

ERC ArcGIS Tutorial Step-by-step guide:

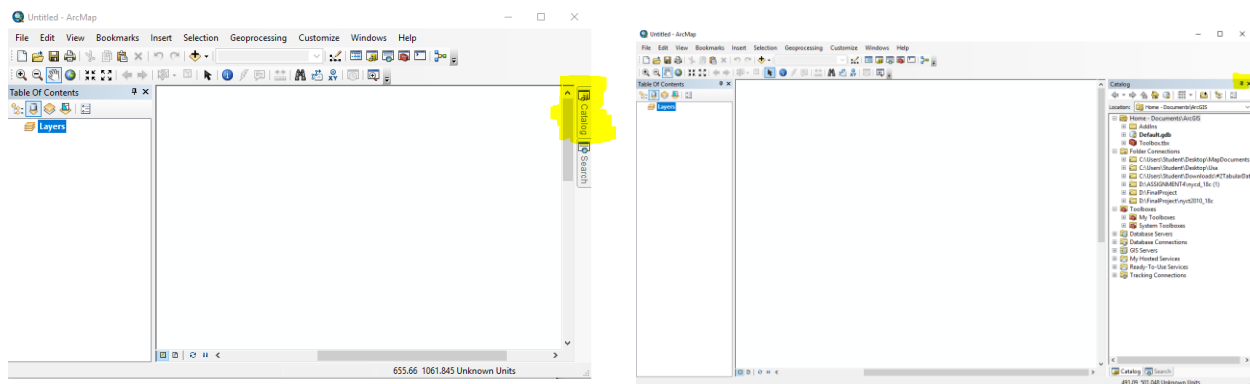
This guide is for use with the ERGISWORKSHOP materials available on the ERC site page for Environmental and Natural Resource Economics.

Download the zip file – extract the entire file into a USB or hard drive – **KEEP ALL THE FILES TOGETHER and DO NOT DELETE ANY OF THE FILES**

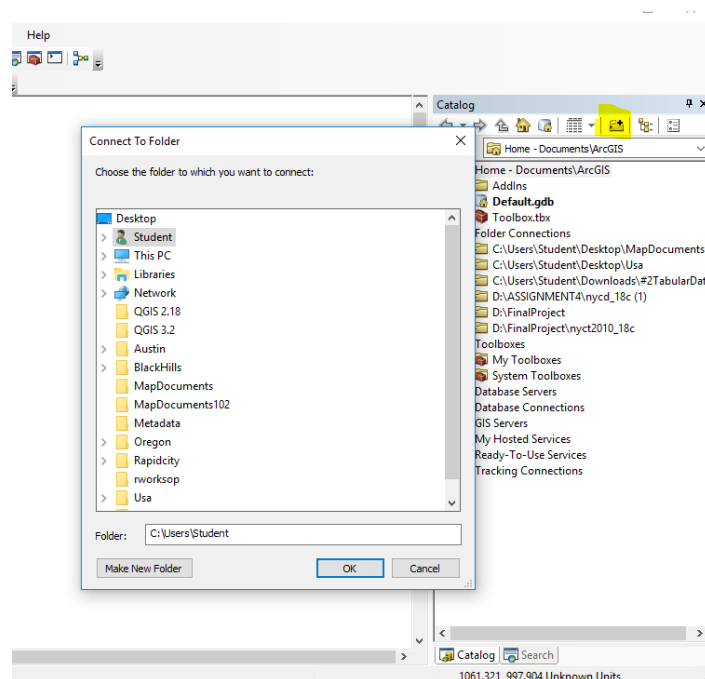
Loading the data and shapefile into ArcMap:

Open ArcMap 10.3.1 (on a Columbia or Barnard campus computer)

Click on the catalog tab (all the way on the right), when you click on it, the catalog dialog box will expand. Click the pushpin/thumbtack icon (it's small) in the right corner of the catalog dialog box (by the X).



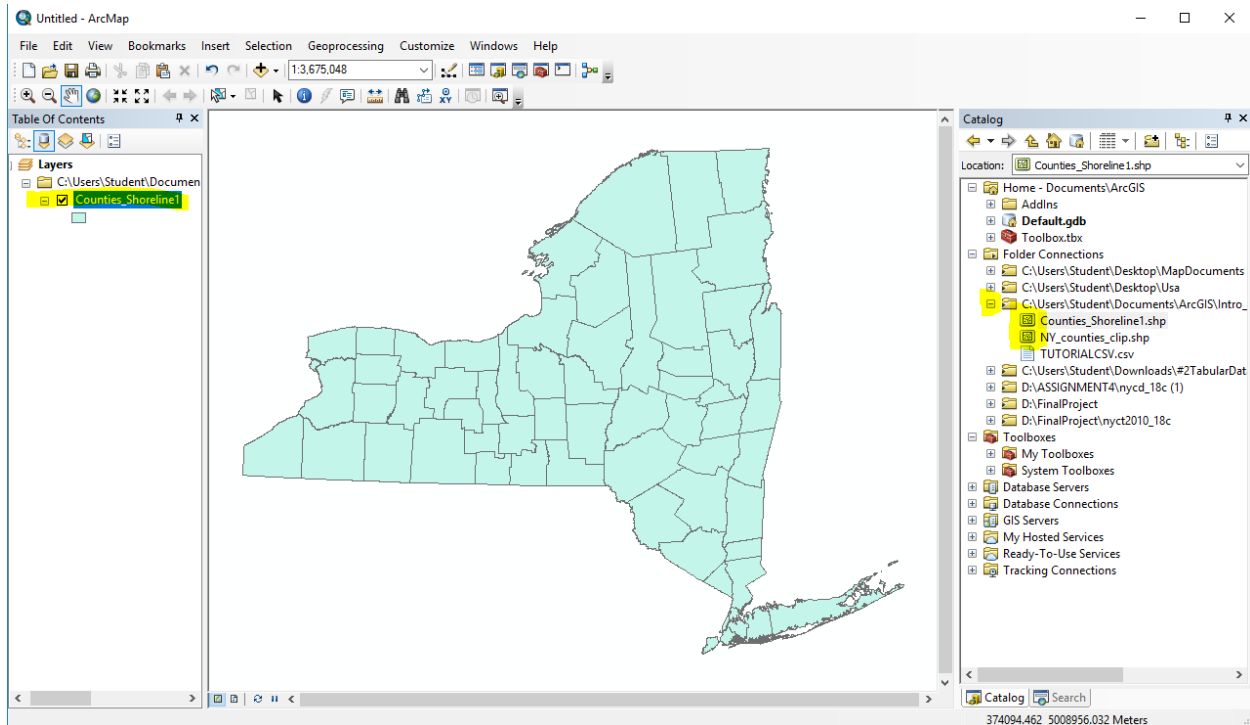
Click on the icon with a folder and a plus sign. “Folder connections” should appear in the menu.



