





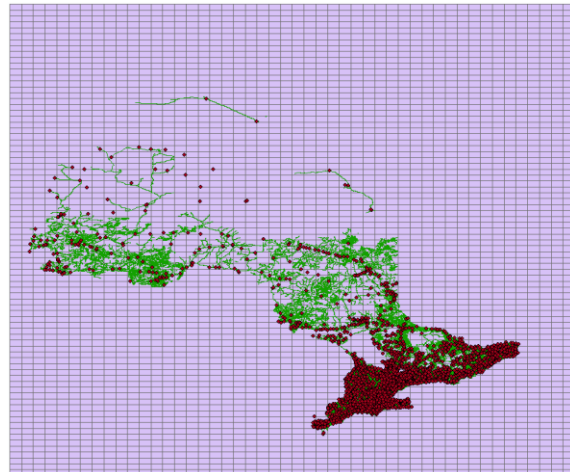
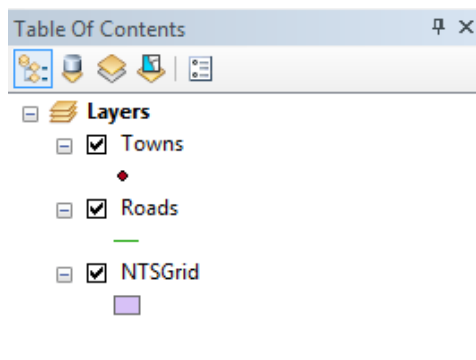
Basic Tasks in ArcGIS 10.3.x

This guide provides instructions for performing a few basic tasks in ArcGIS 10.3.1, such as adding data to a map document, viewing and changing coordinate system information, and clipping data to a new extent. These processes are meant to provide guidance for beginners who wish to learn how to perform simple geoprocessing tasks in ArcGIS.

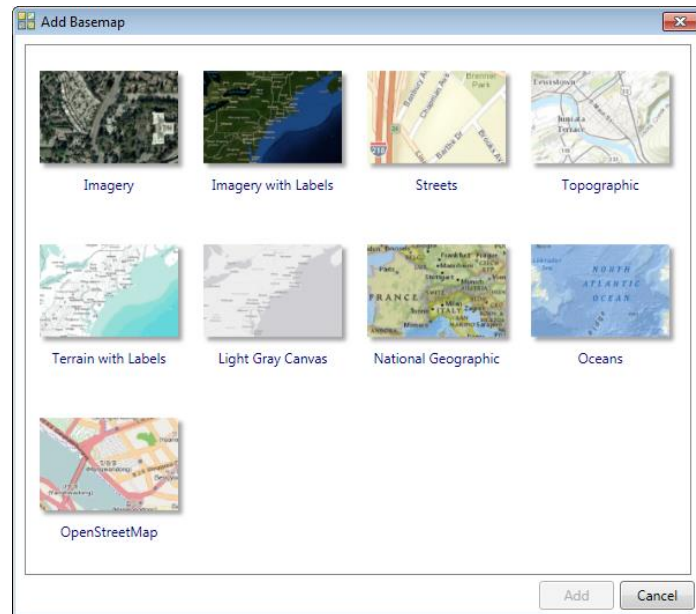
Step 1 Adding data to a map document

1. Open ArcMap (*Programs > ArcGIS > ArcMap*) and create a new, blank map document.
2. Click the *Add Data* button  from the main menu and browse to the location of your data. Note that the *Add Data* dialog will display only those folders to which a connection has been established.

If you do not see your drive or folder in the list, use the *Connect to Folder* button  to establish a connection with the directory. Browse into the directory and select each file that you wish to add to the map (select multiple files by holding down the *Ctrl* key). Click *Add*. The data will draw on the map document, and each layer will be listed in the ArcMap table of contents. Note that ArcMap will always draw layers with random symbology and order them according to geometry, with point layers drawing on top of line layers, and line layers on top of polygon layers. You can change the symbology by clicking the symbol swatch below each layer name, and you can switch the drawing order by dragging the layers to a new position in the table of contents.



Note: ArcGIS provides built-in base maps that can be used as backdrops for your data, or to orient yourself on the map. To add a base map, click the drop down arrow beside the Add Data button and select the base map you wish to use from the thumbnail selections provided.



