click Link to Index Map*. *Click GTA COUNTY*.

The screenshot shows the Ryerson University website interface. At the top, there is a navigation bar with the Ryerson University logo and a search box. Below the navigation bar, there are several tabs for different user groups: Current Students, Undergraduate, Graduate, Continuing Education, Alumni, Supporting, Research & Innovation, and Faculty & Staff. The main content area is titled "Geospatial Map and Data Centre" and displays the record information for "Toronto CMA and GTA Boundary Files". The record details include: Publication Date: 2003, Edition: 2001, Geography: Toronto (CMA) Greater Toronto Area (GTA), Description: Boundary files for the Toronto Census Metropolitan Area (CMA) and Greater Toronto Area (GTA). Each boundary file is further divided in to various geographic units. Accessing the Data: Access data via index map link below. Index Map: [Link to Index Map](#) (highlighted with a red box). Use Restriction: For use by Ryerson University faculty, students and staff for academic teaching and non-commercial research. Read appropriate licensing agreement for further information.

GTA COUNTY



5. You will then be asked for your Matrix user name and password (the same as your Ryerson e-mail and password), fill this information out then *click Login*.

a. Read the DMTI Data Release Agreement then *click I Agree*.

b. In the view data page *click* [GTA county.zip](#).

6. Once the file is *clicked*, you will be prompted to Open or Save each file.

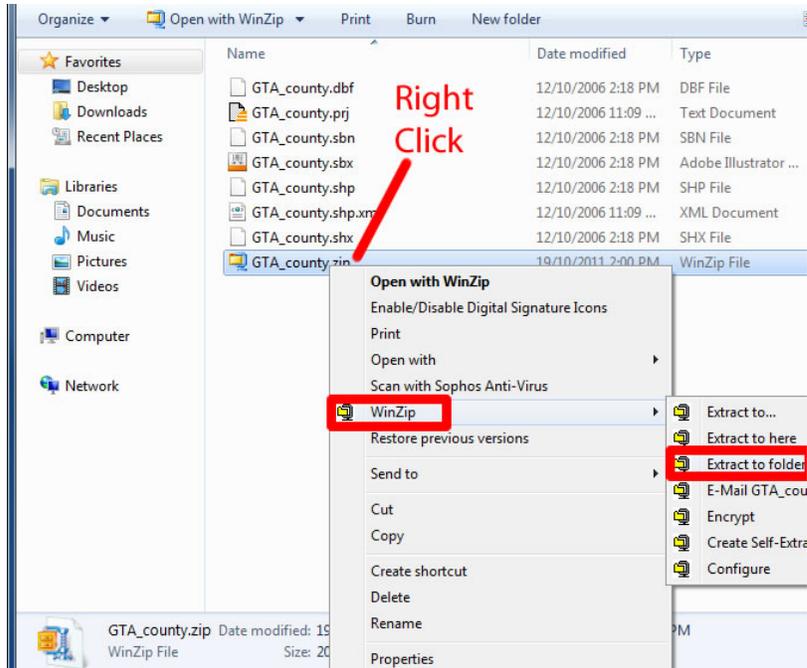
C. Uncompressing the Downloaded Files

As you may have noticed while downloading the boundary file and the soil image, the extension for the file was **.zip**. This is a Zip file or compressed file. Files are stored in this format on the server to save space. The following section outlines the procedure for uncompressing these files.

The extraction process varies depending on whether or not WinZip is loaded on your computer. Select one of the following options:

With WinZip

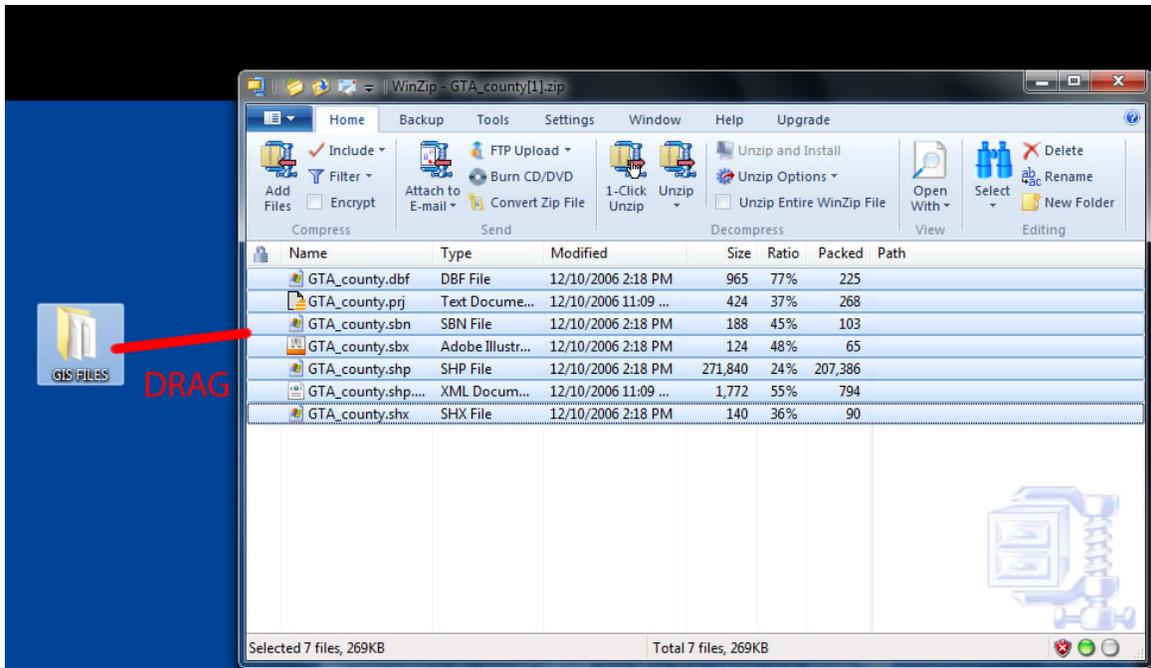
1. **Save** the file to an appropriate location on your hard drive.
2. Browse to the location of the downloaded file.
3. *Right click* the desired file.
4. Scroll down to **WinZip** then *click* **Extract to folder...**



