

## TUTORIAL 7.4 | CREATING POINT DATA FROM GOOGLE MAPS

### Goals

- Create your own geographic dataset using Google Maps.
- Style your data by concentration of data.
- Investigate the relationship between collected data and other variables.

### Introduction

Part of the power of GIS softwares is the ability to create and map your own data, and not only rely on data that already exists. The simplest kind of data to create, which we'll be looking at in this tutorial, is point data. These can be easily generated from a spreadsheet collection of latitudes and longitudes. For each row of data (each point), you can optionally add as many additional information columns as you'd like. In this example we'll be collecting the locations of grocery stores, so you can imagine adding columns for store name, size, google maps star rating, and so on, if that's information you might want to visualize.

From point data, you can also extrapolate larger shapefile datasets. In an earlier tutorial, we used Urban Heat data maps which were generated from a few collected points of data with temperature values. In another tutorial, we use point data to create travel distance polygons. These are both useful ways to visualize concentration from point data.

There are several ways to generate data from Google Maps. It is possible to scrape the map results and automatically generate a spreadsheet with relevant data. This requires either signing up for a third-party application or using a combination of coding and Google API which can be complicated. The simplest and most reliable way to collect this data is to manually enter each Google Maps search result into a spreadsheet. However, as we'll see, this can take a while.

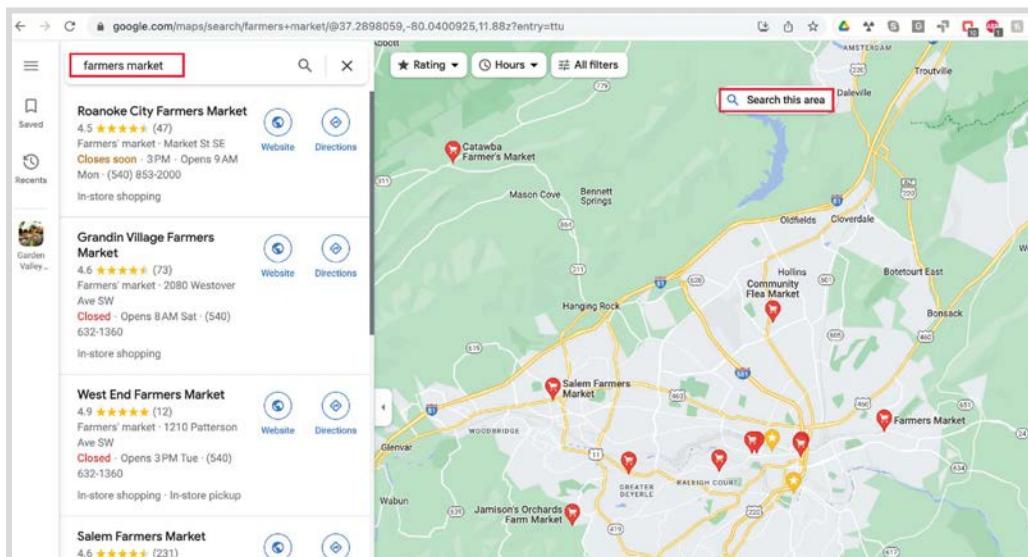
In this tutorial, we'll look at both the manual and the third-party methods.

**Step 1: Search in Google maps.**

Searching for comprehensive results in Google maps is not as simple as it seems. First, open Google Maps and visit your study city. Search for “grocery”, and hit enter. You’ll see several points pop up on the map, and a side bar with the results below the search bar. Try zooming in, and you’ll see that the number and location of results on the map changes. Try scrolling down the results in the sidebar, and you’ll see they continue to load beyond the first results returned.

Because of how Google returns search results, it's difficult to get an accurate picture of locations and numbers of whatever you're searching for. This is especially true for a search that will return many results, like “grocery”. The first method of creating point data from Google Maps that we'll look at in this tutorial is manually copying the results of a search from the map, so we'll start with a narrower search category.

1a Search “Farmers Market”. Zoom slightly away from your city and then back, and click “Search this Area” button that appears at the top of your map. If you scroll through the sidebar results, you should now see a manageable number (around 15-30).



