

QGIS Workshop

1. Introduction to QGIS

QGIS is a free and open source Geographic Information System (GIS).

QGIS can help users create, edit, visualize, analyze, and publish geospatial information on various operating systems including Windows, Mac OS, Linux, BSD, etc.

2. QGIS vs. ArcGIS

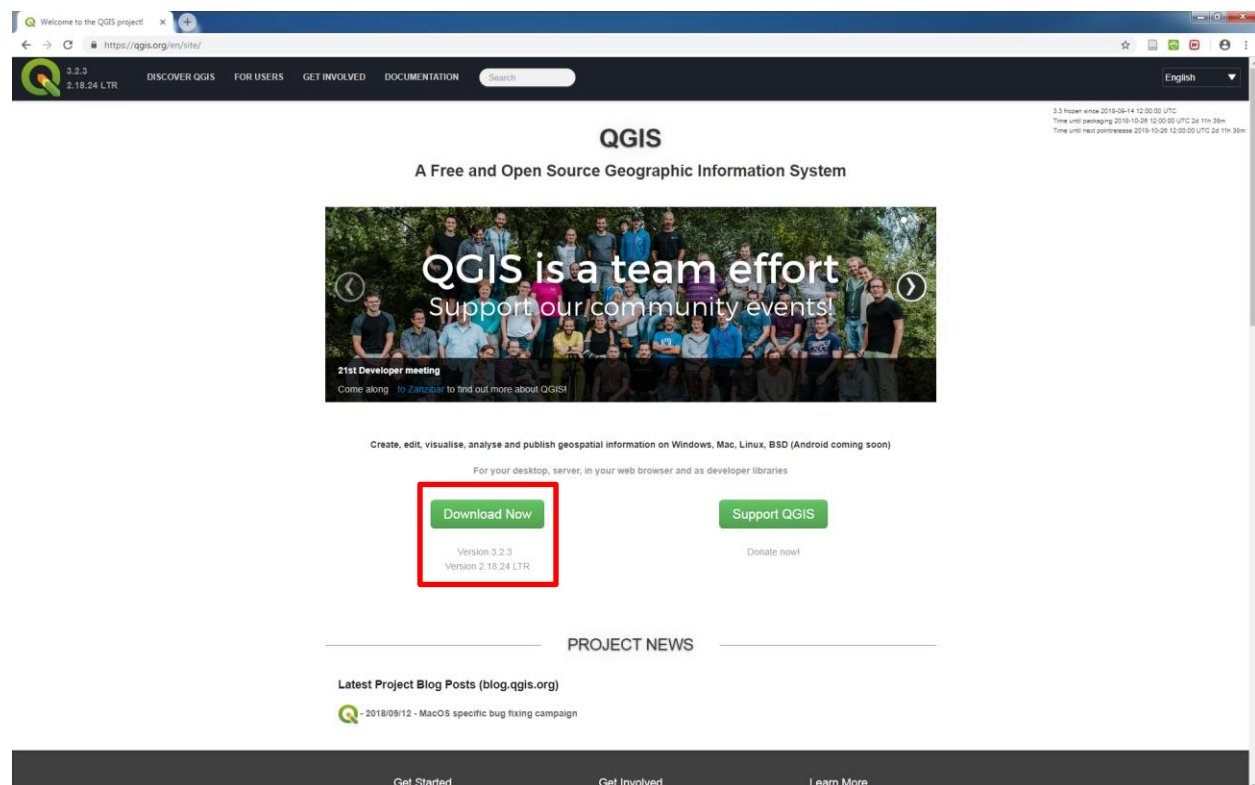
QGIS --- free and open source software package, more stable, less analysis tools, multi-platform

ArcGIS --- commercial software package, less stable, more analysis tools, single-platform

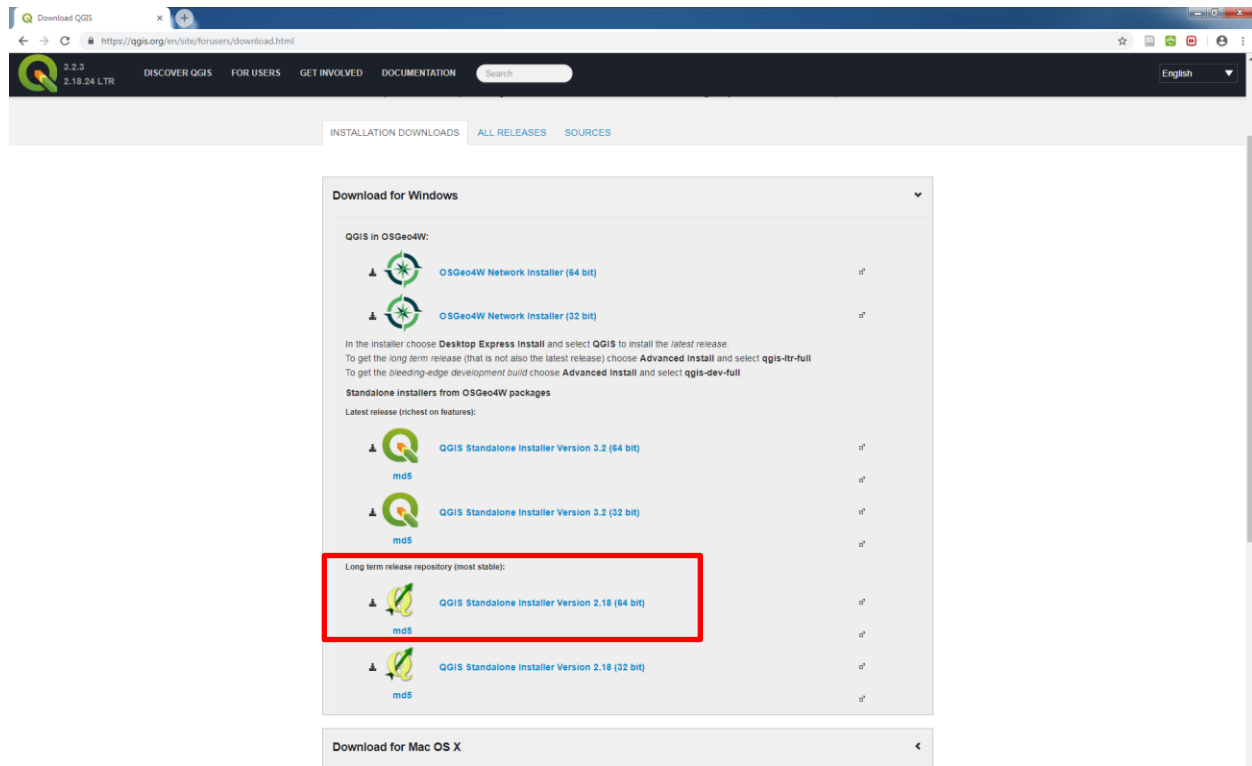
3. Download QGIS

1) Go to www.qgis.org

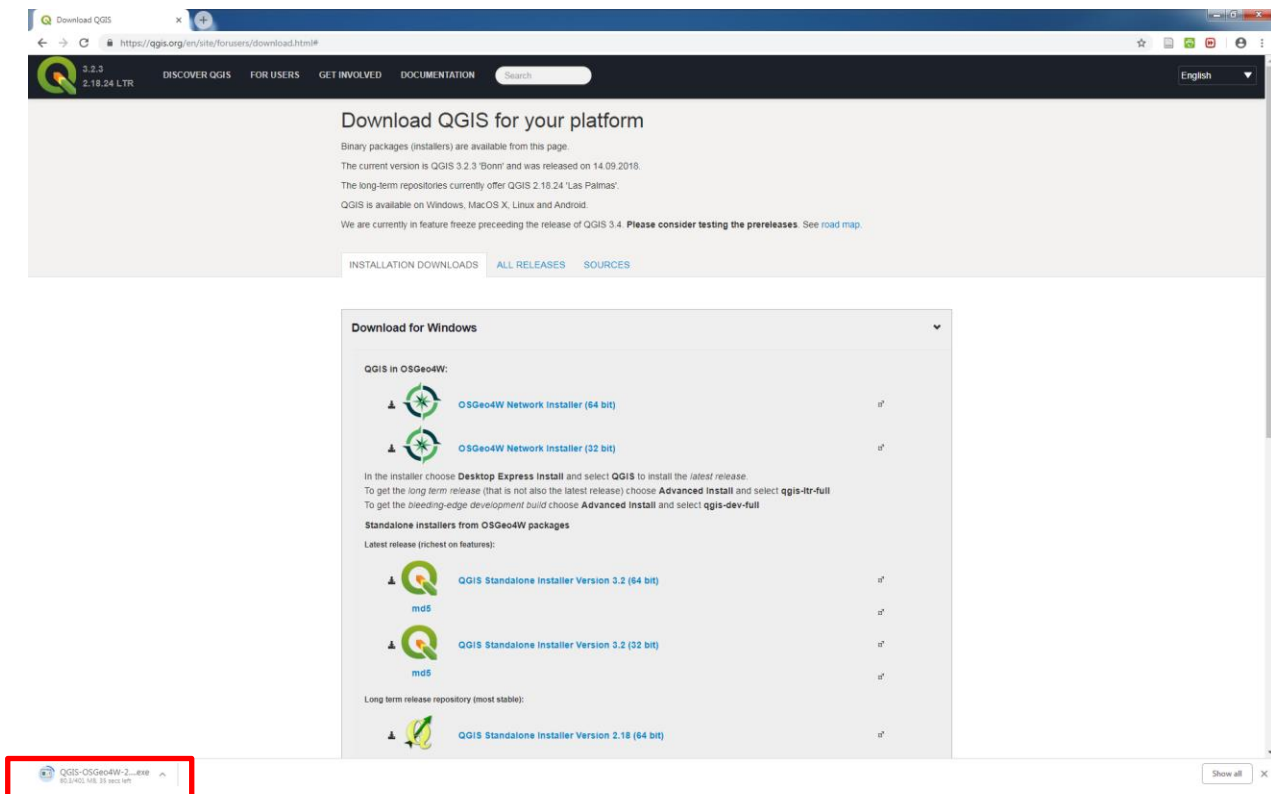
2) You will see a webpage looks like the one below; click on “Download Now” to go to the download page



3) Select the long term release that is compatible with your operating system to download; it is suggested to download the 64-bit version if it is compatible with your operating system