Click *File > Map Document Properties* and check the option *Store relative pathnames to data sources*, then click *OK*. Enabling this option insures that the software will have the ability to find your map data if the drive letter changes, for example if you are working from an external drive.

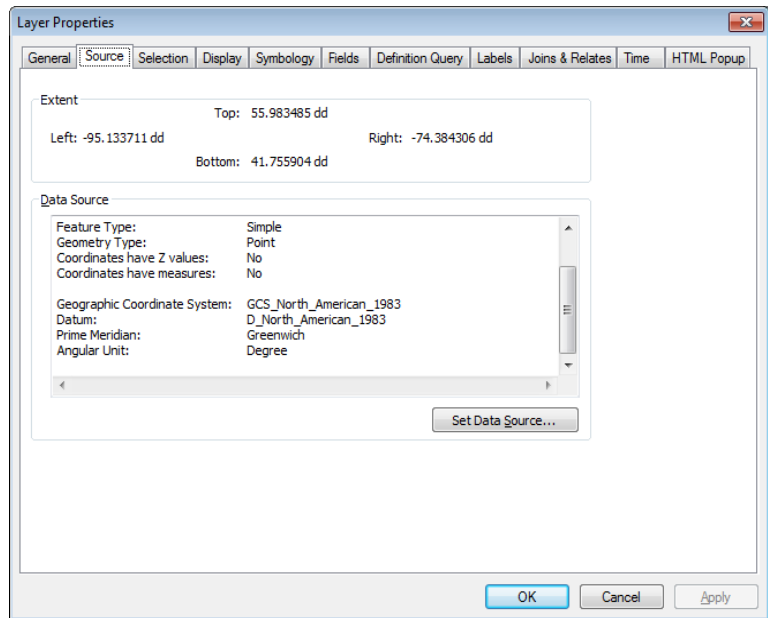
Click *File > Save* to save your map document.

Step 2 View coordinate system information and project data


Prior to performing geoprocessing operations on your data, it is a good idea to check the coordinate system information and insure that the data is using a projection that will make sense for your analysis. Many geoprocessing and spatial analysis operations require that data is projected to a coordinate system that uses linear units (such as meters) rather than degrees of latitude and longitude.

Note: *Selecting a coordinate system is more involved than you might think, as different projections are designed to minimize distortion and preserve certain properties. For example, conformal projections attempt to preserve the property of shape, equidistant projections preserve distance, etc. To select an appropriate coordinate system, consider the type of analysis you wish to perform on the data. If you are plotting a route then an equidistant projection may be your best choice; if you are modeling habitat, then preserving area could be more important for you. It is also important to consider the size and geographic location of your study area. Some projections are designed for east-west orientations, while others work better for north-south. More information about coordinate systems and datums can be found [here](#).*

To view the coordinate system properties of your data set, right-click the layer name in the ArcMap table of contents and select *Properties > Source*. The current coordinate system information will appear in the dialog. If the coordinate system is listed as *<undefined>*, then this means that the data currently has no spatial reference information. This means that the software does not have the information necessary to display the data in its actual location. If you have an undefined coordinate system, then perform steps 2a and 2b below. If there is coordinate system information available but you wish to reproject the data to a new coordinate system, then skip to step 2b.



2a Defining a coordinate system


Open ArcToolbox  and browse to *Data Management Tools > Projections and Transformations*. Double-click the *Define Projection* tool and enter the parameters as follows.

Set the *Input Dataset or Feature Class* to the layer that you are projecting.

Set the *Coordinate System* parameter to the **original** coordinate system of the data. Once you have defined the original projection, you can then reproject the data to a new coordinate system (step 2b).

Click *OK* to run the tool. The coordinate system information will be applied to the existing layer.

2b Reprojecting data

Open ArcToolbox  and browse to *Data Management Tools > Projections and Transformations*. Double-click the *Project* tool and enter the parameters as follows.