1b Create a new spreadsheet (Google sheet or otherwise). Make columns for “Name”, “Category”, and “Address”. Using the sidebar, click on each search result. Copy/paste the name and address. You can find the “category” under the star rating (for instance “Farmers’ market” or “American grocery store”). Fill out the rows for each search result.

The screenshot shows a search results page for "Farmers' market". On the left, there's a sidebar with "Saved" and "Recent" sections. The main area displays five market entries with their names, ratings, addresses, and operating hours. The first entry, "Roanoke City Farmers Market", is highlighted. To its right is a detailed view of the market, featuring a photo of a red brick building with arched windows and a street view. Below the photo is a card with the market's name, rating, and category ("Farmers' market"). At the bottom of this card are links for "Directions", "Save", "Nearby", "Send to phone", and "Share". To the right of the card is a map of the Roanoke area, with the market's location marked by a red pin. The map also shows other locations like "Bryant Orchards Farm Market" and "Farmers Market". A callout box highlights the address "Market St SE, Roanoke, VA 24011" and the closing time "Closes soon · 3PM · Opens 9AM Mon".

	A	B	C	D
1	Name	Category	Address	
2	Roanoke City Farmers Market	Farmers' market	Market St SE, Roanoke, VA 24011	
3	Grandin Village Farmers Market	Farmers' market	2080 Westover Ave SW, Roanoke, VA 24015	
4	West End Farmers Market	Farmers' market	1210 Patterson Ave SW, Roanoke, VA 24016	
5	Salem Farmers Market	Farmers' market	3 E Main St, Salem, VA 24153	
6	Roanoke City Market	Farmers' market	Market Square SE, Roanoke, VA 24011	
7	Jamison's Orchards Farm Market	Farmers' market	5635 Grandin Rd Ext, Roanoke, VA 24018	
8	Mike's Country Market	Produce market	4330 Brandon Ave SW, Roanoke, VA 24018	
9	Farm to Table Roanoke	Farm	5881 Starkey Rd, Roanoke, VA 24018	
10	Grateful Produce	American grocery store	9513 Bent Mountain Rd, Bent Mountain, VA 24059	
11	Catawba Farmer's Market	Farmers' market	4965 Catawba Creek Rd, Catawba, VA 24070	
12	Botetourt Farmers Market	Farmers' market	90 Town Center Street, Daleville, VA 24083	
13	Bryant Orchards Farm Market	Farmers' market	15 Cedar, Plateau Way, Daleville, VA 24083	
14	Wicks & Wreaths	Farmers' market	Town Center Street, Daleville, VA 24083	
15	Woods Farm	Farmers' market	2921 Naff Rd, Boones Mill, VA 24065	
16	Farmers Market	Farmers' market	204 W Lee Ave, Vinton, VA 24179	

1c Save your spreadsheet for the next step.

## Step 2: Use a geocoder to generate lat / lon from address

It's possible to click on a result in Google Maps and copy/paste the latitude and longitude. However, this method is imprecise. You'll notice if you check the latitude and longitude zoomed in to a point, then zoom out and check again, it will change. Instead, it's better to extract the latitude and longitude from the address. This is called geocoding (reverse geocoding is generating addresses from lat / lon), and there are many free sites that will do it for you. I like to use Geocodio.

2a Create a free Geocodio account: <https://www.geocod.io/>

2b Select “**New upload**”. Select “**geocoding**”, and upload your spreadsheet with copy / pasted Google results. Select “**use single data column**”, and then your address column.

The screenshot shows the Geocodio web interface. At the top, there's a navigation bar with 'geocodio' logo, 'Dashboard', 'API Keys', and a 'Get something done' button. Below this is a 'Recent Uploads' section with a 'New upload' button highlighted with a red box. The main area is titled '1 Input'. It has two radio button options: 'Forward Geocoding' (selected) and 'Reverse Geocoding'. Below these are 'Address column' dropdowns containing 'G: address' and a note about multiple columns. A message asks if the data looks right, with a link to a spreadsheet formatting guide. Three address examples are shown in boxes: '3011 VA-101, Roanoke, VA 24017, United States', '3919 Electric Rd, Roanoke, VA 24018, United States', and '3039 Peters Creek Rd NW, Roanoke, VA 24019, United States'. At the bottom are 'START OVER?' and 'PREVIEW >' buttons.

