

Using

ArcGIS 10.x

Introductory Guide

University of Toronto Mississauga Library
Hazel McCallion Academic Learning Centre

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Between 9am & 5pm
Monday to Friday

GIS Exercises using ArcGIS 10.x

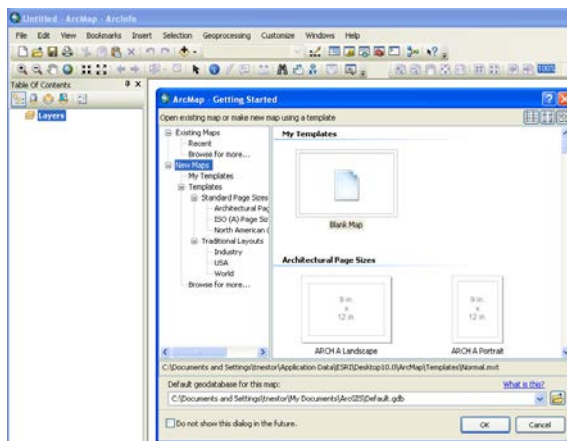
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USING ARCGIS 10.x

OPENING A NEW PROJECT

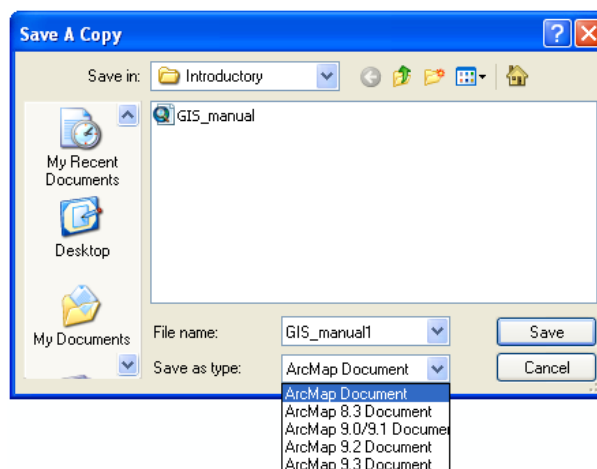
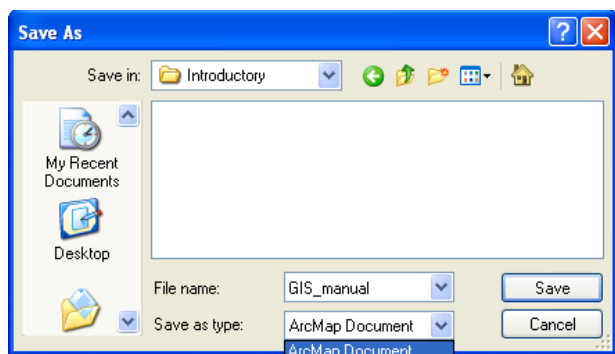
- Open **ArcGIS** and select “New Maps”
- Select “Blank Map”
- Click **OK**



SAVING A PROJECT

You have 2 options of how to save a project. You can either save as an ArcMap 10 project which will only open when using ArcMap 10 or you can save your project as an ArcMap 8.3, 9.0/9.1, 9.2, 9.3 Document. If you are planning on opening your saved project with an older version of ArcMap, be sure to save your project in the most appropriate version.

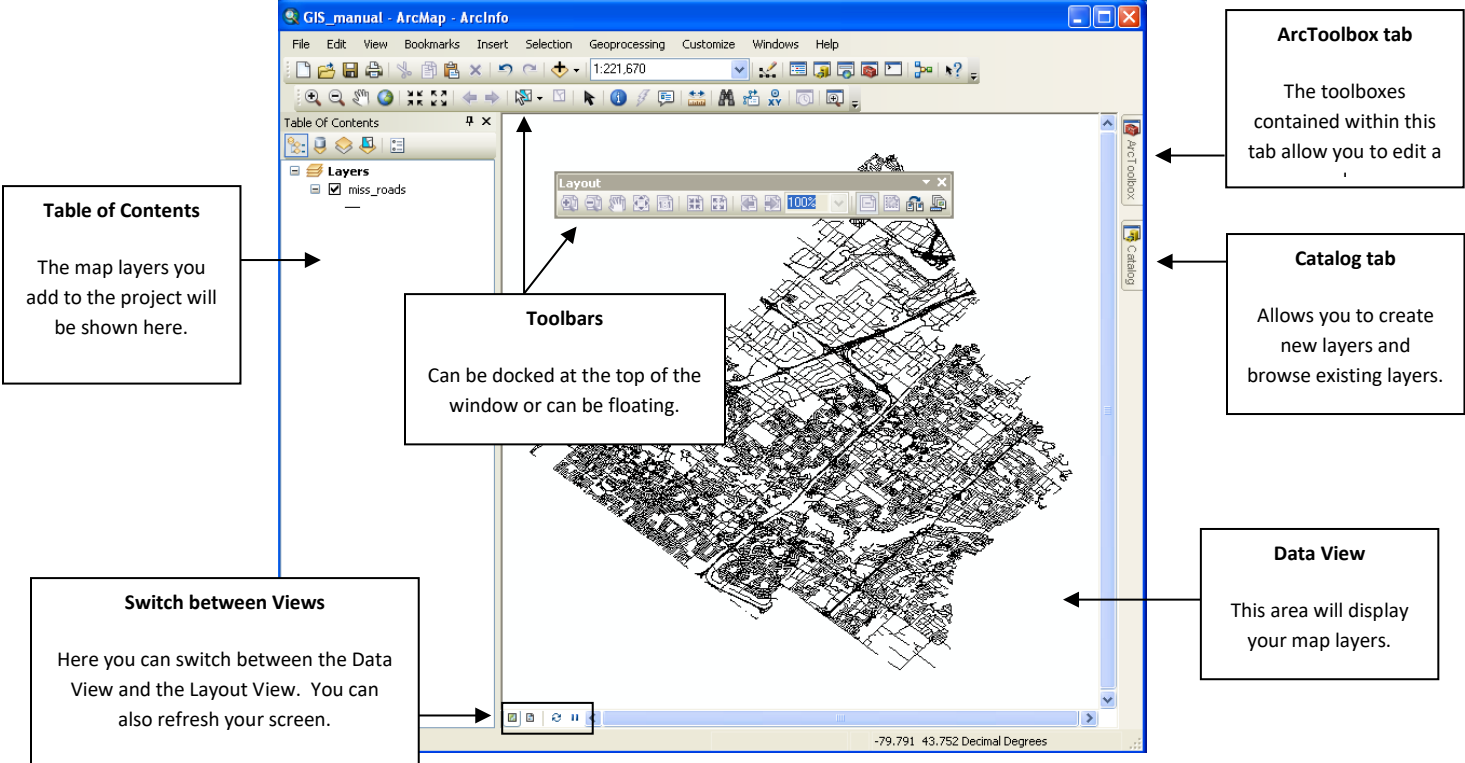
- You can save an open project by selecting **File / Save As...** (*ArcMap 10 document*) or by selecting **File / Save A Copy...** (*ArcMap 8.3, 9.0/9.1, 9.2, 9.3 documents*)
- When the Save As window opens browse to the location you would like to save and give the file a name.