Select the folder where the zip file is located on your computer, i.e. the file path (temp drive on lab computers).

You should see the two green shapefile icons for the files labeled “Counties_Shoreline.shp” and “NY_counties_clip.shp”.

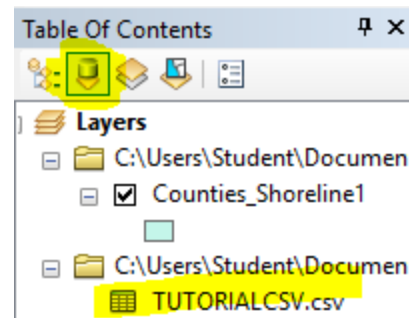
Drag and drop Counties_Shoreline.shp into the white space in the data view of the ArcMap interface. Do not use the NY_Counties_clip file.



You should see Counties_Shoreline show up in the Table of Contents dialog box on the left hand side of the interface (with the box checked). If the box is unchecked, check the box to use the Counties_Shoreline shapefile.

Drag and drop the TUTORIAL.CSV csv/tabular file from the catalog dialog box to the Table of Contents dialog box (or drag and drop it on the map). Nothing will happen, but you should see the csv/tabular file show up in the Table of Contents dialog box.

If you can't see the csv/tabular file, make sure you have selected the “List by Source” icon at the top of the Table of Contents dialog box (make sure you are not clicked on the “List by Drawing Order”)



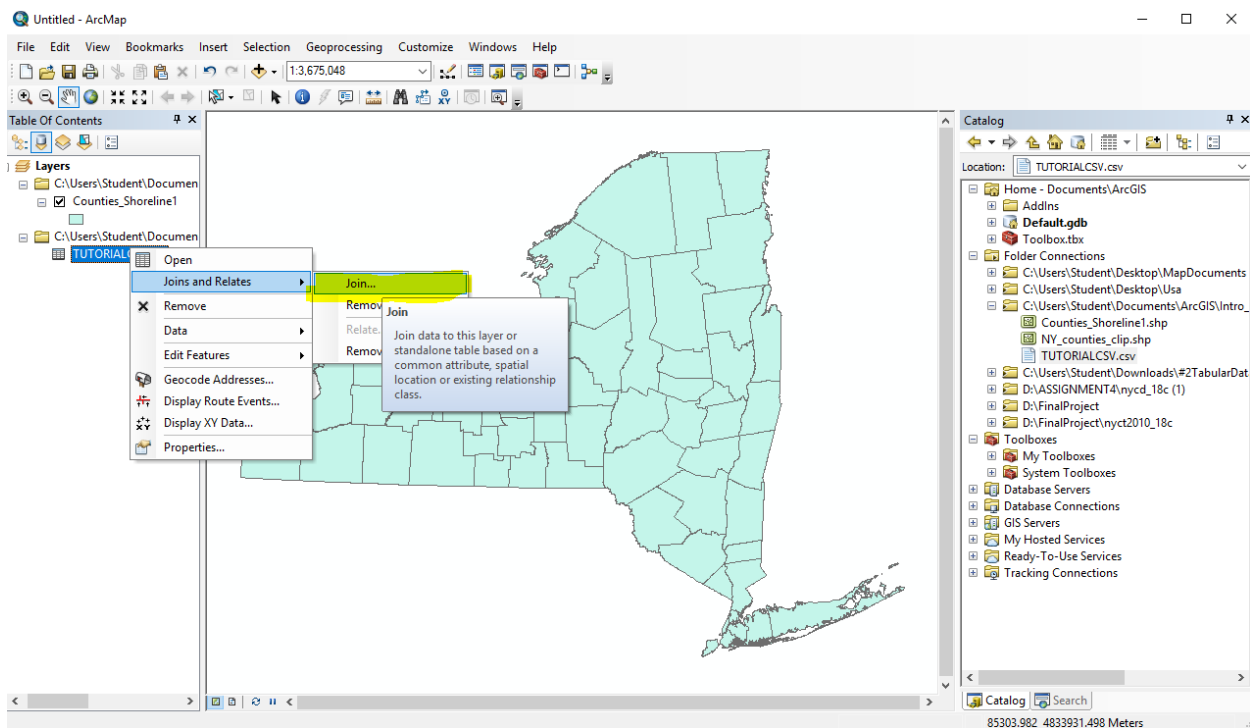
Now you need to join your tabular data (TUTORIAL.csv) with your shapefile (Counties_Shoreline). Each file contains data, you are joining the tabular data on the same geographic variable that is contained in the shapefile (in this case, it's New York counties).

****Tip:** “joining” files in GIS is functionally equivalent to the merge command in Stata (i.e. you are creating one dataset from two, by merging them on a variable that is contained in both datasets and sorted in the same order).

****Second tip:** you can always check your data in tabular form by rightclicking on the shapefile or csv file in the Table of Contents and selecting “Open” or “Open Attributes Table”

Example of troubleshooting mismatched data types when joining shapefiles and .csv:

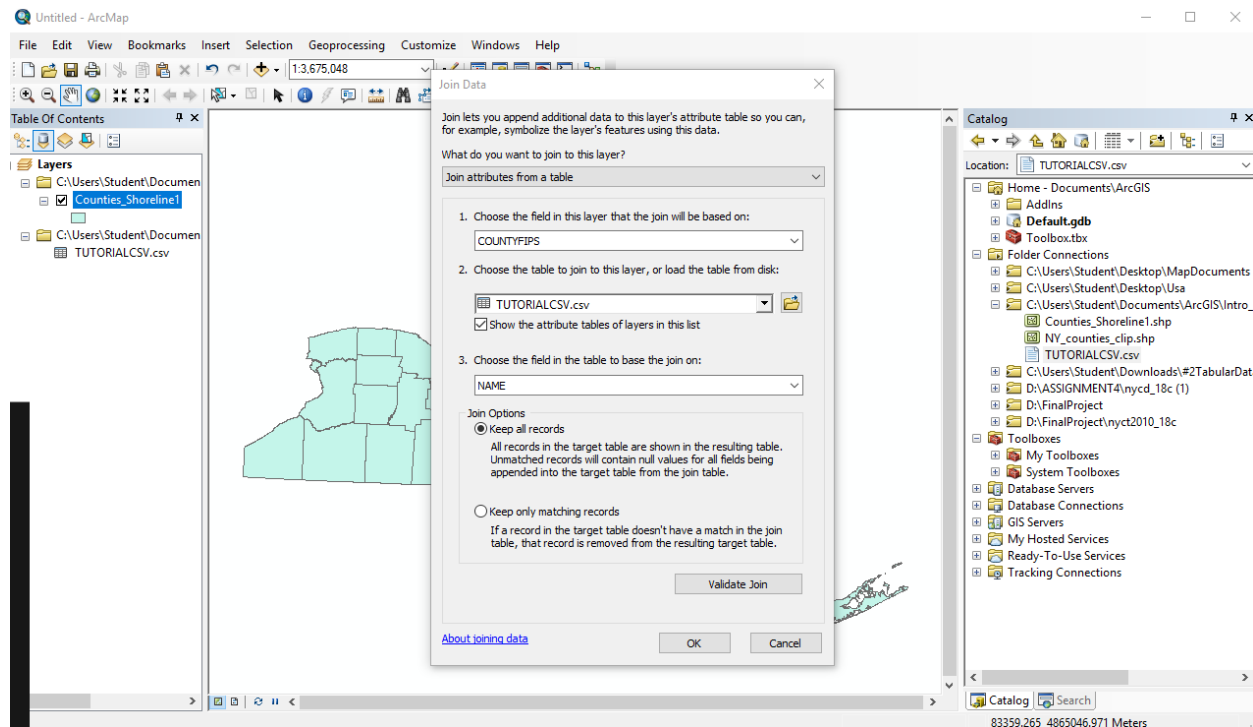
Right click on Counties_Shoreline in the Table of Contents dialog box and click “joins and relates” and then “join.”



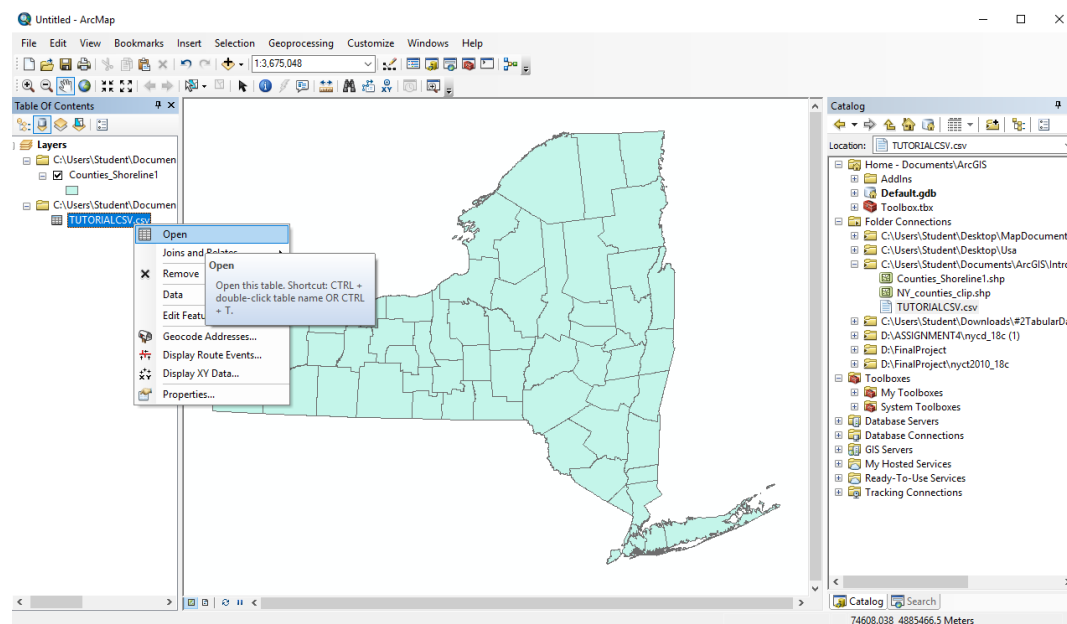
A pop up dialog box. The first drop down menu allows you to select the variable you want to join the files on. Select “CountyFIPS”. (Because you join files on the geographic variable/attribute in common)

In number 3 of the pop up dialog box (another dropdown menu), you should be allowed to select the variable you want to join from the csv file. However, when you select the dropdown menu, you only see “NAMES” and one other “NAMES” type of variable. The numeric variables do not appear, so you know there’s a problem.

This is a common problem: mismatched data types.



Right click on TUTORIAL.CSV and open the attribute table. Right click on the first cell of the COUNTYFIP column and check the data type (it should be long, short, or an integer).



Table

TUTORIALCSV.csv

STATEFP	COUNTYFP	COUNTYNS	GEOID	NAME
36				Albany County
36				Allegany Coun
36				Bronx County
36				Broome County
36				Cattaraugus C
36				Cayuga County
36				Chautauqua Ci
36				Chemung Cour
36				Chenango Cou
36				Clinton County
36				Columbia Coun
36				Cortland Count
36				Delaware Cou
36				Dutchess Cou
36				Erie County
36				Essex County
36				Franklin Count
36				Fulton County
36				Genesee Cour
36				Greene County
36				Hamilton Count
36				Herkimer Coun
36				Jefferson Cou
36				Kings County
36				Lewis County
36				Livingston Cou
36				Madison Count
36				Monroe County
36				Montgomery C

Sort Ascending
Sort Descending
Advanced Sorting...
Summarize...
Statistics...
Field Calculator...
Calculate Geometry...
Turn Field Off
Freeze/Unfreeze Column
Delete Field
Properties...

Properties
View or edit the field properties of the current column.

