

UNDERSTANDING URBAN FORESTS and THEIR ROLE IN COMMUNITY VITALITY

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PRESENTATION OUTLINE

- **The triple bottom line of sustainability**
- **Population demographics and urbanization**
- **Tree canopy cover in urban areas**
- **Urban forests and green infrastructure**
- **Sustaining urban forests**



THE TRIPLE BOTTOM LINE OF SUSTAINABILITY

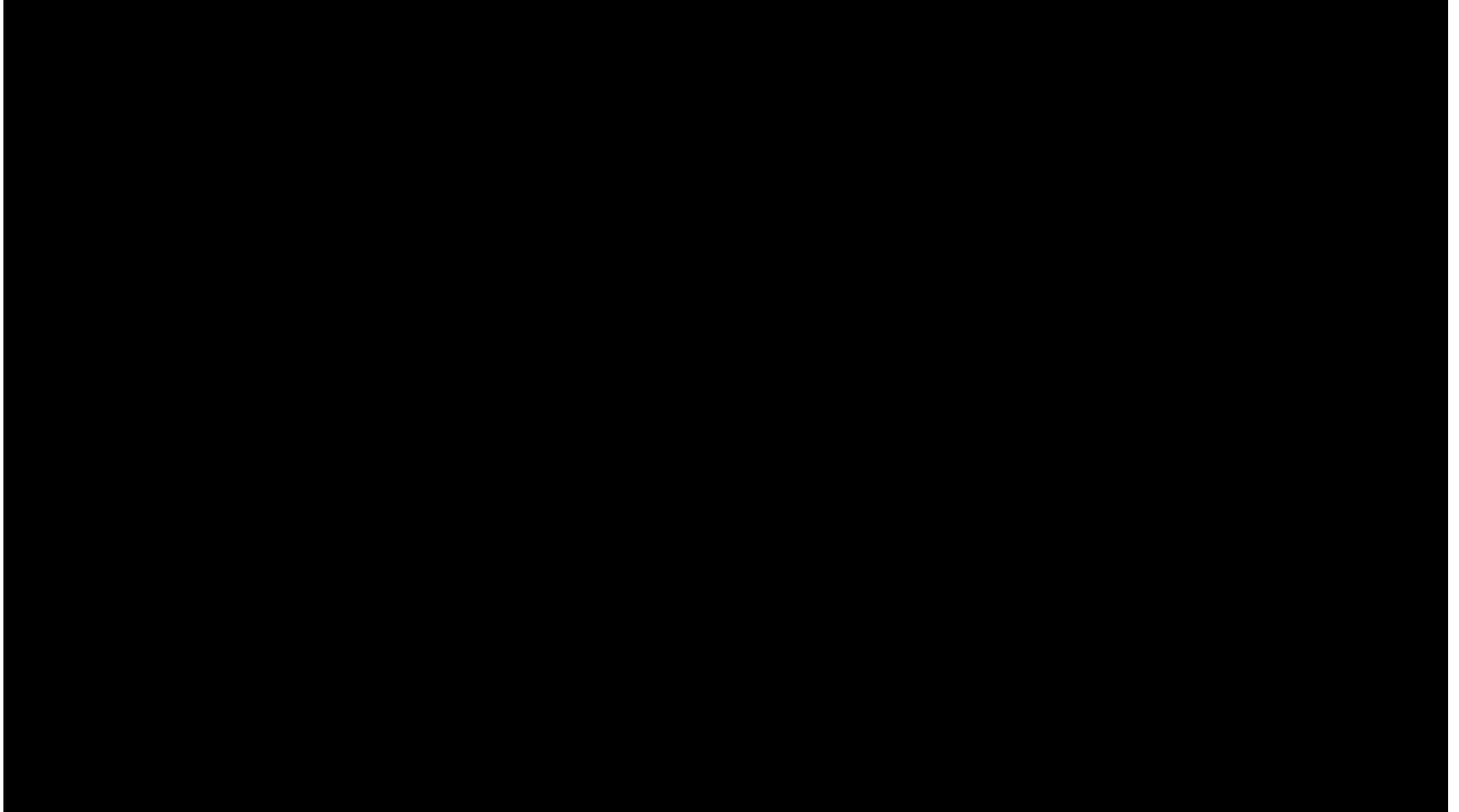


Source: blog.chainpoint.com/blog/triple-bottom-line-measuring-social-and-environmental-kpis



