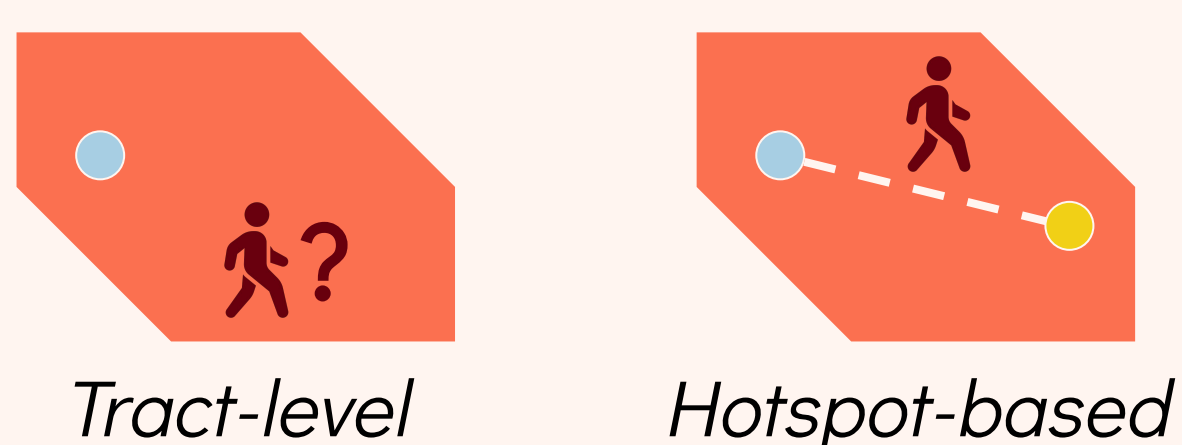


## 1 INTRODUCTION

- By 2080, D.C. could see up to 75 days above the heat-emergency level (95°F)<sup>1</sup>
- Some neighborhoods experience temperatures up to 18°F hotter than others<sup>2</sup>. Uneven distribution often linked with socioeconomic factors<sup>3</sup>
- 130 public buildings designated as cooling centers during >95°F days
- Heat indexes are typically tract-level, limiting analysis and optimization of cooling centers



### Objectives:

Develop a hotspot-based heat-vulnerability index for D.C.

