



Urban Forestry - Village of Marvin



Keith O'Herrin, Ph.D.

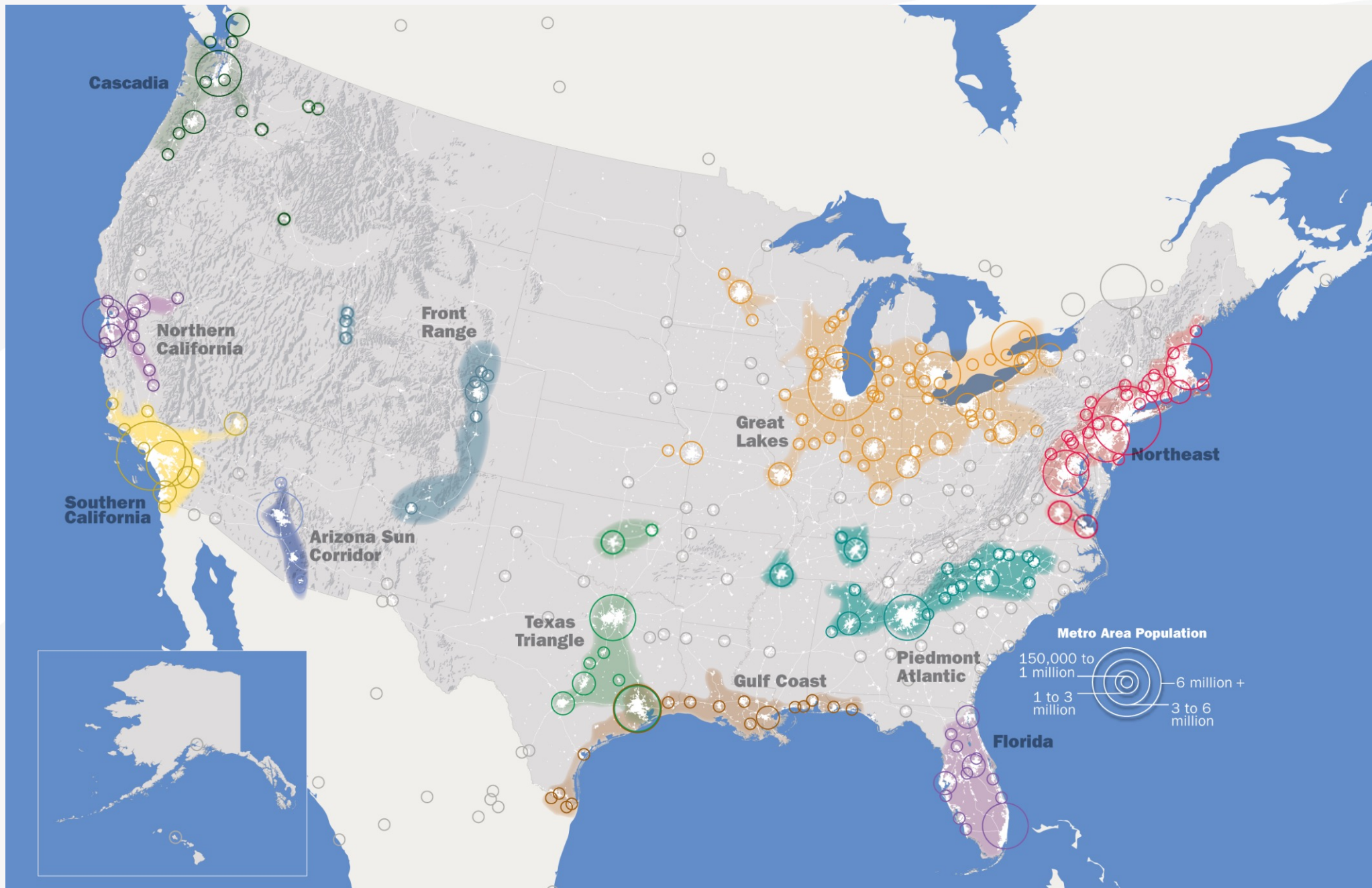
Urban Forester

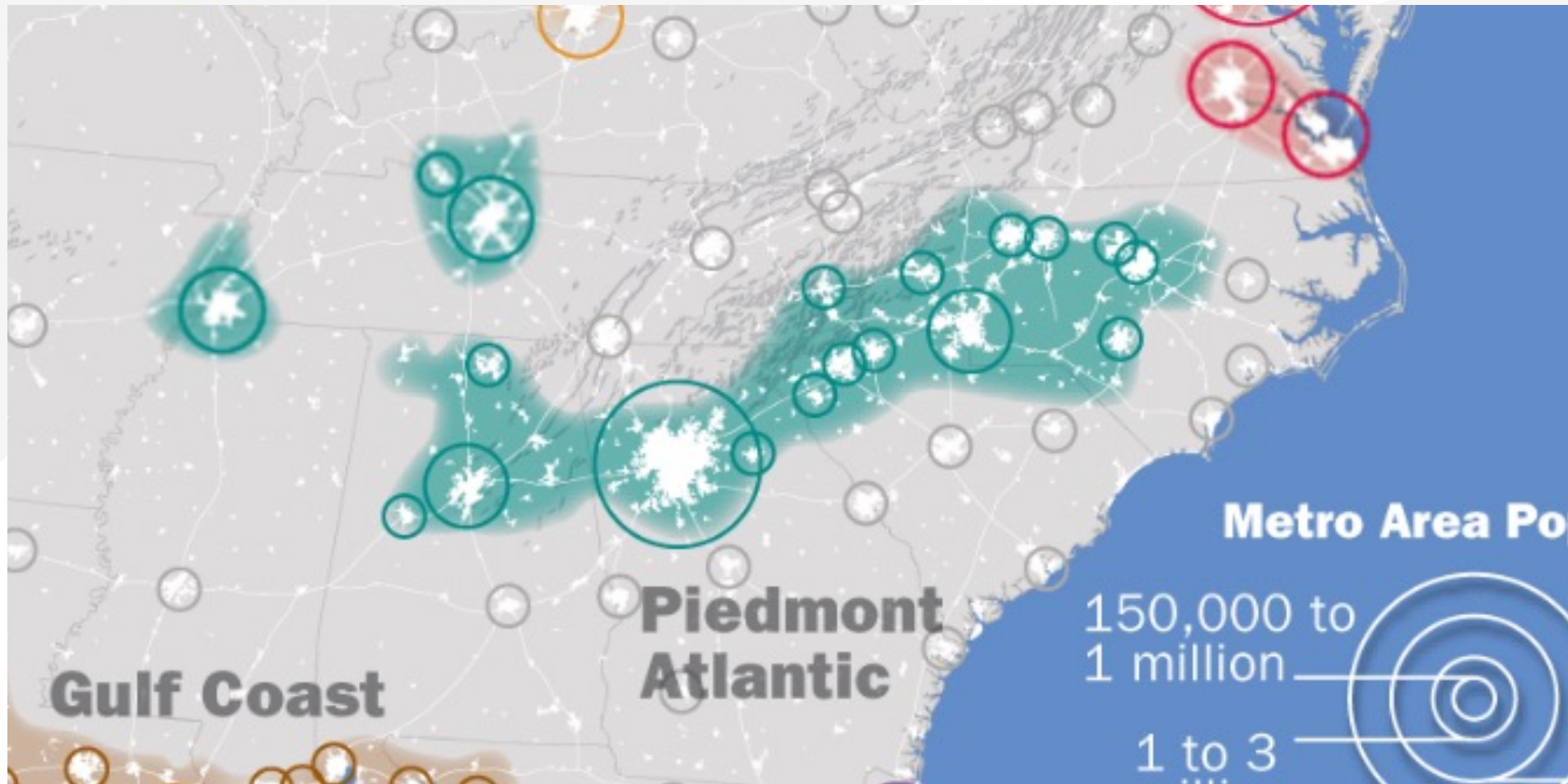
Union County Planning Department

And

NC State Extension

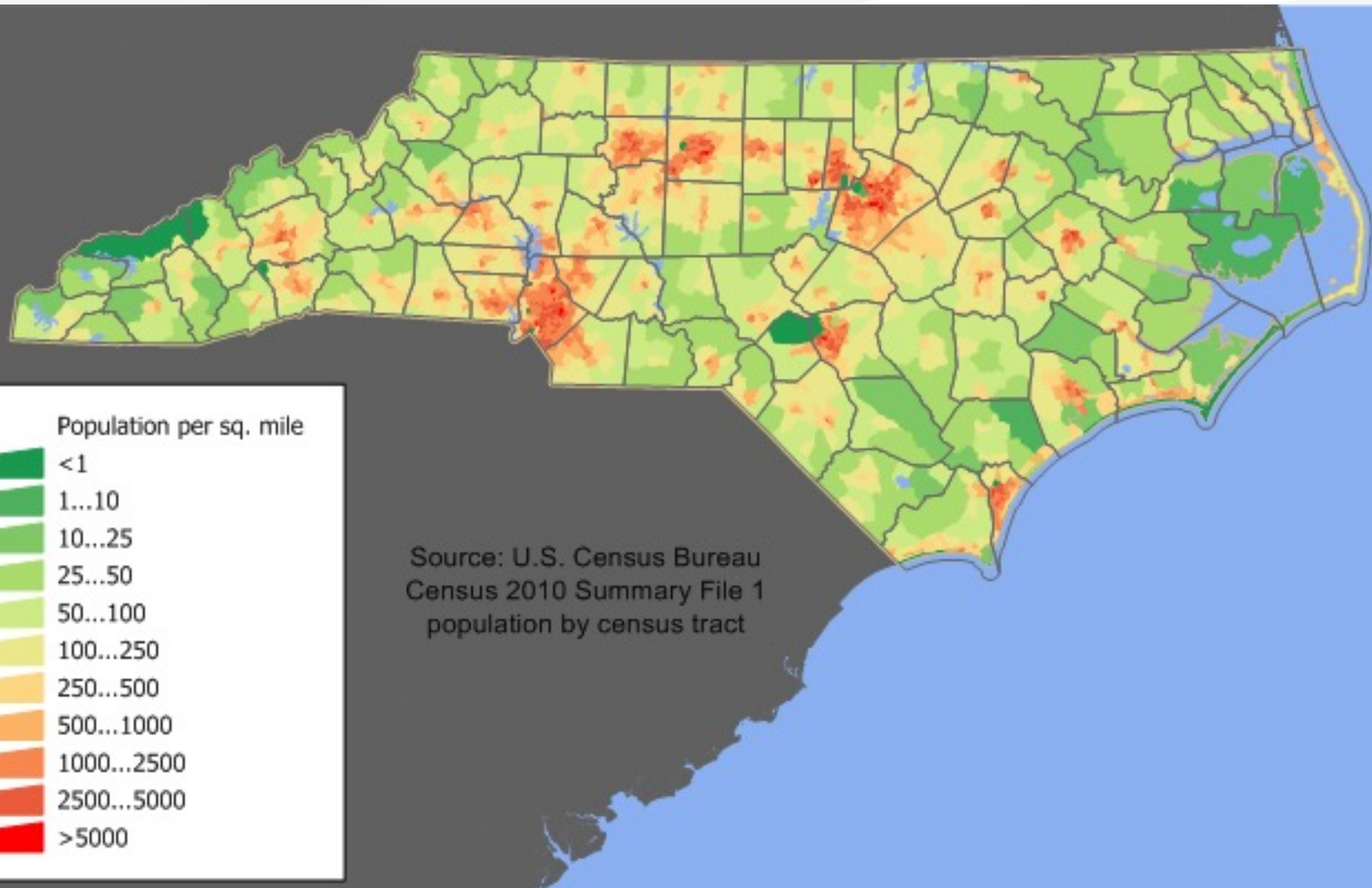


