

A photograph of a park with large, mature trees and a grassy area. A path is visible on the left side. The text is overlaid on a semi-transparent white box.

Urban Forestry Inventory and Analysis

Seeing the urban forest through the
trees (and through time)

How Do We Know What We Know About the Urban Forest?

- Since 1901 we have had Tree Wardens
- Tree Wardens have tended to rely largely on observation and experience
- Responsibility for public trees only (street trees and park trees)
- Private trees are a private issue
- “Trees are Good” – but why and how are they good?



The Next Step - Computers



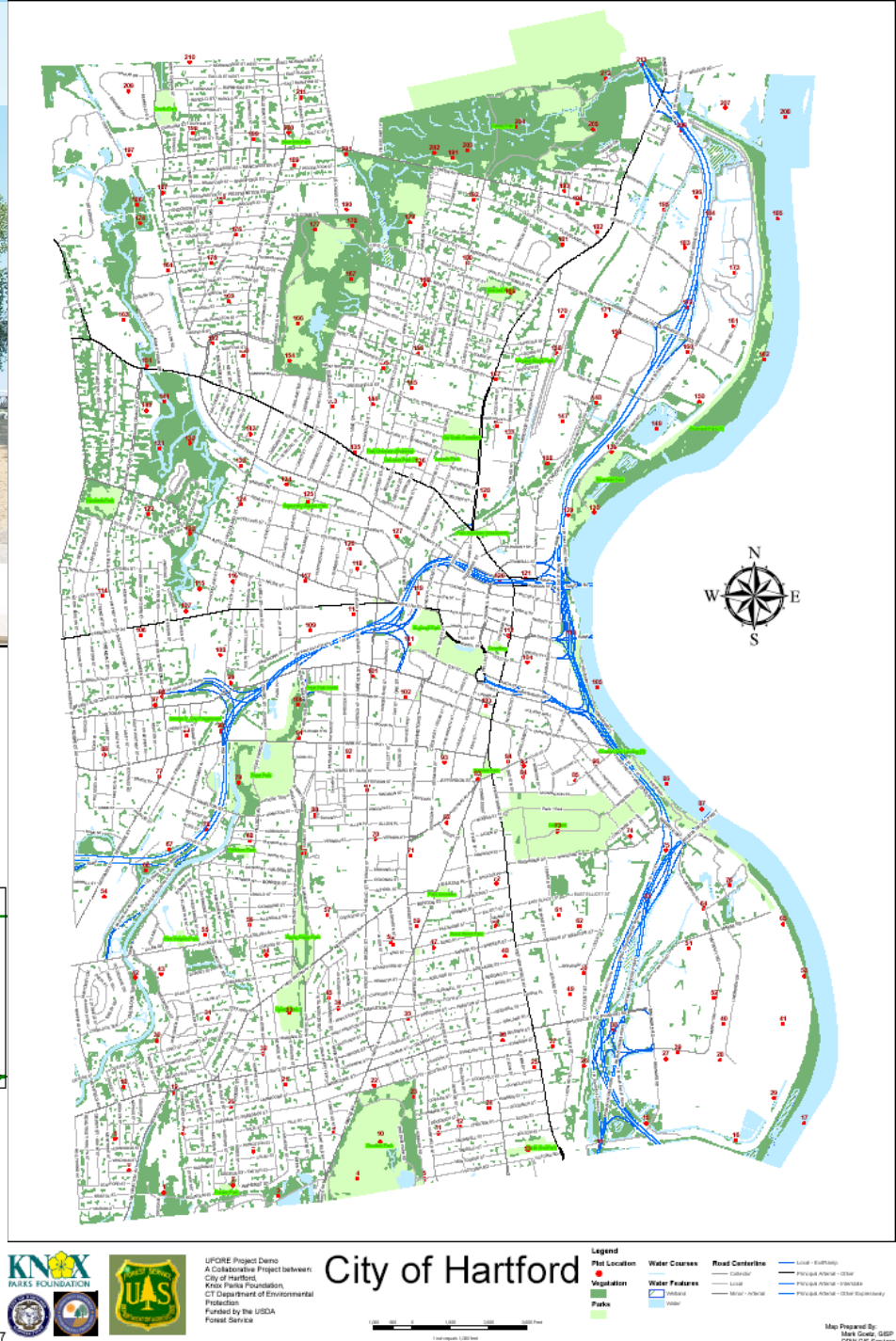
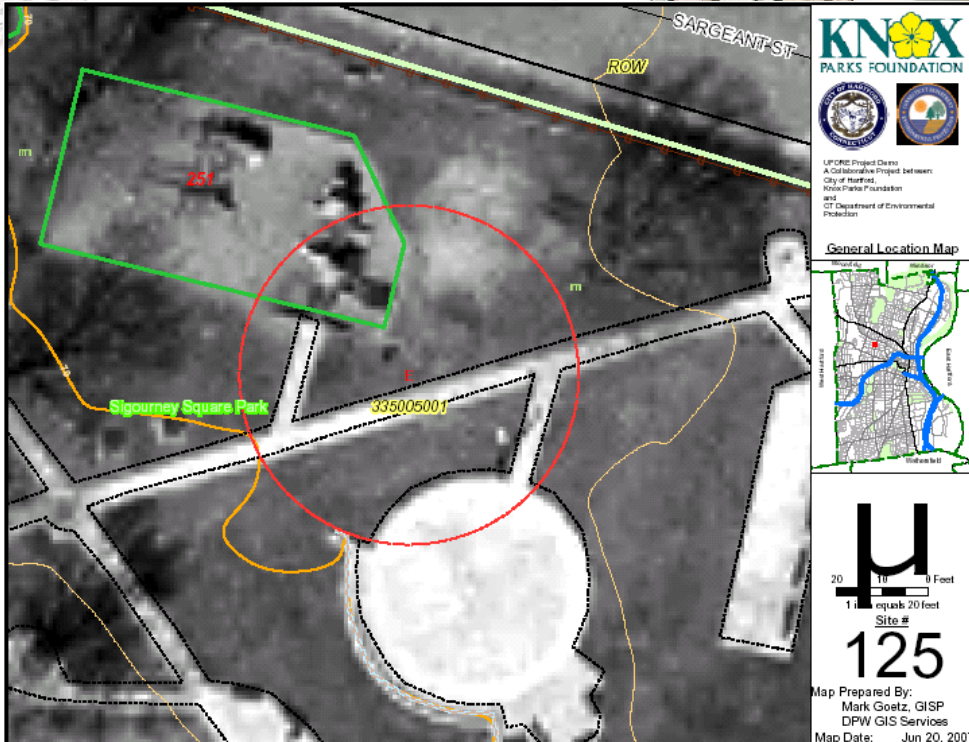
And inventories, and analyses, ...

