i-Tree Overview

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

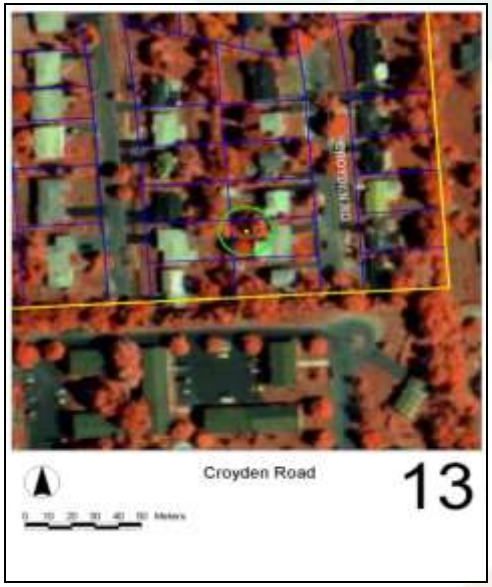
v. 3.0 programs

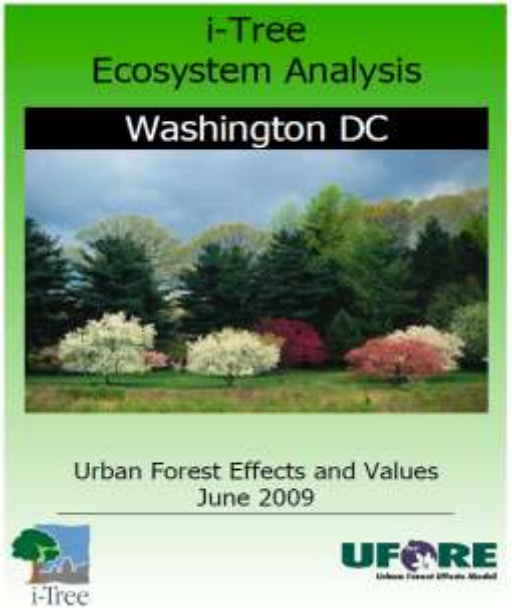
Public-Private Partnership

- 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).

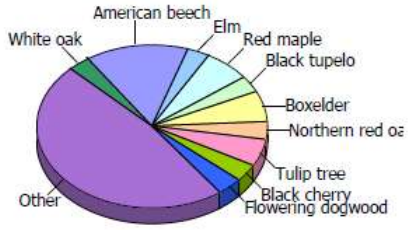


Figure 1. Tree species composition in Washington DC

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

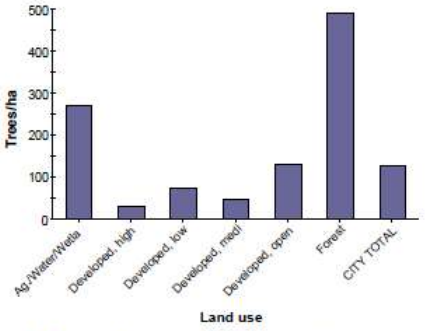


Figure 2. Number of trees/ha in Washington DC by land use

The New York Times
nytimes.com

April 18, 2007

Maybe Only God Can Make a Tree, but Only People Can Put a Price on It

Climate change

Storm water mgt.

Pollution mitigation

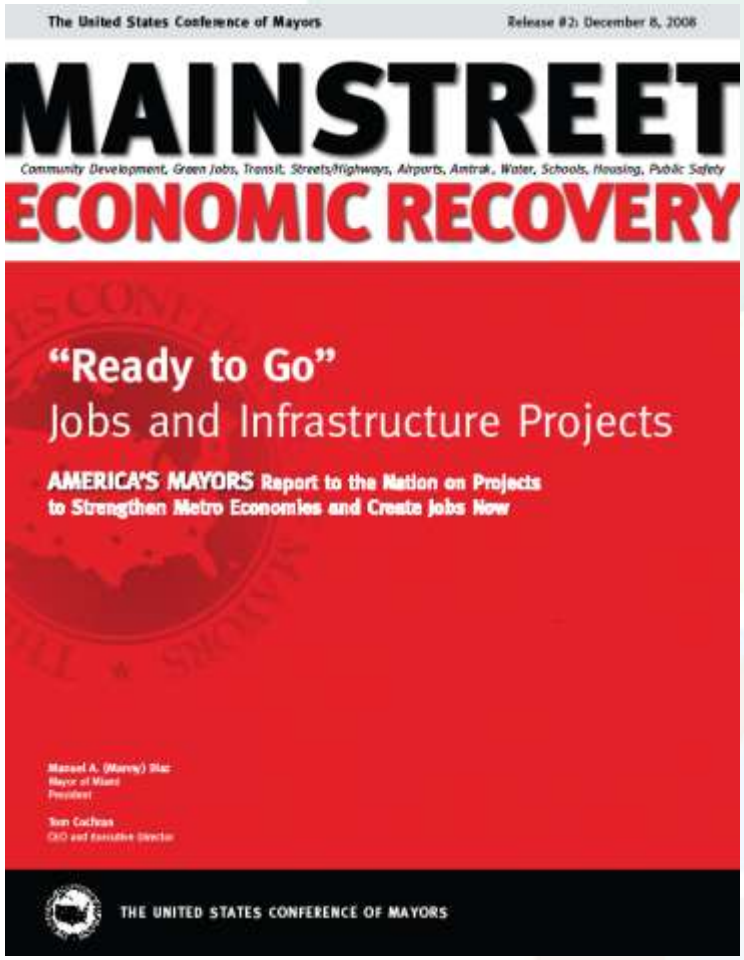
Energy conservation

Carbon strategies

Public health issues

- **Economic development**
- **Green job creation**

Greater Public Scrutiny



"Instead of spending money planting trees on a causeway, we should fix the bridge on the causeway," …

--Senator Tom Coburn (R-OK)

Monday, November 2nd, 2009

KirklandViews.com

Re-Elect Jo
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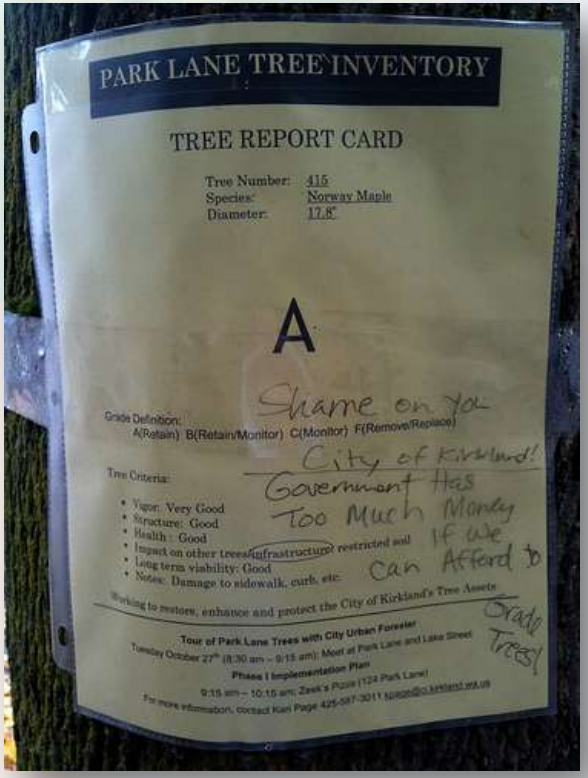
YOU ARE HERE: HOME / CITY HALL / PARK LANE TREES GET REPORT CARDS; SOME QUESTION PROGRAM

Park Lane trees get report cards; some question program 3

The City of Kirkland has given each tree along Park Lane a report card and some of them are not doing so well. The report cards state that the city is "working to restore, enhance

How do we communicate the value of community trees?

