Red or Blue: Presidential / Gubernatorial Politics

Overview and Goals: (NOTE: Save all Excel files as .xls, NOT .xlsx (thus… 97-2003 Excel Workbook)

Objective: In this, the second technical map assignment this term, we will be working with Presidential data from the 2000-2016 elections. We'll investigate voting patterns among counties in Texas state, and pay special attention to differences between the 200 and 2016 elections. While completing this map you will become acquainted with 1) data tables and formulas in MS Excel; 2) importing data into ArcGIS via ArcMap; 3) joining attribute data to an existing feature in ArcMap; 4) the manipulation of attribute data in ArcMap; and 5) the production of simple thematic maps. Your **MS Excel** skills will be put to the test, as you write 'if/then' formulas, paste values, etc.

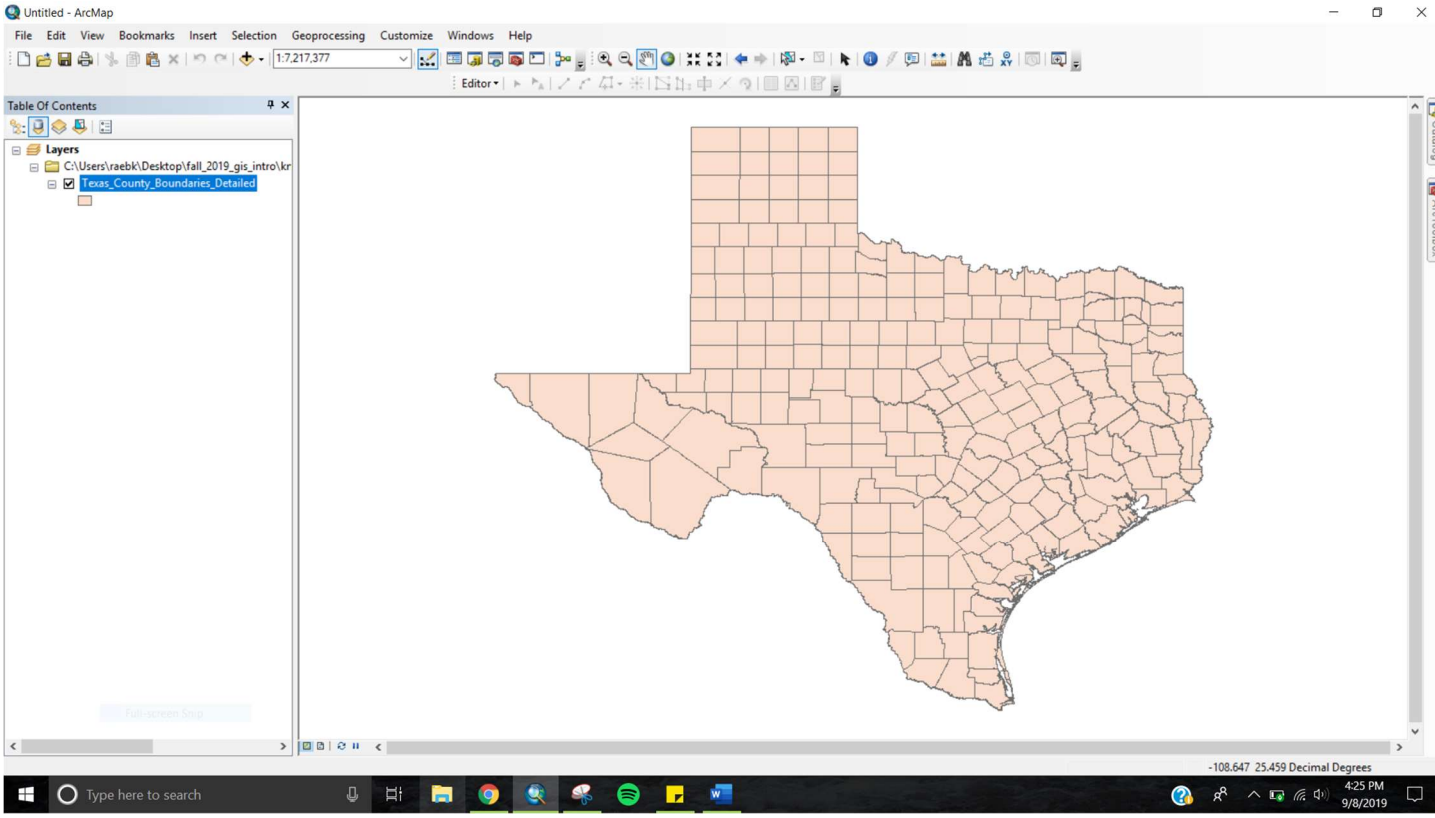
This map is designed to test your MS Excel, problem solving and attention to detail skills that will be required in future maps.

Data:

- Map_2_Data.zip
    - 'Counties_TX' shapefile *(Shapefile of TX Counties) - you will find this file **Make sure there are cty names associated*
    - *pres_cty_electiondata.xls*

Instructions:

1. **Set up your map 2 document**
    1.1. Open a blank map, make sure you're working in the right folder (the folder that has your data)
2. **Before we add data to our map, you'll work in MS Excel**
    2.1. Open MS Excel file provided by T/A
    2.2. Immediately save the empty workbook in your **data (AS A Excel 97-2003 format XLS file**) **'map_2_Table'** into the DATA folder of your map 2 directory!
3. Add 'Counties_TX' .shp to your map document.



3.1. Save the map document

4. In this step you will Populate your results table with data, using the directions provided below.

4.1. We must determine and designate (in our data) the winner elections prior to importing it into ArcMap.

4.1.1. In a new tab named “Results”, create a unique list of county names in column A with the header “county”

4.1.2. Now add to B1 & C1 header names associated with elections

4.1.2.1. I used ‘2000’ and ‘2016’

4.1.3. To populate those columns we need to determine the winner

4.1.3.1. 2 ways to do this:

4.1.3.2. manually add “REP” or “DEM” to the column for which way the county voted

4.1.3.2.1. utilize =if()

4.1.3.2.1.1. =if([logic statement],(value if true),(value if false))

4.1.3.2.1.1.1. simple logic tests such as <,>,= are really easy using this formula

4.1.4.Once these have been populated with “REP” or “DEM” please check all of your results with your neighbors

4.1.4.1. Mistakes are much easier to correct at this stage then once you’ve moved on

4.2. The final work to do on the .xls will be to figure out which counties have changed their voting preference between 2000 and 2016

4.2.1. Add to the next empty column ‘results’

4.2.1.1. using the formula =concatenate() compare the results of the counties between the two years

