High Ground, Hot Property: Mapping 'Climate Gentrification' in Miami-Dade County, Florida

Introduction

Climate change will increase the risk of flooding and inundation in Miami-Dade County. The 2015 Unified Sea-Level Rise (SLR) Projection study, a comprehensive analysis of multiple climate prediction models, predicts short term (2030) sea level rise between 6 to 10 inches above 1992- mean sea level, 14 to 34 inches in the medium term (2060) and 31 to 81 inches in the long-term (2100). In Miami-Dade County, Florida, the highest property values are for those properties nearest the ocean. However, as sea level rises and increases potential property damage due to flood and inundation risk, coastal property is expected to lose value. Due to discriminatory housing and urban planning throughout the 20th century, low-income minority communities live in the urban core, which lies at higher elevations, such as Miami Gardens. As wealthier low-lying communities are increasingly at risk of climate –induced flooding and move toward higher elevation, they will likely displace low -income, minority communities. This project aims to map which communities are most at risk of climate-induced flooding and which communities are potentially at risk of climate gentrification. 'Climate gentrification' is defined as the displacement of incumbent, low-income communities of color due to low property values and the fact that the property is on relatively higher elevations than wealthier neighborhoods more at risk of flooding. Gentrification is a well understood phenomenon within urban studies, as is climate-induced flooding. However, little research has considered how climate change will exacerbate the conditions of gentrification and housing inequality.

Methods & Data

First, a literature review was undertaken to determine what the existing literature considers when looking at potential threats of gentrification. Welch (2013) identifies a number of potential neighborhood-level factors that might portend possible gentrification including racial demographic, median income of neighborhoods and adjacent neighborhoods, access to amenities and services such as public transit. My research only relies on a handful of the potential metrics that this paper used. My research relied on the Southeast Florida Regional Climate Change Compact Sea Level Rise Working Group (2015) to determine what the potential for climate-induced, sea-level rise was in Miami-Dade County. The report synthesizes three different model projections (IPCC AR5, USACE High-Scenario, and NOAA High) to show that between 2030 and 2100, sea-level rise is expected to be between 6 to 81-inches above 1992-mean sea-level. For this project, I assume that sea-levels will rise 24 inches above 1992-mean by 2060, a level that falls within the high-probability scenario. Data for this project was taken from a number of sources. Demographic data including racial makeup, median income, and education status is from the 2012- 16 ACS 5-year estimate.

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Projected Coordinate System: NAD 1983 NSRS2007 UTM Zone 17N

Data Sources: NOAA SLR (2012) https://coast.noaa.gov/slrdata/, SVI (2014) https://svi.cdc.gov/map.aspx, US Census Bureau ACS (2016) https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml, Florida Parcel Data (2012)—Florida Dept of Revenue https://www.fgdl.org/metadata/fgdc_html/parcels_2012.fgdc.htm. Metrorail & Trirail Stations, Miami-Dade County GIS Office, http://gis-mdc.opendata.arcgis.com/

References: Welch, Nicolas. (2013). "City for All? A Geospatial Approach to Equity, Sustainability, and Gentrification in Seattle, Washington." Tufts UEP Master's Thesis

Southeast Florida Regional Climate Change Compact Sea Level Rise Working Group (2015). "Unified Sea Level Rise Projection for Southeast Florida." Prepared for the Southeast Florida Regional Climate Change Compact Steering Committee.

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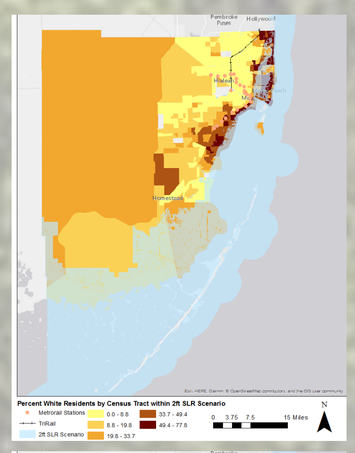
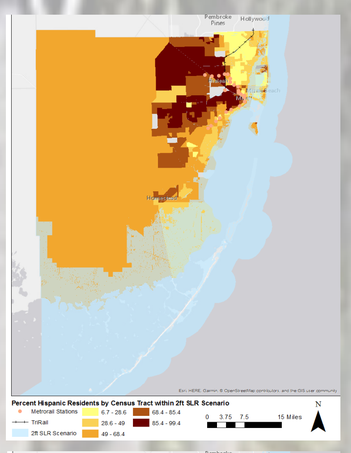
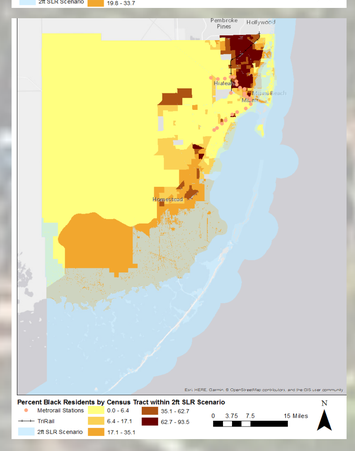
Projected sea-level rise data is available from the 2012 NOAA Coast Services Inundation database. This data layer measures inundation levels for predicted sea-level rise from 1 to 6 feet. Parcel data from 2012, including classification and just assessed value, was published by the Florida Department of Revenue. Additional data on Metrorail stations, bus stops and major roads was published by the Miami-Dade County GIS office. Finally, the Social Vulnerability Index (2014), compiled by the CDC, measures social vulnerability for every census tract based on 14 social factors and indicators, grouped into 4 themes. For this research I use the Housing/Transportation theme.