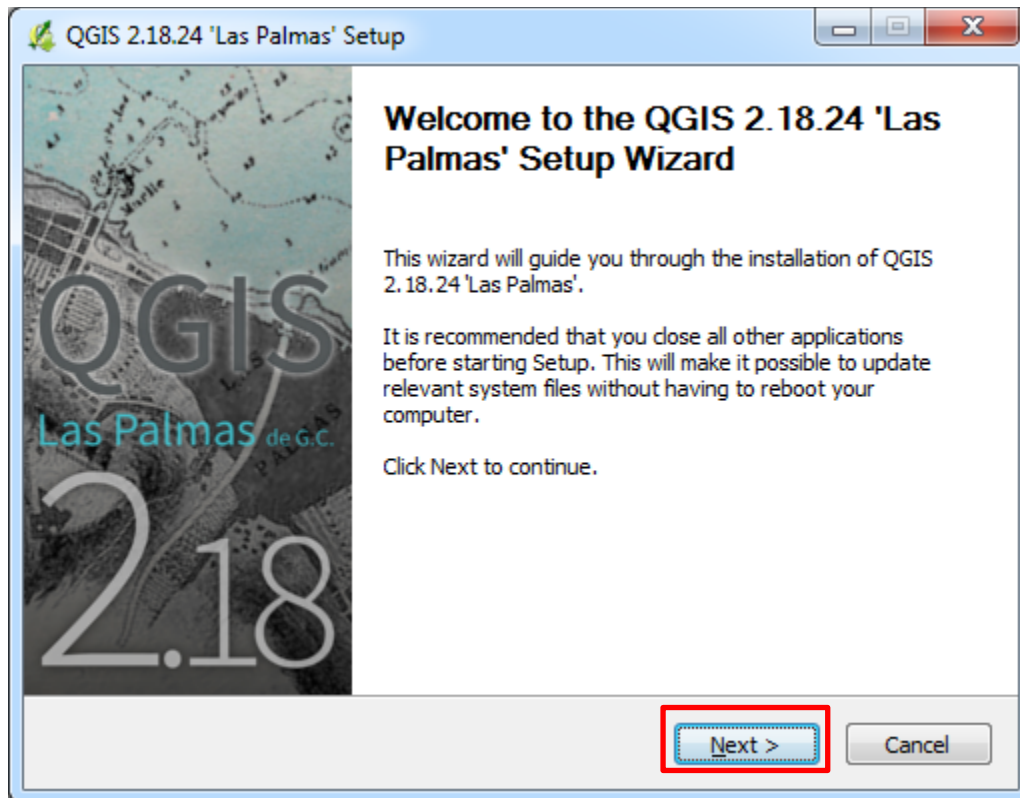


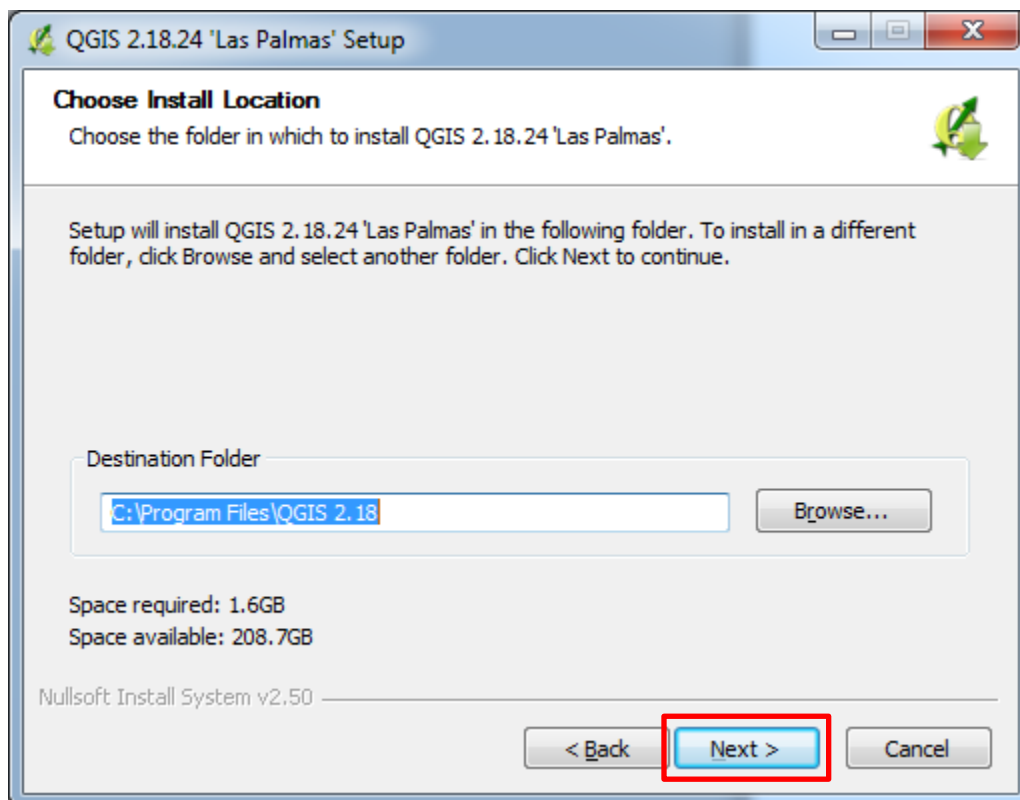
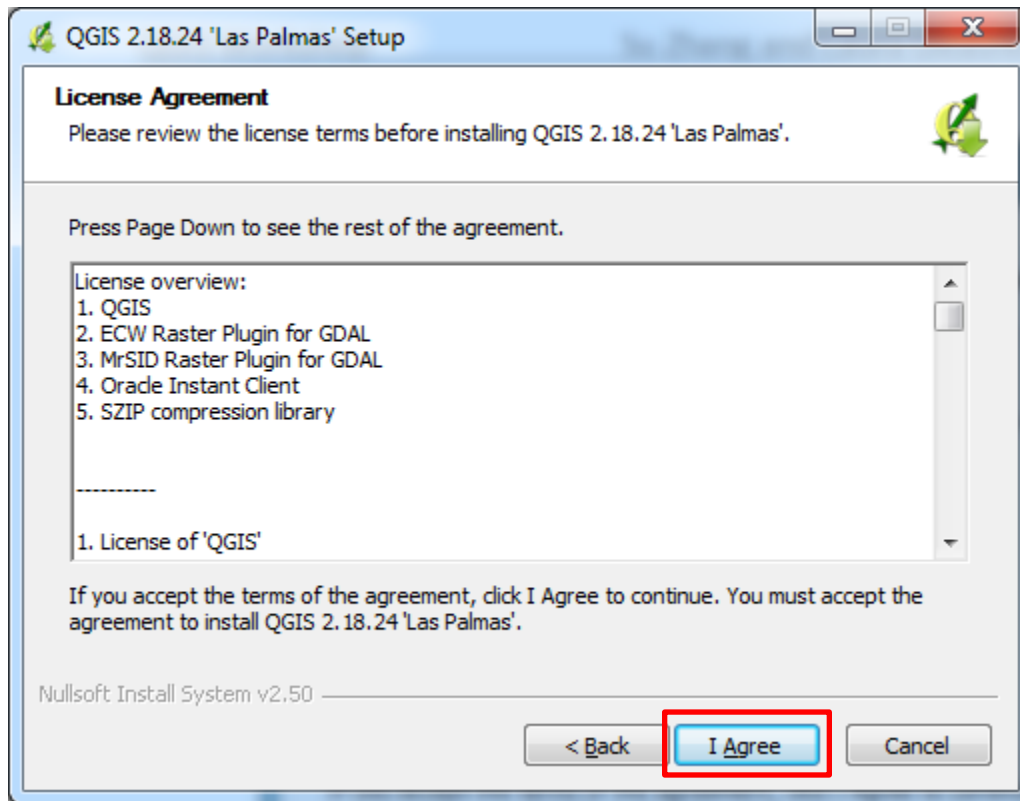
3) Click on the desired version, your browser will automatically download the QGIS installer

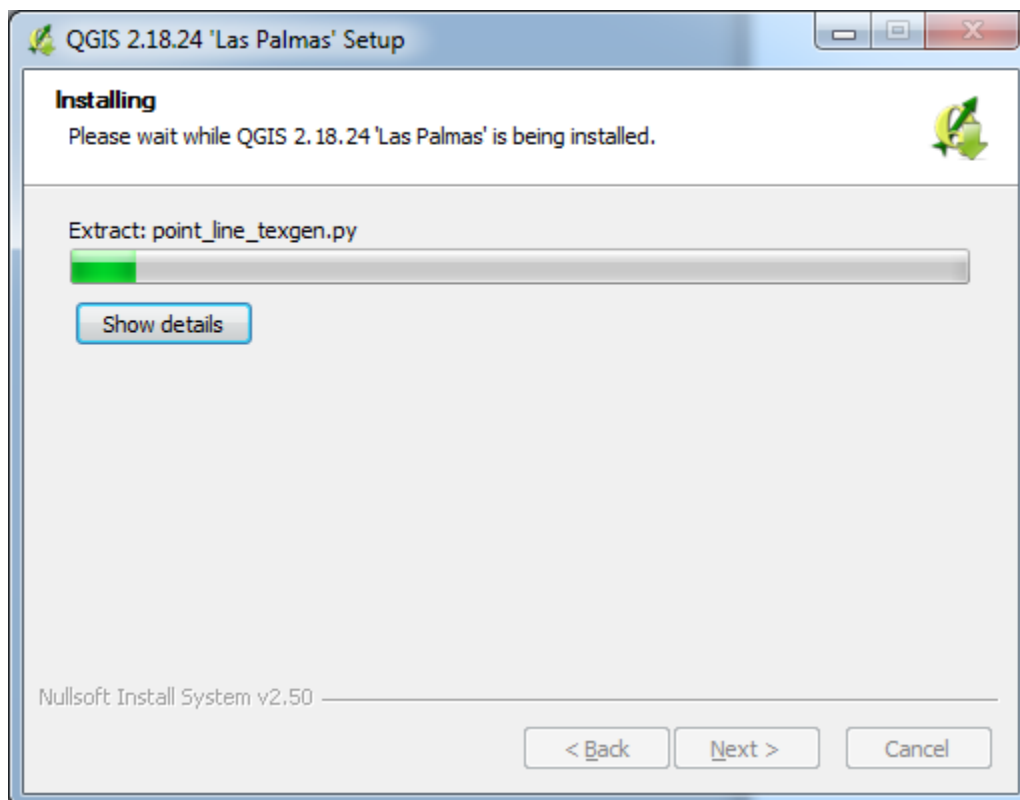
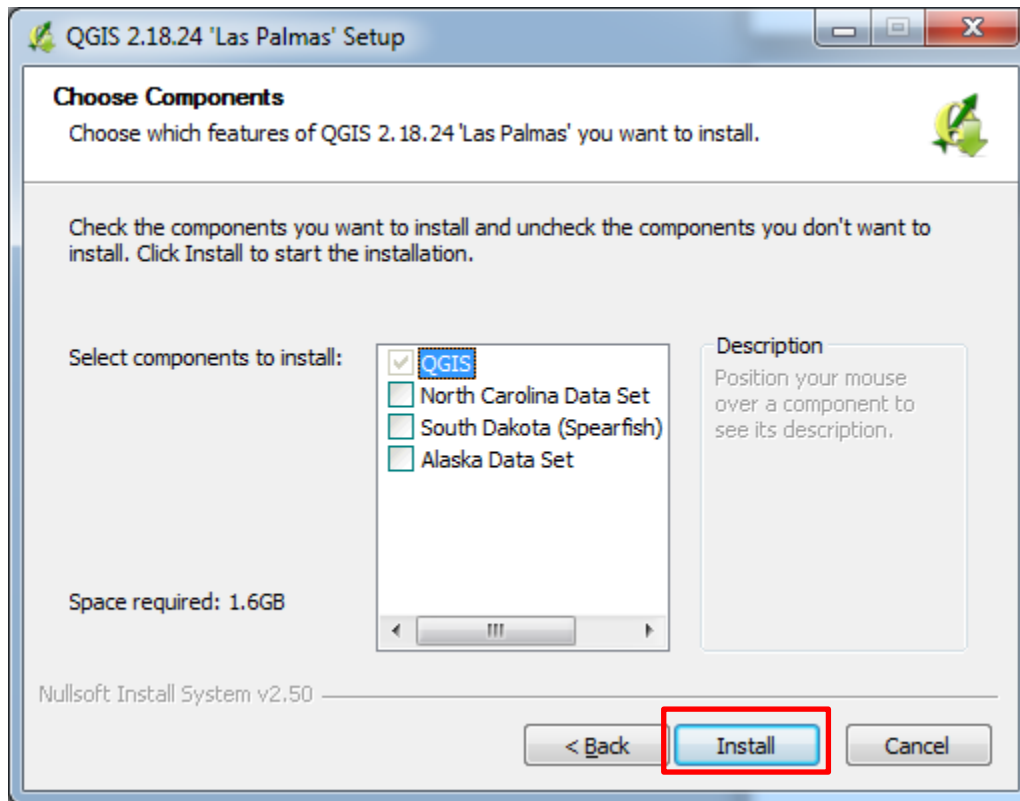


