

Alcohol Consumption Patterns in NYC

By: Sam Burns

Project Overview

The diversity of nightlife activity in New York City is as diverse as New Yorkers themselves: people go out for dinner or to see a show, or they are at home resting up after a long day, or maybe exercising to blow off steam.

Of course, many New Yorkers also like to spend their evenings drinking at bars and restaurants with their friends. But without knowing how many drinks are sold at each bar and restaurant in the city, it can be challenging to understand exactly where New Yorkers drink.

One way to spatially understand nightlife drinking culture in NYC would be to map every establishment that sells alcoholic beverages. But instead of relying solely on the spatial distribution of establishments that sell alcohol, I decided to incorporate observed human behavior into my analysis. The analysis that follows explores the raw distribution of drinking patterns in NYC through 311 complaint data as well as the relationship between drinking and dive bars in NYC.

Data and Methodology

Rather than attempting to conduct an on-the-ground study of drinking patterns through raw tallying, I decided to use a pre-existing data source that would include information about NYC's drinking culture. Naturally, I turned to 311.

311 is a service that New Yorkers use to lodge complaints (by phone or online) that require a response from a public agency. There are many kinds of 311 complaints, from fallen trees to rowdy neighbors. Because I was interested in where New Yorkers drink the most, I decided to look for complaints related to drunkenness. Sure enough, two complaint types, in particular, stood out from the rest: complaints of public drunkenness and complaints of public urination. Complaints of public drunkenness had the most obvious relevance to my study. I decided to also include public urination complaints since, though public urination may not always entail drunkenness, the two are often intertwined.

Next, I acquired a shapefile containing every neighborhood in New York City available via NYC Open Data. The neighborhood shapefile is a relatively straightforward spatial dataset containing the polygonal coordinates and dimensions of each neighborhood in NYC (although neighborhoods can be a relatively informal way to describe a geographic area, the NYC Department of City Planning groups census tracts into neighborhoods or "Tabulation Areas" for the agency's purposes.)

Before I could plot the 311 complaint data, I had to clean and filter the data and transform it into a spatial dataset. Complaints of drunkenness initially included instances of

underage drinking in establishments and these results were filtered out since they were not directly related to this study. I also kept only those complaints lodged between 8 pm and 4 am since these time periods roughly correspond to the hours during which nightlife activity occurs.

Finally, I split the 311 complaint data into two separate dataframes: one for public drunkenness (874 data points spanning from January 2010 to October 2018) and one for public urination (316 data points spanning from January 2010 to November 2018):

