

# i-Tree Open Academy

## 2024

### Session 5: i-Tree Eco

*The Keystone Tool for Canopy Assessment*

*April 24, 2024*

*1:00pm Eastern Time*

*Davey Institute/USDA Forest Service*




i-Tree is a  
Cooperative  
Initiative  
among these  
partners



# Accessing the Science of Tree Benefits

- 🌳 [www.itreetools.org](http://www.itreetools.org)
- 🌳 Session 1-4 now online!
- 🌳 Exercises available
- 🌳 Use Chat for questions
- 🌳 Certificates of completion available after Academy close




**The trees around you:**  
remove hazardous pollutants from the air you breathe, absorb carbon dioxide from the air to store as wood, and control storm water by intercepting and absorbing rainfall.

Trees provide more than just beauty and shade.


They work hard for all of us, every day!  
[Click here to learn more.](#)

**Tools for assessing individual trees**




**MyTree**

Are you new to i-Tree? Start with our EASIEST tool! MyTree helps you quickly assess individual trees with a minimum of fuss.  
*web browser or Android / Apple devices; Learn How to use it!*



**i-Tree Design**


A full-featured web tool with expanded building interactions and forecasting for estimating the benefits of individual trees.  
*via your web browser; Learn How to use it!*



**i-Tree Eco**


Eco is our flagship tool that accommodates tree inventory IMPORT or field data evaluation to derive individual tree benefit estimates.  
*requires installation on a Windows PC; Learn How to use it!*

**Tree canopy area assessment tools**




**OurTrees**

Beta release: Quick tree canopy and related information for your community within the continental US!  
*web browser or Android / Apple devices*



**i-Tree Landscape**

US tree canopy and Census maps/data at your fingertips! Identify priority planting & protection areas for climate & social issues.  
*via your web browser; Learn How to use it!*



**i-Tree Canopy**

From your chair, easily estimate land cover and tree canopy plus benefits using random point sampling on aerial imagery.  
*via your web browser; Learn How to use it!*

More tools...

**i-Tree is for everyone.**

These are free tools and free support for students of all levels, homeowners, community advocates, sustainability officers, urban foresters, and more!

## i-Tree Open Academy - Spring 2024

### Register Here

#### What:

The i-Tree Open Academy virtual learning series is back for spring of 2024, with everything you need to explore the latest from the i-Tree suite of tools. Whether your work with trees involves planting, managing, funding, educating, or beyond - i-Tree can help you better understand the benefits that trees provide, the impacts of where those benefits are, and how to apply that science to your project goals.

#### Who:

This seminar-style offering will serve as both a refresher and an introduction to the newest tools and features, with one-hour virtual sessions over a six-week period. There is no fee for the Academy, and you can join all live sessions, or select those that meet your schedule and interests. Register by filling out the [participant form](#).

We will be offering continuing education credits (CEUs) for both the International Society of Arboriculture (ISA) and the New Jersey state Urban and Community Forestry program. One CEU is available for each of the live sessions attended.

#### How:

All sessions will be streamed live via this [Microsoft Teams link](#). They will also be recorded and posted below as well as on the [i-Tree YouTube channel](#), so that you can catch up on anything you missed. There are no requirements for this course, and there will be self-directed exercises that you can use to gain experience using the tools. You are encouraged to submit any questions related to the course via [info@itreetools.org](mailto:info@itreetools.org), and there will be opportunities to ask questions during certain live sessions and office hours.

#### When:

Each session is one hour long and offered Wednesdays at 1:00 pm (Eastern US time). Note: Office hours days and times may vary.

- **March 20th – Introduction to i-Tree.** Understand the basic science of i-Tree and the USFS research behind it. Explore the relationships between the i-Tree tools and the data they provide. Start to consider which i-Tree tools will be best for the application you have in mind.
  - Video Recording
  - Presenter Slides
  - Self-Directed Exercise - Session 1
  - Q&A
- **March 27th – Online with MyTree, i-Tree Design, and i-Tree Planting.** Explore the easiest to use online i-Tree tools for individual trees. Get a better sense of their advantages and most common uses.
  - Video Recording
  - Presenter Slides
  - Self-Directed Exercise - Session 2

# i-Tree Eco: The keystone for canopy assessment

- 🌳 Sometimes more is...more! Eco requires more comprehensive input, and offers more robust analysis
- 🌳 Flexible, downloadable tool
- 🌳 Can incorporate tree structure, risks, and forecasts for benefits analysis
- 🌳 The science behind Eco is what drives all of the other i-Tree tools



## What does Eco provide?

i-Tree Eco provides extensive forest and individual tree analyses including the following:

### Functional Analyses:

- Pollution removal and human health impacts
- Carbon sequestration and storage
- Hydrology effects (avoided run-off, interception, transpiration)
- Building energy effects
- Tree bio-emissions
- Avian habitat suitability (plot-based projects; limited to 9 bird species) Avian Habitat Suitability Report Example
- Ultraviolet radiation (UV) tree effects UV Report Example

### Structure and composition analyses:

- Species condition and distribution
- Leaf area and biomass
- Species importance values
- Diversity indices and relative performance

### Forecasting modeling options including:

- Tree planting inputs
- Extreme event impacts for weather and pests
- Annual mortality adjustments

### Management information including:

- Pest risk analysis
- User defined optional fields
- Cost benefit analysis

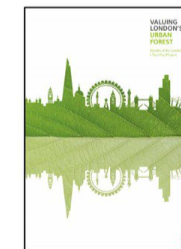
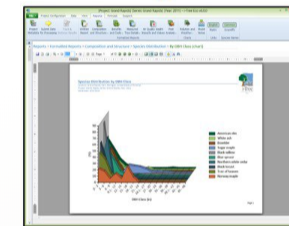
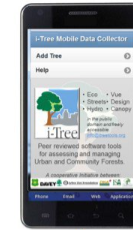
### Eco Report Examples - Springfield MA Squares

These are examples of exported structural, benefit analyses, individual level PDF reports from a demonstration project applying Eco to (2) small public squares. You will not need Eco installed to view examples of these reports.

- Springfield Square report examples: Springfield Eco zip file package (6.3mb)

### Who is using Eco?

Thousands of people in the United States and internationally have used Eco for projects ranging from small tree inventories to regional scale assessments. Eco users include government agencies, consultants, nonprofits, universities, researchers, volunteers, educators, advocates and more.