i-Tree Tools:



UFORE
(now i-Tree Eco)
and
STRATUM
(now i-Tree Streets)

iTree ECO



Hartford's Urban Forest - a Summary

Number of Trees: 568,000

Number of Larger Trees (over 20" in diameter): 55,000

Most Common Trees: red maple, tree of heaven, black cherry, American elm and red oak

Tree Canopy Cover: 26%

**Amount of Carbon Removed by
Hartford's Trees Annually:** 2,440 tons

**Amount of Major Air Pollutants Removed
Annually:** 73 tons

**Oil Saved due to Energy Reduction by
These Trees:** 2,400 barrels a year

Replacement Cost for These Trees:
\$590 million dollars

Next Tool:

Urban Tree Canopy (UTC) Assessments



Existing TC



Vegetation



Impervious

Possible TC



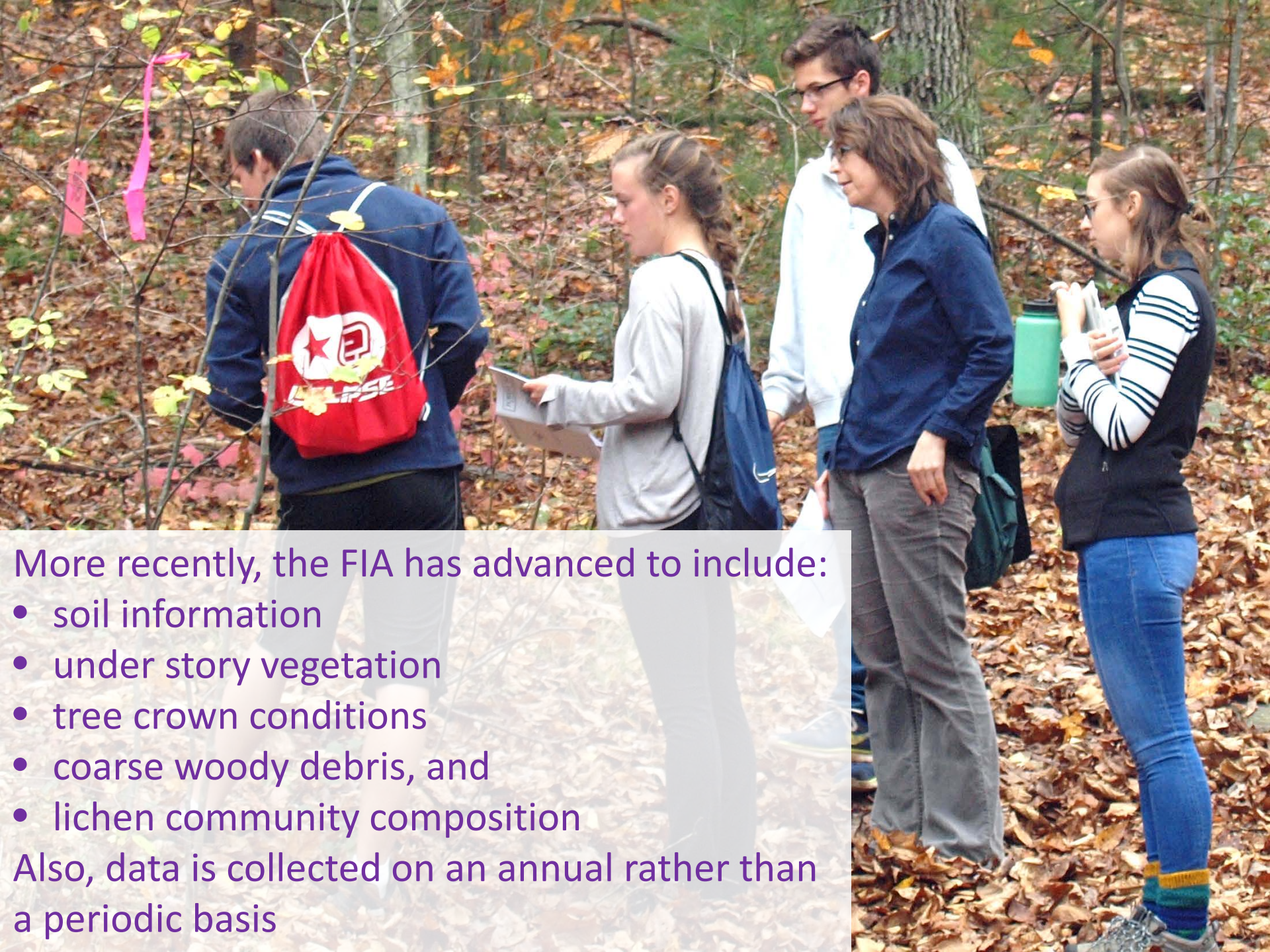
Forest Inventory and Analysis:

- Through US Forest Service
- Our “Forest Census”
- Has been around over 50 years
- Primarily rural forests
- Tracked changes in forested lands on a state by state basis

The USFS FIA Program:

Reports on status and trends in

- forest area and location;
- the species, size, and health of trees;
- total tree growth, mortality, and removals by harvest;
- wood production and utilization rates by various products; and
- forest land ownership



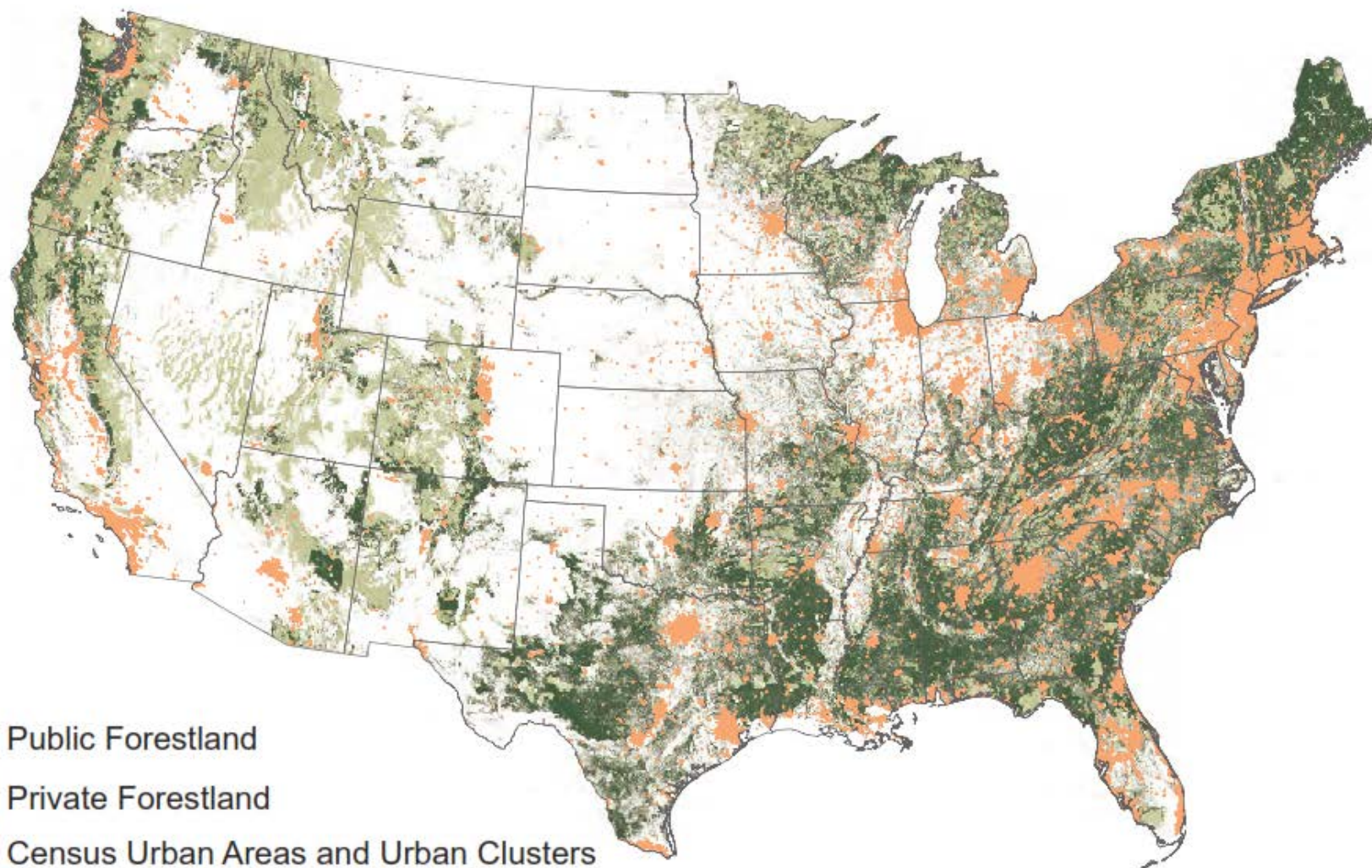
More recently, the FIA has advanced to include:

- soil information
- under story vegetation
- tree crown conditions
- coarse woody debris, and
- lichen community composition

Also, data is collected on an annual rather than a periodic basis



Urban Areas and Forestland Ownership



Hewes, Jaketon H.; Butler, Brett J.; Liknes, Greg C.; Nelson, Mark D.; Snyder, Stephanie A. 2014.
Public and private forest ownership in the conterminous United States: distribution of six ownership types - geospatial dataset.
<http://www.fs.usda.gov/rds/archive/Product/RDS-2014-0002/>

