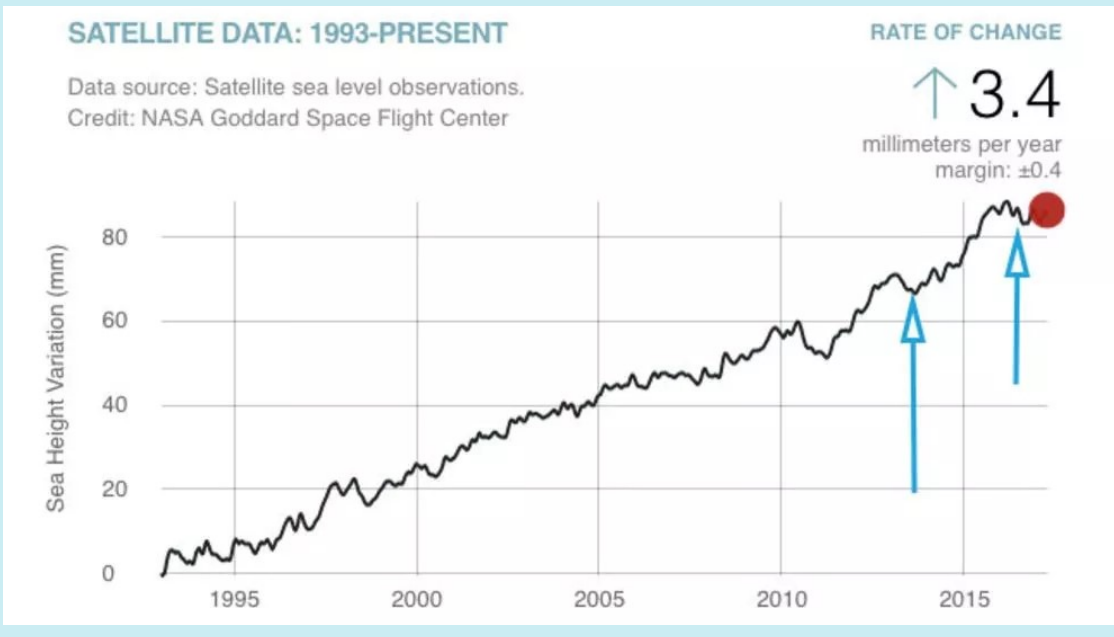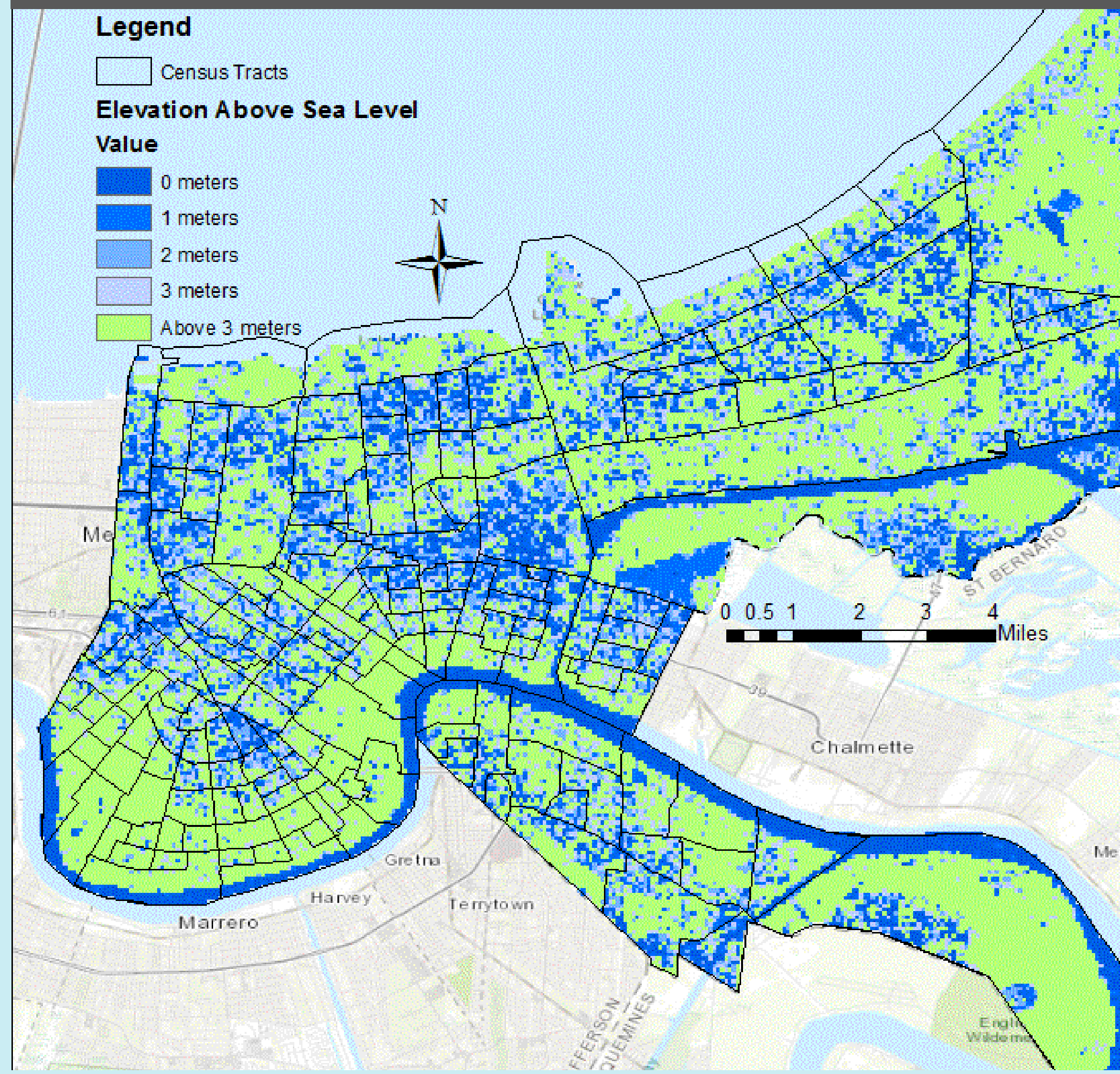# ENVIRONMENTAL JUSTICE AND CLIMATE CHANGE IN NEW ORLEANS

