Urban Forest Inventory and Analysis (Urban FIA): Definitions, Advantages, and Use

Date: September 2018

The USDA's Forest Inventory and Analysis (FIA) Program has been monitoring the Nation's public and private forests since the 1930s and is often referred to the Nation's Forest Census. In 2014, the Farm Bill expanded the program's focus to include urban areas. The goal of Urban FIA is to annually monitor all census defined urban areas across the nation with a special emphasis on the nation's largest cities.

Urban FIA is a strategic level long-term annualized inventory and monitoring system that is an extension of the FIA program, capturing trees outside of traditionally-designated forests on both public and private lands. It provides managers and decision makers with a continuous flow of urban forest data to support both public and private management of the nation's urban forests, and seamlessly integrates with core FIA data to build a holistic picture of our nation's forests from rural to urban. Urban FIA builds on a long-standing, recognized National Program with a strong track record.

The three components of the Urban FIA program are an extension of and analogous to the core FIA program:

- The **Urban Forest Inventory** provides systematic monitoring to understand the biophysical aspects and ecosystem service benefits of the nation's urban forests. The Urban FIA protocol represents a collaboration between the core FIA program and i-Tree ecosystem services modeling.
- The **Urban Landowner Survey** is the urban counterpart to FIA's rural-focused National Woodland Owner Survey. It is a concerted national effort to examine the social dimensions of the urban forest, including the perspectives of private landowners who manage urban green space.
- The **Urban Wood Flows** is the urban counterpart to FIA's Timber Products Output Survey. It is being piloted in Baltimore and is designed to capture the flows of urban wood and wood products from both private and public lands, beginning with the producers and processors of urban wood.

Urban FIA builds on the strengths of the core FIA Program in the following ways:

- Follows similar certification and QA/QC protocols as the core program, **producing data that are of a known and trusted quality**.
- Will **provide a continuous stream of consistent data** in all urban areas, with even higher intensity in the nation's largest cities. This will provide greater potential for change detection than a snapshot or periodic approach.
- May **illuminate regional or national trends in urban forest health and status** and inform a seamless forest inventory that spans the rural to urban gradient.
- May **illuminate critical links between society and urban natural resource management**, including attitudes and behaviors towards urban wood products and urban green spaces.
- May **inform the potential for diversified regional wood economies** that support the U.S. wood industry. Urban and suburban tree and woody residues are similar in magnitude to harvest removals from National Forests, yet there is little information about what happens to wood that is removed from the urban forest. Transforming urban wood from a liability to an asset has the potential to reduce landfill waste and create jobs, businesses, and markets, as is currently happening in Baltimore.

Why and how to use Urban FIA data?

- As urban growth continues, it is important to monitor changes in the condition, health and growth of urban trees to ensure their sustainability. Forest inventory data provide information forest managers need to maintain healthy urban tree canopies and sustainably manage urban forests to maximize their ecosystem service benefits.
- In order to maximize the benefits of urban forests, natural resource managers need to consider trees on private property in addition to those in parks, sidewalk tree pits, and other public areas. Urban FIA provides citywide strategic data based on both public and private trees. This includes capturing data on

management practices on private lands as well as private landowners' sources of information, attitudes, beliefs, and concerns about the urban forest.

- Urban FIA provides easy access to urban data through the Urban FIA DataMart as well as user-friendly interfaces like the My City's Trees App. Table-making tools that create user-defined summaries of Urban Forest Inventory data are being developed including the Urban EVALIDator program. National Landowner Survey and Urban Wood Flows data will also be made publicly available as they are collected.

Example outputs and applications of Urban FIA data and analysis include the following:

- The Urban FIA protocol enables detailed city-specific analyses for communities across the country.
  - For example, an analysis of the urban forest in Austin, Texas estimated that trees save that city nearly $19 million annually in reduced building-energy use, some $5 million in reduced carbon emissions, and account for about $16 billion as standalone physical assets. In addition, they're worth $3 million per year in their reduction of air pollution (based on avoided respiratory health problems), and nearly $12 million per year in the amount of carbon they sequester.
- Urban FIA data collected over the long term will help us understand trends and evaluate the impacts of major disturbances.
  - Scientists with the USDA Forest Service estimate that between 2009 and 2014, tree cover in the Nation's urban/community areas declined by 0.7 percent, which translates to losing an estimated 36 million trees or approximately 175,000 acres of tree cover annually. Nationally, urban/community tree cover declined from 42.9 percent to 42.2 percent. Urban FIA can help track national trends in urban tree canopy cover, and inform practices and policies to maintain or enhance canopy cover.
  - In Texas, an estimated 5.6 million trees in urban areas died during the 2011 drought, which may have been as much as 10 percent of urban trees across the region. By collecting Urban FIA plot data consistently over time and across metropolitan areas, we will be able to assess the damage caused by the next drought or storm and monitor ecological impacts and recovery over time.
- Urban FIA can inform a wide variety of municipal, statewide, or even national strategies and policies.
  - Many know that urban trees can have a positive effect on mitigating stormwater runoff by intercepting rainfall, and that this relationship is driven by leaf area. Data collected from Urban FIA can provide leaf area estimates by geographical region, species, and size class, allowing urban natural resource managers to calculate the interceptive capacity of urban trees in a watershed and implement stormwater policy changes accordingly.
  - USDA Forest Service urban forest inventory data helped make the case to Mayor Bloomberg to create the MillionTreesNYC campaign.

To learn about Urban FIA implementation in your area, contact our Regional FIA Program Leaders

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For inquiries about the Urban Landowner Survey or Urban Wood Flows, contact Nancy Sonti: nancyfsonti@fs.fed.us