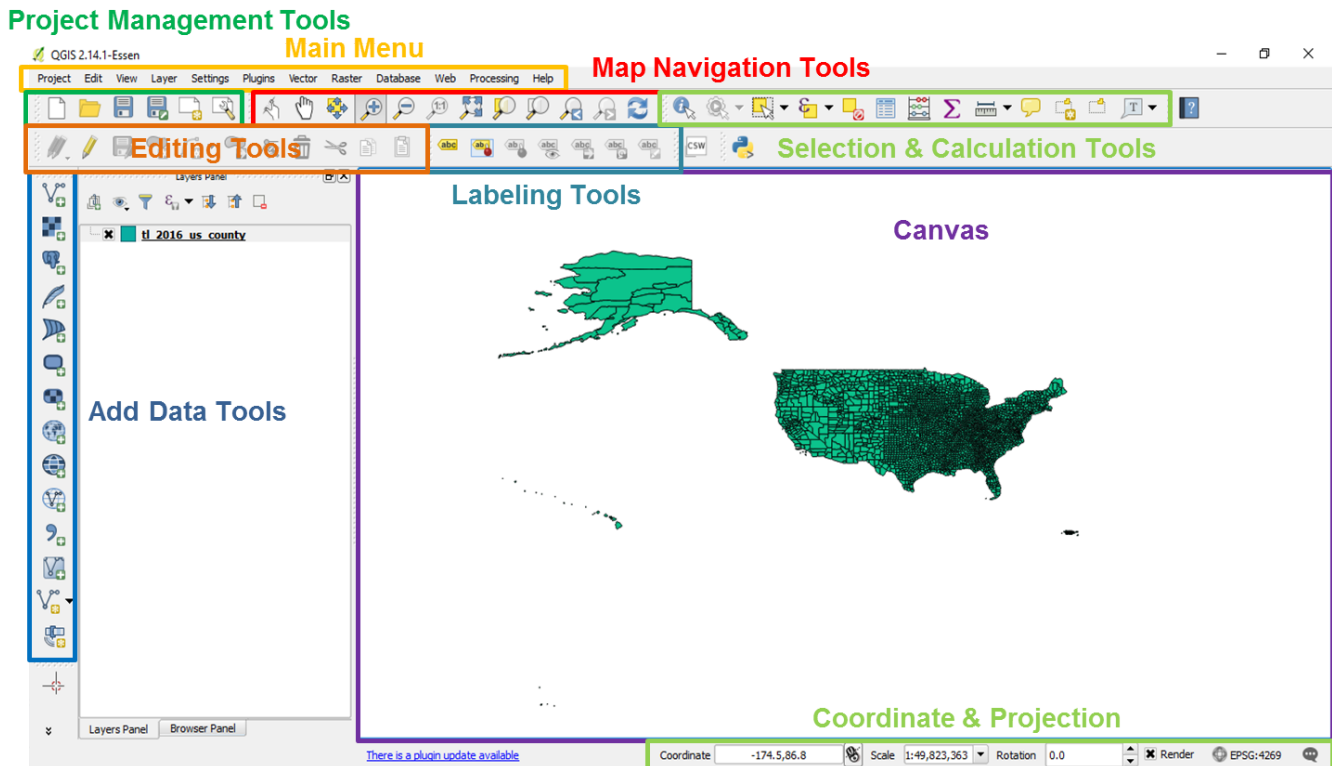


MAPPING WITH QGIS: THE BASICS

QGIS is an open source mapping software used to map and analyze geospatial information.

PART I: Installation of QGIS

1. Download the software from **qgis.org**. Available in Windows, Mac, & Linux.
2. Once downloaded, launch QGIS Desktop 2.18 or whatever version you have
3. QGIS Interface



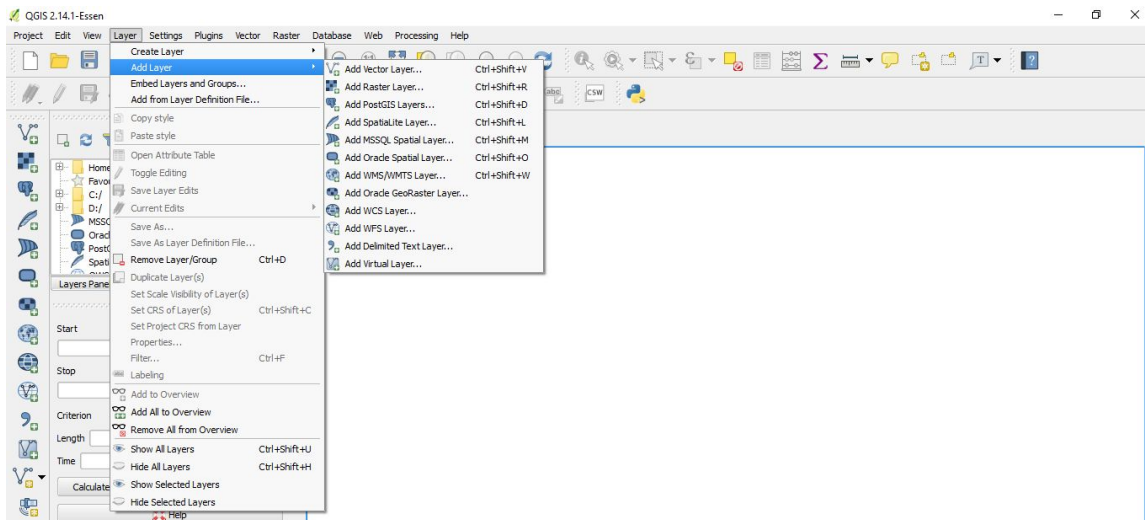
PART II: Collecting DATA

Both datasets were retrieved from the National Historic Geographic Information System (NHGIS).