Urban Area / Urban Clusters

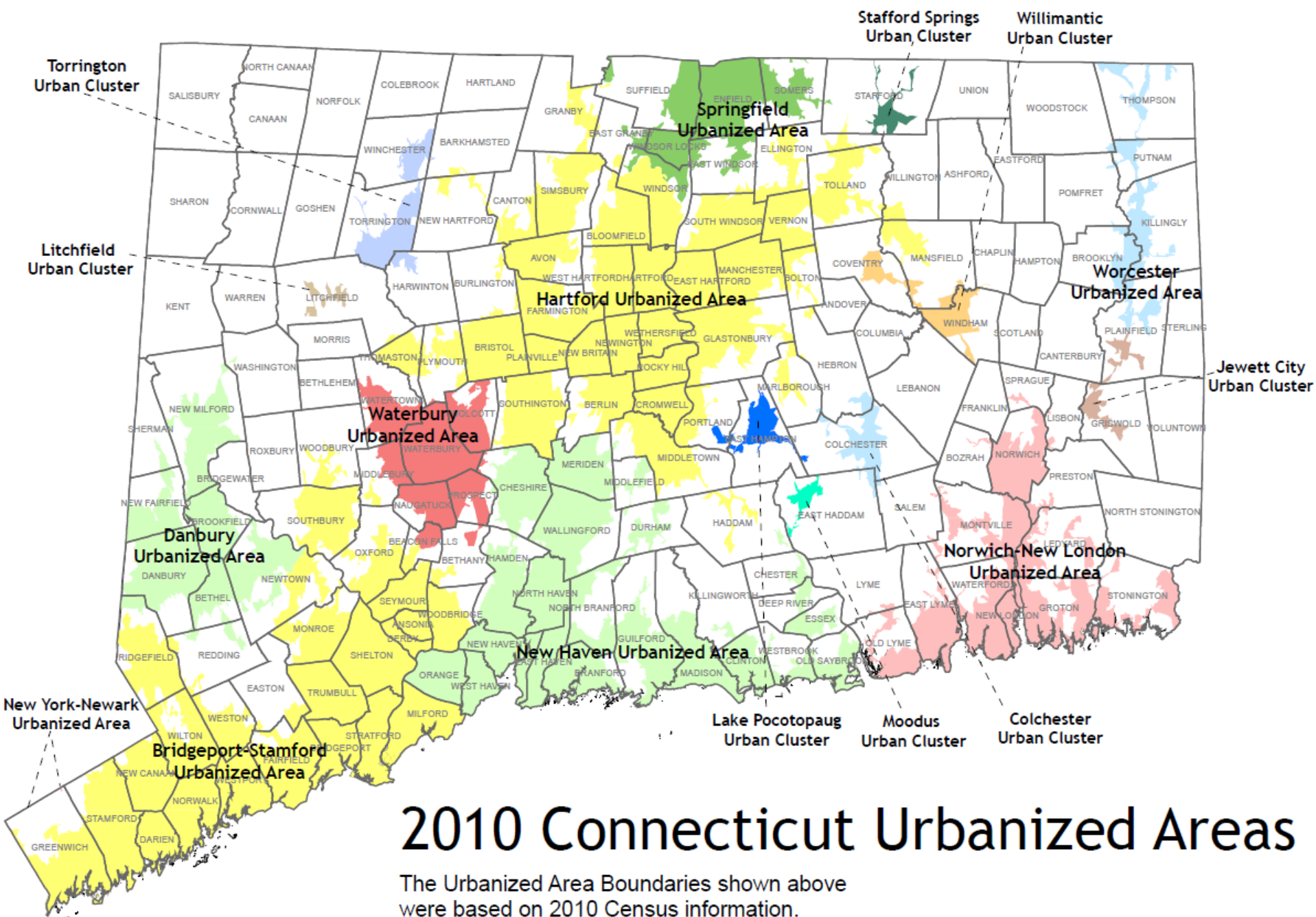
(The Blue line)

- Urbanized Areas (UAs):
 - >/= 500 people / sq. mile
 - 50,000 or more people
- Urban Clusters (UCs):
 - >/= 500 people / sq. mile
 - At least 2,500 and less than 50,000 people.
- 3,573 City / Places:
 - The number of UA / UC within the United States in 2010
 - 80.7 % of our entire population live within these areas
 - Urban FIA commonly refers to these areas as the Blue line.
- Rural:
 - encompasses all population, housing, and territory not included within an urban area.

Hub Cities

(The Red line)

- Within a CBSA the **Hub City** is the city of interest.
- For example: Providence is the Hub city within the **Providence**, New Bedford, Fall River RI-MA CBSA
- The boundaries of the city are not based on census data, they are **political in nature**
- Urban FIA commonly refers to this as the **Red line**
- Hub cities with a population **> 200k** will be intensified to at least 200 plots / cycle.



Urban FIA – a marriage of rural FIA and iTree, especially iTree ECO.

