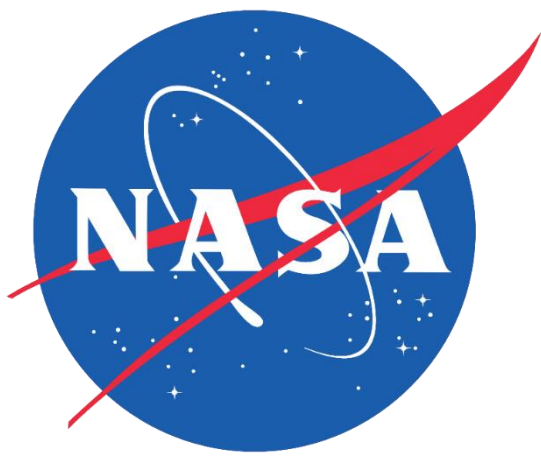




Huntsville Urban Development II

Utilizing NASA Earth Observations to Map the Urban Heat Island and Evaluate Heat Vulnerability in Huntsville, Alabama



Project Synopsis

This project mapped the changes in land surface temperature (LST), vegetation (NDVI), and impermeable structures (NDBI) in Huntsville, Alabama from 2019 to 2022. Combining these changes with heat vulnerability based on socioeconomic risk factors, the team assessed urban vulnerability and priority areas for urban tree planting within the city. Additionally, the team classified roof materials and their correlation with UHI based on land surface temperature.