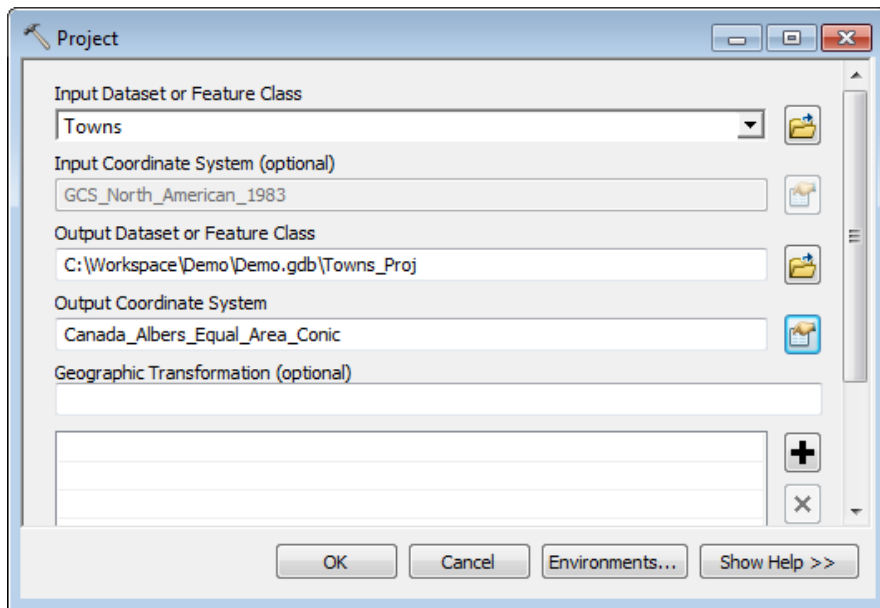
Set the *Input Dataset or Feature Class* to the layer that you are projecting.

The *Input Coordinate System* will be filled in with the existing coordinate system information for the layer.

Set the *Output Dataset or Feature Class* to the directory where you wish to save your output and give the projected file a descriptive name.

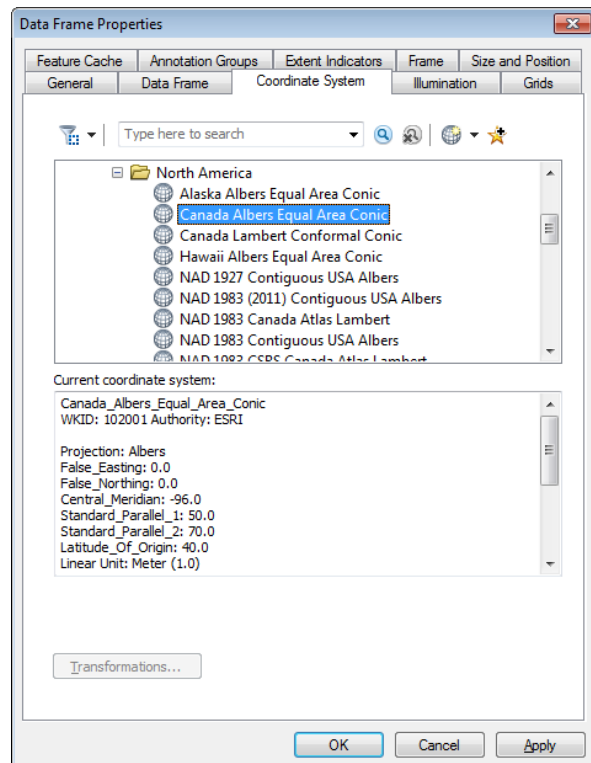
Set the *Output Coordinate System* to the projection you wish to apply to your data.

If a green dot appears beside the *Geographic Transformation* option, then use the drop down arrow provided to select a transformation from the list. If there is no green dot then this parameter can be left blank.




Click *OK* to run the tool. The *Project* tool creates a new file that is automatically added to the map document. Keep in mind that you have applied this projection to the actual data file itself; however, the map document you are currently working with will be set to the coordinate system of the first data set that was added. To test this, you can select *File > New > Blank Map* and then use the *Add Data* button to add the newly projected file to the map document. You will see that the units at the bottom right corner of the screen will reflect values of the coordinate system that has been applied to the data set. Now, both your map and your data set are in the same coordinate system.