4. QGIS Installation

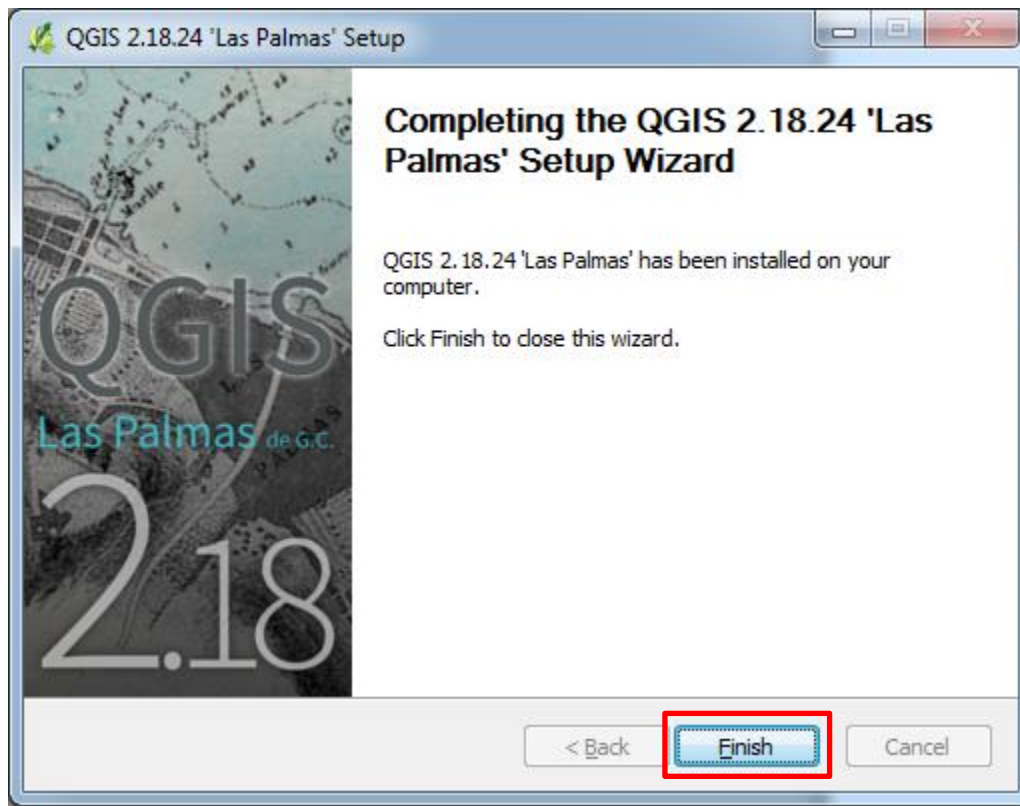
- 1) Double click the installer that you have downloaded
- 2) QGIS Setup Wizard will show up
- 3) Click Next to start the installation process
- 4) You will see the License Agreement, installation location, components to install, etc.







5) Click “Finish” to complete the installation

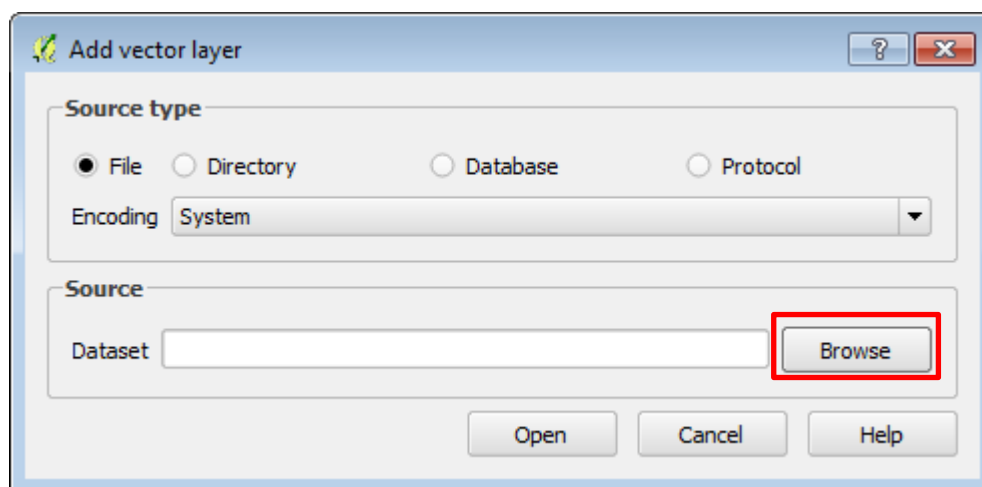
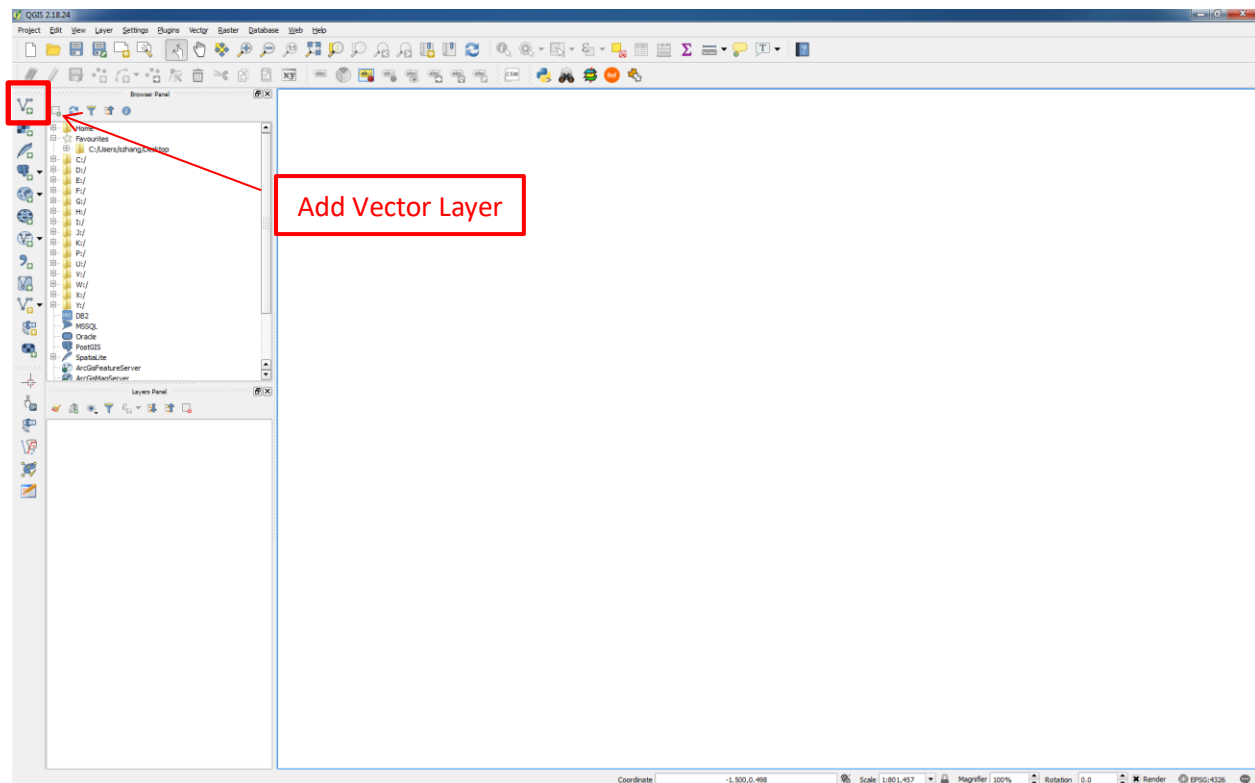


5. Start QGIS

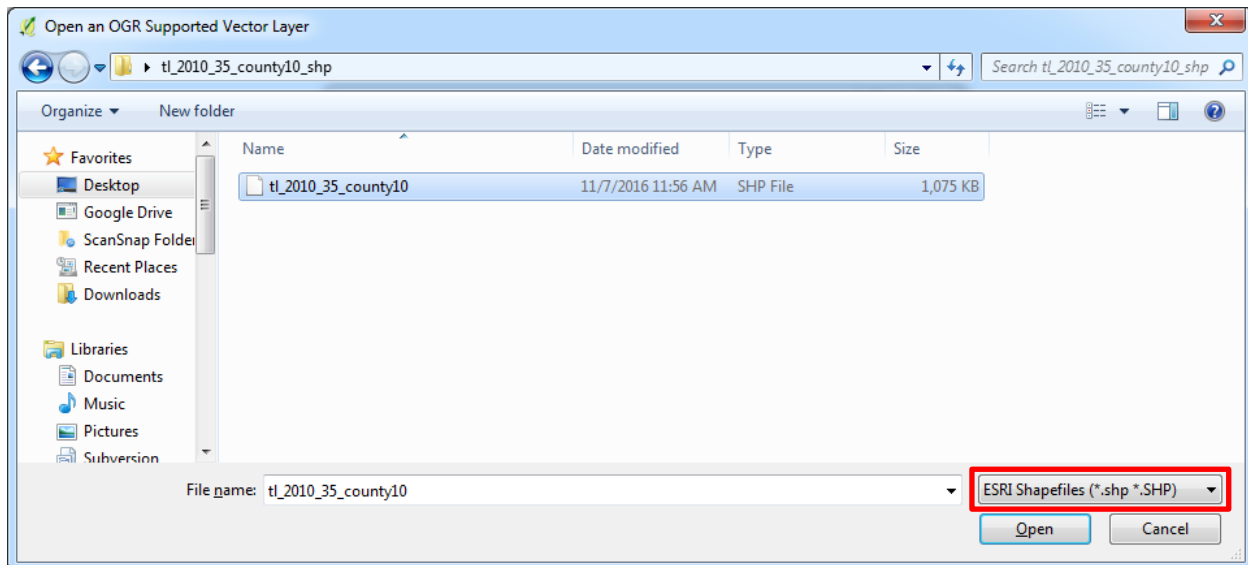
Click on the “QGIS Desktop 2.18.24” application icon on your desktop or please go to my computer ---- all programs (all apps for Windows 10) --- QGIS Desktop 2.18.24.