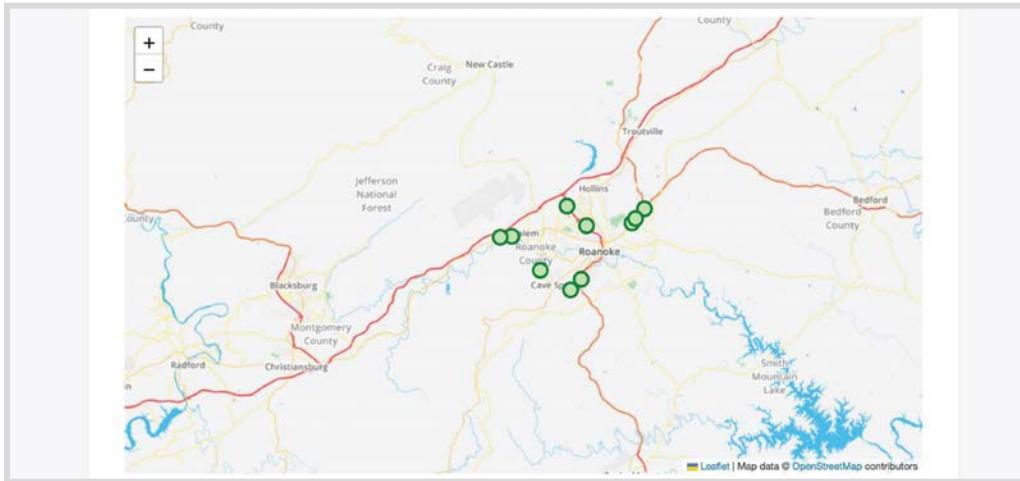
2c Check that the data shows up in the right place in the preview. You should only see dots in your city, or something has gone wrong (probably the wrong column selected or addresses entered incorrectly).

**2 Preview**

We geocoded a small sample of your list. Please confirm that the results are as expected.

Read more about what you get. The map is just for visualization purposes, you will also receive a downloadable CSV file with the following normalized columns appended: Latitude, Longitude, Accuracy Score, Accuracy Type, Number, Street, Unit Type, Unit Number, City, State, County, Zip, Country

< NO, I NEED TO CHANGE THE COLUMNS      YES, LOOKS GOOD >



2d Click “Yes, looks Good”, skip the “Appends”, then click “Start”. When it’s finished, **download** the results. Geocodio will send you an email when it’s ready – it should not take long.

NAME	STATUS
Untitled spreadsheet - Sheet1.csv Jun 11th 2023 2:53 pm <a href="#">Details »</a>	COMPLETED

[Download](#) [Preview](#) [Create map](#) [Delete](#)

2e Open the new spreadsheet. You’ll see that several new columns have been added to your original spreadsheet. You can delete all the new columns except “Latitude” and “Longitude”.

