

## Exploring Our Data

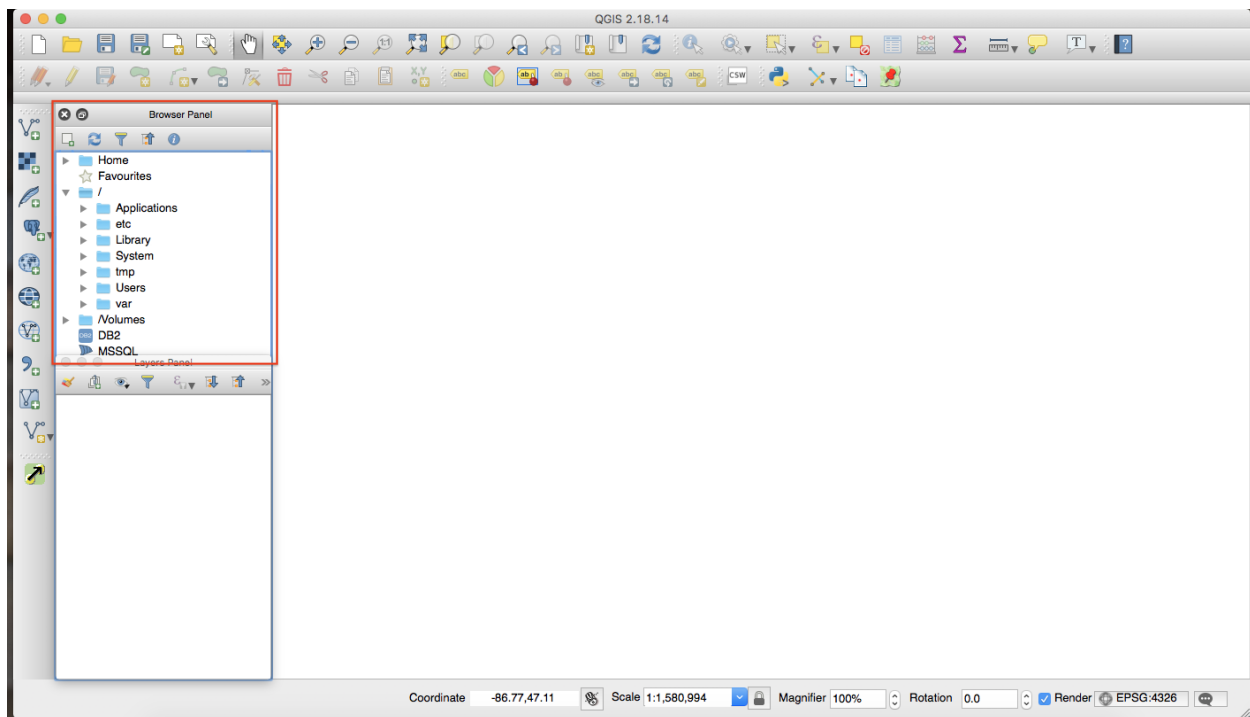
Today, we will visualize some tabular data. To do so, we will first join a shapefile with tabular data. The shapefile will contain the spatial data of Mississippi and will be at the County level. The tabular data contains the values for our indicators at that same County level. Joining is when we merge those two types of data based on a common feature. In our case, it will be a feature that uniquely identifies each county.

### Notes on the data:

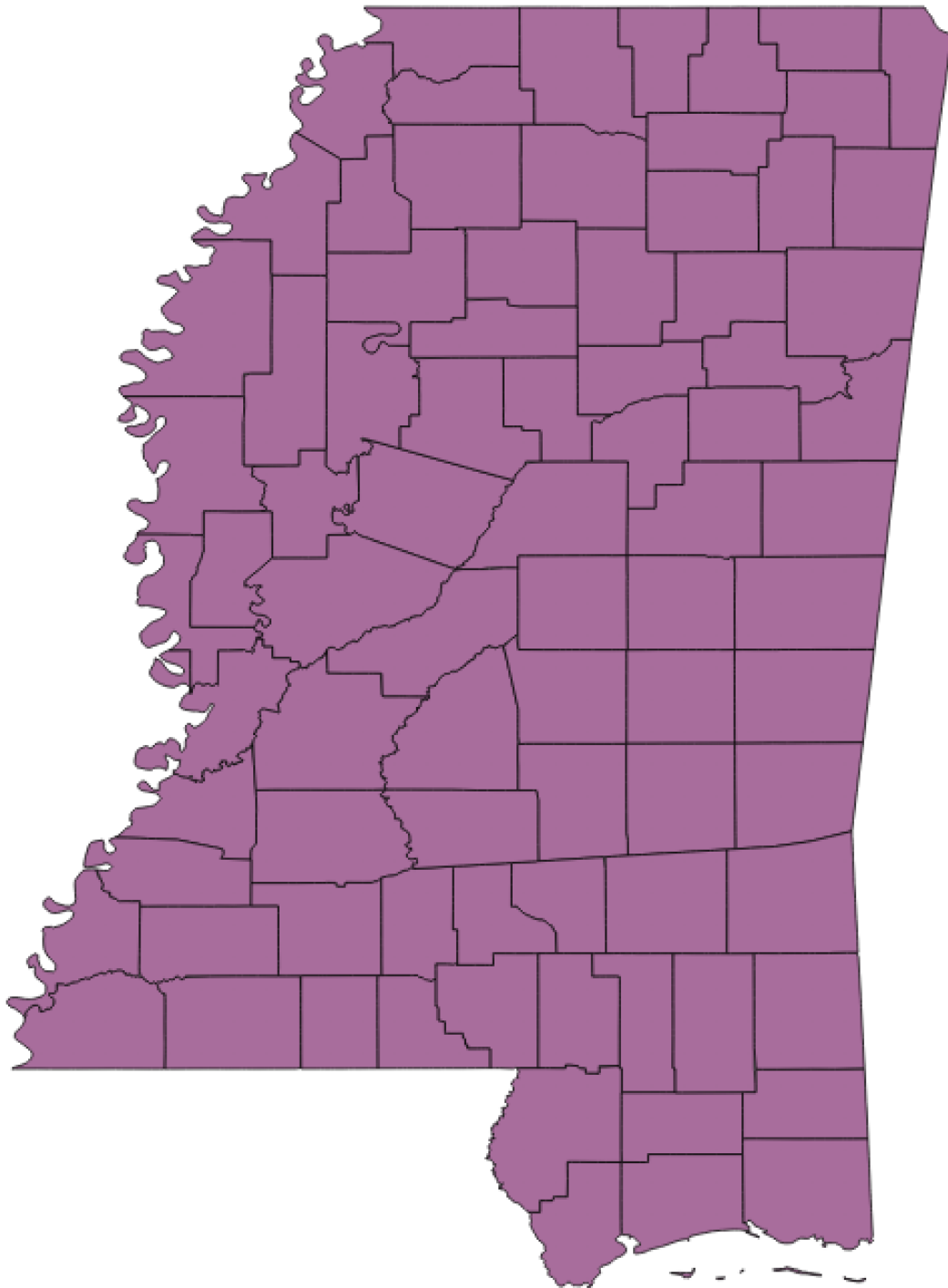
The tabular data is from the US Census and was collected through American Fact Finder. I've used Python to clean up the data and get the relevant variables.

