

# Predicting the Optimal City Location for a Central Florida Barbecue Restaurant

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## 1. Introduction

### 1.1 Background

Barbecue is a cooking method, and a name for a meal or establishment at which this style of food is cooked and served in large, specially designed brick or metal ovens. Barbecue is practiced in many areas of the world and there are numerous regional variations. The technique for which it is named involves cooking using smoke at low temperatures and long cooking times (several hours). Central Florida is a region of the Southern U.S. state of Florida. Different sources give different definitions for the region, but as its name implies it is usually said to comprise the central part of the state. Success in the barbecue restaurant industry is not easy. Sixty percent of all restaurants do not make it past their first year and eighty percent go out of business within five years. Despite the hurdles, many barbecue restaurant owners and operators believe that if they will be able to make any money, they are doing “good enough.” The failure in this approach is that it does not account for multiple location elements which when combined are critical for success with any barbecue restaurant in Central Florida.

### 1.2 Business Problem

Data that might contribute to determining optimal location conditions might include visibility, parking, space size, crime rates, surrounding businesses, accessibility and affordability. Data that might contribute to determining optimal city profile might include population, competitor analysis and economy. This project aims to predict whether and how likely a location having these elements in optimal ranges within a ranked Central Florida city will succeed based on these data.

### 1.3 Interest

Prospective Central Florida barbecue restaurant owners would be interested in accurate prediction of optimal location opportunities. Others who are interested in Central Florida barbecue restaurants include Central Florida economic development organizations and commercial realtors.

## 2. Data acquisition and cleaning

### 2.1 Data Sources

Data has been scraped comparing cities and their population data from [https://en.wikipedia.org/wiki/Central\\_Florida](https://en.wikipedia.org/wiki/Central_Florida). Data has been scraped on consumer spending and personal income by county from <https://www.bea.gov/data/economic-accounts/regional>. Data has been scraped on competitor metrics from <https://developer.foursquare.com/docs/api->

[reference/venues/search/](#). Data has been scraped on visibility, parking, accessibility and traffic data from <https://www.google.com/maps>. Data has been scraped on crime rate statistics from [https://www.fdle.state.fl.us/FSAC/Data-Statistics-\(1\).aspx](https://www.fdle.state.fl.us/FSAC/Data-Statistics-(1).aspx). Data has been scraped on location and space size availability from <https://totalcommercial.com/territory/usa/florida/central-florida>. These datasets lack data for certain desired years, cities and locations so these datasets were cleansed and additionally sourced as needed to provide a current ten-year analysis as closely as possible.

## **2.2 Data Cleansing**

There are several problems with the datasets. Population data of this type is historically aggregated in ten-year increments based on census data and the latest available public data is from over ten years ago. To address this the data was forecasted out using the two prior decades and comparing the growth rate to apply it to the most recent decade to estimate the current decade values. Consumer spending and personal income data is not specific to barbecue restaurant spending only and needed to be calculated percentage wise based on other data. Crime rate statistics needed to be compared against location data to determine the number of calls for service, which is not always accurate based on prior ownership of the same location by other types of businesses. Location and space size availability data is of an ever-changing nature and reflective only of the most recent availability for locations and thus subject to change almost immediately from the time of publication, resulting in a snapshot of availability which is not reflective of any trends towards availability and subject to change.

After addressing these issues as much as possible, outliers were checked for in the data. The underlying source data itself had already addressed some of these and the exceptions were noted as part of their data source sections wherever data has been changed to address any outliers present in the data sources.

There were multiple missing values across nearly every data source. Wherever possible the missing data has been sourced and will be cross-referenced in the References section to cite source materials which supplemented or made their way into the data source calculations.

## **2.3 Feature Selection**

After data cleaning, there were 15 samples and 4 features in the data. Upon examining the meaning of each feature, it was clear that there was some redundancy in the features.

# **3. Methodology**

## **3.1 Calculation of Population Growth Variable**

As they are comprised of census results reported, population data for Central Florida was available for the years 2000 and 2010 only. I chose to take the difference in the growth of population between 2000 and 2010, calculate the percentage growth rate increase or decline and then apply that to the 2010 population results to estimate what those results would then be for 2020 as the census data for this year is still being compiled.

City	County	2000 Population	2010 Population	2020 Population Estimate	2020 Estimate % Growth
Tampa	Hillsborough	303,447	335,709	367,971	9.61
St. Petersburg	Pinellas	248,232	244,769	241,306	-1.41
Orlando	Orange	185,951	238,300	290,649	21.97
Clearwater	Pinellas	108,789	107,685	106,581	-1.03
Palm Bay	Brevard	79,413	103,190	126,967	23.04
Lakeland	Polk	78,452	97,422	116,392	19.47
Deltona	Volusia	69,543	85,182	100,821	18.36
Largo	Pinellas	69,371	77,648	85,925	10.66
Melbourne	Brevard	71,382	76,068	80,754	6.16
Daytona Beach	Volusia	64,112	61,005	57,898	-5.09
Kissimmee	Osceola	47,814	59,682	71,550	19.89
Port Orange	Volusia	45,823	56,048	66,273	18.24
Sanford	Seminole	38,291	53,570	68,849	28.52
Clermont	Lake	9,333	35,211	61,089	73.49
Oviedo	Seminole	26,316	33,342	40,368	21.07

### 3.2 Calculation of Per-Capita Income Growth Variable

Per capita income data was available from 2006-2010 ranked by County instead of specific to the Central Florida cities desired. After sourcing the data for the period, a merge of the two data sets was then done using the county as a match between and the estimated population for 2020 was used as the basis and adjusted by the estimated percentage of population growth to estimate the per capita income growth for 2020 in the 15 cities being compared.

While this is by no means an overly accurate approach to take with all things being considered more people means more money per capita based on there being more households averaging roughly the same as they did growth of income wise between 2006-2010, and by extension the number of estimated population growth follows closely with trends between 2006-2010 as areas improved or declined in quality overall within each city to appeal to others to move into or away from there.

City	County	2010 population	2020 population estimate	Per capita income	2020 est. per capita income
Tampa	Hillsborough	335,709	367,971	\$27,062	\$29,663
St. Petersburg	Pinellas	244,769	241,306	\$28,742	\$28,335
Clearwater	Pinellas	107,685	106,581	\$28,742	\$28,447
Largo	Pinellas	77,648	85,925	\$28,742	\$31,806
Orlando	Orange	238,300	290,649	\$25,490	\$31,090
Palm Bay	Brevard	103,190	126,967	\$27,606	\$33,967
Melbourne	Brevard	76,068	80,754	\$27,606	\$29,307
Lakeland	Polk	97,422	116,392	\$21,881	\$26,142
Deltona	Volusia	85,182	100,821	\$24,768	\$29,315
Daytona Beach	Volusia	61,005	57,898	\$24,768	\$23,507
Port Orange	Volusia	56,048	66,273	\$24,768	\$29,286
Kissimmee	Osceola	59,682	71,550	\$20,536	\$24,620
Sanford	Seminole	53,570	68,849	\$29,795	\$38,293
Oviedo	Seminole	33,342	40,368	\$29,795	\$36,074
Clermont	Lake	35,211	61,089	\$25,323	\$43,934

### 3.3 Calculation of Average Consumer Spending on Barbecue Restaurants Variable

Average annual expenditures on all food away from home in Florida were \$3,154 in 2016, \$3,365 in 2017 and \$3,459 in 2018 with growth percentage changes of 6.7 and 2.8 between 2016-2017 and 2017-2018. Both percentages were repeated for years 2019 and 2020 to represent the variances between normal years based on history and to also factor in the impact COVID-19 had on 2020 barbecue restaurant lack of dine-in availability.

Barbecue industry-specific data is not available to the public, so the following 12 categories were divided equally into the total spend on food away from home, as each of them has both the potential to be a competitor in the non-barbecue spend as well as a form of the barbecue restaurant format: Limited service restaurants including quick service restaurants, quick casual dining, cafeteria, delivery and take-away, buffet, full-service restaurants including family style restaurants, casual dining, upscale casual dining, fine dining restaurants and drinking places such as bars and taverns.