Without WinZip

1. **Open** the file
2. **Drag** the desired files into an appropriate location on your hard drive

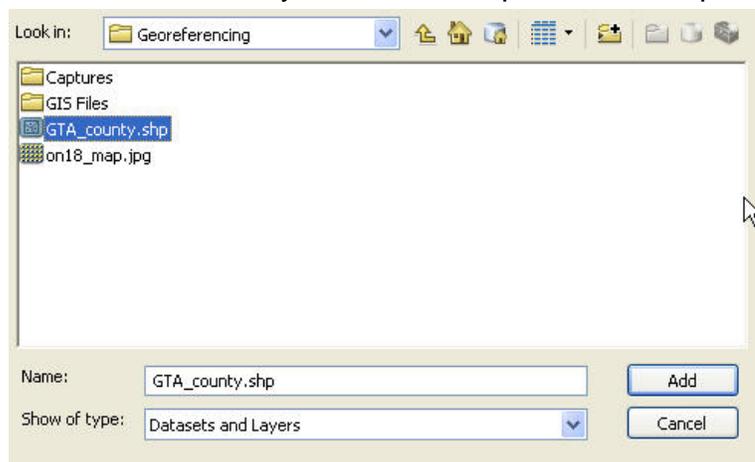
Note: The soil map may need to be uncompressed as well. Follow the procedure outlined above to unzip soil map.



D. Opening the Boundary file and Soil Map in ArcMap 10.x

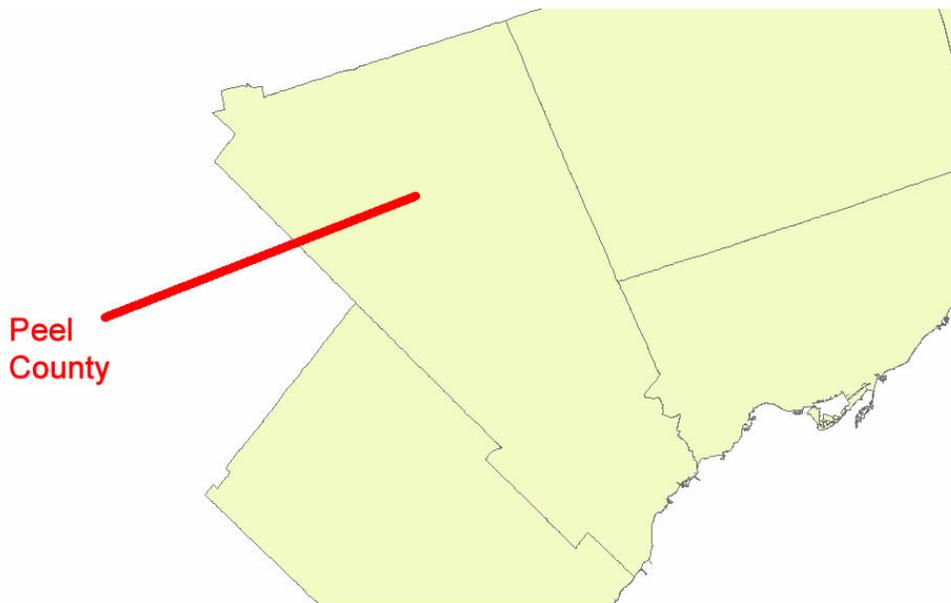
ArcMap 10.x is software that allows the user to view, manipulate or create spatial data. ArcMap is part of the ArcGIS software package created by ESRI. This section will demonstrate how to open files in ArcMap 10.x.

1. The first step is to open ArcMap. *Double-Click* on the **ArcMap 10.x** icon or *Select Start > Programs > ArcGIS > ArcMap*. ArcMap should automatically prompt the option to **Add Data**. Otherwise, *Click* the **Add Data** button .
2. In the **Add data** window, browse to the shape file that you wish to add (in this example it is GTA_county.shp). **Note:** If there were more than one file in this folder, you can hold down the **CTRL** or **Shift** key to select multiple files and open them at the same time.
3. *Click Add*.