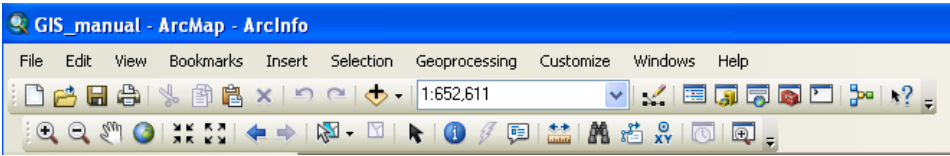
HELPFUL HINT: Please keep in mind that when you save an ArcMap project you are only saving the pathname to where your data is located, not the data itself. The project file is not a basket with your data inside, but merely a pathfinder (or placeholder) to where your current data and settings are pointed to. If you want to take your project with you, you must remember to take the data with you as well.

WORKING WITH ARCMAP

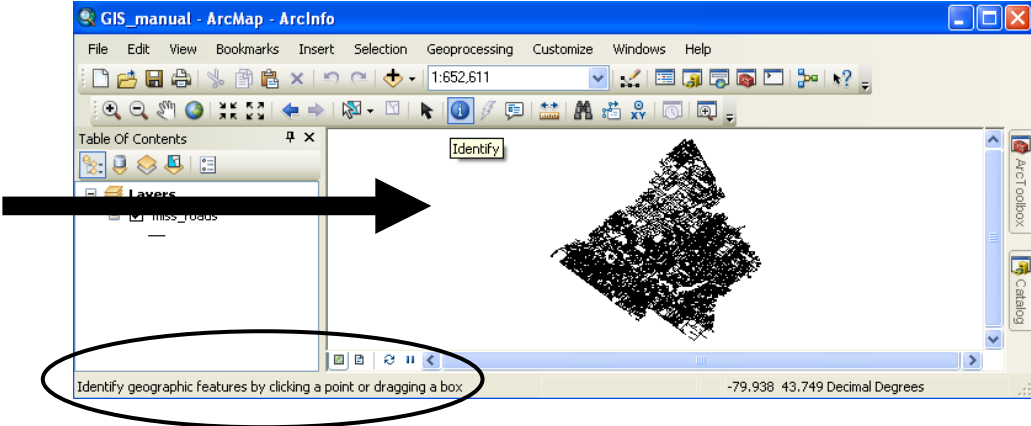
- Before beginning you may wish to familiarize yourself with the two basic section of an ArcMap project
- On the **left side** (where Layers appears) is the **Table of Contents**
- The **right side** is the **mapping area** (or data frame)
- The entire window is called the **Data View**



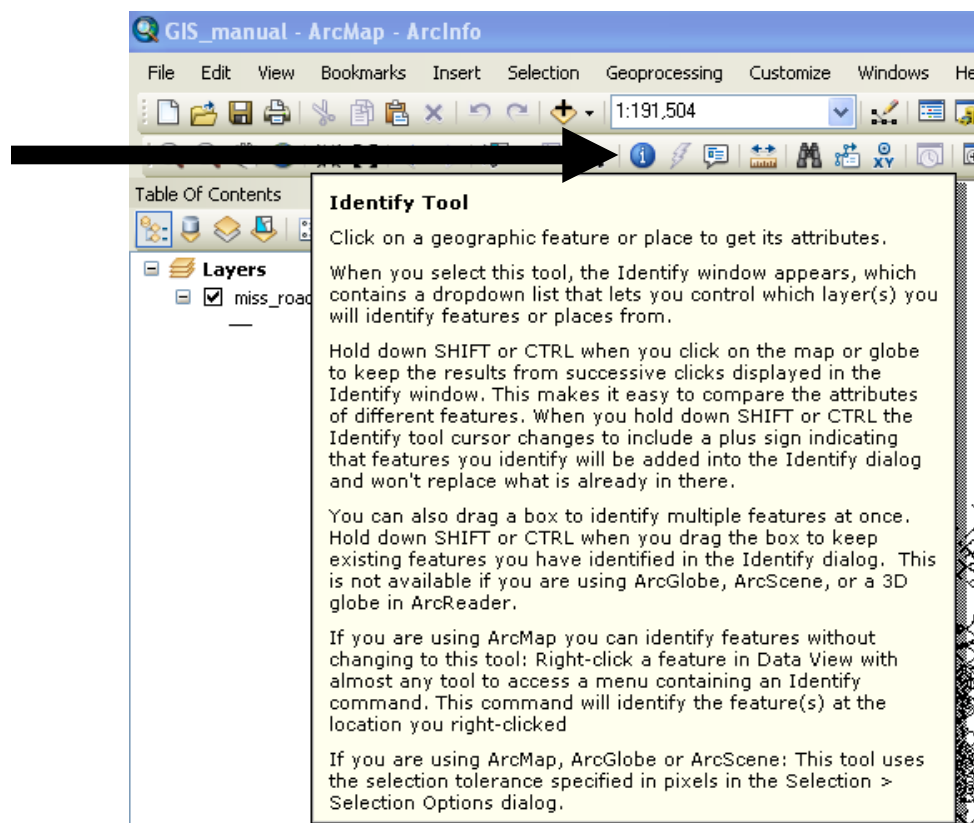
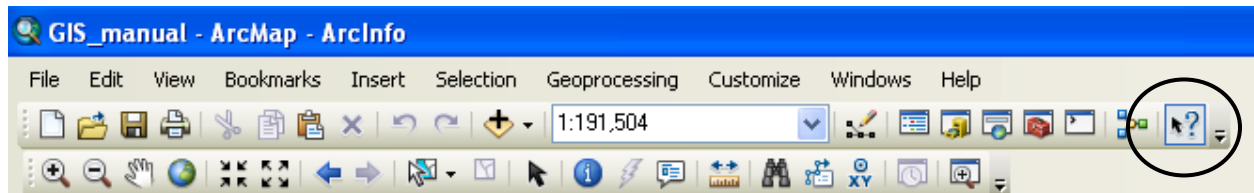
- To assist you in working with ArcGIS, it would be helpful to familiarize yourself with the standard tools