Source: twitter.com/theplanetisno1

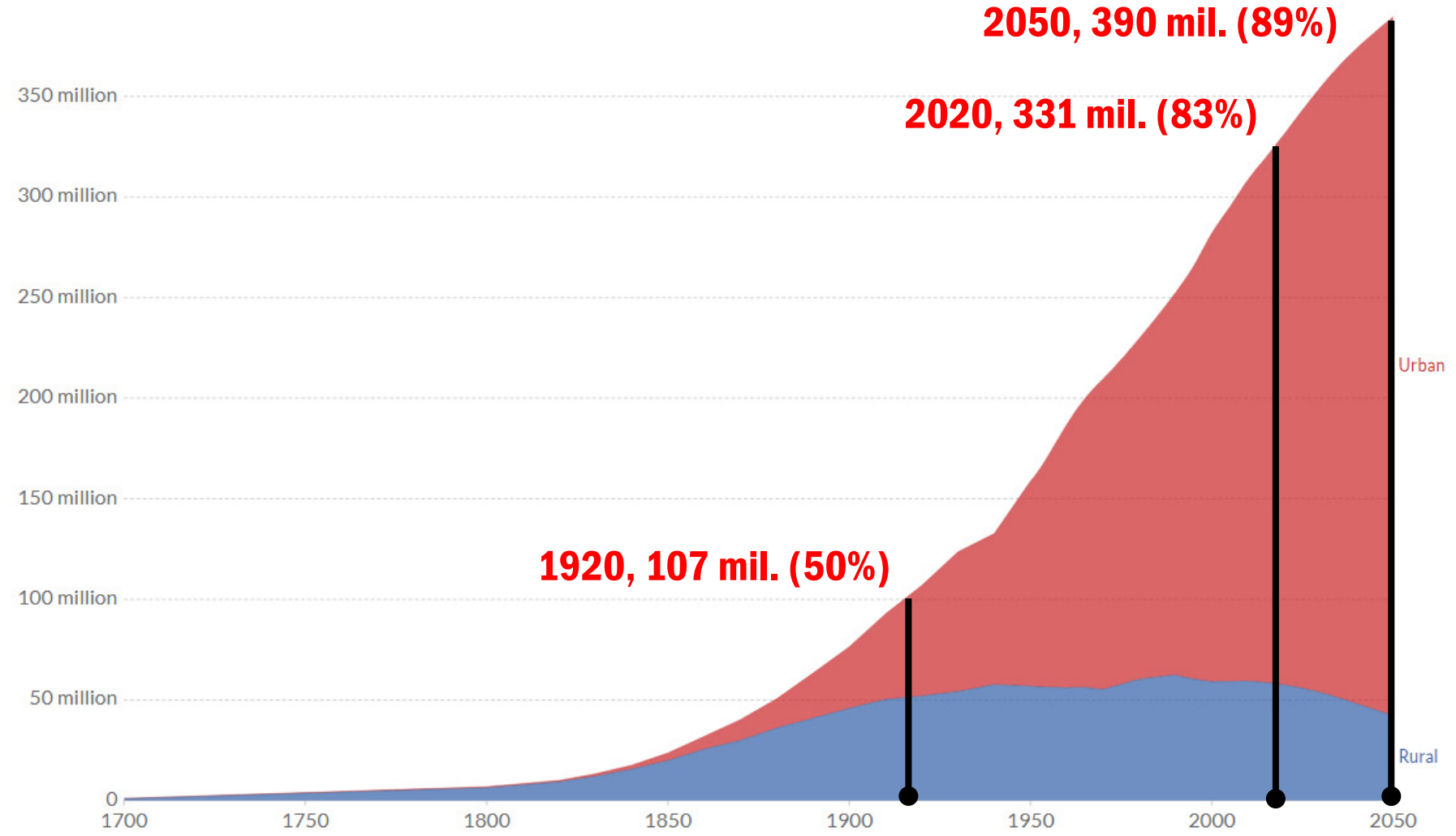
URBAN FORESTS MAKE CITIES VIBRANT



POPULATION DEMOGRAPHICS and URBANIZATION

Urban and rural population projected to 2050, United States, 1700 to 2050

Total urban and rural population, given as estimates to 2016, and UN projections to 2050. Projections are based on the UN World Urbanization Prospects and its median fertility scenario.



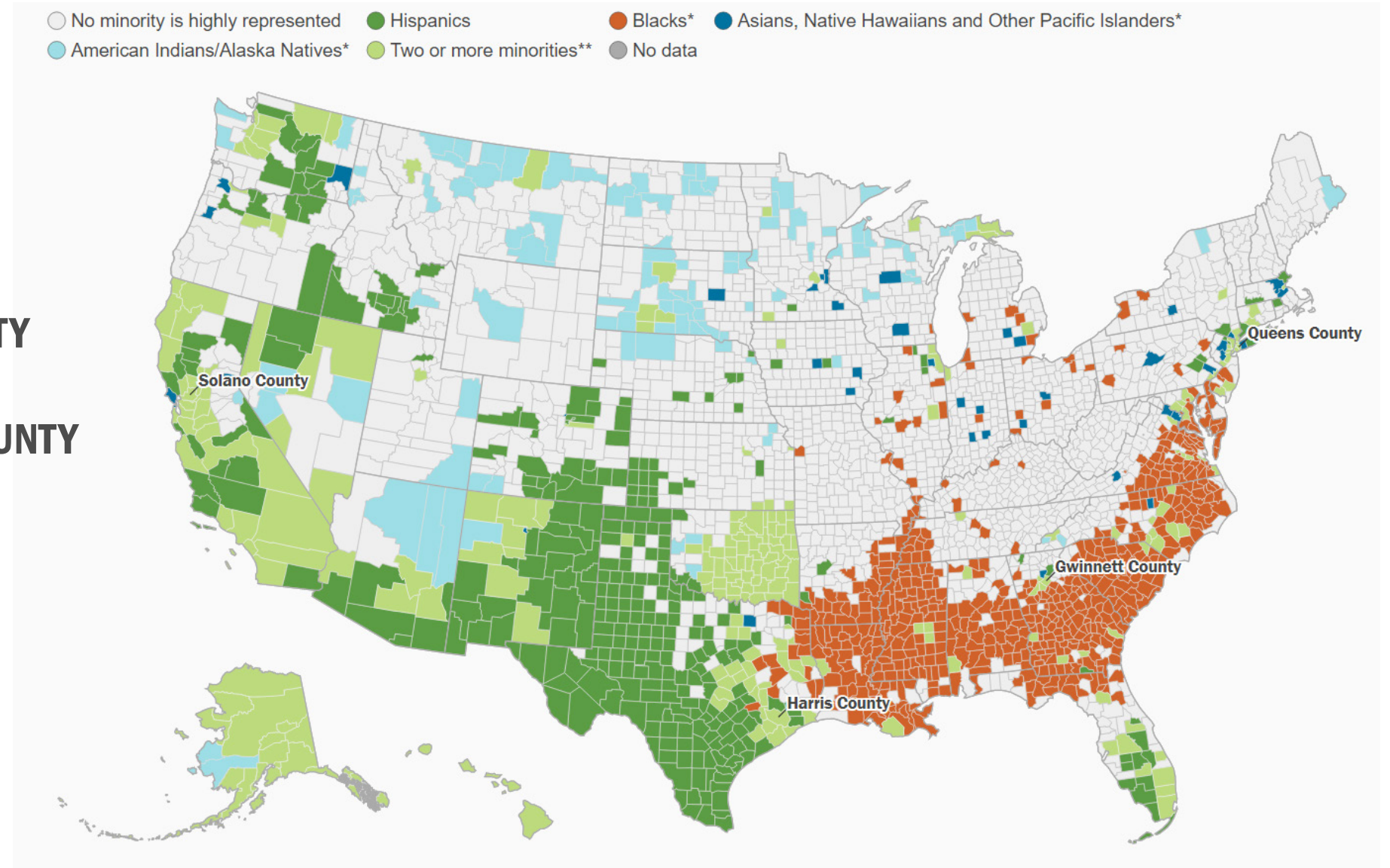
Source: ourworldindata.org/urbanization

Source: OWID based on UN World Urbanization Prospects 2018 and historical sources (see Sources)

