Mapping Disadvantaged Communities in New York City

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Abstract

New York City is a historically redlined urban center that has exposed people of color to disproportionate impacts of pollution and economic distress. To remediate this, the CLCPA agreed to allocate 35-40% of climate funds to “Disadvantaged Communities” (DACs). This study uses the data gathered and synthesized by New York State’s Climate Justice Working Group (CJWG) to create a visual representation of the environmental and economic vulnerabilities found across census tracts that define a DAC. The study leverages a dataset comprising 45 distinct “Environmental Burden” and “Social Vulnerability” indicators, analyzed to provide a multifaceted understanding of each census tract’s unique challenges and needs. The resulting bivariate map of “Combined Vulnerability” highlights the most vulnerable census tracts in New York City. Additionally, ranking the tracts by population shows that taking population into consideration widely changes the number of people that can benefit from the provisions of the CLCPA. This ranking can be used as a tool for policymakers and climate justice advocates to catalyze climate investments.

Background

New York City faces urgent climate challenges and historic social and environmental injustices

- **Social Vulnerabilities of New Yorkers**
  - 21% suffer from lead exposure
  - 23% are at or below the poverty line
  - 34% are rent burdened
- **Environmental Burdens of New Yorkers**
  - 15+ days of exposure of 90F+ degree weather
  - Expected 8-30in of sea level rise by 205
  - 01/25 deaths are due to PM2.5

Enacted in 2019, the CLCPA mandates that at least 35% of New York's climate-related investments benefit disadvantaged communities, and support clean energy, pollution reduction, and economic development initiatives. The Climate Justice Working Group (CJWG) was established to define DAC criteria, focusing on environmental and social challenges to ensure equitable resource allocation. The study analyses the DAC from the CJWG to identify the most vulnerable census tracts

Limitations

- 45 indicators out of 170 possible indicators were used
- All indicators were turned into a percentile rank instead of using z-scores or min-max normalization
- “Climate Burden” was magnified by 2 by the CJWG-- meaning that some non-vulnerable communities got higher rankings
- The granularity and modeling area of each indicator was different

Results

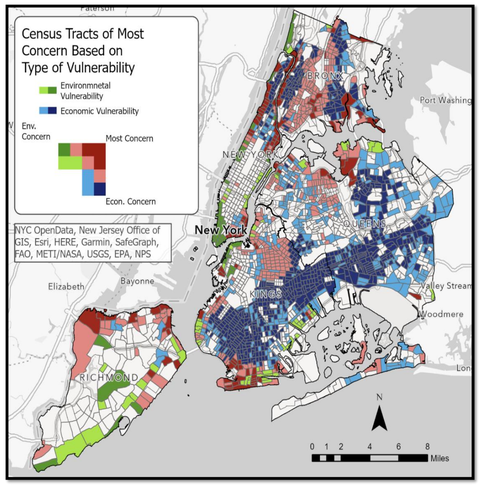


Figure 1: Map of Combined Vulnerability in NYC using ArcGIS

Areas of Environmental Vulnerability:
Battery Park
Financial District

Areas of Social and Economic Vulnerability:
East Harlem
Flatbush

Areas of Combined Vulnerability:
Washington Heights
Coney Island

Ranking the Top 15 Census Tracts of Most Concern (shown in dark red)

Ranked by Vulnerability

Rank	GEOID	County	Population	Combined Vulnerability
1	36005009300	Bronx	6,154	100.0
2	36047008500	Kings	7,793	99.9
3	36005005100	Bronx	5,737	99.9
4	36061016200	New York	9,412	99.7
5	36061018000	New York	7,422	99.6
6	36061021900	New York	6,008	99.6
7	36061024302	New York	7,756	99.5
8	36005018900	Bronx	8,210	99.5
9	36005019300	Bronx	6,350	99.4
10	36061024200	New York	5,003	99.4
11	36005020501	Bronx	6,976	99.2
12	36061000600	New York	9,838	99.2
13	36061018800	New York	5,437	99.1
14	36061001002	New York	5,157	99.1
15	36061019400	New York	6,166	99.1
	TOTAL		103,419	99.5

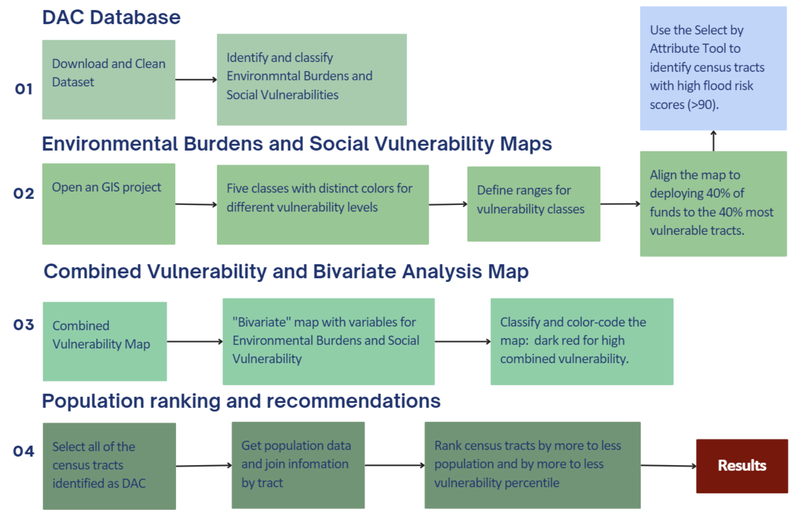
Ranked by Populations

Rank	GEOID	County	Population	Combined Vulnerability
1	36005046201	Bronx	28,109	79.8
2	36061024500	New York	14,717	80.6
3	36081045500	Queens	14,284	69.2
4	36061025300	New York	13,572	79.4
5	36061026100	New York	13,145	88.4
6	36085004000	Richmond	12,548	85.9
7	36081101001	Queens	12,253	66.9
8	36061029100	New York	12,165	77.0
9	36061027900	New York	12,053	70.2
10	36061018900	New York	11,654	76.4
11	36061021100	New York	10,824	75.8
12	36061030900	New York	10,593	93.9
13	36047120800	Kings	10,413	72.6
14	36061022500	New York	10,334	97.9
15	36061019300	New York	10,255	67.9
	TOTAL		196,919	78.8

In New York City, taking **population** into consideration creates a *widely different path of resource distribution* under the funds of the CLCPA

1. Difference of 93,500 people when ranking the top 15
2. Difference of 21 points of vulnerability
3. Population ranking favors Manhattan

Methods



Conclusions

- It is essential that cities like New York keep on resourcing and expanding climate advisory groups, having ongoing revisions about census tracts, and resourcing data collection that can be standardized
- Choosing how to approach resource distribution is contingent on many factors, including Environmental Burdens, Social Vulnerability, Population density, and definitions of vulnerability
- In New York City, taking population into consideration creates a widely different path of resource distribution under the funds of the CLCPA

Future Work

- Expand the number of indicators used for DAC criteria across cities
- Create a clear distinction between indicators of future climate burdens and current and past environmental burdens and vulnerability
- Create distinctions between individual scale and community scale investments (especially considering Native people)
- Refine public maps for policy and civil society advocacy use
- Create pathways for resource distribution based on rankings

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