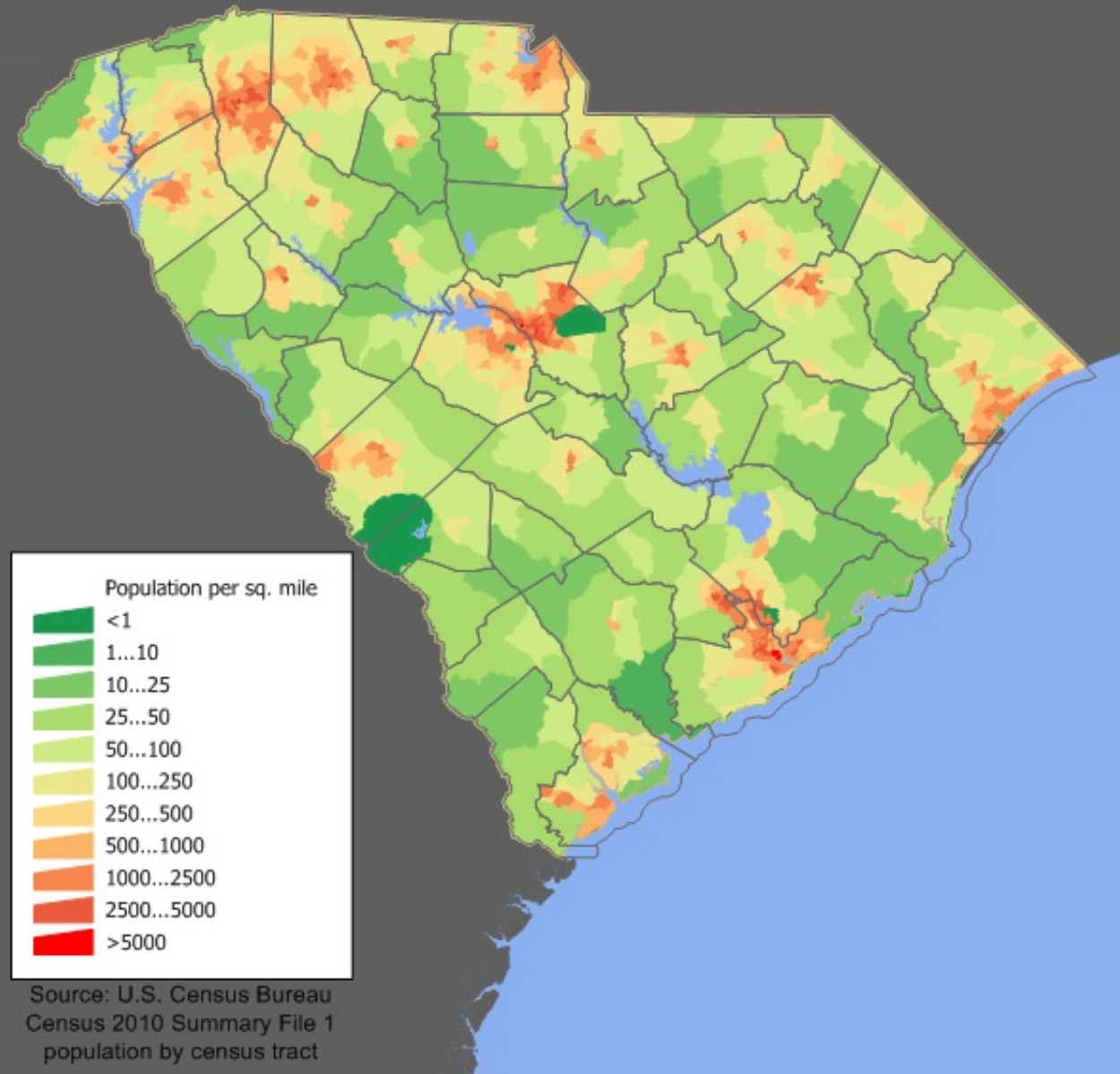




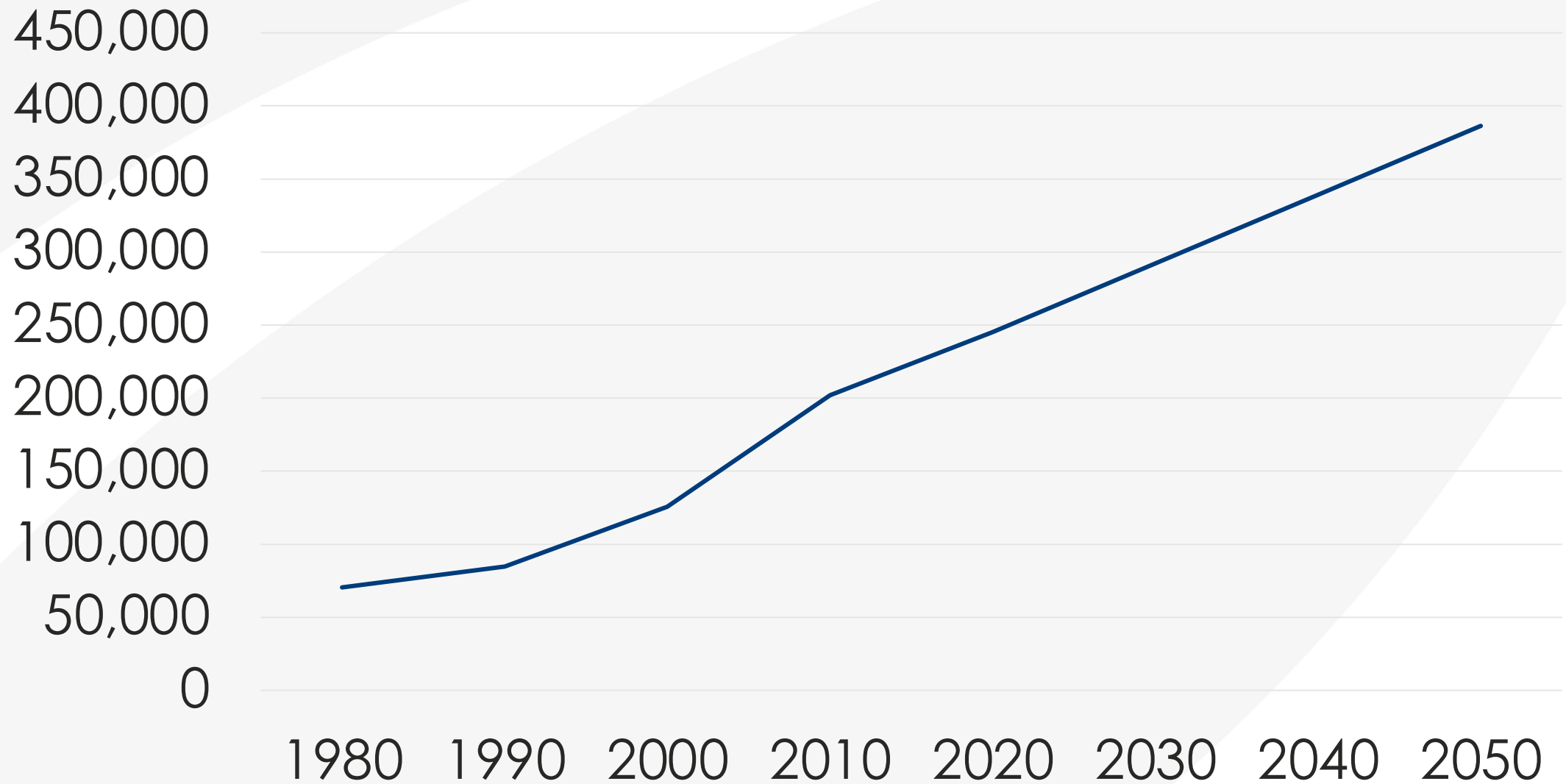
Regional Plan Association

- Piedmont Atlantic Megaregion (aka Charlanta)
- 12% total U.S. population
- I-85 corridor from Charlotte to Atlanta will continue to fill in