0 (0 out of 62 Selected)

Table

TUTORIALCSV.csv

STATEFP	COUNTYFP	COUNTYNS	GEOID	NAME
36	1	974099	36001	Albany County
36	3	974100	36003	Allegany Coun
36	5	974101	36005	Bronx County
36	7	974102	36007	Broome County
36	9	974103	36009	Cattaraugus C
36	11	974104	36011	Cayuga County
36	13	974105	36013	Chautauqua Ci
36	15	974106	36015	Chemung Cour
36	17	974107	36017	Chenango Cou
36	19	974108	36019	Clinton County
36	21	974109	36021	Columbia Coun
36	23	974110	36023	Cortland Count
36	25	974111	36025	Delaware Cou
36	27	974112	36027	Dutchess Cou
36	29	974113	36029	Erie County
36	31	974114	36031	Essex County
36	33	974115	36033	Franklin Count
36	35	974116	36035	Fulton County
36	37	974117	36037	Genesee Cour
36	39	974118	36039	Greene County
36	41	974119	36041	Hamilton Count
36	43	974120	36043	Herkimer Coun
36	45	974121	36045	Jefferson Cou
36	47	974122	36047	Kings County
36	49	974123	36049	Lewis County
36	51	974124	36051	Livingston Cou
36	53	974125	36053	Madison Count
36	55	974126	36055	Monroe County
36	57	974127	36057	Montgomery C

Field Properties

Name: COUNTYFP
Alias: COUNTYFP
Type: Long

Display
☐ Turn field off
☐ Make field read only
☐ Highlight field

Number Format: Numeric ...

Data
Allow NULL Values: Yes
Default Value:

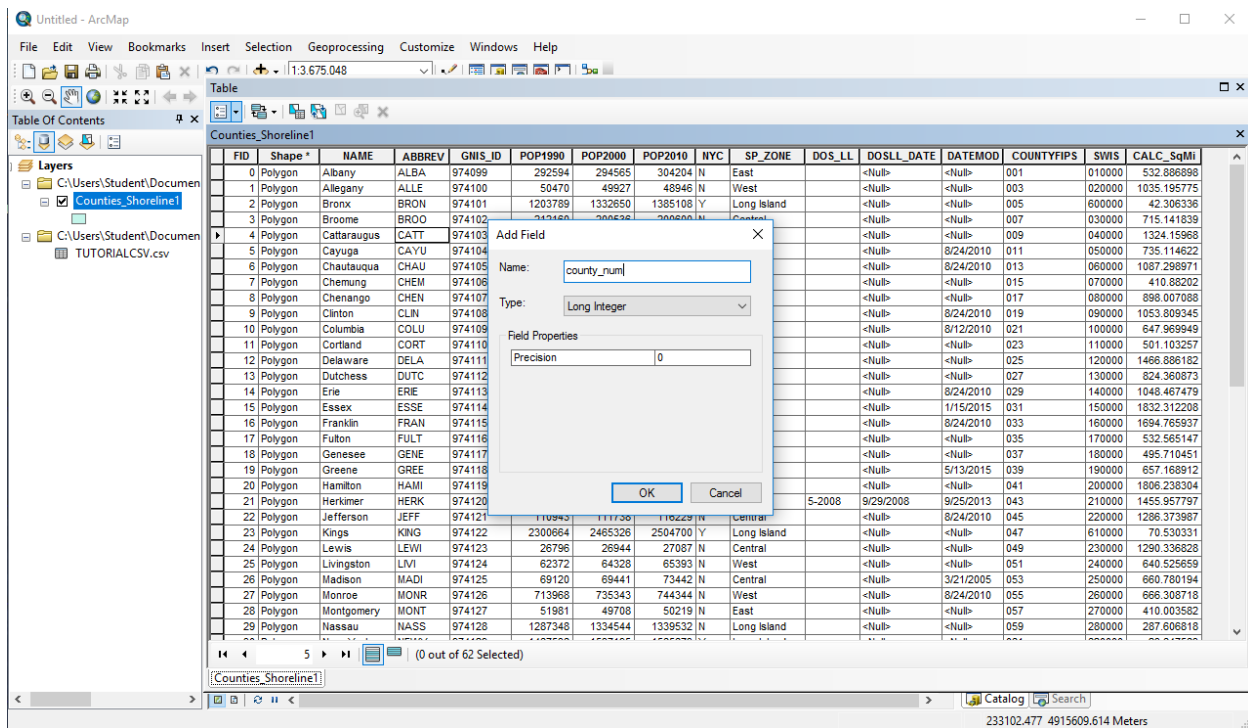
OK Cancel Apply

0 (0 out of 62 Selected)

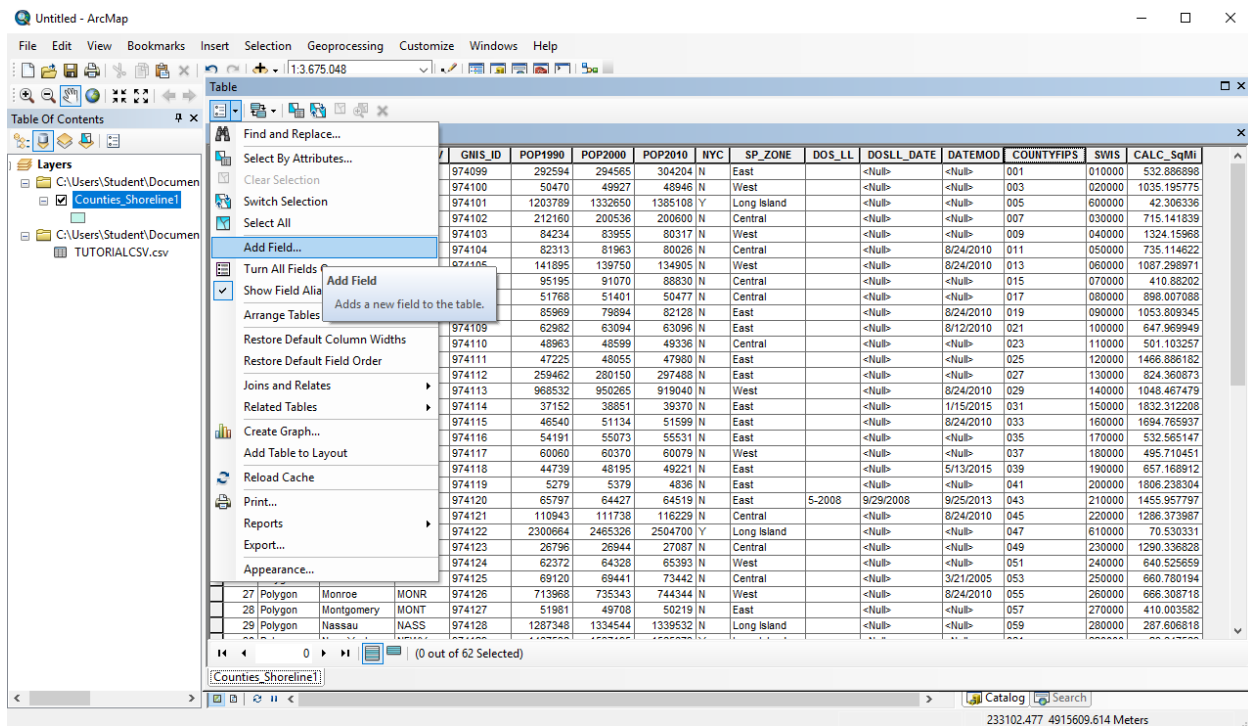
TUTORIALCSV.csv

Close the TUTORIAL.CSV attribute table, right click on Counties_Shoreline and open the attribute table. Right click on the first cell of the COUNTYFIPS column and check the data type (it should be a string). You need to create a new variable for counties that's an integer so that it will join with the .csv file.