Barbecue restaurants span the spectrum of these offering types within the whole of the restaurant industry, so it was decided a factor of 12 would suffice to estimate the annual spending on barbecue restaurants alone within the total average annual expenditures on all food away from home in Florida as compare to all other competitors within the restaurant industry in Florida.

Not all citizens of any given city in Central Florida will consume meat. Vegetarians and those identifying as non-meat eaters account for roughly 33% of the Florida population. This factor was also applied to the estimates to reduce the population estimates accordingly to consider for those having preferences and beliefs.

City	County	2020 population estimate	2020 estimated barbecue spending	2020 estimated non-barbecue spending
Tampa	Hillsborough	367,971	\$730,551	\$8,036,066
St. Petersburg	Pinellas	241,306	\$479,077	\$5,269,847
Clearwater	Pinellas	106,581	\$211,601	\$2,327,607
Largo	Pinellas	85,925	\$170,591	\$1,876,504
Orlando	Orange	290,649	\$577,040	\$6,347,442
Palm Bay	Brevard	126,967	\$252,074	\$2,772,814
Melbourne	Brevard	80,754	\$160,325	\$1,763,575
Lakeland	Polk	116,392	\$231,079	\$2,541,868
Deltona	Volusia	100,821	\$200,165	\$2,201,815
Daytona Beach	Volusia	57,898	\$114,948	\$1,264,426
Port Orange	Volusia	66,273	\$131,575	\$1,447,327
Kissimmee	Osceola	71,550	\$142,052	\$1,562,570
Sanford	Seminole	68,849	\$136,689	\$1,503,584
Oviedo	Seminole	40,368	\$80,145	\$881,591
Clermont	Lake	61,089	\$121,283	\$1,334,114

### 3.4 Calculation of Competing Barbecue Restaurants Within Each City

The latitude and longitude for the epicenter of each city was used to determine the number and locations for competing barbecue restaurants found within a 20-mile radius from the center of each Central Florida city. The red circle indicates the epicenter and blue circles indicate competitor locations.