Identify heat-vulnerable areas

Optimize cooling center locations so that walking distance is <0.5 mi

## 2 APPROACH

Reviewed **23** heat indexes  
Spoke with **10** cooling centers

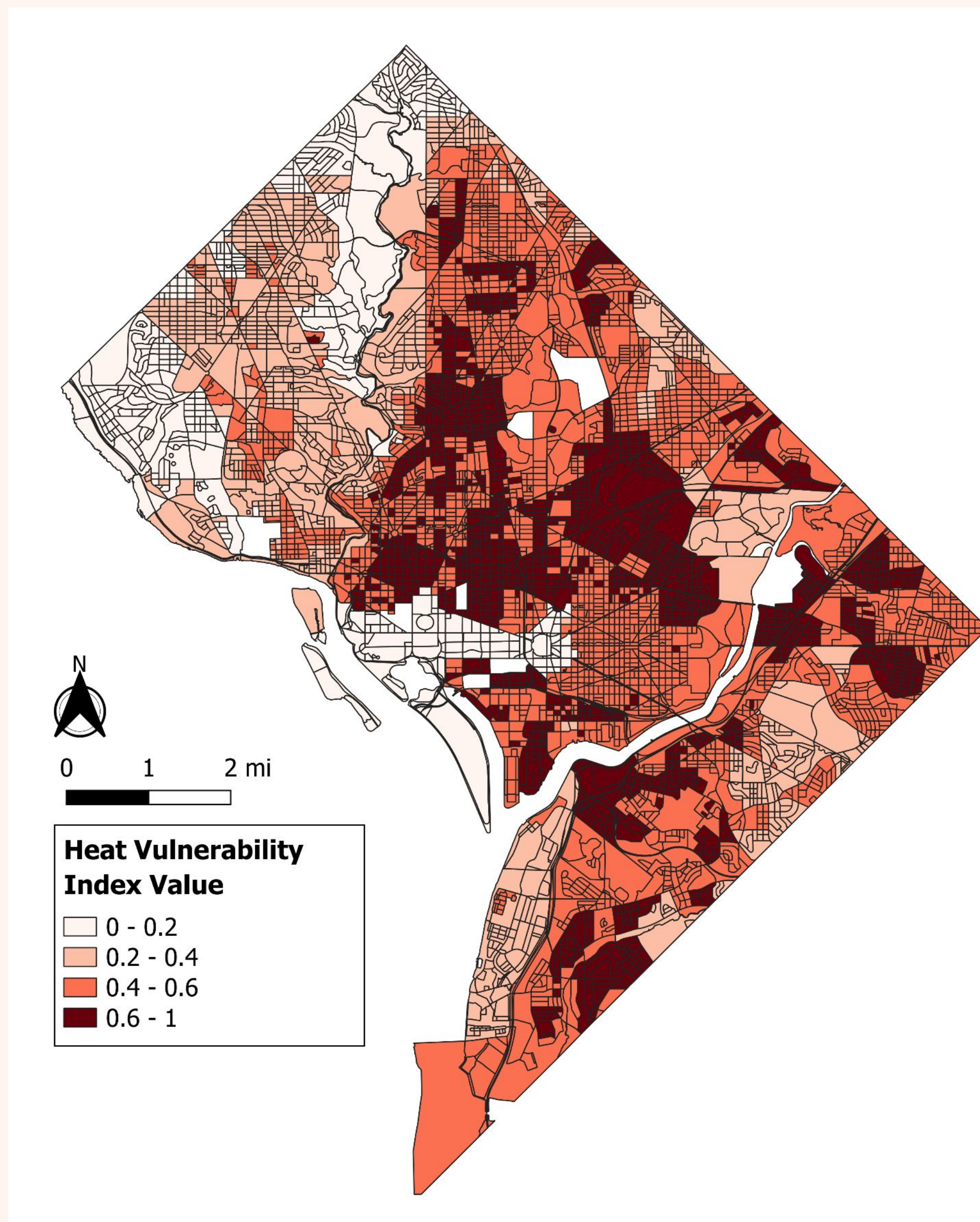
### Index split:

**40 / 40 / 20**  
Socio-economic    Heat Exposure    Population Density

### Analysis:

- Hotspot = max index value by tract
- Assessed minimum distance from hotspot to cooling center
- Quantified vulnerable population served by each cooling center
- Placed additional cooling centers to achieve walking distance <0.5 mi and reduce vulnerable population served per hotspot

