The Socioeconomic Effects of Hurricane Events in New York City

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Background

- With increasing frequency of hurricanes and storms, the health, safety, and welfare of residents in New York City are at risk.
- As a result, this study is focused on the frequency, location, and socioeconomic impact of street floods before and after a major hurricane event affects New York City.
- Our data will be derived from the National Climatic Data Center (NCDC) and NYC Open Data. The NCDC receives daily precipitation within Central Park, LaGuardia Airport, and JFK Airport from 2011 to the present. NYC Open Data is accessible to the public and provides 311 calls service requests.
- With this, an analysis can be conducted on the correlation and patterns between the calls reporting street floods or catch basin clogs, and the precipitation data found on the NCDC.
- This provides the opportunity to identify which locations are more severely affected or vulnerable to flooding.
- The ways city's residents experience these effects can also be analyzed. These might include, but are not limited to infrastructural issues such as inefficient drainage systems, negative impacts on the welfare of New Yorker's and other factors.

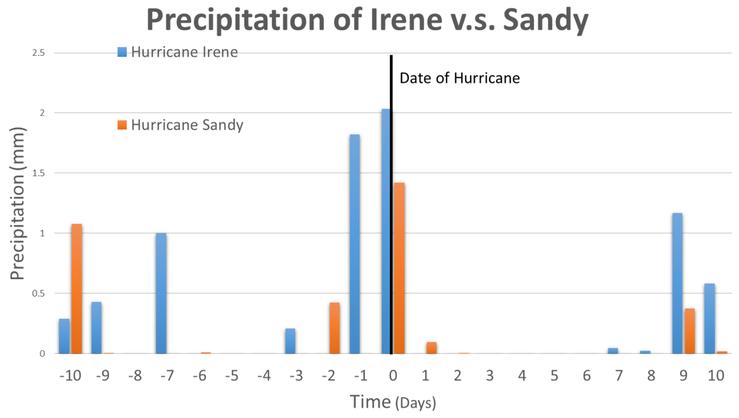
Research Objectives

- Determine how hurricanes affect the city and its residents.
- Determine what are the most affected areas by flooding in New York City.
- Investigate where residents complaint more about flooding to 311 calls service request.
- Analyze the causes of floods in non flooding areas on the city.
- Analyze why some areas are less likely to complaint about flooding than others.

Methods

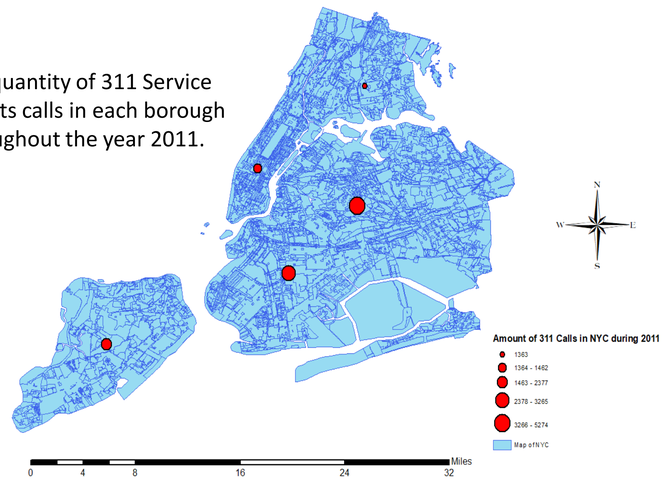
- Used Rstudio programming to statistically analyze 311 calls service requests provided by NYC Open Data.
- Analyzed the relevant patterns and correlations on the selective data.
- Displayed this on ArcGIS to create spatial visualization from the results obtained.

Results



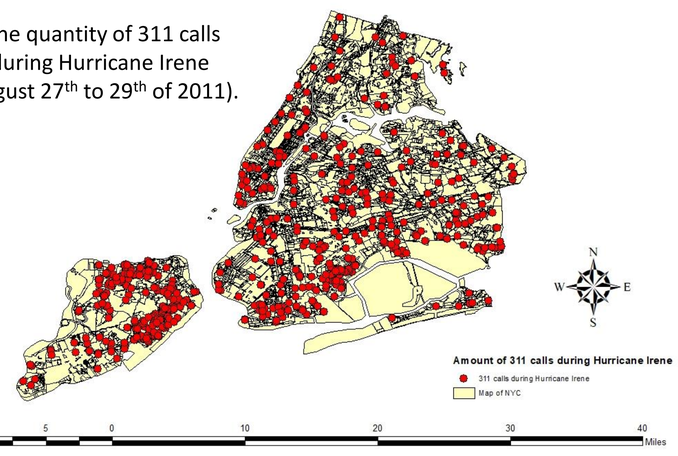
Amount of 311 calls in 2011

The quantity of 311 Service Requests calls in each borough throughout the year 2011.



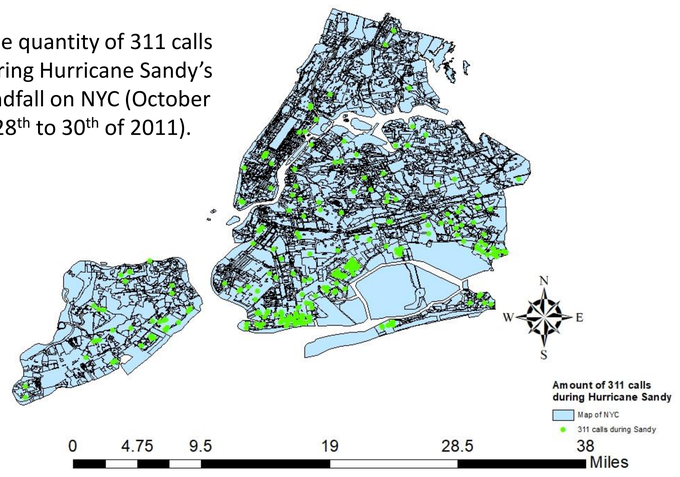
311 Calls During Hurricane Irene

The quantity of 311 calls during Hurricane Irene (August 27th to 29th of 2011).



311 Calls during Hurricane Sandy

The quantity of 311 calls during Hurricane Sandy's landfall on NYC (October 28th to 30th of 2011).



Conclusions

- Through data cleaning techniques, 3.9% of the 2011 data was inapplicable with our spatial analysis as well as 3.1% of the 2012 data.
- Storms have their own unique characteristics and are influence by different dependent and independent factors.
- For instance, Hurricane Irene had a higher level of precipitation than Sandy. For this reason, we can observe on the 311 NYC calls during the calls had a greater distribution around the boroughs during hurricane Irene. On the other hand, Hurricane Sandy has less precipitation, but a higher storm surge affecting more severely the coastal areas.
- Out of the four city boroughs, Queens is the most vulnerable to flooding effects from storm, while the Bronx proves to be the least vulnerable borough.

Future Work

- Expand the scope of this research to cover other negative effects of hurricane events.
- Provide information that could be use to alleviate the aftermath of a hurricane affecting the city.
- Continue research on street floods in New York City.
- Study more in detail the frequency of Hurricanes striking directly NYC.
- Research on the income level of the most affected areas on in city borough.
- Determine whether there is a correlation between income level and to the frequency of reporting of flood related incidents.
- The impacts that street flooding has on infrastructure and human welfare in vulnerable area.

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