- By moving your cursor over an icon on the toolbar, a short description of the tool will appear. At the same time a **descriptor of the tool will appear on the bottom left corner of the ArcMap window**

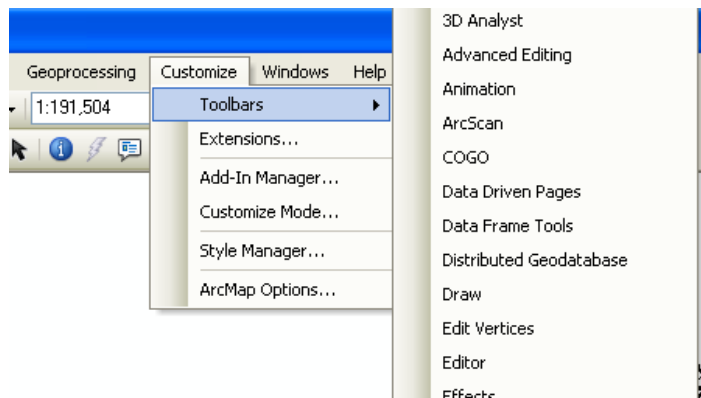


- To get more detailed information on a tool and shortcut options, select the **What's this? Help tool**
- Once selected then click on a tool to get a full description



TOOLBARS

- There are many special toolbars that can be added to the project window
- To see all the toolbars available select **Customize / Toolbars**
 - A list of all the toolbars available will appear
- You can also add a Toolbar by right-clicking anywhere in the project window menu bar



TYPES OF DATA

The data that can be displayed within ArcMap can be in either raster or vector format.

Vector Data

A coordinate-based data model that represents geographic features as **points, lines, and polygons**. Each point feature is represented as a single coordinate pair, while line and polygon features are represented as ordered lists of vertices. Attributes are associated with each vector feature, as opposed to a raster data model, which associates attributes with grid cells.

Vector definition courtesy of: ESRI Support Centre <http://support.esri.com/index.cfm?fa=homepage.homepage>

Types of Vector Data

There are 3 types of vector data files that ArcMap uses to represent spatial items.
They are: **Points, Lines, and Polygons**

Points

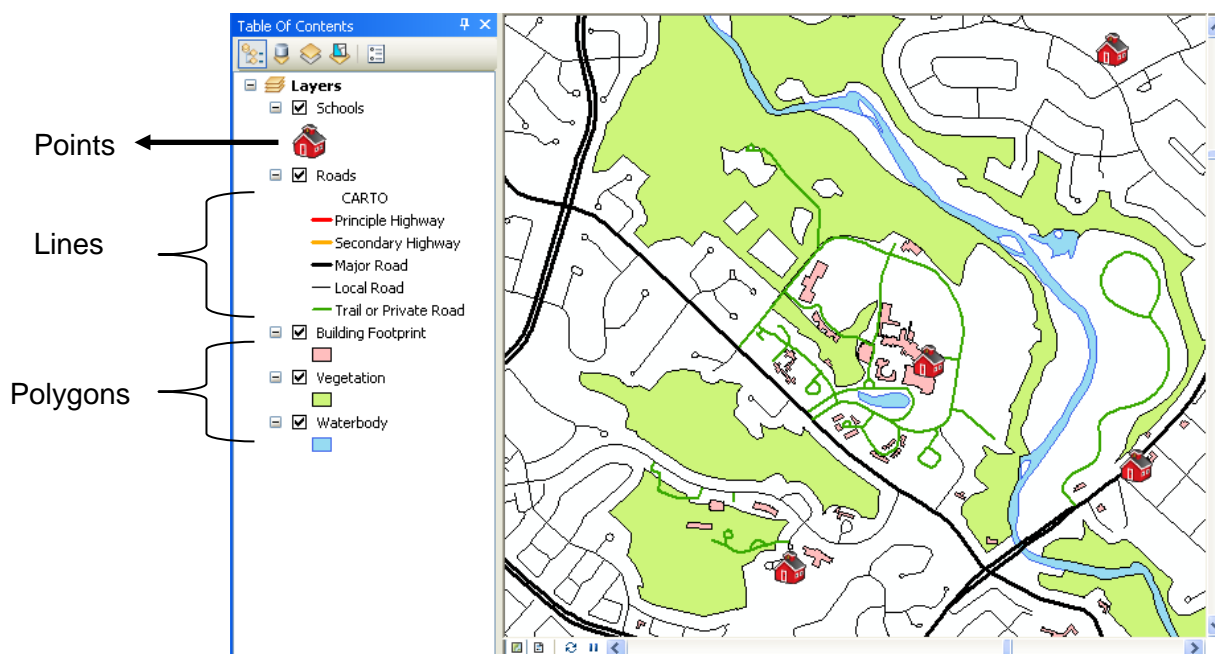
- a point is exactly as it sounds a point
- a point's icon, size, shape, and color can be changed once added to the data view