### Steps

1. Download the zip folder from the Dropbox link provided and extract it to your working folder. Keep all the files together. One shapefile consists of many different files (.shp, .dbf, .prj, .qpj, .shx) and QGIS will need all of them to read the file. For a csv, QGIS also needs a .csvt file in order to recognize the type of values given to it.
2. Open QGIS.
3. Use the Browser panel to navigate to your working folder.

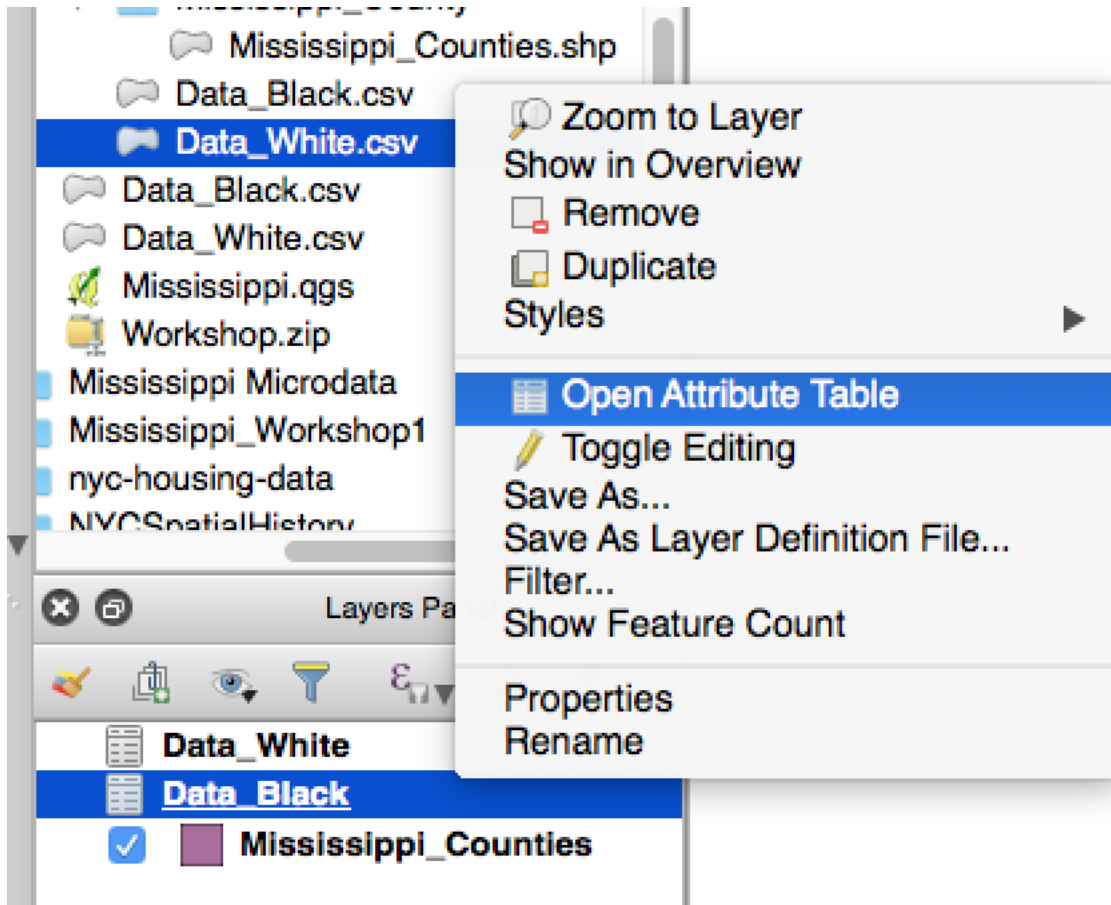


4. You should see a shapefile icon next to **Mississippi\_Counties.shp**. Notice how you only see one file for the shapefile instead of all of the files we noticed earlier. Drag the file onto the white space, which is where you will visualize your maps. Your window should look something like this (the color doesn't matter):



5. Then, drag in the `Data_Black.csv` and `Data_White.csv` files. Nothing will change on your map, but you should see the csv's show up in the Layers panel.
6. Now, you need to join your tabular data layers (`Data_Black` and `Data_White`) with the shapefile (`Mississippi_Counties`). To find a variable that is in both files, we can open them and see their attribute tables.
7. In the Layers panel, click on one of the csv layers. It should be highlighted in blue. Then, right click

and choose Open Attribute Table.



8. The attribute table (shown below) should show up. The first two variables (Id2 and Geography) represent each of the census tracts and the other variables are the indicator variables we collected through the Census.

Data\_Black :: Features total: 82, filtered: 82, selected: 0

	Id2	Geography	IBP_Men	IBP_Children	IBP_Women	IAP_Men	IAP_Children	IAP_Women
1	28001	Adams Coun...	1255	2964	2460	3942	1525	4455
2	28003	Alcorn Count...	444	345	556	979	548	1155
3	28005	Amite Count...	602	597	906	1262	698	1219
4	28007	Attala Count...	766	1159	1329	1694	1209	1925
5	28009	Benton Coun...	436	248	318	666	572	824
6	28011	Bolivar Coun...	2267	3682	3735	4083	2378	4644
7	28013	Calhoun Cou...	298	559	605	980	440	1058
8	28015	Carroll Coun...	289	410	477	924	412	808
9	28017	Chickasaw C...	589	1223	982	1725	901	1924
10	28019	Choctaw Co...	313	421	453	529	220	595
11	28021	Claiborne Co...	1071	1130	1247	1542	707	1893
12	28023	Clarke Count...	383	636	608	1301	908	1758
13	28025	Clay County,...	942	1684	1624	2678	1547	3123
14	28027	Coahoma C...	1741	3230	2977	3861	2604	4399