CC BY

POPULATION DEMOGRAPHICS and URBANIZATION

RACE-ETHNIC MINORITY GROUPS HIGHLY REPRESENTED, BY COUNTY

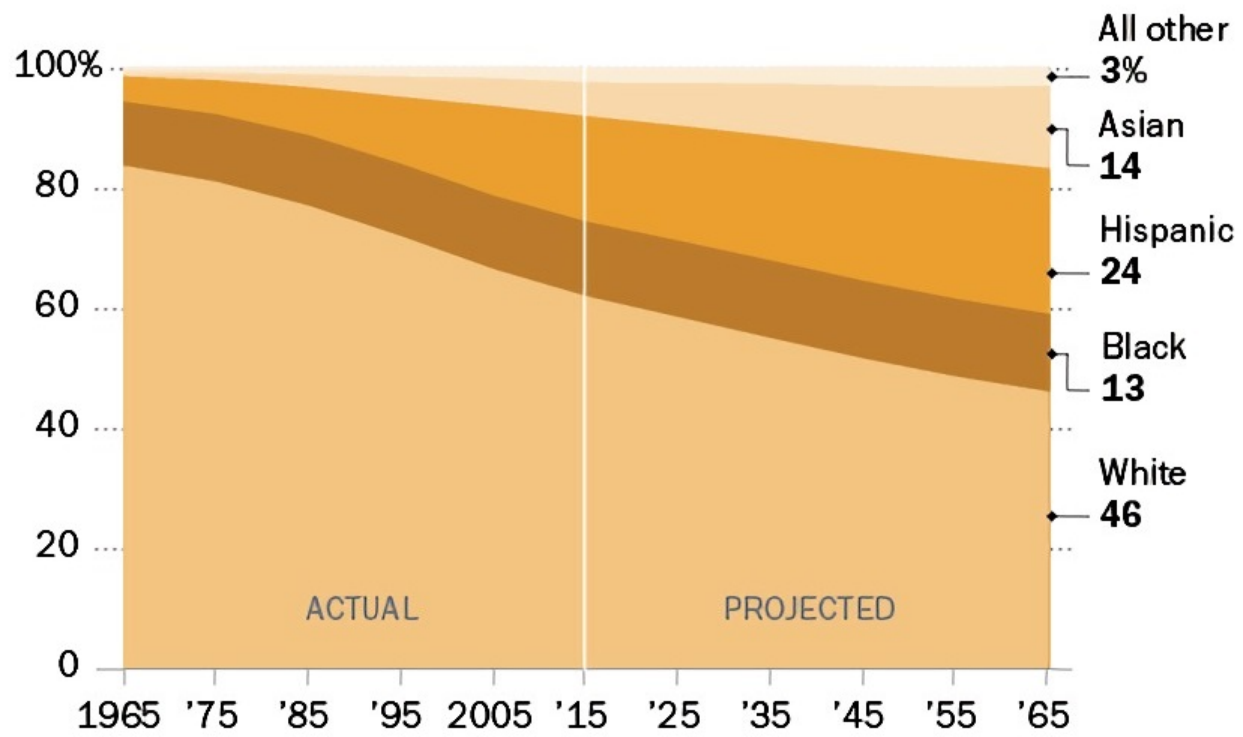


Source: www.brookings.edu/research/americas-racial-diversity-in-six-maps

POPULATION DEMOGRAPHICS and URBANIZATION

The changing face of America, 1965-2065

% of the total population





HISPANIC AND ASIAN POPULATIONS ARE FASTEST GROWING MINORITY POPULATIONS

Note: Whites, blacks and Asians include only single-race non-Hispanics; Asians include Pacific Islanders. Hispanics can be of any race.
Source: Pew Research Center 2015 report, "Modern Immigration Wave Brings 59 Million to US, Driving Population Growth and Change Through 2065"

Source: www.pewresearch.org/fact-tank/2016/03/31/10-demographic-trends-that-are-shaping-the-u-s-and-the-world


POPULATION DEMOGRAPHICS and URBANIZATION



 


Heat and Health in American Cities

Racist Housing Practices From The 1930s Linked To Hotter Neighborhoods Today

January 14, 2020 · 2:38 PM ET
Heard on All Things Considered

 MEG ANDERSON

 3-Minute Listen 



Vacant rowhouses line a portion of Franklin Square, a formerly redlined neighborhood in Baltimore. New research shows many communities subjected to discriminatory housing practices in the 1930s are hotter today.

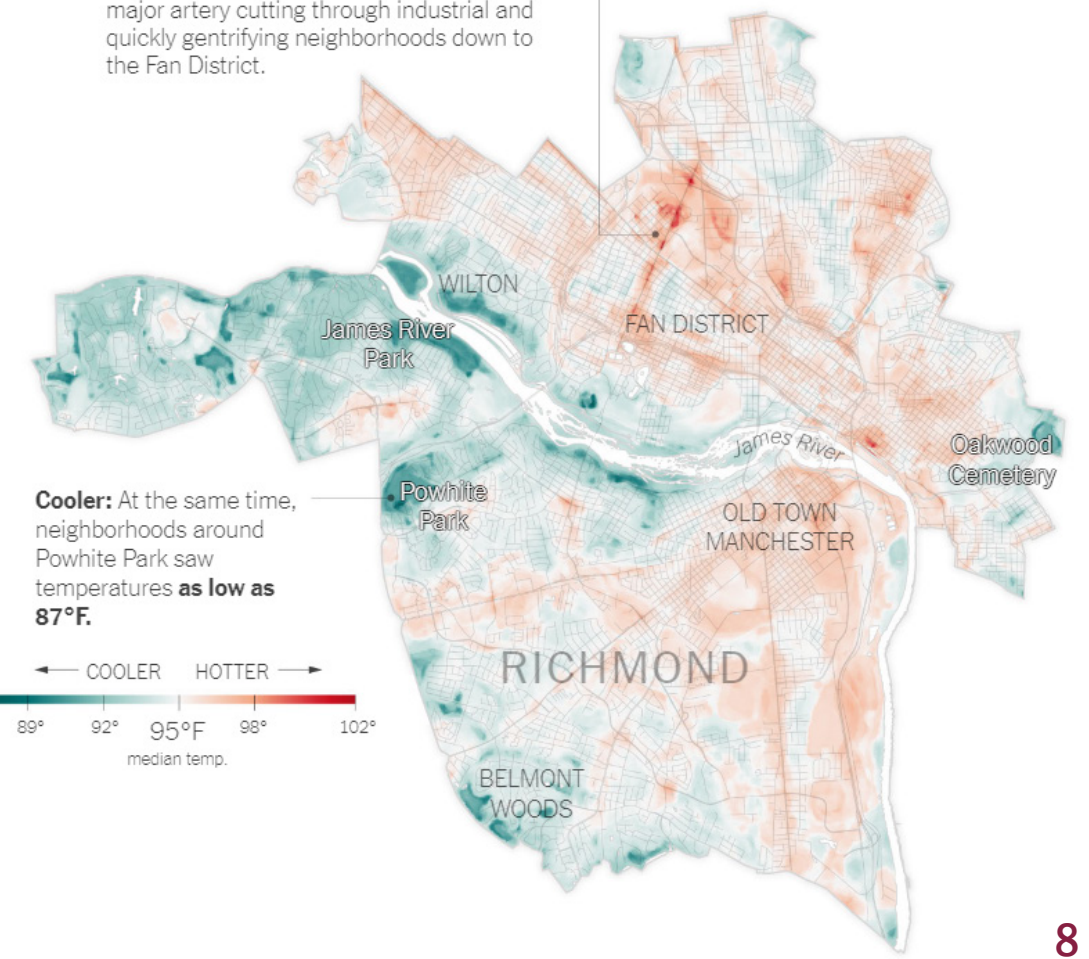
Ian Morton for NPR

The New York Times

Summer in the City Is Hot, but Some Neighborhoods Suffer More

By Nadja Popovich and Christopher Flavelle Aug. 9, 2019

Hotter: Afternoon temperatures **over 100°F** were found along Arthur Ashe Boulevard, a major artery cutting through industrial and quickly gentrifying neighborhoods down to the Fan District.



POPULATION DEMOGRAPHICS and URBANIZATION

Between 2010 and 2060, urban land is projected to increase another 95.5 million acres to 163.1 million acres (8.6%) with 18 states projected to have an increase of over 2 million acres.