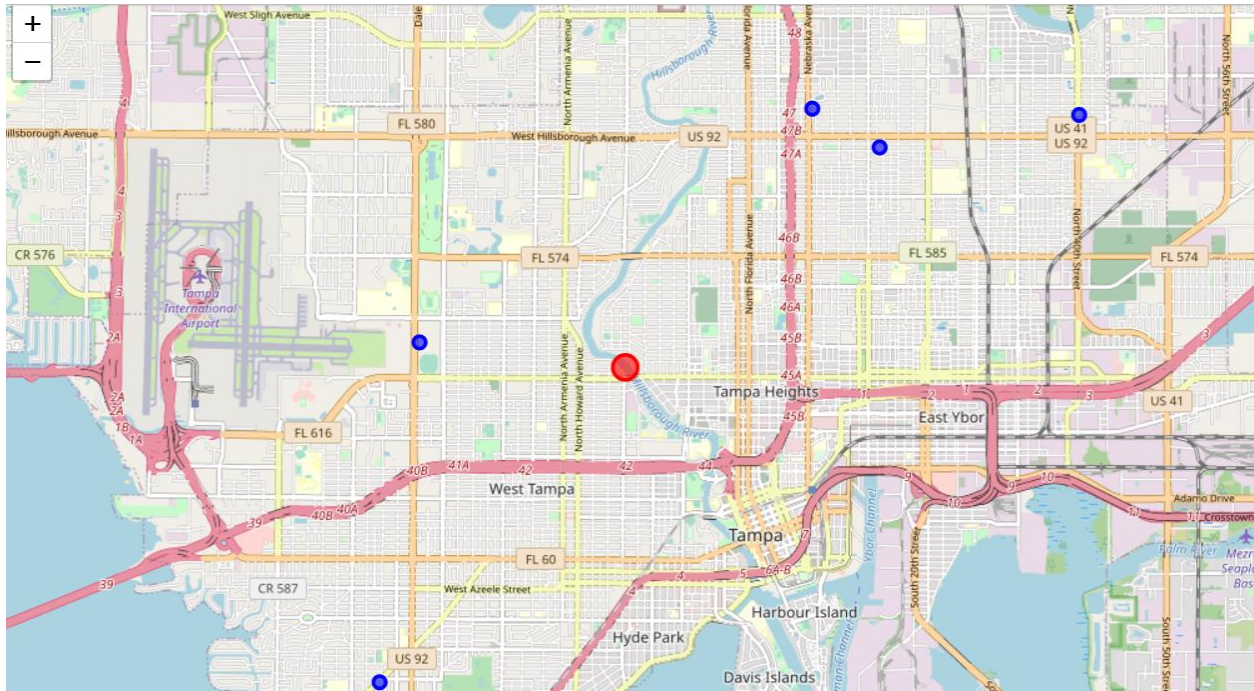


Figure 1 Tampa, FL Barbecue Restaurant Competitor Locations

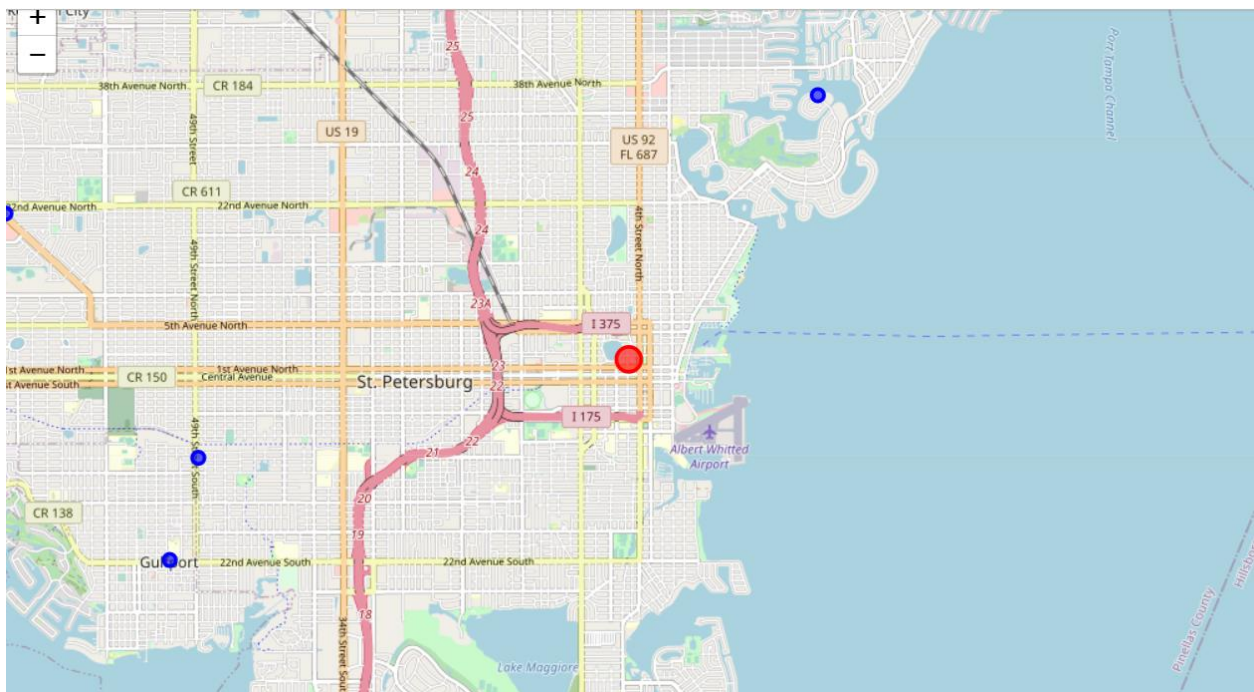


Figure 2 St. Petersburg, FL Barbecue Restaurant Competitor Locations



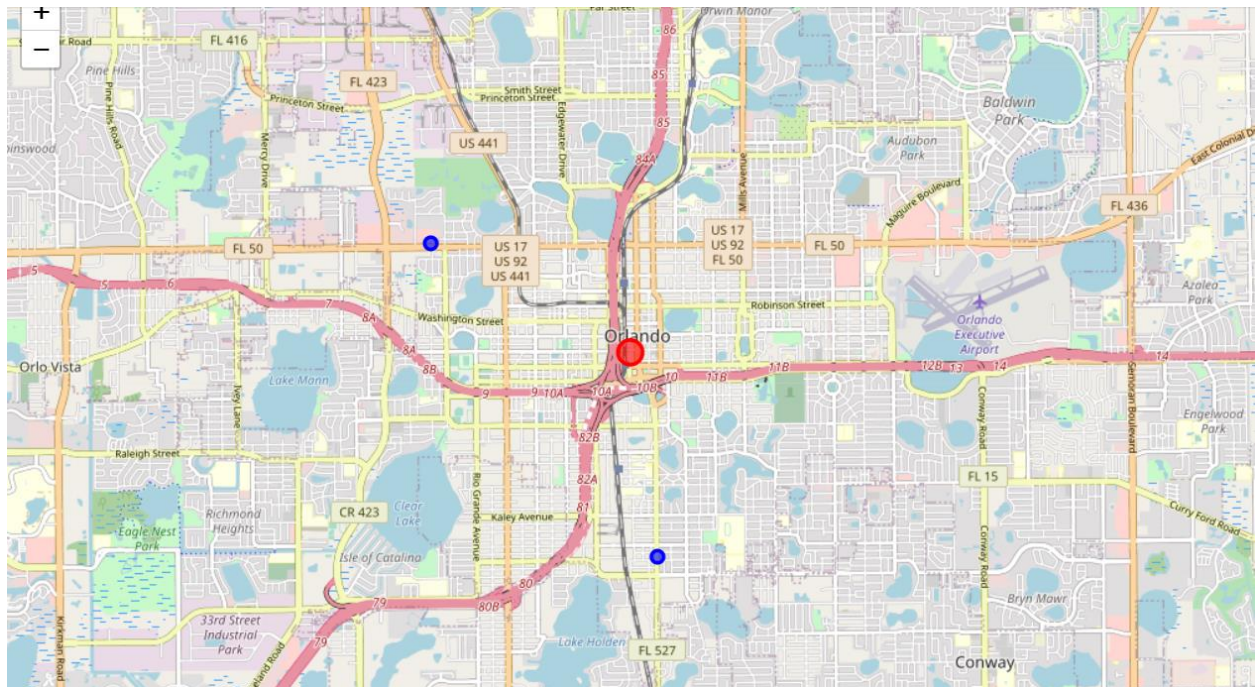


Figure 3 Orlando, FL Barbecue Restaurant Competitor Locations