Note: The first time may take a few minutes to start. For this workshop, we will only focus on vector data (points, polylines, and polygons).

1) Add Vector Layer

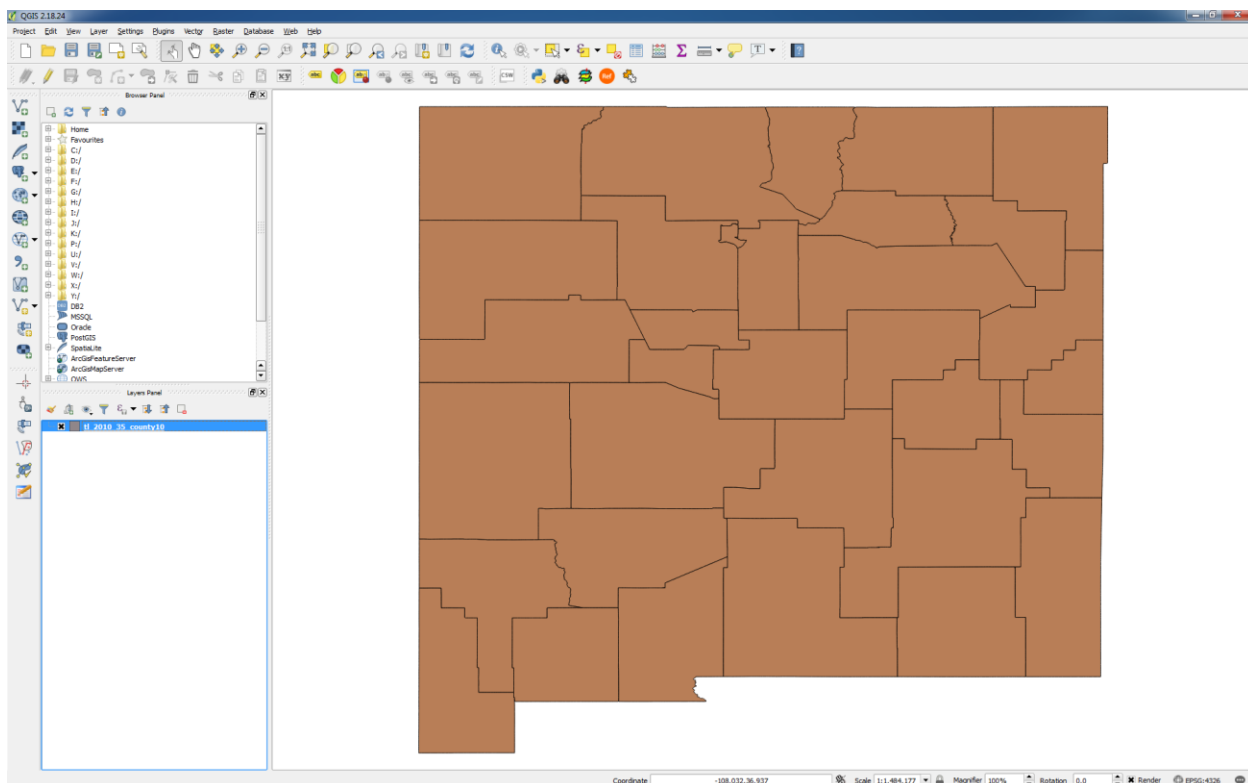


2) Browse to where you saved your data; make sure you choose the “ESRI Shapefiles (*.shp *.SHP)” file in Type to upload; load the New Mexico county boundary polygon shapefile

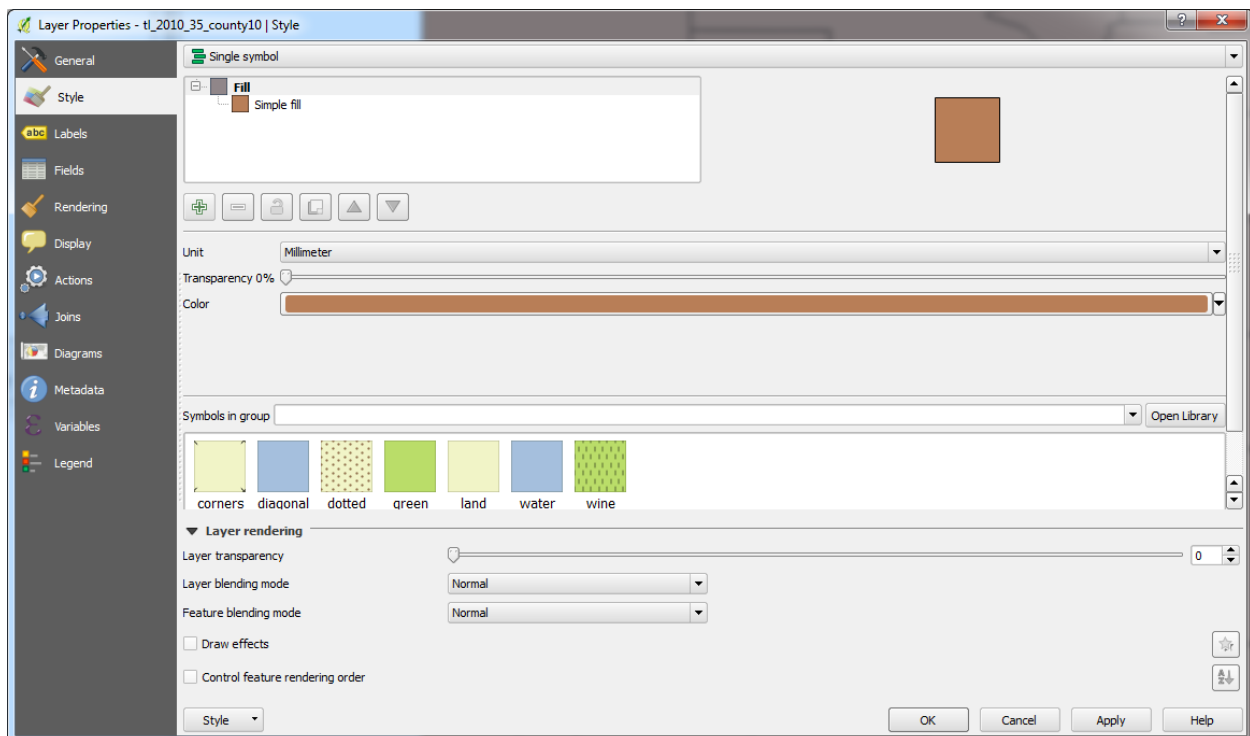
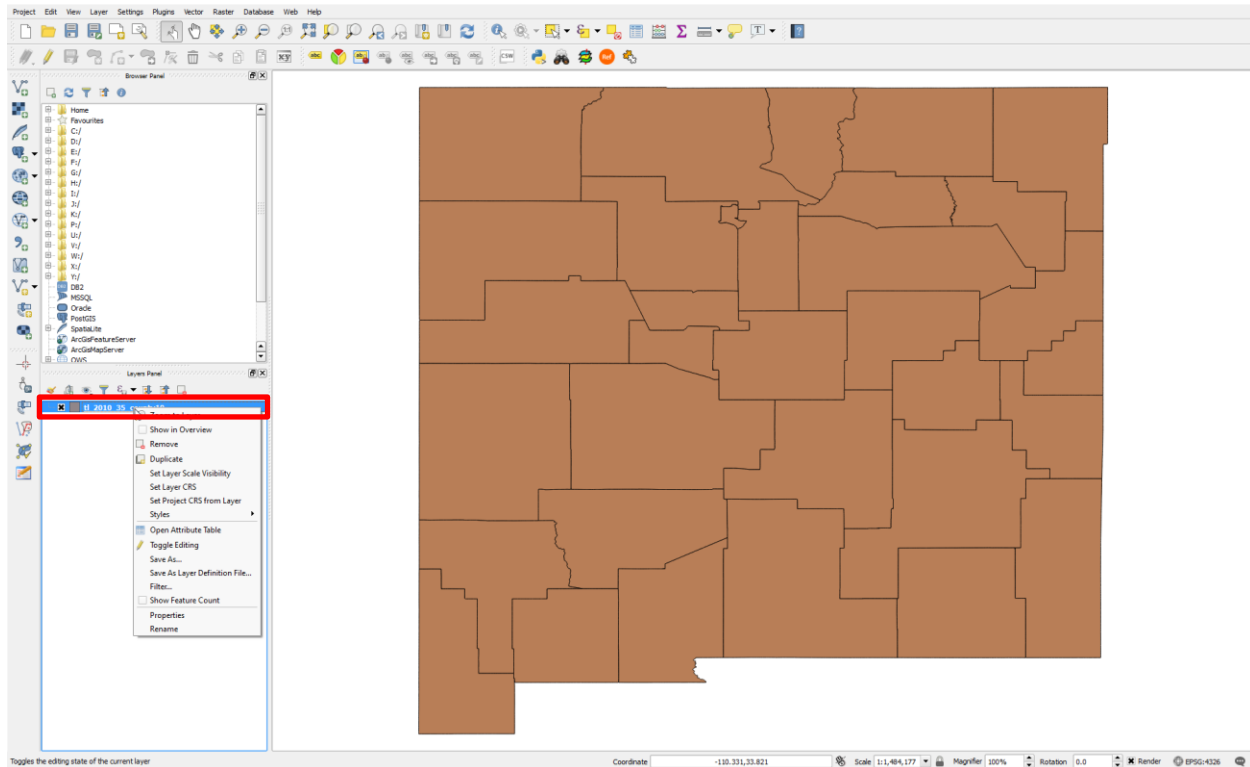