Your data view (main viewing window) should show a file similar to the one below.

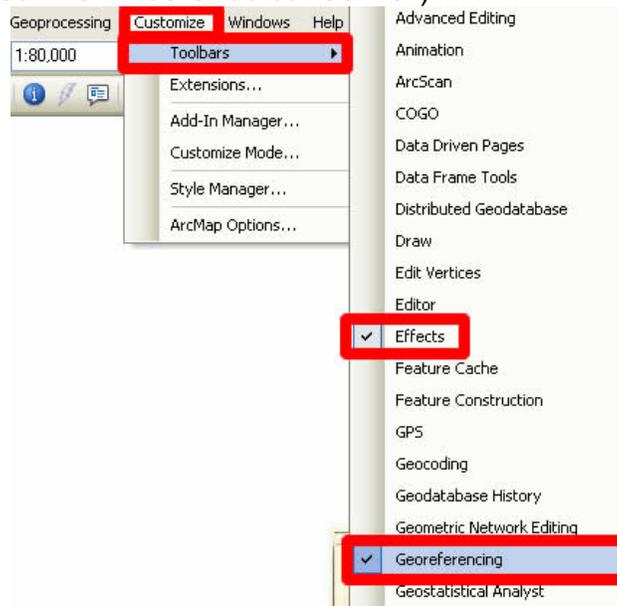
Note: Your colours may be slightly different as ArcMap 10.x chooses the colours at random when the files are initially opened. Zoom in to Peel County.



- Repeat steps 2 and 3 to open the soil image (on18_map.jpg). **Note:** Initially, the soil image will not appear in the data view. When adding the soil image, if asked to build pyramids, select **Yes**.

E. Georeferencing the Soil Map

- From the main menu *select* **Customize > Toolbars > Georeferencing** (repeat this step to select the **Effects** toolbar as well).



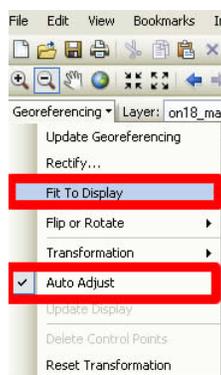
- Using the **Georeferencing** task bar, select the image to be georeferenced in the **Layer** drop-down window.



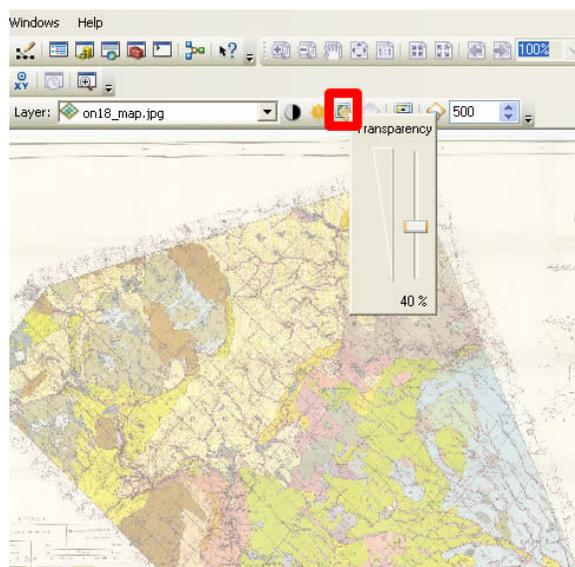
3. Drag the soil image in the Layers window so that it appears above GTA_County.



4. In the **Georeferencing** drop down menu, *click* **Auto Adjust** and **Fit to Display**. The soil image should now appear in the data view.

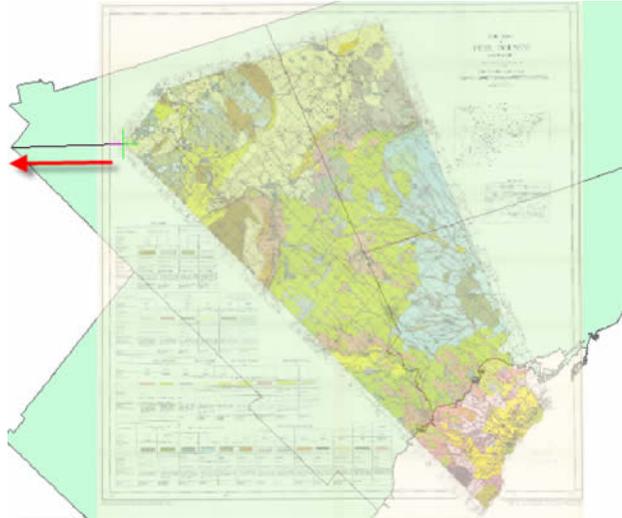


5. In the **Effects** toolbar select the soil image (on18_map.jpg) in the drop down menu. Using the **Adjust Transparency** button located in the **Effects** toolbar, select a transparency percent that will allow you to adequately view the boundary file underneath your soil image (40% works well).

