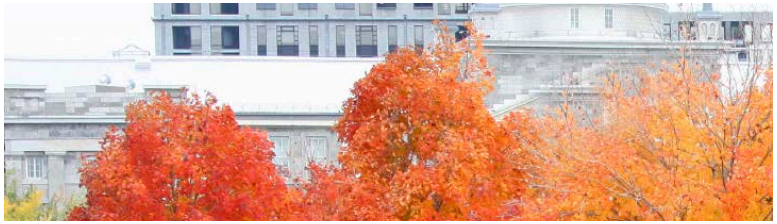
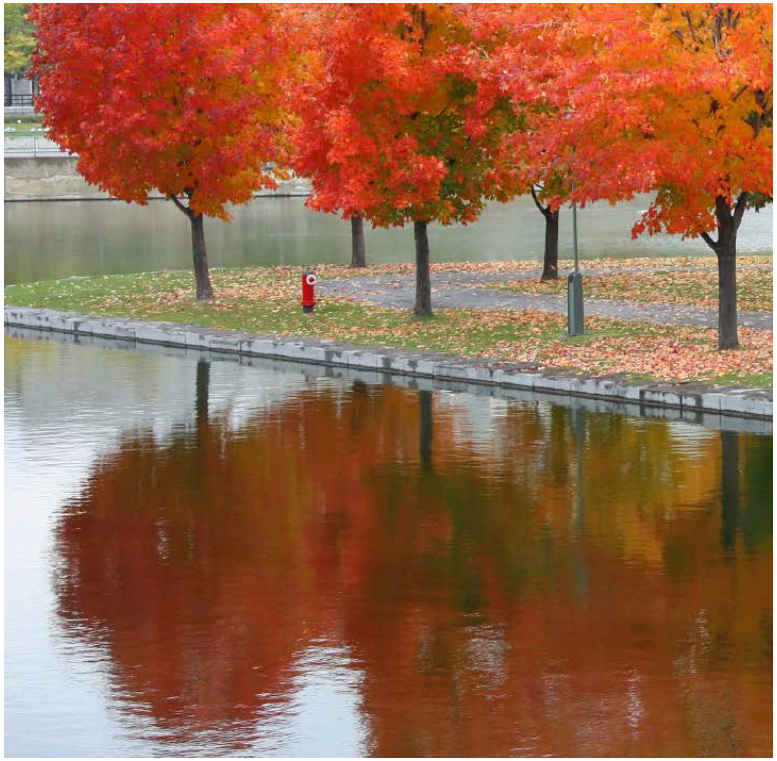