- ***"Shame on you City of Kirkland! Government has too much money if we can afford to grade trees!"***



i-Tree: Demonstrating That Trees Pay Us Back!

Street Tree Benefits in Minneapolis:

- $6.8 million in energy savings
- $9.1 million in reduced storm water runoff
- $7.1 million increase in property value
- $1 million improvements to air quality

i-Tree is…

Development, Dissemination, Support, & Refinement

Credible, USDA FS peer-reviewed tools

Public Domain Software

Accessible

Technical Support

"Putting USFS Urban Forest science into the hands of users"

The Foundation: Local Data

Local Sample or Inventory

Local information:

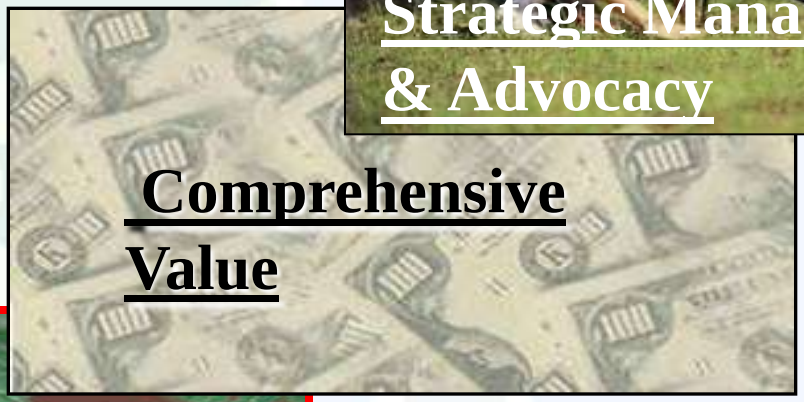
- Weather
- Pollution
- Environmental variables