Union County Population 1980-2050



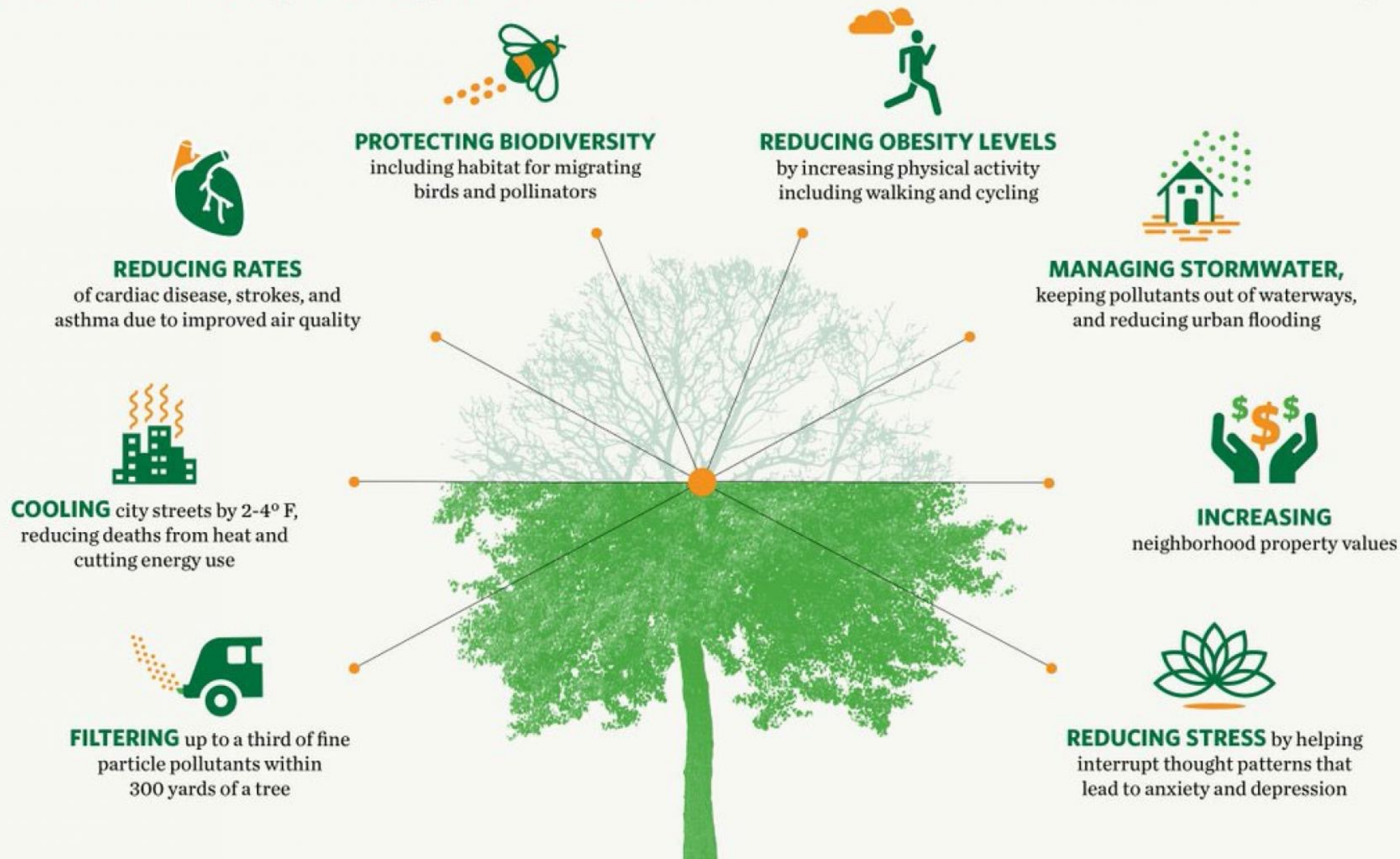
- "Urban trees are the hardest working trees in America."
 - U.S. Forest Service Chief Tom Tidwell





Benefits of Urban Trees

Research has linked the presence of urban trees to...