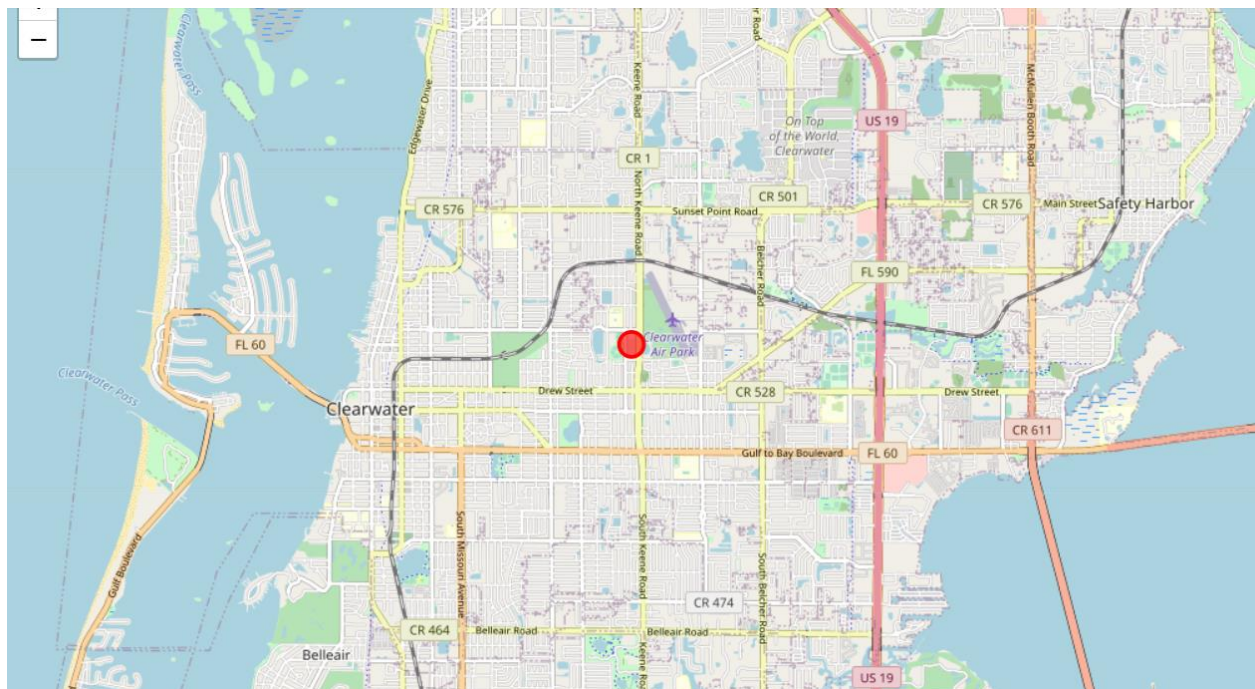


Figure 4 Clearwater, FL Barbecue Restaurant Competitor Locations



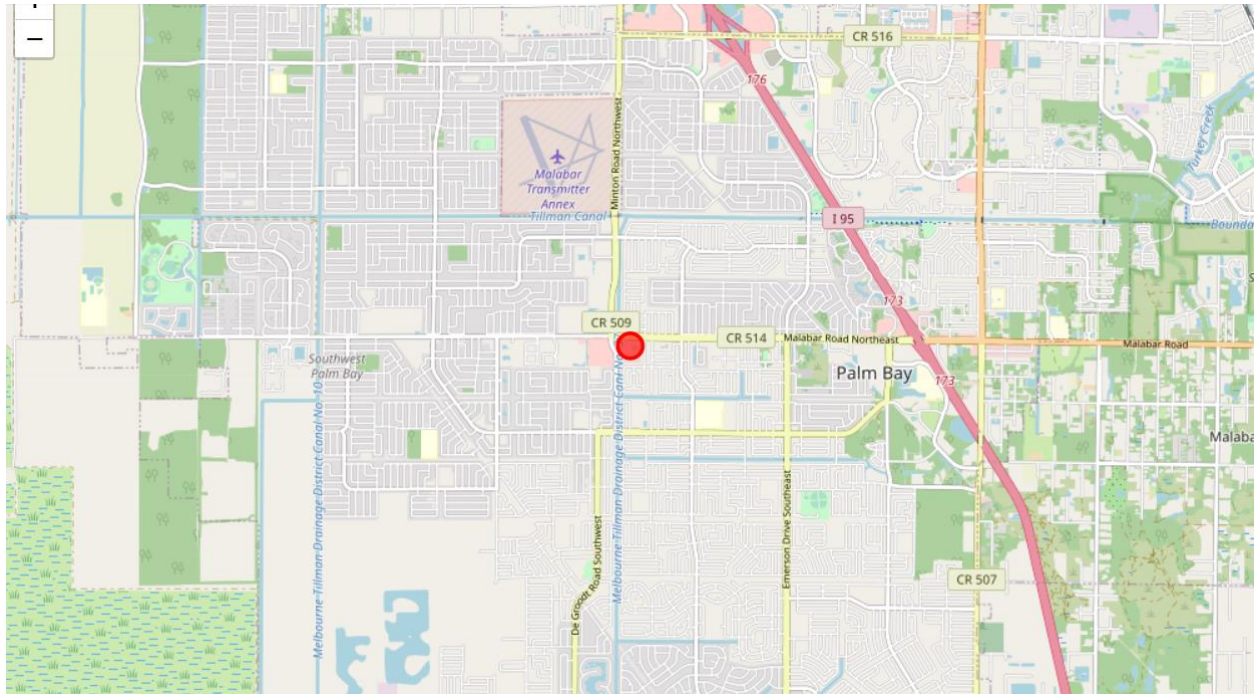


Figure 5 Palm Bay, FL Barbecue Restaurant Competitor Locations

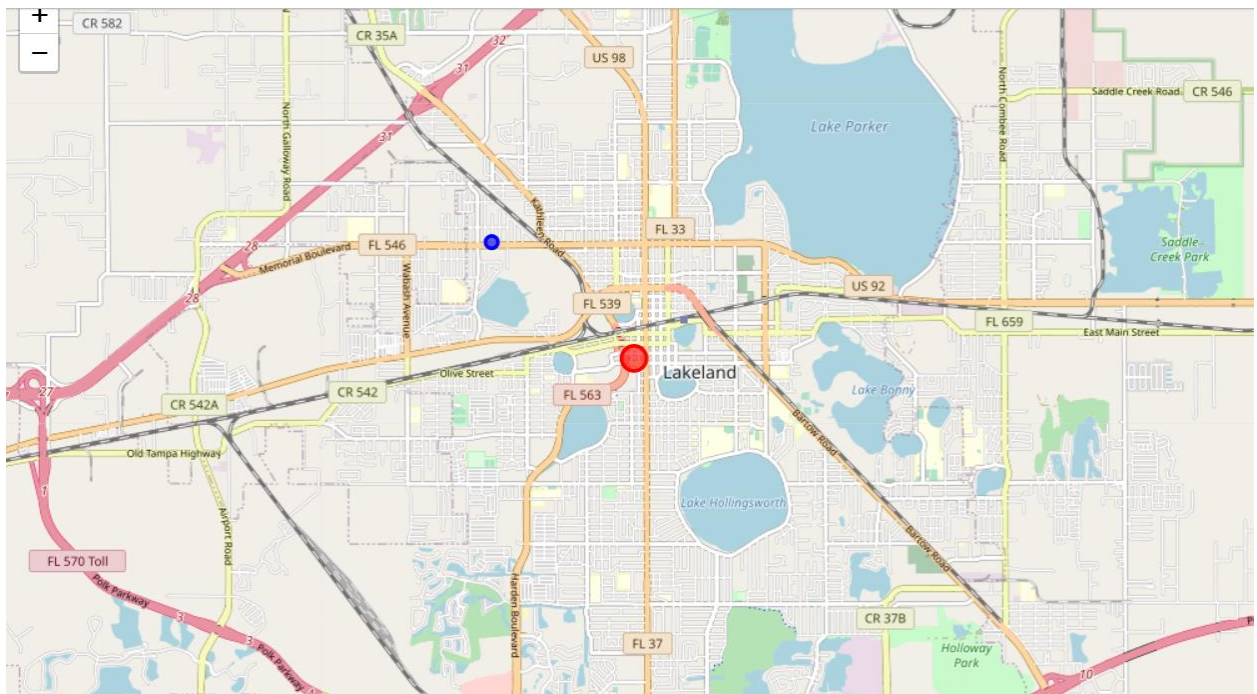


Figure 6 Lakeland, FL Barbecue Restaurant Competitor Locations

