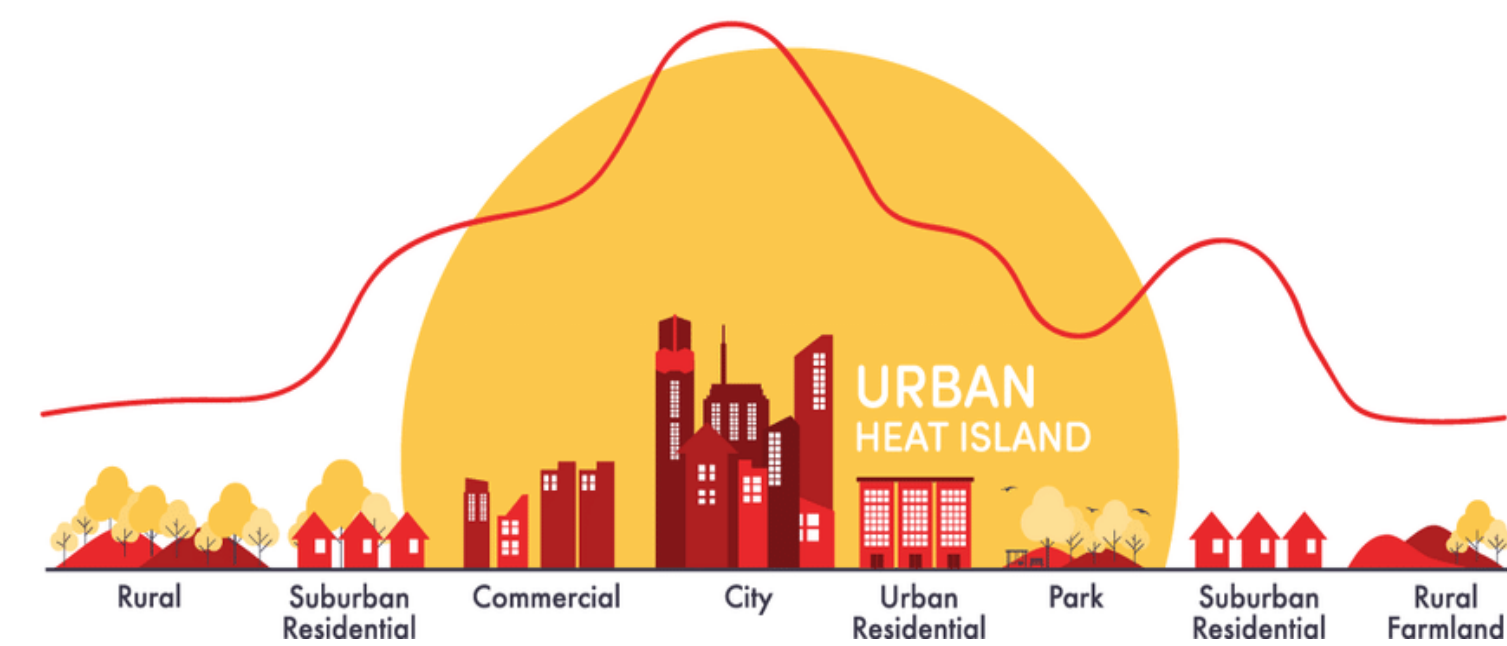


# Urban Heat Mitigation Mapping

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ELEVATED TEMPERATURES INCREASE MORTALITY AND MORBIDITY RISKS FOR VULNERABLE POPULATIONS. TREES CAN HELP MITIGATE HEAT ISLAND EFFECTS.



We created a prototype spatial tool in R that estimates the mortality and morbidity (and associated costs) due to the colling effect of current tree canopy cover for urban areas throughout the US, focusing on populations aged 65 and older. Our tool can be applied to all urban centers in the U.S. Census.