Tree Benefits and Return on Investment (ROI)

- \$1 invested gives back \$2.25
 - <https://www.greenbiz.com/article/we-calculated-how-much-money-planting-trees-can-save-your-city>
 - iTree
 - Grossly underestimates – only stormwater, carbon sequestration, and air pollution captured
 - Missing
 - Energy savings (shade, urban heat island)
 - Property values
 - Wildlife habitat
 - Mental health
 - Physical health
 - More

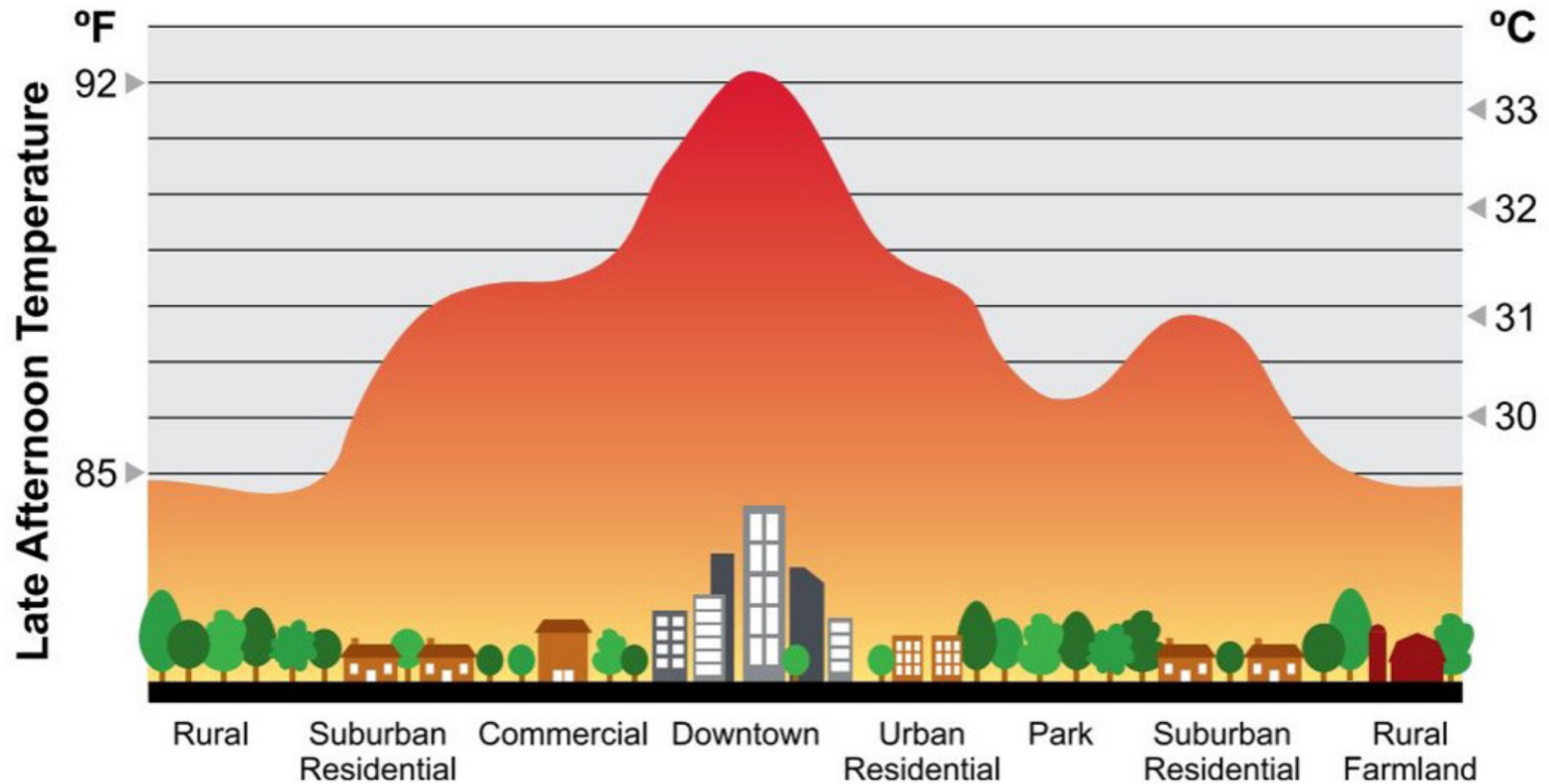
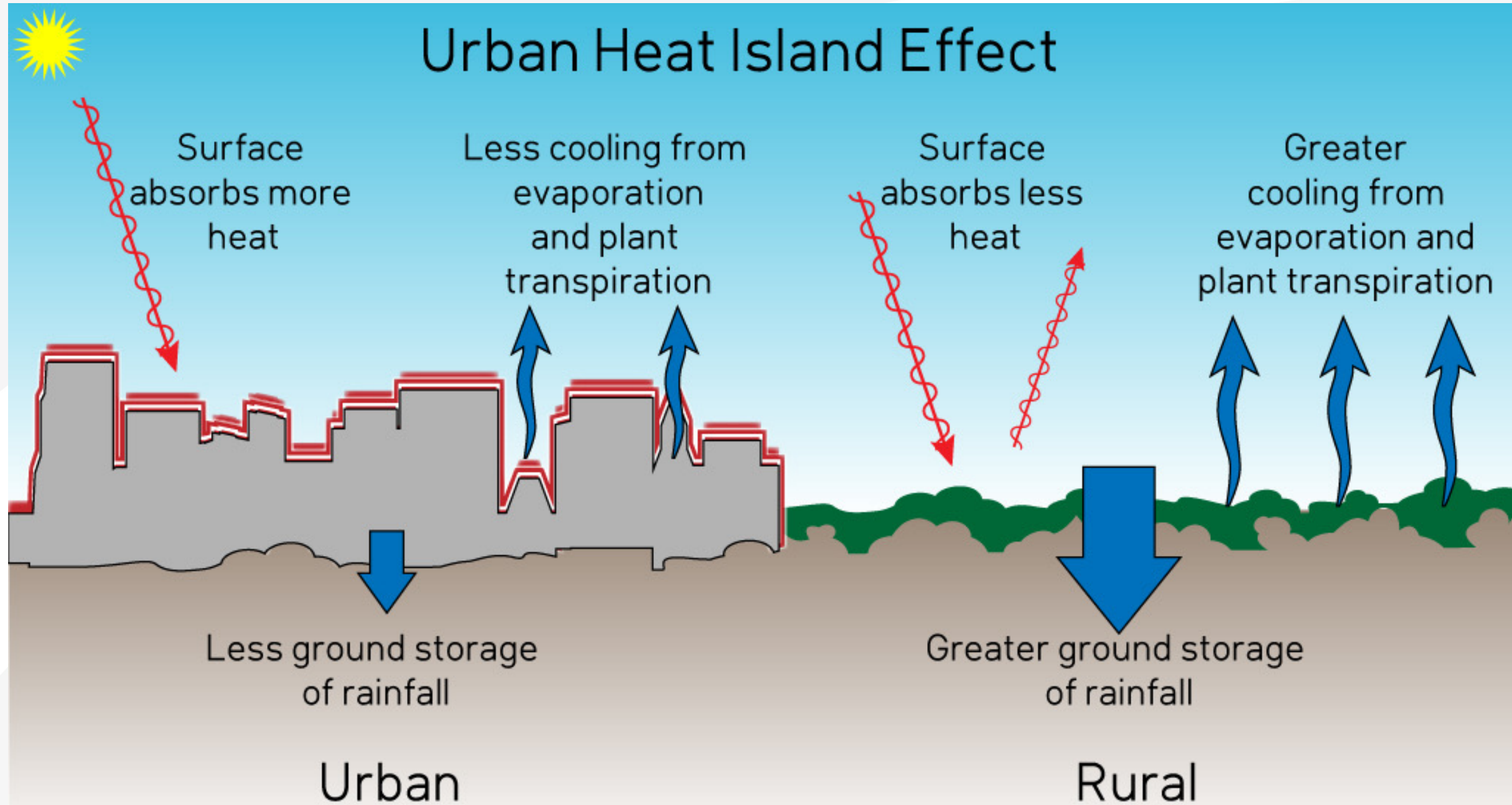
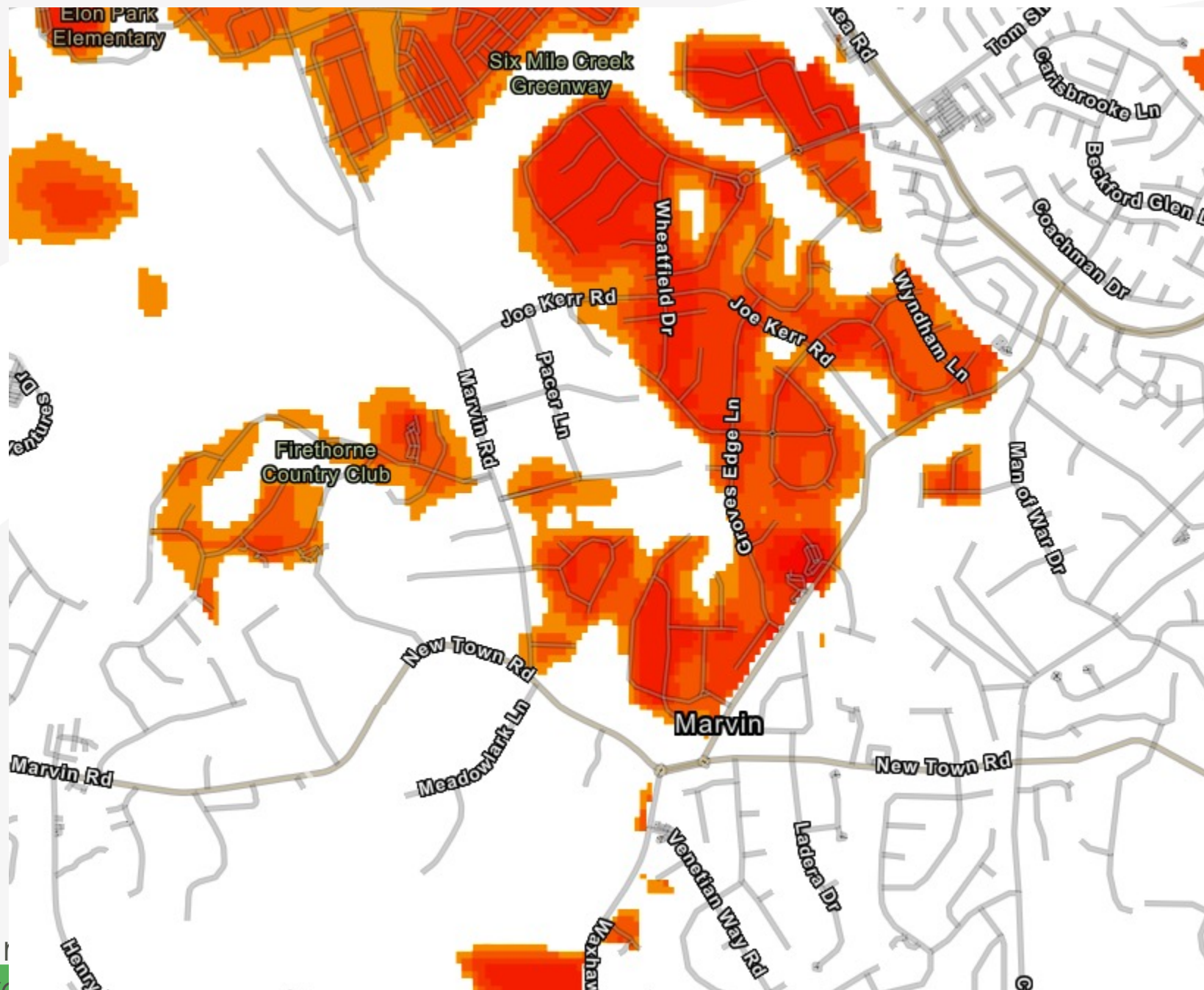