Hourly simulations

Benefit-Based Approach

i-Tree

i-Tree Tools



Conserving Energy

Image courtesy of the Center for Urban Forest Research

Improving Air Quality

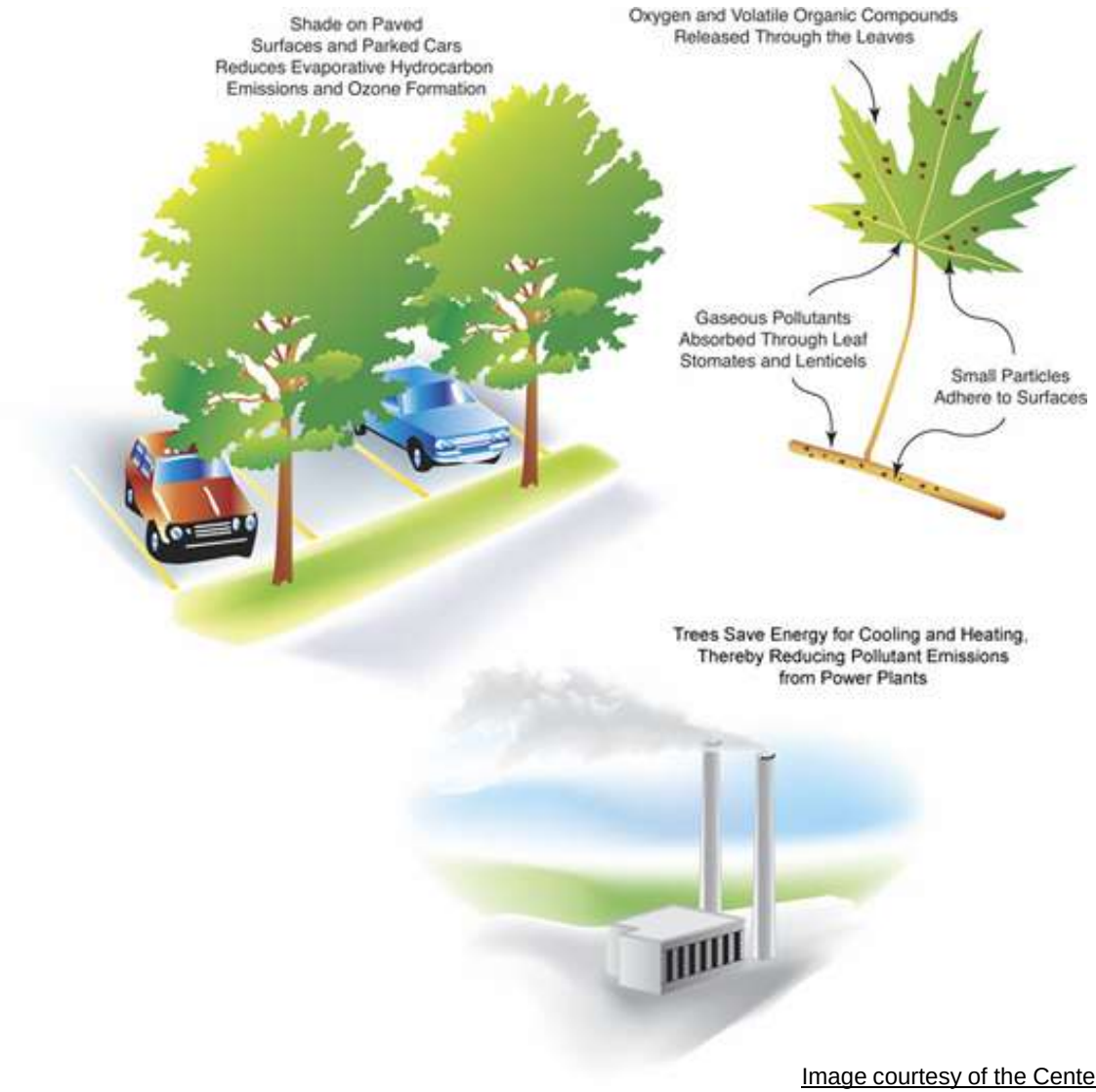


Image courtesy of the Center for Urban Forest Research

Reducing Atmospheric Carbon Dioxide

Image courtesy of the Center for Urban Forest Research

Reducing Stormwater Runoff

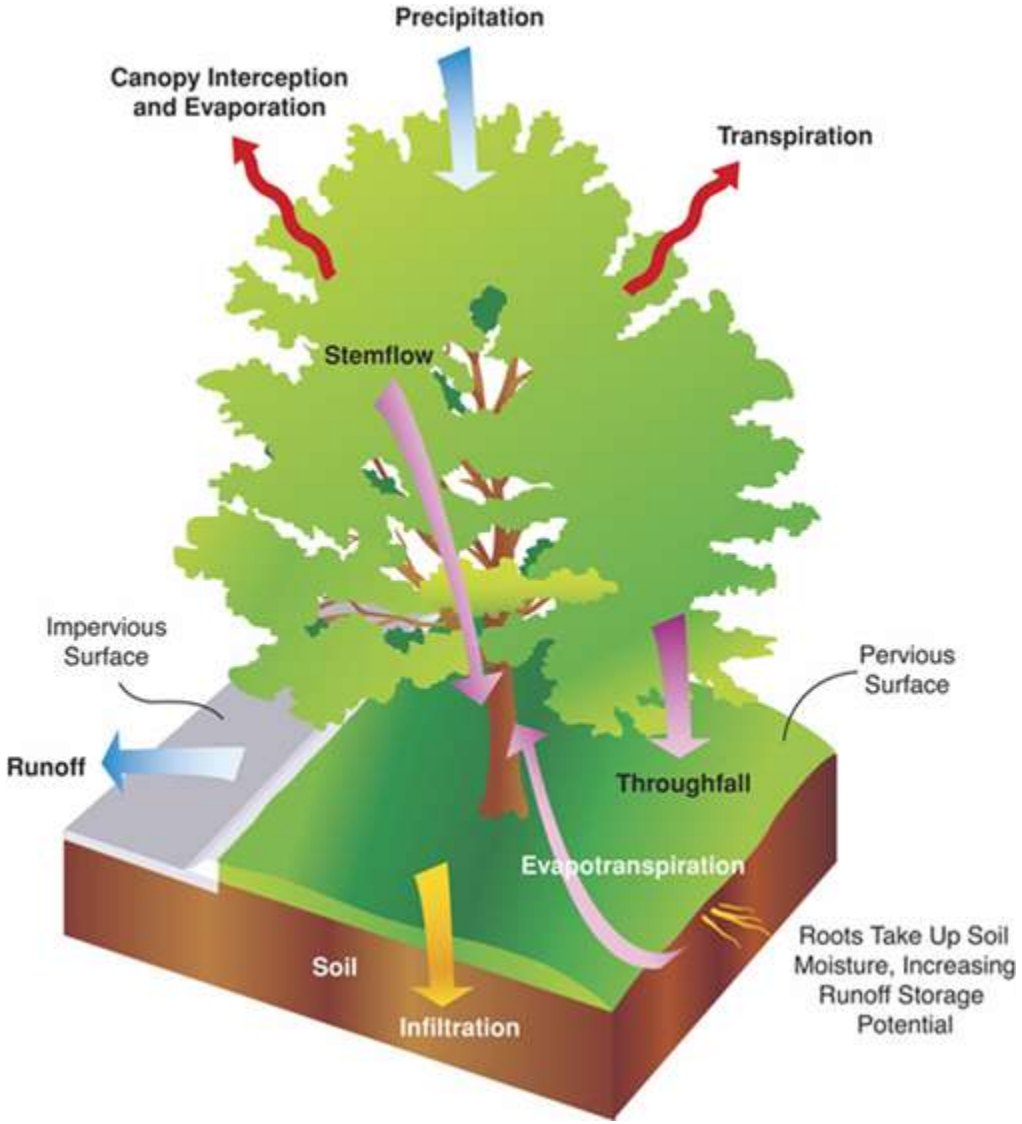
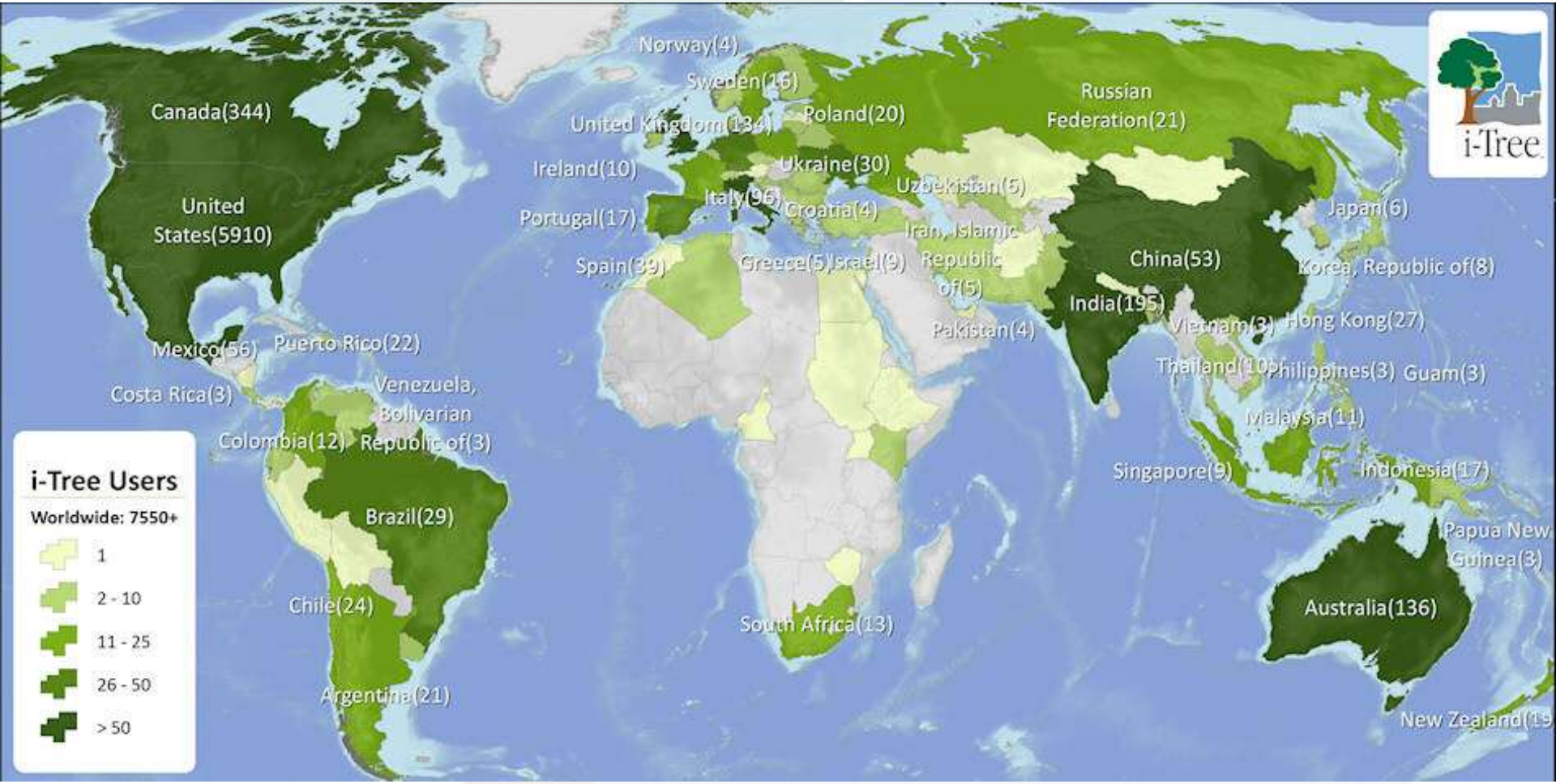