# Understanding i-Tree



- Understanding i-Tree: 20
- Abstract
- Preface
- Executive Summary
- Introduction
- What is i-Tree?
  - Vision
    - Goals
  - Tools
  - Core Programs
    - Utilities
    - Partner Tools Po
    - by i-Tree
    - Research Progra
    - Legacy Program
  - Partnerships
  - History
    - i-Tree 2020
    - i-Tree and Urban Fl

**Table 2.—Summary of which directly field-measured characteristics are used to estimate derived variables and ecosystem services. D= directly used; I= indirectly used; C= conditionally used.**

|                                    | DERIVED VARIABLES |  | ECOSYSTEM SERVICES |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------------|-------------------|--|--------------------|--|--|--|--|--|--|--|--|--|--|--|--|
|                                    |                   |  |                    |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>DIRECT MEASURES</b>             |                   |  |                    |  |  |  |  |  |  |  |  |  |  |  |  |
| Species                            |                   |  |                    |  |  |  |  |  |  |  |  |  |  |  |  |
| Diameter at breast height (d.b.h.) |                   |  |                    |  |  |  |  |  |  |  |  |  |  |  |  |
| Total height                       |                   |  |                    |  |  |  |  |  |  |  |  |  |  |  |  |
| Crown base height                  |                   |  |                    |  |  |  |  |  |  |  |  |  |  |  |  |
| Crown width                        |                   |  |                    |  |  |  |  |  |  |  |  |  |  |  |  |
| Crown light exposure               |                   |  |                    |  |  |  |  |  |  |  |  |  |  |  |  |
| Percent crown missing              |                   |  |                    |  |  |  |  |  |  |  |  |  |  |  |  |
| Crown health (condition dieback)   |                   |  |                    |  |  |  |  |  |  |  |  |  |  |  |  |
| Field land use                     |                   |  |                    |  |  |  |  |  |  |  |  |  |  |  |  |
| Distance to building               |                   |  |                    |  |  |  |  |  |  |  |  |  |  |  |  |
| Direction to building              |                   |  |                    |  |  |  |  |  |  |  |  |  |  |  |  |
| Percent tree cover                 |                   |  |                    |  |  |  |  |  |  |  |  |  |  |  |  |
| Percent shrub cover                |                   |  |                    |  |  |  |  |  |  |  |  |  |  |  |  |
| Percent building cover             |                   |  |                    |  |  |  |  |  |  |  |  |  |  |  |  |
| Ground cover composition           |                   |  |                    |  |  |  |  |  |  |  |  |  |  |  |  |

## METHODS, ADVANTAGES, AND LIMITATIONS

The premise behind i-Tree is shown in Figure 11. Structure is the basic information on the physical forest resource (e.g., number of trees, species composition, tree sizes and locations, leaf area, etc.). The attributes are directly measured by users or estimated (e.g., leaf area) by i-Tree based on direct measures of structure. From the structure data, along with local environmental data (e.g., weather data), various tree functions (e.g., gas exchange, tree growth) are estimated. These functions are then converted to various services (e.g., pollution removal) based on other local data (e.g., pollution concentrations). These services are then converted to benefits (e.g., cleaner air, impacts on human health) based on other data (e.g., local atmospheric conditions, human population data). Finally, the benefits are converted to values based on various economic procedures.

Forest management objectives often seek to improve environmental or human health, or the value of the forests. Forest managers do not directly manage functions or values, rather they manage forest structure (i.e., plant and remove trees, protect existing forests, and select species and locations) to optimize services and values. However, managers are not the only force influencing forest structure. The existing forest and the environment have a substantial influence on forest structure through natural regeneration, tree growth and mortality, storms, insects and diseases, invasive plants, and other factors. Included in this environmental influence are unintended consequences of human actions and development (e.g., introduction of exotic plants, insects and diseases, increased air temperatures and pollution, climate change, etc.). People and nature act to alter forest structure and consequently forest services and values.

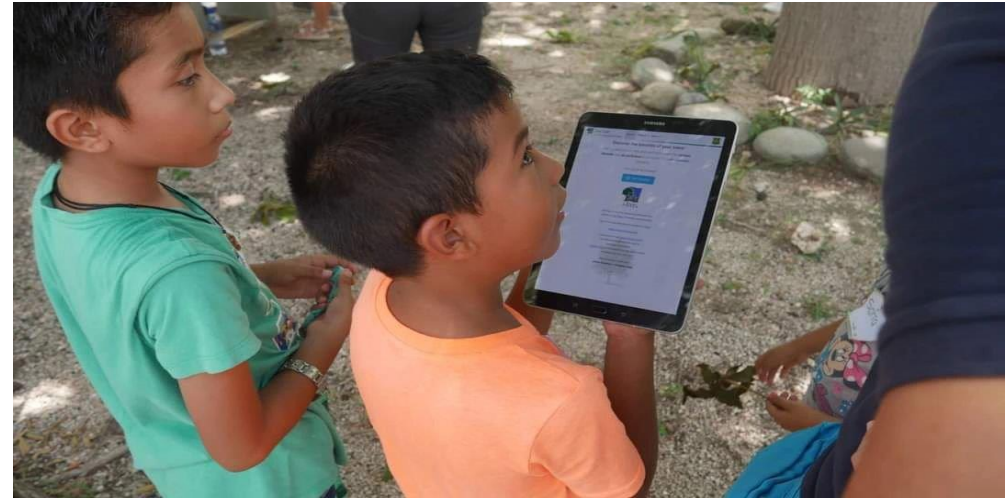


Figure 11.—Diagram showing basic i-Tree process.