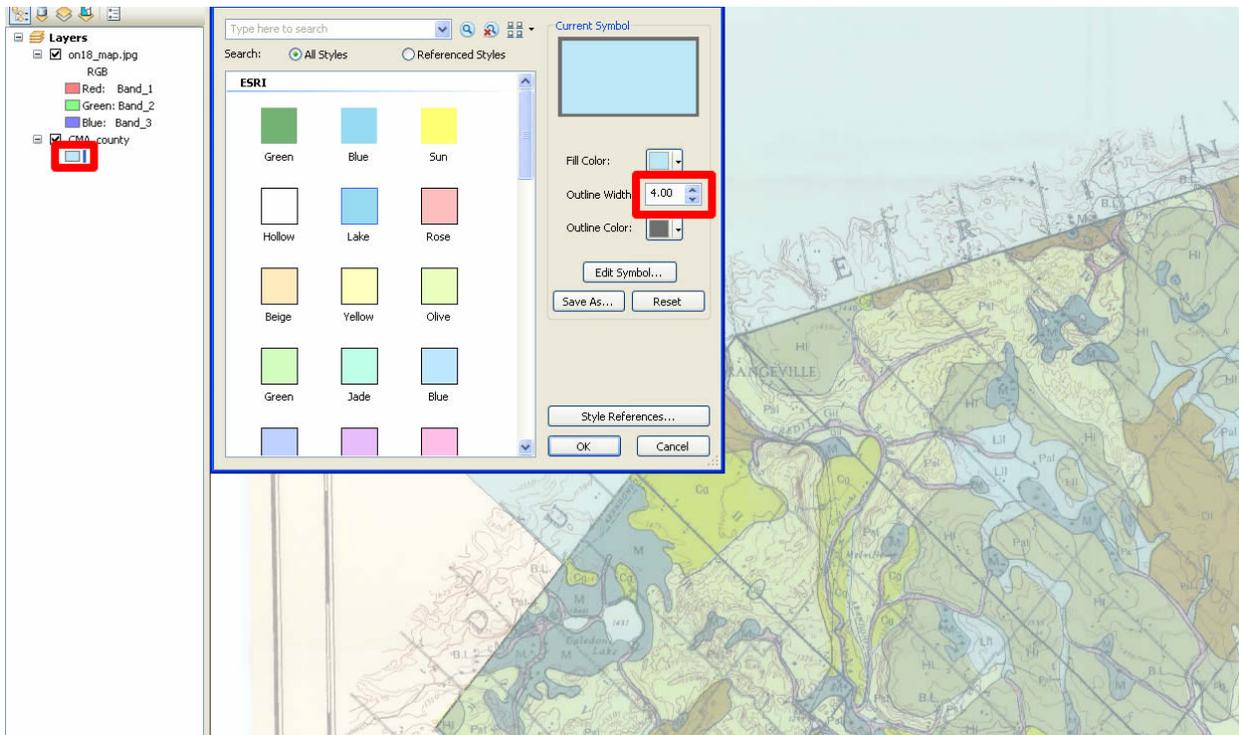


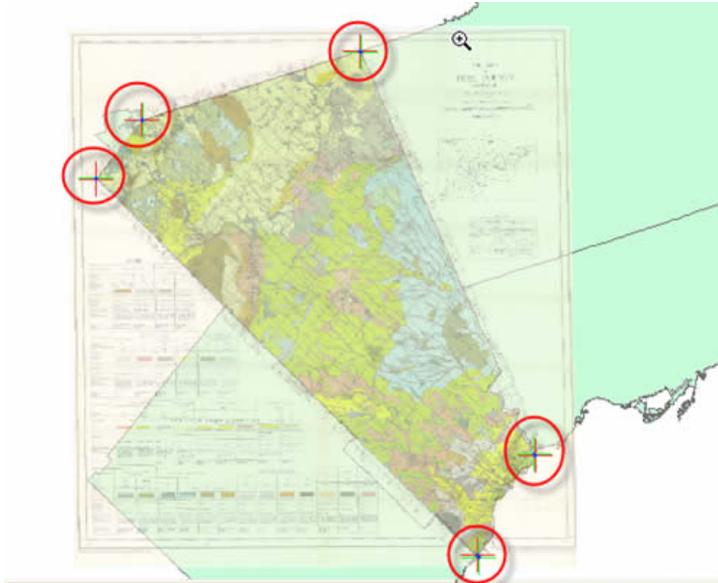
6. *Click* the **Add Control Points** button. *Click* a point on the soil map image (a green cross will appear) then *click* a known point on the Toronto GTA boundary file (a red cross will appear). Repeat this step four times using the corners of

Peel Region as reference points. **Note:** ArcGIS needs at least 3 control points. Eventually, your image will warp into place.

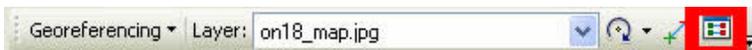


You may want to zoom in order to align the corners more accurately.  Or you may temporarily thicken the boundary of Toronto GTA Boundary File (*Double-Clicking* the symbol for the file and then increasing the **Outline Width**).



