mdhdocs Documentation

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Feb 12, 2020

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CHAPTER 1

Introduction

Welcome to the Quick Visual Guide guide! :D

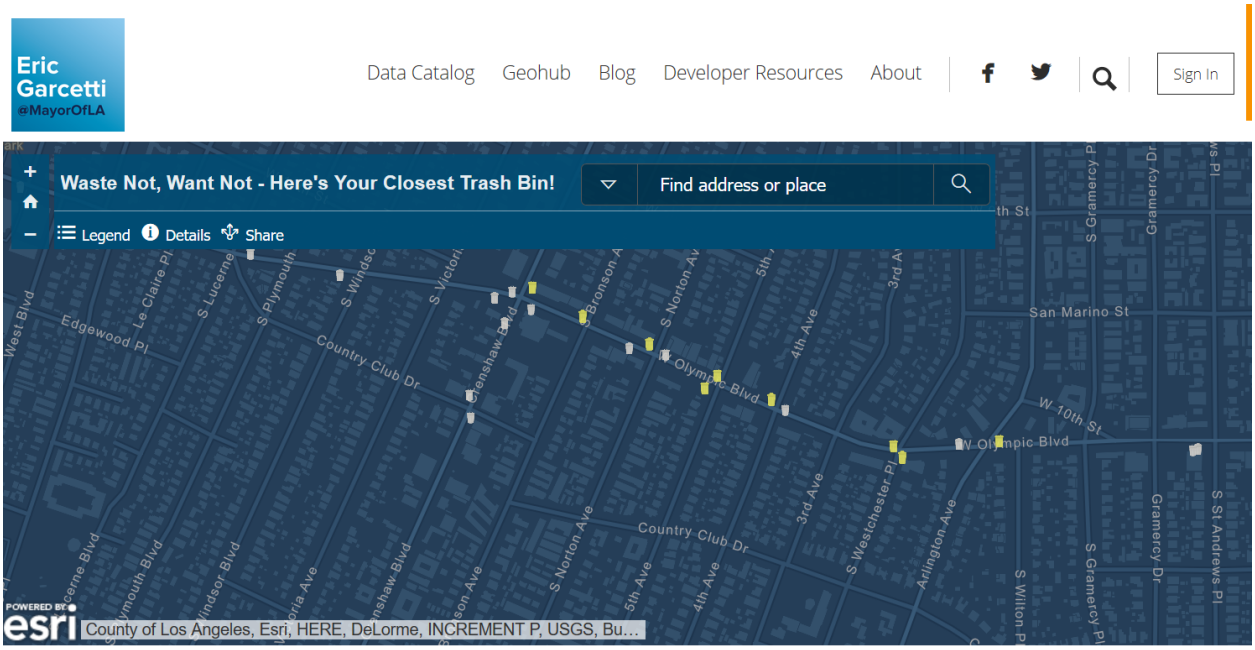
CHAPTER 2

Guides for working with data

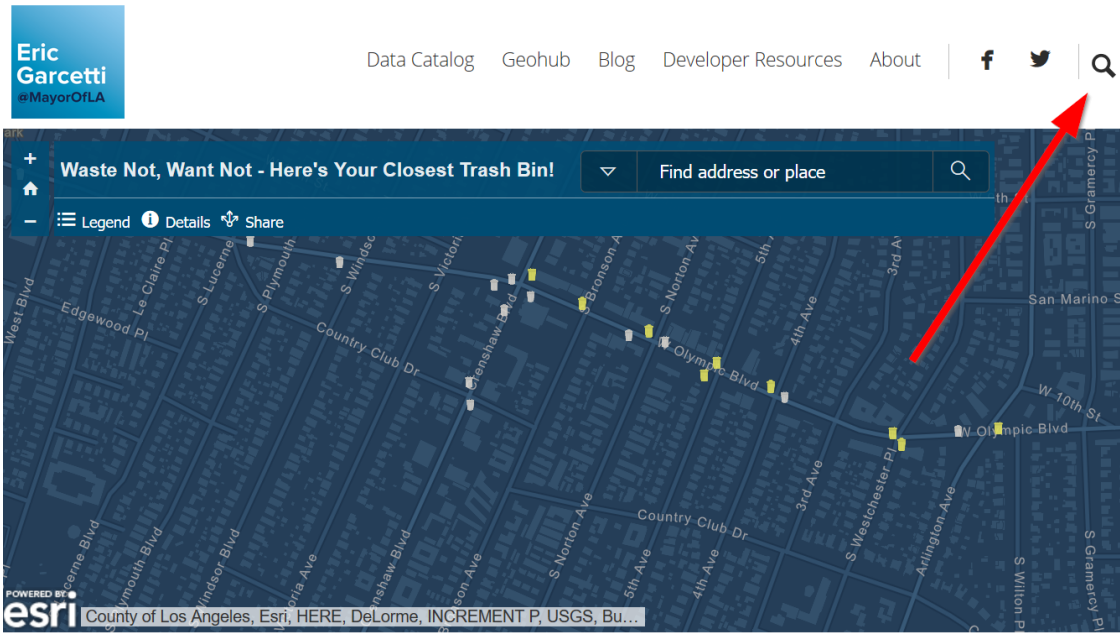
2.1 Data on the Los Angeles Open Data Portal

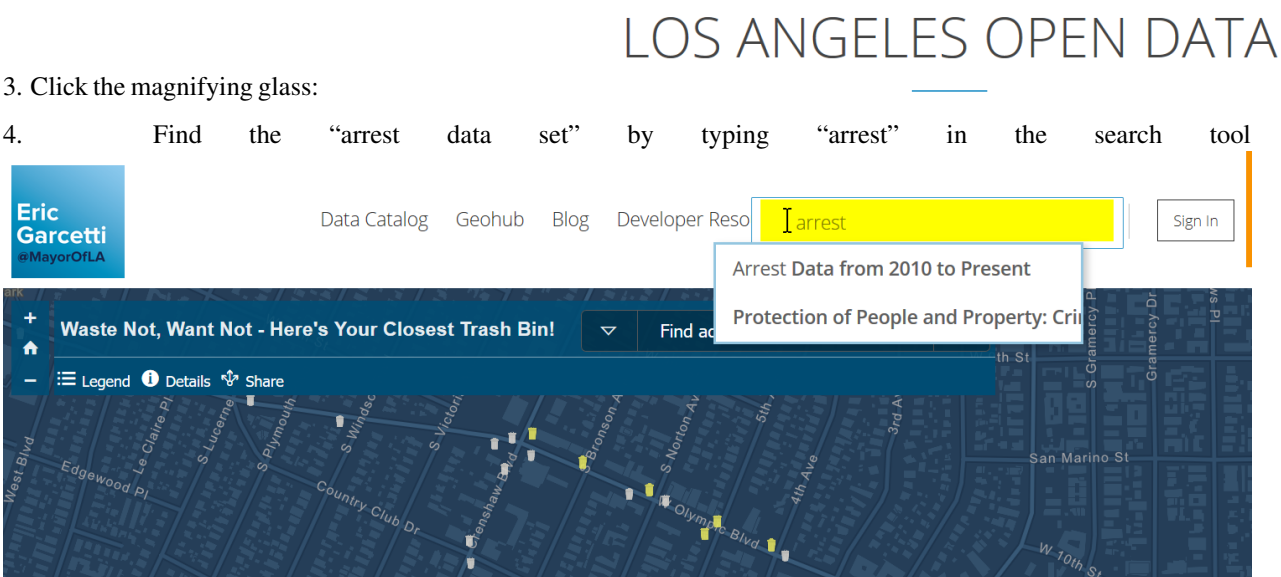
2.1.1 Getting Started

1. Navigate to the LA Open Data Portal (https://data.lacity.org/)



LOS ANGELES OPEN DATA

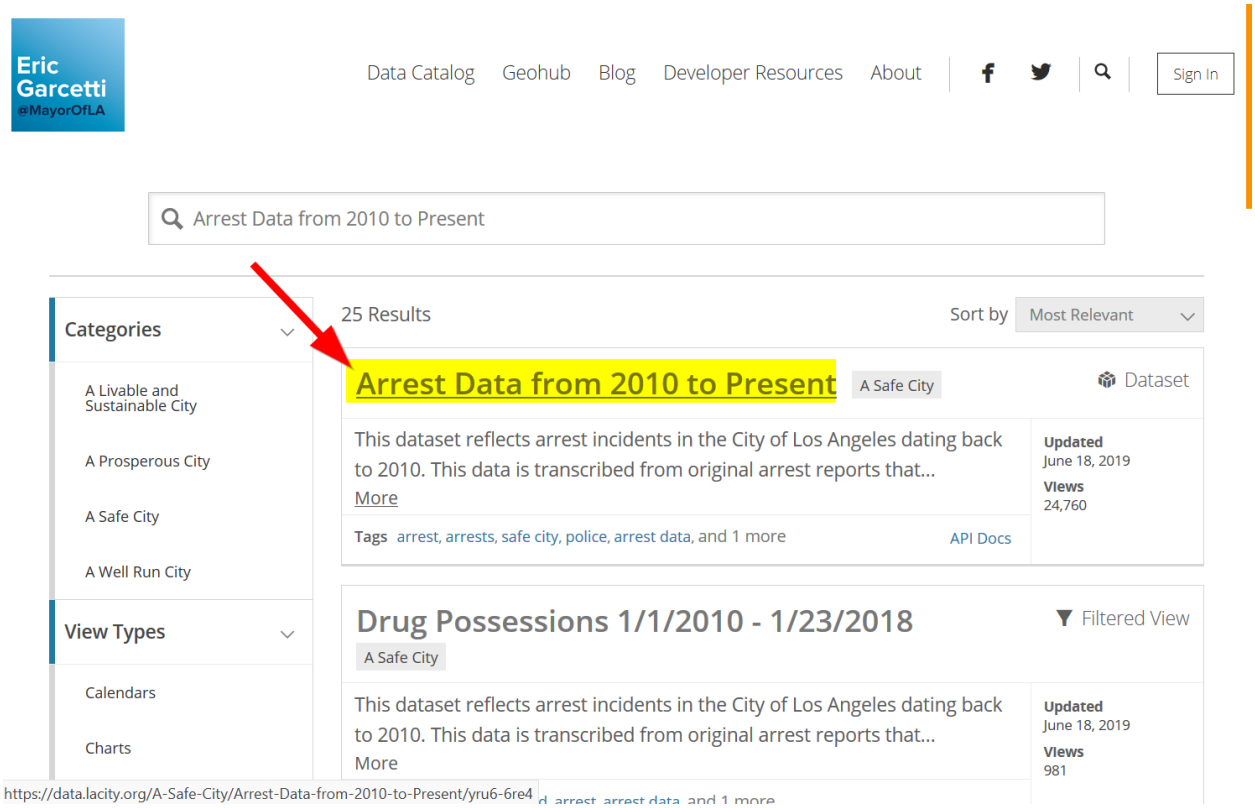




3. Click the magnifying glass:

4. Find the "arrest data set" by typing "arrest" in the search tool

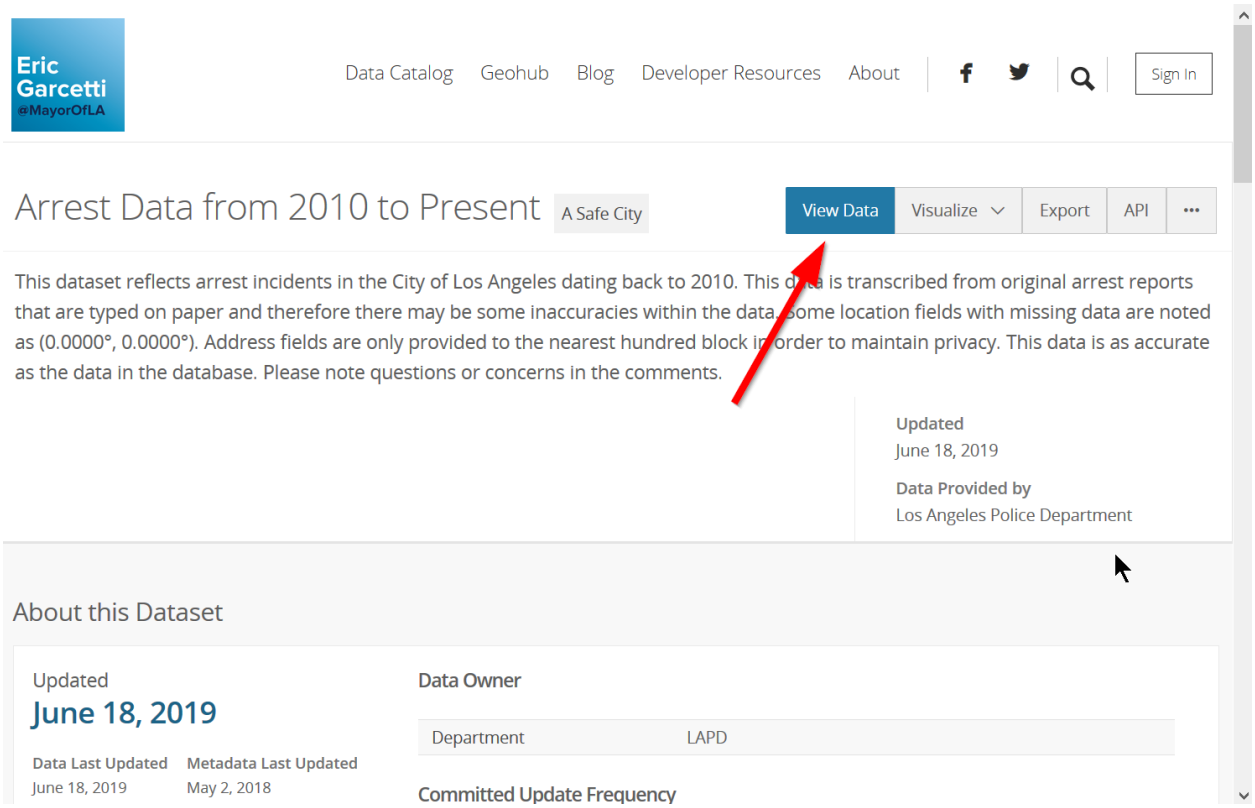
5. In the results page, click on "Arrest Data from 2010 to Present"

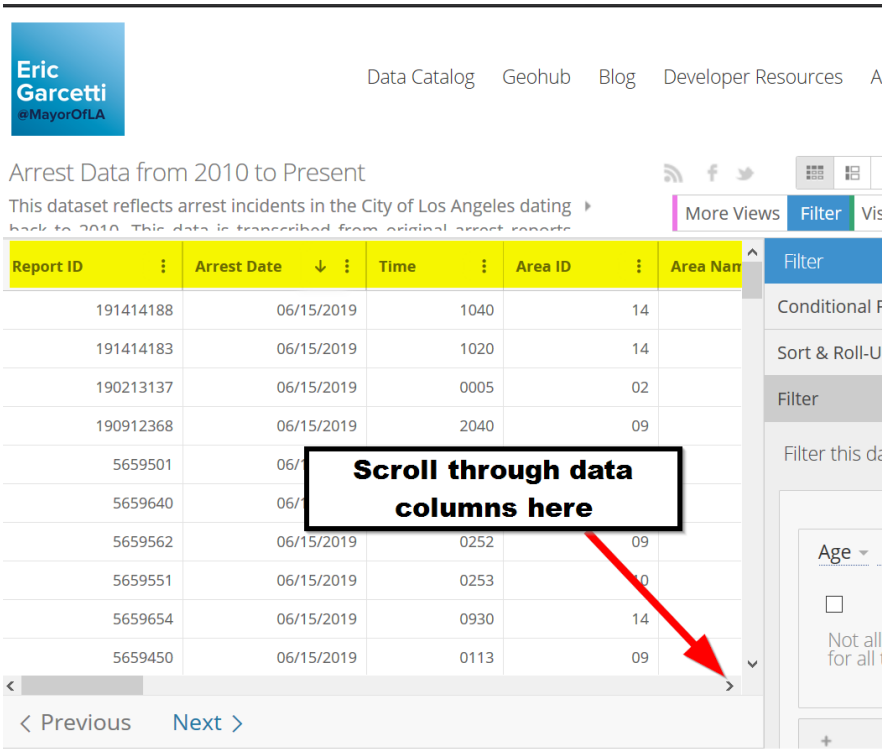


2.1.2 Viewing Data

6. In the Data set page, you can view information about the data, such as column names, source of the data, etc.

7. After familiarizing yourself with the data set, click on "View Data"

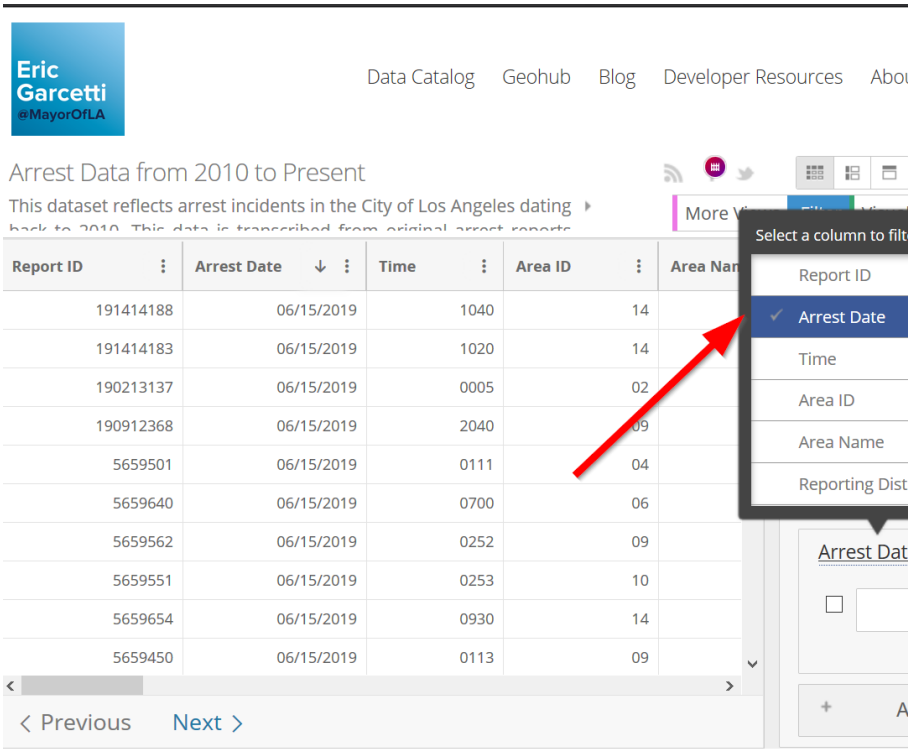




8. You can scroll through the data columns or records

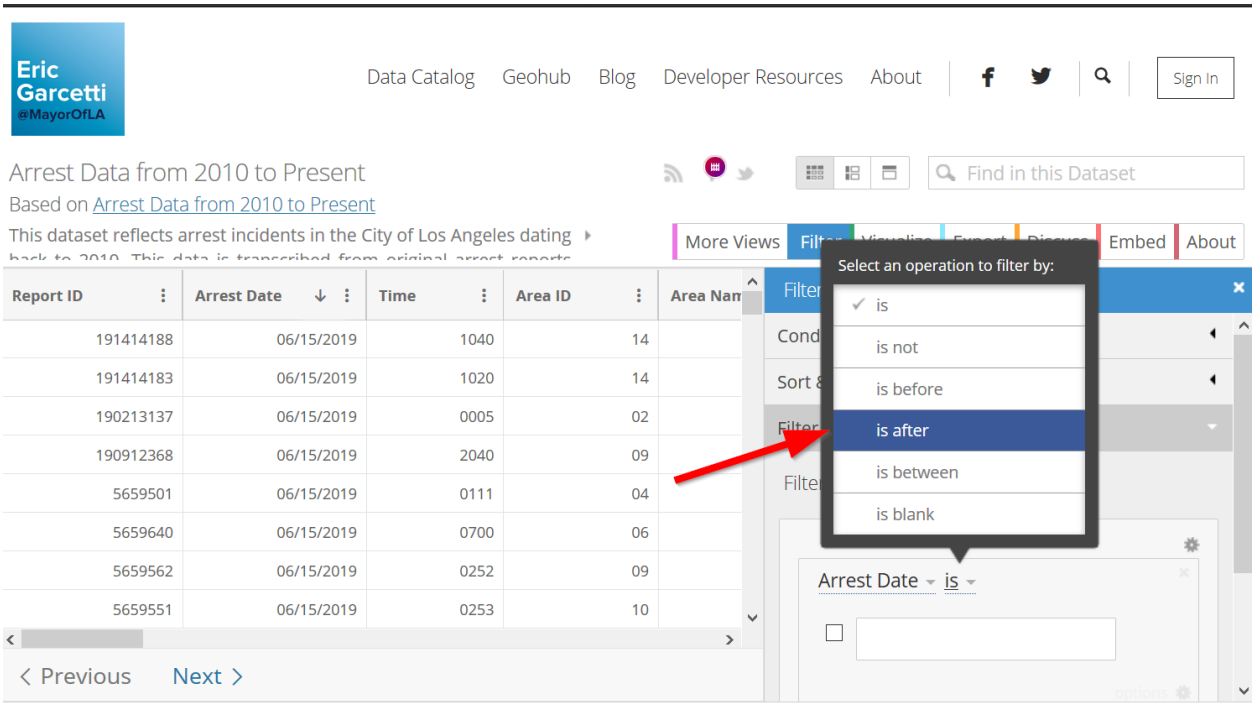
2.1.3 Filtering the data set by date

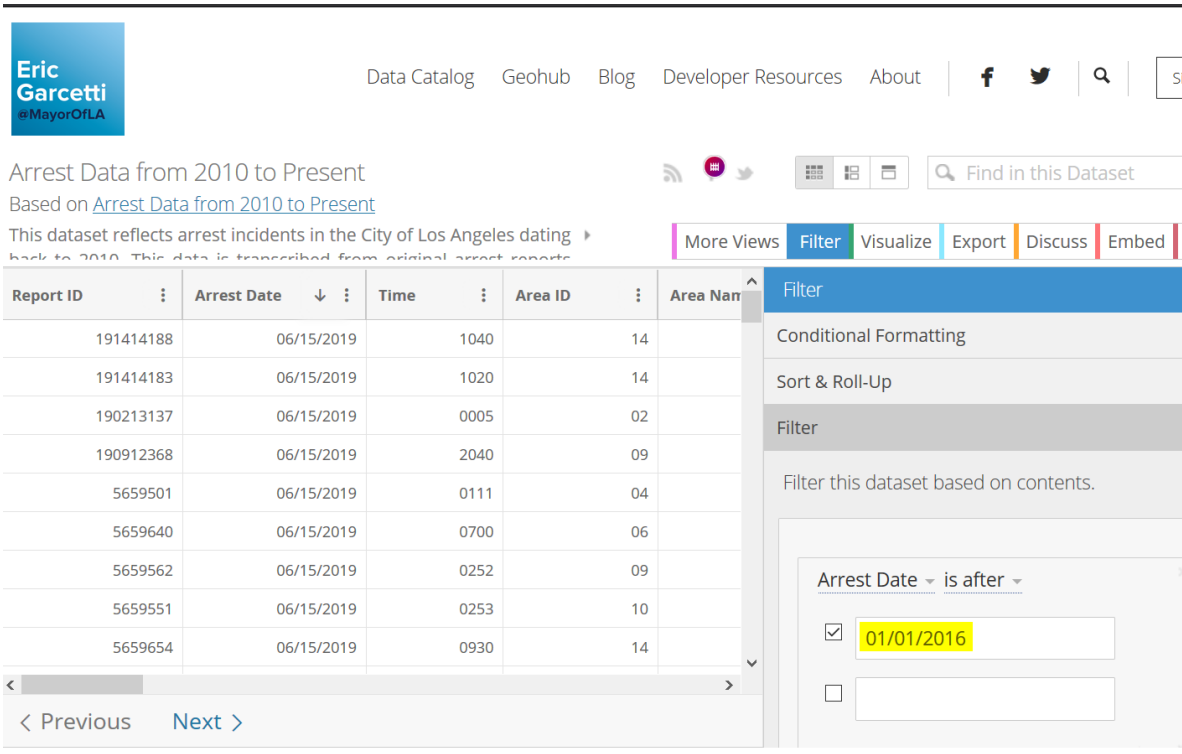
9. Under “Filter” click the initial filter column



10. Choose “Arrest Date” as the column to filter by

11. Next click on “is” and change the filter condition to “is after”



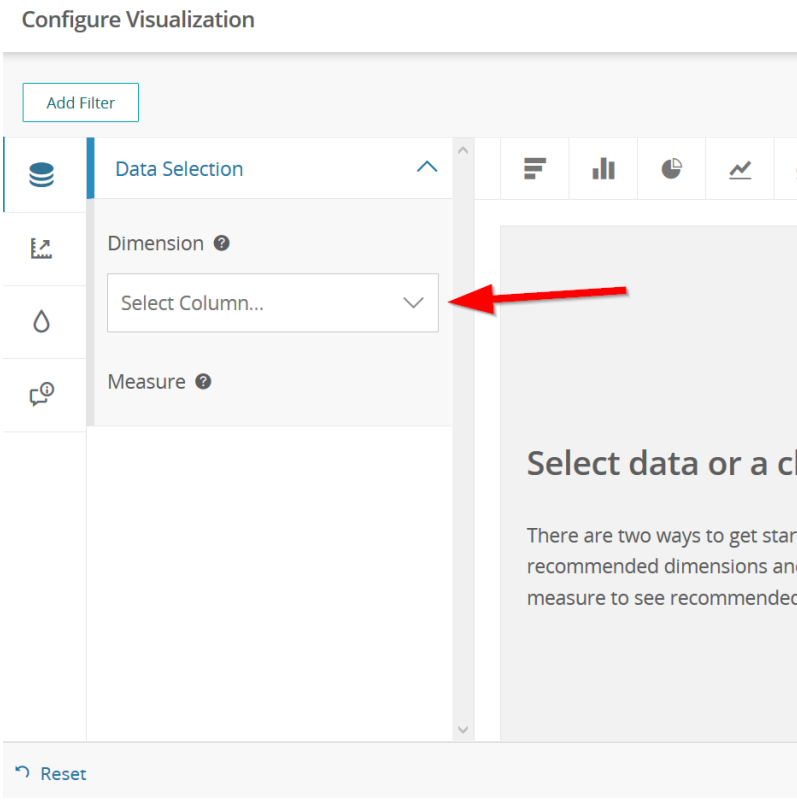


12. Choose after “2016”

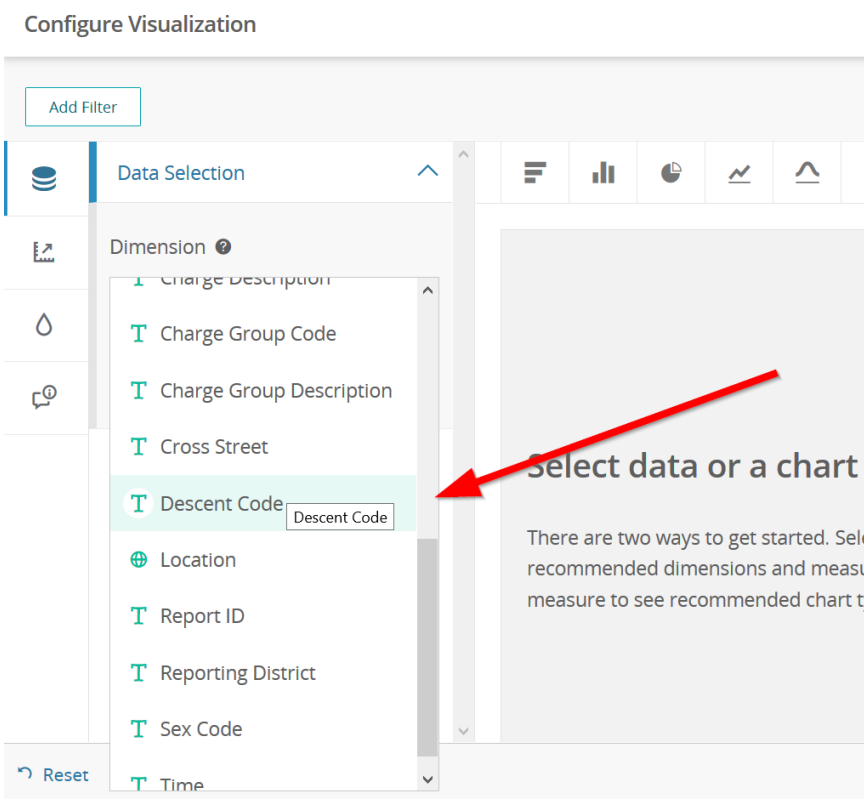
2.1.4 Visualizing the data

13. Click on “Visualize”

14. Choose whether to “sign in” and save your visualization, or continue without being able to save. Note you can use:bigdataforjustice@gmail.coml summer2019!

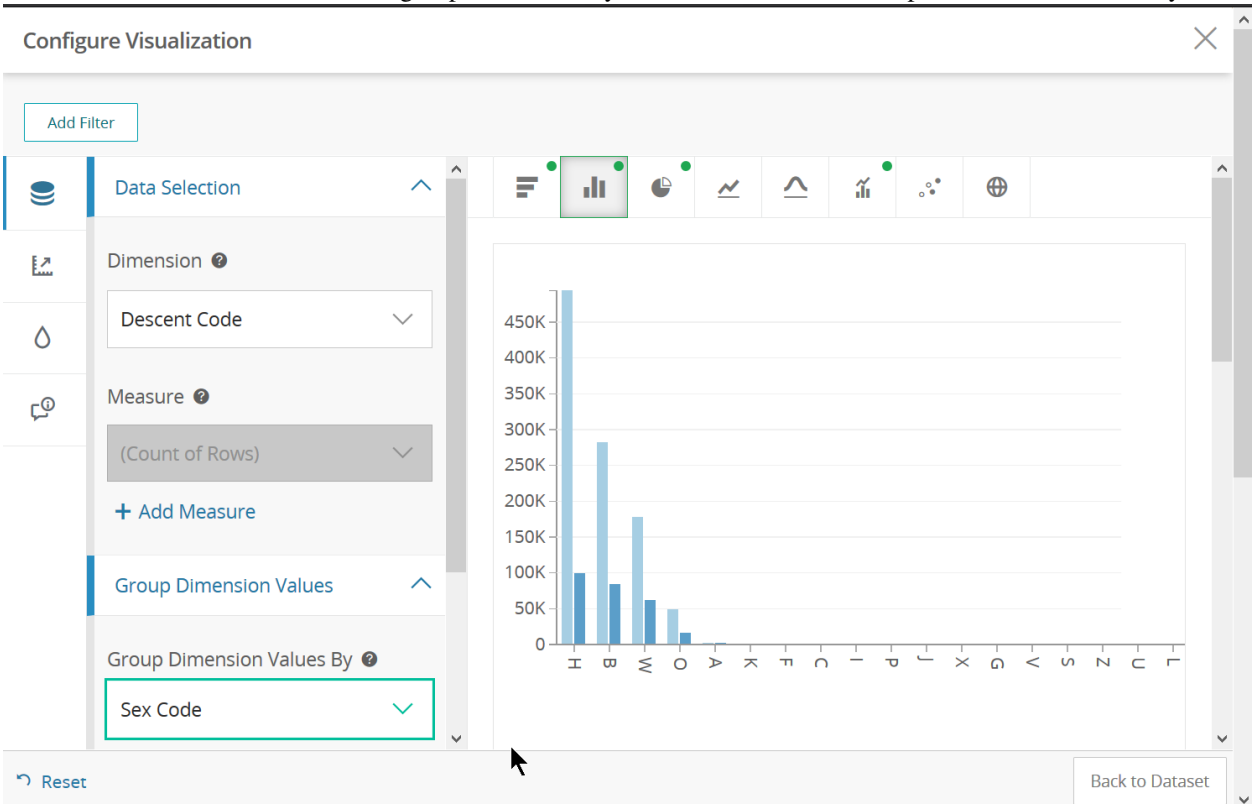


15. Click on “Select Column” to select a column to visualize.

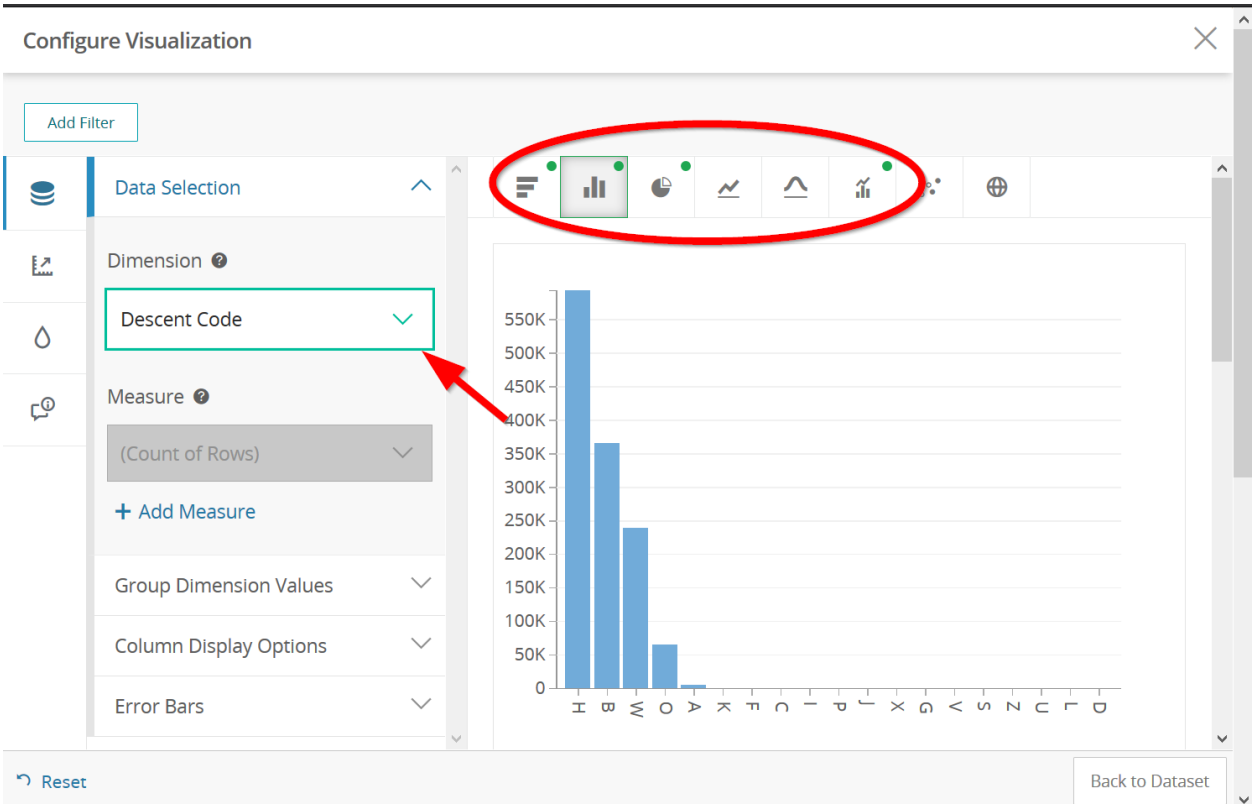


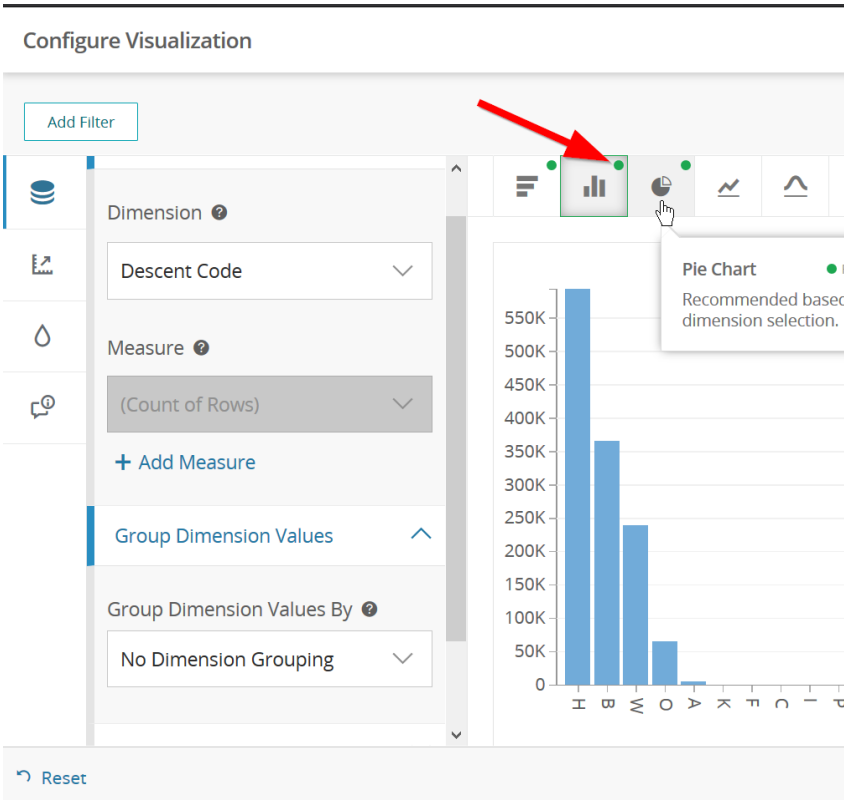
16. Select "Descent Code" to start visualizing the data.

17. You can scroll down and group the data by other values, for example, "Descent Code by Sex"



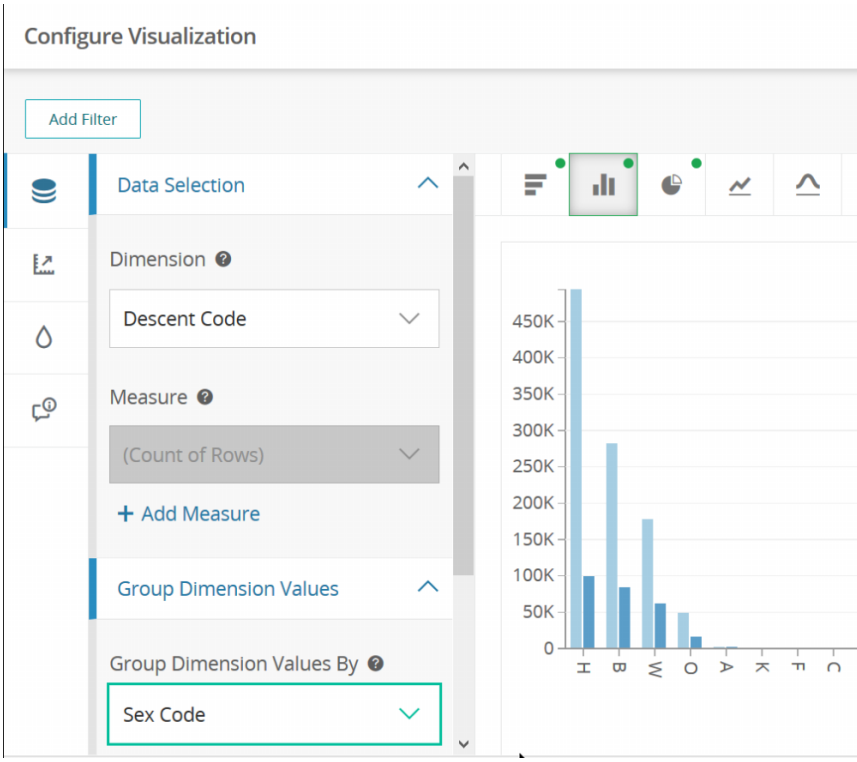
18. You can switch the visualization by clicking on one of the buttons on the right





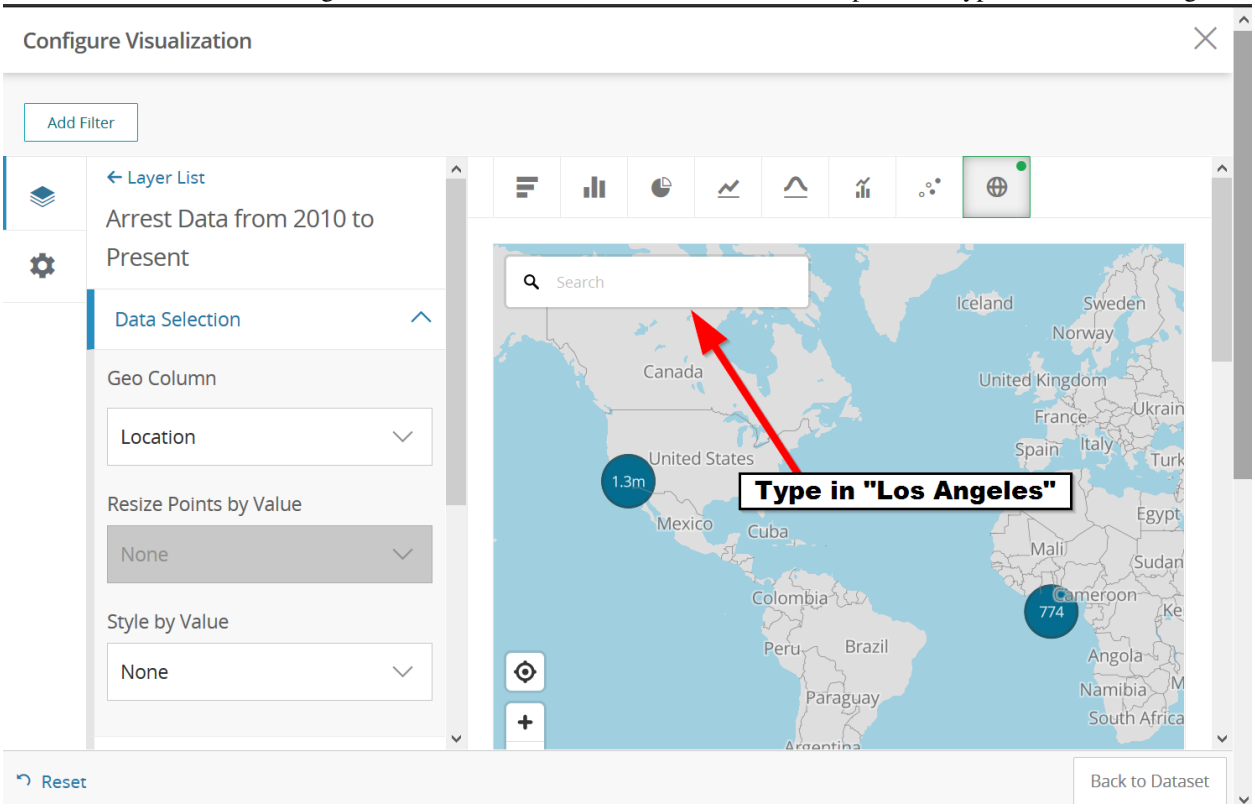
19. The green circle shows a recommended visualization

2.1.5 Mapping our data

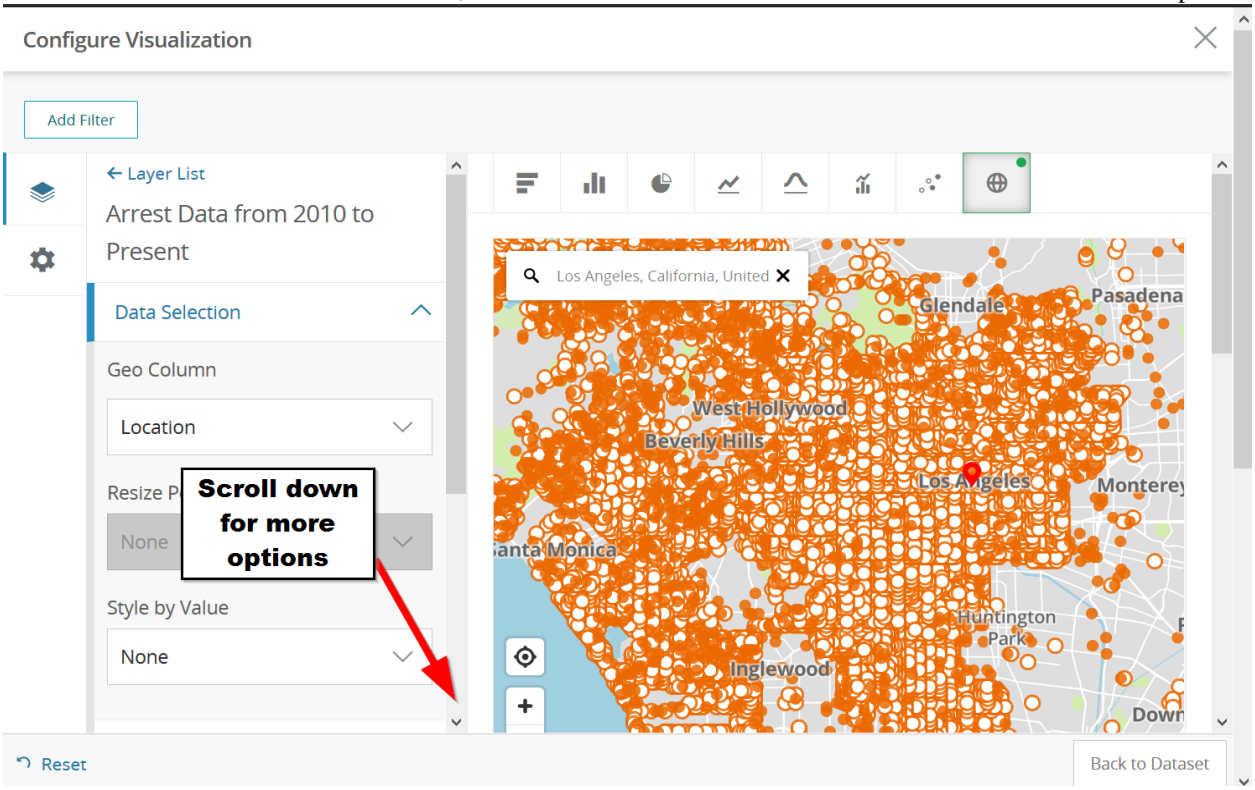


20. We will choose map, which is the globe to the right:

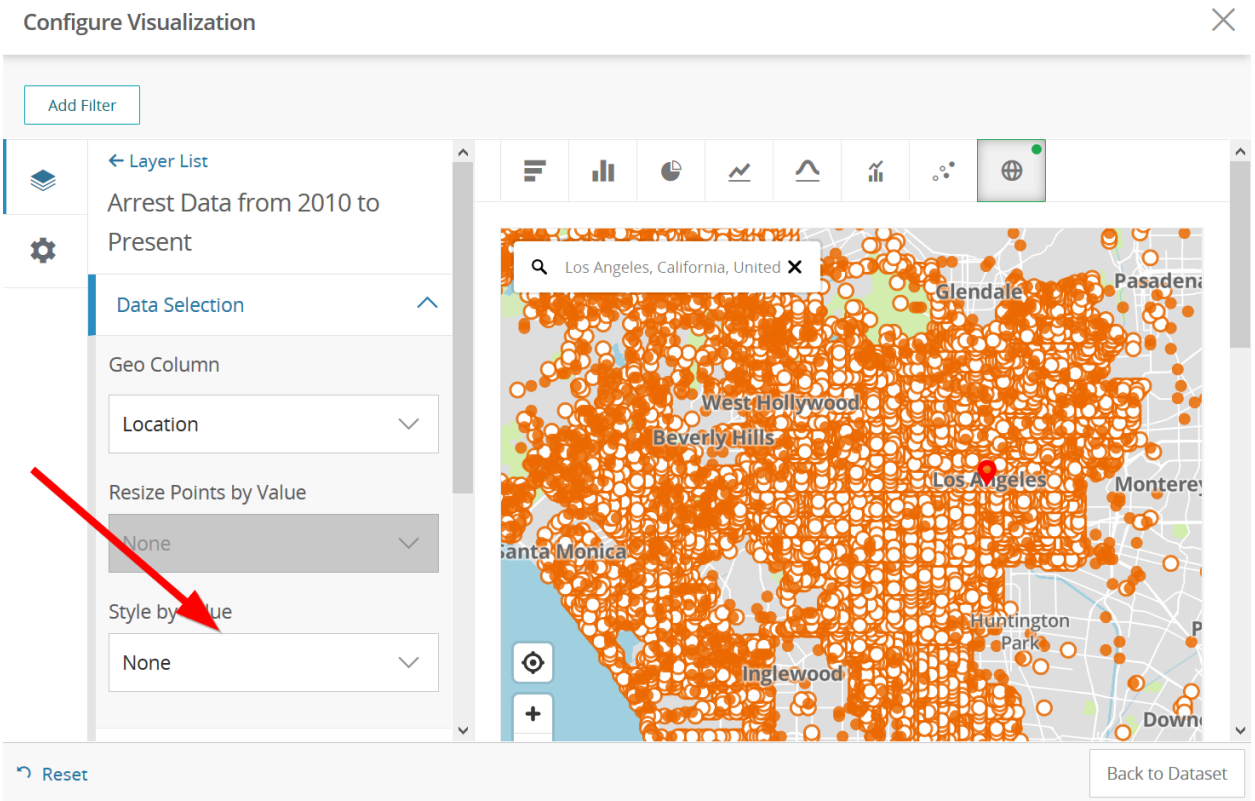
21. To find Los Angeles, click the search icon in the map and type in "Los Angeles"

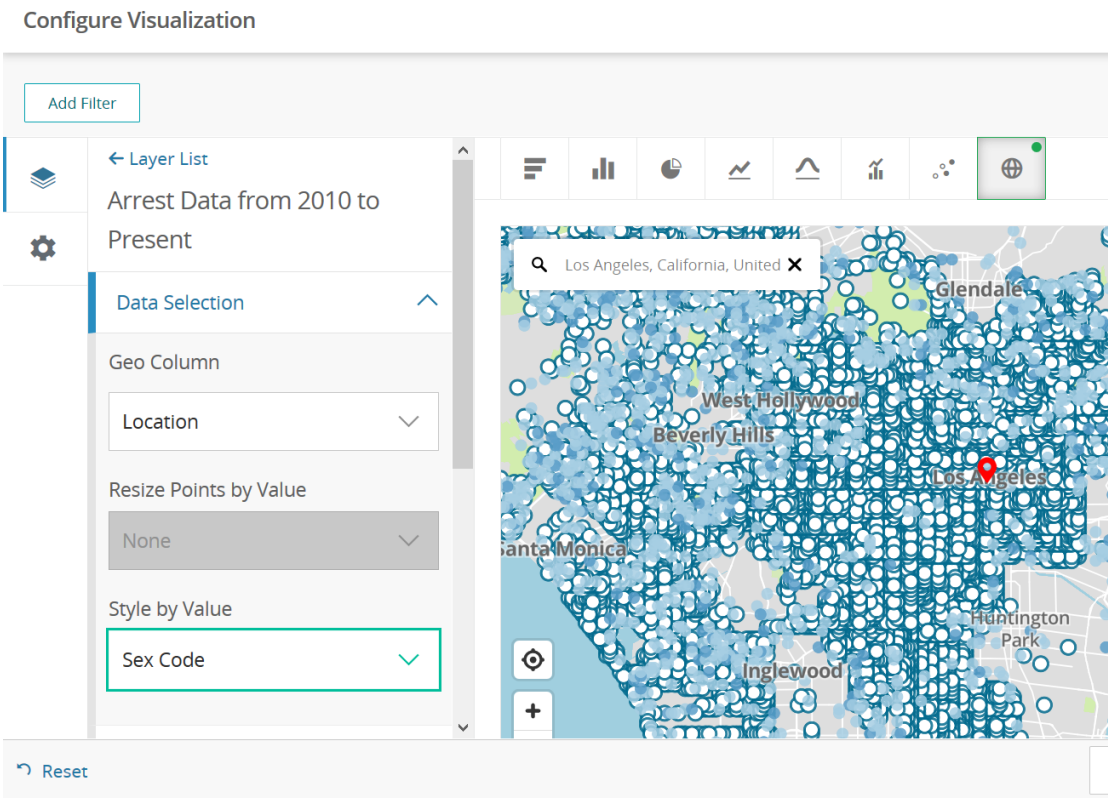


22. This is our data, but we can scroll down for more options:



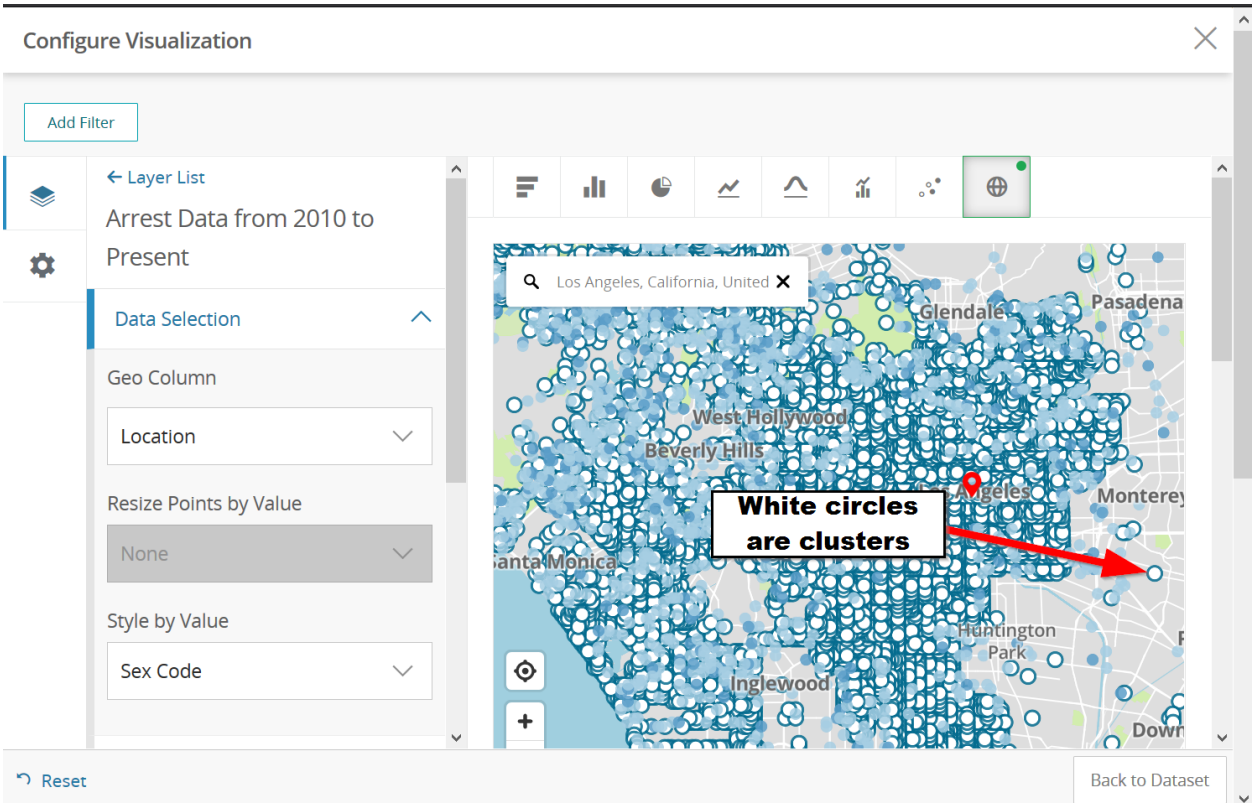
23. Let's "Style by Value" to change how our points look.



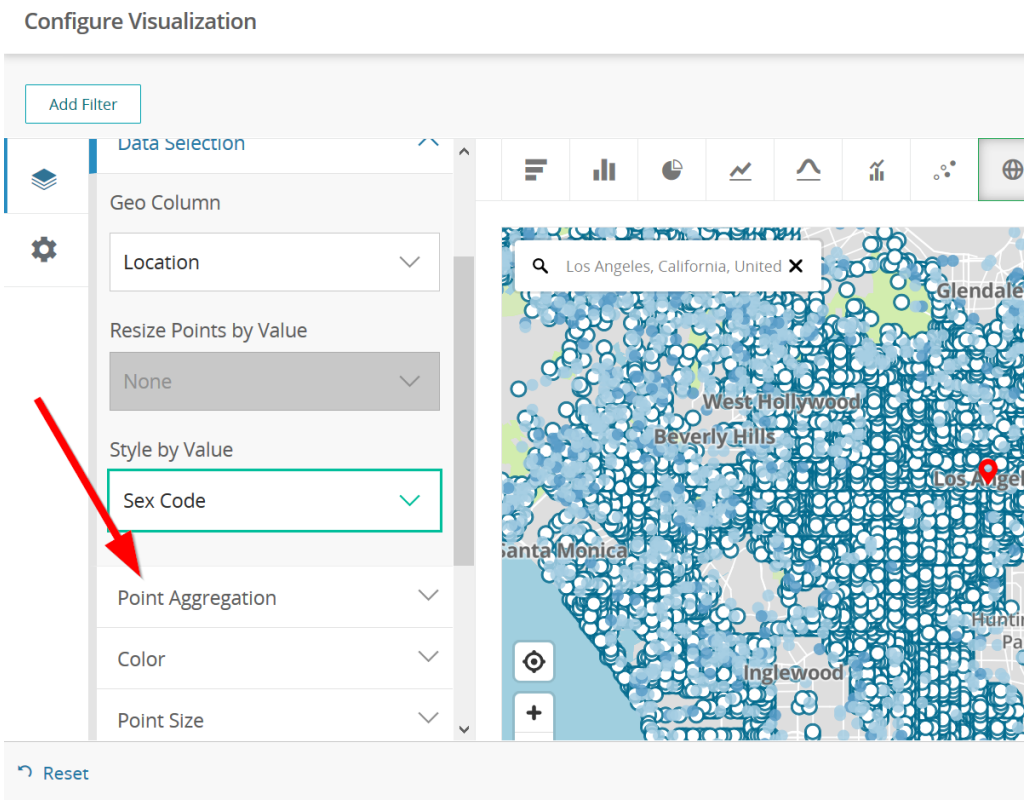


24. We will choose “Sex Code”

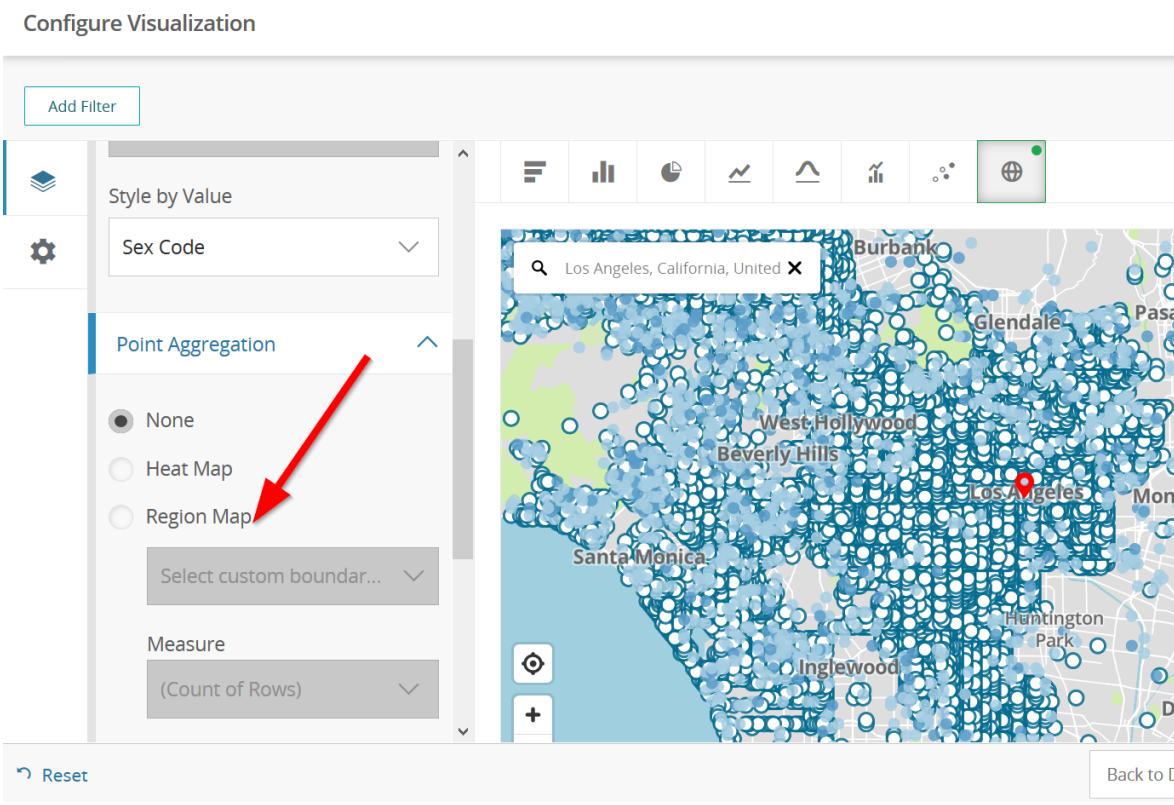
25. White points are clustered points:



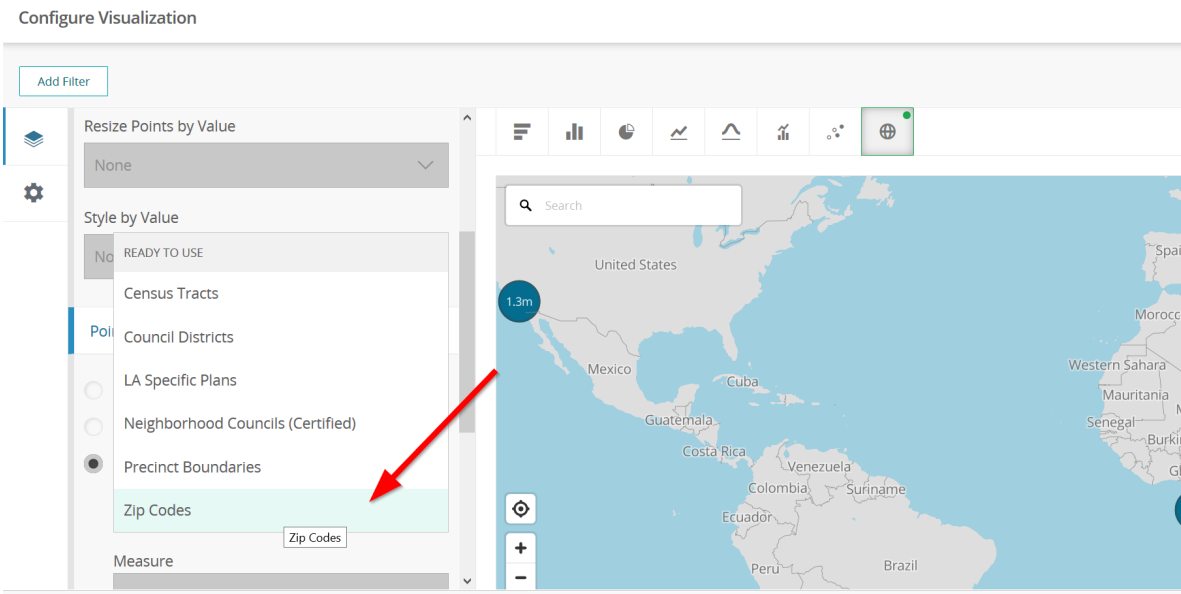
2.1.6 Summarizing our Map Points



26. Scroll down to “Point Aggregation”

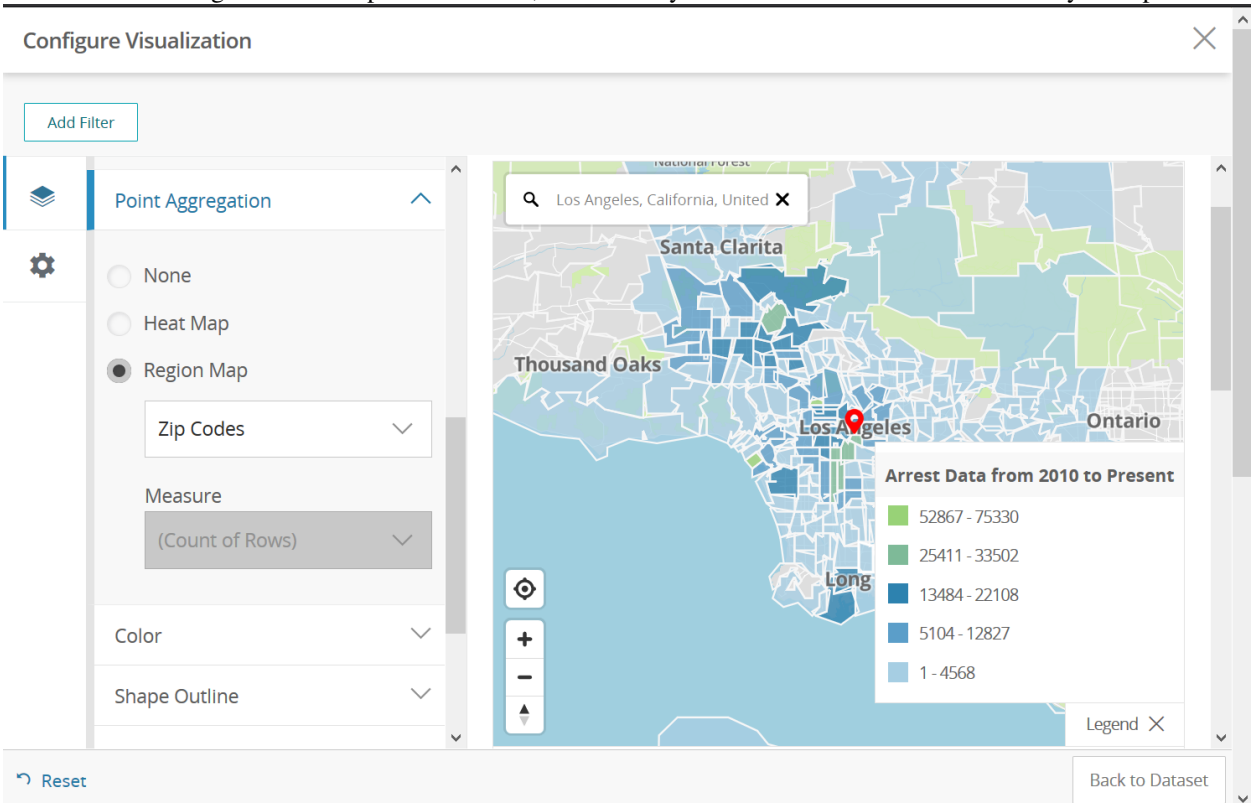


27. Select “Region Map”



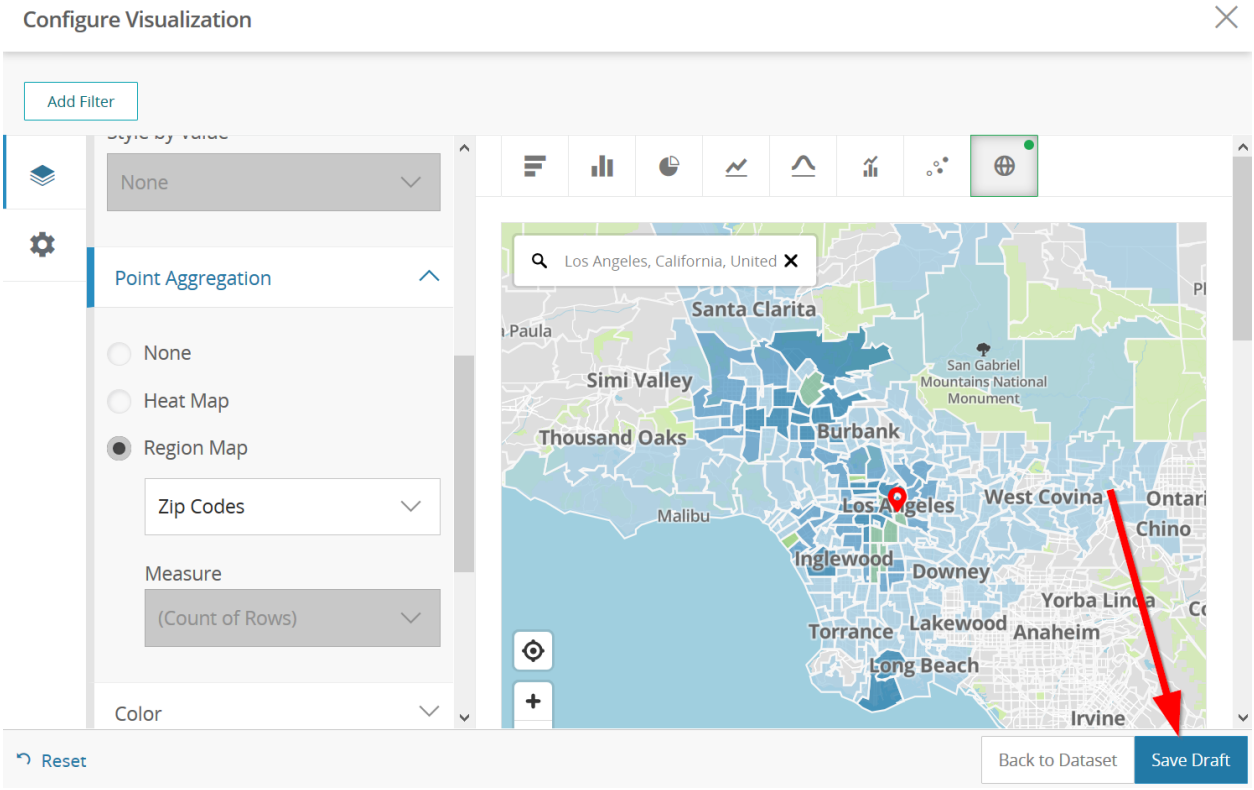
28. Choose “Zip Codes”

29. Zoom back to Los Angeles again, by either searching “Los Angeles” or moving the map to there, now you can see our data by Zip Code

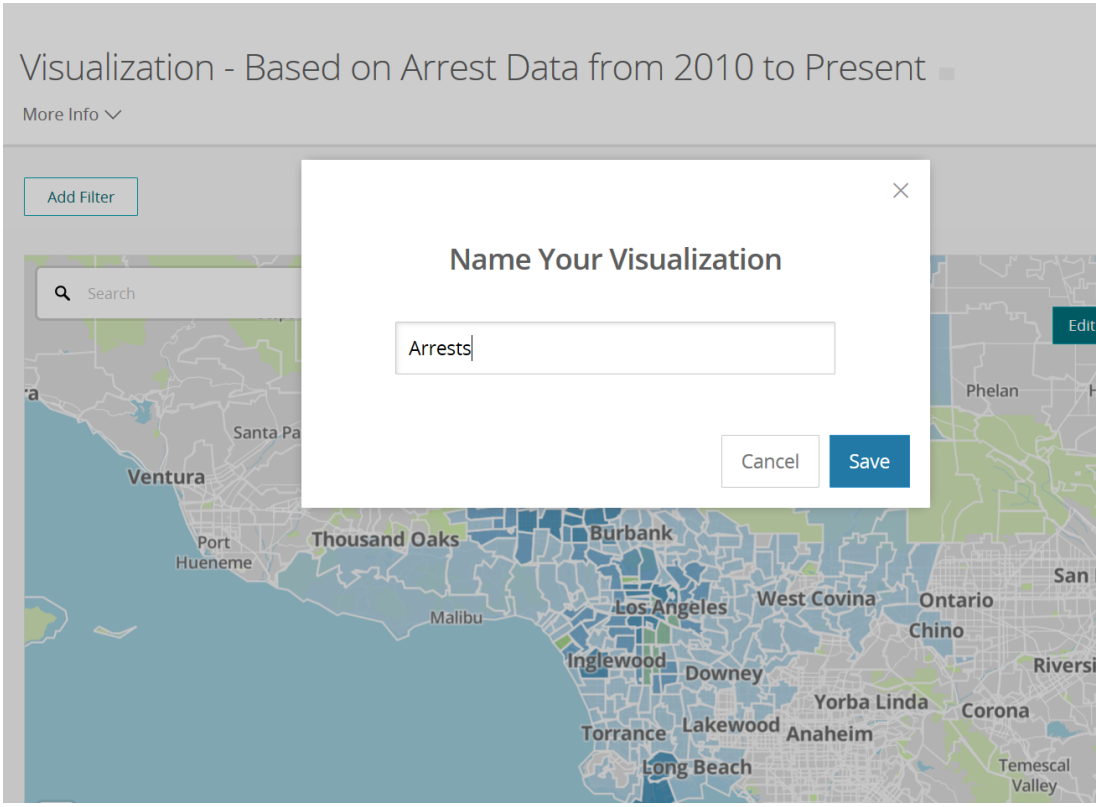


2.1.7 Save the Visualization

30. If you have created a Socrata Account, you can save the Visulization by clicking at the bottom, “Save Draft”



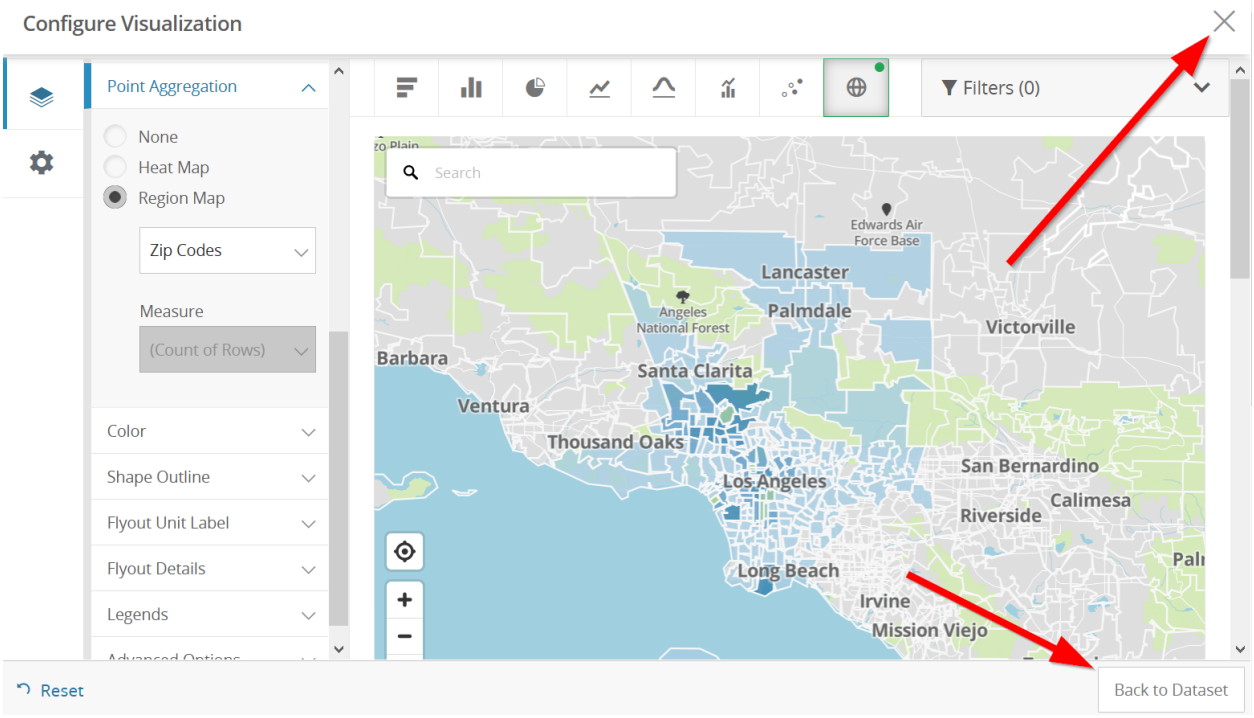
31. Give it a name and click save



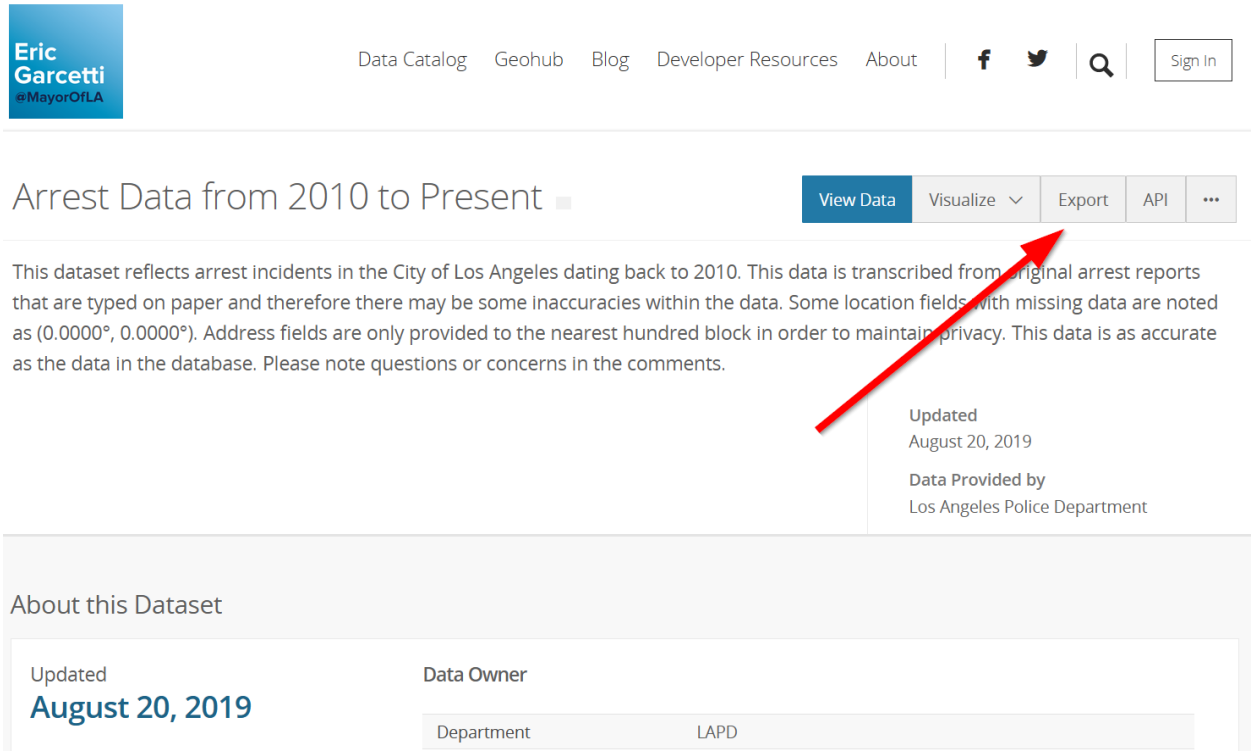
32. You can now “Publish” the visualization and share it via html link. Note, you cannot save your visualization as a static image or page.

2.1.8 Downloading the entire data

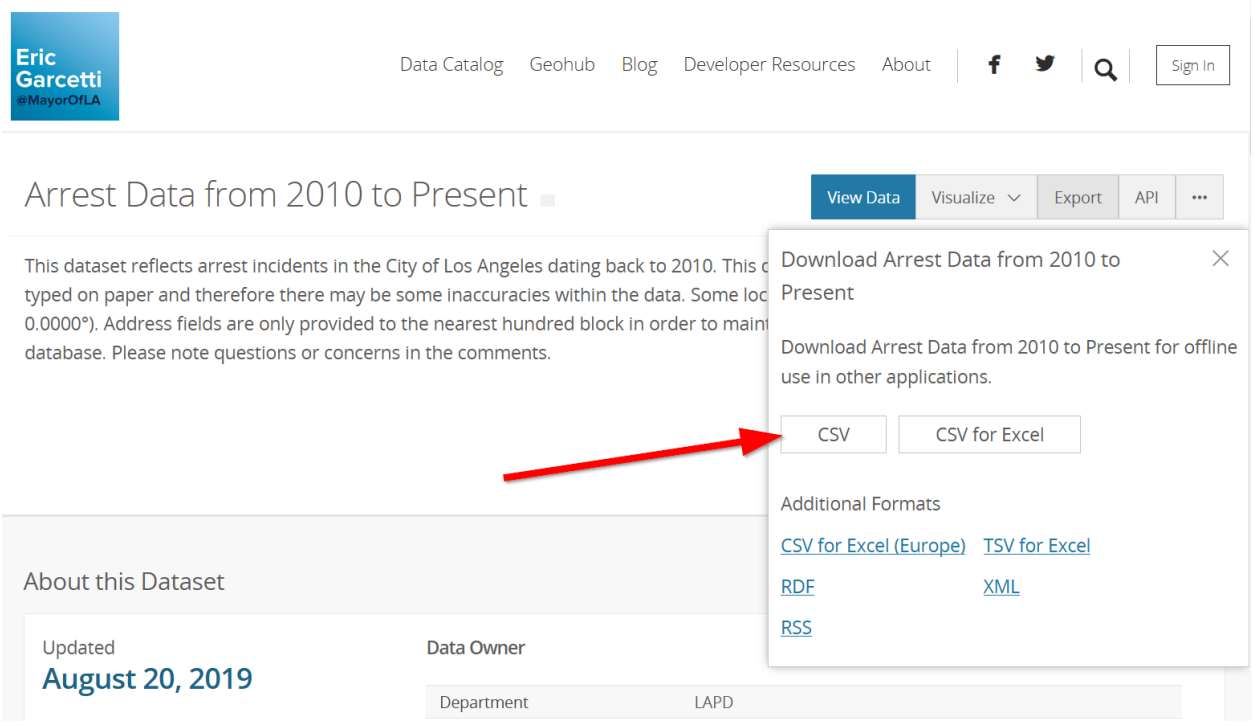
Return back to the page with the data by clicking on the X or “Back to Data Set”



33. Click on the “Export” button

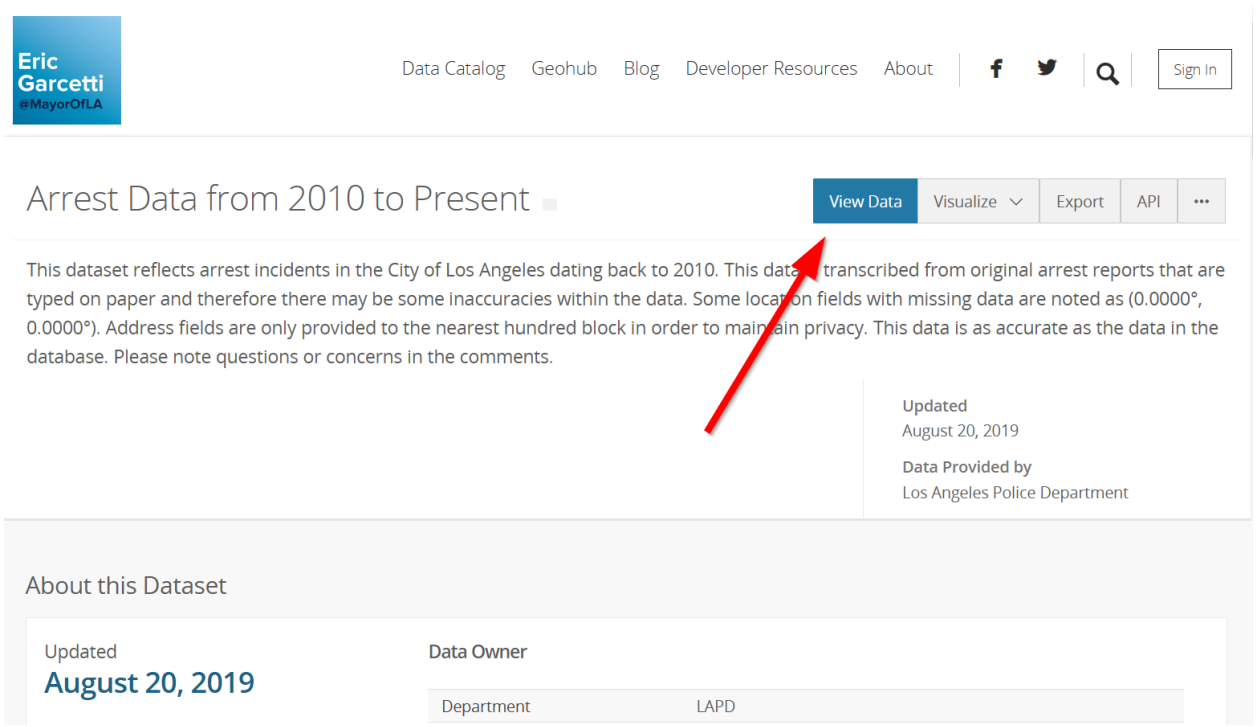


34. We will choose to download the data as "CSV" which is the simplest data type:

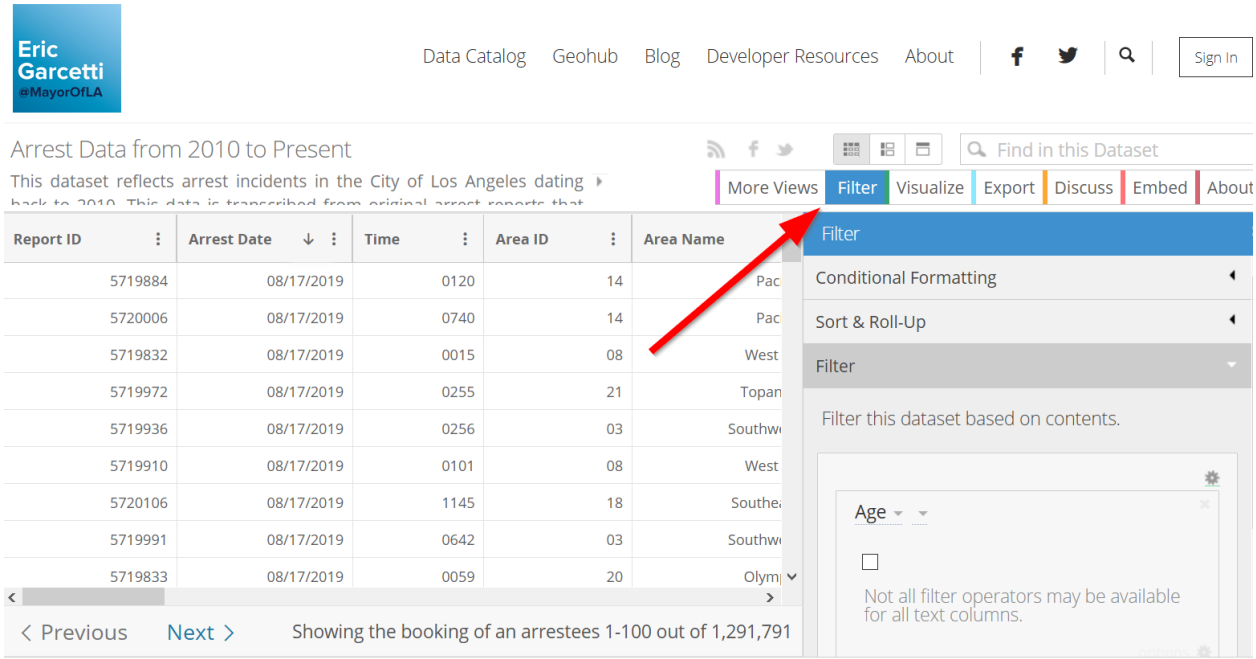


2.1.9 Download filtered Data

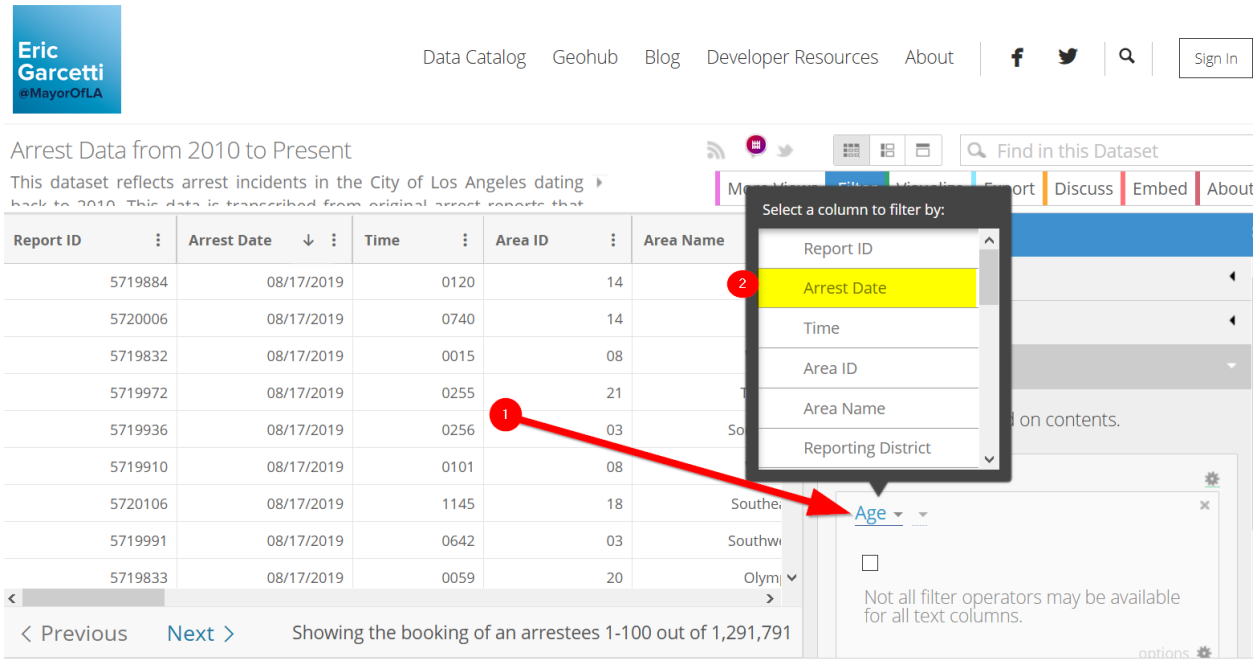
35. Go back to "View Data" to open the Socrata data page for the arrest dataset:



36. Click on “Filter” to filter the data:

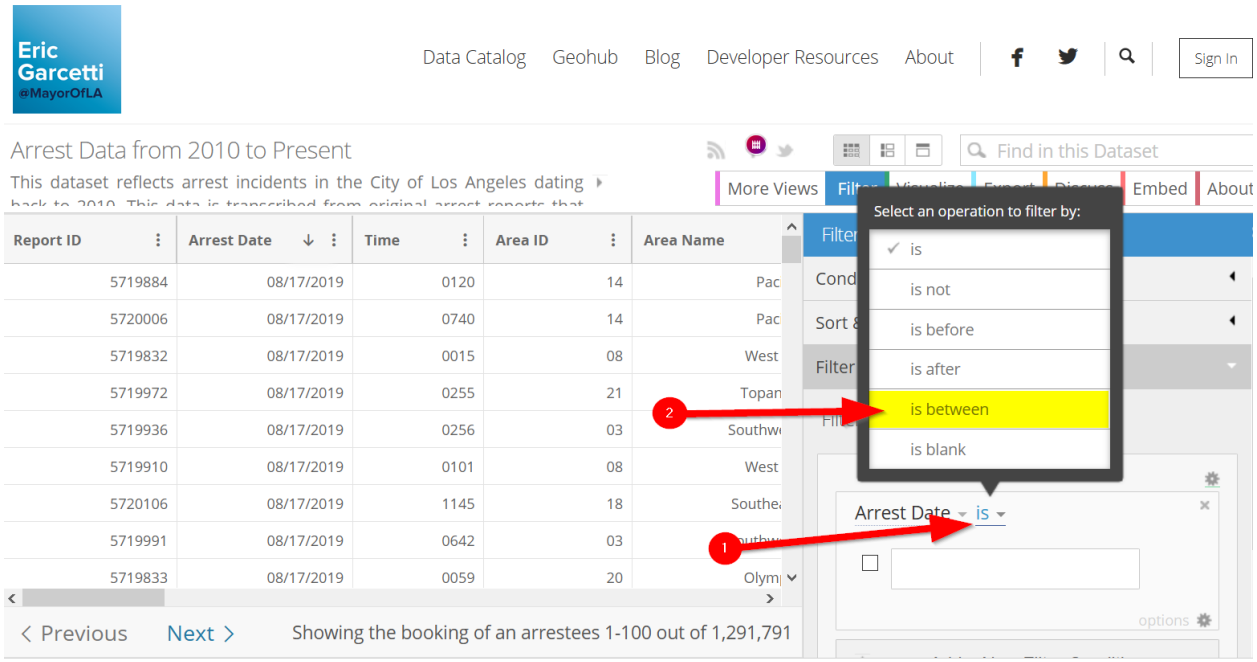


37. Let’s only get data for 2017 to 2018, click on “Age”(1) and then choose “Arrest Date” (2):



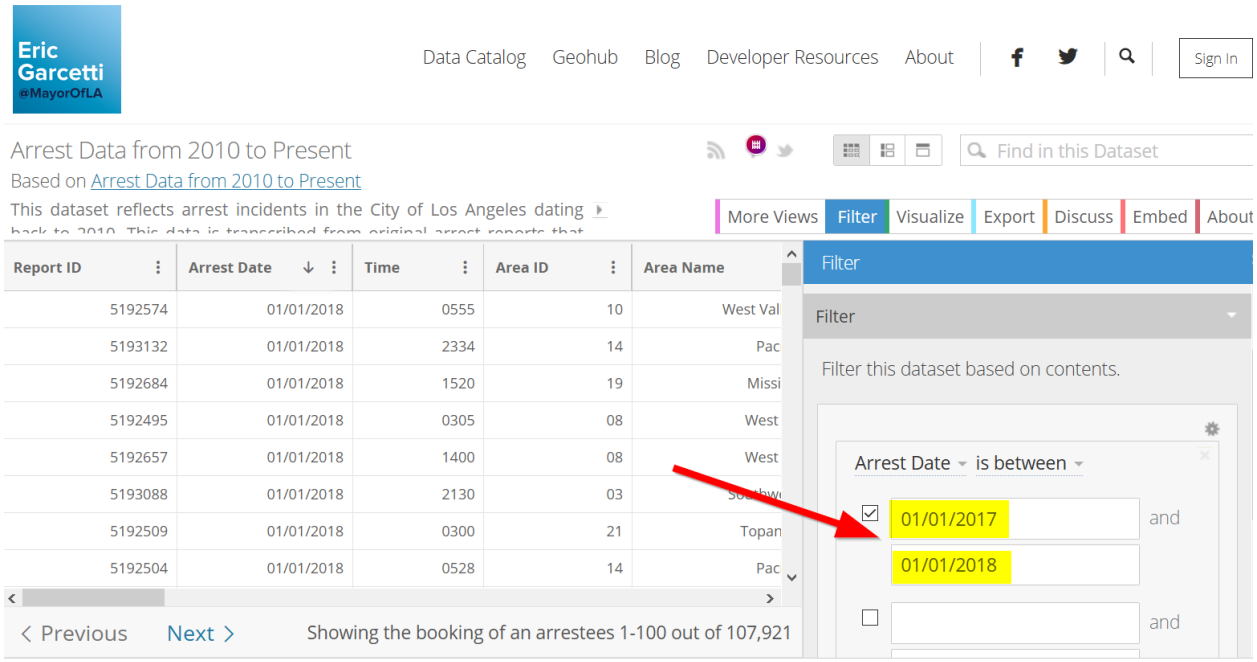
https://data.lacity.org/A-Safe-City/Arrest-Data-from-2010-to-Present/yru6-6re4/data#change