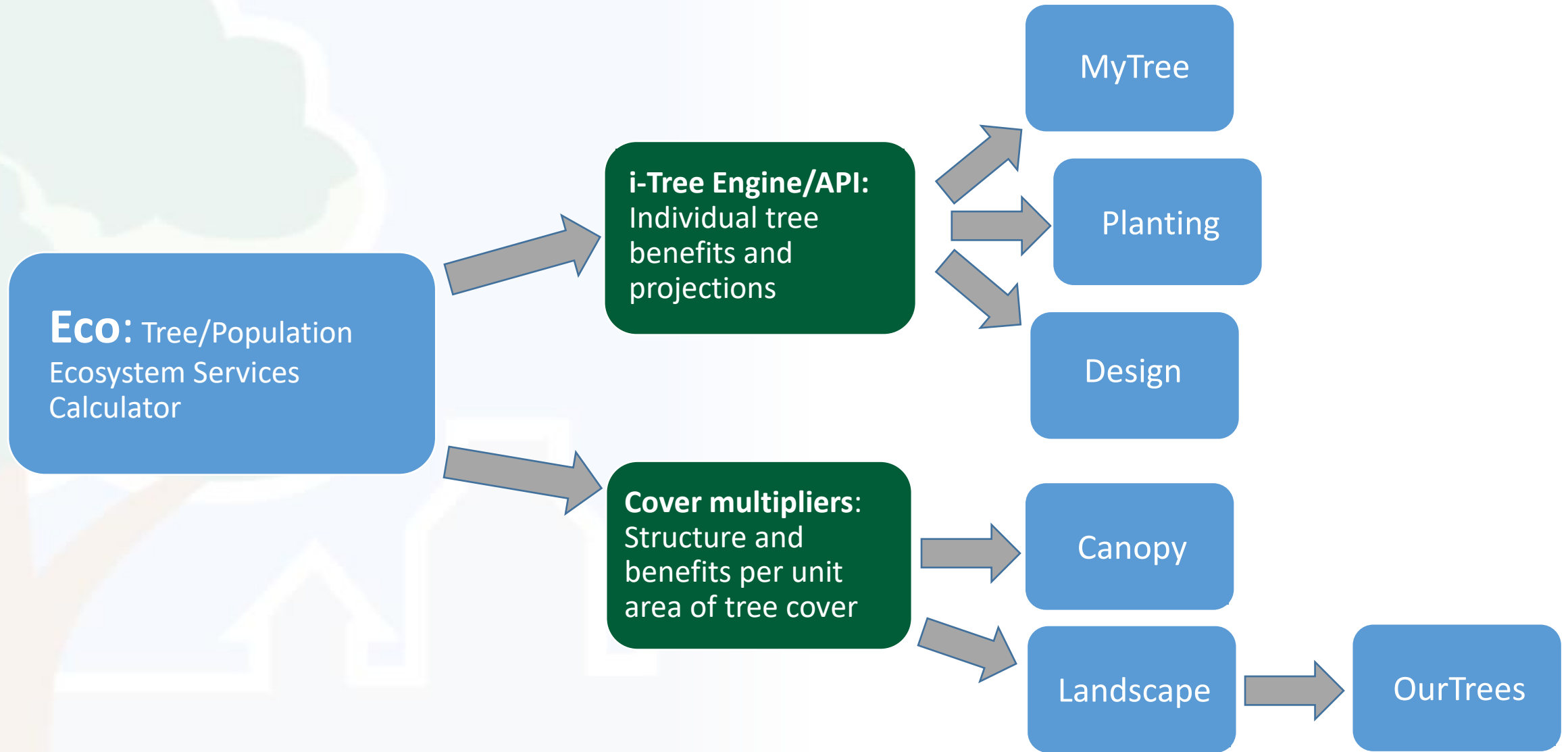


# Plan for today

1. Setting up your first project
2. Key decisions
3. i-Tree Eco data to results
4. Is i-Tree Eco right for you?



# i-Tree Tool Relationships



i-Tree is a Cooperative Initiative among these partners



# The i-Tree Eco Framework

## Structure



## Function



## Value

- Summary of field measurements
- Leaf area
- Tree condition
- Species distribution
- Diameter distribution

- Air quality improvement
- Energy effects
- Carbon storage & sequestration
- Hydrology effects
- Shade ultraviolet effects (UV)
- Foodscape characteristics
- Wildlife suitability – avian focus
- Volatile organic compounds (VOC)
- Leaf nutrients, wood production, and more

- Monetary value
- Equivalent values
- Health outcomes
- Cost Benefit analysis
- Summaries for management

# Key Decision 1: What data will you collect?

## Minimum Required Tree Data

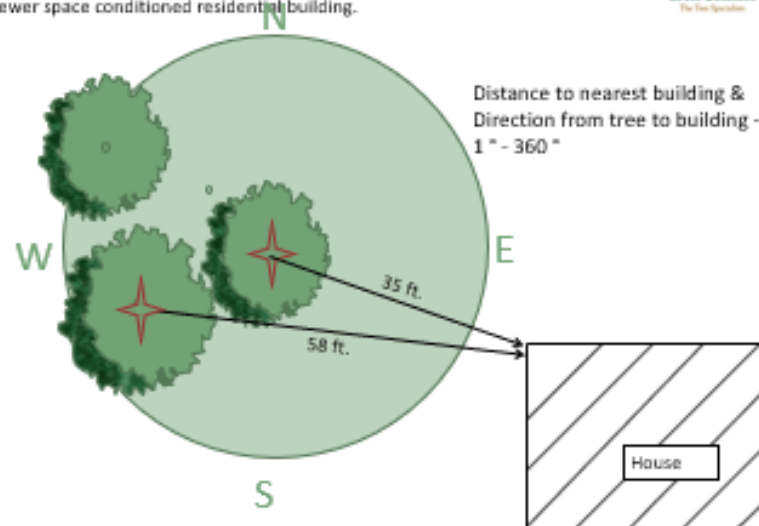
1. Tree species
2. Diameter at breast height (DBH)

## Optional but Recommended Tree Data

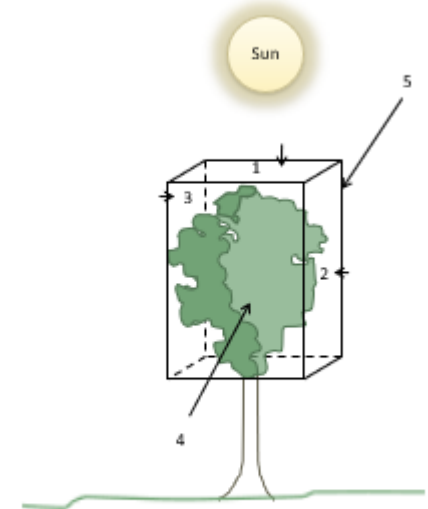
3. Total tree height
4. Height to live top
5. Height to crown base
6. Crown width (N-S)
7. Crown width (E-W)
8. % Crown missing
9. % dieback (condition)
10. Crown light exposure (CLE)
11. Land use

### Energy Effect (optional)

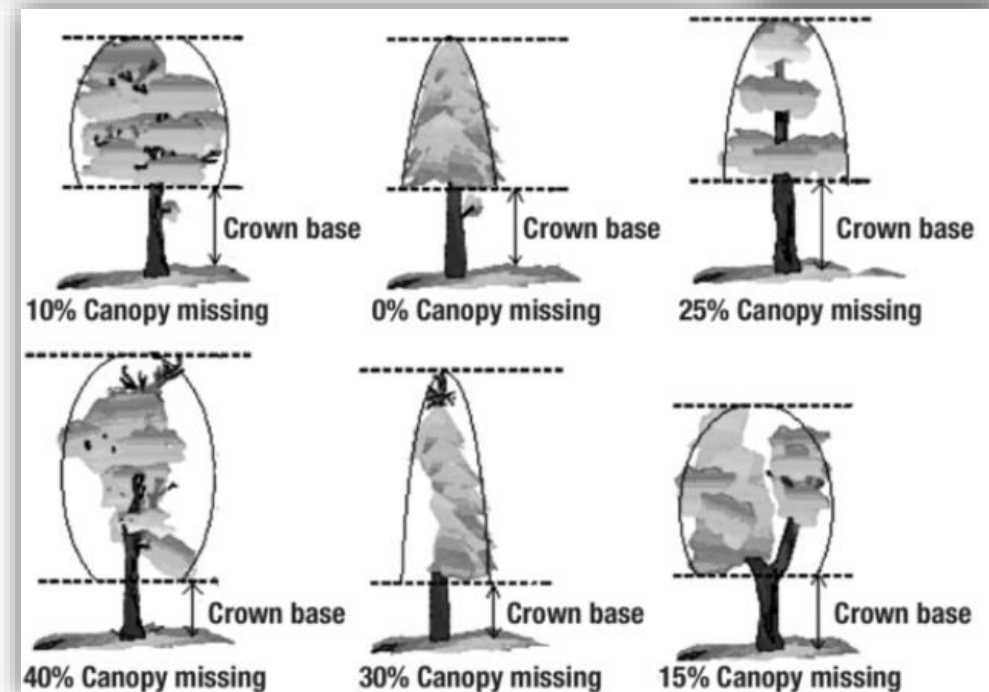
Collect for trees  $\geq 20\text{ft}$  (6.1m) tall and within 60ft (18.3m) of a 3 story or fewer space conditioned residential building.



### CROWN LIGHT EXPOSURE



CLE affects tree growth rates and accounts for competition with other trees for access to light.