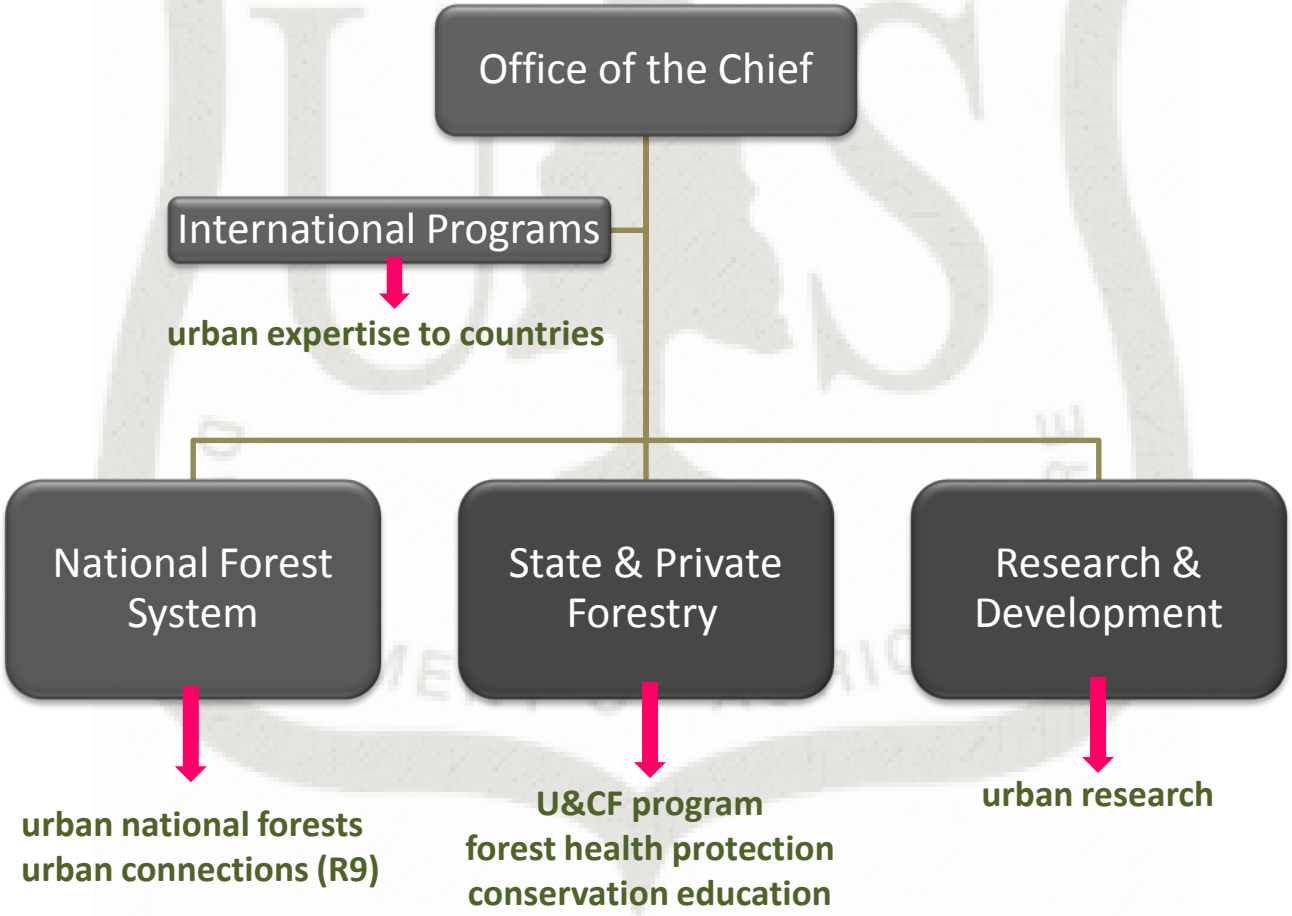


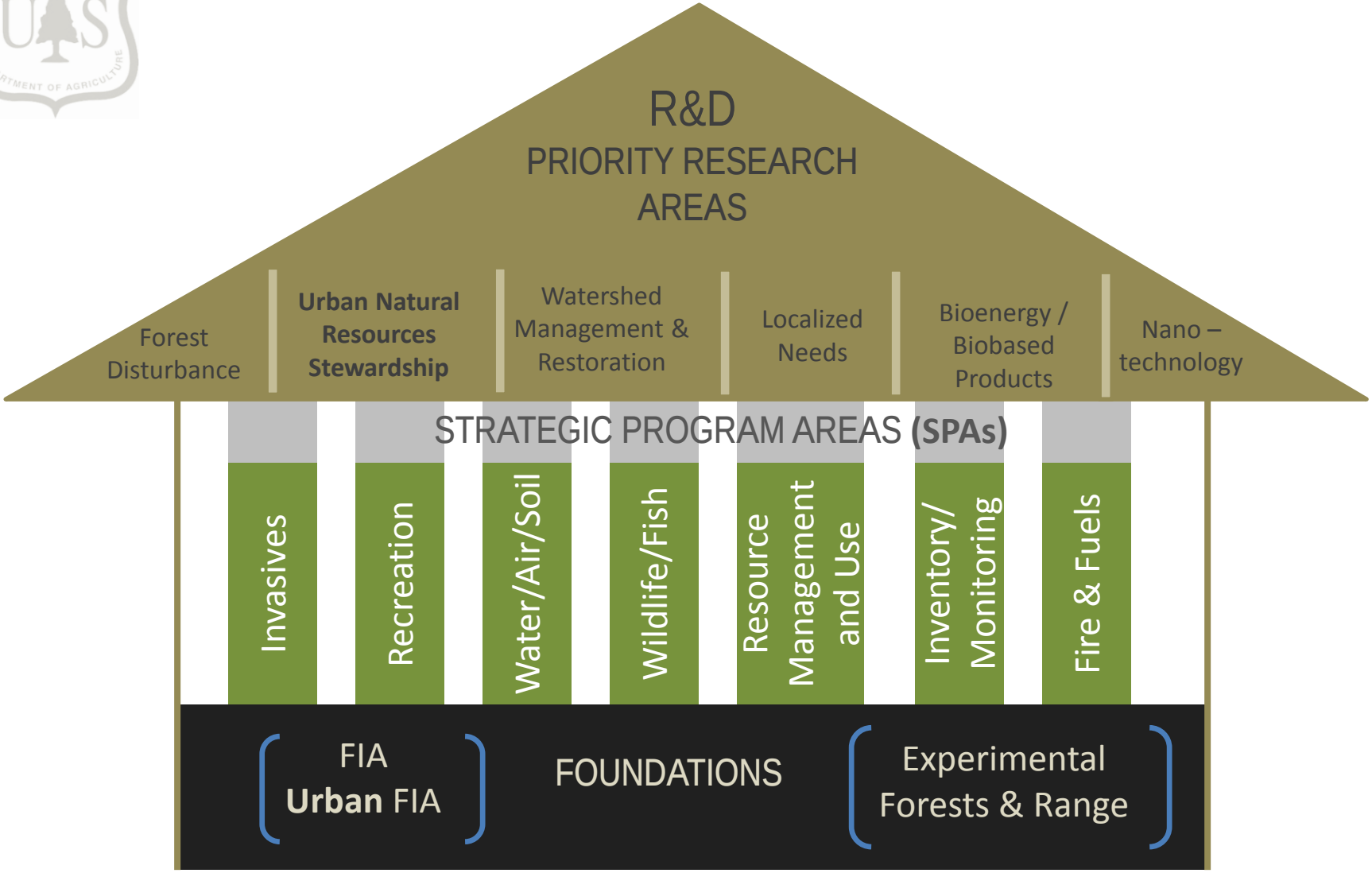
Urban research at the U.S. Forest Service

Beth Larry
National Lead
eblarry@fs.fed.us

Forestry Research Advisory Council
February 23, 2016

The mission of the Forest Service is to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations.



