QGIS Tutorial for Redistricting Game

About the tutorial: This tutorial is intended to be an aid for you and your group when working on the Redistricting Project.

Programs you will need: QGIS (download from http://qgis.org), Microsoft Excel, Microsoft Word, and either Open Office (as Excel cannot save files in the *.dbf; get it from https://www.openoffice.org/) or LibreOffice (get it from https://www.libreoffice.org). You will also need Python (3X series) if you wish to use our contiguity checker locally. We recommend the Anaconda distribution from Continuum IO, which is free at https://www.continuum.io/.

QGIS introduction: QGIS is a geographical information system that can view and understand geographic information. In any configuration, there are one or more layers of information which the GIS software manages for you. Every layer that you see in QGIS (or any other GIS platform) consists of five different data files, two of which are important to us. The .dbf is a data table that can be opened using OpenOffice or LibreOffice (but not Microsoft Office). The .shp file (the "shapefile") is the one that will, when opened in QGIS, afford visualizing the geographical information.

Before you start: Download the information given for this task and find a location on your computer or some removable media for all your data. QGIS will save the local path to the data. If you change the data location after you start working with QGIS you will receive an error when opening QGIS the next time

Important Files: There are three files of paramount importance for this project:

- **Data and Python/Data for redistricting.xlsx**
- **Louisiana Geographical Information.qgs**
- **Shapefiles/Districts/districts.dbf**

This tutorial is meant to familiarize you with these three files in order to drawn your own congressional districts in Louisiana in accordance with the guidelines available here:

Assignment, Workflow and Tutorial/Instructions for Redistricting game.pdf

Data for Redistricting Spreadsheet

This spreadsheet includes population and demographic data for the 64 parishes and the 1,148 census tracts in Louisiana. You have data on the total population and the voting-age population (VAP) in each parish and census tract. You also have the count of Caucasian American, African American, and Latinos in each parish and census tract. At the county level you have counts of registered Democrats, Republicans, and 3rd party voters, but these data are not available at the census tract level. The census tract sheet also indicates places within and across census tracts. If, for example, you wanted to keep Crowley in Acadia Parish in a single district you will have to keep tracts 9608, 9609, and 9610 in the same district.

The census tract sheet also includes a column "District" for you to change. This column will be used to sort the census tracts and parishes into one of the six congressional districts in the state. The spreadsheet is configured to automatically populate the table in the "Districts overview" sheet as you sort areas of the state into districts (using "1", "2", and so on). Note that all census tracts must

be assigned to one and only one district, that the total population of each district must be within 1% of the ideal district population (755,562), and that districts must be contiguous.

Louisiana data QGIS file

You should be able to open the “Louisiana Geographical Information.qgs” file using QGIS. Once the file loads you should see something like the image in Figure 1 below. If the file loads but the window is blank, right-click on an active layer and select “Zoom to Layer.”