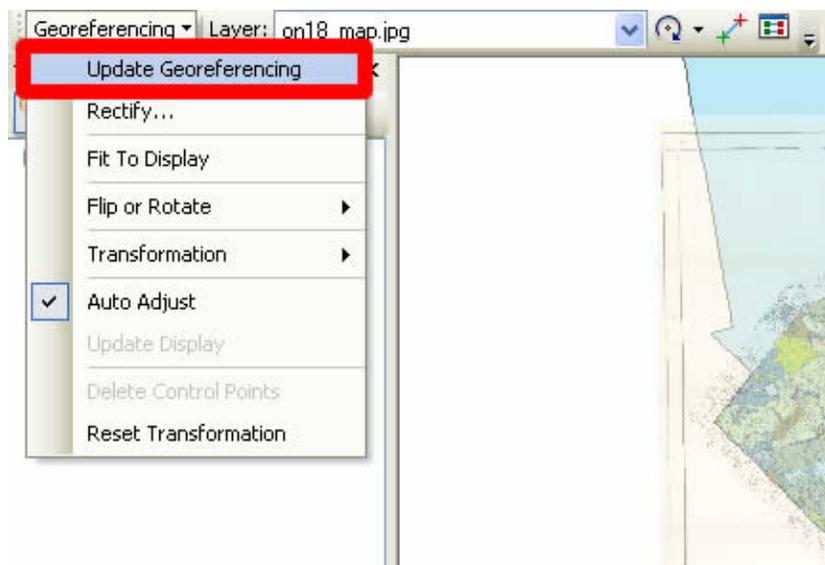


Note: In order to edit, delete or save your control points, *click* the **View Link Table** button on the **georeferencing** task bar.



F. Saving

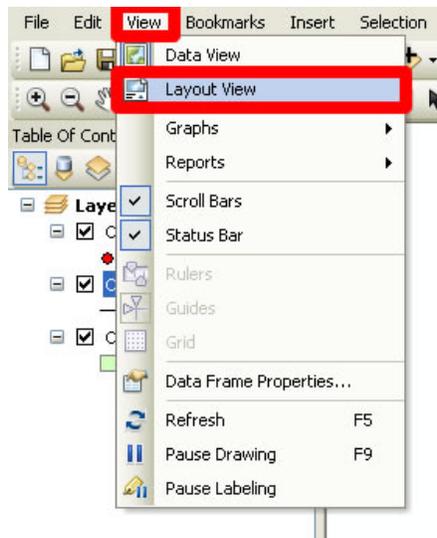
1. In the **Georeferencing** drop down menu, click **Update Georeferencing** to save the transformation information with the raster dataset. This creates a new file with the same name as the raster dataset, but with an .aux file extension. It also creates a world file for .tif and .img files.



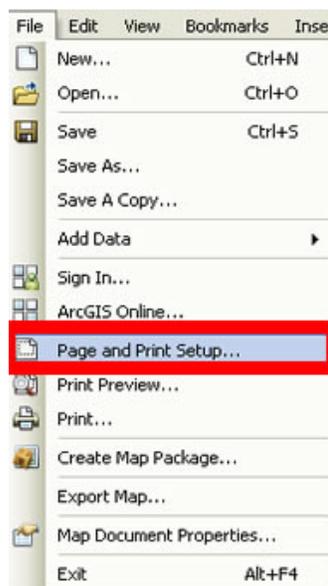
G. Preparing the Layout for Printing and Exporting the Map into Various File Formats

Compared to other GIS software, creating a layout in ArcMap is a simple task. The following section describes how to create a basic layout including the fundamental map elements.

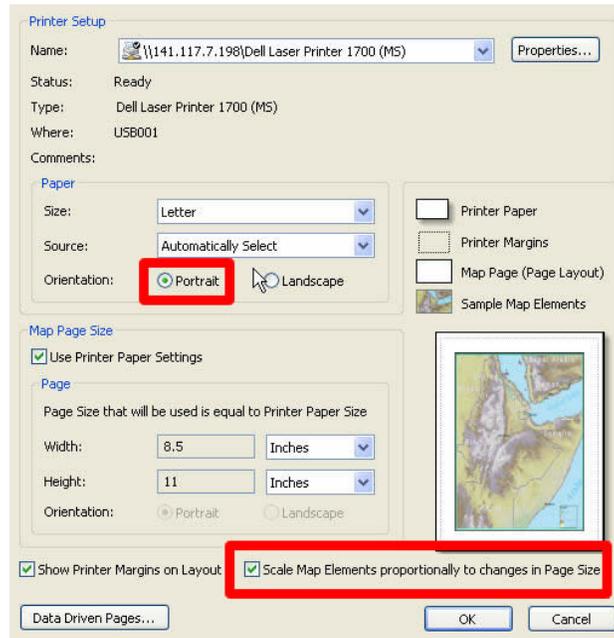
1. To change the View from **Data View** to **Layout View**. *Click View* from the main menu and *Select Layout View* from the drop down menu.



2. **Note:** If your layout view is already in **portrait** view then skip to **step 3**. The Peel County image is elongated vertically, thus it would be more appropriate to display the map on a portrait image. From the main menu, *click File* then *click Page and Print Setup*.