Figure 1: Varying temperatures across rural, commercial, urban and other landscape features (adapted from EPA, 2008).

Urban Heat Island Effect

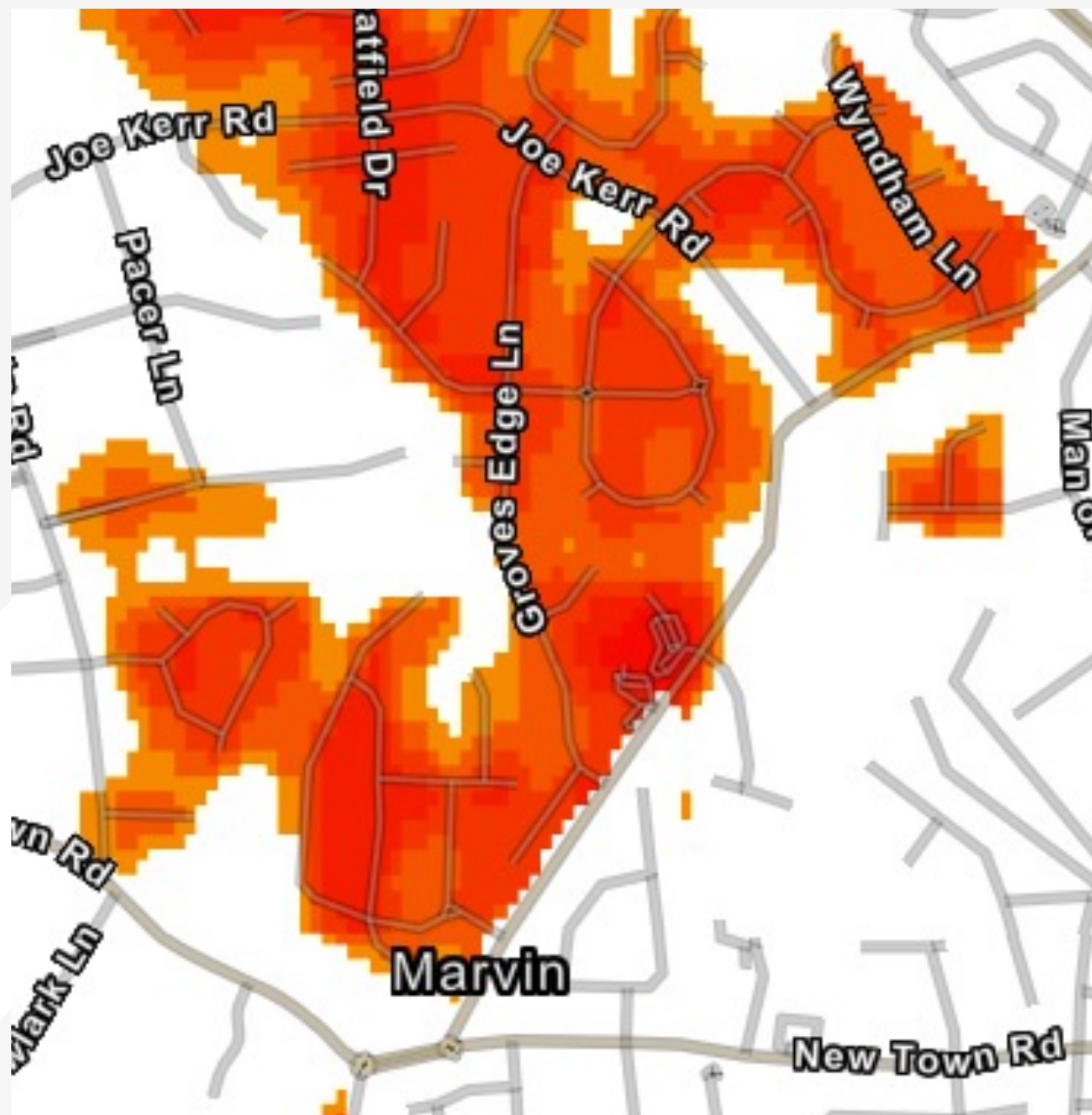






Urban Heat Island

<https://www.arcgis.com/home/main.html?appid=4f6d72766c77416a666667416676672>



Urban Heat Island Severity for US Cities – 2019. The Trust for Public Land.

<https://www.arcgis.com/home/item.html?id=4f6d72903c9741a6a6ee6349f5393572>



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Consider Health Benefits

- New study examined health benefits from trees
- 30 years of street tree planting data from Portland, OR (49,000 street trees)
- cardiovascular, respiratory, or non-accidental causes
- The results reveal lower mortality rates in neighborhoods with more trees planted, and the researchers report this negative association is significant for both cardiovascular and general non-accidental mortality, especially among males and anyone above the age of 65.
- **ROI > 1,000**
- <https://www.sciencealert.com/people-in-portland-planted-trees-decades-later-a-stunning-pattern-emerged>

Northern California Study

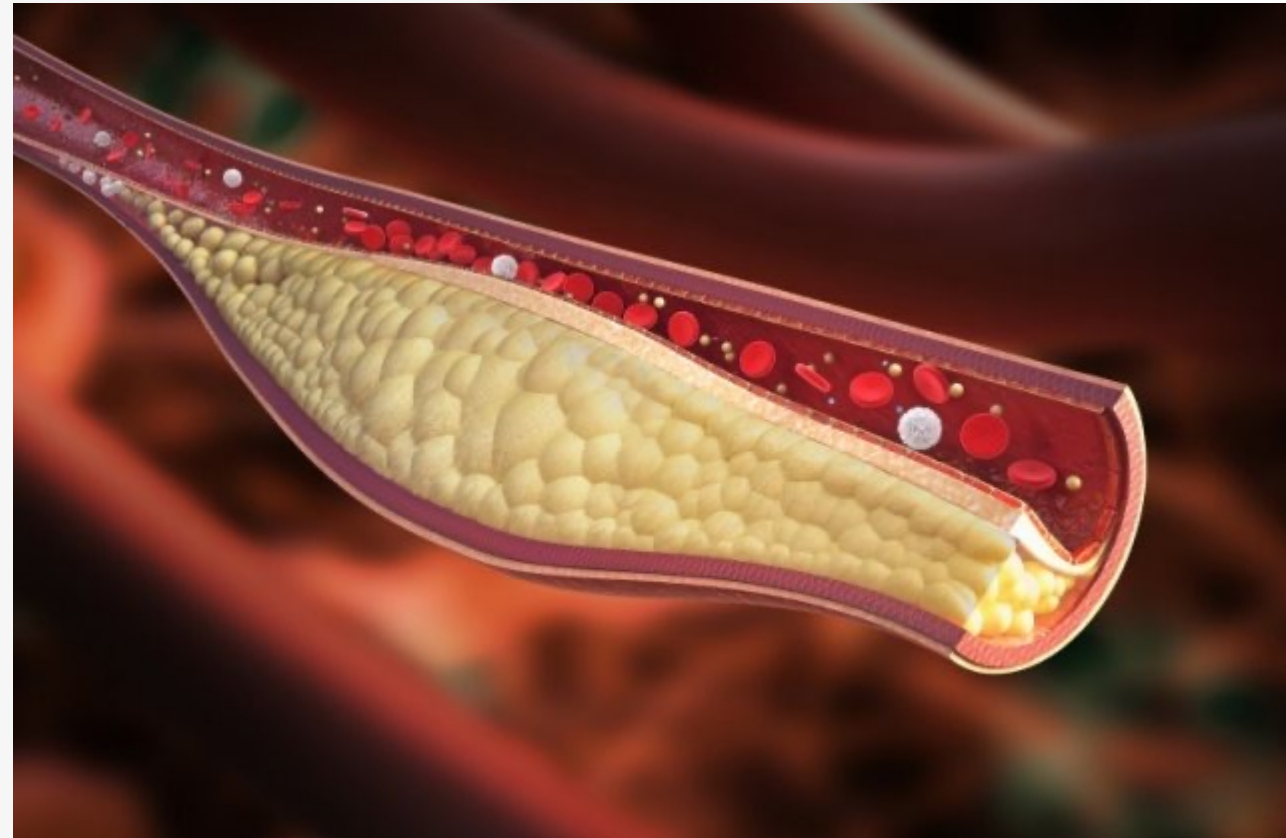
- Health data for 5 million people (Kaiser Permanente)
- Compare health care costs against urban tree canopy
 - Controlled for age, sex, race/ethnicity
 - Controlled for median income, education levels, population and housing density
- People in greenest neighborhoods had \$374/year less in health costs
- "While people who can afford to live in greener areas tend to be wealthier and healthier to begin with, we found that taking those things into account doesn't change our findings. We are as confident of our findings as you can be for this type of study."
- <http://www.dollarsgrowontrees.org/the-northern-california-study>

Functionally, how does this work?