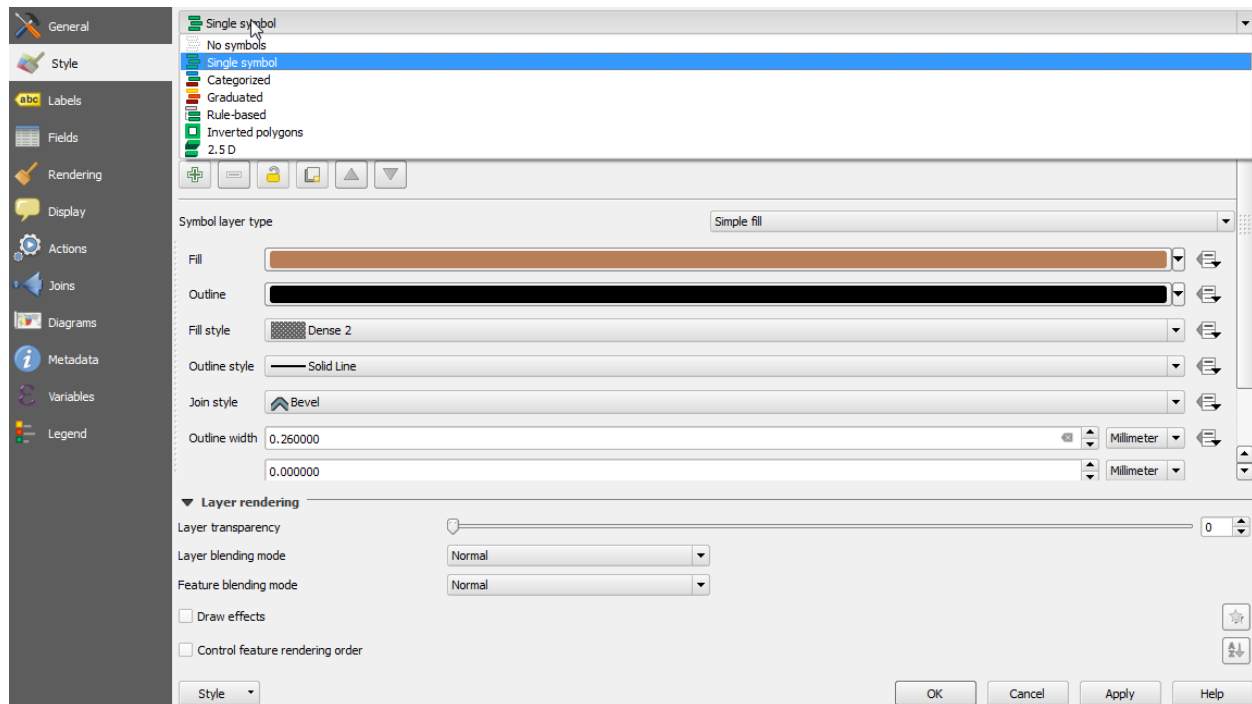
6. Basic Editing

1) Now you should have already successfully added the New Mexico county boundary polygon shapefile, and it should look like this



2) Right click on the layer name (tl_2010_35_county10), and then click “Properties” for editing; you can change the color, transparency, fill style, outline style, outline width, etc. The default symbol type is “Single Symbol”, but you can choose among No Symbol, Single Symbol, Categorized, Graduated, Rule-based, Inverted Polygons, and 2.5 D

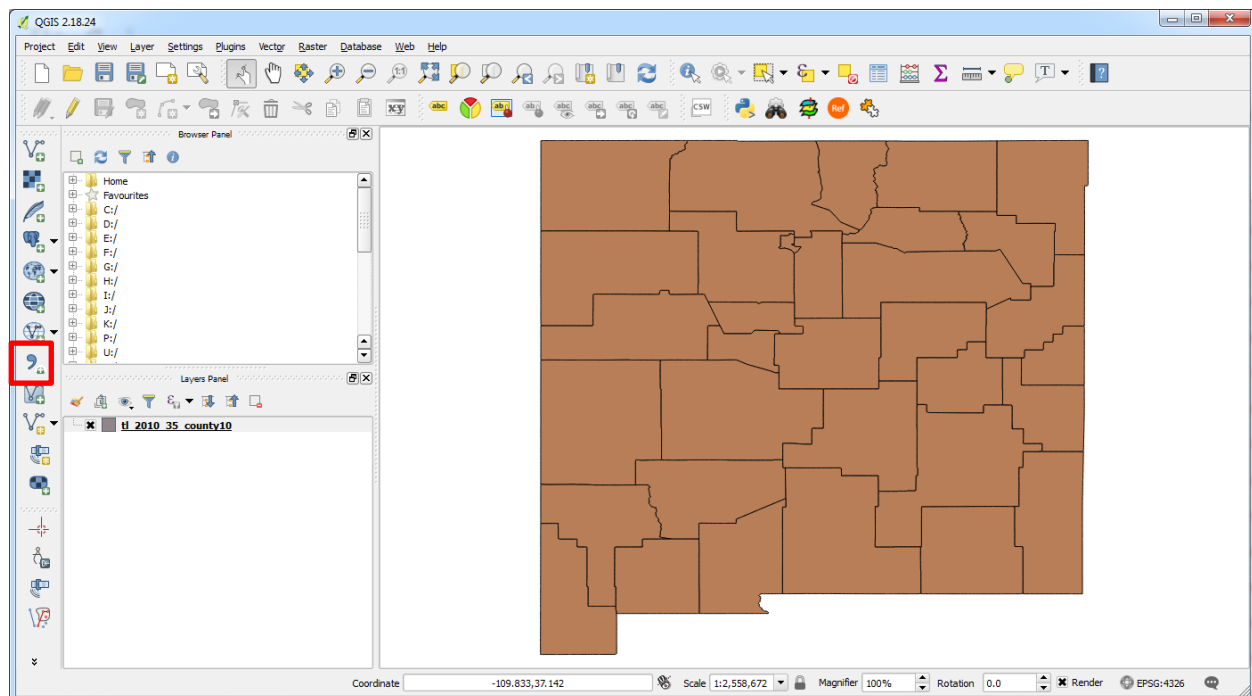




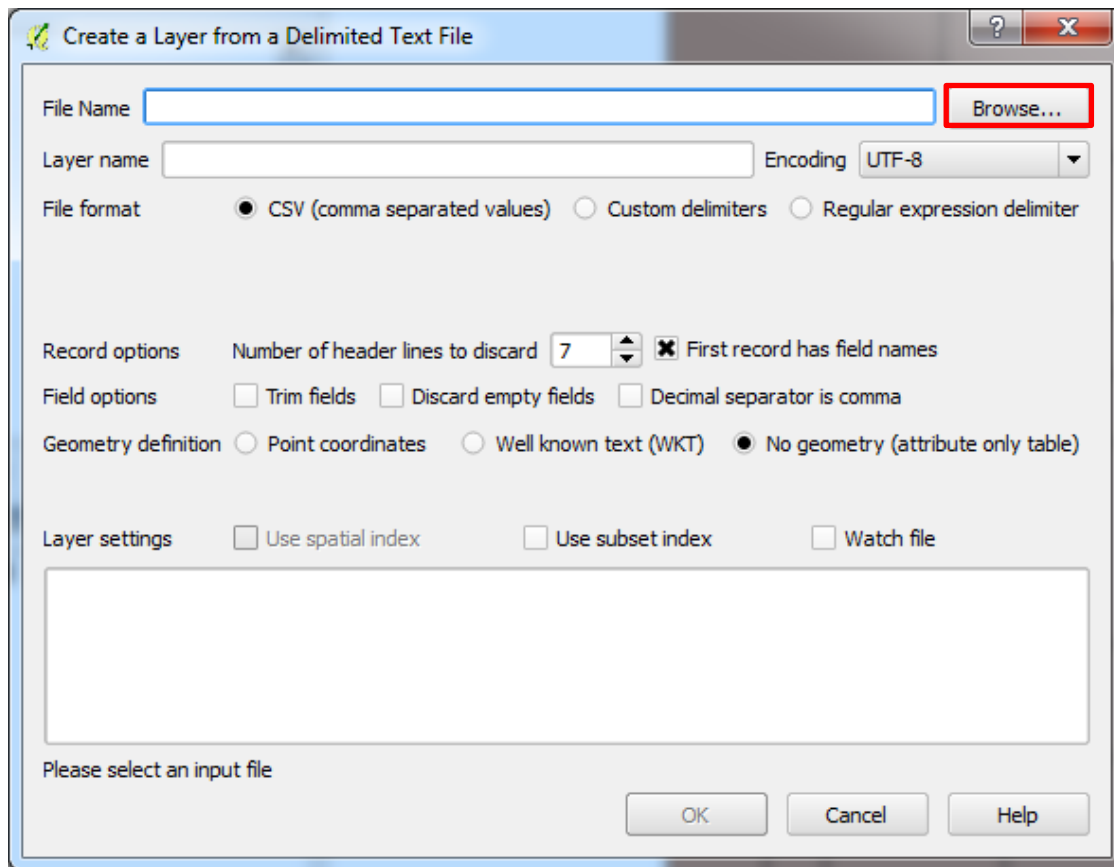
7. Table Join

Sometimes a single shapefile does not include all information that you want, which makes “Table Join” tool to be necessary and very useful; Table Join is typically used to append the fields of one table to another through an attribute or field common to both tables

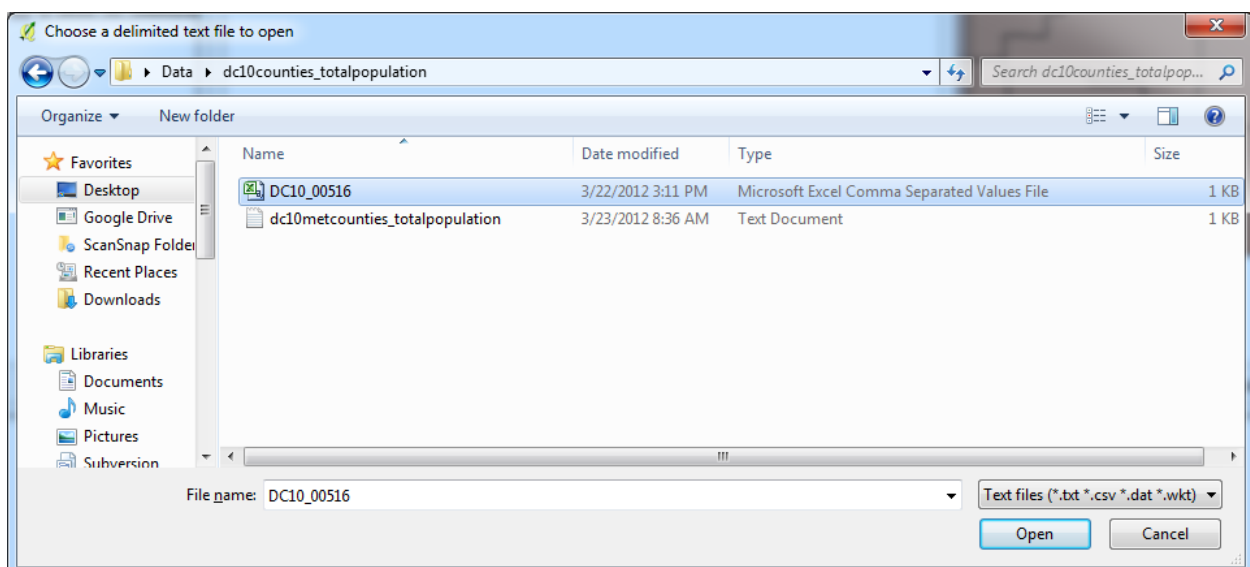
1) Click on the Add Delimited Text Layer button



2) The “Create a Layer from Delimited Text File” will pop up



3) Browse to where you saved your population data, make sure you choose the file in “Microsoft Excel Comma Separated Values File” format, the number of header lines to discard should be 8, and the geometry definition should be no geometry (attribute only table)



Create a Layer from a Delimited Text File

File Name:

Layer name: Encoding:

File format: ☒ CSV (comma separated values) ☐ Custom delimiters ☐ Regular expression delimiter