38. Next, select “is” (1) and choose “is between” (2):

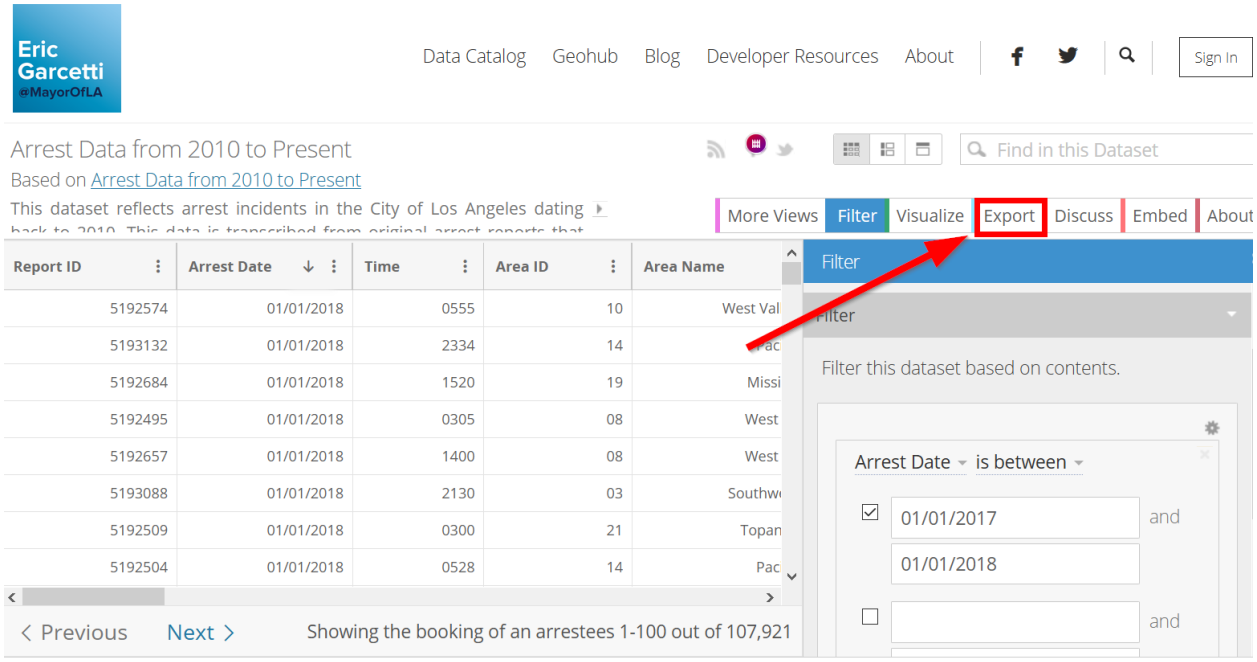


https://data.lacity.org/A-Safe-City/Arrest-Data-from-2010-to-Present/yru6-6re4/data#change

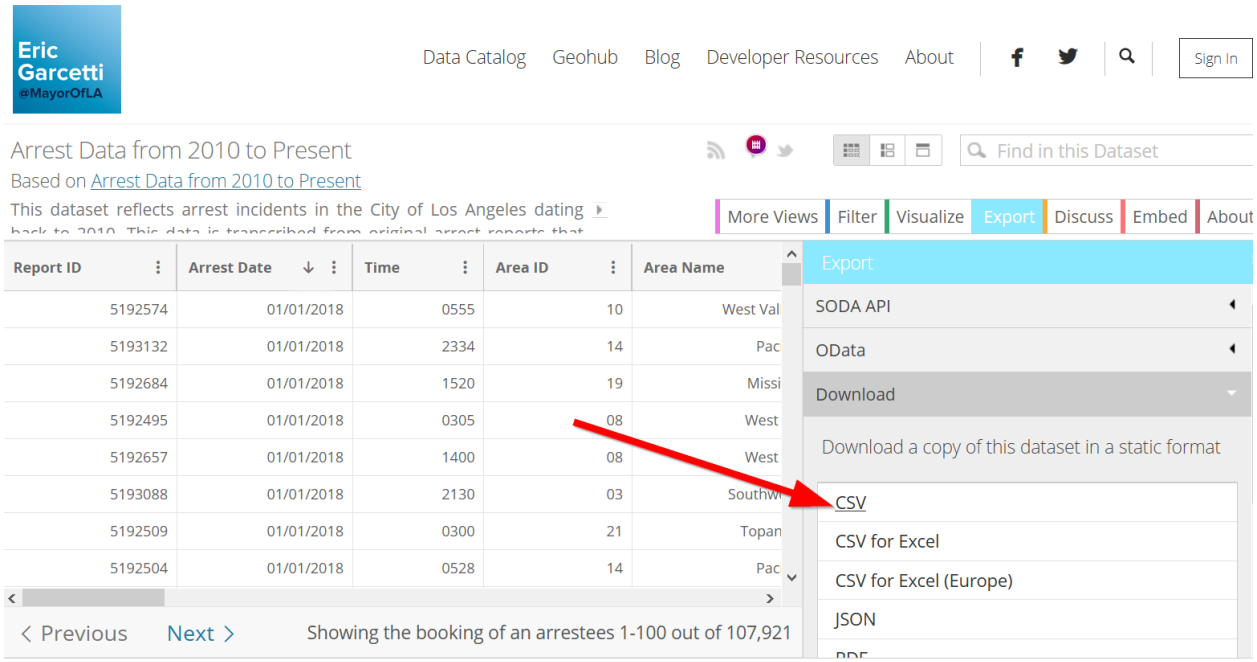
39. Choose the dates on the calendar (or type in “01/01/2017” and “01/01/2018”) :



40. Click on “Export”



41. Choose “CSV”



42. Congratulations! You can now work with the data in other applications!

2.2 Cleaning Data in Microsoft Excel

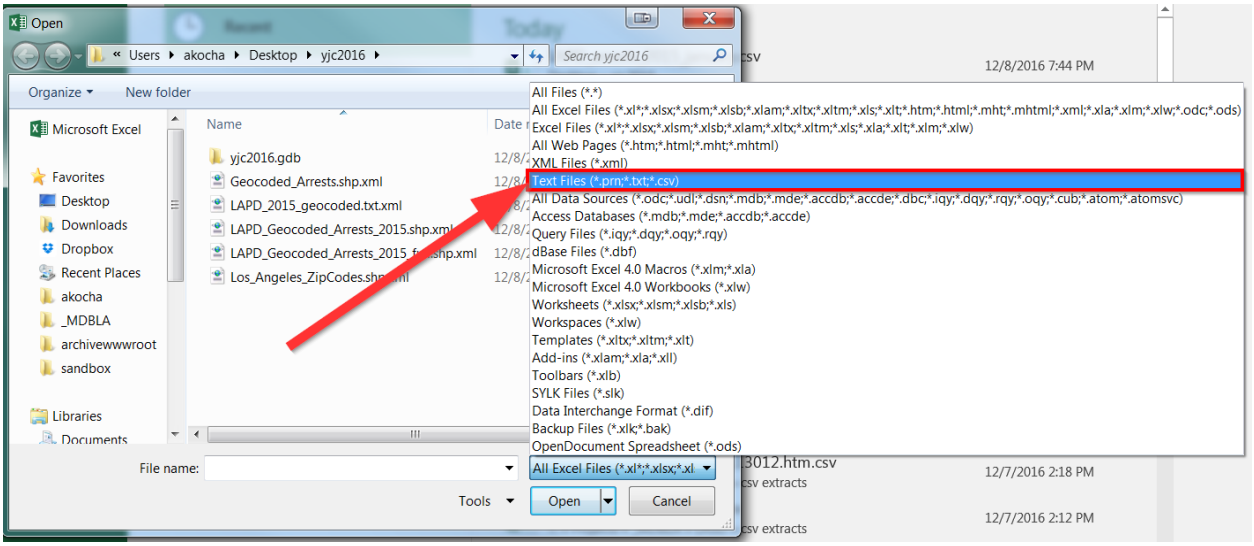
2.2.1 Getting Started

Note: This tutorial uses Los Angeles Police Department Arrest data filtered for the month of January downloaded from Los Angeles Open Data portal (see: *Data on the Los Angeles Open Data Portal*)

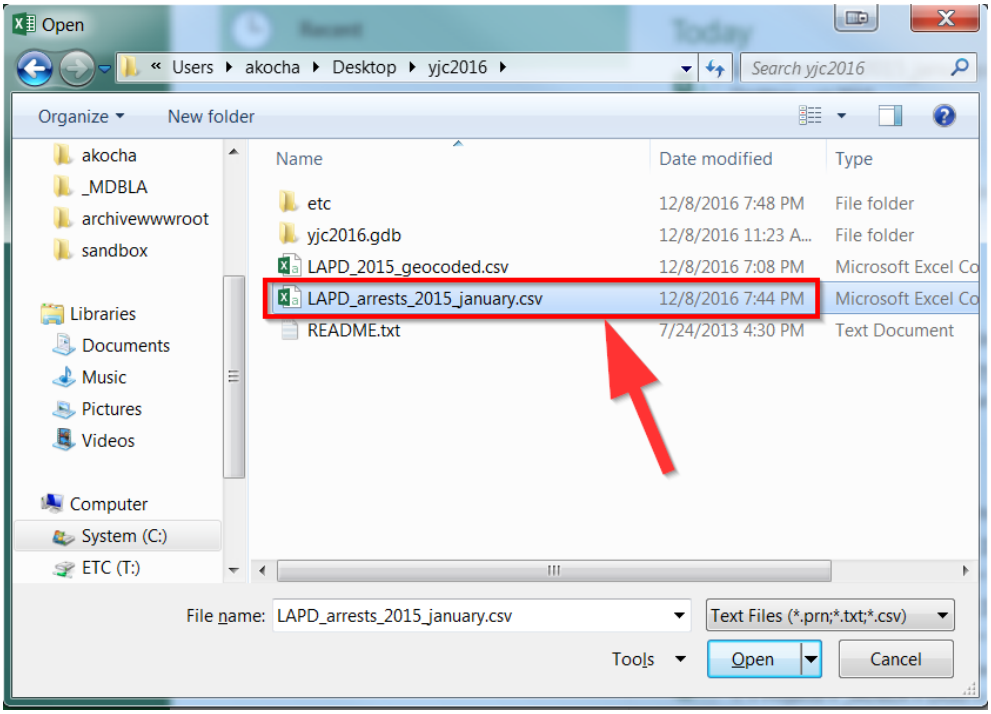
2.2.2 How to open CSV files

1. Go to File -> Open

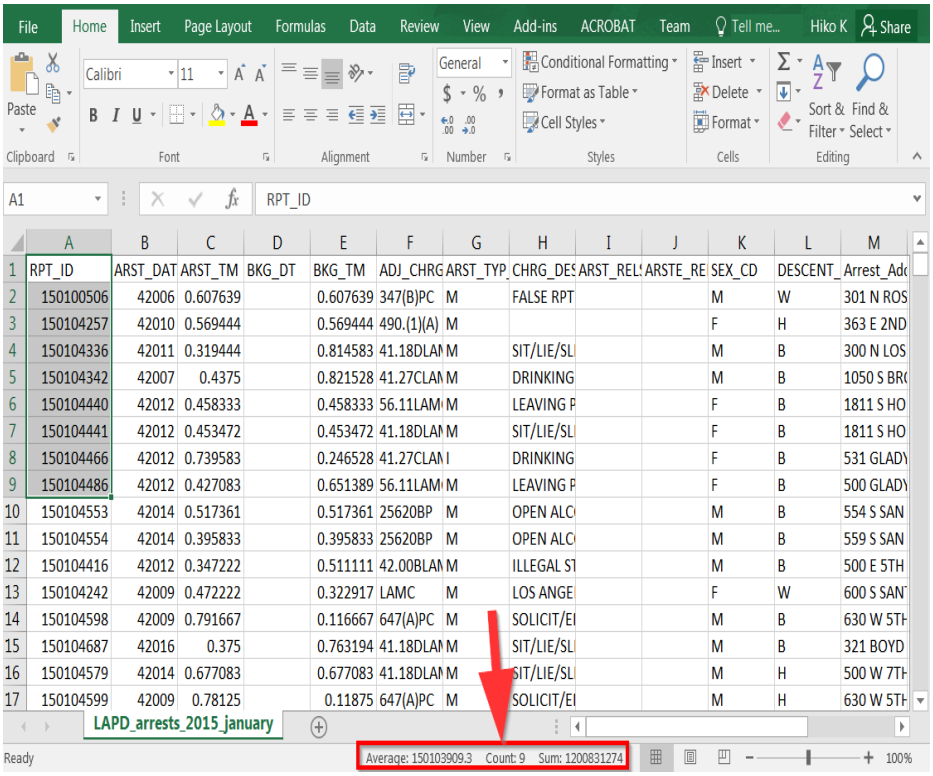
2. Select “Text” file ..



3. Select the “LAPD_arrests_2015_january.csv” file: ..



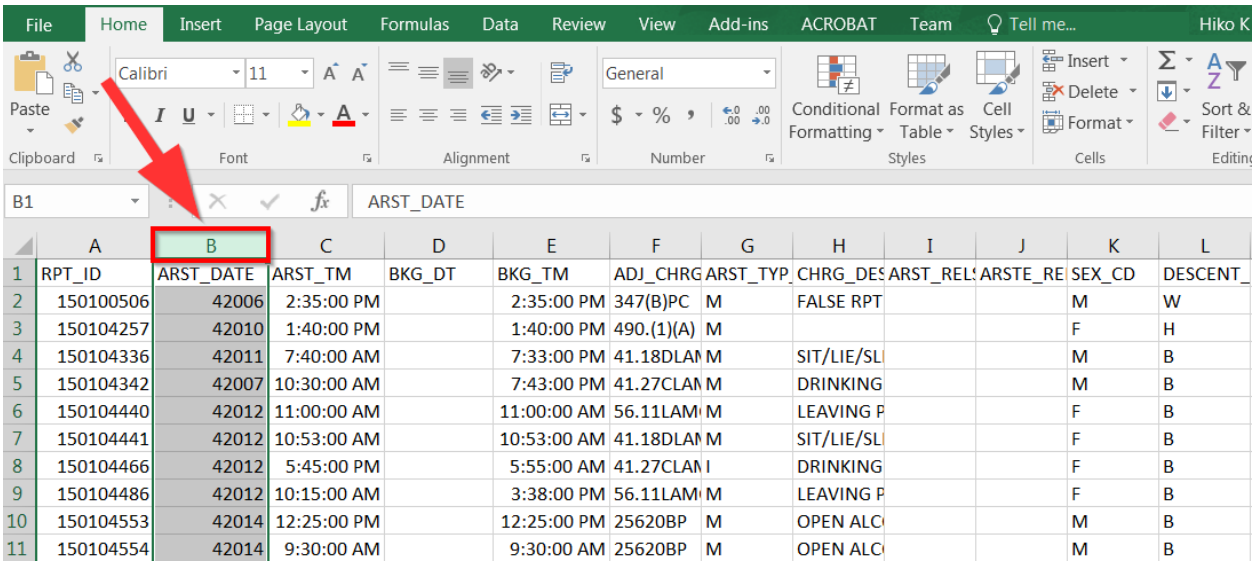
4. Excel always provides a summary of selected information near the bottom: ..



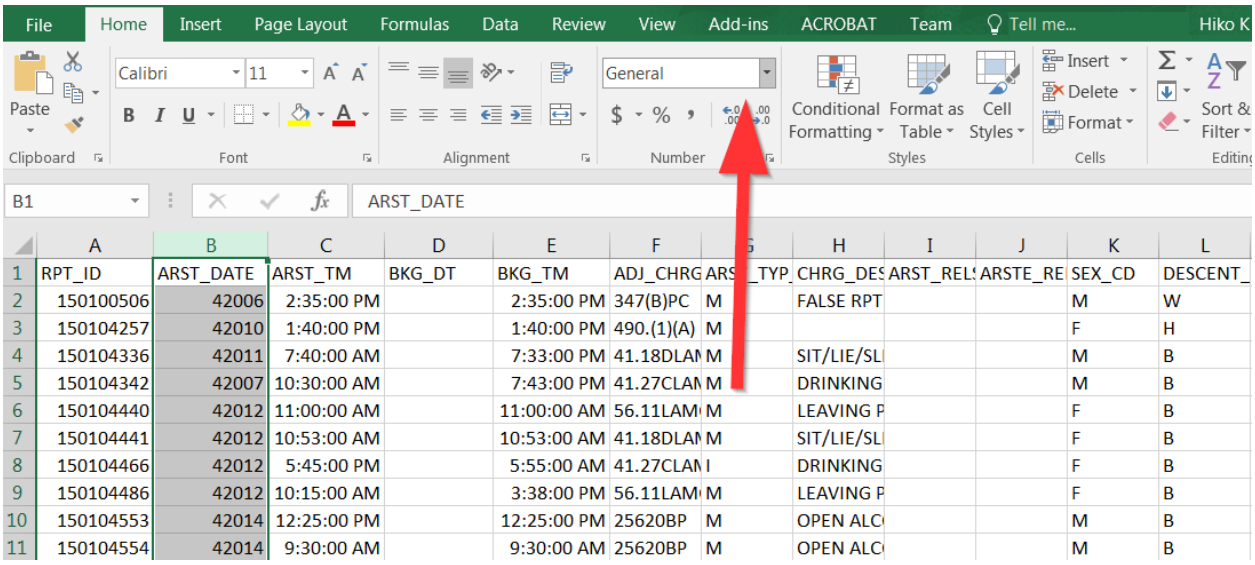
Before going forward, let's make sure our data columns are in good order:

ARST_DATE should be a date field, and ARST_TM should be a Time Field.

5. Select the columns:

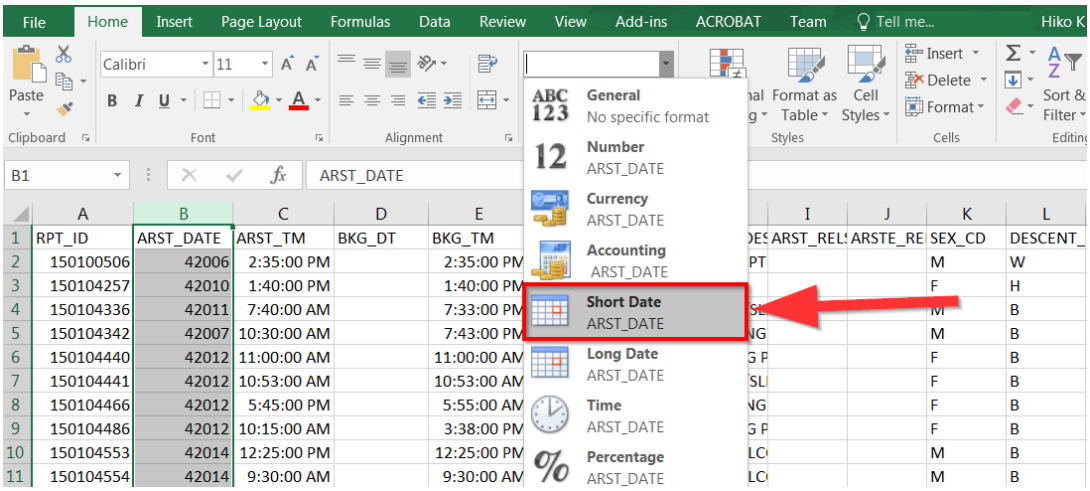


6. Select dropdown box near the top: ..



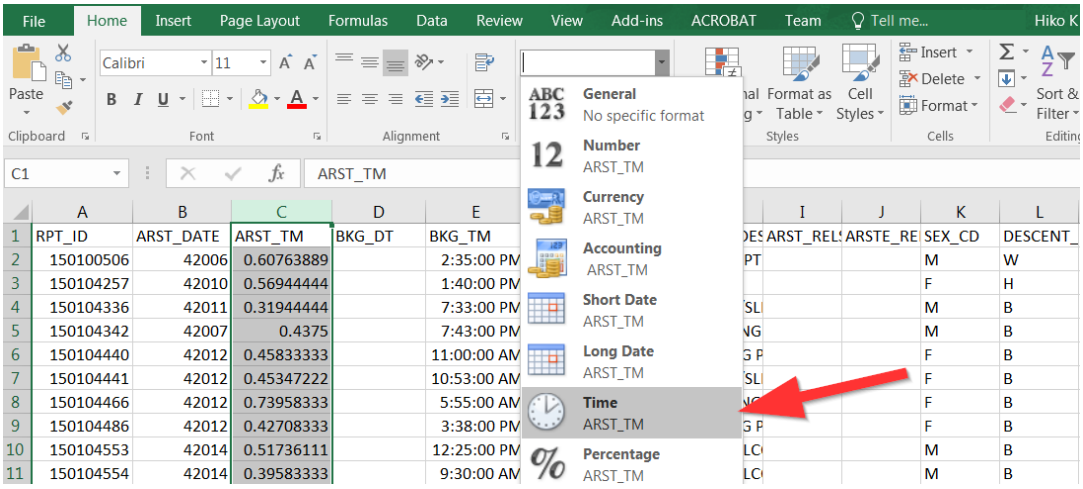
	A	B	C	D	E	F	G	H	I	J	K	L
1	RPT_ID	ARST_DATE	ARST_TM	BKG_DT	BKG_TM	ADJ_CHRG	ARS_TYP	CHRG_DES	ARST_REL	ARSTE_RE	SEX_CD	DESCENT_
2	150100506	42006	2:35:00 PM		2:35:00 PM	347(B)PC	M	FALSE RPT			M	W
3	150104257	42010	1:40:00 PM		1:40:00 PM	490.(1)(A)	M				F	H
4	150104336	42011	7:40:00 AM		7:33:00 PM	41.18DLAN	M	SIT/LIE/SL			M	B
5	150104342	42007	10:30:00 AM		7:43:00 PM	41.27CLAN	M	DRINKING			M	B
6	150104440	42012	11:00:00 AM		11:00:00 AM	56.11LAM	M	LEAVING P			F	B
7	150104441	42012	10:53:00 AM		10:53:00 AM	41.18DLAN	M	SIT/LIE/SL			F	B
8	150104466	42012	5:45:00 PM		5:55:00 AM	41.27CLAN	I	DRINKING			F	B
9	150104486	42012	10:15:00 AM		3:38:00 PM	56.11LAM	M	LEAVING P			F	B
10	150104553	42014	12:25:00 PM		12:25:00 PM	25620BP	M	OPEN ALC			M	B
11	150104554	42014	9:30:00 AM		9:30:00 AM	25620BP	M	OPEN ALC			M	B

7. Then choose “Short Date”:



	A	B	C	D	E	I	J	K	L
1	RPT_ID	ARST_DATE	ARST_TM	BKG_DT	BKG_TM	ARST_REL	ARSTE_RE	SEX_CD	DESCENT_
2	150100506	42006	2:35:00 PM		2:35:00 PM			M	W
3	150104257	42010	1:40:00 PM		1:40:00 PM			F	H
4	150104336	42011	7:40:00 AM		7:33:00 PM			M	B
5	150104342	42007	10:30:00 AM		7:43:00 PM			M	B
6	150104440	42012	11:00:00 AM		11:00:00 AM			F	B
7	150104441	42012	10:53:00 AM		10:53:00 AM			F	B
8	150104466	42012	5:45:00 PM		5:55:00 AM			F	B
9	150104486	42012	10:15:00 AM		3:38:00 PM			F	B
10	150104553	42014	12:25:00 PM		12:25:00 PM			M	B
11	150104554	42014	9:30:00 AM		9:30:00 AM			M	B

8. For ARST_TM choose “Time”:



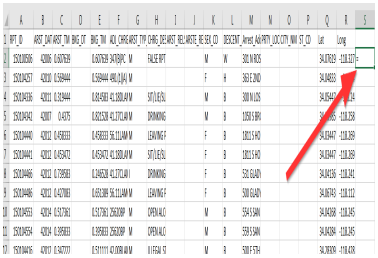
	A	B	C	D	E	I	J	K	L
1	RPT_ID	ARST_DATE	ARST_TM	BKG_DT	BKG_TM	ARST_REL	ARSTE_RE	SEX_CD	DESCENT_
2	150100506	42006	0.60763889		2:35:00 PM			M	W
3	150104257	42010	0.56944444		1:40:00 PM			F	H
4	150104336	42011	0.31944444		7:33:00 PM			M	B
5	150104342	42007	0.4375		7:43:00 PM			M	B
6	150104440	42012	0.45833333		11:00:00 AM			F	B
7	150104441	42012	0.45347222		10:53:00 AM			F	B
8	150104466	42012	0.73958333		5:55:00 AM			F	B
9	150104486	42012	0.42708333		3:38:00 PM			F	B
10	150104553	42014	0.51736111		12:25:00 PM			M	B
11	150104554	42014	0.39583333		9:30:00 AM			M	B

9. Do the same for BKG_DT and BKG_TM as well.

2.2.3 Formulas

Excel is a spreadsheet program, which means it is made up of rows and columns: one giant table. One of the most powerful tools is formulas, which means starting a cell with an "="

Go ahead and find an empty cell so we can start our formula:



S2 looks like a good spot.

The most basic formula we will use is to combine columns together:

```
= A1 & B1
```

Every Excel formula relies on using the cells of a table in order to work. For example A1 is the very first cell in the spreadsheet. If you want to combine the contents in the first cell together with the second column, then you can use "=A1&B1"

Question: Whats the formula to combine the Lat(Q2) and Long(R2) columns into one?

If you simply add the two, it might look a little messy, so we should add a space in between columns by the following formula:

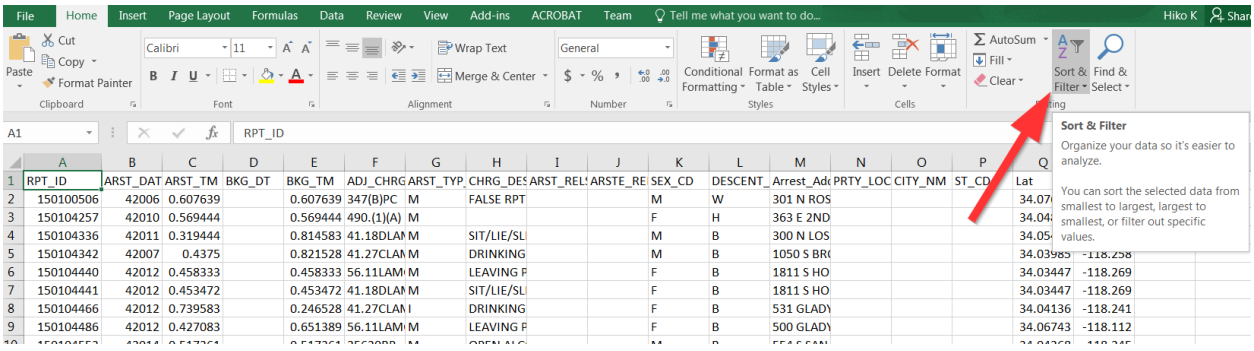
```
= A1 &" "& B1
```

You will notice that the " "symbols acts as a seperator. You can go ahead and put anything in between those symbols and it will appear in between the result.

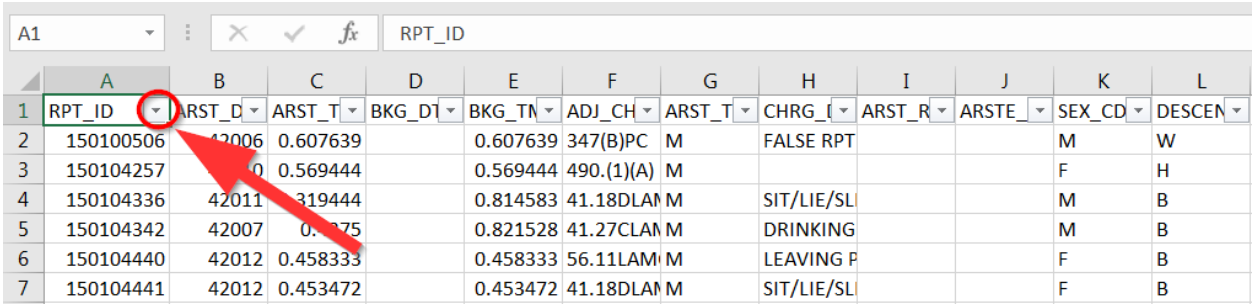
Question: Whats the formula to combine the Lat(Q2) and Long(R2) columns into one with a comma in between?

2.2.4 Sorting

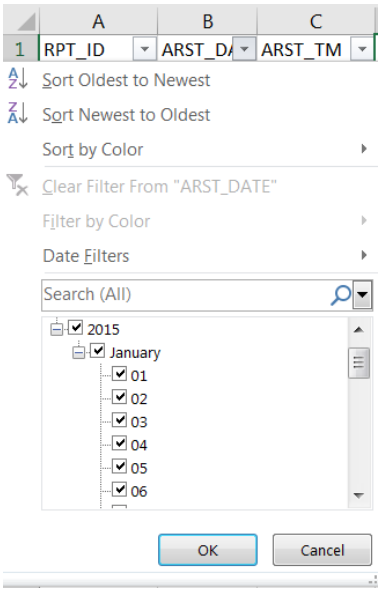
In the top part of the menu you can select "Sort":



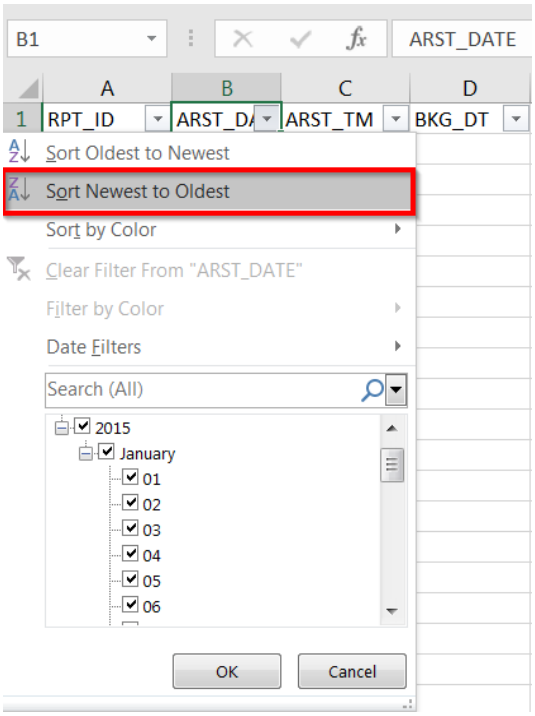
A dropdown arrow will now be shown next to the first row (also known as the header)



When clicking it, you can choose to sort the information in different ways:



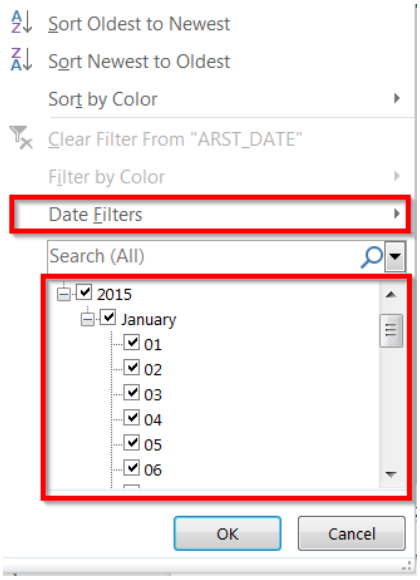
We will sort the data from highest to lowest arrest date:



Feel free to explore sorting the data!

2.2.5 Filtering

You can also filter the data by using the Checkboxes or the Filter By box below the Sort options:



Different data types will have different filter options, feel free to try it out and answer this question:

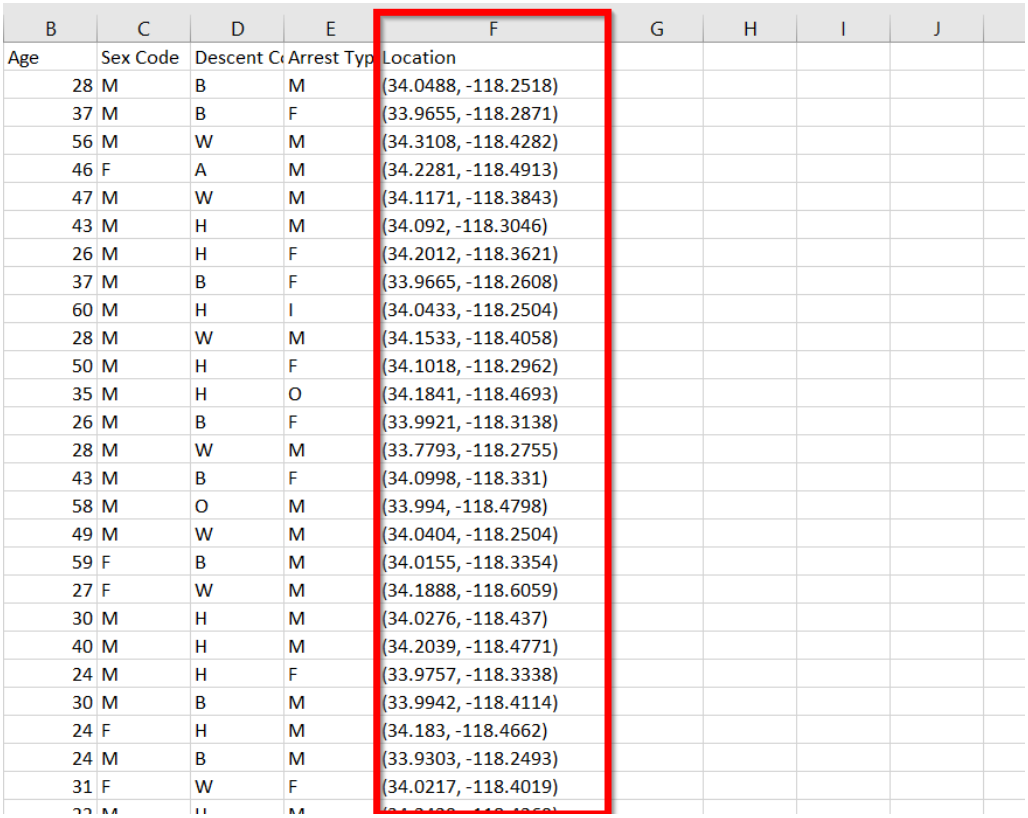
Question: How many arrests were there on January 1st?

2.2.6 Splitting content from one cell into two cells

Sometimes a dataset may include coordinates, which can easily be imported into ArcGIS Online to visualize spatially. However, in order to import seamlessly the latitude and longitude need to be in two separate columns. Follow the instructions below if the coordinates are in one column.

1. Select the cell or cells whose contents you want to split.

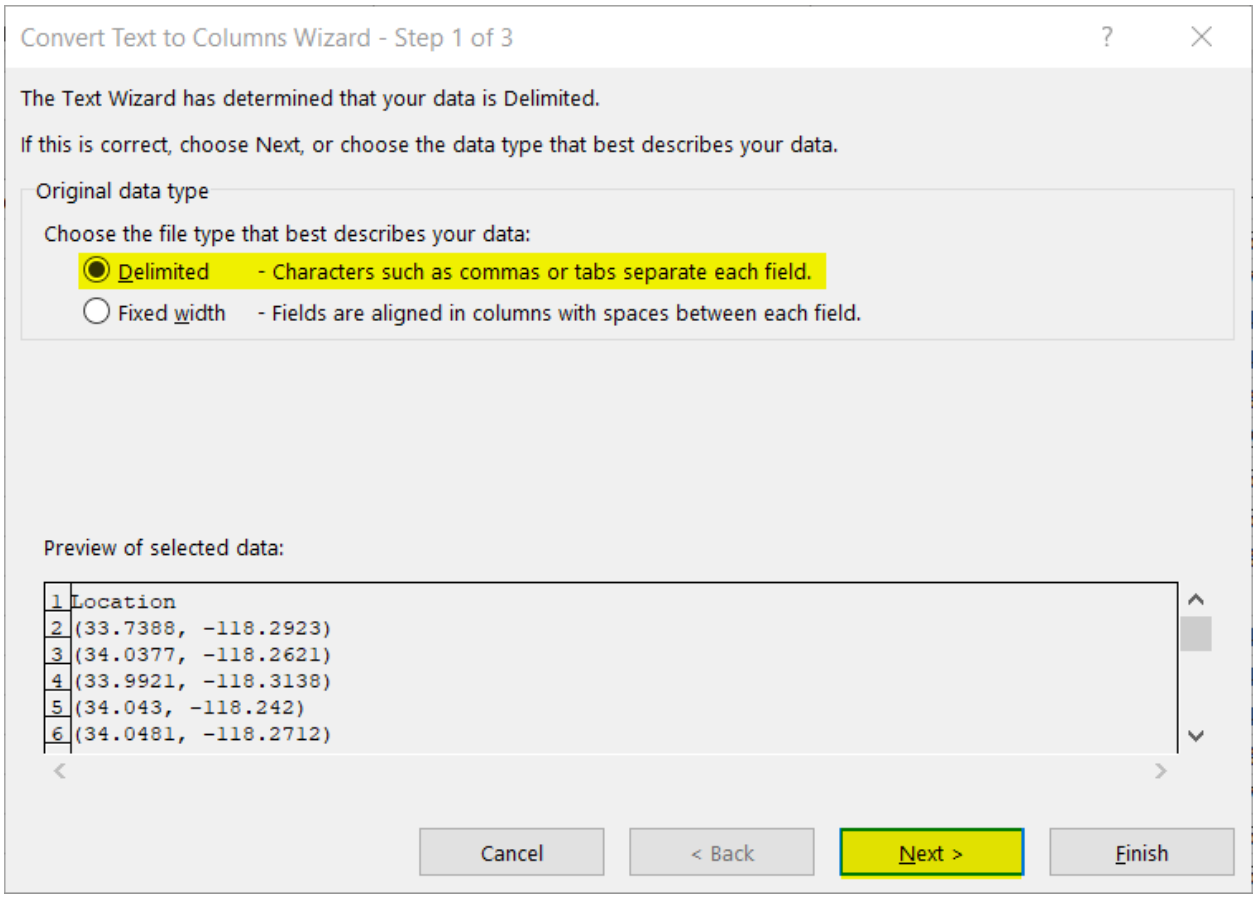
    a. Important: When you split the contents, they will overwrite the contents in the next cell to the right, so make sure to have an empty column there.



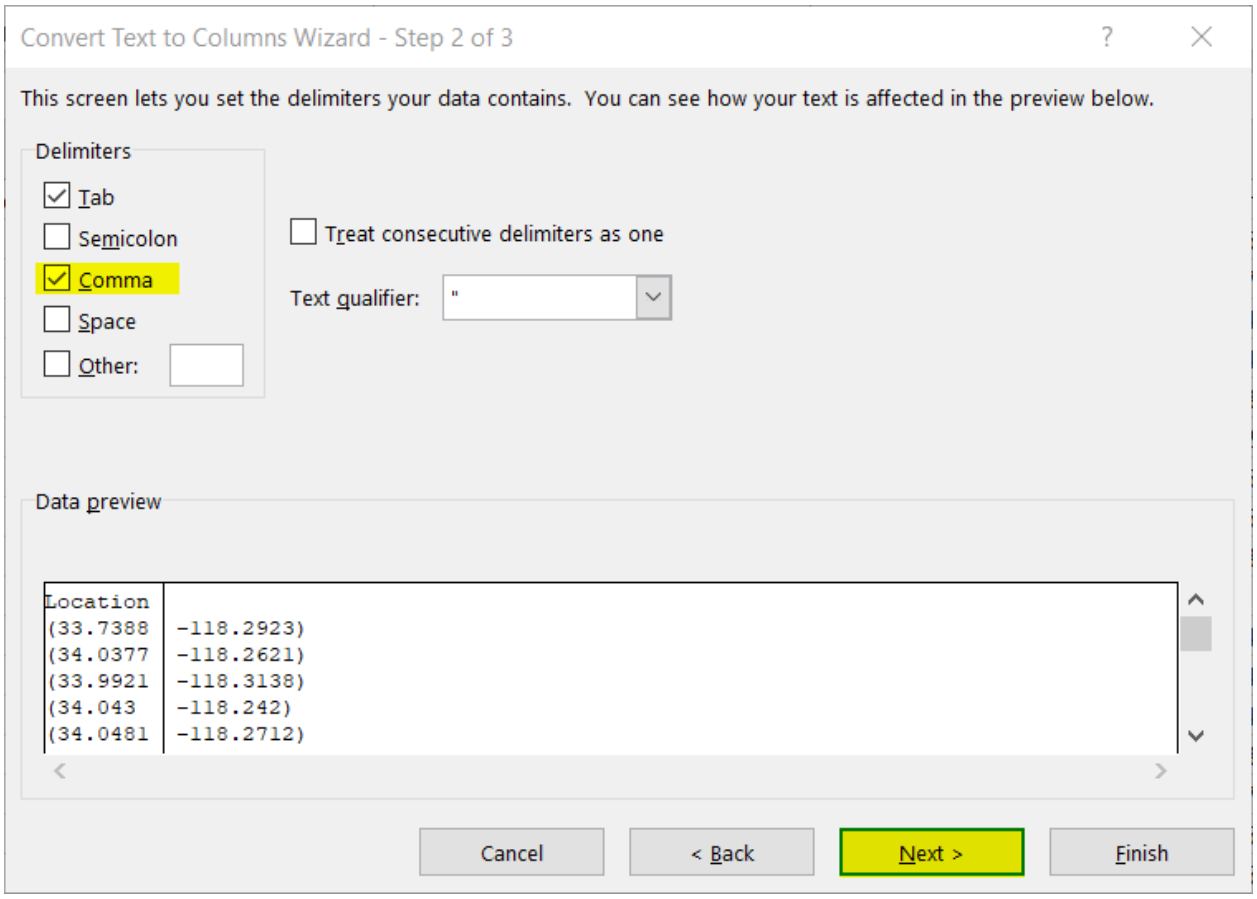
B	C	D	E	F	G	H	I	J
Age	Sex Code	Descent C	Arrest Typ	Location				
28	M	B	M	(34.0488, -118.2518)				
37	M	B	F	(33.9655, -118.2871)				
56	M	W	M	(34.3108, -118.4282)				
46	F	A	M	(34.2281, -118.4913)				
47	M	W	M	(34.1171, -118.3843)				
43	M	H	M	(34.092, -118.3046)				
26	M	H	F	(34.2012, -118.3621)				
37	M	B	F	(33.9665, -118.2608)				
60	M	H	I	(34.0433, -118.2504)				
28	M	W	M	(34.1533, -118.4058)				
50	M	H	F	(34.1018, -118.2962)				
35	M	H	O	(34.1841, -118.4693)				
26	M	B	F	(33.9921, -118.3138)				
28	M	W	M	(33.7793, -118.2755)				
43	M	B	F	(34.0998, -118.331)				
58	M	O	M	(33.994, -118.4798)				
49	M	W	M	(34.0404, -118.2504)				
59	F	B	M	(34.0155, -118.3354)				
27	F	W	M	(34.1888, -118.6059)				
30	M	H	M	(34.0276, -118.437)				
40	M	H	M	(34.2039, -118.4771)				
24	M	H	F	(33.9757, -118.3338)				
30	M	B	M	(33.9942, -118.4114)				
24	F	H	M	(34.183, -118.4662)				
24	M	B	M	(33.9303, -118.2493)				
31	F	W	F	(34.0217, -118.4019)				

2. On the Data tab, in the Data Tools group, click Text to Columns. The Convert Text to Columns Wizard opens.

3. Choose Delimited if it is not already selected, and then click Next. ..

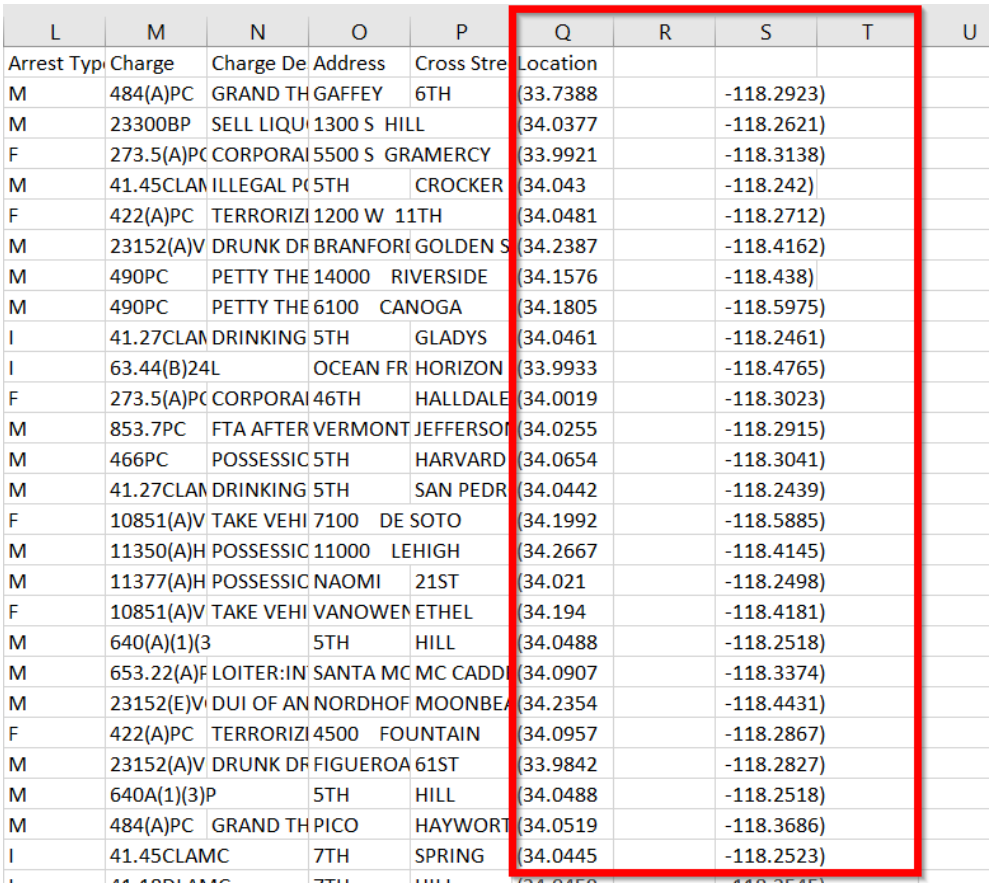


4. Select the delimiter or delimiters to define the places where you want to split the cell content. The Data preview section shows you what your content would look like. Click Next.



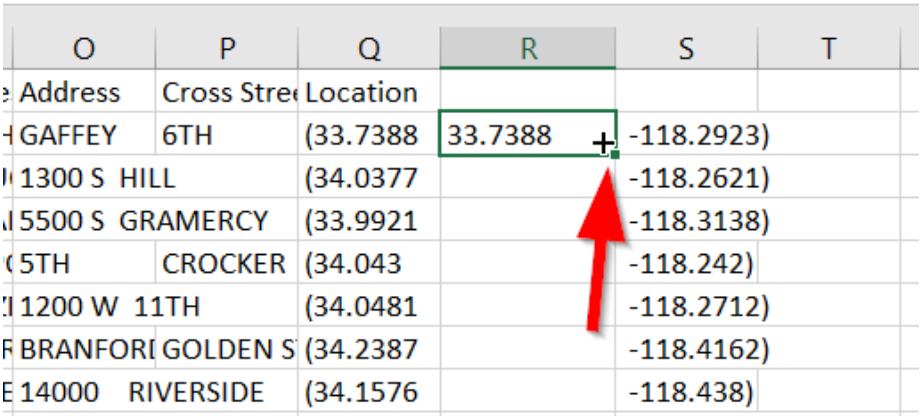
5. In the Column data format area, select the data format for the new columns. By default, the columns have the same data format as the original cell. Click Finish.
6. The coordinates are now split into two columns based on the comma delimiter. However, the new columns still have the single parenthesis. To remove the parentheses add two new columns to the right of each new coordinate column.

L	M	N	O	P	Q	R	S	T	U
Arrest Typ	Charge	Charge De	Address	Cross Stre	Location				
M	484(A)PC	GRAND TH	GAFFEY	6TH	(33.7388	-118.2923)			
M	23300BP	SELL LIQU	1300 S	HILL	(34.0377	-118.2621)			
F	273.5(A)P	CORPORAI	5500 S	GRAMERCY	(33.9921	-118.3138)			
M	41.45CLAI	ILLEGAL P	5TH	CROCKER	(34.043	-118.242)			
F	422(A)PC	TERRORIZI	1200 W	11TH	(34.0481	-118.2712)			
M	23152(A)V	DRUNK DF	BRANFORI	GOLDEN S	(34.2387	-118.4162)			
M	490PC	PETTY THE	14000	RIVERSIDE	(34.1576	-118.438)			
M	490PC	PETTY THE	6100	CANOGA	(34.1805	-118.5975)			
I	41.27CLAI	DRINKING	5TH	GLADYS	(34.0461	-118.2461)			
I	63.44(B)24	L	OCEAN FR	HORIZON	(33.9933	-118.4765)			
F	273.5(A)P	CORPORAI	46TH	HALLDALE	(34.0019	-118.3023)			
M	853.7PC	FTA AFTER	VERMONT	JEFFERSO	(34.0255	-118.2915)			
M	466PC	POSSESSIC	5TH	HARVARD	(34.0654	-118.3041)			
M	41.27CLAI	DRINKING	5TH	SAN PEDR	(34.0442	-118.2439)			
F	10851(A)V	TAKE VEHI	7100	DE SOTO	(34.1992	-118.5885)			
M	11350(A)H	POSSESSIC	11000	LEHIGH	(34.2667	-118.4145)			
M	11377(A)H	POSSESSIC	NAOMI	21ST	(34.021	-118.2498)			
F	10851(A)V	TAKE VEHI	VANOWEN	ETHEL	(34.194	-118.4181)			
M	640(A)(1)(3		5TH	HILL	(34.0488	-118.2518)			
M	653.22(A)F	LOITER:IN	SANTA MC	MC CADD	(34.0907	-118.3374)			
M	23152(E)V	DUI OF AN	NORDHOF	MOONBE	(34.2354	-118.4431)			
F	422(A)PC	TERRORIZI	4500	FOUNTAIN	(34.0957	-118.2867)			
M	23152(A)V	DRUNK DF	FIGUEROA	61ST	(33.9842	-118.2827)			
M	640A(1)(3)P		5TH	HILL	(34.0488	-118.2518)			
M	484(A)PC	GRAND TH	PICO	HAYWOR	(34.0519	-118.3686)			
I	41.45CLAMC		7TH	SPRING	(34.0445	-118.2523)			



L	M	N	O	P	Q	R	S	T	U
Arrest Typ	Charge	Charge De	Address	Cross Stre	Location				
M	484(A)PC	GRAND TH	GAFFEY	6TH	(33.7388		-118.2923)		
M	23300BP	SELL LIQU	1300 S HILL		(34.0377		-118.2621)		
F	273.5(A)PC	CORPORAI	5500 S GRAMERCY		(33.9921		-118.3138)		
M	41.45CLAN	ILLEGAL P	5TH	CROCKER	(34.043		-118.242)		
F	422(A)PC	TERRORIZI	1200 W 11TH		(34.0481		-118.2712)		
M	23152(A)V	DRUNK DF	BRANFORI	GOLDEN S	(34.2387		-118.4162)		
M	490PC	PETTY THE	14000 RIVERSIDE		(34.1576		-118.438)		
M	490PC	PETTY THE	6100 CANOGA		(34.1805		-118.5975)		
I	41.27CLAN	DRINKING	5TH	GLADYS	(34.0461		-118.2461)		
I	63.44(B)24L		OCEAN FR	HORIZON	(33.9933		-118.4765)		
F	273.5(A)PC	CORPORAI	46TH	HALLDALE	(34.0019		-118.3023)		
M	853.7PC	FTA AFTER	VERMONT	JEFFERSOI	(34.0255		-118.2915)		
M	466PC	POSSESSIC	5TH	HARVARD	(34.0654		-118.3041)		
M	41.27CLAN	DRINKING	5TH	SAN PEDR	(34.0442		-118.2439)		
F	10851(A)V	TAKE VEHI	7100 DE SOTO		(34.1992		-118.5885)		
M	11350(A)H	POSSESSIC	11000 LEHIGH		(34.2667		-118.4145)		
M	11377(A)H	POSSESSIC	NAOMI	21ST	(34.021		-118.2498)		
F	10851(A)V	TAKE VEHI	VANOWEN	ETHEL	(34.194		-118.4181)		
M	640(A)(1)(3		5TH	HILL	(34.0488		-118.2518)		
M	653.22(A)F	LOITER:IN	SANTA MC	MC CADDI	(34.0907		-118.3374)		
M	23152(E)V	DUI OF AN	NORDHOF	MOONBEA	(34.2354		-118.4431)		
F	422(A)PC	TERRORIZI	4500 FOUNTAIN		(34.0957		-118.2867)		
M	23152(A)V	DRUNK DF	FIGUEROA	61ST	(33.9842		-118.2827)		
M	640A(1)(3)P		5TH	HILL	(34.0488		-118.2518)		
M	484(A)PC	GRAND TH	PICO	HAYWORT	(34.0519		-118.3686)		
I	41.45CLAMC		7TH	SPRING	(34.0445		-118.2523)		

7. Type the following equation in the cell to the right of the first column: =RIGHT(Q2, LEN(Q2)-1).
8. To copy the equation to the remaining rows, select the cell and hover over the bottom right corner until the cursor becomes a cross. Double-click.

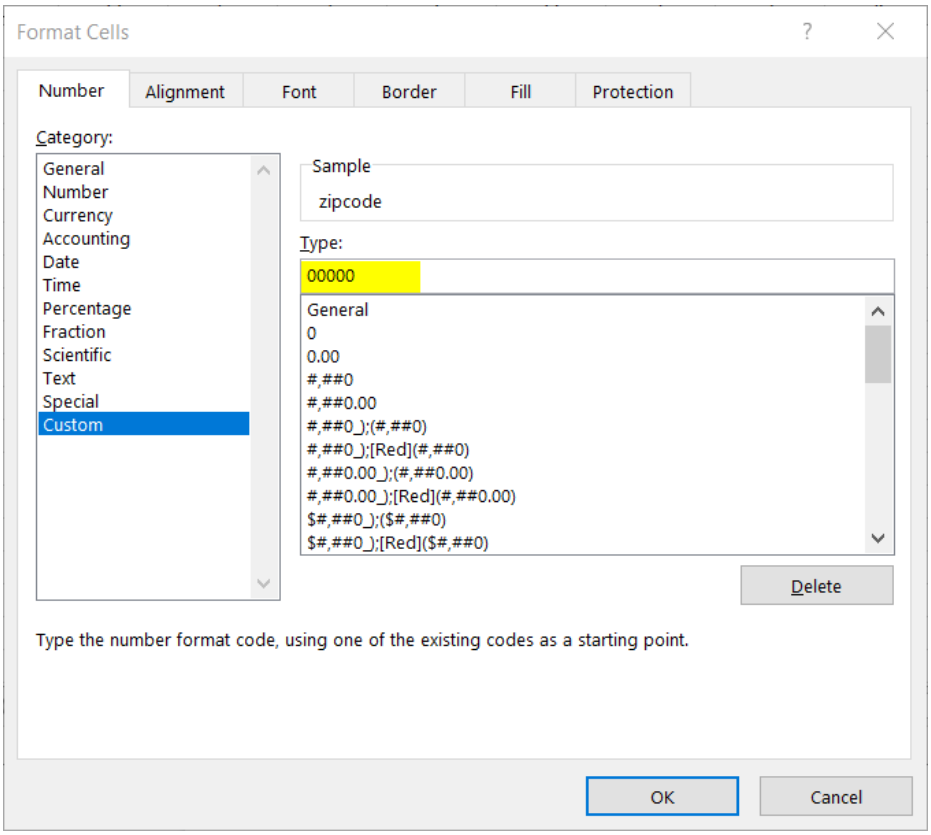


O	P	Q	R	S	T
Address	Cross Stre	Location			
GAFFEY	6TH	(33.7388	33.7388	-118.2923)	
1300 S HILL		(34.0377		-118.2621)	
5500 S GRAMERCY		(33.9921		-118.3138)	
5TH	CROCKER	(34.043		-118.242)	
1200 W 11TH		(34.0481		-118.2712)	
BRANFORI	GOLDEN S	(34.2387		-118.4162)	
14000 RIVERSIDE		(34.1576		-118.438)	

9. Type the following equation in the cell to the right of the second new location column: =LEFT(S2, LEN(S2)-1). Repeat the process for the longitude column and copy the formula into the remaining cells. Make sure to label the new columns ‘lat’ and ‘lon’.

2.2.7 Leading Zeros

1. Sometimes when moving data between software, leading zeros are dropped which change the way you can use a particular dataset. This is particularly true when working with zip codes.
2. To add back the leading zeros, highlight the column and right-click to select Format Cells. Then select Custom.
3. Type '00000' in the Type field and click 'OK'.. .



4. Leading zeros have now been added back to your field!

2.2.8 Next Guide: Joining Data in QGIS

Sometimes you want to summarize data by location. For example you want to see the number of arrests by zipcodes or neighborhoods. To do this, you need to do what is called a spatial join.

2.3 Working with Tableau and data

Data visualization is the graphical representation of information and data. By using visual elements like charts, graphs, and maps, data visualization tools provide an accessible way to see and **understand trends, outliers, and patterns in data**.

Tableau is a data visualization software. It allows anyone to upload data from any source and instantly create interactive visualizations aka Dashboards. Here some of the great examples of how others have used Tableau.

The purpose of this tutorial is to give everyone the basic tools necessary to start using Tableau. If you believe Tableau meets your needs for visualizing your data, please visit this site, where you can find a more detailed overview of

tableau.

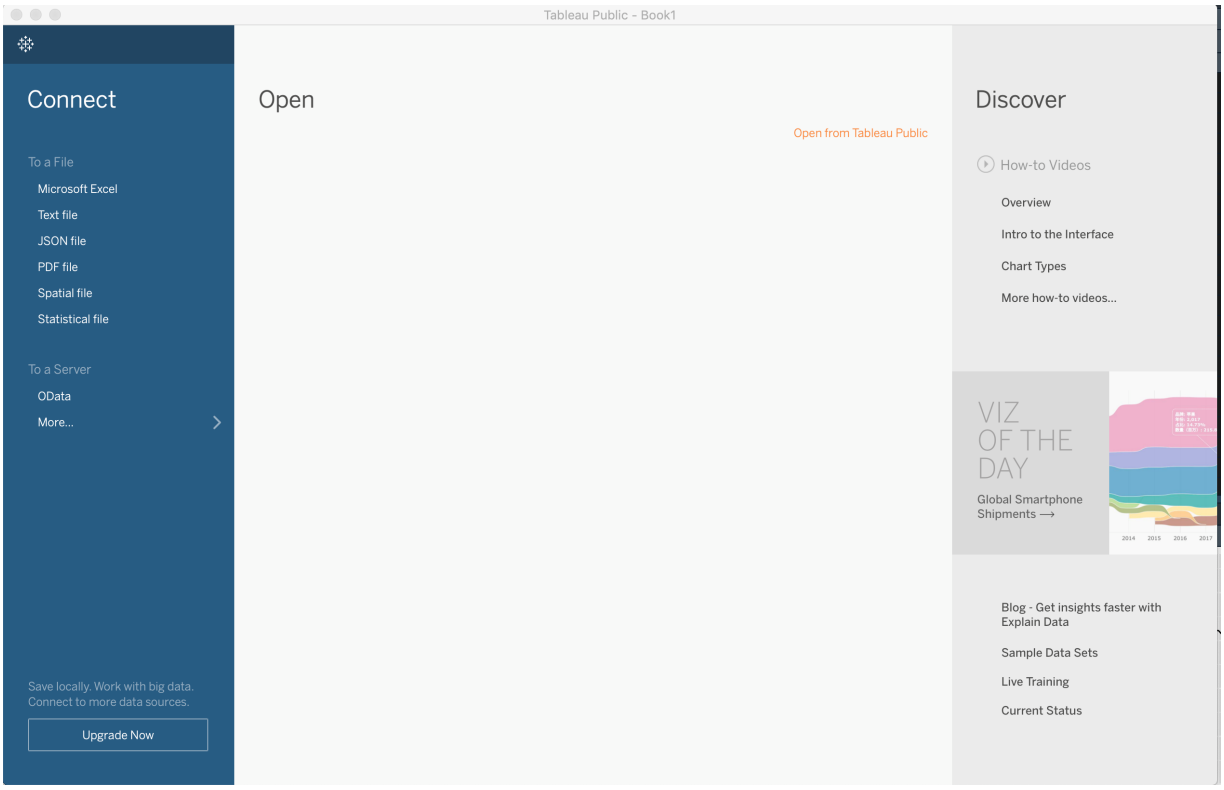
Outline:

1. Connect to Data
2. Create Visualizations
    a. Table
    b. Bar
    c. Linear (Trend)
    d. Basic Map
3. Dashboard

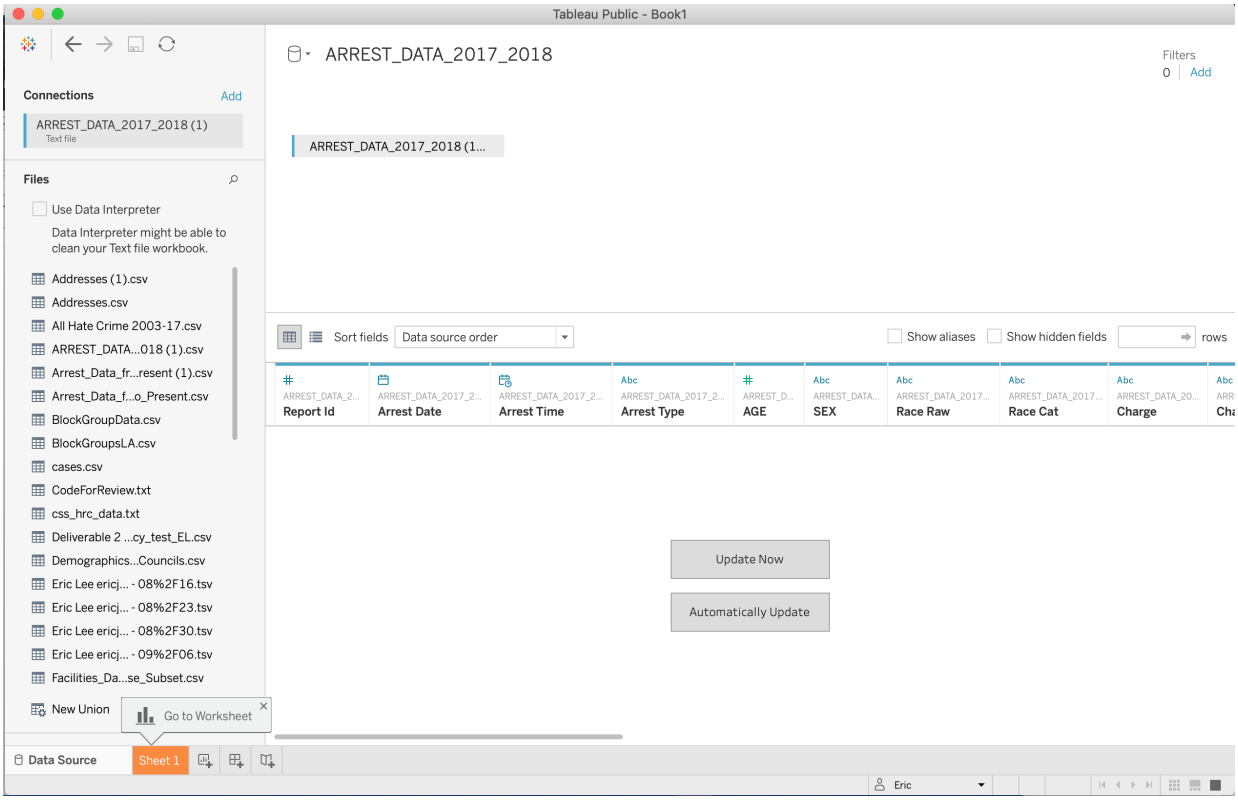
2.3.1 Connect to Data

For the purposes of this exercise, we will use the "ARREST_DATA_2017_2018". Please download the following dataset to follow along: _____

When you open Tableau, the first screen should look like this:



Since we are working with a CSV (comma delimited file), click on "Text File" to the left. What should result is a screen like this:



The connection should be the main dataset you connected to. Your data should display in the center. If you click "Update Now" you should be able to get a preview (first 1,000 rows) of the dataset you imported.

Over the variable names are various symbols. These are the data types that Tableau automatically assigned to each of the variable names. If the values in your dataset looked like a number you should see a "#" sign. If you brought in something that looks like a date, you'll see a calendar icon, and if your data looks like a bunch of character strings, you'll see an "Abc" symbol. Not shown here is a logical type variable (True/False). Those will appear as "T|F".

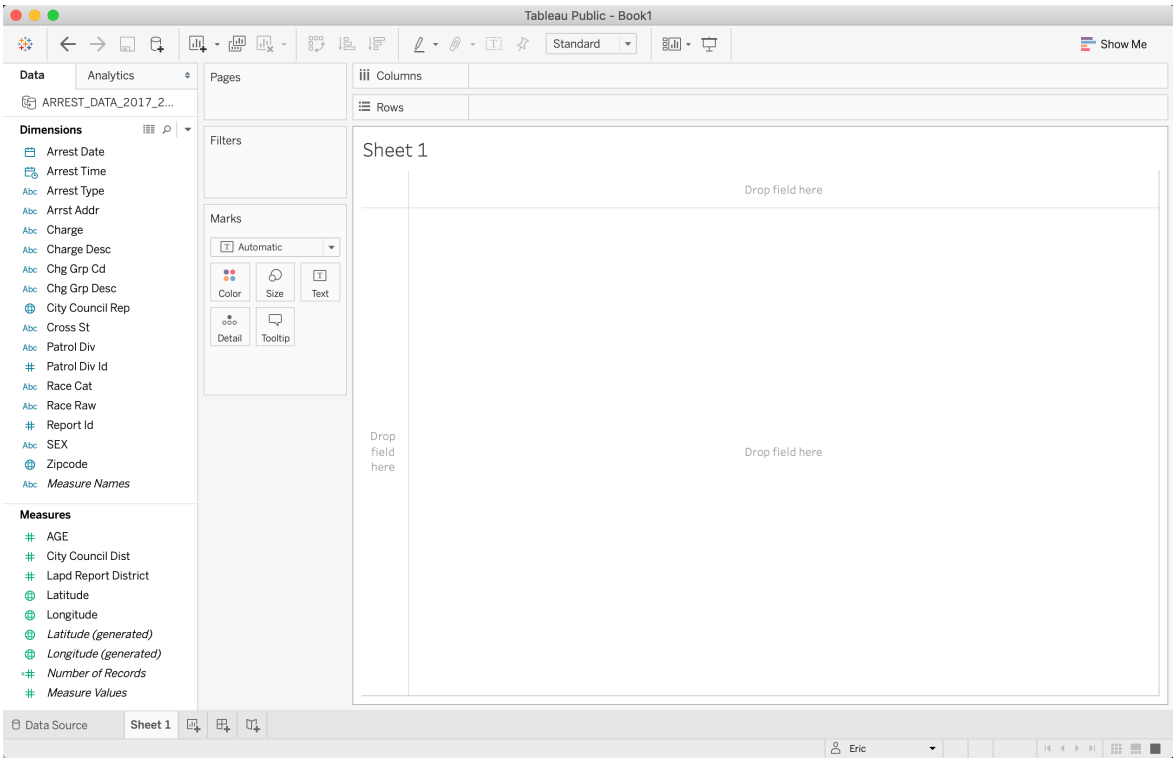
You'll also see that some variables are green or blue. This is something more unique to Tableau and unique to numerical variable types. If your variable is green, Tableau read the values of your numerical variable as "Continuous". In other words, as a form of metric. If it's blue, it read the values of your numerical variable as "Discrete". In other words, as a form of a category.

This is different from something inherent that Tableau does which is assign your data as "Dimensions" and "Measures" which are inherent in the Tableau language to know the type of view to use for your visualization.

These will make more sense as we get deeper into it. For now let's open up our first "Sheet". Highlighted in orange at the bottom is "Sheet1". Please click on that to continue.

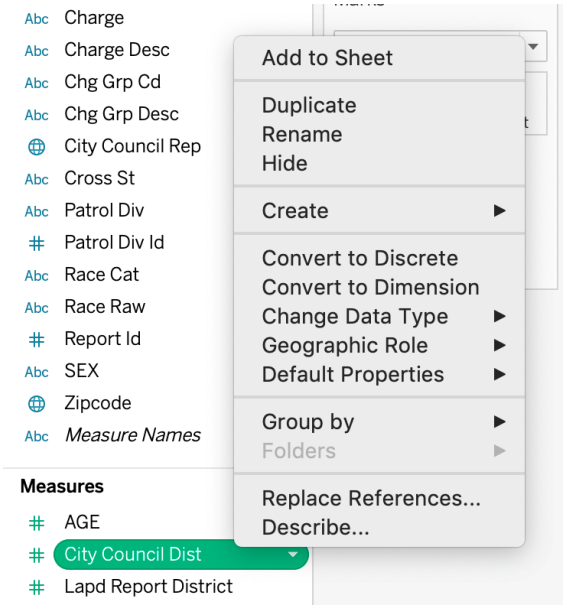
2.3.2 Create Visualizations

When you open up your sheet, you should first see a screen like this:

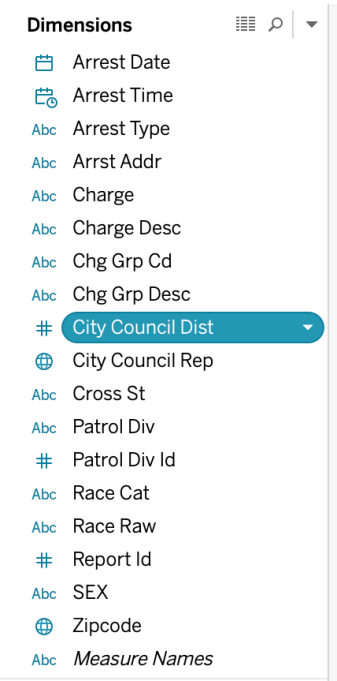


As mentioned before, are our “Dimensions” and “Measures”. This is one way that Tableau will know what graph to generate. Under “Dimensions” are our variables that tableau assigned as “discrete” variables. Under “Measures” will rest what Tableau assigned as “continuous” variables.

Tableau will not always do this correctly. For example, our City Council District variable, though they are numbers, are actually categories. In order to change this, right click or left click on the down arrow when you highlight over the variable. See below:

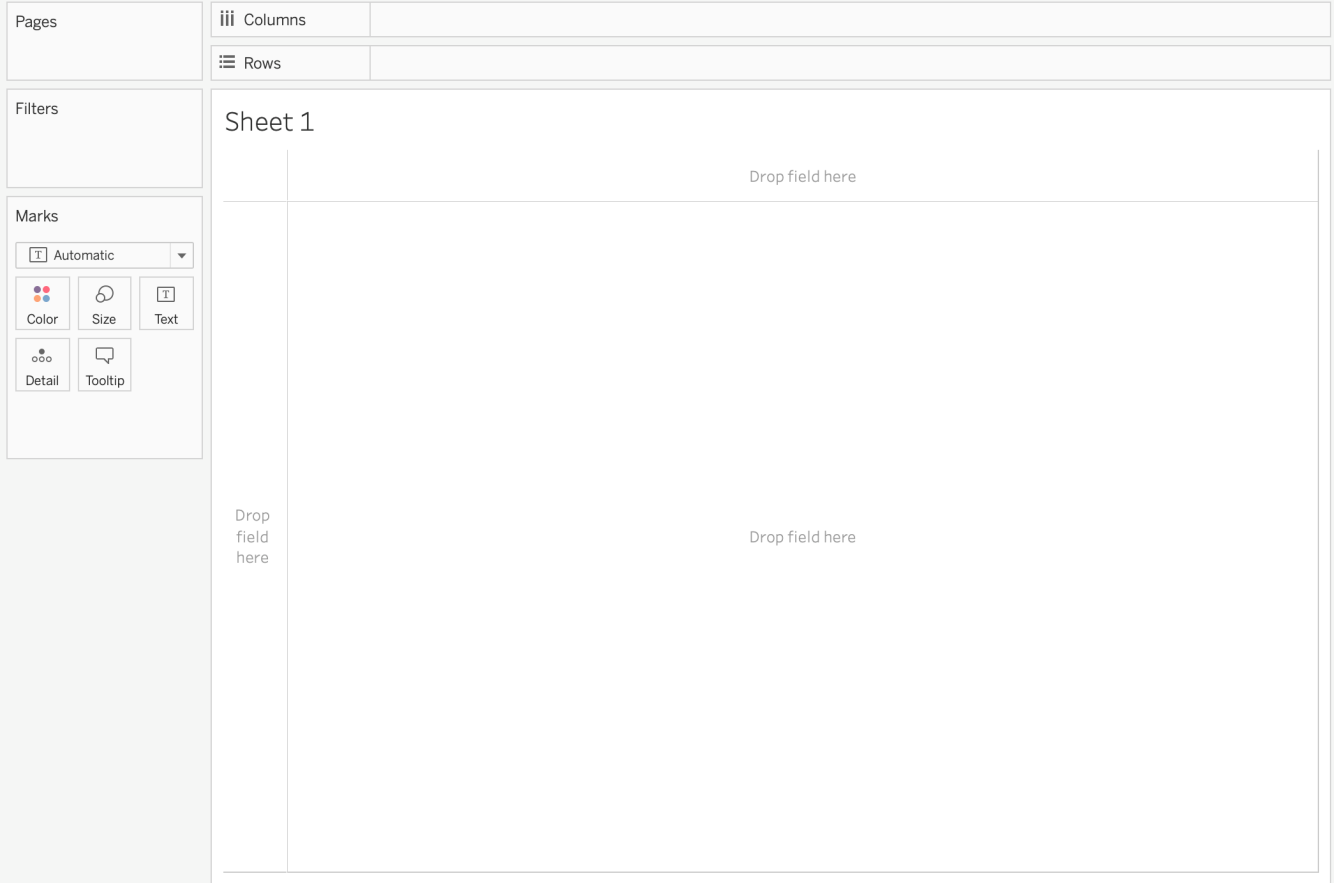


Then click on “Convert to Dimension”. Our City Council Dist variable should then appear in our Dimensions section. See Below:



We also have the option to turn our variable into "Continuous" after it's put into our Dimensions shelf, but we wouldn't want to because even though it's a numerical value, it acts more like a distinct discrete variable. To read more about this distinction please refer here.

Next to our Dimensions and Measures is the main body of the sheet:



The big white area will be where our visualizations will appear. The "Filters" is if we want to filter our visualization based on certain values. For example, if we wanted to visualize only "Females", we would place our Gender variable here. "Marks" is where we will we can customize our visualizations based on how we want our visualization to look. For example if we want to separate our visualization based on our different racial categories, we would drag our race variables into one of the Marks. If we wanted to differentiate it by color we would drag the variable to the Color box.

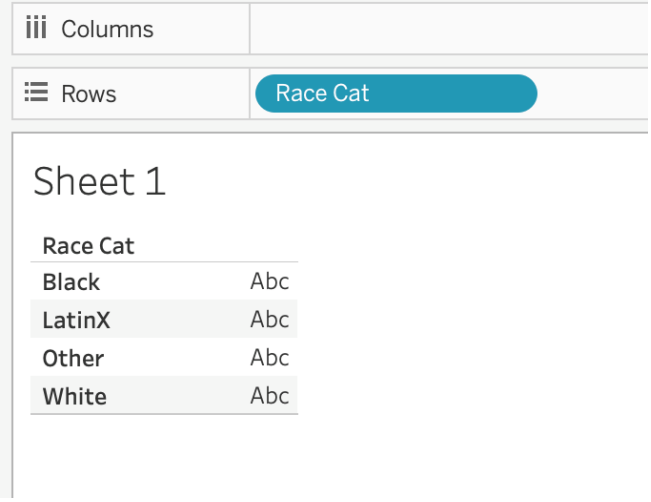
We have a columns and rows which is where the variables need to go to visualize. "Pages" will be unimportant for our purposes, but if you wish to know please refer here.

This makes sense as you work more with Tableau. For now, let's create a couple of simple visualizations.

Create a Table

Let's make our first visualization.

Say we wanted to create a table with the number of arrests by Race, we would first double click our Race variable ("Race Cat"). Our variable would appear on the columns shelf and we'd see the following empty table:



If we wanted to populate this table with the number of arrests, we'd have to choose a variable from our "Measures" section. Since each row/record in our dataset is an arrest, we can double click the "Number of Records" variable (Tableau generated variable). What you should see is "Number of Records appear on the "Marks" shelf and a table that is now populated with numbers:

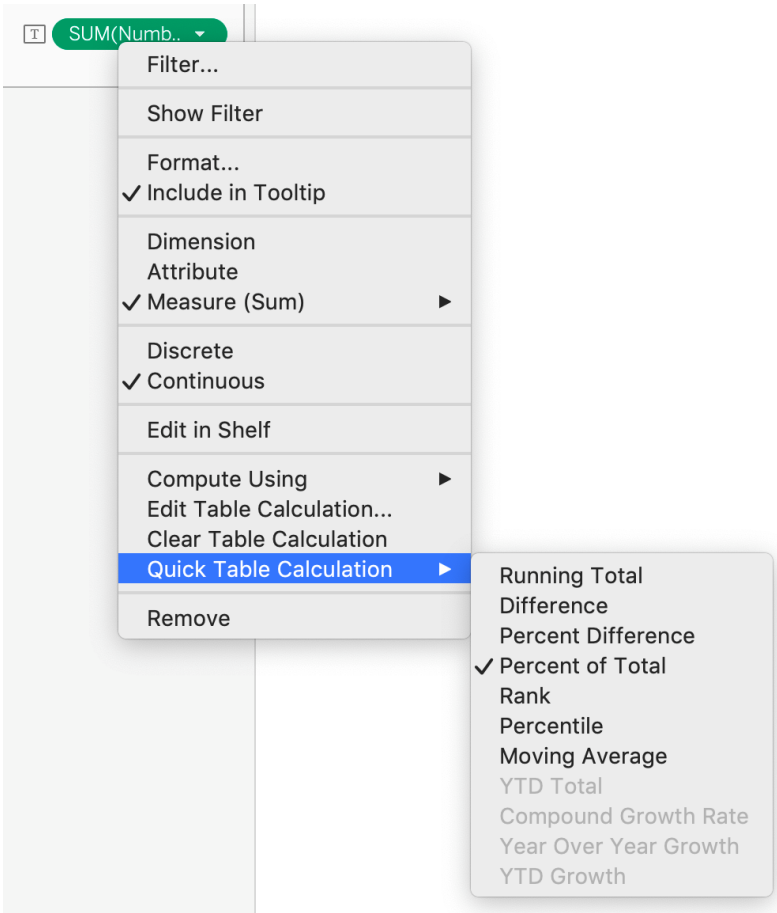
Race Cat	
Black	62,758
LatinX	97,301
Other	12,676
White	39,315

We've created our first visualization!

Now say we wanted to cross-tab Gender into this. In other words see how many arrests look when we cross race and gender together. If we now click on our Gender variable ("SEX" in our dataset) we should see a cross tab of Gender and Race:

	SEX	
Race Cat	F	M
Black	14,663	48,095
LatinX	16,780	80,521
Other	3,367	9,309
White	10,664	28,651

If we didn't want just a count and would rather want percentage, we can change that by right clicking our "Number of Records" variable under "Marks" and clicking on "Quick Table Calculations" then "Percentage of Total":



That should result in a table that looks like below:

	SEX	
Race Cat	F	M
Black	23.36%	76.64%
LatinX	17.25%	82.75%
Other	26.56%	73.44%
White	27.12%	72.88%

We can see now that there's a greater proportion of males in our LatinX population as opposed to our other racial groups in our data.

We can name this table if we double click on either the "Sheet 1" in our main visualization space or in the tab below. Let's rename this to "Demographic Exploration". Our final table should look like below:

Demographic Exploration

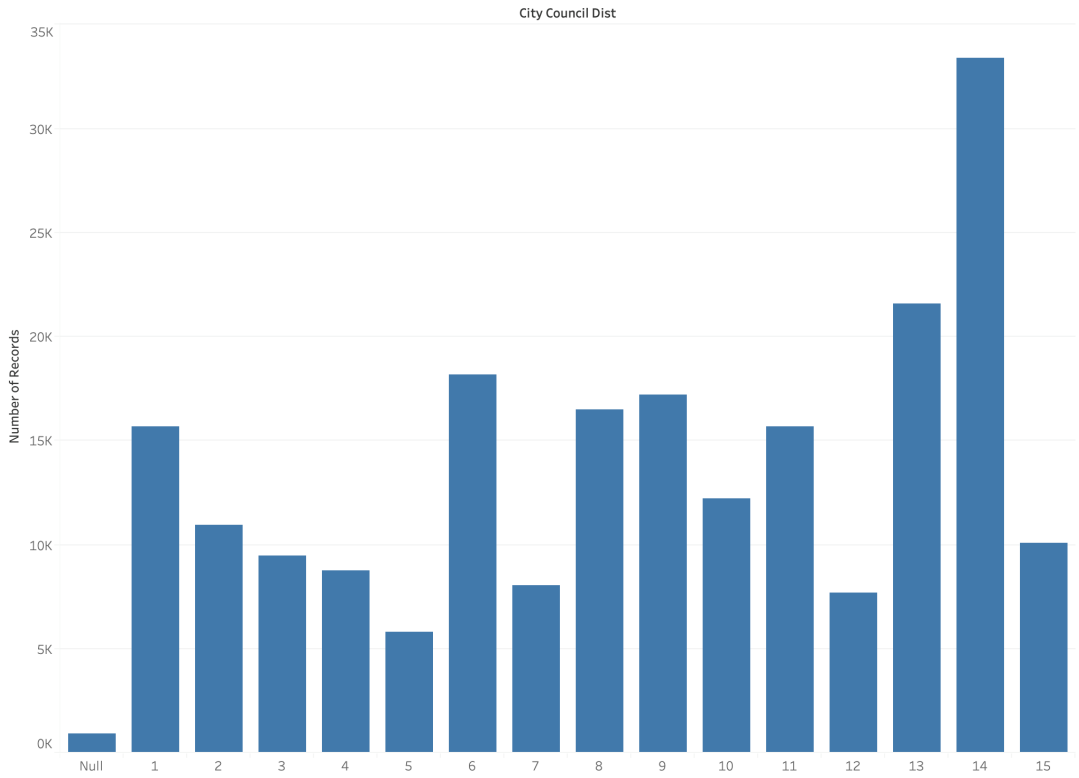
	SEX	
Race Cat	F	M
Black	23.36%	76.64%
LatinX	17.25%	82.75%
Other	26.56%	73.44%
White	27.12%	72.88%

Tables are one way to visualize data and Tableau has a way to quickly create these tables for you. We will now go on other more "visual" based visualizations.

Create a Bar Graph

Create a new sheet by clicking on this icon in the bottom tabs: 

For this example, let's say we are interested in how many people are being arrested for each City Council District. Let's double click on "Number of Records" in the Measure section, then click on "City Council District". What you should see is our desired bar graph. See below:



If what you're seeing is horizontal lines rather than vertical lines. On the top menu bar, you should see a symbol that

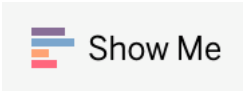
looks like this: 

That will change your graph from a horizontal to a vertical one.

Does your visualization actually look like a table? This is because the order in which you clicked on these variables mattered to tableau to automatically generate visualizations.

If you click on "City Council District" then "Number of Records", you'll probably see something like this:

City Council..	
Null	911
1	15,685
2	10,940
3	9,474
4	8,731
5	5,794
6	18,148
7	8,052
8	16,475
9	17,187
10	12,237
11	15,676
12	7,678
13	21,569
14	33,401
15	10,092

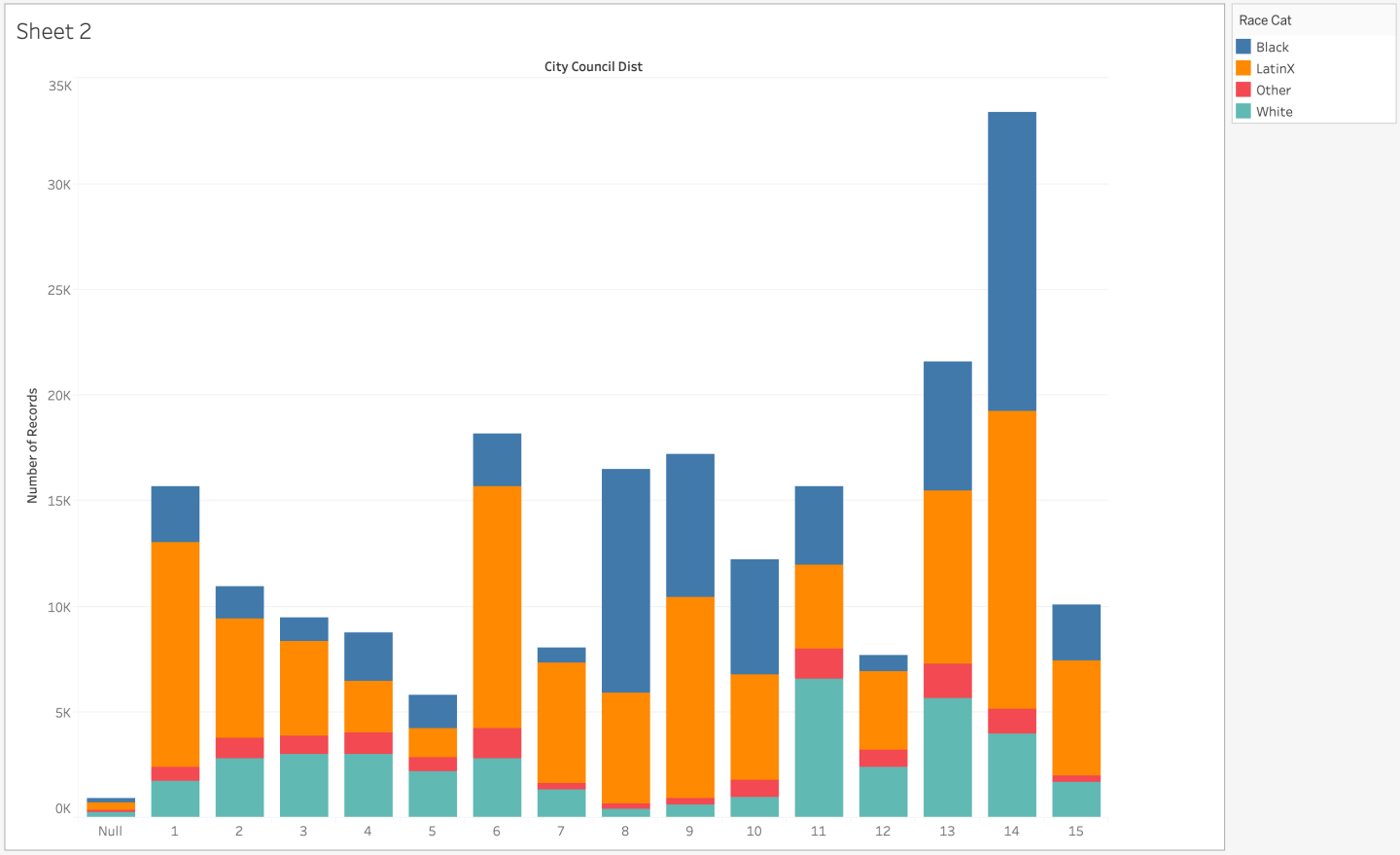
If that's the case, you can start over and click on "Number of Records" first, then "City Council Districts", but there's no way you can memorize which order produces what visualization. In which case there's a handy shortcut in the top right of the menu bar: 

The "Show Me" menu gives you the option for quickly turning the visualization shown to another type of visualization.

It even gives you a recommend visualization which is usually boxed in orange. Click on the bar graph visualization on the left, third row down.

That should give you a horizontal bar graph in which you can use what was mentioned before to turn it into a vertical bar graph.

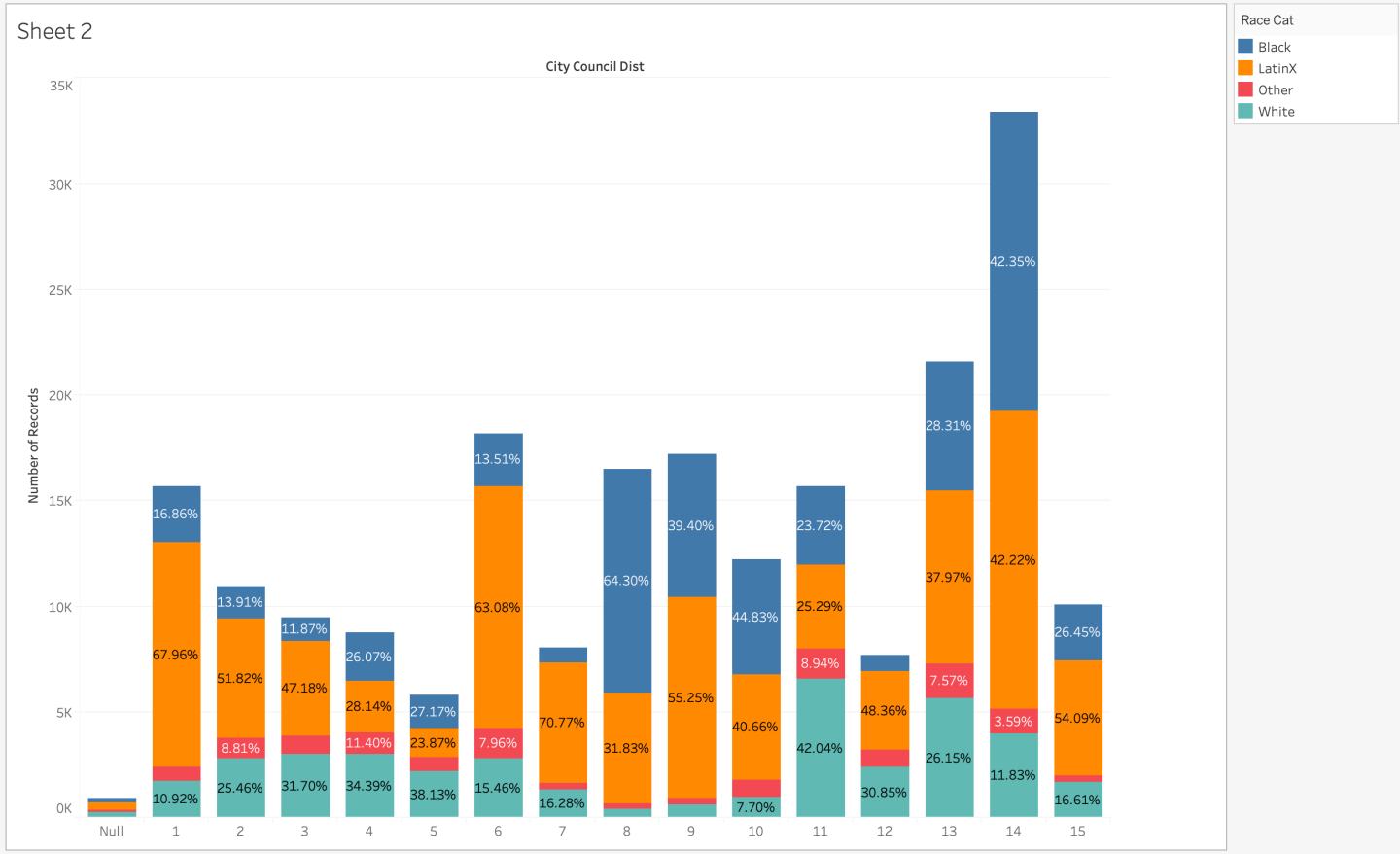
Say for we also wanted to show how each of these different districts arrests looked by Race. As mentioned previously, the way to do that is for using our "Marks" shelf. Let's drag "Race Cat" into the "Color" box in the "Marks" shelf. What you should see is the visualization below:



The bar graph is now stacked by our different racial categories. If we wanted to actually take a look at the numbers for each of these, let's drag the "Number of Records" to the "Label" box. You should see the total number of record for each bar and each racial category. If we wanted to see percentage, we'd right click and do a quick table calculation (as we've done before) and click on percentage of total.