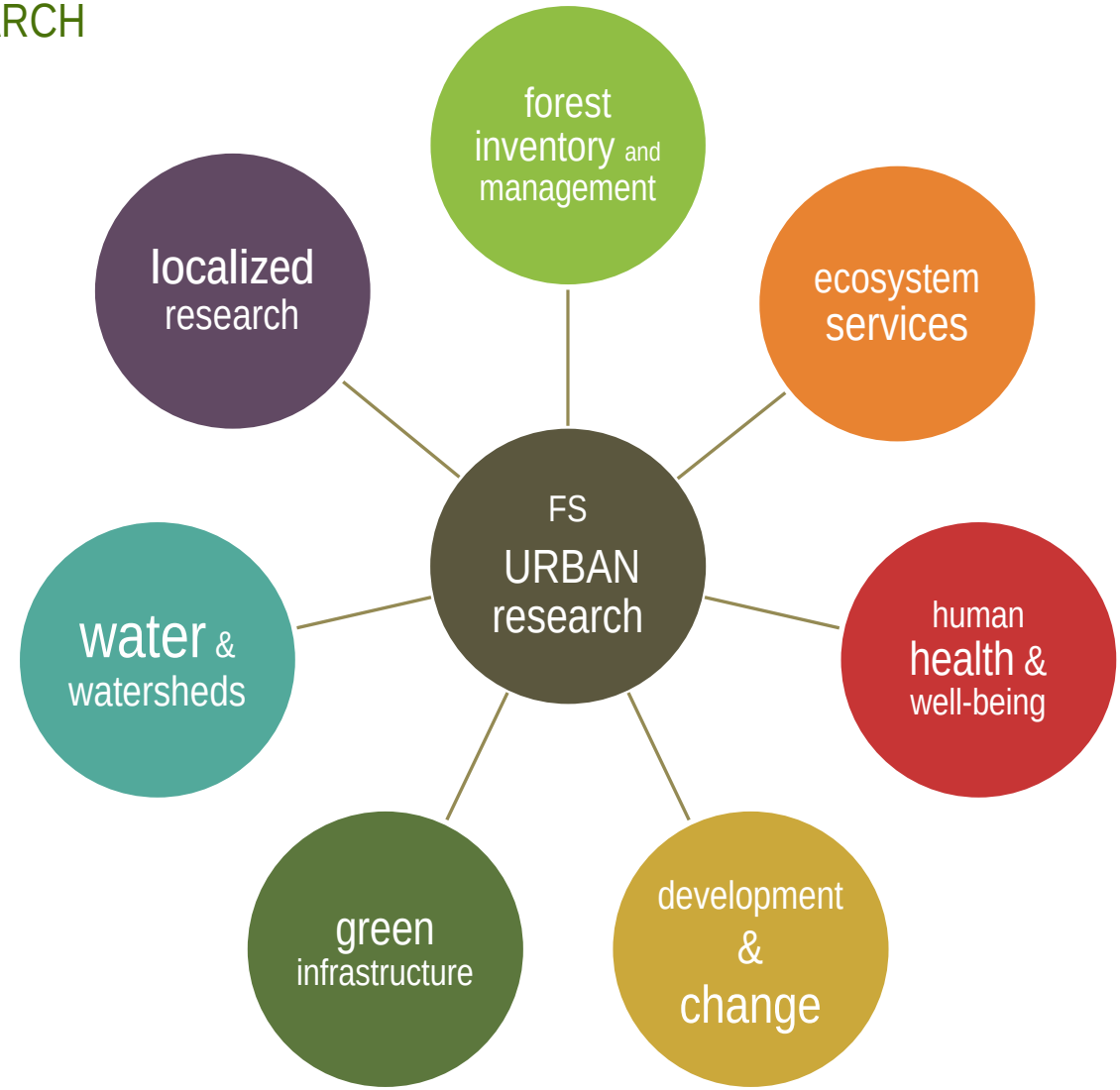

R&D
PRIORITY RESEARCH AREAS
Forest Disturbance
Urban Natural Resources Stewardship
Watershed Management & Restoration
Localized Needs
Bioenergy / Biobased Products
Nano – technology
STRATEGIC PROGRAM AREAS (SPAs)
Invasives
Recreation
Water/Air/Soil
Wildlife/Fish
Resource Management and Use
Inventory/ Monitoring
Fire & Fuels
FIA
Urban FIA
FOUNDATIONS
Experimental Forests & Range

USDA Forest Service

Urban Research Locations

R&D’s **Urban** Priority Research Area is highly relevant and we are thriving.