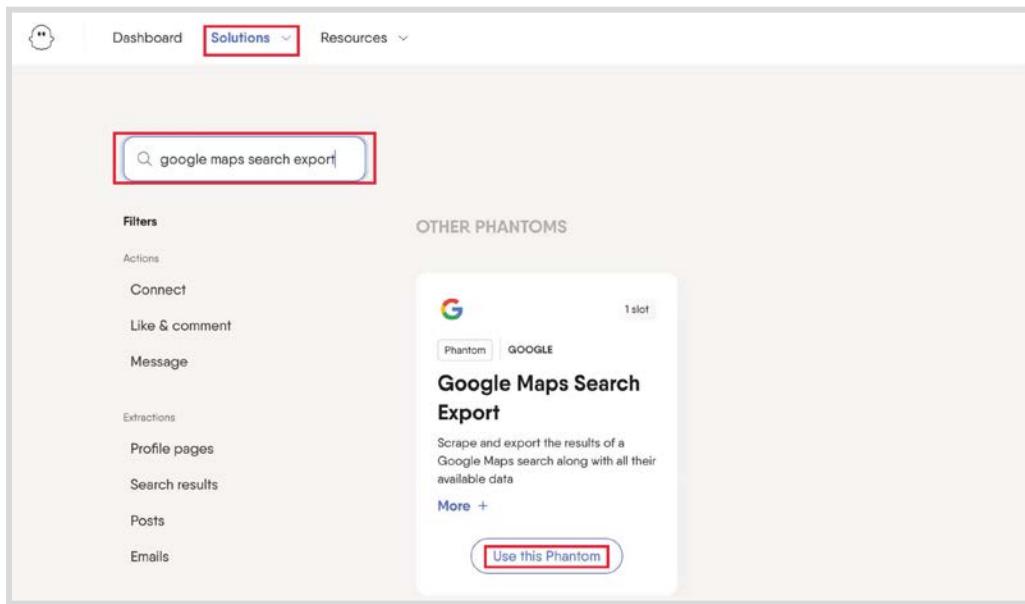
Latitude	Longitude	Accuracy Score	Accuracy Type	Number	Street	Unit Type	Unit Number	City	State	County	Zip	Coun
37.303268	-79.959508	1	rooftop	4805	Valley View Blvd NW			Roanoke	VA	Roanoke City	24012	US
37.284685	-79.932534	1	rooftop	1419	Williamson Rd NE			Roanoke	VA	Roanoke City	24012	US
37.229722	-79.977782	1	rooftop	4234	Electric Rd			Roanoke	VA	Roanoke County	24018	US
37.278951	-79.933799	1	rooftop	701	Williamson Rd NE			Roanoke	VA	Roanoke City	24016	US
37.315318	-80.005604	1	rooftop	2398	Peters Creek Rd NW			Roanoke	VA	Roanoke City	24017	US
37.304634	-79.963747	1	rooftop	4802	Valley View Blvd NW	Ste	UB105	Roanoke	VA	Roanoke City	24012	US

2f Save your spreadsheet as a .csv file.

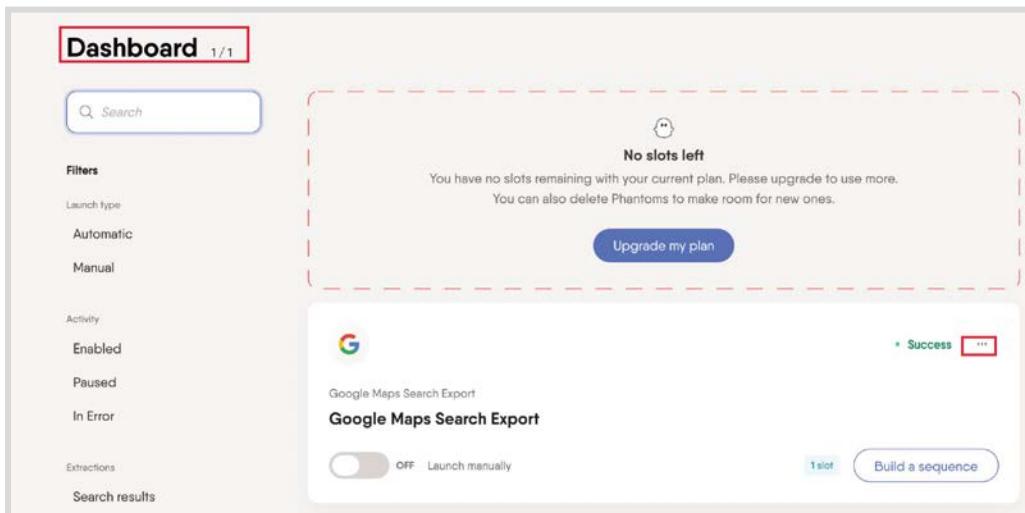
### Step 3: Use Phantom Buster to scrape Google Map results.

3a Sign up for Phantom Buster: <https://phantombuster.com/> This is a collection of web scraping and other tools. With a free account you can use one tool for up to 30 minutes per day – enough for our purposes.

3b In the “Solutions” tab at the top, search for the “Google Maps Search Export” phantom. Click “Use this Phantom” to add it to your dashboard.