# From field data to results

## Understanding i-Tree: 2021 Summary of Programs and Methods

David J. Nowak



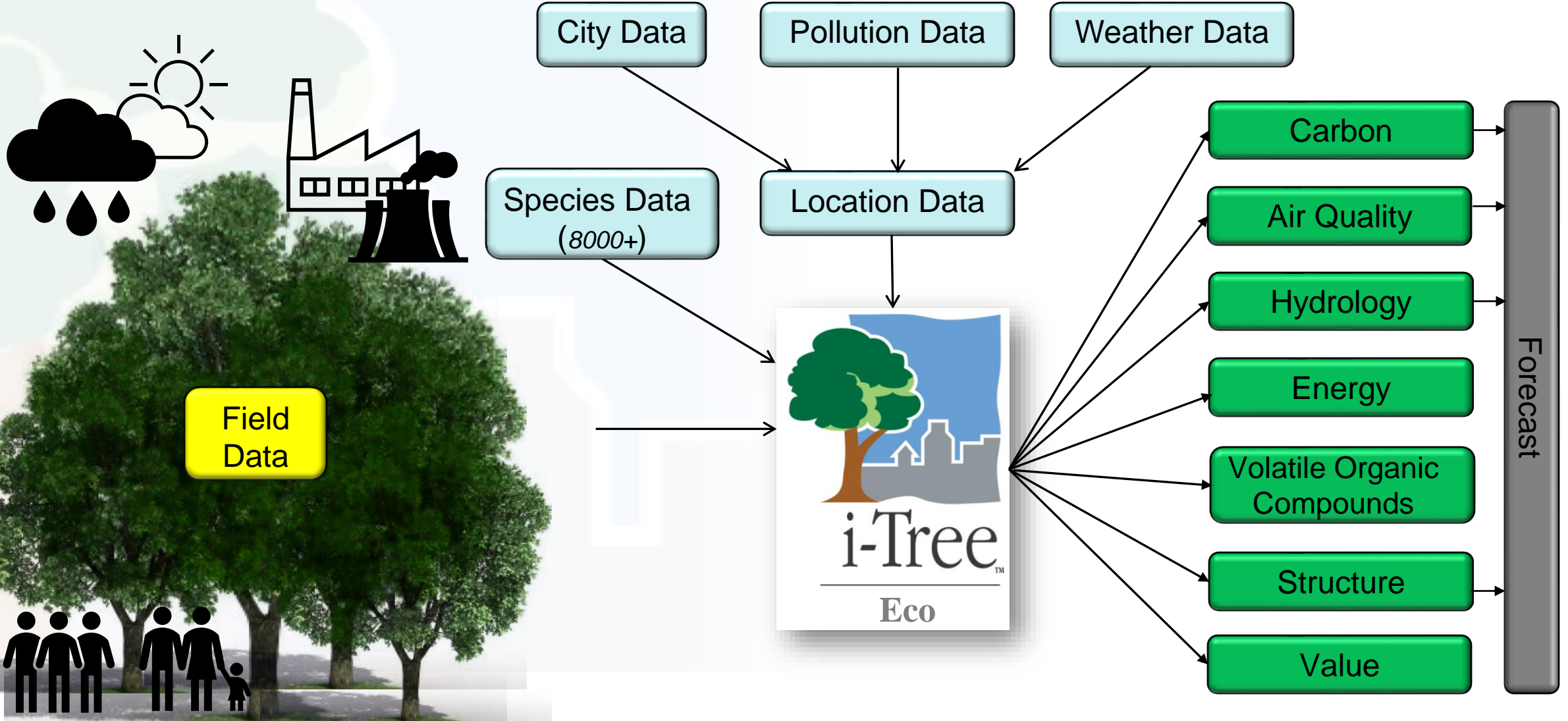
Table 2.—Summary of which directly field-measured characteristics are used to estimate derived variables and ecosystem services. D= directly used; I= indirectly used; C= conditionally used.

|                                    | DERIVED VARIABLES |              | ECOSYSTEM SERVICES |                            |                          |                |                       |                |               |               |                    |                      |            |
|------------------------------------|-------------------|--------------|--------------------|----------------------------|--------------------------|----------------|-----------------------|----------------|---------------|---------------|--------------------|----------------------|------------|
|                                    | Leaf Area         | Leaf Biomass | Carbon Storage     | Gross Carbon Sequestration | Net Carbon Sequestration | Energy Effects | Air Pollution Removal | Avoided Runoff | Transpiration | VOC Emissions | Compensatory Value | Wildlife Suitability | UV Effects |
| <b>DIRECT MEASURES</b>             |                   |              |                    |                            |                          |                |                       |                |               |               |                    |                      |            |
| Species                            | D                 | D            | D                  | D                          | D                        | D              | I                     | I              | I             | D             | D                  |                      |            |
| Diameter at breast height (d.b.h.) |                   |              | D                  | D                          | D                        |                |                       |                |               |               | D                  | D                    |            |
| Total height                       | D                 | D            | C                  | C                          | C                        | D              | I                     | I              | I             | I             |                    | D                    |            |
| Crown base height                  | D                 | D            | C                  |                            |                          |                | I                     | I              | I             | I             |                    |                      |            |
| Crown width                        | D                 | D            | C                  |                            |                          |                | I                     | I              | I             | I             |                    |                      |            |
| Crown light exposure               |                   |              | C                  | D                          | D                        |                |                       |                |               |               |                    |                      |            |
| Percent crown missing              | D                 | D            | C                  | C                          | C                        | D              | I                     | I              | I             | I             |                    |                      |            |
| Crown health (condition/dieback)   |                   |              |                    | D                          | D                        |                |                       |                |               |               | D                  | D                    |            |
| Field land use                     |                   |              |                    | D                          |                          |                |                       |                |               |               | D                  | D                    |            |
| Distance to building               |                   |              |                    |                            |                          | D              |                       |                |               |               |                    |                      |            |
| Direction to building              |                   |              |                    |                            |                          | D              |                       |                |               |               |                    |                      |            |
| Percent tree cover                 |                   |              |                    |                            |                          | D              | D                     | D              |               |               |                    | D                    | D          |
| Percent shrub cover                |                   |              |                    |                            |                          |                | D                     |                |               |               |                    | D                    |            |
| Percent building cover             |                   |              |                    |                            |                          | D              |                       |                |               |               |                    |                      |            |
| Ground cover composition           |                   |              |                    |                            |                          |                | I                     |                |               |               |                    | D                    |            |