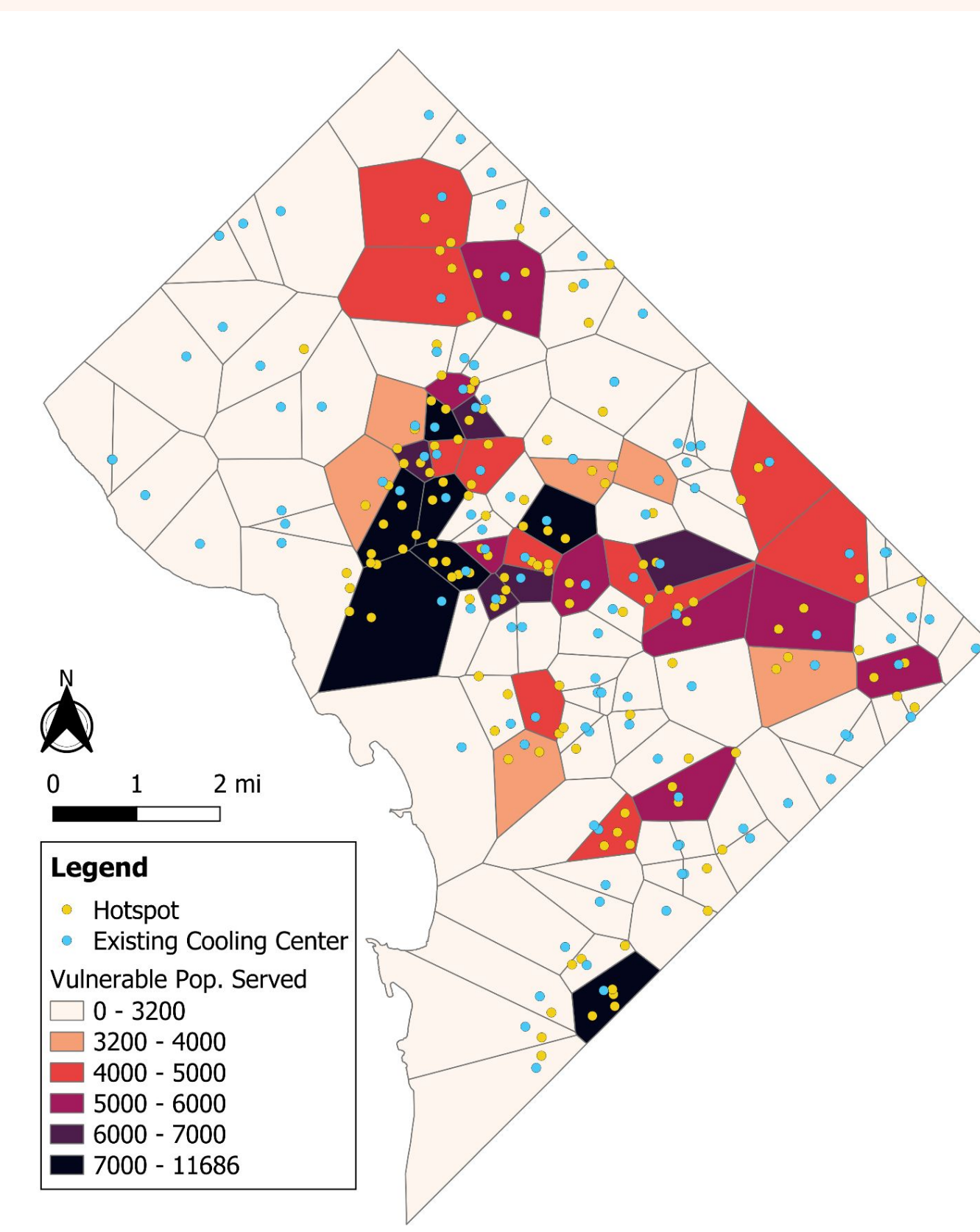
## 3 FINDINGS



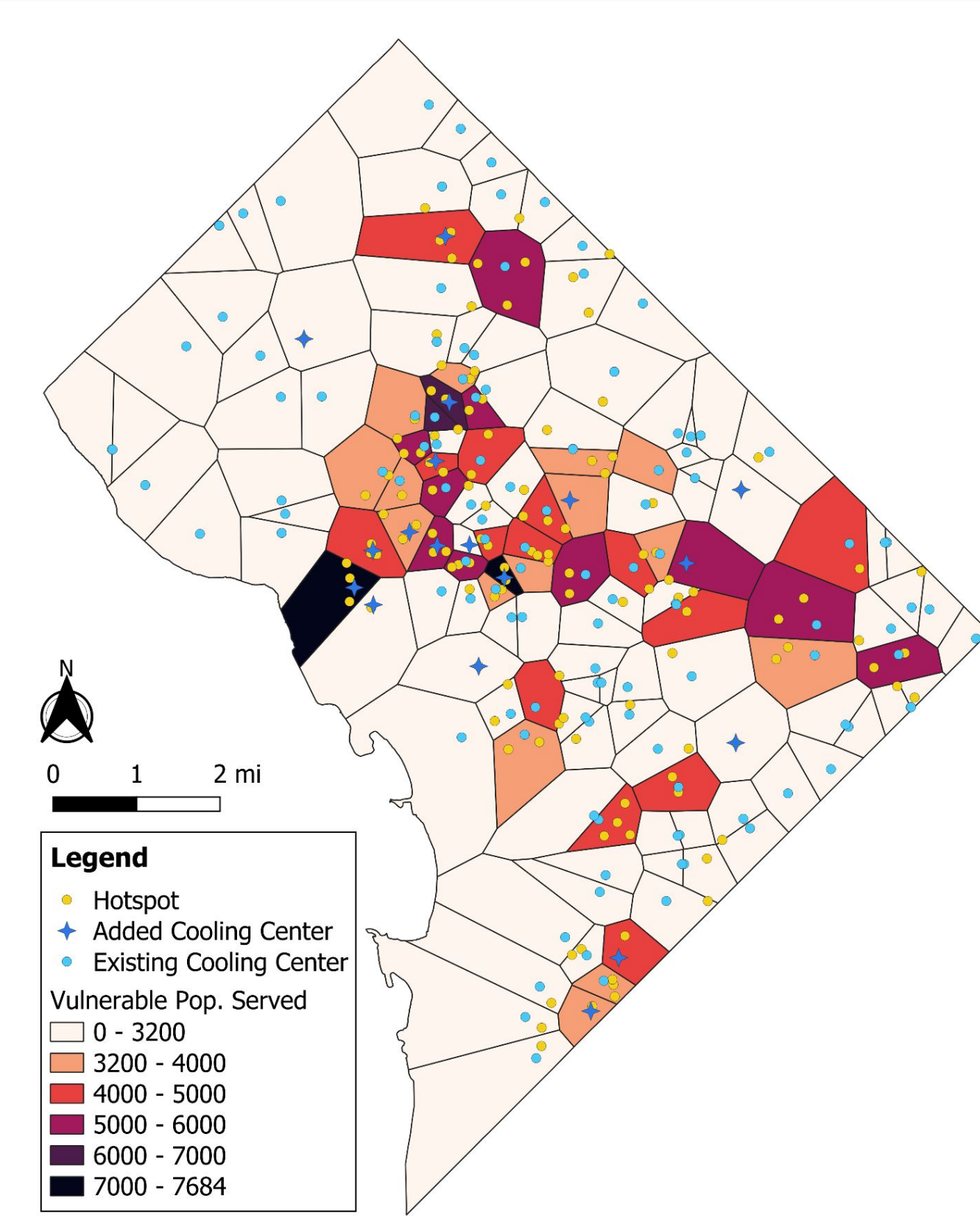
Heat vulnerability index for D.C.

### Current Conditions:

- 17 hotspots >0.5 mi from a cooling center
- 67,597 people live in vulnerable areas served by an overextended cooling center (service pop. >7000)
  - Average vulnerable service pop. = 3208 people
- Lack of communication between cooling centers, local government, and vulnerable population



Impact of added cooling centers



## 4 RECOMMENDATIONS

Implement **17 new cooling centers** in areas of dense vulnerable populations

Improve government **oversight** and **communication** about cooling centers

**Inform** vulnerable populations about cooling center **accessibility**

Collect data on cooling center **usage** and **capacity** for future planning

## 5 IMPACT

**78%** reduction in the overall population served by an overextended cooling center

**15%** reduction in the average vulnerable population served by each cooling center

**0.5Mi** is now the farthest distance between any hotspot and the nearest cooling center

Index serves as a framework for DC and other cities

## REFERENCES

- [1] "The District of Columbia's Extreme Heat Adaptation Strategy," D.C. Department of Energy and the Environment, 2022. <https://doee.dc.gov/keepcool> (accessed Dec. 11, 2023).  
 [2] T. Small, J. P. H. Padilla, and R. DeAmeller, "Urban heat islands in Washington DC," ArcGIS StoryMaps, Feb. 2, 2023. <https://storymaps.arcgis.com/stories/19cd6cf71776464eaf06b3f0c3709a57> (accessed Oct. 23, 2023).  
 [3] "Heat islands and equity," United States Environmental Protection Agency, [https://19january2021snapshot.epa.gov/heatislands/heat-islands-and-equity\\_.html](https://19january2021snapshot.epa.gov/heatislands/heat-islands-and-equity_.html) (accessed Oct. 23, 2023).

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