Lines

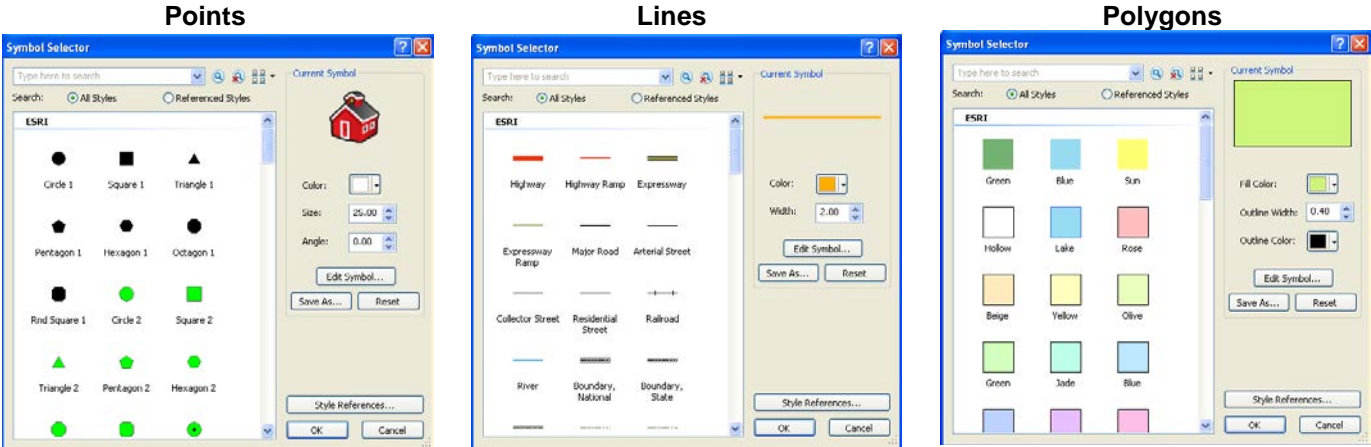
- a line is also exactly as it sounds, a line
- a line can straight, bent, crooked, curved, long, or short
- a line can vary in thickness and color

Polygons

- a polygon is a theme (or shapefile) which is encased by an edge
- a polygon's interior can any color or have no color
- a polygons edge can vary in thickness and in color



HELPFUL HINTS: To adjust color shade, line thicknesses, and other characteristics, move your cursor to the Table of Contents and left click once on the layers current display

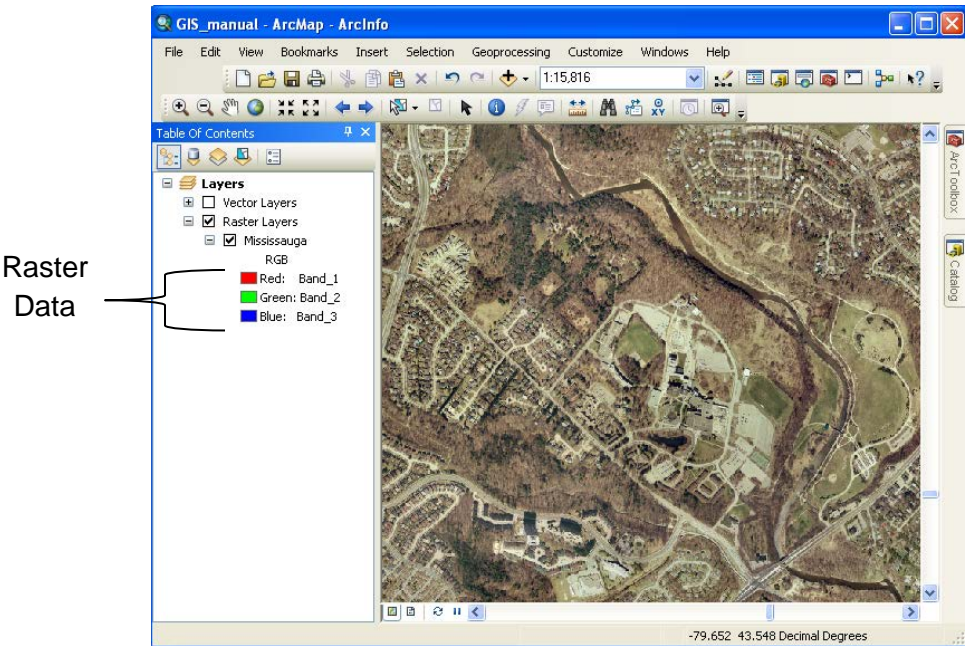


Raster Data

A spatial data model that defines space as an array of **equally sized cells arranged in rows and columns**, and composed of single or multiple bands. Each cell contains an attribute value and location coordinates. Unlike a vector structure, which stores coordinates explicitly, raster coordinates are contained in the ordering of the matrix. Groups of cells that share the same value represent the same type of geographic feature.

Raster definition courtesy of: ESRI Support Centre <http://support.esri.com/index.cfm?fa=homepage.homepage>

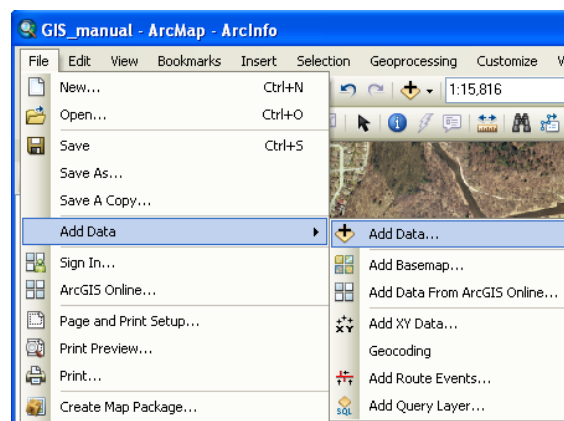
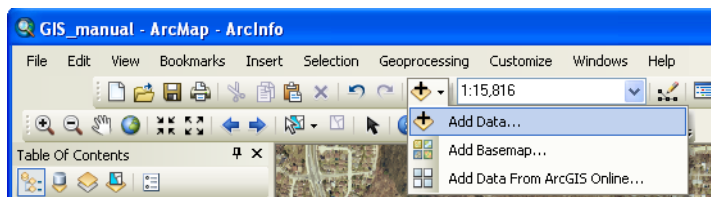
An example of Raster Data would be any type of image file, for instance a JPEG or a TIFF image file.