Tree Data

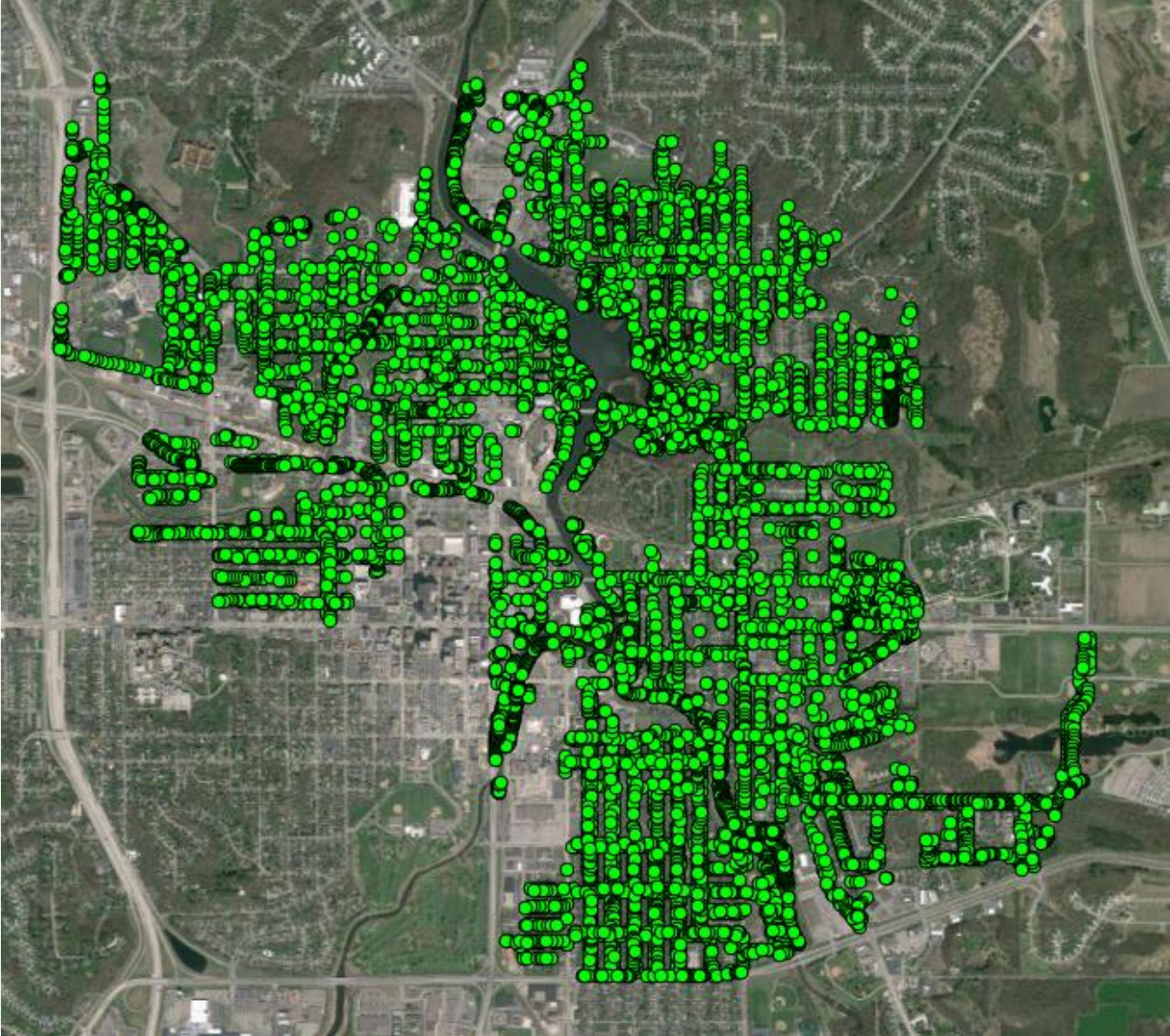
Plot Data

# i-Tree model basics: Inventory data → tree benefits?





# Let's set-up an i-Tree Eco project



Rochester, MN  
Street Tree Inventory



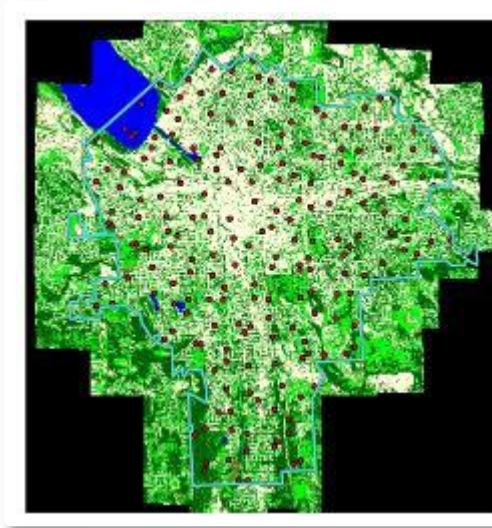


# Key Decision 2: Sample or complete inventory?



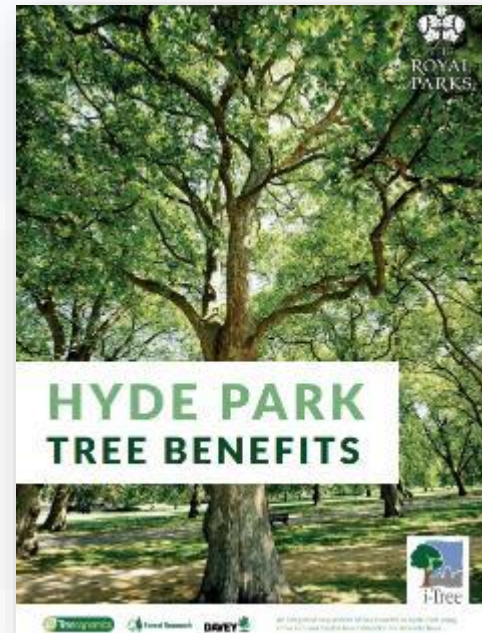
## Random sample of plots

- City
- County
- Regional or watershed
- Large scale or forested areas



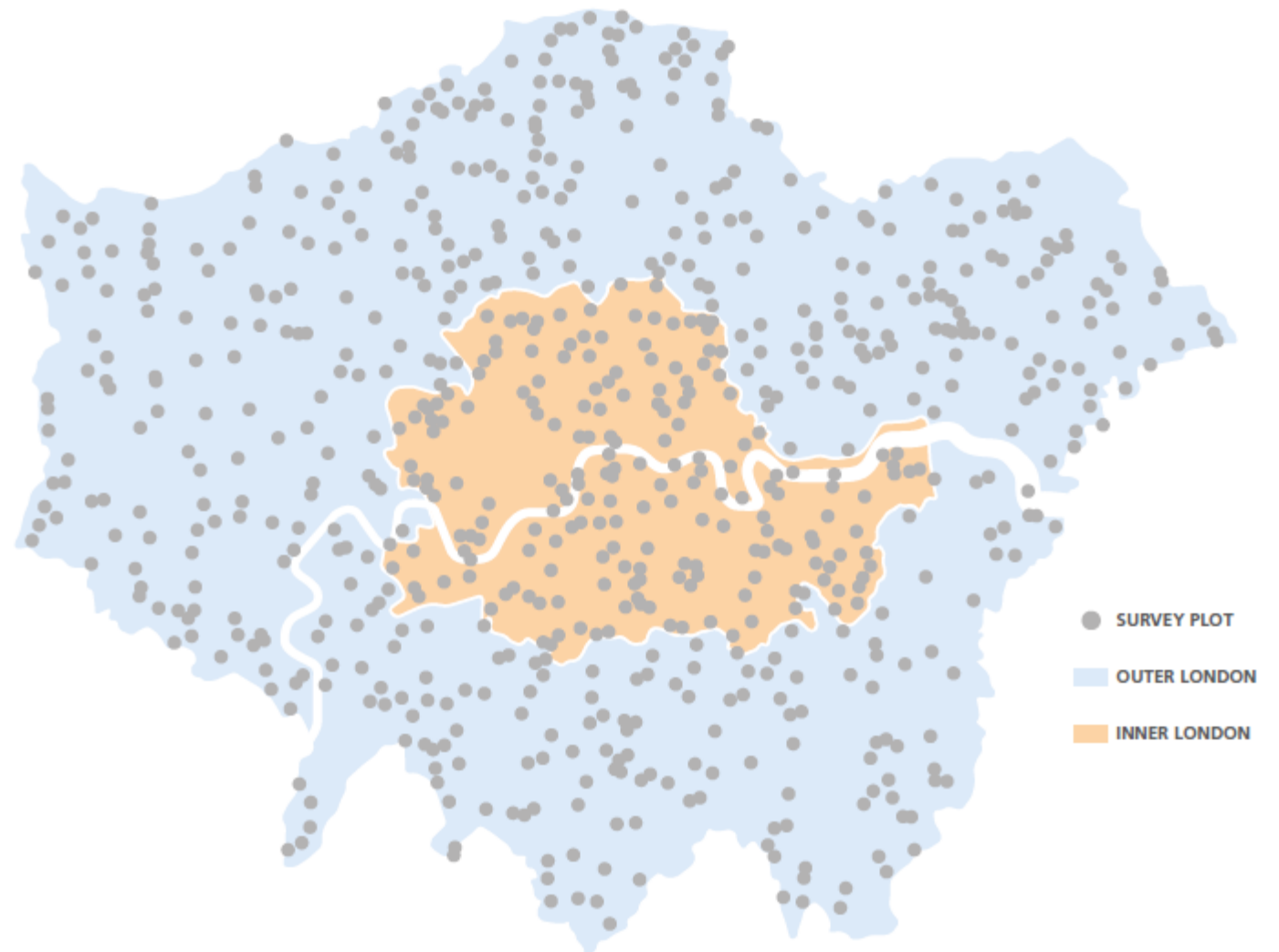
## Complete inventory

- Parks
- Campuses
- Residential properties