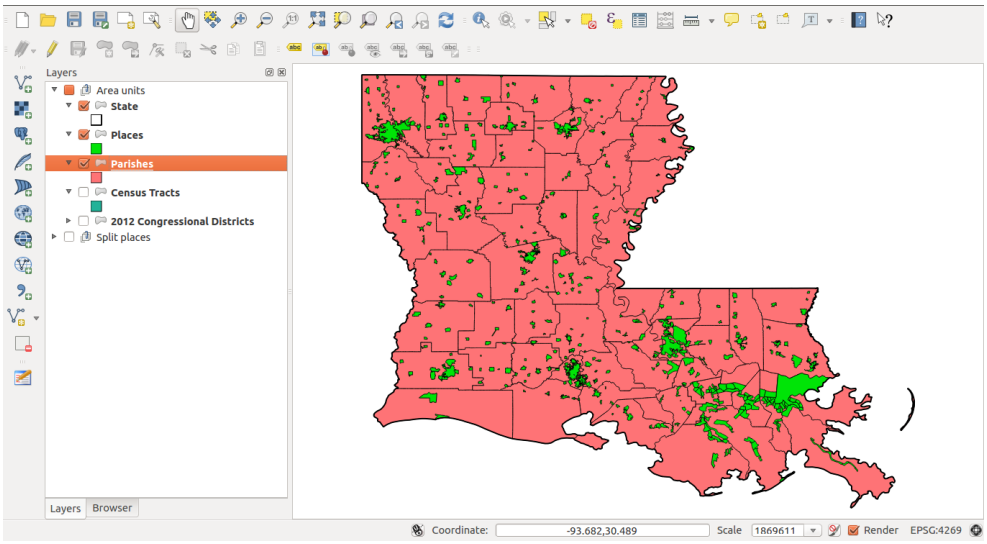

Figure 1: Opening Louisiana data QGIS file

The map itself contains a number of “layers” that can be displayed. You can see the border of the state, individual places, parishes, and census tracts can be displayed. The map also contains the congressional districts as they were drawn by the legislature after the 2010 census and, in the group “Split places,” the cases of places split into more than one census tract or parish.

Here you see a projection of Louisiana with parishes (in salmon) and places (in green) displayed. You can alter the layers that are displayed by checking or unchecking the boxes on the left. For example, if you wanted to display census tracts in place of the parishes, uncheck the box next to parishes, check the box next to census tracts and you should then see a map like the one shown in Figure 2 below.

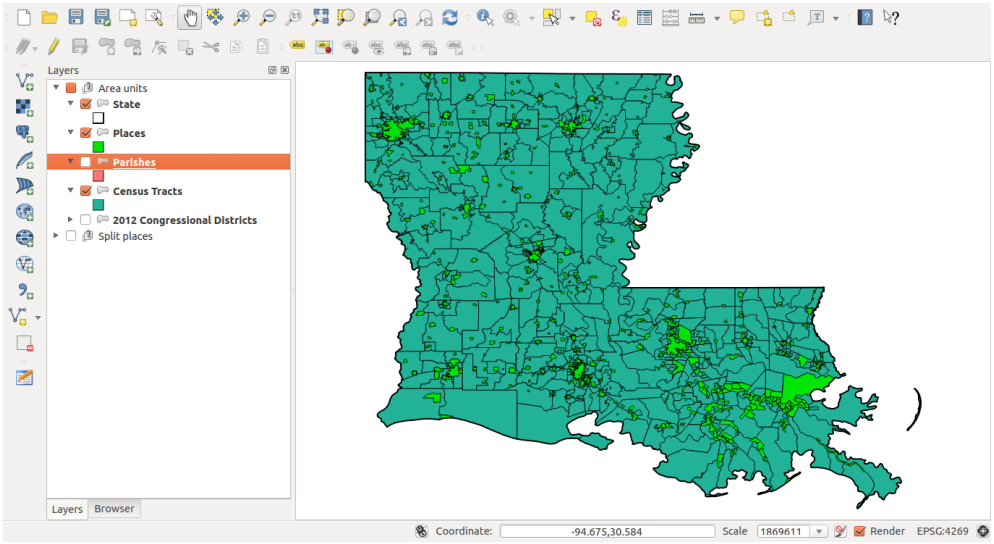

Figure 2: Louisiana Places and Census Tracts

You can use QGIS to get information about bounded units within the state. Use the “Identify Features” tool at the top of the window and then click on the census tract in the southwest part of the state. You should see a dialog box appear like in Figure 3.