Note: Should you wish to change the coordinate system of your map document at any time, simply right-click the bolded word *Layers* in the table of contents, select *Properties > Coordinate System* and use the dialog to browse to the projection that you wish to apply to your map document. This will apply the chosen coordinate system to that particular map document, but will not change the projection of the underlying data.



Step 3 Creating and exporting selections

In this example, we wish to isolate the NTS 1:50,000 map sheet for Peterborough and subsequently clip the roads and cities layers to the boundaries of this sheet. The first step in this process is to select the Peterborough map sheet from the NTS Grid layer using a selection query.

There are many ways to select features in ArcMap, such as dynamic selection using the selection arrow  from the main navigation toolbar, or building selections by attributes or location (for example, select all features that are completely within another feature, etc.). Each feature class in our map has an **attribute table** that holds the associated attribute information for each feature in the layer. To view a layer's attribute table, simply right-click its name in the table of contents and select *Open Attribute Table*. It is possible to select records directly within the table by clicking the cell at the far left of the row, but this is not a feasible option when there are a large number of records. Instead, we will use an attribute selection query.

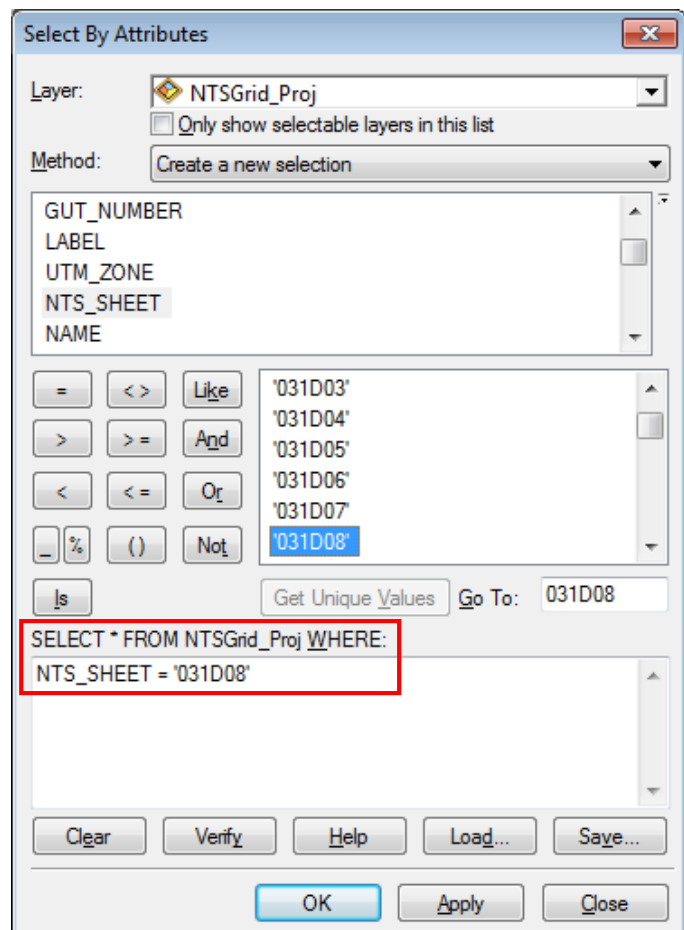
Click *Selection > Select by Attributes* to open the *Select by Attribute* dialog. Ensure that the *Layer:* parameter is set to the appropriate data set – in this case, we will be selecting from the *NTSGrid_Proj* layer. The *Method* parameter should be set to *Create a new selection*.