Show All Features

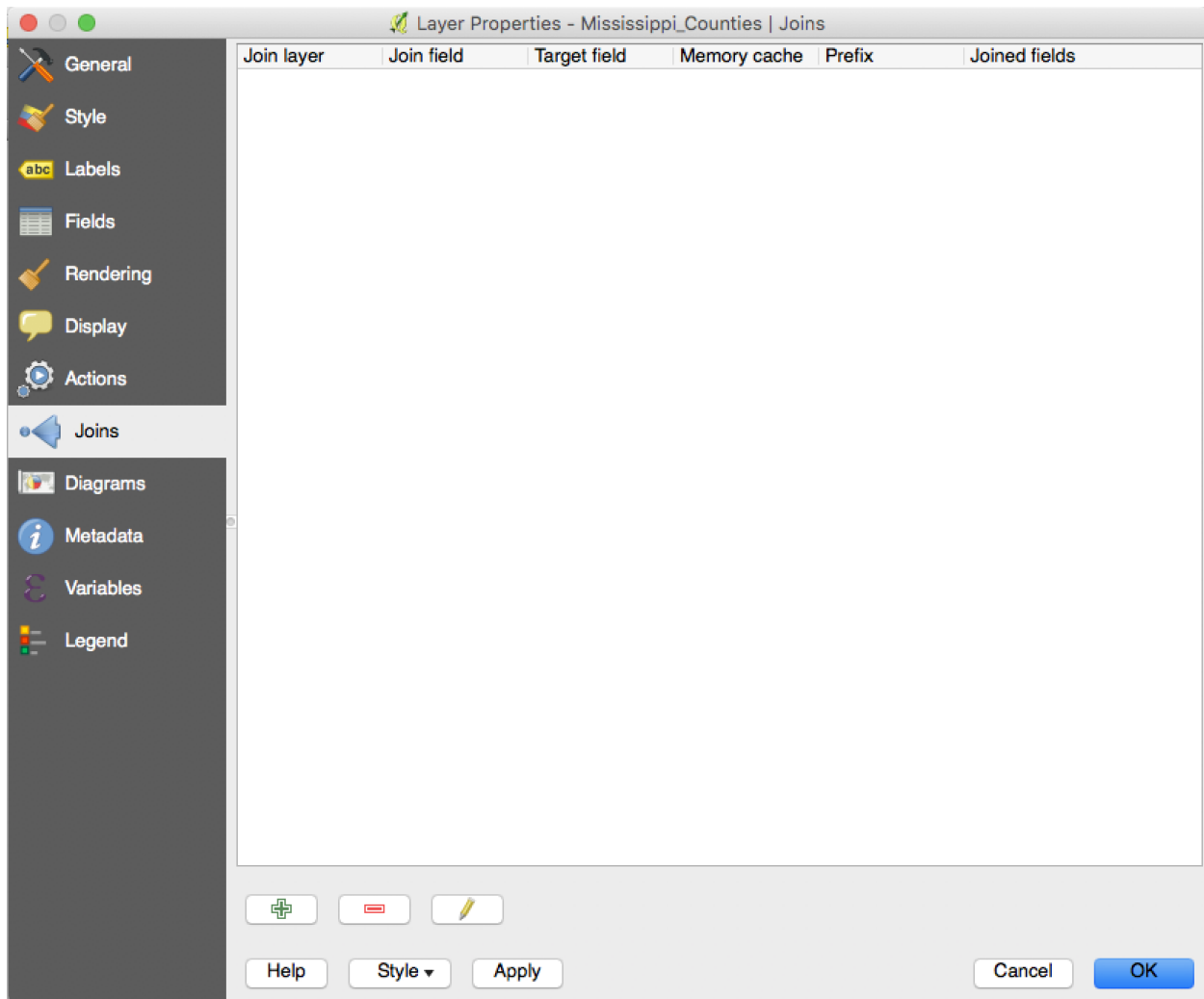
- Close this attribute table and now, open the attribute table for our shapefile following the steps above. In this table, COUNTYFP, and GEOID uniquely define a census tract. Because we are only looking at Mississippi, COUNTYFP could be used on its own, but if we had other states, we would have repeat COUNTYFP values for different states. In our case, we will use GEOID as the column to join, because in our csv's, the Id2 variable contains 5 numbers and contains the 28 used to represent Mississippi, just like GEOID.

Mississippi\_Counties :: Features total: 82, filtered: 82, selected: 0

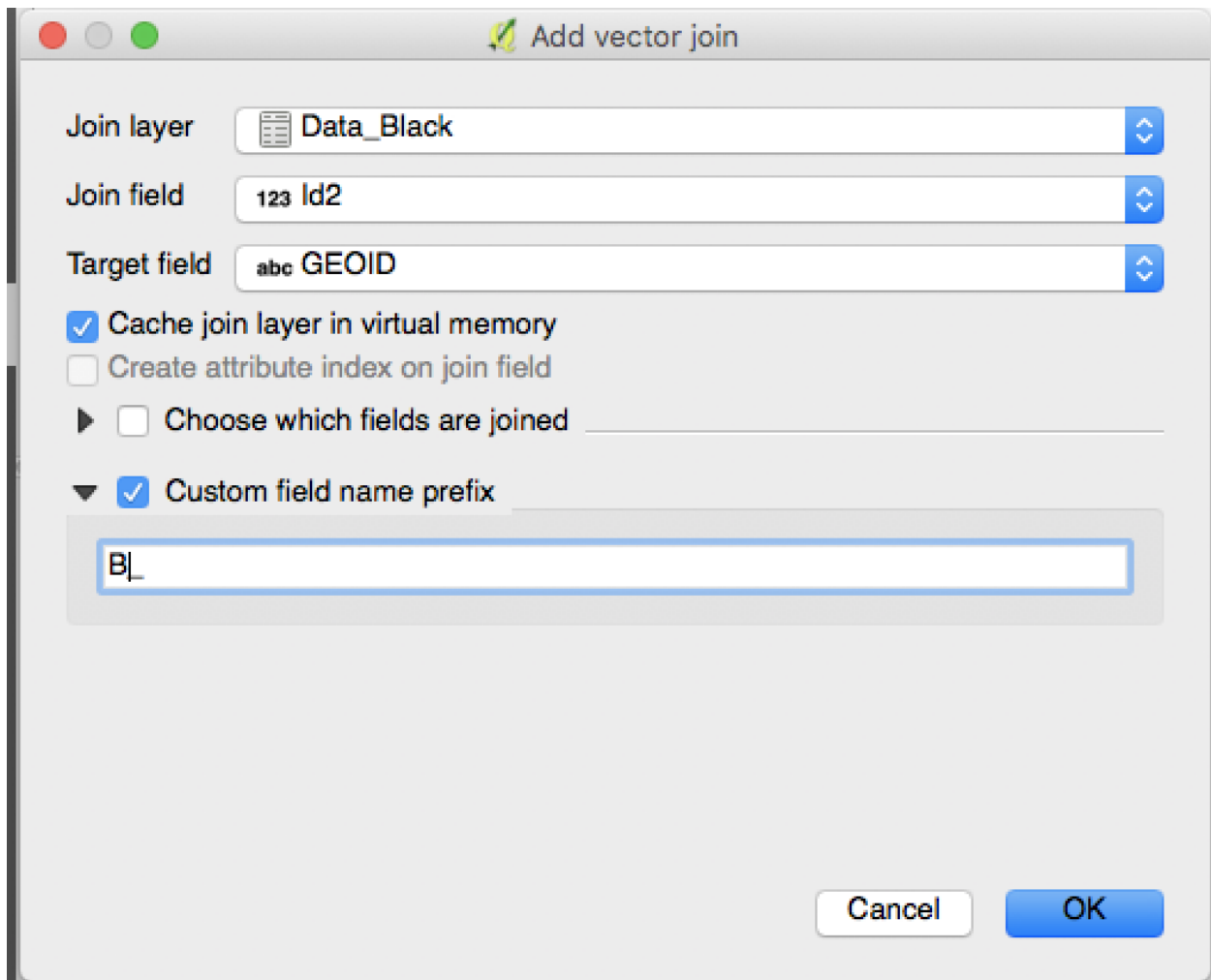
	STATEFP ▲	COUNTYFP	COUNTYNS	AFFGEOID	GEOID	NAME	LSAD	ALAND
1	28	007	00695728	0500000US2...	28007	Attala	06	1903594478
2	28	011	00695730	0500000US2...	28011	Bolivar	06	-2024652507
3	28	021	00695735	0500000US2...	28021	Claiborne	06	1262400025
4	28	051	00695749	0500000US2...	28051	Holmes	06	1959776825
5	28	101	00695773	0500000US2...	28101	Newton	06	1496636739
6	28	149	00695795	0500000US2...	28149	Warren	06	1524245417
7	28	151	00695796	0500000US2...	28151	Washington	06	1877069905
8	28	163	00695802	0500000US2...	28163	Yazoo	06	-1906587470
9	28	033	00695741	0500000US2...	28033	DeSoto	06	1233556699
10	28	035	00695742	0500000US2...	28035	Forrest	06	1207042799
11	28	053	00695750	0500000US2...	28053	Humphreys	06	1083947281
12	28	083	00695765	0500000US2...	28083	Leflore	06	1536793533
13	28	089	00695768	0500000US2...	28089	Madison	06	1850058790
14	28	103	00695774	0500000US2...	28103	Noxubee	06	1800451886