U.S. Forest Service
URBAN RESEARCH



www.fs.fed.us/research/urban/research-areas

URBANRESEARCH

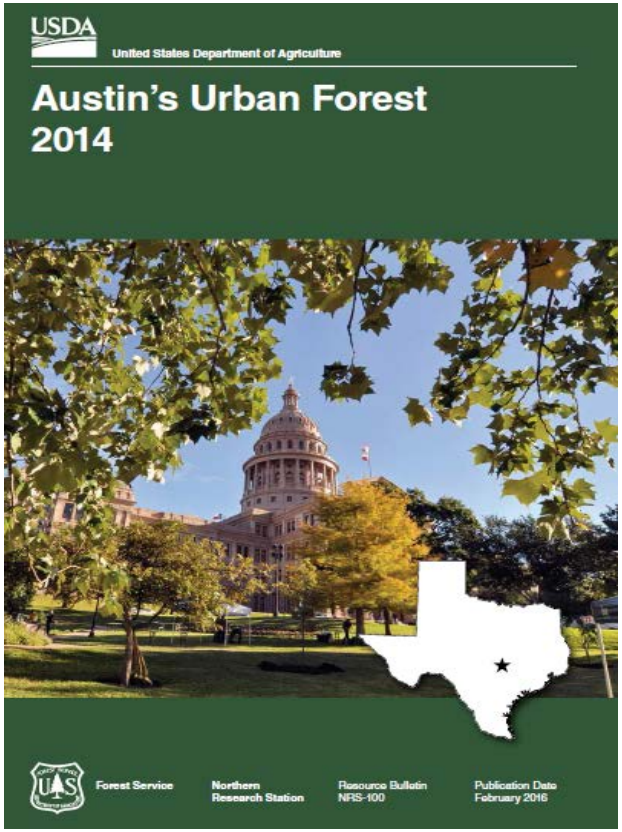
Key areas of Forest Service urban research

FOREST INVENTORY AND MANAGEMENT

Assessing the **structure, condition, function, and extent** of urban forests across the U.S.

Supporting **urban ecosystem management and planning** with information on tree biology, physiology, and health; ecology; urban wildlife and biodiversity; biomass.

David Cappaert
www.forestryimages.com



February 2016

ECOSYSTEM SERVICES

Examining the **role of urban ecosystems** in mitigating air pollution, managing stormwater, saving energy, storing carbon, improving property values, and providing other public benefits.

i-Tree

HUMAN HEALTH AND WELL-BEING

Studying the **health benefits** of urban canopy cover and green infrastructure | role of community greening in building resilience and capacity for disaster recovery.

Describing **human perceptions and experiences** with urban nature – active living, recreation, real estate, crime, food and foraging, stewardship, citizen science, and environmental justice.

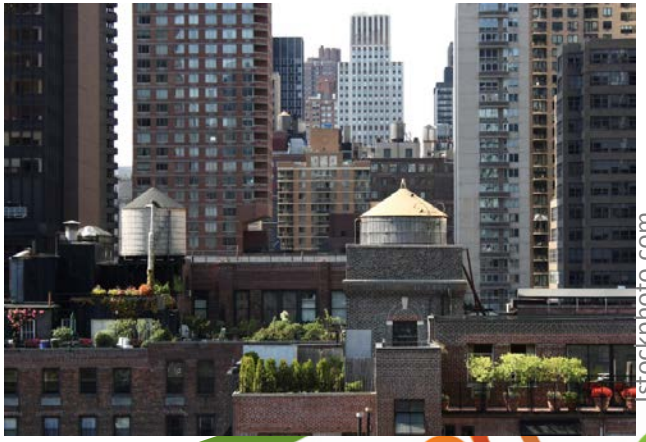
URBAN DEVELOPMENT AND CHANGE

Quantifying and predicting patterns of **demographic, land-use, and climate change** within cities and across the rural-to-urban landscape, and implications for urban sustainability.

GREEN INFRASTRUCTURE

Informing the design of **landscapes that reduce energy and water use**, manage stormwater, improve air quality, increase biodiversity, and create opportunities for active living.

Assessing markets and developing new technology and approaches to **utilizing urban wood waste**.



Istockphoto.com

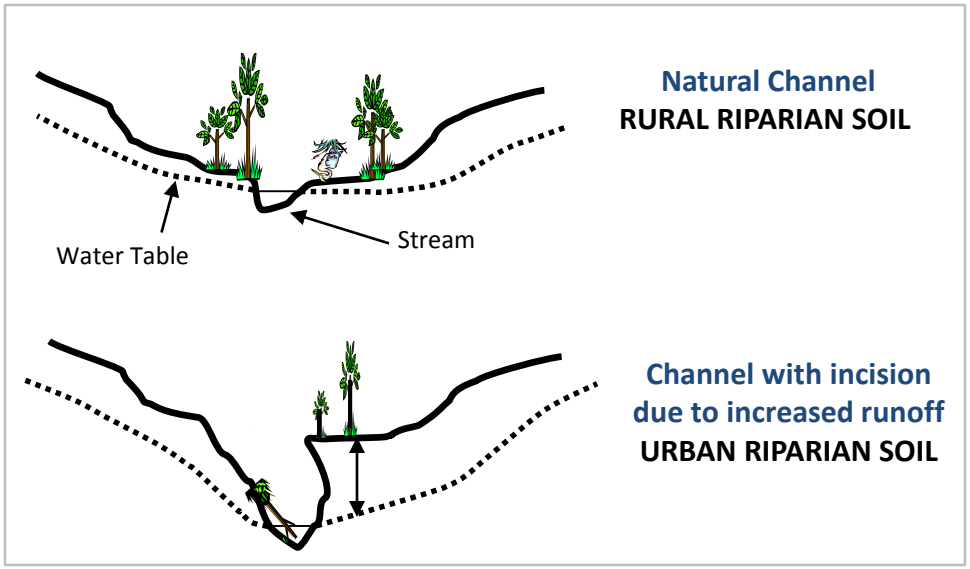
Carbon Challenge

DESIGN COMPETITION & SEMINARS

WATER AND WATERSHEDS

Studying how people, vegetation, and built infrastructure impact **aquatic life and urban hydrology**.

