



Mapping Environmental Injustices in Florida: An Initial Analysis of Superfund Sites & Demographic Data



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Background

Environmental justice was popularized in the 1980s, following the United Church of Christ's mapping of environmental hazards and racial injustices.^{1, 2} Since then, many have set out to define, identify, and address environmental justice. The **Environmental Protection Agency (EPA)**, the regulating body of environmental protection in the United States, currently defines environmental justice as “the **just treatment and meaningful involvement** of all people [...] in agency **decision-making** and other Federal activities that affect **health** and the **human environment**.”³

Superfund sites are places that have been **polluted or contaminated** by hazardous materials. The EPA utilizes a Hazard Ranking System to determine site's risk level to the public.⁴ Superfund site proximity is associated with an increased risk of certain health conditions. Populations living near Superfund sites have shown an **increase** in congenital anomalies, **cancer**, low birth weights, infant **mortality**, and an overall **diminished life expectancy**.^{5, 6, 7}

Research Objectives

- Identify **environmental injustices** in Florida
- Identify **populations** experiencing the most **environmental burden**
- Isolate a **socially-defined radius** of environmental injustice, in the context of Superfund sites

Figures

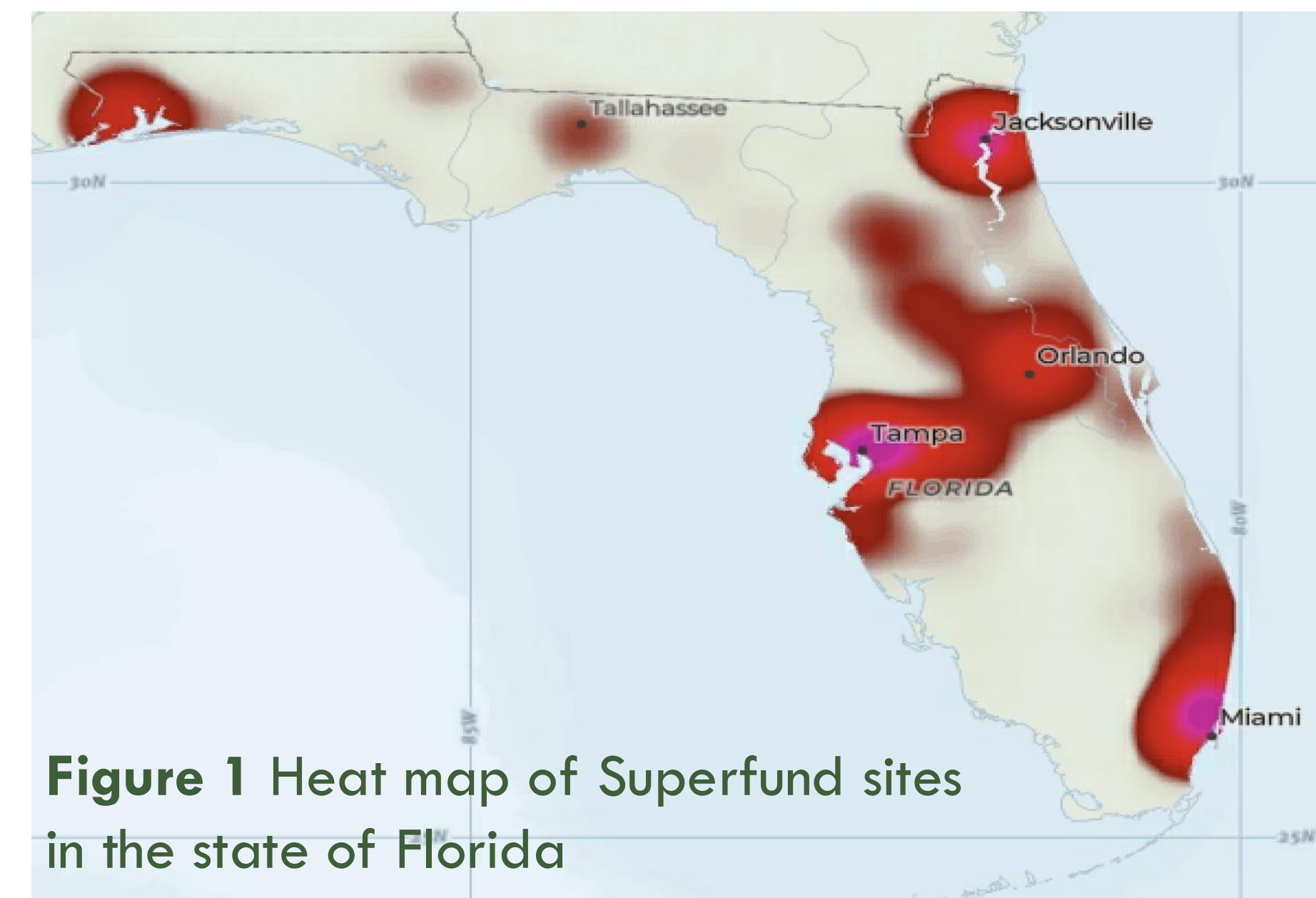


Figure 1 Heat map of Superfund sites in the state of Florida

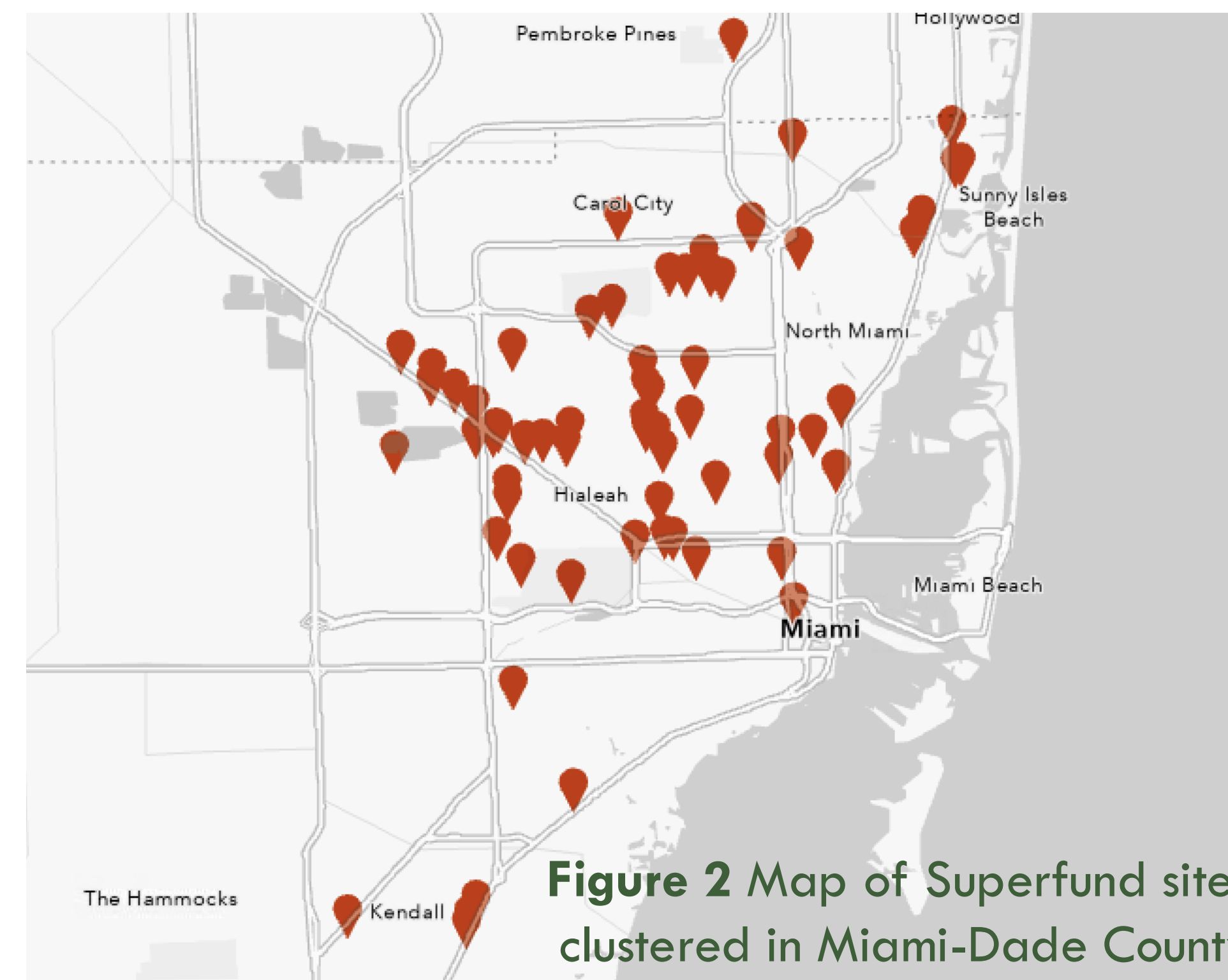
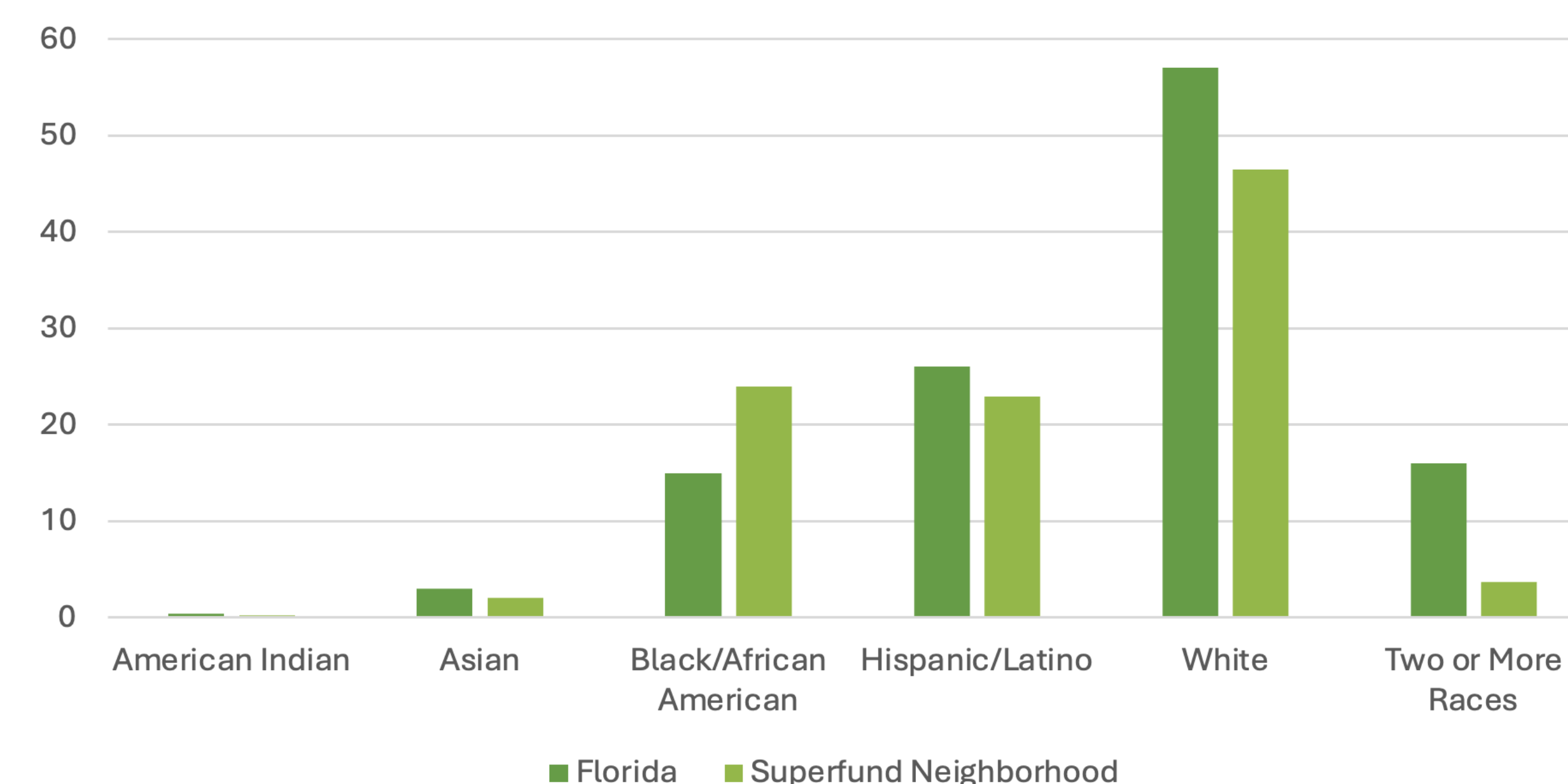