Show All Features ▼

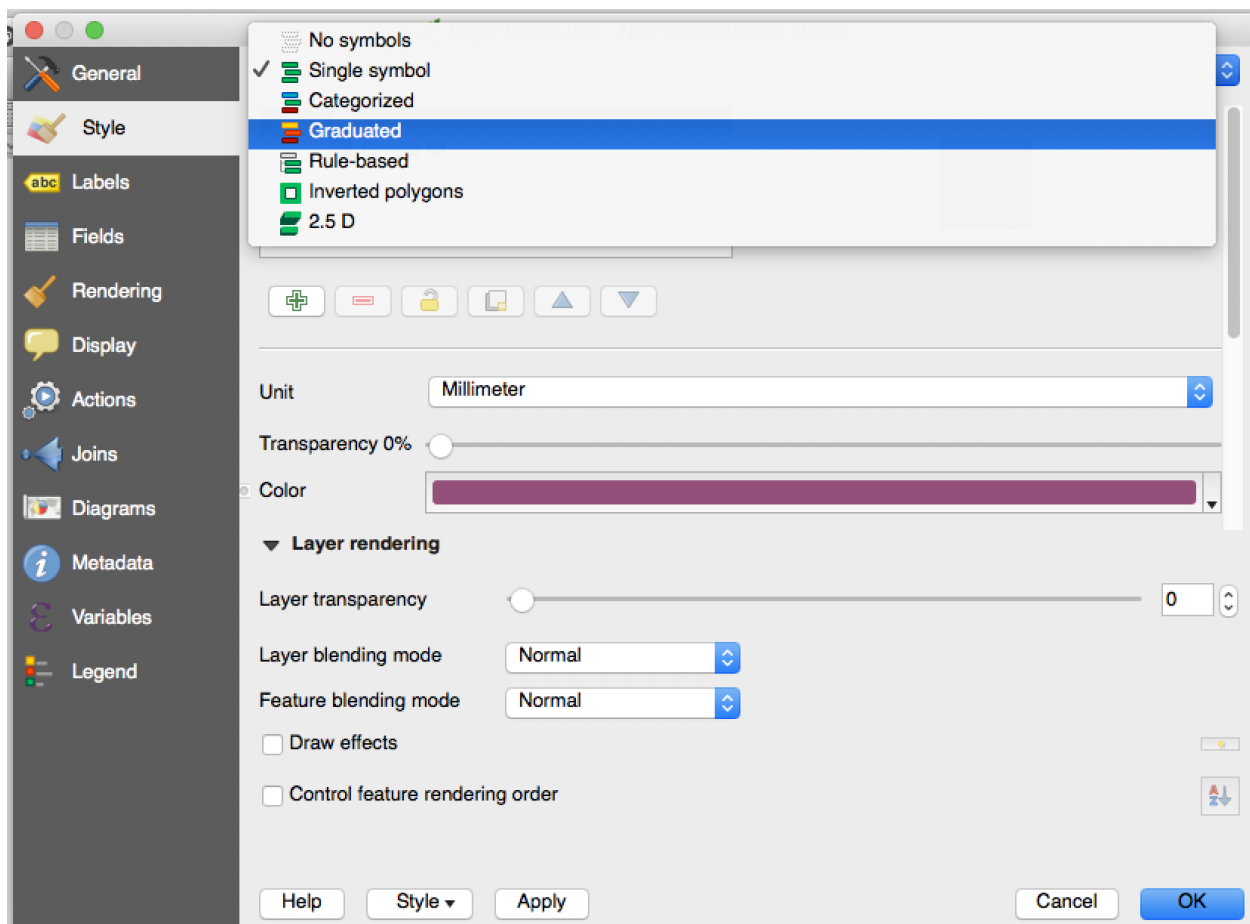
- Close the attribute table. To join the files, right click on the shapefile layer and click **Properties**. Click on the **Join** tab. Your window should look like this:



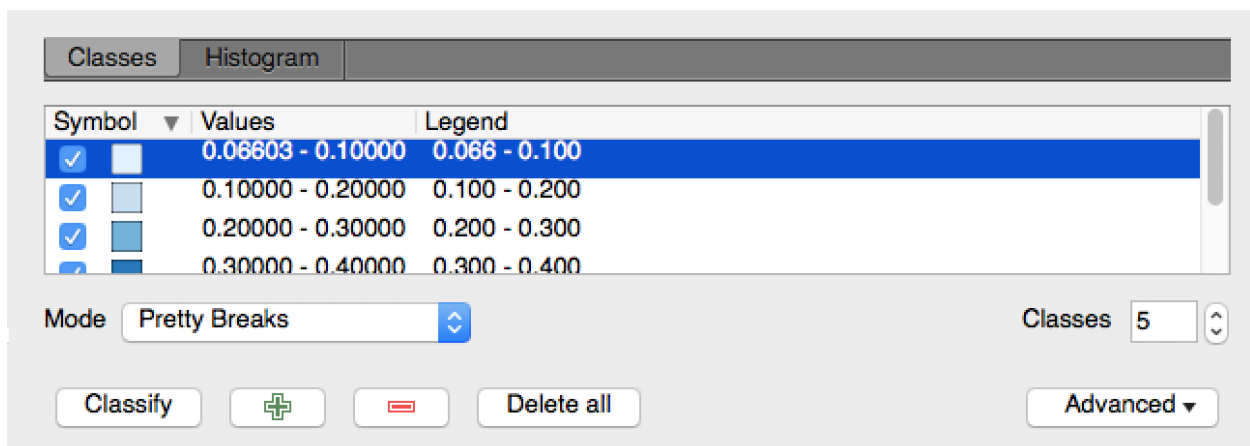
11. Click on the Plus sign to add a join. For Join layer, it should automatically populate but you should choose the csv that you want to join your shapefile to. We will do **Data\_Black** first. For Join field, choose the variable in the csv that you want to join on. In our case, that is **Id2**. For Target field, choose the field from the shapefile that you want to join on. Here, that will be **GEOID**. Lastly, check the **Custom field name prefix** and change that to **B\_**. When the attributes from the csv get added to our shapefile attribute table, they will have this prefix so that we know where they are coming from. You could have chosen a different prefix, but I chose this since it's short. Repeat this for the **Data\_White** layer, the only difference there should be the prefix, which you could set to **W\_**. Click Ok.



12. Click Ok in the Properties window.
13. Now, right click on the shapefile to open its attribute table. Let's see if the join worked. Scroll to the right to see if variables from the csv were added and if there are any values from matching counties. You should see the original variables and variables from the csv's with either B\_ and W\_ as a prefix.
14. Now, to visualize some data, right click on the shapefile layer and click on **Properties**. Go to the **Style** tab. Use the dropdown menu to change the style to **Graduated**.

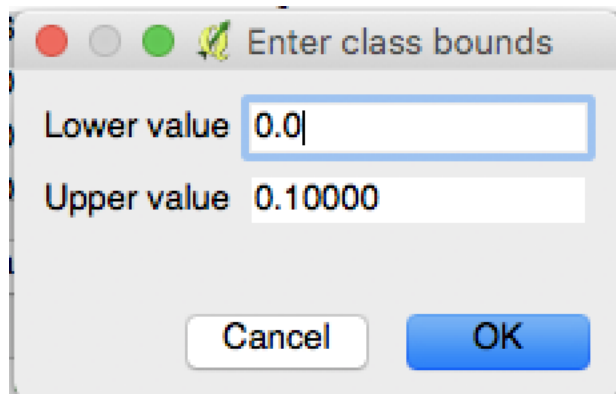


15. In the column option, choose the variable that you want to display on the map. For now, let's choose B\_Percent\_IBP\_Men which shows the percent of Black Men with Income below Poverty level. Click Classify and change the mode to Pretty Breaks. There are other options for mode that may be better, but for now, we will use this option.

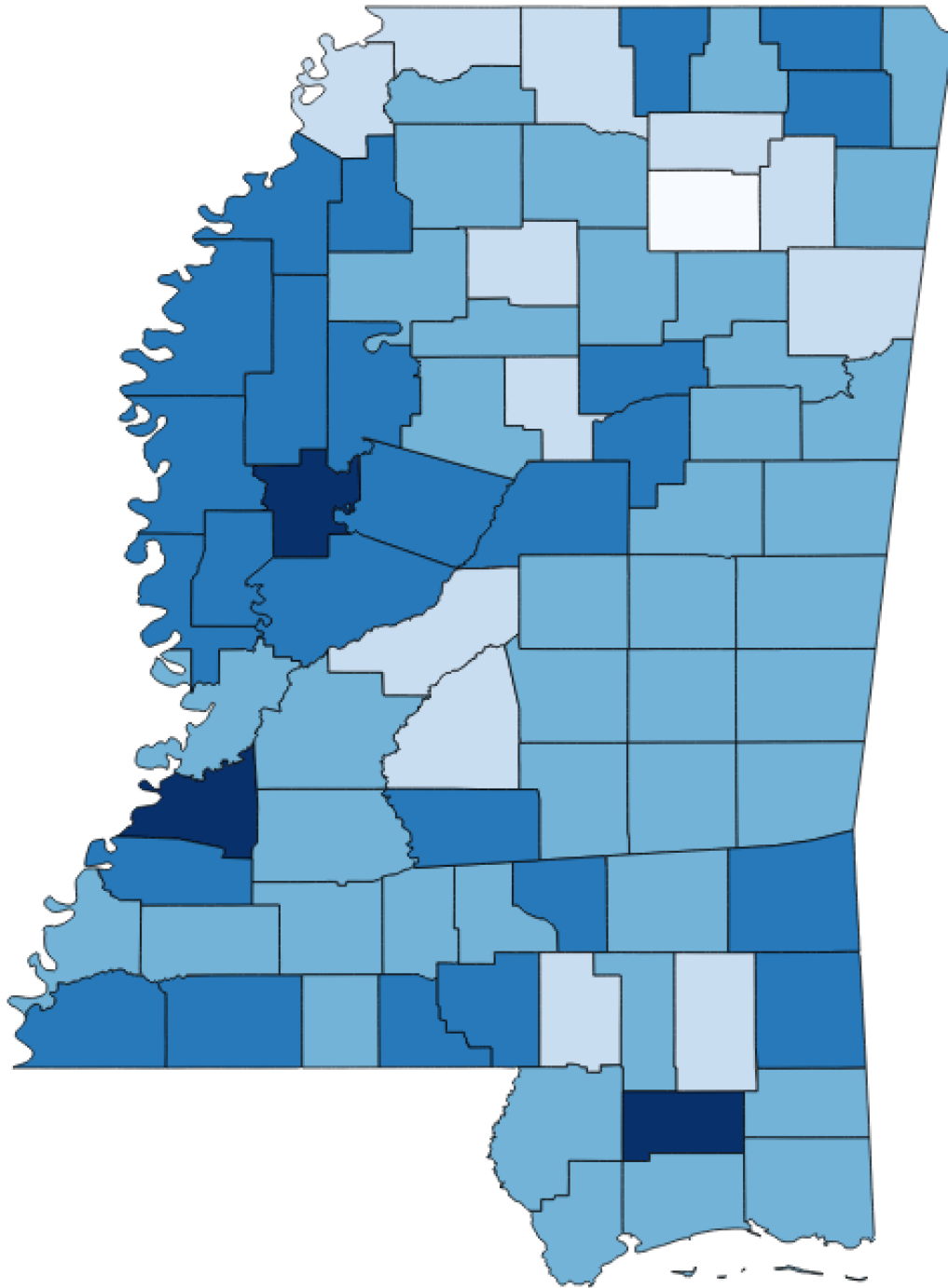


16. Double click on the values for the first class. Change the lower value to 0 so that our first class goes from 0 to .1. The image below shows what the window should look like. Then, for the last class, change the upper value to .51. We will do this so that all the layers we will create will fit in this classification.