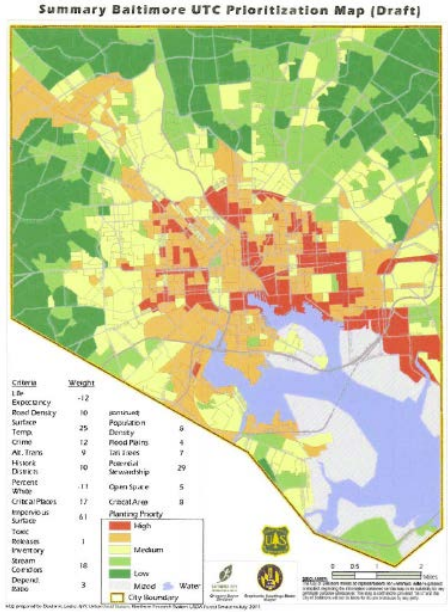
Providing science to support **urban watershed restoration projects** that improve urban waters and revitalize neighborhoods.

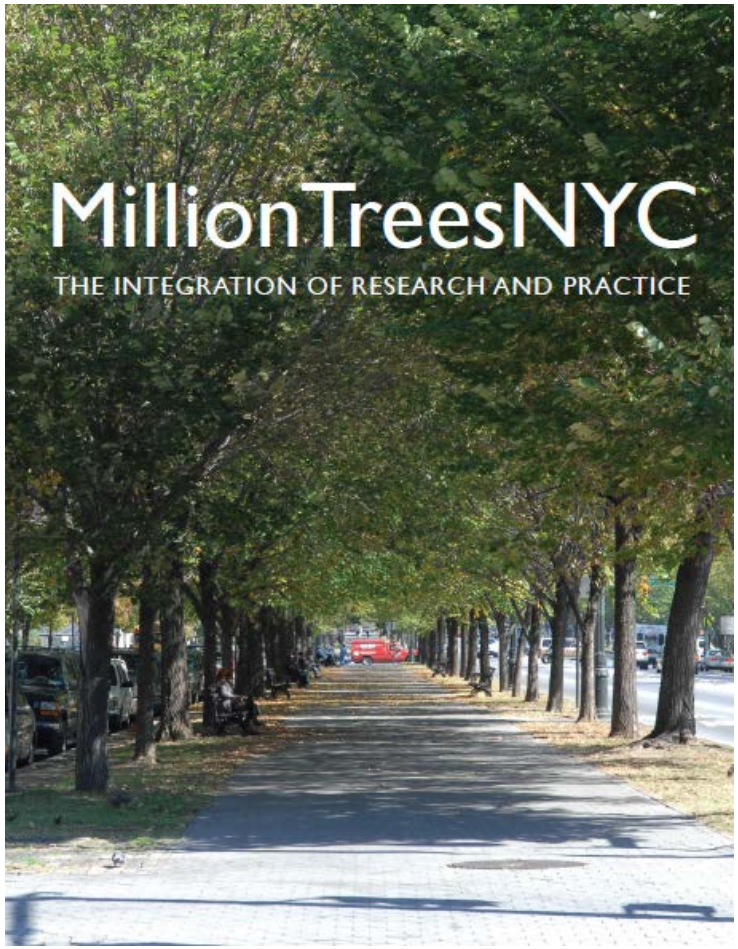


Istockphoto.com

LOCALIZED RESEARCH

Working across disciplines and with local partners to provide **place-based, client-focused, actionable research** on urban ecosystems and people. Locally driven | broadly applied





USDA Forest Service

Urban Research Locations

MillionTreesNYC

THE INTEGRATION OF RESEARCH AND PRACTICE

…Informing science-based action
for healthy cities and neighborhoods

advancing science
building research capacity

delivering knowledge & decision tools
collaborating with partners

Our urban research is in **high demand**.

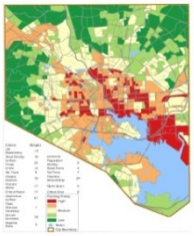
We provide critical data and decision tools.