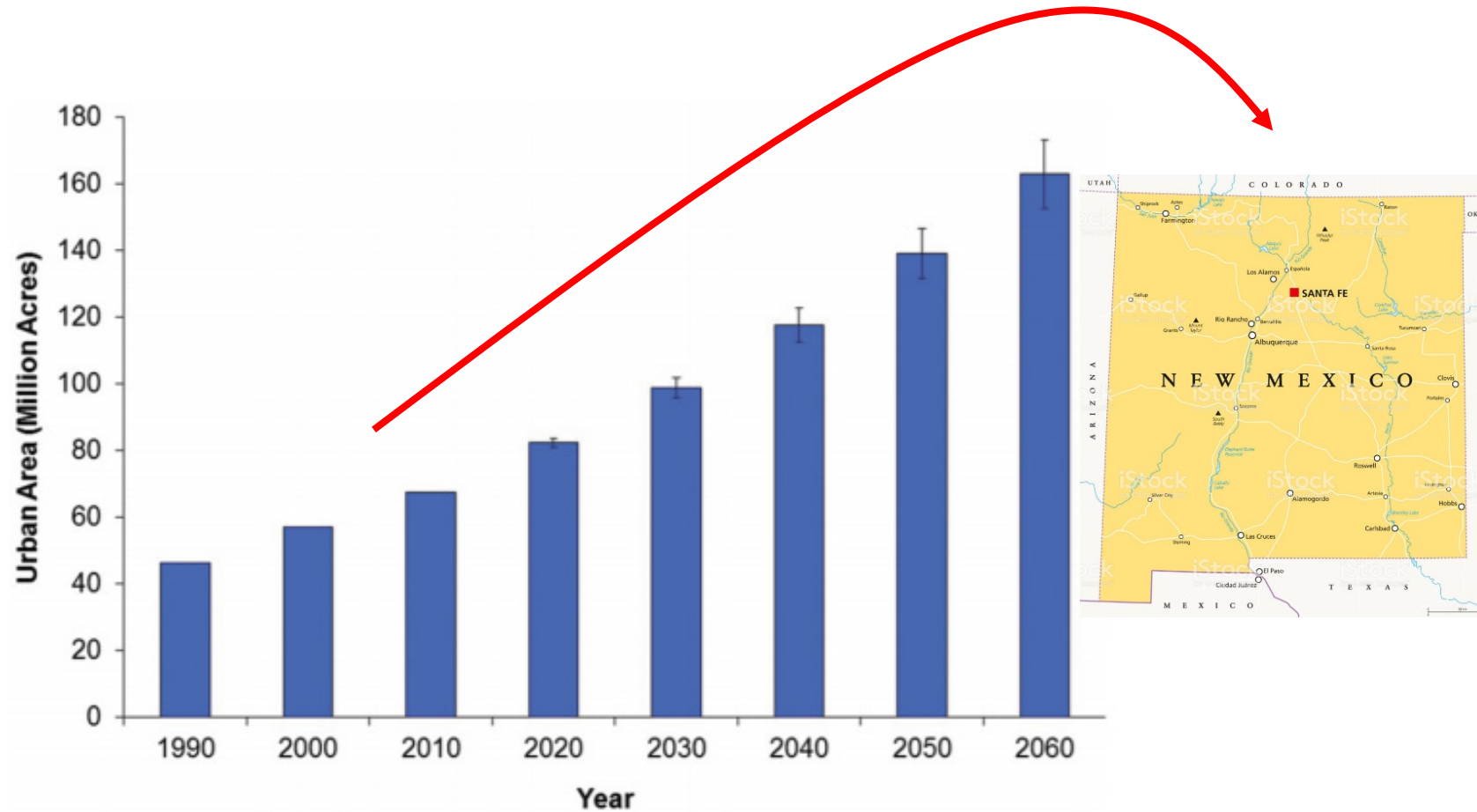


Figure 3. Projected percent of land classified as urban in the conterminous United States. Error bars indicate estimate given plus or minus one standard error of growth.

Source: Nowak, D. J., & Greenfield, E. J. (2018). US urban forest statistics, values, and projections. *Journal of Forestry*, 116(2), 164-177.

POPULATION DEMOGRAPHICS and URBANIZATION

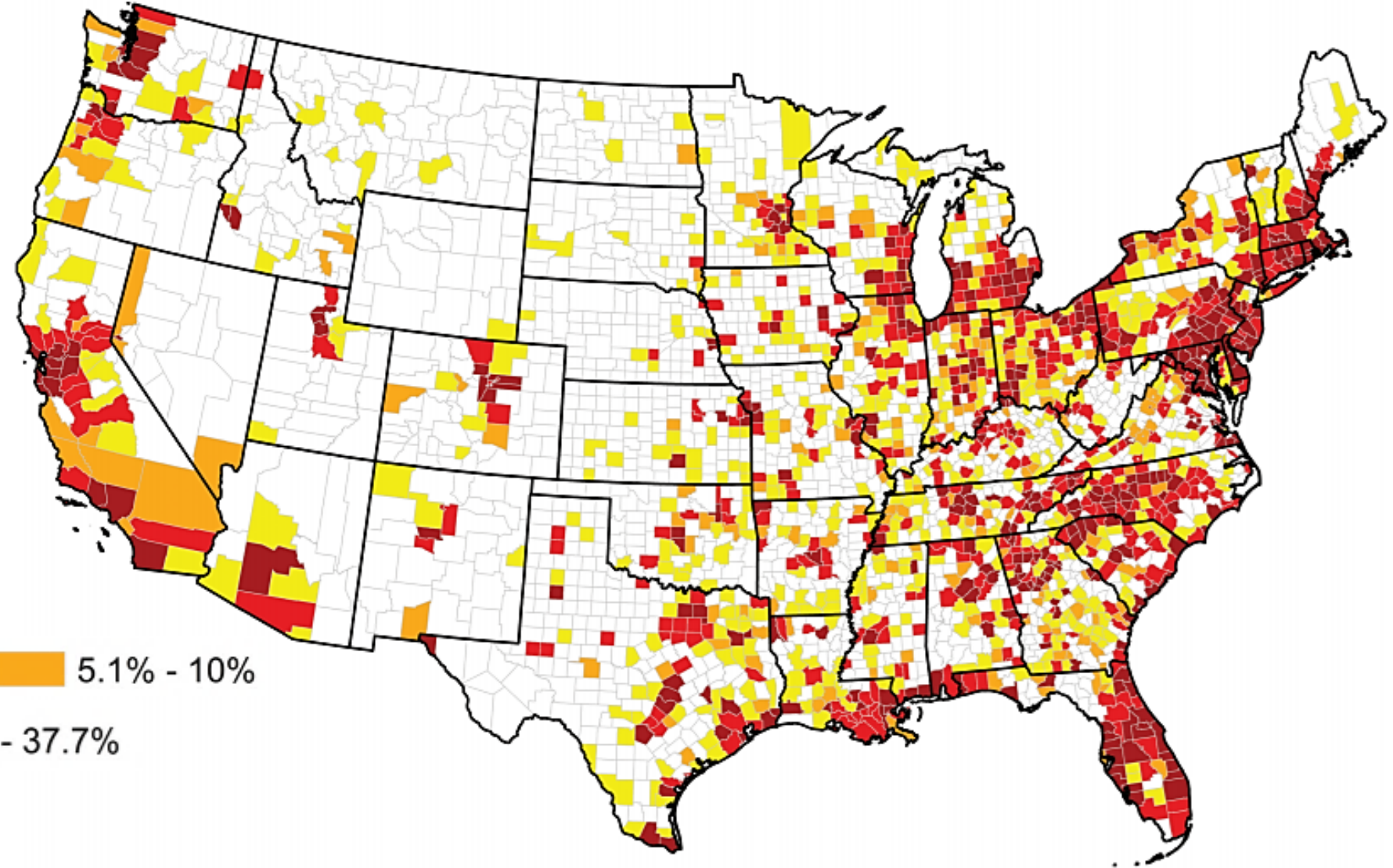
Growth in percent urban land by county (2010–2060).