Figure 2 Map of Superfund sites clustered in Miami-Dade County

State vs Superfund Demographic Percentages



Methods

Utilizing ArcGIS Pro, the researchers geocoded all Superfund sites from the EPA's list. Sites with no address were either removed from list or addresses were identified. Census tracts containing Superfund sites were isolated. The percentage of each racial group within these census tracts was averaged and compared with state percentages.

Results & Discussion

Superfund sites seem to be **clustered in major metropolitan areas**. In fact, oftentimes Superfund sites are very clustered together, with many sites being within one mile of each other. This raises a question of **combined environmental burden**. Are those already experiencing injustice experiencing a **compounded burden**? Some feel that environmental burden can never fully be quantified.²

There are **observed differences** in the **populations surrounding Superfund sites**, as seen in Figure 3. For example, Black/ African American individuals make up a greater percentage of the population living near Superfund sites than the state population.

As mentioned in the objectives section, it is our hope to analyze multiple facets of socioeconomic and demographic data to **identify a socially-defined radius of environmental justice**. We hope to identify what **society has determined** to be a safe radius away from Superfund sites and other environmental hazards. The researchers are creating an **Environmental Justice Dashboard Tool**, which will aid in further analyses and research.

References

- United Church of Christ. (n.d.) *Toxic Wastes and Race and Toxic Wastes and Race at Twenty*. https://www.ucc.org/what-we-do/justice-local-church-ministries/efam/environmental-justice/environmental-ministries_toxic-waste-20/ Accessed June 8, 2024.
- Maantay, Julia. (2002, April). Mapping environmental injustices: Pitfalls and potential of geographic information systems in assessing environmental health and equity. *Environmental Health Perspectives*, 110(2), 161-171. <https://doi.org/10.1289/ehp.02110s216>
- United States Environmental Protection Agency. (2024, May 9). *Environmental justice*. <https://www.epa.gov/environmentaljustice>
- United States Environmental Protection Agency. (2023, October 23). *What is Superfund?* <https://www.epa.gov/superfund/what-superfund>
- Baibergenova, A., Kudyakov, R., Zdeb, M., & Carpenter, D.O. (2003). Low birth weight and residential proximity to PCB-contaminated waste sites. *Environmental Health Perspectives*, 111(10), 1352-1357. <https://doi.org/10.1289/ehp.6053>
- Dolk, H., Vrijheid, M., Armstrong, B., Abramsky, L., Bianchi, F., Garne, E., Nelen, V., Robert, E., Scott, J., Stone, D., & Tenconi, R. (1998). Risk of congenital anomalies near the hazardous-waste landfill sites in Europe: the EUROHAXCON Study. *The Lancet (British Edition)*, 352(9126), 423-427. [https://doi.org/10.1016/S0140-6736\(98\)01352-X](https://doi.org/10.1016/S0140-6736(98)01352-X)
- Vrijheid, M. (2000). Health effects of residence near hazardous waste landfill sites: A review of epidemiological literature. *Environmental Health Perspectives* 108(suppl 1), 101-112. <https://doi.org/10.1289/ehp.00108s1101>
- Grattet, R., Mascarenhas, M., & Mege, K. (2021). Toxic waste and race in twenty-first century America: Neighborhood poverty and racial composition in the siting of hazardous waste facilities. *Environment and Society*, 12(1), 108-126. <https://doi.org/10.3167/ares.2021.120107>
- United States Environmental Protection Agency. (2020, September). *Population surrounding 1857 superfund remedial sites*. <https://www.epa.gov/sites/default/files/2015-09/documents/webpopulationrsuperfundsites9.28.15.pdf>