Urban FIA: city-based inventories (forest, residents, mills)

Estimates of the quantity, health, composition, and benefits of urban trees and forests at the municipal level, as well as local perceptions and mill activity. **Complements local inventory efforts and provides a strategic, cohesive picture of urban forest conditions in the U.S.**

i-Tree Software Suite: urban forest information

Urban forestry analysis and benefit assessment tools. i-Tree applications enable users to examine the urban forest resources at multiple scales. **Increases understanding of urban forest resources; helps inform green infrastructure management and planning.**



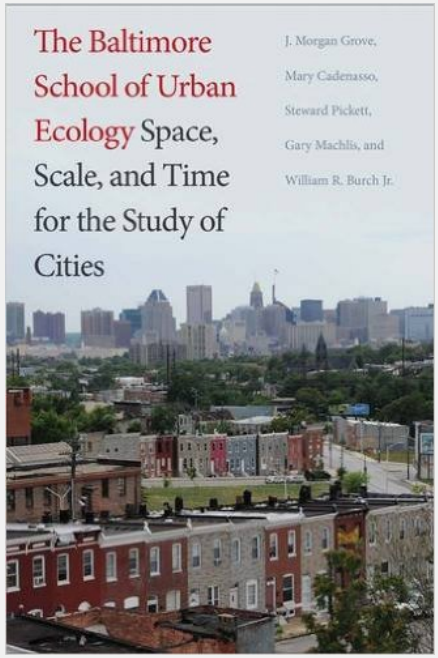
Urban Tree Canopy (UTC)*:* tree canopy analytics

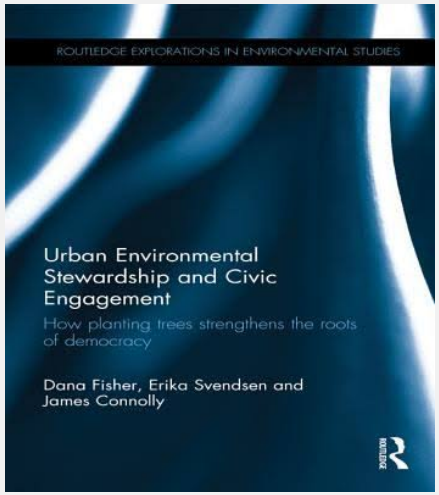
Urban Tree Canopy tools for assessment, prioritization, and market analysis. *How much tree canopy do we have? How much could we have?* Helps to set goals, prioritize actions, and understand how to reach neighborhood populations**. Spatially integrates ecological and social data for strategic greening efforts.**

STEW-MAP: stewardship mapping and assessment

Identifies stewardship and information networks at local level. Interactive maps support sustainability planning and help to meet environmental justice goals. **Can help measure program performance (monitoring and evaluation) and emergency response.**

www.fs.fed.us/research/urban/tools | www.fs.fed.us/research/urban/FIA





Treesearch

www.treesearch.fs.fed.us

We are publishing. A lot.

An ecology *for* cities: a transformational nexus of design and ecology to advan
climate change resilience and urban sustainability (Childers, Cadenasso, **Grov**

The relationship between trees and human health: evidence fro the spread o
Emerald Ash Border (**Donovan** et al.)

The impact of green stormwater infrastructure installation on surrounding he
and safety (**Kondo** et al.)

Assessing urban vacant land ecosystem services: urban vacant land as green
Infrastructure in the city of Roanoke, Virginia (Kim, Miller, and **Nowak**)

Convergence of microclimate in residential landscapes across diverse cities in
United States (Hall et al.)

Surface water storage capacity of twenty tree species in Davis, California (Xia
McPherson)

Approaching environmental health disparities and green spaces: an ecosyster
services perspective (**Jennings** and **Gaither**)

Cumulative effects: managing natural resources for resilience in the urban co
(Low)

Multiple pathways to sustainability in the city: the case of San Juan, Puerto Ri
(**Muñoz-Erickson**)

Community-based memorials to September 11, 2014: environmental stewarc
as memory work (**Svendsen** and **Campbell**)

Elemental concentrations in urban green stormwater infrastructure soils (**Kor**
al.)

Comprehensive methods for earlier detection and monitoring of forest declin
(Pontius and **Hallett**)

Our science is useful.

Million Trees campaigns: research, monitoring, evaluation (NYC, Philly, LA)

Using moss as bioindicators: discovering atmospheric cadmium hotspots in city neighborhoods

National Science Foundation support and collaboration: RCN for urban sustainability; SRN on urban resilience to extreme events $12 million, 9-city network, 5 years

International interest and exchange in urban field station model; FS urban research; i-Tree

National Academy of Sciences workshop: state of the science on ecosystem services provided by urban tree canopy cover

Baltimore emerges as USFS template for restoring urban canopy *EENews: Land Letter*

New research initiative aims at making cities more resilient to climate change *EENews: Climate Wire*

Three Oregon Lawmakers Want New National Pollution Standards In the Wake of Portland Glass Concerns.... "We are aware of this health risk in Portland only because of a Forest Service study of toxic metals concentrations in tree moss." *Portland Mercury*

Newsweek

TECH & SCIENCE

Money Growing on Trees

"Some of the instruments in Alley Pond Park in Queens, where the United States Forest Service is using sophisticated tools to monitor data to better understand the effects of climate change. *Credit: Richard Perry/**The New York Times***"

In a Queens Forest, Compiling a Picture of Urban Ecology

We are engaged and responsive.