ADDING DATA

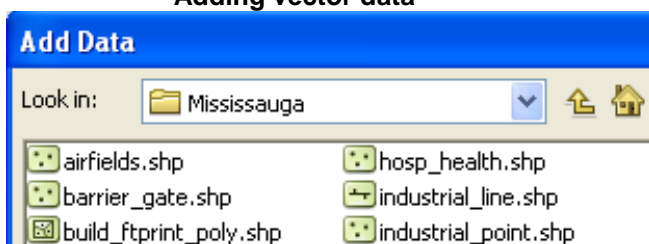
There are two ways to add layers:

- 1) Move your cursor up to **File / Add Data / Add Data...**
OR
- 2) Select the **Add Data** icon from the tool bar

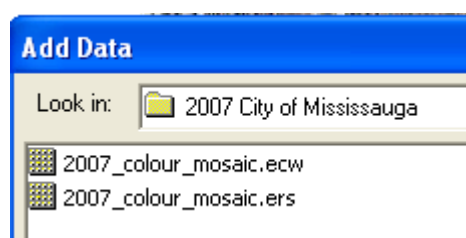


Once the **Add Data** window opens browse to the location that your data is situated. You should notice the difference between the vector layers and a raster layer. You should also be able to notice the difference between the different types of vector layers; points, lines, polygons.

Adding vector data



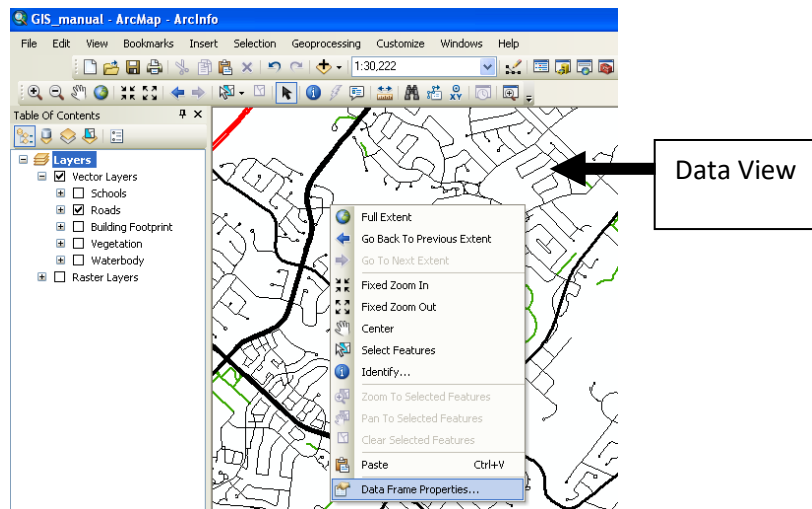
Add raster data



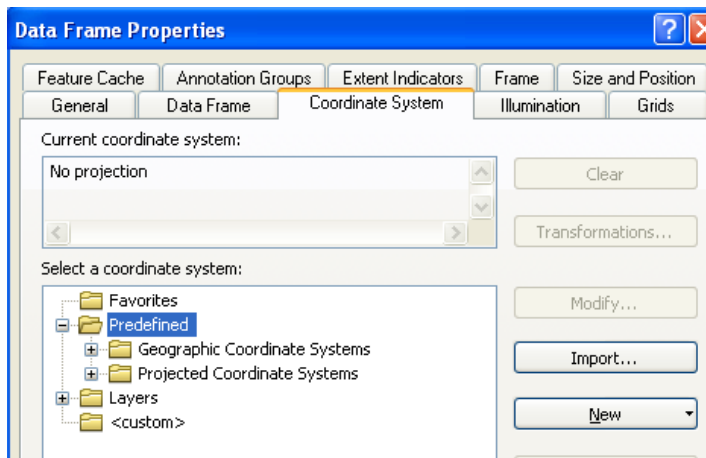
PROJECTING THE DATA FRAME

Projecting your data brings the data into a “real world” view. It will display the data as it as it actually is. You will want to project the Data View (mapping area). ArcMap allows the user to project the data frame which in turn projects the data but does not change the projection properties that are associated with the data itself.

- Move your cursor into the **Data View**
- Right-click on the mouse and select **Data Frame Properties...**



Within the Data Frame Properties window, select the **Coordinate System** tab. Here you will find a variety of Geographic and Projected Coordinate Systems to choose from. Please note that it is possible that your data frame already has a coordinate system identified. This will occur when the first layer or shapefile you have added to the project already has a coordinate system. You can also check the projection of the layers you have added to your data frame here by selecting the Layers folder.



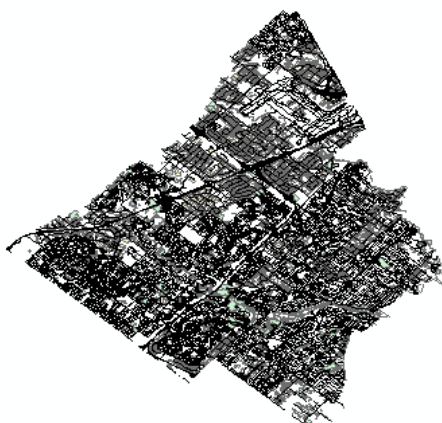
In this guide we will change the Coordinate System to **NAD83 UTM Zone 17N**.

Select:

- **Predefined**
 - **Projected Coordinate Systems**
 - **UTM**
 - **NAD 1983**
 - **NAD 1983 UTM Zone 17N**
- Once you have selected the correct coordinate system, select **OK**

Take note of how the data within the data frame has changed:

Before Projecting



After Projecting



CREATING A LAYOUT

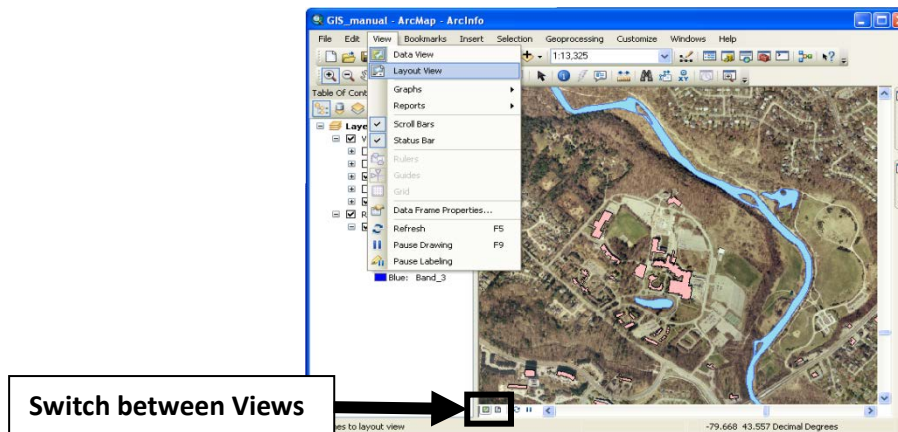
Once you have your map created in the Data View, you will want to create a layout of your map including a scale bar, orientation arrow, legend, title, and data source. You can then take this layout and print it out or save it as an image to place into a text document.