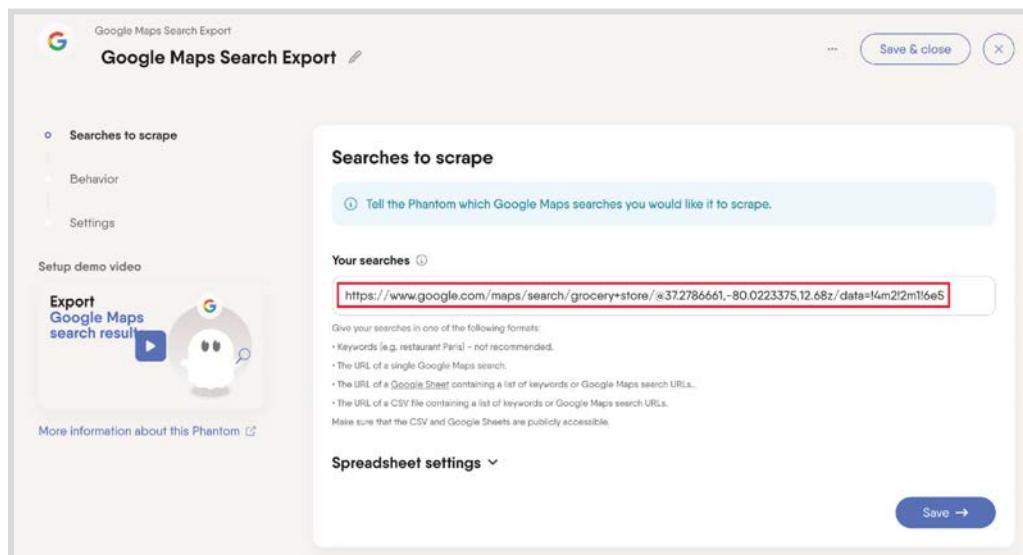
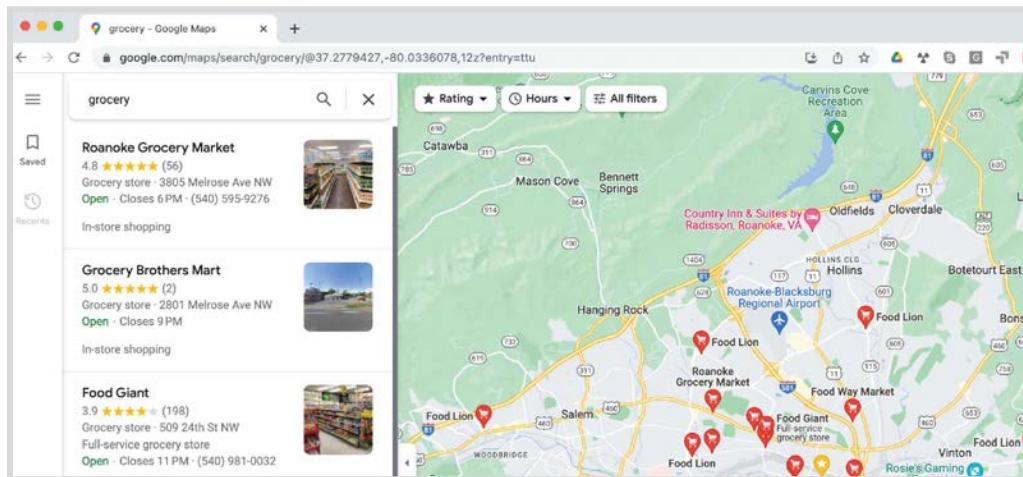


3c In “Dashboard”, click on the three dots at the top right of the Google maps phantom and select “Setup”. Note: Don’t click the “Build a sequence” button.



3d Go back to Google Maps. Search “grocery” and click enter. Make sure you’re zoomed out to show your entire city. Then, copy the Google Maps url. Back in Phantom Buster, paste the Google Maps search url into the “Your searches”

box. The url format will be: [https://www.google.com/maps/search/\\*your search terms here\\* /@\\*your city lat lon here\\*/data=\\*somenumbersandletter\\*](https://www.google.com/maps/search/*your search terms here* /@*your city lat lon here*/data=*somenumbersandletter*).



Click “Save”. On the following page, check “Extract GPS from coordinates”. Click through the next “saves”, leaving the rest of the settings as they are. You will then be taken back to your Dashboard.

3e Now that the web scraper is set up with your search terms, click the “Google Maps Search Export” banner (click on the words) to open the phantom. Click “Launch” and wait while it scrapes the results. This may take several minutes.



