

Final Project Proposal

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+ Problem/Question

// Option 1

Problem: Climate Change, more extreme weather, sea levels rise - increased frequency of flooding

Purpose: Information on Flood Risk + Community Preparedness (Evacuation)

In the event of a hurricane in NYC, let user know if they are at risk (within flood zone); if so, give him/her addresses of the closest hurricane evacuation centers/ subway stations + directions/routes to get there

// Option 2

Problem: Rising Flood Insurance Costs

Context:

The National Flood Insurance Program (NFIP) was created by Congress in 1968 as a response to the lack of affordable disaster assistance and private insurance. The NFIP is currently managed by FEMA, with the aim to reduce the impact of flooding through the provision of affordable insurance to property owner, and education of communities on flood risk mitigation and floodplain management. Historically, a portion of NFIP policyholders have received subsidized premiums without being means-tested. After Hurricane Katrina in 2005, NFIP was found to be in debt to the US Treasury, with the debt at \$24 billion as of 2013. This led to concern over FEMA flood maps and NFIP premiums not accurately reflecting risk. A new legislation, the Biggert-Waters Flood Insurance Reform Act was signed to phase out these discounted premiums, and transition towards a risk-based pricing structure. The argument for risk-based premiums was that it would improve NFIP's financial basis and enable it to be self-sustaining. However, this new legislation, along with updated flood hazard maps, many policyholders see huge increases in their insurance premiums. This leads to concern over the affordability of flood insurance.

Purpose: Information on Flood Risk + Insurance

Help users understand flood risk in NYC with visual simulation of flood and/or give a guesstimate (using basic regression model) of insurance premiums for residential buildings (by census tract)/ or compare (un)affordability of flood insurance premiums by census tracts

+ The data

NYC Hurricane Evacuation Centers

NYC Subway Entrances/ Stations

NYC Floodplain

Census/ ACS demographic/ housing characteristics data

MapPLUTO data - land use/ building heights/ basements

NFIP premium data to make regression model (county level)

etc.

+ Technologies used

MapBox

Mapzen

CARTO (analysis)

Turf

jQuery

underscore

<https://www.mapbox.com/help/enabling-terrain-visualization/>

<https://www.mapbox.com/blog/3d-features-in-mapbox-gl-js/>

<https://www.mapbox.com/mapbox-gl-js/example/mapbox-gl-draw/>

<https://www.mapbox.com/mapbox-gl-js/example/animate-point-along-line/>

<https://www.mapbox.com/bites/00258/>

<http://www.chartjs.org/>

<https://mapzen.com/products/search/>

<https://mapzen.com/documentation/turn-by-turn/api-reference/>

+ Design spec/ User Experience

Option 1:

In the event of a hurricane in NYC, let user know if they are at risk; if so, the closest hurricane evacuation centers + routes

<https://www.floodzonenyc.com/>

<http://www1.nyc.gov/assets/em/html/know-your-zone/knowyourzone.html>

Type in Address/ Locate current location

Inform user:

-if they are within the 100-year floodplain

-the closest hurricane shelter/ subway station entrances

-subway station entrances that are within floodplain

-route to closest hurricane shelter (with option of route outside of floodplain if possible)

Option 2:

Help users understand flood risk in NYC with visual simulation of flood and/or give a guesstimate of insurance premiums for residential buildings (by census tract)

Terrain Map of NYC/ 3D buildings

Flood simulation

(<https://www.propublica.org/nerds/item/how-we-made-the-3-d-new-york-city-flood-map>) <- something like this?

Identify buildings that will be flooded

Allow user to draw polygons to calculate areas - building footprints/ flood zone area

Inform user of flood zone designation

If possible: highlight residential buildings in NYC (or limit to Rockaway Peninsula) - using census tract demographic/housing characteristics data - as variable inputs into regression model to inform user a "predicted" estimate of NFIP insurance premium of the particular building

+ Layout

- Header bar to type in current address/ locate current address
- Pop-out sidebar for additional functions/ information (charts/ drawing polygons. display area etc.)
- Pop-up Modal for Evacuation Centers addresses

+ Anticipated difficulties

- Cleaning datasets to desired format
- Limiting dataset size
- Loading multiple datasets (slow performance)
- Insufficient data on insurance premiums
- Learning new technologies/ tools
- Combining new technologies/ tools - trial and error
- Regression model to predict NFIP premiums

+ Missing pieces

- 3D visualizations (extrude)
- CARTO analysis (unlimited)
- animation
- topography/terrain maps