The percentages will look wrong at first which is because currently it's calculating across, rather than down (per column). So on the right click menu click "Compute Using" then "Table (down)".

Your final table should look like below:



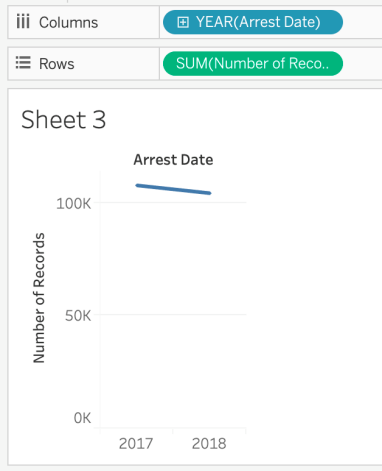
You can play around with the visualization here. Add other variables into the "Marks" shelf, switch out colors, change your labels, etc. If it starts getting out of control, you can always just start over.

Let's rename this visualization to "Bar Graph of Arrests"

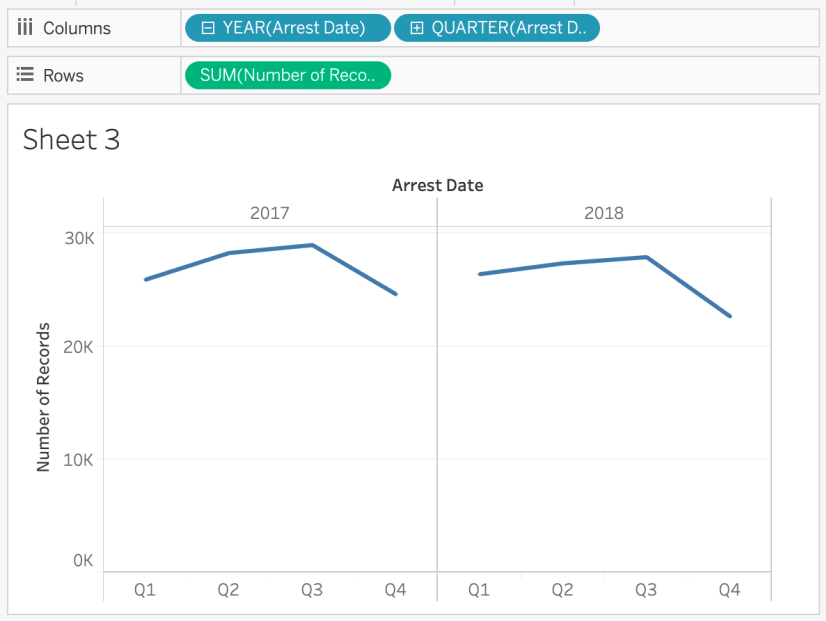
Create a Linear Trend

Our next example will be to create a linear trend. Say for example, you'd like to see how arrests look like over a period of time. We'd want something like a line/trend graph to be able to illustrate this.

To get the first set of graphs set up, we'd first double click on "Number of Records" then our date variable which is "Arrest Date". What you should see is something like the graph below.



This is a version of our line graph, but it's currently only showing year totals for 2017 and 2018. There's a plus sign, next to the "YEAR(Arrest Date)" in the columns section. Click on that once and you should get a graph that looks like below:

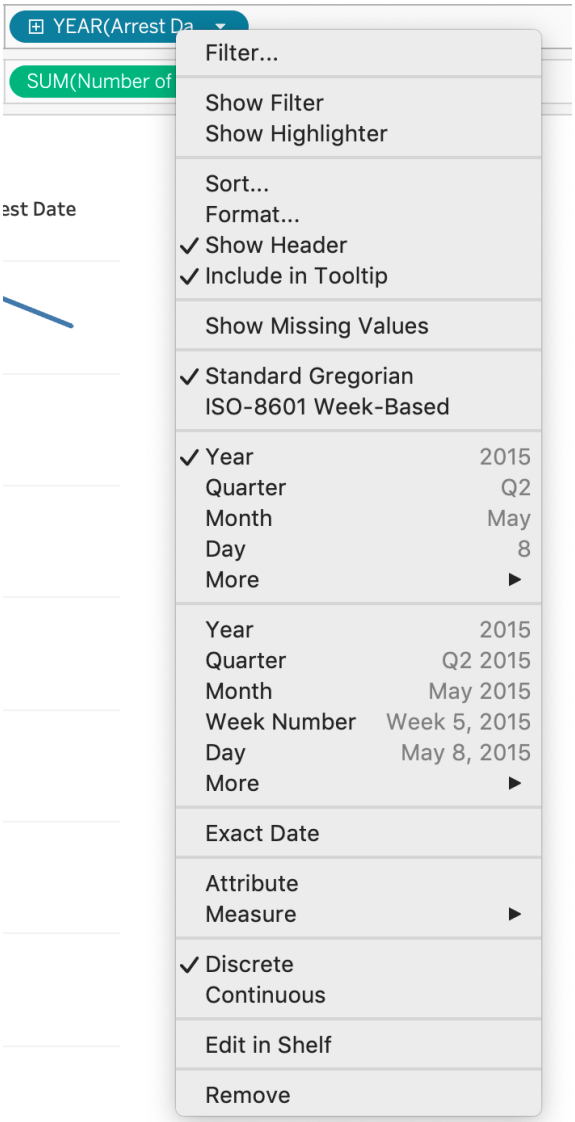


Now our graph is separated by Quarters. If you click on the plus sign again next to "QUARTER(Arrest Date)" then it splits itself into months.

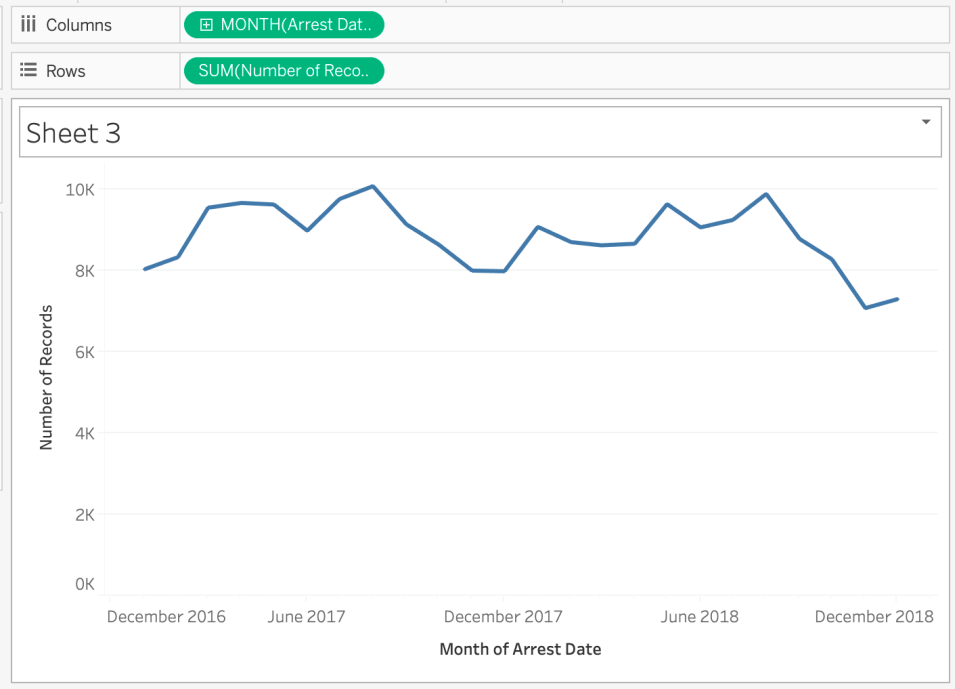
Though this would technically be what we would want, the graph currently looks disjointed and it awkwardly separates by Quarters and Years. We'd rather like to see one continuous graph.

The reason why it does this is because our "Arrest Date" variable is currently a "Discrete" variable. Thus our values are separated by the Month/Quarter/Year categories. Since we don't want those distinct categories in our trend graph, we'll have to convert it to continuous.

Click the minus button next to "YEAR(Arrest Date)" to condense everything to year. Then right click the variable. What you should see is the following menu:



Click on the second set of "Month", the one that says "May 2015" next to it. The resulting graph is what we want to see:



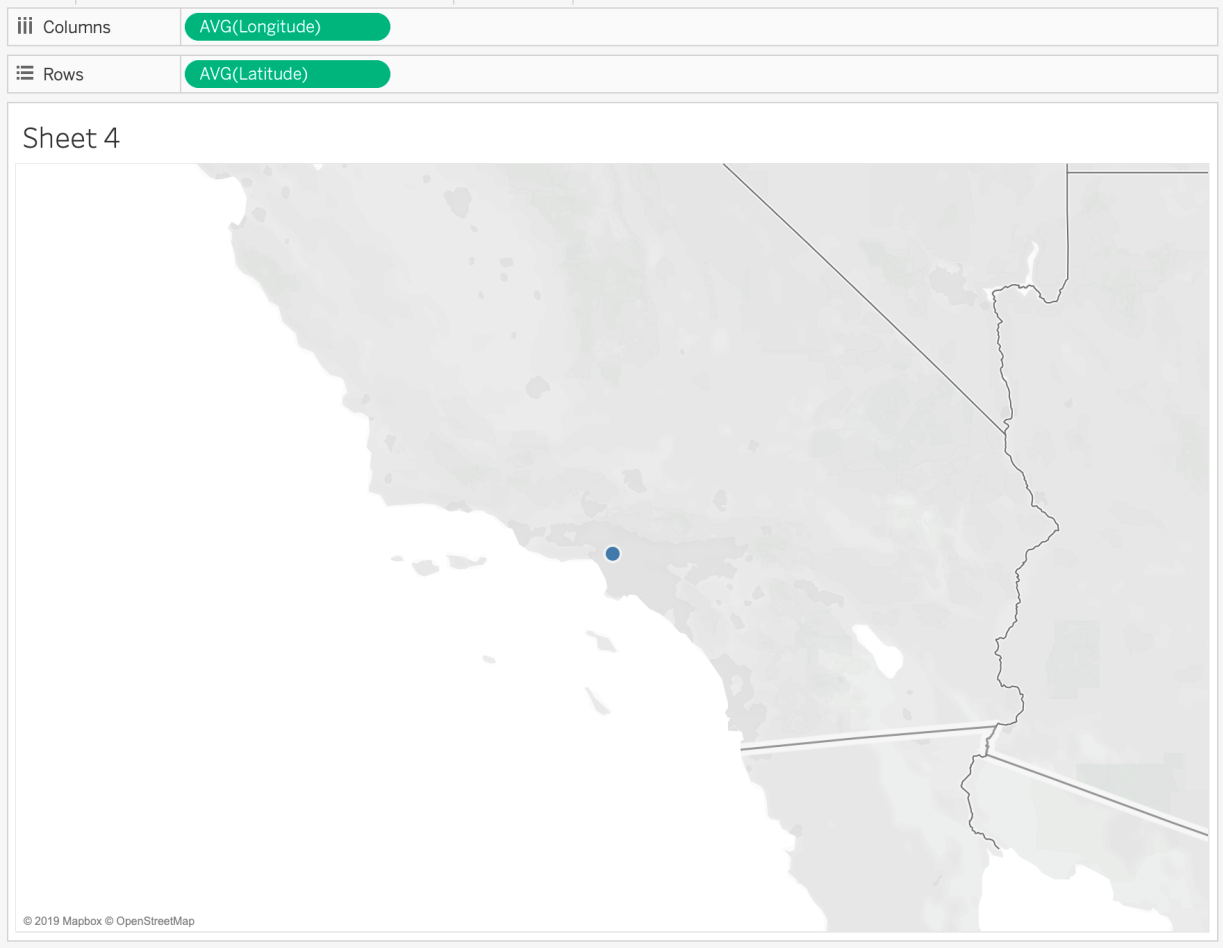
It also automatically converted our "Discrete" date variable into a continuous one (It's now green instead of blue). Take your time to play around with the Marks at this time to see how different variables look when you place them in there.

Let's save this sheet as "Trend Over Time".

Create a Basic Map

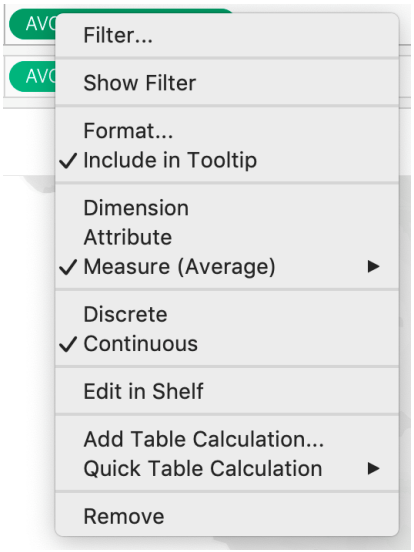
The last thing we want to do is create a basic map through Tableau. On the left are our "Longitude" and "Latitude" variables with a little globe to the left to indicate that it's a "Geography" type variable. Note: We are NOT using the ones that are "generated". Those are ones that Tableau created which don't matter to us because we have our Longitude and Latitude variables.

Let's double click on "Latitude" and "Longitude". What you see should be something like below:

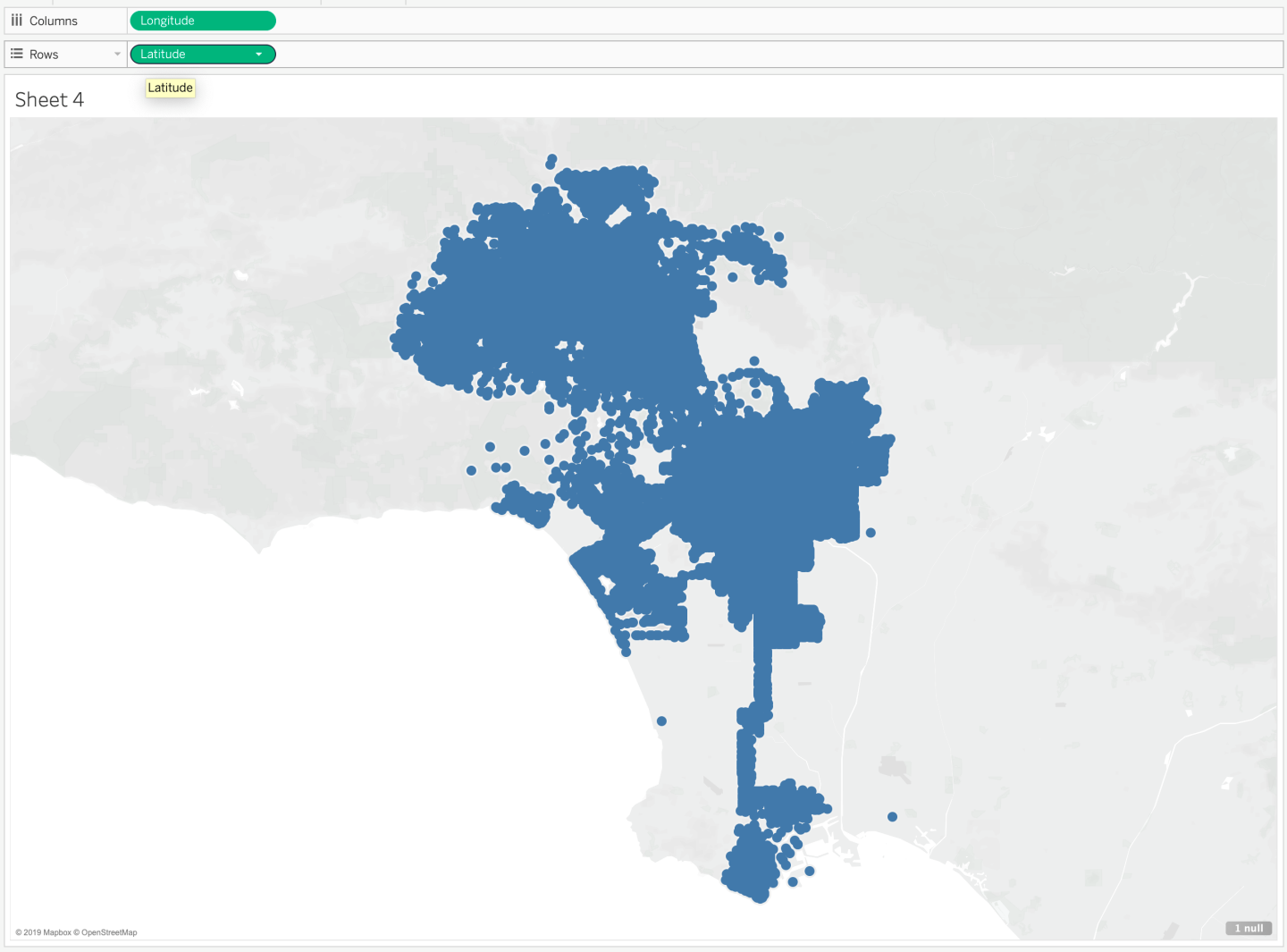


A basic map is created, but there's only one dot. The reason why it's doing this is because it is a "Measure" it will automatically do some sort of calculation here. In this instance we see "AVG" (Average) encasing our Longitude and Latitude variables. In this case it's mapping the average longitude and average latitude, which is one value.

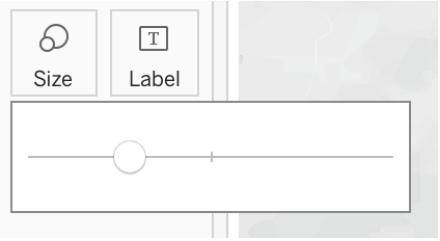
We don't want anything calculated so let's right click our "AVG(Longitude)" variable in the Column shelf and we should see the list of options like shown below:



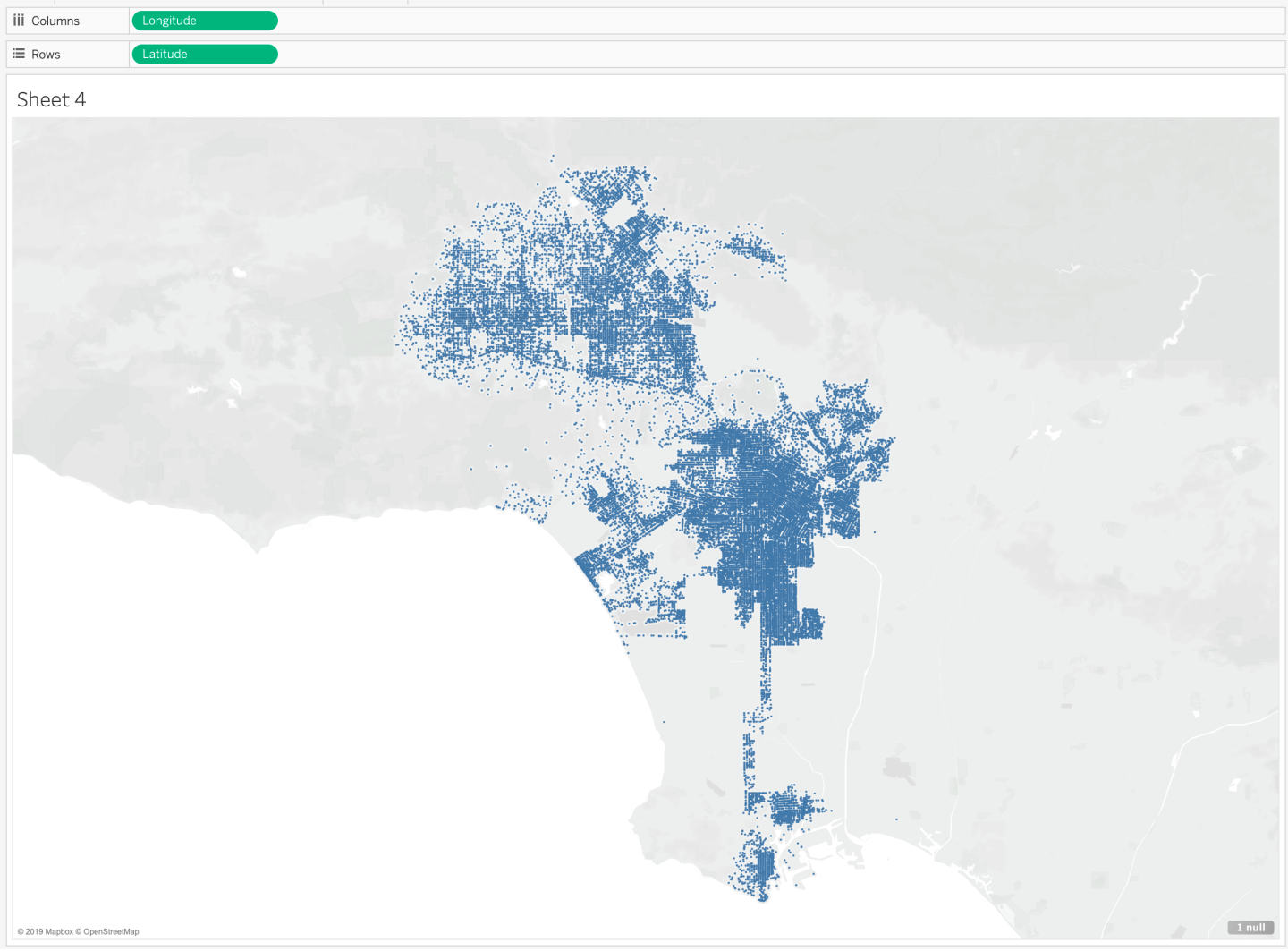
Let's click on "Dimension". We should see that Longitude is no longer encased by "AVG". Let's also do the same thing for "AVG(Latitude)". The resulting visualization should look like the below:



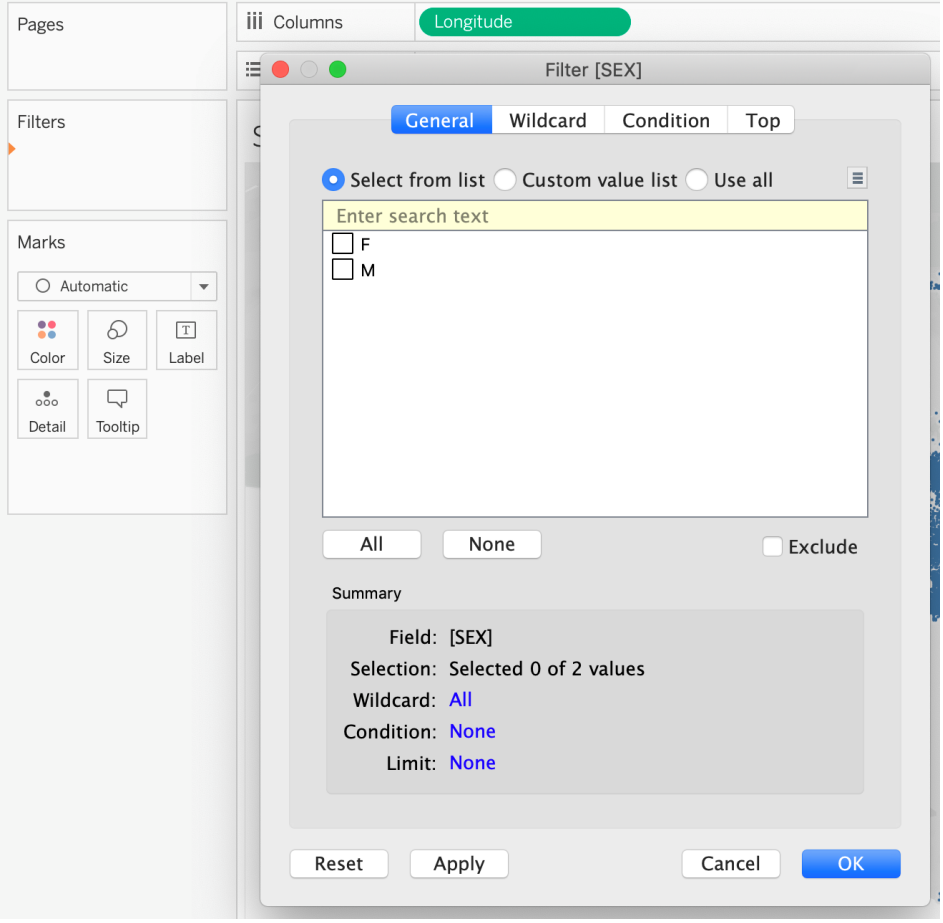
Since the dots look a little too clustered together now, I'm going to reduce the size of the dots by going to the "Marks" shelf and click on "Size" like below:



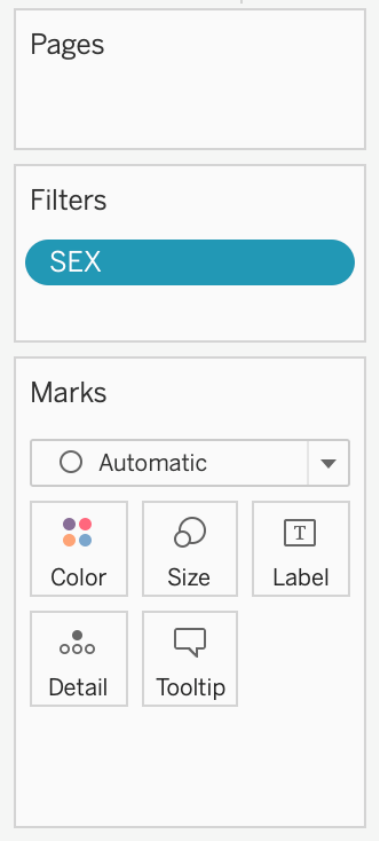
Let's slide the slider to the left. You can go however much you want, but the resulting dots should be smaller now. Here is how mine looks:



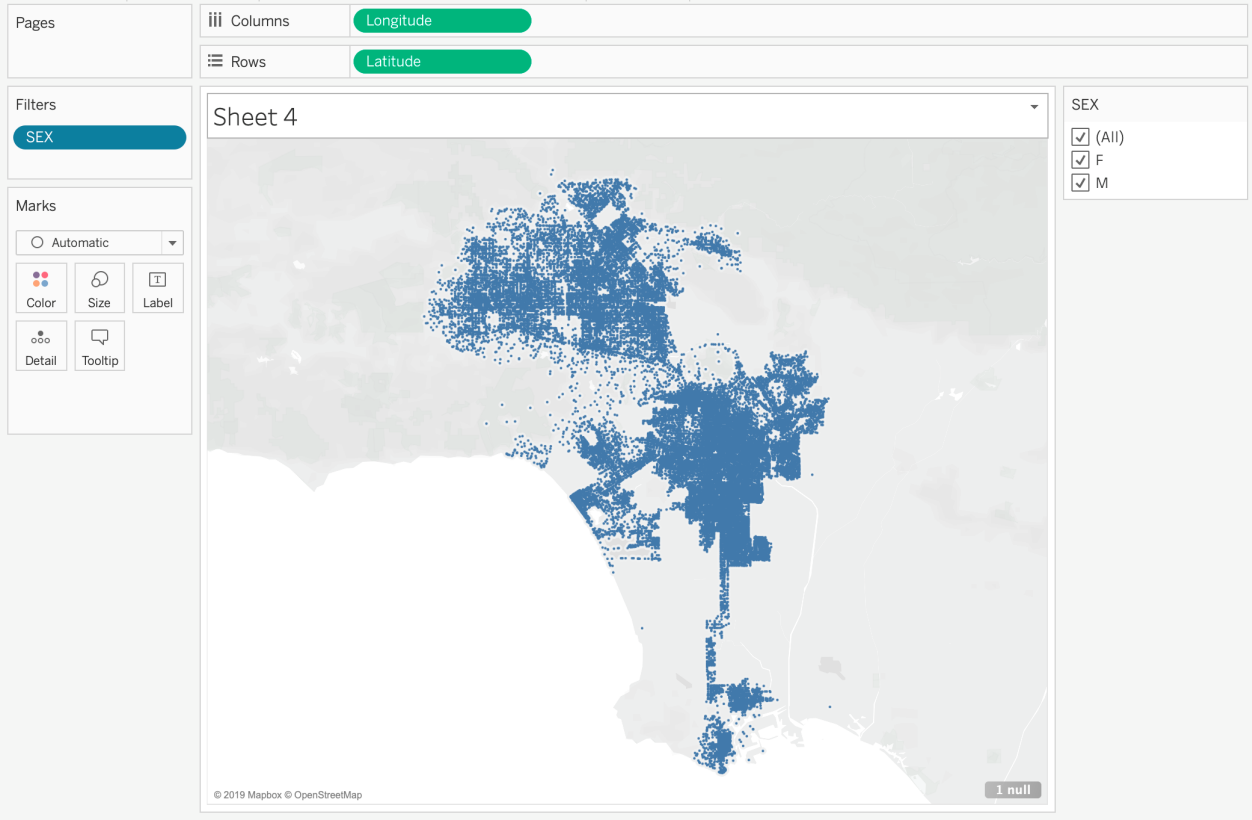
For the purposes of this exercise, say we only want to see the dots of all the Females who are arrested. We will now work with our “Filter” shelf. Let’s drag our “SEX” variable into our “Filter” shelf. When you do, a pop-up will appear that looks like below:



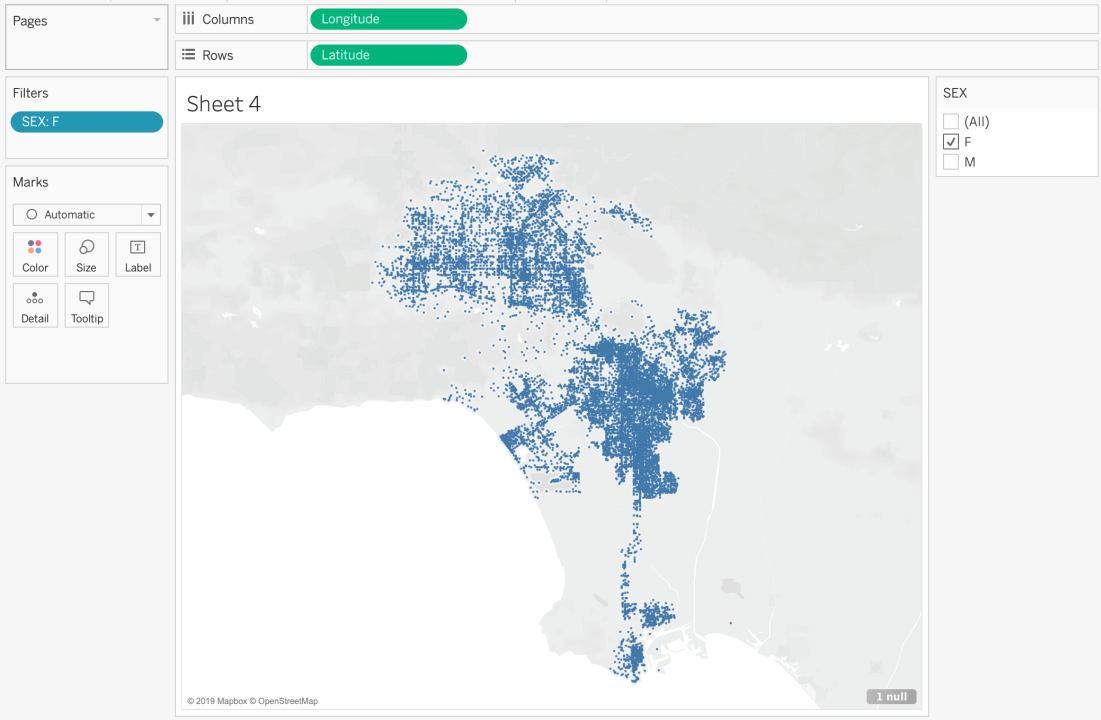
This will ask us directly what we want to filter by. For now let's select "All" then press "OK". We now have our "SEX" variable resting on our shelf:



Let's right click on "SEX" and click on "Show Filter". What results is our map with a filter that now appears on the right:

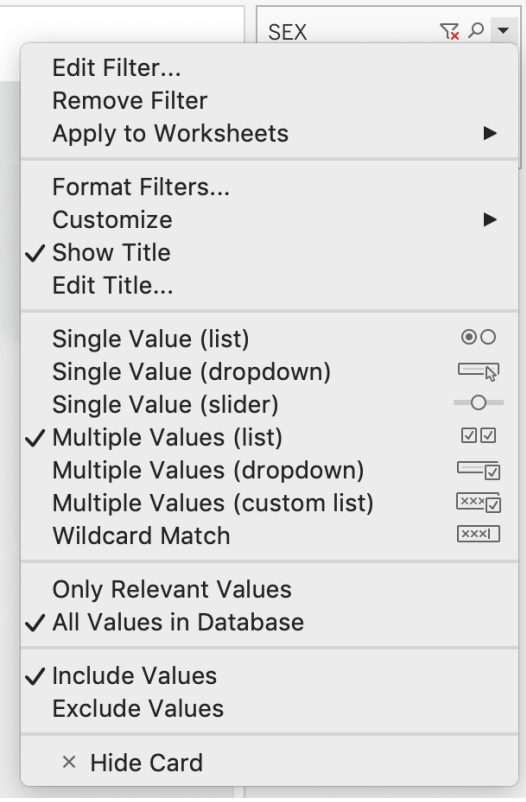


If you click through the different filters. The map will change based on what you decide to filter by. If we wanted to see how Arrests look for "Females", we'd unclick our "Male" values. The resulting maps should look like below:

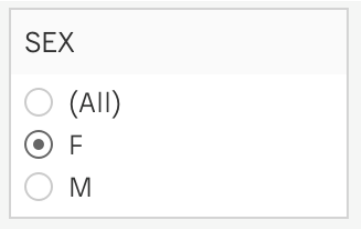


One of the things I like to do is change how the filter looks like. This is entirely up to you though. If you want to change how the filter looks, hover your mouse to the filter and three icons will appear. Click on the little down arrow.

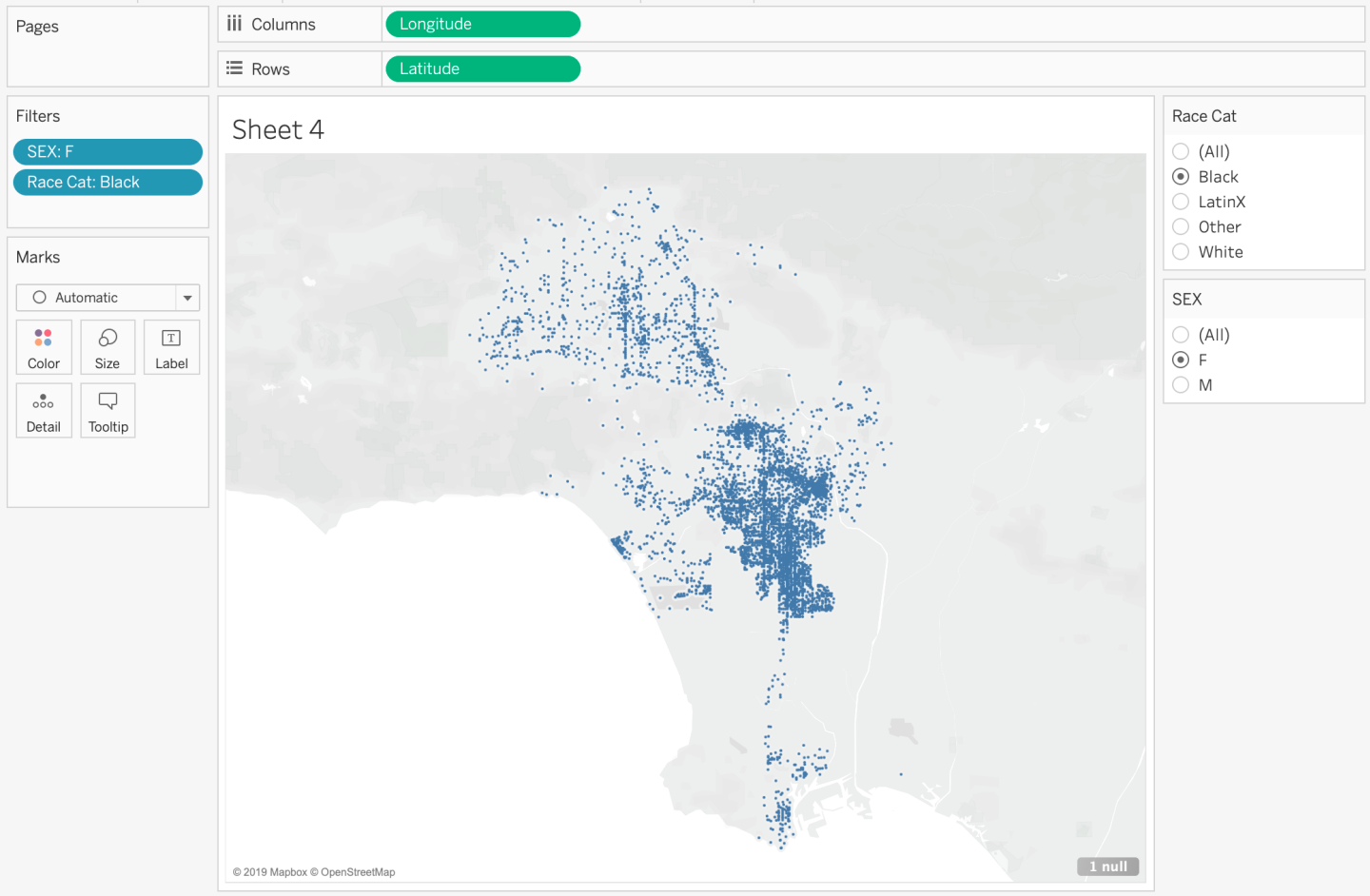
From there we'll see, as options, a host of ways we can display the filter:



I personally like "Single Value (list)". I will be clicking on that. Now my filter will be single click and I'll be able to switch easily from "M" and "F".



Let's do the same thing for Race. Drag "Race Cat" into our "Filters" shelf. Go through the same process detailed for "SEX" above. The resulting map should look like below:



This map now displays all arrests from 2017-2018 for Black Females.

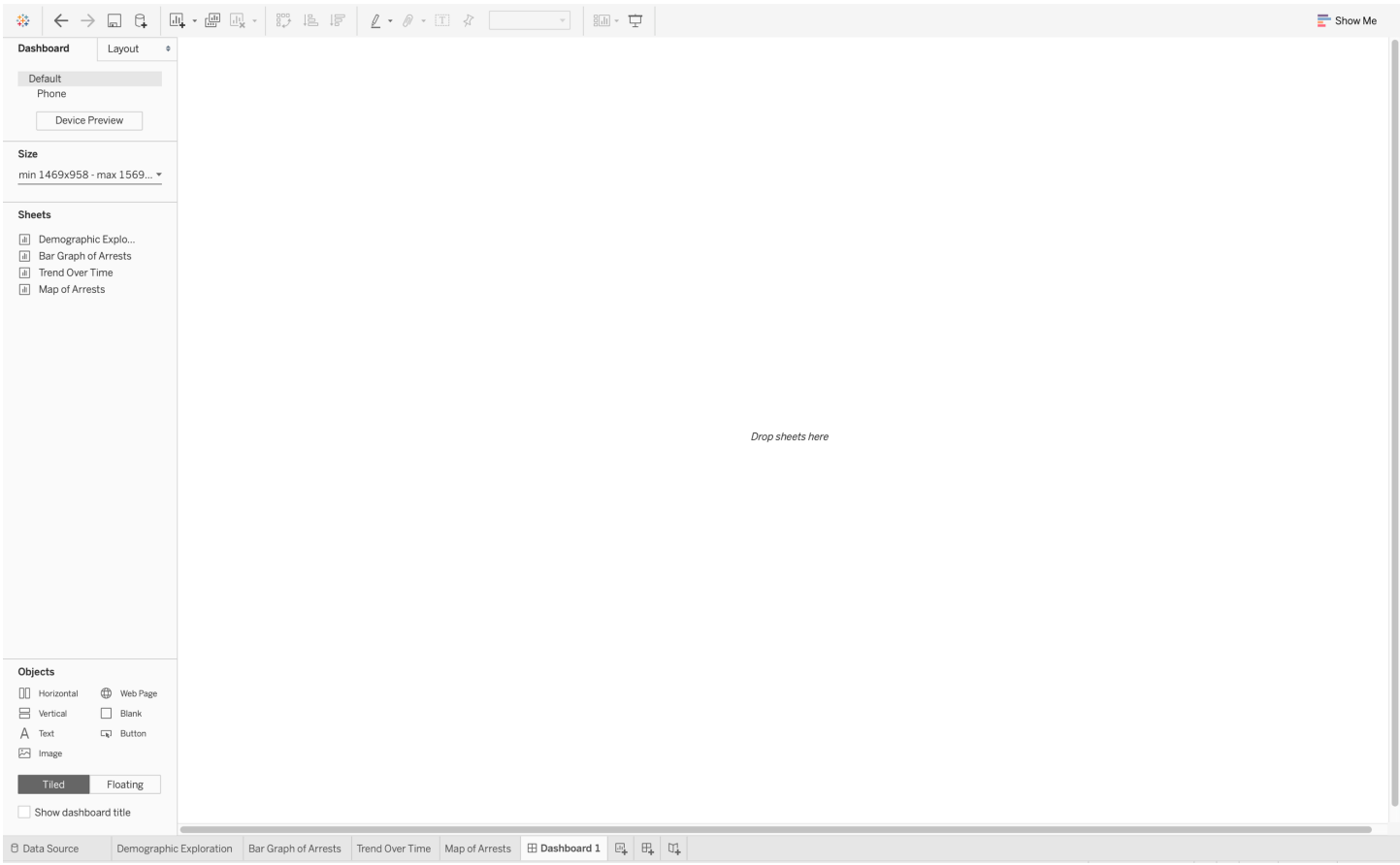
Let's name this "Map of Arrests"

We've created our last visualization for this exercise. What we will go over next is how to put this all together into a "Dashboard" which is one way you can have people interacting and playing with the underlying data so that they may derive insight.

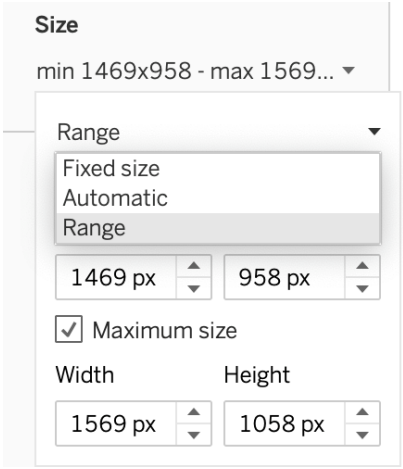
2.3.3 Create a Dashboard

To Create a new Dashboard click on this icon: **|image38|**

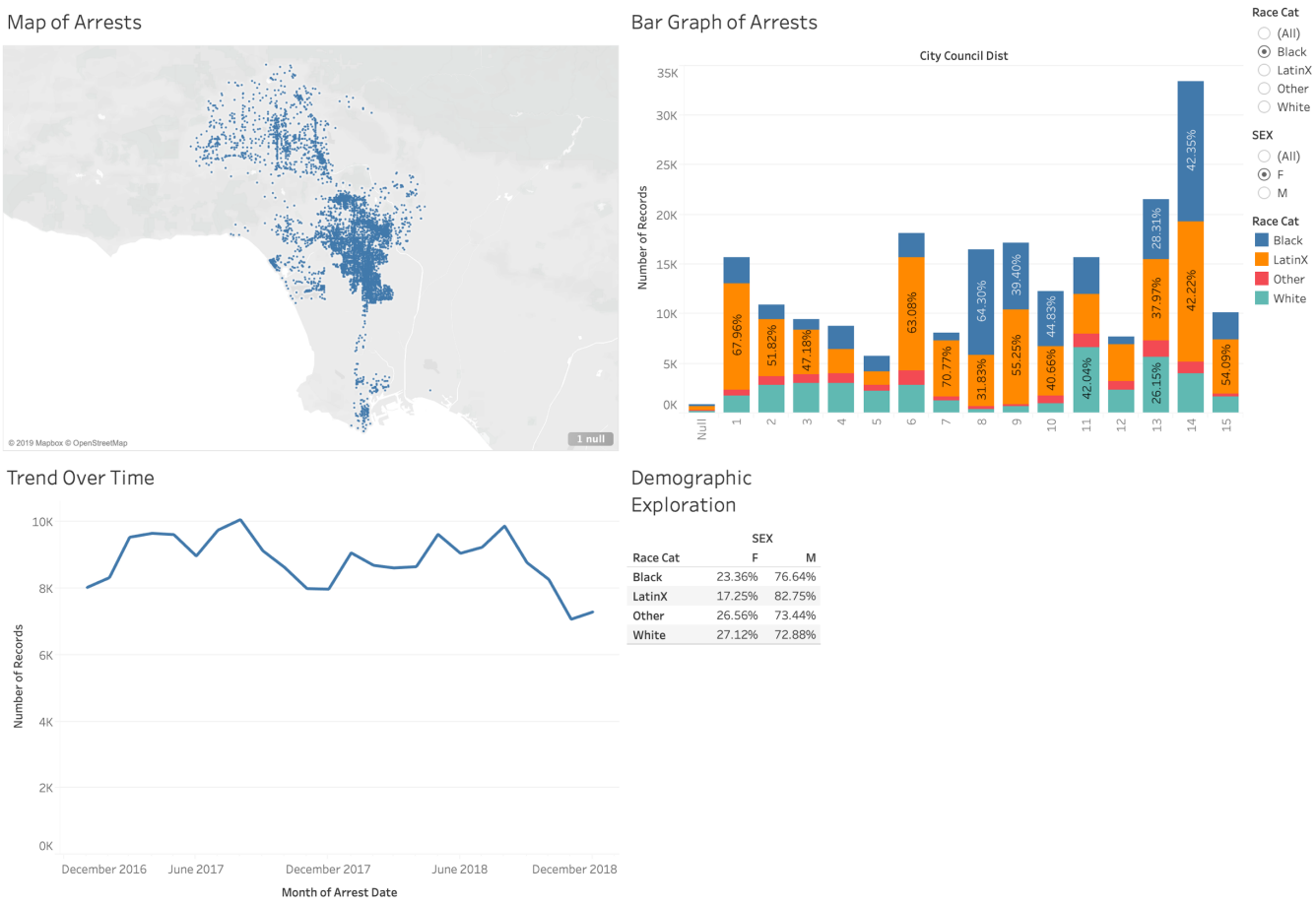
What you should see is a screen like below:



On the left is our size. This may look different for you. You can adjust the size of your dashboard to however width and length you'd like. For now let's change our size to "Automatic". To do so click on the little arrow under our "Size" shelf. Click on the little arrow again on the right of "Range" then click on "Automatic".



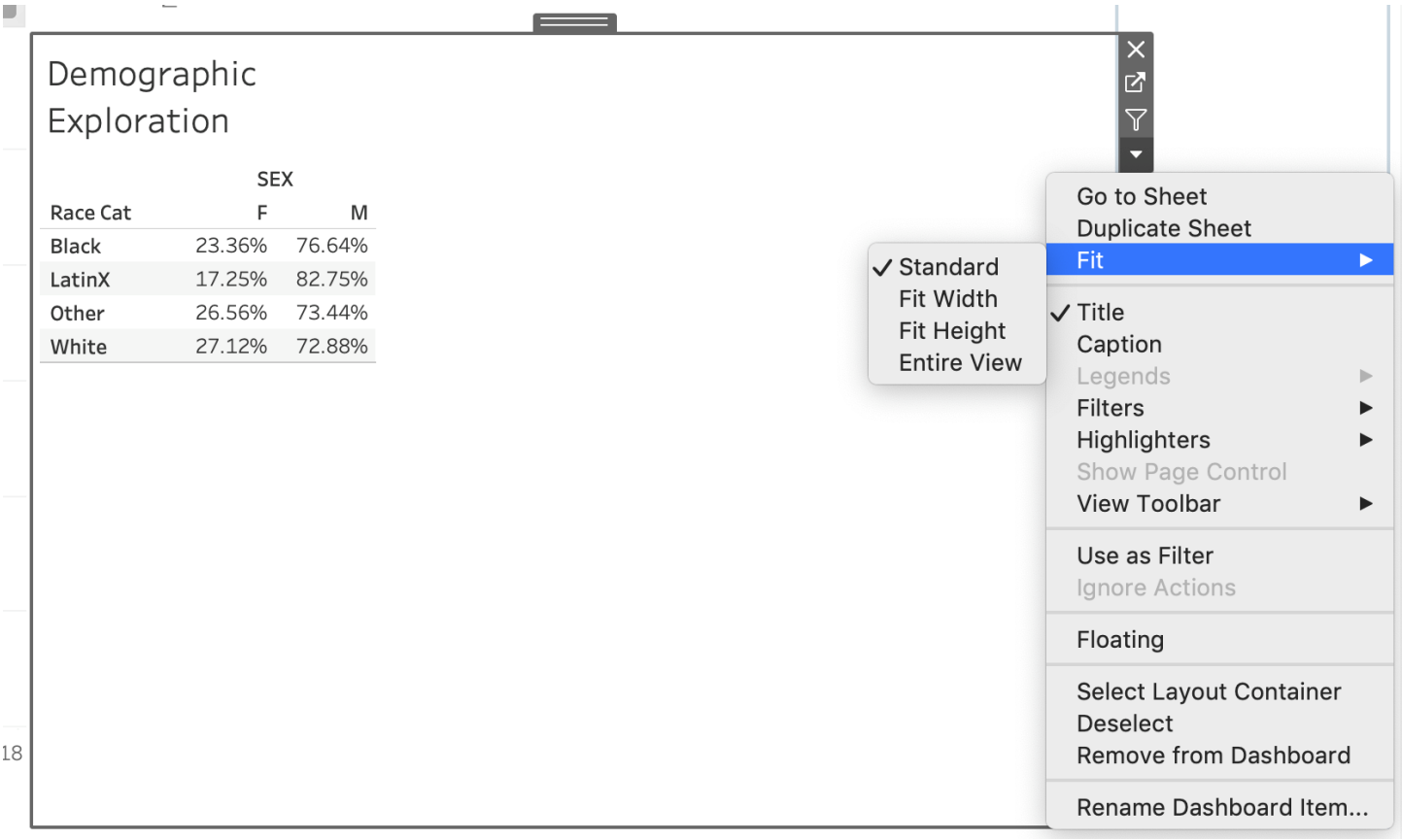
Under the size are our created "Sheets". Click on "Map of Arrests", then "Bar Graph of Arrests", then "Trend Over Time", then "Demographic Exploration". What should result is the Dashboard below:



This is what Tableau is most popular for. The ability to see multiple visualization on one "Dashboard". You'll see filters on the right as well as our four sheets.

Let's edit our Dashboard a little bit.

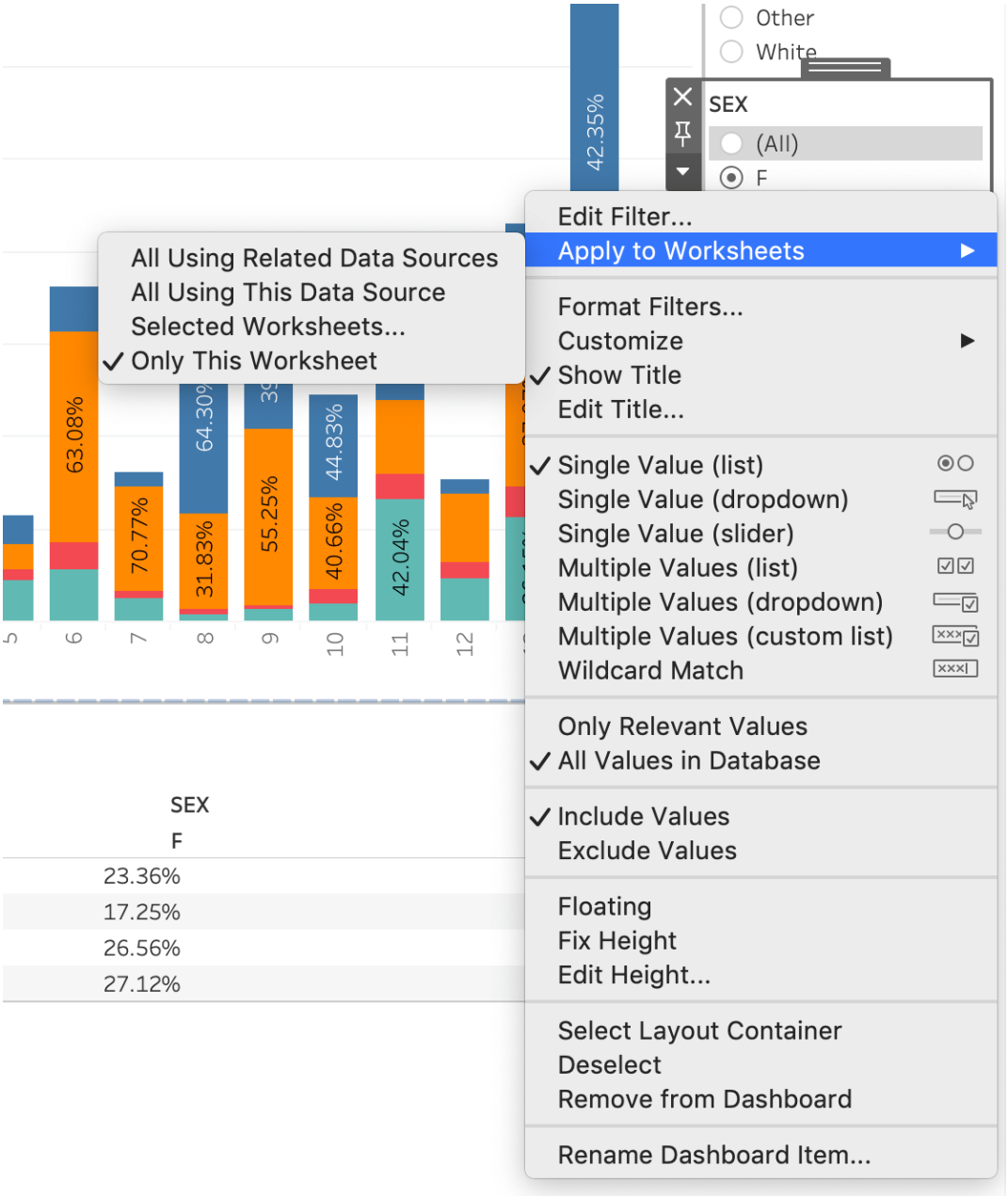
Our table looks kind of small. Let's fix how this sheet fits in this dashboard. Click on our "Demographic Exploration" sheet. The sheet will be highlighted in grey. Four icons will appear on the right. Click on the down arrow and you'll see a list of options:



Click on “Fit” then “Fit Width” which will give us the most visually pleasing display of this table. You can play around with this to see which one you believe looks best.

Now on the right are our filters which we created when we did our Map visualization. When you import sheets into a dashboard, the dashboard will also import the filters. However, for now, the filters will only filter our map (try it out). We can however make this filter also drive all of the other sheets in the dashboard.

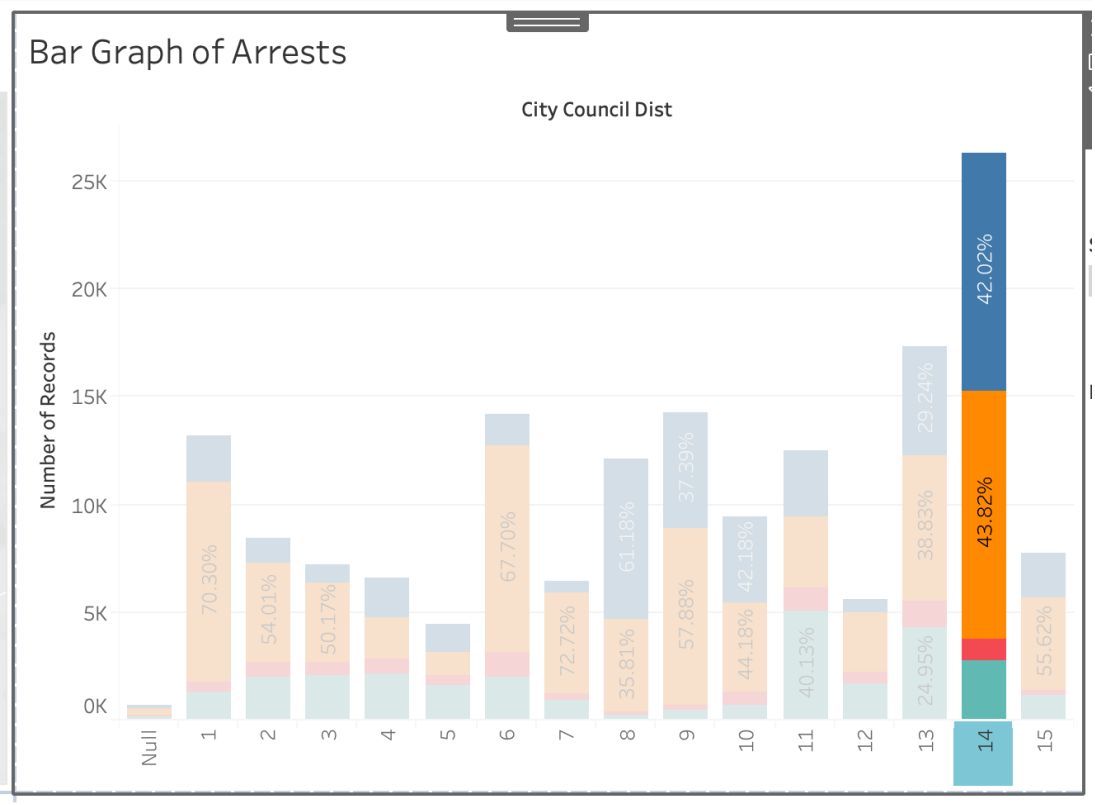
Let’s click on the “SEX” filter. We’ll see the same grey border appear and a down arrow that comes along with it. In that menu, you’ll see these options:



Click on “Apply to Worksheets” then “All Using This Data Source”. Now everything will be driven by this filter. Make sure to try it out yourself and see how everything changes!

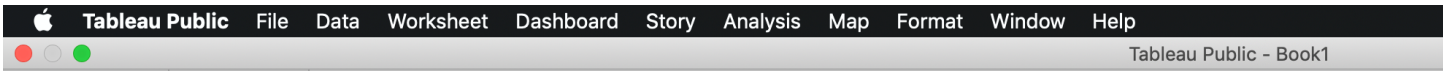
You can interact and click on various parts of each sheet and it will highlight, but say you also want the visualization to change based on what you click in the Dashboard itself. You can create an “Action” to do so.

For example, in our bar graph are the different council district numbers. Click on “14” on the x-axis. What you should see is the bar highlighted like below:

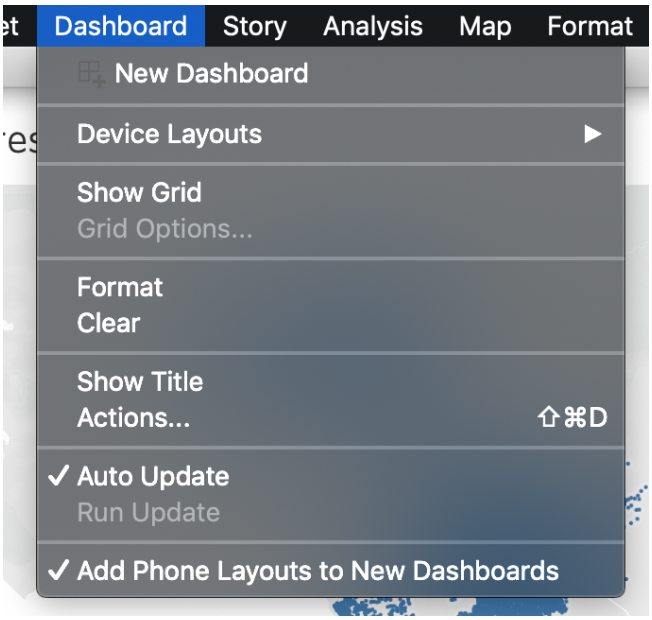


That's cool in and of itself, but say we want to also change everything else so that all the other visualizations we're seeing are only those in City Council District 14.

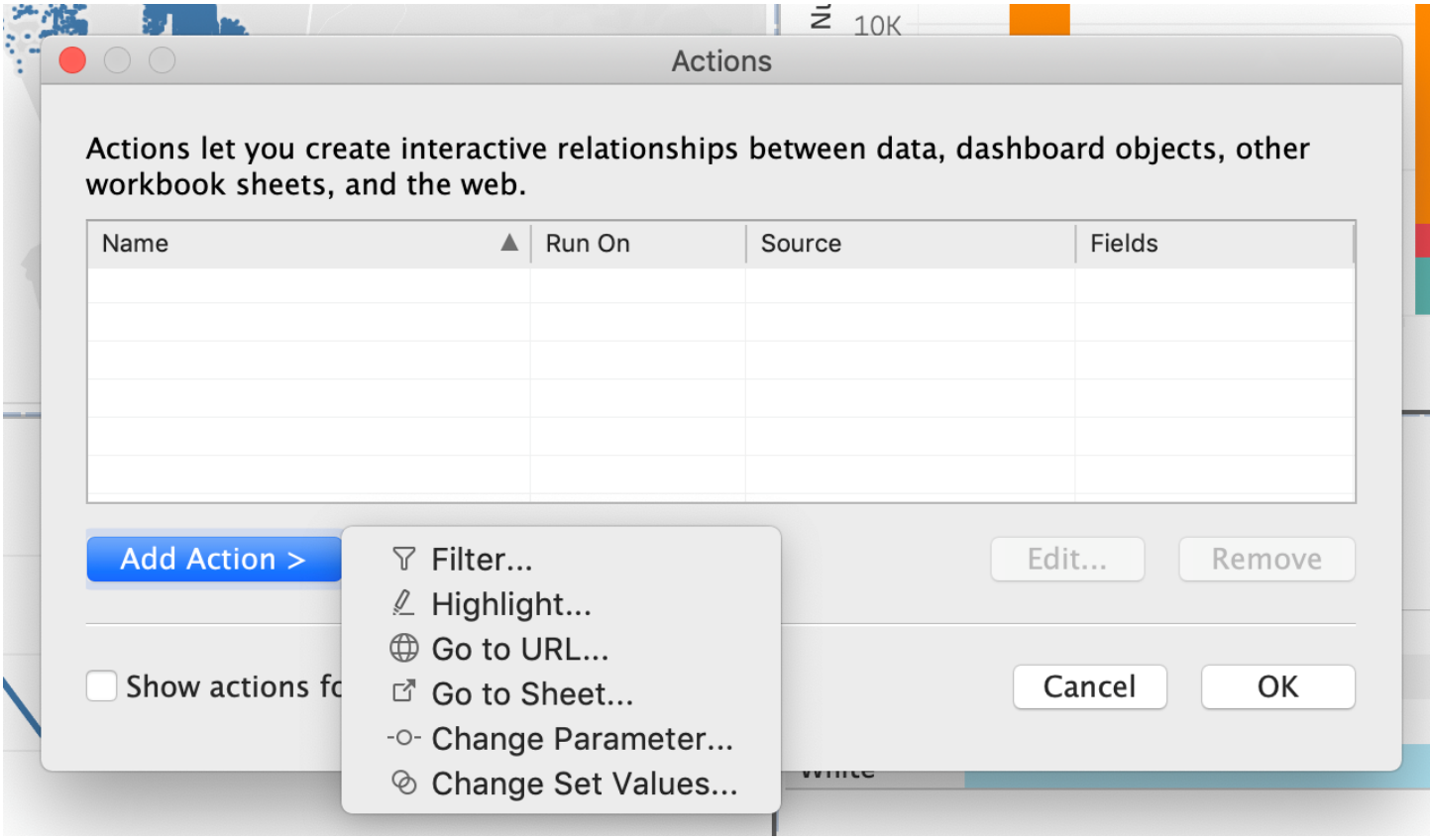
On the very top of our menu you'll see a menu for "Dashboard" (may look different if using Windows):



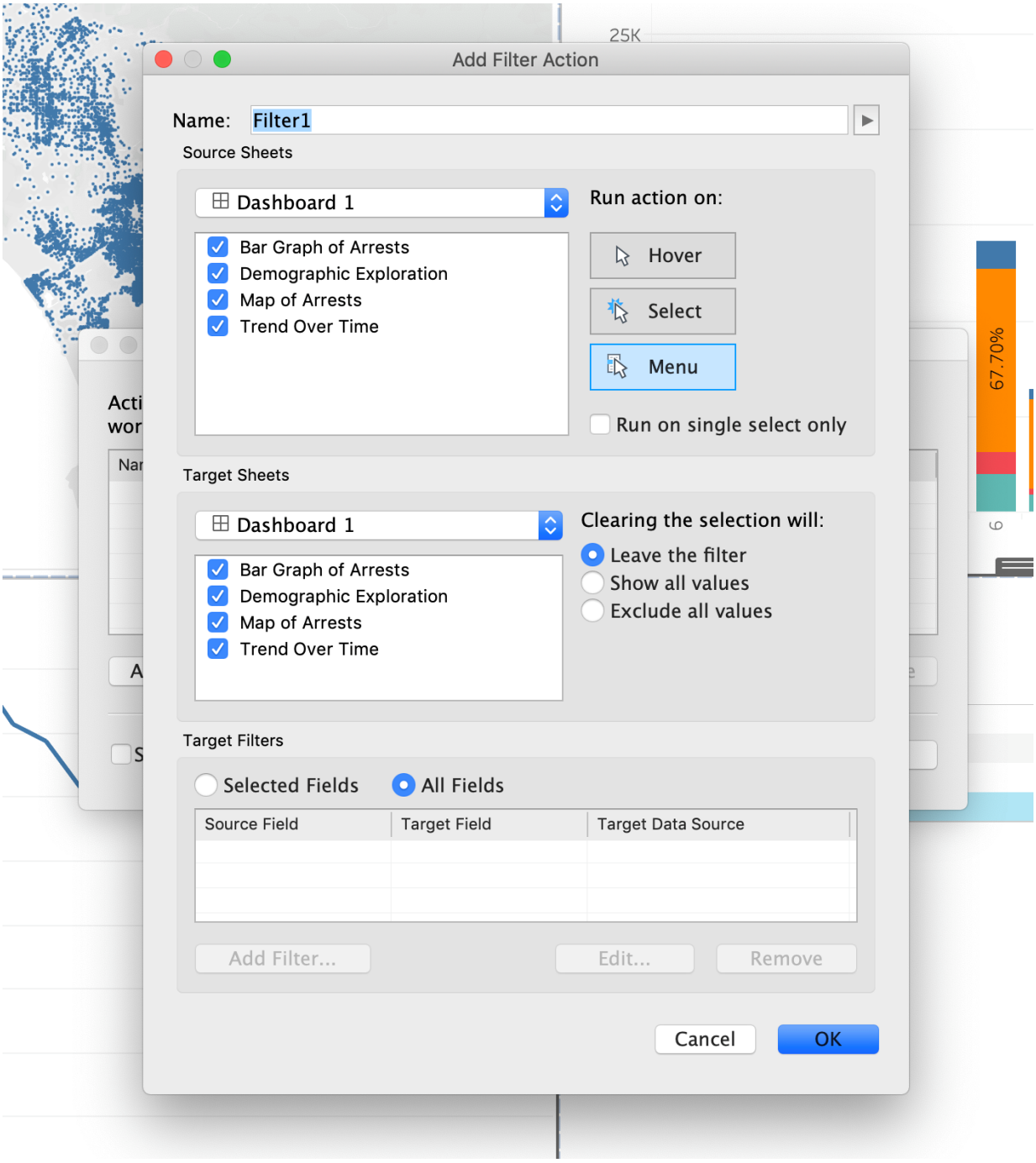
Click on that menu and go to "Actions…"



A pop-up menu should pop up. From there click “Add Action >” then “Filter”



Another pop up should appear like below:



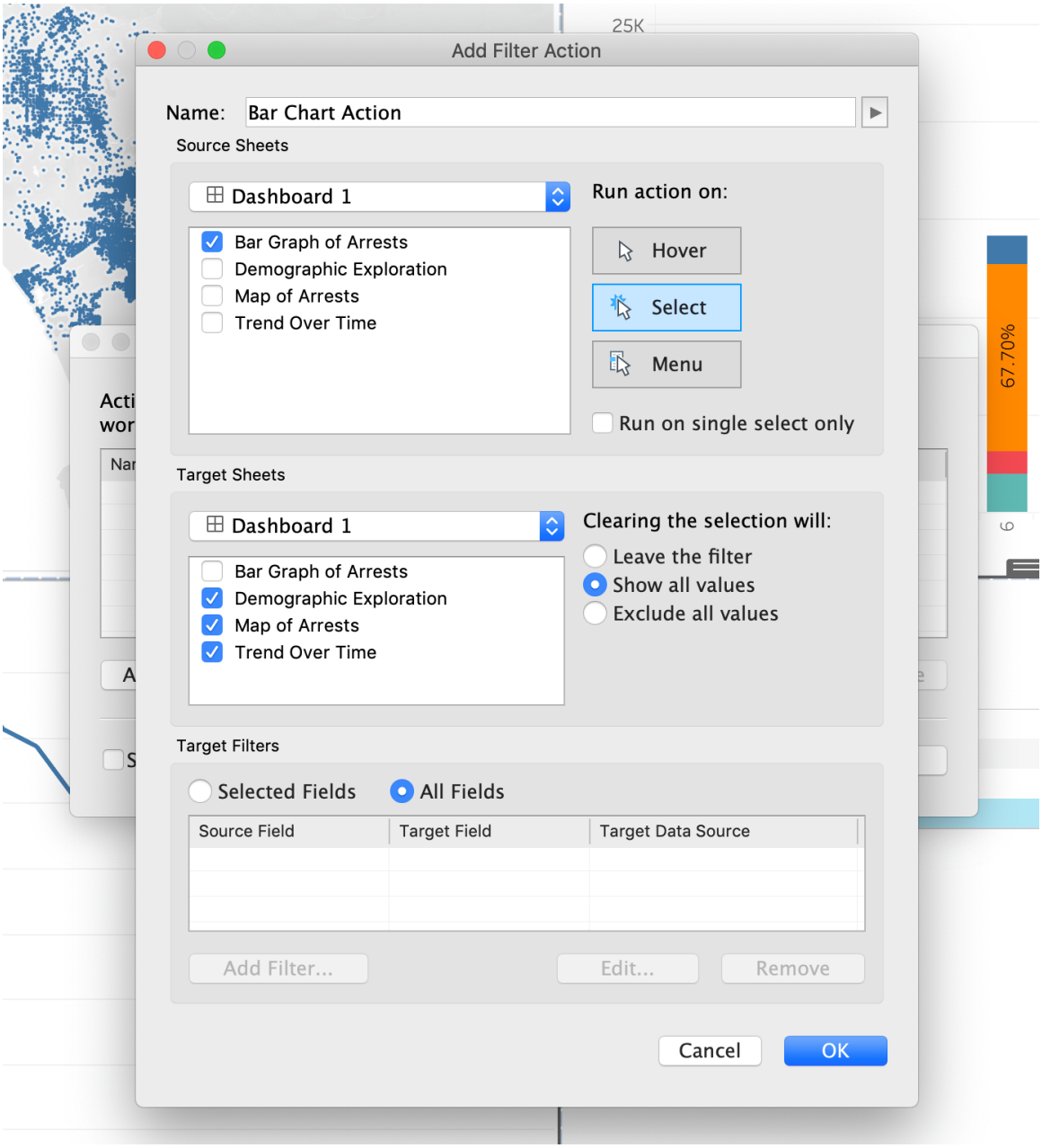
You'll have the sheet you want the action to start from and the resulting sheets you want to change. We want to be able to click on the "14" on the bar char x-axis and change all the other sheets in the dashboard. You'll want to de-select all other sheets in the "Source Sheets" and select all, but the Bar Graph sheet for our "Target Sheets".

On the right, we have the option to "Run Action On" and a choice of Hover, Select, and Menu. We want to have it so that it changes when we click on it, so we'll have to change to "Select".

Lastly, there's a "Clearing the selection will:" option on the right. This is what you want to happen to the other sheets once you de-select "14" on the bar chart. For now we'll have it "Show all values" again, but this is something you can play with in accordance to how you want to present the visualization.

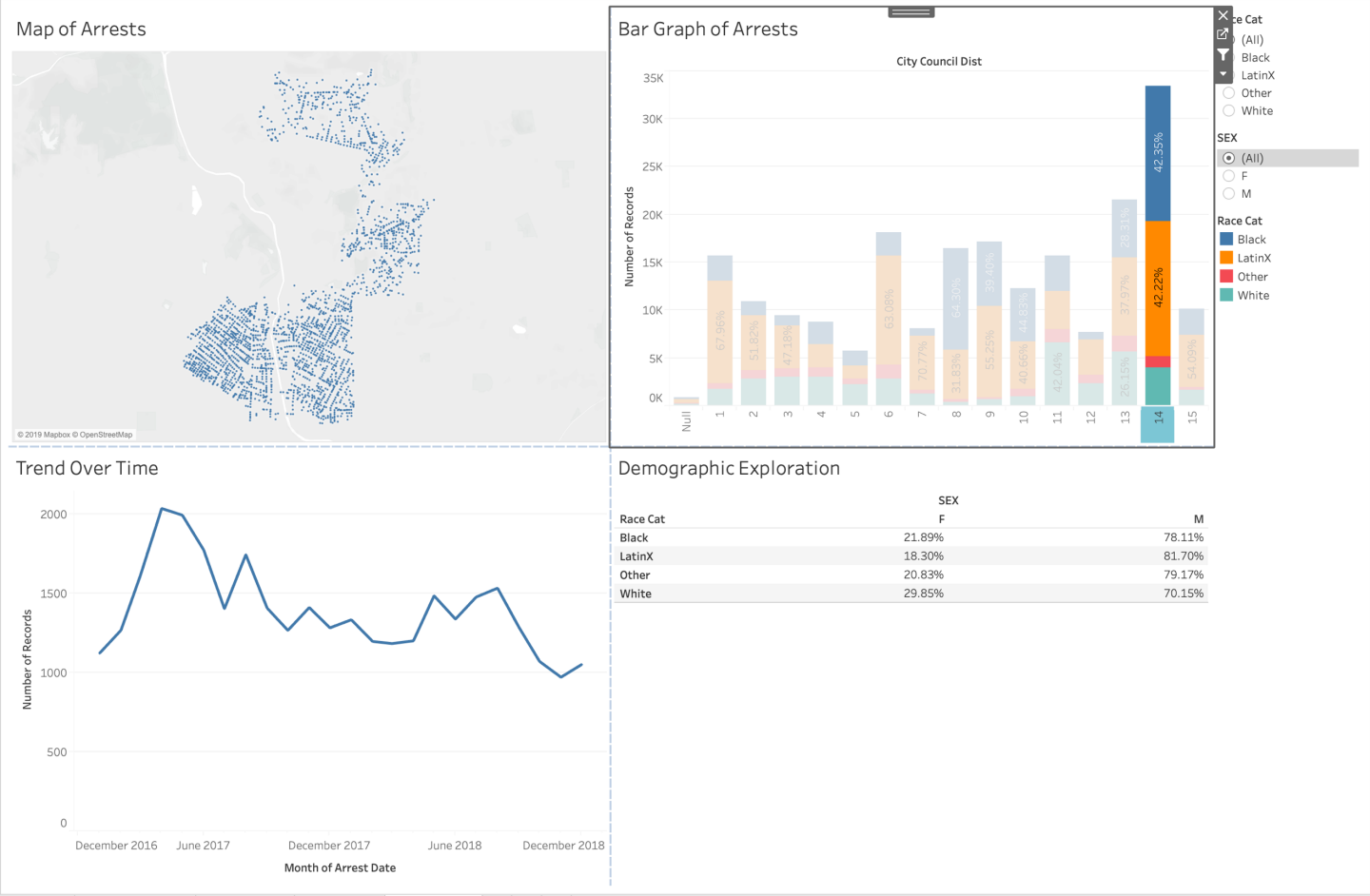
Let's rename this action above in "Name:" to "Bar Chart Action".

When you finish putting the action together, your Action criteria should look like below:



When your Action criteria matches above, click “OK” then “OK” again in the previous dialog box.

Now when you click on the “14” on the x-axis of the bar chart all the other sheets should change. The dashboard should look like below:



Our Trend over time changed as well as our map.

People place multiple actions onto dashboards and as a result have a full working data playground.

This is a simple dashboard we put together, but Tableau is a powerful tool that allows people to create interactive multi-faceted visualizations with their data.

2.3.4 More resources

If you believe that Tableau is a tool you'd like to become more acquainted with, as mentioned before, please visit this site which hosts a lot of detailed videos on all the moving parts of this program.

CHAPTER 3

Guides for mapping data

3.1 Introduction to Mapping & QGIS

Friday, December 9, 2016, 10am - 3pm

http://tinyurl.com/yjc2016ws

What is Mapping?

https://cdn.knightlab.com/libs/timeline3/latest/embed/index.html?source=1DyOxCYw5KgPCdkMwhr_zfqcE-pVT-tdjpucchc2EQrw

3.1.1 Our Views on Maps:

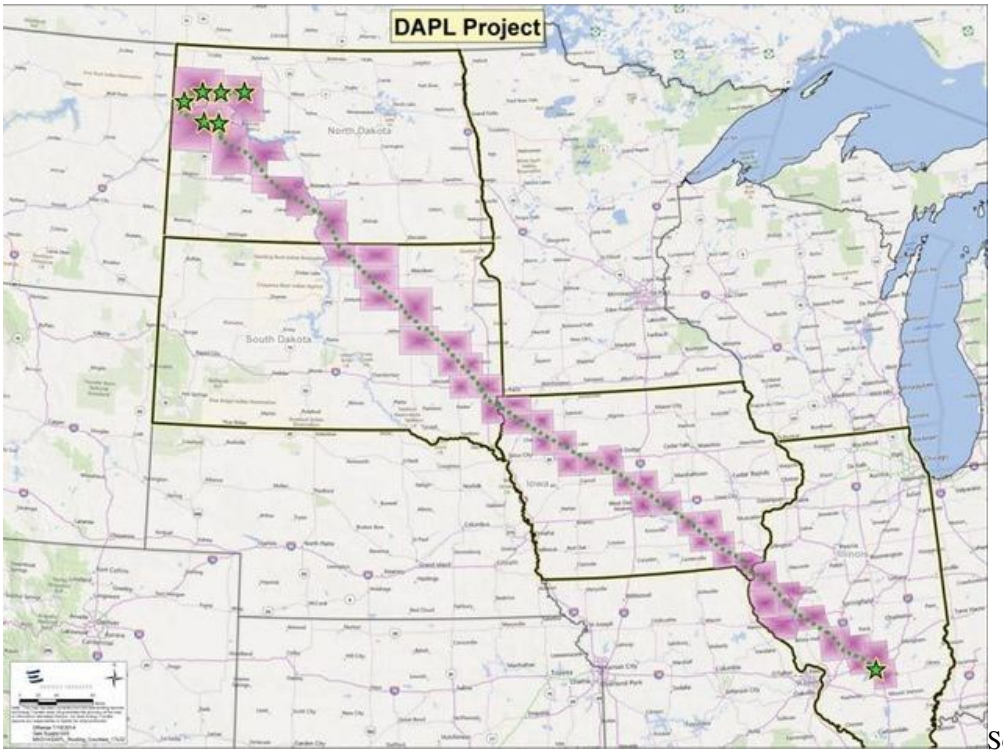
Mapping can be defined in so many different ways, there is no easy answer to these questions. In fact, your campaigns can determine how you design and develop parameters for your map. Below are a few examples of just how multi-faceted mapping can be for any community, and how the digital can help scope and develop innovative approaches to research and resistance. How then might your project utilize these tools?

3.1.2 Your views on maps

Question: "What is a map? What is in a map? How do you map?" Is this a map?

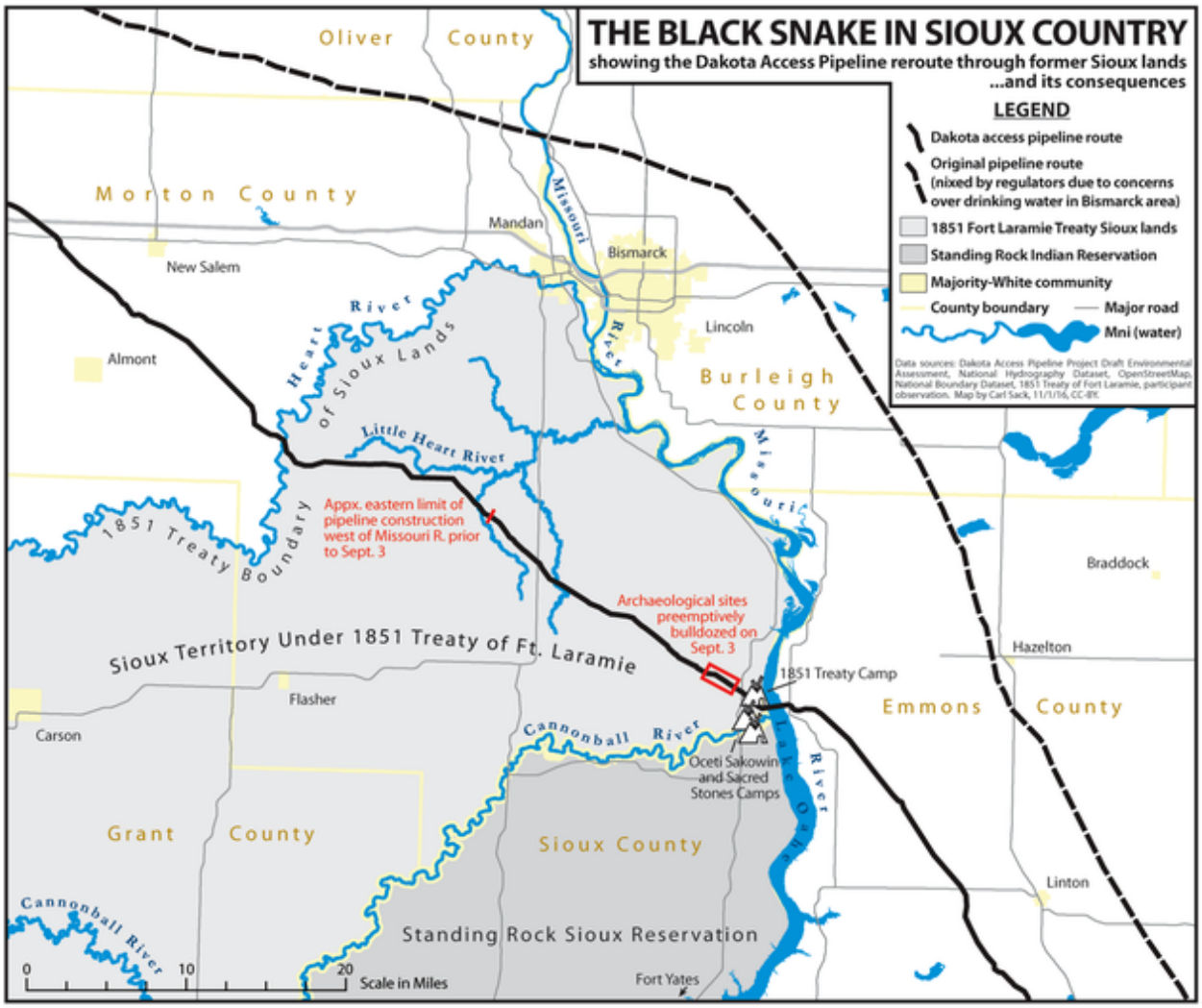
While mapping is increasingly being used for entertainment, there are strong implications for mapping as a resistance tool too.

Question: "What does this map show? And what does it avoid?"



Source:Dakota Access Pipeline Route Map by Energy Transfer Partners

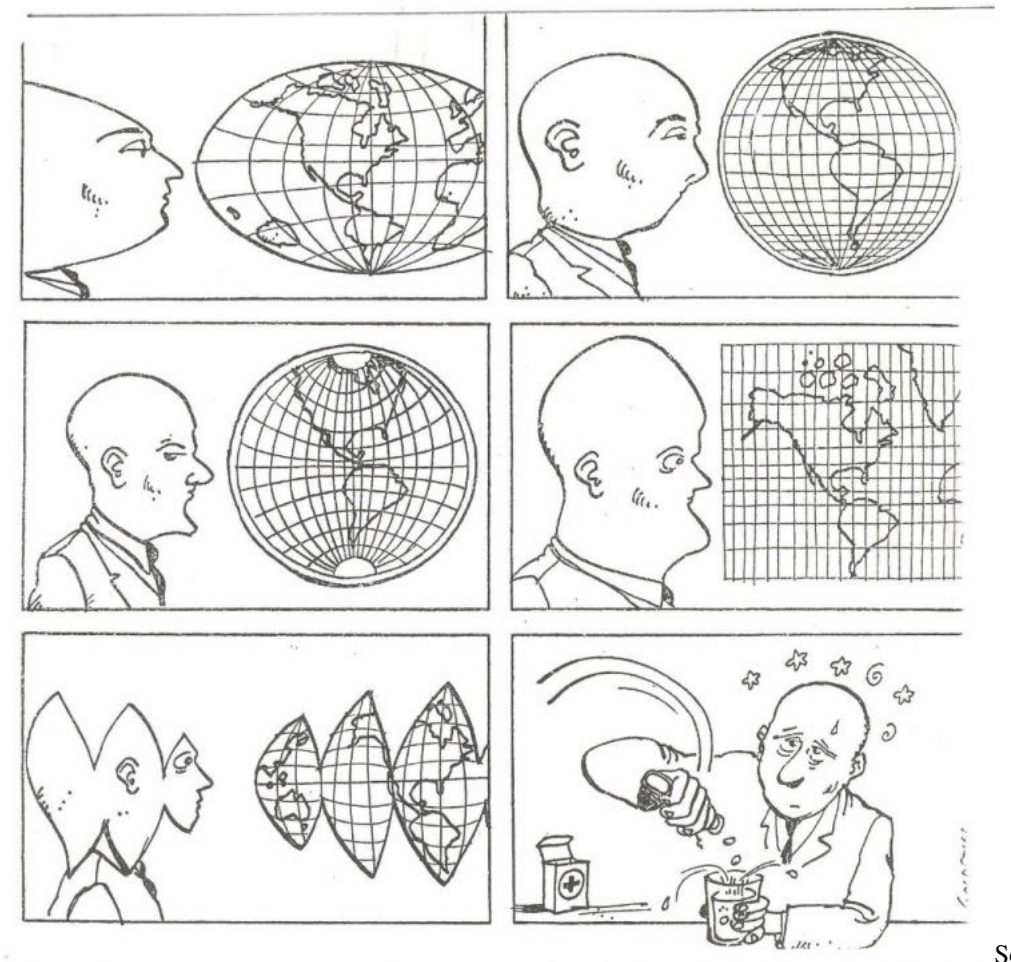
Question: "What does this map show? Is it different from the previous map?"



Source: Carl Sackhttp://www.huffingtonpost.com/entry/a-nodapl-map_us_581a0623e4b014443087af35

3.1.3 Distortions

"Everything is related to everything else, but near things are more related than distant things." -Waldo Tobler Waldo Tobler's statement defines the first law of geography, in stating a connection between objects. This lays the foundation behind spatial relationships.



Source: Jacques Goldstyn, 1983.

Maps are a 3D projection onto a 2D surface, so what results is a SADD distortion based on the following:

1. Shape - The way something looks in relation to another
2. Area - The total content of something in relation to another
3. Distance - How far something is in relation to another
4. Direction - Where something is in relation to another

Exercise: Think of some examples for each distortion.

To preserve one of these elements with highest accuracy, all other elements are to be sacrificed to some degree.

working_with_mapping/../media/4m_image4.jpg

https://en.wikipedia.org/wiki/Mercator_projection#/media/File:Mercator_projection_SW.jpg

working_with_mapping/../media/4m_image5.jpg

Impact of map projections. Source: https://www.flickr.com/photos/internetarchivebookimages/14762351614/

Question: Check outhttp://thetruesize.com/and try to see what is the implication of representing places as smaller than reality?

3.1.4 Introduction to QGIS

What is GIS?

Simply put, Geographic Information Systems (GIS) is digital mapping. In GIS data is layered upon one another like slices on a pizza or layers of a pie.