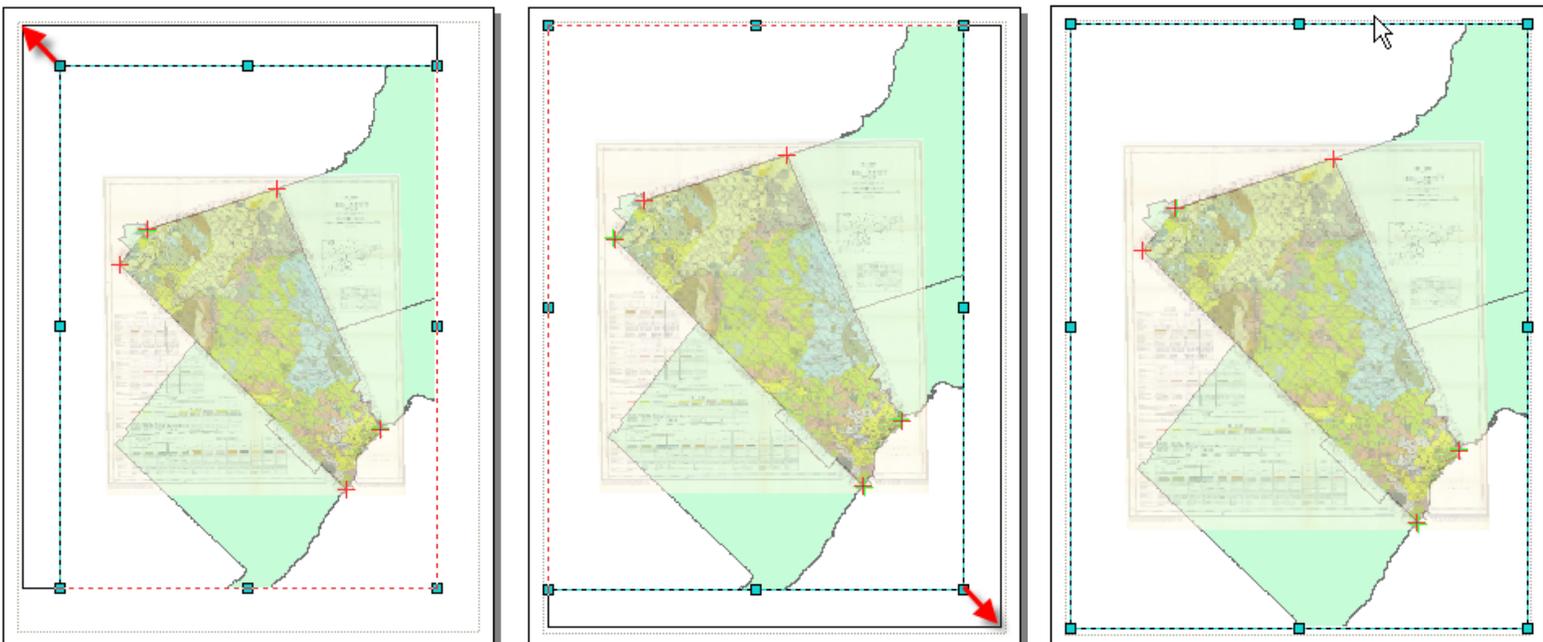


- a. In the **Page and Print Setup** window *click on the Portrait radio button and check on the Scale Map Elements ... button*. Then *click OK*.



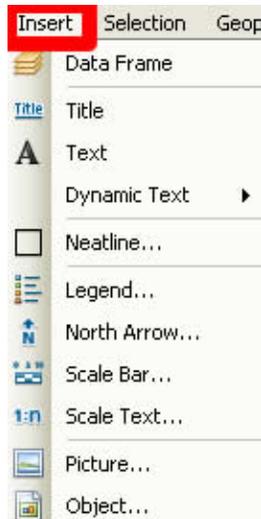
You should notice that your layout view has changed to portrait.

3. Neatline – A neatline is automatically added to the layout view, however, in the previous step we changed the layout to portrait and now the neatline must be adjusted to fit the print layout. In order to do this, grab one of the corners of the neatline and drag it to the corresponding corner of the page layout (**Do not** pull the corner farther than the dotted lines because anything outside of that region will not be printed). Example below.