You can move back and forth between the **Data View** and the **Layout View** in 2 ways:

- 1) Select **View / Layout View** or **View / Data View**

OR

- 2) Select the icon that looks like a sheet of paper at the bottom of the data frame to see to the **Layout View** and select the icon that resembles a map to see the **Data View**



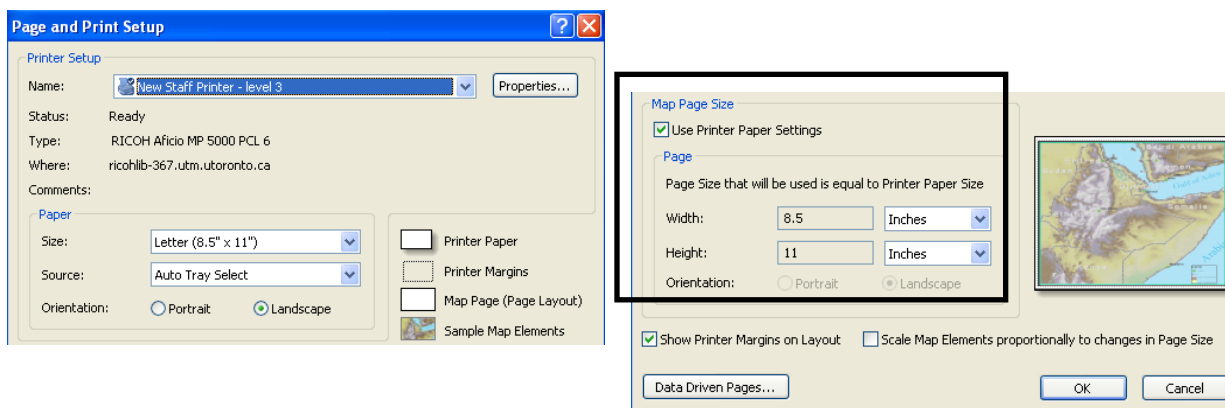
Page and Print Setup

Once you are in the Layout View, you will notice that ArcMap defaults to a Portrait Layout. If you would like to change the orientation of your Layout to landscape, you can do this by selecting **File / Page and Print Setup...**

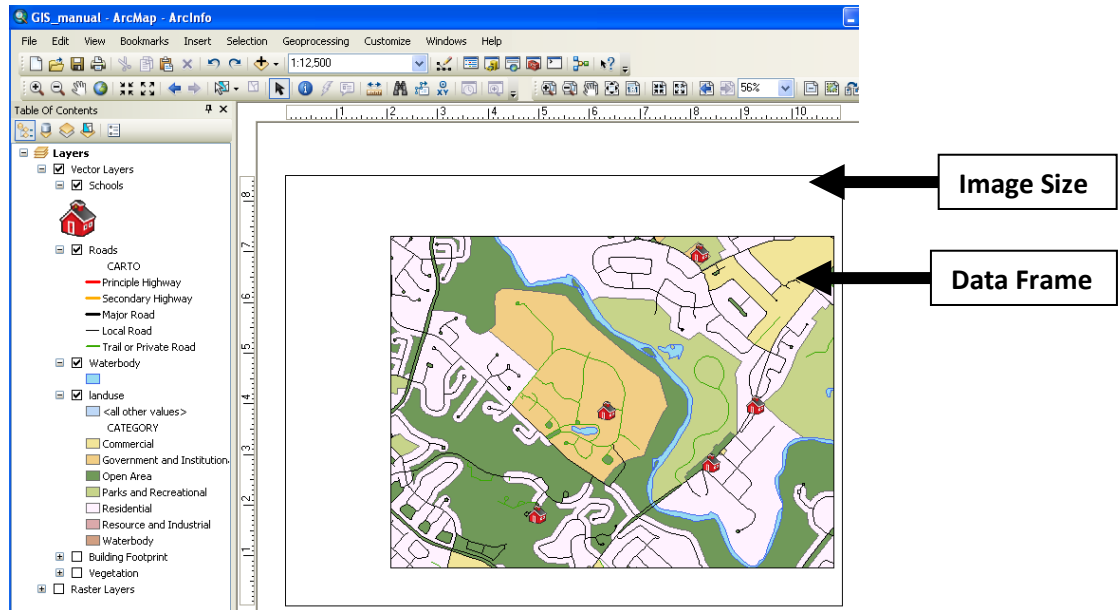
You will want to ensure that the page size is correct. For example if you are planning to print a large map you will want to ensure that the page size to 100% of the size you would like to print to. This will eliminate distortion and pixilation when printing.

Page Orientation & Size

- If you wish to change the orientation of your map you can do that here by selecting either Portrait or Landscape beneath the **Map Page Size**
- If you wish to change the page size you can change that beneath the **Map Page Size**



NOTE: If you change the page orientation, you will have to re-size the Data Frame (the area on the layout which contains your map) within the Layout View to fit the new orientation. You can change the data frame to any size you wish. Please note that the outside border is the actual image size and the inside is the data frame.

