

i-Tree Eco Workshop

Assessing the value of urban trees

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Overview:



- ✿ **i-Tree and Eco overview**
- ✿ **Phase I: Early decisions and objectives**
 - ✿ Creating a sample
 - ✿ Gathering general data
- ✿ **Phase II: Getting started with Eco software**
- ✿ **Phase III: Field data collection**
- ✿ **Phase IV: Running Eco**
 - ✿ Reporting results
 - ✿ Data interpretation and use
- ✿ **Considerations for international users**

What is i-Tree?



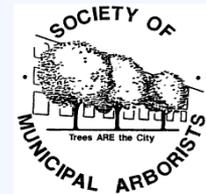
 A suite of tools to assess urban vegetation and their ecosystem services and values



i-Tree Eco = UFORE

v. 3.0 programs

Public-Private Partnership



 **USDA Forest Service**

 **Davey Tree Expert Co.**

 **National Arbor Day Foundation**

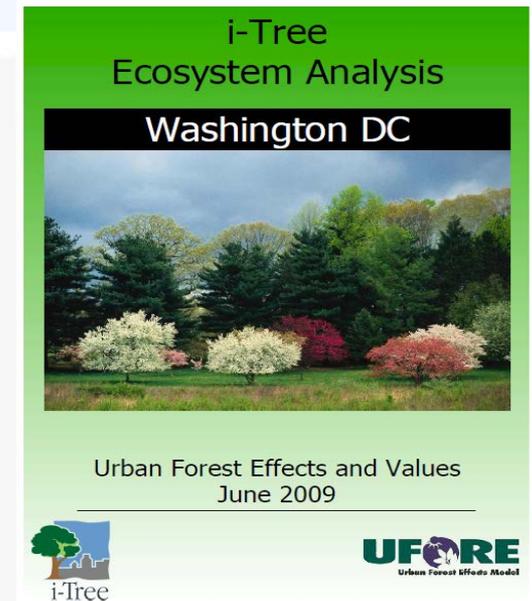
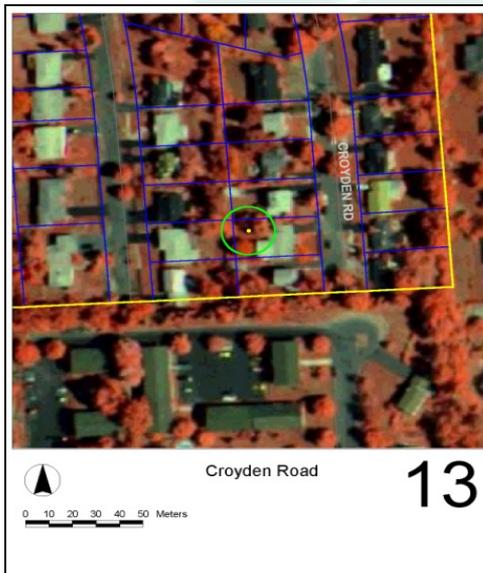
 **Society of Municipal Arborists**

 **International Society of Arboriculture**

 **Casey Trees**

Goals

- ✿ Simple and low-cost tools and methods to aid in forest planning and management
- ✿ Complete process – start to finish



Assessing Tree Populations

i-Tree assesses:

- 🌳 Structure
- 🌳 Function
 - Energy use
 - Air pollution
 - Carbon
 - VOC emissions
- 🌳 Value
- 🌳 Management needs
 - Pest risk
 - Tree health
 - Exotic/invasive spp.

I. Tree Characteristics of the Urban Forest

The urban forest of Washington DC has an estimated 2,043,000 trees with a tree cover of 29.6 percent. Trees that have diameters less than 6-inches constitute 56.7 percent of the population. The three most common species are American beech (14.60 percent), Red maple (6.43 percent), and Boxelder (6.17 percent).

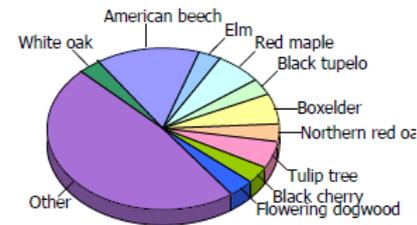


Figure 1. Tree species composition in Washington DC

Among the land use categories, the highest tree densities occur in Forest followed by Ag./Water/Wetlands and Developed, open. The overall tree density in Washington DC is 128 trees / hectare (see Appendix III for comparable values from other cities).