Image courtesy of the Center for Urban Forest Research

i-Tree: the early years

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**

Remote Sensing Canopy Assessment Tools

Cost, Resolution, Time

less

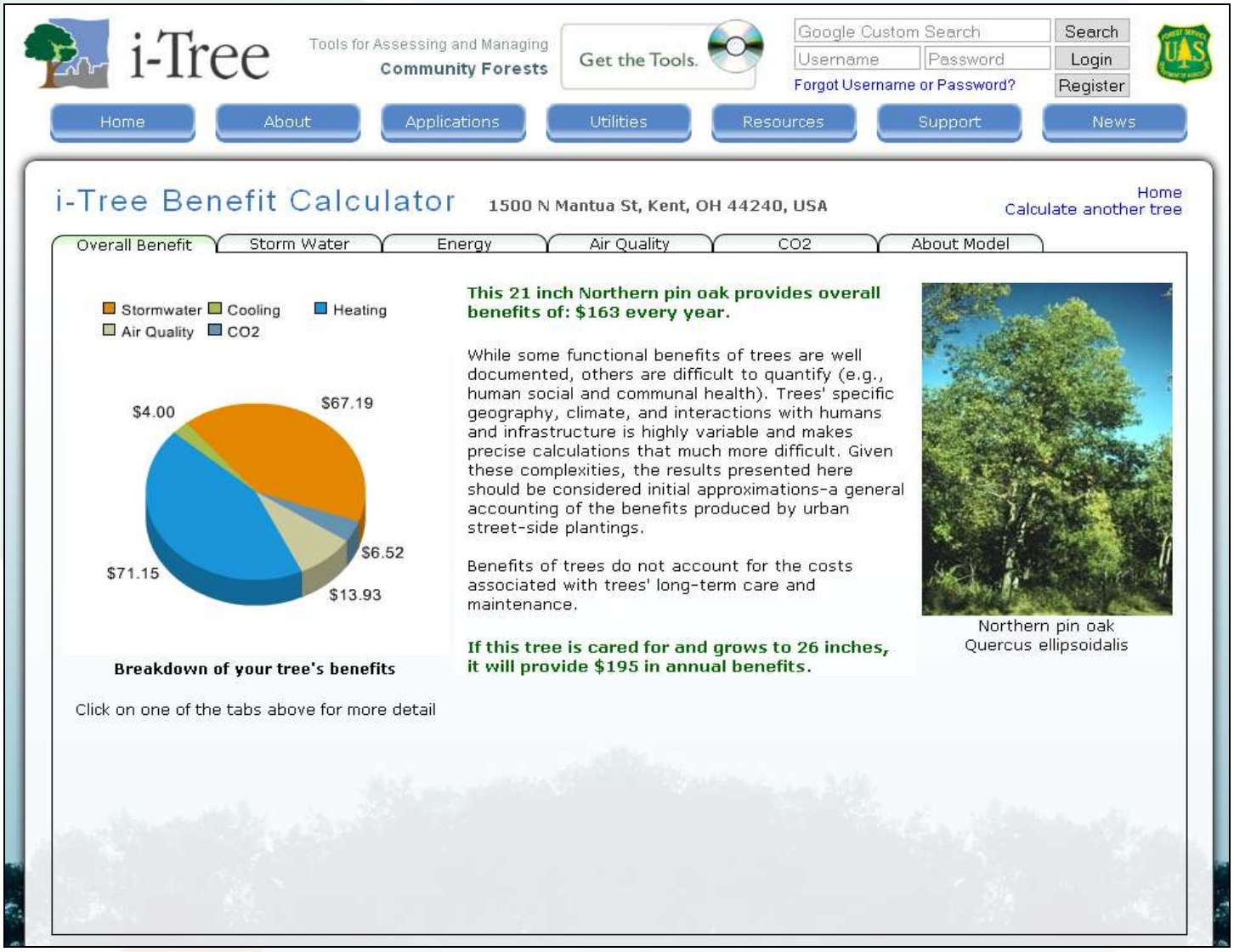
more

- Satellite Based
  - i-Tree Vue

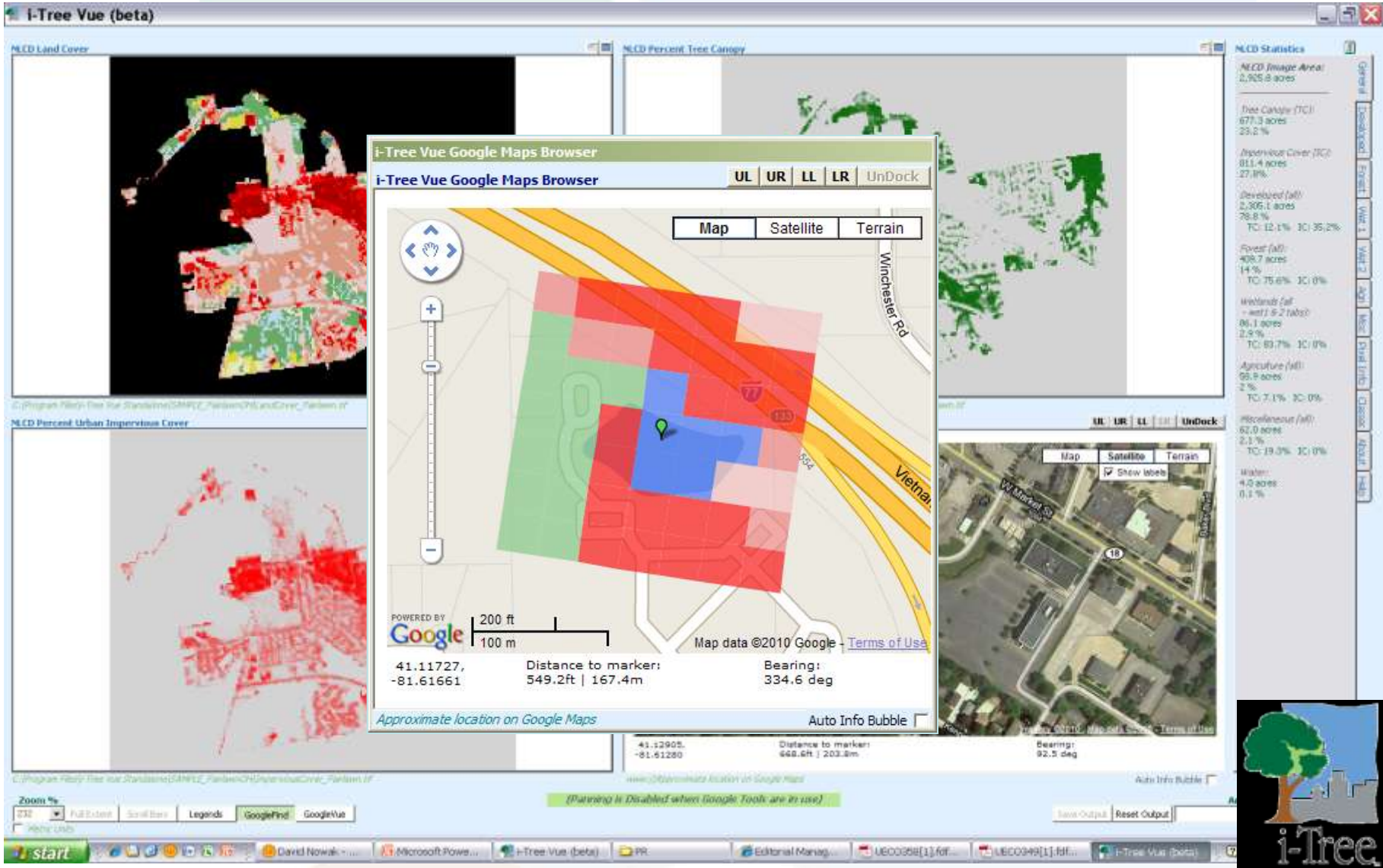
- Statistical Estimation via photo-interpretation
  - i-Tree Canopy