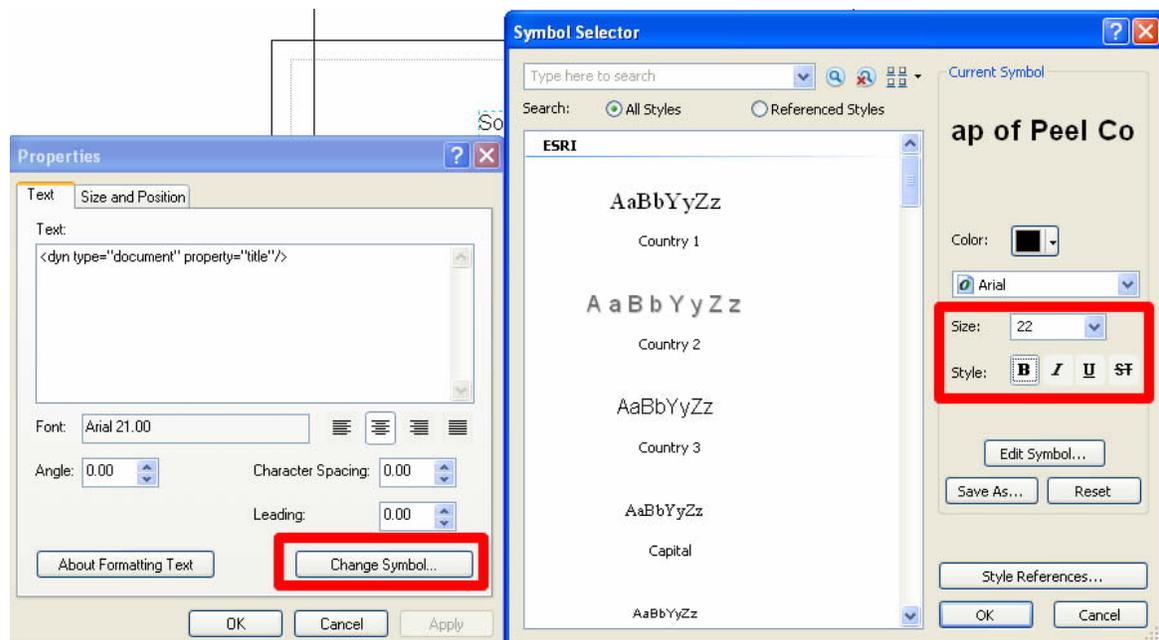


Note: if you would like to add a neatline to other objects in the layout, *click* the object, *click* **Insert** from the main menu, then *click* **Neatline**. The **Neatline** window will appear allowing you to change the properties of the neatline. *Click* **OK**, when you are satisfied with the neatline.

4. *Click* **Insert** from the main menu. In the ensuing drop down menu, you can add a Title, Legend, North Arrow, and Scale Bar. Once inserted into the layout view, each item can be manipulated by *Double-Clicking* on it. Examples are listed below:



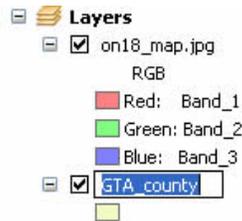
5. Title – *Click* **Insert** from the main menu. Select **Title**. In the **Text** textbox type in the title *Soil Map of Peel Country* then push **Enter** on your keyboard. *Double-Click* the Title to open the **Properties** window.



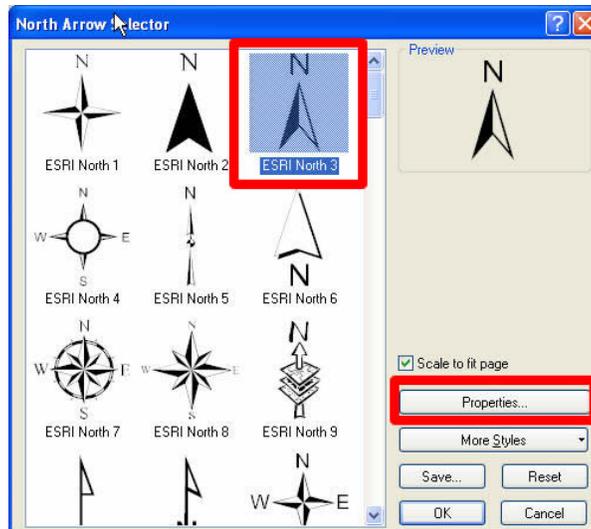
Click Change Symbol. In the **Symbol Selector** window, you can change the properties of the text. **Click** the bolded **B** in order to make the text bold. Change the font size to **22**. **Click OK**, then **click OK** again.

6. **Legend** - **Click Insert** from the main menu. Select **Legend**. The **Legend Wizard** window will appear. Remove on18_map.jpg from the legend items by highlighting it and selecting the left arrow. **Click Next**. Change the legend title if you wish, otherwise **click Next**. **Click Next** two more times, then **click Finish**. **Click** and **drag** the legend from the centre of the layout and move it to the bottom right corner.

To customize the legend labels, **left click** the appropriate layer in the **Layer** window then wait two seconds and click it again, you should now be able to change the name. Change **GTA_Country** to Toronto CMA.