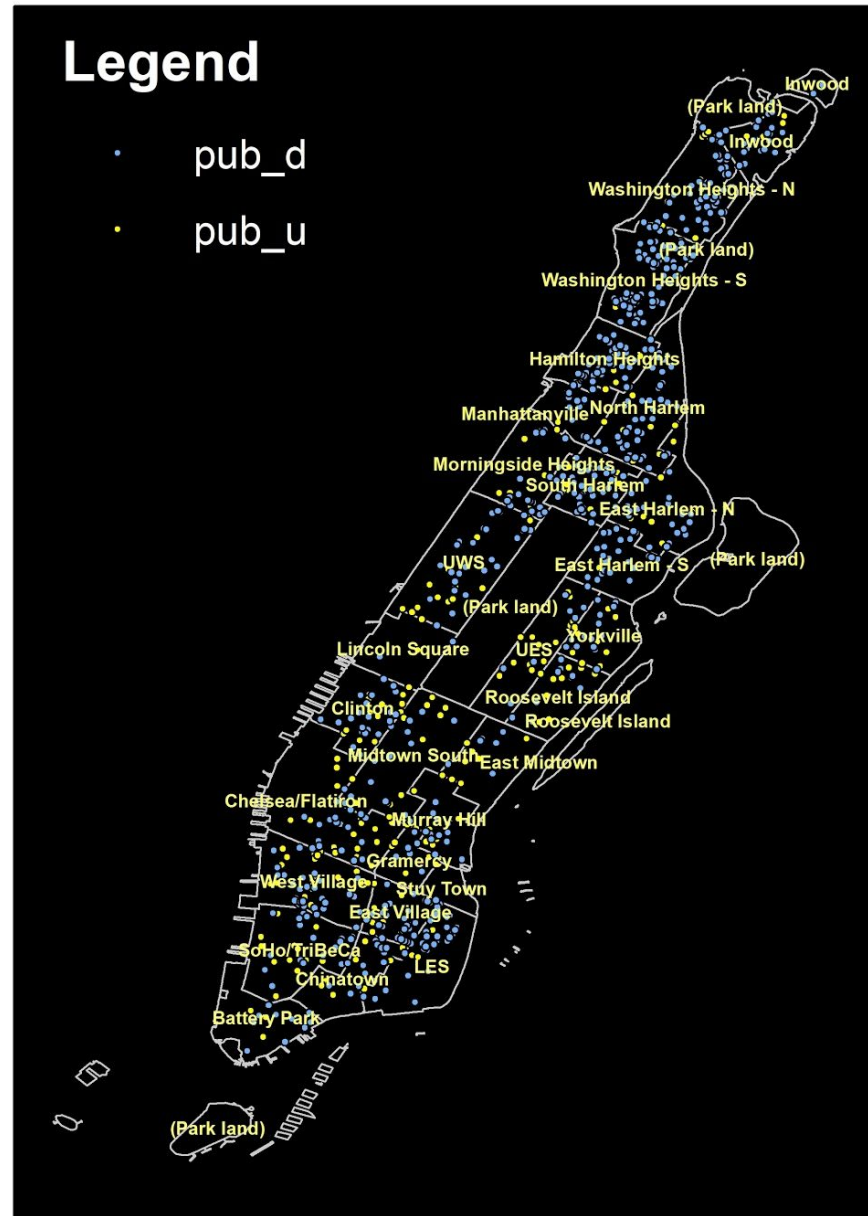
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0	ADDRESS	NYPD	New York City Police Department	1019370024	MANHATTAN	NEW YORK	2011-06-10T22:47:24.000	10 MANHATTAN	Drinking	2011-06-10 22:00:26
1	INTERSECTION	NYPD	New York City Police Department	NaN	MANHATTAN	NEW YORK	2011-06-15T04:23:45.000	09 MANHATTAN	Drinking	2011-06-14 23:55:29
2	BLOCKFACE	NYPD	New York City Police Department	NaN	MANHATTAN	NEW YORK	2011-06-15T22:50:15.000	10 MANHATTAN	Drinking	2011-06-15 22:10:21
3	ADDRESS	NYPD	New York City Police Department	1021420036	MANHATTAN	NEW YORK	2011-06-15T22:46:08.000	12 MANHATTAN	Drinking	2011-06-15 22:19:10
4	ADDRESS	NYPD	New York City Police Department	1009050056	MANHATTAN	NEW YORK	2011-06-15T23:09:53.000	06 MANHATTAN	Drinking	2011-06-15 21:50:16

	address_type	agency	agency_name	bbl	borough	city	closed_date	community_board	complaint_type	created_date
0	INTERSECTION	NYPD	New York City Police Department	NaN	MANHATTAN	NEW YORK	2011-06-08T07:35:03.000	12 MANHATTAN	Urinating in Public	2011-06-07 23:19:56
1	ADDRESS	NYPD	New York City Police Department	1007900045	MANHATTAN	NEW YORK	2011-06-15T23:10:55.000	04 MANHATTAN	Urinating in Public	2011-06-15 21:16:41
2	ADDRESS	NYPD	New York City Police Department	1015050022	MANHATTAN	NEW YORK	2011-06-15T22:07:02.000	08 MANHATTAN	Urinating in Public	2011-06-15 21:51:21
3	BLOCKFACE	NYPD	New York City Police Department	NaN	MANHATTAN	NEW YORK	2011-06-17T01:10:52.000	12 MANHATTAN	Urinating in Public	2011-06-16 21:49:18
4	ADDRESS	NYPD	New York City Police Department	1017520010	MANHATTAN	NEW YORK	2011-06-17T02:43:14.000	11 MANHATTAN	Urinating in Public	2011-06-16 22:51:22