- Hyperspectral classification, GIS analysis, and photo-interpretation
  - UTC

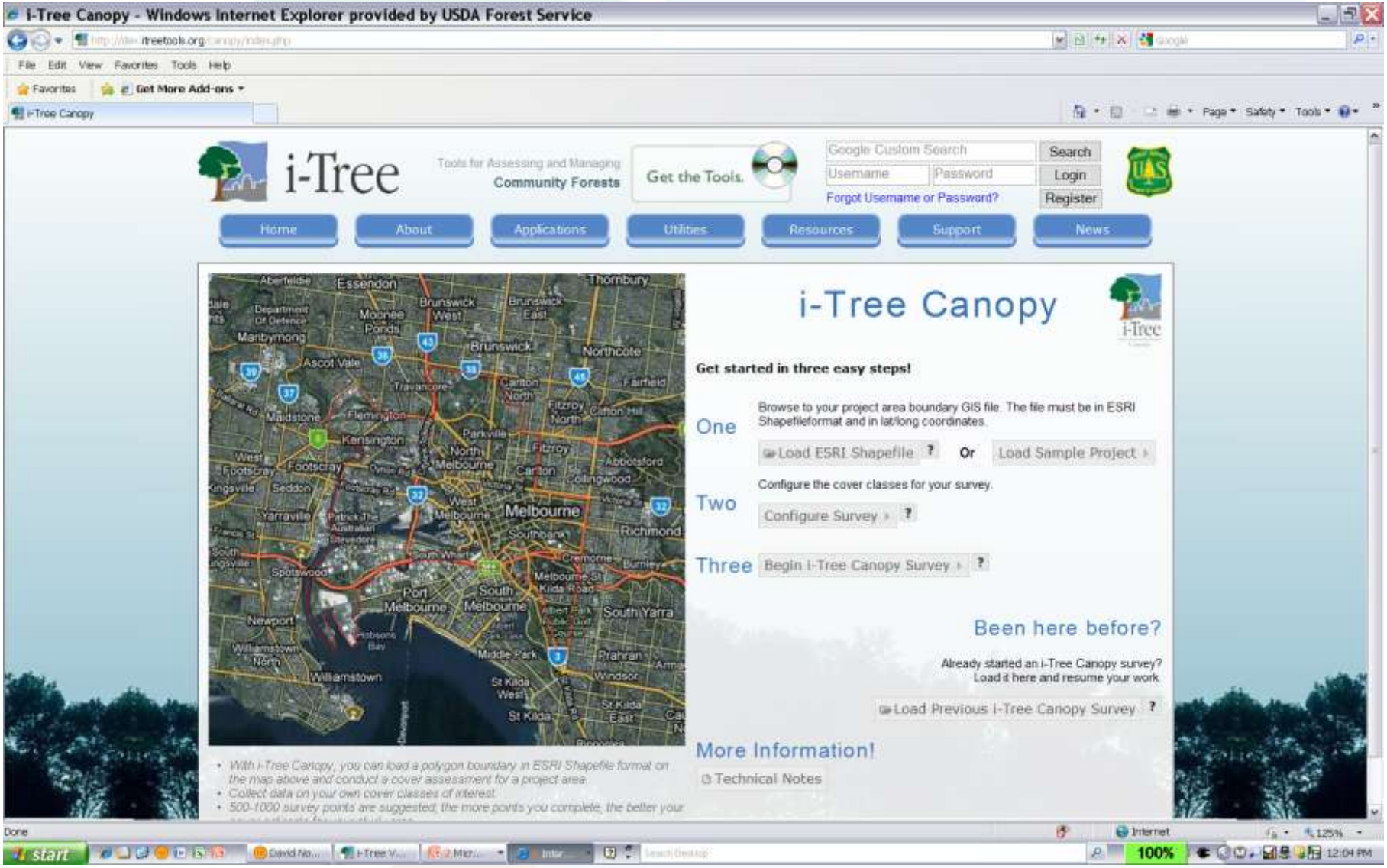
i-Tree Design



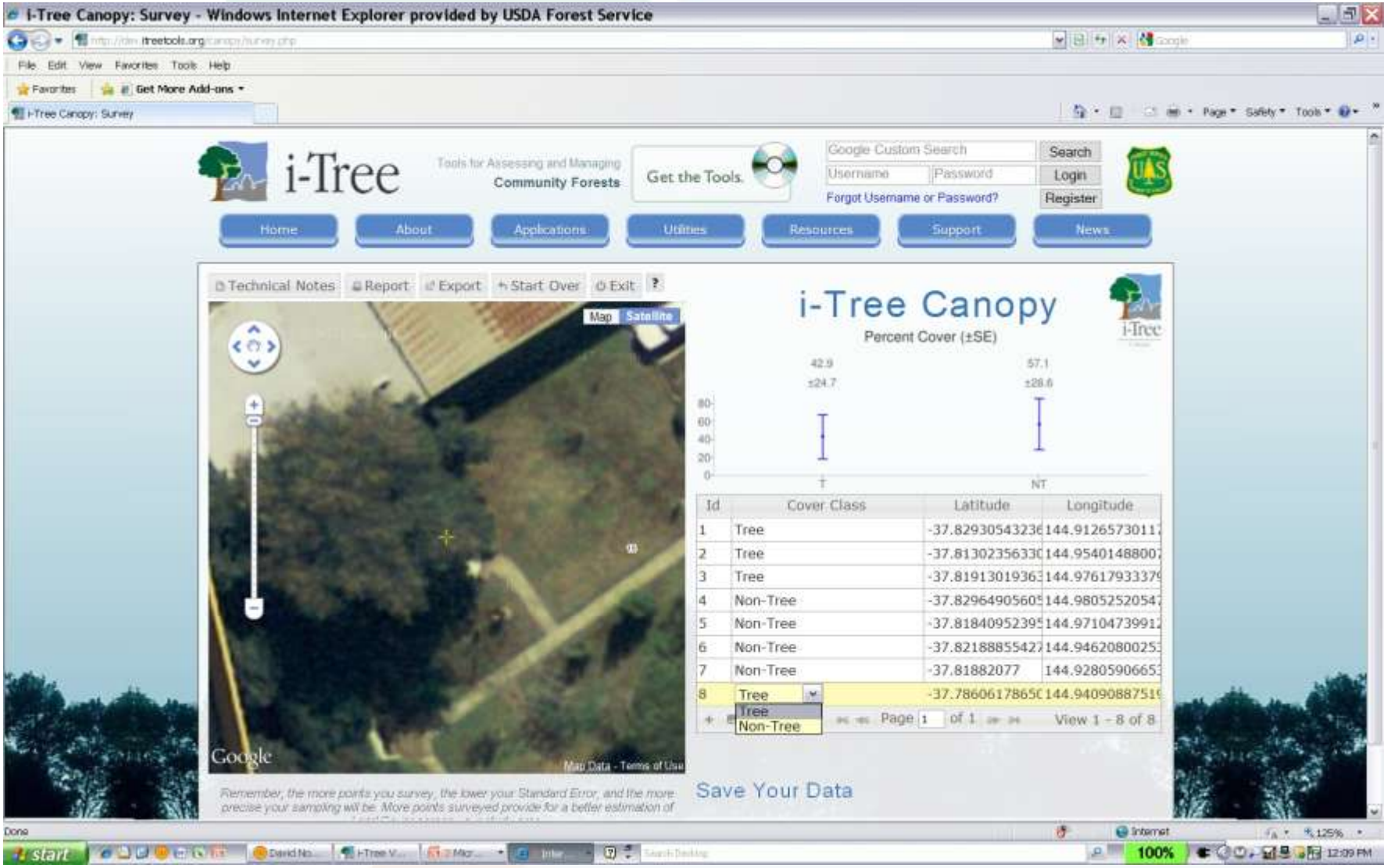
Vue – Estimates Ecosystem Services from National Cover Maps and Google Maps



i-Tree Canopy



Classify random points



File Edit View History Bookmarks Tools Help

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

i-Tree Canopy: Survey

i-Tree

Tools for Assessing and Managing **Community Forests**

Get the Tools.

Google Custom Search | Search

Username | Password | Login

Forgot Username or Password? | Register

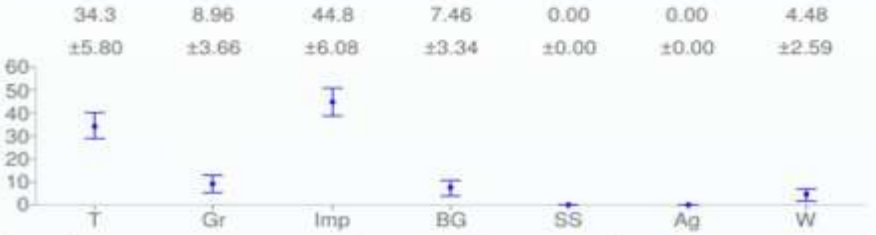
Home | About | Applications | Utilities | Resources | Support | News

Technical Notes | Report | Export | Start Over | Exit | ?