## HEALTH IMPACT FUNCTIONS

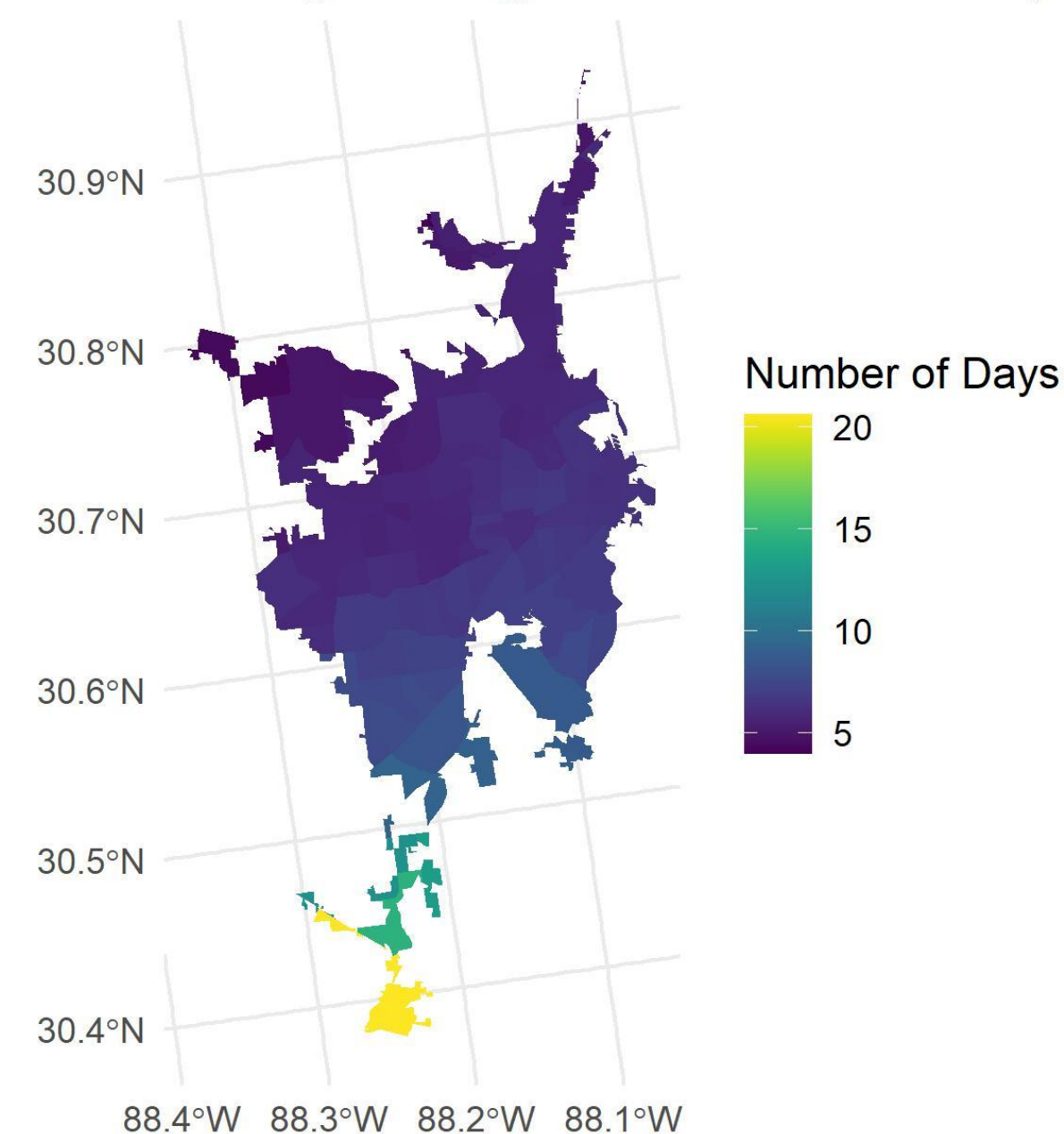
- Base mortality rates from the CDC.
- McDonald et al. (2020) estimate relationship between tree canopy and heat in 97 cities using regression analysis.
- Mortality and Hospitalization parameters are taken from Medina-Ramon and Schwartz (2007) and Gronlund et al. (2014).

## MOBILE, AL

- ~50% tree canopy cover (2011) (2<sup>nd</sup> largest)
- Cooling effect of trees: 0.73 – 1.65 C (top 10)
- Change in annual days with extreme temps ~ 6.5
- Population 65+: 16%
- Avoided deaths: 8.75/ tract
- Avoided hospitalizations: 584/tract
- Avoided COH ~ \$12,157
- Average annual income for 65+: \$51,320

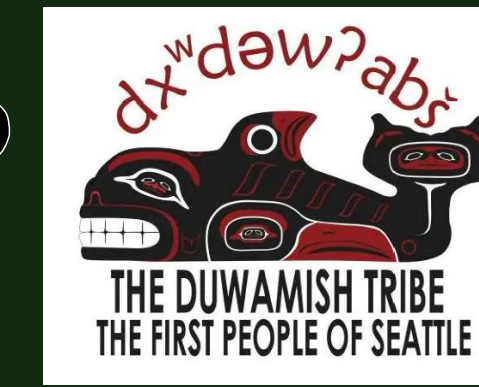


Average Change in Extreme Heat Days



## LAND ACKNOWLEDGEMENT

Earth Economics acknowledges that we operate on the lands of the Coast Salish peoples, specifically the ancestral homelands of the Puyallup Tribe of Indians, and the 1854 Medicine Creek Treaty. We also recognize the work of this project occurs on the ancestral homelands of the federally unrecognized Duwamish Tribe and the 1855 Point Elliot Treaty.