Download QGIS if you do not have it installed: http://www.qgis.org/en/site/forusers/download.html

~~~~~~

Python Download (get 3.6.9 for the QGIS extended release)

https://www.python.org/downloads/

https://www.python.org/ftp/python/3.6.8/python-3.6.8-macosx10.6.pkg(mac)

https://www.python.org/ftp/python/3.6.8/python-3.6.8-amd64.exe(win)

LA Times Data Sets

http://boundaries.latimes.com

http://boundaries.latimes.com/1.0/boundary-set/la-county-neighborhoods-v5/?format=shp

http://sandbox.idre.ucla.edu/mapshare/data/usa/census/Los_Angeles_ZipCodes.zip

Boundaries from the Los Angeles Times:http://boundaries.latimes.com/sets/

Datasets hosted by UCLA:http://gis.ucla.edu/geodata/

Data from Los Angeles County:http://egis3.lacounty.gov/dataportal/

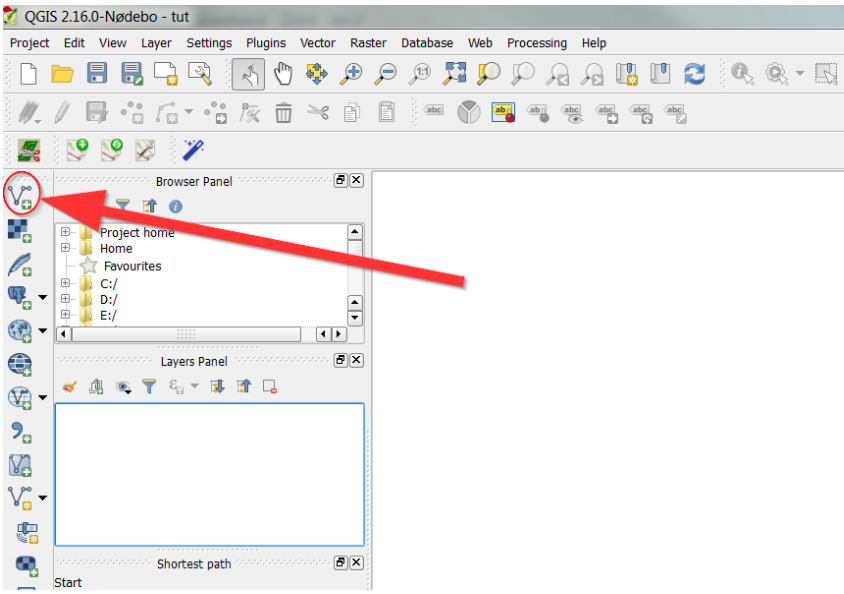
Most GIS files (also called shapefiles) will be in a zipped format, so be sure to unzip them!

Mac Example:https://asmand.files.wordpress.com/2015/09/unzip-mac.gif

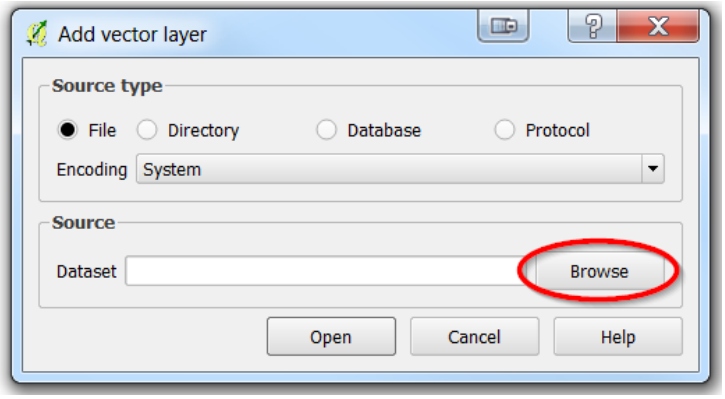
PC Example:https://www.youtube.com/watch?v=ZQOYqzGHiDY

3.1.5 How to add vector data

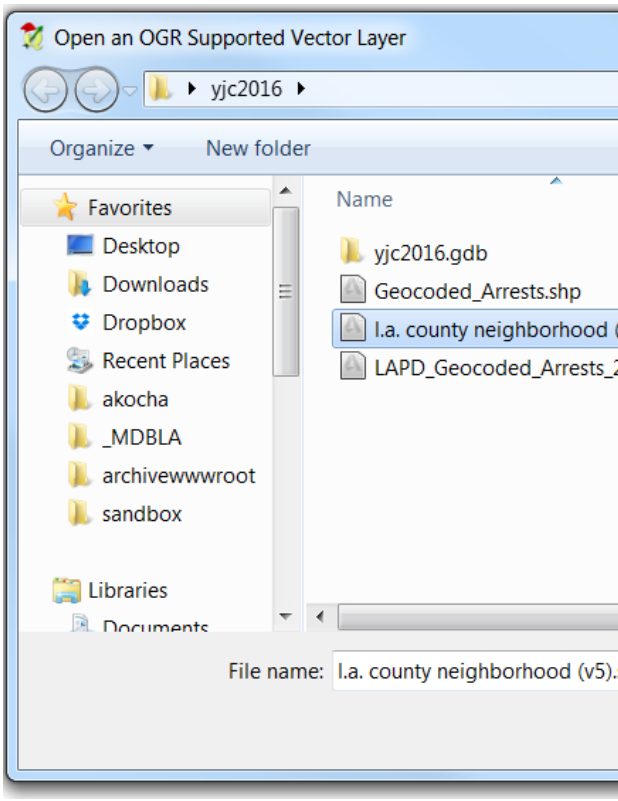
1. **Click the weird V to the left of the main menu**


~~~~~~

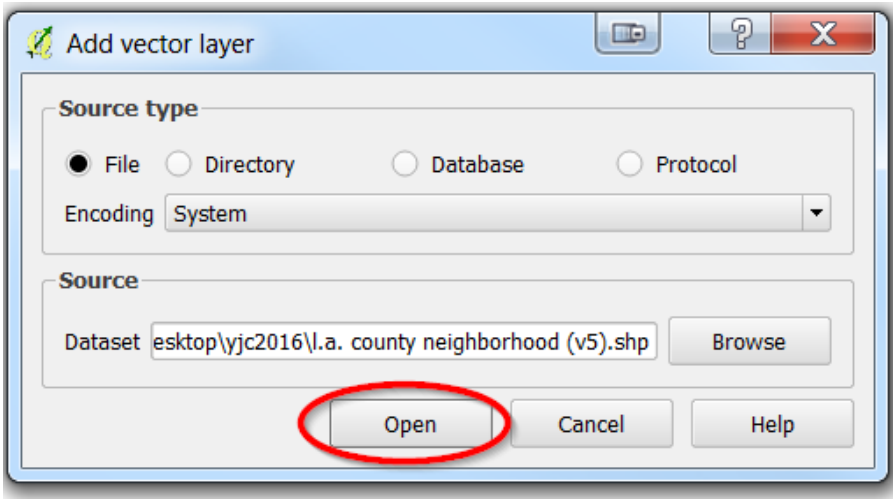
2. **Click Browse**



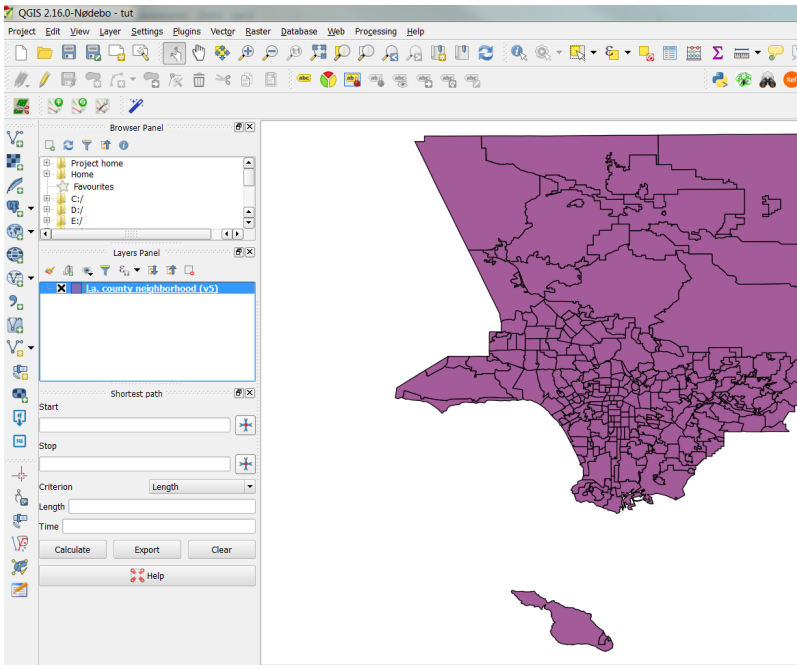
3. **Find the "l.a county neighborhood (v5).shp" file and click "Open"**



4. **Now select open**

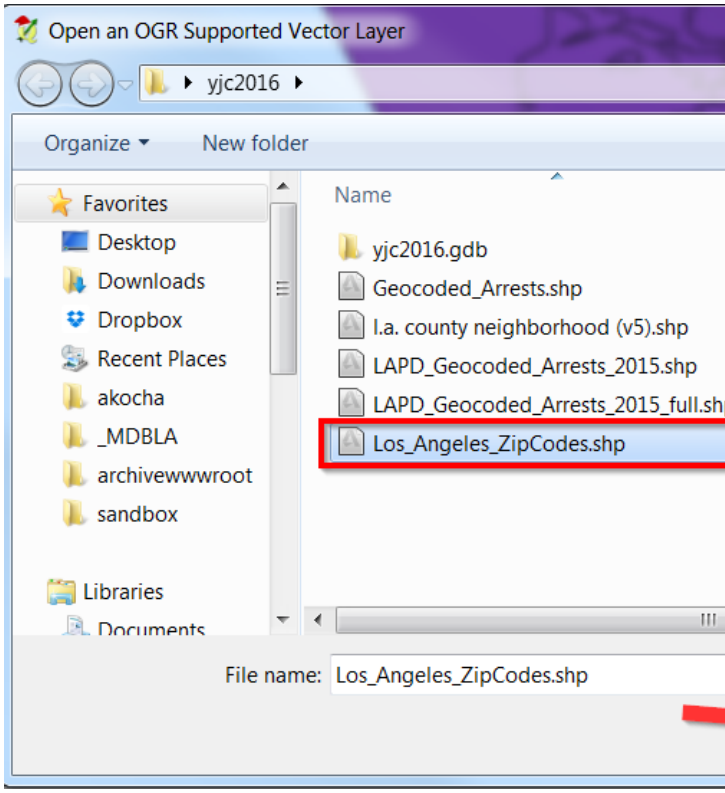


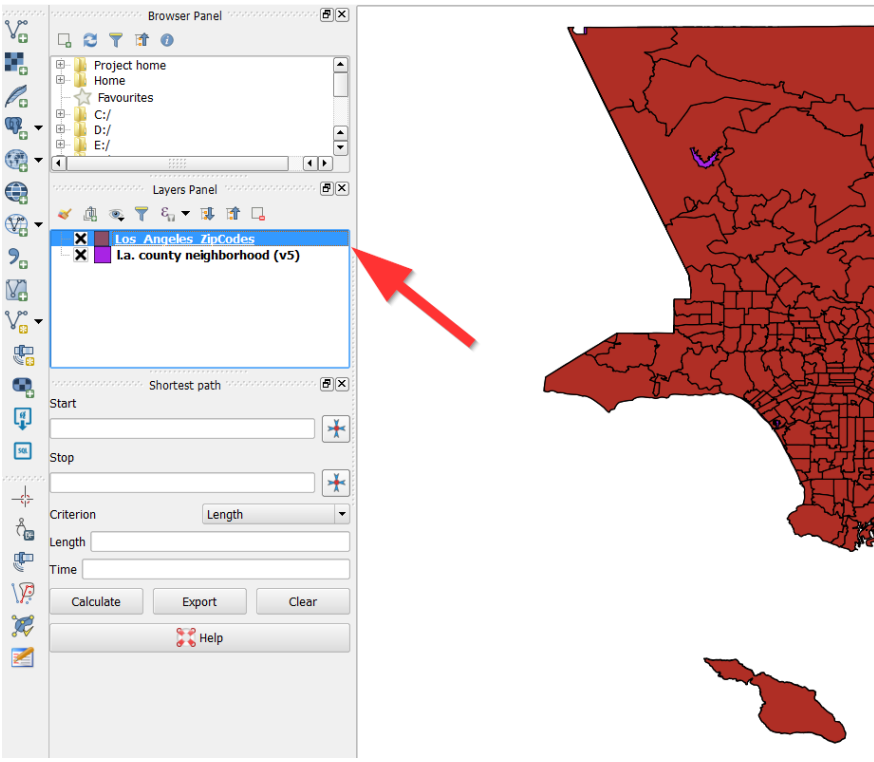
5. **Now the vector file should show up in the window:**



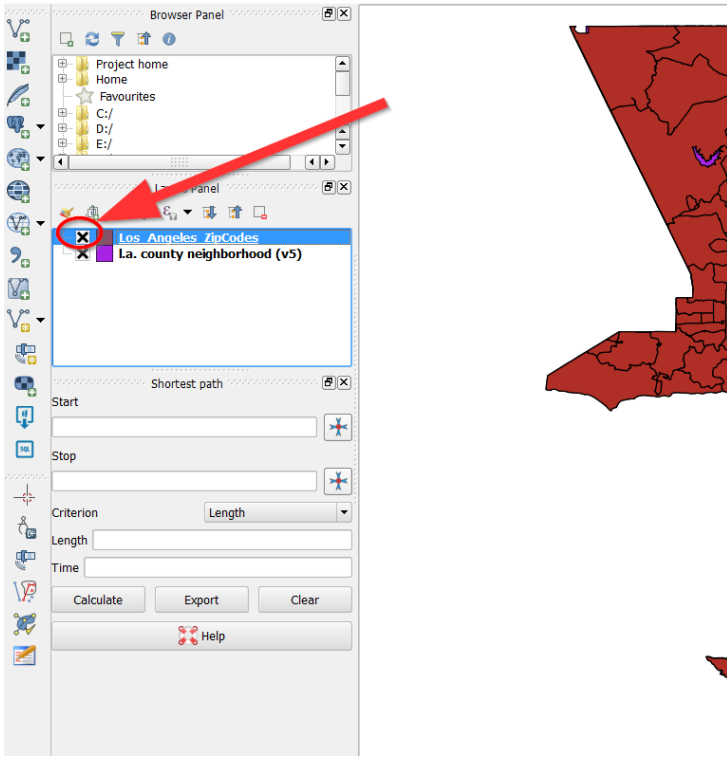
3.1.6 Working with layers:

1. **Let's add another GIS file called Los_Angeles_ZipCodes**

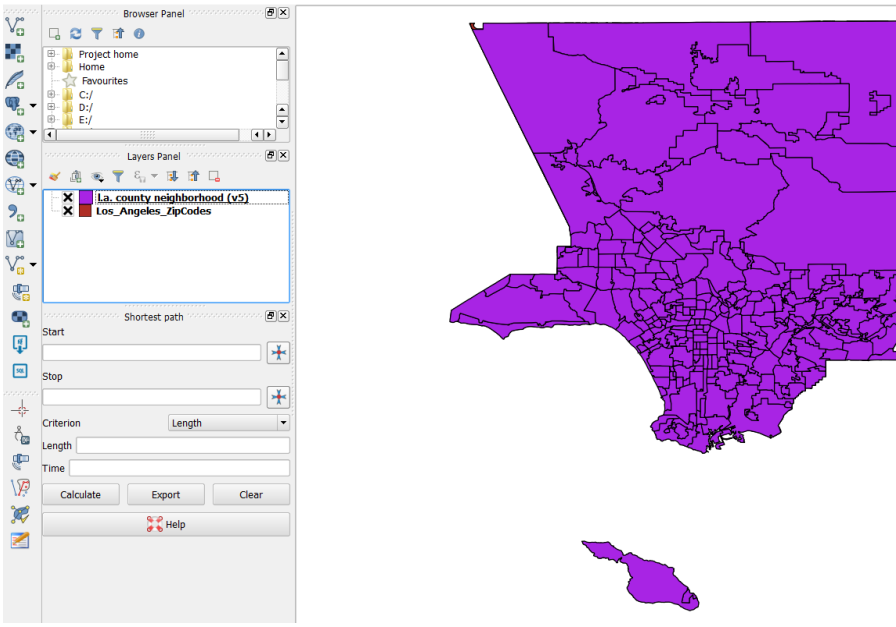




2. **Notice what happens right after you add it:**
3. It appears on top of the La county neighborhood (v5) layer which masks it from view.

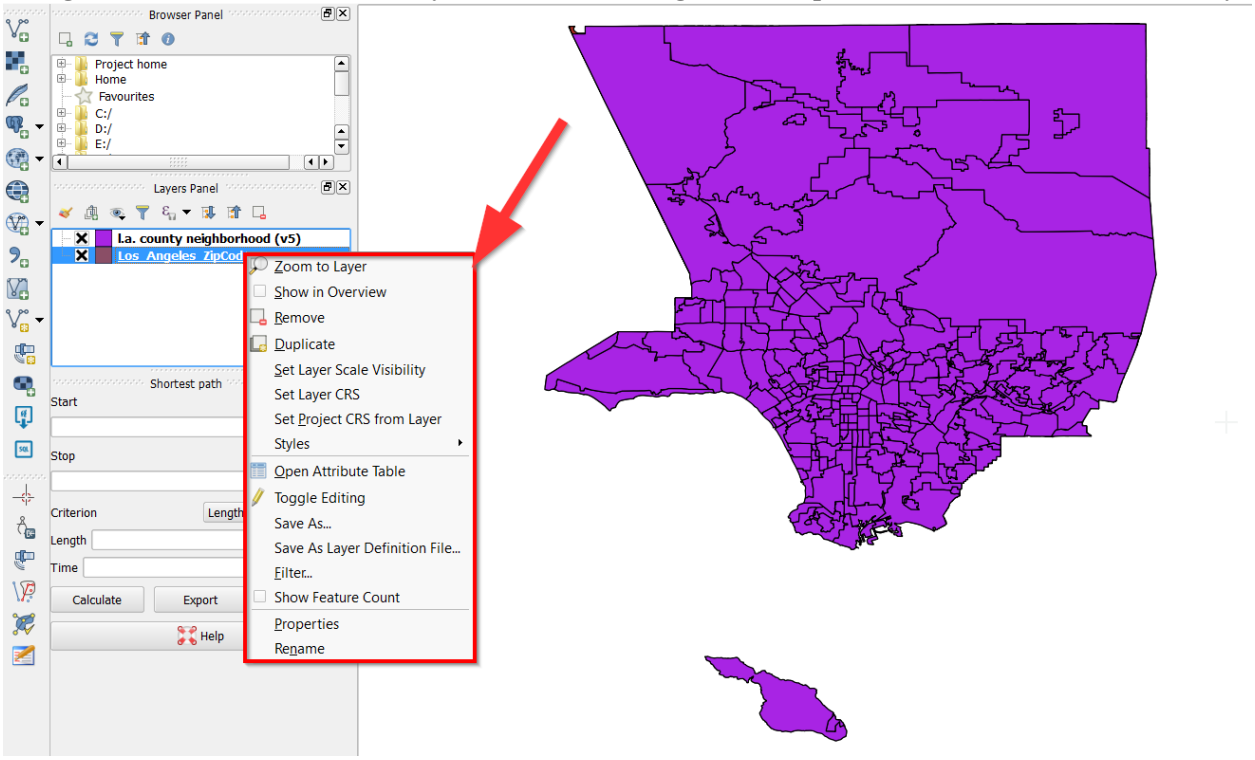


4. **If you hit the box with the X you can toggle it on and off.**

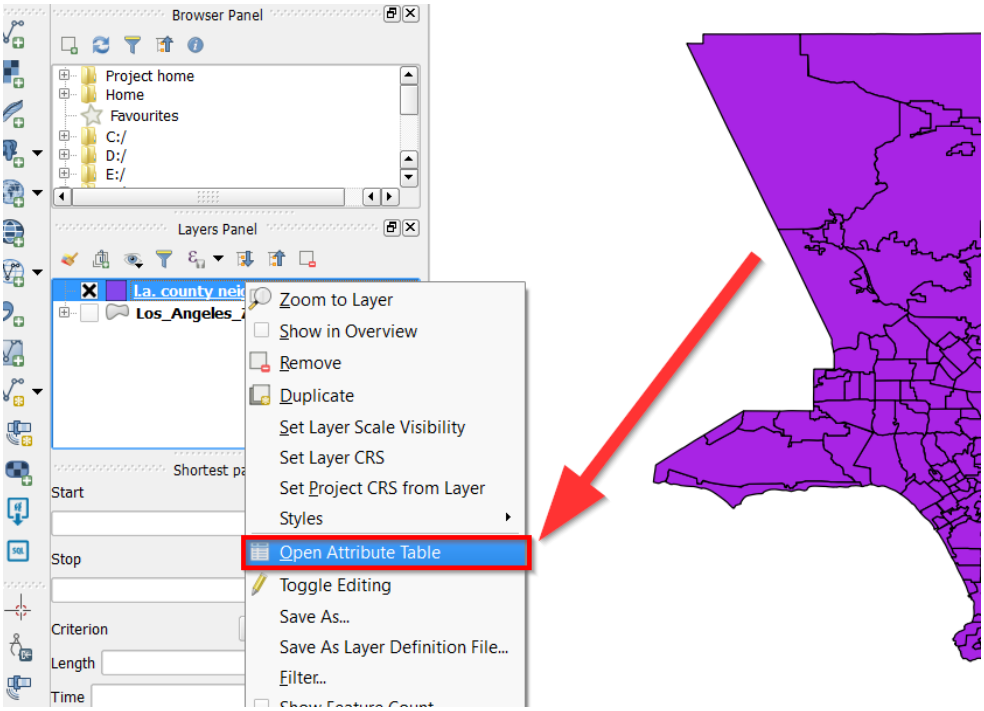


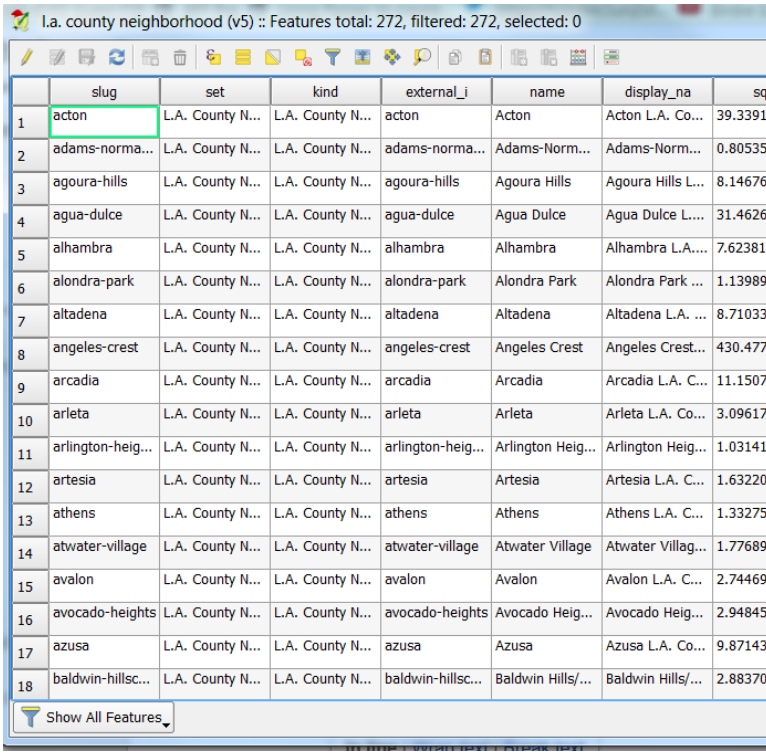
5. **You can also drag the layer up and down.**

6. **You can right click or cmd + click on the layer to do various things, such as open an attribute table, remove the layer, or c**



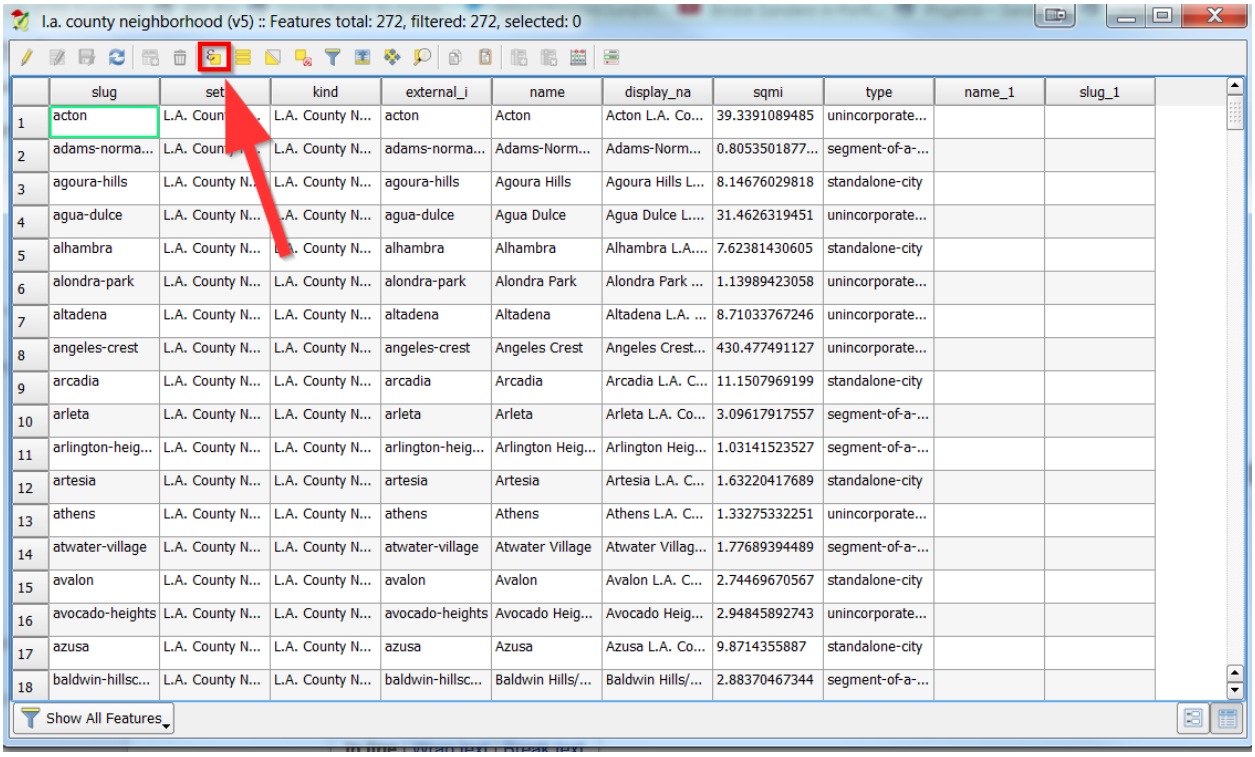
7. Let's click on "Open Attribute Table":





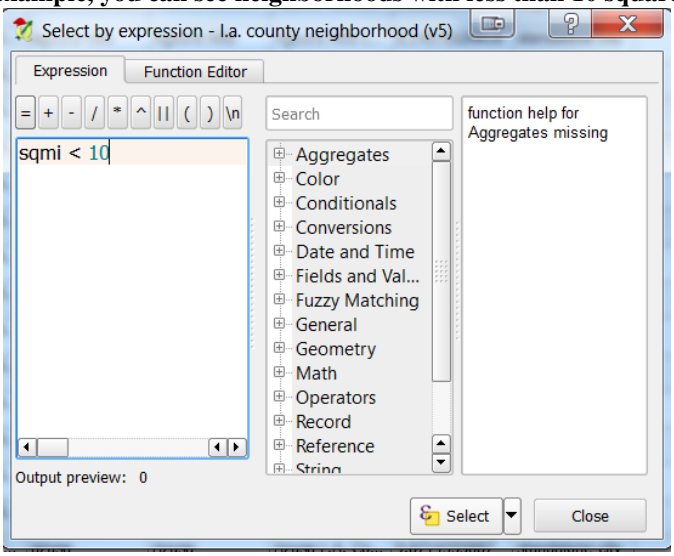
	slug	set	kind	external_i	name	display_na	sq
1	acton	L.A. County N...	L.A. County N...	acton	Acton	Acton L.A. Co...	39.3391
2	adams-norma...	L.A. County N...	L.A. County N...	adams-norma...	Adams-Norm...	Adams-Norm...	0.80535
3	agoura-hills	L.A. County N...	L.A. County N...	agoura-hills	Agoura Hills	Agoura Hills L...	8.14676
4	agua-dulce	L.A. County N...	L.A. County N...	agua-dulce	Agua Dulce	Agua Dulce L....	31.4626
5	alhambra	L.A. County N...	L.A. County N...	alhambra	Alhambra	Alhambra L.A....	7.62381
6	alondra-park	L.A. County N...	L.A. County N...	alondra-park	Alondra Park	Alondra Park ...	1.13989
7	altadena	L.A. County N...	L.A. County N...	altadena	Altadena	Altadena L.A. ...	8.71033
8	angeles-crest	L.A. County N...	L.A. County N...	angeles-crest	Angeles Crest	Angeles Crest...	430.477
9	arcadia	L.A. County N...	L.A. County N...	arcadia	Arcadia	Arcadia L.A. C...	11.1507
10	arleta	L.A. County N...	L.A. County N...	arleta	Arleta	Arleta L.A. Co...	3.09617
11	arlington-heig...	L.A. County N...	L.A. County N...	arlington-heig...	Arlington Heig...	Arlington Heig...	1.03141
12	artesia	L.A. County N...	L.A. County N...	artesia	Artesia	Artesia L.A. C...	1.63220
13	athens	L.A. County N...	L.A. County N...	athens	Athens	Athens L.A. C...	1.33275
14	atwater-village	L.A. County N...	L.A. County N...	atwater-village	Atwater Village	Atwater Villag...	1.77689
15	avalon	L.A. County N...	L.A. County N...	avalon	Avalon	Avalon L.A. C...	2.74469
16	avocado-heights	L.A. County N...	L.A. County N...	avocado-heights	Avocado Heig...	Avocado Heig...	2.94845
17	azusa	L.A. County N...	L.A. County N...	azusa	Azusa	Azusa L.A. Co...	9.87143
18	baldwin-hillsc...	L.A. County N...	L.A. County N...	baldwin-hillsc...	Baldwin Hills/...	Baldwin Hills/...	2.88370

8. **Here you can see all the data that is stored in the file:**
9. **You can also filter the data to show only certain things by using the expression calculator:**

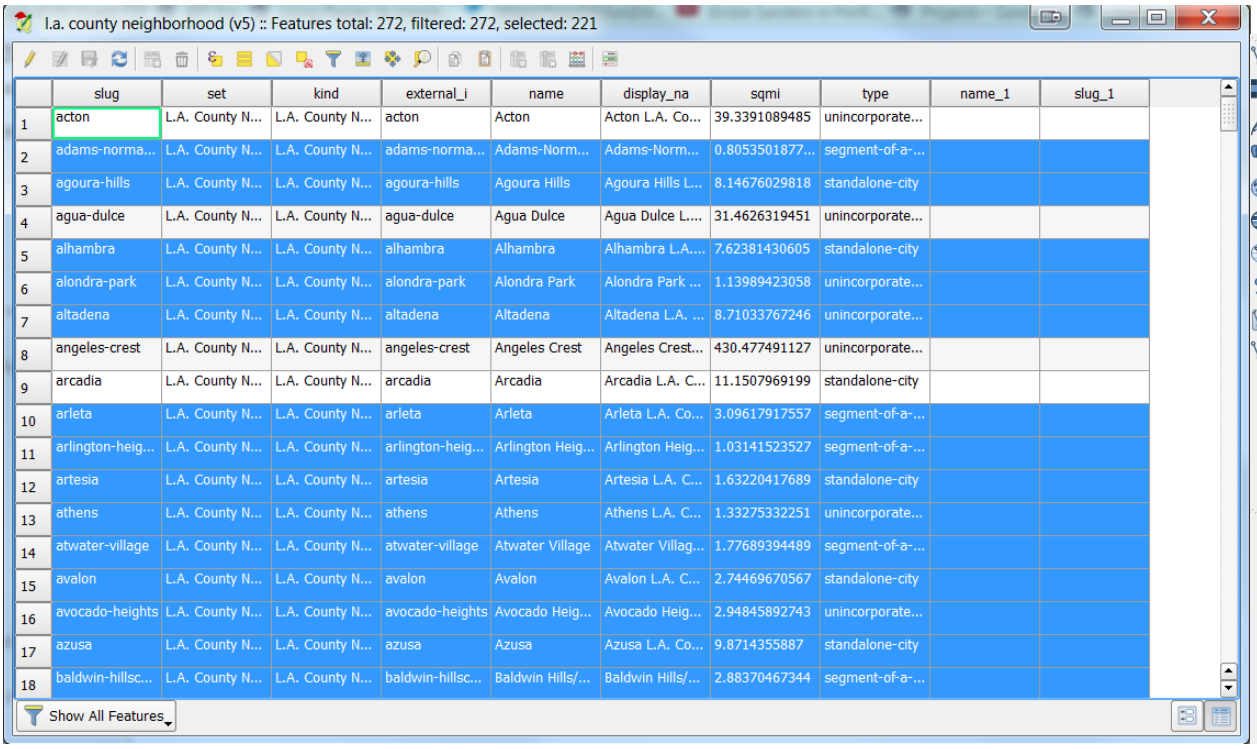


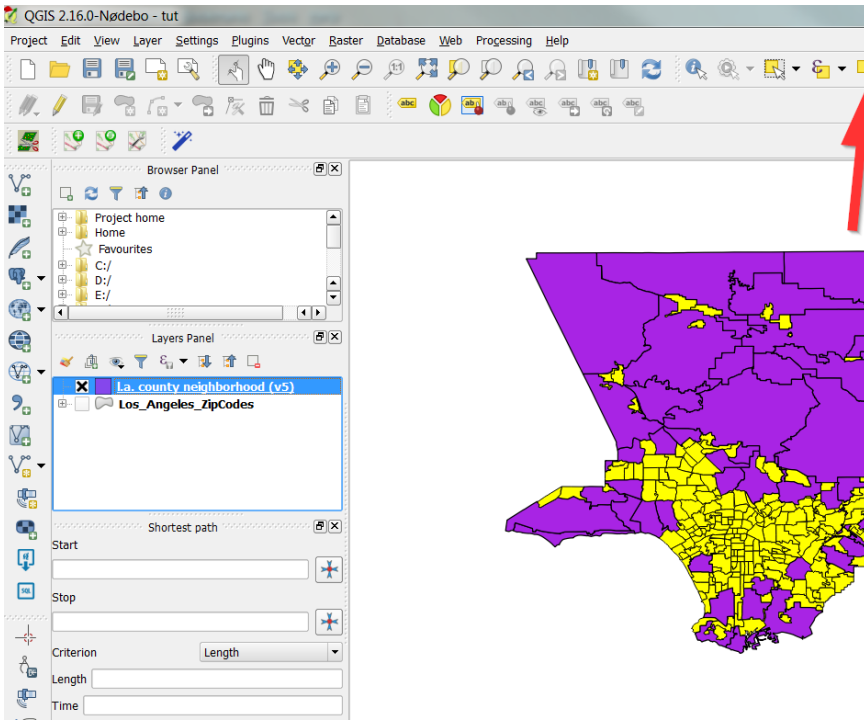
	slug	set	kind	external_i	name	display_na	sqmi	type	name_1	slug_1
1	acton	L.A. Coun...	L.A. County N...	acton	Acton	Acton L.A. Co...	39.3391089485	unincorporate...		
2	adams-norma...	L.A. Coun...	L.A. County N...	adams-norma...	Adams-Norm...	Adams-Norm...	0.8053501877...	segment-of-a-...		
3	agoura-hills	L.A. County N...	L.A. County N...	agoura-hills	Agoura Hills	Agoura Hills L...	8.14676029818	standalone-city		
4	agua-dulce	L.A. County N...	L.A. County N...	agua-dulce	Agua Dulce	Agua Dulce L....	31.4626319451	unincorporate...		
5	alhambra	L.A. County N...	L.A. County N...	alhambra	Alhambra	Alhambra L.A....	7.62381430605	standalone-city		
6	alondra-park	L.A. County N...	L.A. County N...	alondra-park	Alondra Park	Alondra Park ...	1.13989423058	unincorporate...		
7	altadena	L.A. County N...	L.A. County N...	altadena	Altadena	Altadena L.A. ...	8.71033767246	unincorporate...		
8	angeles-crest	L.A. County N...	L.A. County N...	angeles-crest	Angeles Crest	Angeles Crest...	430.477491127	unincorporate...		
9	arcadia	L.A. County N...	L.A. County N...	arcadia	Arcadia	Arcadia L.A. C...	11.1507969199	standalone-city		
10	arleta	L.A. County N...	L.A. County N...	arleta	Arleta	Arleta L.A. Co...	3.09617917557	segment-of-a-...		
11	arlington-heig...	L.A. County N...	L.A. County N...	arlington-heig...	Arlington Heig...	Arlington Heig...	1.03141523527	segment-of-a-...		
12	artesia	L.A. County N...	L.A. County N...	artesia	Artesia	Artesia L.A. C...	1.63220417689	standalone-city		
13	athens	L.A. County N...	L.A. County N...	athens	Athens	Athens L.A. C...	1.33275332251	unincorporate...		
14	atwater-village	L.A. County N...	L.A. County N...	atwater-village	Atwater Village	Atwater Villag...	1.77689394489	segment-of-a-...		
15	avalon	L.A. County N...	L.A. County N...	avalon	Avalon	Avalon L.A. C...	2.74469670567	standalone-city		
16	avocado-heights	L.A. County N...	L.A. County N...	avocado-heights	Avocado Heig...	Avocado Heig...	2.94845892743	unincorporate...		
17	azusa	L.A. County N...	L.A. County N...	azusa	Azusa	Azusa L.A. Co...	9.8714355887	standalone-city		
18	baldwin-hillsc...	L.A. County N...	L.A. County N...	baldwin-hillsc...	Baldwin Hills/...	Baldwin Hills/...	2.88370467344	segment-of-a-...		

10. **For example, you can see neighborhoods with less than 10 square miles large, by using "sqmi < 10"**



11. Both in the table and map, the yellow rows are what is less than 10 square miles:

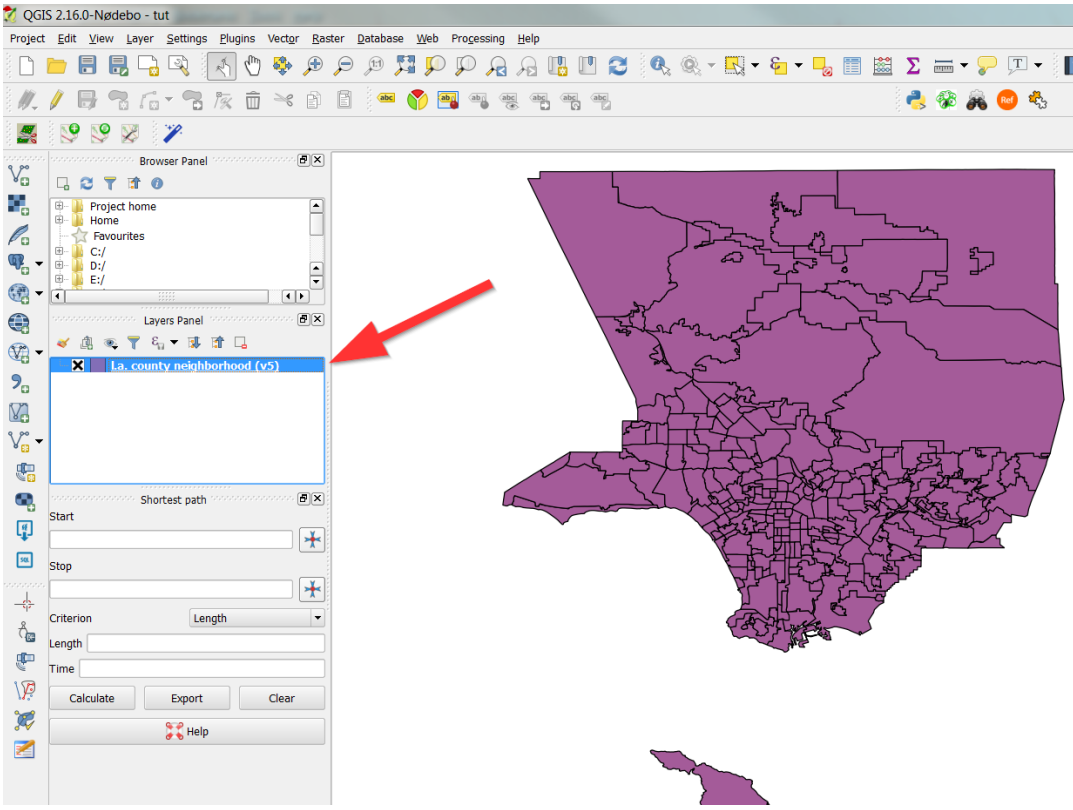




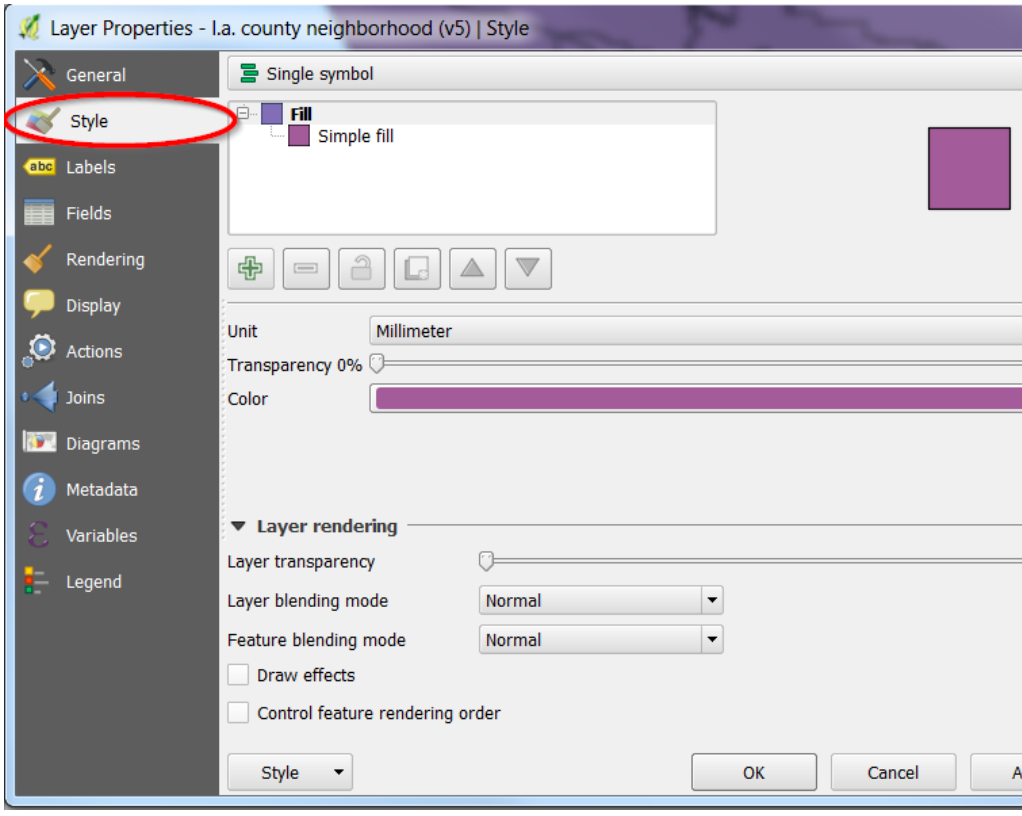
12. **You can clear the selection by clicking clear:**
13. If you want, you can go ahead and remove the layer if you'd like.

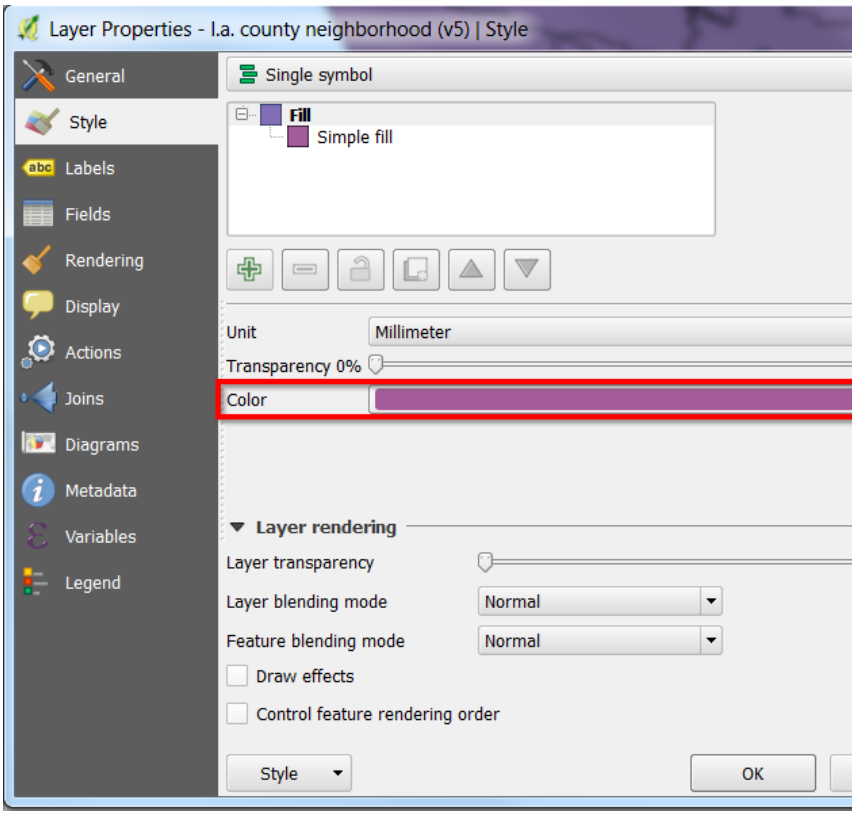
3.1.7 Working with styles

1. **Double click on the layer:**

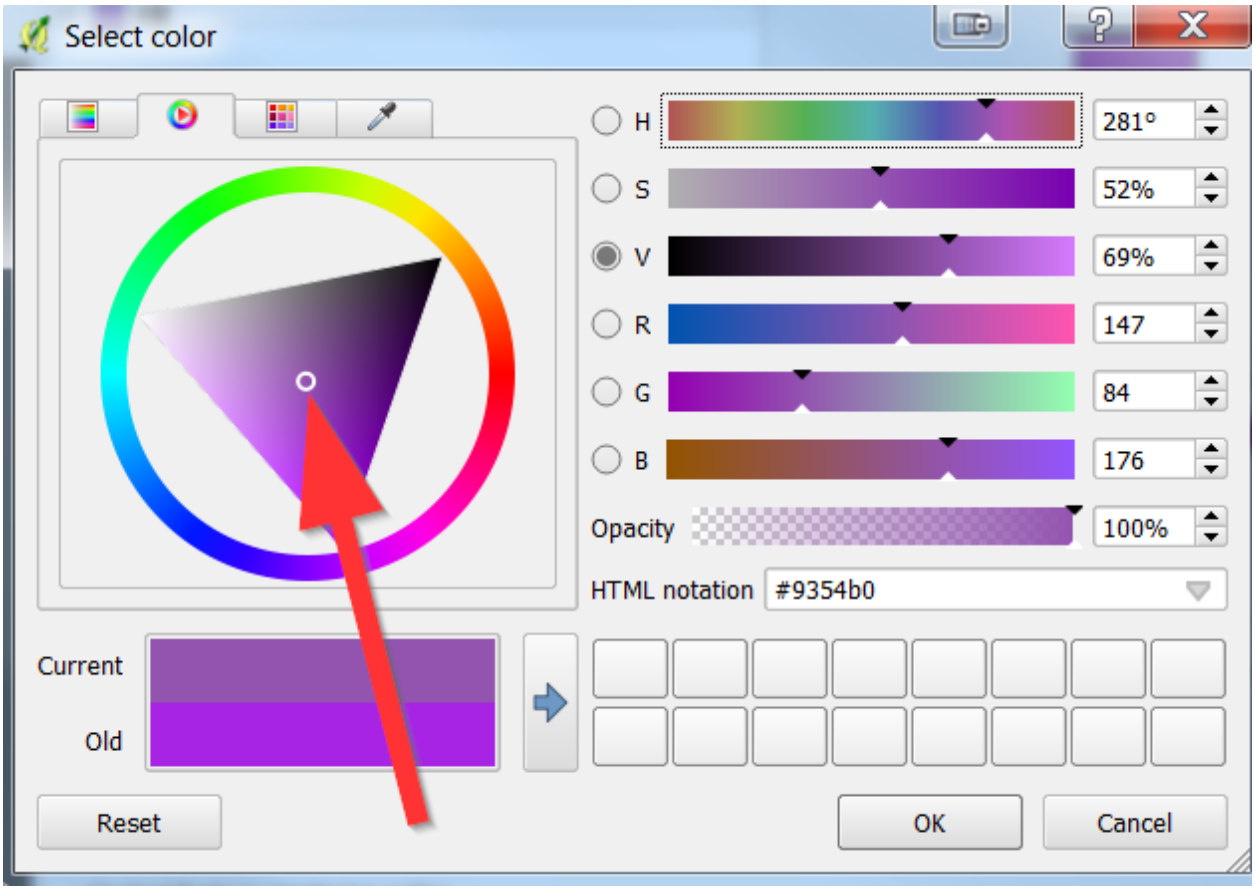


2. **Make sure you are on "Style":**

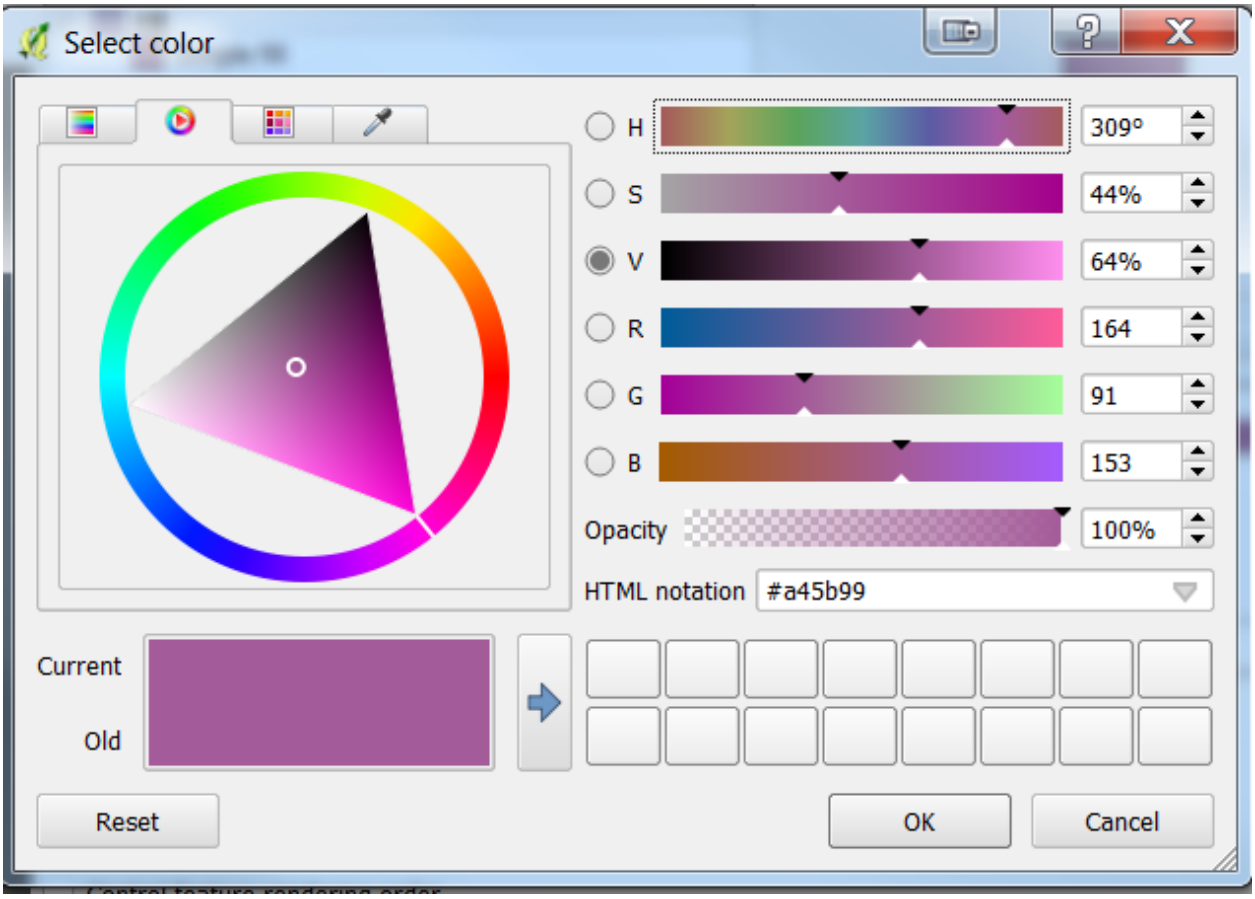




3. **You can change the color by clicking on color**
4. **Feel free to change the colors in the following window by dragging the white circle**



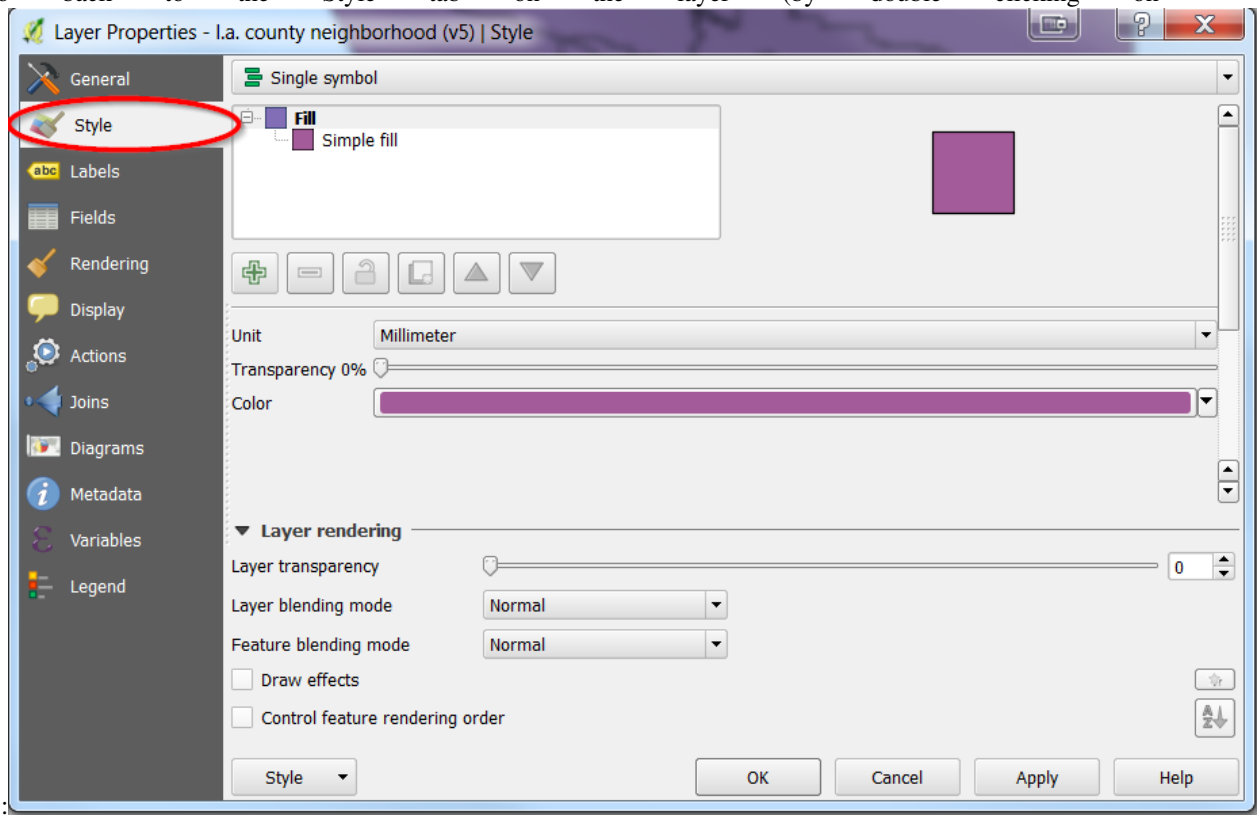
5. **Colors are very important for map representation, for example blue is always associated with water.**



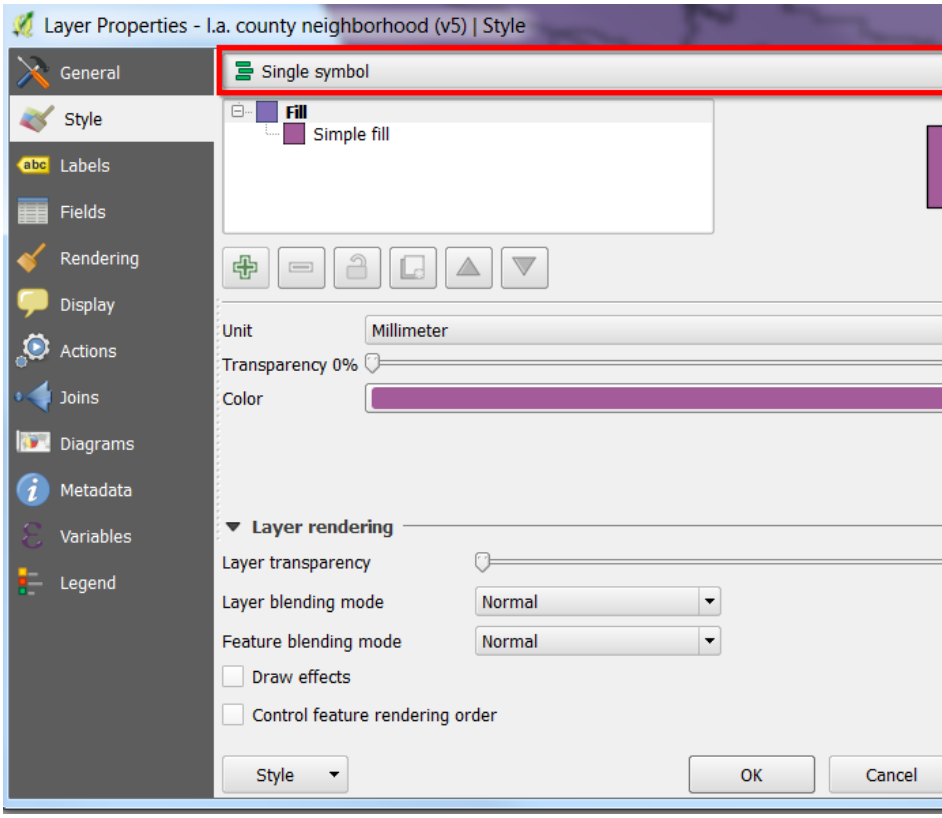
6. Click “Ok” to apply your changes.
7. Your map should now be different.

3.1.8 Visualizing Categories (not numbers)

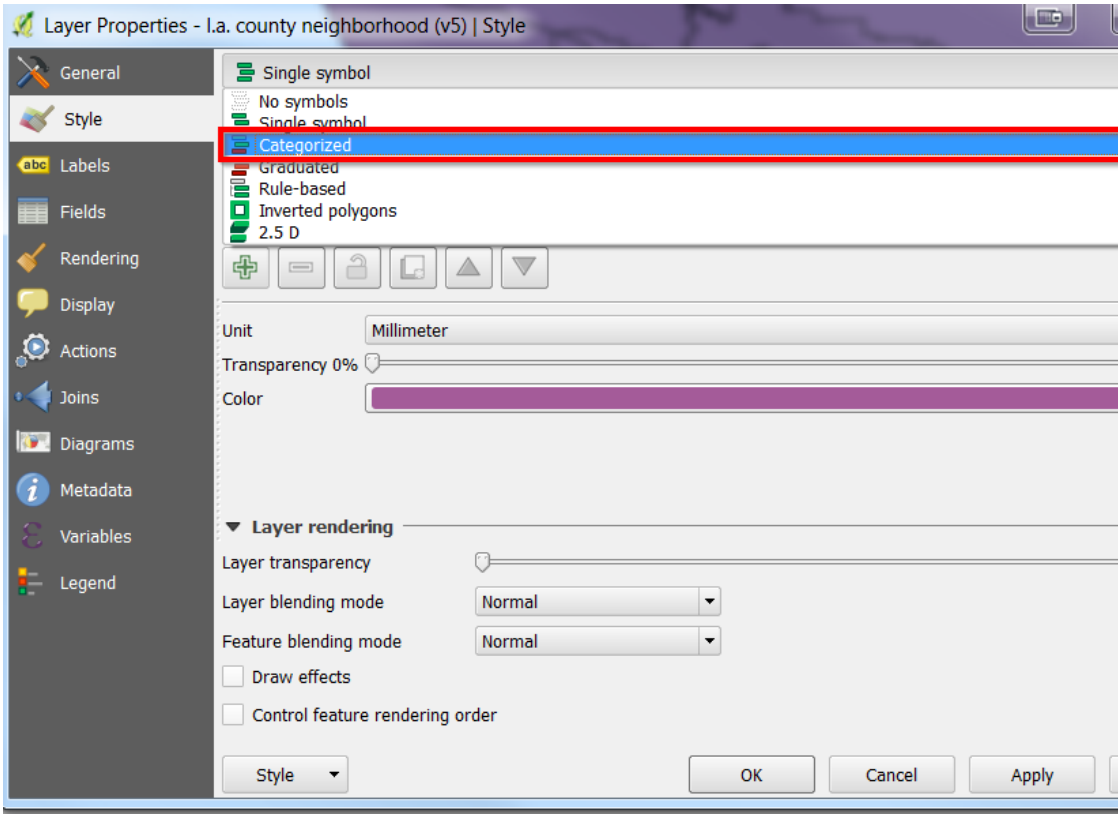
1. Go back to the Style tab on the layer (by double clicking on it):

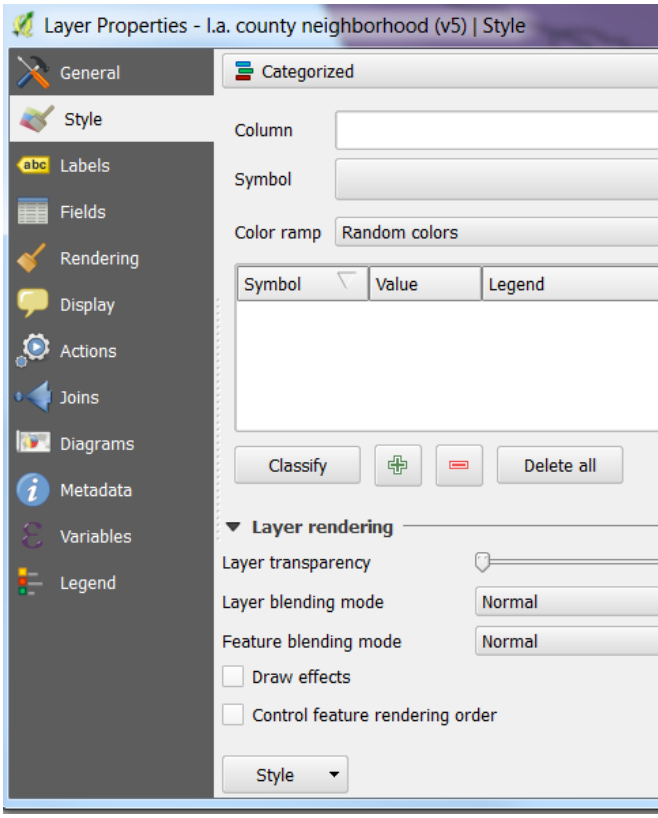


2. **Click on the dropdown box at the top**

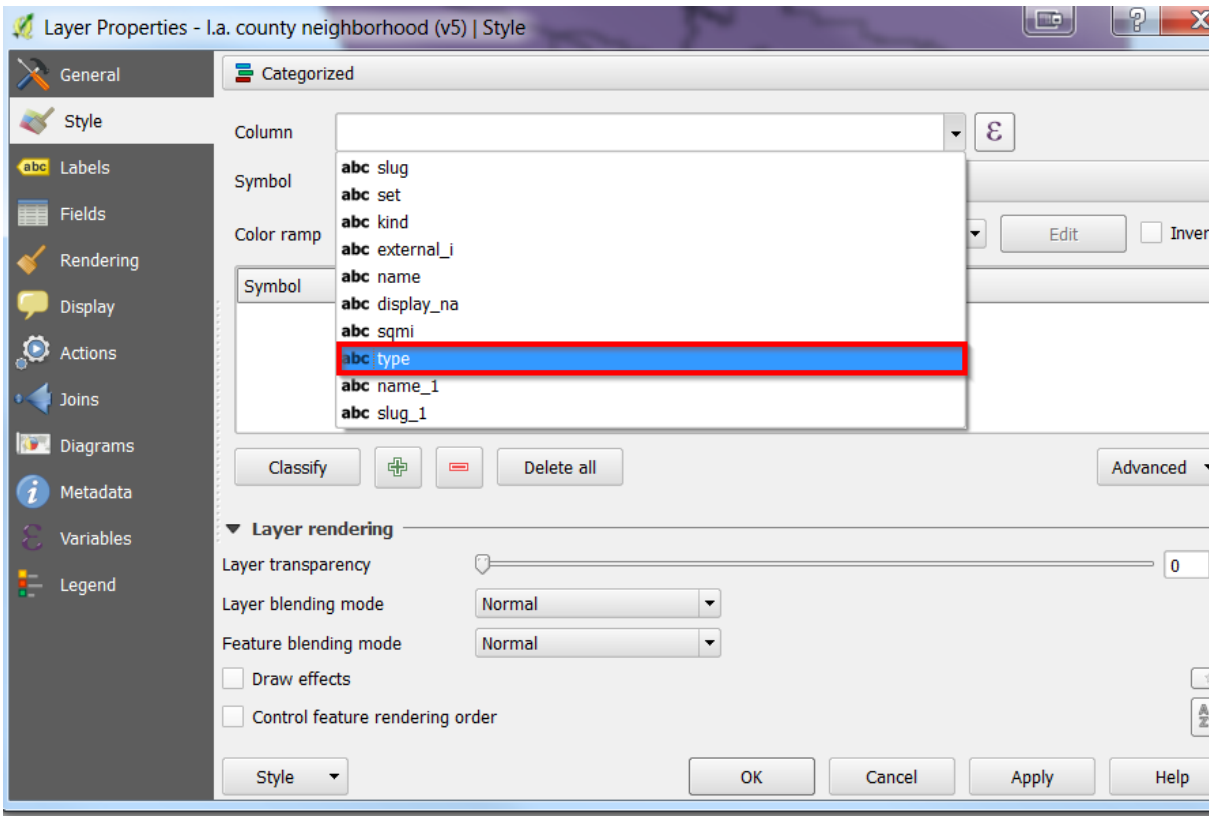


3. **Select "Categorized":**



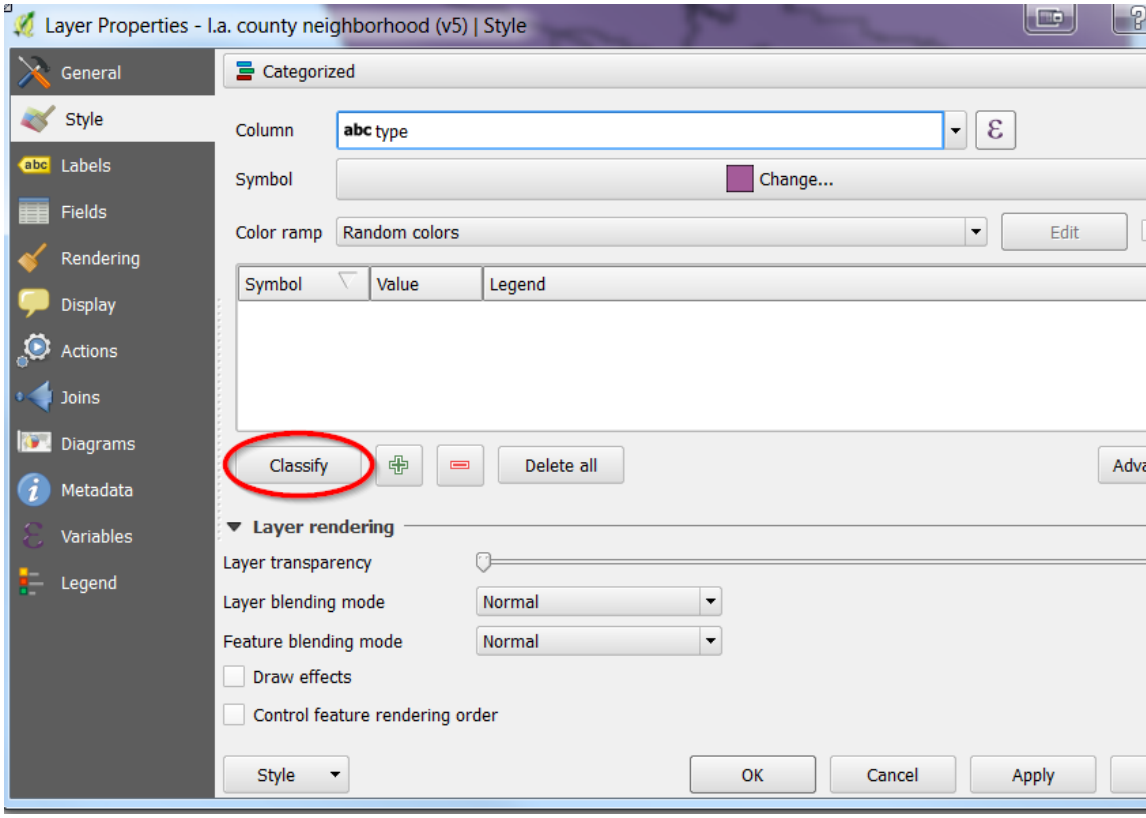


4. **In the new window, select the dropdown arrow near in column**

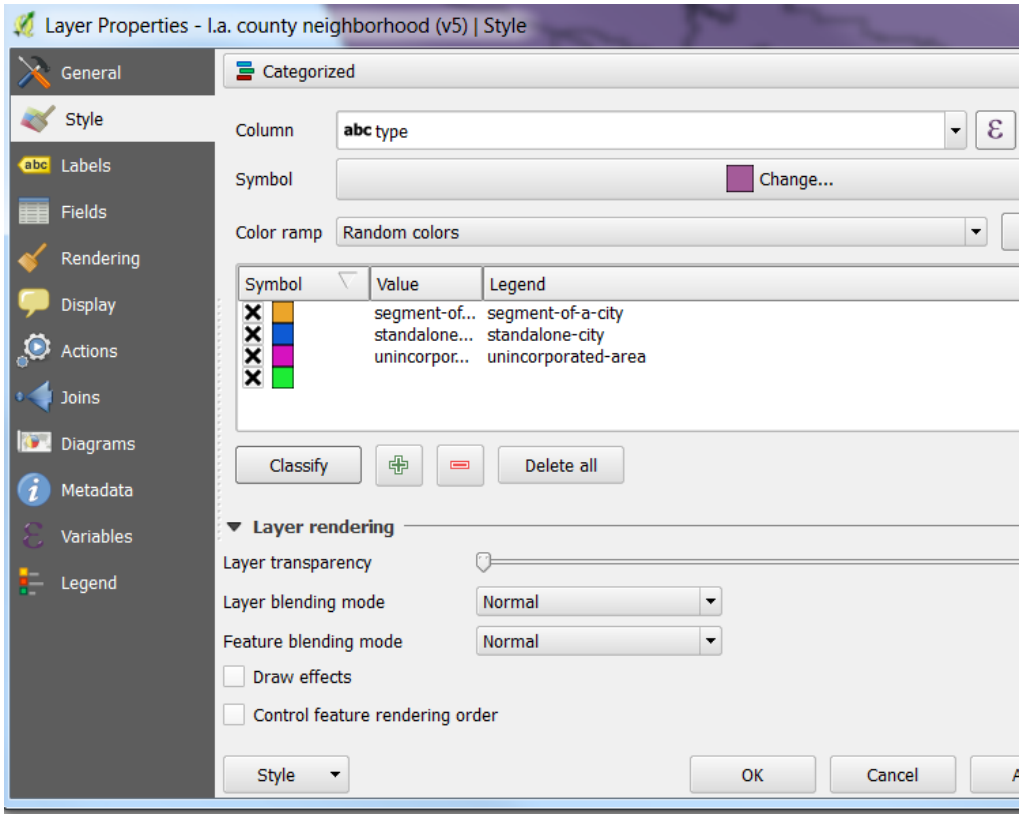


5. **Select "Type"**

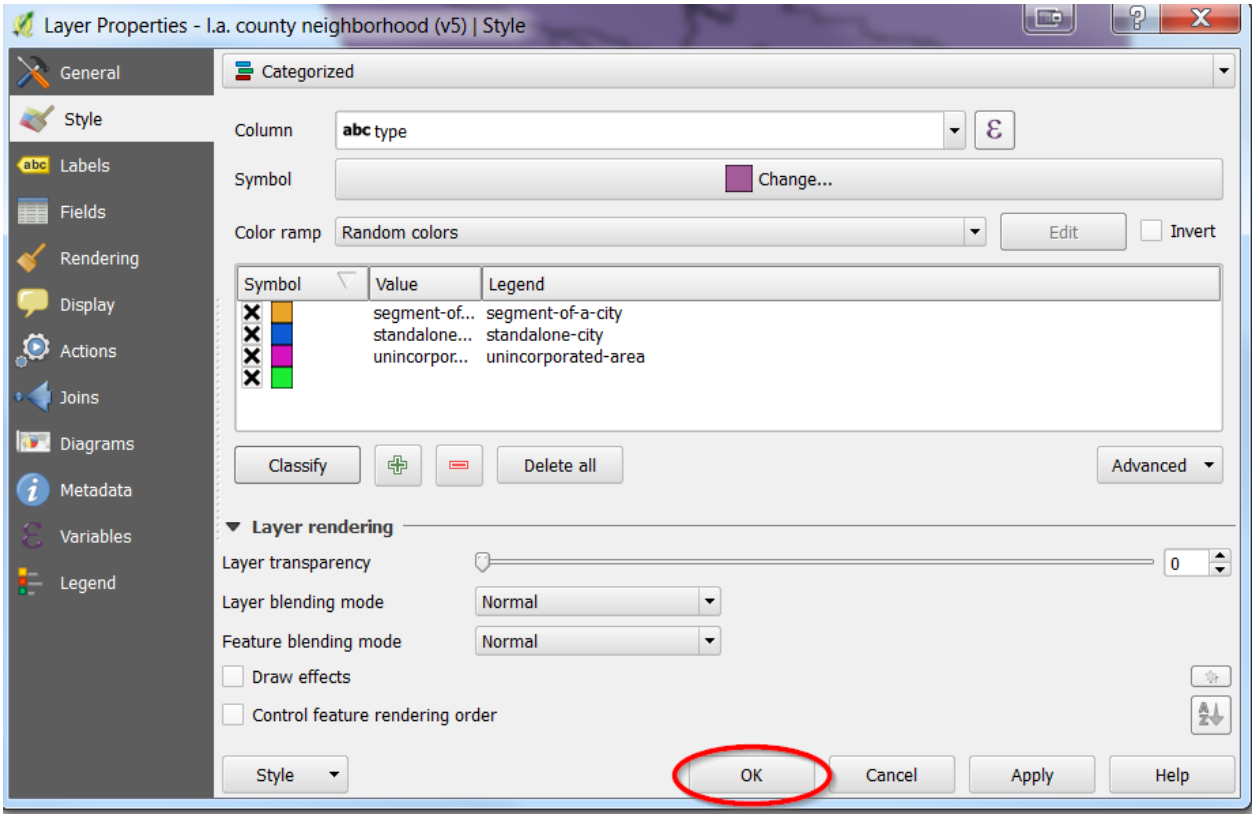
6. **Click on "Classify"**



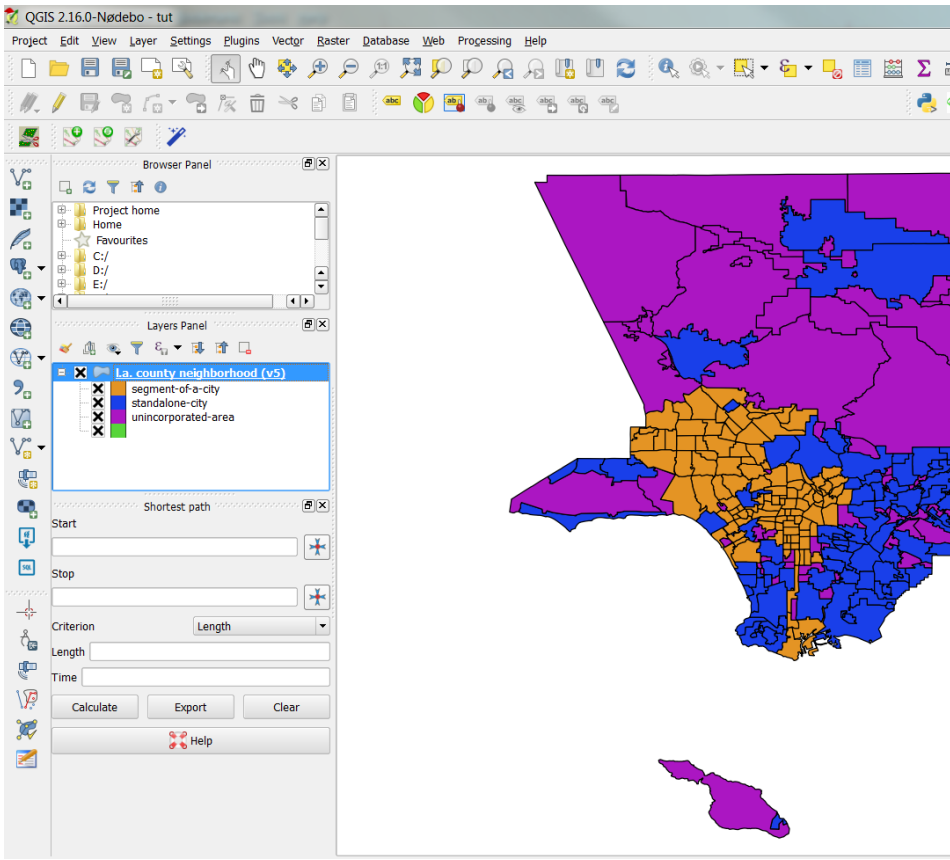
7. **The following should show up:**



8. **You can edit the colors if you'd like by clicking on them, otherwise** click "Ok":

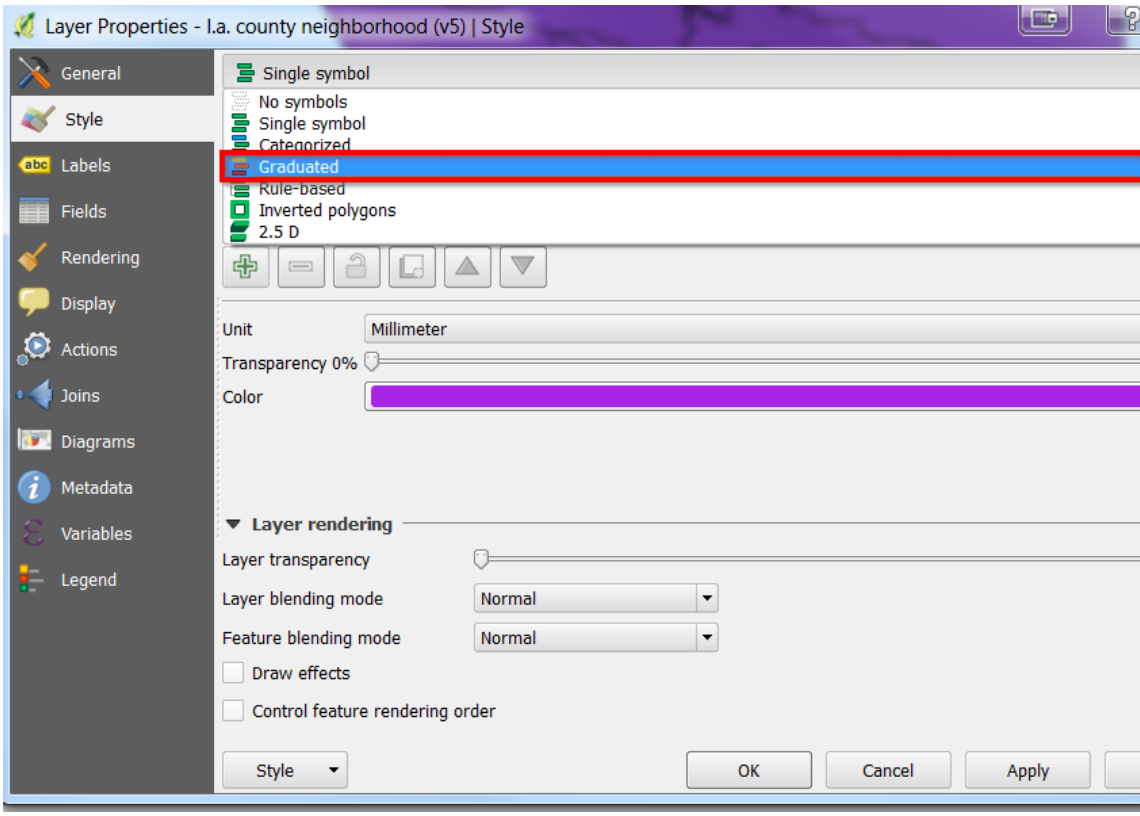


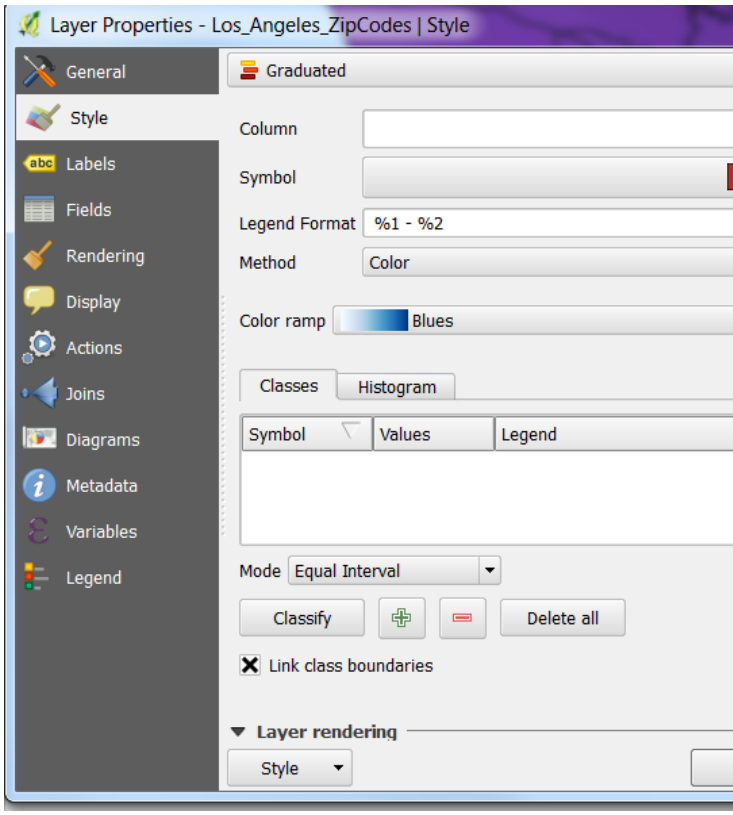
9. **You map should now be categorized:**



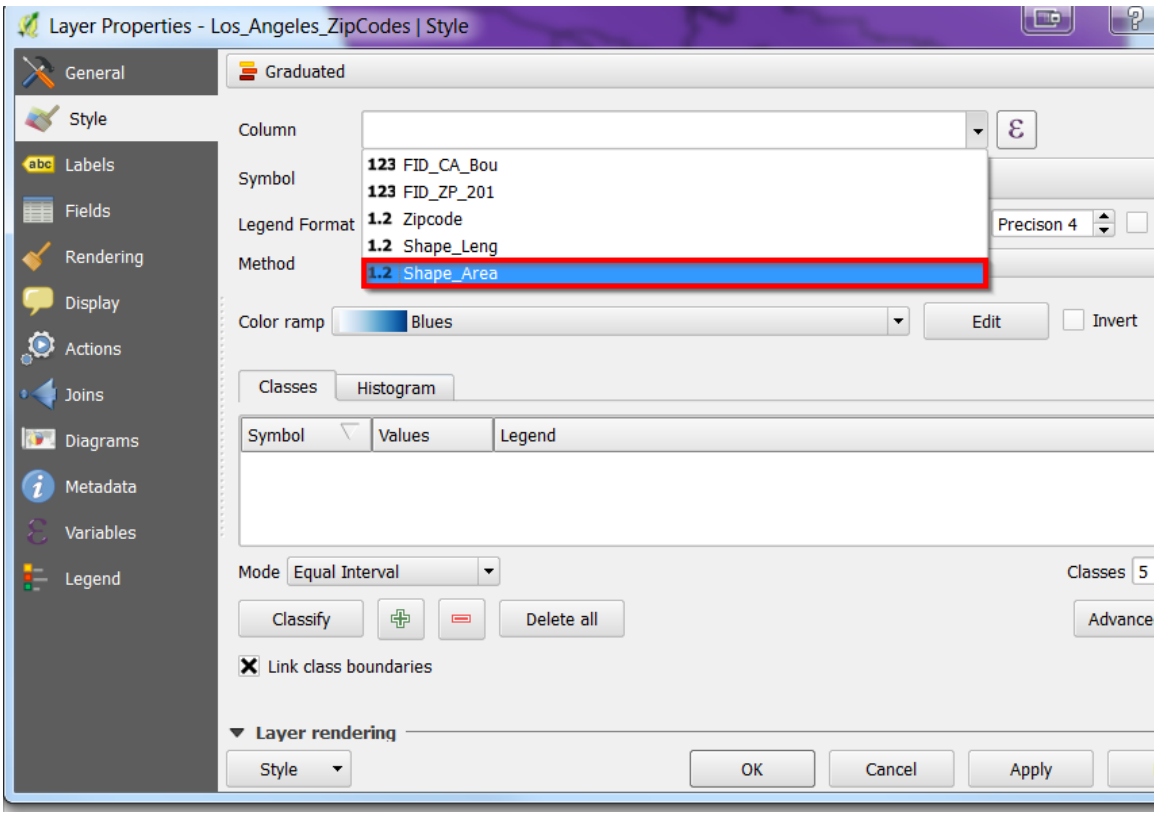
3.1.9 Visualizing numbers (not categories)

1. Re-add the Los_Angeles_ZipCode layer.
2. Go to layer properties of the Los_Angeles_ZipCode layer and then “Style”.
3. **Select “Graduated”**

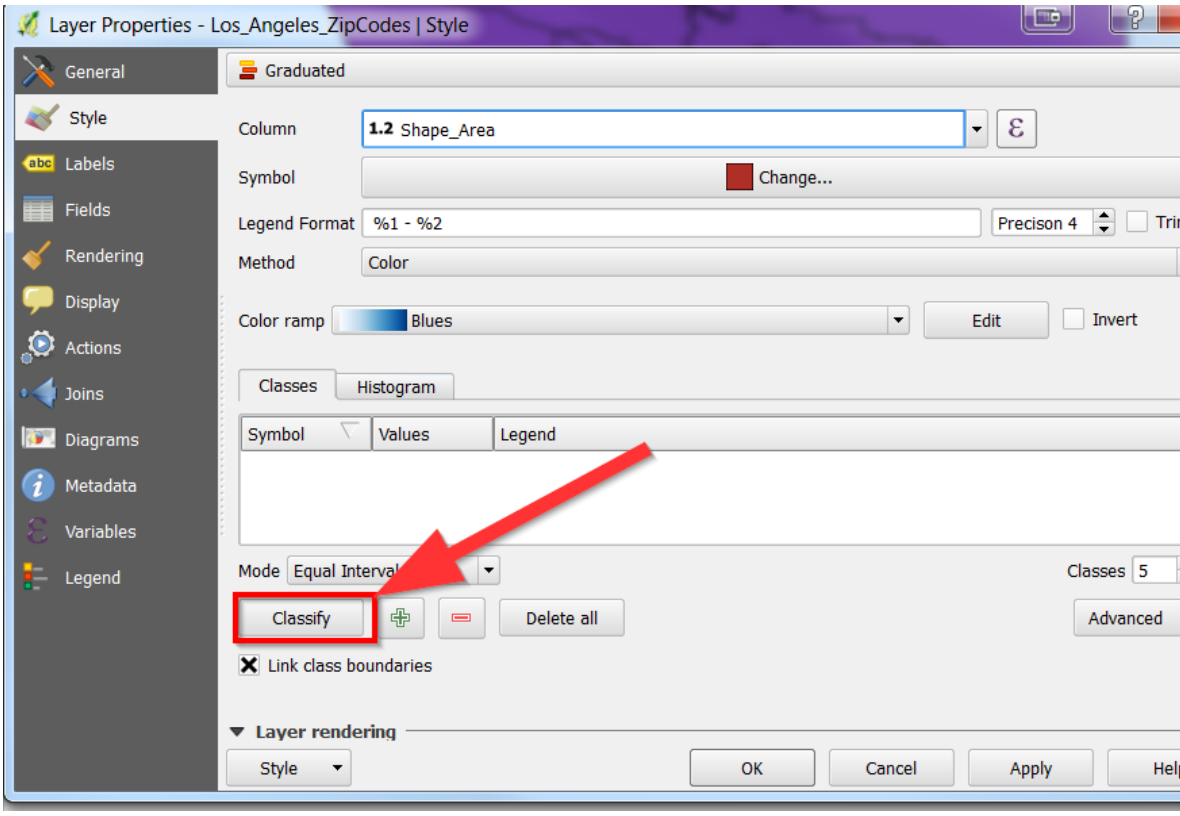




4. **Go ahead and select the drop down near Column again:**

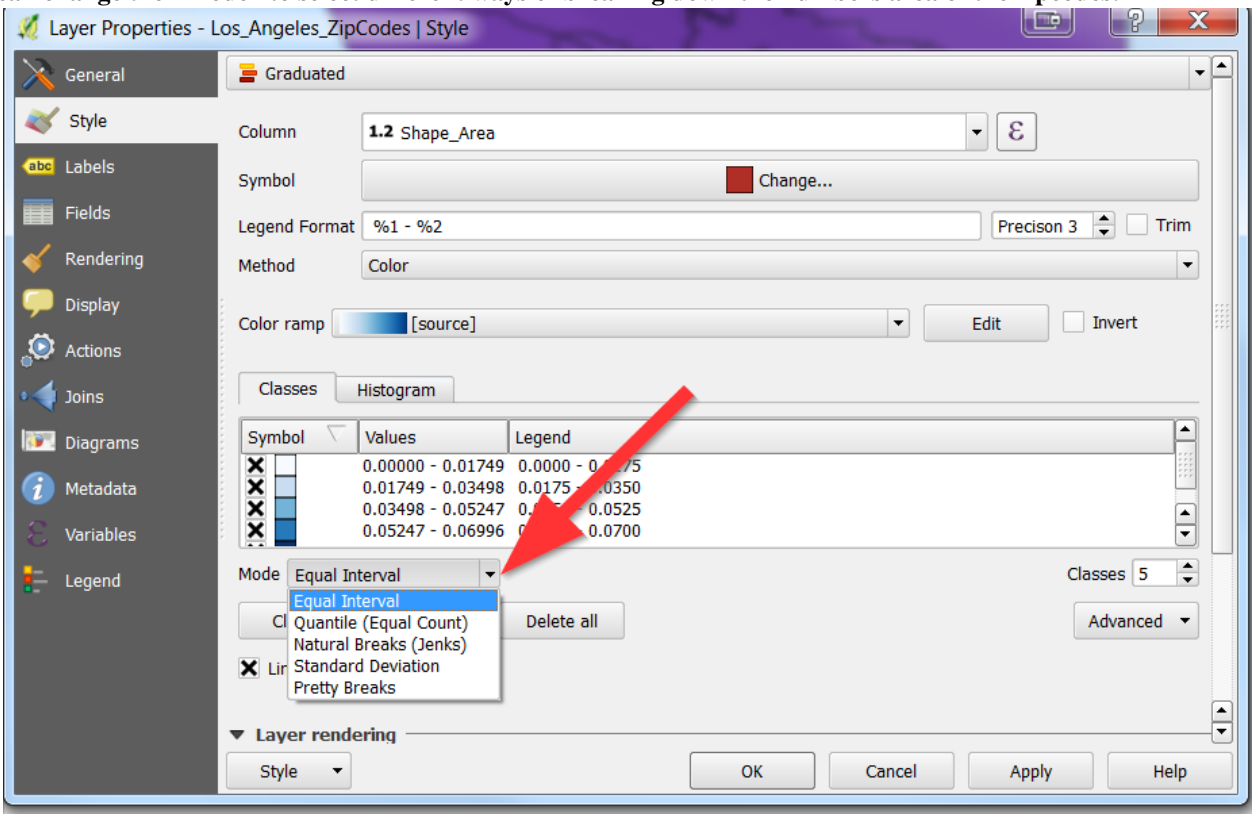


5. **Select shape_area:**



6. **Click "Classify"**

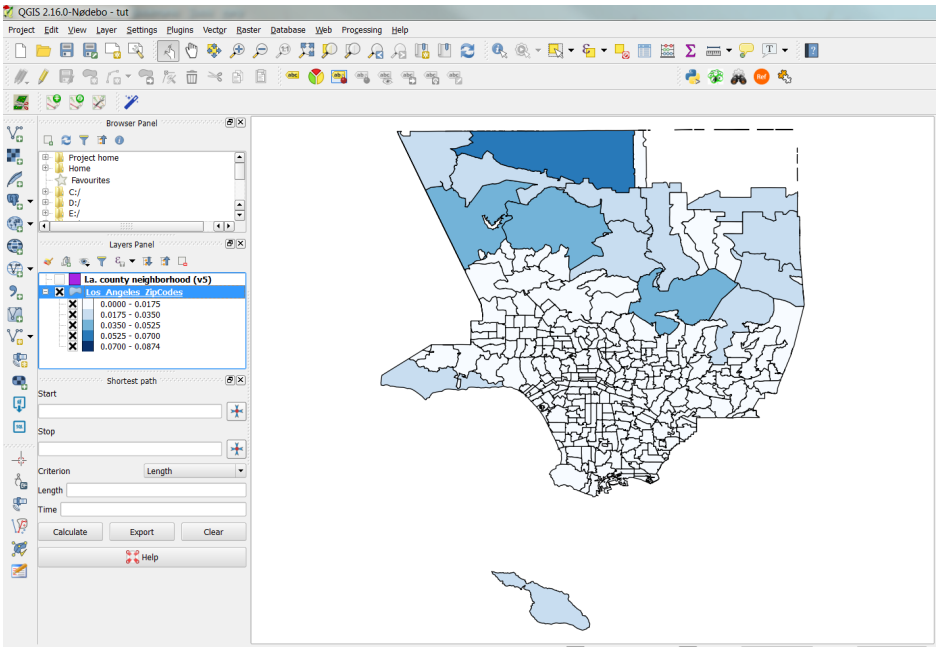
7. **You can change the "Mode" to select different ways of breaking down the numbers area of the zipcodes:**



8. As you can tell, this type of data visualization can be useful when working with population, number of arrests,

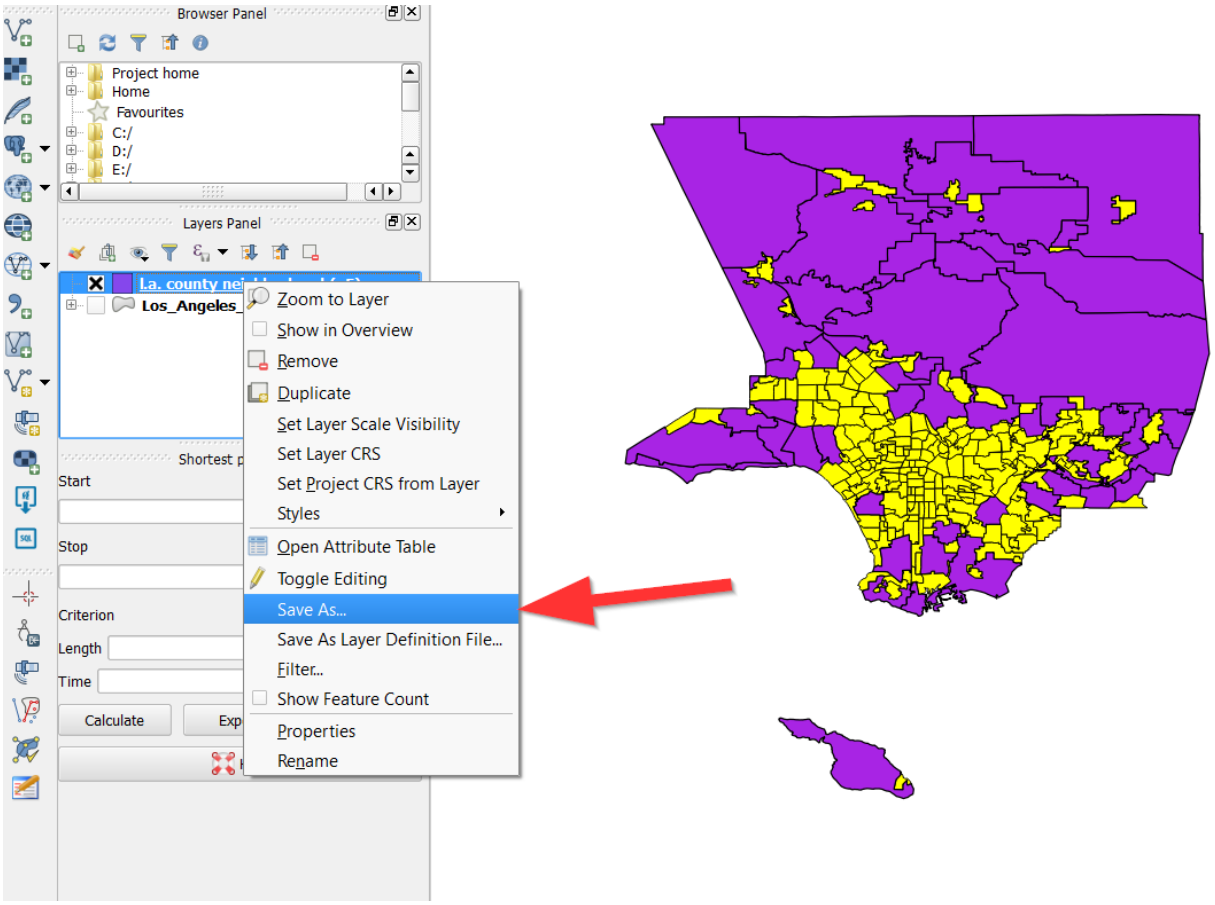
etc.