Record options: ☒ First record has field names

Field options: ☐ Trim fields ☐ Discard empty fields ☐ Decimal separator is comma

Geometry definition: ☐ Point coordinates ☐ Well known text (WKT) ☒ No geometry (attribute only table)

Layer settings: ☐ Use spatial index ☐ Use subset index ☐ Watch file

	COUNTY_CODE	COUNTY_NAME	POP_2010
1	35001	Bernalillo	662564
2	35003	Catron	3725
3	35005	Chaves	65645
4	35006	Cibola	27213
5	35007	Colfax	13750
6	35009	Curry	48376
7	35011	De Baca	2022

4) Right click on the layer name of the New Mexico county boundary (tl_2010_35_county10), and then click on Open Attribute Table; browse the table to find unique IDs (GEOID10) and examine it

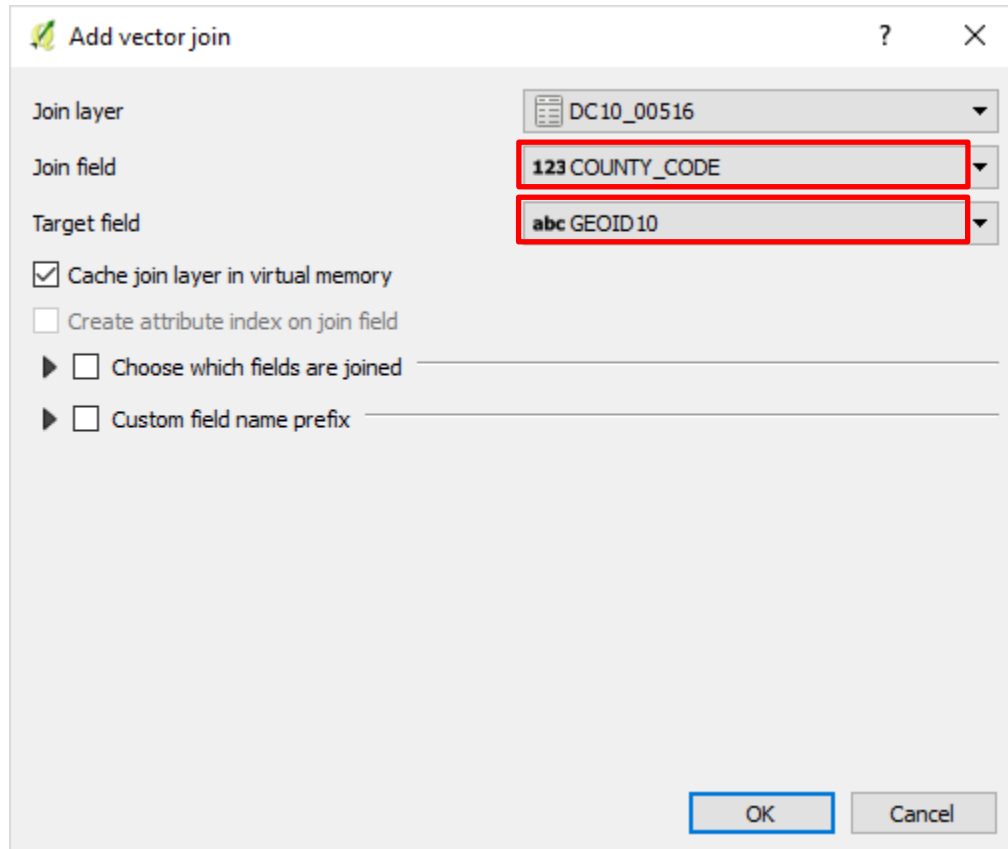
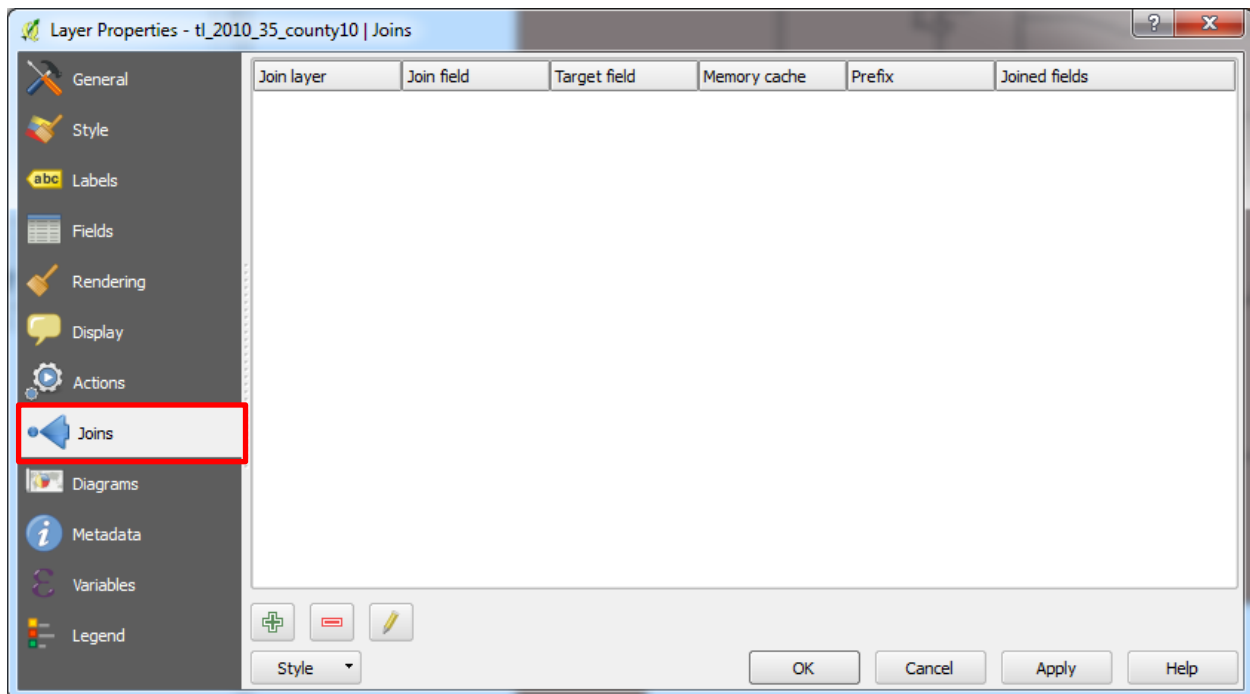
tl_2010_35_county10 :: Features total: 33, filtered: 33, selected: 0

	LSAD10	observed	FUNCSTAT10	NAMLSAD10	CSAFP10	COUNTYFP10	CBSAFP10	STATEFP10	MTFCC10	GEOID10	id	INTPTLON10
1	16		A	Harding County	-9999	021	-9999	35	G4020	35021	18611109	-103.8299311
2	16		A	Sierra County	-9999	051	-9999	35	G4020	35051	18611110	-107.1881607
3	16		A	Lea County	-9999	025	26020	35	G4020	35025	18611111	-103.4132707
4	16		A	Guadalupe County	-9999	019	-9999	35	G4020	35019	18611112	-104.7849677
5	16		A	Torrance County	-9999	057	10740	35	G4020	35057	18611113	-105.8468361
6	16		A	Grant County	-9999	017	43500	35	G4020	35017	18611114	-108.3815043
7	16		A	Otero County	-9999	035	10460	35	G4020	35035	18611115	-105.7810785
8	16		A	San Juan County	-9999	045	22140	35	G4020	35045	18611116	-108.3245778
9	16		A	Roosevelt County	188	041	38780	35	G4020	35041	18611117	-103.4827248
10	16		A	Curry County	188	009	17580	35	G4020	35009	18611118	-103.3460546
11	16		A	Taos County	-9999	055	45340	35	G4020	35055	18611119	-105.6379865
12	16		A	Hidalgo County	-9999	023	-9999	35	G4020	35023	18611120	-108.7457292
13	16		A	Eddy County	-9999	015	16100	35	G4020	35015	18611121	-104.3064708
14	16		A	De Baca County	-9999	011	-9999	35	G4020	35011	18611122	-104.4015274
15	16		A	Cibola County	-9999	006	24380	35	G4020	35006	18611123	-108.0002545

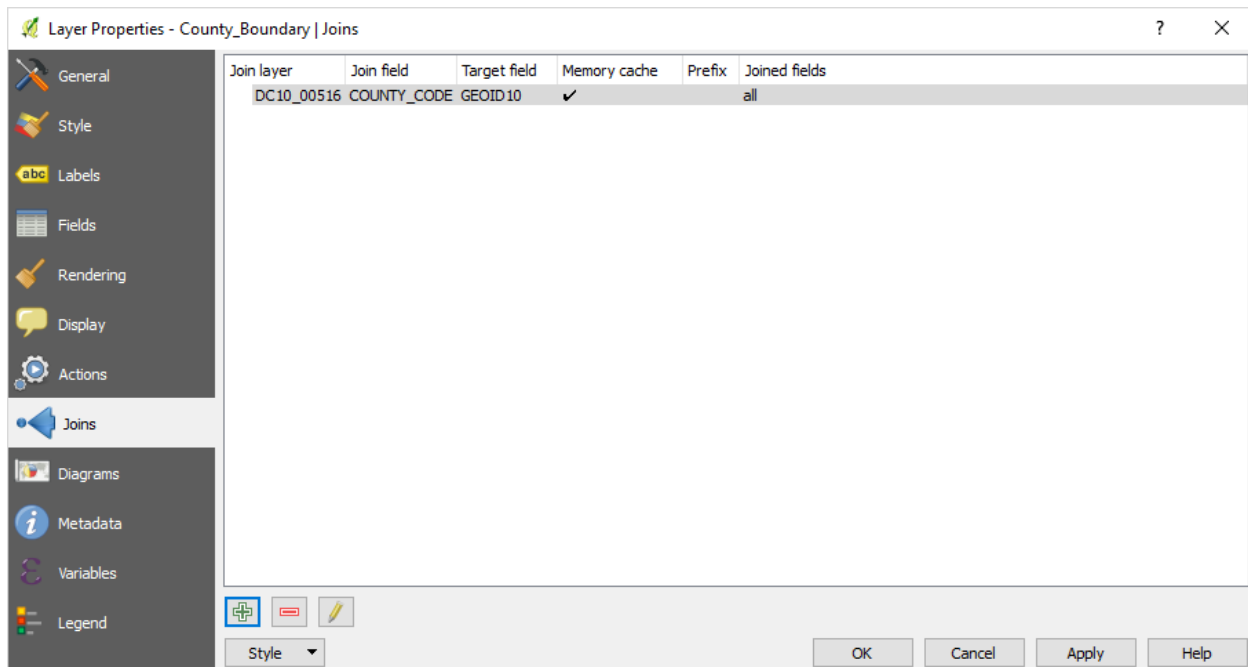
Show All Features

5) Right click on the layer name of the New Mexico county boundary (tl_2010_35_county10), and then click on Properties

6) Click on “Joins” and then click on the green plus sign and the following dialog should appear, the john field should be COUNTY_CODE and the target field should be GEOID 10, and then click OK



7) Successfully joined process should show the following dialogue, and please click OK