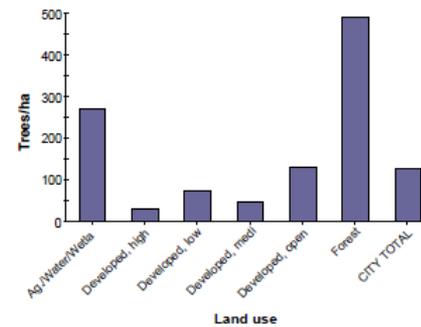


Figure 2. Number of trees/ha in Washington DC by land use

The Foundation: Local Data

Local Sample or Inventory

Local information:

-  Weather
-  Pollution
-  Environmental variables

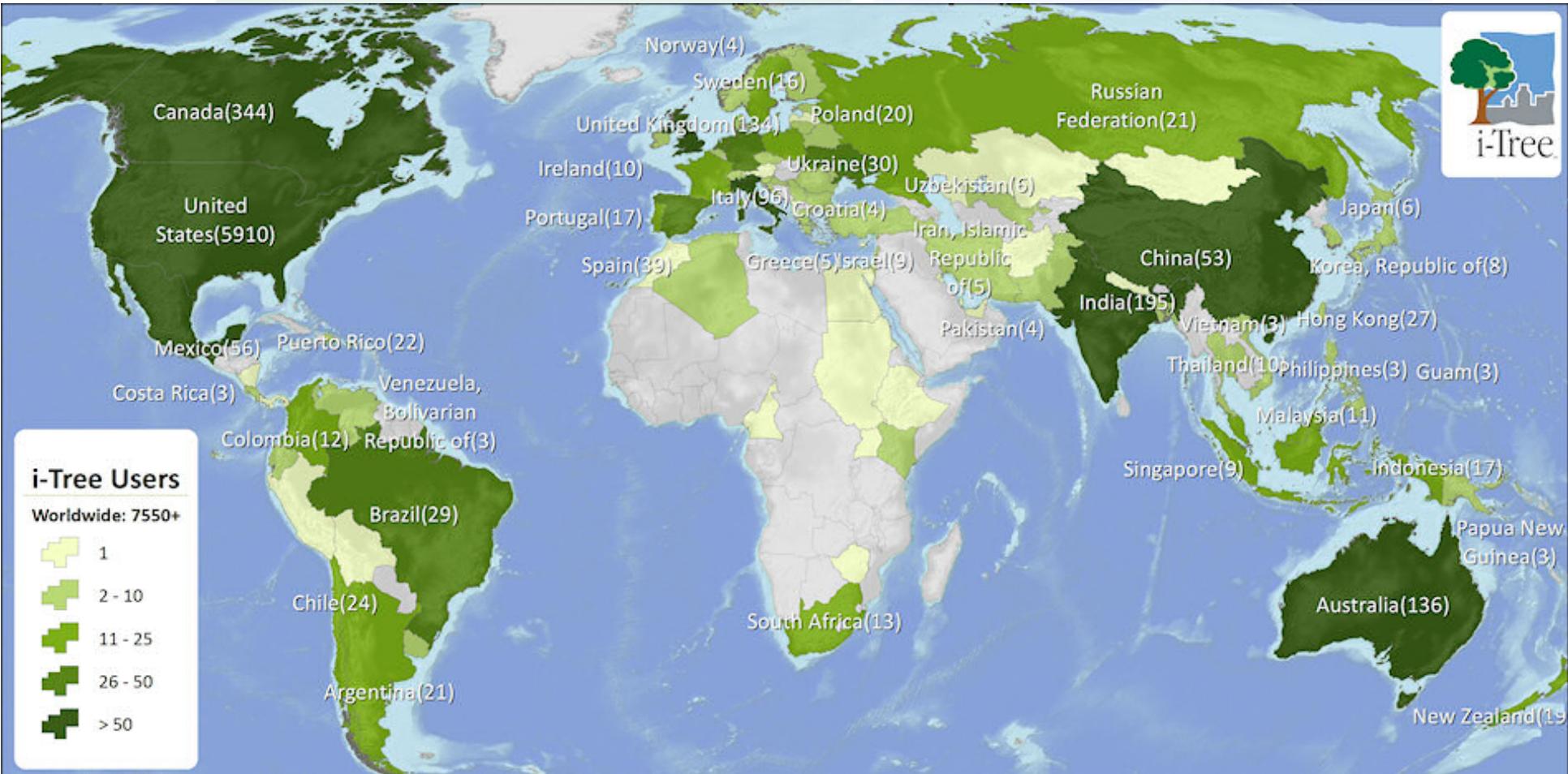
Hourly simulations



i-Tree Use