9. When you are done selecting and noticing how the numbers change, feel free to hit “Ok”
10. You map should look like the following:

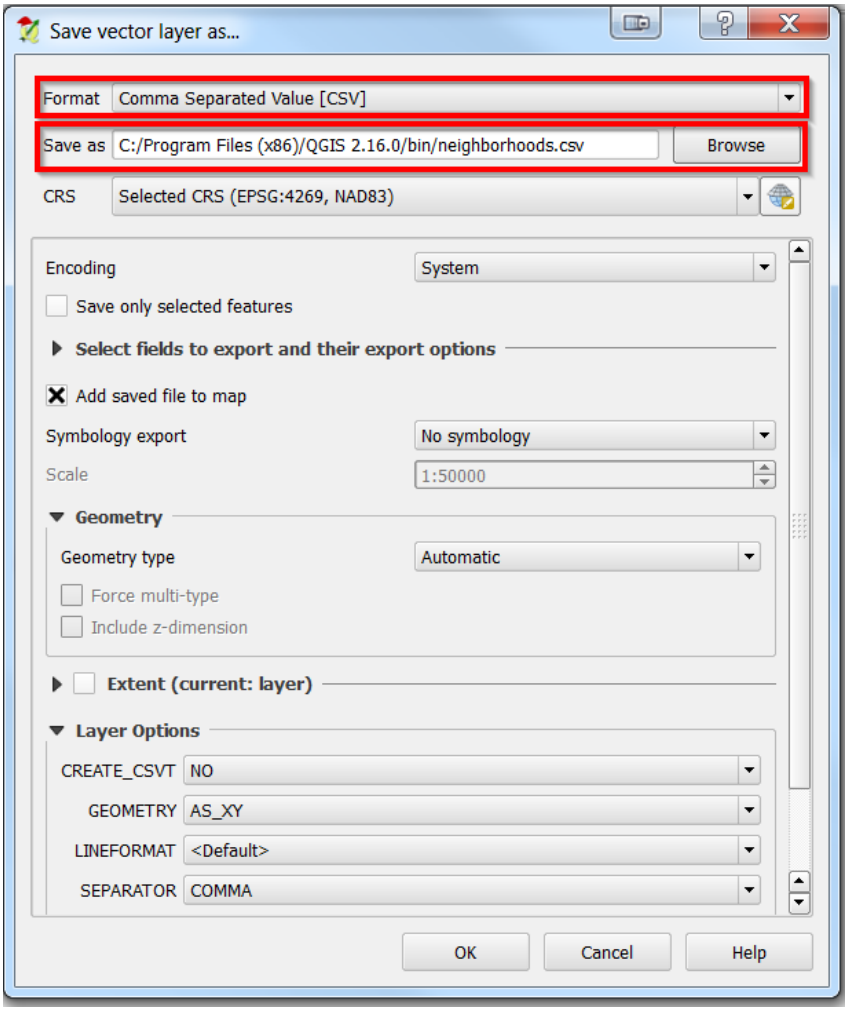


3.1.10 Taking data out of QGIS

Sometimes you want to take data out of QGIS to manipulate it in other software, such as Excel. You can do so, by opening the layer properties and clicking save as:



You can now choose a file type and name, make sure to select “CSV”:



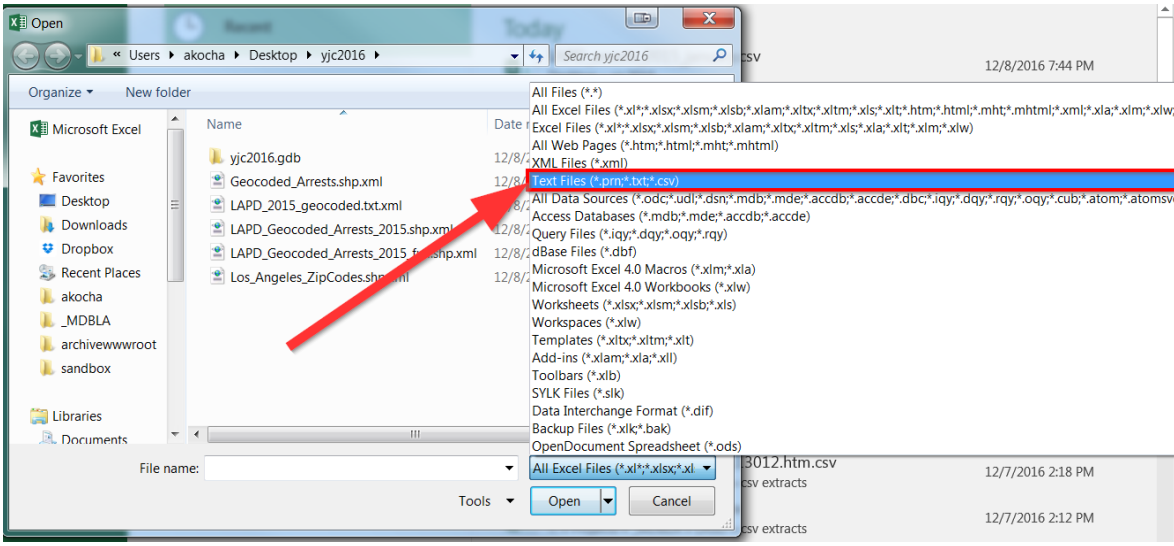
3.1.11 Data Management with Excel

Lets go ahead and open another CSV file, you are welcome to open the neighborhoods.csv file too though.

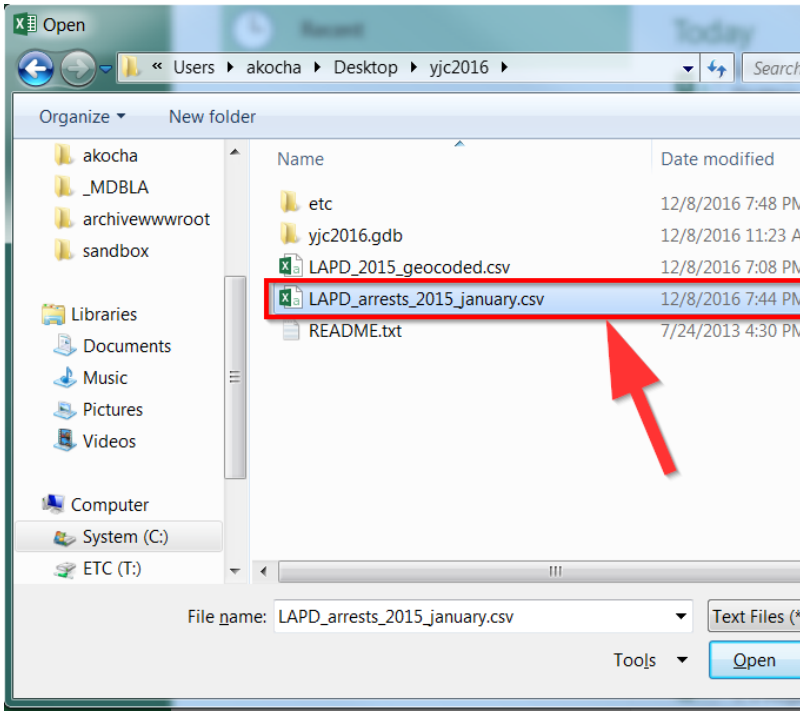
How to open CSV files

1. Go to File -> Open

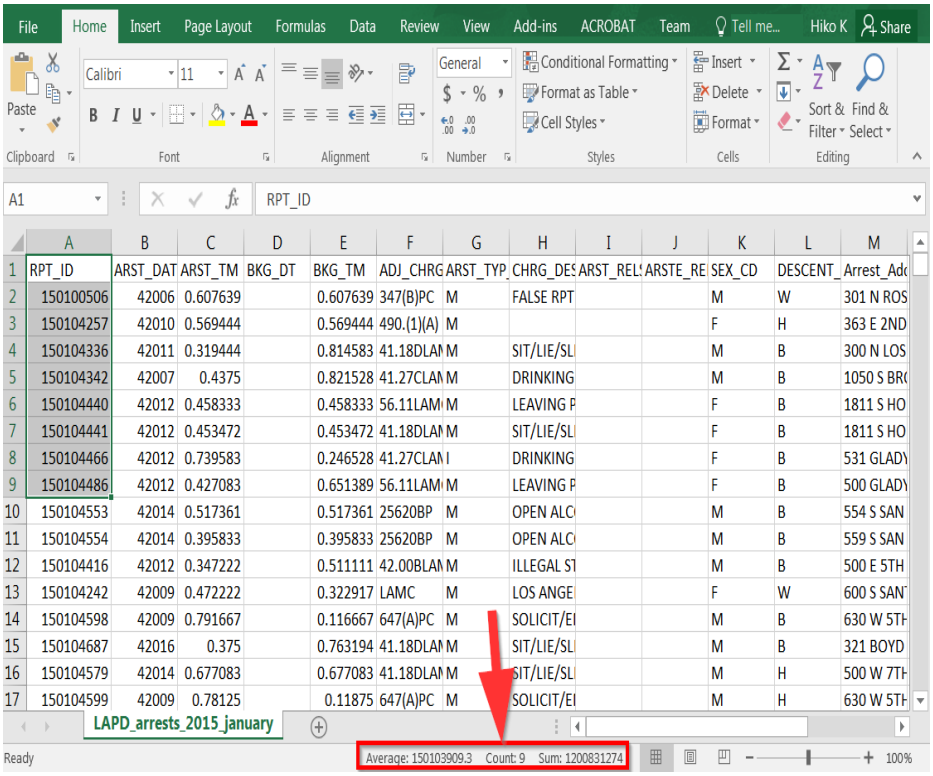
2. **Select "Text" file**



3. **Select the "LAPD_arrests_2015_january.csv" file:**



4. **Excel always provides a summary of selected information near the** bottom:

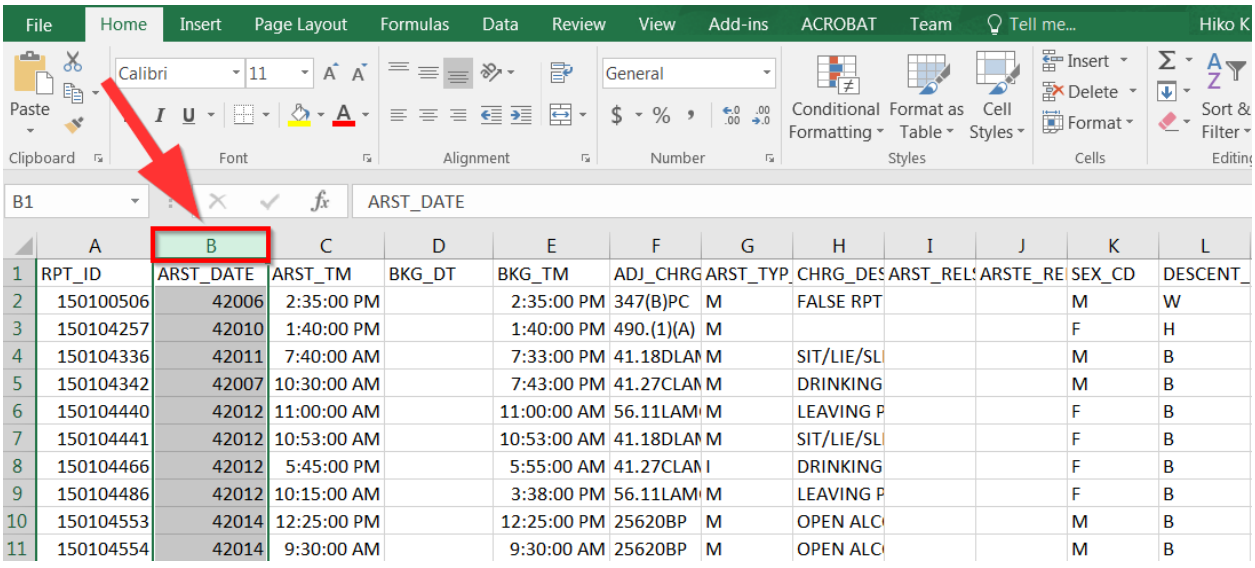


	A	B	C	D	E	F	G	H	I	J	K	L	M
1	RPT_ID	ARST_DAT	ARST_TM	BKG_DT	BKG_TM	ADJ_CHRG	ARST_TYP	CHRG_DES	ARST_REL	ARSTE_RE	SEX_CD	DESCENT_	Arrest_Ad
2	150100506	42006	0.607639		0.607639	347(B)PC	M	FALSE RPT			M	W	301 N ROS
3	150104257	42010	0.569444		0.569444	490.(1)(A)	M				F	H	363 E 2ND
4	150104336	42011	0.319444		0.814583	41.18DLAN	M	SIT/LIE/SL			M	B	300 N LOS
5	150104342	42007	0.4375		0.821528	41.27CLAN	M	DRINKING			M	B	1050 S BR
6	150104440	42012	0.458333		0.458333	56.11LAM	M	LEAVING P			F	B	1811 S HO
7	150104441	42012	0.453472		0.453472	41.18DLAN	M	SIT/LIE/SL			F	B	1811 S HO
8	150104466	42012	0.739583		0.246528	41.27CLAN	I	DRINKING			F	B	531 GLAD
9	150104486	42012	0.427083		0.651389	56.11LAM	M	LEAVING P			F	B	500 GLAD
10	150104553	42014	0.517361		0.517361	25620BP	M	OPEN ALC			M	B	554 S SAN
11	150104554	42014	0.395833		0.395833	25620BP	M	OPEN ALC			M	B	559 S SAN
12	150104416	42012	0.347222		0.511111	42.00BLAN	M	ILLEGAL ST			M	B	500 E 5TH
13	150104242	42009	0.472222		0.322917	LAMC	M	LOS ANGE			F	W	600 S SAN
14	150104598	42009	0.791667		0.116667	647(A)PC	M	SOLICIT/EI			M	B	630 W 5TH
15	150104687	42016	0.375		0.763194	41.18DLAN	M	SIT/LIE/SL			M	B	321 BOYD
16	150104579	42014	0.677083		0.677083	41.18DLAN	M	SIT/LIE/SL			M	H	500 W 7TH
17	150104599	42009	0.78125		0.11875	647(A)PC	M	SOLICIT/EI			M	H	630 W 5TH

Before going forward, lets make sure our data columns are in good order:

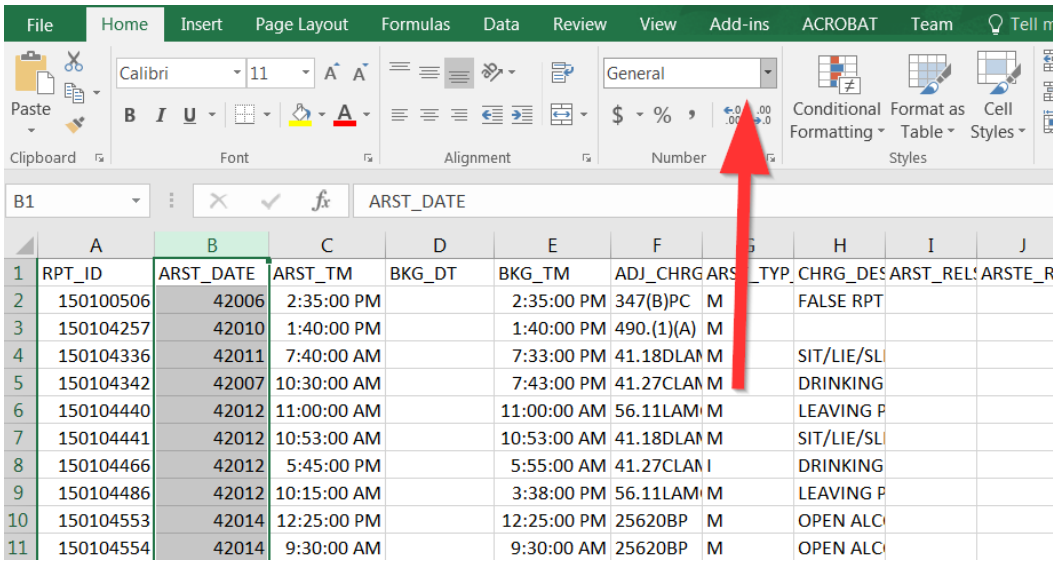
ARST_DATE should be a date field, and ARST_TM should be a Time Field.

1. Select the columns:

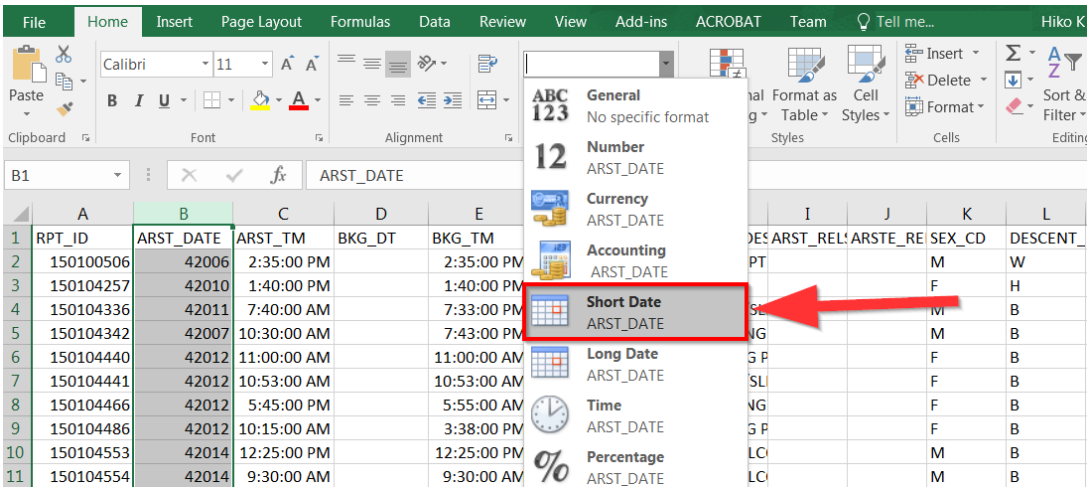


	A	B	C	D	E	F	G	H	I	J	K	L
1	RPT_ID	ARST_DATE	ARST_TM	BKG_DT	BKG_TM	ADJ_CHRG	ARST_TYP	CHRG_DES	ARST_REL	ARSTE_RE	SEX_CD	DESCENT_
2	150100506	42006	2:35:00 PM		2:35:00 PM	347(B)PC	M	FALSE RPT			M	W
3	150104257	42010	1:40:00 PM		1:40:00 PM	490.(1)(A)	M				F	H
4	150104336	42011	7:40:00 AM		7:33:00 PM	41.18DLAN	M	SIT/LIE/SL			M	B
5	150104342	42007	10:30:00 AM		7:43:00 PM	41.27CLAN	M	DRINKING			M	B
6	150104440	42012	11:00:00 AM		11:00:00 AM	56.11LAM	M	LEAVING P			F	B
7	150104441	42012	10:53:00 AM		10:53:00 AM	41.18DLAN	M	SIT/LIE/SL			F	B
8	150104466	42012	5:45:00 PM		5:55:00 AM	41.27CLAN	I	DRINKING			F	B
9	150104486	42012	10:15:00 AM		3:38:00 PM	56.11LAM	M	LEAVING P			F	B
10	150104553	42014	12:25:00 PM		12:25:00 PM	25620BP	M	OPEN ALC			M	B
11	150104554	42014	9:30:00 AM		9:30:00 AM	25620BP	M	OPEN ALC			M	B

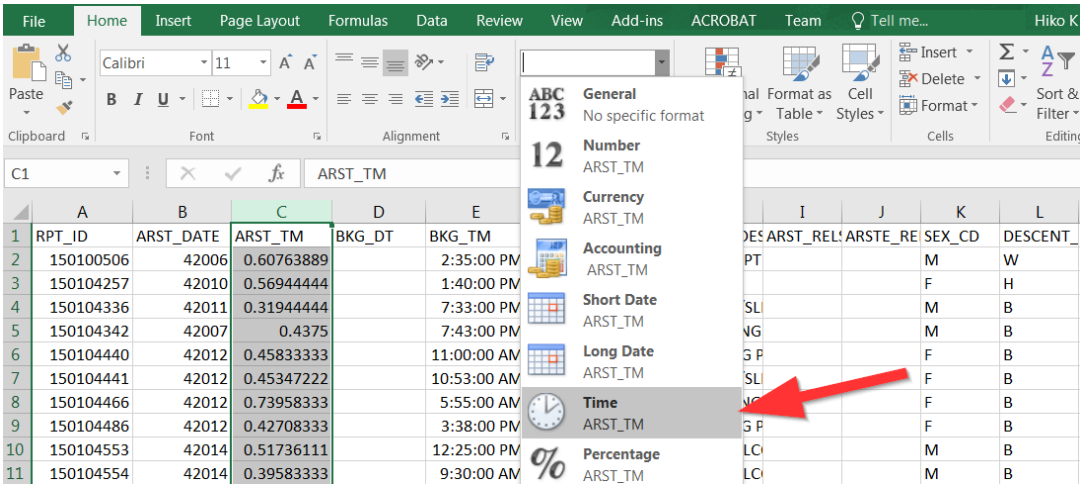
2. Select dropdown box near the top:



3. Then choose “Short Date”:



4. For ARST_TM choose “Time”:

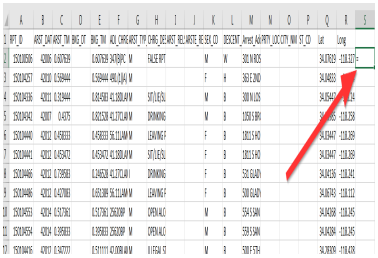


5.Do the same for BKG_DT and BKG_TM as well.

3.1.12 Formulas

Excel is a spreadsheet program, which means it is made up of rows and columns: one giant table. One of the most powerful tools is formulas, which means starting a cell with an "="

Go ahead and find an empty cell so we can start our formula:



S2 looks like a good spot.

The most basic formula we will use is to combine columns together:

=A1 & B1

Every Excel formula relies on using the cells of a table in order to work. For example A1 is the very first cell in the spreadsheet. If you want to combine the contents in the first cell together with the second column, then you can use "=A1&B1"

Question: Whats the formula to combine the Lat(Q2) and Long(R2) columns into one?

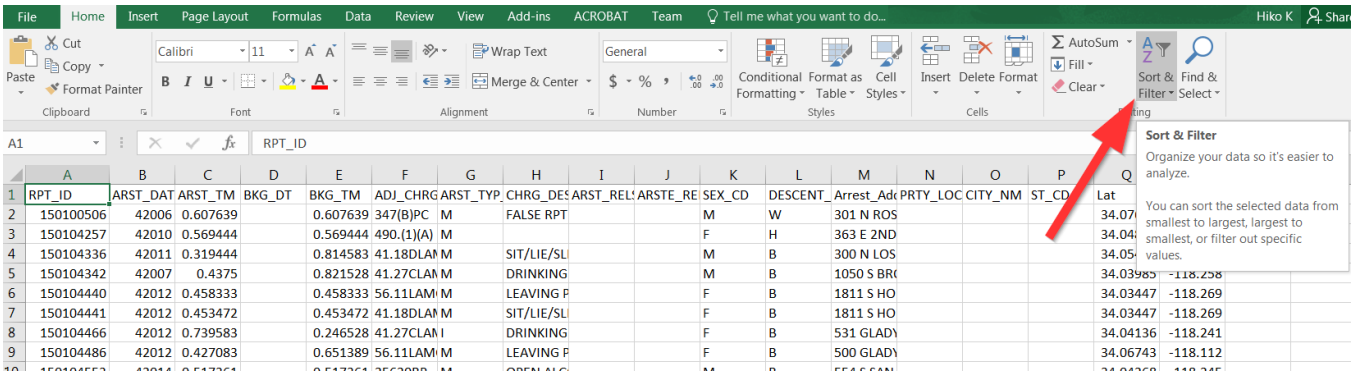
=A1&" "&B1

You will notice that the " "symbols acts as a seperator. You can go ahead and put anything in between those symbols and it will appear in between the result.

Question: Whats the formula to combine the Lat(Q2) and Long(R2) columns into one with a comma in between?

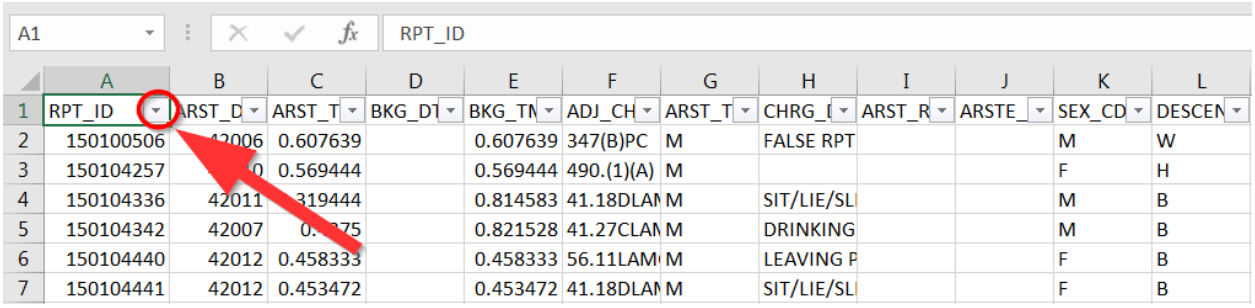
3.1.13 Sorting

In the top part of the menu you can select "Sort":

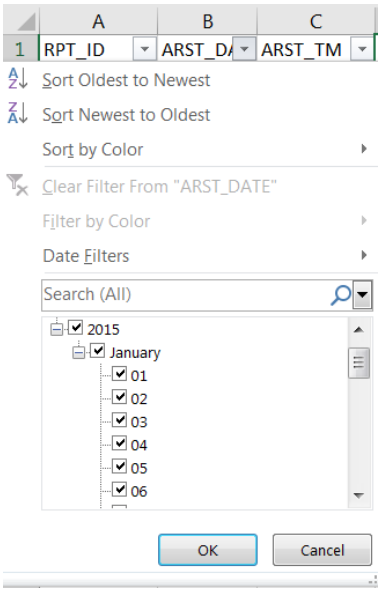


	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	RPT_ID	ARST_DAT	ARST_TM	BKG_DT	BKG_TM	ADJ_CHRG	ARST_TYP	CHRG_DES	ARST_REL	ARSTE_RE	SEX_CD	DESCENT_	Arrest_Ad	PRTY_LOC	CITY_NM	ST_CD	Lat
2	150100506	42006	0.607639		0.607639	347(B)PC	M	FALSE RPT			M	W	301 N ROS				34.07
3	150104257	42010	0.569444		0.569444	490.(1)(A)	M				F	H	363 E 2ND				34.04
4	150104336	42011	0.319444		0.814583	41.18DLAN	M	SIT/LIE/SL			M	B	300 N LOS				34.05
5	150104342	42007	0.4375		0.821528	41.27CLAN	M	DRINKING			M	B	1050 S BR(				34.03985 -118.258
6	150104440	42012	0.458333		0.458333	56.11LAM(	M	LEAVING F			F	B	1811 S HO				34.03447 -118.269
7	150104441	42012	0.453472		0.453472	41.18DLAN	M	SIT/LIE/SL			F	B	1811 S HO				34.03447 -118.269
8	150104466	42012	0.739583		0.246528	41.27CLAN	I	DRINKING			F	B	531 GLADY				34.04136 -118.241
9	150104486	42012	0.427083		0.651389	56.11LAM(	M	LEAVING F			F	B	500 GLADY				34.06743 -118.112

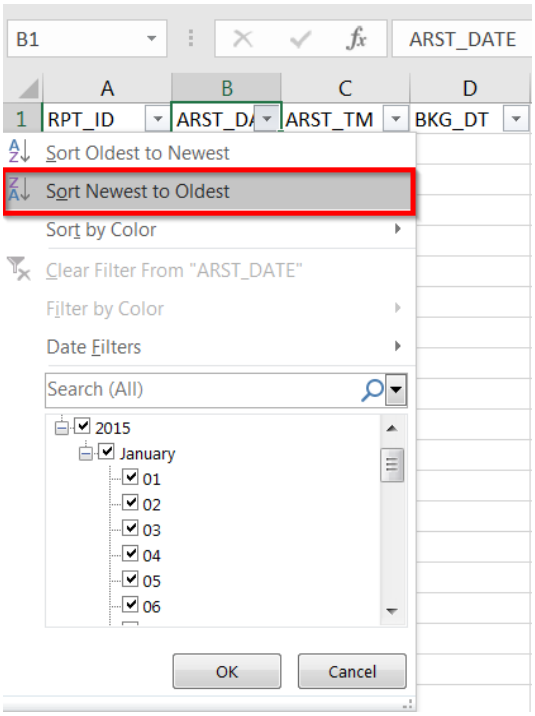
A dropdown arrow will now be shown next to the first row (also known as the header)



When clicking it, you can choose to sort the information in different ways:



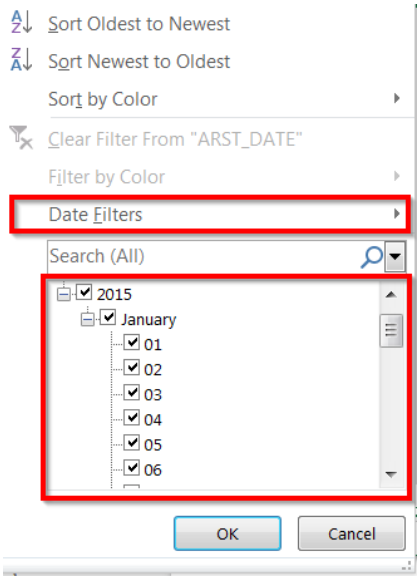
We will sort the data from highest to lowest arrest date:



Feel free to explore sorting the data!

3.1.14 Filtering

You can also filter the data by using the Checkboxes or the Filter By box below the Sort options:



Different data types will have different filter options, feel free to try it out and answer this question:

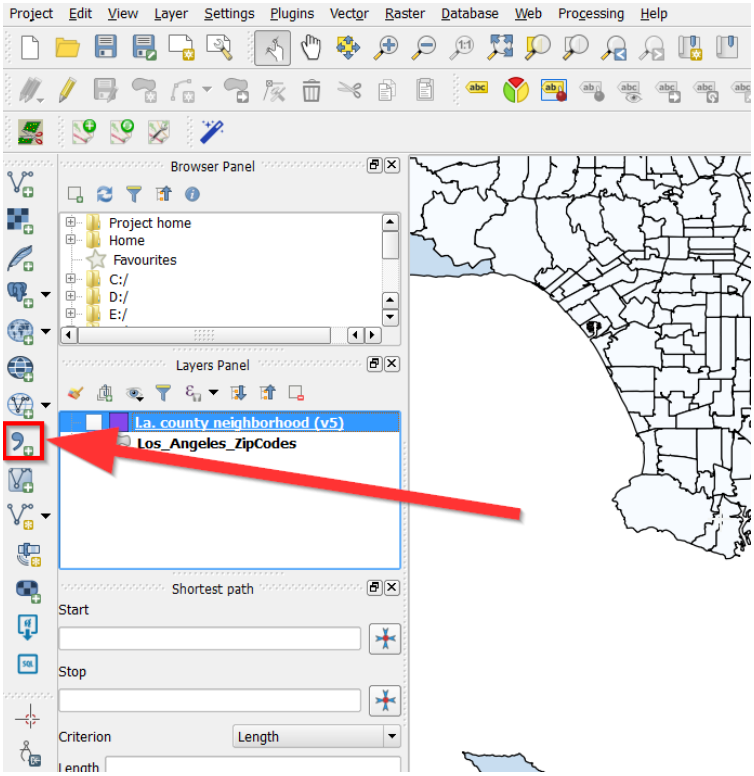
Question: How many arrests were there on January 1st?

3.1.15 Back to QGIS for a moment!

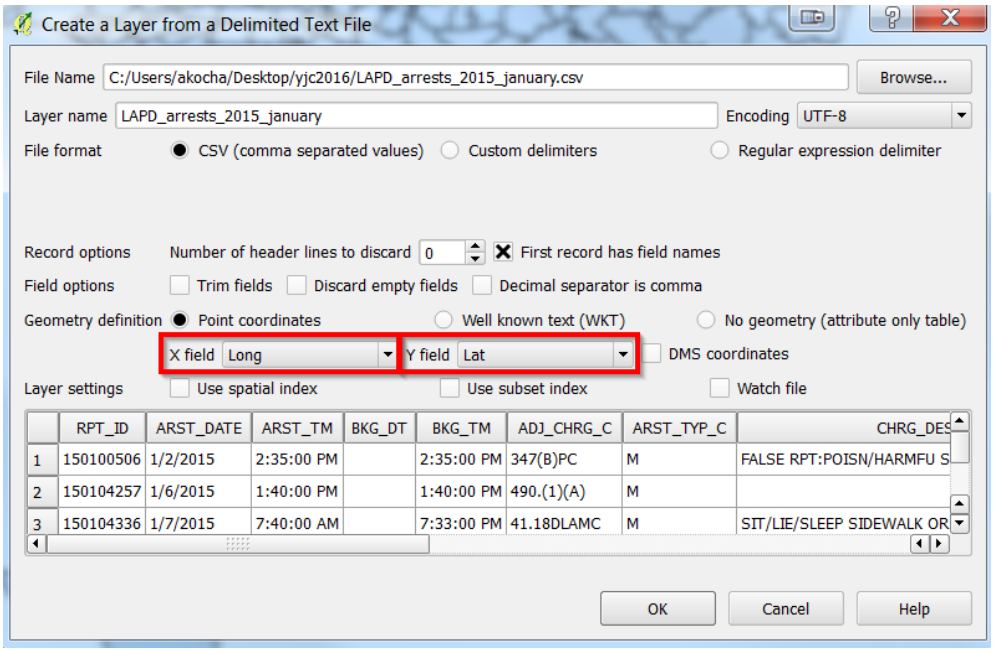
Sometimes you want to summarize data up, for example you want to see the number of arrests by zipcodes or neighborhoods. To do this, you need to do what is called a spatial join.

3.1.16 Add a CSV file in QGIS

Start by clicking the comma:



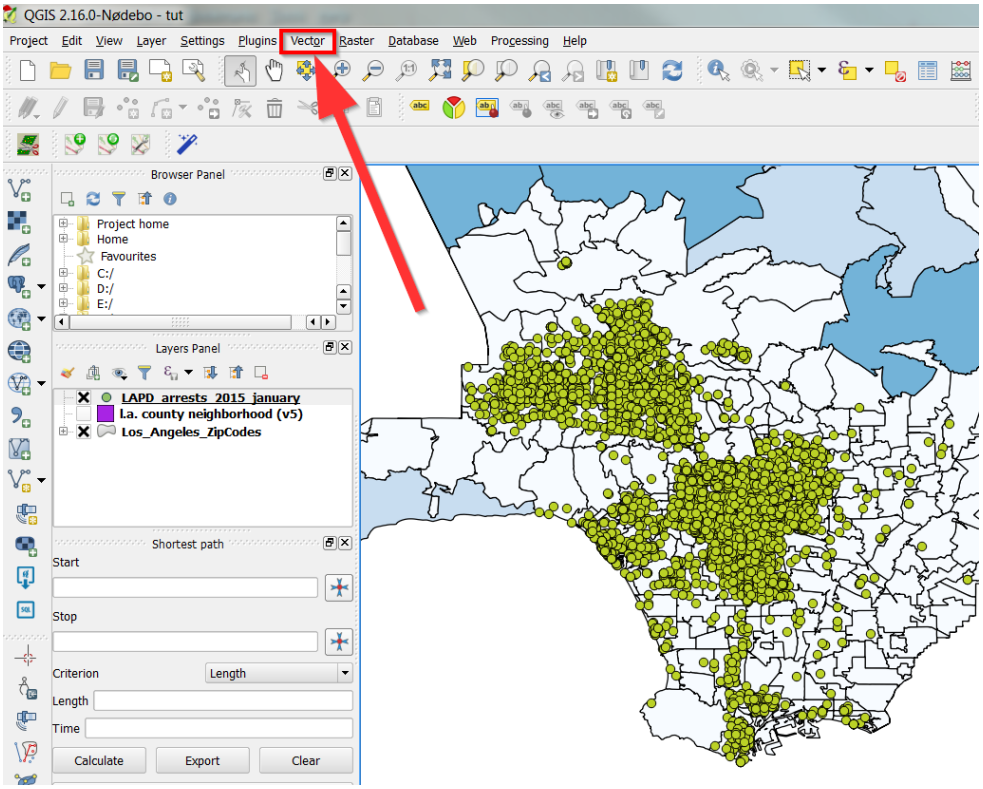
After finding the file, a new dialogue box will show up. Be sure to have Lat and Long selected for the X and Y values [X is always Longitude and Y is always Latitude]:



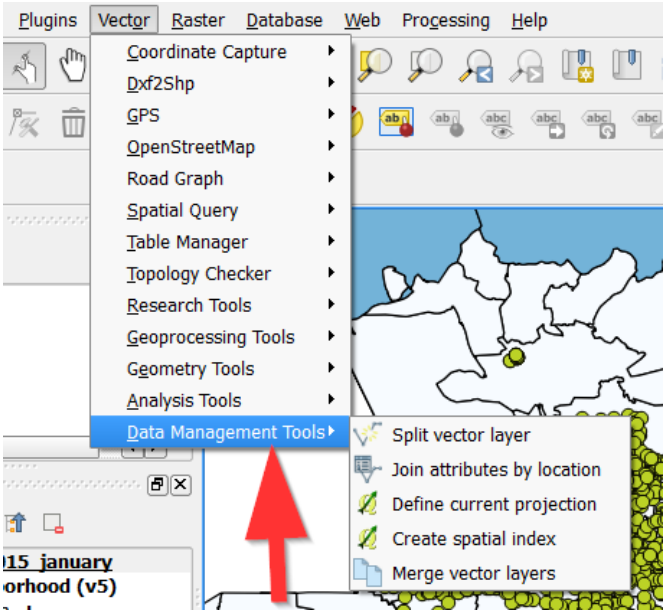
3.1.17 Spatial Joining Data

1. Make sure you have the two layers you want to join together, in this case the LAPD_arrests_2015_january.csv and the Los_Angeles_ZipCodes.

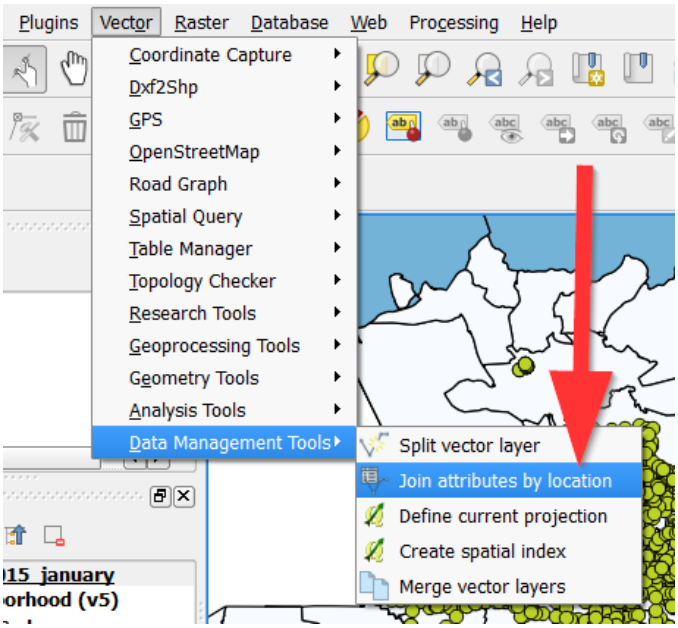
2. **Go to Vector in the menu**



3. **Then Data Management**



4. **Then Join Attributes by Location**



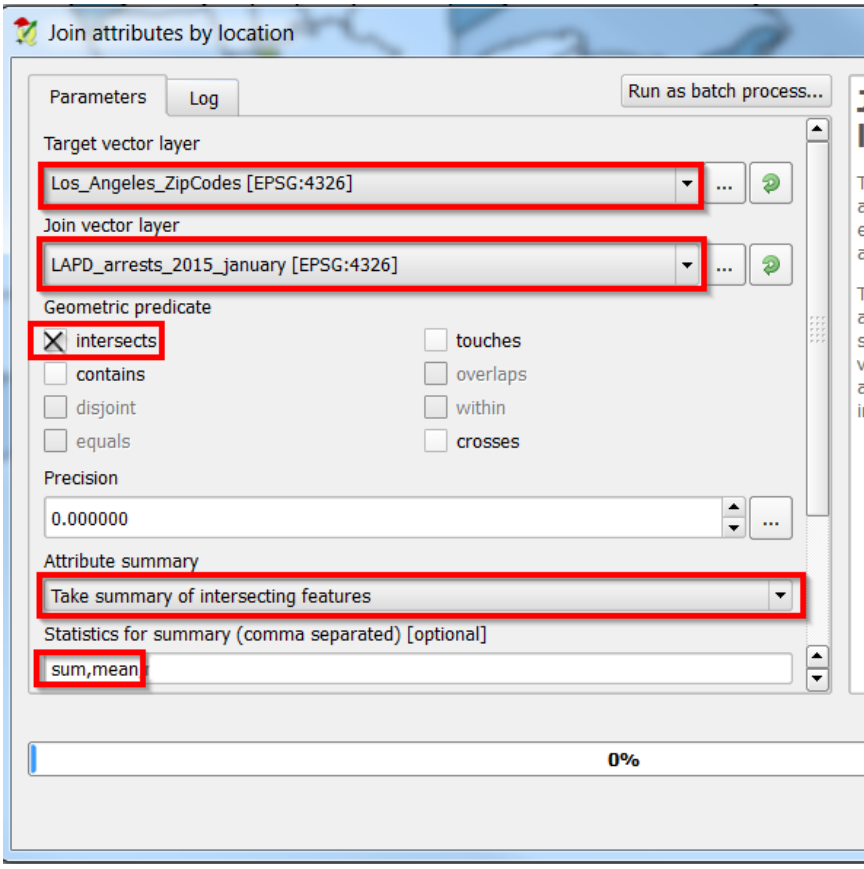
5. The target layer should be the layer you want the data to go

   towards, the join layer is the layer you are taking the information from. So in this case, the Target is the Los Angeles ZipCodes, while the Join is the LAPD_arrests_2015_january.

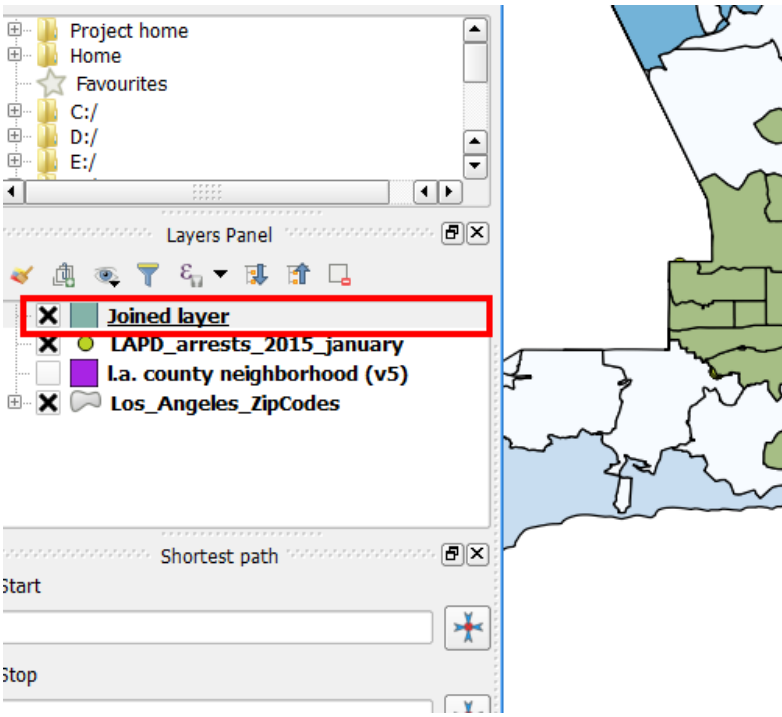
6. Make sure to choose “Intersects” for the Gemetric Predicate.

7. Be sure to select “Take a summary of Intersecting Features” and you

   only need “sum” and “mean” for the Statistics field.

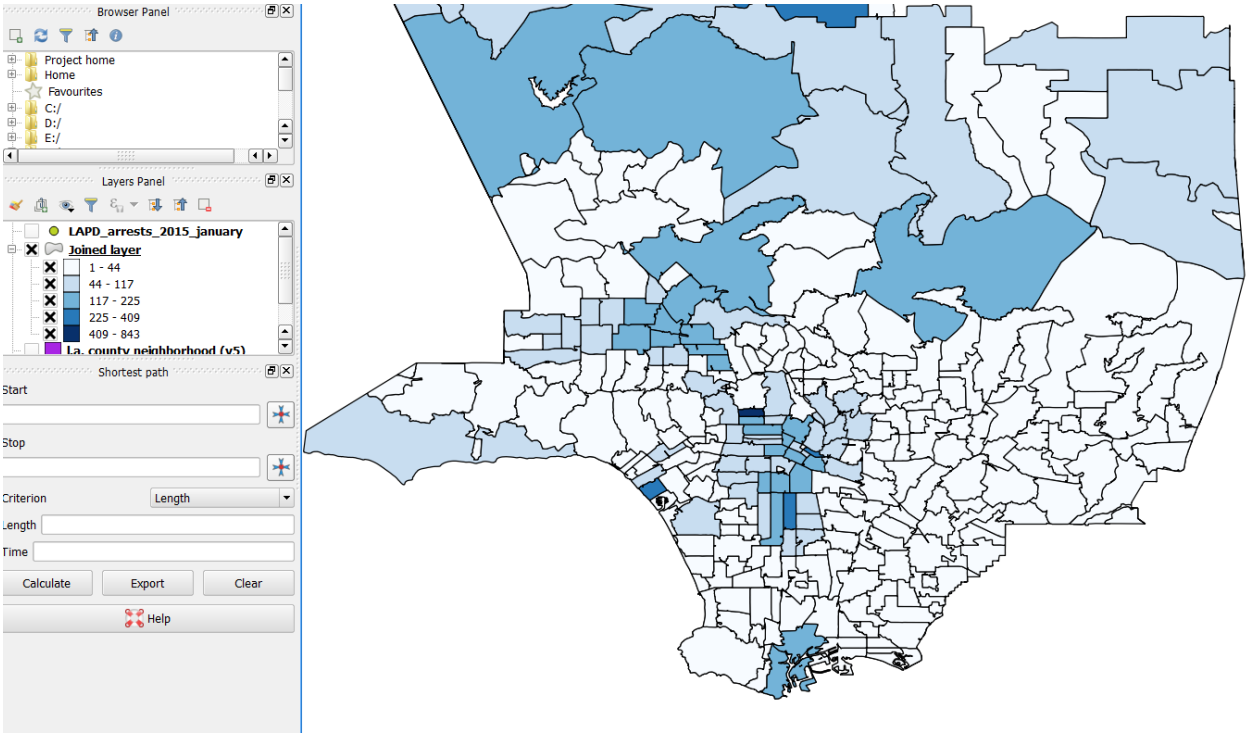


8. **Your text box should look like the following:**
9. Click "Run" to run the join.



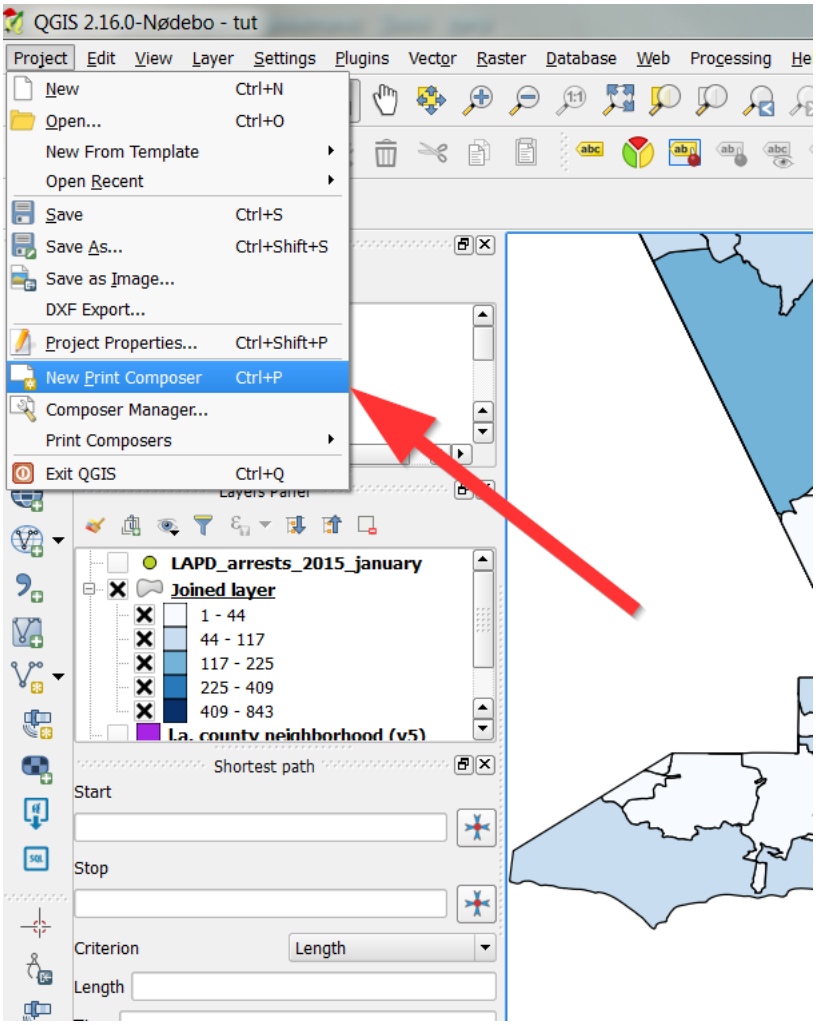
10. **A new layer called "Joined Layer" should show up:**
11. Go ahead and open the attribute table and see if the "sum" worked!

12. Try and visualize the data like so:

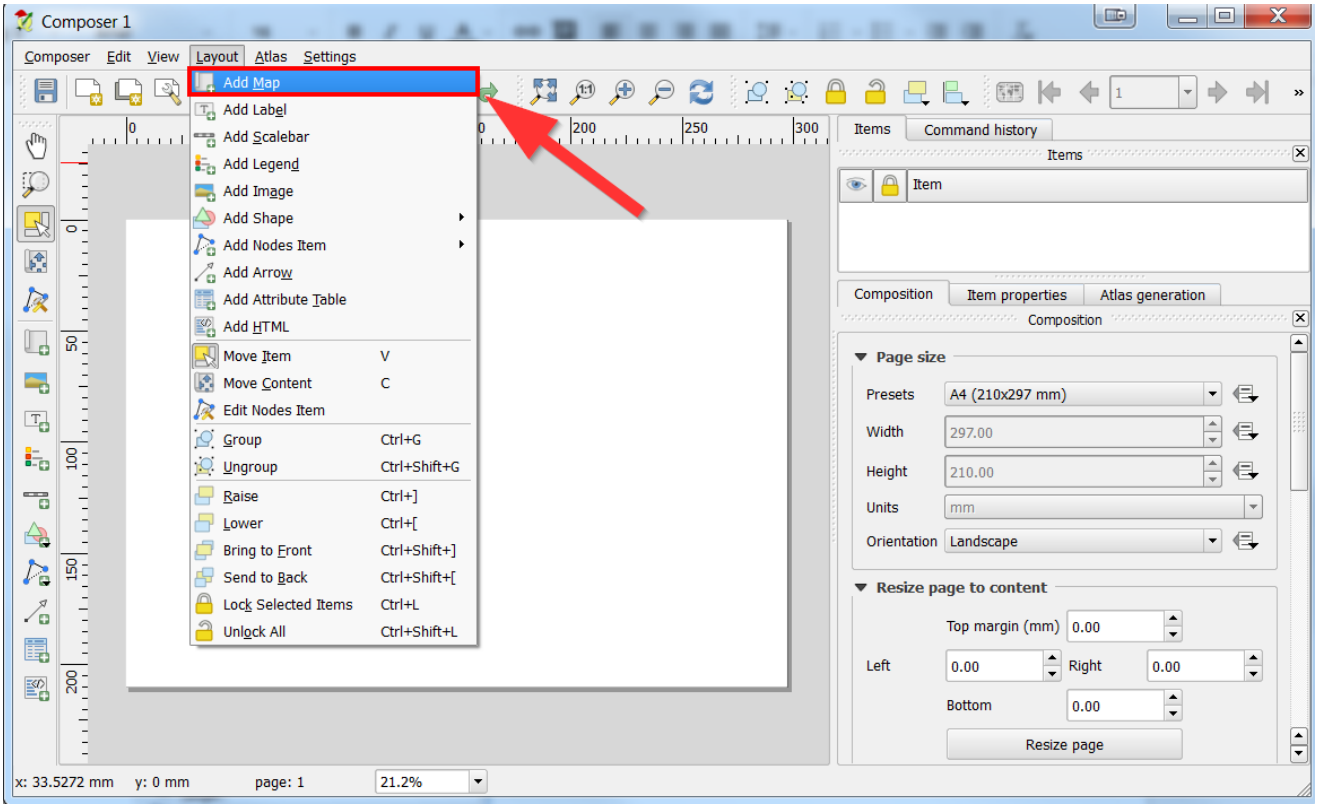


3.1.18 Exporting a map

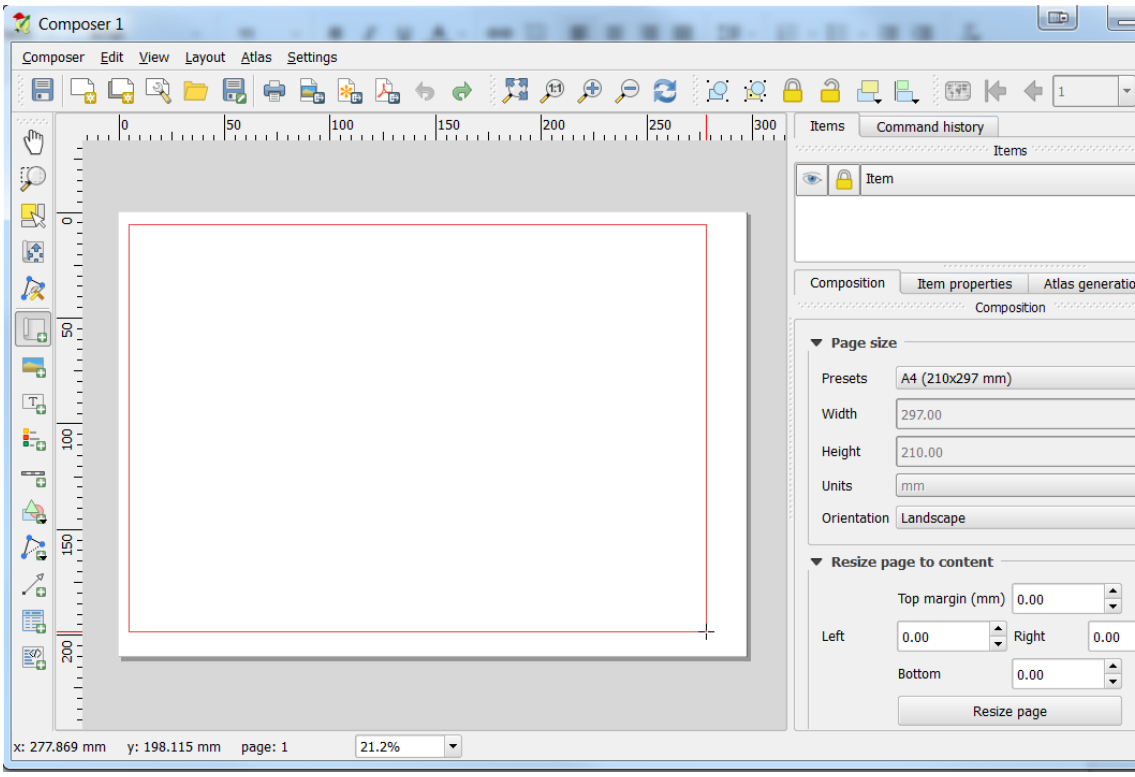
QGIS has a tool called “Print Composer” to take care of all your map printing needs. You can find it by going to “File” then “New Print Composer”

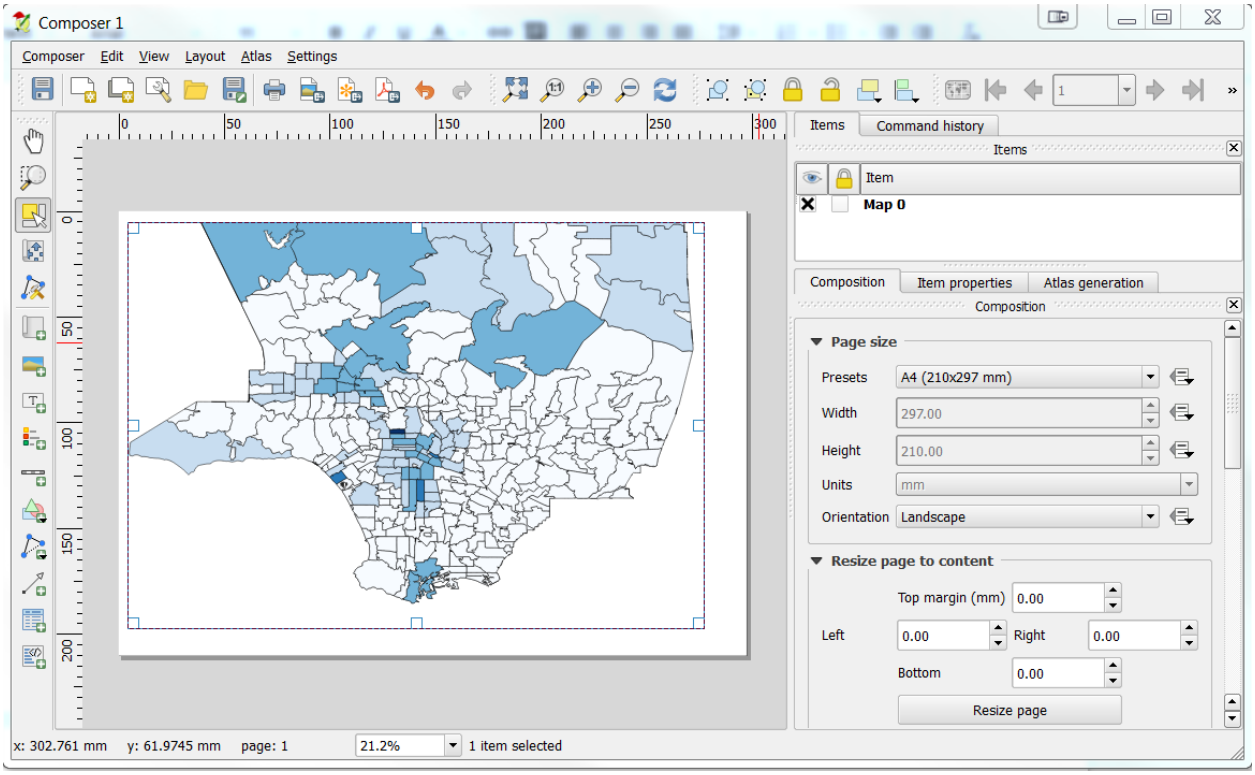


After opening a new print composer, you should add a map, which can by done by going to “Layout” then “Add new map”:



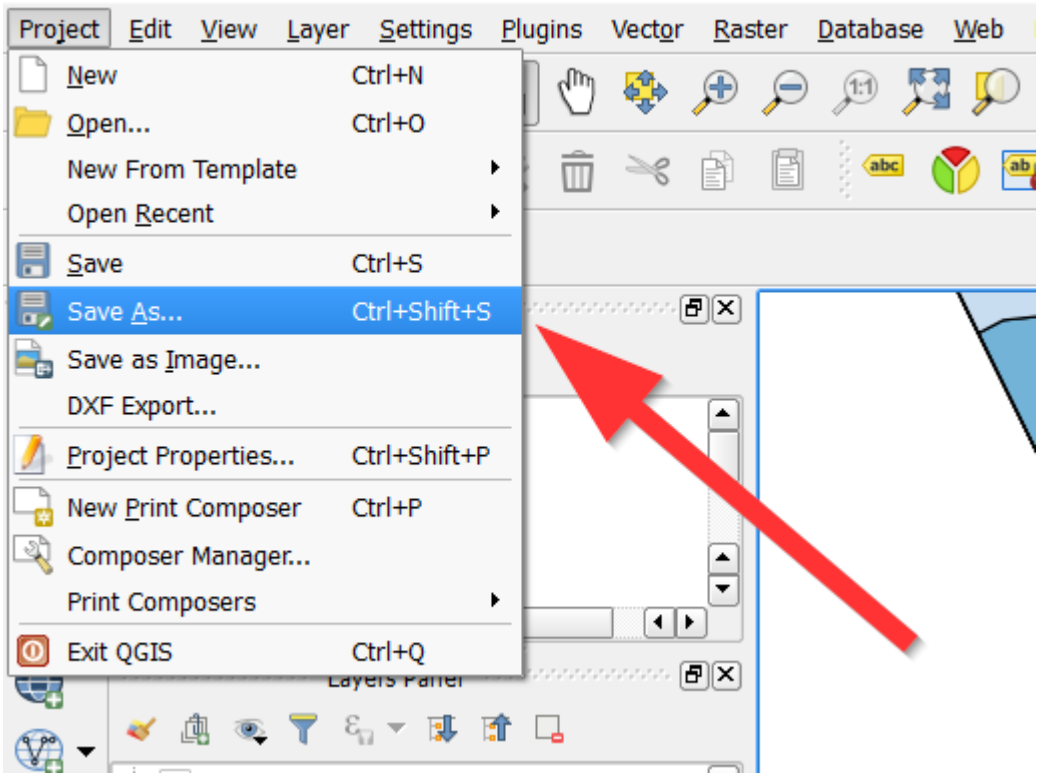
Draw a box to add your map:





You can also add text, shapes and other content.

When you are done using QGIS, you can save your project as a QGIS file:



3.1.19 Extra Topics!

3.1.20 Georeferencing

http://www.findlatitudeandlongitude.com/batch-geocode/(down)

3.1.21 Pivot Tables

http://www.excel-easy.com/data-analysis/pivot-tables.html

3.1.22 Mapping Projects to Explore

http://dsl.richmond.edu/panorama/

3.2 Visualizing Data in ArcGIS Online

3.2.1 Introduction to GIS Vector Data

There are three basic types of vector data: points, lines, and polygons. See the figure below for an example of each of the types.

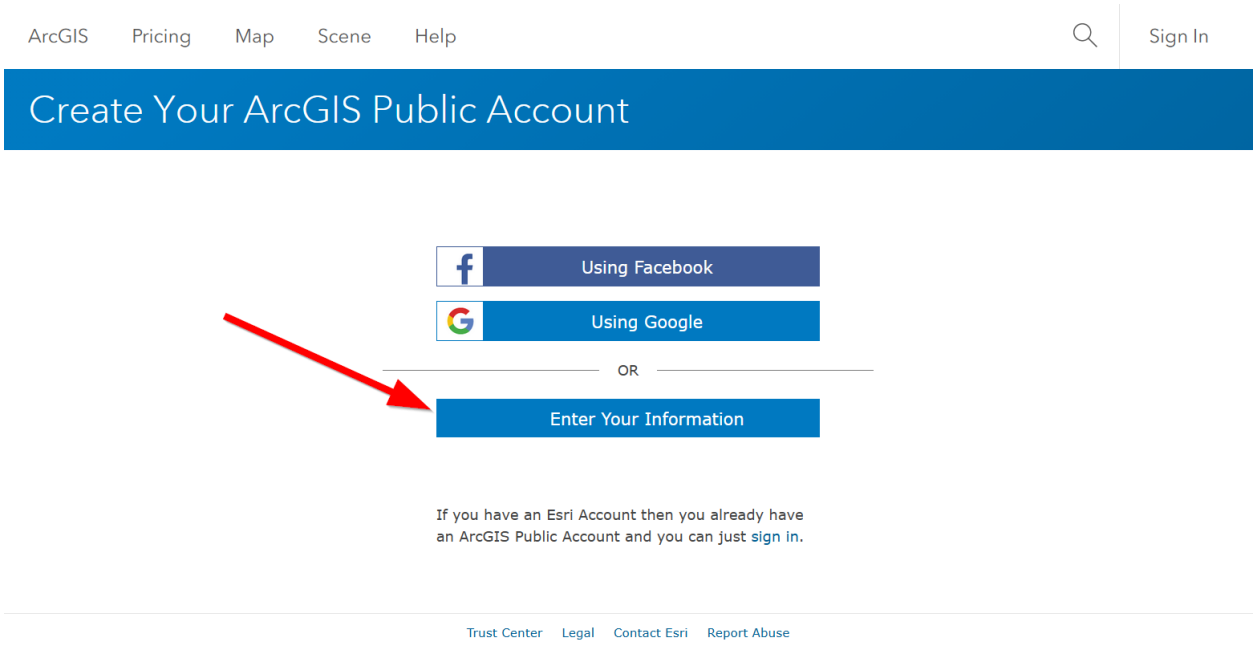
3.2.2 Getting Started

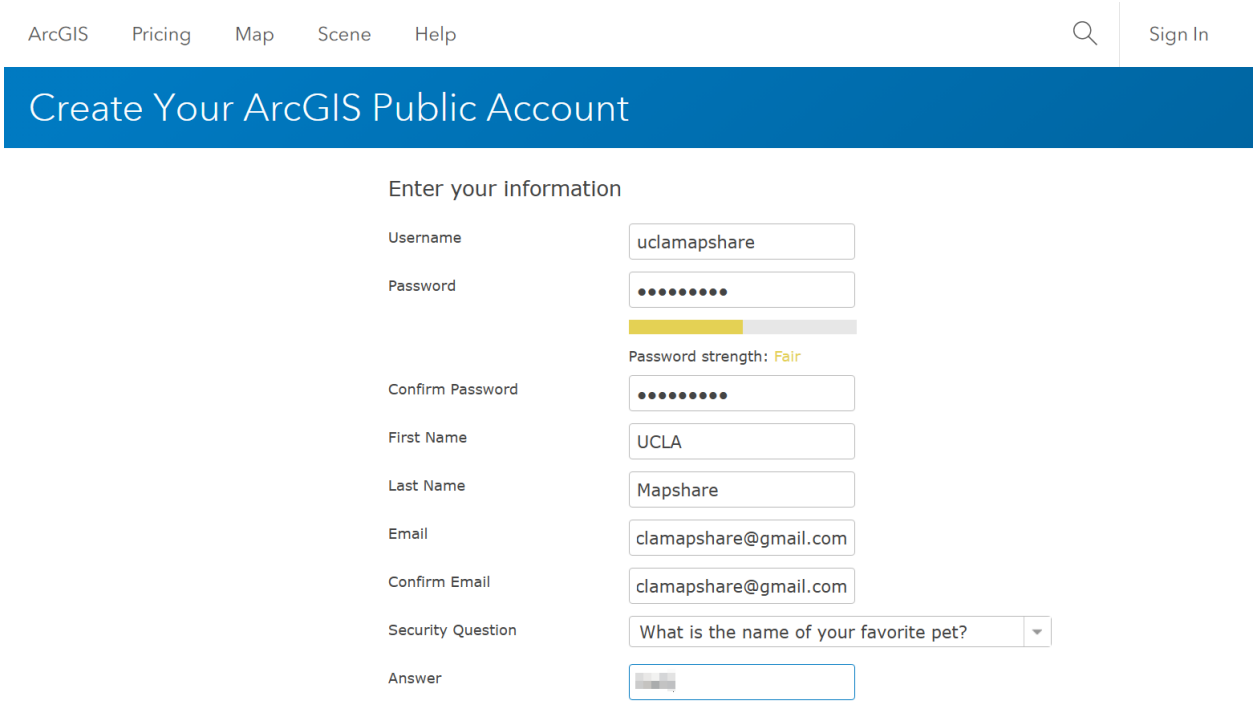
Note: This tutorial uses arrest data downloaded from Los Angeles Open Data portal filtered for the year of 2017 only (see: 'Quick Visual Guide to Visualizing Data on LA Open Data Portal <https://drive.google.com/file/d/140rq7sU548VdtYMkiQ8SLIMDLl7smoJE/view?usp=sharing>'__)

You can download the data here:

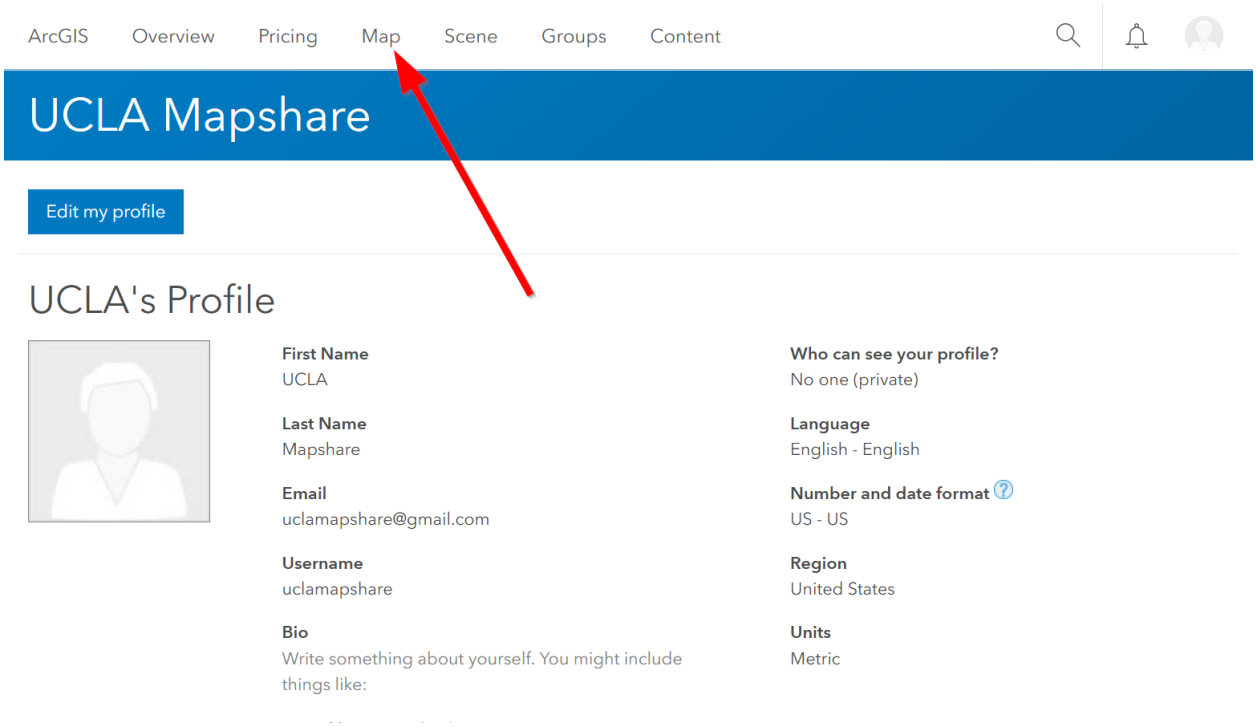
https://sandbox.idre.ucla.edu/data/Arrest_Data_from_January_2017.csv

1. Create your ArcGIS Online Public Account (https://www.arcgis.com/home/createaccount.html)





2. Once your account has been successfully created, click on 'Map' to start your first map!

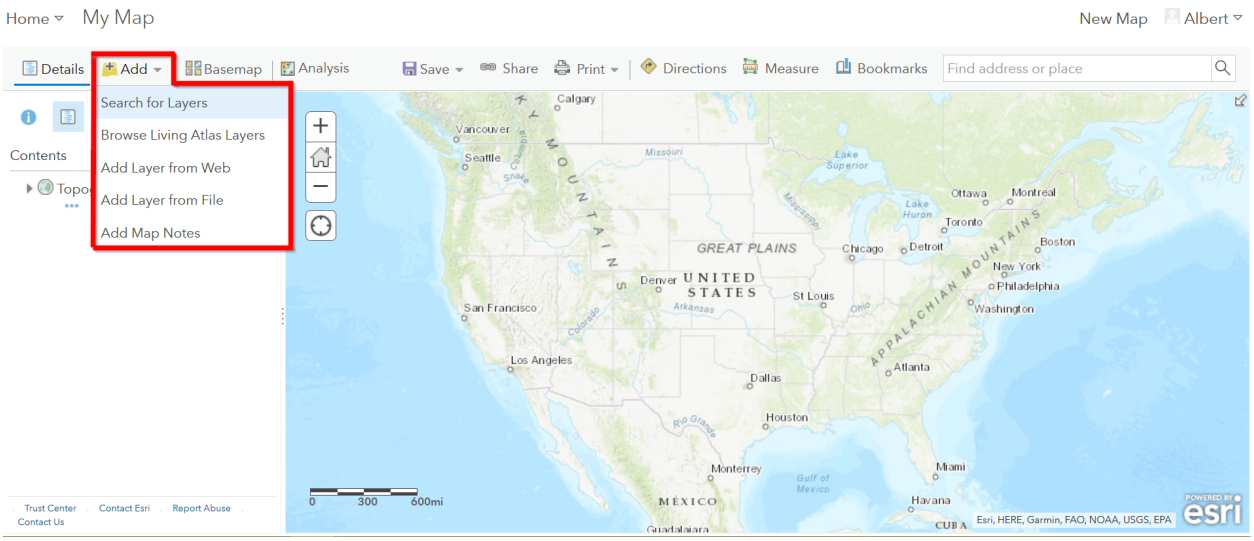


3.2.3 Working with Point Data

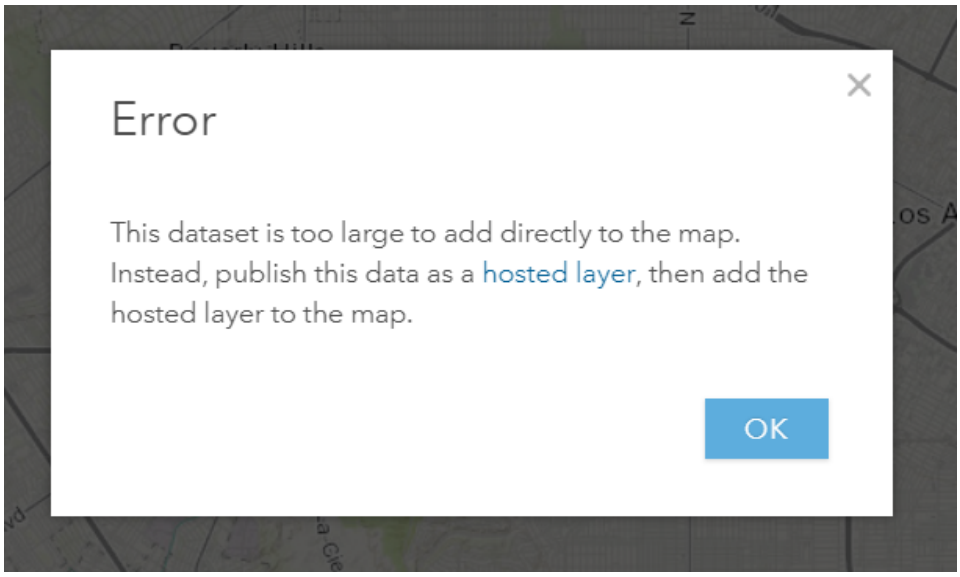
There are multiple ways to add data in ArcGIS Online. Let's start with adding data in Map View.

Adding Point Data (Less than 2,000 records*) in Map View

1. Click on the 'Add Content to Map' icon in Map View. The first two options from the drop down menu allow you to search for already shared data on ArcGIS Online or the Living Atlas. While the last three options allow you to add your own data. Click on 'Add Layer from File".



2. Find your CSV file with the arrest data from the LA County Data Portal. Make sure you have the location data cleaned up!
    a. *Note: If you data has not been cleaned up yet see: *Cleaning Data in Microsoft Excel*
    b. Note: The maximum number of records for adding data via this method 2,000. If you attempt to use your arrest data from the LA City Portal then ArcGIS Online will return the following error message:



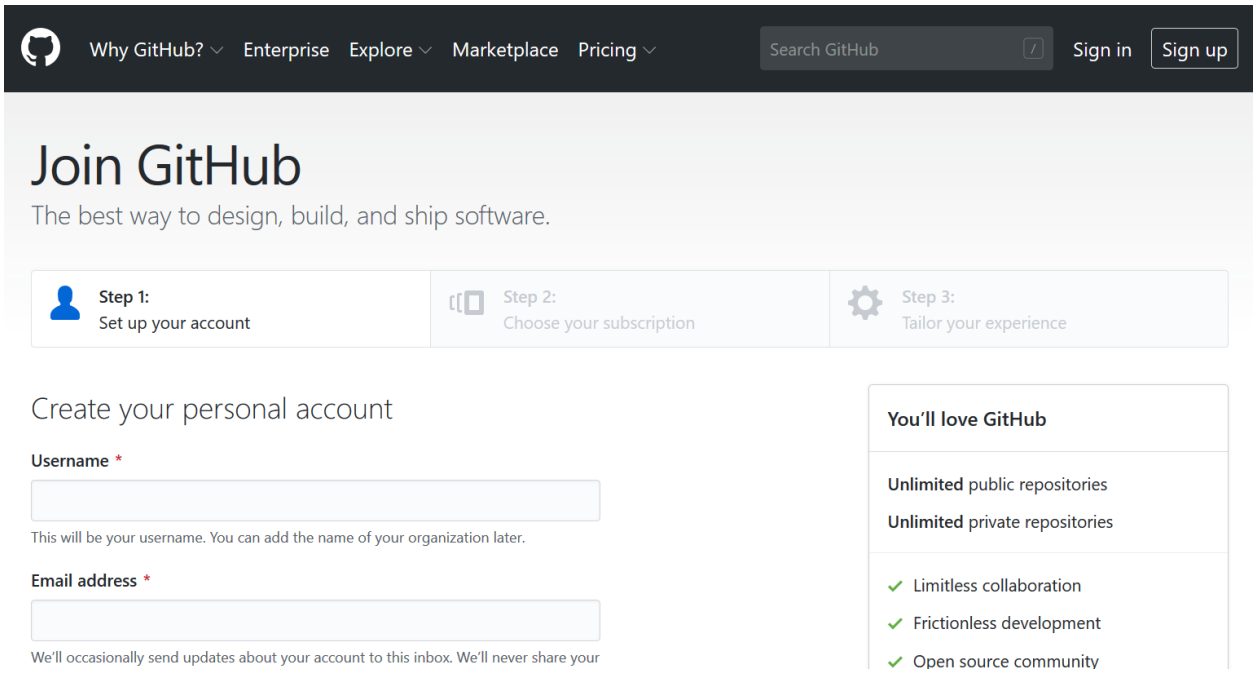
3. A workaround for this size limitation is publishing your csv file on Github and linking the data back to your map.
    c. Note: If you pay for an ArcGIS Online account you can also publish a feature service from one of the two desktop software options: ArcMap or ArcGIS Pro. These options have higher maximum records for publishing, however the Github option is a good free workaround.

Big Data Workaround: Github to the Rescue

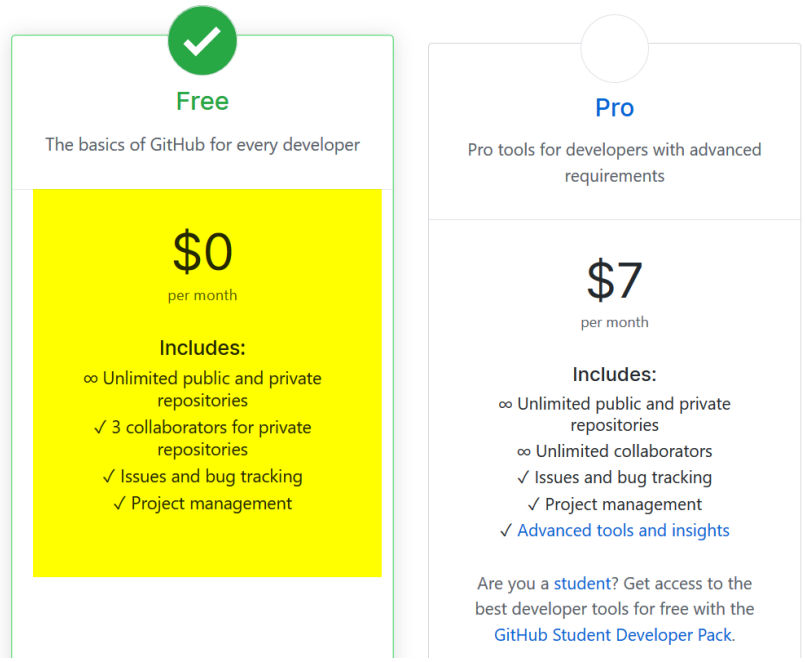
Free accounts are limited to less than 2,000 records, so we need to find a work around for this. One method is to store your data somewhere online, this is where the coding repository, GitHub comes in handy!

Creating a Github Account

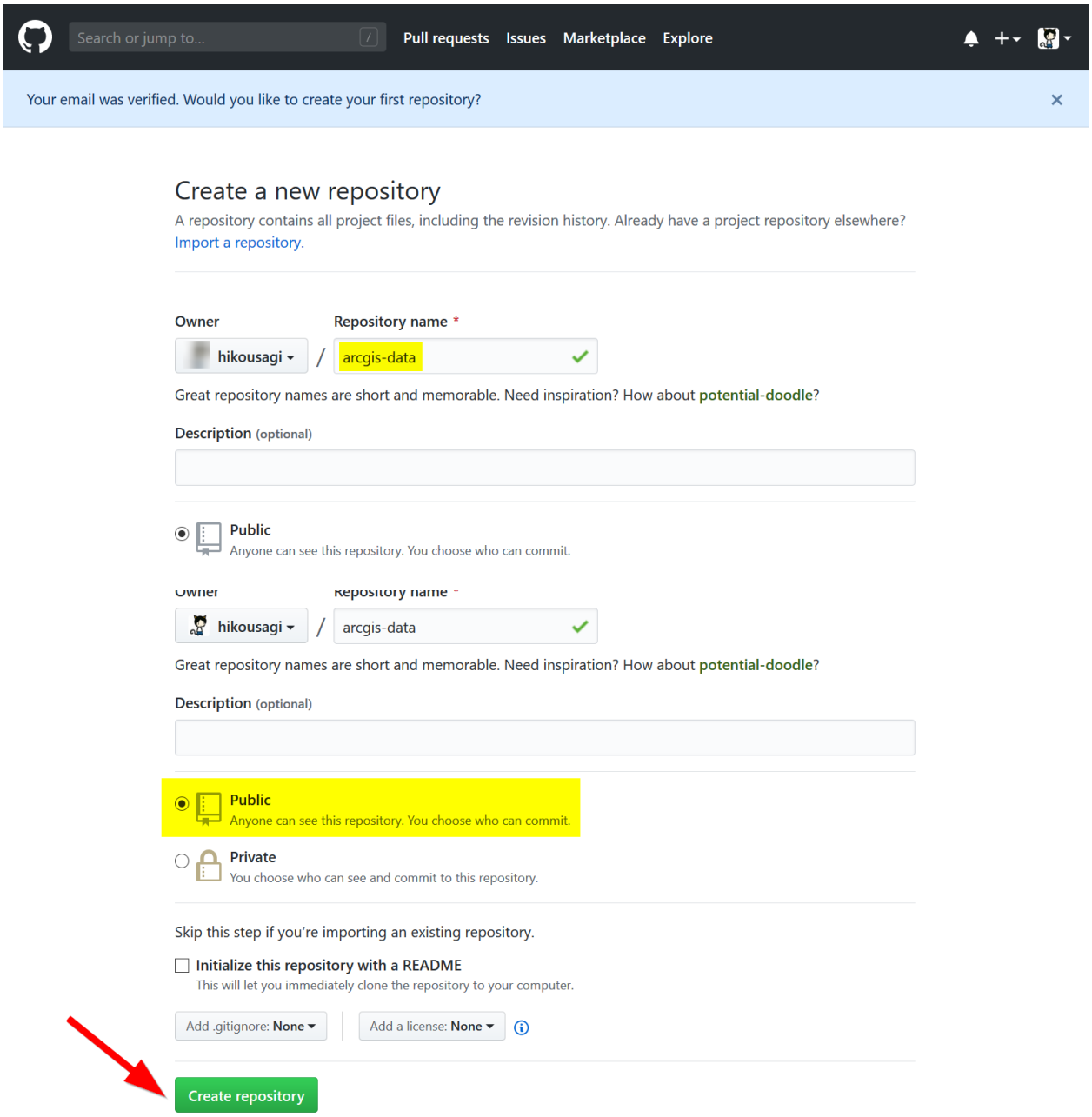
1. Github is a platform for developers and a place to store, share, and collaborate on coding projects. Create a Github Account here:https://github.com/join



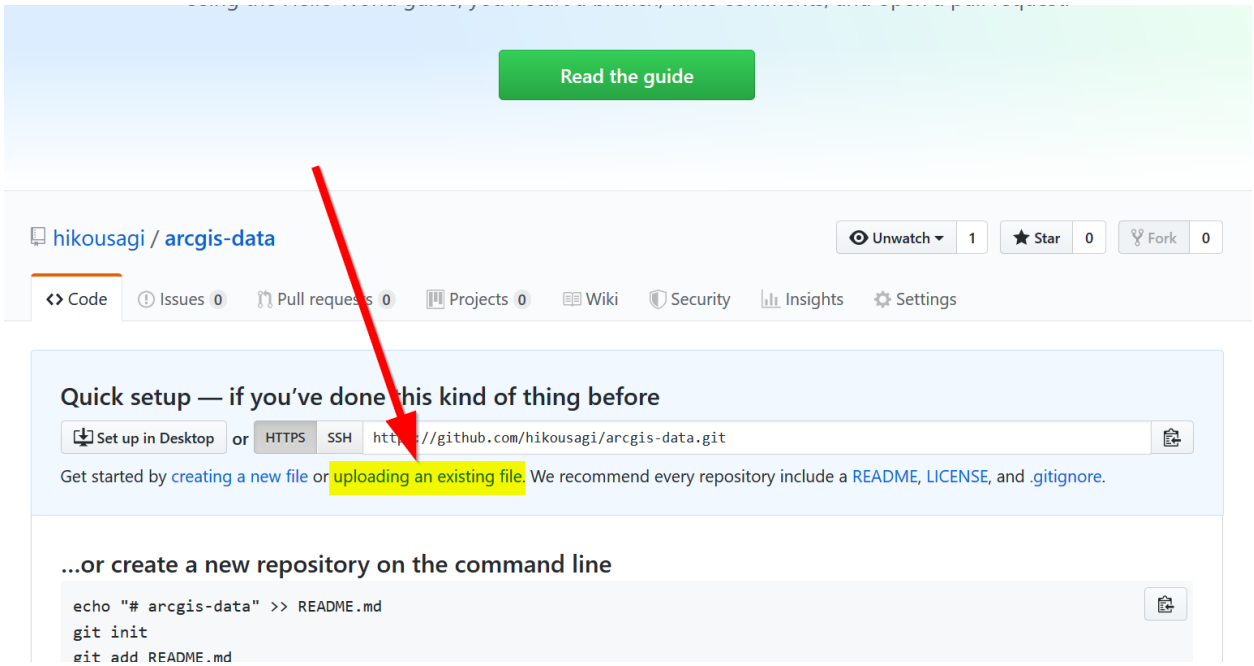
2. Go ahead and set up a free account



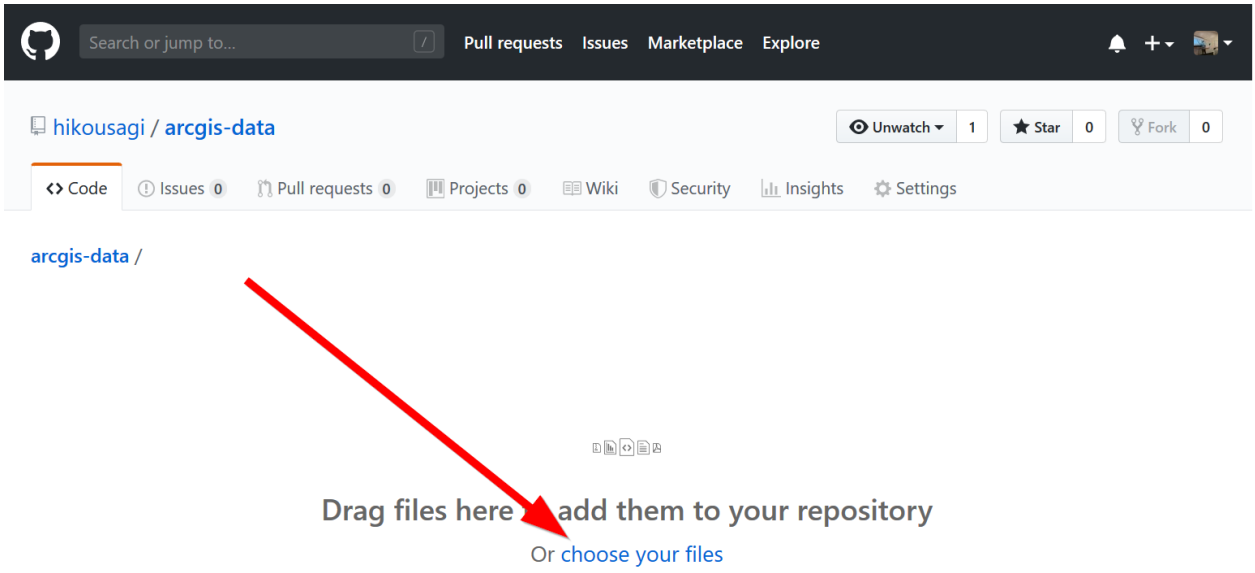
3. After you click your email activation link, you can create your first repository, give it a name and make sure it is a Public repository:



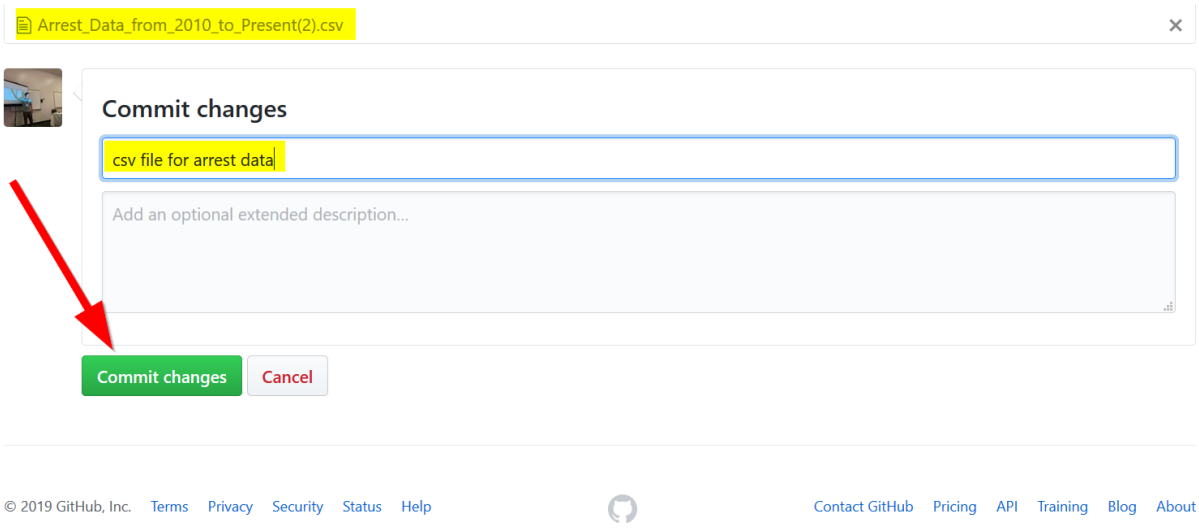
4. After creating your repository, click on “uploading an existing file”



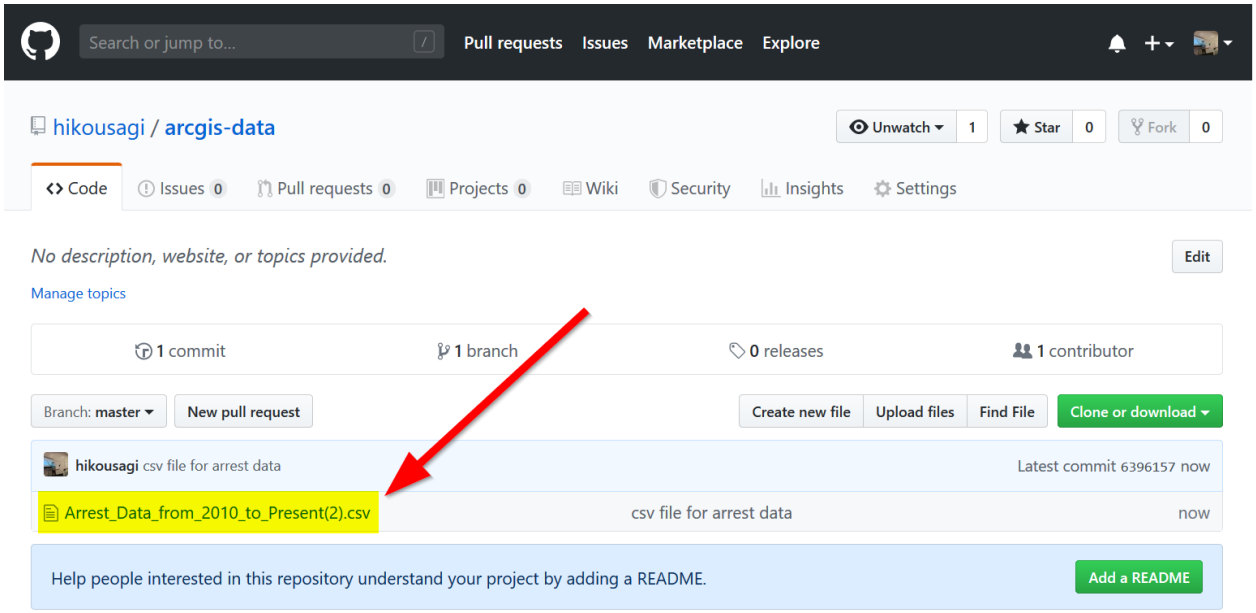
5. Drag the csv file with the locations into the upload location or click "choose your files" if you want to locate it (reminder: make sure latitude and longitude are separate columns!)



