BIKE LANES & BEYOND
Reimagining Bikeability in New York City

Introduction
Home to over 1.5 million bicyclists, New York City is a hotbed for bike infrastructure, boasting an ever-expanding network of bike lanes for which there are plenty of maps. However, not all bike lanes are created equal, and not all biking takes place in a bike lane. Unfortunately, typical bike maps don’t provide much more info than simply where bike lanes are located.

The goal of this project is to categorize different areas of New York through a number of factors indicating the quality of bicycling, from bike lane accessibility to quality of pavement to number of complaints made about bike lane obstructions. When I bike, I have a long list of details that influence which streets I like to travel on, and I would like to highlight those less popularized but often highly important factors.

This project reveals how areas of New York measure up in bikeability, and will hopefully show where future bike infrastructure projects should occur in order to ensure better biking citywide.

Methodology
For this project, community districts (CDs) were used as the statistical boundaries for calculation, as they are reasonably sized, comparable subdivisions of the city.

All fields were calculated using spatial overlays with CD boundaries as polygons. Lane length was calculated and summed by district, which was normalized by CD area. Average distance from a bike lane was calculated with a Euclidian distance tool, with average values found using zonal statistics. For crash and lane obstruction data, spatial overlays were used to find the number in each CD, with complaint data normalized by lane mileage and crash data normalized by CD area. For pavement rating, spatial overlays were used to find the average value of rating by CD.

Bikeability in Action
A biker is forced into traffic while a police car obstructs the bike path. In high volume downtown areas, vehicular obstructions like this are a common occurrence.

These maps show that while many areas of New York have better dedicated bike infrastructure, no one area is perfect. In fact, only three CDs had a favorable Z-score (a positive Z-score for pavement and lane mileage in 6, negative for all others) across every measure (Manhattan CD 10 and Bronx CD 1 and 2). Take a look at a few CDs of interest to get an idea of how these maps can be informative:

### Bronx CD 1
By bike lane density, Bronx CD 1 has 4.5 lanes per square mile, a near average rating. However, its average distance from a lane at any point is 0.07 miles, so its lanes are relatively well spaced among CDs. As seen here, a bicyclist is rarely far from a bike lane, somewhat correcting for a low bikeability caused by low-level pavement quality.

### Manhattan CD 6 and Brooklyn CD 1
These CDs seem to be great places to bike by bike lane analysis. However, biking around is complicated by relatively low pavement quality on its streets, high crash rates, and frequent bike lane obstructions, so they might not be the best areas to bike.

### Queens CD 1 and 2
A large limitation for this study is that outside of Manhattan, rider sharing statistics are not readily available, so statistics like crashes and obstruction complaints could not be normalized for number of bicyclists. Due to this, comparing things like obstruction complaints between Manhattan and Staten Island isn’t totally feasible, as there are many fewer bikers riding in Staten Island who would call 311. However, even in Queens CD 1 and 2, which both have mid-range bike lane access, obstruction complaint frequency is high, implying that there are both frequent obstructions and a lot of bikers complaining about them in these areas, suggesting that these CDs could be areas of focus for improving bike infrastructure.

While these maps paint a better picture of bikeability around New York, they still don’t tell the whole story. There are more bikeability measures that are harder to account for, like traffic light timing and driver attitudes toward bicyclists. I hope that this project can give an idea of areas of focus for bike infrastructure development in New York, and that the next time you plan a bike ride, bike lanes won’t be the only factor that will influence the route you take.

Results and Conclusion

Community Districts
Shown here are community district numbers and boroughs of New York City. They are provided for individual and analytic reference.

Bike Lane Mileage
CDs here are represented by miles of bike lanes per square mile. While this is a good measurement to see, this study hopes to go deeper.

Pavement Rating
CDs are shown here by average pavement rating on a scale of 1-10 given by the city. By their rating, a rating of 1-4 is poor; 5-6 is fair; and 8-10 is good. Streets rated 7 received fair and good ratings. Bad pavement can make a street dangerous for bikers.

Links to Bikeability in Action
- [Flickr user nkhakka](https://www.flickr.com/photos/nkhakka/7966410338)
- [NYPD traffic data](https://data.cityofnewyork.us/Community-Districts/CDs-by-Bike-Lane-Mileage-and-Pavement-Rating-6G5J-2PSV)
- [OpenStreetMapContributors](https://www.openstreetmap.org)

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*All data used for bikeability measurements was obtained from NYC Open Data at [https://data.cityofnewyork.us](https://data.cityofnewyork.us). Accessed between October 10-15, 2017*

*OpenStreetMap Credits: OSM, OpenStreetMap contributors, and the GIS user community*

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