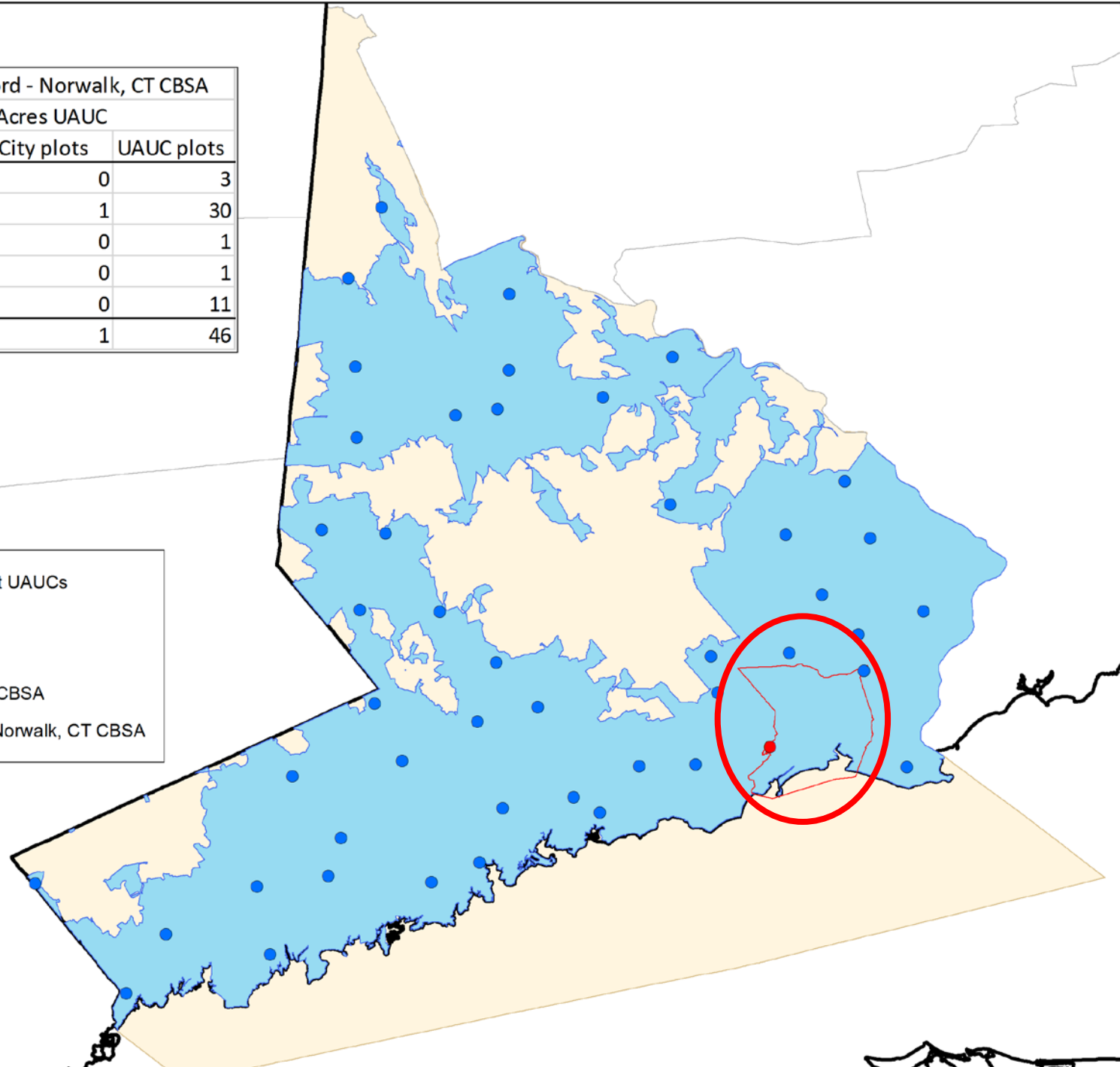
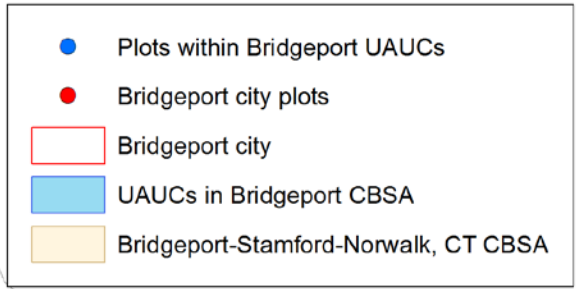


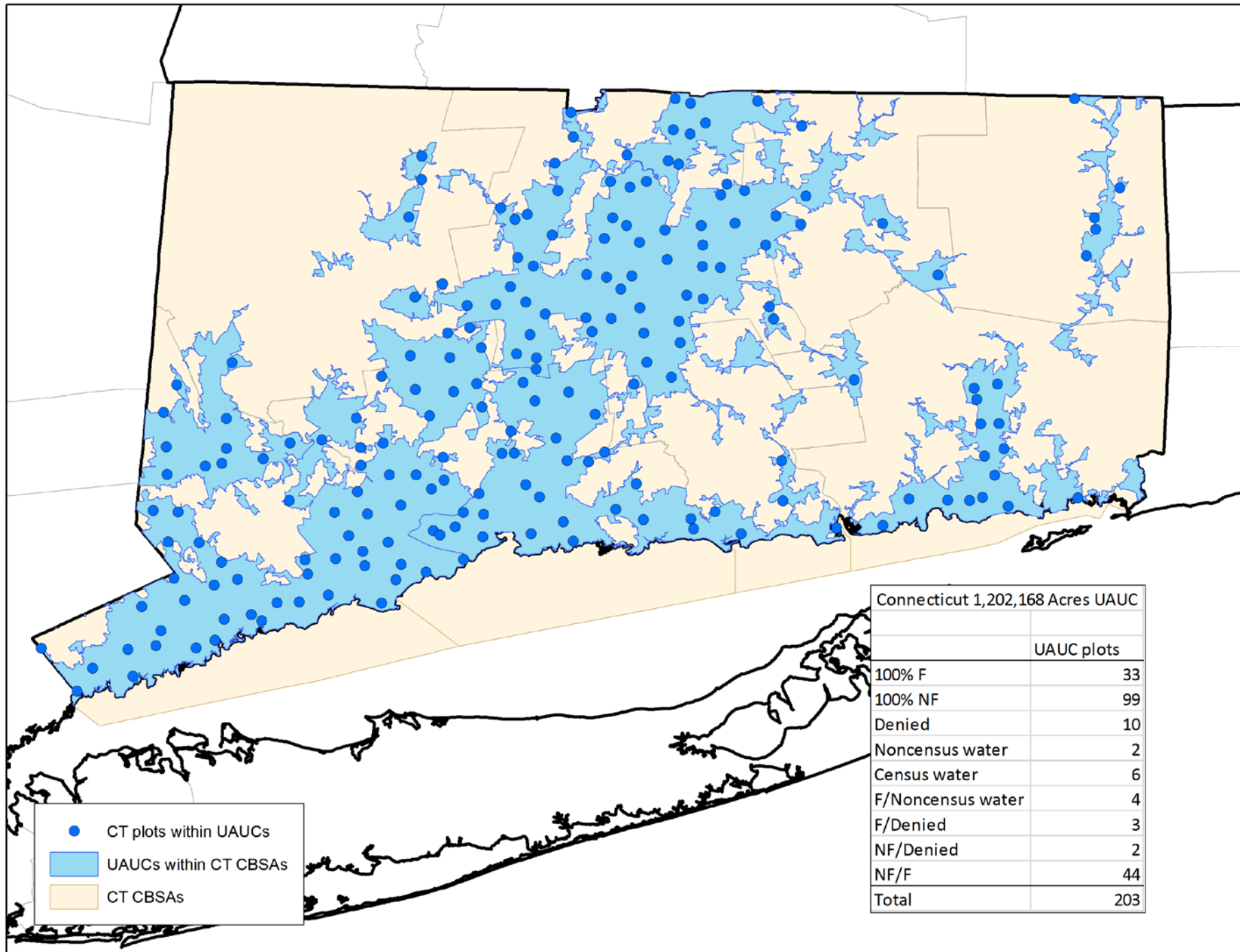
What information is UFIA collecting?