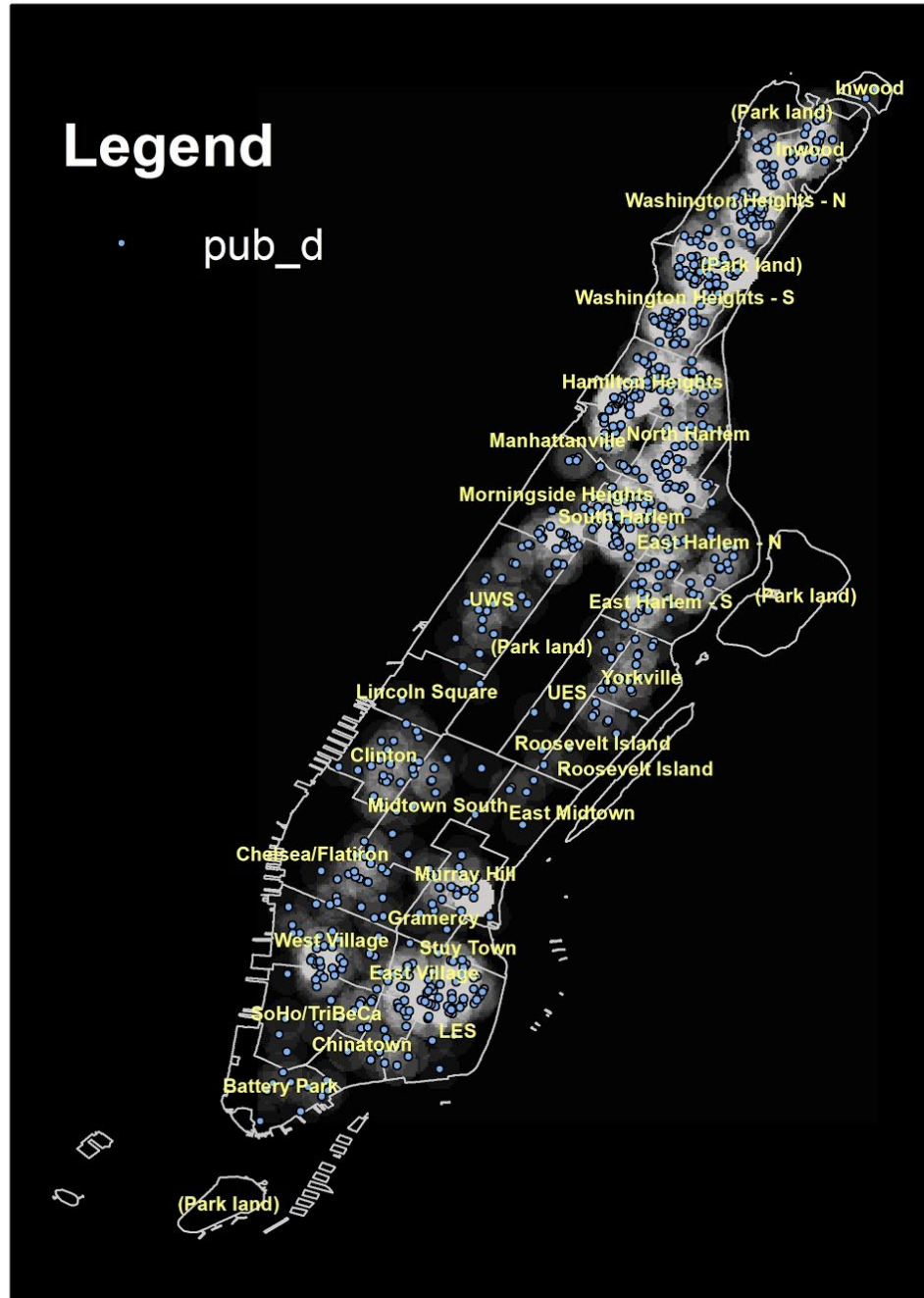
Lastly, using Yelp's API, I acquired a dataframe containing every bar in Manhattan categorized as a "dive bar" with the lowest price rating (one "\$" sign; 134 bars in total). I restricted my query to the cheapest bars because I wanted to see if there was a spatial correlation between cheap dive bars and instances of public drunkenness or public urination.