In the attribute table for Counties_Shoreline, click the first icon on the left in the menu ("Table Options"), then select "add field."

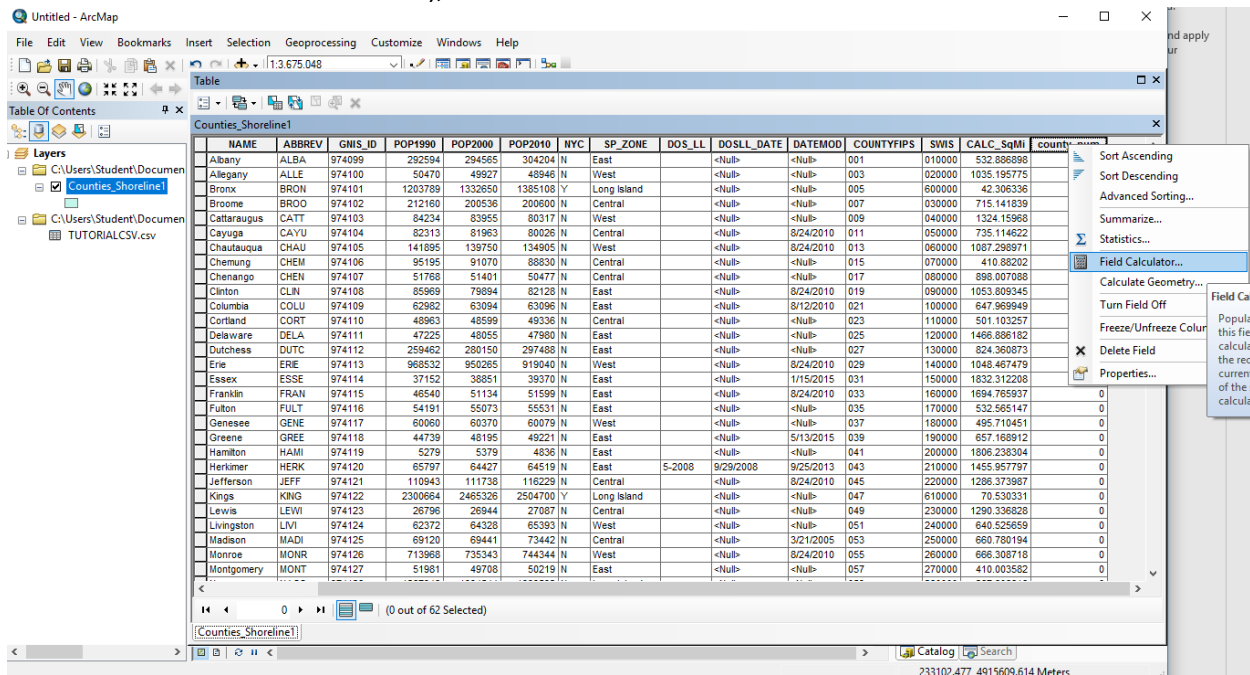


In the pop up dialog box, type in a name for the new variable, it must be less than 12 characters (county_num).

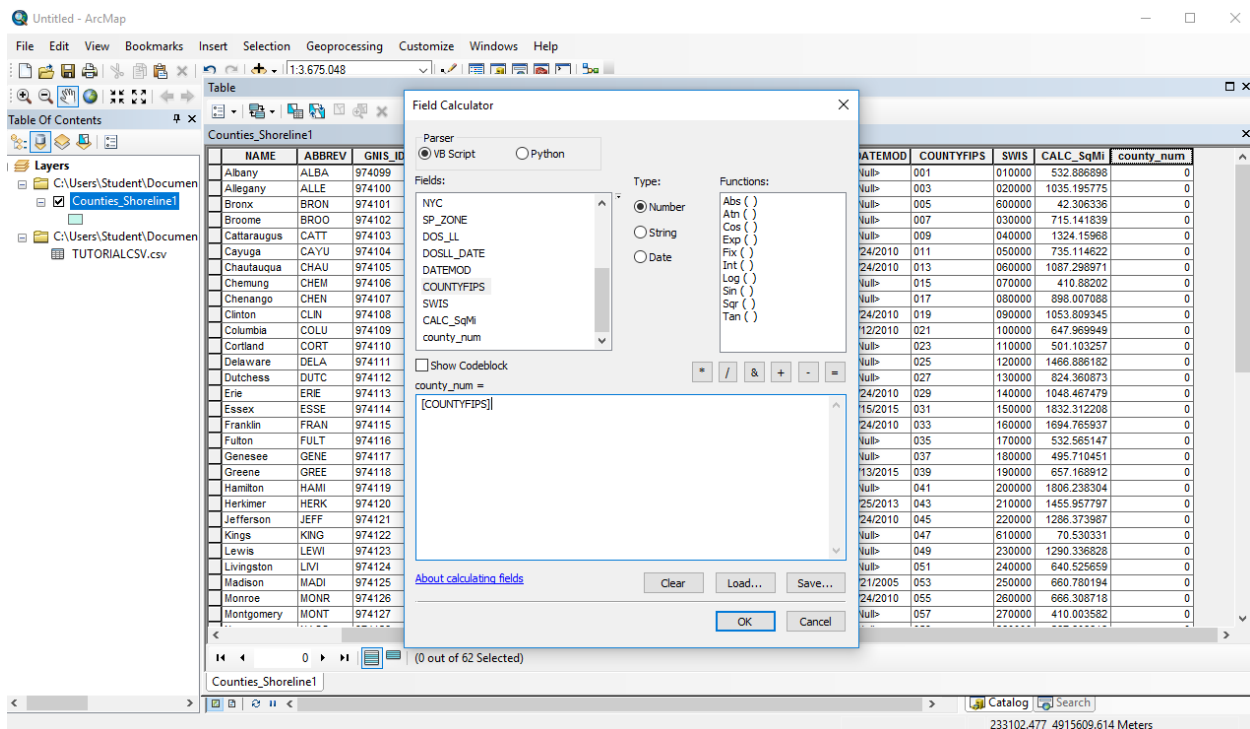


Set the new variable/field to a "long integer" and hit OK (or save). When that box is closed, scroll to the end of the attribute table. You should see the new variable. Right click on the variable name (the first

cell in the first row for that variable), and select “field calculator” from the menu.