- ***Tree species*** / Identifying the trees species growing in the urban environment and which tree species are most abundant.
- ***Tree size*** / Measuring tree size helps us learn more about the tree's ability to provide benefits as well as the future of the urban forest.
- ***Tree crown condition*** / Recording the size, shape, and density of a tree's branches and leaves tells a lot about the health of a tree, how well it's growing in its location, and its impact on plants growing underneath.
- ***Tree damage*** / Assessing trees for any signs of damage, such as the presence of forest pests or disease, impact from storms or environmental stresses, or improper care or management.
- ***Ground cover*** / Describing the existence of other plants as well as permeable (gravel, bare soil) and impermeable (asphalt, cement) surfaces to learn more about runoff and water infiltration potential and runoff.
- ***Urban markets*** / Providing traditional wood quality volume and merchantability metrics to help inform wood utilization and urban wood economies.
- ***Ownership and social values*** / Classifying land as public or private; social science surveys will provide information on the values and perceptions of the urban home/landowner.

Repeated measurements over many years will tell us how the Nation's urban forests are changing.

Bridgeport - Stamford - Norwalk, CT CBSA		
290, 769 Acres UAUC		
	City plots	UAUC plots
100% F	0	3
100% NF	1	30
Denied	0	1
F/Noncensus water	0	1
NF/F	0	11
Total	1	46





Connecticut UFIA:

- will target Bridgeport with 200 *new* sample plots
- in the UA/UC areas throughout the state, will use UFIA methods to assess 200 existing FIA plots
- each year 1/7 of the plots will be measured; each plot will be re-measured every seven years



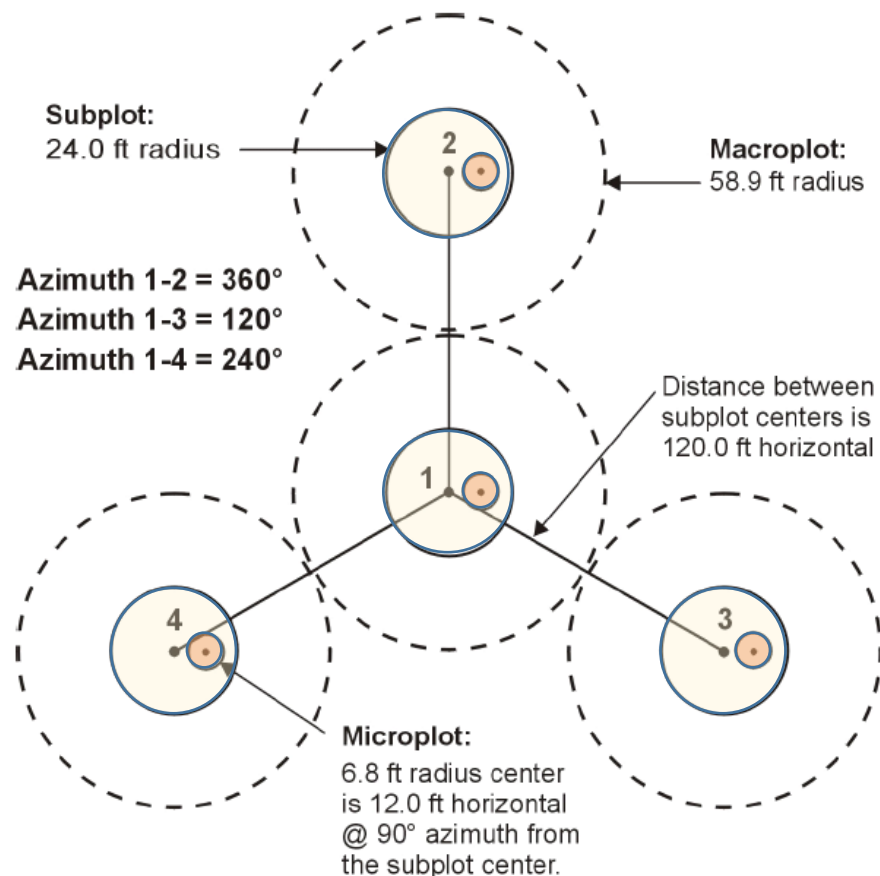


Figure 1-2: The FIA mapped plot design. Subplot 1 is the center of the cluster with subplots 2, 3, and 4 located 120 feet away at azimuths of 360° , 120° , and 240° , respectively.