Program distribution increasing about 25% per year



Distributed to over 90 countries

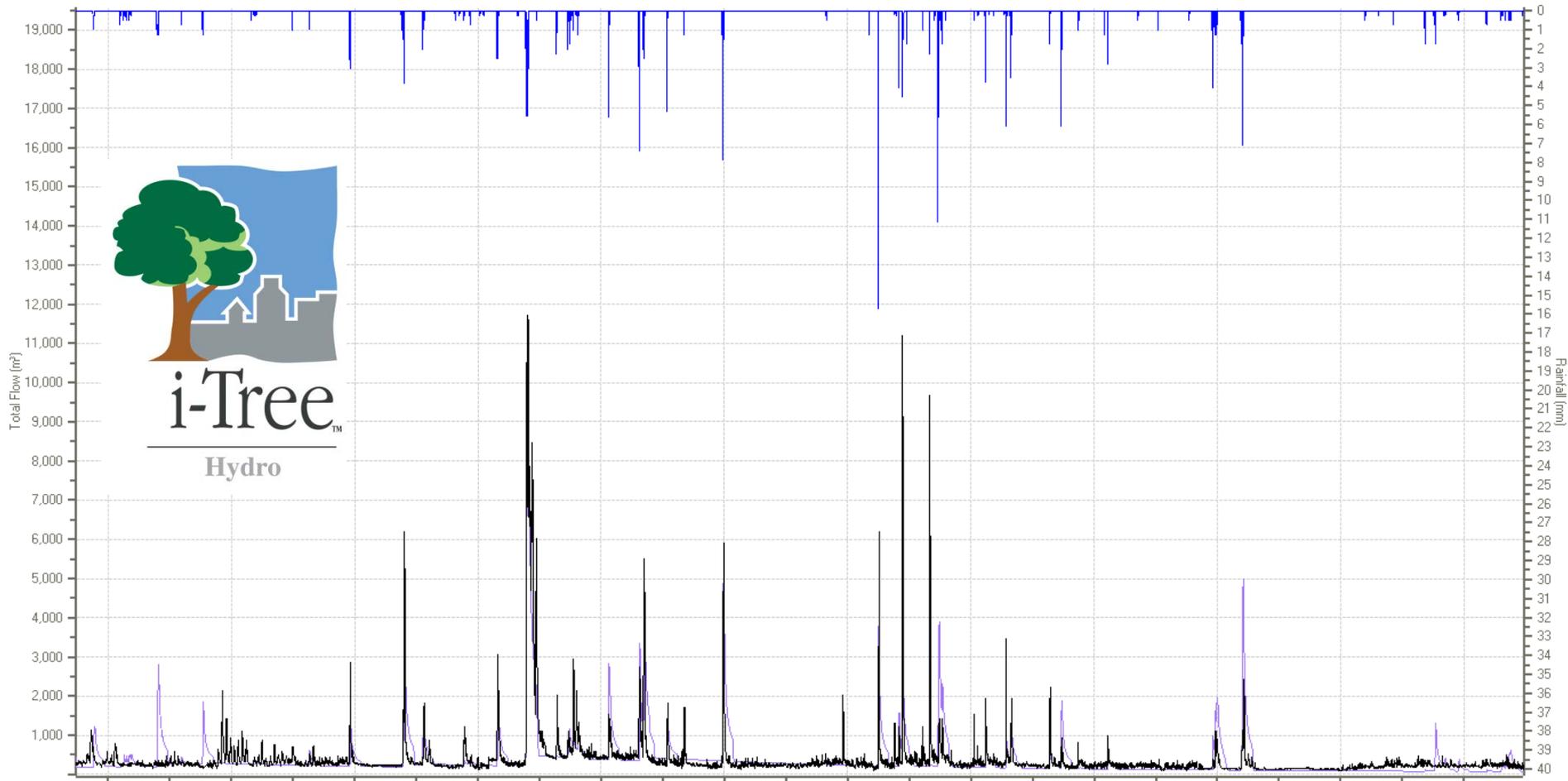
i-Tree Version 4.0

5 New or Enhanced Tools



i-Tree-Hydro

- 🌳 Separate GIS program
- 🌳 Calibrates against stream flow data



National Cover Maps and Google Maps



i-Tree Vue (beta)