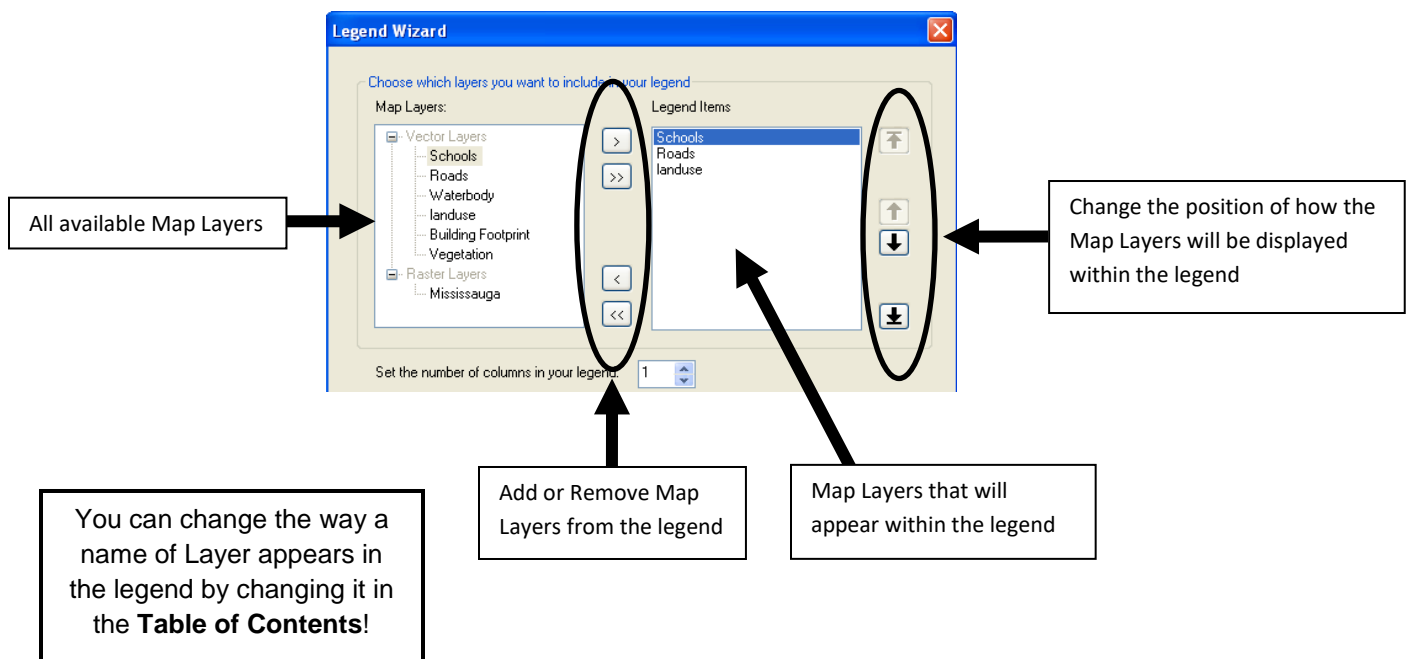


Adding a Legend

Our next step will be to add a legend to our map.

- Select **Insert / Legend...**

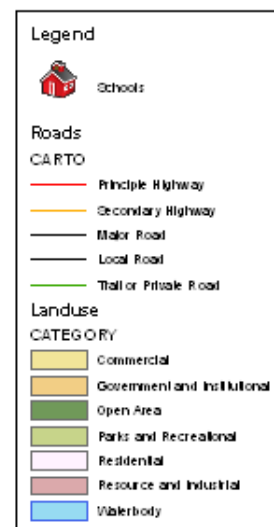
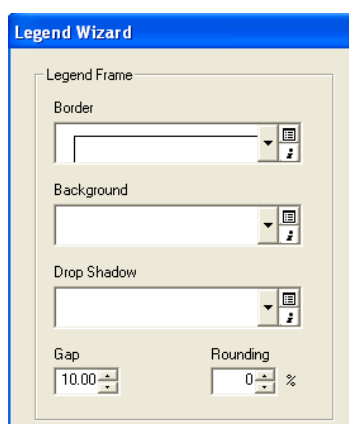
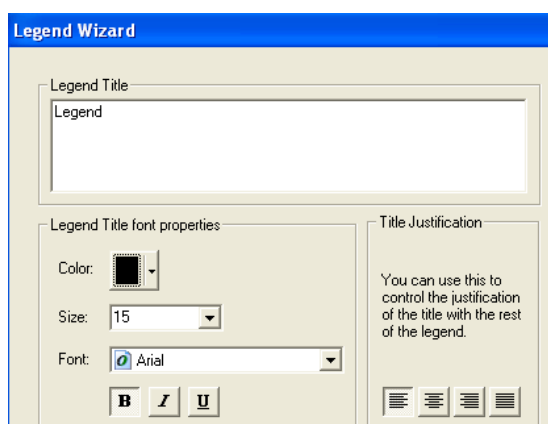
This tool will assist you in creating your legend. Take notice of the two columns. The column on the left shows all map layers present in the dataset while the one on the right shows what will actually appear in the legend. Begin by selecting the map layers that you wish to see in the legend. In this example we would like to see schools, roads, and landuse. You can add and remove map layers (as well as re-order them) by using the up and down arrows.



The next screen of the Legend Wizard allows you to give the Legend a Title as well as adjust its color, size, font, and justification. If you choose not to include a legend title within your legend, simply leave the Legend Title box blank. Once you have given your legend an appropriate title....**Click Next**

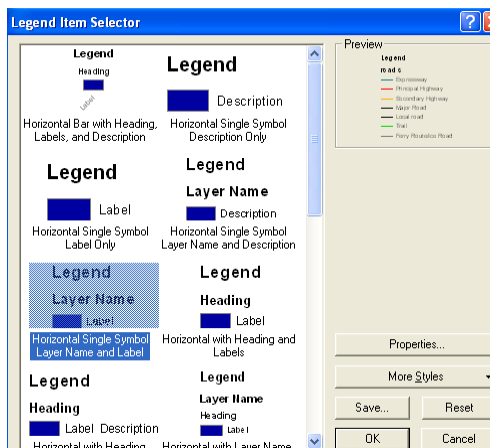
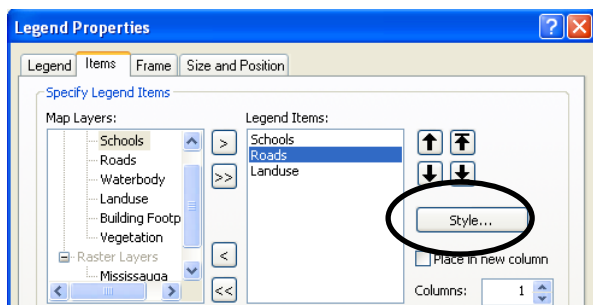
The following screen of the Legend Wizard allows you to give the Legend a border, background color, and drop shadow. Select a border and a background color for you legend. To preview your selections simply click Preview. Be sure to unselect the Preview button to continue within the Legend Wizard. Once you are satisfied with the appearance of you legend...**Click Next**