David J. Nowak and Eric J. Greenfield

J. For. 116(2):164–177

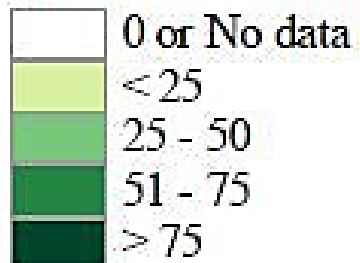
doi: 10.1093/jofore/fvx004

Copyright © 2018 Society of American Foresters

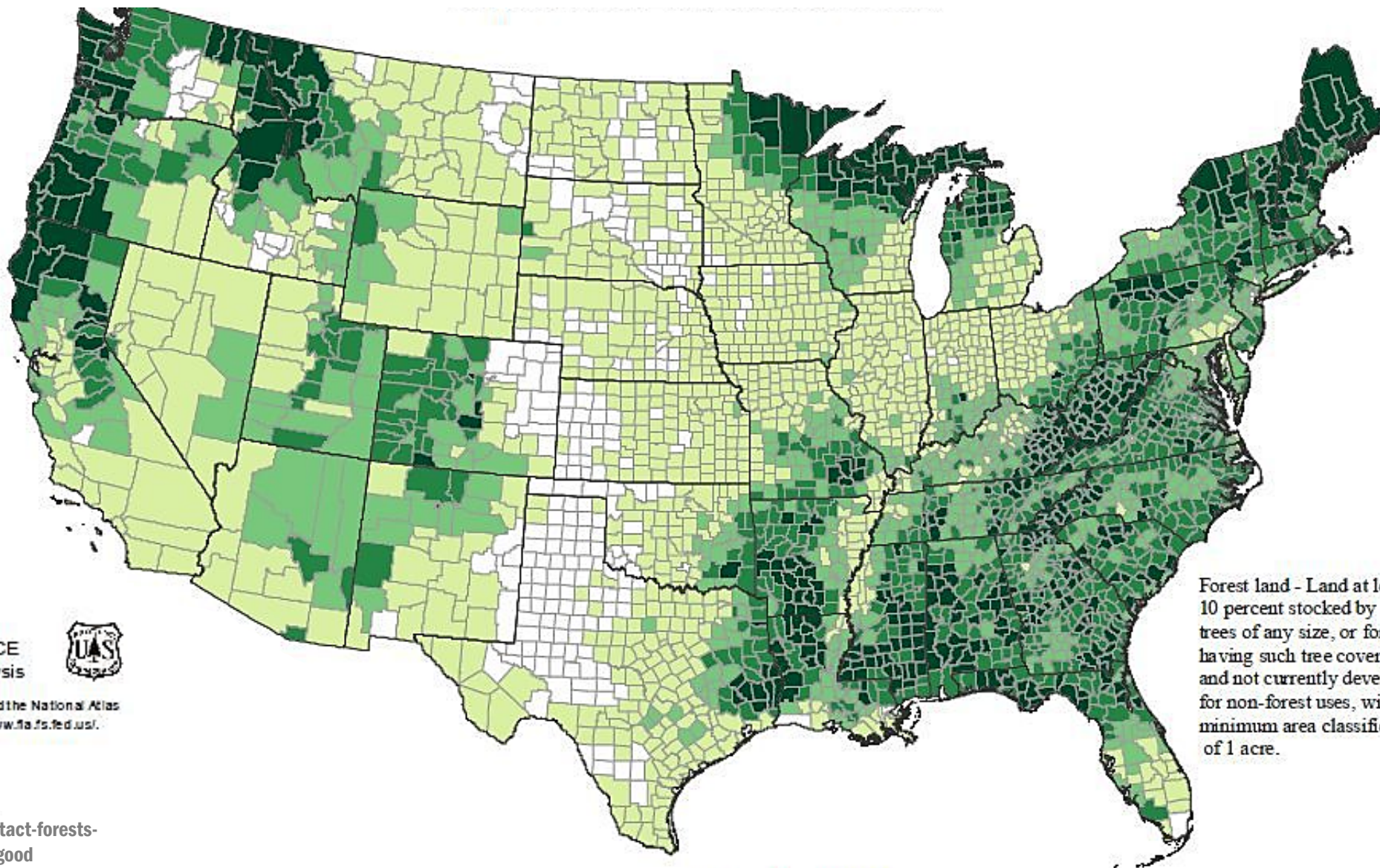


POPULATION DEMOGRAPHICS and URBANIZATION

Percent forest land



Average = 37



Forest land - Land at least 10 percent stocked by trees of any size, or formerly having such tree cover, and not currently developed for non-forest uses, with a minimum area classification of 1 acre.



USDA FOREST SERVICE
Forest Inventory & Analysis

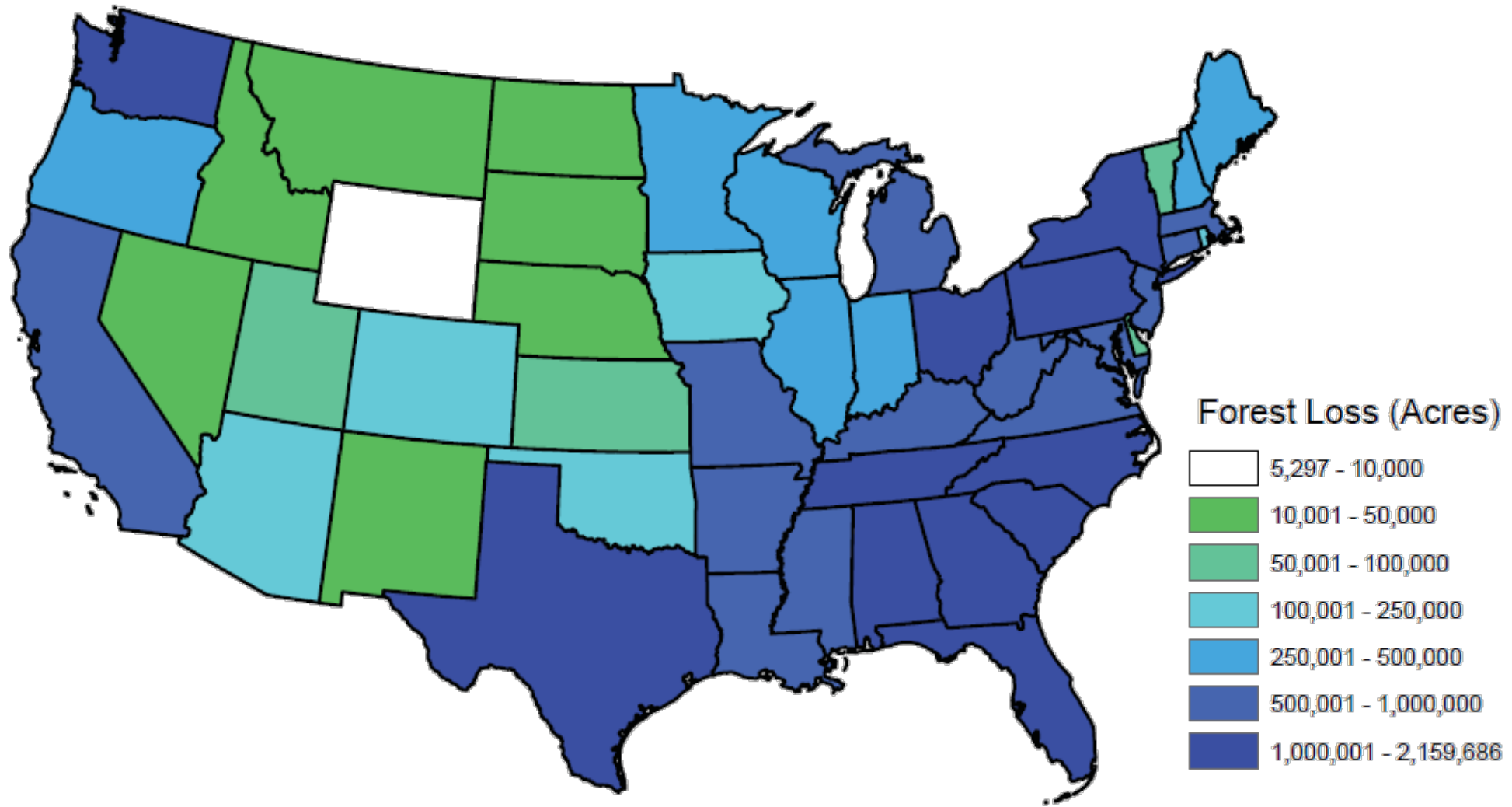


Sources: USDA Forest Service, 2007 RPA data and the National Atlas of the United States. For information visit: <http://www.fia.fs.fed.us/>.
Produced March, 2009. Author: D. Gormanson.