i-Tree Vue Google Maps Browser

UL UR LL LR UnDock

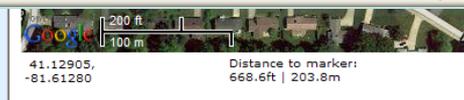
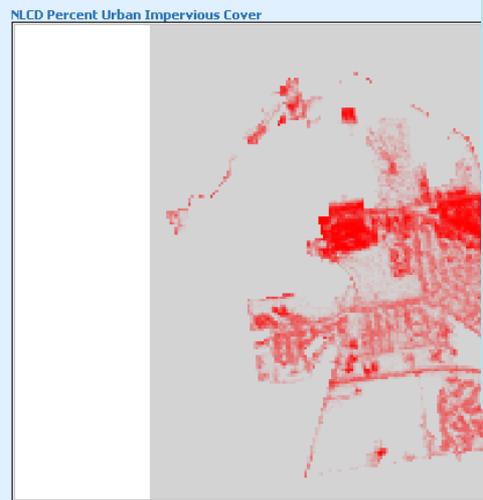
Map Satellite Terrain

Map data ©2010 Google - Terms of Use

41.11727, -81.61661 Distance to marker: 549.2ft | 167.4m Bearing: 334.6 deg

Approximate location on Google Maps

Auto Info Bubble



NLCD Statistics

NLCD Image Area:		2,925.8 acres
Tree Canopy (TC):		677.3 acres 23.2 %
Impervious Cover (IC):		811.4 acres 27.8 %
Developed (all):		2,305.1 acres 78.8 % TC: 12.1% IC: 35.2%
Forest (all):		409.7 acres 14 % TC: 75.6% IC: 0%
Wetlands (all - wet1 & 2 tabs):		86.1 acres 2.9 % TC: 83.7% IC: 0%
Agriculture (all):		58.9 acres 2 % TC: 7.1% IC: 0%
Miscellaneous (all):		62.0 acres 2.1 % TC: 19.3% IC: 0%
Water:		4.0 acres 0.1 %

Zoom %
232 Full Extent Scroll Bars Legends GoogleFind GoogleVue

Metric Units

(Panning is Disabled when Google Tools are in use)

Save Output Reset Output



i-Tree Canopy



i-Tree Canopy - Windows Internet Explorer provided by USDA Forest Service

Browser address bar: <http://dev.itreetools.org/canopy/index.php>

Browser menu: File Edit View Favorites Tools Help

Browser toolbar: Home Back Forward Stop Refresh Print Page Safety Tools



i-Tree

Tools for Assessing and Managing
Community Forests

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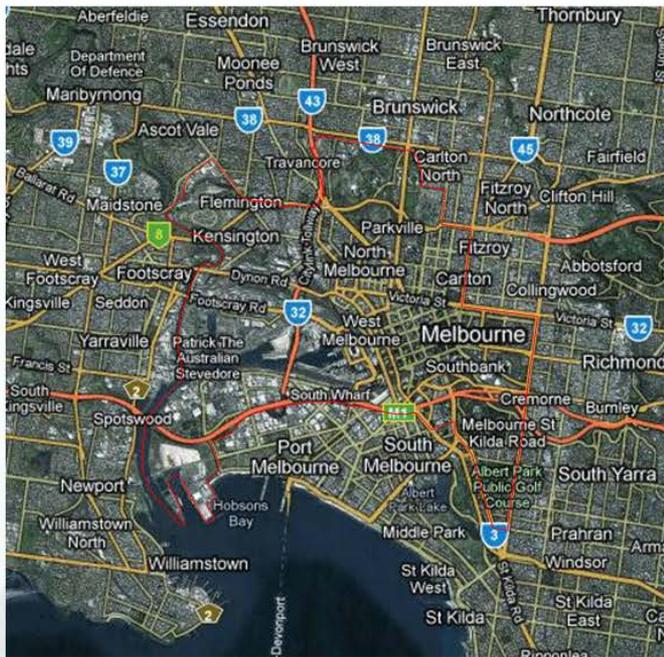
Applications

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i-Tree Canopy



Get started in three easy steps!

One

Browse to your project area boundary GIS file. The file must be in ESRI Shapefile format and in lat/long coordinates.

[Load ESRI Shapefile ?](#)

Or [Load Sample Project >](#)

Two

Configure the cover classes for your survey.