The two following screens of the Legend Wizard allows you to change and adjust the size and shape of the symbol patch used to represent the line and polygon features in your legend and allow you to adjust the spacing between parts of your legend. Once you are satisfied with your legend...**Click Finish**



You can also change the way in which the legend appears. In this case I can see that beneath the Roads heading the word CARTO still appears and beneath Landuse CATEGORY.

- Double click on the Legend
- Select the **Style** link from the Items tab
 - Be sure to have the legend item you want to change selected
- When the Legend Item Selector window opens you can choose various formats to view your Legend

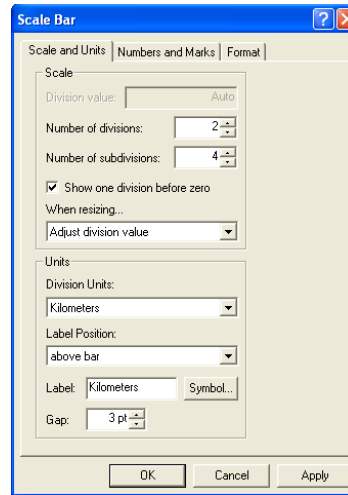
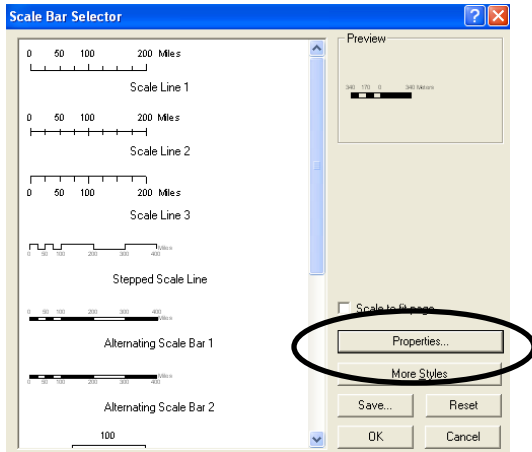


Adding a Scale Bar

Our next step will be to add a scale bar to our map.

- Select **Insert / Scale Bar...**

Numerous options for Scale Bars will appear. Select a Scale Bar and then click...**Properties**. This will allow you to define the units for your Scale Bar as well as other various characteristics. Once you are satisfied with your scale bar selections...Click **OK**

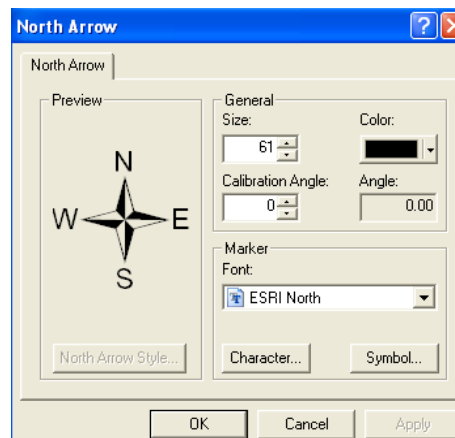
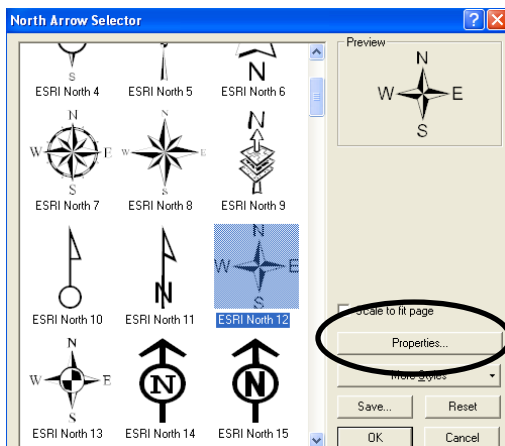


Adding a North Arrow

Our next step will be to add a north arrow to our map.

- Select **Insert / North Arrow...**

Once again numerous options for North Arrows will appear. Select a North Arrow and then click...**Properties**. This will allow you to further define your North Arrow selection. Once you are satisfied with your North Arrow selections...Click **OK**



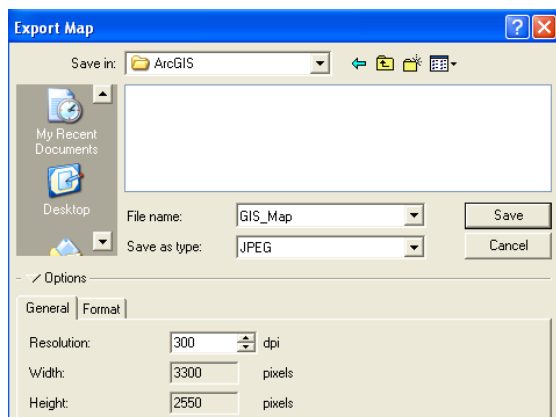
Exporting and Printing

Once you are happy with your layout, you can print it or export it in digital format using the Export function, under the File menu.

Exporting

- You can export your layout by selecting **File / Export map...**

The Export Map window will open and allow you to save the layout as an image file. As you can see below you have the option of saving in various formats. You can also save the image to a resolution of your choosing. Keep in mind the higher the dpi (dots per inch) the larger the file size will be.



Printing

We always recommend that you set your **Page and Print Setup** before starting to work on your layout. If you have not done this yet please refer to **Page and Print Setup** on page 8 of this guide.

- Select **File / Print Preview...**

This will take you to a screen shot of what your layout will look like once printed. After you verify that the layout looks as you would like, select **Print**. Next verify that the printer you want to print to is selected and select **OK**.