4.3. Save and **close all of your Excel windows**! If you forget this step, it will create a MESS!

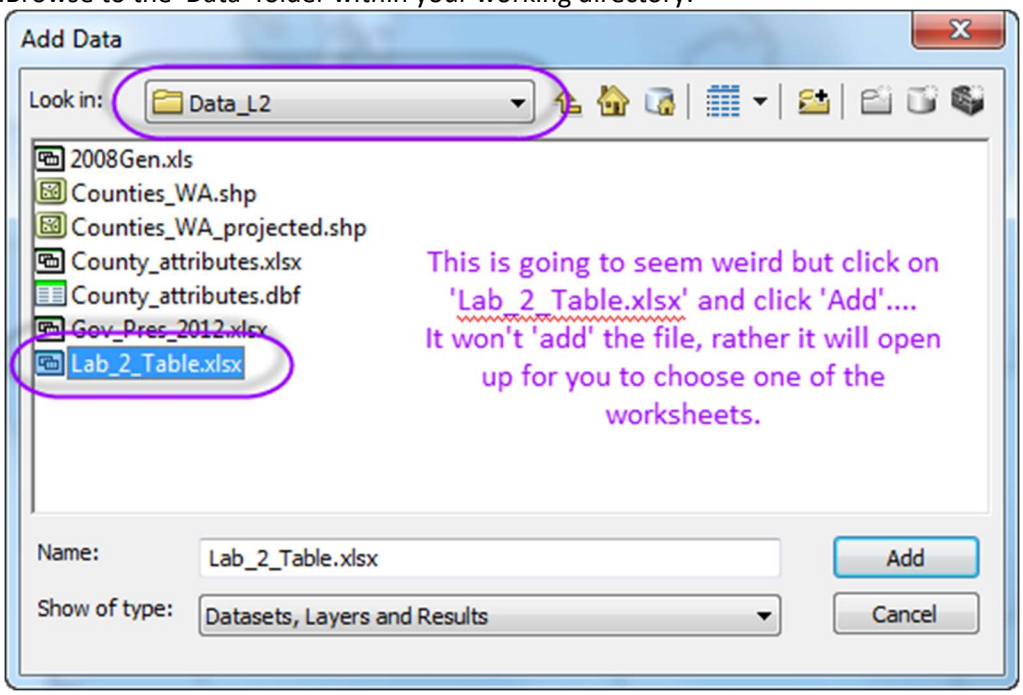
5. Now the REAL fun begins! You will Import your results table to ArcMap and join the results to the Shapefile

5.1. In this step you are going to add the 'results' Sheet of the workbook to your map on your own, or using the directions below.

5.1.1. Start (or return/navigate to) ArcMap and open the map document that you created earlier in the map. For this step we will use a little different method of getting the Table into our 'Table of Contents'

5.1.2. Click the 'Add data' button in the main menu and if necessary/desired, add a folder connection to your 'Data' folder.

5.1.3. Browse to the 'Data' folder within your working directory.

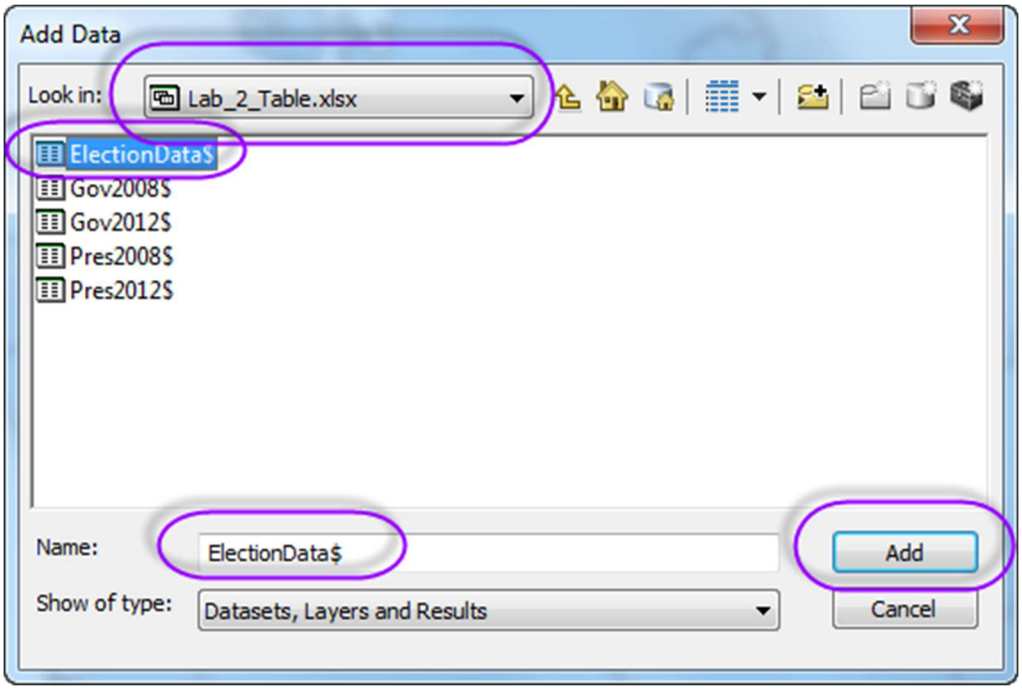


5.1.4.

5.1.5. Find your 'map_2_Table' Excel Workbook as shown above and click <Add>.

5.1.5.1. When you double click or <Add> an Excel **Workbook** in ArcGIS you gain access to all of the various worksheets/sheets that are part of the Workbook.

5.1.5.2. When you created this Workbook, you created a sheet titled 'results' that is the sheet with the summary results all counties and data for each of the elections with which we're concerned.



5.1.5.3.

5.1.5.4. Select 'results' from within the 'Add Data' window and click 'Add'.

5.1.6. The 'results$' is just a table, it doesn't have any 'spatial' data attached. In order to symbolize our map, we must add (or join) this data to a layer of spatial data. This is called a JOIN.

5.2. We will now 'Join' the data from your 'results' table **to** the Counties shapefile so that you can create a map of election results for which you gathered data.

5.2.1. *In order to join table data to spatial data (Shapefile) in ArcGIS, each of the two layers that you join must include a field that holds an identical, and discrete (non-repeating), field (column).The fields do not, however, need to have the same name, they just need their data in the same format. By joining data from one table to a spatial layer, you apply all the attributes from the cases in one layer (table) to all of the cases in another layer - the assumption being that the cases are the same in both layers.*

5.2.1.1. In this case, both Counties and 'results' share a field that includes county names. This TXs by design, and TXs carefully planned out for this analysis. There were a number of steps we took throughout the map that led us to this point. It isn't by accident that all of our layers have fields PERFECT for joining!

5.2.2. Open the Attribute table for Counties to determine which field contains the names of the counties, and make a written note of it on a piece of paper, then close the attribute table.

5.2.3. Right click on the 'results' table and choose 'Open'. This is similar to opening an attribute layer of a vector file (shapefile) but in this case it's called open, because in fact the file (in this case) is already a table. Thus, we right click it and choose 'Open'.

5.2.3.1. In the 'results' table, determine which field contains the names of the counties, and make a written note of the name of this field on a piece of paper (not for your write up, just for your use in a minute), then close the table.