- Specimen or single trees
- Only trees of interest



# What is a sample and why would you do it?

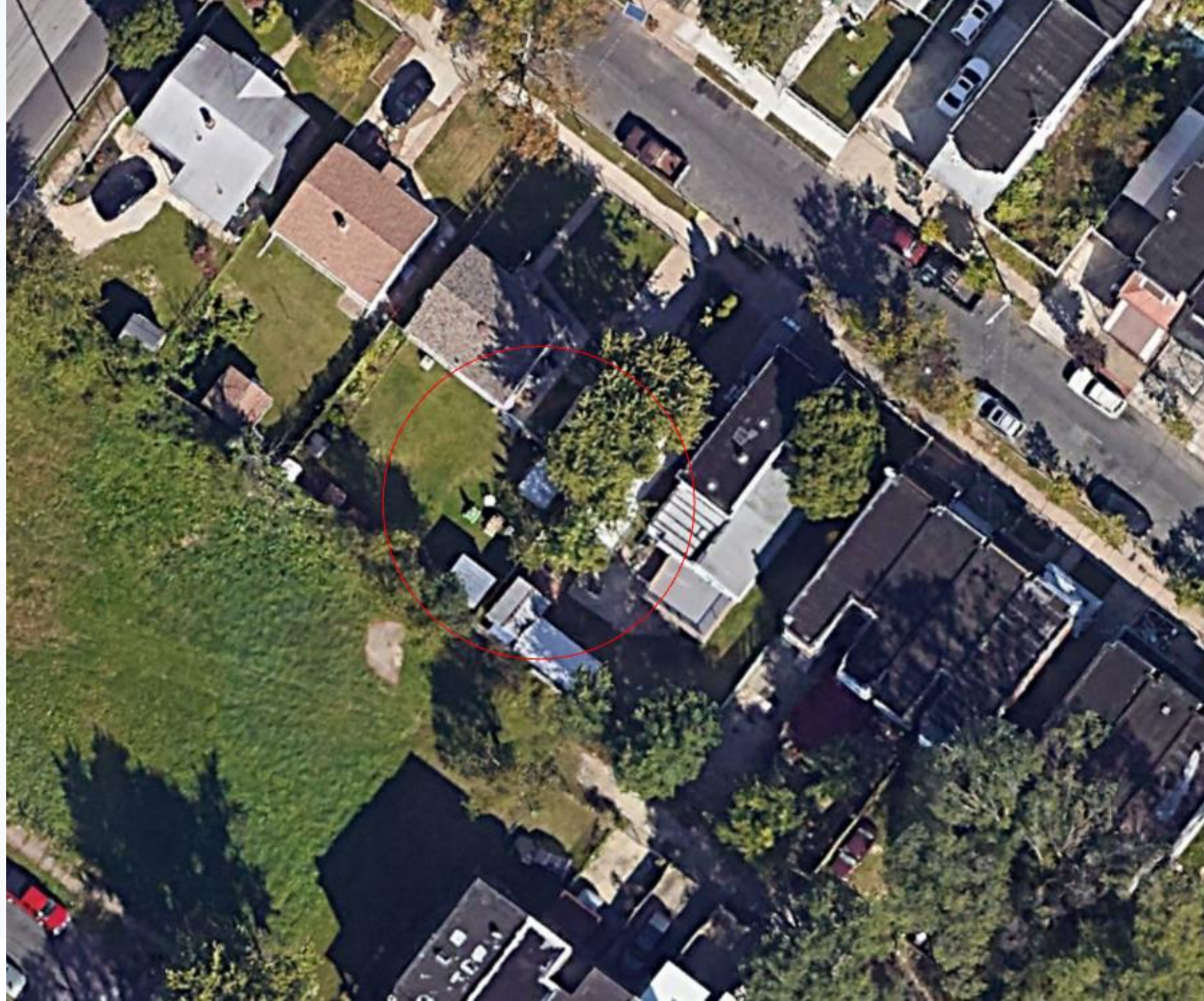
- A small subset of the items you are interested in
- Easier than measuring the whole thing
- For statistical reasons must be random
- We can estimate how well our sample represents the whole population
- This is how London measures 8.5 million trees





# What is a plot?

- By default 37.2 ft in radius, 1/10<sup>th</sup> acre in area.
- Plot size can be changed
- Tradeoffs between plot size and the number you can measure