Basic FIA Design – four 24-foot radius subplots, with each sub-plot containing a 6.8 foot microplot. Subplots are used for selecting trees on which to conduct basic tree measures (over 5" dbh). Microplots are used to measure regeneration and understory vegetation (less than 5" dbh). The larger macroplots are an option when the trees on the site are very large.

Urban Microplots:

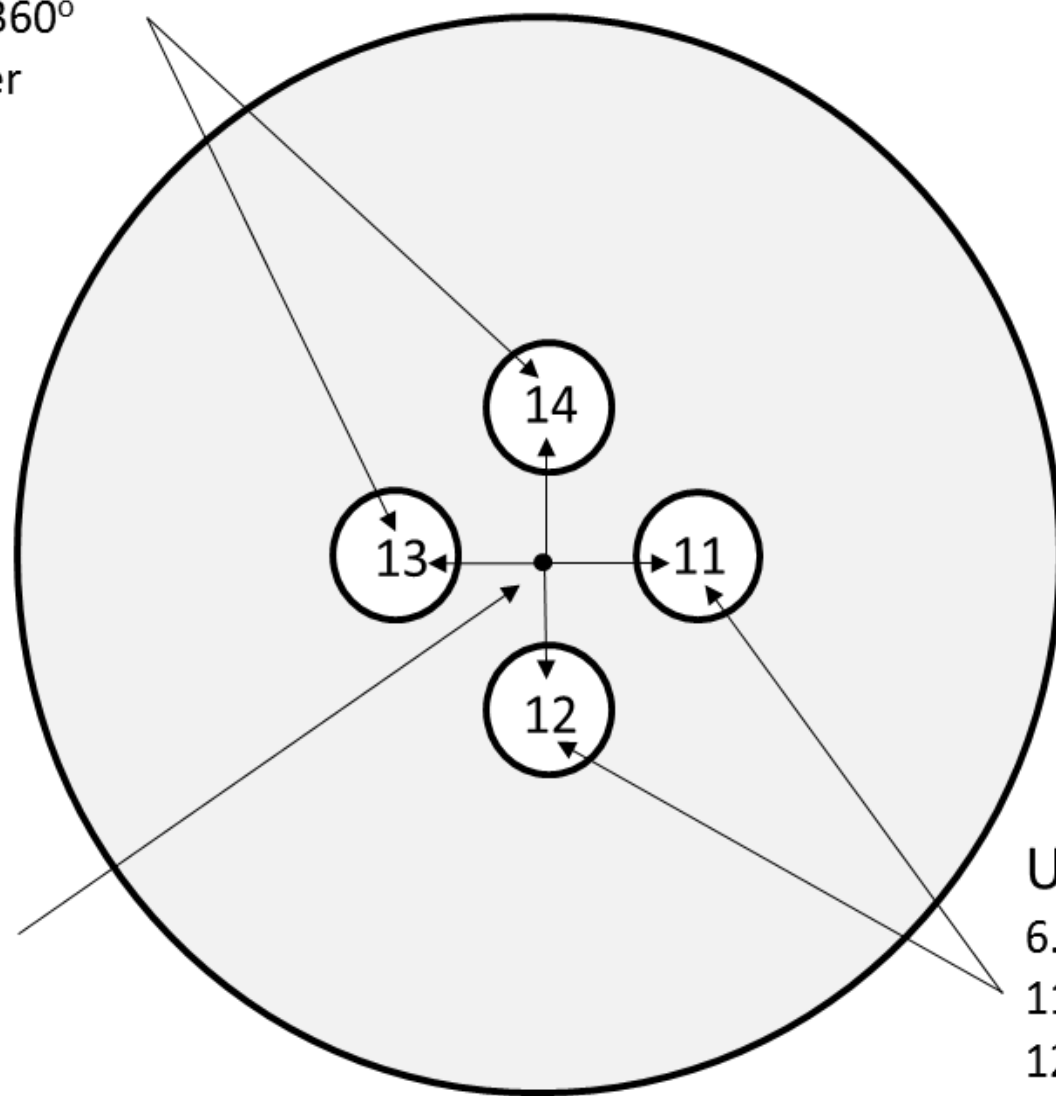
6.8 ft. radius

13 - 12.0 ft. @ 270°

14 - 12.0 ft. @ 360°

From plot center

Urban Plot



Plot Center:

48.0 ft. radius

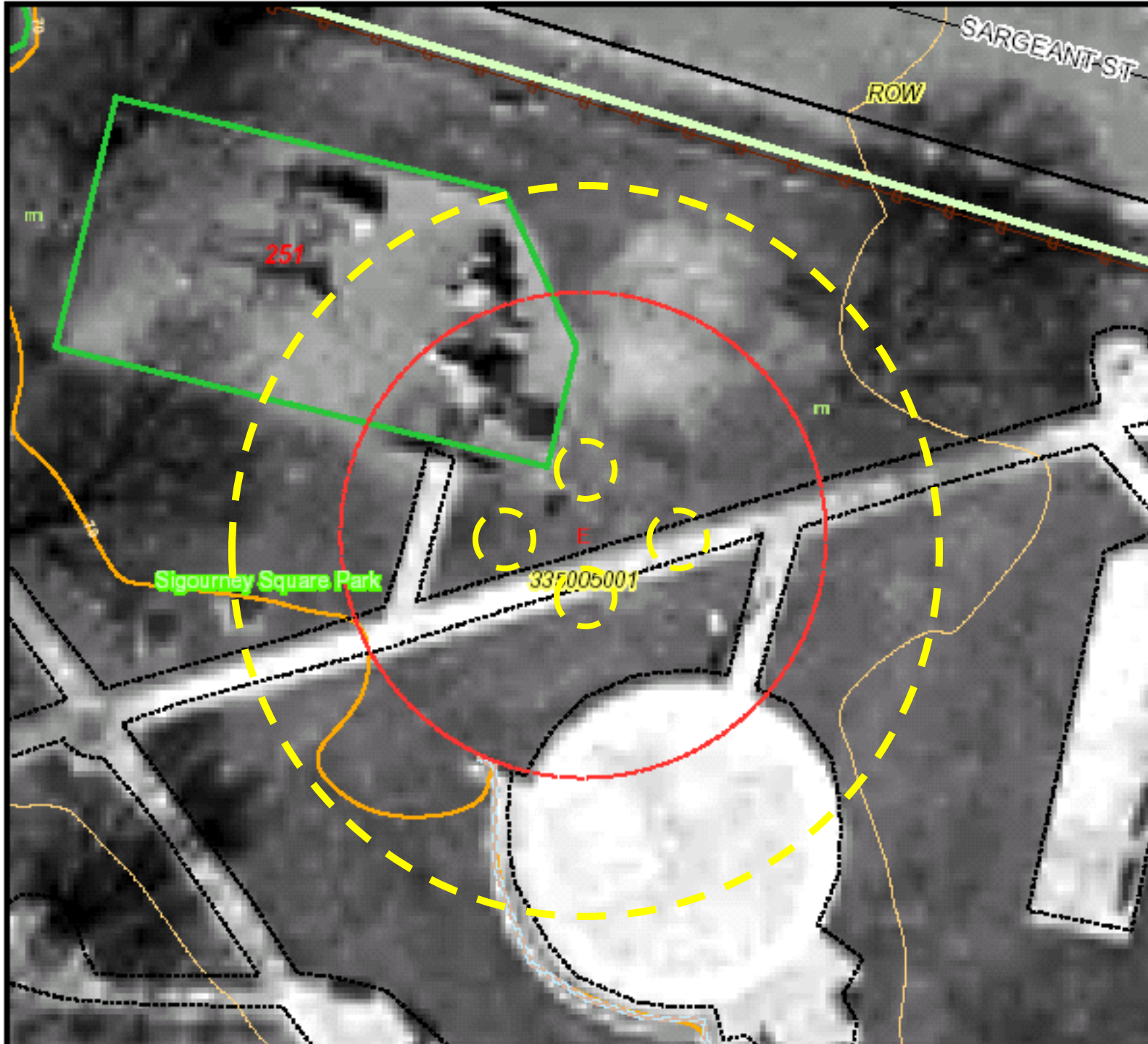
Urban Microplots:

6.8 ft. radius

11 - 12.0 ft. @ 90°

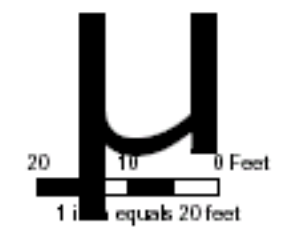
12 - 12.0 ft. @ 180°

From plot center



UPCONE Project Demo
A Collaborative Project between:
City of Hartford,
Knox Parks Foundation
and
CT Department of Environmental
Protection

General Location Map



Site #
125

Map Prepared By:
Mark Goetz, GISP
DPW GIS Services



Google







For this tree:

- Record die-back percentage
- Record girdling roots



CENTURY DR





Urban Forest Land Owners

The [National Woodland Owner Survey](#) (NWOS) is the socioeconomic dimension of the USDA Forest Service's [Forest Inventory and Analysis](#) (FIA) Program and is administered by the [Family Forest Research Center](#). As FIA continues to expand its inventory into urban areas, the FFRC is working with USDA Forest Service scientists to develop and deploy an urban counterpart to the NWOS in order to better understand the critical link between society and urban natural resource management.

Why is this Good News?

- Sometime soon we will have consistent, across the board data about the trees in our urban areas, including public trees, private trees, trees in forests, trees in parks, trees along streets and trees in yards.
- This data will encourage us to stretch our understanding of urban trees and forests, perhaps even making mainstream such concepts as the specific benefits these trees provide or the potential value of the wood available in these trees.
- We should be in a much better position to spot problems and trends earlier and to adapt our management practices to these observations of what is actually happening with these urban trees.

A man in a light blue polo shirt and blue jeans stands with his hands on his hips next to the massive, moss-covered trunk of an old tree. The tree's branches spread out in all directions, some covered in Spanish moss. The background is filled with lush green foliage and a bridge structure is visible in the distance. The ground is a well-maintained green lawn.

Thank you very much!

**Chris Donnelly
Urban Forestry Coordinator
CT DEEP Forestry**

**www.ct.gov/deep/urbanforestry
chris.donnelly@ct.gov**