INTRODUCTION

Recent studies in climate change science reveal that the sea level is rising at average 3mm per year, displayed in the graph to the right. This model estimates that within 100 years, the sea will be 3m higher than its current state. As the ocean level rises, communities that live near or below sea level will be forced to leave their homes. Historically, low income and high minority communities are the first to be affected by climate related disasters. This was especially prevalent during Hurricane Katrina in 2005, where poor black neighborhoods were disproportionately devastated. Causes for this include a lack of mobility and means to evacuate, and the results of discriminatory housing policies: by the time banks started to loan money to African Americans seeking to buy a house, the high ground areas had already been taken by white residents.
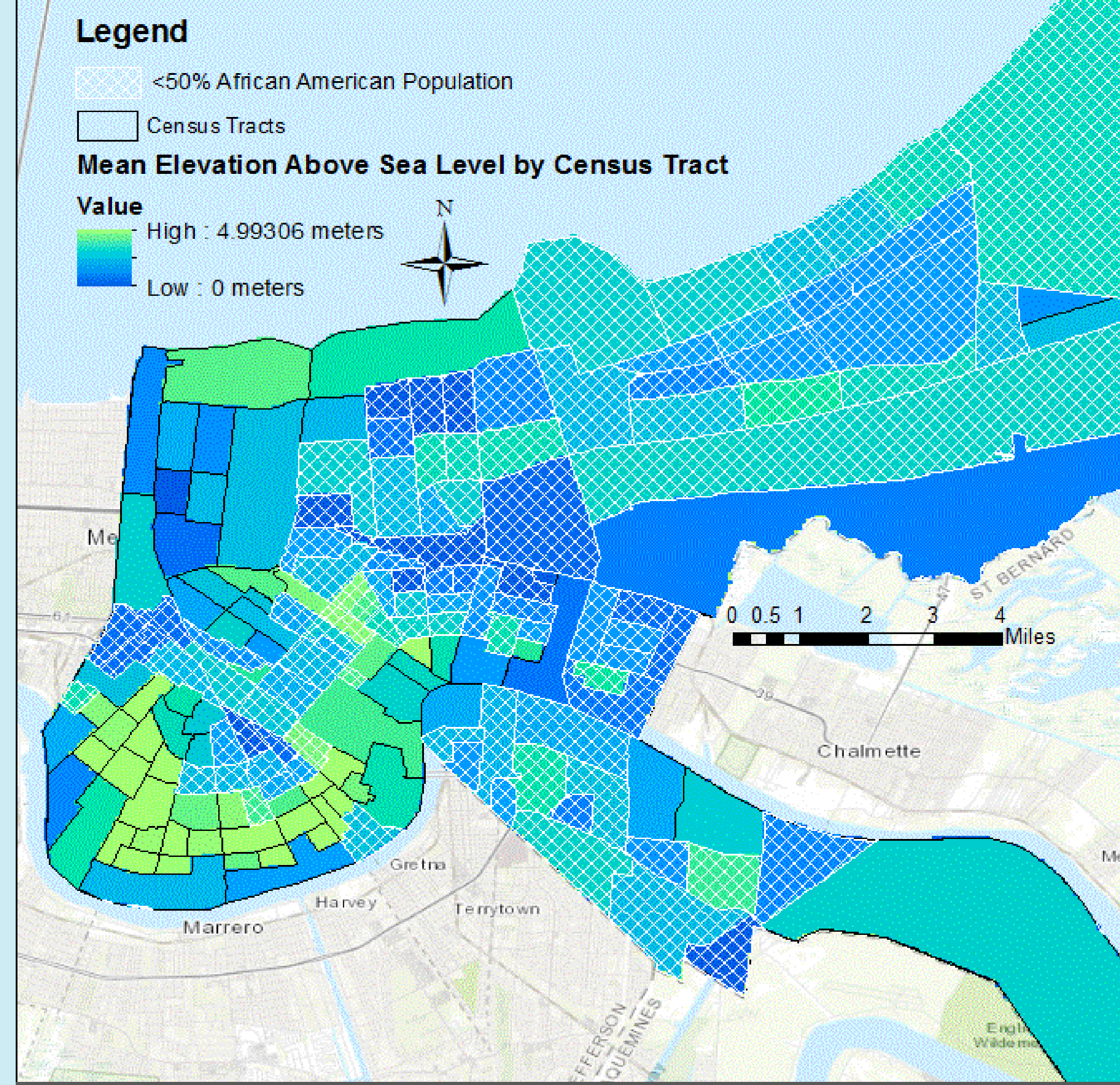
After seeing the unjust impacts from Katrina, I wanted to see if the predicted sea level rise would have a similar effect in the future on black and low income communities. New Orleans is a perfect case study on mapping the intersection of environmental inequality and race. With 61% of the population African American and average elevation less than 2 meters above sea level, I wanted to explore if the upcoming dangers of sea level rise fall disproportionately on low income or black communities.