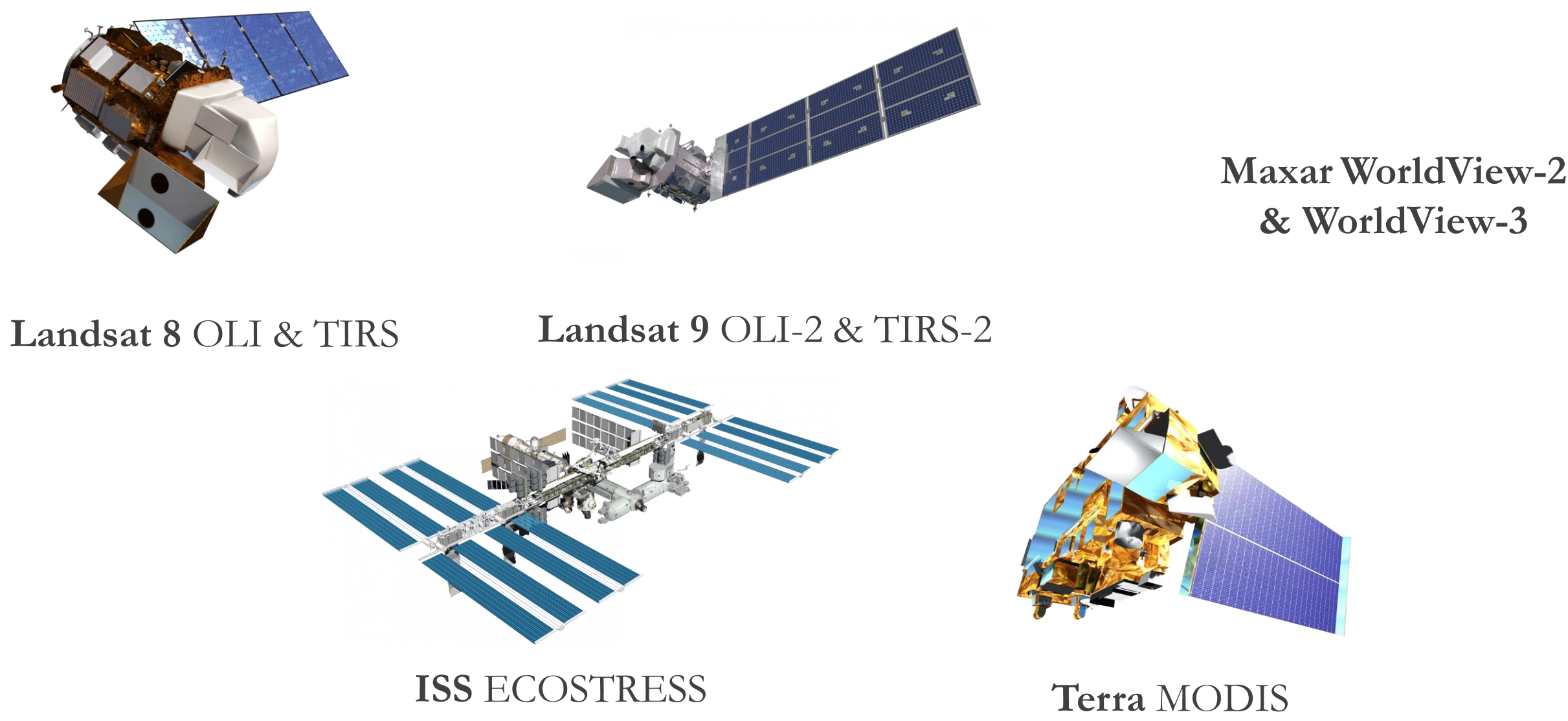
Objectives

- Quantify** changes in land surface temperature and land cover over time to understand the effects of urban development on the urban heat island
- Map** the extent of the urban heat island in Huntsville, which partners can use as a baseline to assess the future effectiveness of tree planting initiatives
- Classify** roof and pavement materials to visualize the contribution of certain materials to urban temperatures
- Assess** urban heat vulnerability from the intersection of the UHI and socioeconomic risk factors

Methodology

Data Source:	ECOSTRESS	Landsat	Tree Equity Score	Maxar
Parameter:	LST	NDVI & NDBI	Socioeconomic factors	Reflectance
End product:	LST time series	Vegetation + impervious time series	Heat vulnerability map	Roof classification map