# Sample Plots vs. Complete Inventory



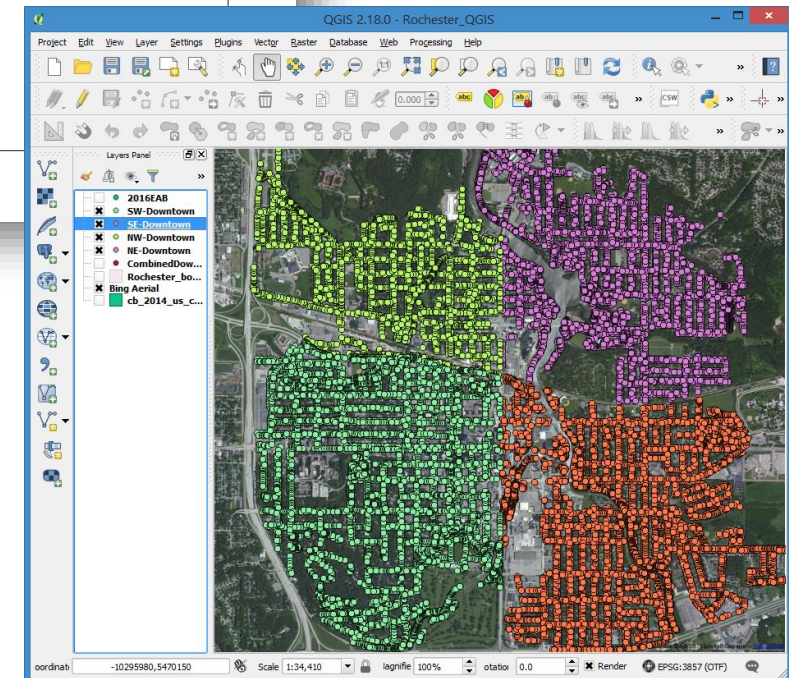
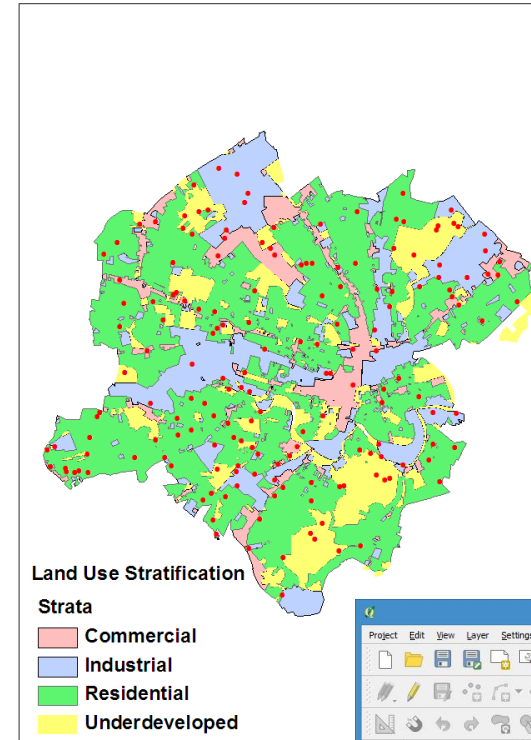
| <b>Characteristic</b>          | <b>Sample</b>                                | <b>Complete</b>                                   |
|--------------------------------|--|---|
| <b>Recommended area</b>        | City or larger                               | Any   |
| <b>Number of plots</b>         | 200 or more                                  | not applicable                                    |
| <b>Typical number of trees</b> | >500   | Any   |
| <b>Access</b>                  | Numerous permissions usually required        | Often no permission required                      |
| <b>Accuracy</b>                | Some loss of accuracy due to sampling error  | No sampling error, all trees of interest measured |
| <b>Results</b>                 | Estimates expanded to whole area of interest | Estimates only for measured trees                 |



# Key Decision 3: Will you stratify?

Dividing area of interest into categories

- Can be performed by any categories of interest (land use, ownership, political, watershed, etc.)
- Summaries generated by categories of interest
- Perform pre- or post- measurement (sample must be random)
- Can improve statistical accuracy
- Plots or complete inventory





# Key Decision 4: How will you enter data? manual, mobile, or import

i-Tree Eco v6 sample plot data sheet

Sheet \_\_\_\_\_ of \_\_\_\_\_  Check when plot is completed  
Initials: \_\_\_\_\_

**Plot Information**

|          |         |                 |       |       |            |
|----------|---------|-----------------|-------|-------|------------|
| Plot ID: | Strata: | GPS Coordinates | Date: | Crew: | Plot Size: |
|          |         | Lat.            |       |       |            |
|          |         | Long.           |       |       |            |

Plot Address: \_\_\_\_\_

Plot Contact Name: \_\_\_\_\_ Contact Type or Title: \_\_\_\_\_

Phone #: \_\_\_\_\_ Email: \_\_\_\_\_

Plot or Access Notes: \_\_\_\_\_

\_\_\_\_\_

|                     |                 |                     |                              |
|---------------------|-----------------|---------------------|------------------------------|
| Plot Tree Cover (%) | Shrub Cover (%) | Plantable Space (%) | Percent of Plot Measured (%) |
|                     |                 |                     |                              |

Did this Plot have any Trees? (Y/N): \_\_\_\_\_ Permanent stake used? (Y/N): \_\_\_\_\_

Photo ID(s): \_\_\_\_\_



[Project: Adrian] [Series: Adrian\_2012] [Year: 2012] - i-Tree Eco v6.0.4

File Project Configuration Data View Reports Forecast Support

Paper Form Submit to Mobile Retrieve from Mobile Plots Trees Shrubs Check Data CSV KML Benefit Annual Prices Costs Editing Mode: Off

Data Collection Inventory Data Export Inventory Value

Help

Data > Inventory Data > Plots

The **Plots** function seen in the action panel to the right is where you can enter or edit the plot data that you collected in the field (see Notes below). The upper table displays your plot data. While working in this table, you may use the tools in the **Actions** group to help manually enter new data or edit data that has already been added.

**Steps to Viewing Plot Data:**

1. When you click on a record in the plot table, additional plot data will be displayed in the table below it.
2. Use the tabs located at the bottom of the action panel to view different plot data in the lower table.
3. Hide the lower table by clicking on the pin button in the upper right-hand corner of the table.
4. Unhide the lower table by clicking on one of the tabs at the bottom of the action panel and clicking on the pin button again.

**Steps to Manually Add/Edit Data:**

1. Click in the box where you would like to enter data and begin typing.
2. Use the Tab key on your keyboard or the left and right arrows to move from

| ID | Eude (Y) | Longitude (X)  | Date      | Crew   | Contact Info | Size (i) | Photo ID | Stake                    | % Tree    | % Shrub   | % P    |
|----|----------|----------------|-----------|--------|--------------|----------|----------|--------------------------|-----------|-----------|--------|
| 1  | 8656011  | -84.0385827151 | 4/24/2... | Team 2 | fda fdsa fgr | 0.10     |          | <input type="checkbox"/> | 10% - 15% | 1% - 5%   | 30% -  |
| 2  | 38815014 | -83.9977850608 | 4/18/2... | Team 1 |              | 0.10     |          | <input type="checkbox"/> | 1% - 5%   | 65% - 70% | 10% -  |
| 3  | 15508679 | -84.0575169972 | 4/25/2... | Team 2 |              | 0.10     |          | <input type="checkbox"/> | 1% - 5%   | 10% - 15% | 30% -  |
| 4  | 4037655  | -84.0336271443 | 4/23/2... | Team 1 |              | 0.10     |          | <input type="checkbox"/> | 1% - 5%   | 1% - 5%   | 0%     |
| 5  | 78022666 | -84.0433420921 | 4/24/2... | Team 1 |              | 0.10     |          | <input type="checkbox"/> | 0%        | 5% - 10%  | 0%     |
| 6  | 797495   | -84.0634443259 | 4/19/2... | Team 1 |              | 0.10     |          | <input type="checkbox"/> | 0%        | 0%        | 30% -  |
| 7  | 10326133 | -84.0622901734 | 4/19/2... | Team 2 |              | 0.10     |          | <input type="checkbox"/> | 45% - 50% | 1% - 5%   | 5% - 1 |
| 8  | 08126706 | -84.0363356381 | 4/24/2... | Team 1 |              | 0.10     |          | <input type="checkbox"/> | 15% - 20% | 0%        | 15% -  |
| 9  | 96562689 | -84.069754892  | 4/19/2... | Team 2 |              | 0.10     |          | <input type="checkbox"/> | 0%        | 0%        | 100%   |
| 10 | 1926253  | -84.0396421345 | 4/24/2... | Team 1 |              | 0.10     |          | <input type="checkbox"/> | 0%        | 0%        | 0%     |
| 11 | 72922179 | -84.0192211756 | 4/27/2... | Team 2 |              | 0.10     |          | <input type="checkbox"/> | 95% - 99% | 1% - 5%   | 0%     |