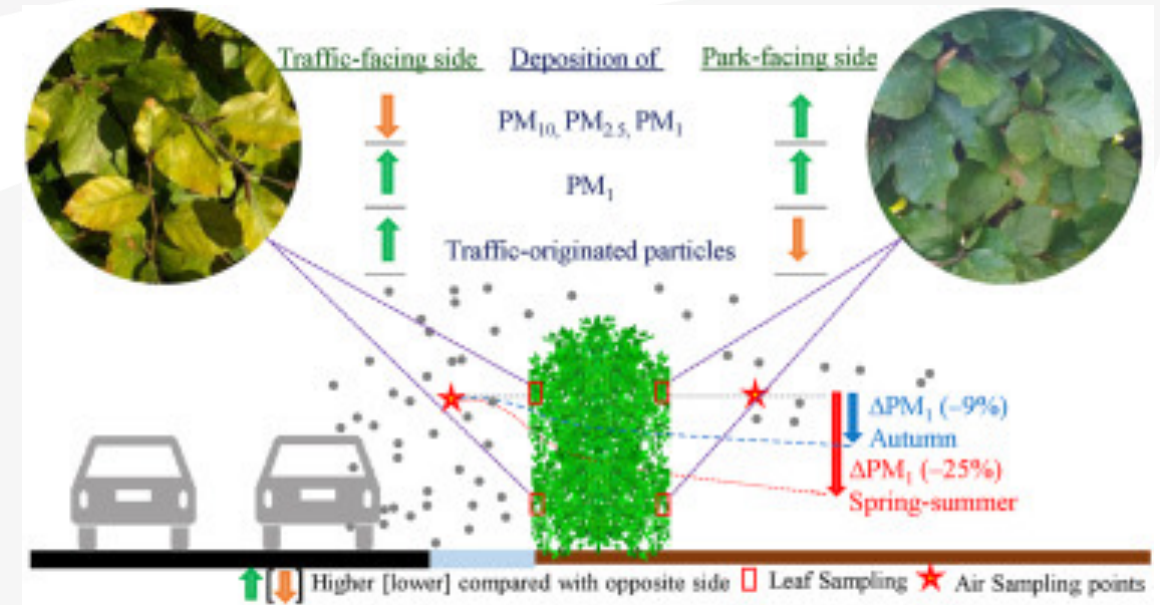
- Portland, OR study
 - air pollution (pm2.5), temperature, and noise (stress)
 - Heart disease
- Northern California study
 - decrease stress, promote healthy behaviors, and improve air quality
 - Heart disease
- Cardiovascular health
 - Preventing health problems (heart disease)
 - Encouraging healthy behaviors (which prevent health problems)

Linking Air Pollution and Heart Disease

- a direct link between air pollution and atherosclerosis, which is a buildup of plaque in the coronary artery that can affect heart health
- Air pollution = particulate matter and nitrogen oxides
- Vehicle emissions
- <https://www.epa.gov/sciencematters/linking-air-pollution-and-heart-disease>



- Urban road greenbelt configuration: The perspective of PM_{2.5} removal and air quality regulation, 2021, Wu et al. Environment International. <https://doi.org/10.1016/j.envint.2021.106786>
- The impacts of existing and hypothetical green infrastructure scenarios on urban heat island formation, Tiwari et al. 2021, Environmental Pollution. <https://doi.org/10.1016/j.envpol.2020.115898>



INDIVIDUAL



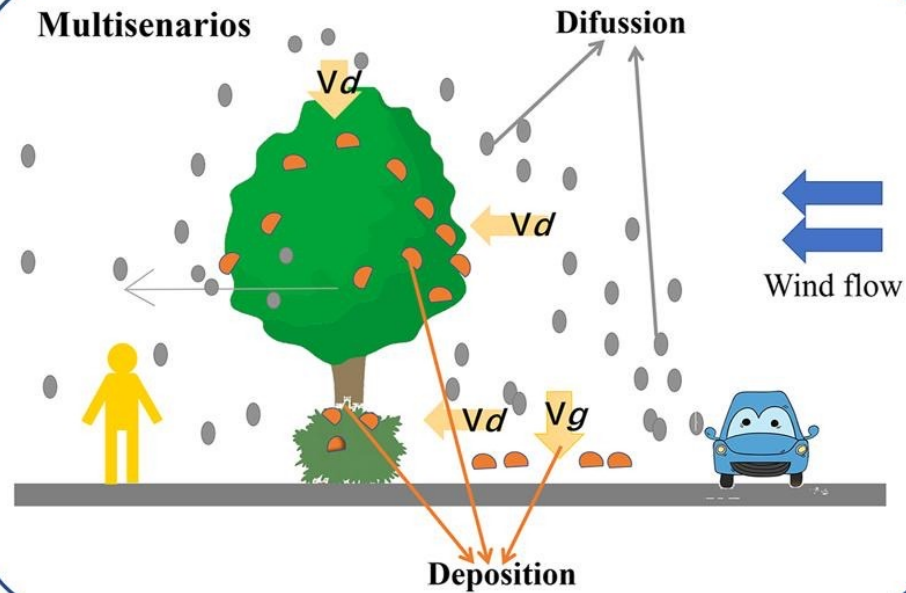
Plant species

COMMUNITY



RGB structure

Multisenarios



Goal-based decision on RGB configuration

Pedestrian protection	Shrub	Arbor	Arbor + Shrub
Maximum retention	Shrub	Arbor	Arbor + Shrub

Priority ranking: ■ > ■ > ■

- Reducing Harm
 - Air Pollutants and Respiratory Condition
 - Tree Pollen and Volatile Organic Compounds
 - Excess Heat and Thermal Comfort
 - Ultraviolet Radiation and Crime
- Restoring Health Capacity
 - Cognition and Attention
 - Anxiety and Mood
 - Psychophysiological Stress
- Building Capacities
 - Active Living and Obesity
 - Cardiovascular Function
 - Birth Outcomes
 - Immune System
 - Social Cohesion and Mental Health

Meta-analysis of over 200 studies on urban trees and human health

Wolf, Kathleen L., et al. "Urban trees and human health: A scoping review." *International journal of environmental research and public health* 17.12 (2020): 4371.

Consider Property Values

- Compare sales price against tree canopy coverage
- “The average (mean) effect of tree canopy across all six communities was an increase of approximately USD \$780 per one percent increase in tree cover. This indicates the average value of tree canopy is \$20,226 or **10.7% of the sale price of the home.**”
- Dimke et al., 2013. The Effect of Landscape Trees on Residential Property Values of Six Communities in Cincinnati, Ohio.

Property Values

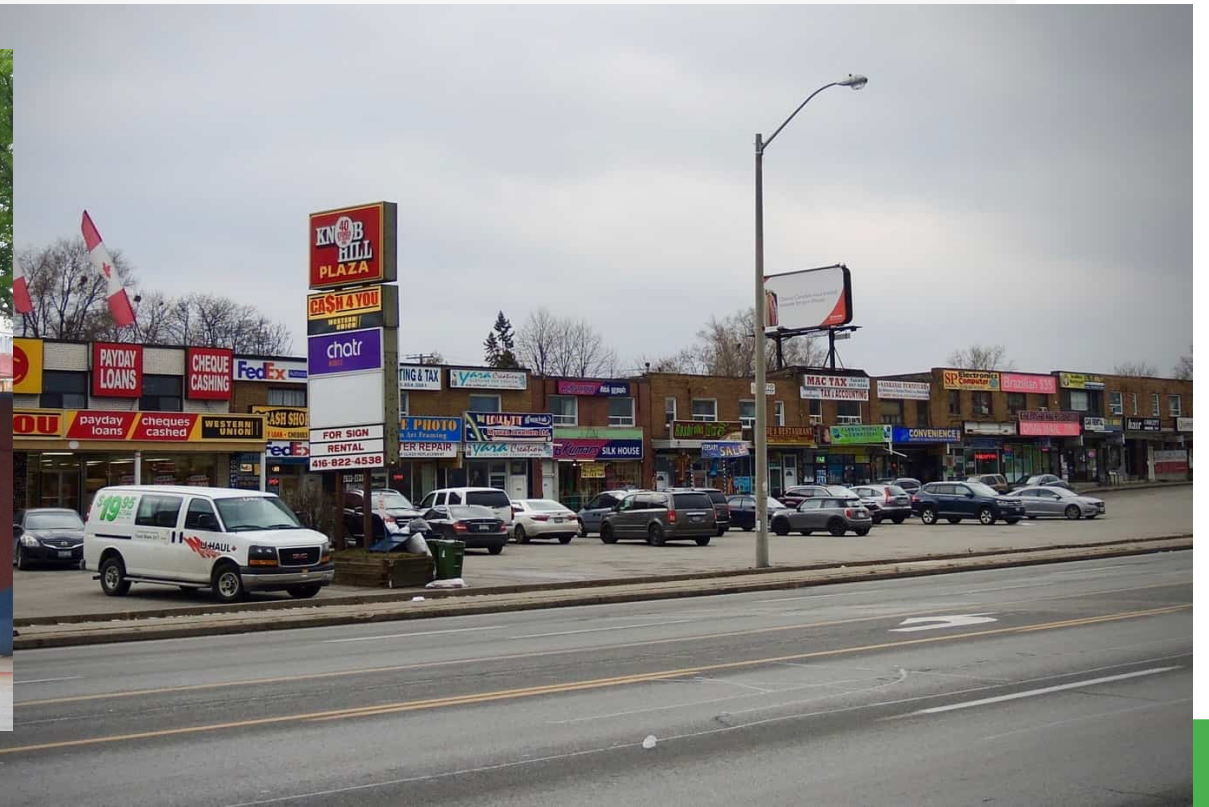
- Having large trees in yards along streets increases a home's value from 3 percent to 15 percent.