Source: biobrief.org/strengthening-usas-intact-forests-mitigates-climate-change-serves-greatest-good

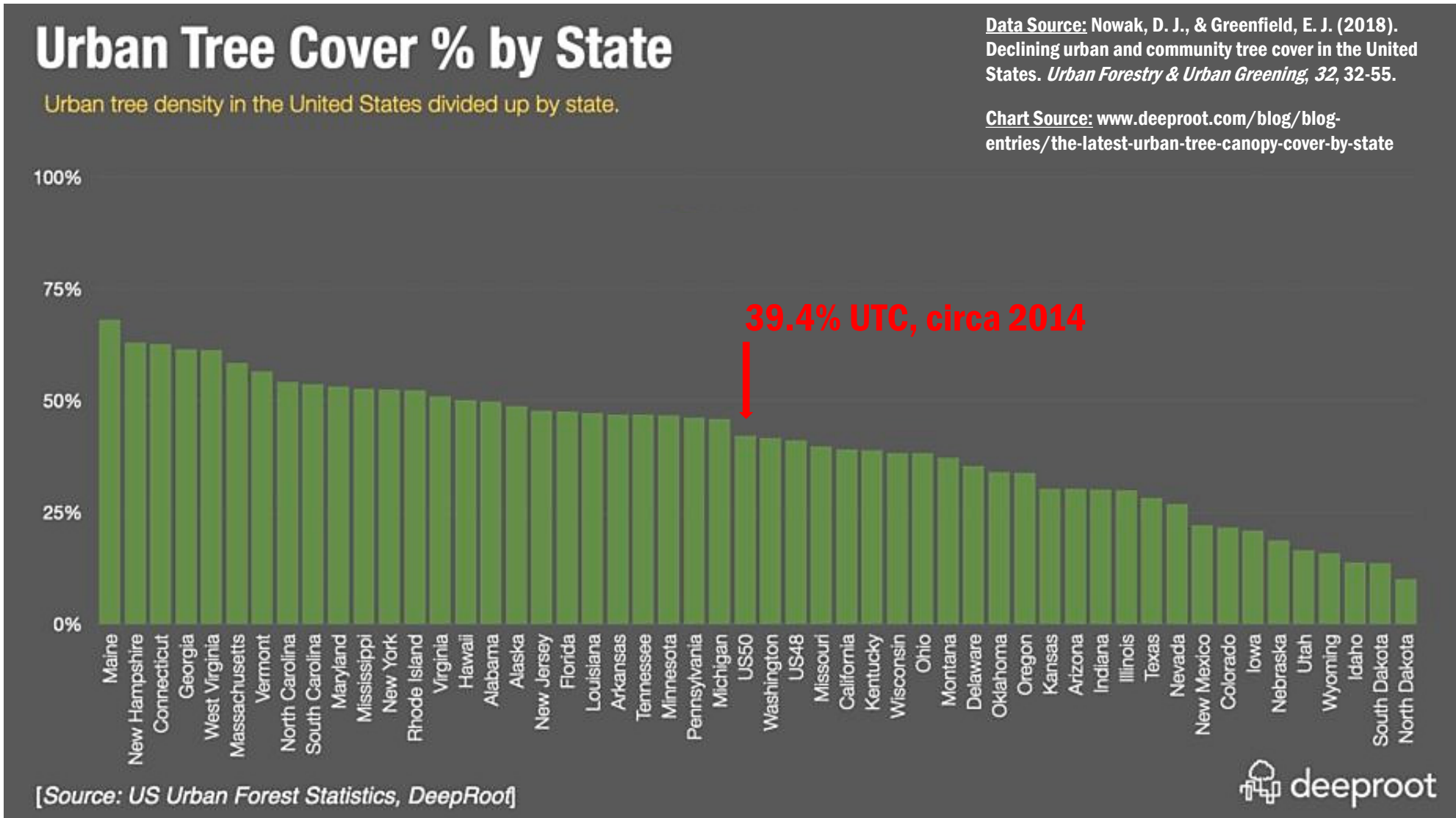
POPULATION DEMOGRAPHICS and URBANIZATION