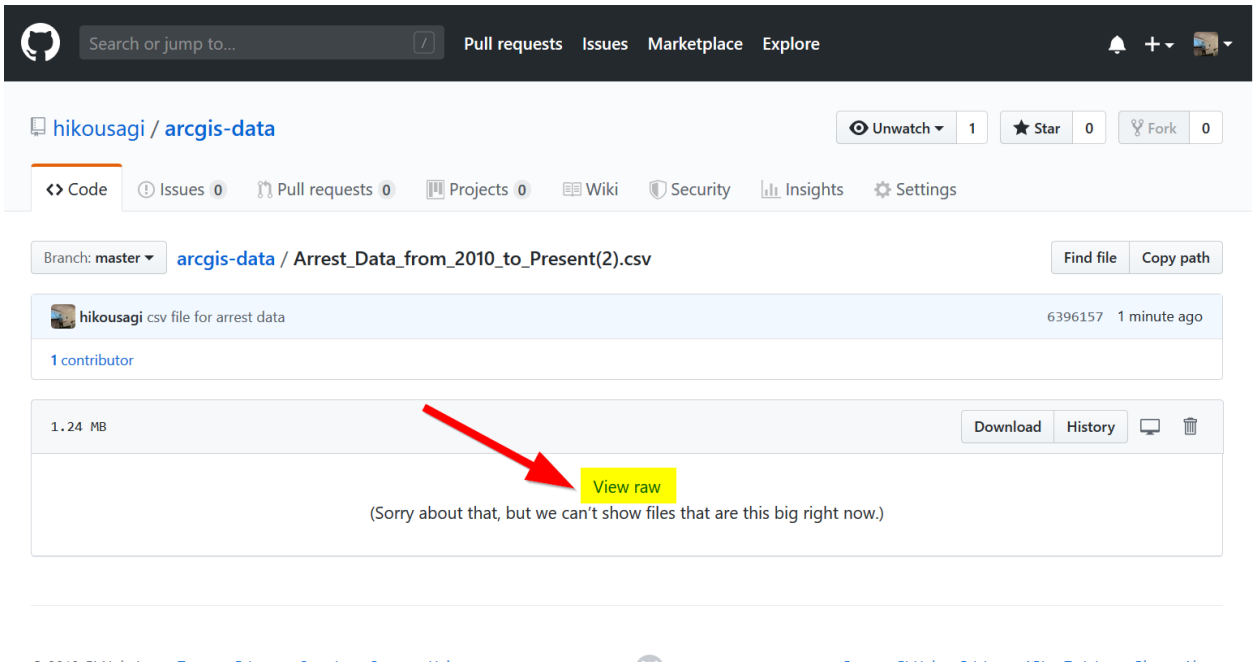
6. Add a "commit" title and then commit your changes:



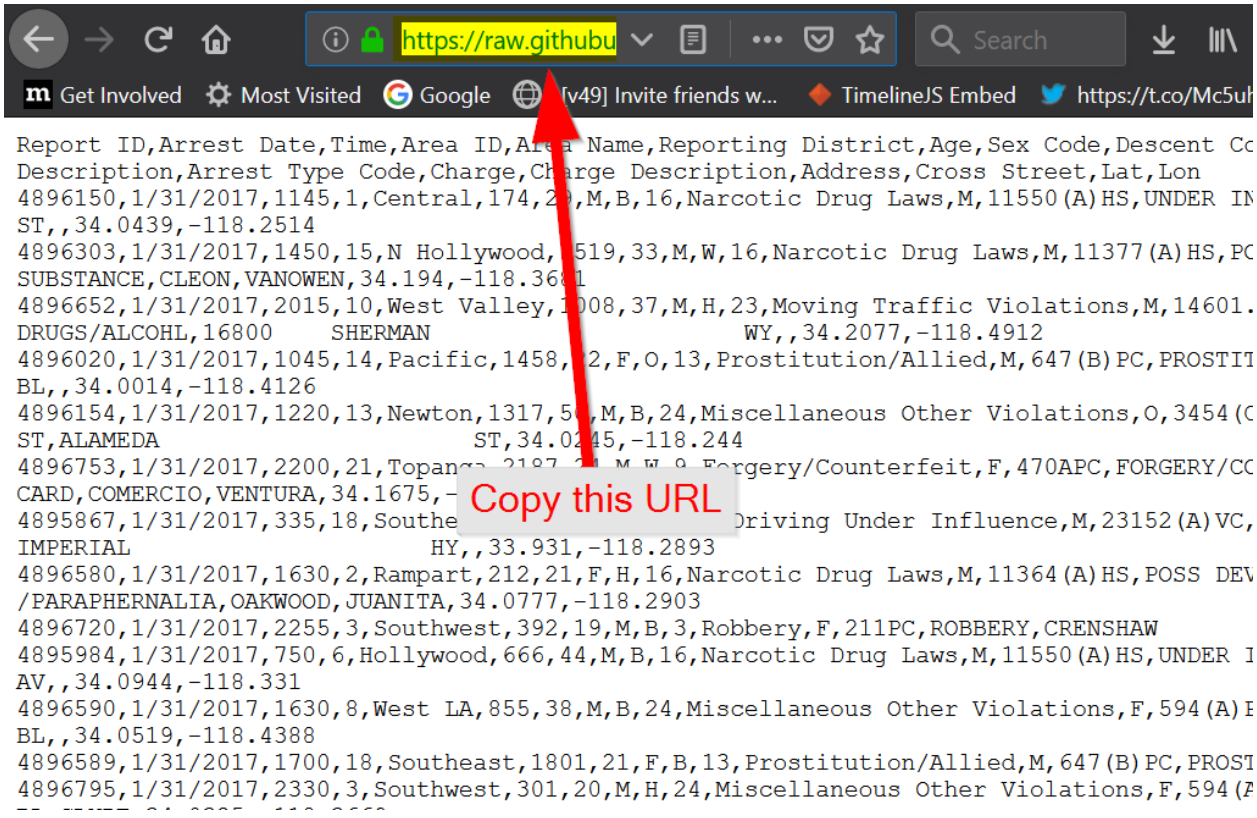
7. Click the csv file:



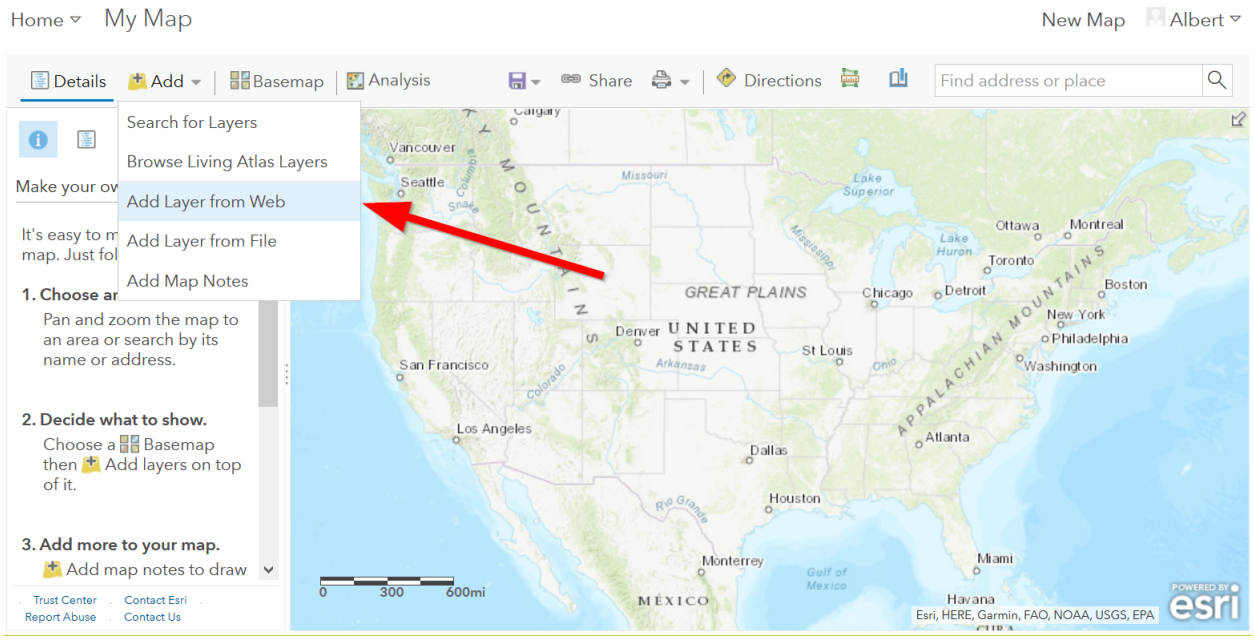
8. Click on “View Raw”



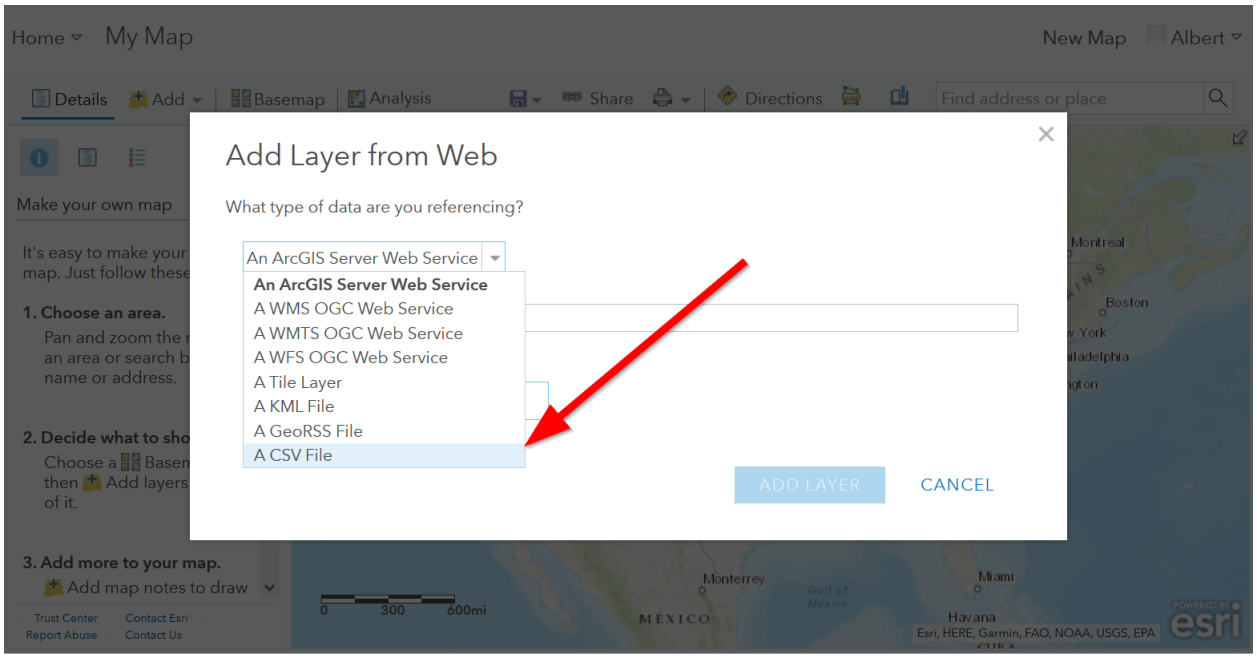
9. Copy the URL



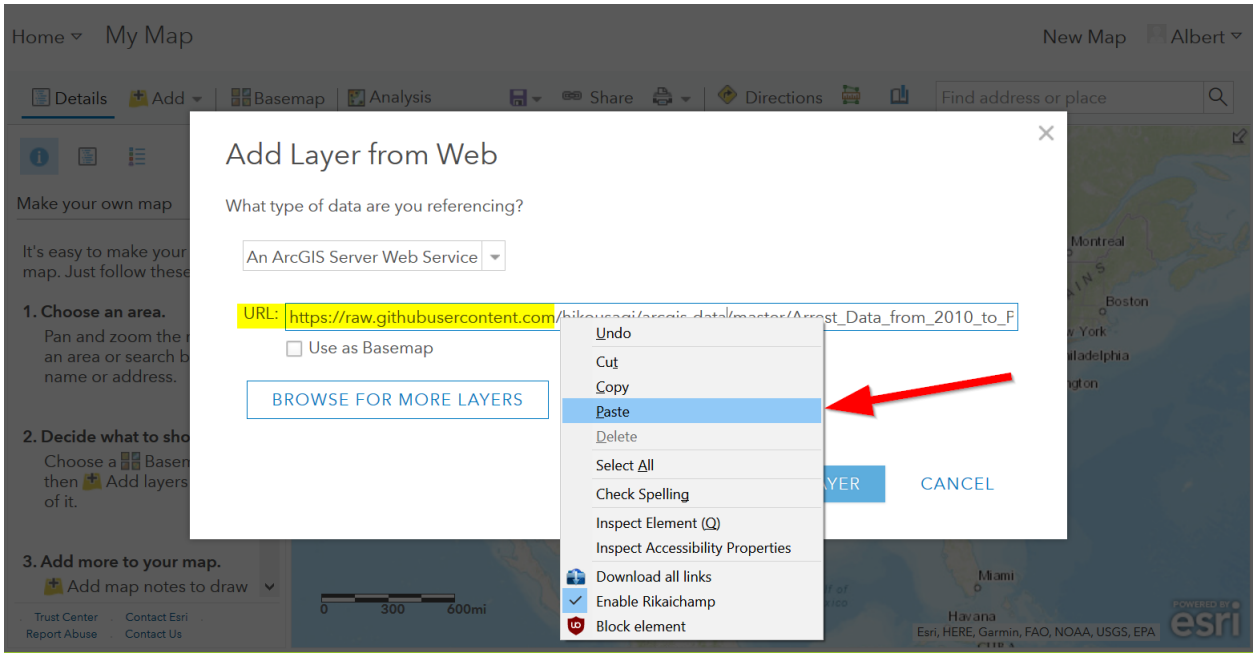
10. Now, finally go back to ArcGIS Online and click on "Add data from web"



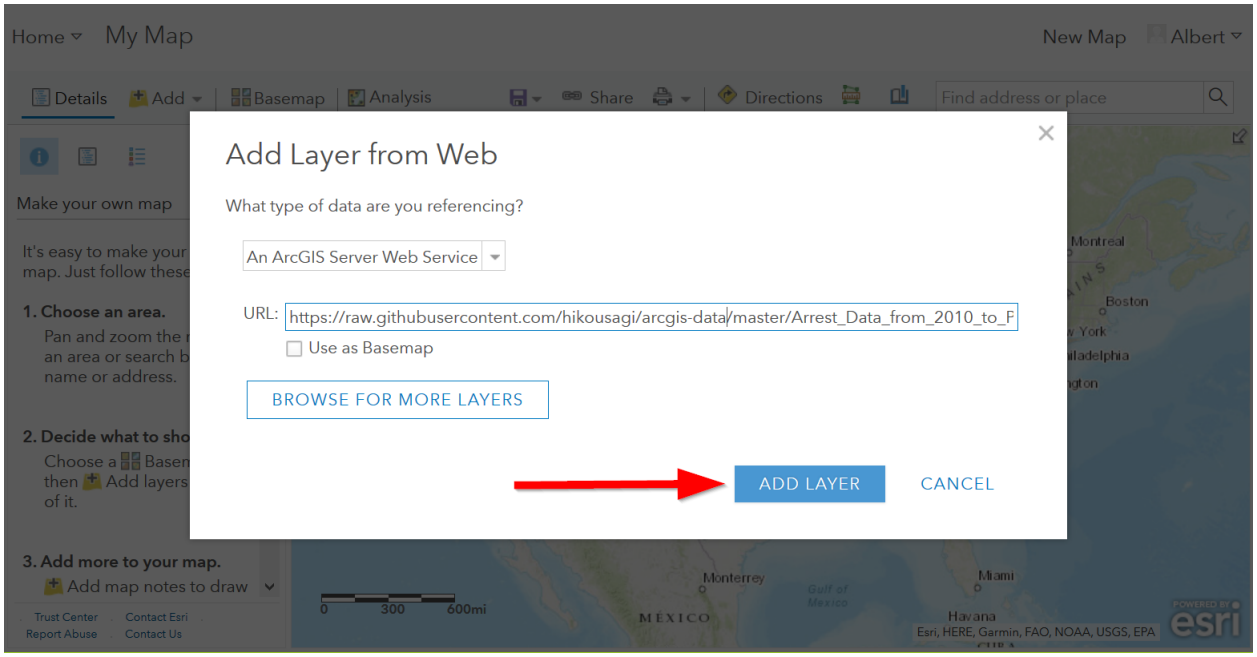
11. Choose “A CSV file”:



12. Paste the URL in to “URL”:



13. Click “Add Layer”



14. Now we can start to style it!

Geocoding your data

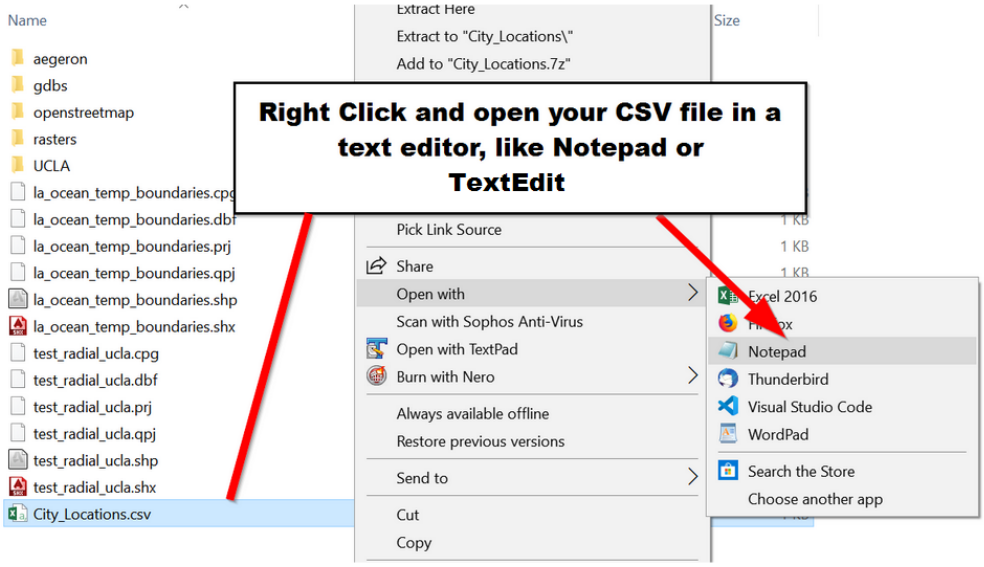
Sometimes you will not have latitude and longitude, what to do then?

We can geocode it!

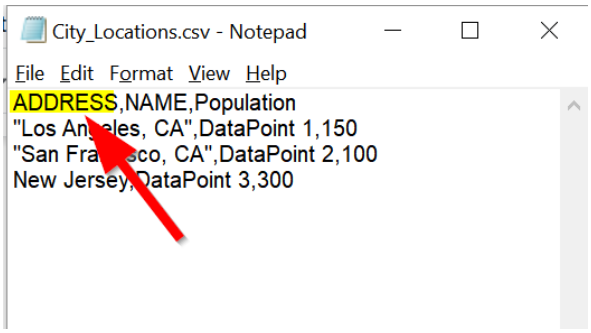
This tool below takes in copy-pasted CSV files with a “Address” column name, that can be a city, country, or street address:

https://gis.ucla.edu/geocoder

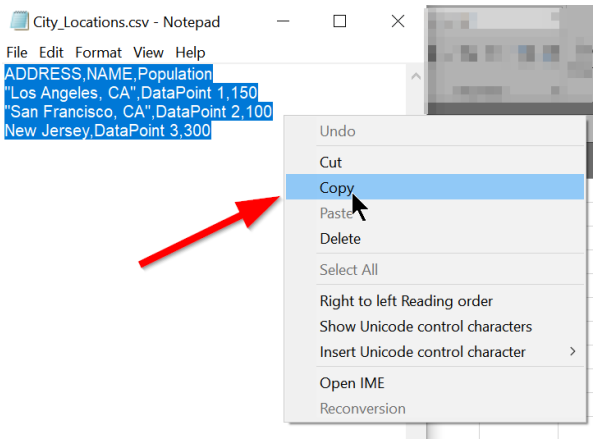
1. Open up your CSV file in a text editor:



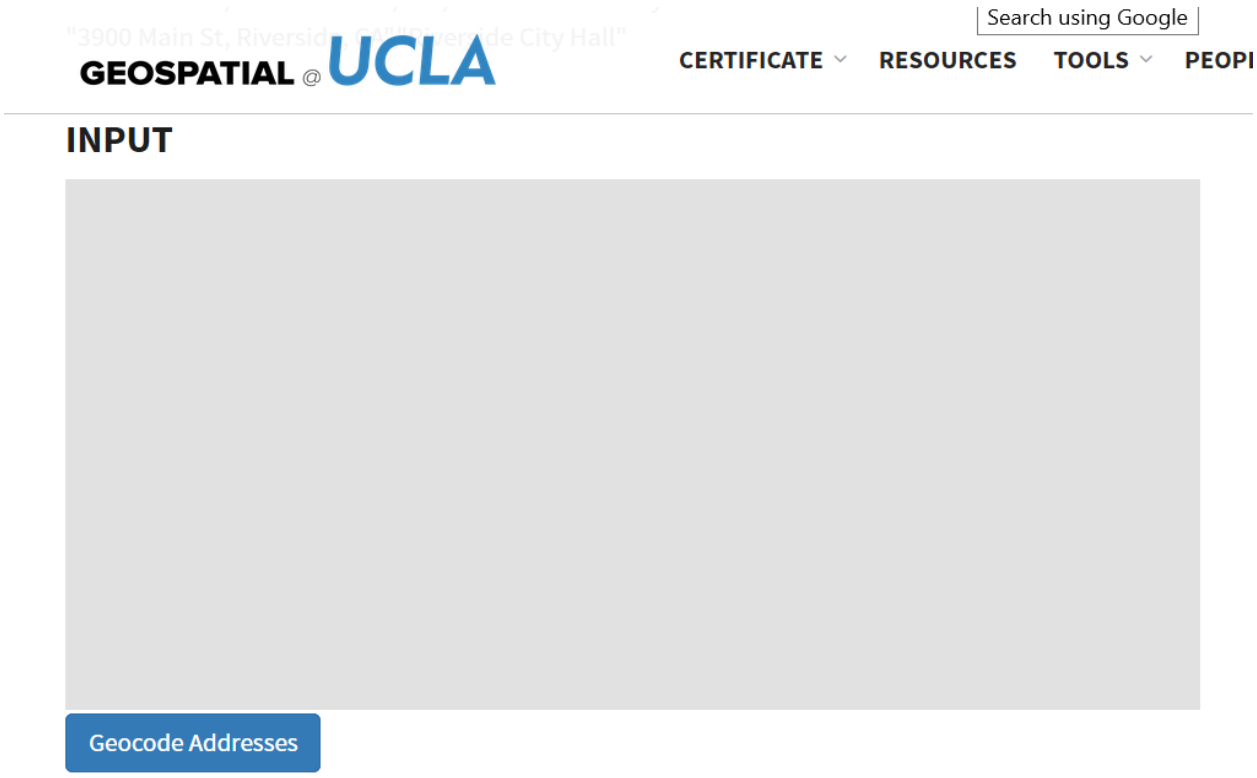
2. For the UCLA Geocoder, make sure your location column has “ADDRESS” for the field name!!



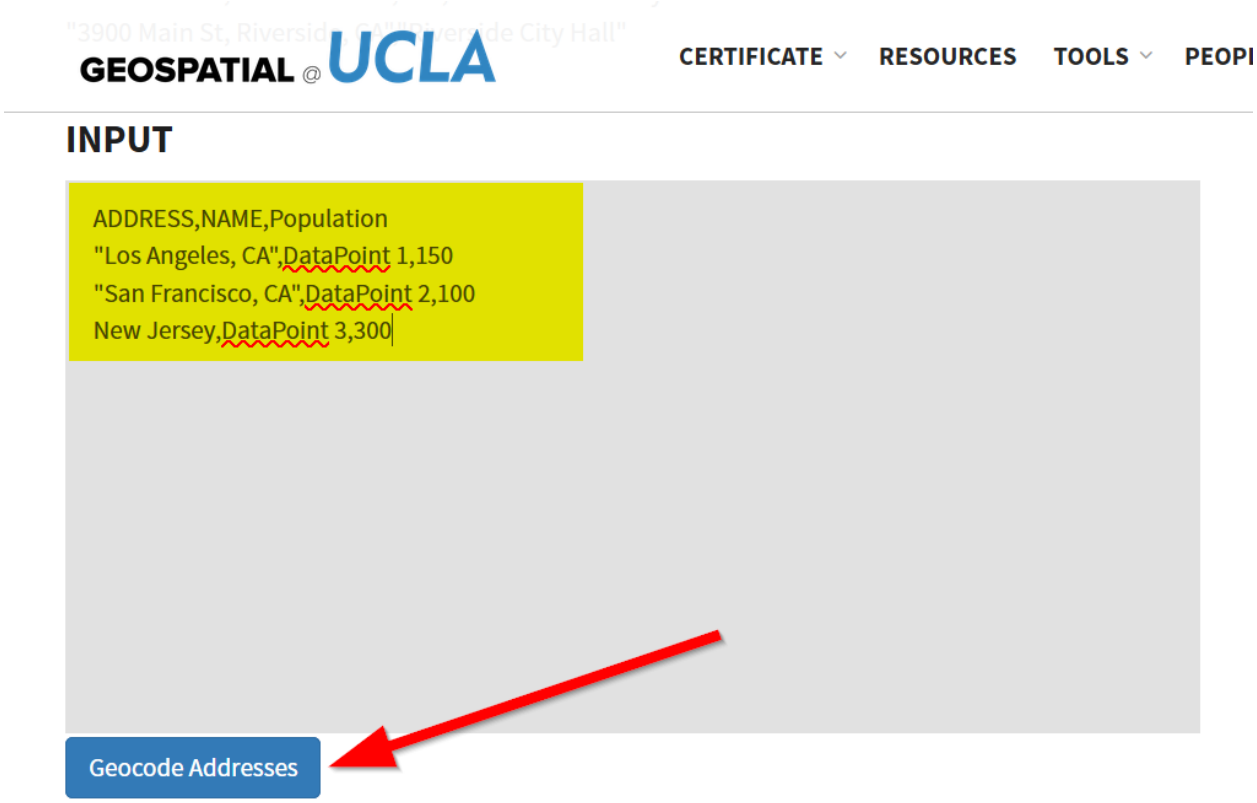
3. Select all the data and copy it



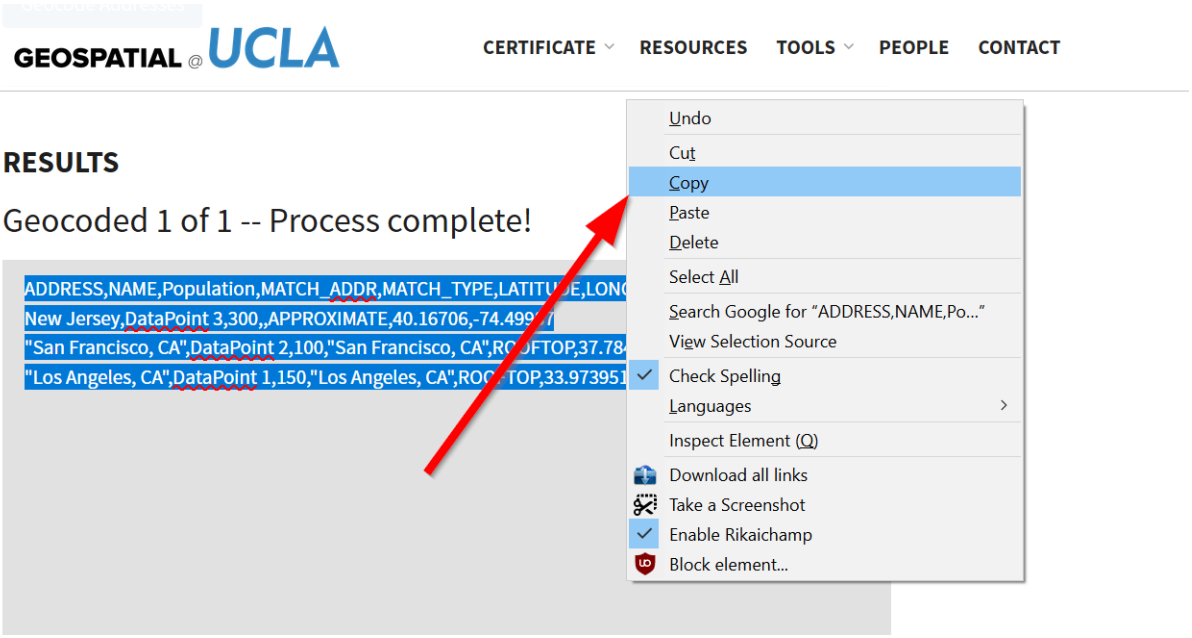
4. Go tohttps://gis.ucla.edu/geocoder
5. Scroll down to the input box



6. Paste your data into it and click “Geocode Addresses”

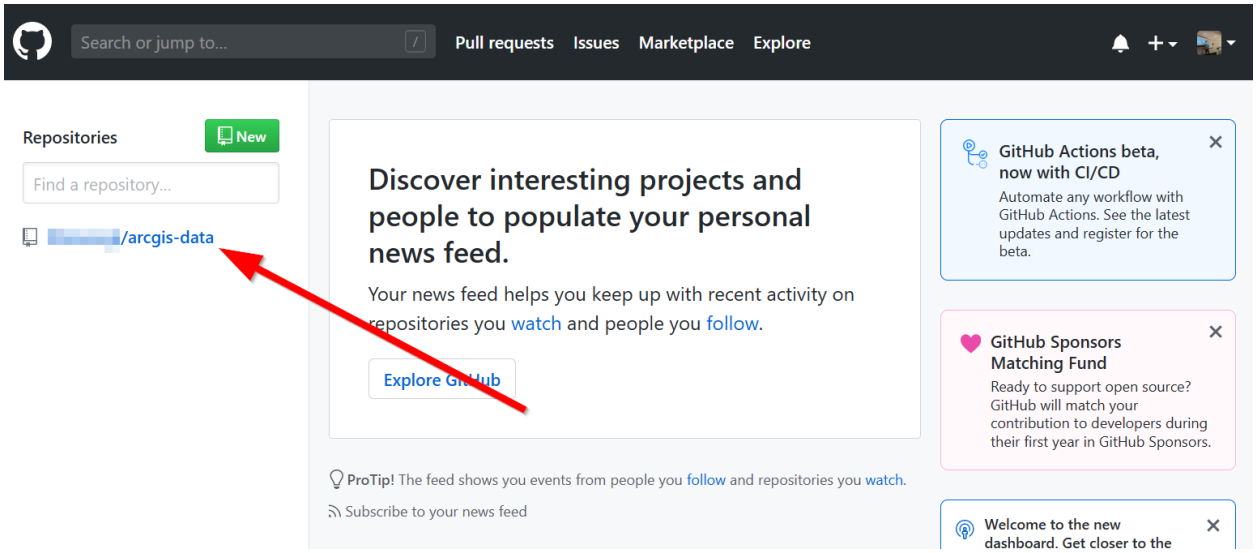


7. Copy the output to your clipboard

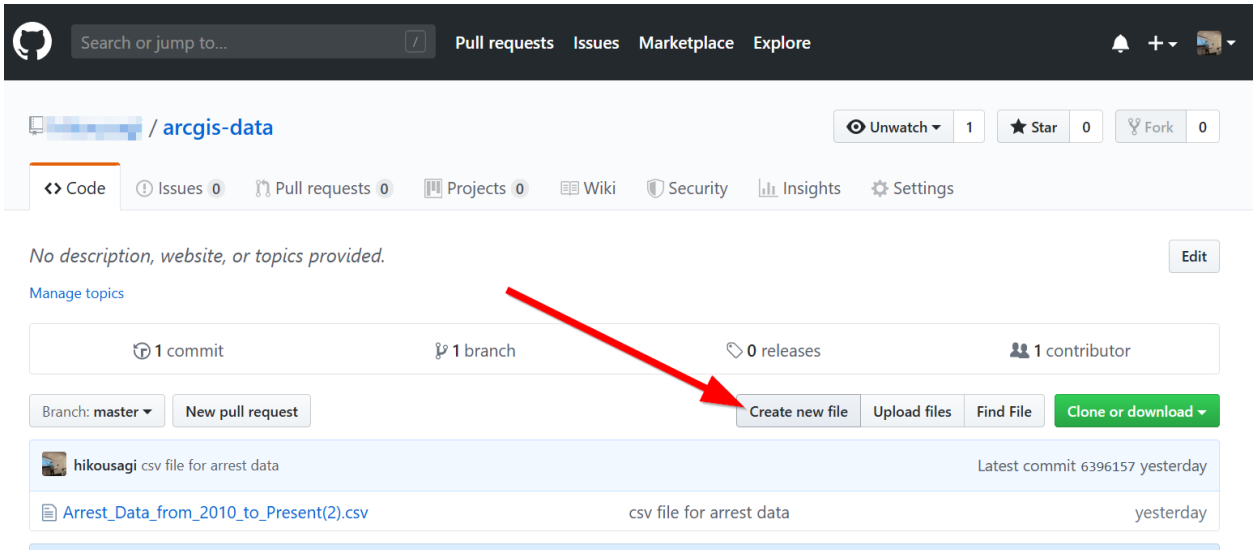


Let's take that data into GitHub so we can map it!

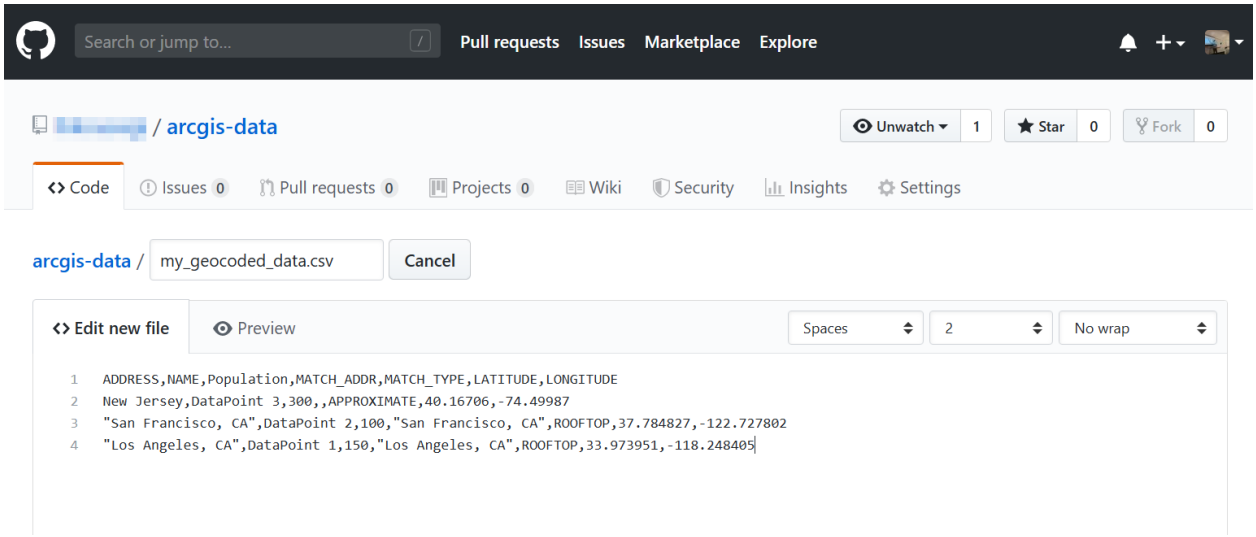
8. Open up GitHub and click on your data repository



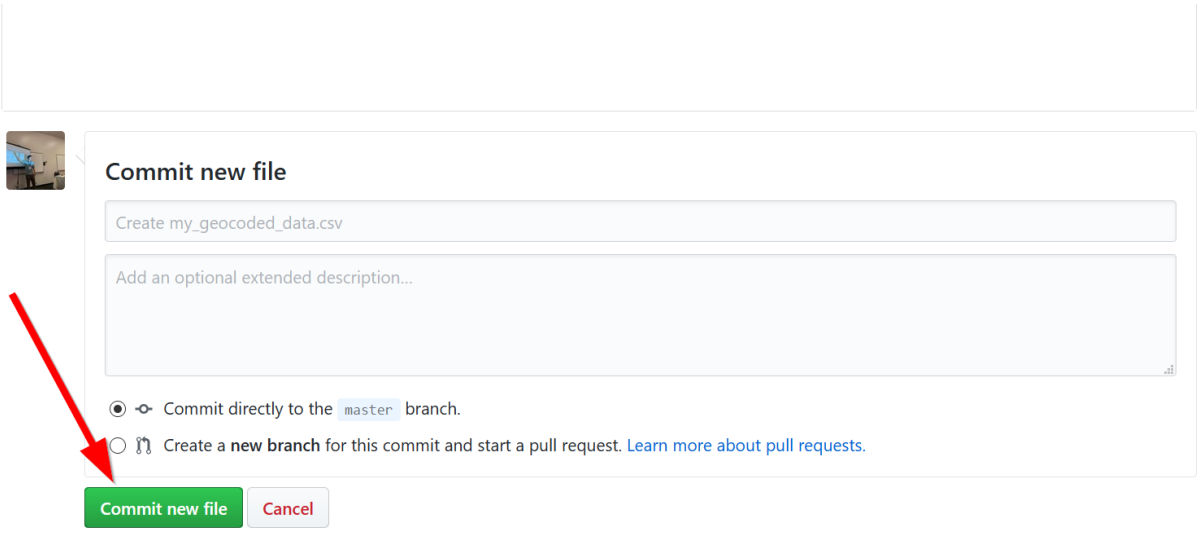
9. Click on "create new file"



10. Paste your CSV data into there.



11. Commit the changes!

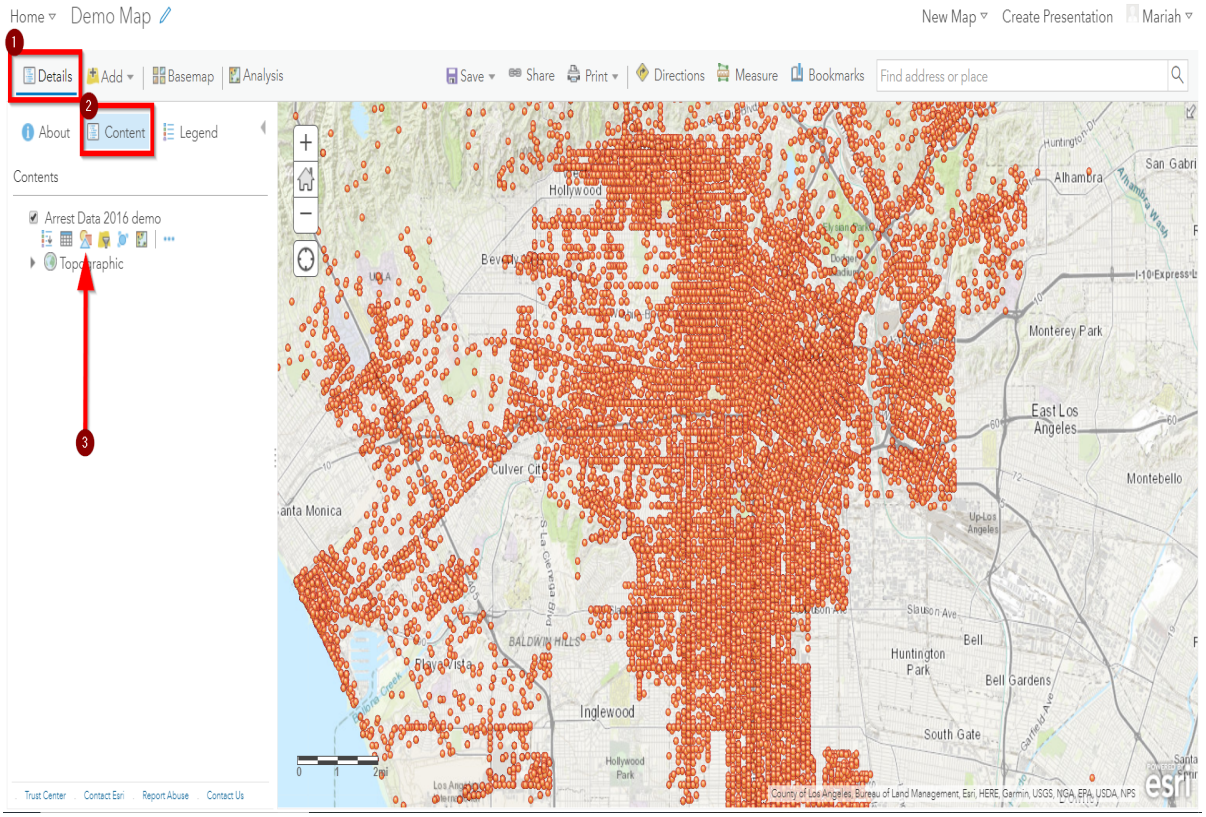


12. Open the raw CSV file and copy the URL.
13. Paste the URL into ArcGIS Online "Add Data from Web"

Styling Point Data

1. There are a variety of ways to style your point data. The best symbology for your data depends on what kind of story you wish to tell. Try each of the different methods listed below to see which fits best for your data.

   When you add your data, the style pane should automatically appear, however to access the symbology settings for your layer at any time, go to the 'Details' pane and click on 'Contents'. The Contents pane displays each layer within your map. Click on the 'Change Style' icon to open the symbology settings for your arrest data layer.

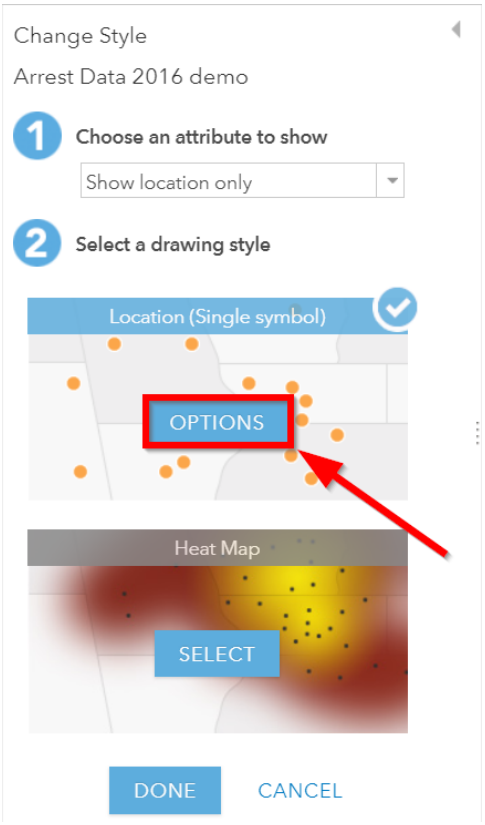


2. The Change Style pane consists of a two step process. The first step dictates which attribute to display and the second step controls the drawing style.

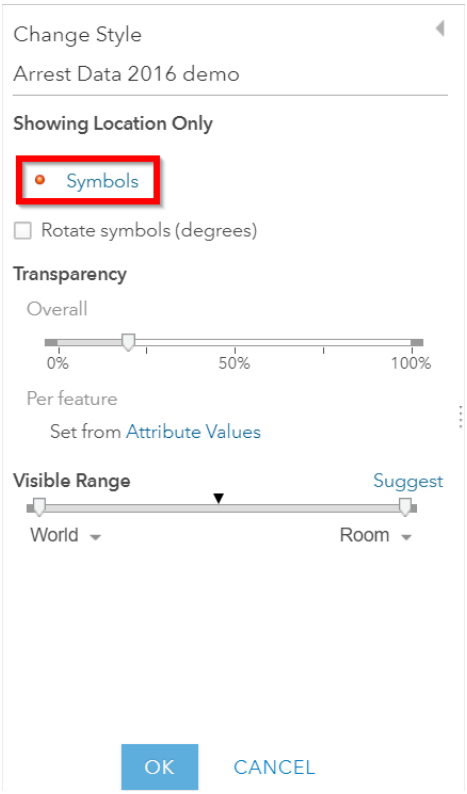
Location Only Symbology

1. For now, let's stick with the default options:
   a. Show Location Only
   b. Location (Single symbol)

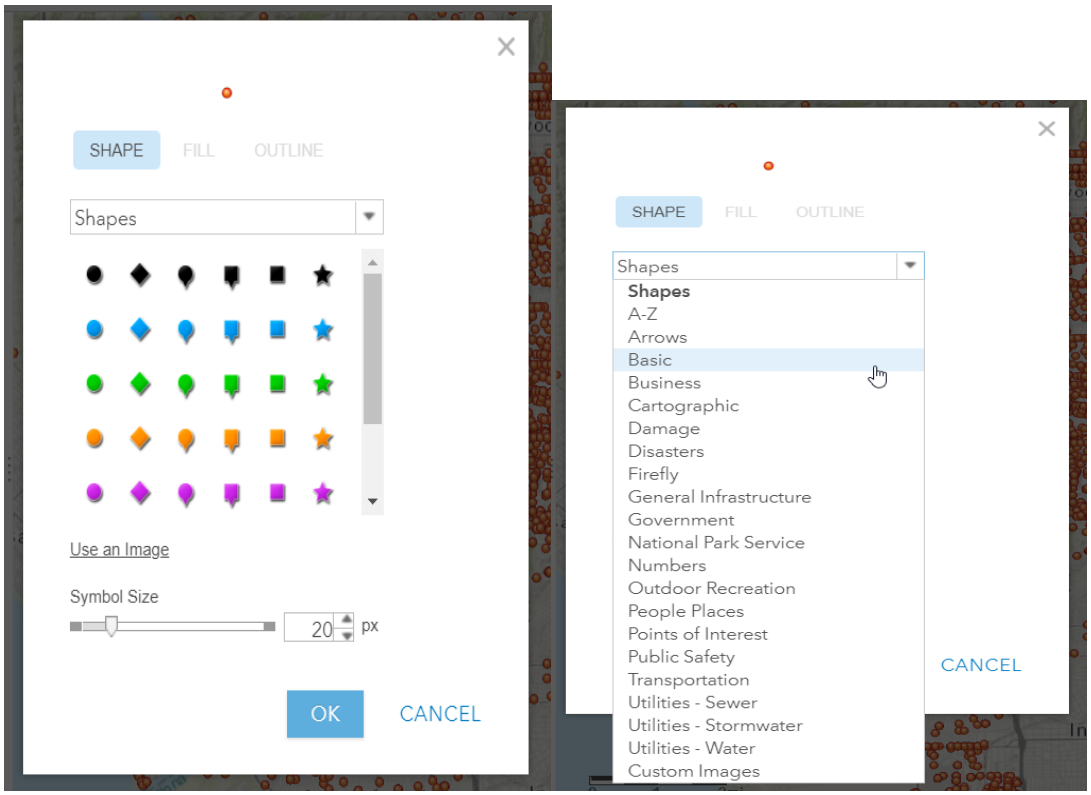
   Click on 'Options' under Location (Single symbol).



3. There are three main elements under the Styling options for Showing Location Only:
    a. Symbol: Controls all of the styling options for the chosen point symbol.
    b. Transparency: Controls the transparency of each point.
    c. Visible Range: Drag the two tick marks to control the scale ranges that the selected layer becomes visible.



4. Click on ‘Symbols’. A new window pops up with more styling options. Click on the ‘Shapes’ drop-down menu and select ‘Basic’.



5. Make the following changes to your symbol:

a. Chose Basic Circle

b. Size: 5 px

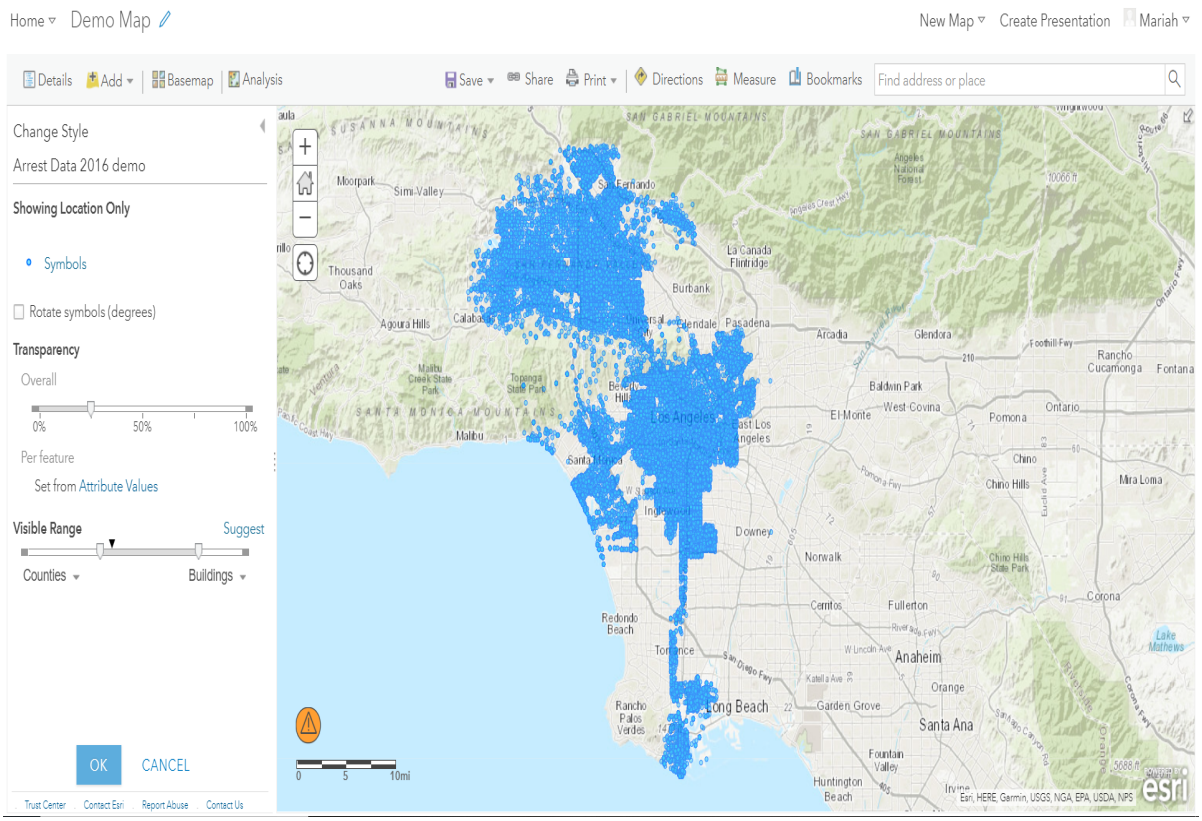
c. Fill: Light Blue

d. Outline: Dark Blue

e. Overall Transparency: 25%

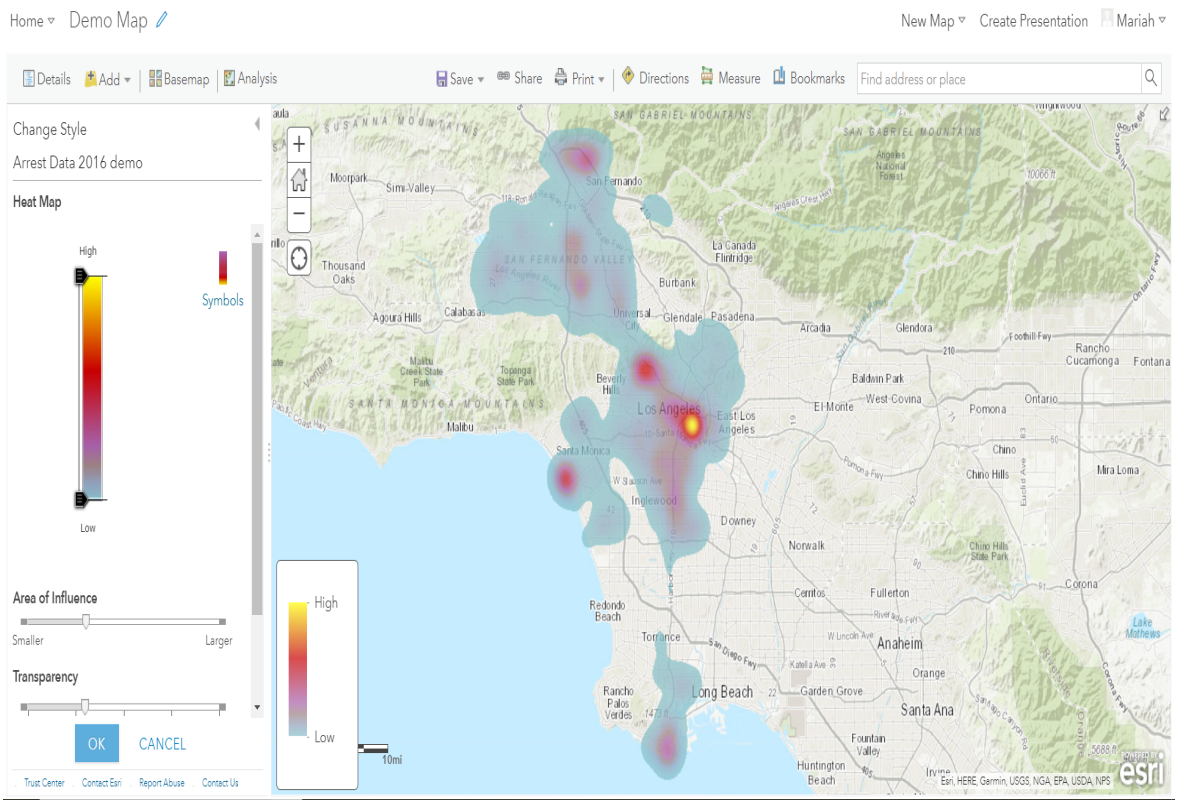
f. Visibility Range: Counties to Buildings

Click ‘Ok’.



6. With so many points, it is difficult to see any spatial patterns within your dataset when symbolizing individual points. Try a different symbology method and switch from ‘Show location only’ to ‘Heat Map’.

   Heat maps represent density and show the range of areas where arrests have low and high density. Notice the difference in your map from the previous symbology and how downtown Los Angeles emerges as a dense area for arrests.



Attribute Based Symbology

1. Click ‘Ok’ to return to the original Change Style pane. Now under Step 1, select ‘Age’ for ‘Choose an attribute to show’.

   Scroll down to see the six options for drawing styles by attributes:

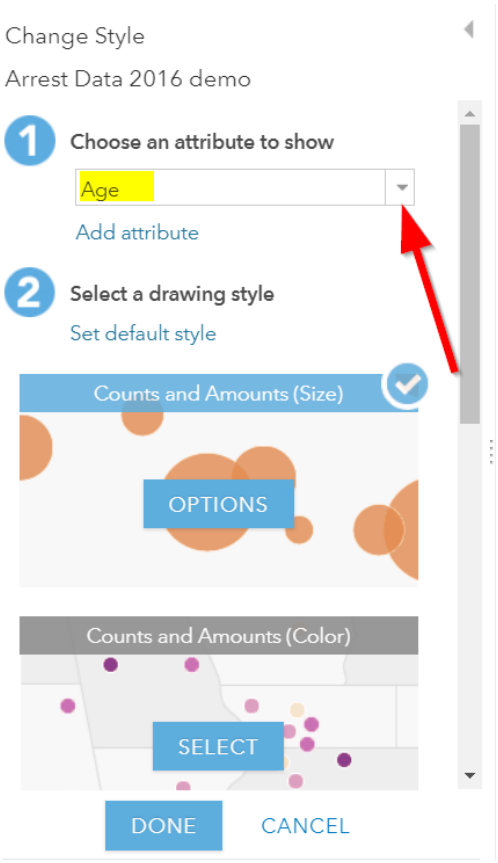
   a. Counts and Amounts (Size)

   b. Counts and Amounts (Color)

   c. Heat Map

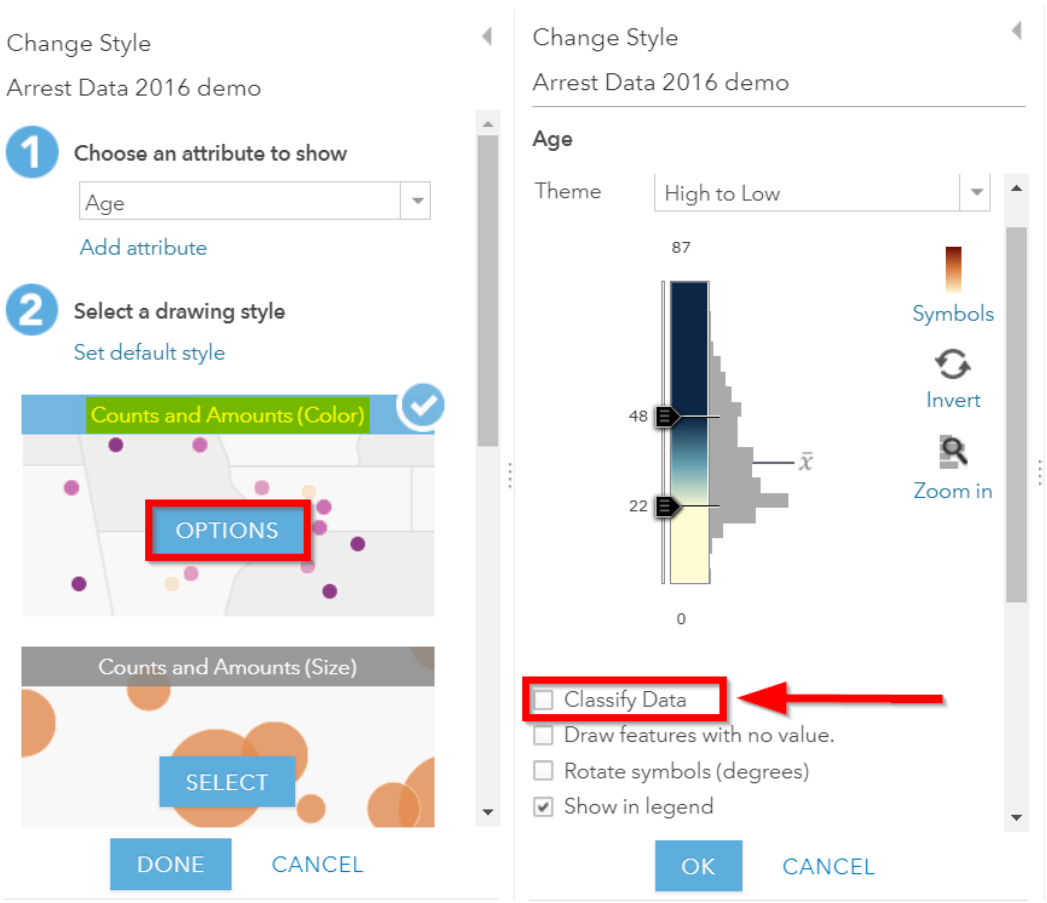
   d. Location (Single Symbol)

   e. Types (Unique Symbols)



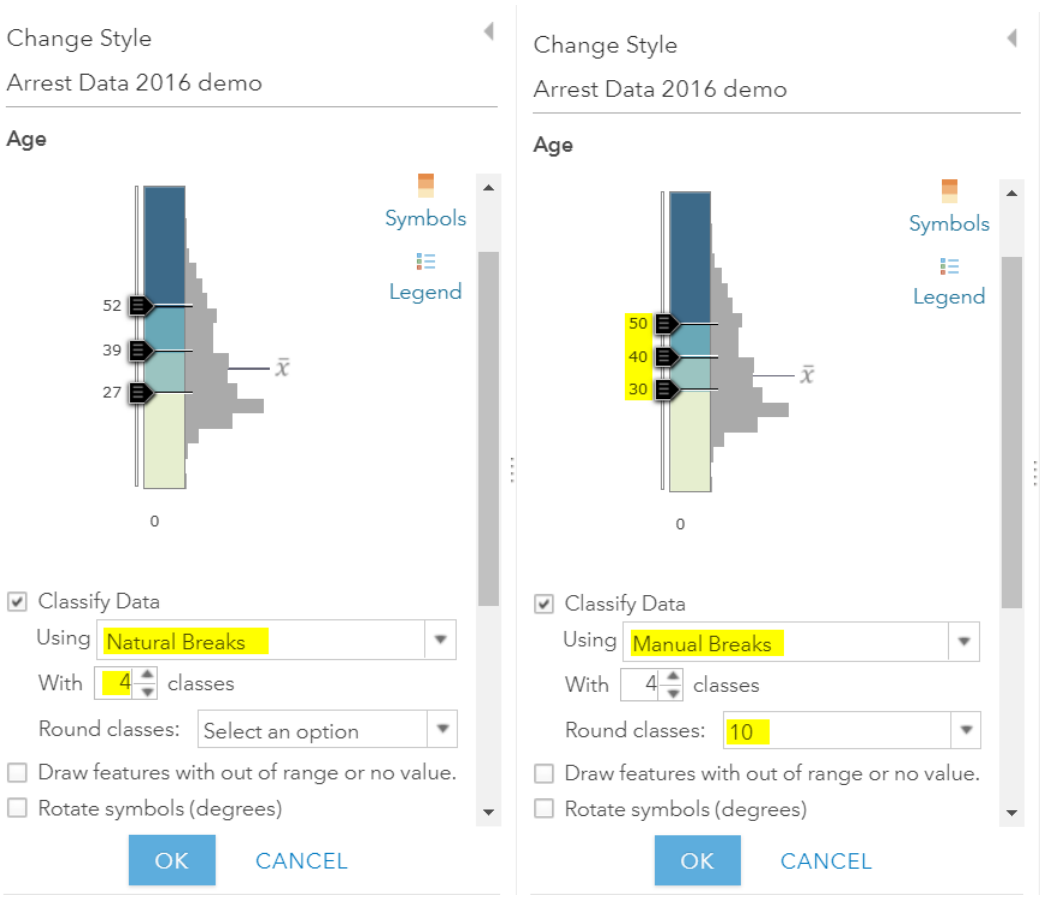
9. Select 'Counts and Amounts (Color)' and Click 'Options'. Then Click 'Classify Data'.

   Data classification refers to how you group your data into classes to better visualize patterns across your dataset. There are a variety of methods for data classification. To learn more about the different methods see Esri's Data Classification Help Page.



10. Select ‘Natural Breaks’ from the dropdown menu and keep the number

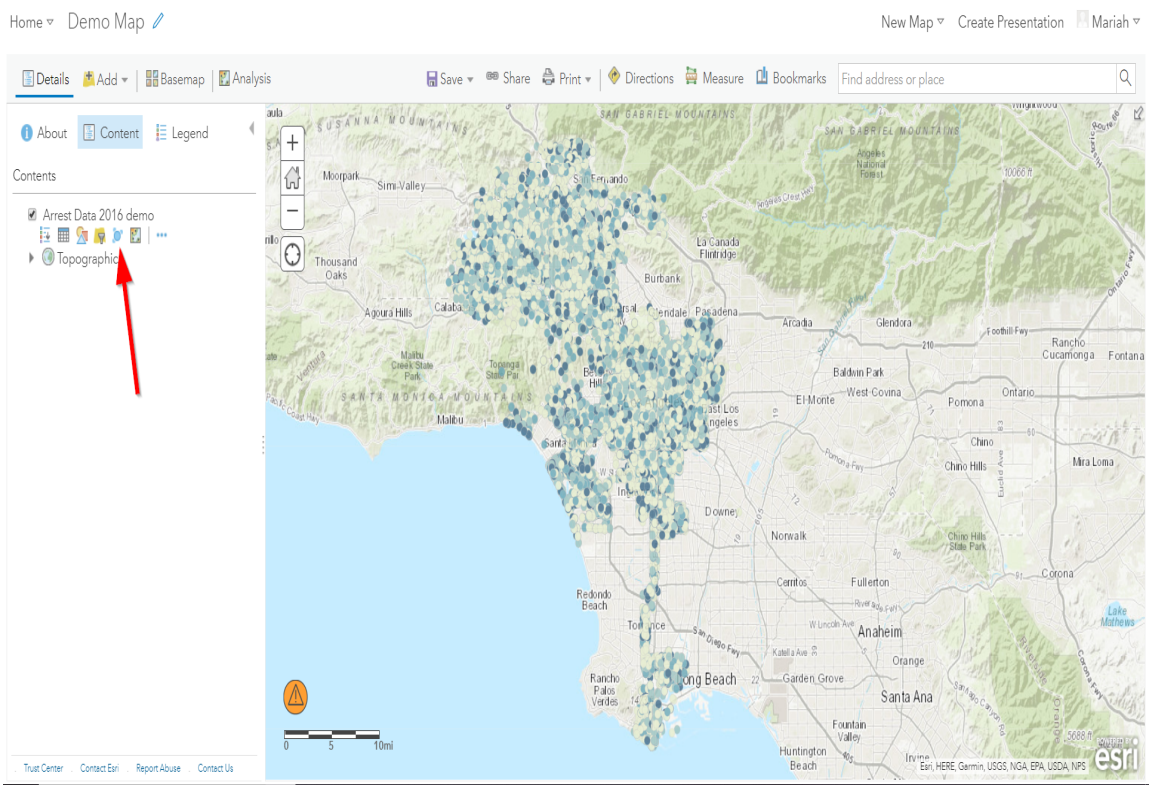
    of classes at 4. Then select ‘10’ from the ‘Round classes’ dropdown menu. Notice how the breaks change and how the classification type changes to ‘Manual Breaks’.



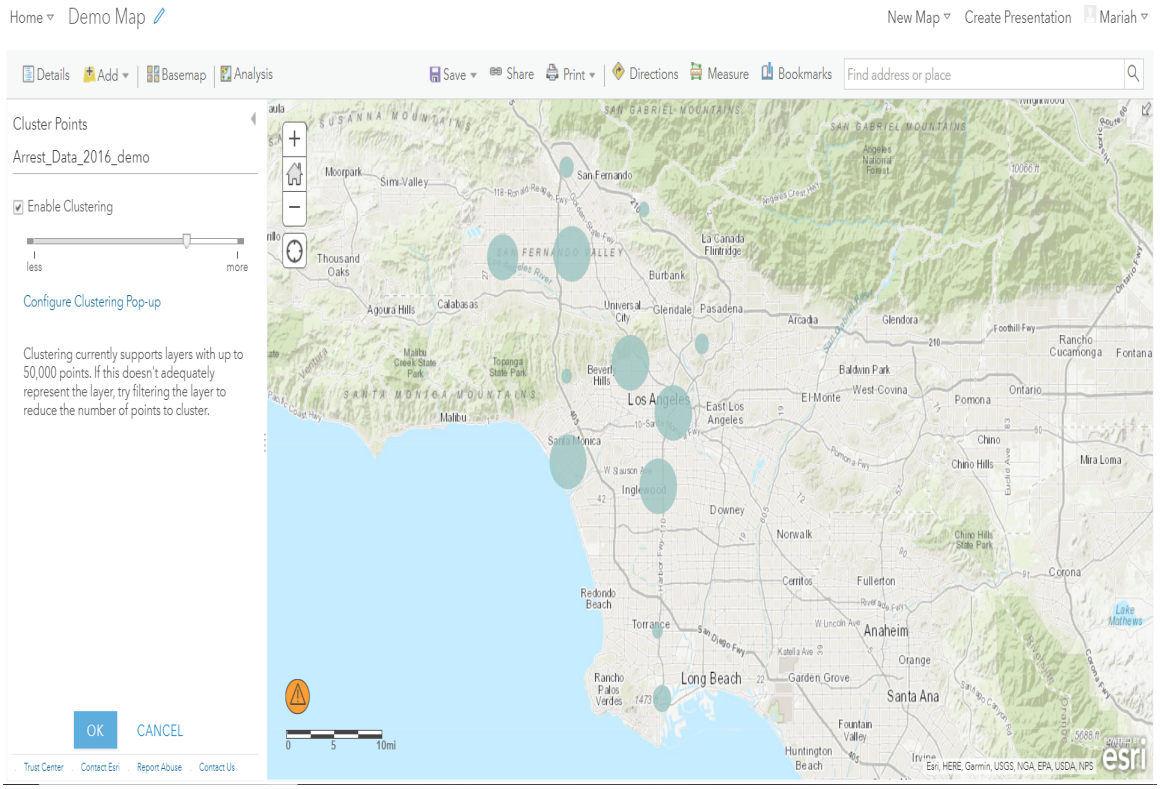
11. Click ‘Ok’. Then click ‘Done’. Then save your map.

Enable Clustering

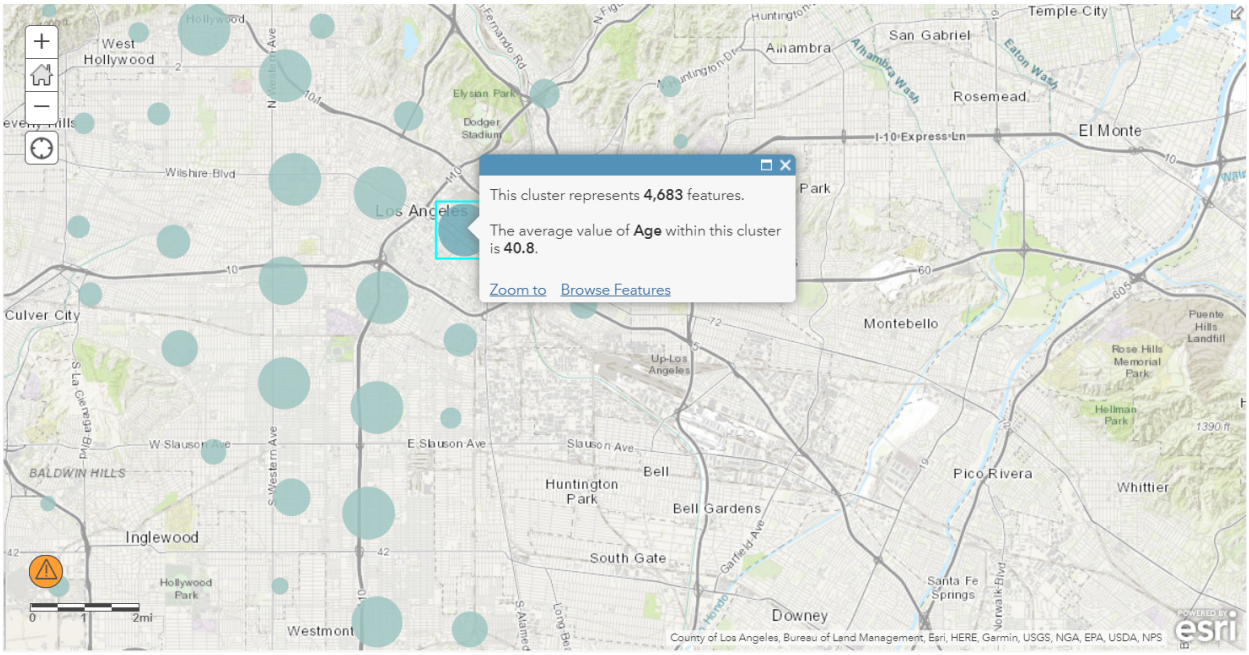
1. An additional cartographic feature that’s helpful for viewing dense point data is the clustering feature. To enable this feature browse to your layer in the ‘Contents’ pane and select the ‘Cluster Points’ icon.



2. Slide the clustering bar to create more or less clusters.



3. Zoom in and out to see how the clusters adjust as you change scales. Click on a cluster to get a summary.



3.2.4 Working with Polygon Data

Getting Polygon Data

Shapefiles are ESRI files that can be found on the web, typically as a compressed zip file.

Let's go to the LA Times website and grab a shapefile of Los Angeles Neighborhoods:

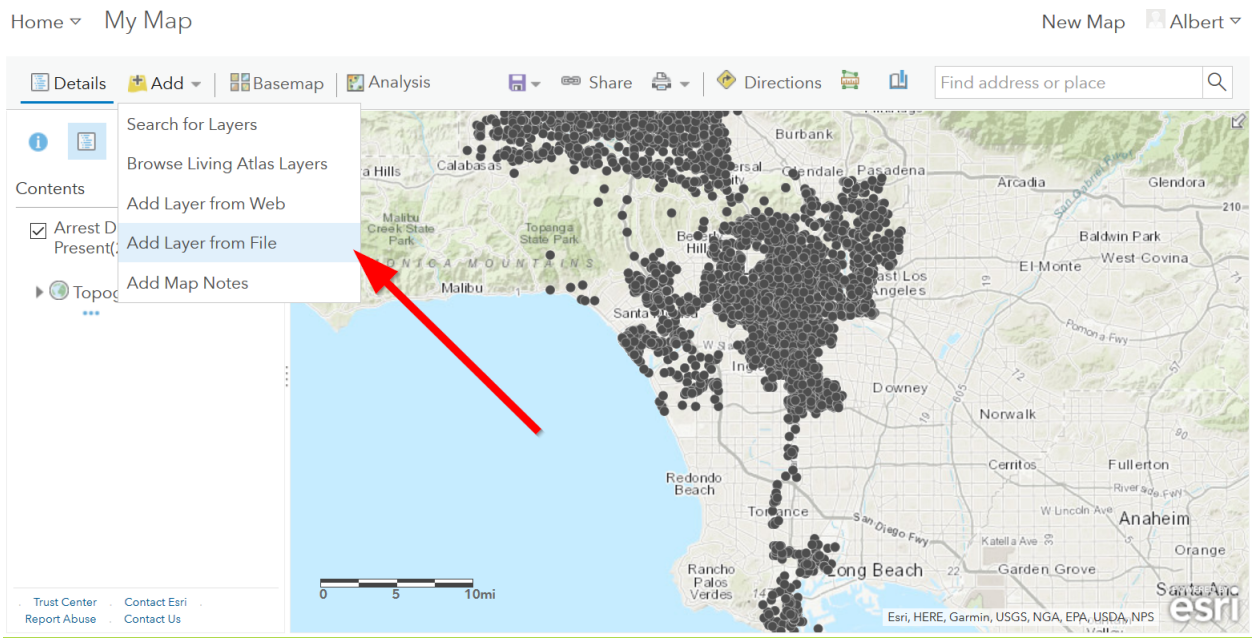
http://boundaries.latimes.com/sets/

					SHP
L.A. County Neighborhoods (Current)	Los Angeles Times	272	L.A. County	JSON	GeoJSON, KML, SHP
L.A. County Neighborhoods (V1)	Los Angeles Times	87	L.A. County	JSON	GeoJSON, KML, SHP
L.A. County Neighborhoods (V2)	Los Angeles Times	113	L.A. County	JSON	GeoJSON, KML, SHP
L.A. County Neighborhoods (V3)	Los Angeles Times	114	L.A. County	JSON	GeoJSON, KML, SHP
L.A. County Neighborhoods (V4)	Los Angeles Times	276	L.A. County	JSON	GeoJSON, KML, SHP
L.A. County Neighborhoods (V5)	Los Angeles Times	272	L.A. County	JSON	GeoJSON, KML, SHP
L.A. County Neighborhoods (V6)	Los Angeles Times	318	L.A. and Orange counties	JSON	GeoJSON, KML, SHP
L.A. County Regions (Current)	Los Angeles Times	16	L.A. County	JSON	GeoJSON, KML, SHP
L.A. County Regions (V3)	Los Angeles Times	7	L.A. County	JSON	GeoJSON, KML, SHP

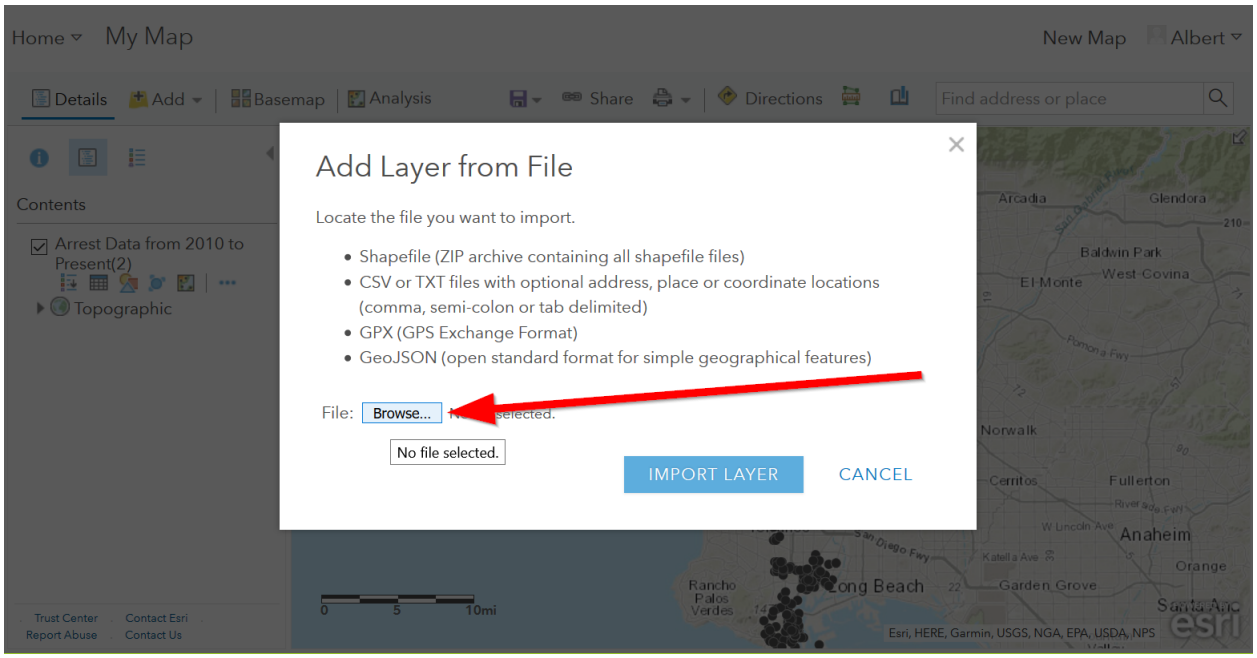
boundaries.latimes.com/1.0/boundary-set/la-county-neighborhoods-v5/?format=shp

Adding Polygon Data in Map View

1. Click ‘Add Content to Map’ and select ‘Add Data from File’

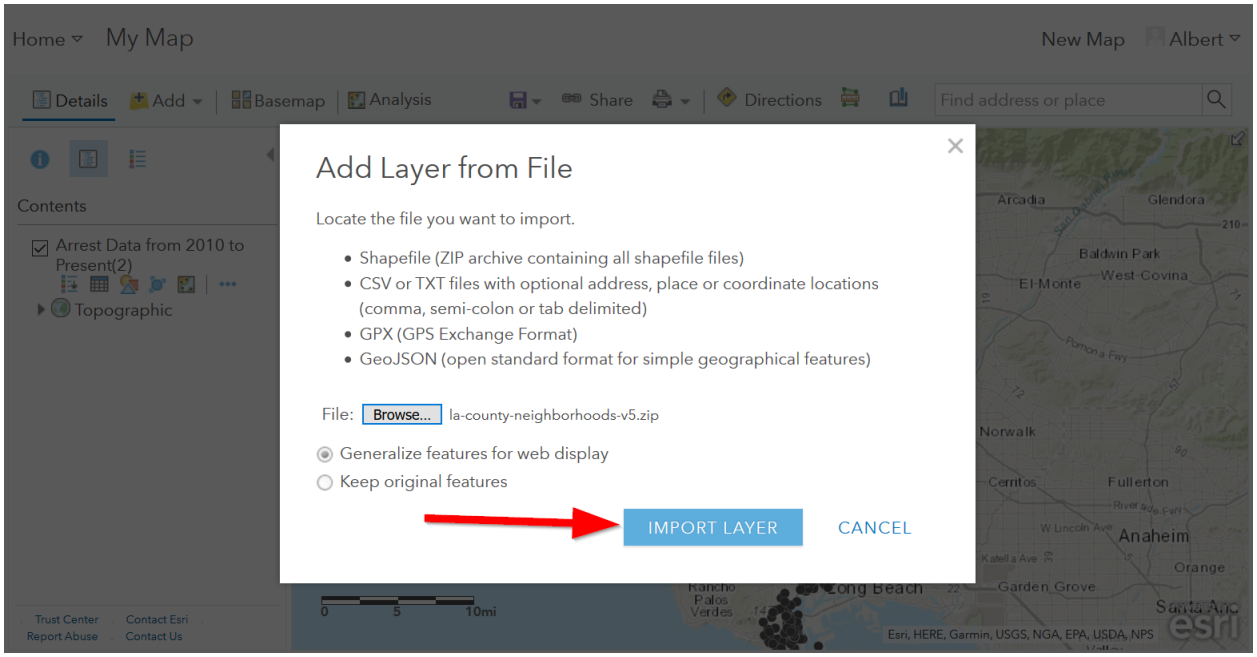


2. Select “Browse”



3. Choose the zipped shapefile

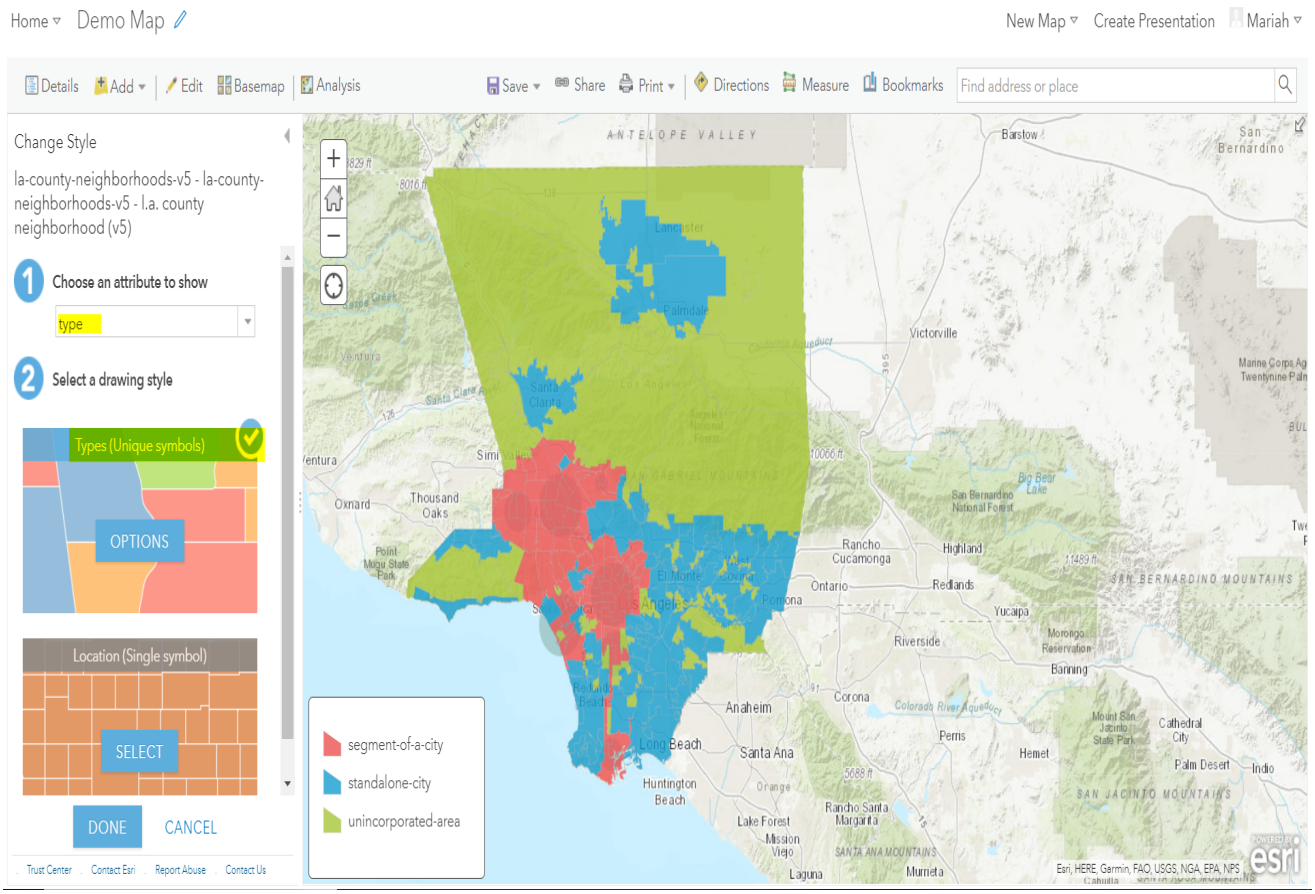
4. Click on "Import Layer" to finish adding the file:



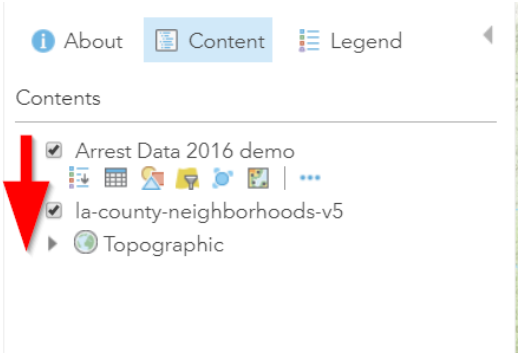
5. Now we can start to style it!

Styling Polygon Data/Choropleth Map

1. Just like the point data, the Change Style pane for polygon data (would also be the same for line data) consists of a two step process. The first step dictates which attribute to display and the second step controls the drawing style. Select 'type' for your attribute and select 'Types (unique symbols)' for drawing style.



2. Keep the default colors and Click 'Done'. Select and drag the neighborhoods layer to move it below the arrest layer.



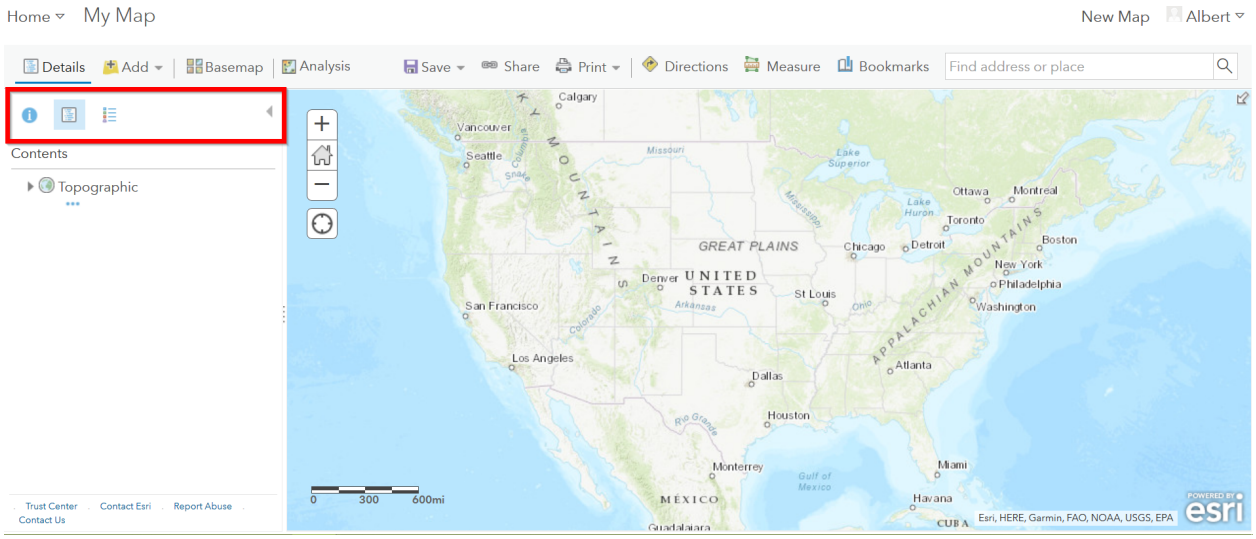
3. Notice what the arrest data looks like on top of the neighborhood layer. Is your map readable? What needs to be changed to increase the legibility of your map?

3.2.5 Other Map Tools

Table of Contents: Managing your Data

1. To access the Table of Contents and general map information, click on the 'Details' section (This should be the default view for your map).

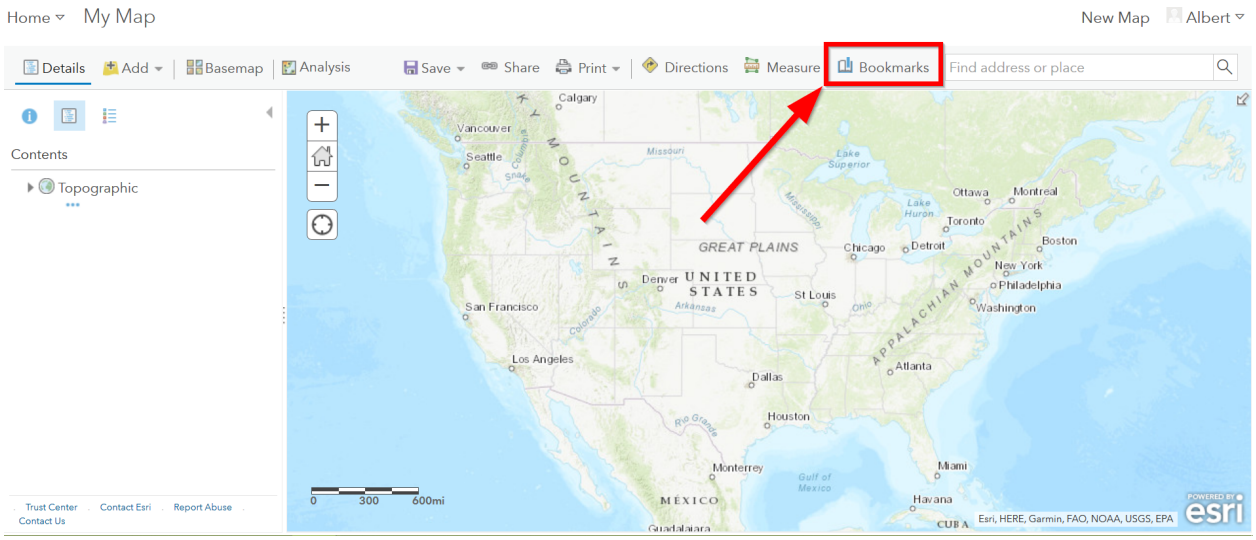
   This section consists of three subsections: About this Map, Show Contents of Map, and Show Map Legend. The About icon displays a quick breakdown of how to build your map. We will return to the next two subsections after we add data to the map.



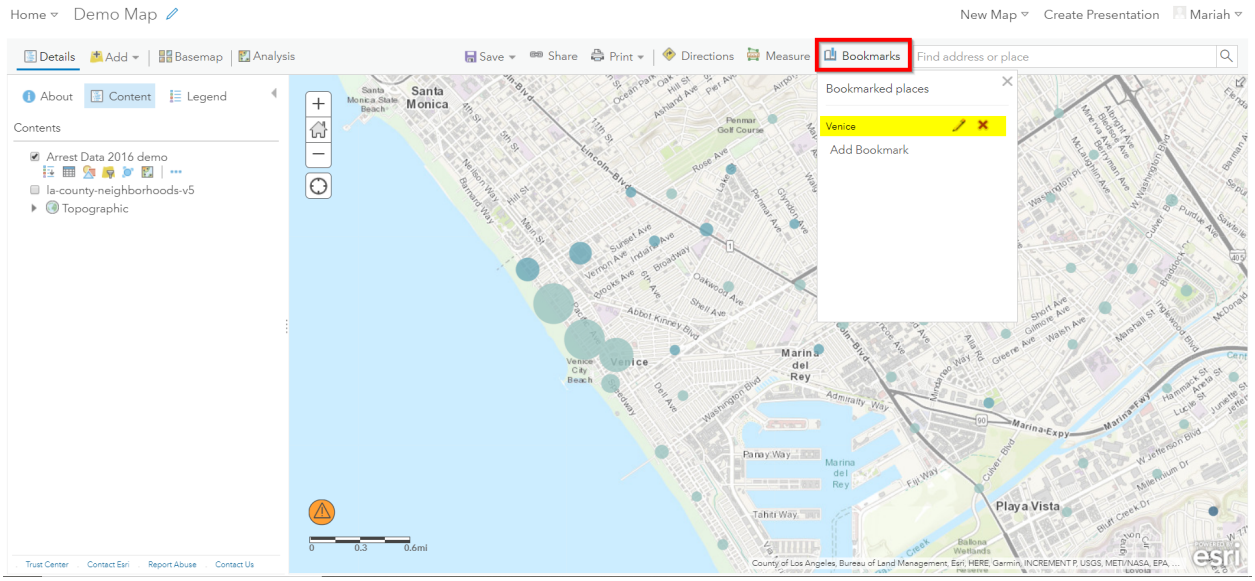
2. Click 'Save'. Enter the mandatory Map Title information, Tags, and Description to save your map.

Bookmarks

1. Bookmarks are a great tool for saving views. Type 'Venice, CA' in the search box. Once zoomed to Venice, click 'Bookmarks' and select 'Add Bookmark' and name bookmark as 'Venice'.