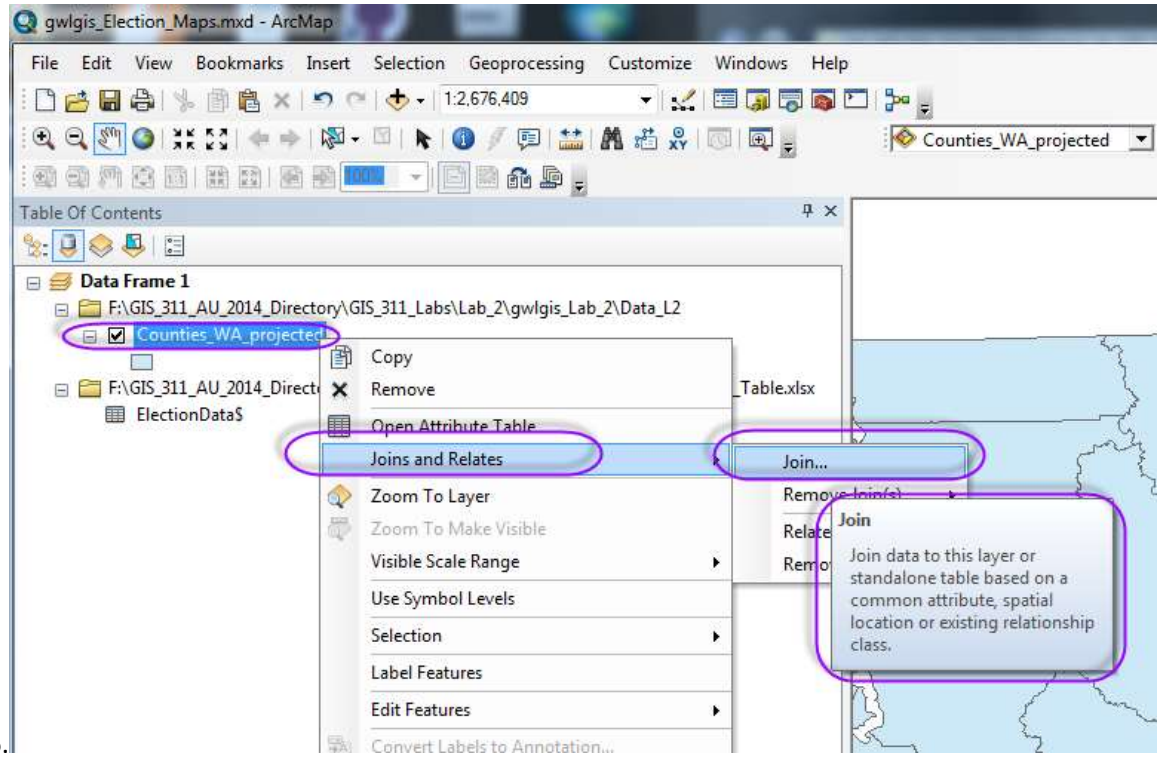
5.2.4. Now that you know which fields to choose, let's get on with the join.

5.2.5. First and foremost, you must always remember that when joining a data table ('results') to a shapefile (Counties), you always start with the SHAPEFILE!

5.2.5.1. Unfortunately, ArcMap is NOT smart, and it will actually allow you to do it backwards. It may seem as though it works, but in the end, it will not end up working.

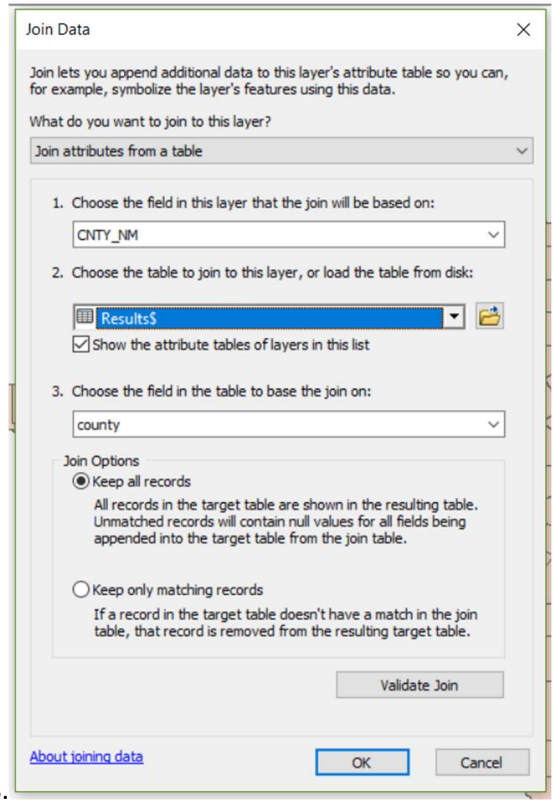
5.2.5.2. To join the 'results' to Counties, right click on Counties in the table of contents and click 'Joins and Relates Join...'. *(Remember, we always start a join from the layer with Geography (spatial data), NOT the table layer!) Remember this important rule, we must START with the shapefile layer!*

5.2.6.



5.2.7. In the 'join Data' dialog, under 'What do you want to join to this layer?' be sure that 'Join attributes from a table' is chosen from the first drop-down menu.

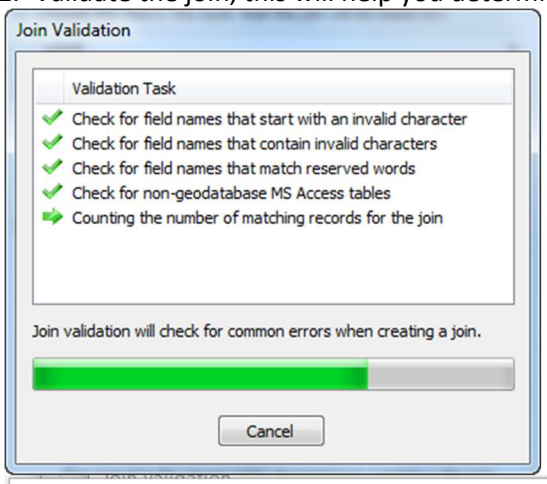
5.2.8.

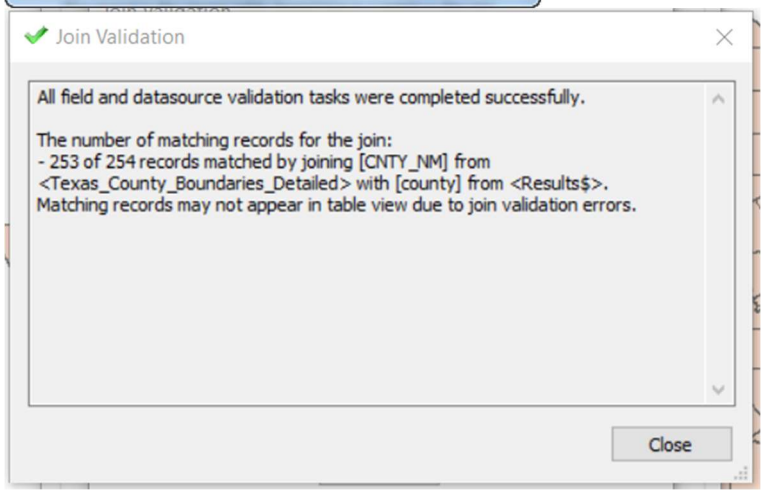


5.2.9. Notice that ‘results$’ shows up all on it’s own, likely because it is the ONLY standalone table in our map.

5.2.10.