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 Land Cover across your study area.

i-Tree Canopy

Percent Cover (±SE)



Id	Cover Class	Latitude	Longitude
61	Tree	38.902153927112	-76.965047428253
62	Water	38.923799096149	-77.110429223729
63	Tree	38.961324676131	-77.03983893727
64	Impervious	38.866540734234	-76.965398989474
65		38.888206252128	-76.951066339859
66		38.891553823381	-77.04287817671
67		38.907230806429	-77.049487697045

Tree
Grass
Impervious
Bare Ground
Shrub/Scrub
Agriculture
Water
Other

+ | Page 7 of 7 | View 61 - 67 of

Save Your Data

Save Data — Save Early. Save Often. Don't lose your project data!

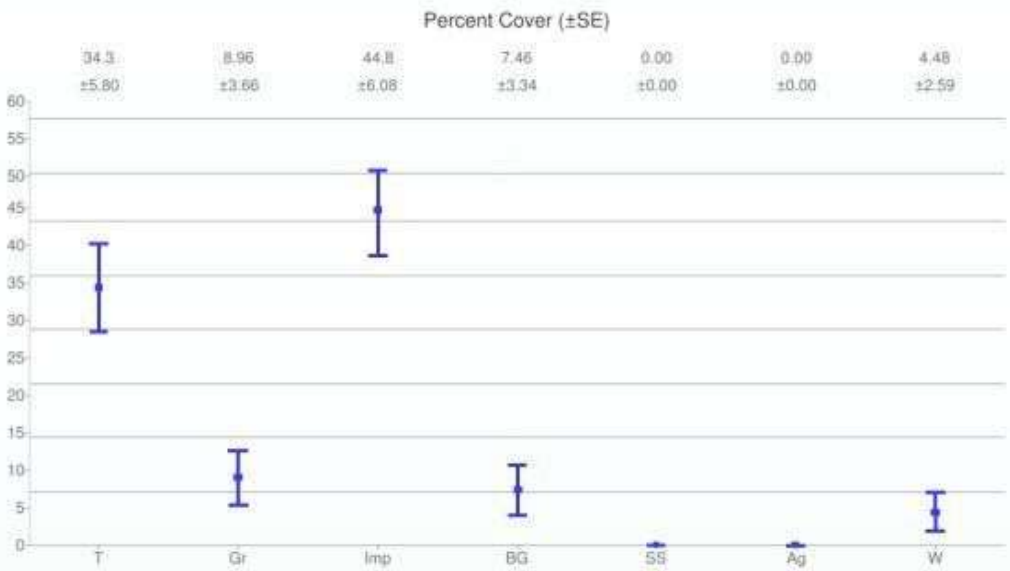
File Edit View History Bookmarks Tools Help

http://www.itreetools.org/canopy/report.php

i-Tree Canopy: Cover Report

i-Tree Canopy

Cover Report



Cover Class	Description	Abbr.	% Cover
Tree	tree, non-shrub	T	34.3 ±5.80
Grass	herbaceous ground cover	Gr	8.96 ±3.66
Impervious	artificial surfaces	Imp	44.8 ±6.08
Bare Ground	soil or barren	BG	7.46 ±3.34
Shrub/Scrub	non tree woody land cover	SS	0.00 ±0.00
Agriculture	crops, pasture, hay	Ag	0.00 ±0.00
Water	lakes, streams	W	4.48 ±2.59
Other	other land cover	O	0.00 ±0.00

About i-Tree Canopy

The concept and prototype of this program were developed by David J. Nowak, Jeffery T. Walton and Eric J. Greenfield (USDA Forest Service). The current version of this program was developed and adapted to i-Tree by David Ellingsworth, Mike Binkley, and Scott Maco (The Davey Tree Expert Company).

Limitations of i-Tree Canopy

The accuracy of the analysis depends upon the ability of the user to correctly classify each point into its correct class. As the number of points increase, the precision of the estimate will increase as the standard error of the estimate will decrease. If too few points are classified, the standard error will be too high to have any real certainty of the estimate.

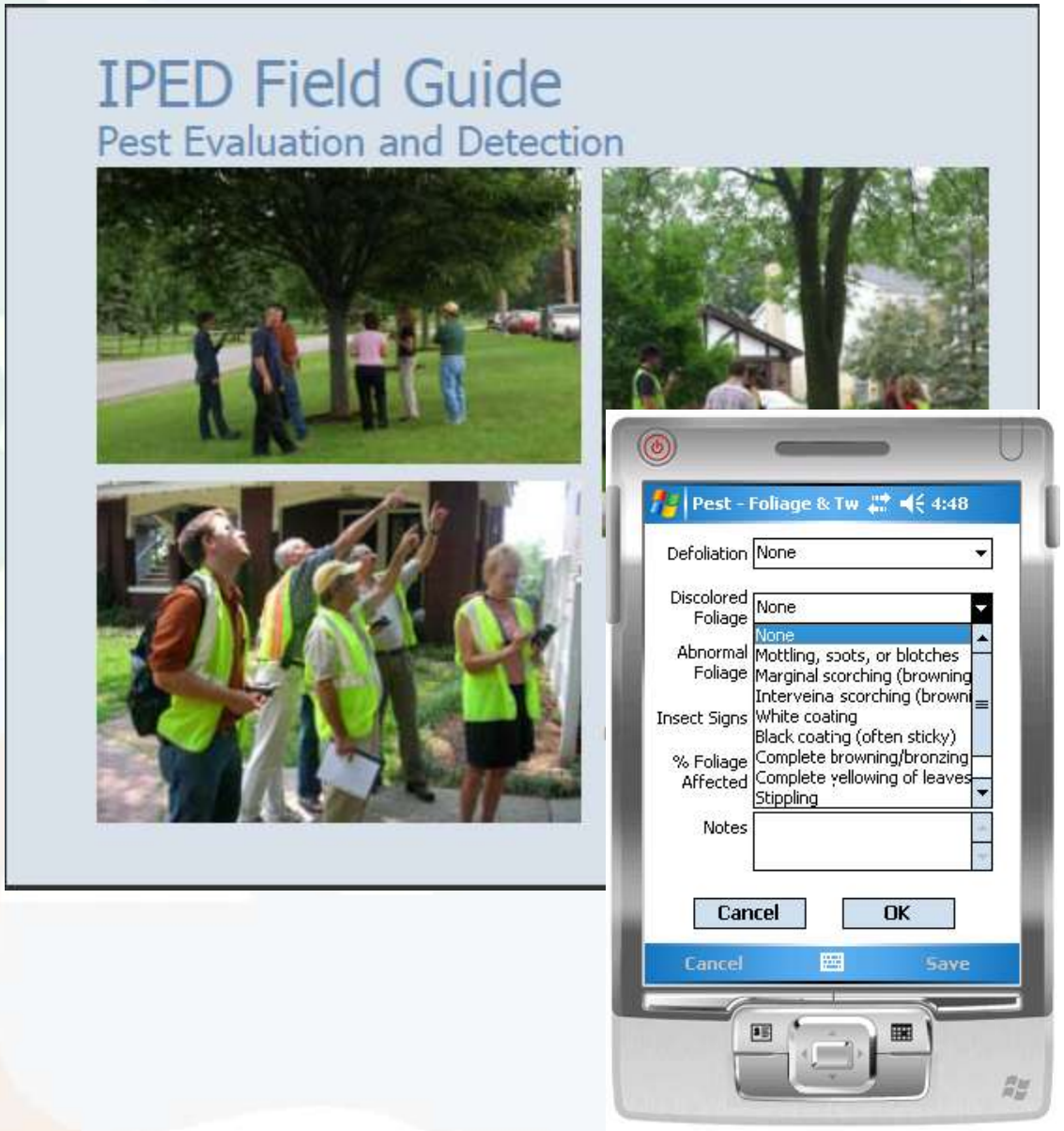
A Cooperative Initiative Between:

DAVEY Arbor Day Foundation SMA ISA Casey Trees

‹ Back

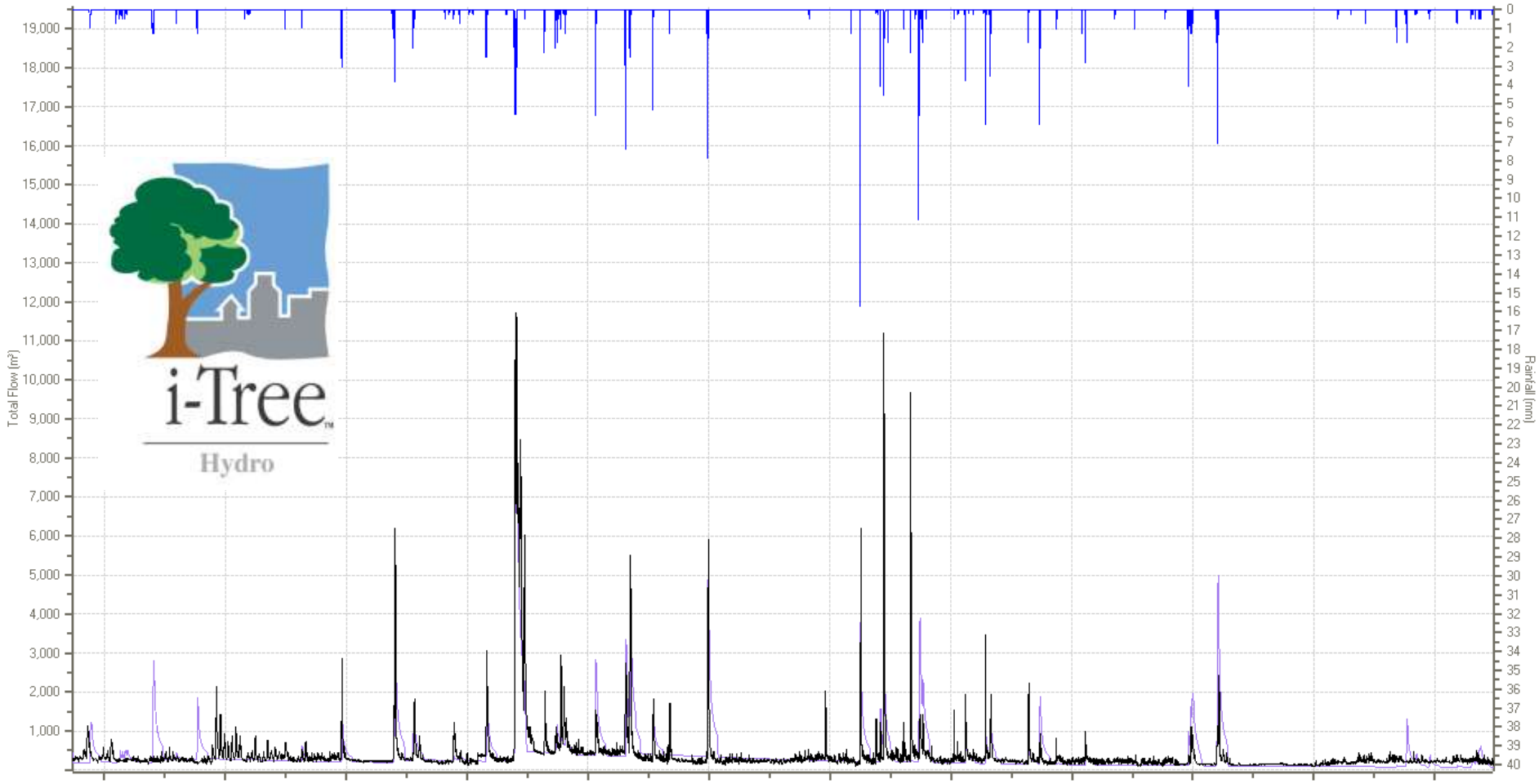
Pest detection Protocol

- **Component of Streets in i-Tree v.4.0**
- **Collect Pest & Disease**
  - Signs
  - Symptoms
- **Reports**
  - Associated pest & diseases
  - Trends/patterns