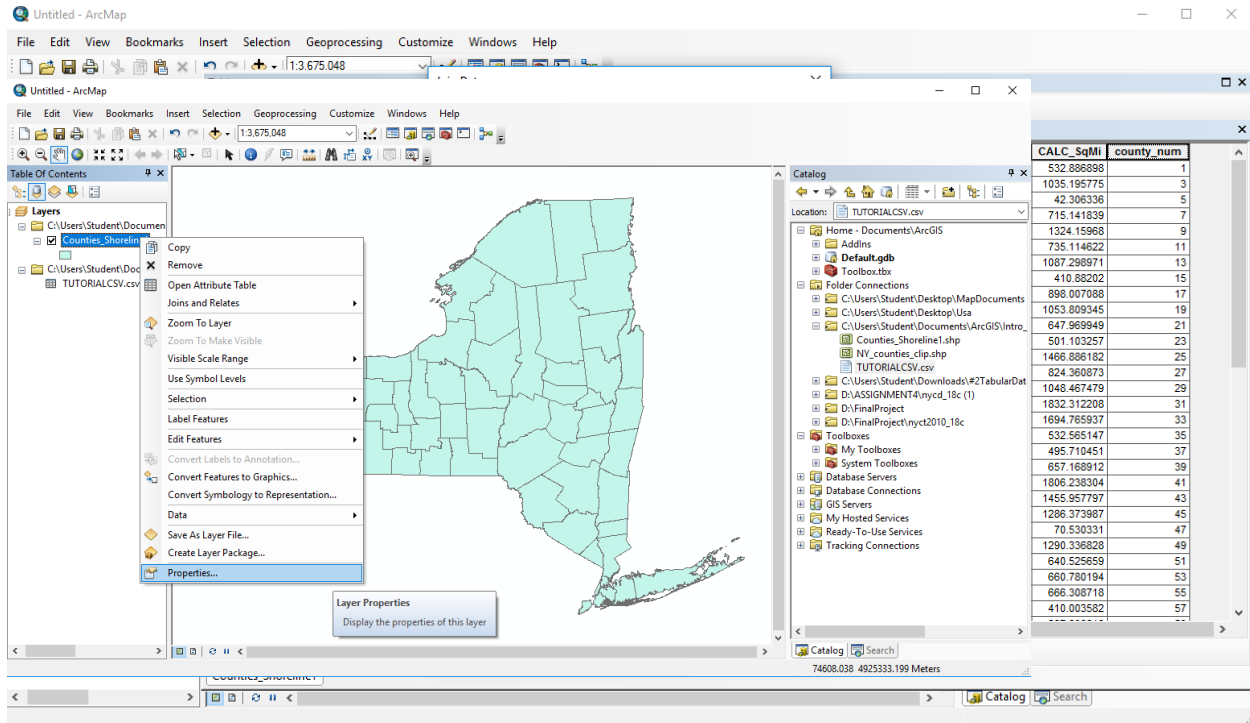
In the field calculator, scroll through the variable until you find the string version of the county variable (COUNTYFIPS), and double click on it. It should appear in the box below. Once you have selected “OK” or save and the dialog box closes, you should see the numbers appear in the new variable column.



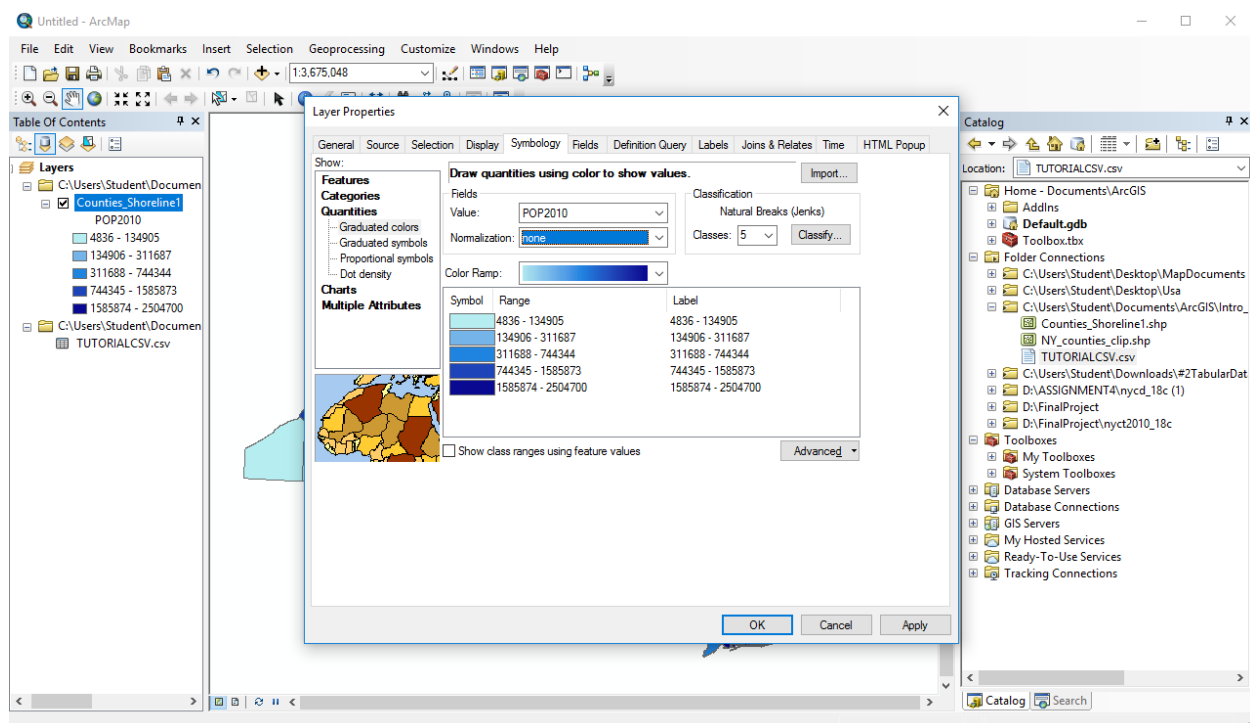
You can close the attribute table and go through the steps again to join the tabular file and shapefile (right click Counties_Shoreline and click “joins and relates” and then “join”). You should now be able to

select your newly created variable (county_num or whatever you named it (it will be at the end of the drop down menu) and then select COUNTYFP.