- You can download the data from <https://www.nhgis.org/>
 - o Attribute Data – .csv file - 1820 Census Data, Number of Persons Engaged in Selected Industry
 - o Spatial Data – .shp file - 1820 2000 US Census TIGER County Boundaries

Tips: Be sure to inspect the data, specifically the attribute table. Make sure the columns do not have any spaces, use underscores (_) if needed. Also make sure your cell values do not have extra unnecessary spaces. This could affect your geoprocesses.

PART III: Adding DATA



4. First, you will add the county boundaries. Since this is a shapefile, you will add it as a vector layer.

To add the vector layer, click  OR go to Layer→Add Layer→Add Vector Layer

You will receive a pop-up, click Browse to find county boundaries shapefile. Go to the folder where you saved the extracted shapefile. Add the shapefile.

5. Next, you will add the census data. Since this is a csv or text file, you will add it as a text-delimited layer.

To add the text file, click  OR Layer→Add Layer→Add Text-Delimited Layer

You will receive a pop-up, click Browse to find census CSV file. Go to the folder where you saved the CSV and add it. Select CSV(comma separated values) and No geometry (attribute only table) .You have no columns with latitude and longitude information.

6. SAVE! SAVE! SAVE!

PART IV: Join Tables

7. Now you have 2 layers, but your census data is NOT attached to the county boundaries. So we have to join them together. Both the shapefile and the CSV file have a field called GISJOIN. We will use this field to join both datasets.

8. Right-click on the county boundaries shapefile in the Layers table of contents

9. Select Properties then select Joins on the left panel and click + on the bottom right

10. The program should automatically select the right layer(CSV) to join, if not change it in the dropdown menu

11. Select the two fields that have the same type of information. In this case it will be GISJOIN.

- Note: In the future, they do not necessarily have to have the same field name
- The Join field is the field in the layer without geometry (the text layer).
- The Target field is the field in your shapefile.

12. Click OK

13. SAVE! SAVE! SAVE!

14. Open the attribute table of the county boundaries to see if the table join was successful

15. To save the join for future use, right-click on the county boundaries shapefile in the Layers table of contents

16. Click `Save As...`
17. A new dialog box will open, `Format` is automatically selected as `ESRI Shapefile` which you want.
18. Click `Browse` to select the folder where you want to save your new shapefile
19. `Add saved file to map` is pre-selected, you can leave it or unselect
20. Click `OK`

PART V: Symbolize





Experiment by changing the style and color of the polygons.

21. Right-click on the county boundaries shapefile in the `Layers` table contents
22. Select `Properties`→`Style`→ change `Single symbol` at the top to `Graduated`
 - a. You would use `Graduated` for quantities and `Categorized` for qualitative data
23. For `Column`, select one of the industry types (agriculture, commerce, manufacturing)
24. For `Color ramp`, explore!
25. Go to `Classes`, for `Mode`, explore, each one is different.
26. Once you select a `Mode`, click `Classify`.
27. Stay in this dialog box. Now, notice the data ranges. We want to get rid of the extra zeros after the decimal. They are meaningless to us for this map.
28. Go to `Legend Format` just below `Symbol` near the top. Go to the right for `Precision`. Change this to `Precision 0`. You can also check the `Trim` box to remove the zeros.
29. Click `OK` at the bottom
30. If you notice several areas disappeared. Go to the attribute table and you'll notice there are `NULL` values. They are not considered as zero values. To allow `NULL` values for agriculture to appear:
 - a. Go to `Properties`→`Style`
 - b. For `Column`, click the `E` to access the `Expression Dialog` box.
 - c. In the `Expression` window, type this command:

```
case when "industry_census1820_AGRICULTURE" IS NULL then 0 else  
"industry_census1820_AGRICULTURE" end
```

31. Click `OK` and `OK` again

PART VI: Designing Your Map for Print

22. Go to the `Project` menu in the top lefthand corner. Select `Print New Composer`.
23. Add a title for the composer. Click `OK`
24. Go to `Layout`, select `Add Map` or click . Hold the left mouse button and drag a rectangle where you want to insert the map.
25. You can go back to `Layout`, and add a scalebar , another map, a legend , compass arrow. Try it. You would use `Add Label` or  to add text such as a title.

26. For every element you add to your final map, you can use the `Item Properties` tab on the right to edit each feature.

27. Once you are done, you can export the map as an image, pdf, or SVG. Go to `Composer` and make your selection for export. You can use SVG files in other open source graphic softwares including Inkscape and GIMP.

PART VII: Map to Web

28. Go to `Plugins` → `Manage and Install Plugins`. Then search for `qgis2web` and click `Install plugin`.

29. After the plugin is installed go to the `Web` menu and select `qgis2web`.

30. Set your parameters. Be sure to specify the appropriate output directory in the `Export Folder` option.

31. Select `Export`. This will create an `index.html` and folders with associated Javascript and CSS files.

No coding required!