3f Once it's finished, click “Download results” from the results tab below.

A screenshot of the Google Maps Search Export interface showing the results table. The table has columns for Place Url, Title, Rating, Review Count, Category, and Attributes. There are 260 results listed. A red box highlights the 'Download results' button in the top right corner of the results table area. The table also includes a search bar and a 'More' dropdown menu.

3g Open your results spreadsheet. You'll see several columns of data you don't need. Delete everything but the “Title”, “Category”, “Address”, and “Latitude” and “Longitude” columns.

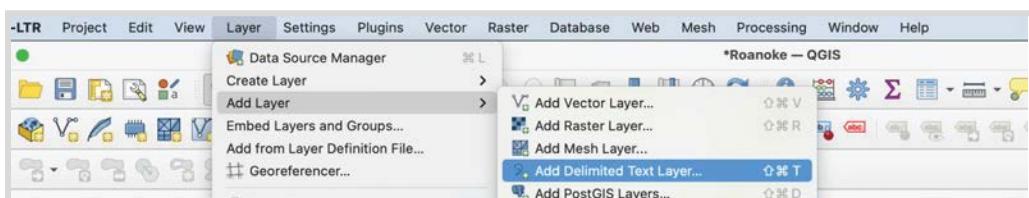
3h Save your spreadsheet as a .csv.

#### Step 4: Import csvs to QGIS.

Now you have two datasets: grocery store locations and farmers' market locations. These should each have the following 5 columns: name (or title), address, category, latitude, and longitude. You'll notice that the "category" column might be useful for further classifying the information in QGIS – for instance, large vs. small grocery stores.

4a Open a New QGIS file. Set your CRS to UTM 17N, and then import your administrative boundary, river, roads, and railroads. Import **one other layer that adds social context** – either census data, redlining, or another demographic layer.

4b Go to Layer > Add Layer > Add Delimited Layer... For "File Name" use the three dots on the right to select your first csv file. Under "Geometry Definition", select "**point coordinates**". The X field should be "longitude" and the Y field should be "latitude". Set the Geometry CRS to "**EPSG:4326 - WGS 84**". (NOTE: if you set the CRS wrong your data will show up in the wrong place).



**Data Source Manager | Delimited Text**

File name: /Users/mirandashugars/Desktop/QGIS/Roanoke/Data/GoogleMaps/Roanoke-FarmersMarket.csv

Layer name: Roanoke-FarmersMarket Encoding: UTF-8

**File Format**

- CSV (comma separated values)
- Regular expression delimiter
- Custom delimiters

**Record and Fields Options**

**Geometry Definition**

- Point coordinates  X field: Longitude Z field:   
Y field: Latitude M field:   
 DMS coordinates
- Well known text (WKT)
- No geometry (attribute only table)  Geometry CRS: EPSG:4326 - WGS 84