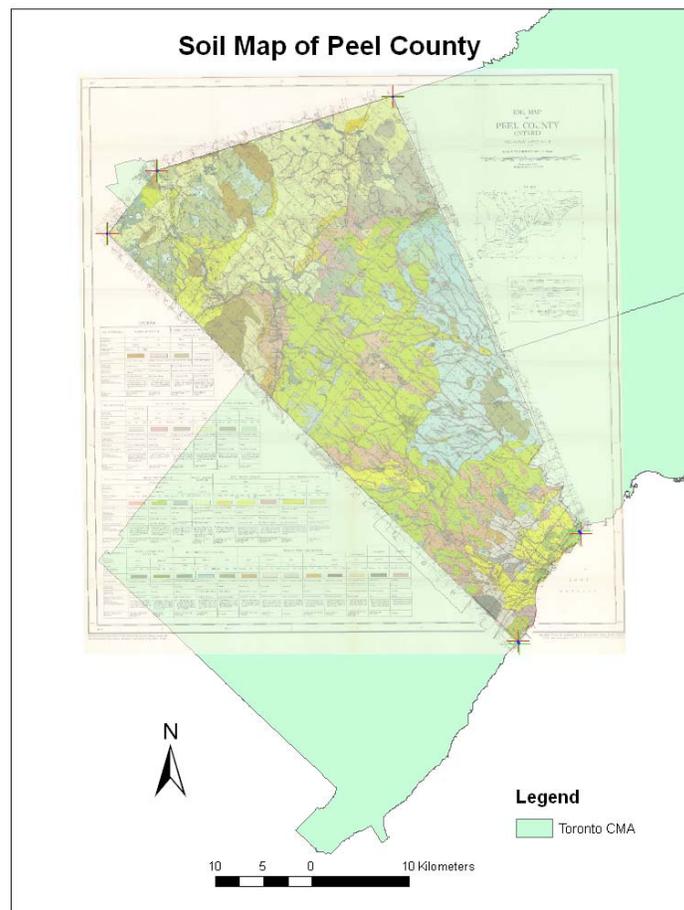
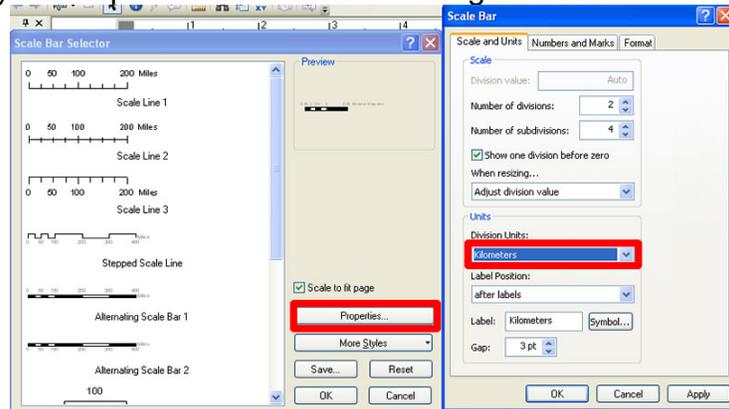


7. **North Arrow** - **Click Insert** from the main menu. Select **North Arrow**. In the **North Arrow Selector** window, chose an appropriate north arrow then **click OK**. **Click** and **drag** the north arrow from the centre of the layout and move it to the bottom left corner.



8. Scale Bar - Click **Insert** from the main menu. Select **Scale Bar**. Click **Properties** to open the **Scale Bar** window. In the **Division Units** textbox, select **kilometers**. Click **OK**. Click **OK**. Click and drag the scale bar from the centre of the layout and move it to an appropriate position below the map.

If done correctly, your map should look like the image below.

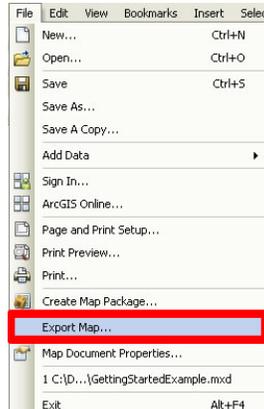


9. To print the map, Click **File** from the main menu and Select **Print** from the drop down menu. After selecting the appropriate printer and print specifications, Click **OK**.

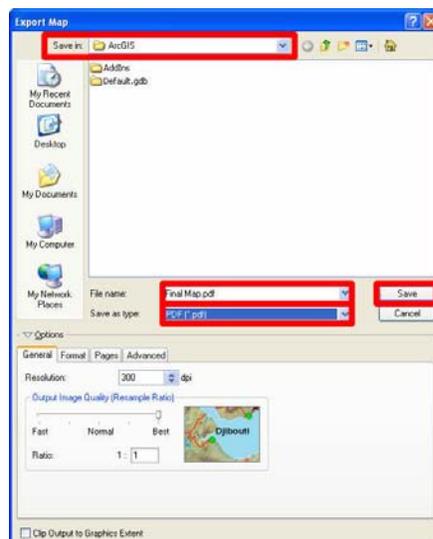
Exporting to PDF or Other Formats

Alternatively, you may opt to export your map and save it for later use rather than printing your map. ArcMap offers a variety of file types that you can save your map as. The following procedure will show you how to export your map, using one of the various file types.

1. Once you have completed *Steps 1* through *8* above or you are satisfied with your map, you may begin the export procedure. *Click File* from the main menu and *Select Export Map*.



2. The **Export Map** window will open. In the **Save In** window, *browse* to the location that you wish to save your map. In the **File Name** text box, chose an appropriate name for your map. In the **Save as Type** textbox *select* the format that you would like to save your map in.



3. *Click Save*.

Ricky Sanchez
October 19, 2011