Urbanization will subsume 29.2 million acres of forest land between 2000-2050

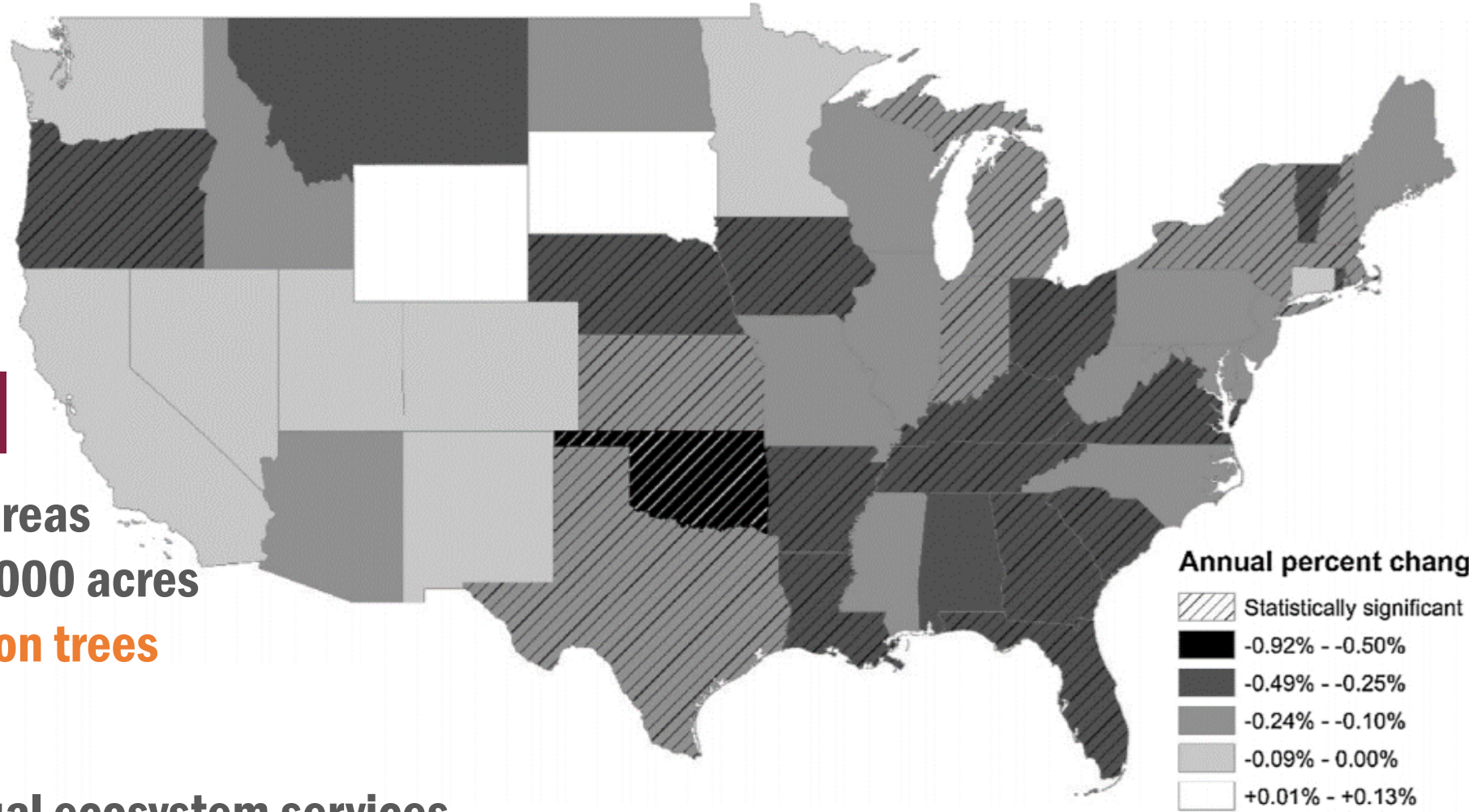


Source: Nowak, D. J., & Walton, J. T. (2005). Projected urban growth (2000-2050) and its estimated impact on the US forest resource. *Journal of Forestry*, 103(8), 383-389.

TREE CANOPY COVER IN URBAN AREAS



TREE CANOPY COVER IN URBAN AREAS



2009 - 2014

Tree cover in US urban areas declined at rate of 138,000 acres annually, about **28 million trees per year**

Lost **\$96 million** in annual ecosystem services

Source: Nowak, D. J., & Greenfield, E. J. (2018). Declining urban and community tree cover in the United States. *Urban forestry & urban greening*, 32, 32-55.

TREE AND FOREST TYPES IN THE URBAN FOREST

PRIVATE LAND
↑
↓
PUBLIC LAND



Street Trees



Park Trees



Yard Trees



Forest Patches



URBAN FORESTS ARE GREEN INFRASTRUCTURE

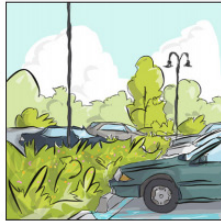
Green infrastructure is the harnessing of nature and incorporating it into the city's infrastructure system to provide ecosystem services and protect people and the environment from the impacts of urbanization. Source: www.asla.org/greeninfrastructure.aspx



RAIN GARDENS

A rain garden is a shallow, vegetated basin that collects and absorbs runoff from rooftops, sidewalks, and streets.

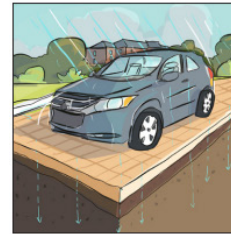
Rain gardens can be added around homes and businesses to reduce and treat stormwater runoff.



VEGETATED SWALES

A vegetated swale is a channel holding plants or mulch that treats and absorbs stormwater as it flows down a slope.

Vegetated swales can be placed along streets and in parking lots to soak up and treat their runoff, improving water quality.



PERMEABLE PAVEMENT

Permeable pavements allow more rainfall to soak into the ground. Common types include pervious concrete, porous asphalt, and interlocking pavers.

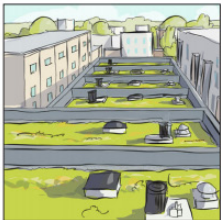
Permeable pavements are most commonly used for parking lots and roadway shoulders.



TREE CANOPY

Tree canopy can reduce stormwater runoff by catching rainfall on branches and leaves and increasing evapotranspiration. By keeping neighborhoods cooler in the summer, tree canopy can also reduce the "urban heat island effect."

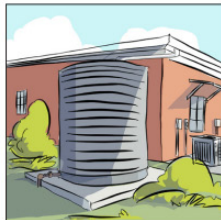
Because of trees' many benefits, many cities have set urban tree canopy goals.



GREEN ROOFS

A green roof is fitted with a planting medium and vegetation. A green roof reduces runoff by soaking up rainfall. It can also reduce energy costs for cooling the building.

Intensive green roofs, which have deeper soil, are more common on commercial buildings. Extensive green roofs, which have shallower soil, are more common on residential buildings.



RAINWATER HARVESTING

Rainwater harvesting systems collect and store rainfall for later use. They slow runoff and can reduce the demand for potable water.

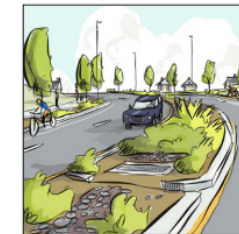
Rainwater systems include rain barrels that store tens of gallons and rainwater cisterns that store hundreds or thousands of gallons.



TREE TRENCHES

A stormwater tree trench is a row of trees planted in an underground infiltration structure made to store and filter stormwater.

Tree trenches can be added to streets and parking lots with limited space to manage stormwater.



GREEN STREETS

Green streets use a suite of green infrastructure practices to manage stormwater runoff and improve water quality.

Adding green infrastructure features to a street corridor can also contribute to a safer and more attractive environment for walking and biking.

Source: www.fema.gov/sites/default/files/2020-08/fema_RiskMAP_nature-based-solutions-guide_2020.pdf

TREES ARE INTEGRAL TO GREEN INFRASTRUCTURE

WHY?

Large

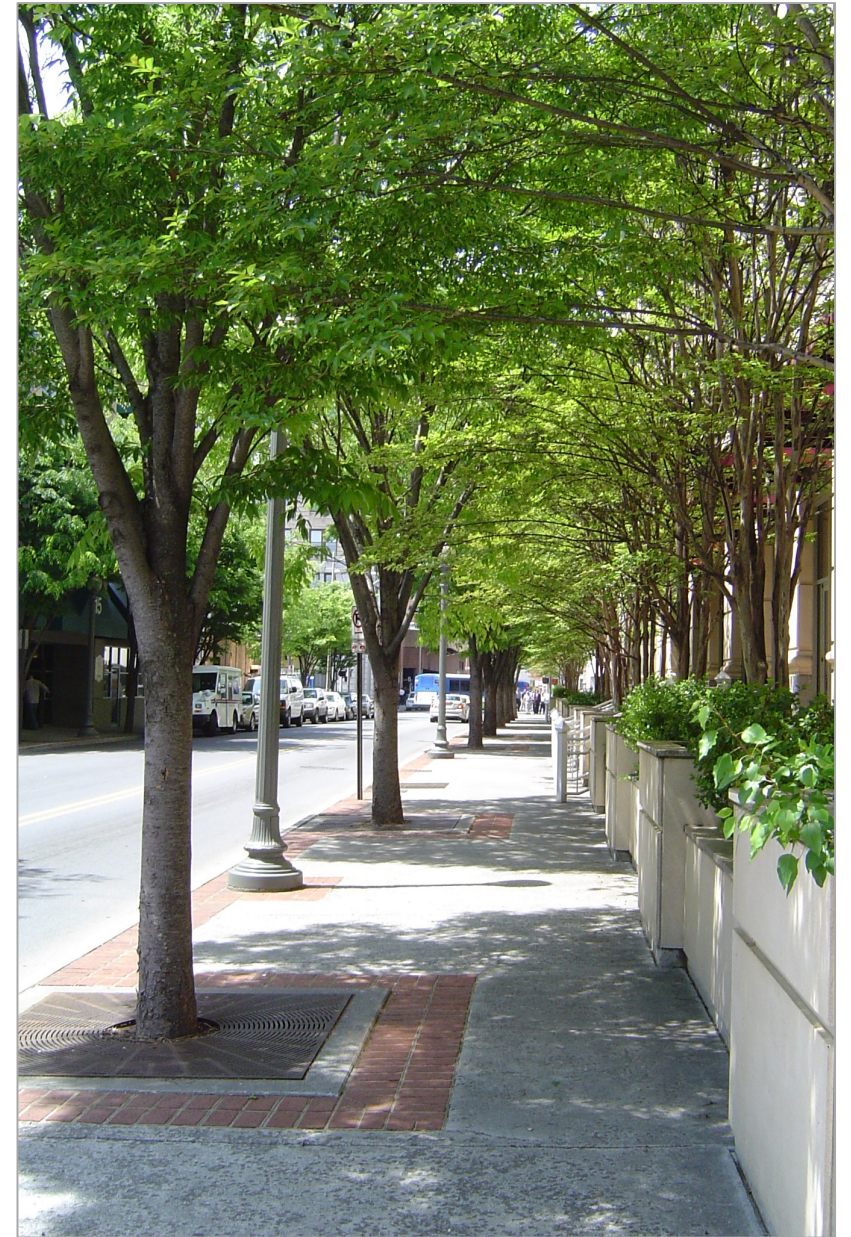
- Lots of leaf surface area to absorb air pollution
- Tall canopies cast shade on buildings and outdoor spaces
- Broad canopies overhang impervious surfaces and intercept rainfall