Click “Validate join”. Make sure the cases match (don’t worry about the error-looking message if the cases match). Then click OK or continue and your data should be joined.



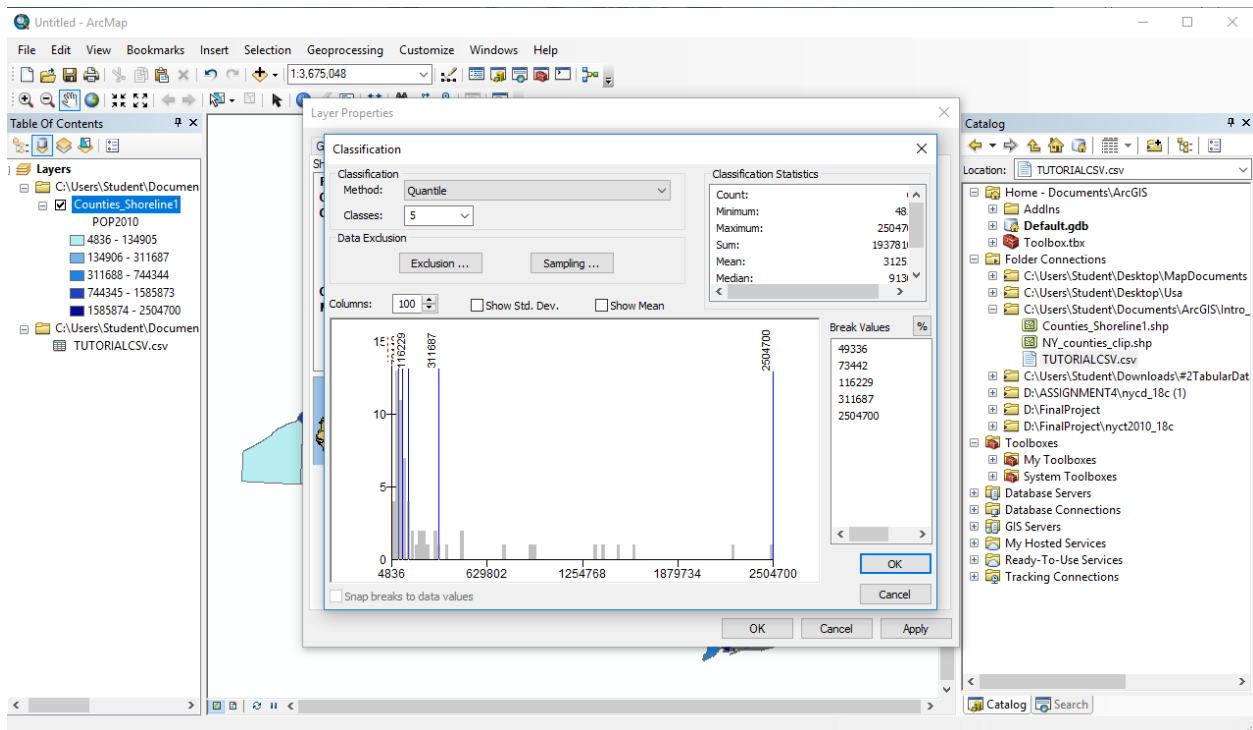
Adding a variable/layer to your map: Right click on Counties_Shoreline in the Table of Contents dialog box and click “properties”.



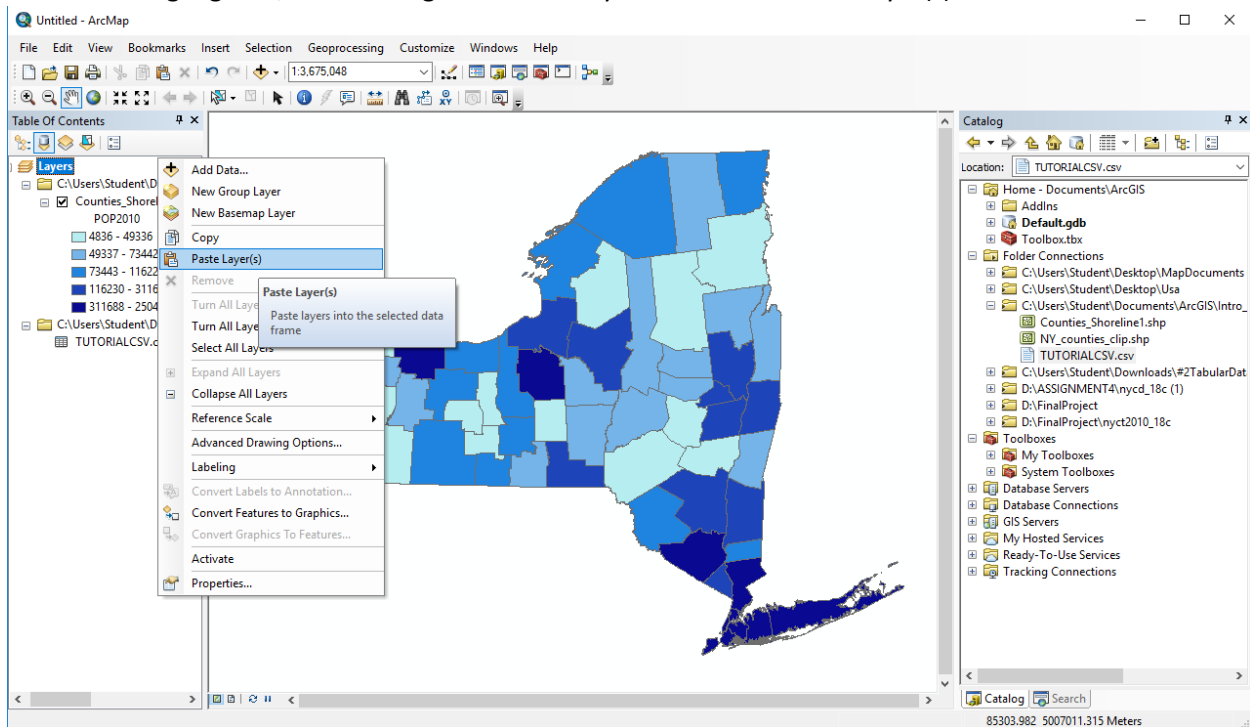
When the dialog box pops up, click on the “Symbology” tab. In the symbology tab, click “quantities”. In the “Quantities” tab, select the dropdown menu labeled “values” and select the variable that you want to display on the map.