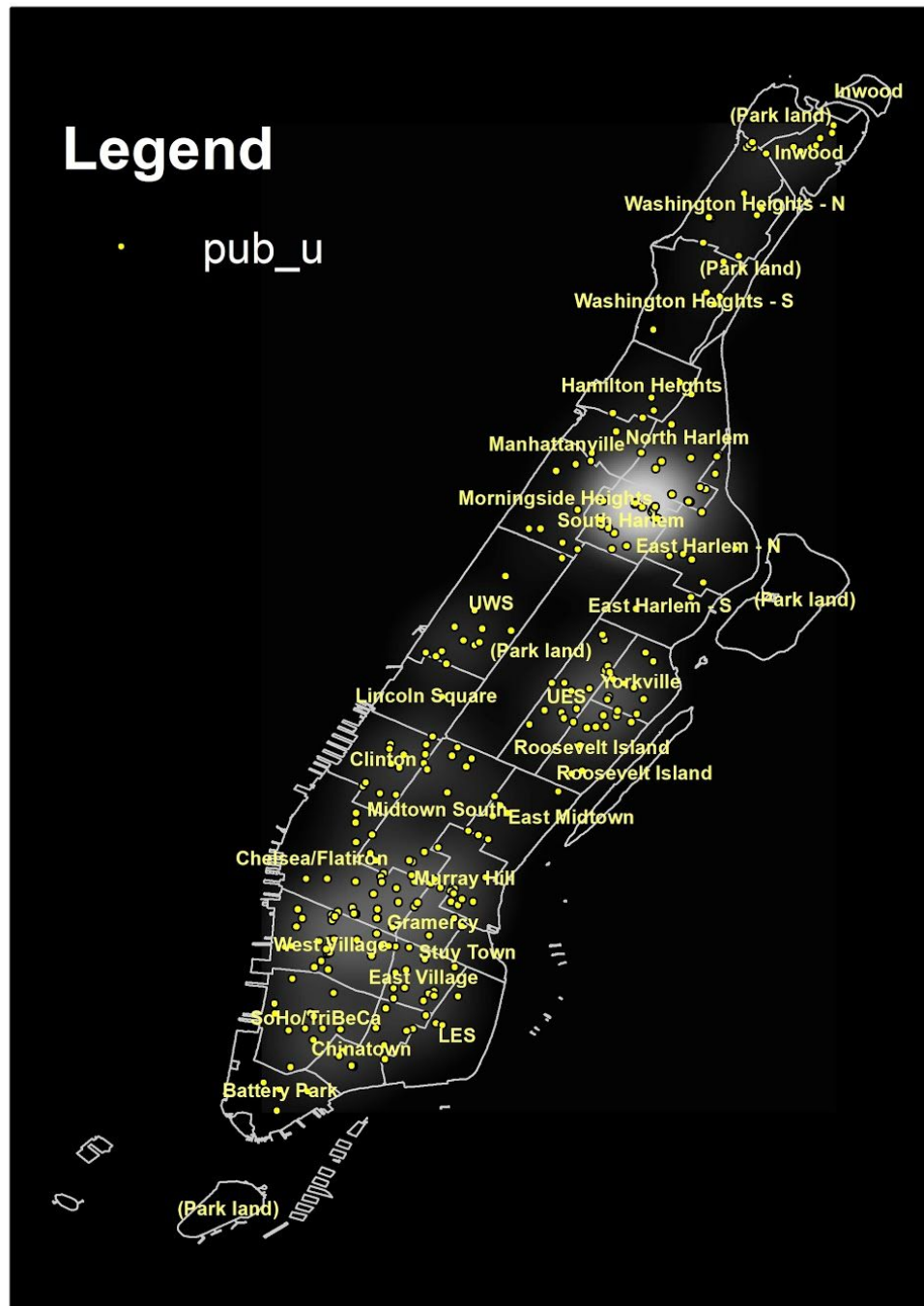
Spatial Analysis

With my spatial dataframes of public drunkenness and public urination, I created the following initial plot showing every 311 complaint:



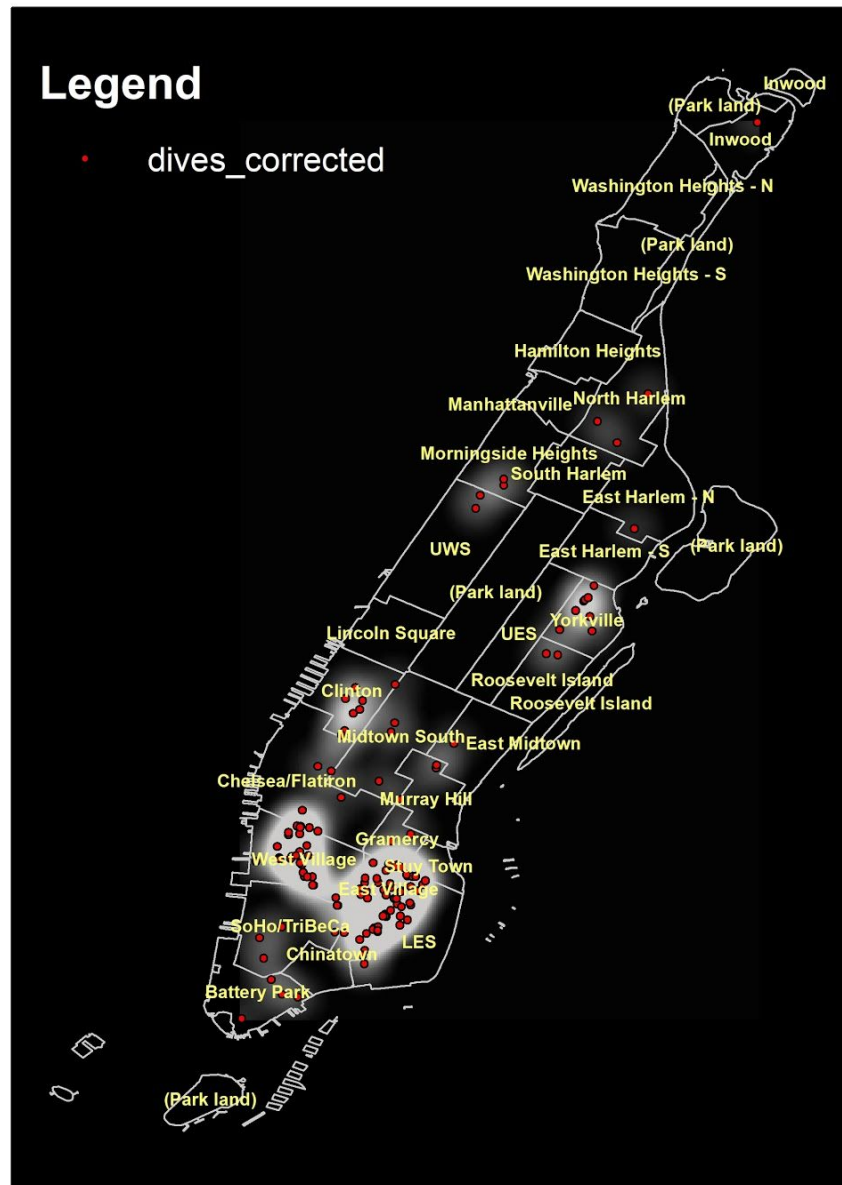
Next, I created separate kernel density visualizations for each complaint type:



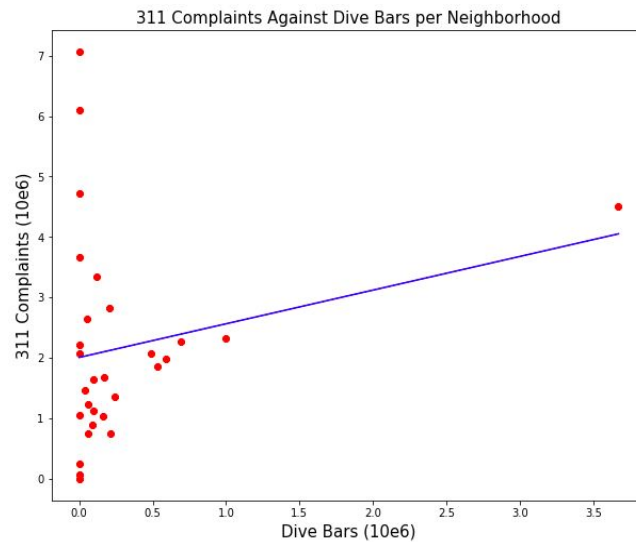


Although I initially expected to see more complaints lodged in lower Manhattan, especially near the Lower East Side, which is commonly referred to as being a neighborhood where people go to drink in bars and clubs, we can see from both plots that there is a larger concentration of complaints in upper Manhattan north of Central Park.

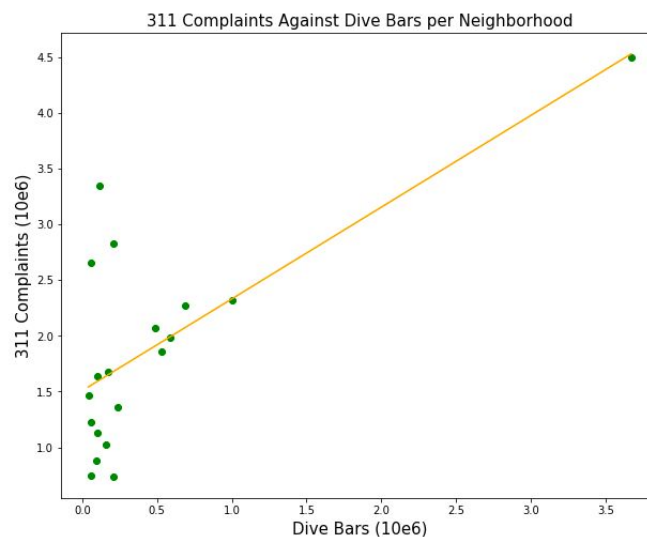
Next, I plotted the density of dive bars in Manhattan:



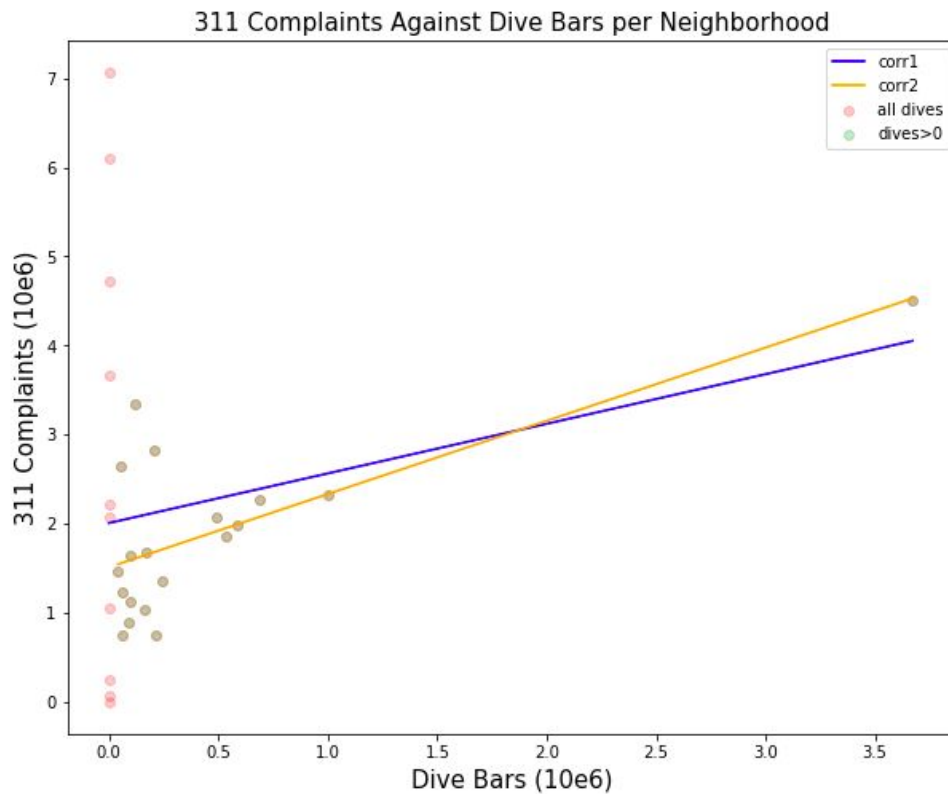
Here we can already tell from the plot that there is at least some overlap between the distribution of public urination and dive bars in Manhattan. I wanted to confirm the presence of correlation by finding the number of 311 complaints for drunkenness and public urination per unit of neighborhood area (based on the shapefile's polygon shape areas) as well as the number of dive bars per neighborhood using spatial joins. I scaled those figures up by a factor of 10^5 (for ease of interpretability) and then fit an ordinary least squares linear model between the 311 complaint per neighborhood and dive bar per neighborhood data sets. The resulting model showed a positive correlation of .55:



But the the model had a p-value of .234. Under the commonly accepted alpha level of .05, we would conclude that the correlation is not statistically significant. However, when fitting a second OLS model to neighborhoods with at least one dive bar, we find a statistically significant positive correlation of .82 (p-value of .001):



The following is a plot of the two models applied to the same axes scales:



Conclusion and Implications

Based on the distribution of public drunkenness, public urination, and dive bars in Manhattan, we can say that for New Yorkers who go out to drink at night, many of them prefer to do so in Lower Manhattan and north of Central Park. We can also conclude that there is a positive correlation between the number of 311 complaints relating to public drunkenness and public urination depending on the number of cheap dive bars in a neighborhood (as long as that neighborhood has at least one cheap dive bar). Still, although there is a correlation, there may be many other factors that explain an increase in 311 complaints for a particular neighborhood. For example, the average age of neighborhood residents likely plays a large role in the number of 311 complaints filed.

This analysis could be further used for specific urban planning projects. Earlier this summer, news outlets reported on the addition of public urinals to city streets in areas where public urination was especially problematic ("Eco-friendly open-air urinals cause uproar in Paris"). Officials in NYC who are interested in implementing a similar project could utilize this spatial analysis to decide where public urinals should be placed. Doing so would promote better sanitation and fewer cases of indecent exposure.

Limitations

A relatively minor limitation concerning my analysis is that I restricted my analysis to 311 complaints specifically made against public drunkenness and public urination. Of course, it is possible that other 311 complaints may also have been related to drunkenness ("Emergency Response Team (ERT)" and "Miscellaneous Categories," for example), however, no other complaint types were clearly tied to alcohol consumption, specifically.

A much more significant limitation of this study is the fact that 311 complaints are an imperfect metric for measuring drinking activity. The fact that more complaints were filed for public drunkenness in one neighborhood than another would suggest that people in that neighborhood drink more. But it could also simply be the case that more people in that neighborhood are more prone to filing complaints. Or that neighborhood may have certain structural factors in place that tend to cause people to drink on the street rather than at home or inside an establishment.

Work Cited

Yeung, Jessie. "Eco-friendly open-air urinals cause uproar in Paris." *CNN*, 14 Aug. 2018, <https://www.cnn.com/2018/08/14/europe/paris-urinal-intl/index.html>. Accessed 20 Nov. 2018.