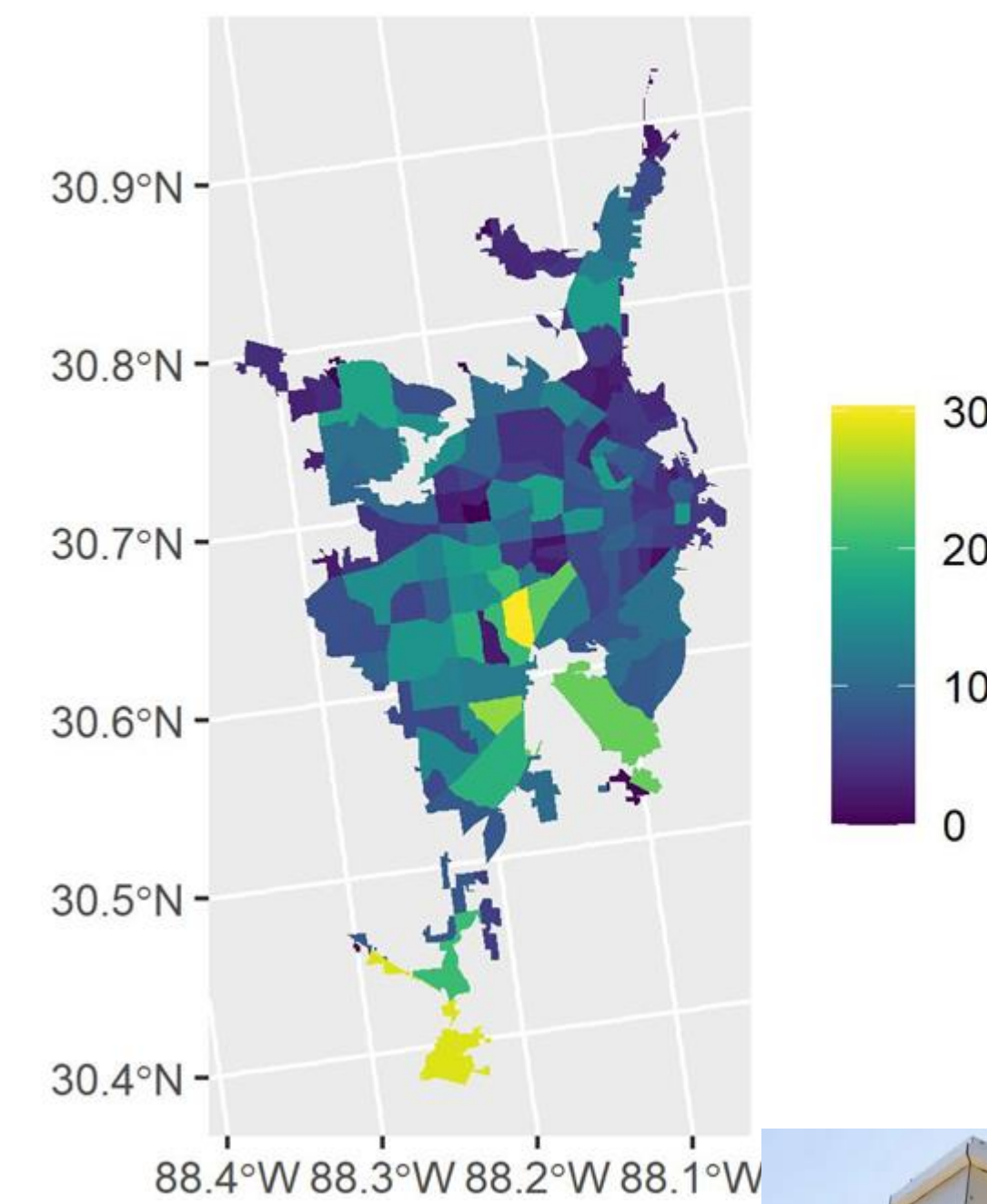
Earth Economics is a leader in ecological economics.



## STYLIZED OUTPUTS:

- ~50% tree canopy cover (2011) (2<sup>nd</sup> largest)
- Cooling effect of trees: 0.73 – 1.65 C (top 10)
- Change in annual days with extreme temps ~ 6.5
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Avoided Annual Deaths Among Adults 65+



$$\Delta y = y_0 \cdot (e^{\beta \Delta HEAT} - 1) \cdot Pop$$

A screenshot of an interactive map showing detailed data for a specific tract (Tract number: 38). The data includes:

- Population: 898
- % 65+: 20.5
- Average income 65+: \$ 35,517
- % people of color: 62.9
- % male: 52.8
- % canopy cover: 23
- % impervious cover: 37.9
- Baseline number of extreme heat days: 1
- Additional number of extreme heat days due to no canopy cover (low): 3.1
- Additional number of extreme heat days due to no canopy cover (high): 11.3
- Additional number of extreme heat days due to no canopy cover (average): 6
- Avoided annual deaths (low): 1
- Avoided annual deaths (high): 11.1
- Avoided annual deaths (average): 3.6
- Avoided annual hospitalizations (low): 69
- Avoided annual hospitalizations (high): 696.3
- Avoided annual hospitalizations (average): 240.6
- Avoided VSL (low): 11,051,836
- Avoided VSL (high): 117,082,467
- Avoided VSL (average): 37,752,799
- Avoided COH (low): 1,915,222
- Avoided COH (high): 307,743
- Avoided COH (average): 6,683,722

## COSTS DATA

- Cost data from HCUP.
- All-causes of admission\*
- Number of admissions, length of stay, and costs by age group