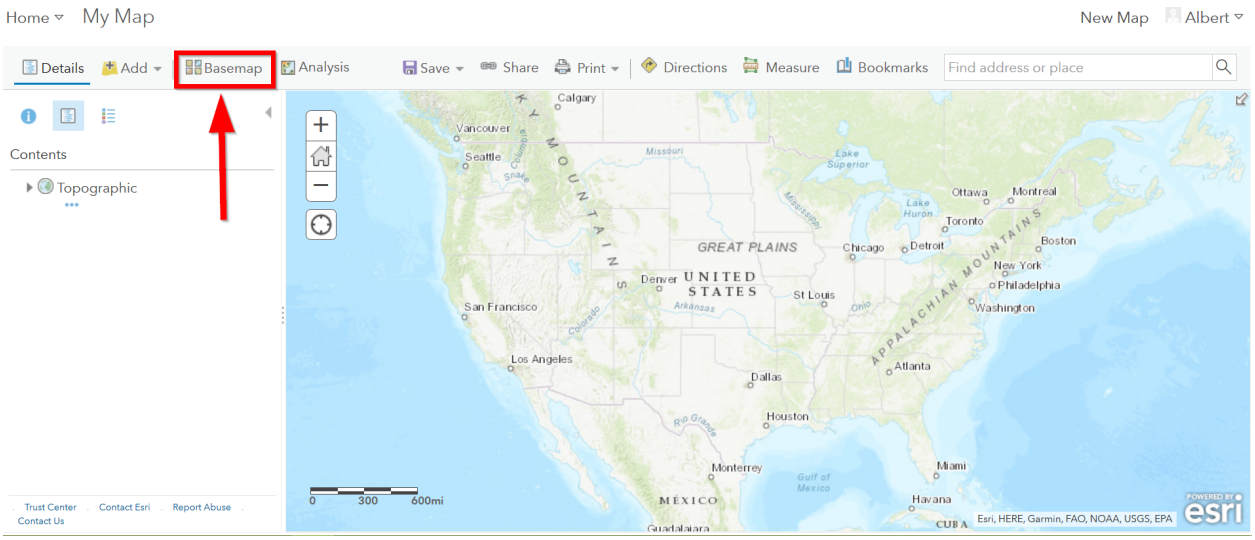
2. Test your bookmark by zooming out to another section of the map. Click 'Bookmarks' and select your newly created 'Venice' bookmark to return to Venice on map.

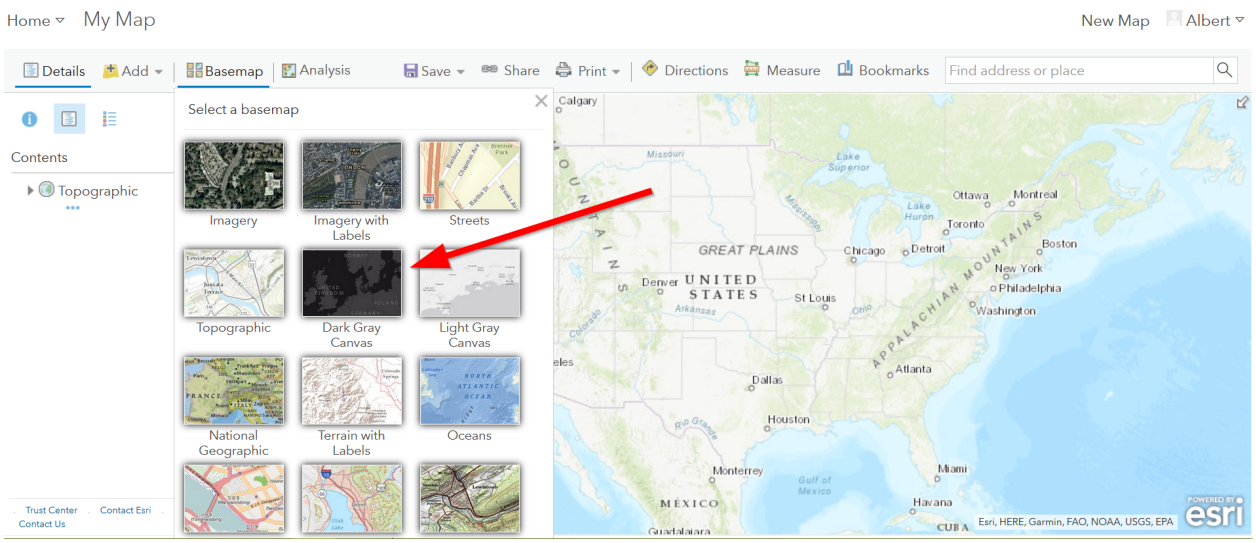


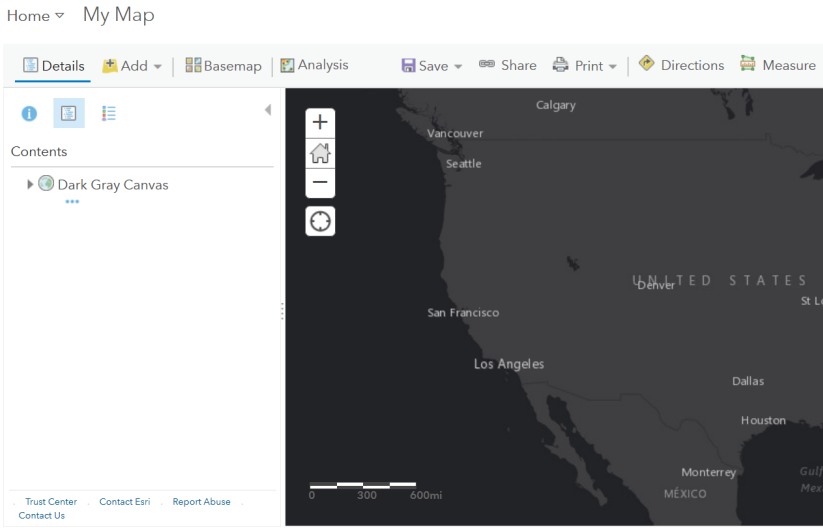
Changing the Basemap

1. Click on 'Basemap Gallery', browse options and explore the basemap options.

    a. Note: Basemaps are an important cartographic choice for building your map. If you have a lot of information on your map a minimal basemap may be the best choice.





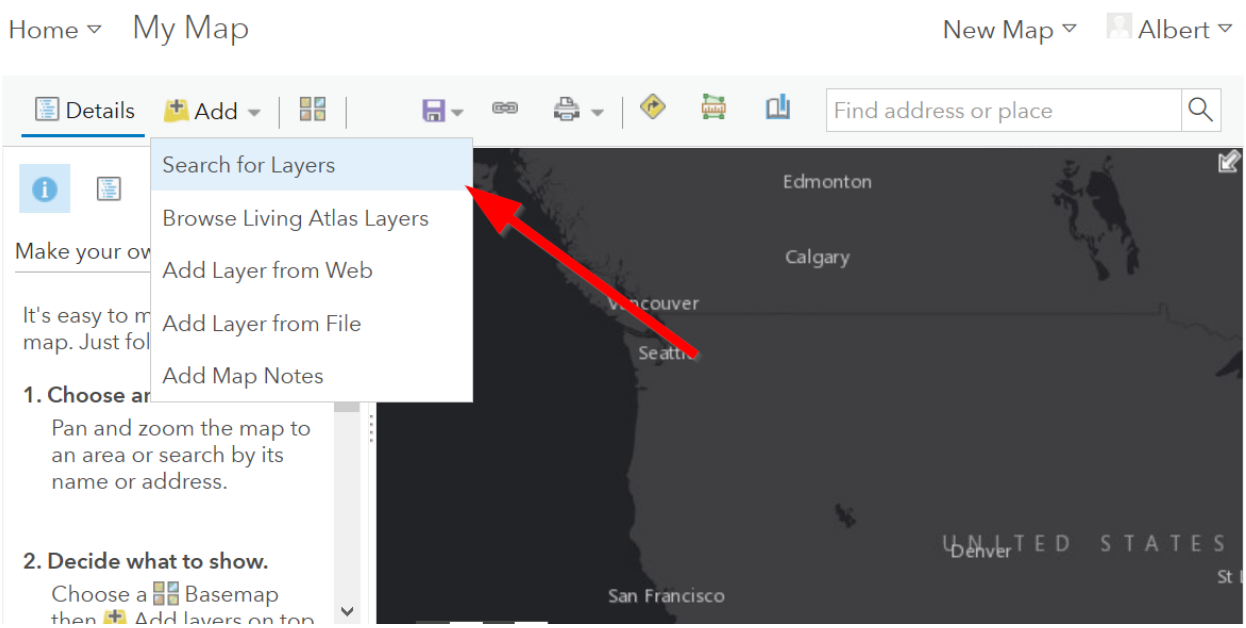


2. Select the ‘Dark Gray Canvas’ and add to your map.

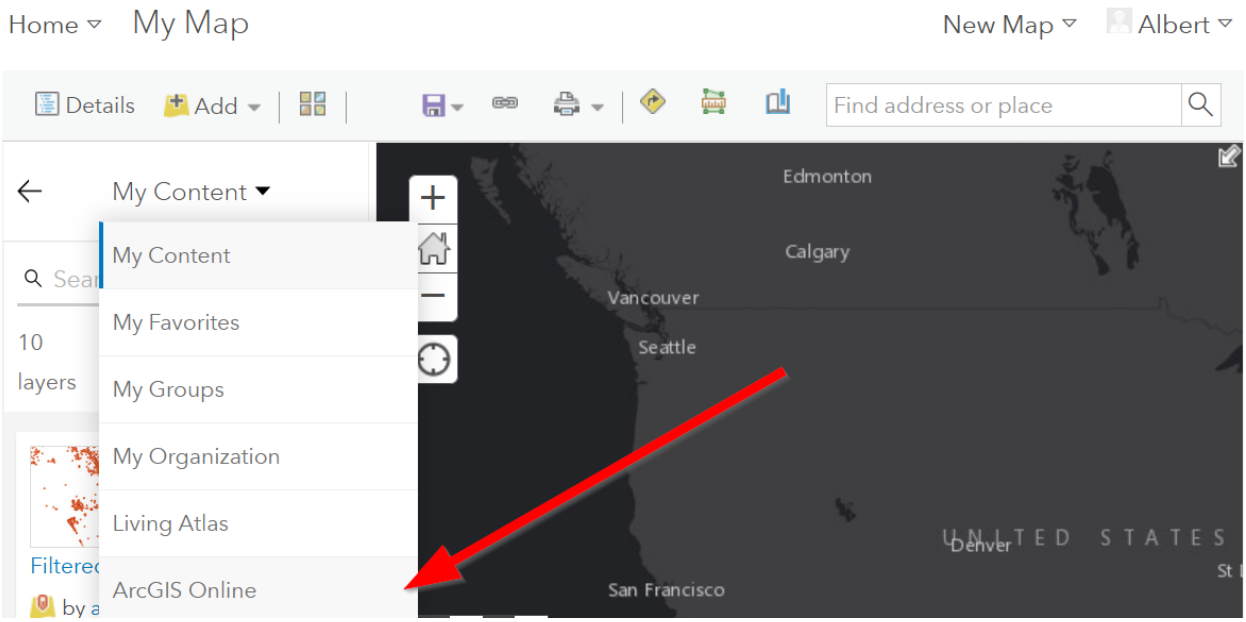
Adding Other Layers

You can also add publicly shared layers.

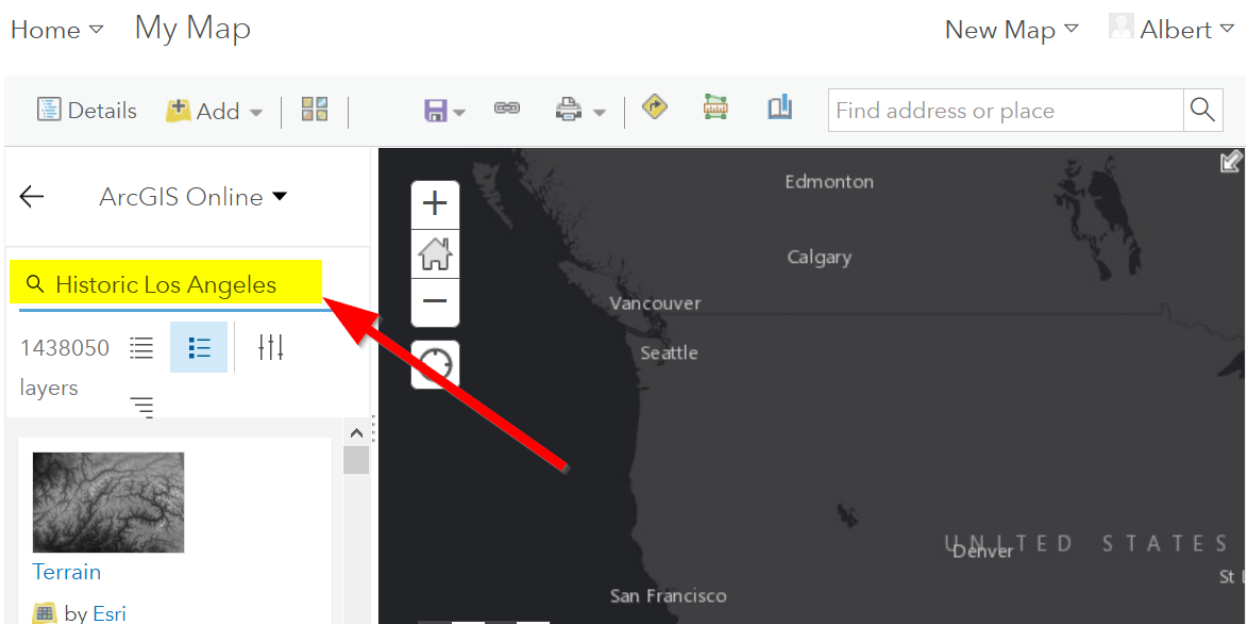
1. Click on “Search for Layers” ..



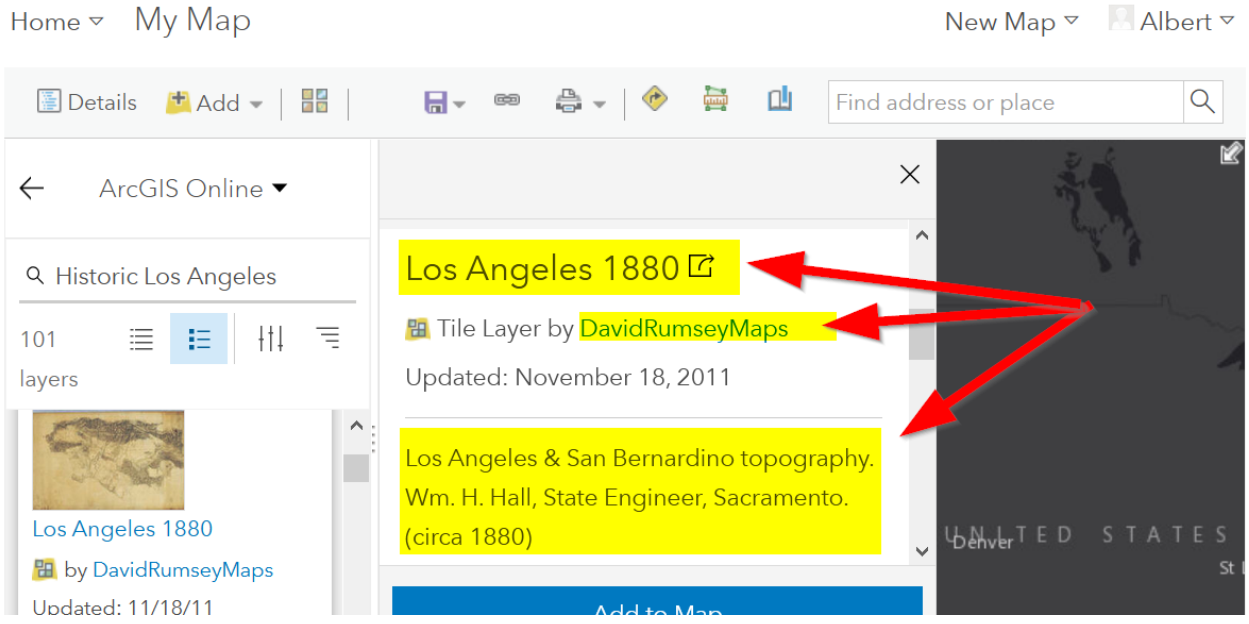
2. Click on “ArcGIS Online”



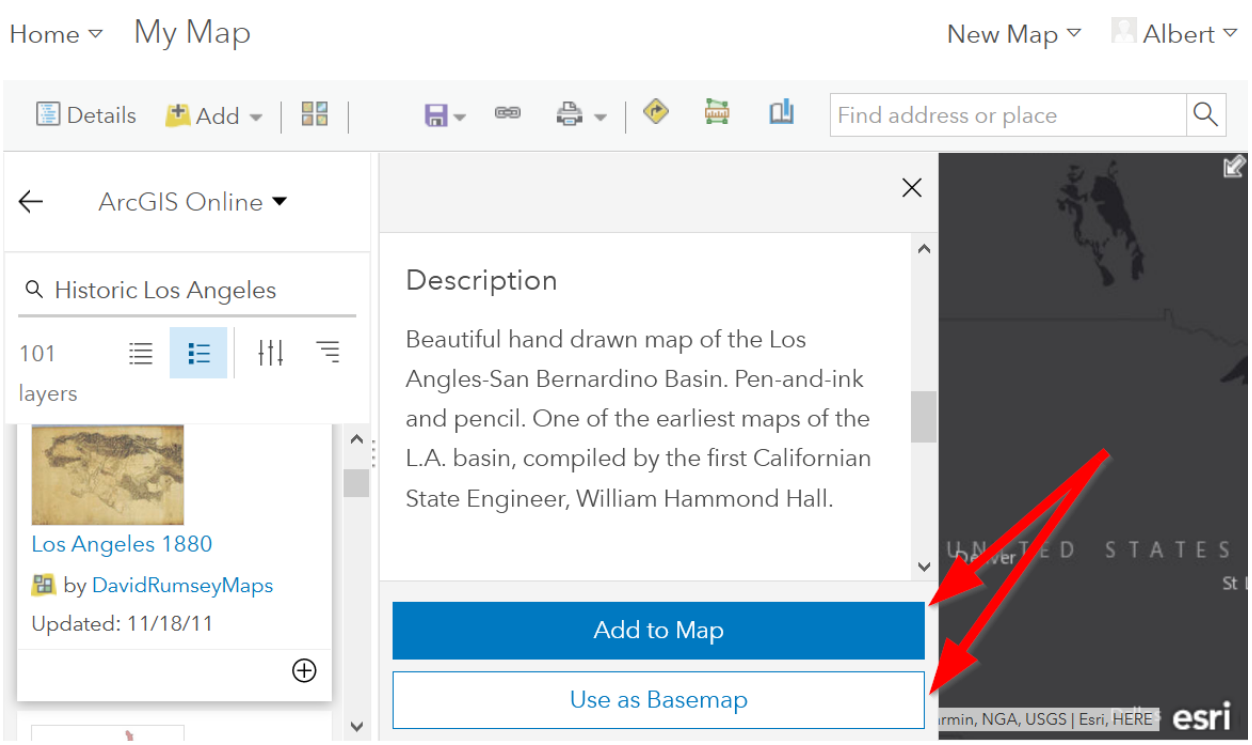
3. Type in “Historic Los Angeles”



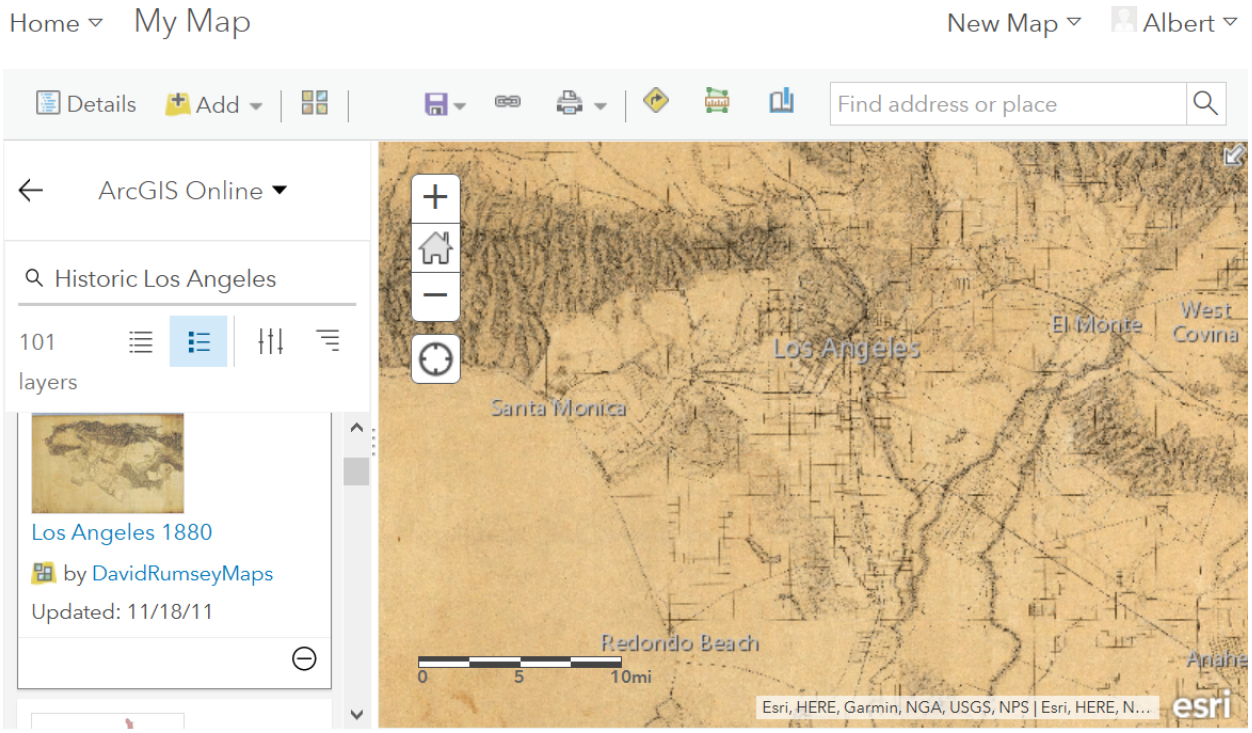
4. Pay close attention to the author and source of the map to make sure it is legitimate. David Rumsey is a map librarian who hosts a lot of maps on his website, so this is pretty good!



5. Click on “Add to Map” to finish adding your new map (you can add it as a basemap if you want the map to sit behind all your other data points).

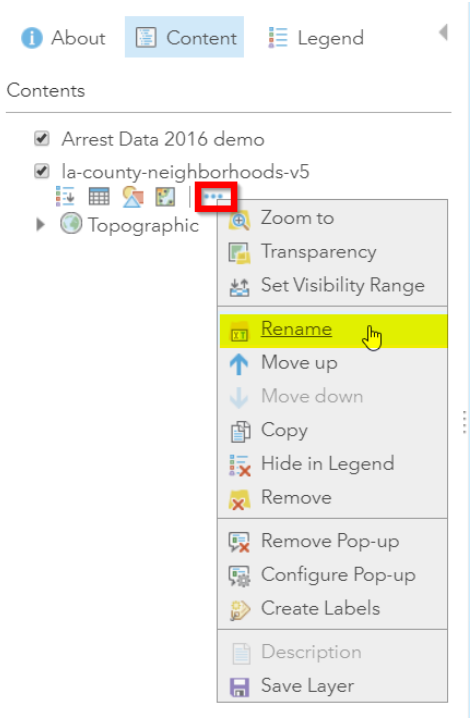


6. Now you can use the historical map to provide more context about your data.



Renaming & Copying Layers

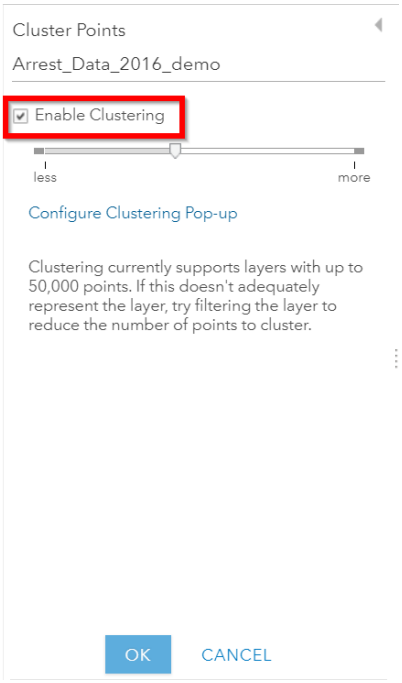
1. To rename layers toggle 'More Options' on a layer and select 'Rename'. Clean up your neighborhoods layer by renaming to "LA County Neighborhoods".



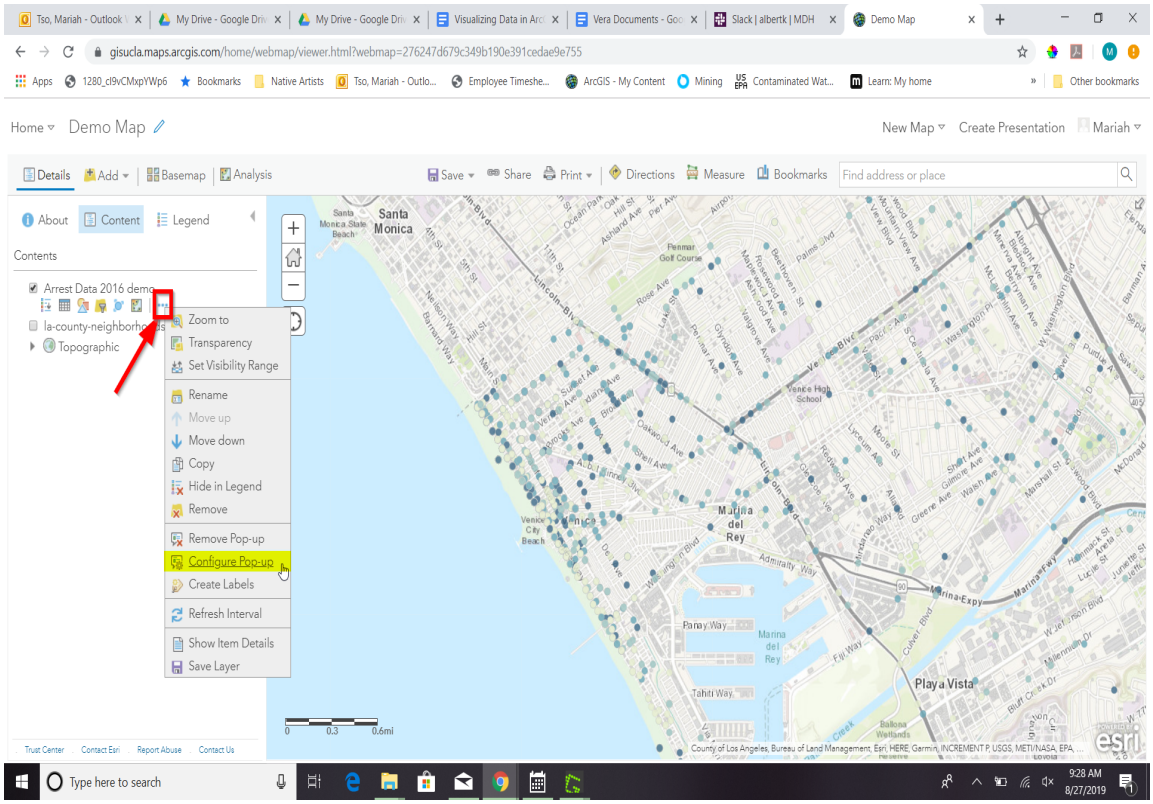
2. Sometimes you may want to include different symbologies for the same layer. Toggle 'More Options' on the arrest data layer and select 'Copy'. Rename the new layer 'Arrest Data Heat Map'. Configure the symbology on this new copy as a heat map.

Configuring Pop-Ups

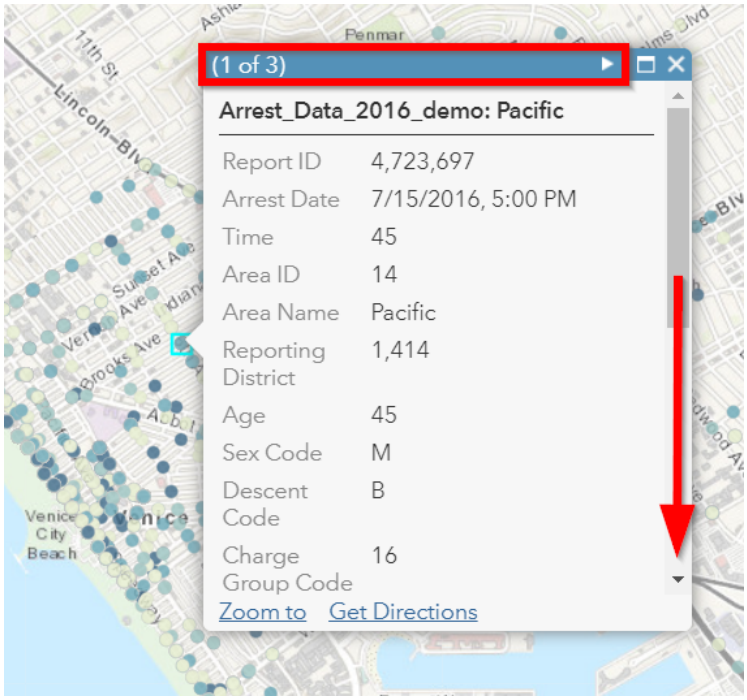
1. Disable Clustering on your arrest data layer. Click 'Ok'.



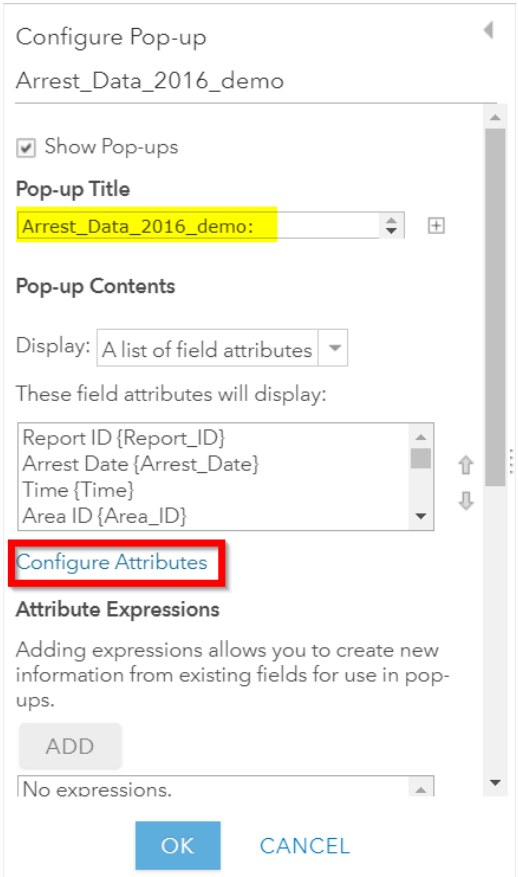
2. Click on the ellipses icon for More Options for your arrest data layer and select 'Configure Pop-Ups'.



3. Click on a random point in your map to view a pop-up. Notice the (1 of #) notification in the top left corner. This signifies that there are multiple points at the same location. Click on the arrow button to see the pop-up for each point. Remember to use the scroll bar to see all the available information.

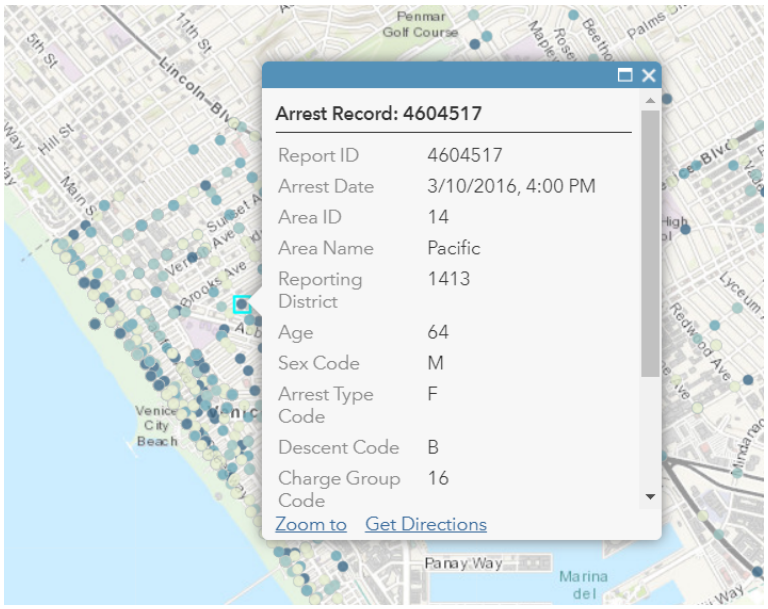


4. Revise the Pop-up Title to read "Arrest Record: {Record_ID}". Use the 'Add field name or expression' icon to select {Report_ID} field. The curly brackets denote a field name, and inclusion in the title means the pop-up will populate with each individual records Report ID. Then Click the 'Configure Attributes' Button.



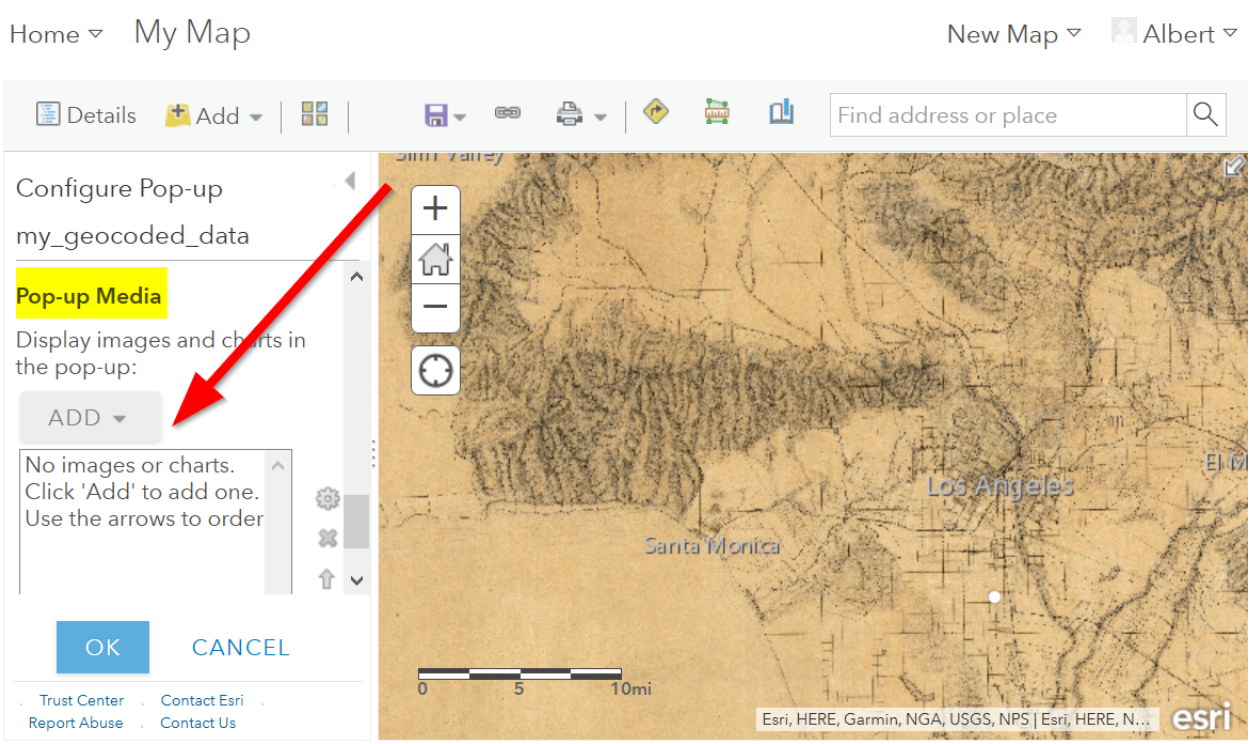
5. In the Configure Attributes window you can control which attributes are displayed in your pop-up. Make the following changes to your pop-up.
    a. Unclick the 'Use 1000 Separator' format fox for Report ID and Reporting District
    b. Uncheck the following fields from display: Time, Address, Cross Street, and any location coordinate fields.
    c. Reorder Arrest Type Code to appear after Descent Code (Select field and use the arrows on the right to reorder). Click 'Ok'. Then Click 'Ok' again.

6. Click on a random point again to see how your pop-up has changed. ..



Adding images to a pop-up

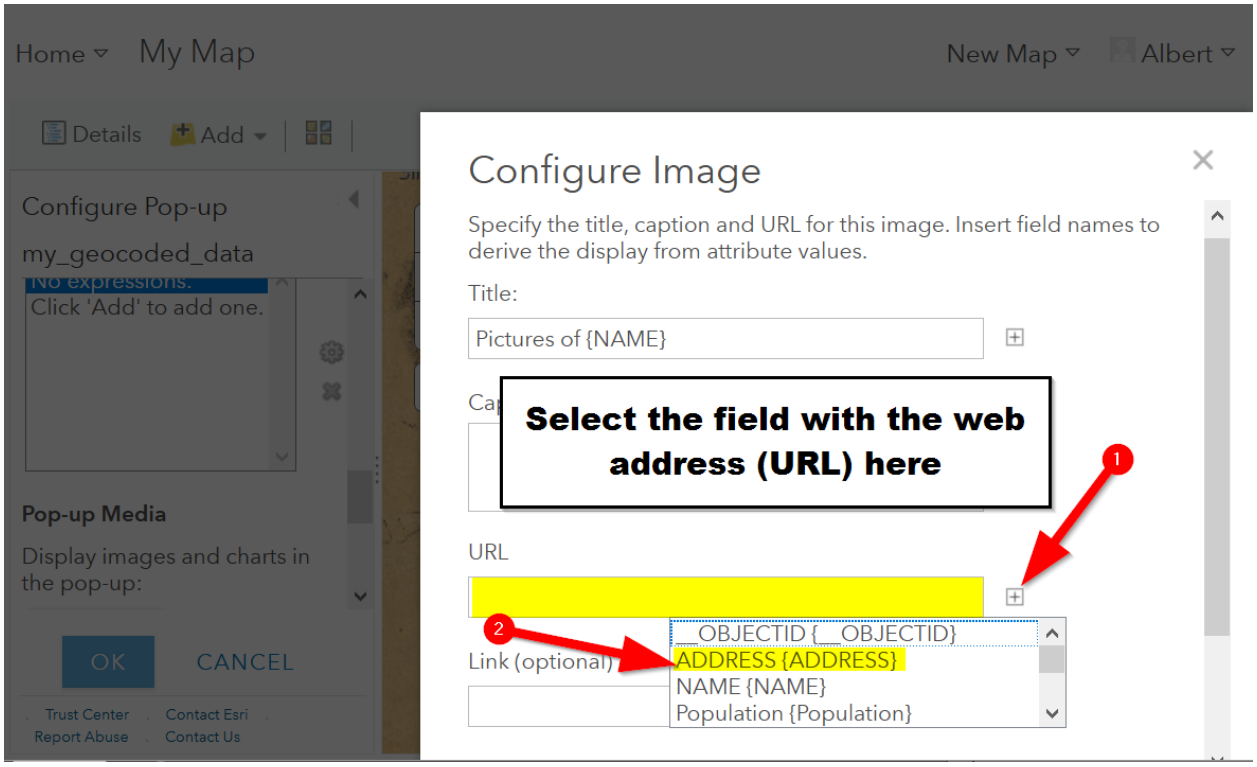
1. You can add images to a pop-up by scrolling down to "Pop-up ../Media" and clicking "Add"



2. Select “Image”

|agol_image74|

3. You can choose the field which contains the URL for all the images:



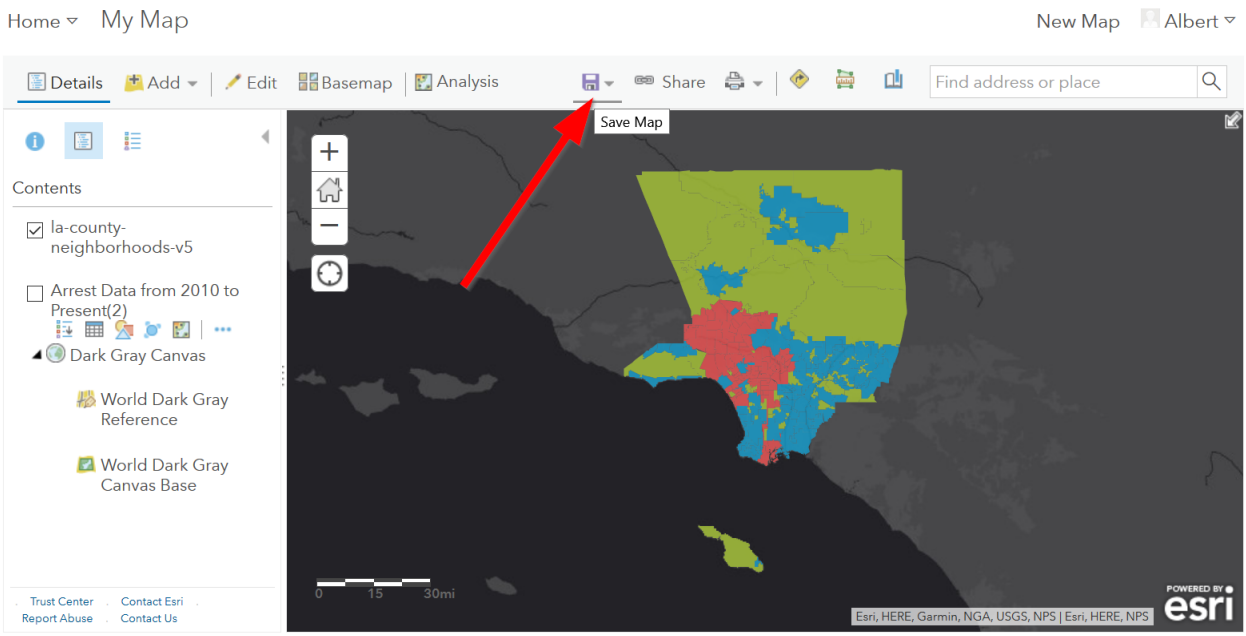
4. Now whenever someone clicks on the pop-up your image will also appear!

3.2.6 Sharing & Publishing Your Map

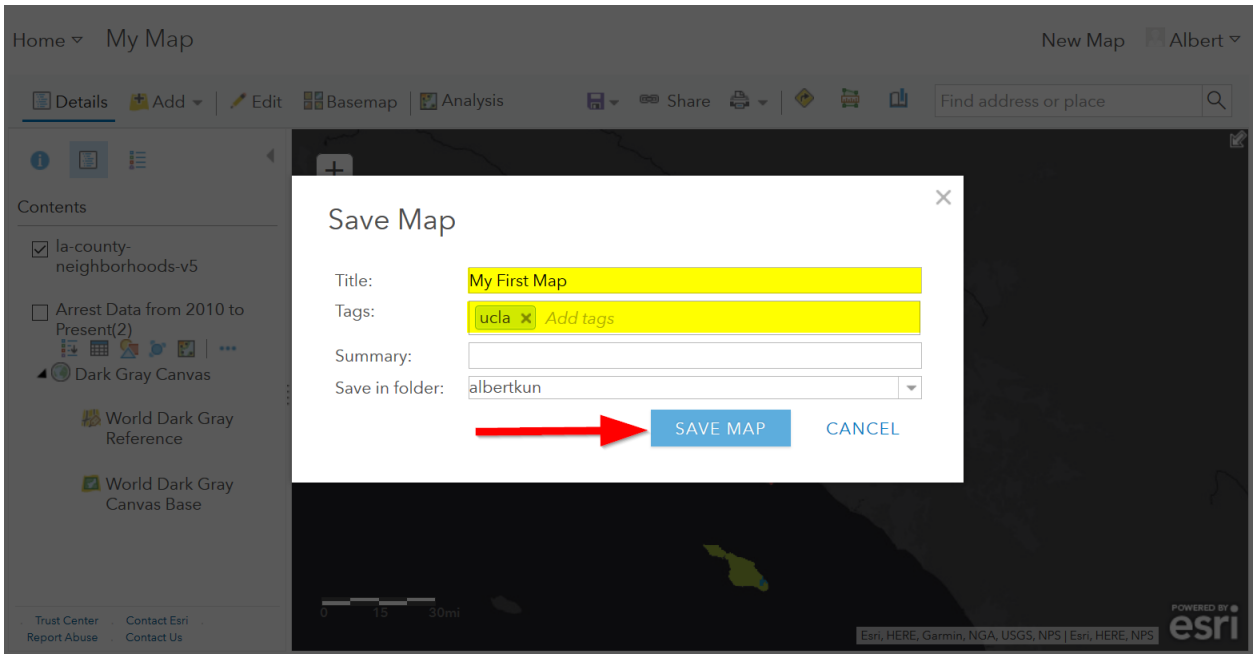
Saving your map

With your map stylized and ready to go, the time has come to save and share it!

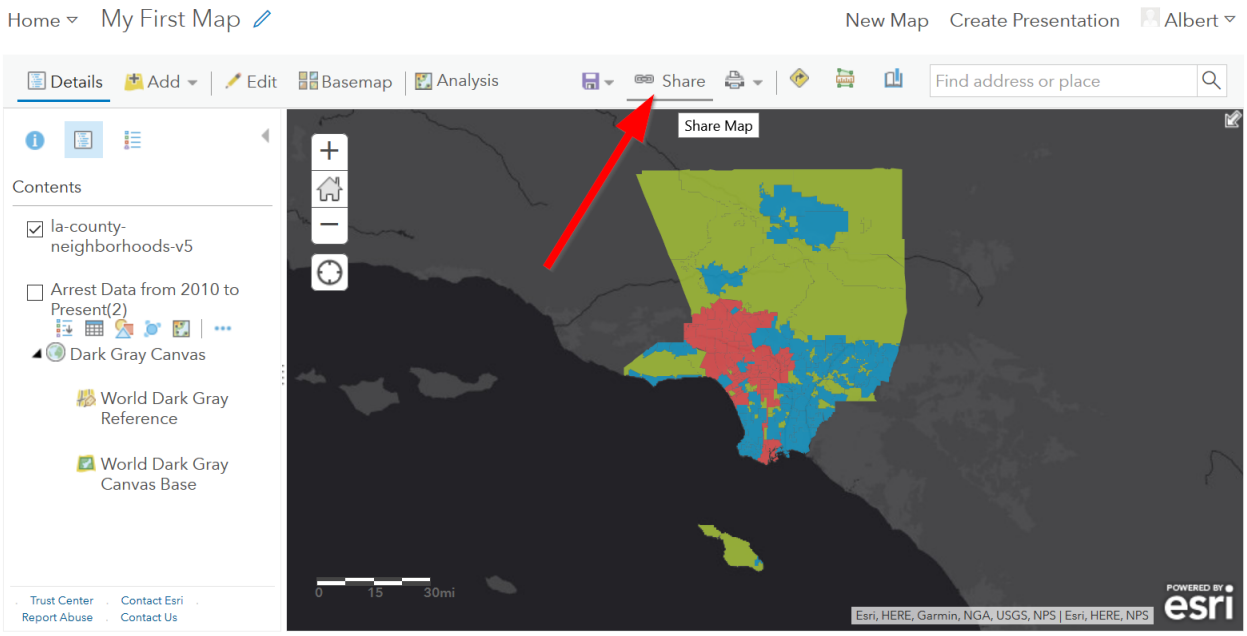
1. Click on the "Save" icon ..



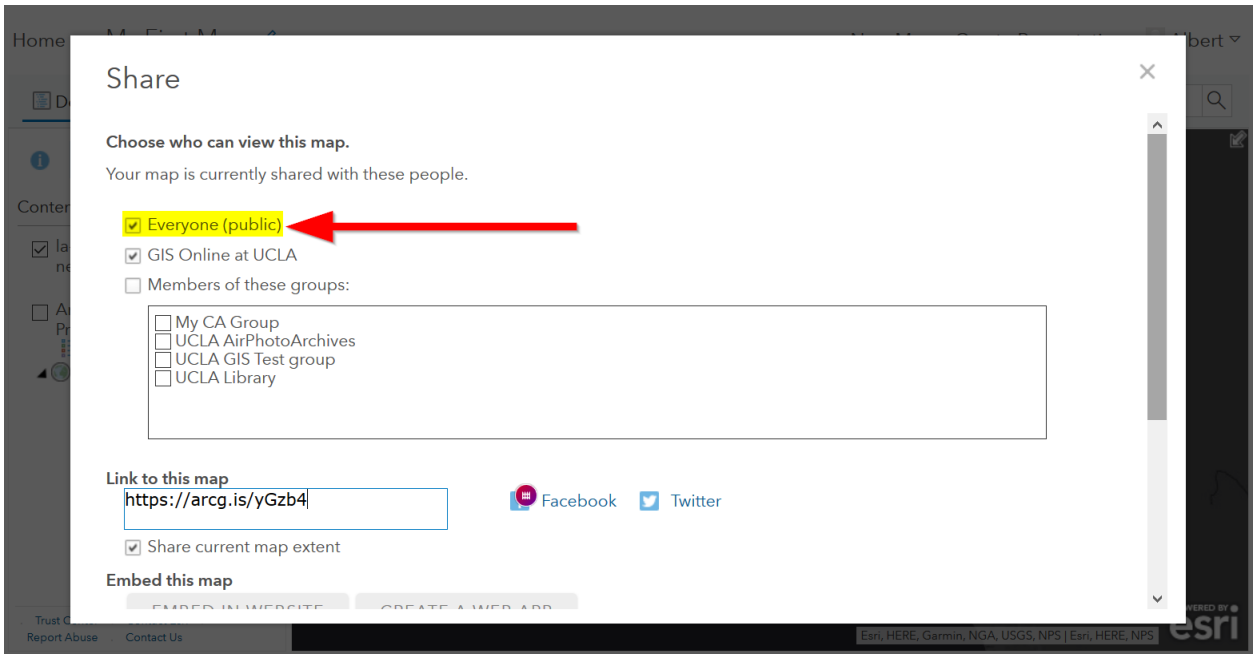
3. Give your map a name and tag and then click "Save Map" ..



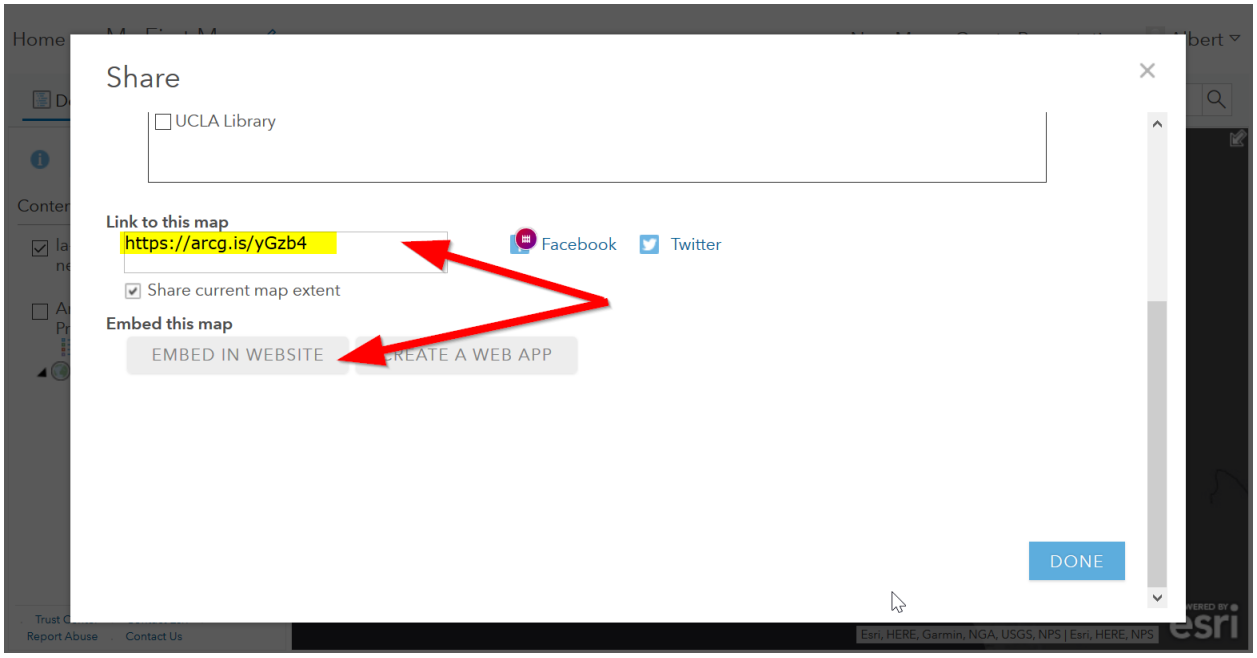
4. To share our saved map, click on the “Share” icon:



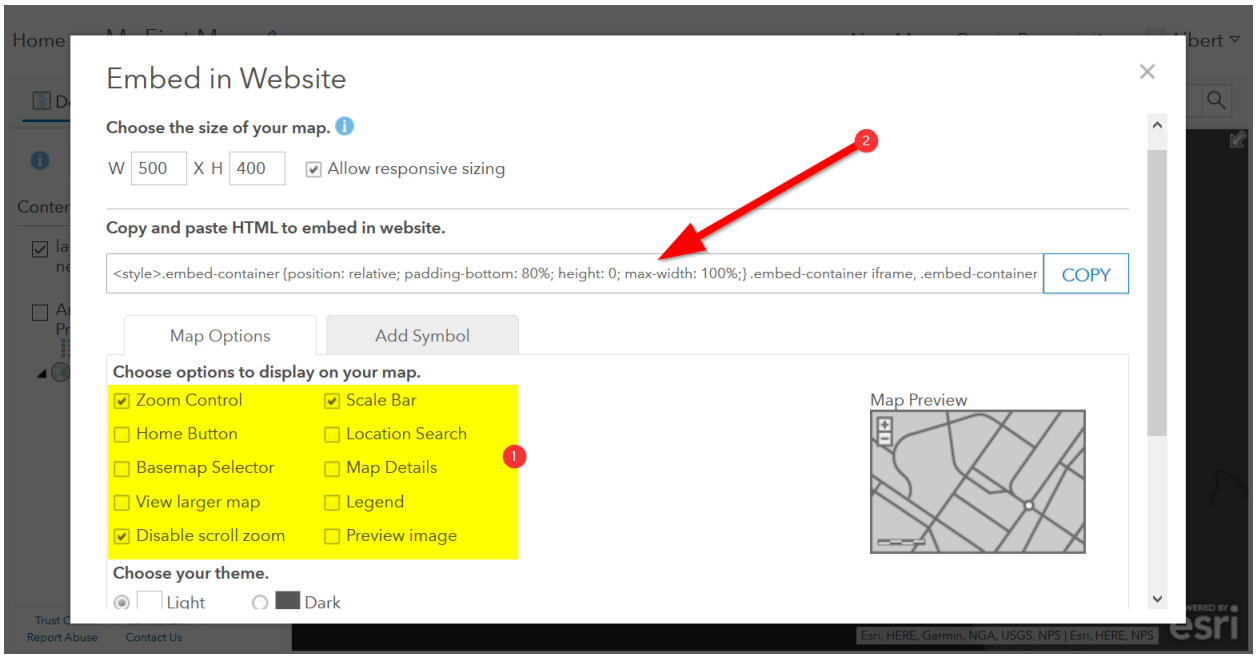
5. Click on “Everyone” to share the map with the public and allow your map to be embedded onto a webpage.



6. You can either link to the map or embed it:



7. Embed in website allows you to customize the map further (1), but be sure to copy and paste the embed code (2) into your website when you are done!

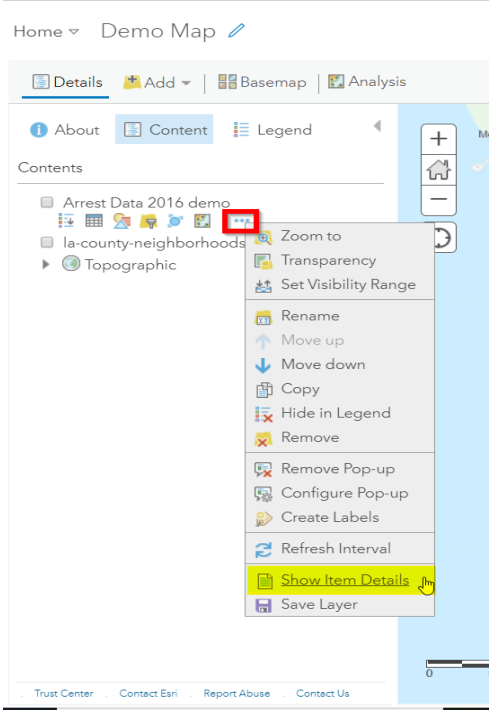


8. Congratulations! You have successfully saved and shared your map!

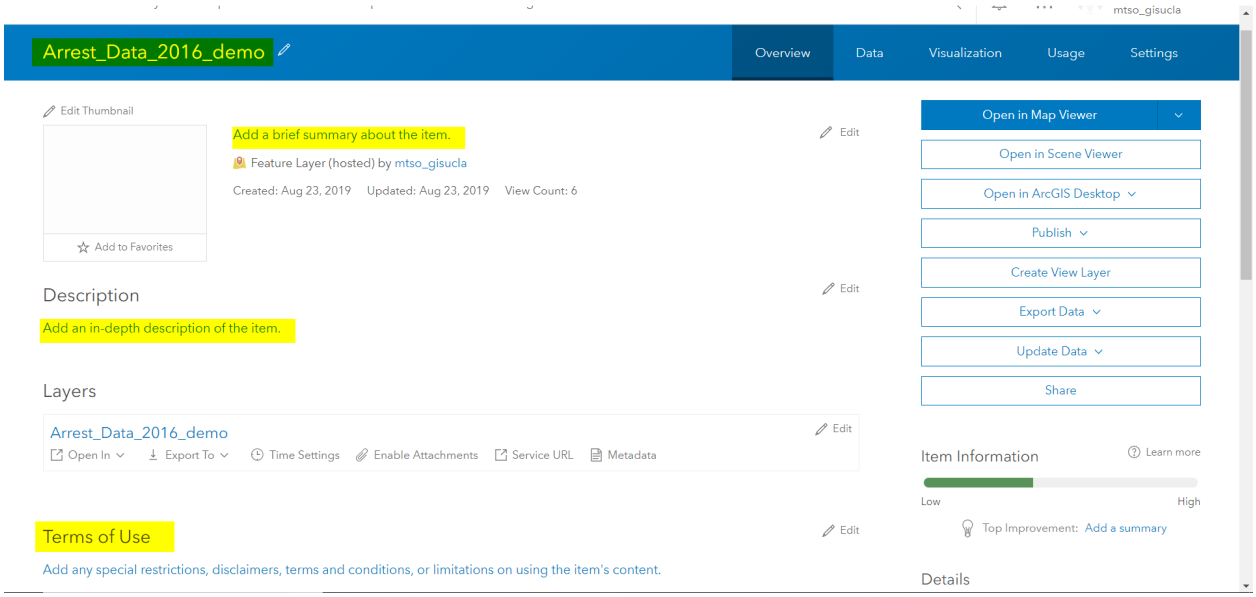
Optional: Organizing your Finished Maps & Content

If you are creating a lot of maps and content, you may want to start organizing it using metadata.

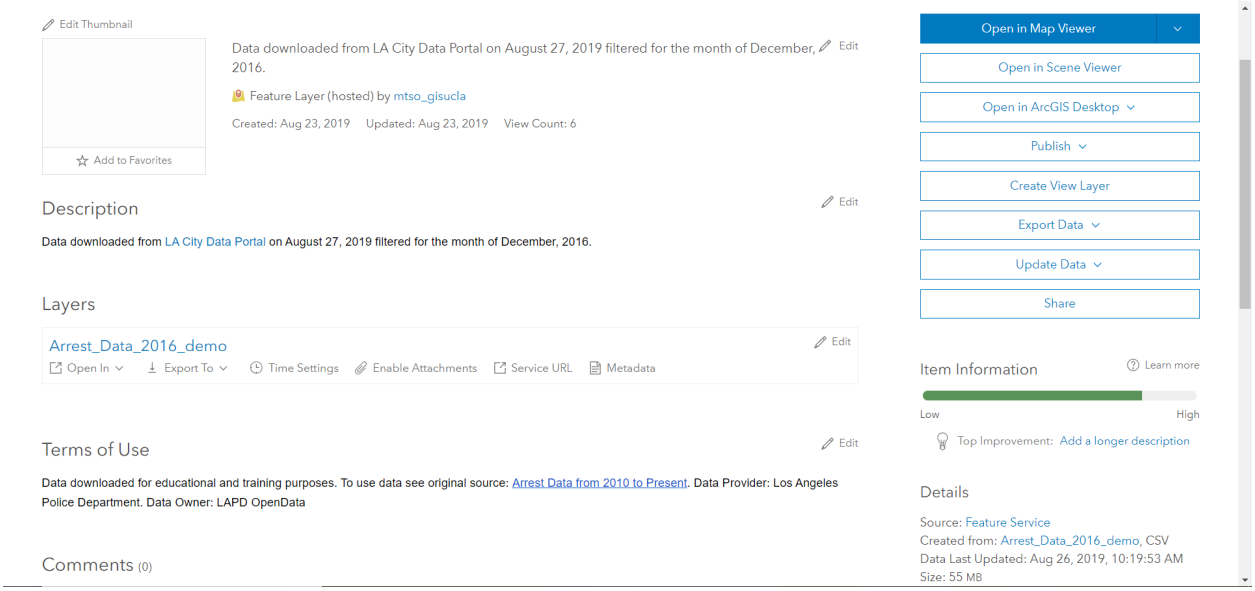
1. Toggle 'More Options' for one of your layers



2. A new browser window will open with detailed information for your layer. Review the various components of this page, particularly the title, summary, descriptions, and terms of use. It is important to fill out and organize this section if you are working with multiple maps and layers in order to stay organized.



3. Update the summary and description to read “Data downloaded from LA City Data Portal (include hyperlink to original source) on [insert date] filtered for the month of December, 2016.” Update the Terms of Use to include the original source and state “Data downloaded for educational and training purposes. To use data see original source:Arrest Data from 2010 to Present. Data Provider: Los Angeles Police Department. Data Owner: LAPD OpenData”



3.3 Joining Data in QGIS

3.3.1 Getting Started

Note: This tutorial uses data downloaded from Los Angeles Open Data portal (see: Quick Visual Guide to Visualizing Data on LA Open Data Portal)

Download QGIS if you do not have it installed: http://www.qgis.org/en/site/forusers/download.html
~~~~~~

3.3.2 Next download the following datasets:

http://boundaries.latimes.com/1.0/boundary-set/la-county-neighborhoods-v5/?format=shphttp://sandbox.idre.ucla.edu/mapshare/data/usa/census/Los_Angeles_ZipCodes.zip

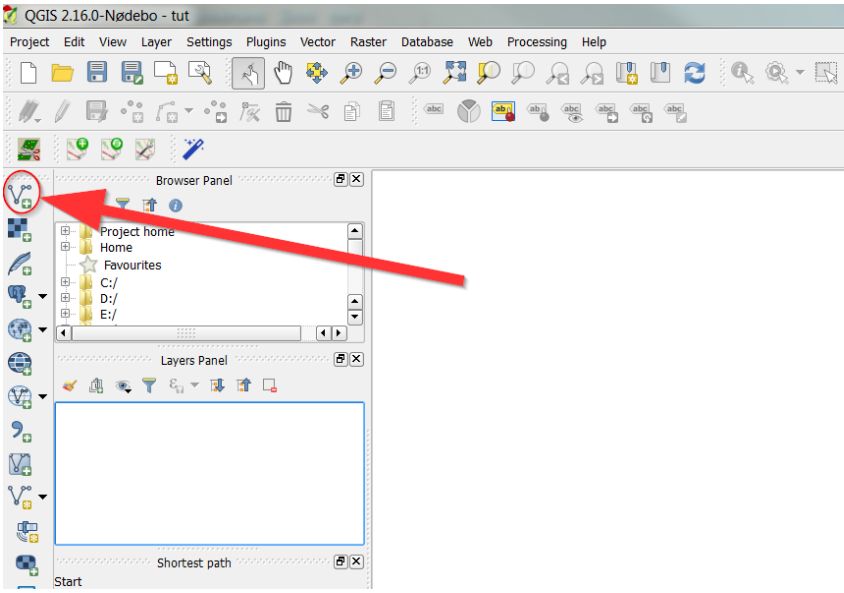
Most GIS files (also called shapefiles) will be in a zipped format, so be sure to unzip them!

Mac Example:https://asmand.files.wordpress.com/2015/09/unzip-mac.gif

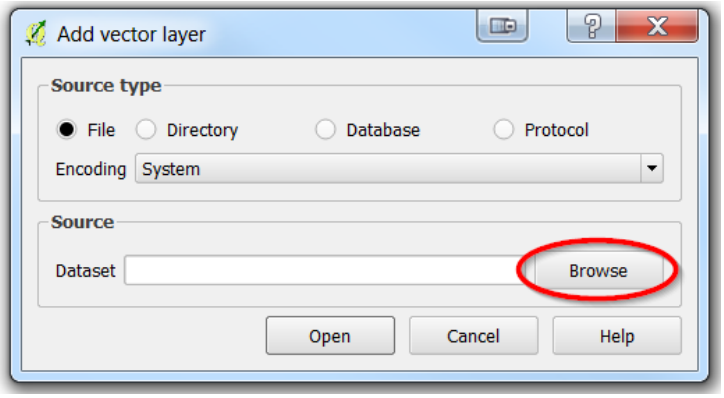
PC Example:https://www.youtube.com/watch?v=ZQOYqzGHiDY
~~~~~~

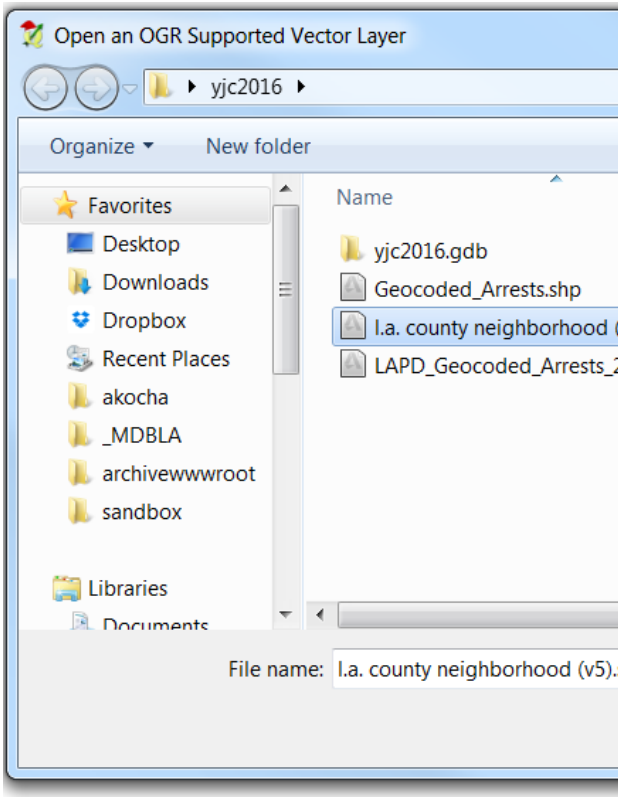
How to add vector data

1. **Click the weird V to the left of the main menu**

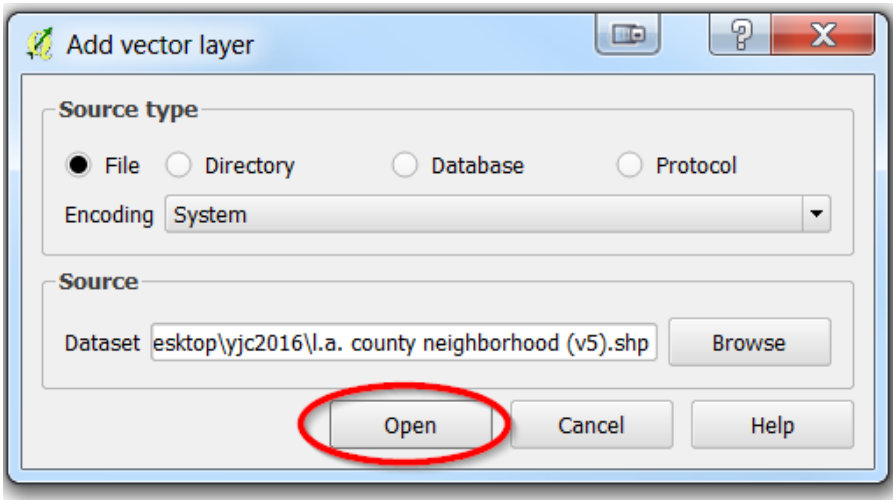


2. **Click Browse**



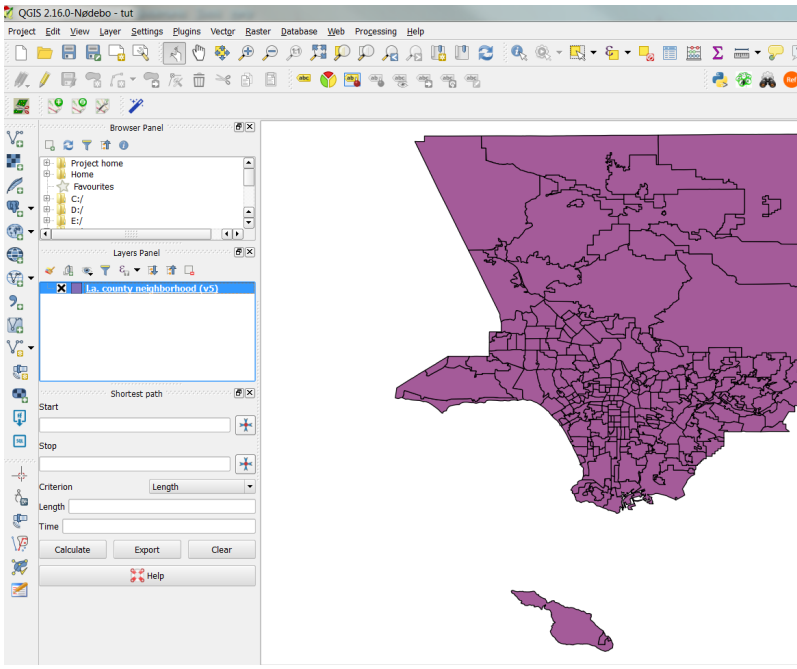


3. **Find the "l.a county neighborhood (v5).shp" file and click "Open"**



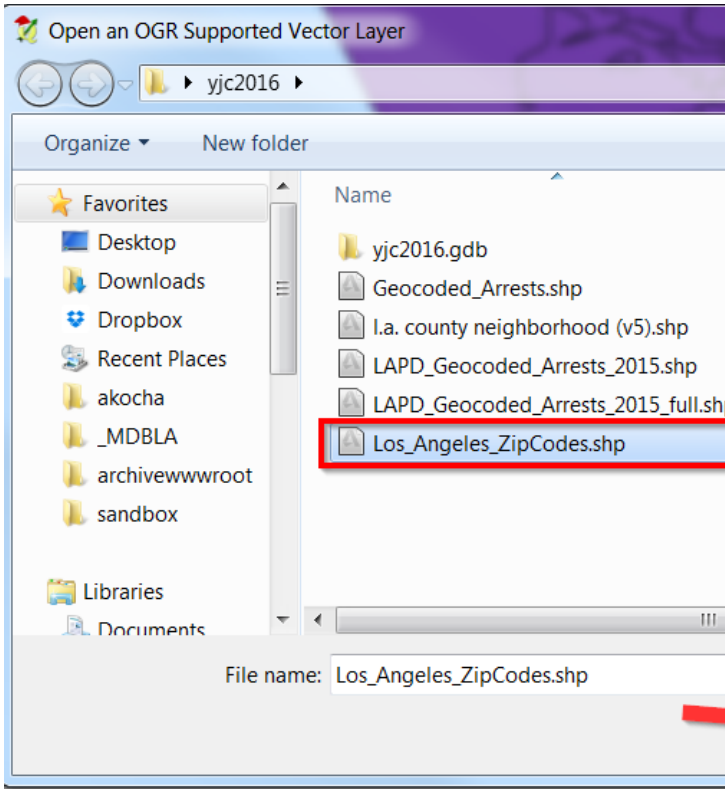
4. **Now select open**

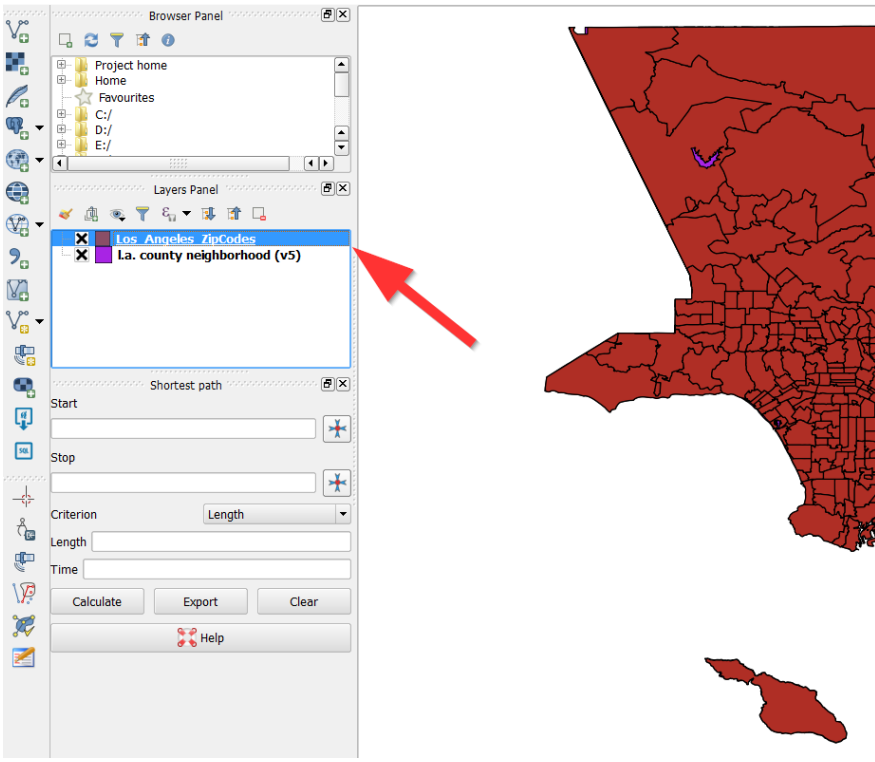
5. **Now the vector file should show up in the window:**



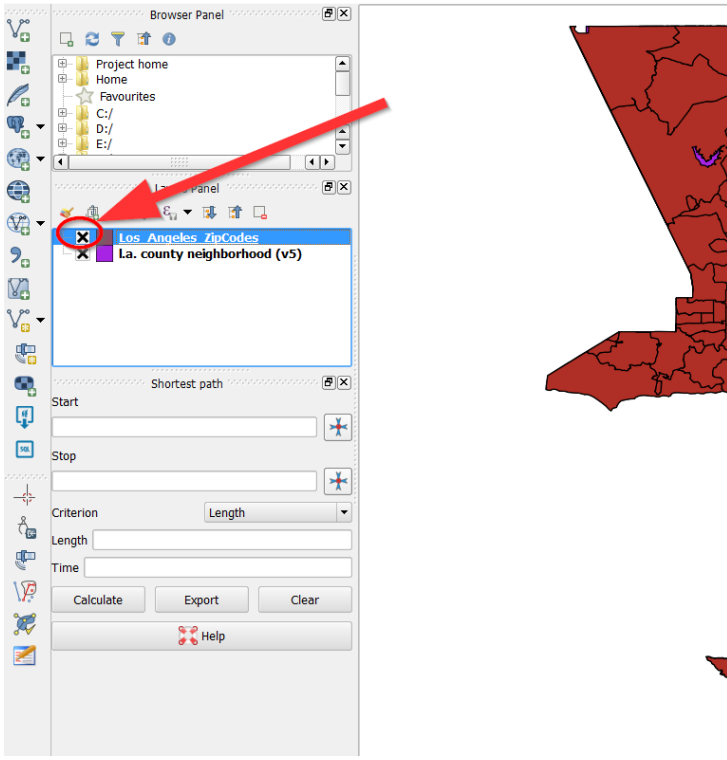
Working with layers:

1. **Let's add another GIS file called Los_Angeles_ZipCodes**

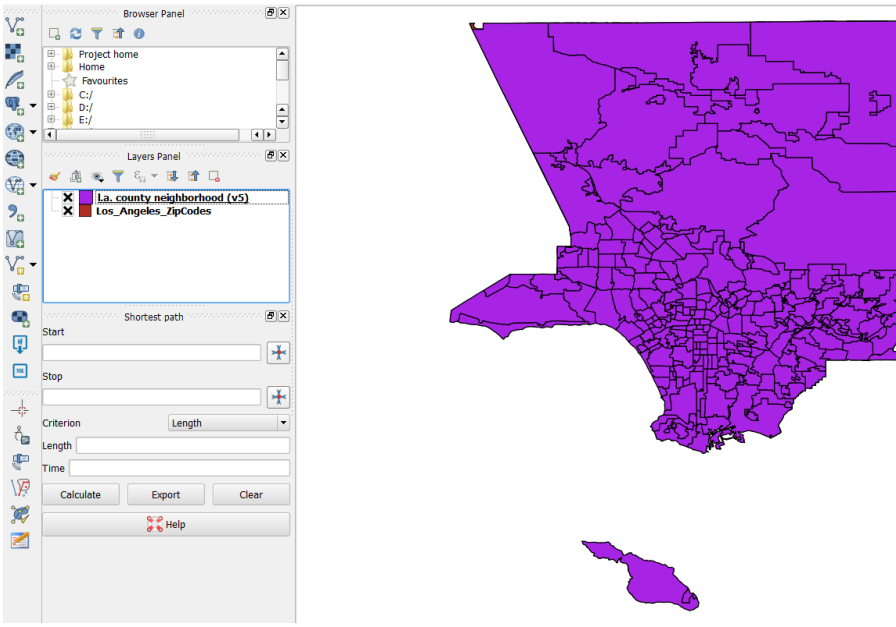




2. **Notice what happens right after you add it:**
3. It appears on top of the La county neighborhood (v5) layer which masks it from view.

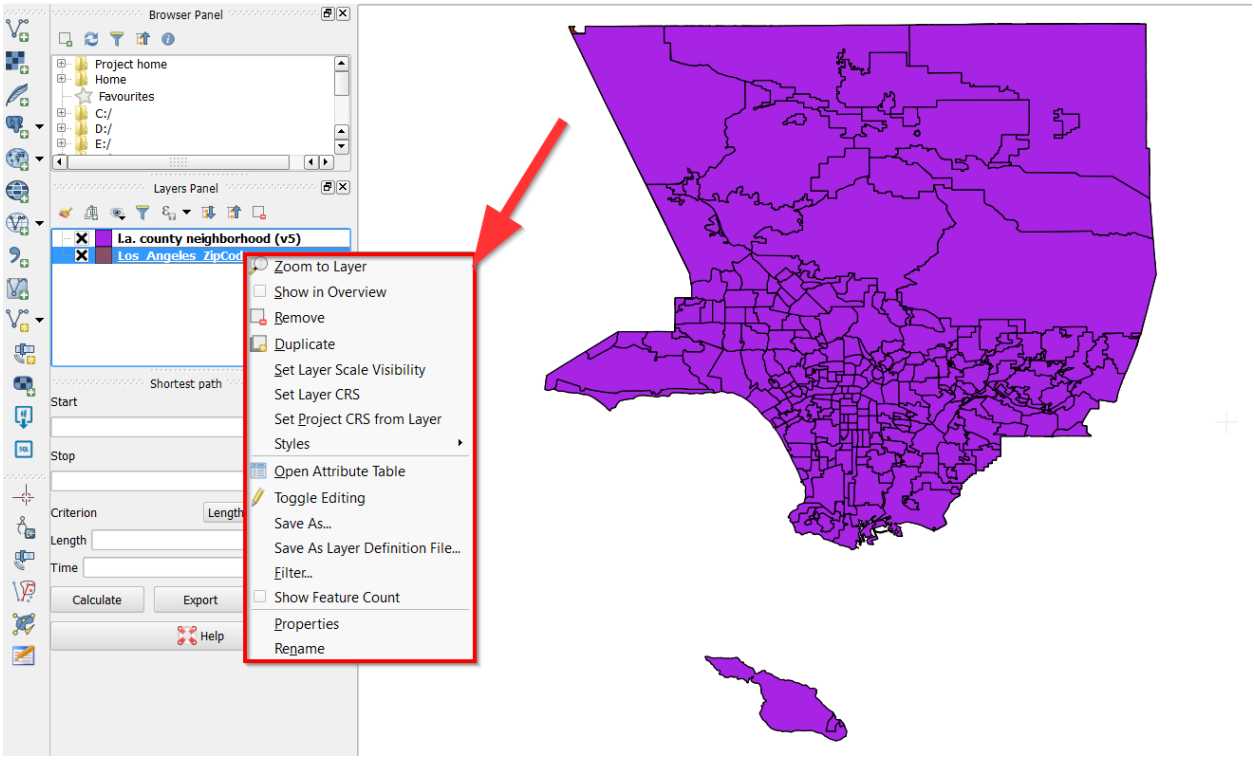


4. **If you hit the box with the X you can toggle it on and off.**

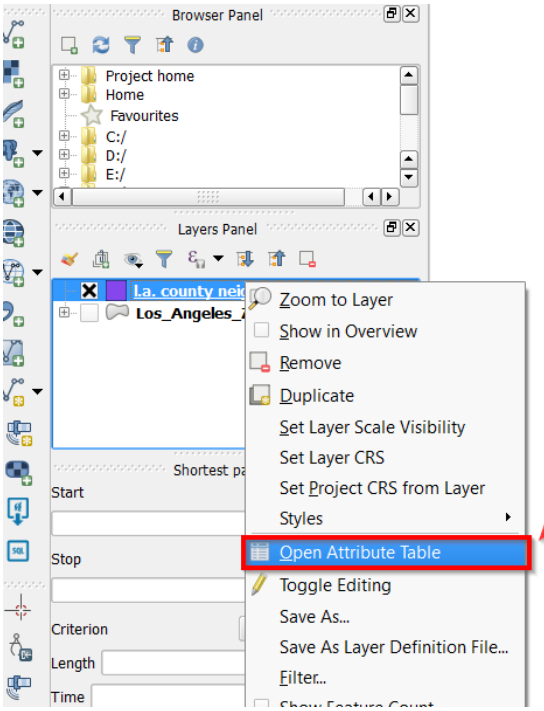


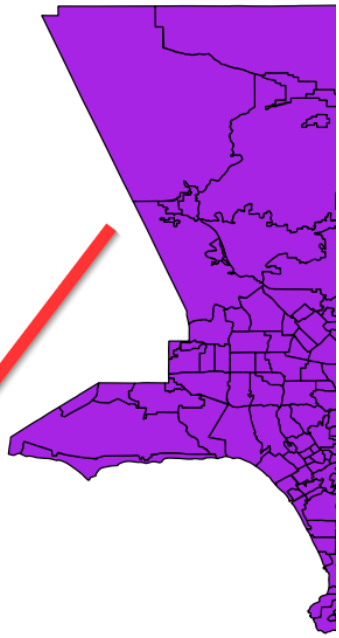
5. **You can also drag the layer up and down.**

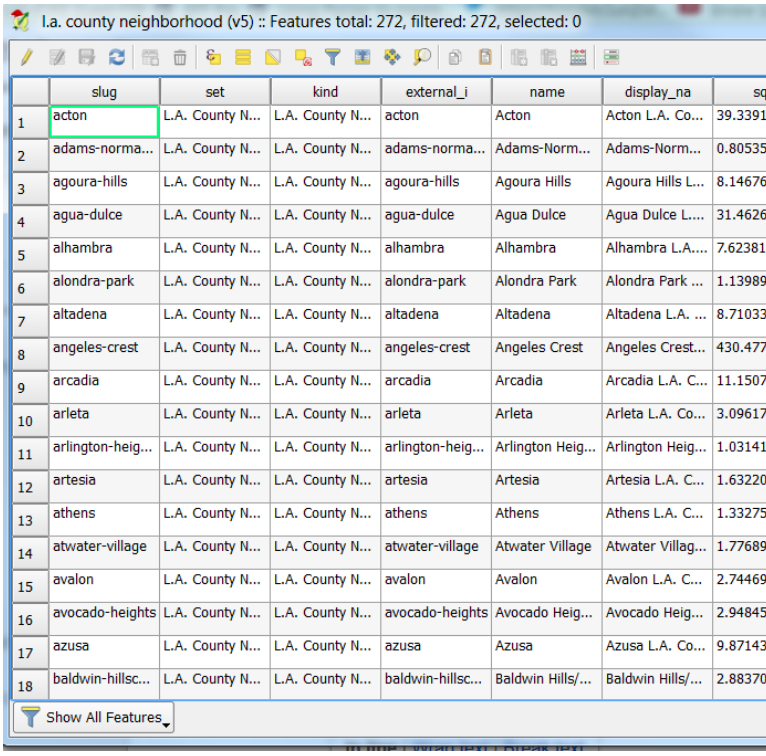
6. You can right click or cmd + click on the layer to do various things, such as open an attribute table, remove the layer, or copy it.



7. Let's click on "Open Attribute Table":

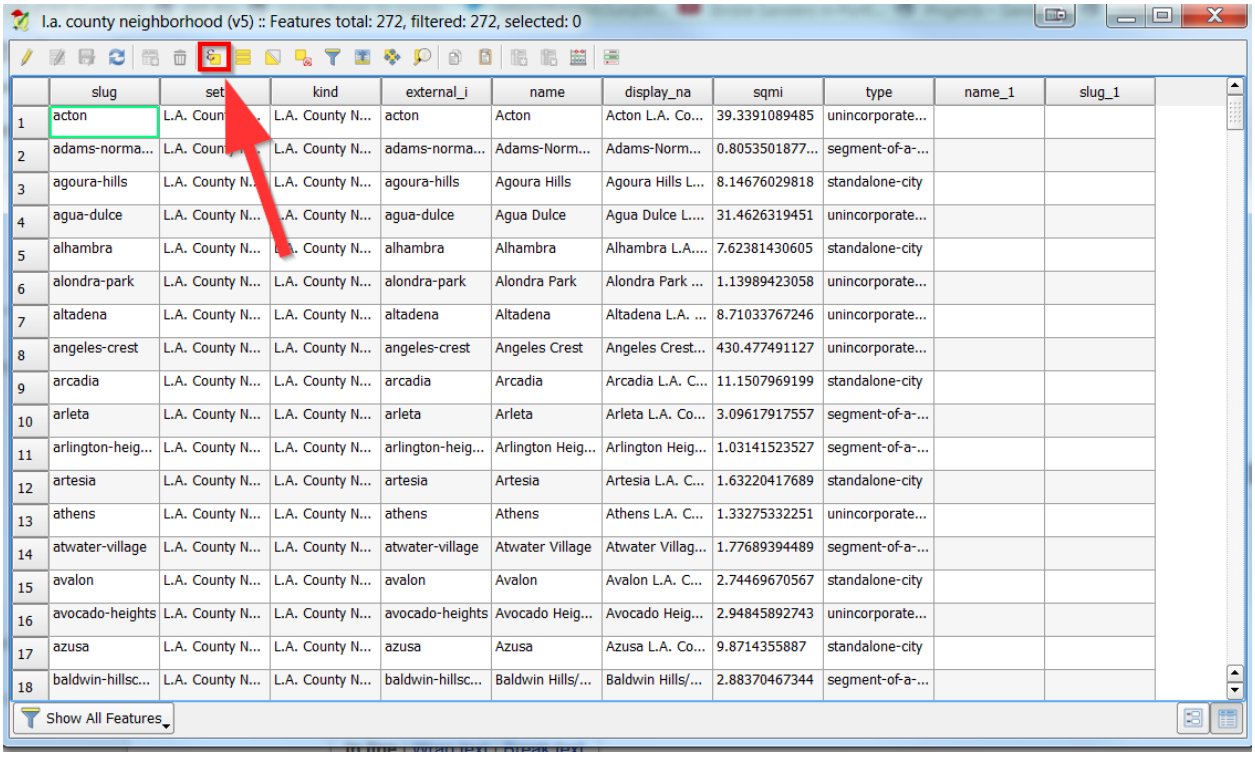






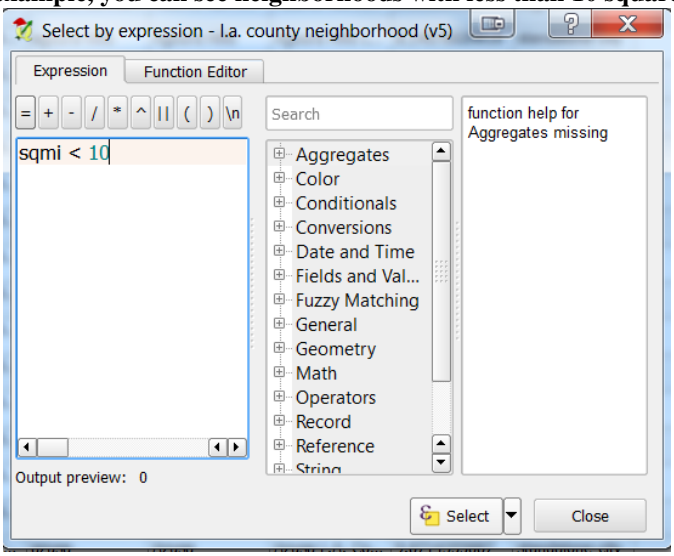
	slug	set	kind	external_i	name	display_na	sq
1	acton	L.A. County N...	L.A. County N...	acton	Acton	Acton L.A. Co...	39.3391
2	adams-norma...	L.A. County N...	L.A. County N...	adams-norma...	Adams-Norm...	Adams-Norm...	0.80535
3	agoura-hills	L.A. County N...	L.A. County N...	agoura-hills	Agoura Hills	Agoura Hills L...	8.14676
4	agua-dulce	L.A. County N...	L.A. County N...	agua-dulce	Agua Dulce	Agua Dulce L....	31.4626
5	alhambra	L.A. County N...	L.A. County N...	alhambra	Alhambra	Alhambra L.A....	7.62381
6	alondra-park	L.A. County N...	L.A. County N...	alondra-park	Alondra Park	Alondra Park ...	1.13989
7	altadena	L.A. County N...	L.A. County N...	altadena	Altadena	Altadena L.A. ...	8.71033
8	angeles-crest	L.A. County N...	L.A. County N...	angeles-crest	Angeles Crest	Angeles Crest...	430.477
9	arcadia	L.A. County N...	L.A. County N...	arcadia	Arcadia	Arcadia L.A. C...	11.1507
10	arleta	L.A. County N...	L.A. County N...	arleta	Arleta	Arleta L.A. Co...	3.09617
11	arlington-heig...	L.A. County N...	L.A. County N...	arlington-heig...	Arlington Heig...	Arlington Heig...	1.03141
12	artesia	L.A. County N...	L.A. County N...	artesia	Artesia	Artesia L.A. C...	1.63220
13	athens	L.A. County N...	L.A. County N...	athens	Athens	Athens L.A. C...	1.33275
14	atwater-village	L.A. County N...	L.A. County N...	atwater-village	Atwater Village	Atwater Villag...	1.77689
15	avalon	L.A. County N...	L.A. County N...	avalon	Avalon	Avalon L.A. C...	2.74469
16	avocado-heights	L.A. County N...	L.A. County N...	avocado-heights	Avocado Heig...	Avocado Heig...	2.94845
17	azusa	L.A. County N...	L.A. County N...	azusa	Azusa	Azusa L.A. Co...	9.87143
18	baldwin-hillsc...	L.A. County N...	L.A. County N...	baldwin-hillsc...	Baldwin Hills/...	Baldwin Hills/...	2.88370

8. **Here you can see all the data that is stored in the file:**
9. **You can also filter the data to show only certain things by using** the expression calculator:

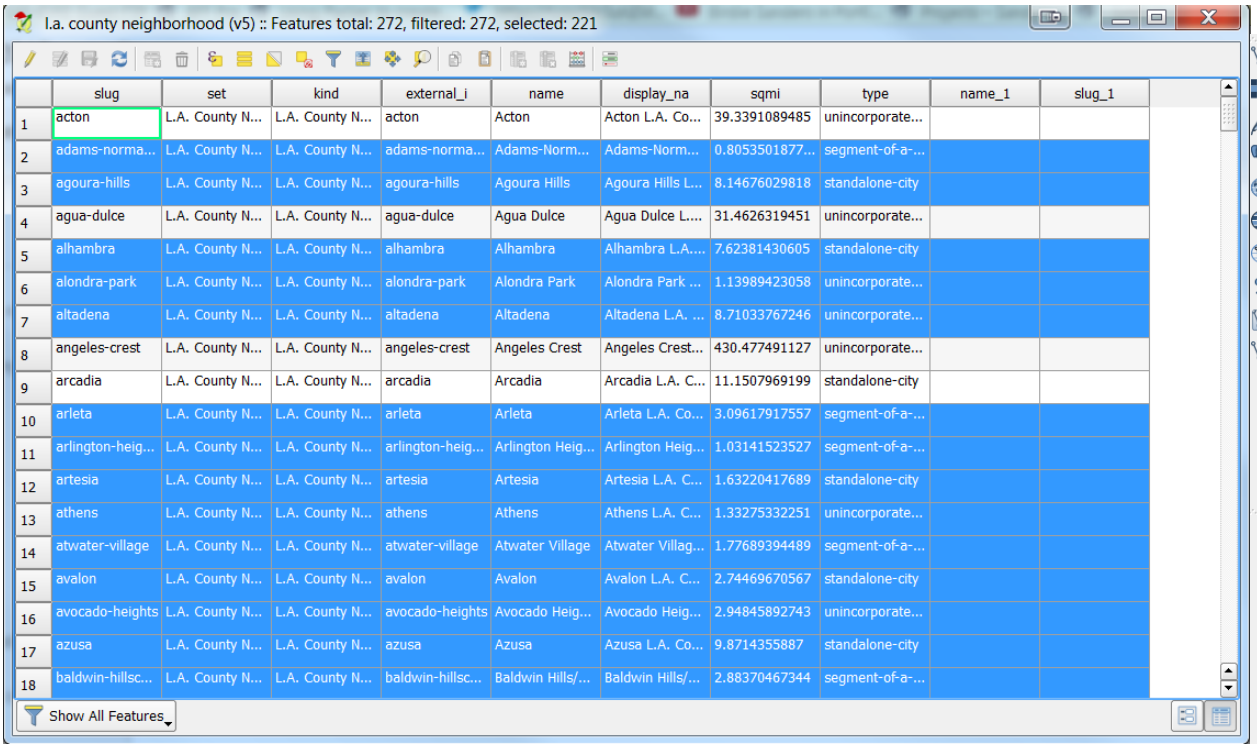


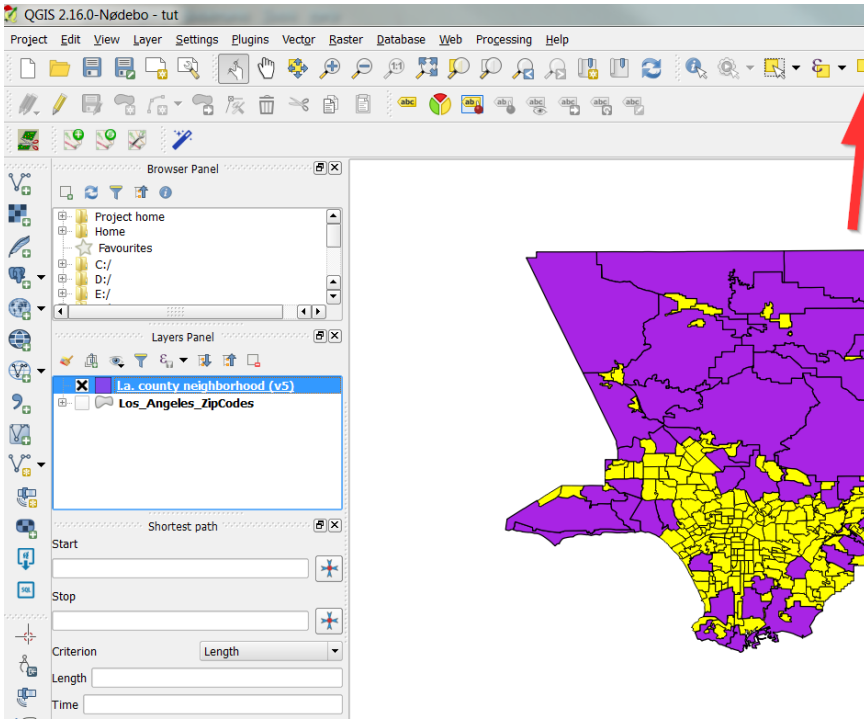
	slug	set	kind	external_i	name	display_na	sqmi	type	name_1	slug_1
1	acton	L.A. Coun...	L.A. County N...	acton	Acton	Acton L.A. Co...	39.3391089485	unincorporate...		
2	adams-norma...	L.A. Coun...	L.A. County N...	adams-norma...	Adams-Norm...	Adams-Norm...	0.8053501877...	segment-of-a-...		
3	agoura-hills	L.A. County N...	L.A. County N...	agoura-hills	Agoura Hills	Agoura Hills L...	8.14676029818	standalone-city		
4	agua-dulce	L.A. County N...	L.A. County N...	agua-dulce	Agua Dulce	Agua Dulce L....	31.4626319451	unincorporate...		
5	alhambra	L.A. County N...	L.A. County N...	alhambra	Alhambra	Alhambra L.A....	7.62381430605	standalone-city		
6	alondra-park	L.A. County N...	L.A. County N...	alondra-park	Alondra Park	Alondra Park ...	1.13989423058	unincorporate...		
7	altadena	L.A. County N...	L.A. County N...	altadena	Altadena	Altadena L.A. ...	8.71033767246	unincorporate...		
8	angeles-crest	L.A. County N...	L.A. County N...	angeles-crest	Angeles Crest	Angeles Crest...	430.477491127	unincorporate...		
9	arcadia	L.A. County N...	L.A. County N...	arcadia	Arcadia	Arcadia L.A. C...	11.1507969199	standalone-city		
10	arleta	L.A. County N...	L.A. County N...	arleta	Arleta	Arleta L.A. Co...	3.09617917557	segment-of-a-...		
11	arlington-heig...	L.A. County N...	L.A. County N...	arlington-heig...	Arlington Heig...	Arlington Heig...	1.03141523527	segment-of-a-...		
12	artesia	L.A. County N...	L.A. County N...	artesia	Artesia	Artesia L.A. C...	1.63220417689	standalone-city		
13	athens	L.A. County N...	L.A. County N...	athens	Athens	Athens L.A. C...	1.33275332251	unincorporate...		
14	atwater-village	L.A. County N...	L.A. County N...	atwater-village	Atwater Village	Atwater Villag...	1.77689394489	segment-of-a-...		
15	avalon	L.A. County N...	L.A. County N...	avalon	Avalon	Avalon L.A. C...	2.74469670567	standalone-city		
16	avocado-heights	L.A. County N...	L.A. County N...	avocado-heights	Avocado Heig...	Avocado Heig...	2.94845892743	unincorporate...		
17	azusa	L.A. County N...	L.A. County N...	azusa	Azusa	Azusa L.A. Co...	9.8714355887	standalone-city		
18	baldwin-hillsc...	L.A. County N...	L.A. County N...	baldwin-hillsc...	Baldwin Hills/...	Baldwin Hills/...	2.88370467344	segment-of-a-...		