5.2.11. Validate the join, this will help you determine if there is something that is super wrong





5.2.12. It will seem like nothing happened, but it did. We’ll look at all of the changes in the next few steps.

5.3. Right-click on Counties, select 'Open Attribute Table', and browse the data to see what you've added.

5.3.1. Scroll to the far RIGHT of the attribute table and you should find the fields that you created in Excel. *(I put an example of the important data, to the right of this page)*

5.3.2. Your corresponding fields must be identical to the fields I pasted to right, they MUST be populated with either ‘DEM’ or ‘REP’ in all CAPS!

5.3.3. If you don’t have all CAPS, or you have >1 ‘null’ value you **must** go back NOW and figure out what happened. Try the steps again, starting from back at the beginning of the map.

5.3.4. If the data is there, you’re all set and may continue by closing the attribute table.

5.3.5. It is very IMPORTANT to note here that the data is ONLY attached to the shapefile within this instance of the Map. Thus, if you wanted to use the data in another Map, it wouldn’t be possible.

5.3.6. To make it possible to use this data in a different map, we must ‘EXPORT’ the data into a new shapefile, with a NEW name.

5.3.7. In addition, to do this we must do it from the SHAPEFILE, not the attribute table. (you may remember earlier in the map, when we wanted a table, we exported from the attribute

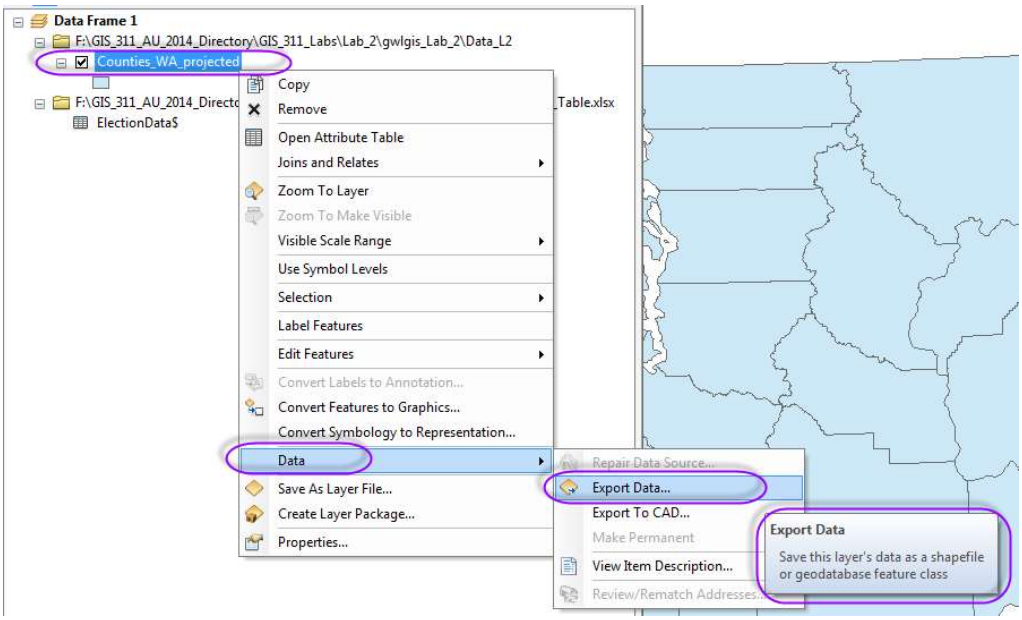
table, but in this case, we want a new shapefile, thus we're going to export the data from the shapefile. (I'll provide all of the directions necessary below, when it is time to export).

5.4. Since there are three sets of results that we're going to 'Map', we're going to need three copies of the current county layer. You currently have only one county layer Counties and one data table 'results' in your table of contents.

5.4.1. MOST importantly, recall from above that the data is not **permanently** joined to the shapefile YET. We must 'extract' the shapefile, creating a new shapefile and name, doing so will make the join permanent!

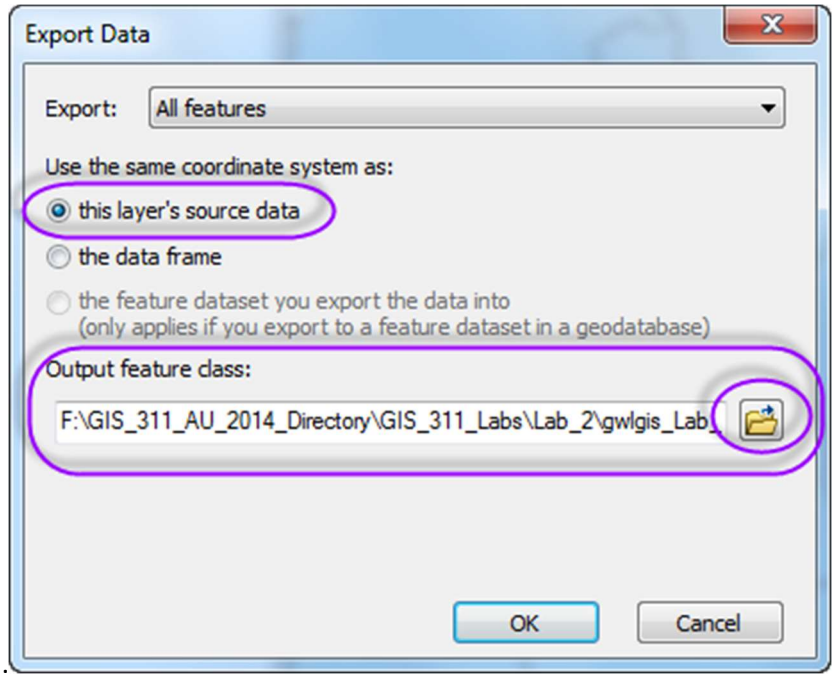
5.4.2. Make sure your attribute table is closed.

5.4.3. To create the three layers that you/we need, right click on Counties click 'Data Export Data as shown here:



5.4.4. You will get a window, similar to the one below:

5.4.5.