i-Tree-Hydro

- Separate GIS program
- Calibrates against stream flow data

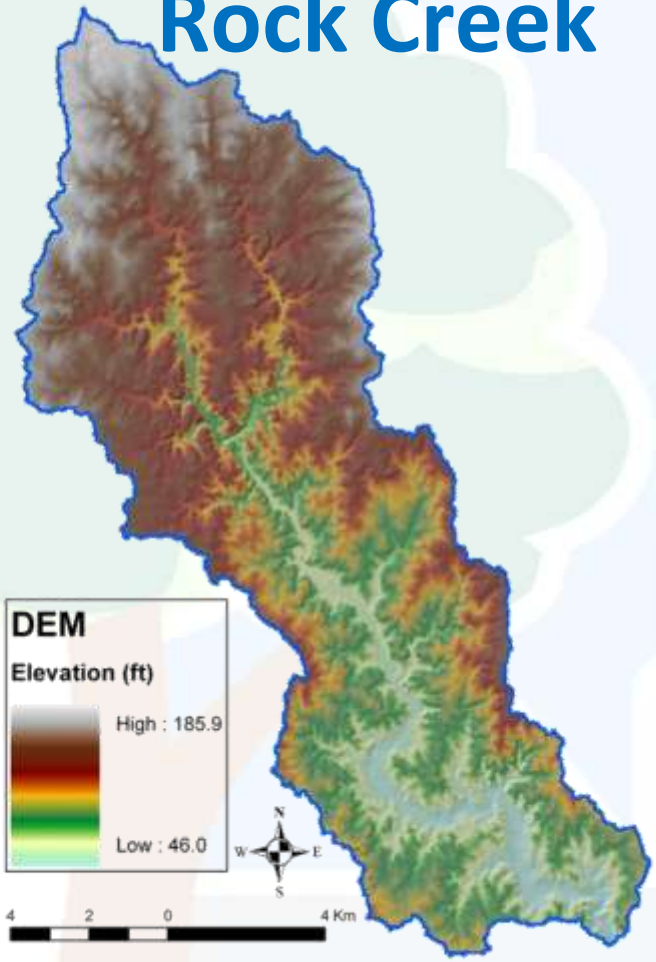


i-Tree™

Hydro

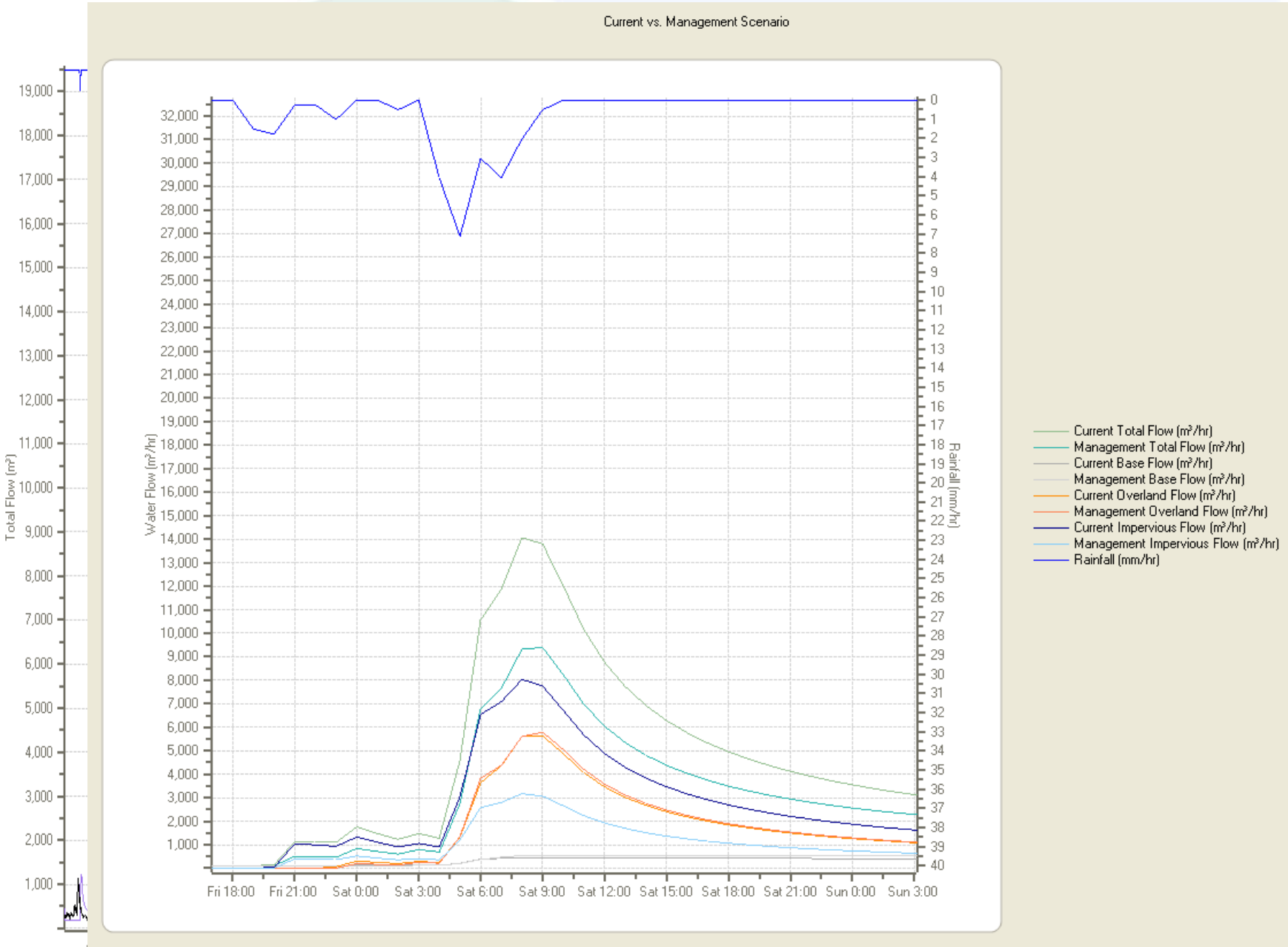
i-Tree

Rock Creek

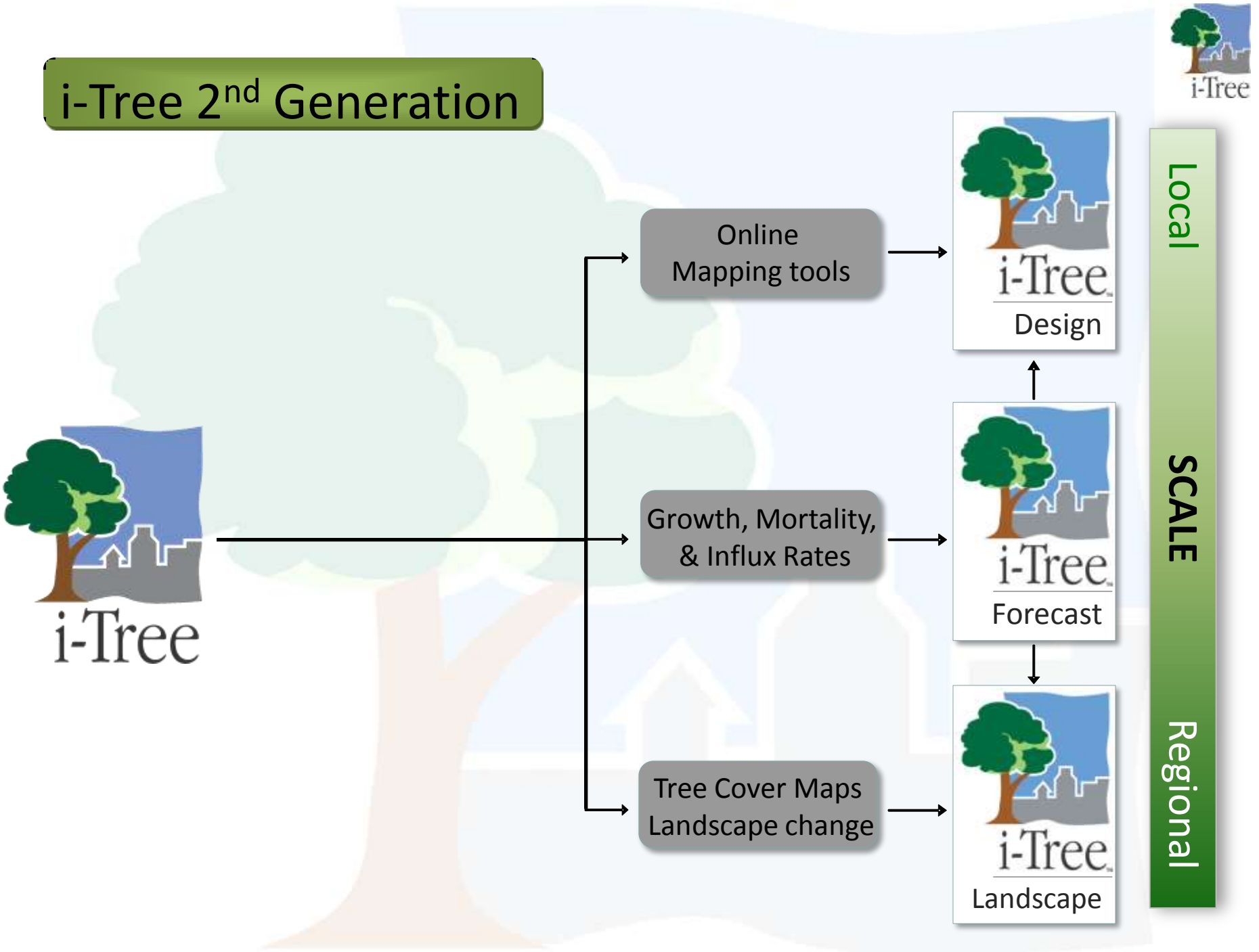


Watershed Area (m2)	**161,653,500**
Percent Impervious cover	**15.8**
Percent Tree Cover	**27**
Percent of Tree Cover over Impervious Area	**10**
Percent Water Cover	**0.3**
Average Tree Leaf Area Index (LAI)	**3.5**
Percent Shrub Cover	**7.8**
Percent Grass Cover	**33.8**
Percent Evergreen Trees	**4.2**
Percent Evergreen Shrubs	**21**
Shrub LAI	**3.9**
Leaf on Day	**80**
Leaf off Day	**294**

Hydro Reporting



i-Tree 2nd Generation



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)

On-line Mapping tools

i-Tree Design

Google Maps

Local Scale

i-Tree Eco

Field Data

Growth / Mortality / Influx rates

Land / Tree Cover Maps

Projected Development

i-Tree Landscape

Digital Cover Maps

Regional Scale