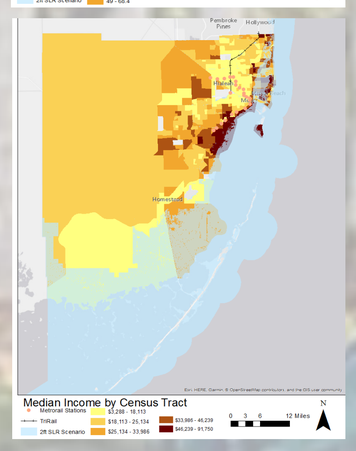
Demographic Survey

The following maps depict a 2ft SLR scenario overlaid with racial census-tract level demographic data along with median income. The maps illustrate that predominately affluent, white neighborhoods are most at risk from 2ft of sea-level rise. We see that while predominantly affluent, white neighborhoods along the coast line will be most effect by 2 feet sea-level rise, less affluent, Hispanic and black communities are less likely to be affected by rising sea-levels.







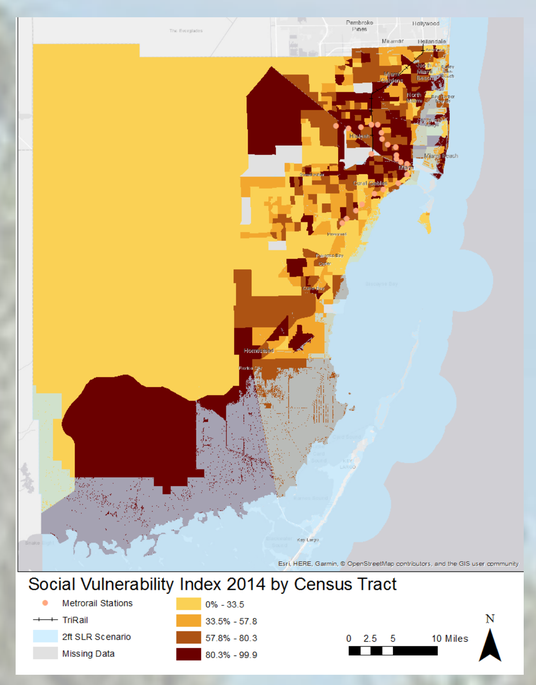


Assessed Value of Affected and Non-Affected Property

	In 2-feet SLR Zone	Within 1/4-mile of 2-feet SLR Zone	Outside 2-feet SLR Zone
Mean Value of Residential Property	$1,282,433	$371,133	$205,646
Median Value of Residential Property	$600,000	$458,562	$123,458
Mean Value per Square-	$88.15	$38.38	$29.41
Total Value of Residential Property	$12,422,928,377	$36,458,682,019	$90,894,113,391
Mean Social Vulnerability Index	.63	.62	.76

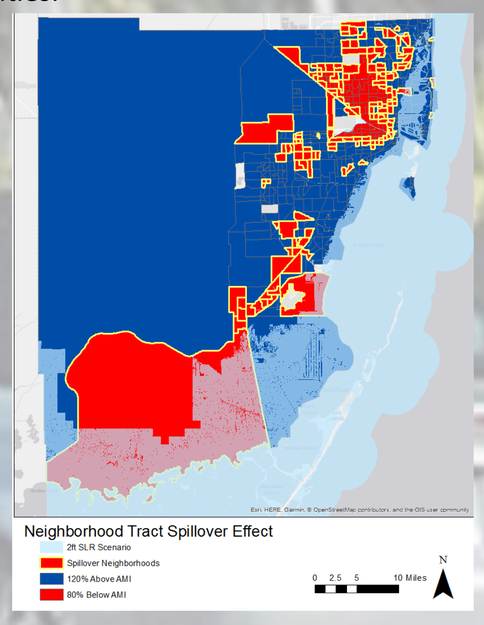
Social Vulnerability Analysis

The Social Vulnerability Index (SVI) is compiled by the CDC using five-year ACS data. It indicates the relative vulnerability of every census tract based on 15 social factors, grouped into four themes. This research relied on the theme of Housing/Transportation. The higher percent a community was in, the more vulnerable that it was in the aftermath of natural disasters, including flooding. We see that relatively more vulnerable communities are outside the 2ft SLR zone.



Neighborhood Spillover

Borrowing from Welch (2013) and Kolko (2007), I map the so-called 'spillover neighborhood effect', or the potential risk of gentrification of lower-income neighborhoods adjacent to higher-income neighborhoods. The map below shows that with the threat of 2 feet of sea-level rise, low-income neighborhoods immediately adjacent to wealthier neighborhoods might be at a higher risk of gentrification as populations move inland. These adjacent communities are predominately minority communities.



Conclusion

This research attempts to map the increasing threat of climate gentrification in Miami-Dade County, Florida. Climate gentrification will increase as wealthier communities along the coast move in land in order to avoid flooding and inundation risk. With demographic data, we see that wealthier, white communities along the coast are more at threat of climate induced flooding. This research would have benefited from more up-to-date data sources for a number of measures.