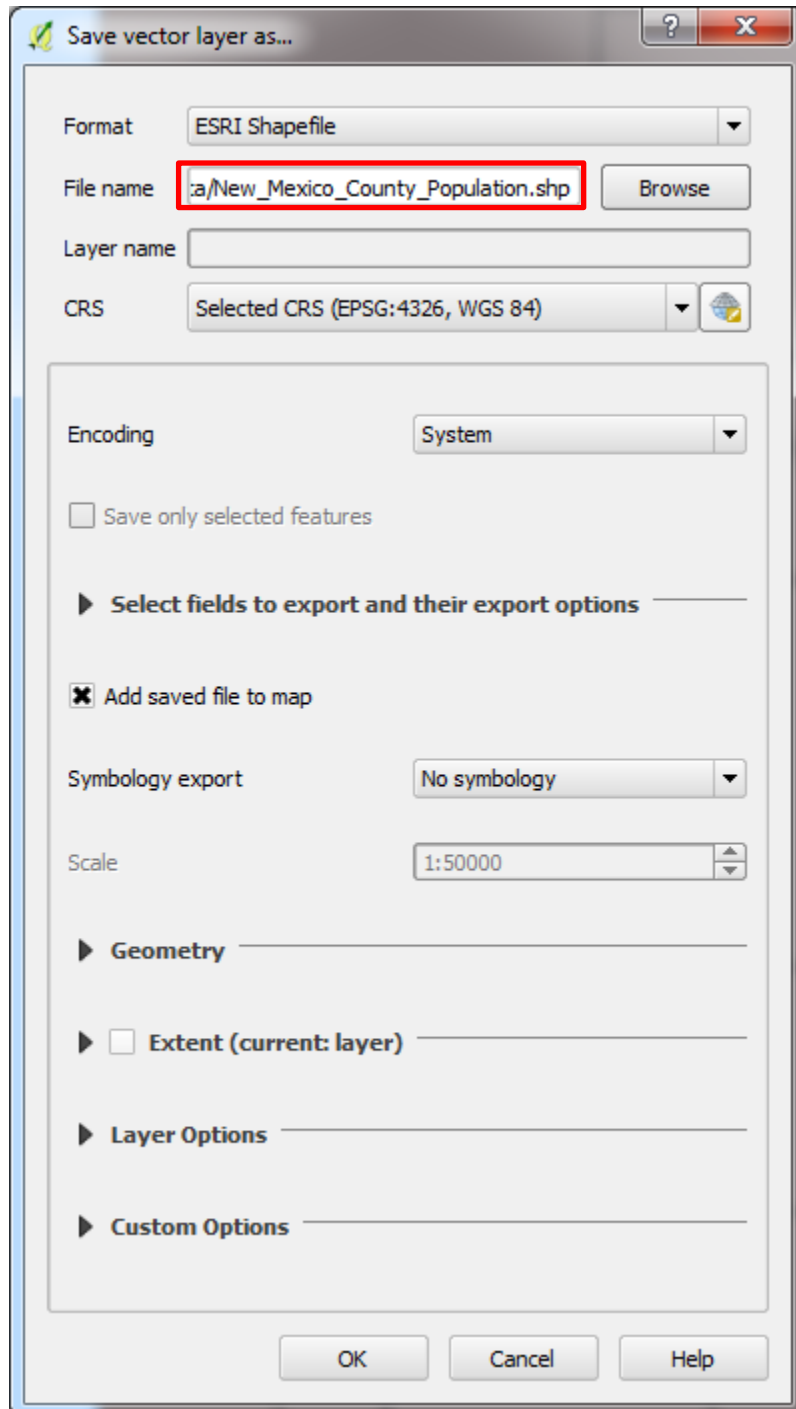


8) Your standalone table should be joined with your shapefile, now right click on your shapefile layer and then click on Open Attribute Table, you can find that the two new attribute fields associated with the standalone table is appended to the back of the attribute table

The screenshot shows the 'tl_2010_35_county10 :: Features total: 33, filtered: 33, selected: 0' attribute table. The table has 7 columns: MTFCC10, GEOID10, id, INTPTLON10, _00516_COUNTY_1, and 10_00516_POP_20. The last two columns are highlighted with a red box. The data is as follows:

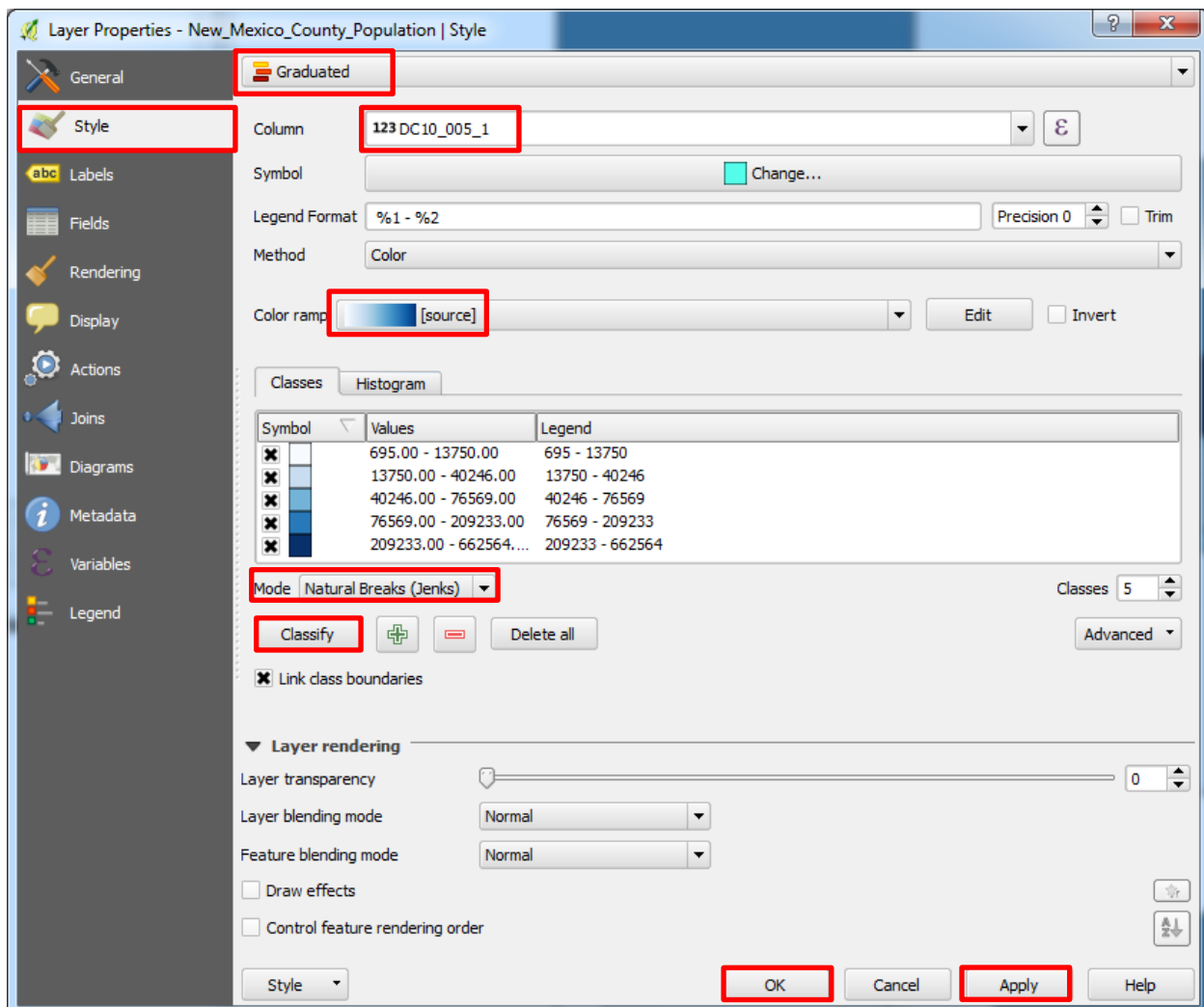
	MTFCC10	GEOID10	id	INTPTLON10	_00516_COUNTY_1	10_00516_POP_20
1	G4020	35021	18611109	-103.8299311	Harding	695
2	G4020	35051	18611110	-107.1881607	Sierra	11988
3	G4020	35025	18611111	-103.4132707	Lea	64727
4	G4020	35019	18611112	-104.7849677	Guadalupe	4687
5	G4020	35057	18611113	-105.8468361	Torrance	16383
6	G4020	35017	18611114	-108.3815043	Grant	29514
7	G4020	35035	18611115	-105.7810785	Otero	63797
8	G4020	35045	18611116	-108.3245778	San Juan	130044

9) It should be noted that this Join is temporary. In order to get a permanent joined layer, save your temporarily joined shapefile to a new shapefile; to do this, you need to right click on the joined shapefile and then click on Save As, a “Save vector layer as ...” dialogue pops up; choose the path you want to save the layer and provide a file name to the new file, and then click OK.