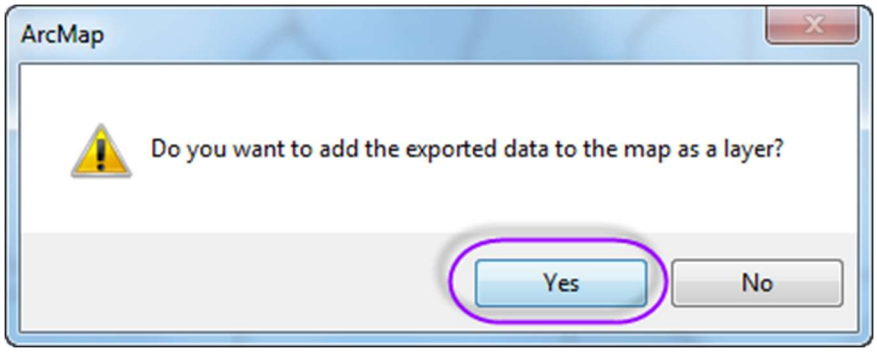


5.4.6. Hover and then click on the "browse" button 

5.4.7. Navigate (if necessary) to you data folder.

5.4.8. Change the 'Name:' to '2000' (no quotes) □ Save □ OK

5.4.9. When asked 'Do you would like to add the exported data to the map as a layer?' (as shown below)… click Yes (<Yes>).



5.4.10.

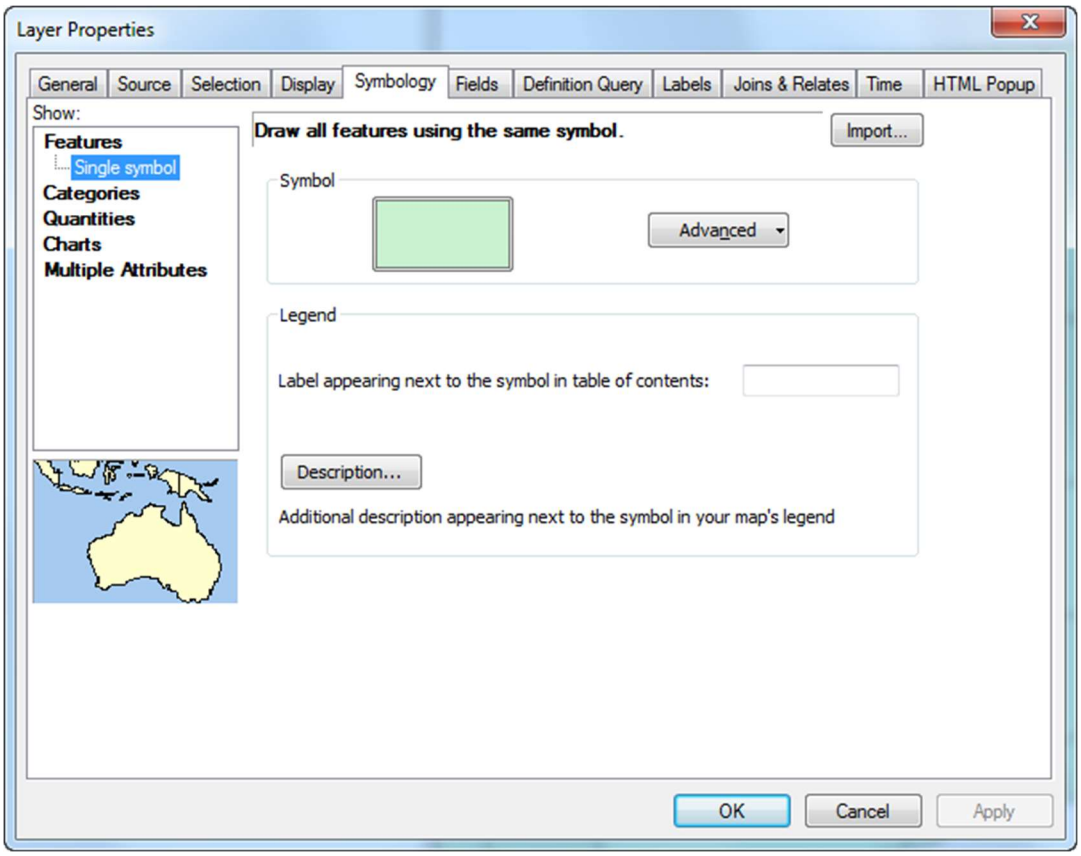
5.4.11. '2000' will be added to your table of contents.

5.4.12. Repeat this process on your own 1 time naming it 2016

5.5. Rename the original file 'Change2000_2016'

6. Time to start Visualizing! We'll start by working with the 2000 or 2016 layer.

6.1.1. Visualize the data for this any of the layers by, right clicking on the layer name and selecting 'Properties' from the contextual menu and click the' Symbology' tab so that your dialog window matches the one below.

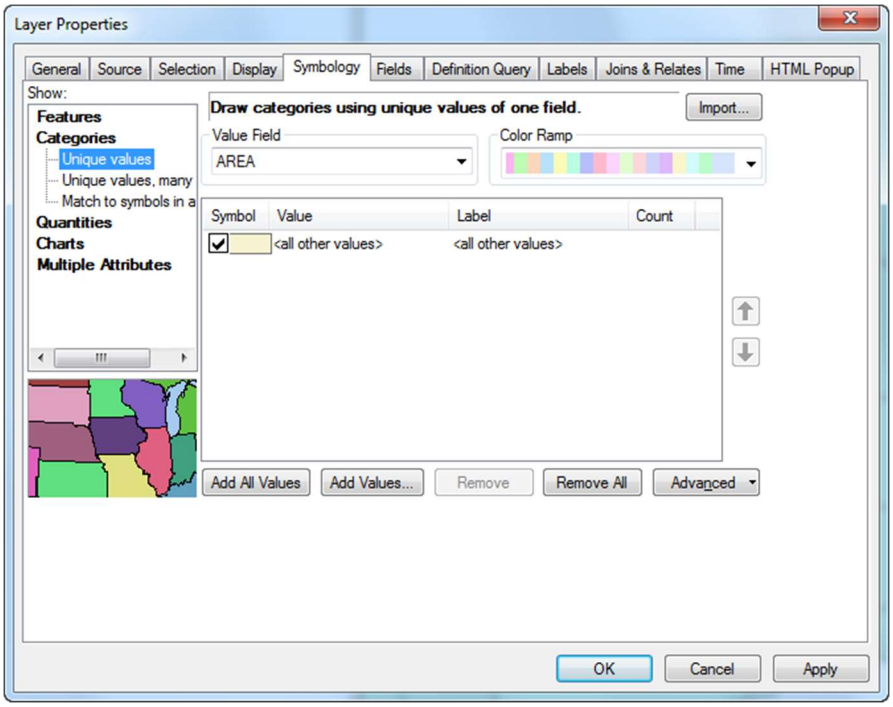


6.1.1.1.

6.1.1.2. When you created your data table in Excel, each county was classified as either 'DEM' (for democrat) or 'REP' (for Republican) according to the results from the year.. You're going to map each county based on the election results by coloring the

county the traditional Blue if it voted Democratic and the traditional Red if it voted Republican.

6.1.1.3. In the left side of the window, in the 'Show:' menu, select 'Categories Unique values' so that your window matches the one below:



6.1.1.4.