SATELLITE DATA: 1993-PRESENT
RATE OF CHANGE
↑ 3.4 millimeters per year margin: ±0.4
Data source: Satellite sea level observations.
Credit: NASA Goddard Space Flight Center

ELEVATION ABOVE SEA LEVEL

Legend
- Census Tracts

Elevation Above Sea Level
Value
- 0 meters
- 1 meters
- 2 meters
- 3 meters
- Above 3 meters

0 0.5 1 2 3 4 Miles

<50% AFRICAN AMERICAN COMPARED TO RISK OF SEA LEVEL RISE

Legend
- <50% African American Population
- Census Tracts

Mean Elevation Above Sea Level by Census Tract
Value
- High : 4.99306 meters
- Low : 0 meters

0 0.5 1 2 3 4 Miles

DATA AND METHODS

Data: I obtained elevation data from the Tufts GIS Country Data, and used STRM Elevation (Western North) from ESRIDataMap10 folder. For the New Orleans boundary, I acquired the city of New Orleans shapefile from the city of New Orleans GIS website. For information on income and race, I downloaded New Orleans census data on mean income and racial makeup per census tract.

Methods: I clipped the elevation layer to the New Orleans shapefile. To see the areas that would be most affected I did used the Raster Reclass tool to reclass the elevation raster to 0, 1, 2, 3, and <3 meters above sea level. I used Zonal Statistics to calculate the mean elevation data per census tract using the elevation raster as the input and census tracts as the input value raster. This new layer shows the mean elevation per census tract. To add the census data which came in the form of an excel spreadsheet, I cleaned and formatted the spreadsheet, saving only the attribute for mean income, race, and GEOID so I could add it to ArcMap. Once in ArcMap, I joined the census tract shapefile to the census data table by GEOID. I exported that new layer, and selected for attribute the census tracts with more than 50% African American population. I looked at the attribute table for median income and found the cutoff for the bottom 50% mean income in New Orleans of <~$45,000. I selected by attribute of the census tract with census data for median income, and exported that layer. I then overlaid the >50% African American layer with elevation by census tract, and did the same for bottom 50% income layer.

Sources of Error: Mean elevation is not a precise way to determine flood risk; structural protection such as levy's are not included in the elevation calculation. Some census tracts also include bodies of water such as rivers which can skew the comparative elevation. The median income is also an imprecise way to determine wealth, a single person household will have a much smaller income than a family.

RESULTS AND CONCLUSION

While creating the risk of sea level rise maps, I was unsure if there would be correlation between race, income, and low elevation. Seeing the results from these maps however confirm my hypothesis that most of areas threatened by sea level rise are a majority black and lower income. The areas with the highest mean elevation and least susceptible to flooding are displayed in yellow-green, while the most low elevation tracts at risk of flooding are displayed in a deep blue. The tracts with the least risk of flooding are mostly clustered and majority white even though New Orleans is 61% African American. There are a few tracts that do not confirm this hypothesis (which may be due to errors in the calculation process) but the overall majority of low risk areas are white and wealthy, while high risk tracts are low income and black.

It is not coincidental that these high elevation areas are also in the top 50% of income. Historically the high ground was purchased by wealthy white homeowners, while African Americans seeking loans to buy houses were forced to reside in low ground areas. It is unsurprising to see that this pattern of disproportionate environmental risk has not changed since Katrina, and that the same black and low income communities devastated by the 2005 hurricane are the most likely to be affected by flooding from future sea level rise. New Orleans is a shifting city: after Katrina 100,000 African Americans never returned, and in 2010 NOLA elected the first white major in 32 years. A smaller and more white city prioritizes the voices with the most capital, which ignores the poor communities forced to low ground. With the current rate of sea level rise, New Orleans must plan for equal future disaster prevention by including the voices and perspectives that make environmental justice and health a priority.

Jessie McIsaac
Tufts University Class of 2020
May 7th, 2018

Tufts UNIVERSITY

LOWER 50% MEDIAN INCOME COMPARED TO RISK OF SEA LEVEL RISE

Legend
- Bottom 50% of Average Income
- Census Tracts

Mean Elevation Above Sea Level by Census Tract
Value
- High : 4.99306 meters
- Low : 0 meters

0 0.5 1 2 3 4 Miles