10. **For example, you can see neighborhoods with less than 10 square** miles large, by using "sqmi < 10"



11. Both in the table and map, the yellow rows are what is less than 10 square miles:

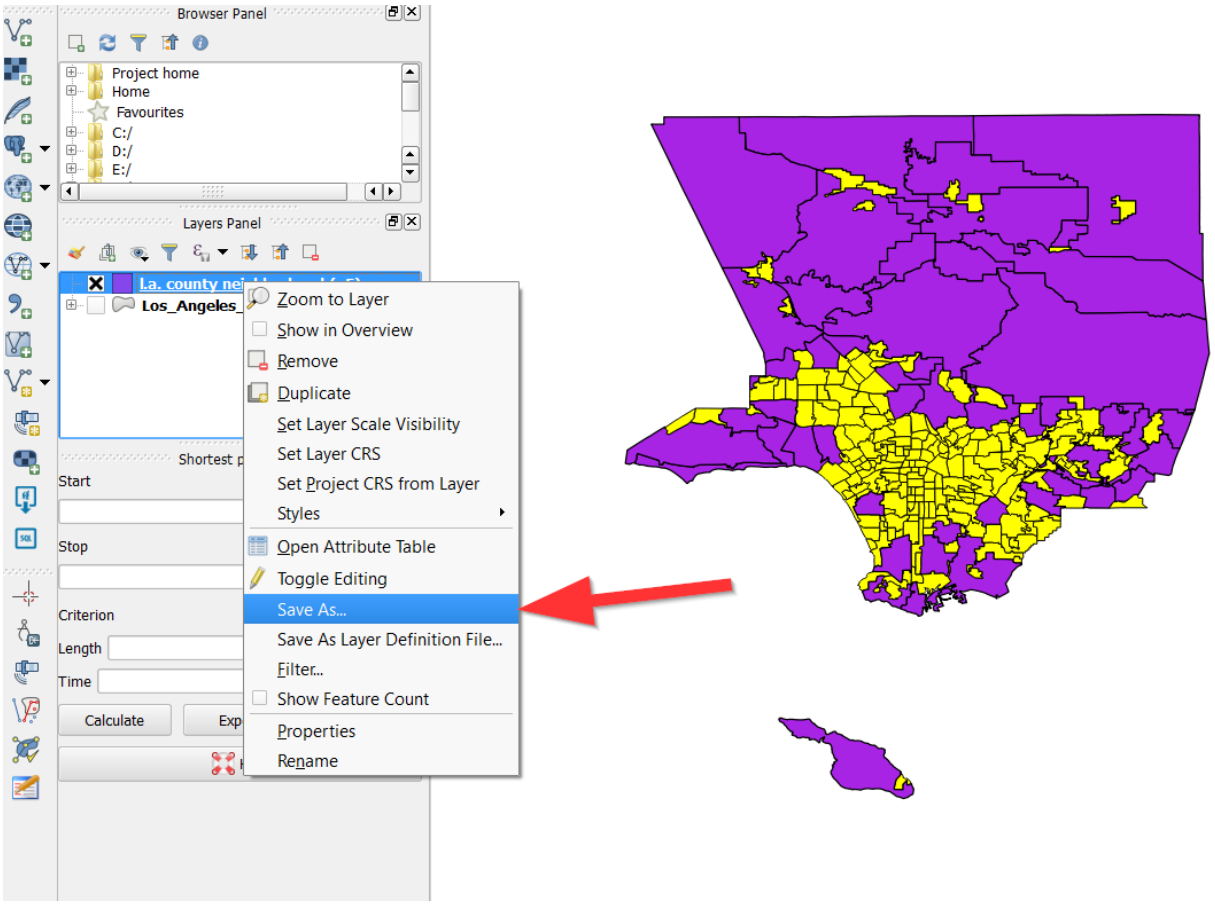




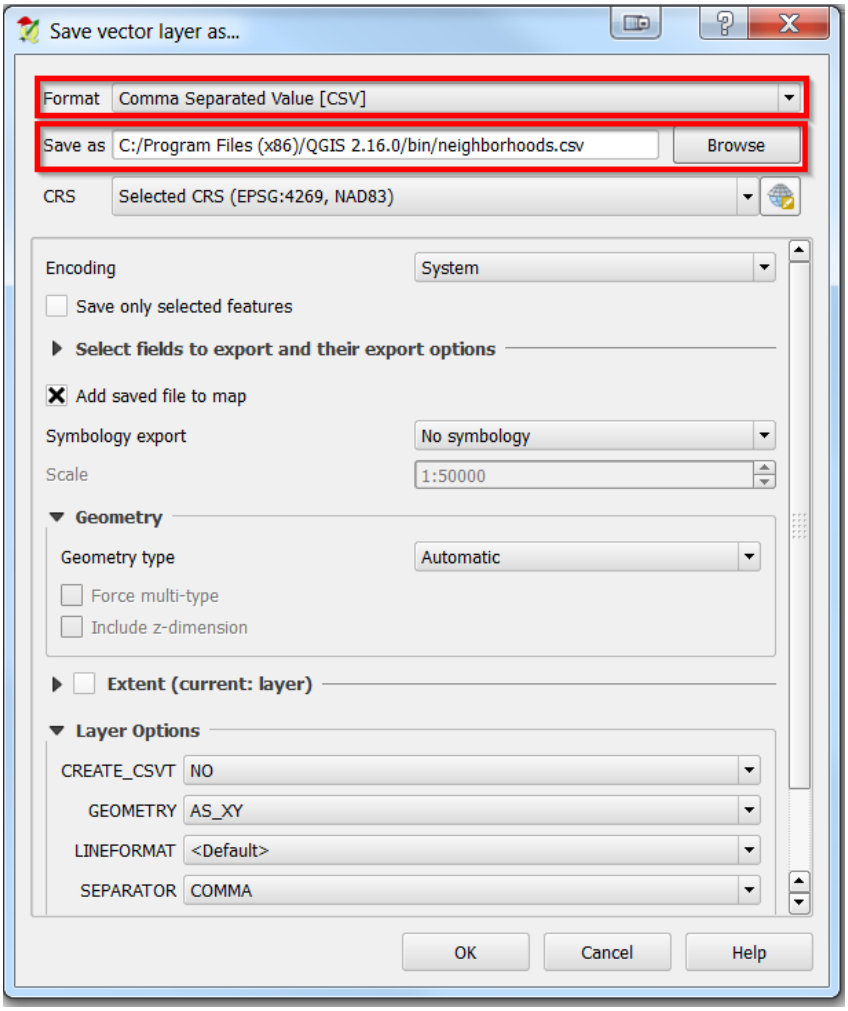
12. **You can clear the selection by clicking clear:**
13. If you want, you can go ahead and remove the layer if you'd like.

Taking data out of QGIS

Sometimes you want to take data out of QGIS to manipulate it in other software, such as Excel. You can do so, by opening the layer properties and clicking save as:

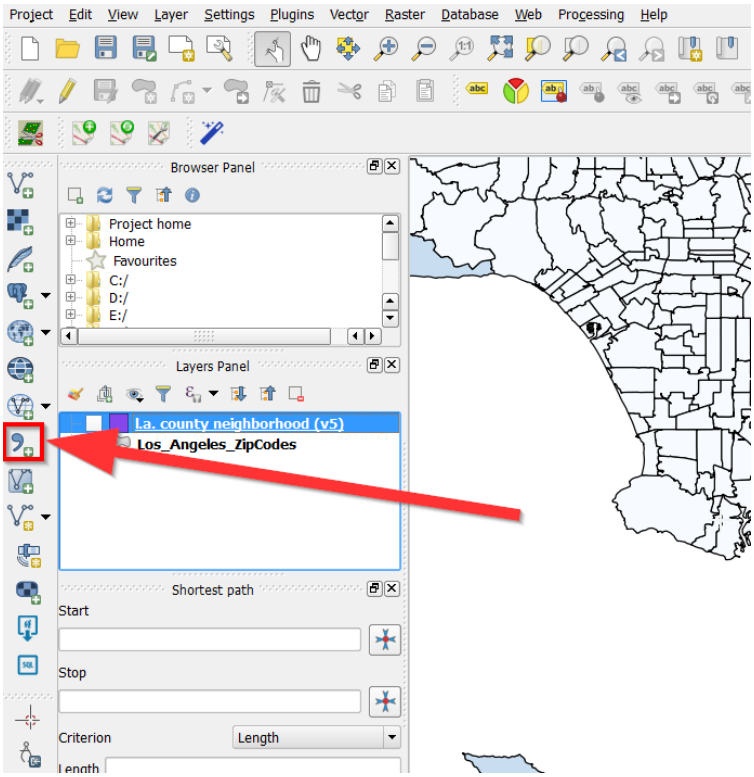


You can now choose a file type and name, make sure to select “CSV”:

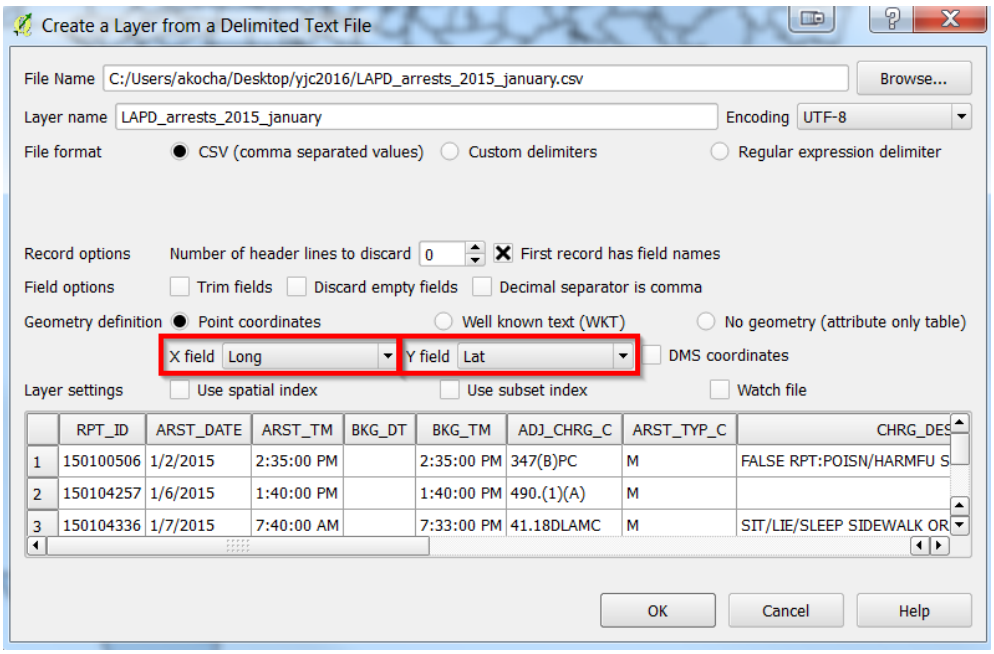

Save vector layer as...
Format
Comma Separated Value [CSV]
Save as
C:/Program Files (x86)/QGIS 2.16.0/bin/neighborhoods.csv
Browse
CRS
Selected CRS (EPSG:4269, NAD83)
Encoding
System
Save only selected features
Select fields to export and their export options
Add saved file to map
Symbology export
No symbology
Scale
1:50000
Geometry
Geometry type
Automatic
Force multi-type
Include z-dimension
Extent (current: layer)
Layer Options
CREATE_CSVT
NO
GEOMETRY
AS_XY
LINEFORMAT
<Default>
SEPARATOR
COMMA
OK
Cancel
Help

Add a CSV file in QGIS

Start by clicking the comma:



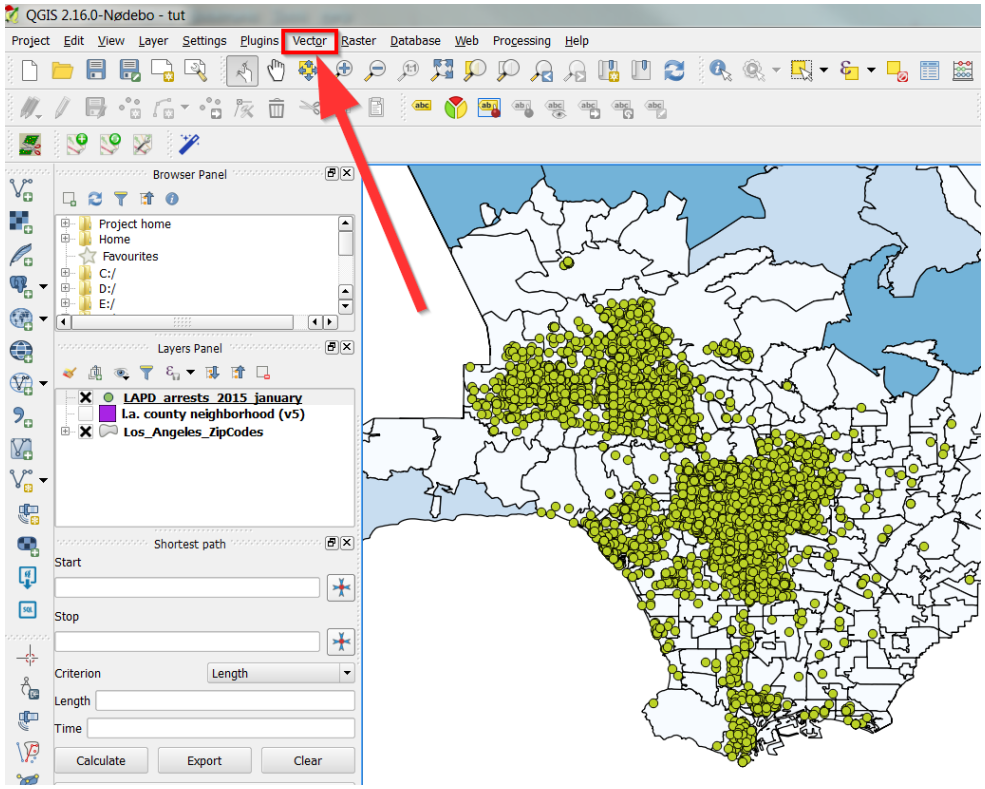
After finding the file, a new dialogue box will show up. Be sure to have Lat and Long selected for the X and Y values [X is always Longitude and Y is always Latitude]:



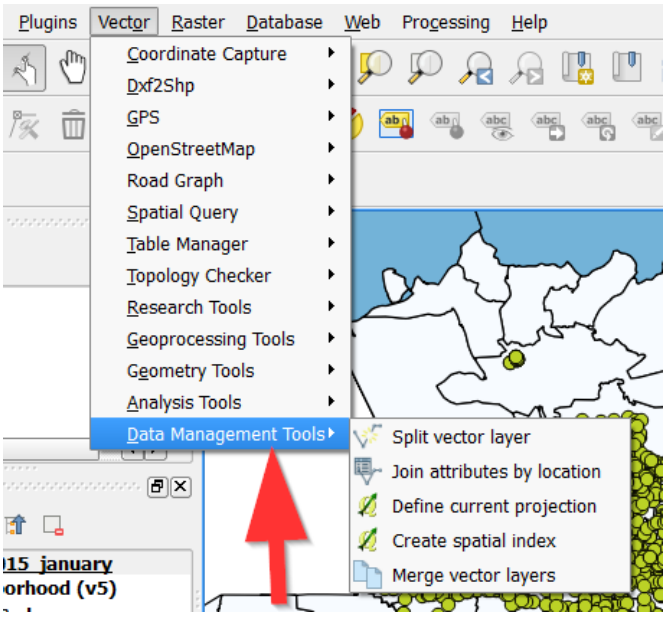
Spatial Joining Data

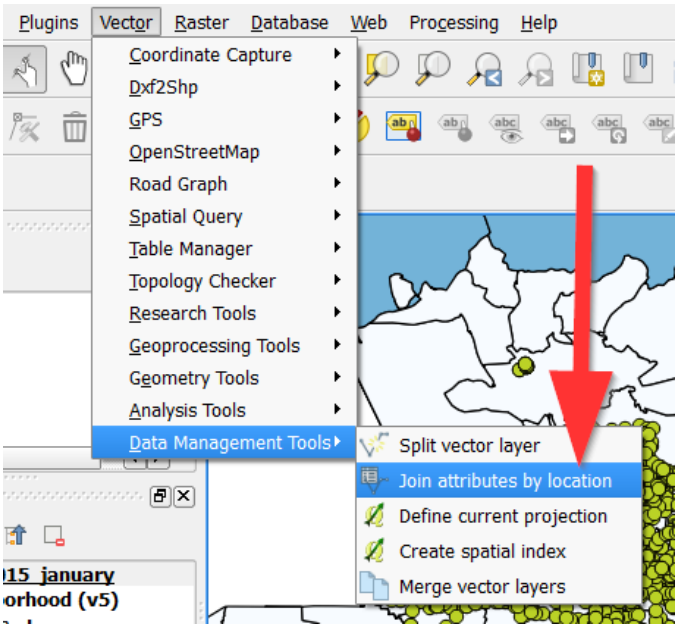
1. Make sure you have the two layers you want to join together, in this case the LAPD_arrests_2015_january.csv and the Los_Angeles_ZipCodes.

2. **Go to Vector in the menu**



3. **Then Data Management**





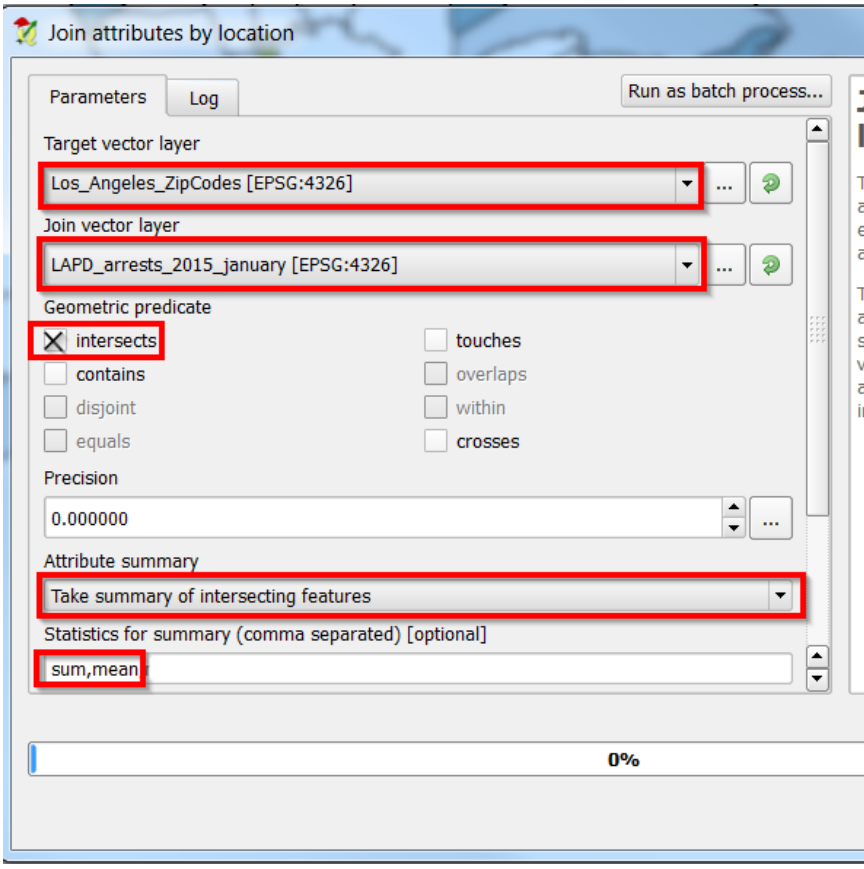
4. **Then Join Attributes by Location**

5. The target layer should be the layer you want the data to go towards, the join layer is the layer you are taking the information from. So in this case, the Target is the Los Angeles ZipCodes, while the Join is the LAPD_arrests_2015_january.

6. Make sure to choose "Intersects" for the Geometric Predicate.

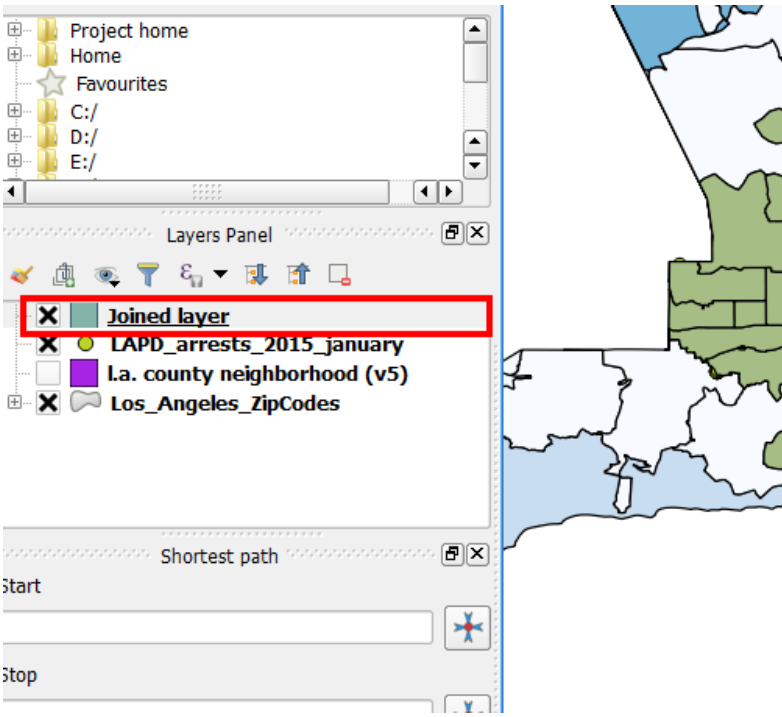
7. Be sure to select "Take a summary of Intersecting Features" and you only need "sum" and "mean" for the Statistics field.

8. **Your text box should look like the following:**



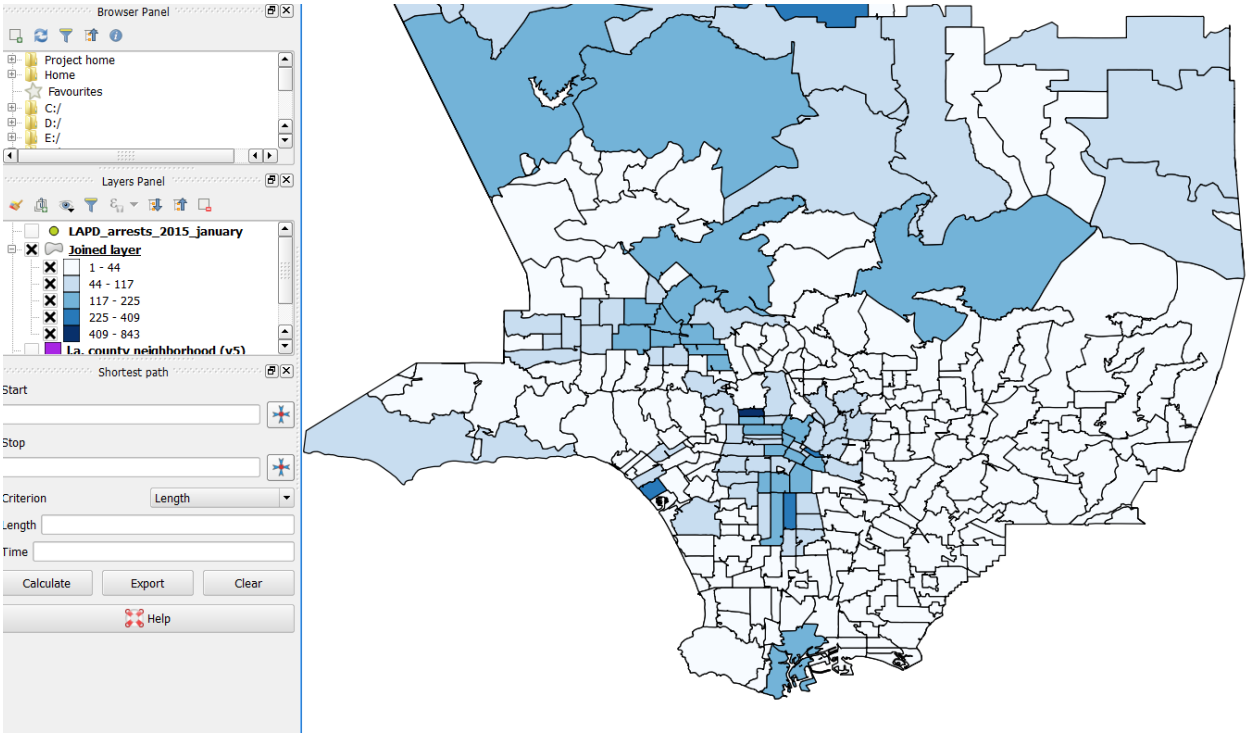
9. Click “Run” to run the join.

10. **A new layer called “Joined Layer” should show up:**



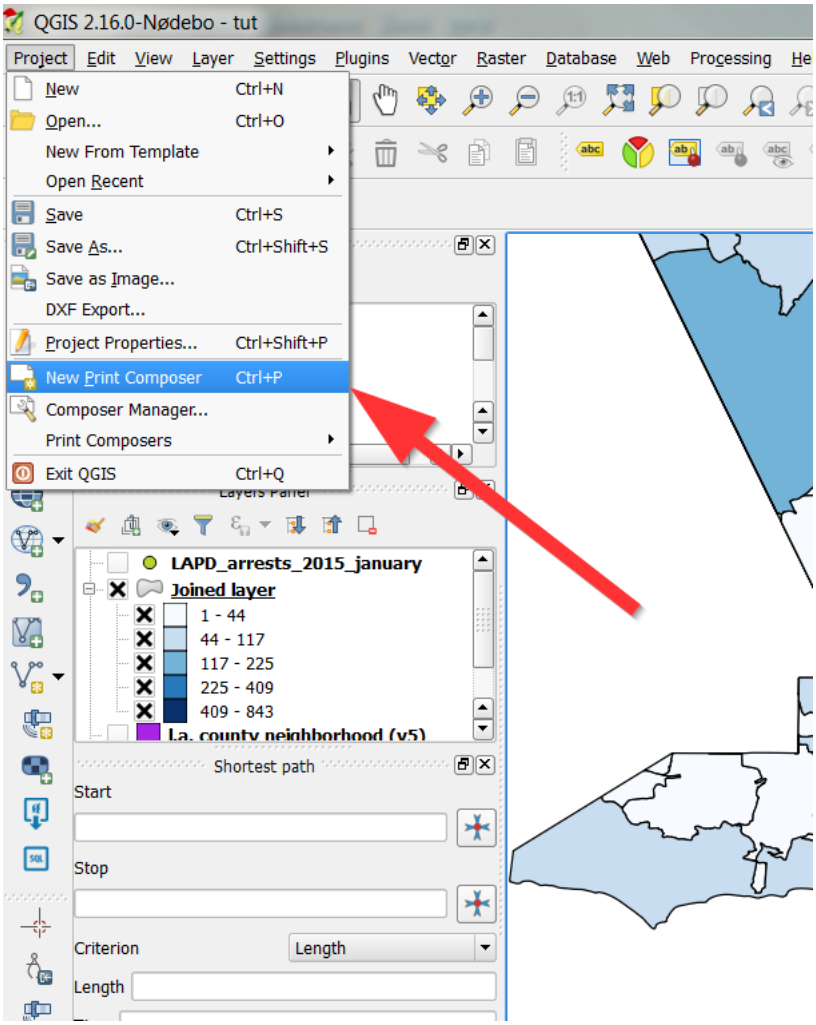
11. Go ahead and open the attribute table and see if the “sum” worked!

12. Try and visualize the data like so:

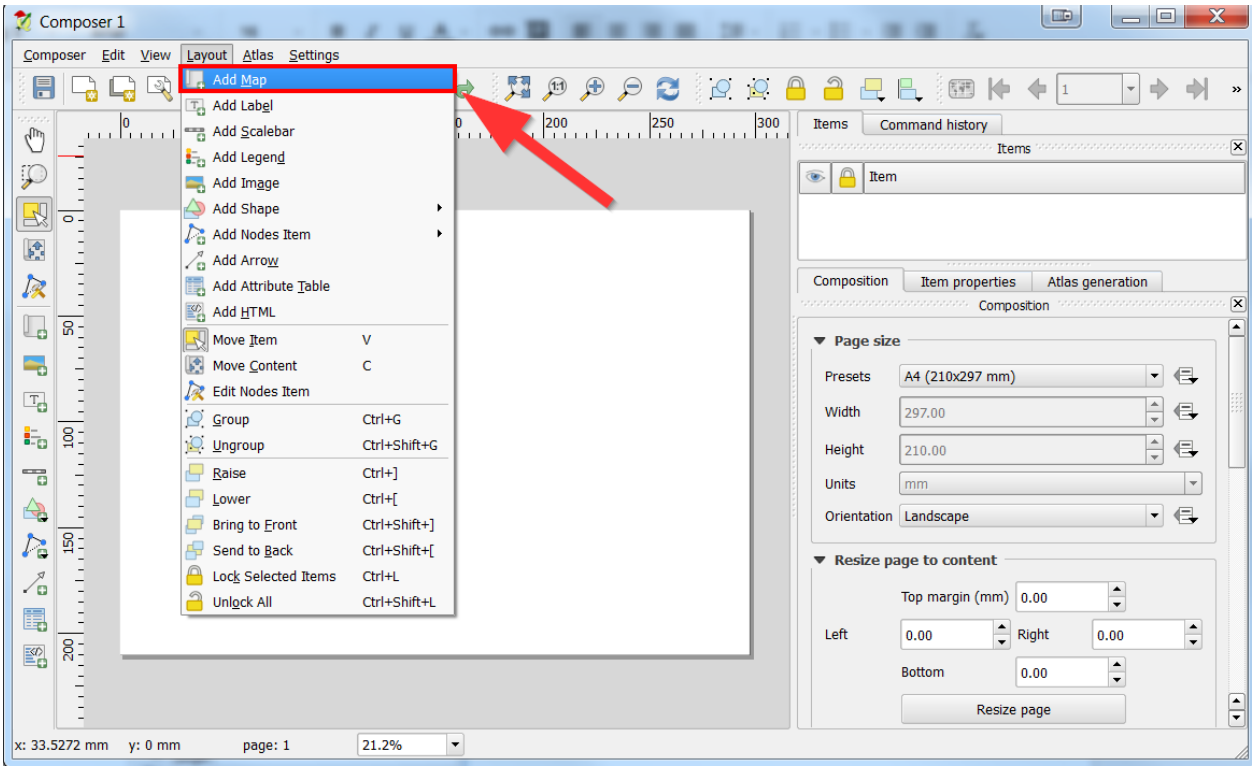


Exporting a map

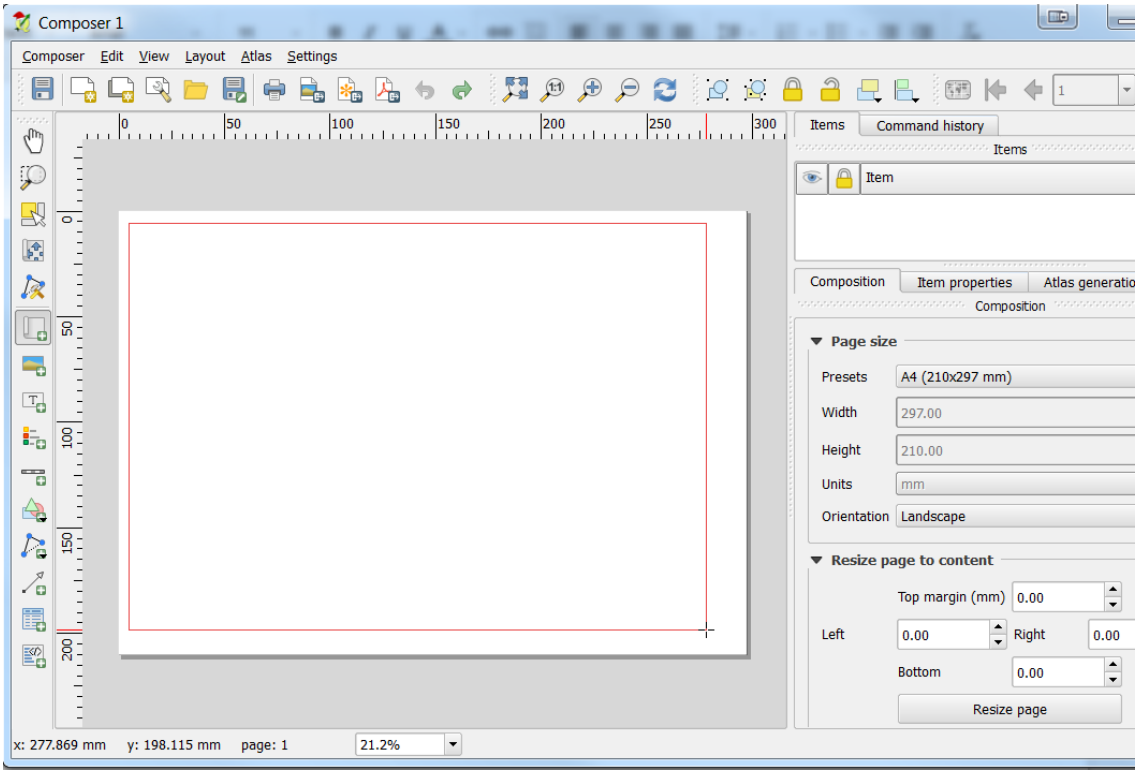
QGIS has a tool called “Print Composer” to take care of all your map printing needs. You can find it by going to “File” then “New Print Composer”

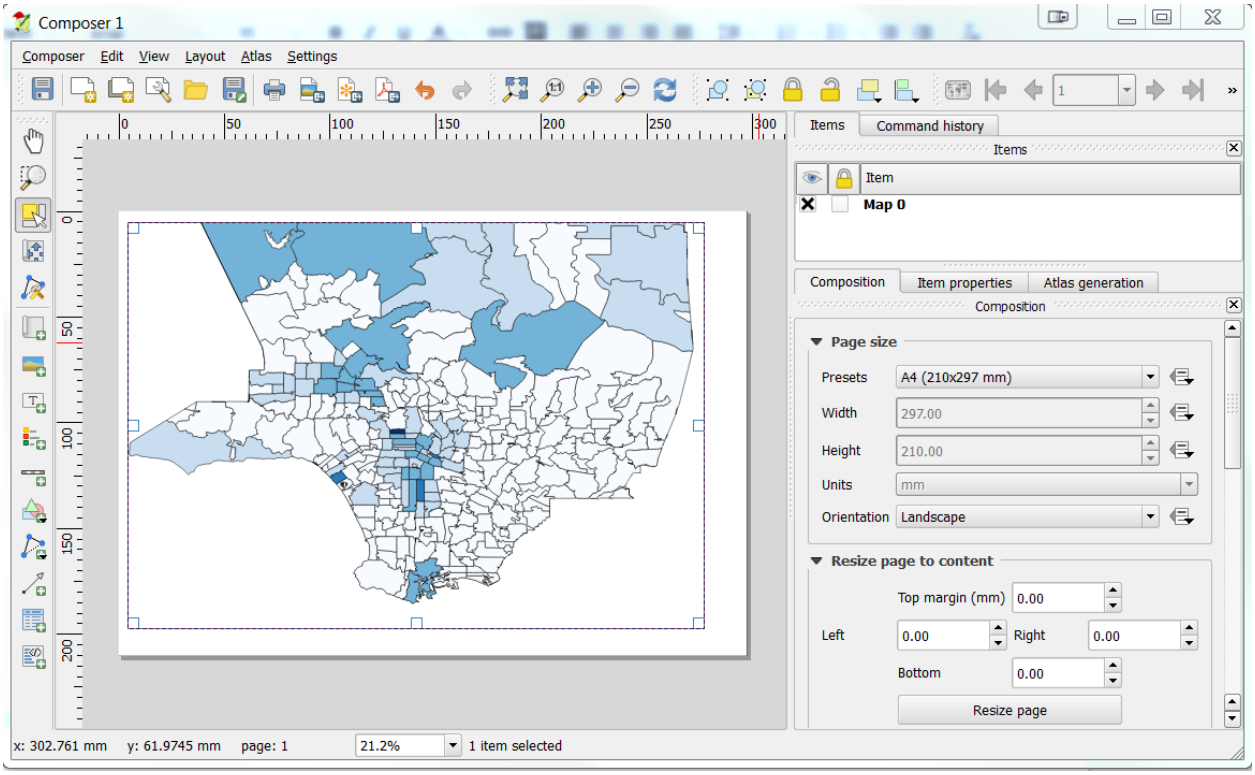


After opening a new print composer, you should add a map, which can by done by going to “Layout” then “Add new map”:



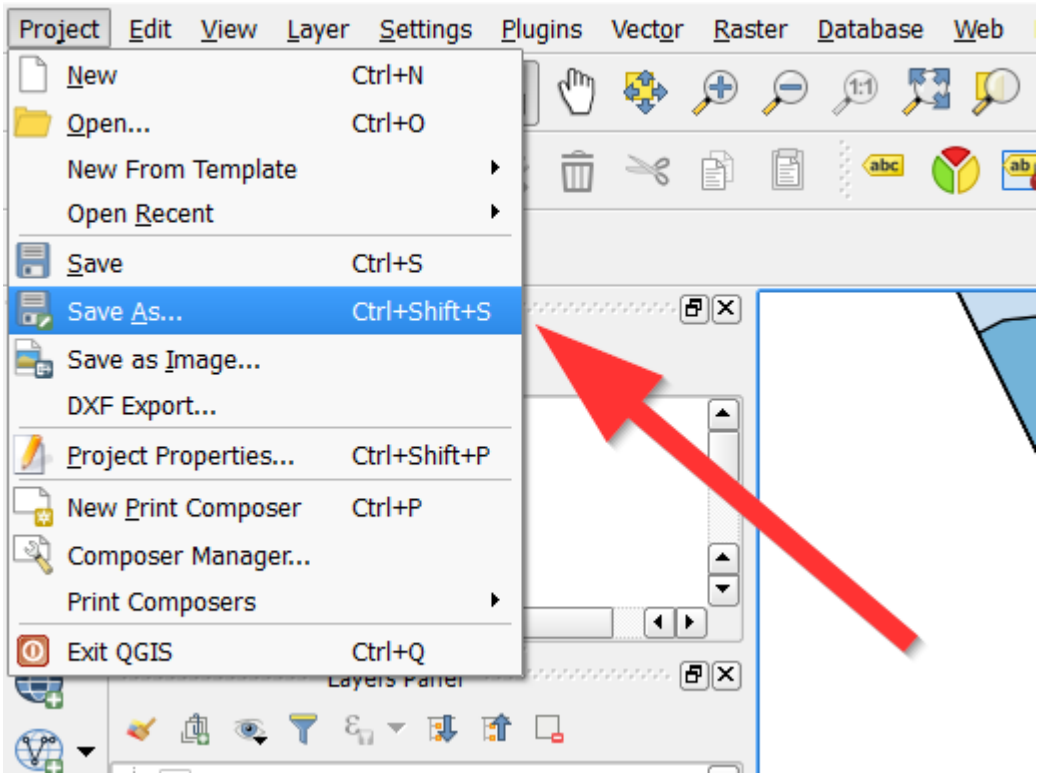
Draw a box to add your map:





You can also add text, shapes and other content.

When you are done using QGIS, you can save your project as a QGIS file:



CHAPTER 4

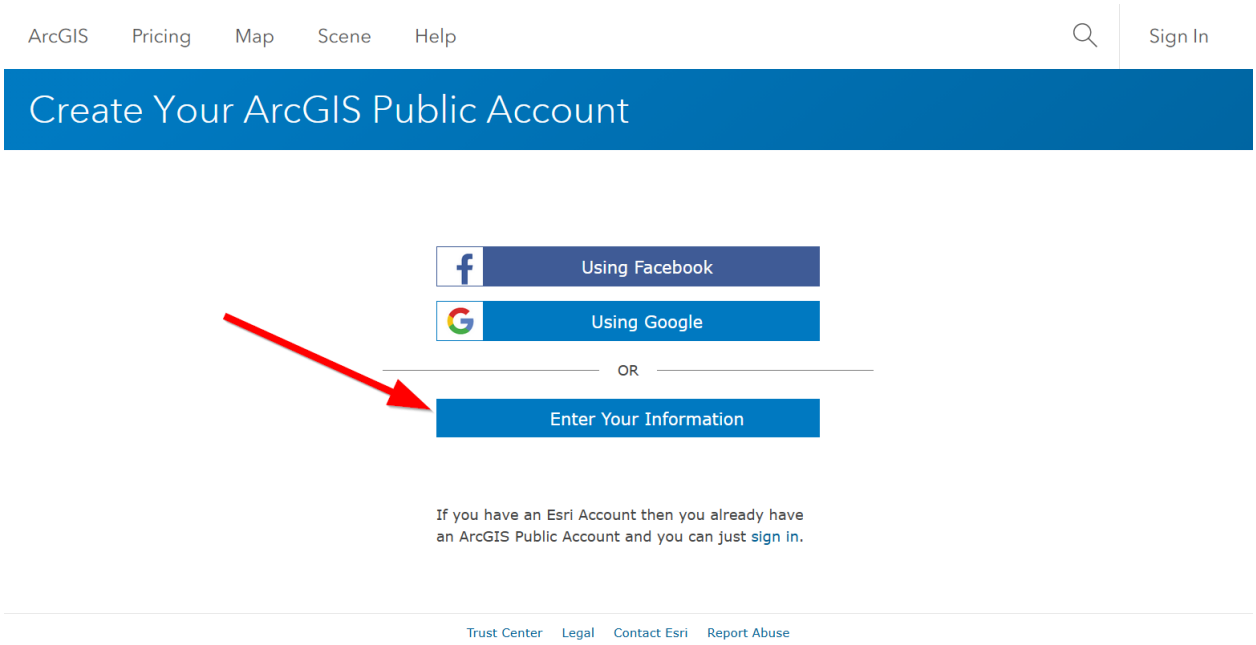
Guides for presenting data

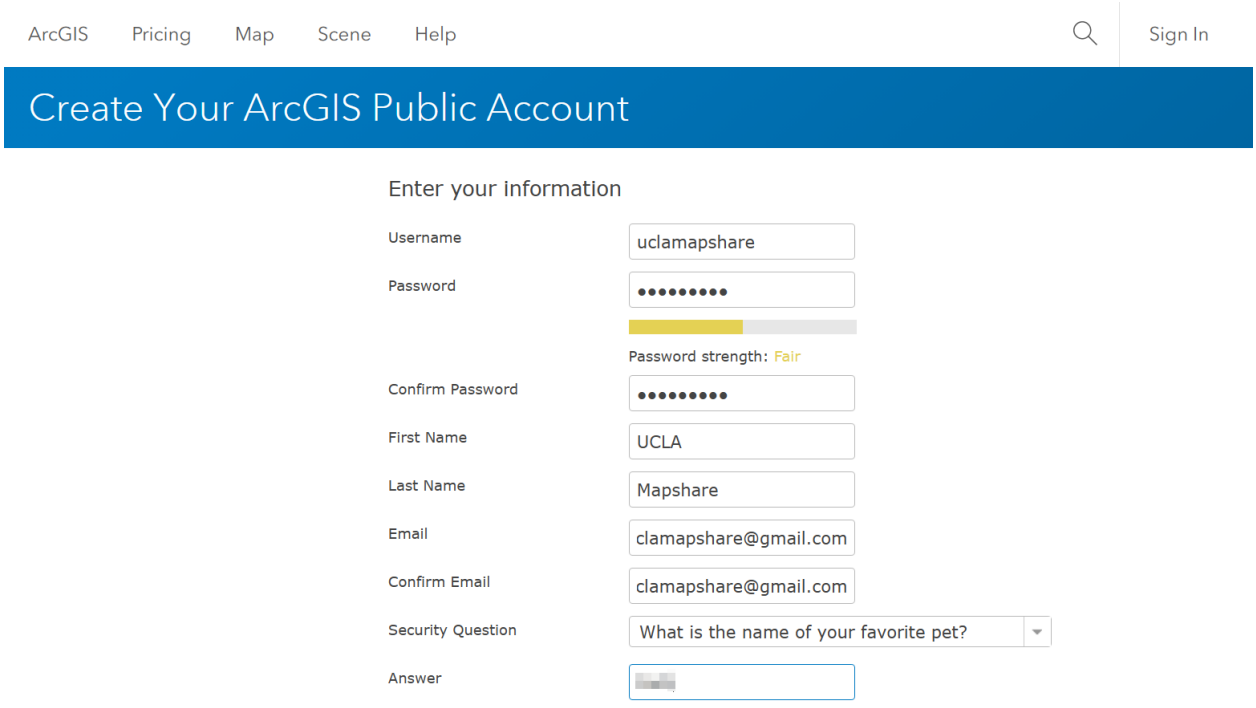
4.1 Visualizing Data using Esri StoryMaps

4.1.1 Getting Started

Note: Some part of this tutorial uses data downloaded from Los Angeles Open Data portal (see: Quick Visual Guide to Visualizing Data on LA Open Data Portal)

1. StoryMaps are a powerful tool for combining spatial data and narrative. For an introduction to building narratives and a list of examples, check out these this wonderful guides from Esri for creating StoryMaps: Nine Steps to Great Storytelling
2. UCLA story map about story maps (https://arcg.is/5vCnb)
3. Browse the ESRI Story Map Gallery for inspriation: (https://www.esri.com/en-us/arcgis/products/arcgis-storymaps/stories)
4. Navigate to ArcGIS StoryMaps (https://storymaps.arcgis.com/stories) and login if you have an account..
5. If you do not have an ArcGIS account then create your ArcGIS Online Public Account here: (https://www.arcgis.com/home/createaccount.html)

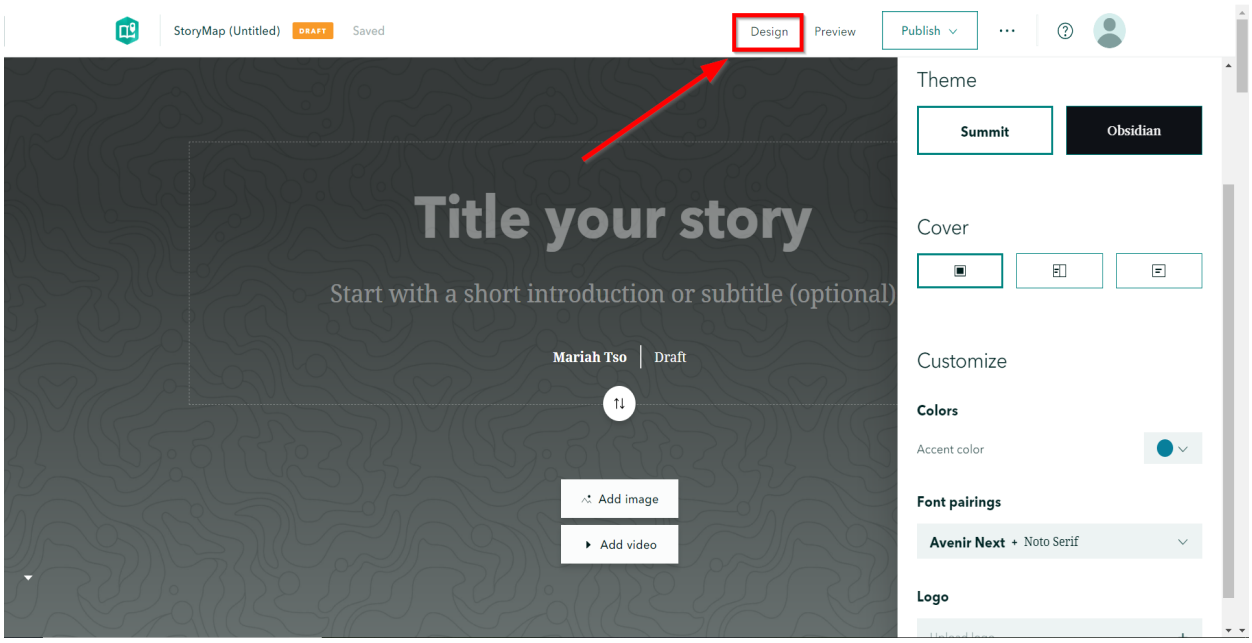




6. Select **Create a new story** and begin adding images, videos and content.

4.1.2 Designing your StoryMap

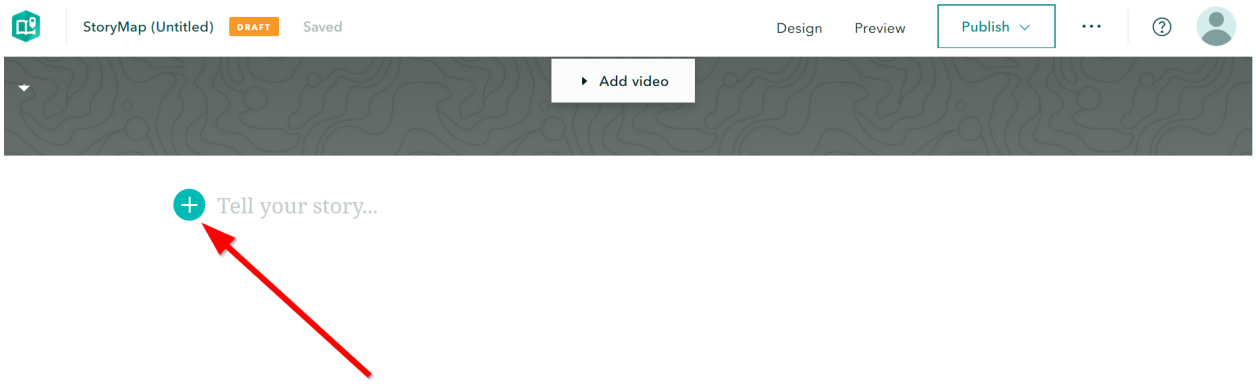
1. Click **Design** to customize your StoryMap theme, cover, accent colors, font, & add a logo.



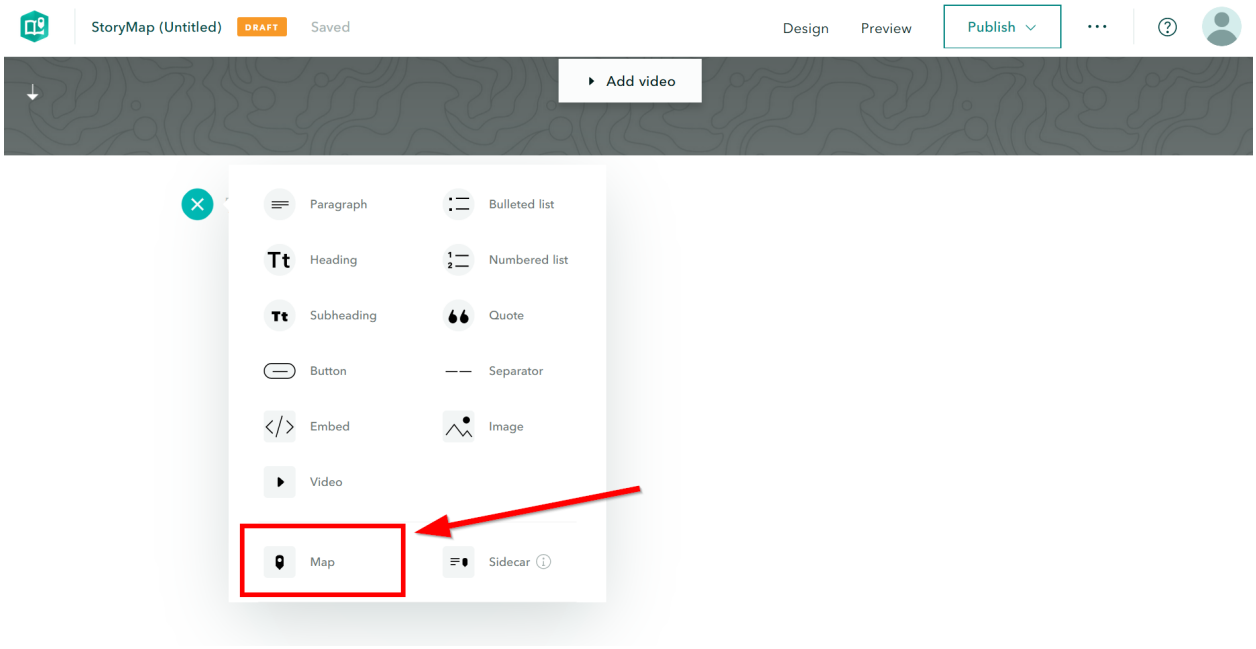
Esri StoryMaps consists of "content blocks" these have different types, such as pictures, text, and maps.

4.1.3 Adding Content Blocks

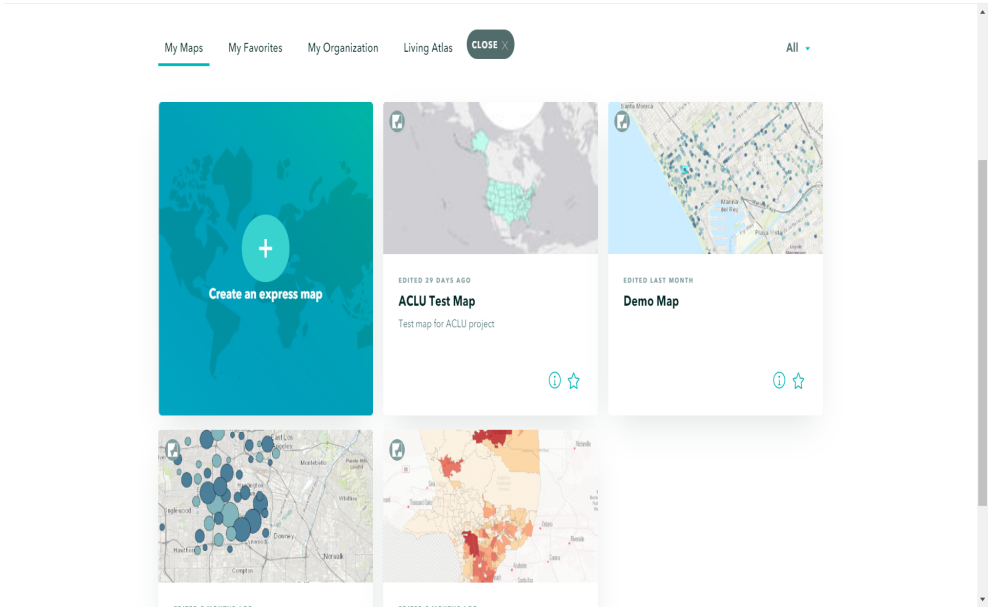
1. Click **Add Content Block**



2. Review the various content block types to build your narrative. Select **Map**.

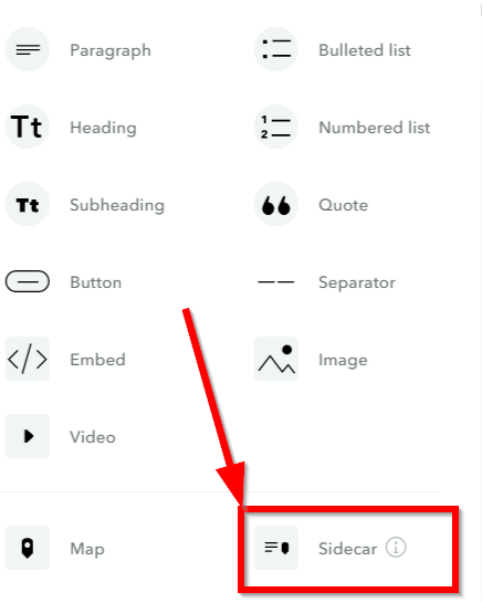


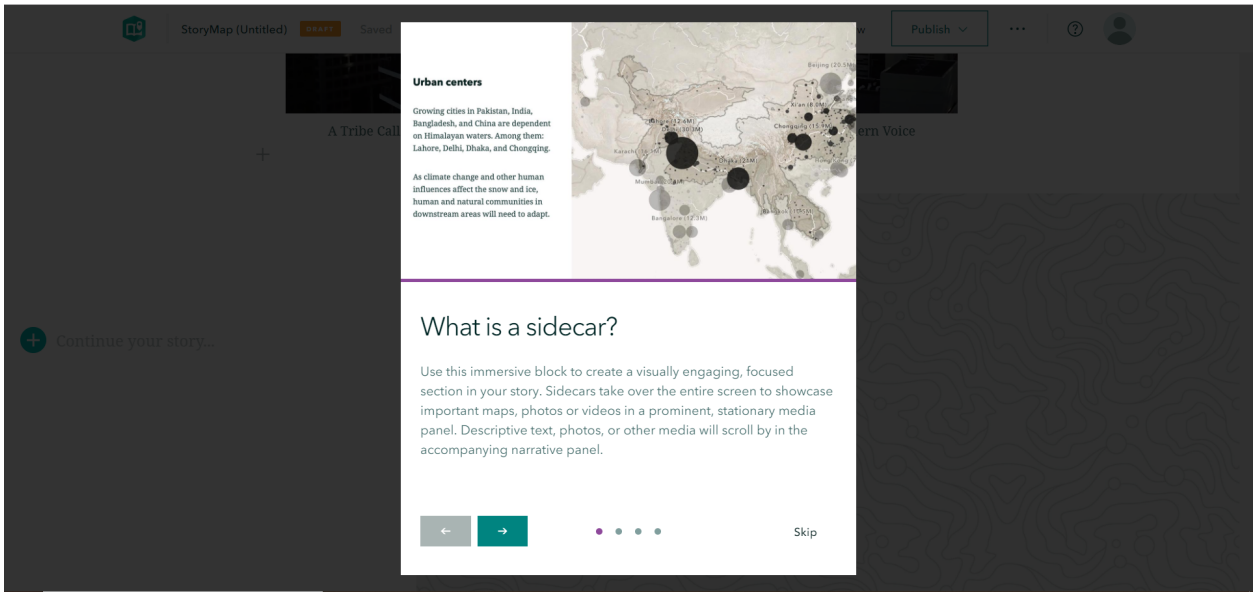
3. There are two options for adding maps: a) Create an Express Map and b) Add an existing ArcGIS Online web map.

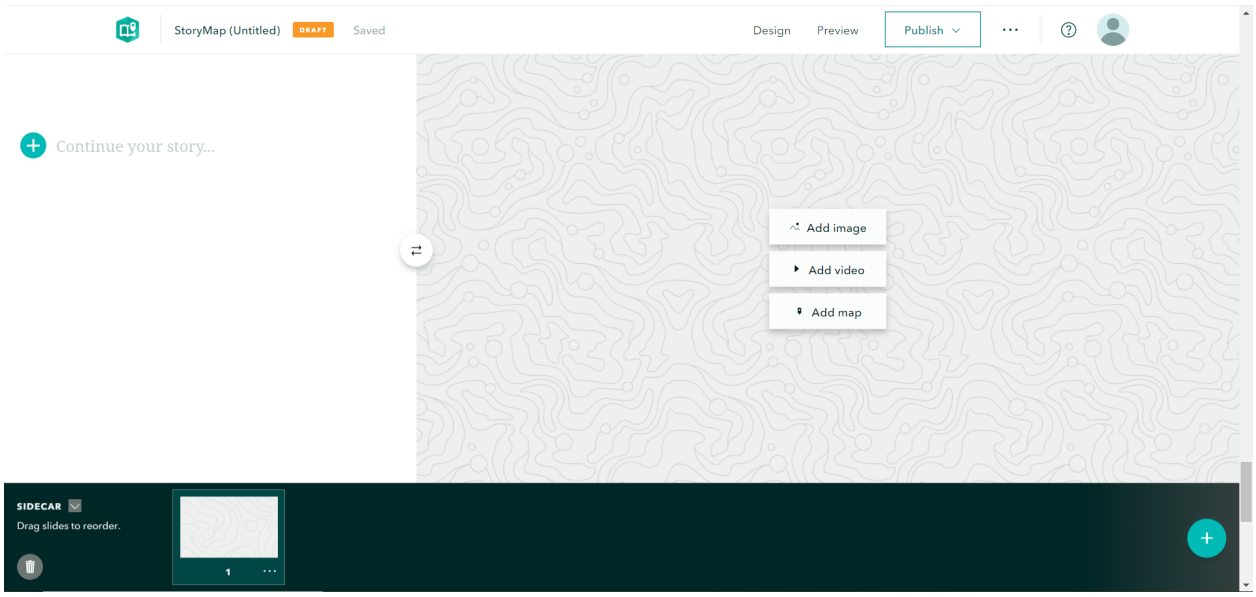


4.1.4 Adding a Sidecar

1. Sidecars are like Powerpoint or Prezi, where you can add accompanying slides, they are perfect for explaining your pictures, graphs, maps, and datasets.


Paragraph
Bulleted list
Heading
Numbered list
Subheading
Quote
Button
Separator
Embed
Image
Video
Map
Sidecar

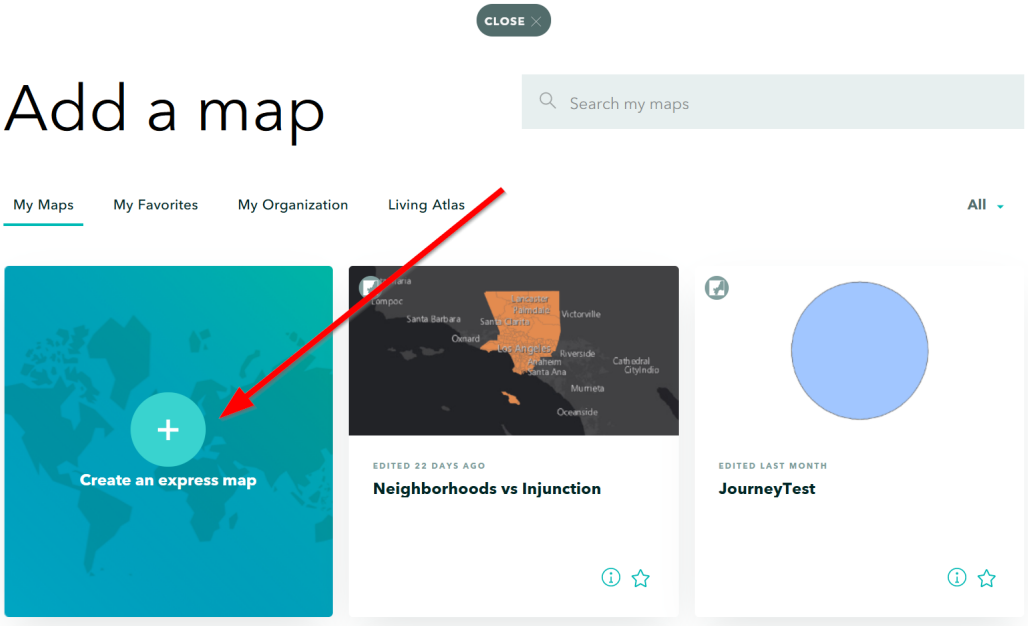

StoryMap (Untitled)
Publish
Urban centers
Growing cities in Pakistan, India, Bangladesh, and China are dependent on Himalayan waters. Among them: Lahore, Delhi, Dhaka, and Chongqing.
As climate change and other human influences affect the snow and ice, human and natural communities in downstream areas will need to adapt.
What is a sidecar?
Use this immersive block to create a visually engaging, focused section in your story. Sidecars take over the entire screen to showcase important maps, photos or videos in a prominent, stationary media panel. Descriptive text, photos, or other media will scroll by in the accompanying narrative panel.
Skip
Continue your story...



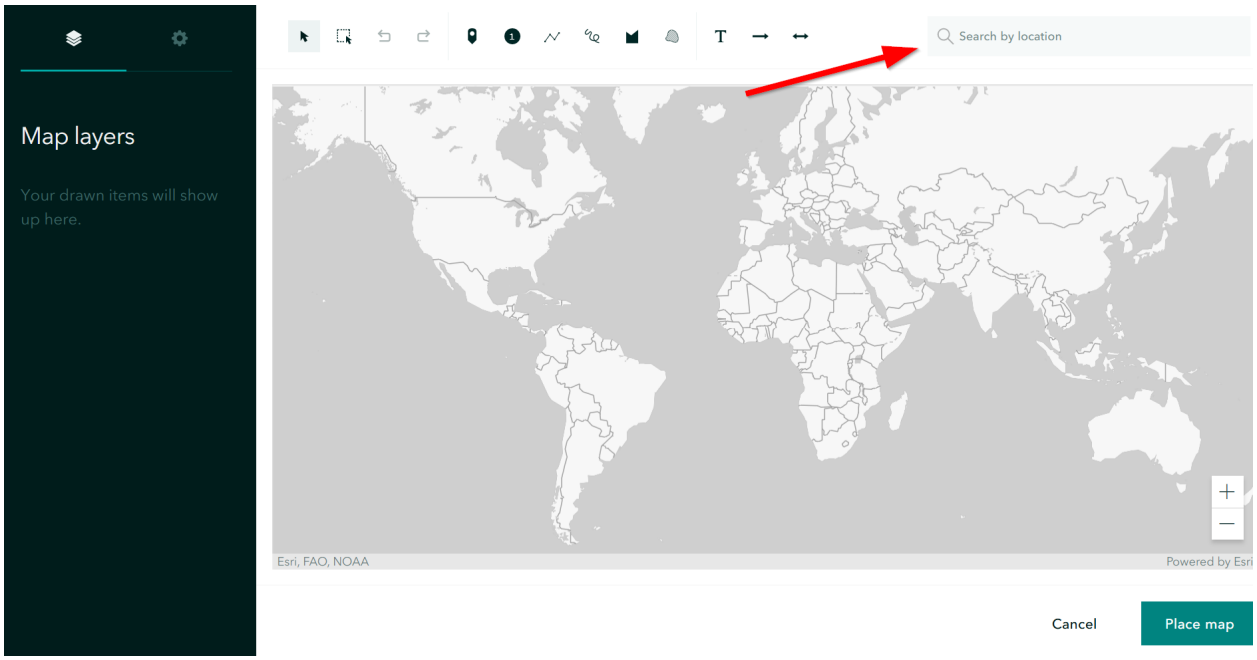
2. For an introduction to sidecar, see Esri's 6 Ways to Use Sidecar in the New ArcGIS StoryMaps

4.1.5 Creating an Express Map

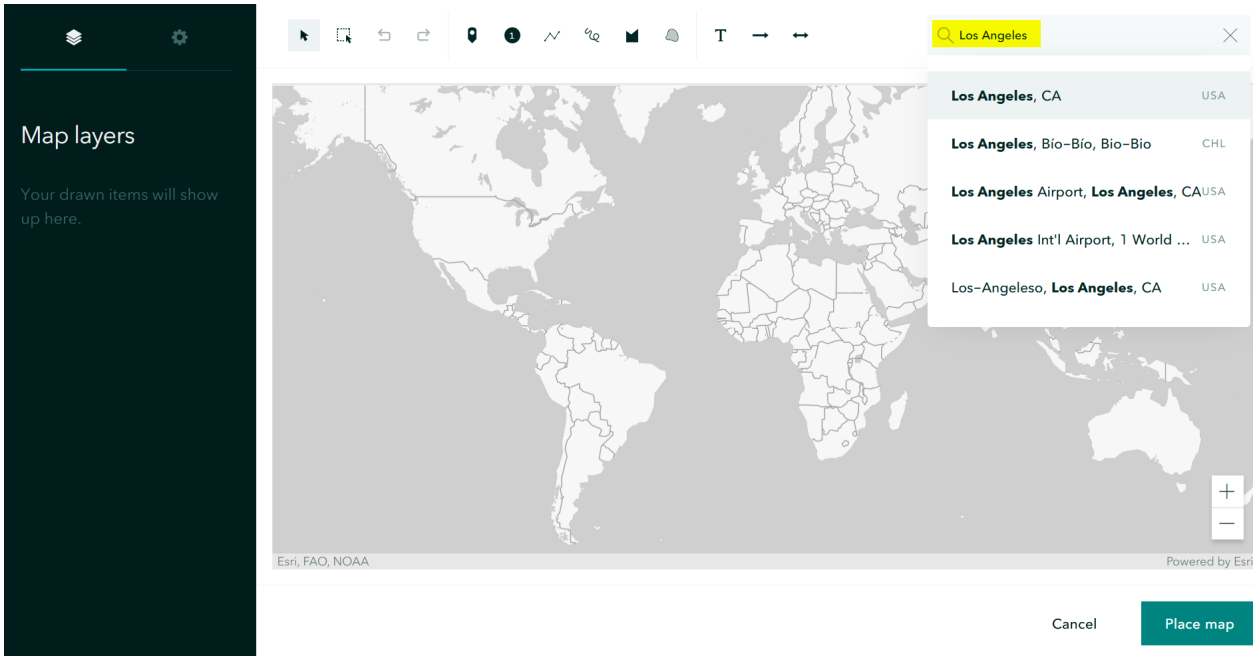
1. Express Maps are perfect for creating quick and simple maps. Select **Create an express map**.



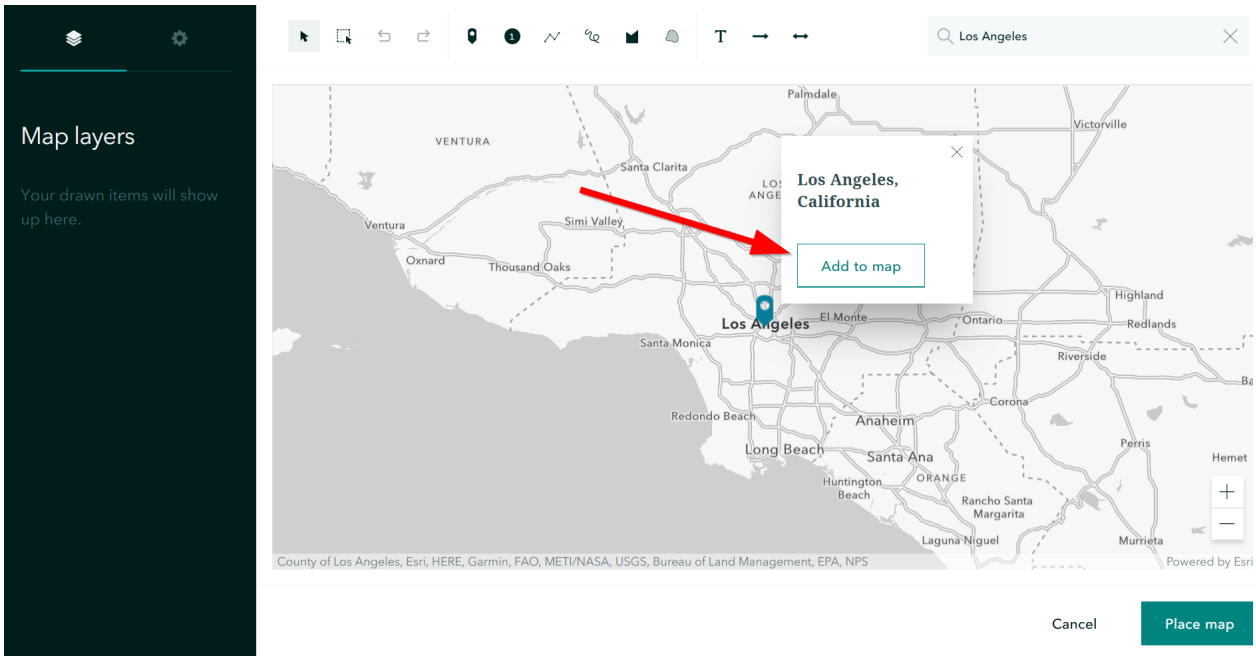
2. The **Search by location** bar allows users to quickly locate specific sites.



3. Search for Los Angeles, CA.



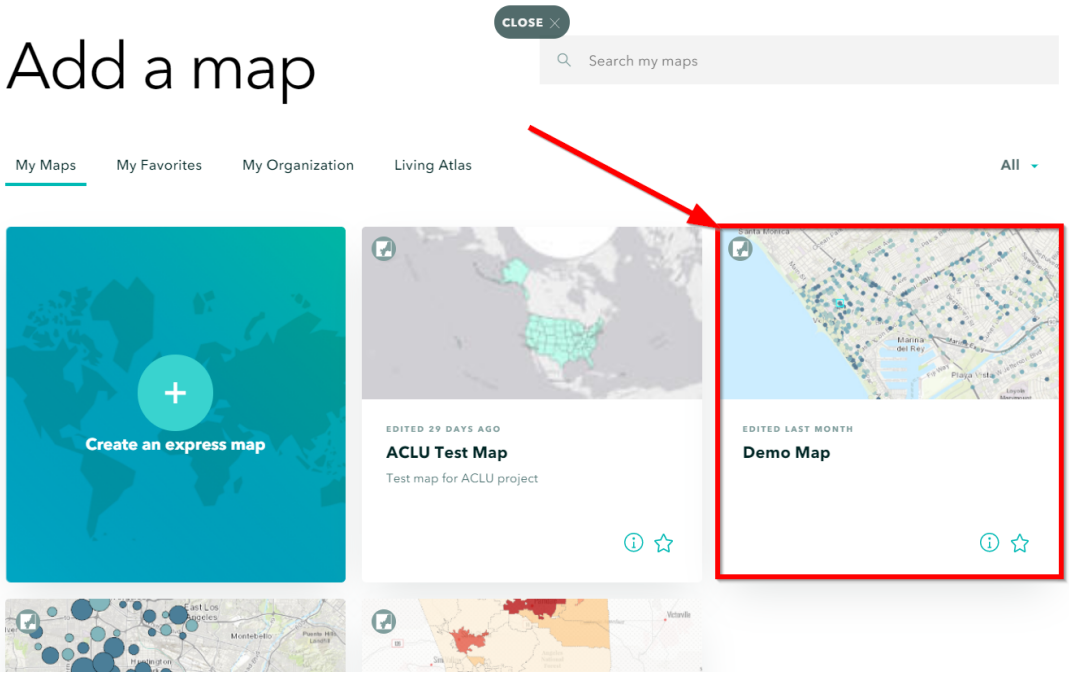
4. Click **Add to map** from results window.



5. For more information on when and how to use Express Maps see Esri's Introducing Express Maps: Making Simple Maps Simply.

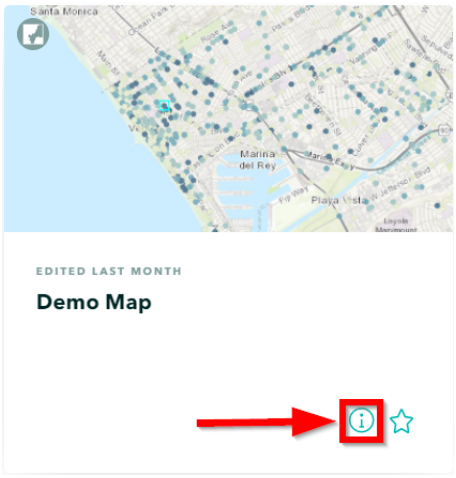
4.1.6 Adding an Existing ArcGIS Online Web Map

1. The second option for adding a map block consists of adding a web map. Let's add the map we created in the previous Quick Guide to Visualizing Data in ArcGIS Online.

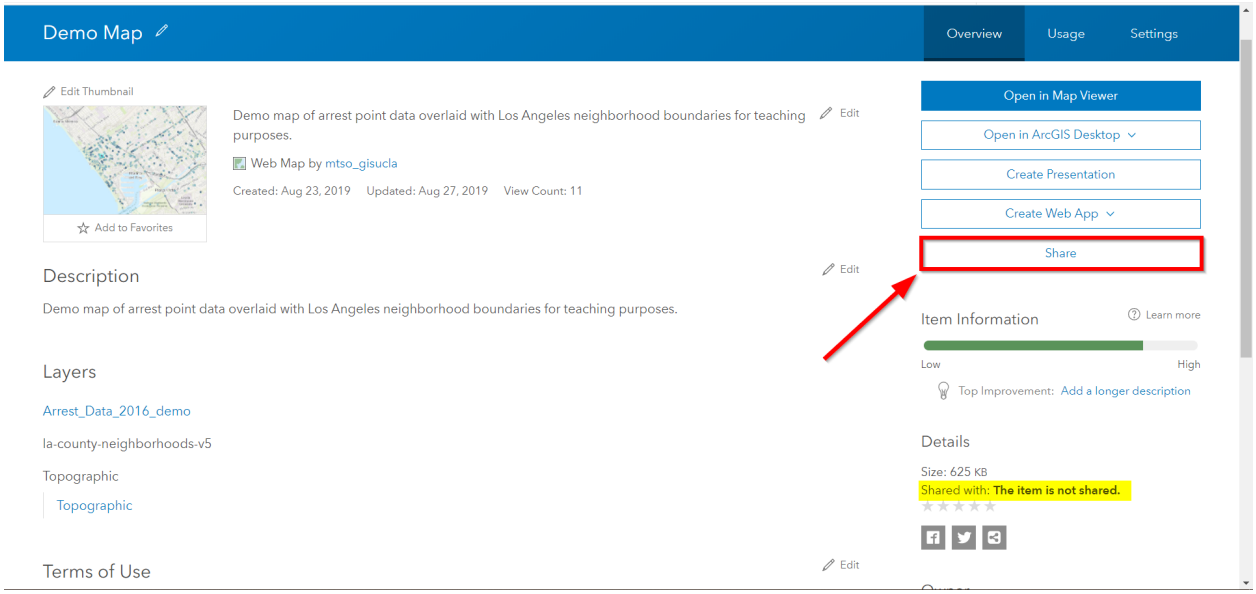


a. *Note: Web Maps must be shared publicly in order to be viewed by people other than yourself without requiring a login. Make sure to check your sharing settings before adding a web map. Click on the*

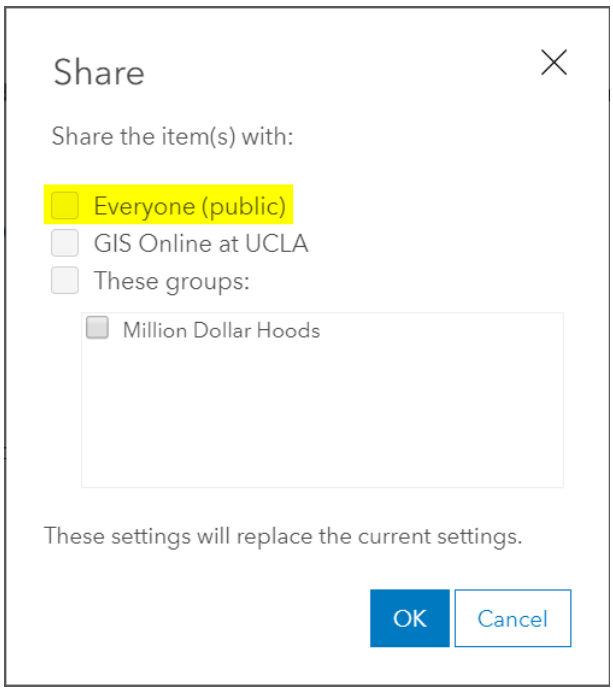
information icon to direct you to the map's description page.



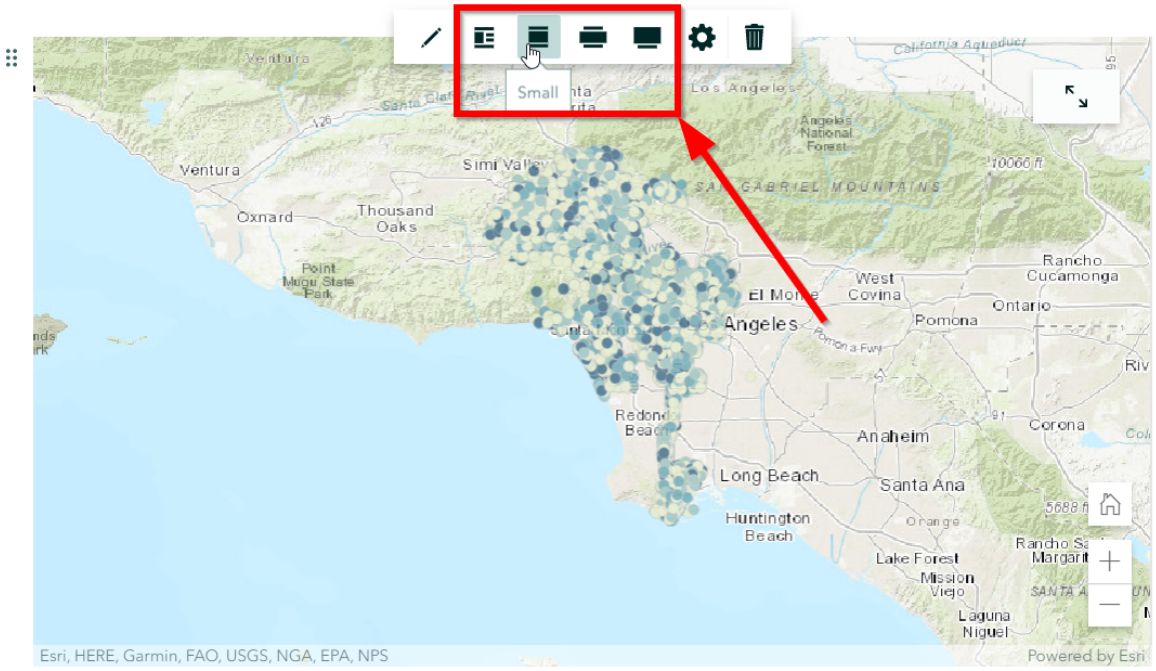
b. Observe the sharing status statement on the right pane. To update the sharing setting click on the Share button.



c. Check the box next to Everyone(Public) and click OK.



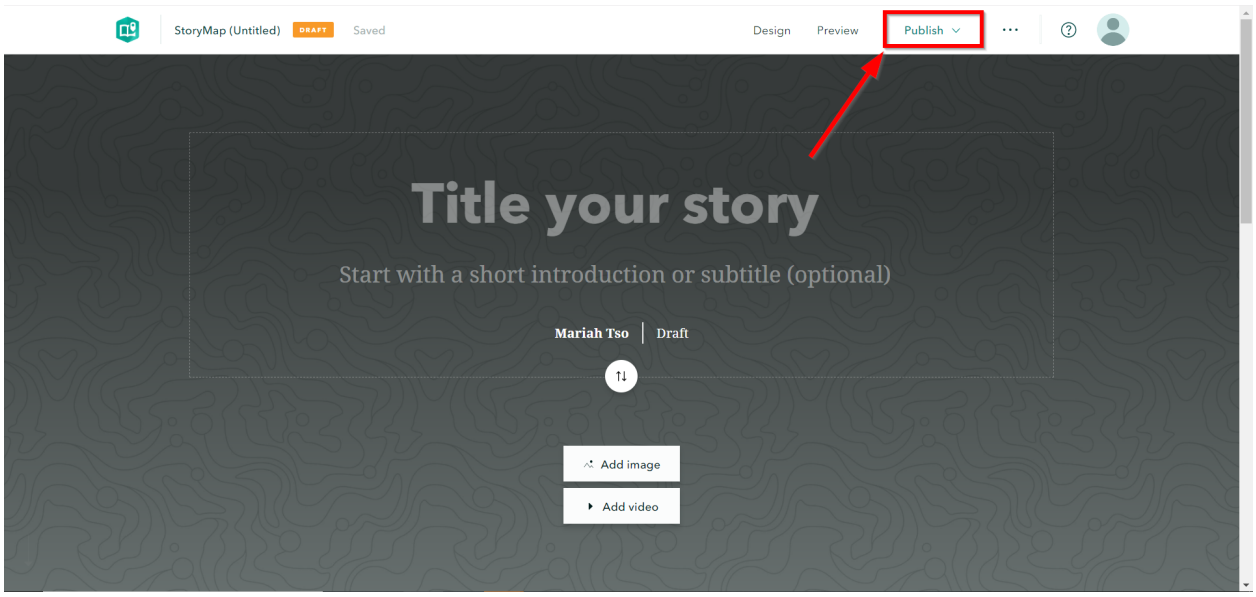
2. Once the map is placed, try different block display options such as **float**, **small**, **medium** or **large**.



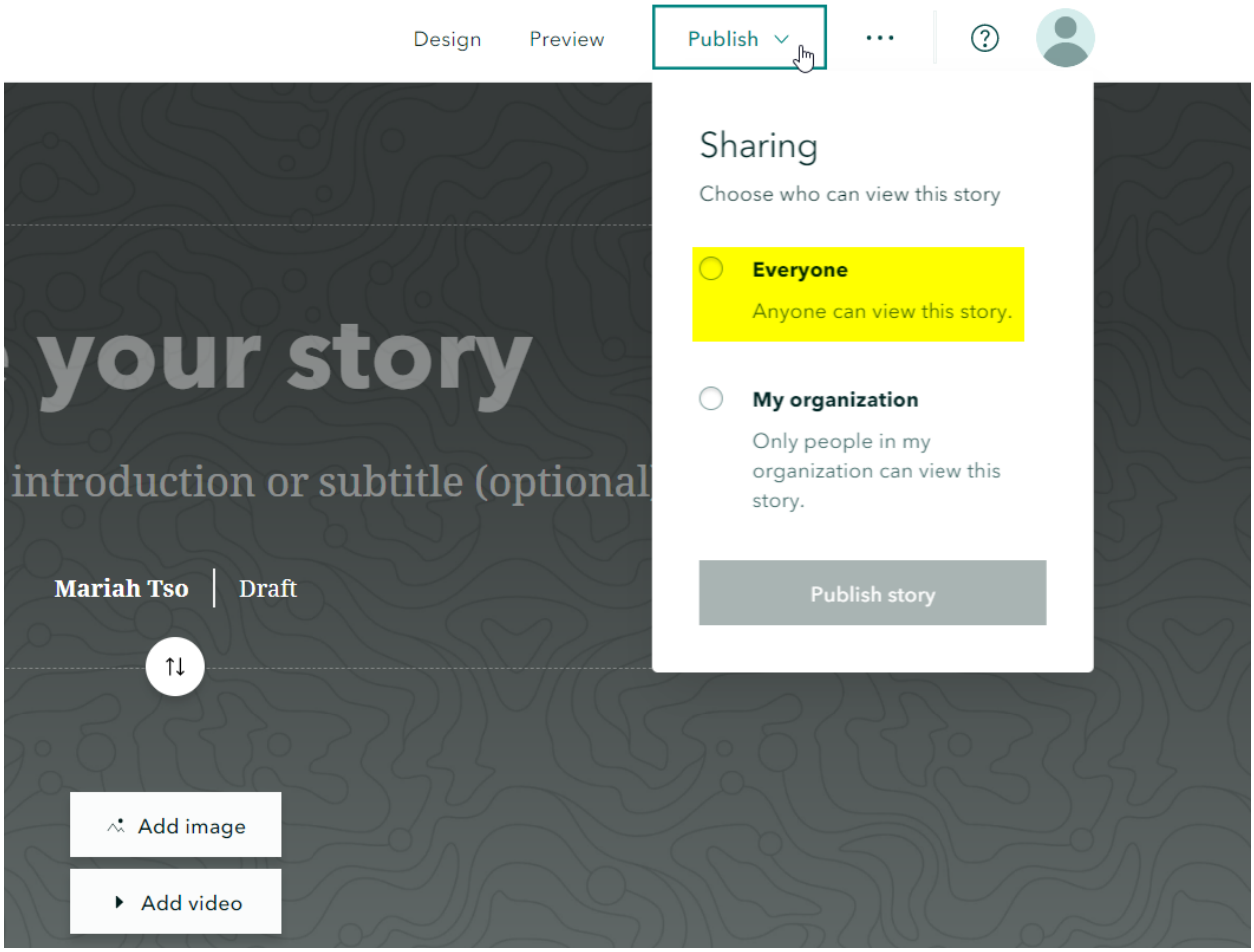
Demo Map

4.1.7 Publishing & Sharing your Story Map

1. When you are finished editing and designing your Story Map, click **Publish** at the beginning of the StoryMap to update the sharing settings of your StoryMap.



2. Select your preferred sharing type. If you want anyone to access your StoryMap make sure to select **Everyone**. Click **Publish Story**.



CHAPTER 5

Indices and Tables

- genindex
- modindex
- search