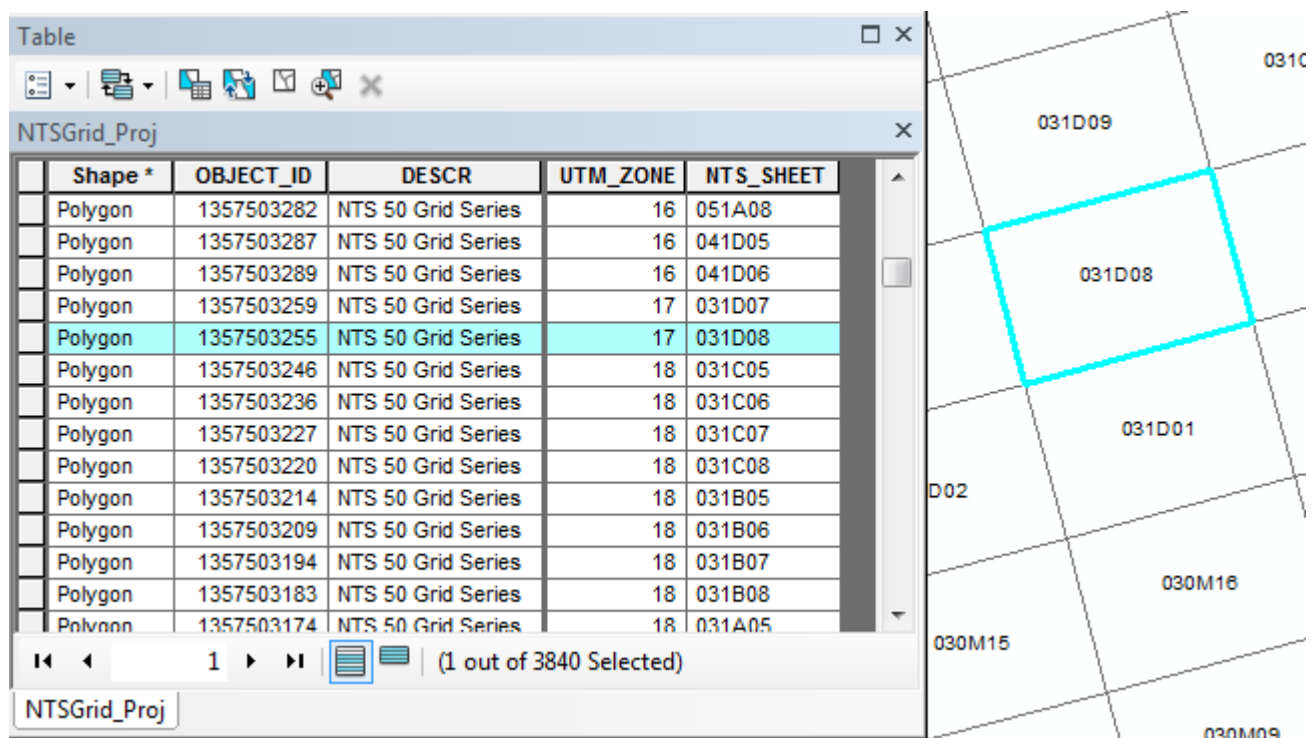
The text box should be populated with a list of the columns in the attribute table that are available for your selection query. In this case, we are looking for the Peterborough map sheet, which is coded as 031D08 according to the National Topographic System.

We build the query by double-clicking the 'NTS_SHEET' attribute to enter it to the query box. We then click the '=' operator to enter it to the expression, and select the *Get Unique Values* button. All of the unique values in the 'NTS_SHEET' column are listed. You can use the *Go To:* option to find specific records quickly.

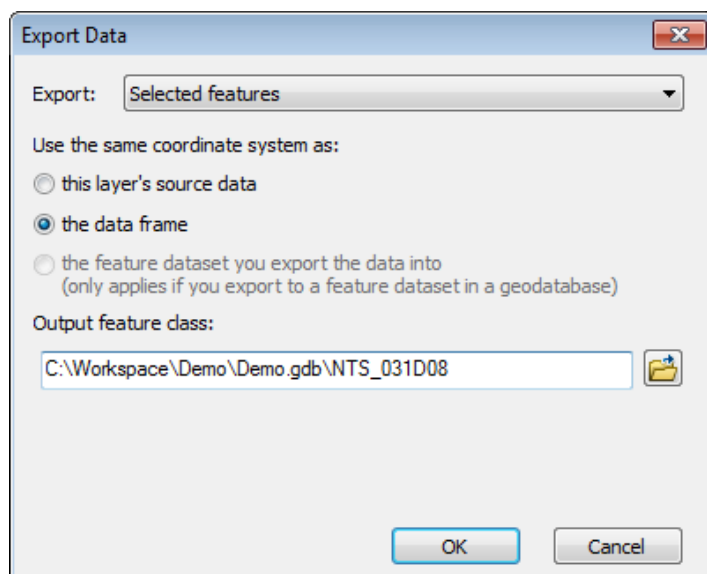
Once we have located the record we wish to isolate, we double-click the value to enter it to the expression. So we now have a query that reads 'SELECT * FROM NTSGrid_Proj WHERE: NTS_SHEET = '031D08''. In plain English, this query is asking the software to select all records from the NTS Grid layer where the NTS Sheet value is equal to '031D08'.