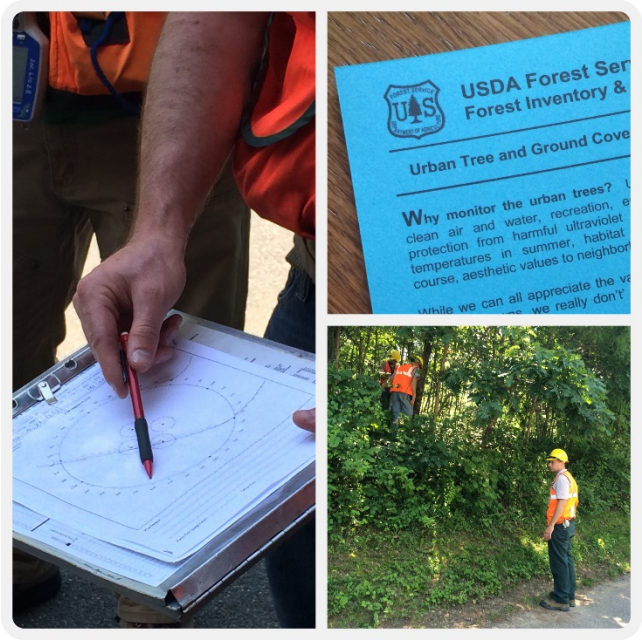
Science leadership in Federal / White House Initiatives

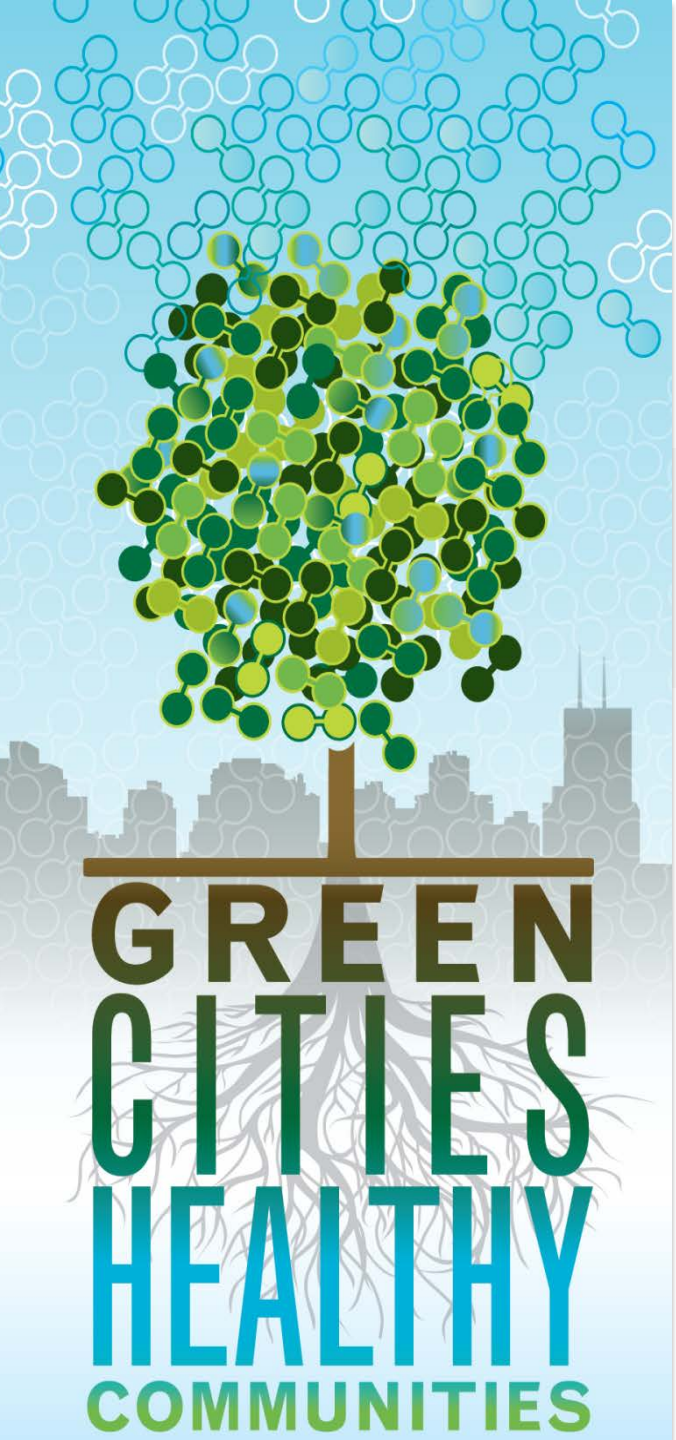
Urban Waters Federal Partnership
Federal Hurricane Sandy Rebuilding Task Force
HUD Natural Disaster Resilience Workshops/Funding
Federal Working Group on Baltimore (post riots)

Embarked on Urban FIA in response to partners and Farm Bill request

Established **USFS National Urban Forest Technology & Science Delivery Team** to meet growing demand for science information and synthesis

Beginning to fill a critical science role for **The Green Heart Project** (TNC, University of Louisville) & **The Oregon Health and Outdoors Framework** (REI, Willamette Partnership, Oregon State, Oregon Public Health Institute)





MONTHLY WEBINAR SERIES

Hear the latest science, practice, and policy on urban forestry and the environment!