[Configure Survey > ?](#)

Three

[Begin i-Tree Canopy Survey > ?](#)

Been here before?

Already started an i-Tree Canopy survey?
Load it here and resume your work.

[Load Previous i-Tree Canopy Survey ?](#)

More Information!

[Technical Notes](#)

- With i-Tree Canopy, you can load a polygon boundary in ESRI Shapefile format on the map above and conduct a cover assessment for a project area.
- Collect data on your own cover classes of interest.
- 500-1000 survey points are suggested; the more points you complete, the better your

Done

Windows taskbar: start button, taskbar icons (David No..., i-Tree V..., 2 Micr..., Inter...), Search Desktop, system tray (Internet, 125%, 100%, 12:04 PM)

Classify random points



i-Tree Canopy: Survey - Windows Internet Explorer provided by USDA Forest Service

http://dev.itreetools.org/canopy/survey.php

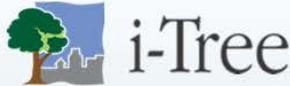
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Technical Notes Report Export Start Over Exit ?



i-Tree Canopy

Percent Cover (\pm SE)



Id	Cover Class	Latitude	Longitude
1	Tree	-37.82930543236	144.91265730117
2	Tree	-37.81302356330	144.95401488007
3	Tree	-37.81913019363	144.97617933379
4	Non-Tree	-37.82964905605	144.98052520547
5	Non-Tree	-37.81840952395	144.97104739912
6	Non-Tree	-37.82188855427	144.94620800253
7	Non-Tree	-37.81882077	144.92805906653
8	Tree	-37.78606178650	144.94090887519

Page 1 of 1 View 1 - 8 of 8

Remember, the more points you survey, the lower your Standard Error, and the more precise your sampling will be. More points surveyed provide for a better estimation of total canopy cover in your study area.

Save Your Data

Pest Detection Protocol

Collect Pest & Disease

 Signs

 Symptoms

Reports

 Associated pest & diseases

 Trends/patterns

IPED Field Guide Pest Evaluation and Detection



Defoliation	None
Discolored Foliage	None
Abnormal Foliage	None Mottling, spots, or blotches Marginal scorching (browning) Interveina scorching (brown)
Insect Signs	White coating Black coating (often sticky)
% Foliage Affected	Complete browning/bronzing Complete yellowing of leaves Stippling
Notes	



i-Tree Design



i-Tree

Tools for Assessing and Managing
Community Forests

Get the Tools.



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i-Tree Benefit Calculator

1500 N Mantua St, Kent, OH 44240, USA

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[Calculate another tree](#)

Overall Benefit

[Storm Water](#)

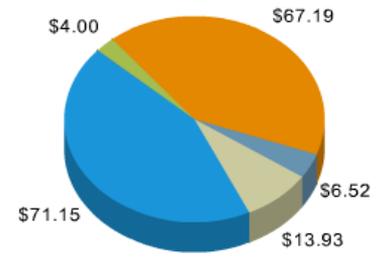
[Energy](#)

[Air Quality](#)

[CO2](#)

[About Model](#)

- Stormwater
- Cooling
- Heating
- Air Quality
- CO2



Breakdown of your tree's benefits

Click on one of the tabs above for more detail

This 21 inch Northern pin oak provides overall benefits of: \$163 every year.

While some functional benefits of trees are well documented, others are difficult to quantify (e.g., human social and communal health). Trees' specific geography, climate, and interactions with humans and infrastructure is highly variable and makes precise calculations that much more difficult. Given these complexities, the results presented here should be considered initial approximations—a general accounting of the benefits produced by urban street-side plantings.

Benefits of trees do not account for the costs associated with trees' long-term care and maintenance.

If this tree is cared for and grows to 26 inches, it will provide \$195 in annual benefits.