Earth Observations



Team Members

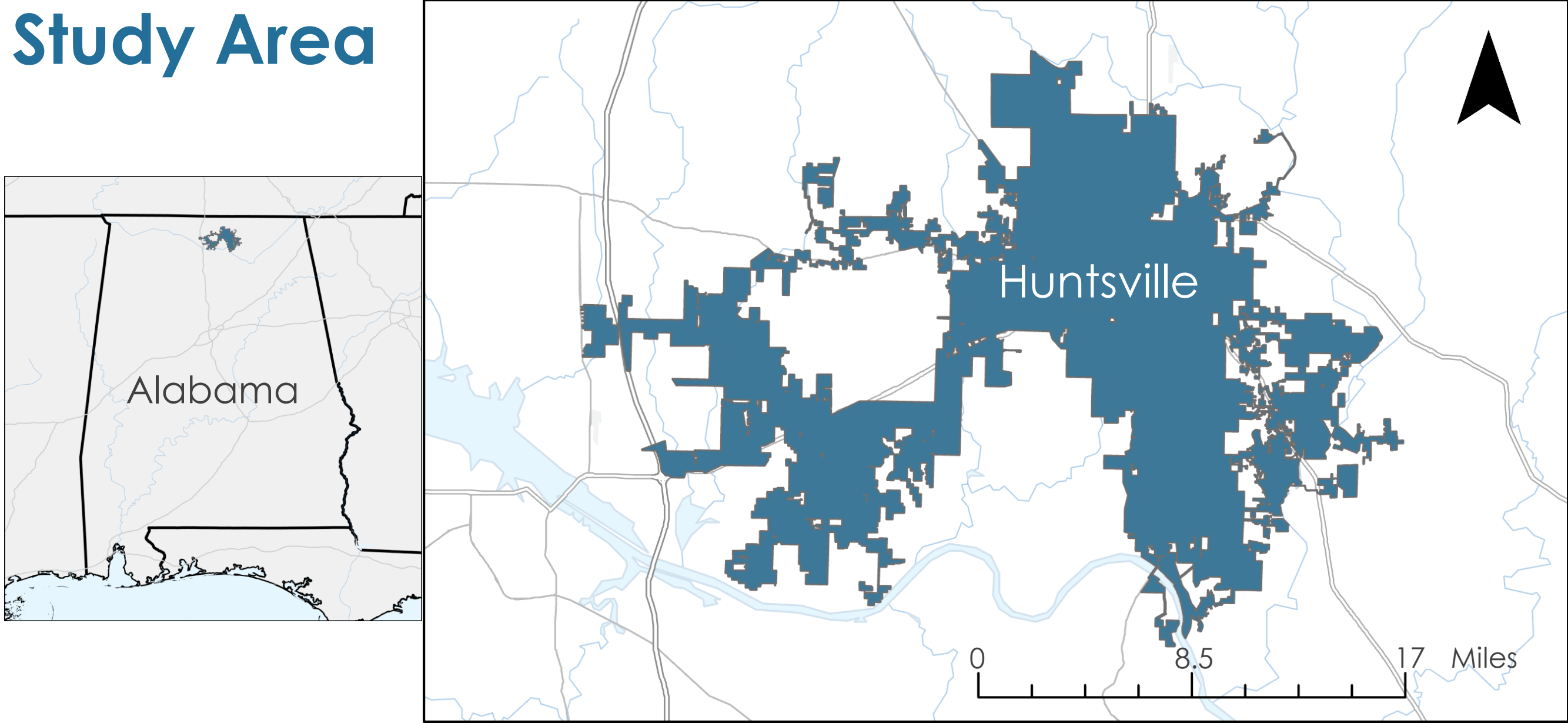


Project Partner

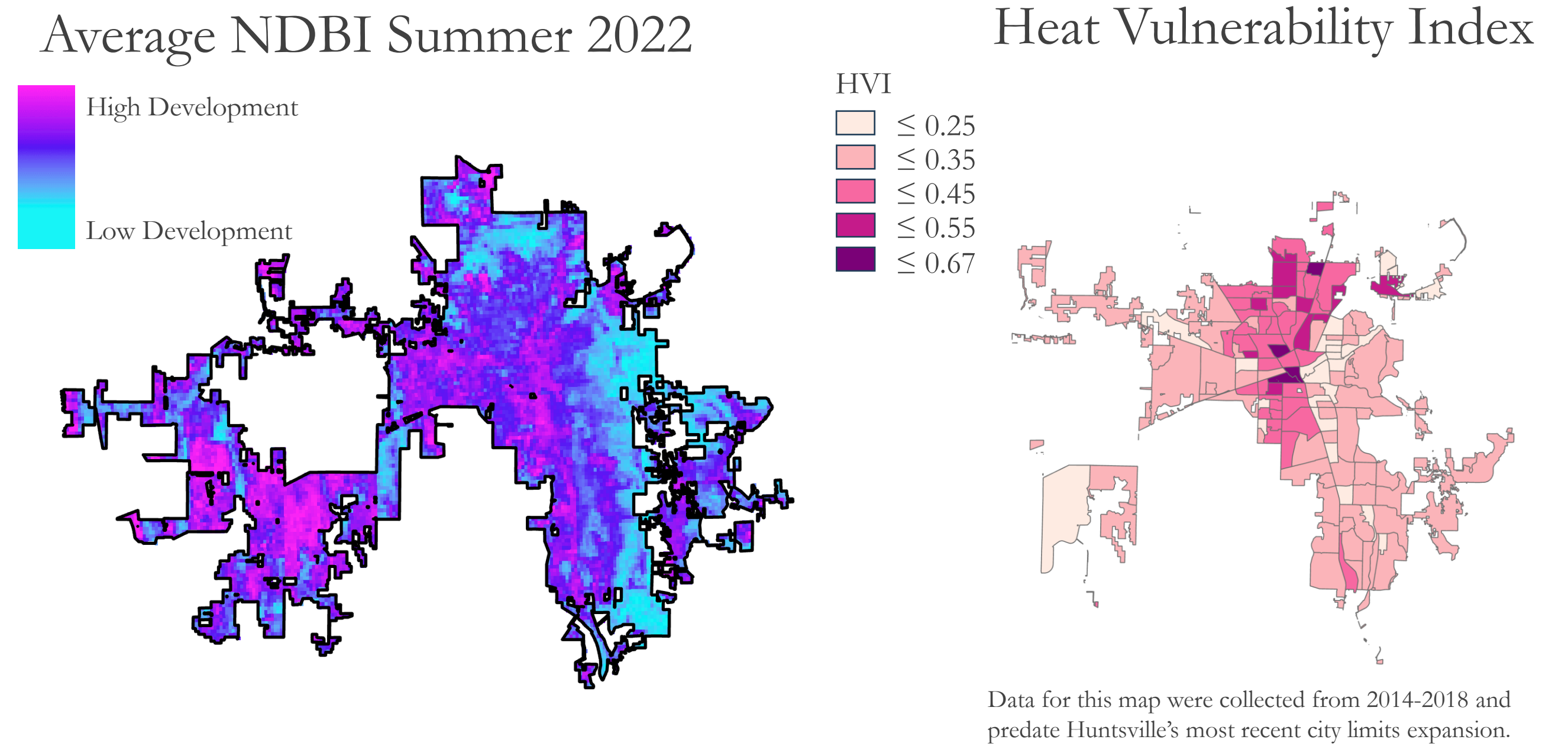
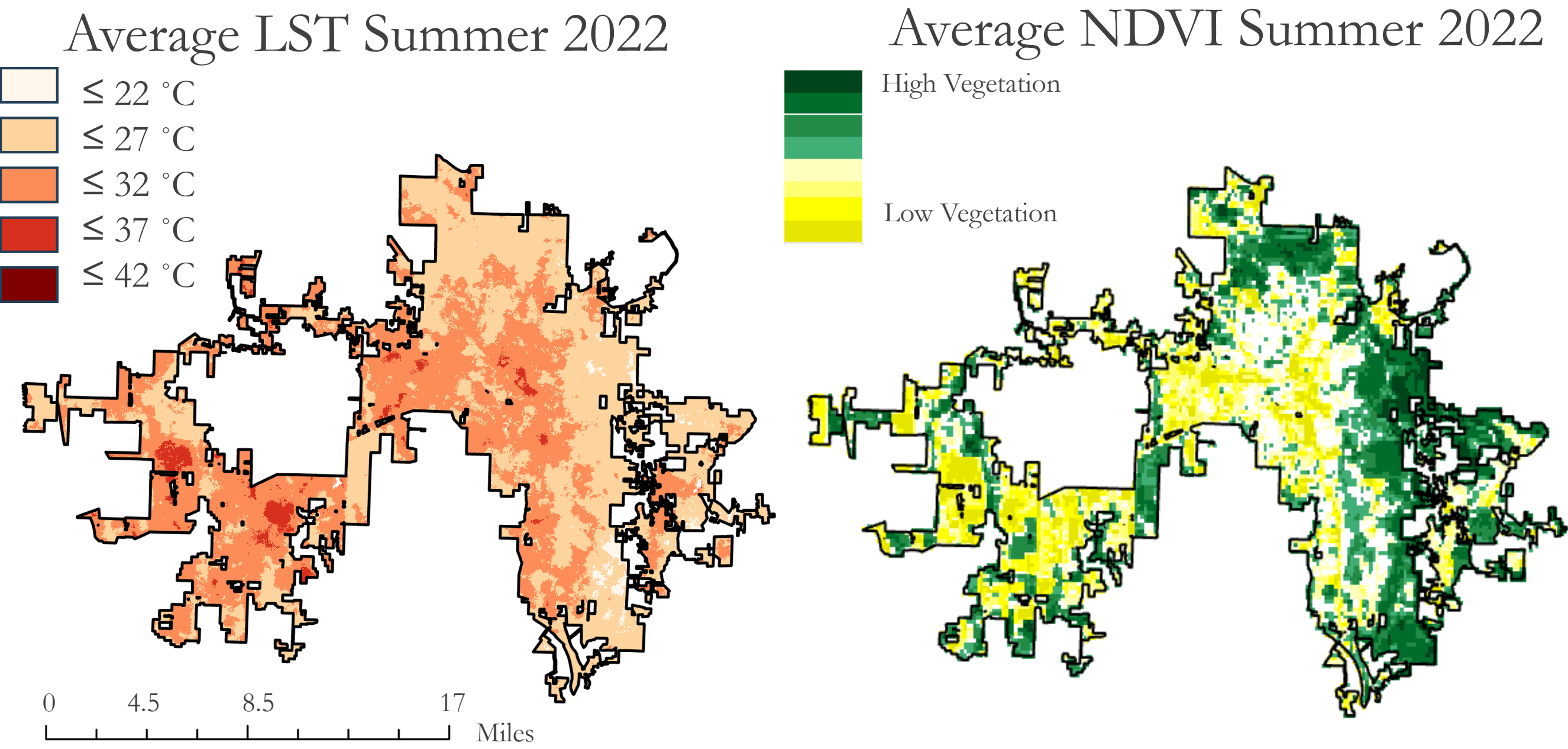
City of Huntsville



Study Area



Results



Conclusions

- When averaged across the city, year-to-year LST change exhibited no trend over the study period, and this irregularity showed that the factors contributing to LST change can vary in severity month to month and year to year.
- LST, NDVI, and NDBI indicate the strongest urban heat island effect in downtown, industrial areas, and newly developed neighborhoods.
- West-central Huntsville has the most potential for heat reduction and community health benefits from tree-planting efforts.

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