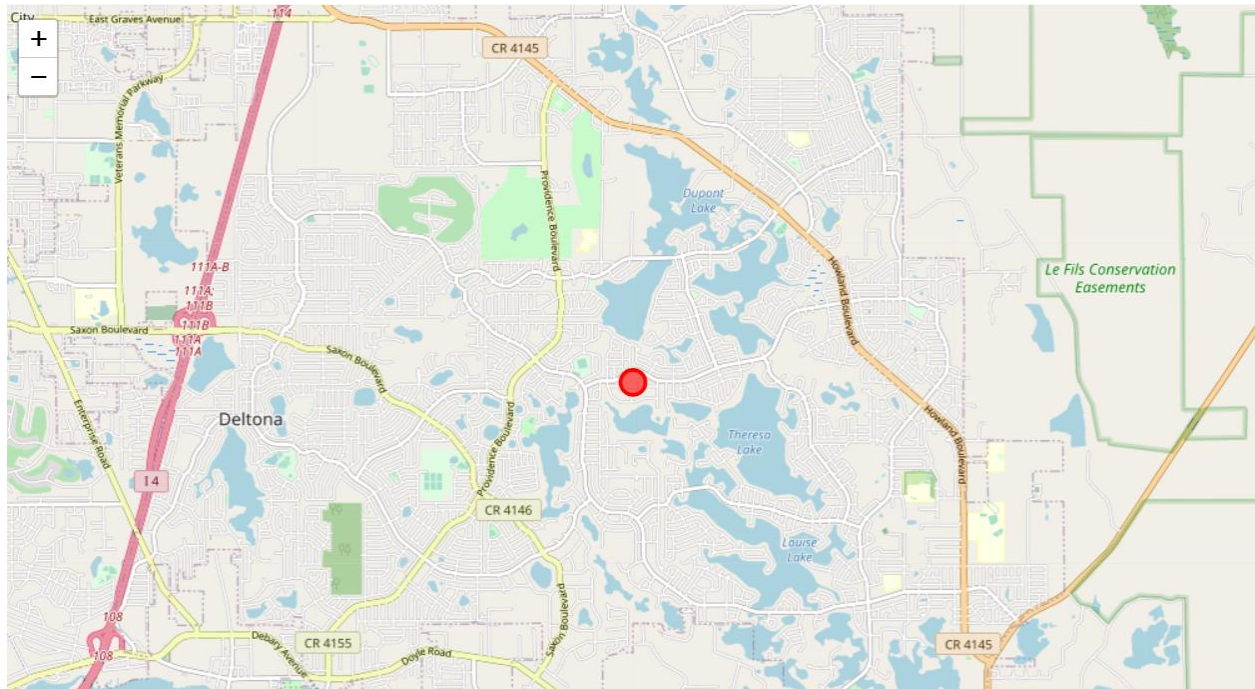


Figure 7 Deltona, FL Barbecue Restaurant Competitor Locations

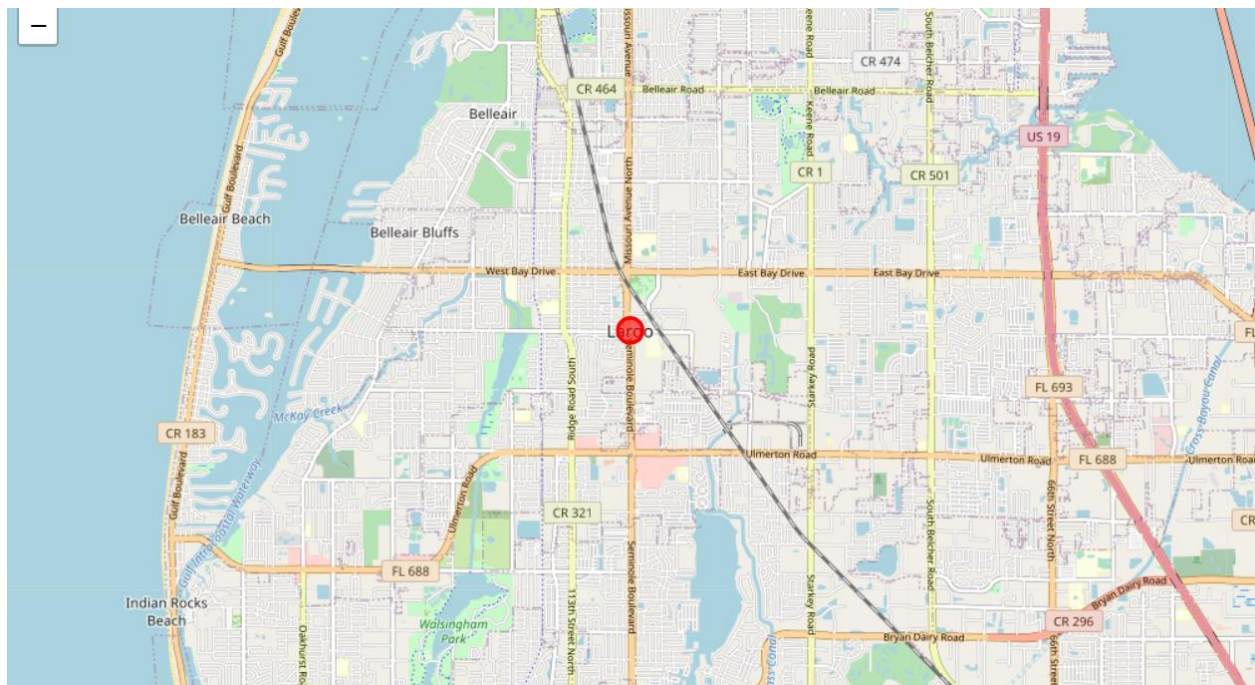


Figure 8 Largo, FL Barbecue Restaurant Competitor Locations



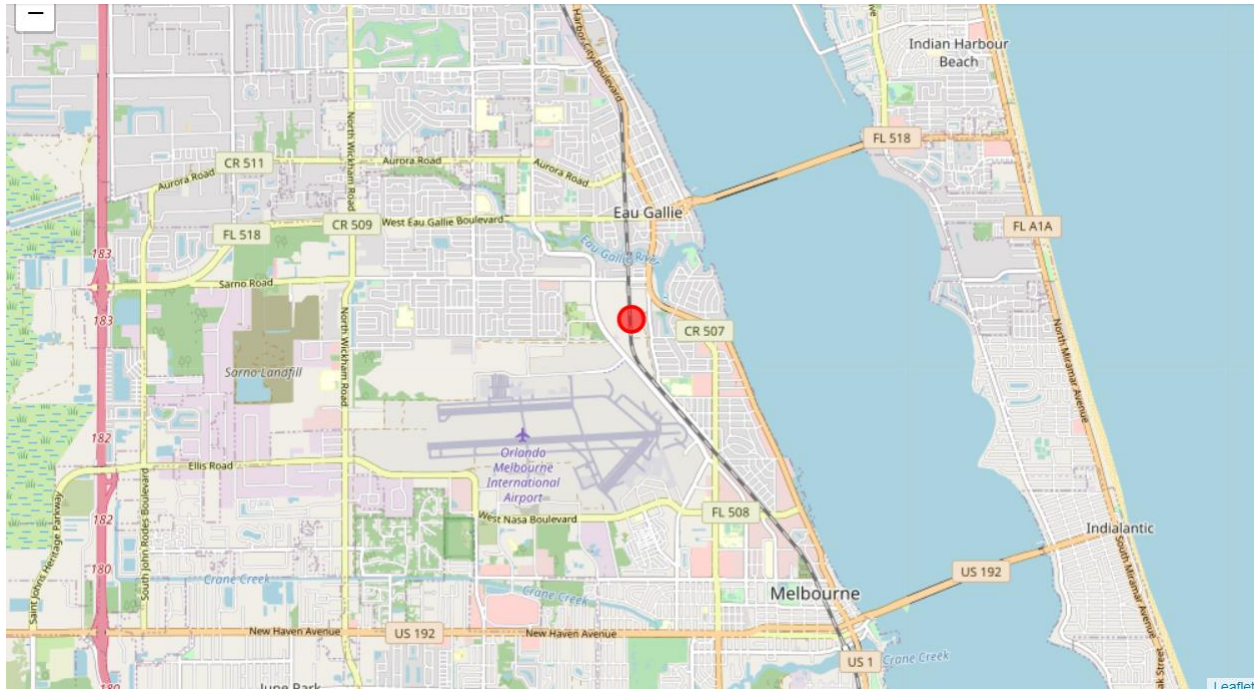


Figure 9 Melbourne, FL Barbecue Restaurant Competitor Locations