Click *OK*. The associated features will be selected on the map document, as well as within the layer's attribute table.






We will now export our selection to a new feature class. Right-click the selected layer in the table of contents and click *Data > Export Data*. In the *Export Data* dialog, ensure that the *Export* parameter is set to *Selected Features* and that the coordinate system is set to *Use the same coordinate system as: the data frame*. Set the *Output feature class* parameter to your working directory and provide a descriptive name for the new file. Click *OK* to export the selection. A new feature class is exported to the directory you have specified. Click *Yes* when prompted to add the layer to the map document.



Step 4 Clipping data

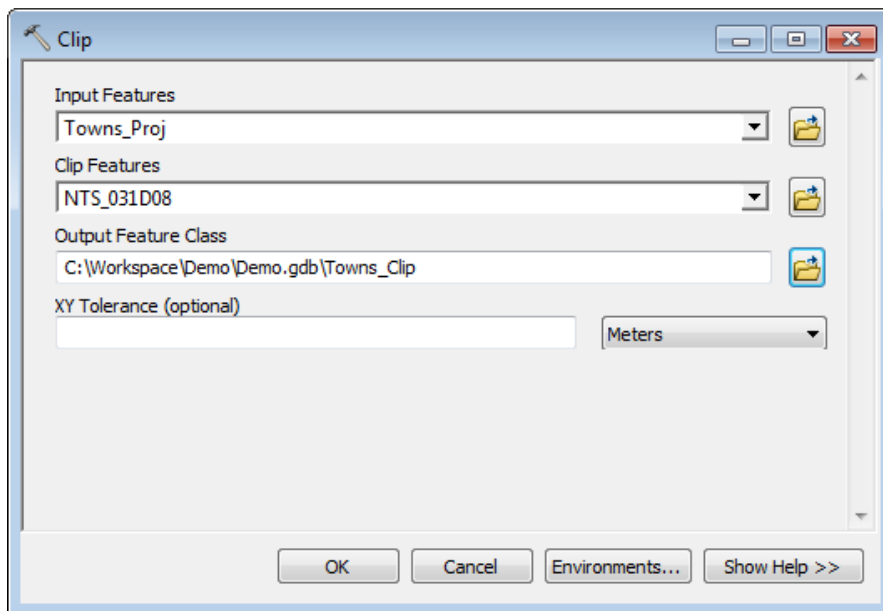
Right-click the original NTSGrid_Proj layer and click *Remove* to remove the layer from the map document. Then, right-click the new 031D08 feature class and select *Zoom to Layer*. Your map document will zoom in to the new extent.

We will now use the exported 031D08 file as our clipping extent. Open ArcToolbox  and browse to *Analysis Tools*. Double-click the *Clip* tool to open its dialog and enter the parameters as follows.