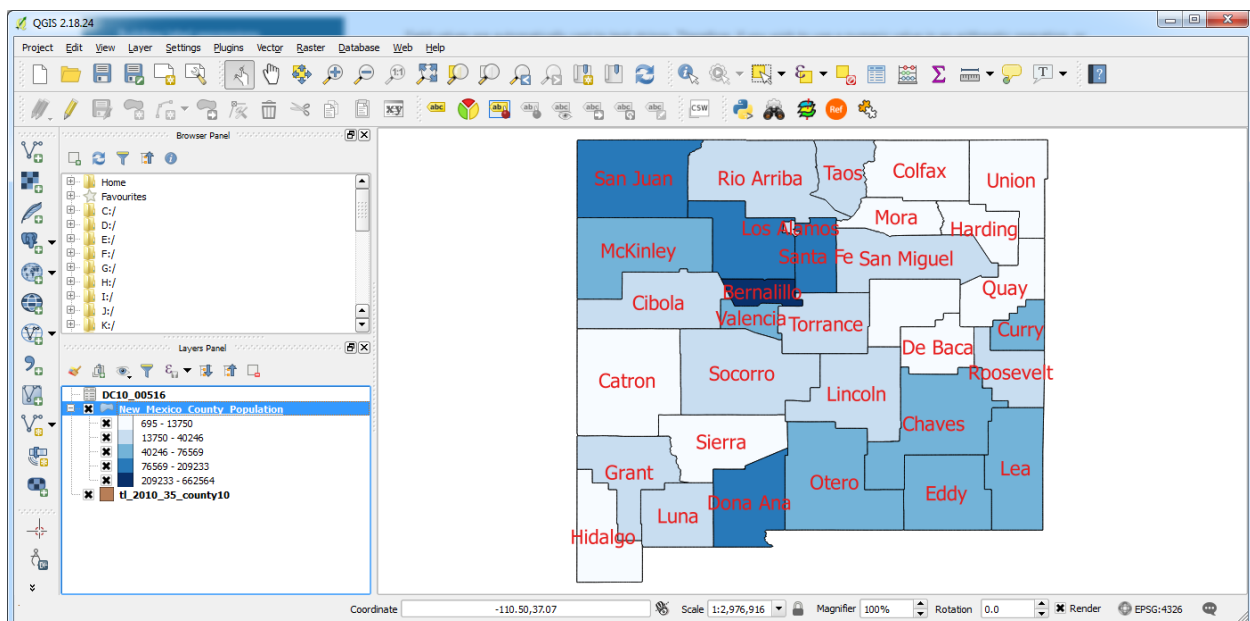
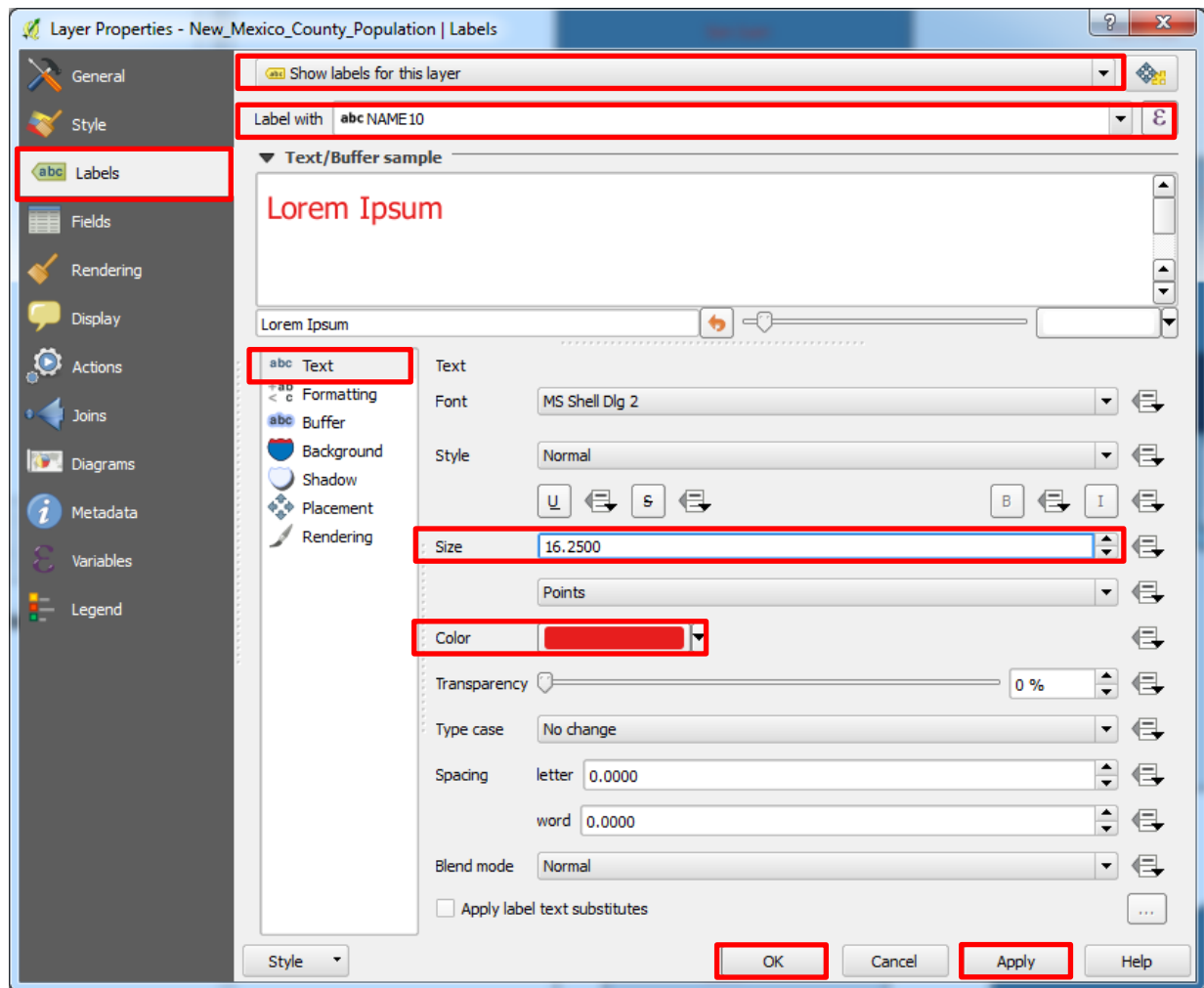
8. Visualize your shapefile

- 1) Add the newly saved shapefile (table joined)
- 2) Right click on the layer name, and then click on Properties
- 3) Click on “Style”
- 4) Click Single Symbol
- 5) Choose Graduated
- 6) Column chooses your population attribute field
- 7) Choose the color ramp you like
- 8) Choose mode of Natural Break (Jenks) for classes, and then click classify
- 9) Apply and then click on OK.



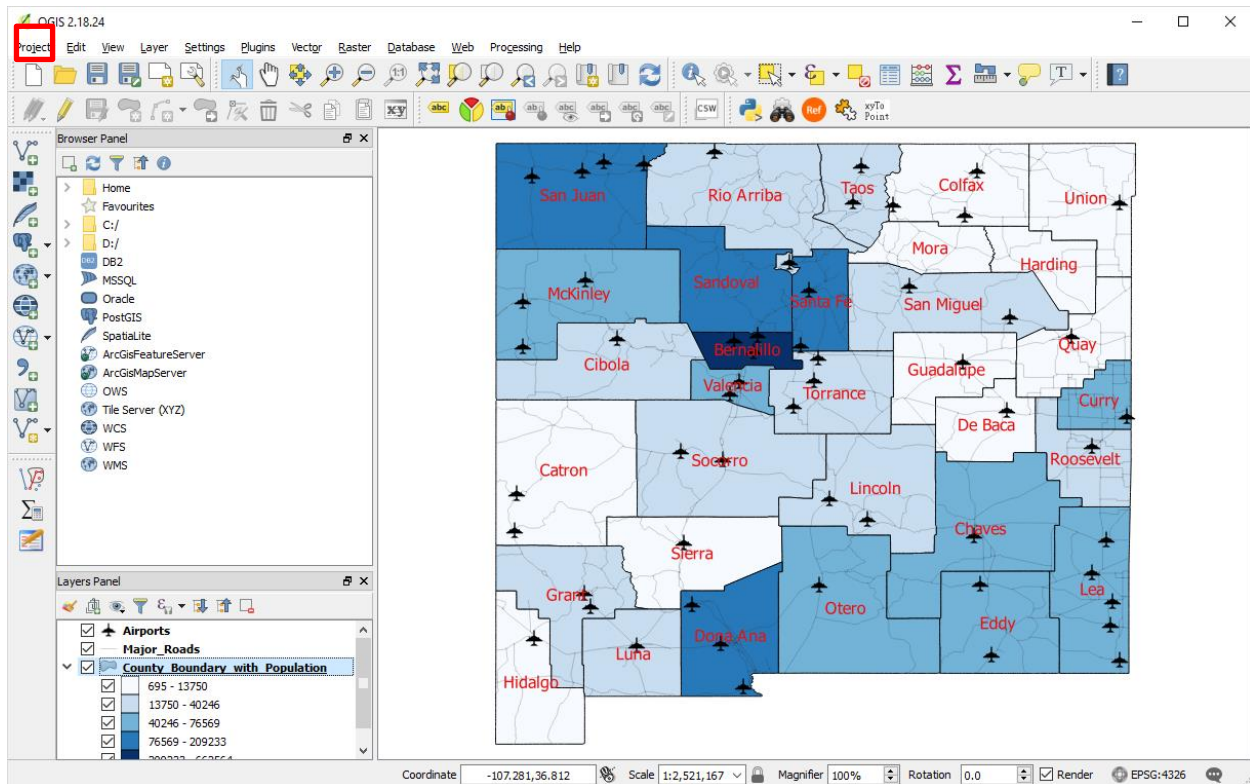
- 10) Right click on the layer name again and click on Properties, choose the labels option and then start explore the settings

11) Please at least select red color for text and choose size 16.25.

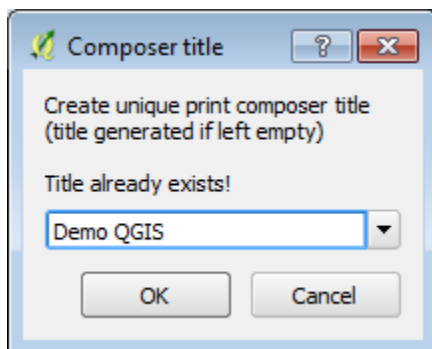


9. Creating Maps

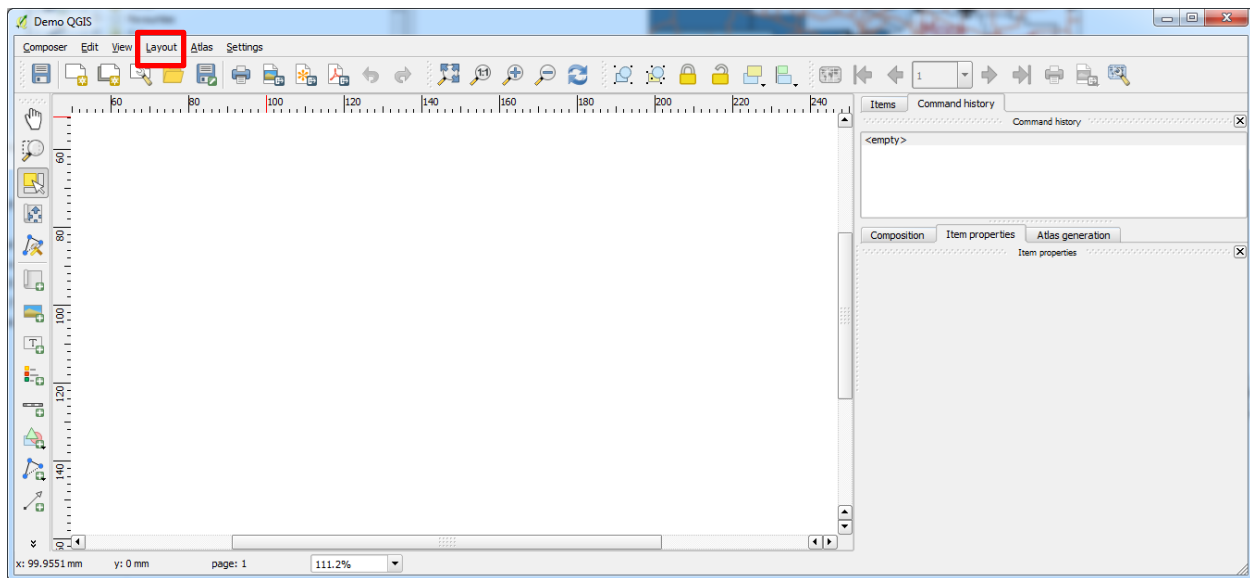
- 1) Add more shapefiles, including airport data (tra2shp) and highway (tra3sh) data
- 2) Explore the editing of these data
- 3) Click Project



- 4) Click on New Print Composer
- 5) Type in a name for your composer



6) The composition panel should appear



7) Click Layout and then click add map

8) Use your mouse pointer to select the area on the white canvas of the composer for adding the map

9) Click Layout and then click Add Scalebar, Add Legend, and Add Image (for north arrow)

10) Click Composer and then click Export as Image in JPEG format