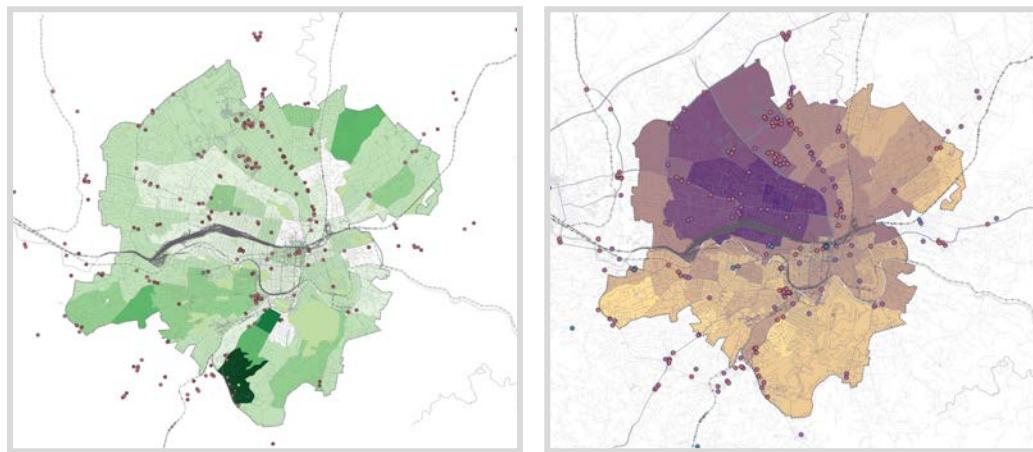
**Layer Settings**

**Sample Data**

Name	Category	Address	...
Roanoke City Farmers Market	Farmers' market	Market St SE, Roanoke, VA 24011	37.21
Grandin Village Farmers Market	Farmers' market	2080 Westover Ave SW, Roanoke, VA 24015	37.21
West End Farmers Market	Farmers' market	1210 Patterson Ave SW, Roanoke, VA 24016	37.21
Salem Farmers Market	Farmers' market	3 E Main St, Salem, VA 24153	37.21
Roanoke City Market	Farmers' market	Market Square SE, Roanoke, VA 24011	37.21
Jamison's Orchards Farm Market	Farmers' market	5635 Grandin Rd Ext, Roanoke, VA 24018	37.21
Mike's Country Market	Produce market	4330 Brandon Ave SW, Roanoke, VA 24018	37.21
...			

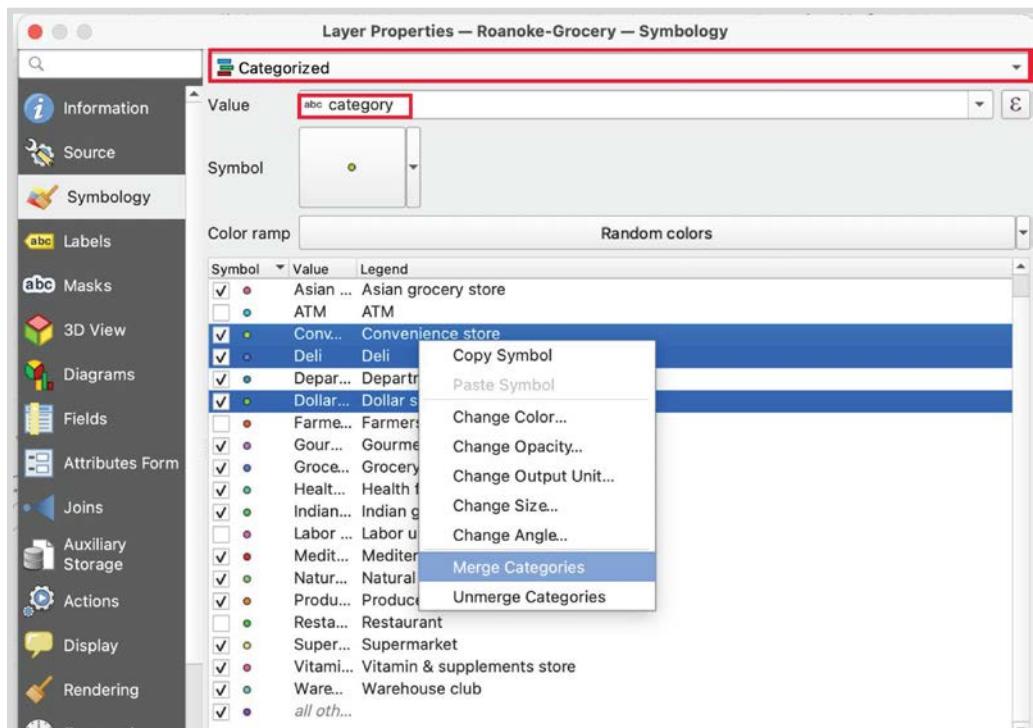
Add Close

"Add" both of your csv files. You should see the point locations show up on your map.



4c Try styling your data according to its category to see where different types of stores are located. Compare the location of farmers' markets with grocery stores. For additional context, I also download the location of "fast food" using Phantom Buster.

Note: try "Merge" in the categorized style to combine categories into fewer general trends. I combined the "convenience store" style smaller places, including Dollar stores; the specialty grocery stores like "Indian Grocery" and "Natural Foods"; and the larger "department stores" and big-box stores. This gave me an idea of where food deserts, not near any of the larger grocery stores, might fall.



**Step 5: Create a print layout map that compares the locations of your food amenities to the social context layer.**

5a As always, include a title, legend, scale, north arrow, map labels, your name, and sources.