Woody

- Store lots of carbon
- Sturdy landscape features
- Renewable resource of fuel and fiber

Perennial

- Carbon stored for decades
- Year-round ecosystem services
- High return-on-investment



WHAT DO URBAN FORESTS DO FOR US?



Source: www.nrs.fs.fed.us/units/urbanNE/focus/forests_greenspaces

WHAT ARE THREATS TO TREE CANOPY COVER?

DIRECT EFFECTS

- **Forest Land Conversion (sprawl)**
- **Urban Infill Development (density)**
- **Lack of Green Infrastructure Plan**
- **Inadequate Greenspace Design**
- **Limited Management Resources**
- **Lack of Tree Protection BMPs**

INDIRECT EFFECTS

- **Climate Change**
- **Extreme Weather Events**
- **Invasive Pests and Plants**
- **Urban Stress Factors**
 - **Heat and Drought**
 - **Degraded Soil**
 - **Pollution**

Source: stevekingonsustainability.blogspot.com, March 10 2013

HOW DO WE SUSTAIN TREE CANOPY COVER?

CONSERVE EXISTING COVER

“Take care of what you’ve got!”

Intrinsic Motivations

Property Value

Commerce

Health & Well-Being

Educate About:

Benefits / Consequences

REPLENISH NEW COVER

“Plant trees!”

Extrinsic Motivations

Zoning

Ordinances

Resource Protection Areas

Conservation Easements

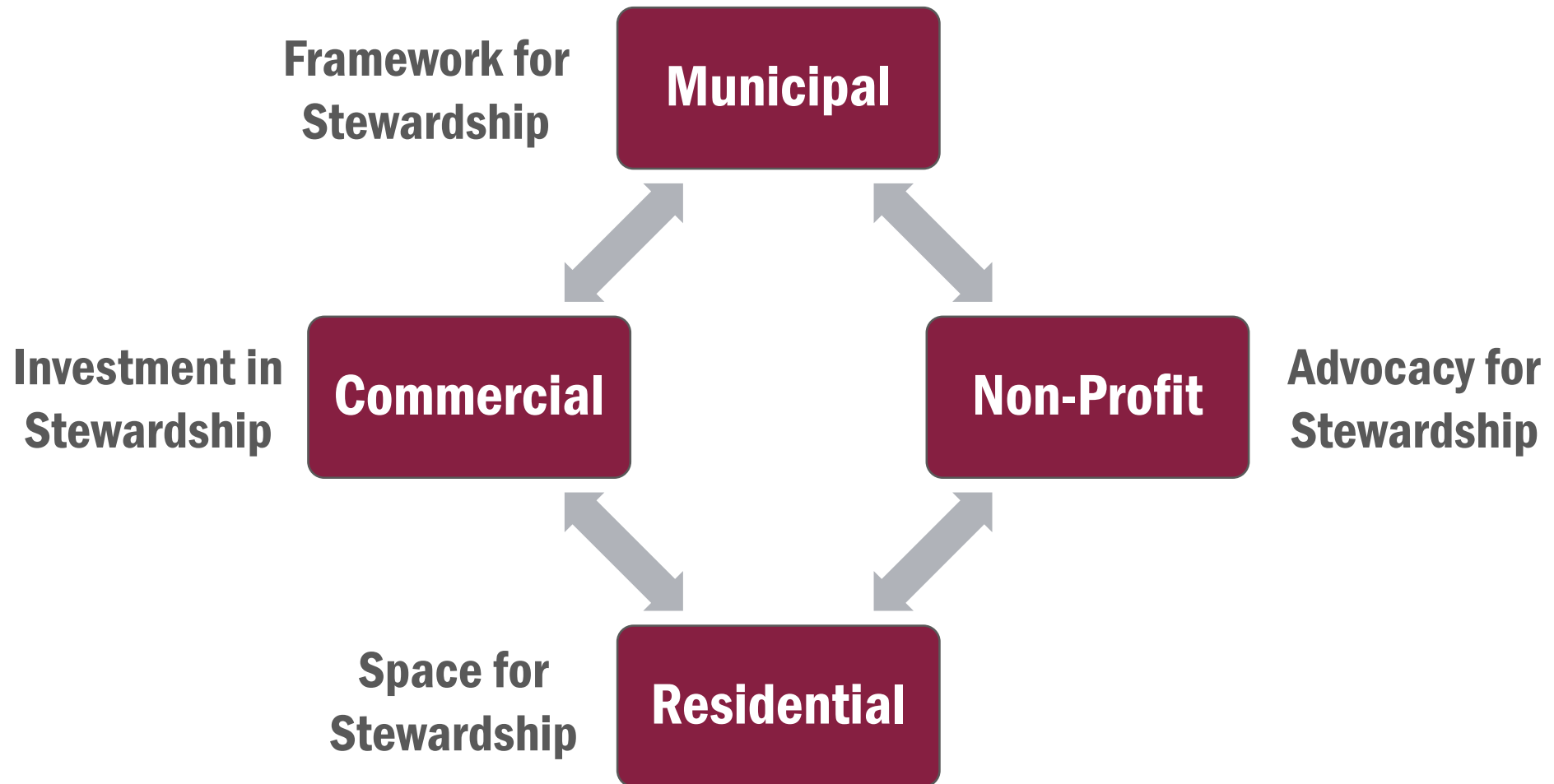
Financial Inducements

BUT IT IS NOT THAT SIMPLE...

- **Urban forests require space**
- **Urban forests require funding**
- **Urban forests require advocates**
- **Urban forests require knowledge**
- **Urban forests require planning**
- **Urban forests require expertise**



SUSTAINABLE URBAN FORESTS REQUIRE PARTNERSHIPS



SUSTAINABLE URBAN FORESTS REQUIRE A CONTINUUM OF CARE



Selection



Planting



Maintenance



Recycling

TAKE HOME MESSAGES

- **The United States is increasingly urban and demographically diverse**
- **Urbanization is both a threat and an opportunity for forest resources**
- **Urban forests and associated green infrastructure are key to creating sustainable communities**
- **Sustainable urban forests require stewardship and partnerships**