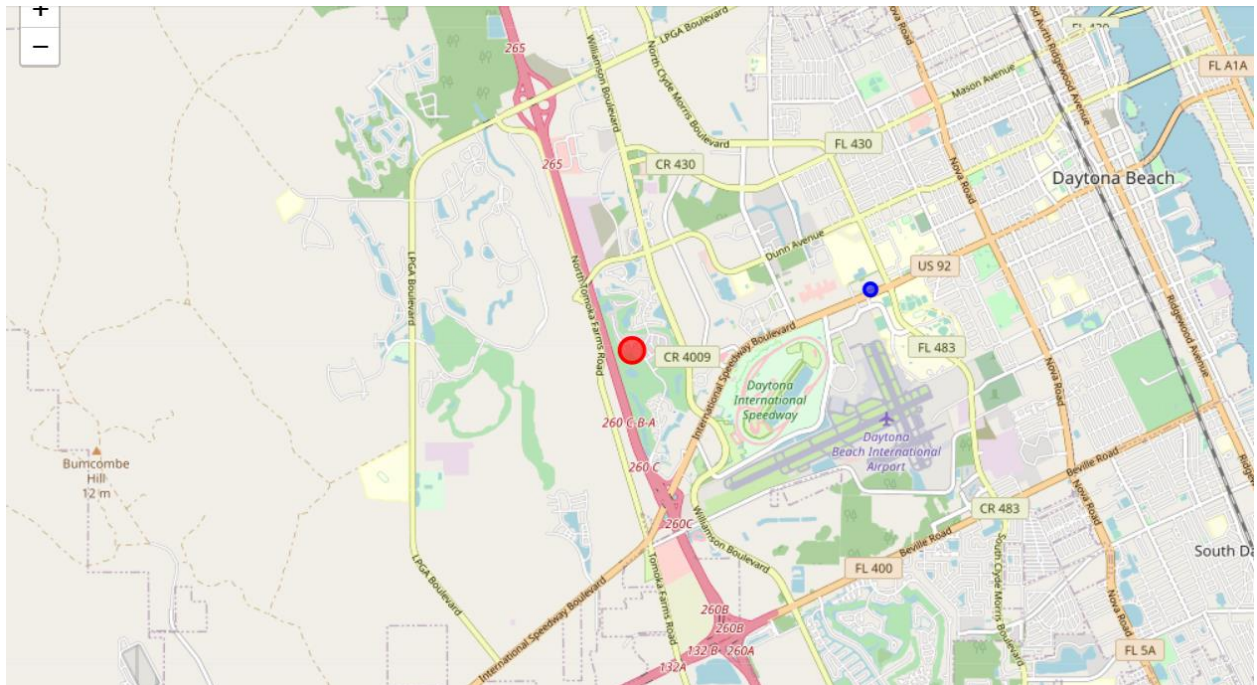


Figure 10 Daytona Beach, FL Barbecue Restaurant Competitor Locations

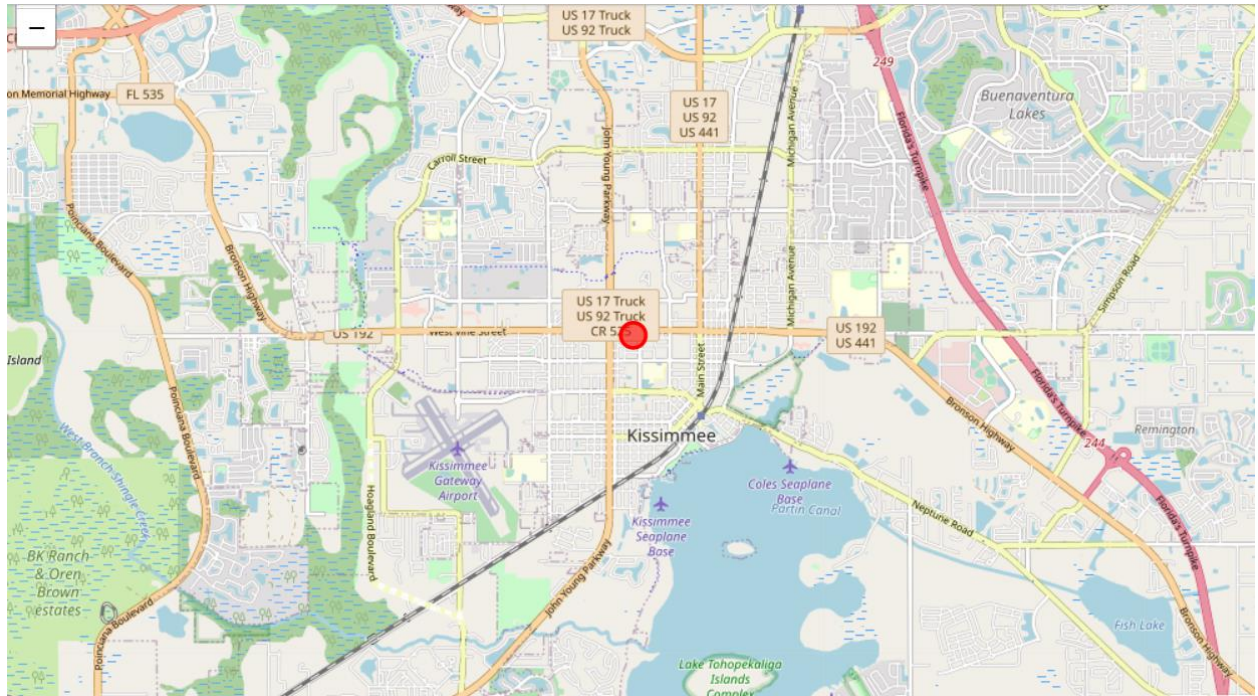


Figure 11 Kissimmee, FL Barbecue Restaurant Competitor Locations

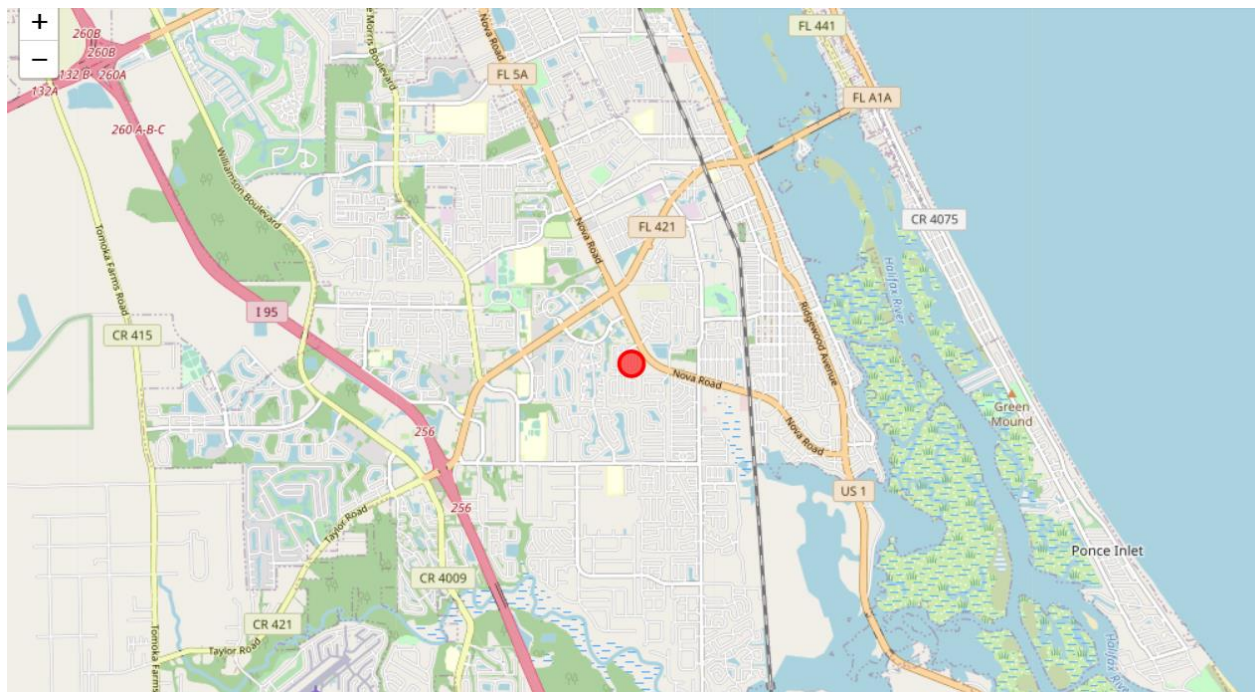


Figure 12 Port Orange, FL Barbecue Restaurant Competitor Locations