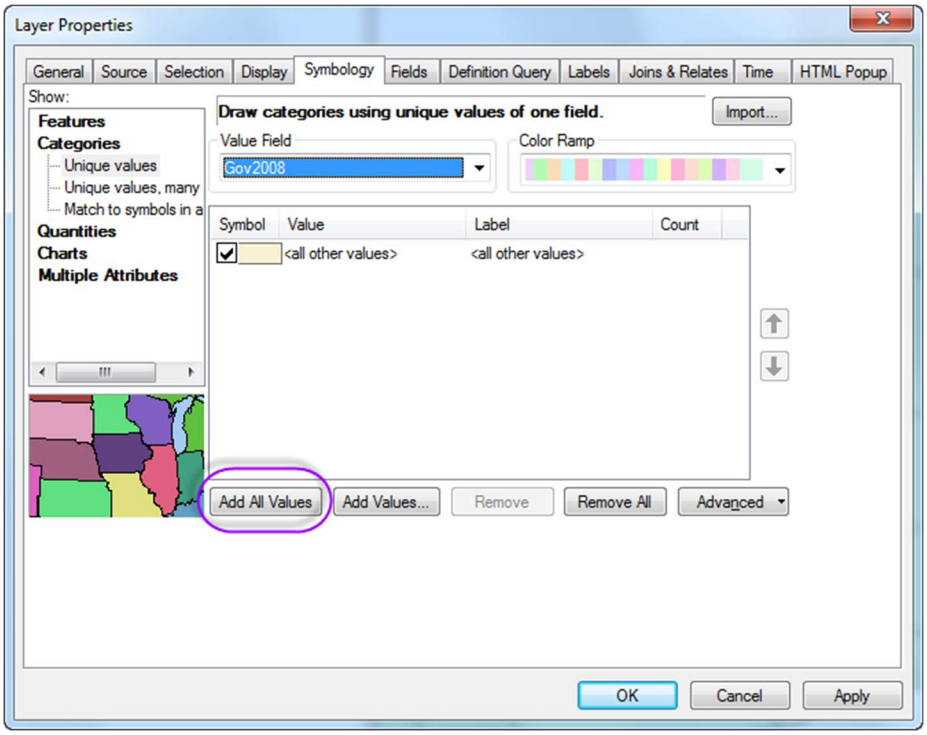
6.1.1.5. You must now tell ArcMap (using the 'Value Field') what field you'd like to symbolize when drawing this map, currently, the image above displays 'AREA'. which is **incorrect**.

6.1.1.6. You want to symbolize how people voted in the election you chose to do first, therefore,

6.1.1.6.1. Choose the field that corresponds in the 'Value Field' dropdown.

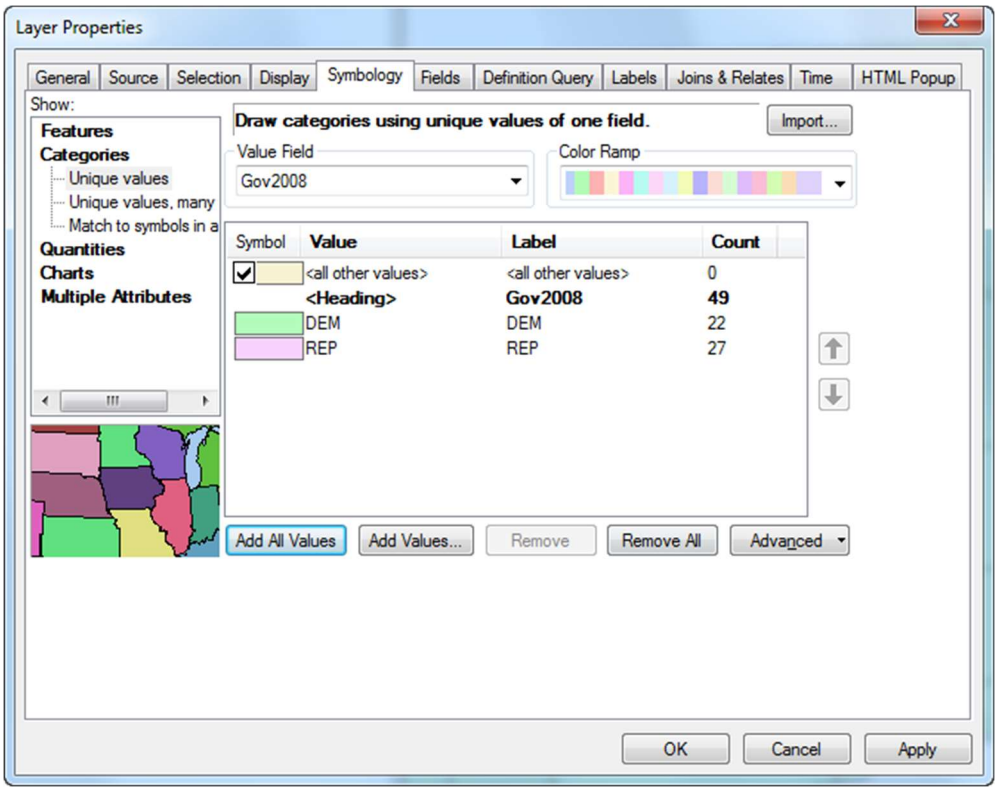
6.1.1.6.2. Notice that nothing seems to change. (don't worry about the 'Color Ramp')

6.1.1.6.3. You must add all of the values from the attribute table, using the 'Add All Values' button.



6.1.1.6.4.

6.1.1.6.5. We are looking to see 'DEM' and 'REP' in there.



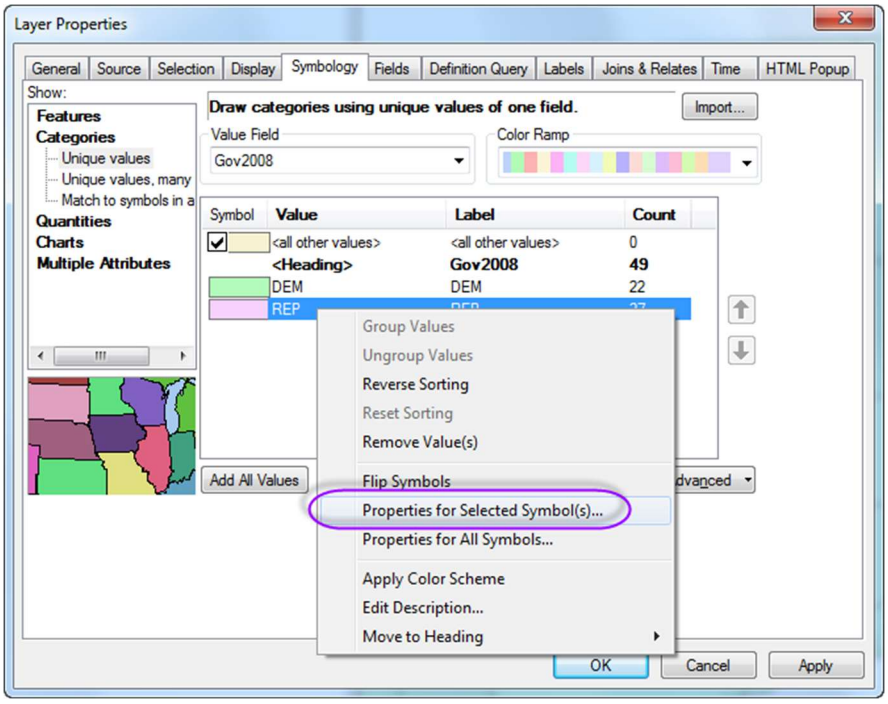
6.1.1.6.6.