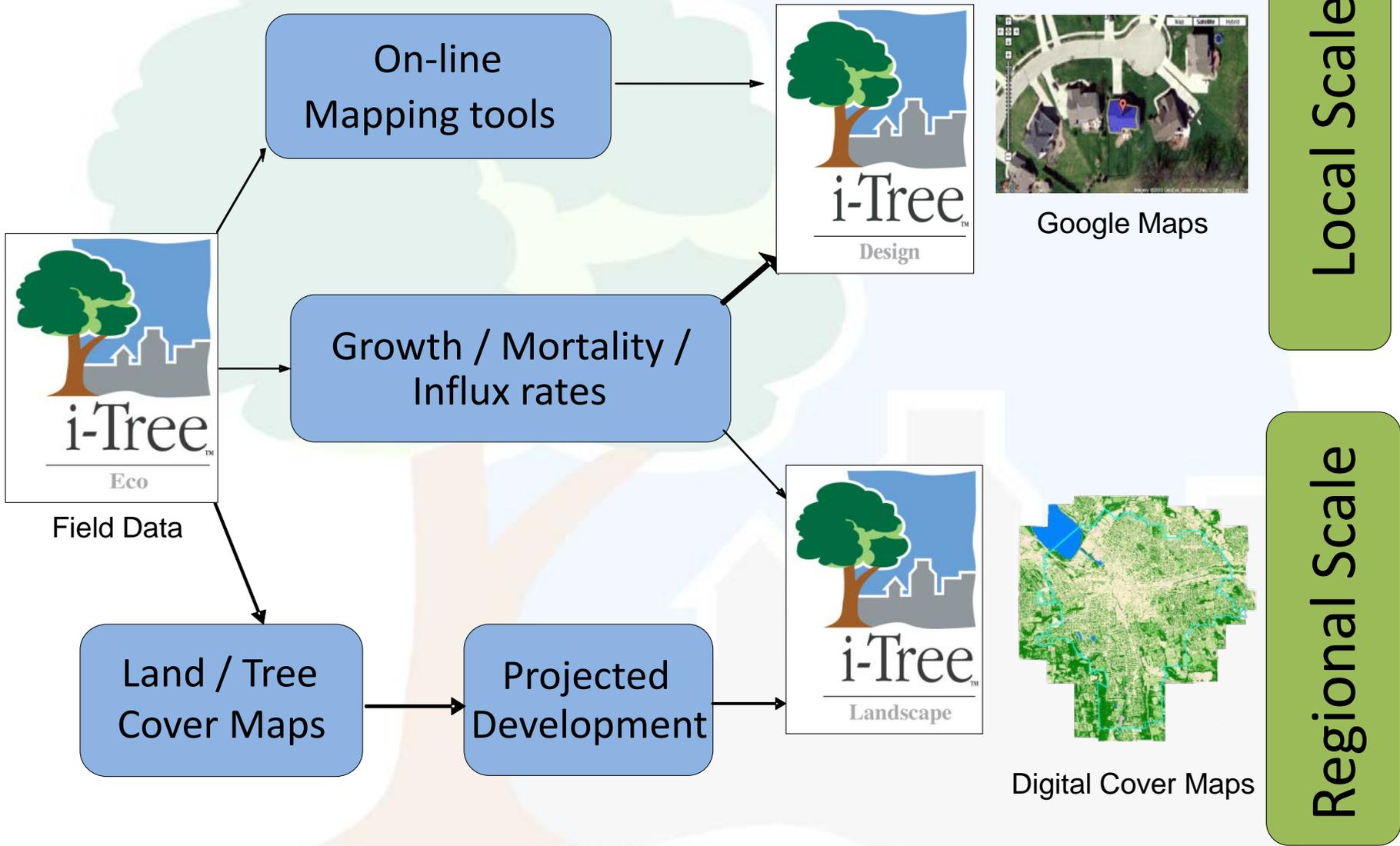


Northern pin oak
Quercus ellipsoidalis

Upcoming i-Tree Features

- 🌳 Projections of tree pop. and canopy cover
- 🌳 Enhanced differentiation by species
- 🌳 Invasive plant composition / risk
- 🌳 New pest ratings (pests and range)
- 🌳 Climate change projections
- 🌳 GIS server and mobile apps
- 🌳 Projected development patterns
- 🌳 Priority planting and protection maps
 - 🌳 Temperature, pollution, eco. services, etc.

i-Tree 2nd Generation (3 Flagship Programs)



International Considerations: Updating data bases



Field Data

Species Data

-  New species – botanical info, shading coeff., range, dec/evergreen, growth rate (S,M,F), height, life span (S,M,L)

Location Data

-  New city – lat/long, elevation, time zone, leaf on/off dates, albedo and terrain factors

Weather Data

Pollution Data

-  Hourly concentration in proper format

International Considerations: Updating program information

Carbon

-  Biomass formulas, growth rates

Air Pollution

VOC emissions

Energy

-  Will not work outside U.S.

Valuation

-  CTLA formula – spp factors, base values
-  Local carbon and pollution values (\$/t)