If the variable needs to be normalized (not raw numbers), select “normalization” and change it to percent.

If you want to change the number of categories displayed on the map, click “classify” in the classification box on the right of the dialog box and change the classification method to something other than “natural breaks” (e.g. quantiles) and click “OK”.



To add a variable, right click on Counties_Shapefile and click “copy”. Then click the bold word “Layers” so that it is highlighted, and then right click on “Layers” and click “Paste layer(s)”.

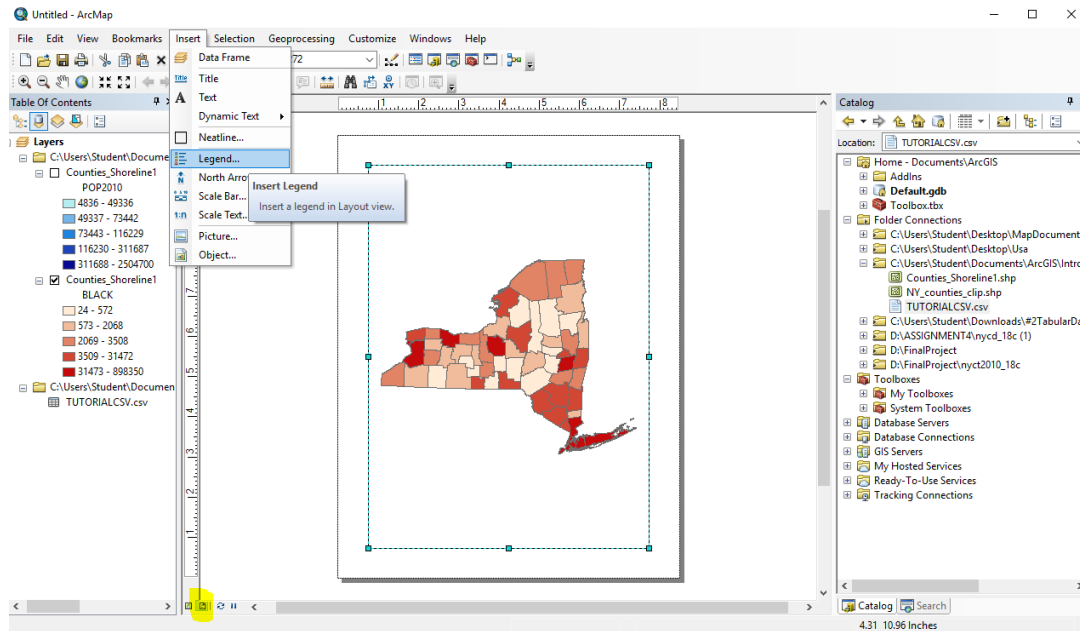


Right click on second Counties_Shapefile layer and click “properties” and repeat the steps to add a variable (quantities → values → classify, etc.).

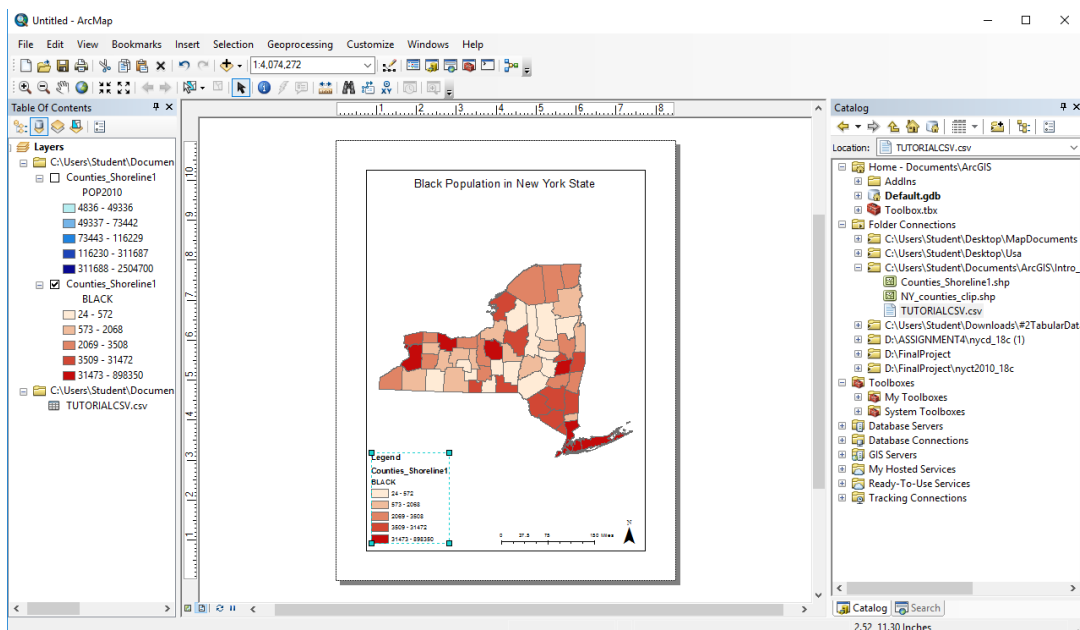
Making your map legible and exporting map(s):

Switch to “Layout view” (bottom right, tiny icon there are two tiny icons, one is the data view, one is the layout view).

Up in the main menu bar, click “Insert”, and click “Legend”. Go through the legend wizard to add the items that you want to the legend.



In the “Insert” menu, add a north arrow and a scale bar.



Select “File” in the main menu bar, and then click “export map” to save a .pdf or .jpg of the map that is currently in the layout view. You can repeat this step for any map that you create, but once you change the map in ArcMap you can no longer navigate back to previous maps. So, you should export each map that you create before generating any further maps.

To save the data and the map, select “Save as” from the “File” drop down menu in the main menu bar, and save the map and the data as a .mxd file, which can only be opened in ArcMap software.