- Wolf, Kathleen L, PhD, University of Washington (2007) *City Trees and Property Values*. *Arborist News*. 16, 4:34-36.

- Trees can be a stimulus to economic development, attracting new business and tourism. Commercial retail areas are more attractive to shoppers, apartments rent more quickly, tenants stay longer, and space in a wooded setting is more valuable to sell or rent. *The Arbor Day Foundation*

Retail

- Shoppers want to spend more time/money in comfortable spaces
- https://nacto.org/docs/usdg/city_trees_retail_wolf.pdf





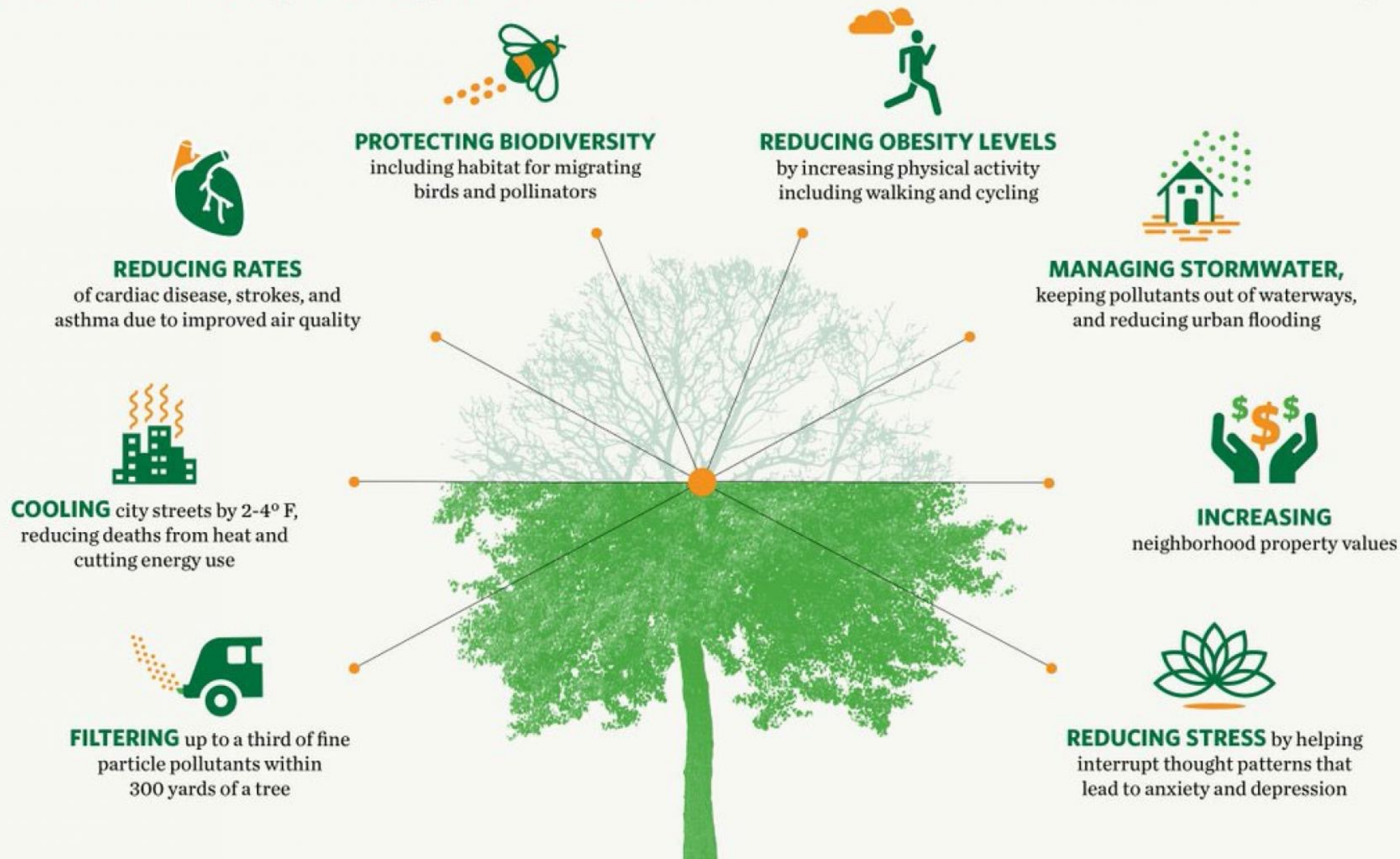


What is the Point?

- Urban Forestry is **not** just aesthetics
- Enormous Value \$\$\$ to our Communities
 - Return on Investment

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TreesUnion

- Our mission is to preserve, grow, and diversify the public and private tree canopy in Union County, NC.

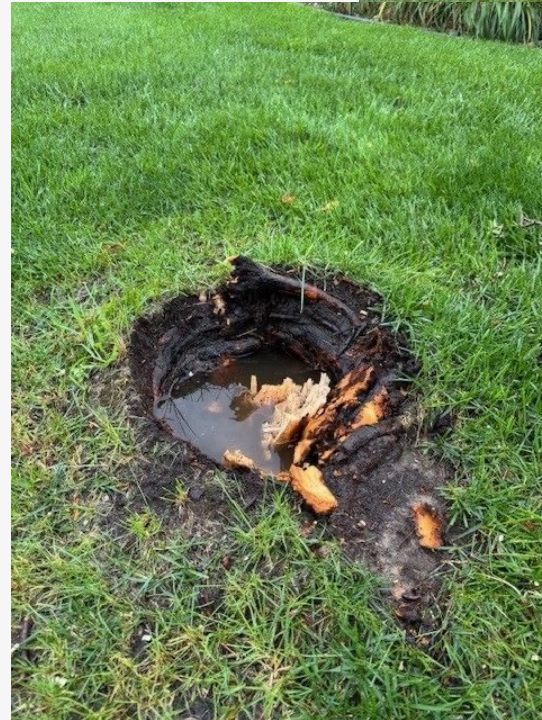


TREES UNION

Tree Care Basics



Tree Care Basics



Tree Care Basics



Tree Care Basics



Tree Care Basics

- 3 inches thick hardwood mulch
- ½" compost each year
- Lime
- Osmocote (15-9-12) (5-3-4 or 3-1-2 ratio)
- Supplemental Water

Ambrosia Beetles





Questions?