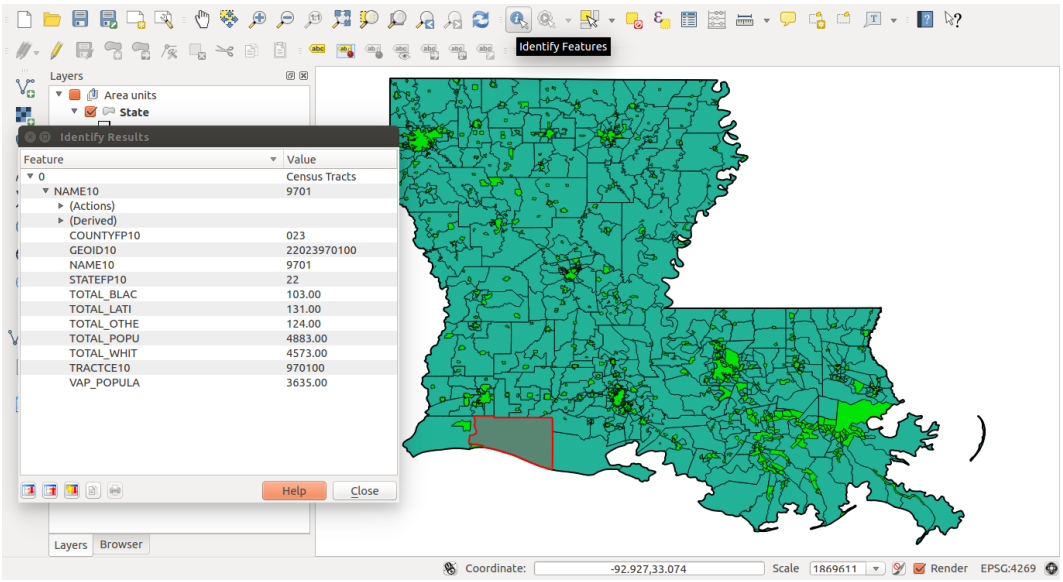

Figure 3: Identify Features Tool

You can see that this census tract, 9701, has a total population of 4,883 people of which 103 are black. You can use this tool to report the data for census tracts, parishes, and places.

A second way to display demographic data is to use a choropleth map to shade areas according to, for example, the number of black people in a census tract. To show a graduated ramp of these data, double click on the census tract layer heading. A dialog box “Layer Properties – Census Tracts” should open. In this box, click the drop-down menu labeled “Single Symbol” and select “Graduated.” Select “TOTAL_BLAC” in the Column drop-down menu and increase the number of classes to 7. Your properties window should then look like Figure 4. Then click OK and you should see a map shaded to indicate black population in each of the census tracts. The same process can be used to show graduated scales of any of the information contained in the data within each layer.

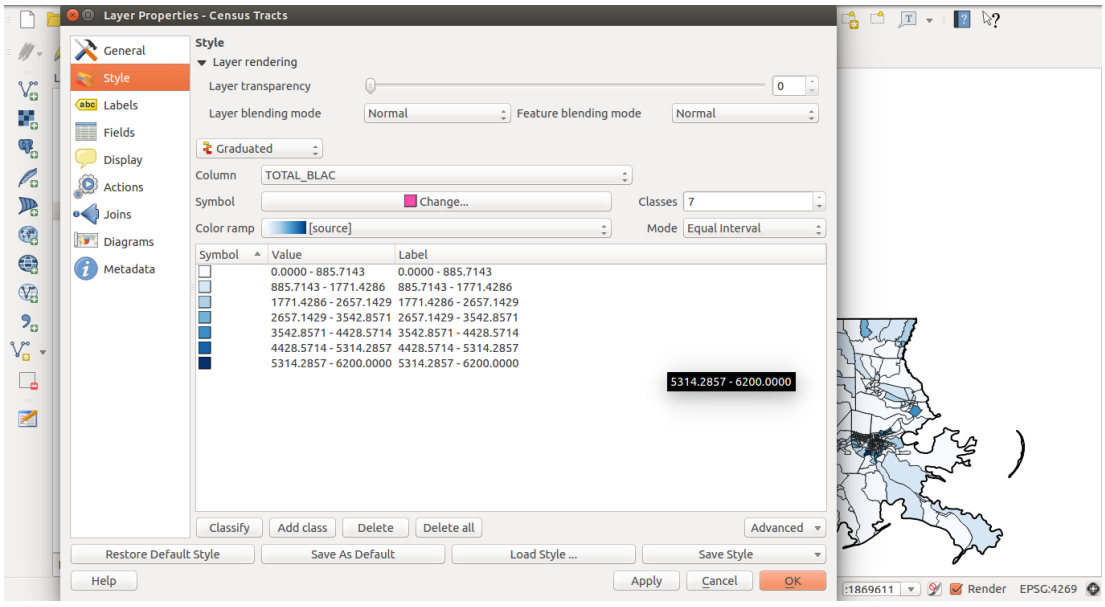

Figure 4: Displaying Population Data

Figure 5 shows the choropleth map that should appear.