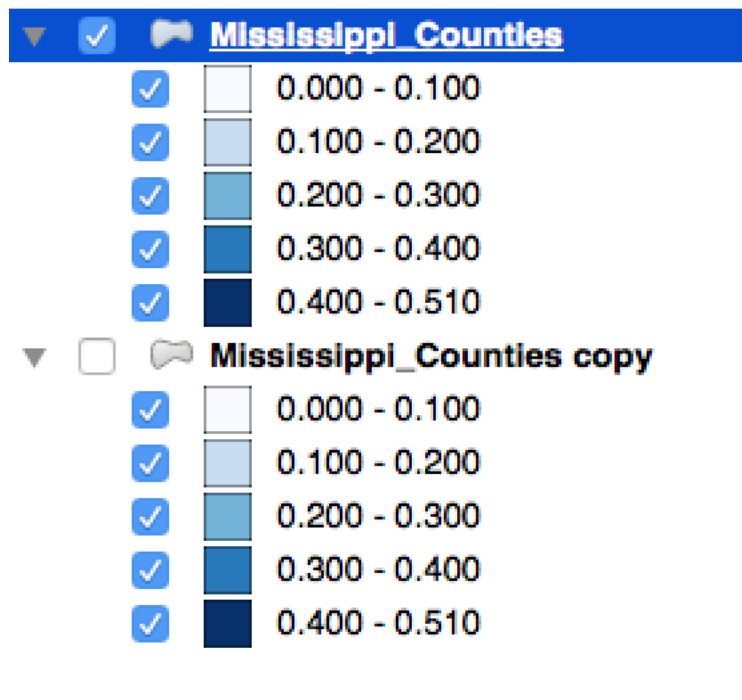




17. Click **Ok**. Your map should look something like this.

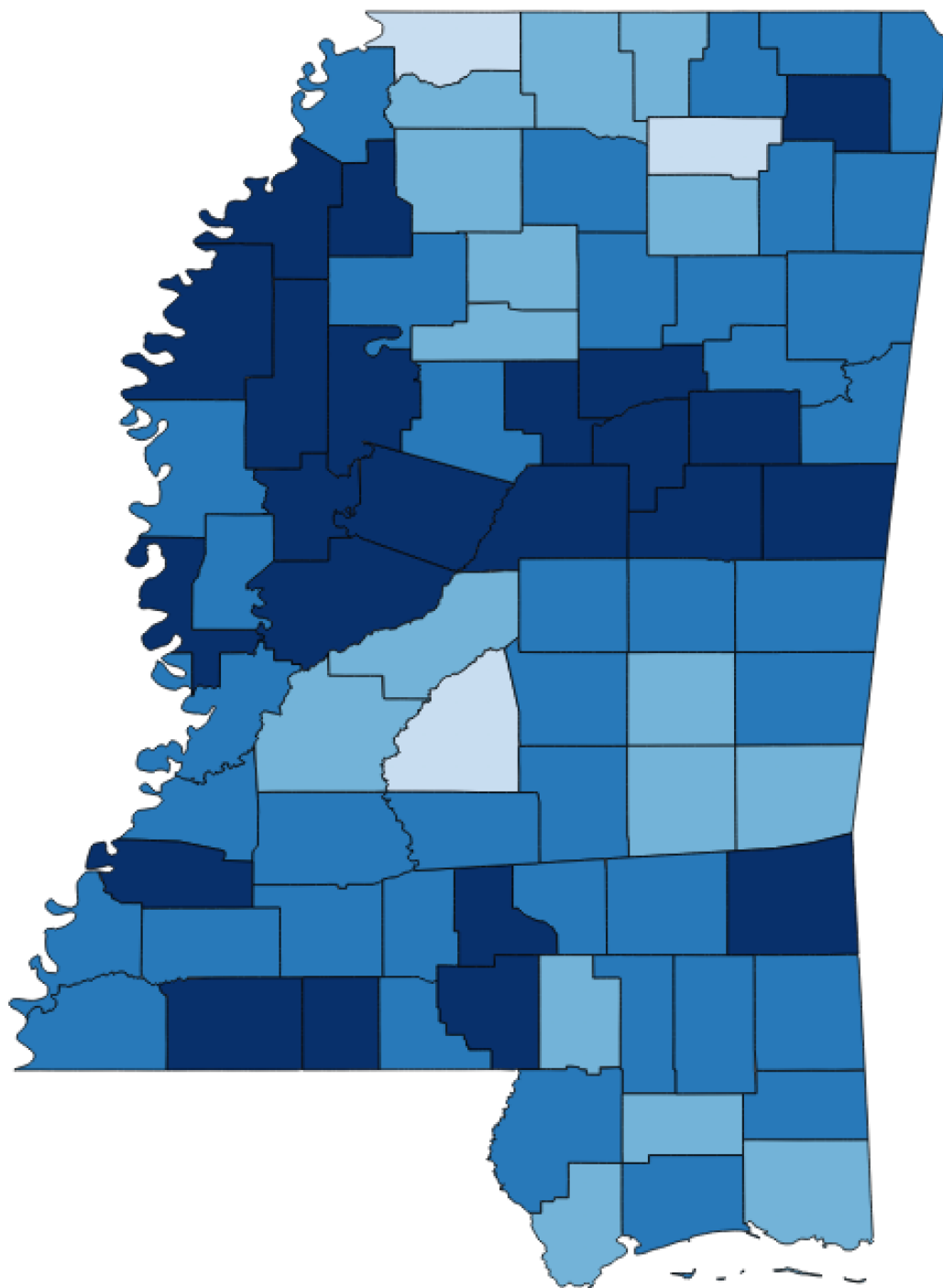


17. You can remove the outlines around the counties if you want. We will keep the outlines for our map, but if you wanted to do that, you would click on the **Change** option for Symbol. Click on **Simple Fill**, scroll down to **Outline style**, and choose the **No pen** option. Click **Ok** and then click **Ok**.
18. To make the maps for each demographic group that we are looking at, we will duplicate our layer. You should do this for each group, but here, I will show you how to do it once and look at Black Women in Poverty. Right click on your shapefile and click **Duplicate**. You should have two layers now:

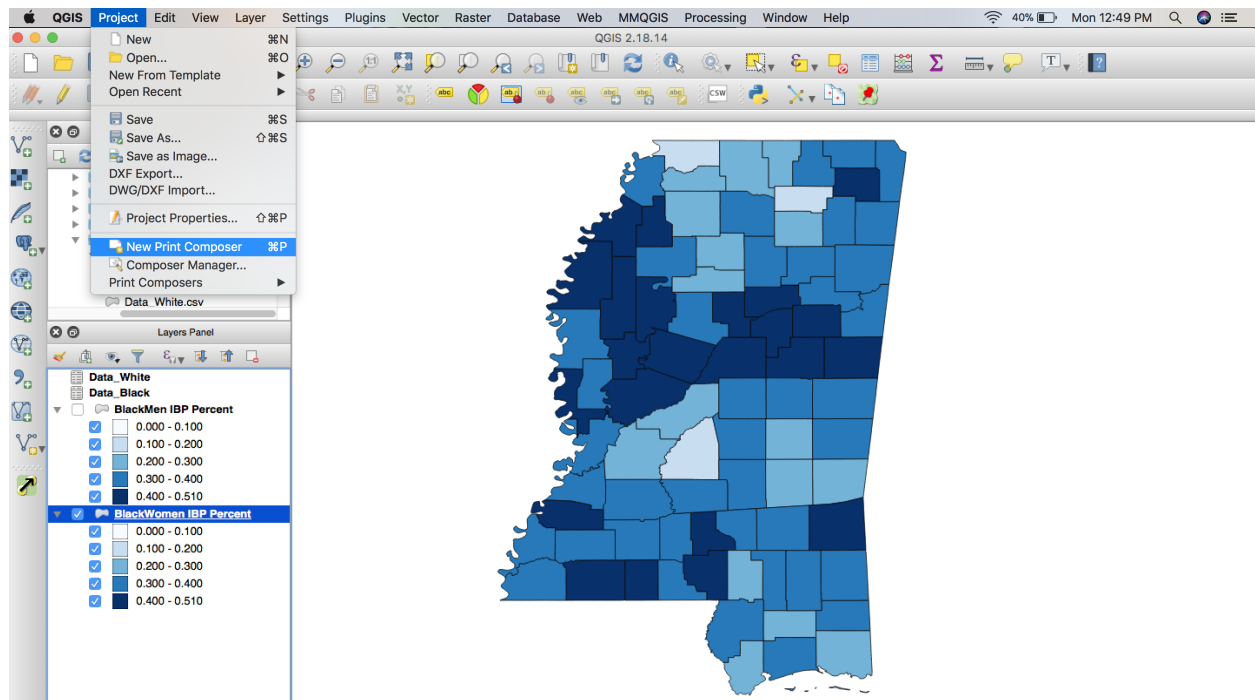



19. Right click on the first one and rename it so that you know it represents the Percent of Black Men in Poverty. Then, rename the second layer to Percent of Black Women in Poverty. Then, right click on it and go to Properties and change the variable to **B\_Percent\_IBP\_Women**. Do not click Classify because we don't want our classes to be recreated based on the values in this new variable. Instead, just click **Ok** and the map will use the same classes.
20. Your map should look the same at first. That's because our layer visualizing Black Men in Poverty is higher up in the Layers panel, so it is overlaying the other panel. The box next to our Black Women in Poverty layer is also not checked off the layer is not visible. To see that layer, check that box and then uncheck the box next to the Black Men in Poverty layer.


[/Users/fatimakoli/Desktop/check.png]




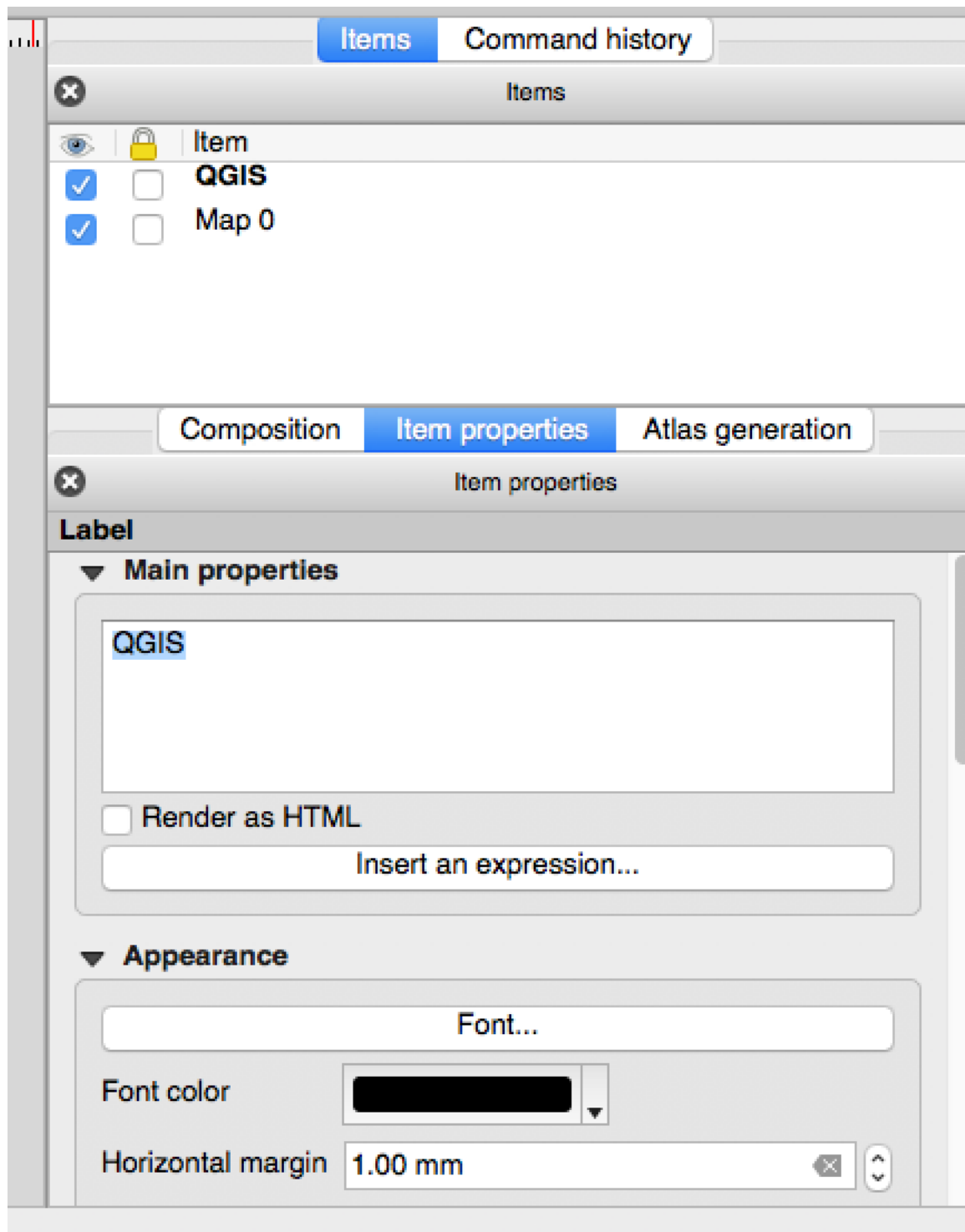
18. Now, we'll make our map legible and export it. Click on **Project > New Print Composer**. Title the Composer, **Workshop**.