URBANFOREST CONNECTIONS

second wednesdays

1-2 PM ET

JOIN US!

MORE INFORMATION | RSVP

www.fs.fed.us/research/urban-webinars

19 URBAN WATERS LOCATIONS

The Forest Service **leads or co-leads Urban Waters partnership activities for USDA** in Patapsco Watershed (Baltimore region), Northwest Indiana area, South Platte watershed (Denver), the Delaware River Watershed (PA-NJ-DE), and the Green-Duwamish River (Seattle) and **provides additional science support** in many other locations.

A **national research framework** will increase our success.

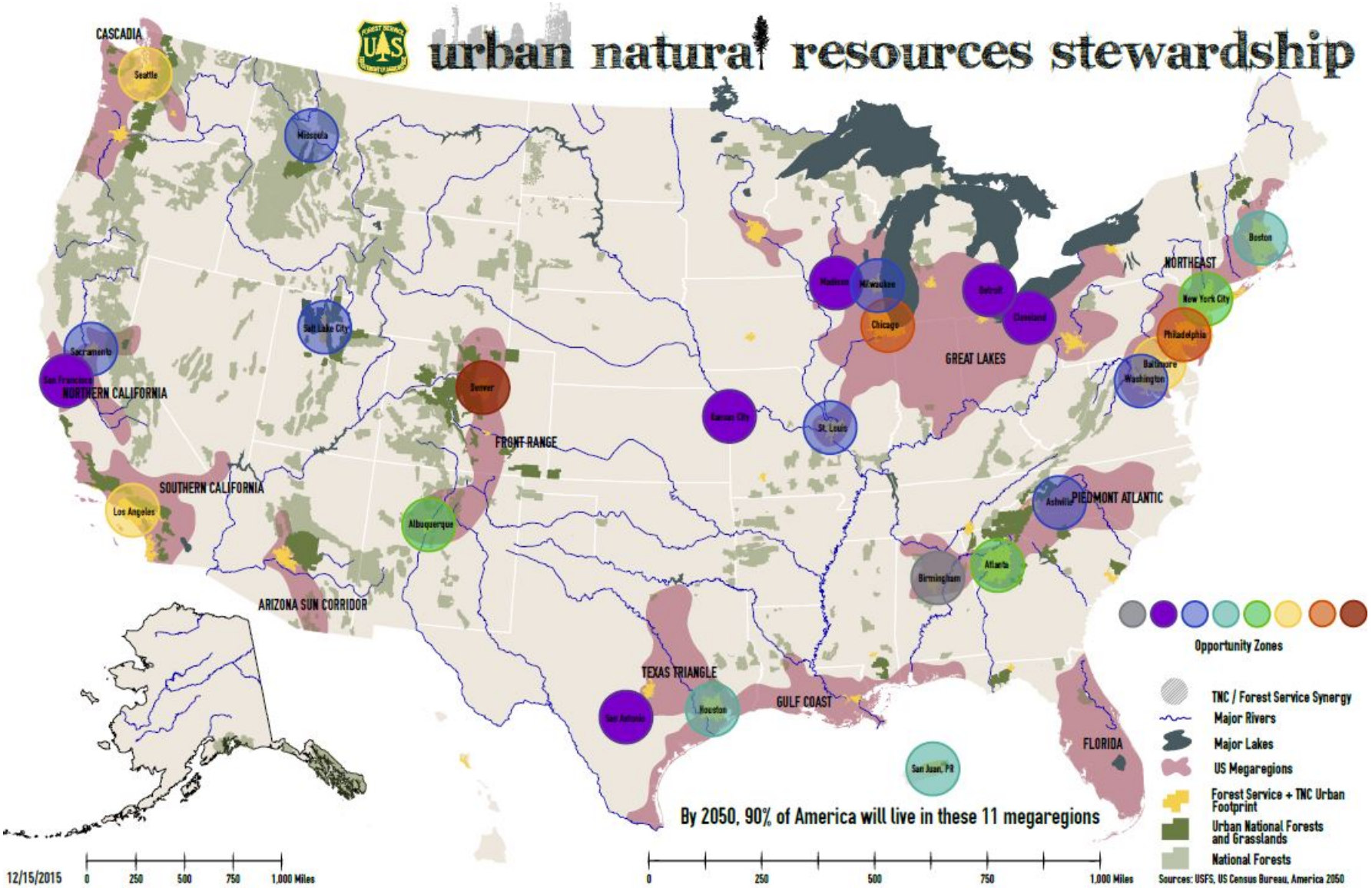
Why do we need a cohesive, cross-station vision?

/ Identifies research needs across research stations, and growth opportunities
/ Sets national and regional research priorities
/ Helps us focus and invest our small urban budget wisely ~$6-7 million
/ Promotes workforce planning; sharing science capacity across stations
/ Empowers our FS urban research network
/ Improves our communication with partners, the FS, Department
/ Facilitates agency-wide discussion of FS mission and role in urban areas

Makes good business sense.

Forest Service scientists bring school kids outside to interact with the Delaware River
Courtesy of Sarah Low, USFS

urban natural resources stewardship



thank you.