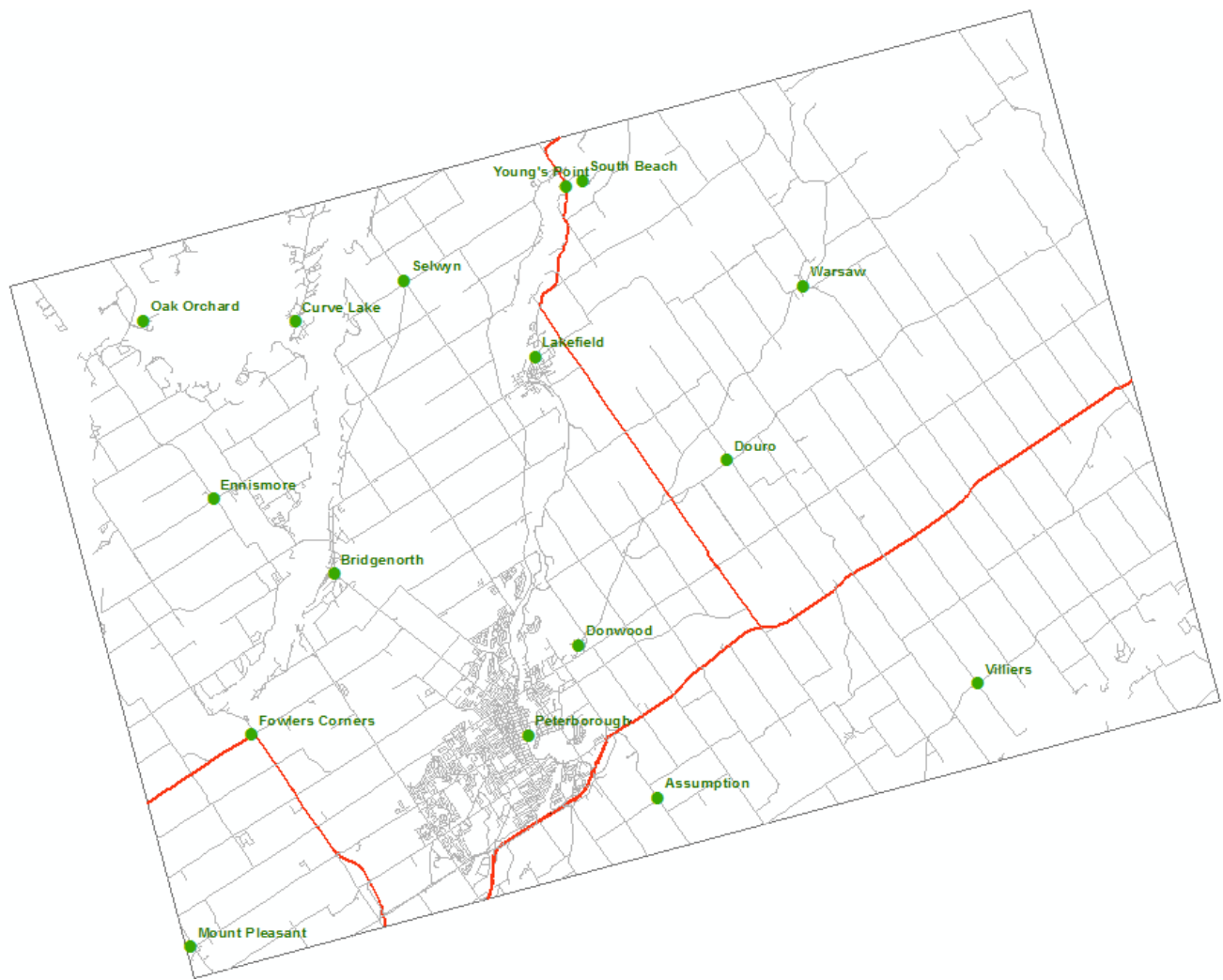
Set the *Input Features* to the layer that you wish to clip.

Set the *Clip Features* to the polygon file that you wish to use as your clipping extent. In this example, we will use the exported 031D08 polygon.

Set the *Output Feature Class* to the directory where you wish to save your clipped files, and give the output a descriptive name. Click *OK* to run the tool. A new, clipped file will be created and added to the map document.



Repeat the clip operation for each layer that you wish to clip to the new extent. In this example, we have clipped the roads and town layers to the 031D08 extent to create a basic map of Peterborough and the surrounding area. Note that you can play with symbology and labels by accessing each layer's properties (right-click > *Properties*) and selecting the appropriate tab.



As mentioned, this guide briefly touches upon a few basic concepts within the ArcGIS environment. For a more in-depth tutorial of the ArcGIS suite, we recommend ESRI's virtual campus course *Learning ArcGIS Desktop*. Virtual campus courses are available at no cost to registered members of Trent University who require GIS software for course or thesis work. If you are interested in taking this or any other virtual campus course, please contact us with your request at madgichelp@trentu.ca. Further information about ESRI virtual campus can be found [here](#).

For further assistance with this guide or other topics related to geospatial and/or statistical data and software, please contact us at madgichelp@trentu.ca.