19. Click on the Add new map icon  and draw a rectangle around the area you want your map to

show up in. Use this icon  to move your map inside the rectangle.

20. Add a title using the Add new label icon . In Item properties, under Main Properties, change the label from QGIS to Percent of Black Women in Poverty (or something else that is informative). You can change the style of the text using the font option.



21. Add a Legend using this icon . In Legend properties, change the Legend title so it is blank. Normally, this is where you would write the name of the variable, but in our case, we have included this in the title. Unclick the **Auto update** button so that we can change what is included in the legend.

**Legend**

▼ **Main properties**

Title Legend

Title alignment Left

Map Map 0

Wrap text on

☒ Resize to fit contents

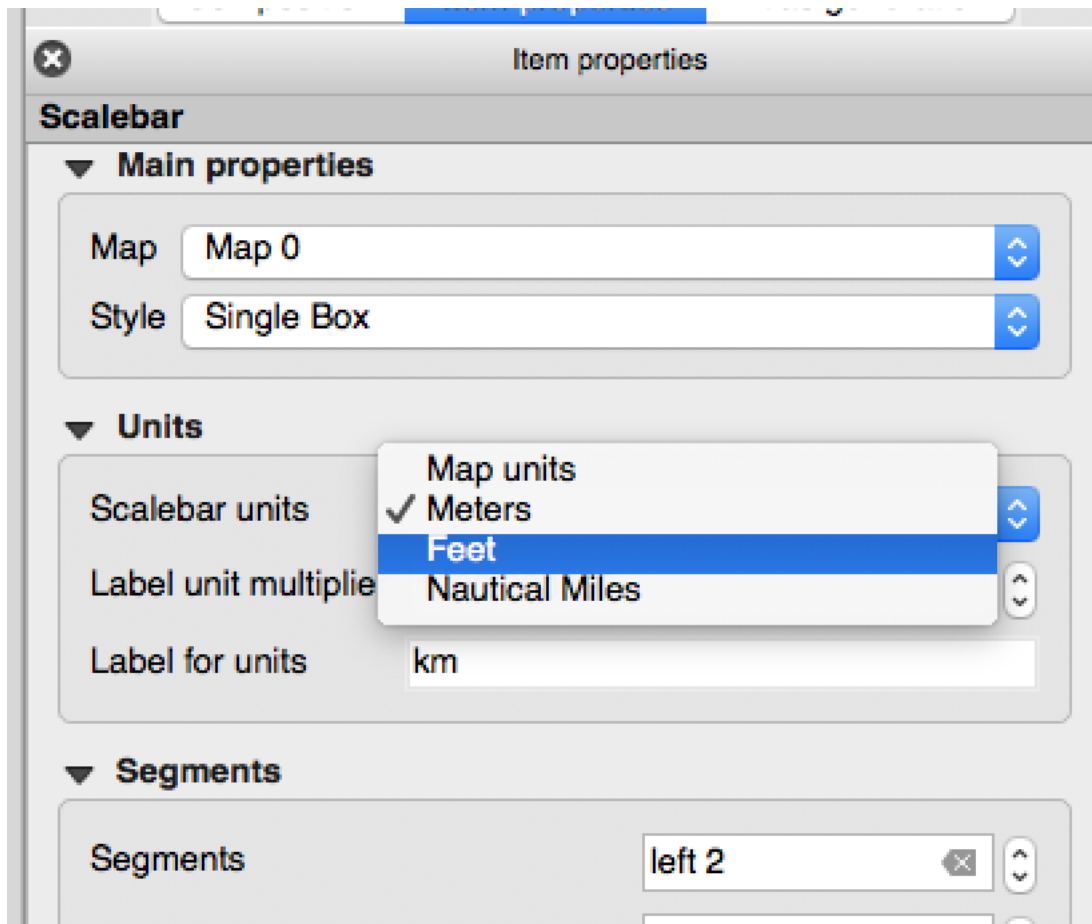
▼ **Legend items**

☒ Auto update Update all

22. Remove all the layers besides one of the shapefile layers (it won't matter which one we leave since both have the same classes). Double click on the name of the layer you left to change it. Make it blank since it is not necessary.



23. Add a Scale bar using this icon. Change the scale to be in miles by changing scalebar units to feet. Scroll down, and in Segments, change **left 2** to say just **left**. This will remove the portion of the scale that is going into the negatives.



24. You can change the way the bar looks using the Style option here.



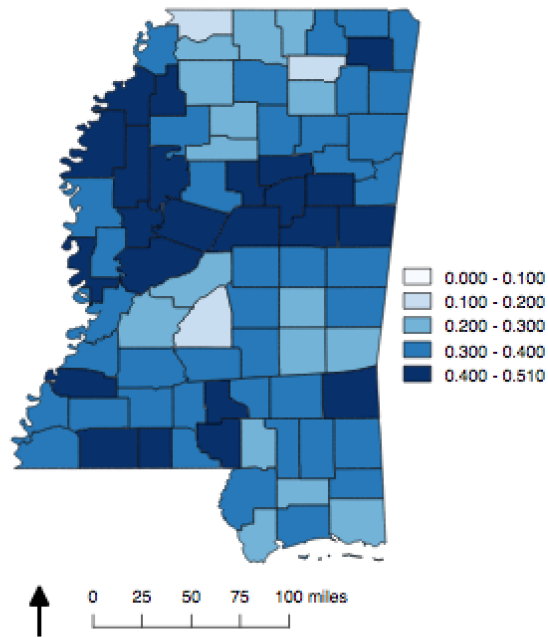
25. Add a North Arrow using this icon . Hold shift and draw a line straight up.

26. You should also add text for the source of the data.

27. Once you are done, you can click on **Composer > Export as PDF** to create a pdf of the Composer view.  
Your map should look something like this:



## Percent of Black Women in Poverty



28. Now, you have to create your pdf for the Black Men in Poverty layer. Instead of redoing all those steps, we can use this composer to just update our map and then fix our title. To do that, close the composer window. In the regular window, uncheck the Black Women layer and check the Black Men layer so we can visualize that layer. Then, click on **Project > Print Composers** and choose the print composer you created before.
29. In the print composer window, select the map. Then, in Item Properties, click on **Update Preview**. Your map should have updated. Now, just fix the title and then you're good to go! You can do that for the rest of the maps you create as well (as long as they are maps of the same indicator. If they are different indicators, you would have to change the legend as well, so for that, I would create a new print composer instead of using the same one.)

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Tutorial written by Fatima Koli, for *Mississippi Semester*.