# Analysis of Flood Risk and Demographics in the South Bronx

## Summary of Findings

This document summarizes the analysis of flood risk (measured by the Flood Social Hazard Risk Index, FSHRI) and its relationship with racial demographics in the South Bronx and New York City.

## 1. OLS Regression Results

The regression analysis examines the relationship between different racial demographic groups and FSHRI. Key findings include:

- R-squared = 0.298: Approximately 29.8% of the variation in FSHRI is explained by the model.

- Significant Variables:

- White alone (coef = -1.0644, p = 0.003): Associated with lower flood risk.

- Asian alone (coef = 3.0629, p < 0.001): Strongly associated with higher flood risk.

- Some Other Race alone (coef = 2.6895, p < 0.001): Positively associated with higher flood risk.

- Non-significant Variables: Other groups (e.g., Black or African American, Two or More Races) do not show significant relationships with flood risk.

Note: Severe multicollinearity among racial variables may affect the reliability of individual coefficients.

## 2. Neighborhood-Specific Risk

The South Bronx neighborhoods exhibit varying levels of flood risk, with the most at-risk neighborhoods having an average flood risk score above 4.0. Key findings include:

- The most at-risk neighborhoods are BX0202 and BX1104, with average flood risk scores of 4.5.

- Across the South Bronx, the overall average flood risk is 3.27.

## 3. Challenges in Data Handling

Several issues were encountered during the analysis, including:

- Key Errors: Columns such as 'GeoID' and 'NTA2020' caused merge failures due to naming inconsistencies.

- Encoding Errors: Non-standard characters in files required reformatting.

- Multicollinearity: High correlations among racial variables reduced the reliability of statistical inferences.

## Explanation of Results

The analysis highlights disparities in flood risk across racial groups and neighborhoods:

- Predominantly White areas exhibit lower flood risk, reflecting historical disparities in urban planning.

- Asian and 'Some Other Race' groups are associated with higher flood risk, possibly due to residing in flood-prone or underserved areas.

- The South Bronx neighborhoods face considerable flood risk, underscoring the need for targeted interventions.

## Recommendations

To address flood risk and demographic vulnerabilities, the following steps are recommended:

- Refine data to address column inconsistencies and ensure uniform formatting.

- Include additional variables (e.g., income, housing type) to improve the explanatory power of the model.

- Use GIS tools to map flood risk scores and overlay demographic data for spatial insights.

- Focus interventions on high-risk neighborhoods, such as BX0202 and BX1104, to enhance flood defenses.