6.1.1.7. Listed (at the top) in addition to DEM and REP, there is also a category called <all other values>. This category will be used for any counties that do not belong to either the DEM or REP categories, but since each county has (or should have) either DEM or REP, we're hoping that no counties get symbolized that color. Currently the swatches are a **random** color chosen by Esri, which don't very effectively represent Democrats (Blue) and Republicans (Red).

6.1.1.8. Click the box to turn OFF '<all other values>'

6.1.2. To adjust the way that your data is visualized, you're going to make two changes to the list of values. First, we'll change the colors that are used to symbolize Republican and Democratic counties (and the <all other values> counties).

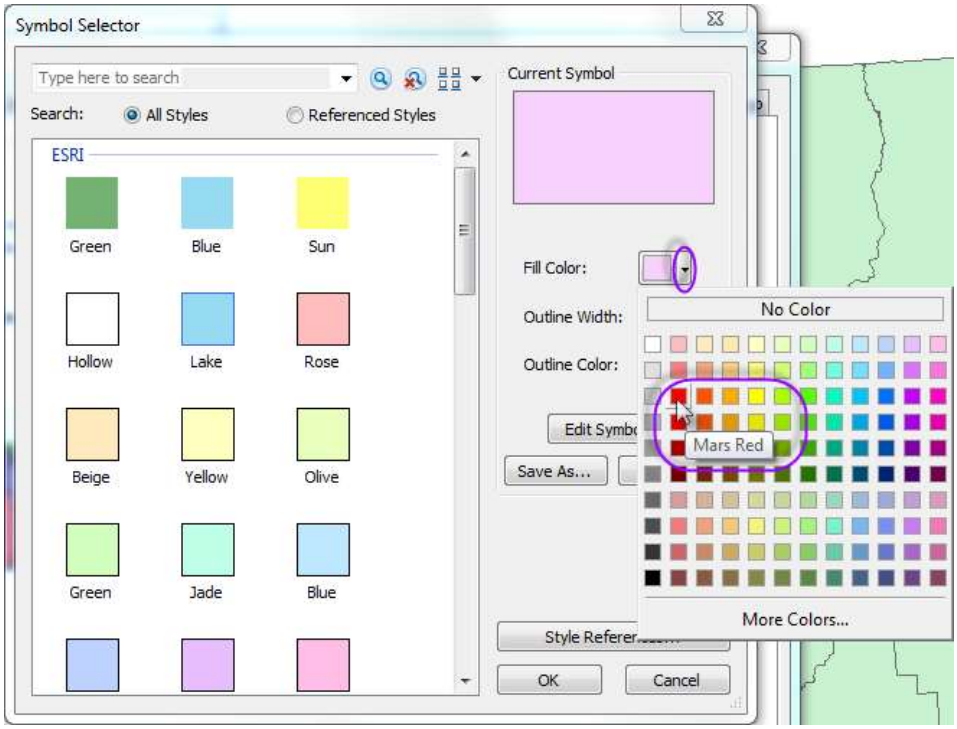
6.1.2.1. Right click on the colored rectangle in the Symbol column for Republican counties and select 'Properties for Selected Symbol(s)...'.



6.1.2.1.1.

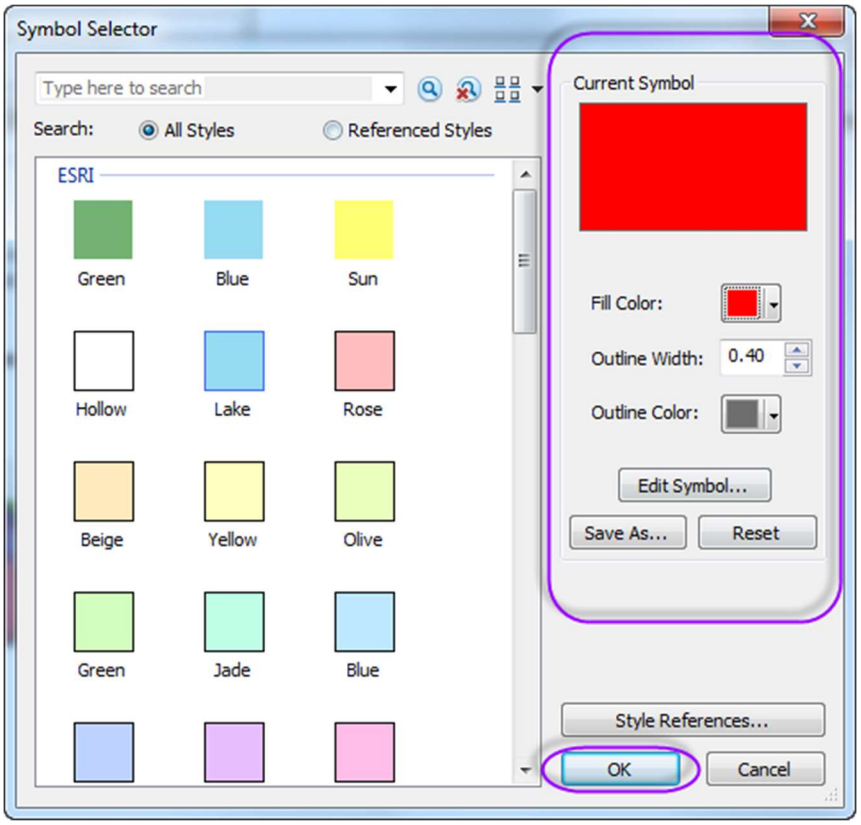
6.1.2.1.2. We're going to change the 'Fill Color' to 'Mars Red.

6.1.2.1.2.1. To do this, click the 'Fill Color' color editor button and choose 'Mars Red' from the palette.



6.1.2.1.3.

6.1.2.1.4. Leave the 'Outline Width' at .40 and the 'Outline Color' at the default gray.



6.1.2.1.5.