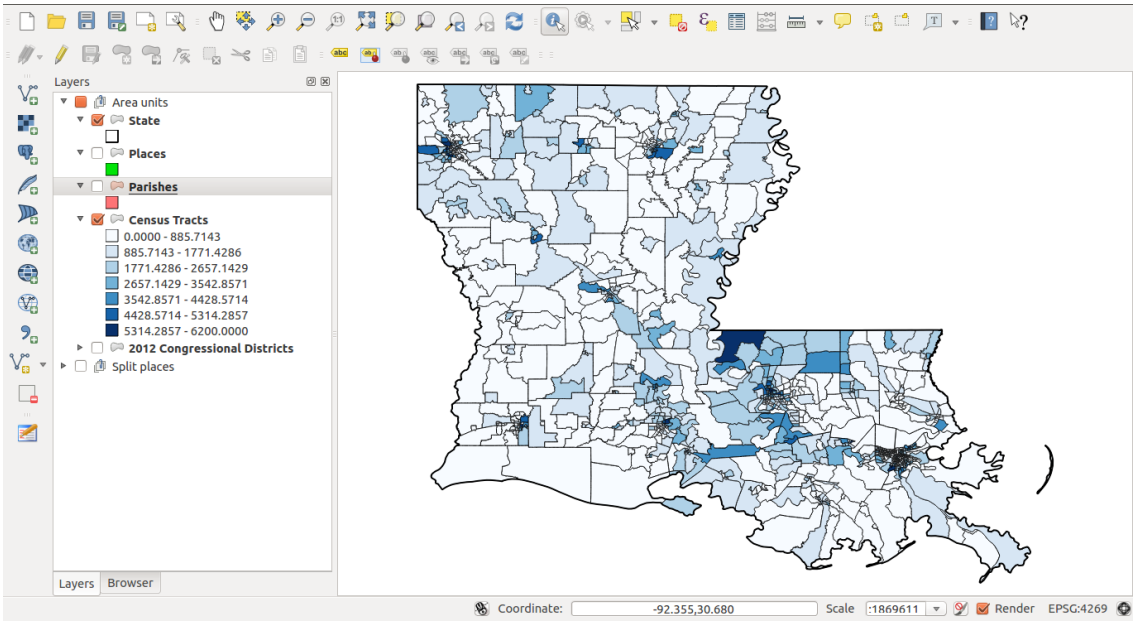

Figure 5: Graduated Display of Black Population across Census Tracts

Drawing Your Districts

To create six congressional districts, you will use the QGIS map to identify contiguous sets of parishes, places, and census tracts and then indicate which district a given area is in using the "Data for Redistricting" spreadsheet, in particular the "District" column in the "Census Tracts" sheet.

To produce a map of your districts (or a partial set) copy and paste the "District" column into the third important file: **Shapefiles/Districts/districts.dbf**. You'll need to open this file using Open Office, as Excel is unable to save *.dbf formats. Be sure to sort the identifying column ("GEOID" in the spreadsheet; "GEOID" in the .dbf file) so the census tracts are in the same order. But be sure not to rearrange the rows in the .dbf file, as that will ruin the data table. Once you have indicated which district the tracts are in, save the .dbf file and then click-and-drag the corresponding .shp file into the QGIS "Layers."

You will want to use the "Dissolve" tool (in the Vector → Geoprocessing Tools → Dissolve menu) to eliminate the internal borders in your new districts. Indicate your "Input vector layer" as the districts.dbf file, use "District" as your dissolve field, and create a new Output shapfile of your choice. You can then label your new districts by double-clicking on the new layer that appears, select "Labels" and then select to label the new layer.