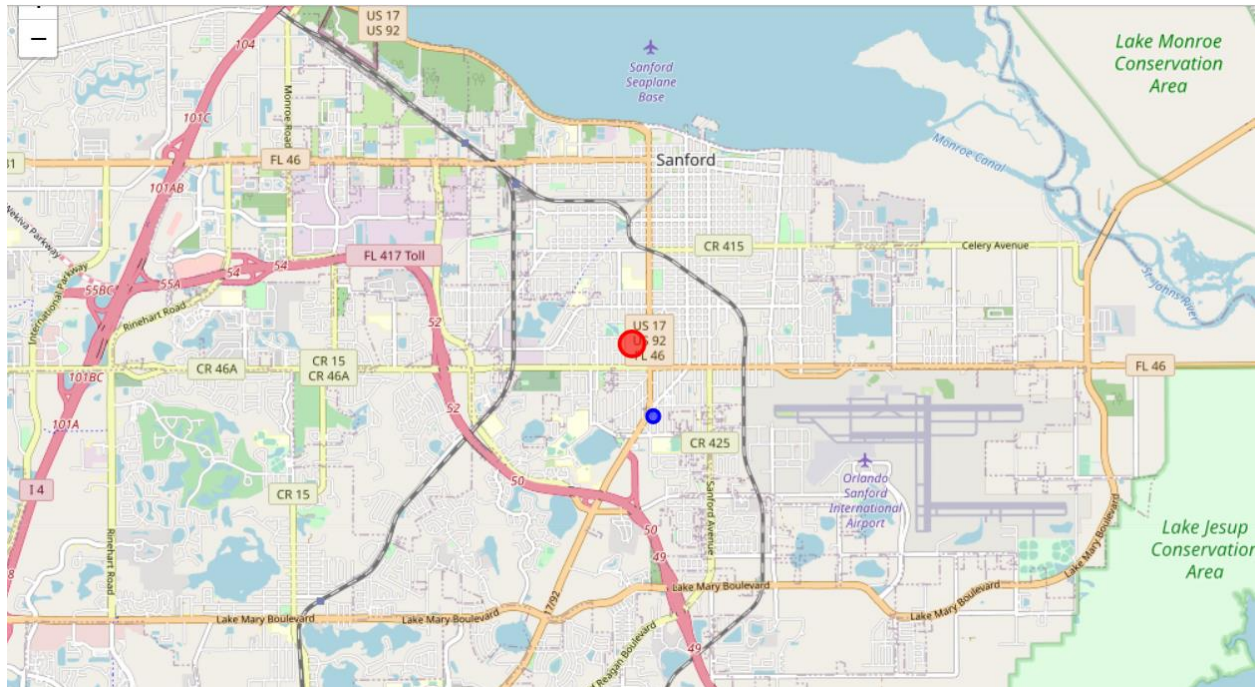


Figure 13 Sanford, FL Barbecue Restaurant Competitor Locations

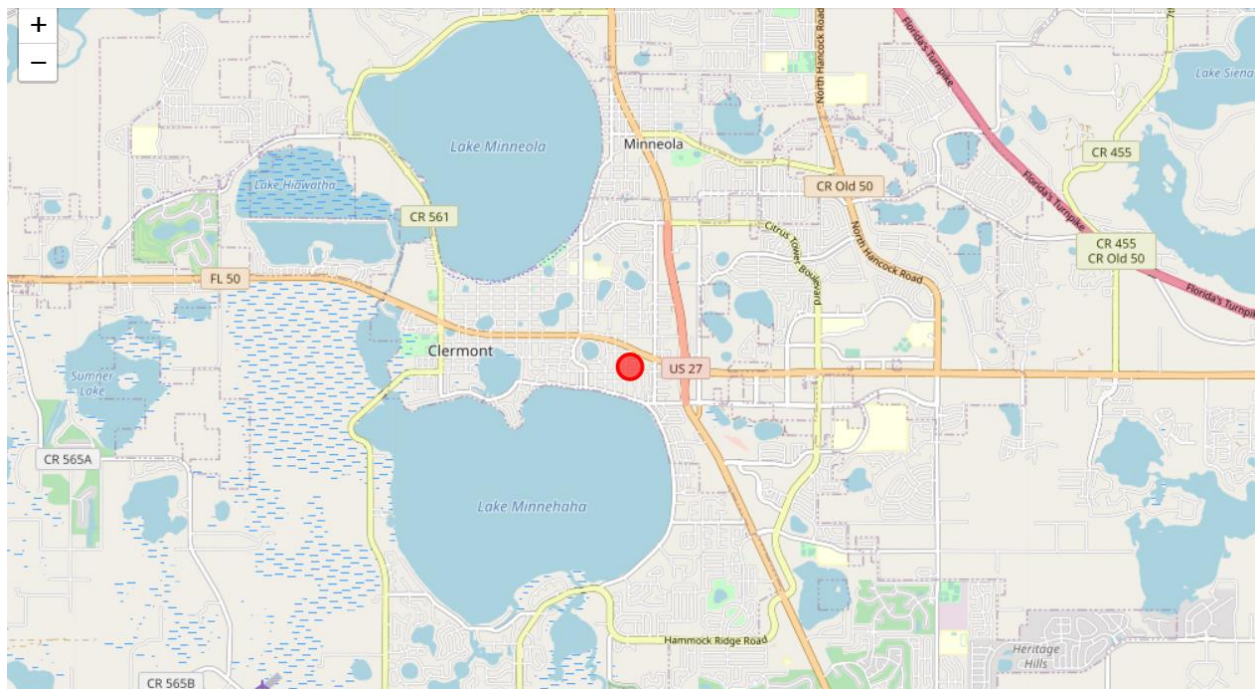


Figure 14 Clermont, FL Barbecue Restaurant Competitor Locations



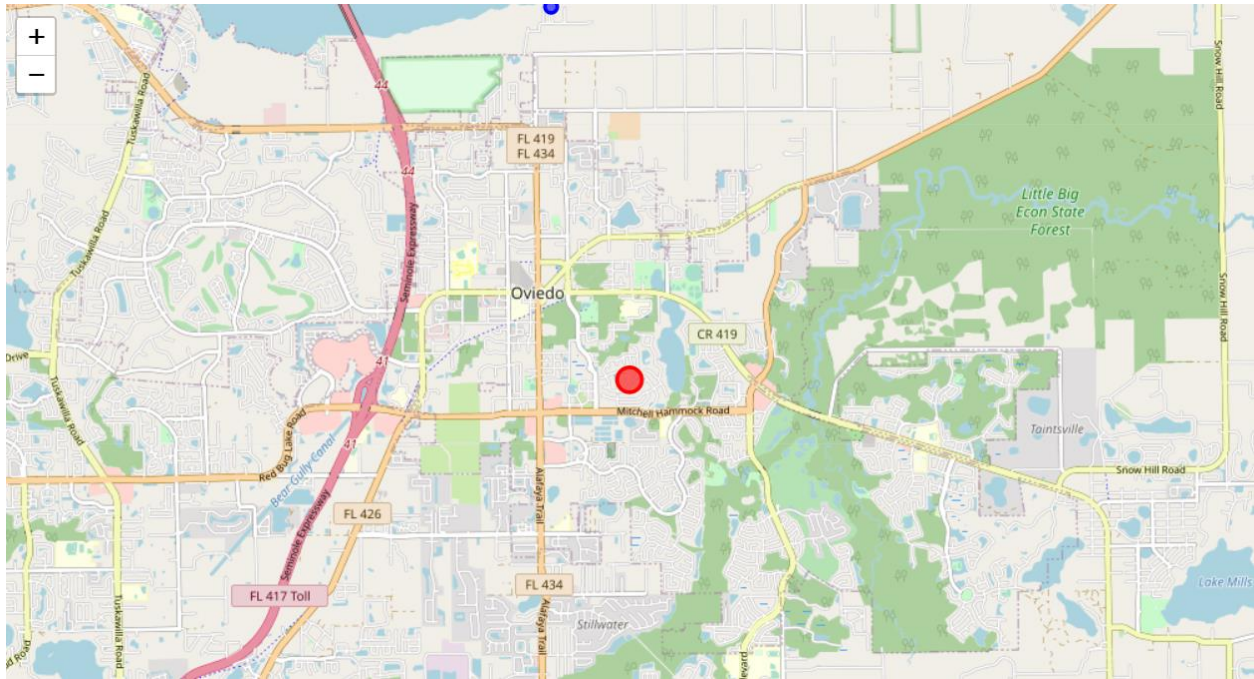
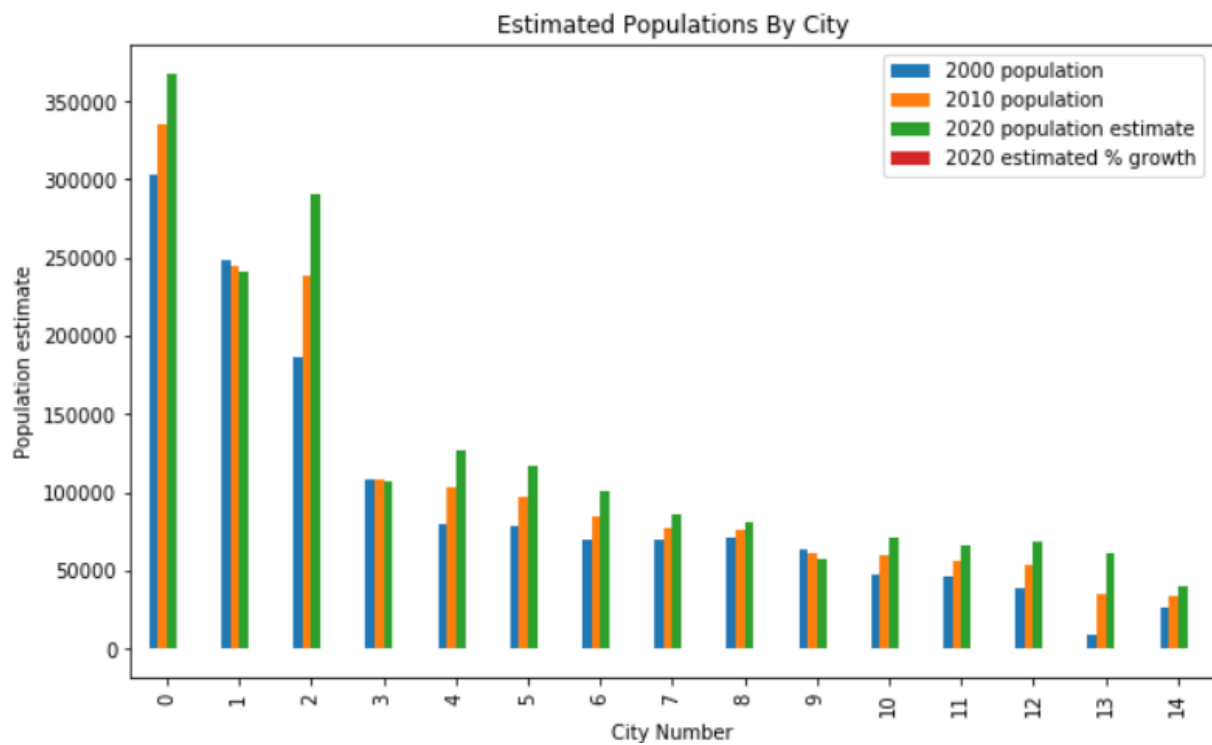
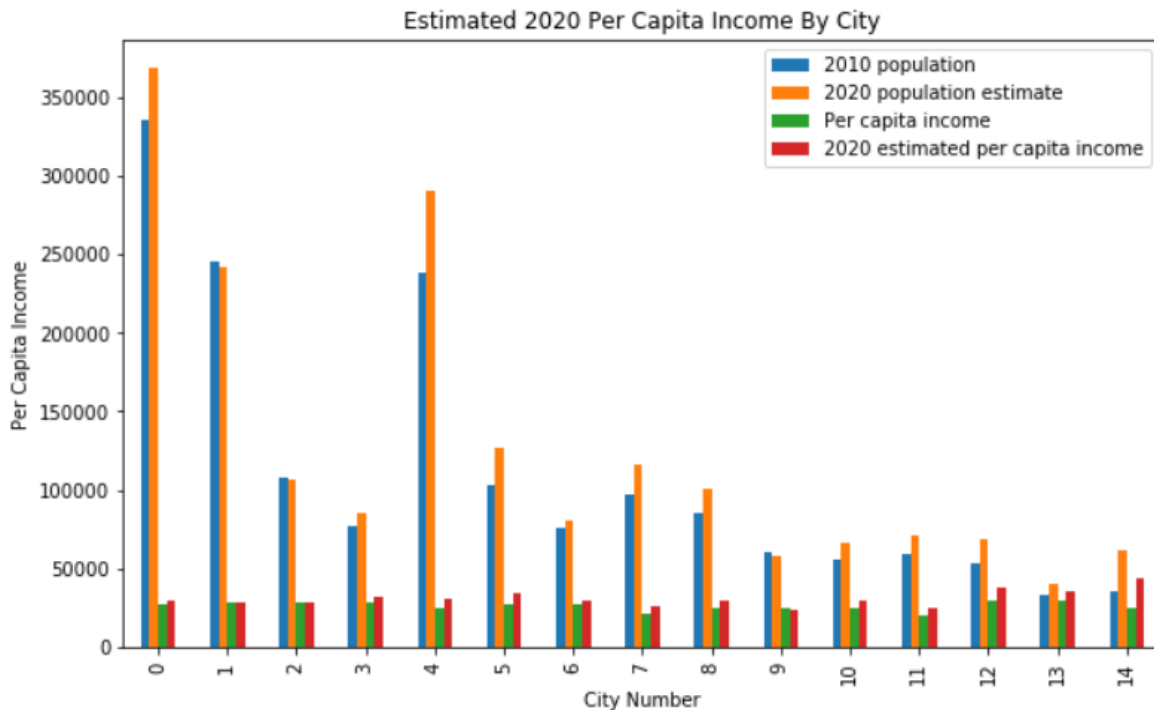