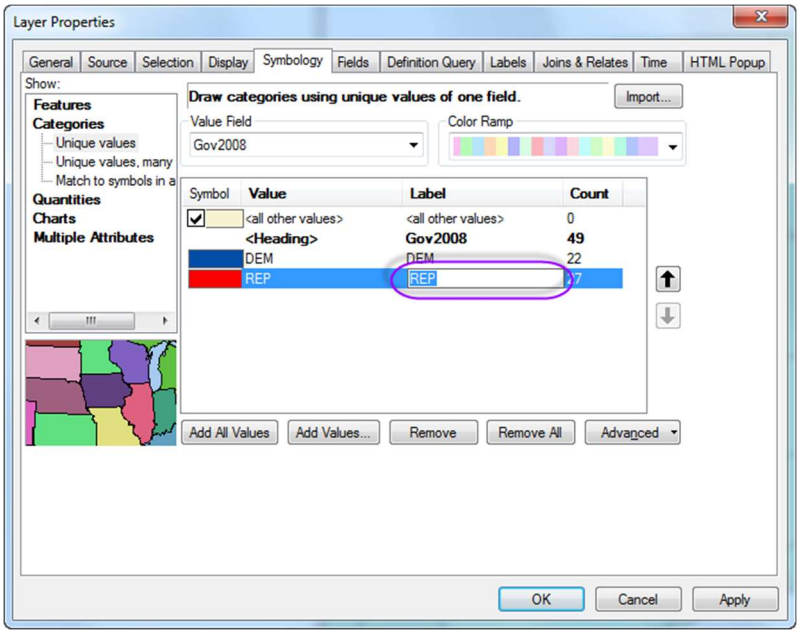
6.1.2.1.6. Click 'OK' to save your changes.

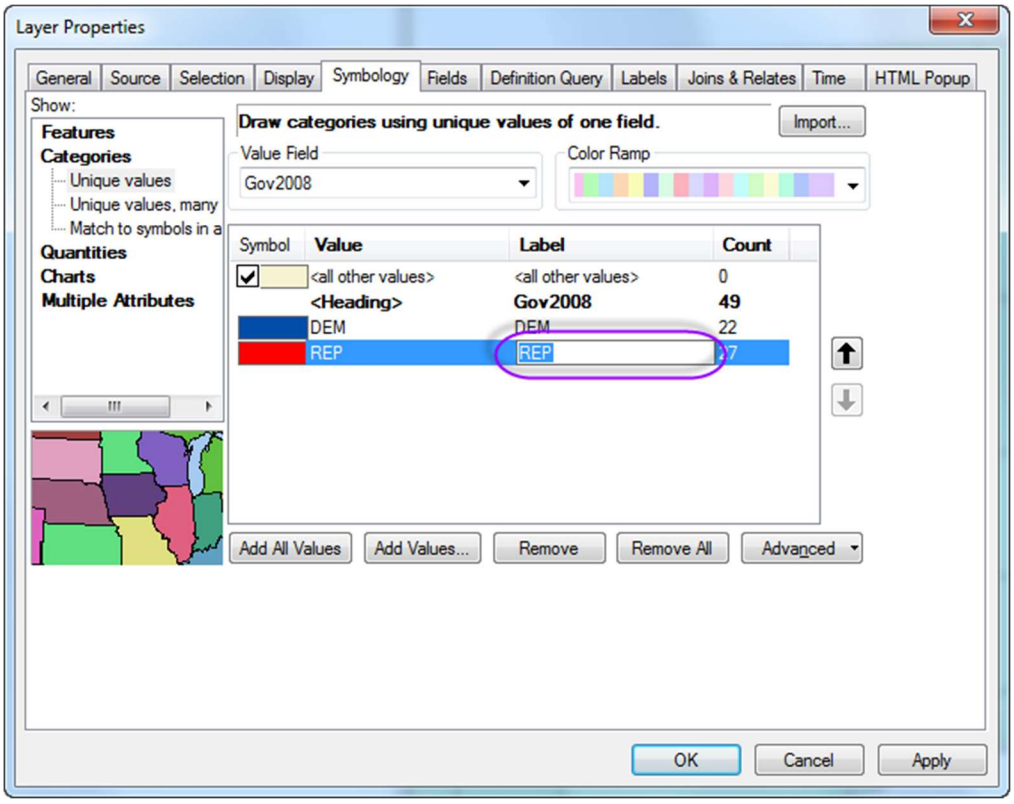
6.1.3. Perform the same operation as in the step above, this time for Democratic counties, but select 'Ultra Blue' as the 'Fill Color'.

6.1.4. If you haven't already, turn **off** the checkmark next to <all other values>.

6.1.5. You'll now change the label used in the table of contents to describe the data that is being visualized in your map. This is a fairly simple task - within the Symbology dialog, click the entry for Republican counties in the 'mapel' column and rename the category 'Republican' rather than 'REP'. Perform the same operation for the Democrat category.

6.1.5.1.

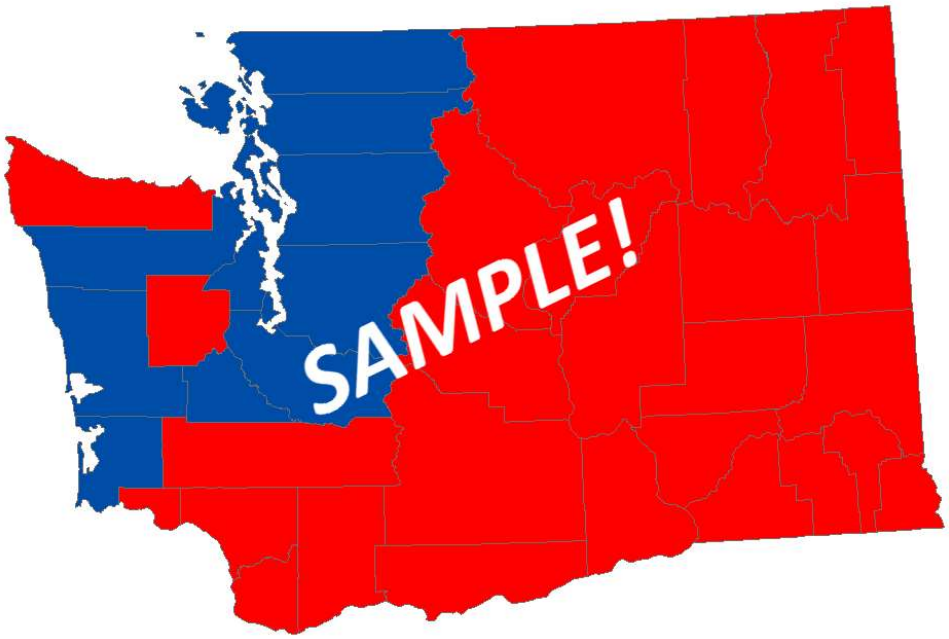




6.1.5.2.

6.1.6.

6.1.7.Click <Apply> to see your changes in the map (it should look similar to the following image - BUT it should probably be Texas)



6.1.8.Click <OK> to close the dialog box.

6.1.8.1. On your own, perform the same steps outlined above for the other election NOT the Results.

6.1.8.2. All your layers should now use the same color palette and naming conventions in the table of contents.

6.1.8.3. Turn off (by using the checkbox) each layer above the layer you're trying to visualize so that you can check your work as you progress.

6.1.8.4. Once your done with all 4 layers, your table of contents should now look like the image to the right.

6.1.8.5. SAVE YOUR MAP DOCUMENT, using 'Save As' (we always use 'Save-as'!)

6.1.9. Now symbolize the third as a change

6.1.9.1. REPREP - Red

6.1.9.2. DEMDEM - Blue

6.1.9.3. REPDEM - Choose a color

6.1.9.4. DEMREP - Choose a color

7. SAVE YOUR MAP DOCUMENT!