Figure 15 Oviedo, FL Barbecue Restaurant Competitor Locations

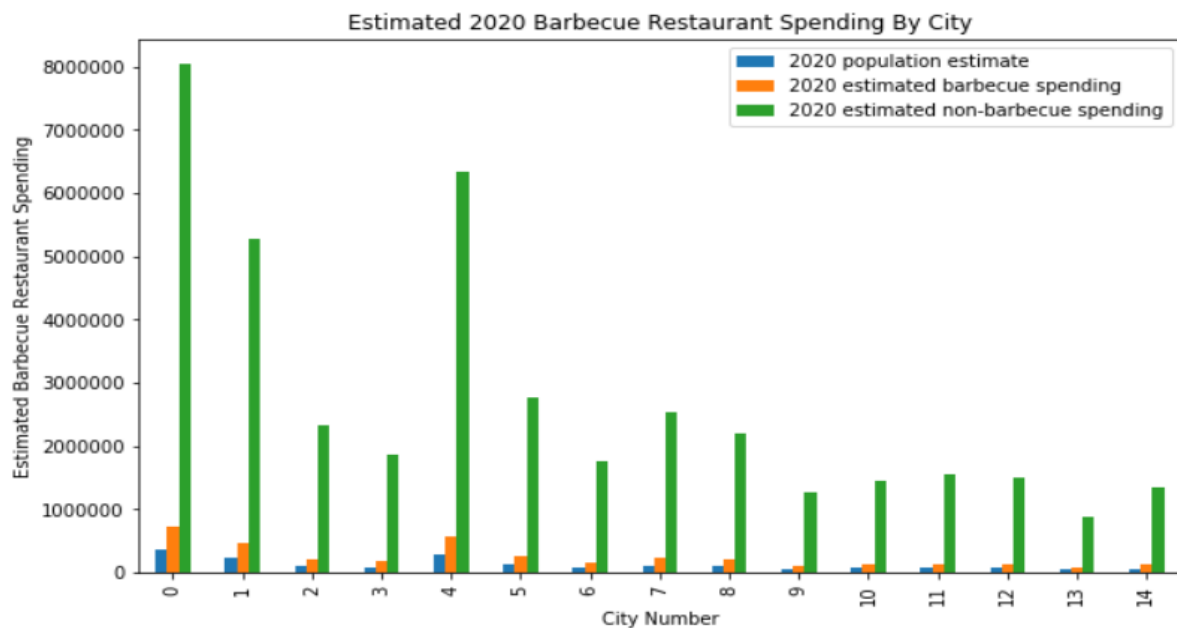
## 4. Results



When it comes to decade over decade population growth, estimates point to considering Clermont, FL which provides strong opportunities with 73.5% growth rates.



When it comes to decade over decade per capita income growth, estimates point to considering Clermont, FL which provides strong opportunities with \$43,934 estimate per capita income.



When it comes to spending on barbecue restaurants, estimates point to considering Tampa, FL which provides strong opportunities with \$730,551 estimated monthly market.

## 5. Conclusion

Even with more competition that is found within any other city Tampa, FL is still the best overall choice for opening a new barbecue restaurant. Having the desirable combination of steady population growth, average rise in per capita income but a market leader strength in barbecue restaurant spending for that population, Tampa is not only a popular barbecue destination it is a strongly recommended location for consideration for any potential new Central Florida barbecue restaurant in 2020 and beyond.

Purpose of this project was to identify Central Florida cities having locations close to their center with low number of competing barbecue restaurants in order to aid stakeholders in narrowing down the search for optimal location for a new barbecue restaurant.

By calculating restaurant density distribution from Foursquare data, we have identified cities that justify further analysis (Clermont and Tampa), and then generated extensive estimates of population growth estimates, per capita growth estimates and estimates on barbecue restaurant spending which satisfy some basic requirements regarding optimal cities for opening barbecue restaurants.

Final decision on optimal restaurant location will be made by stakeholders based on taking into consideration additional factors like visibility, parking, space size, crime rates, surrounding businesses, accessibility and affordability.

## 6. References

1. [https://en.wikipedia.org/wiki/Central\\_Florida](https://en.wikipedia.org/wiki/Central_Florida)
2. [https://en.wikipedia.org/wiki/List\\_of\\_Florida\\_locations\\_by\\_per\\_capita\\_income](https://en.wikipedia.org/wiki/List_of_Florida_locations_by_per_capita_income)
3. <https://www.bls.gov/news.release/cesan.nr0.htm>
4. <https://www.ers.usda.gov/webdocs/publications/90228/eib-196.pdf>
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10. <https://totalcommercial.com/territory/usa/florida/central-florida>
11. <https://foursquare.com/developers/apps>