Trees

| ID | Survey Date | Status   | Distance (ft) | Direction | Species                             | Land Use |
|----|-------------|----------|---------------|-----------|-------------------------------------|----------|
| 1  | 4/27/2012   | Ingrowth | 11.80         | 338       | Shellbark hickory (Carya laciniosa) | Vacant   |
| 2  | 4/27/2012   | Ingrowth | 19.20         | 338       | Black cherry (Prunus serotina)      | Vacant   |
| 3  | 4/27/2012   | Ingrowth | 34.60         | 352       | American elm (Ulmus americana)      | Vacant   |
| 4  | 4/27/2012   | Ingrowth | 10.00         | 0         | American elm (Ulmus americana)      | Vacant   |
| 5  | 4/27/2012   | Ingrowth | 17.70         | 10        | Black cherry (Prunus serotina)      | Vacant   |
| 6  | 4/27/2012   | Ingrowth | 35.20         | 20        | Silver maple (Acer saccharinum)     | Vacant   |

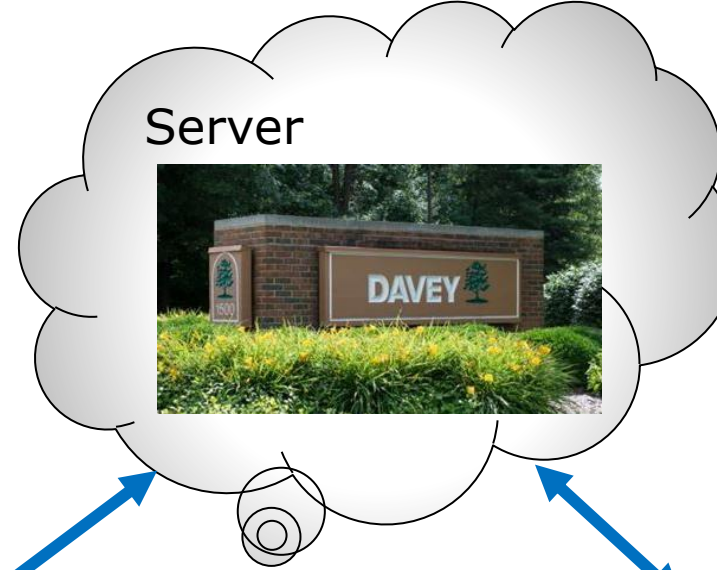
Manual data entry:  
Collect on paper then directly enter in the  
i-Tree Eco interface

# Data entry: mobile



Web-enabled mobile device

1. Measure and enter your selected field variables
2. Regularly submit data to Davey servers
3. Retrieve data into your i-Tree Eco Project



Lake Forest ParkCity (2010) - i-Tree Eco

Project Configuration Data View Reports Forecast Support

Work with Plots Trees CSV Enable Editing

Inventory Data Export

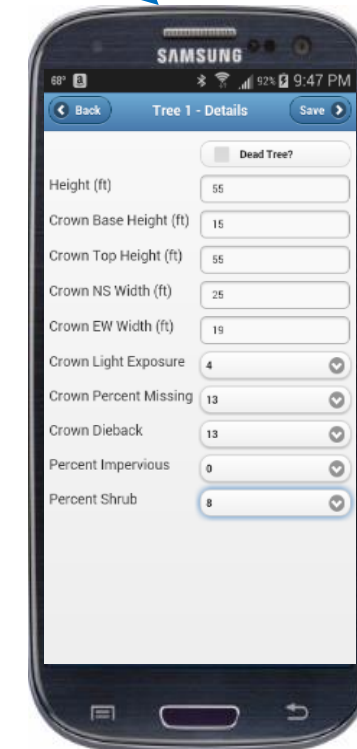
Data > Inventory Data > Plots

| ID | Strata          | Address  | Date       | Crew       | Contact Info |
|----|-----------------|--|------------|------------|--------------|
| 1  | Large Residenti | beach front dr.  | 8/25/2010  | Team 1_Mke |              |
| 2  | Large Residenti | lake washington  | 8/25/2010  | Team 1_Mke |              |
| 3  | Large Residenti | lake washington  | 8/25/2010  | Team 1_Mke |              |
| 4  | Large Residenti | 18418 51st pl ne   | 8/20/2010  | Team 1_Mke |              |
| 5  | Large Residenti | vacant LFP property  | 8/25/2010  | Team 1_Mke |              |
| 6  | Large Residenti | king county water district vacant lot located at 19520 47th ave. ne. | 9/11/2010  |            |              |
| 7  | Large Residenti | 3321 ne 203rd.   | 9/22/2010  |            |              |
| 8  | Large Residenti | west side of acacia cem  | 8/23/2010  |            |              |
| 9  | Large Residenti | Acacia Cemetery  | 9/18/2010  |            |              |
| 10 | Large Residenti | heavily covered invasive himalayan black berry                       | 9/10/2010  |            |              |
| 11 | Large Residenti | northshore utility district 47th ave ne.                             | 9/19/2010  |            |              |
| 12 | Small Residenti | 15327beach drive ne.   | 10/14/2010 |            |              |
| 13 | Small Residenti | 19017largo pl  | 10/1/2010  |            |              |
| 14 | Large Residenti | 5105 ne 180th st   | 8/17/2010  | Team 1_Mke |              |
| 15 | Large Residenti | 3047 ne 180th st.  | 10/6/2010  |            |              |
| 16 | Large Residenti | 18404 47th pl ne   | 9/24/2010  | Team 1_Mke |              |
| 17 | Large Residenti | 19820 47th ave ne.   | 10/4/2010  |            |              |
| 18 | Large Residenti | 18211 Ballinger Way NE   | 9/26/2010  |            |              |
| 19 | Large Residenti | 19535 35th ave ne  | 8/31/2010  |            |              |

| ID | Status  | Distance (ft) | Direction | Species                              | Land Use | DBH 1 (in) |
|----|---------|---------------|-----------|--------------------------------------|----------|------------|
| 1  | Planted | 21.00         | 96        | Western redcedar (Thuja plicata)     | Vacant   | 4.2        |
| 2  | Planted | 17.00         | 104       | Western redcedar (Thuja plicata)     | Vacant   | 5.6        |
| 3  | Planted | 26.00         | 112       | Western redcedar (Thuja plicata)     | Vacant   | 7.3        |
| 4  | Planted | 14.00         | 139       | Bigleaf maple (Acer macrophyllum)    | Vacant   | 1.7        |
| 5  | Planted | 11.00         | 0         | Western redcedar (Thuja plicata)     | Vacant   | 6.2        |
| 6  | Planted | 11.00         | 193       | Western redcedar (Thuja plicata)     | Vacant   | 18.0       |
| 7  | Planted | 3.00          | 193       | Western redcedar (Thuja plicata)     | Vacant   | 20.7       |
| 8  | Planted | 20.00         | 208       | Western redcedar (Thuja plicata)     | Vacant   | 4.5        |
| 9  | Planted | 26.00         | 210       | Western redcedar (Thuja plicata)     | Vacant   | 1.7        |
| 10 | Planted | 17.00         | 232       | English holly (Ilex aquifolium)      | Vacant   | 1.4        |
| 11 | Planted | 22.00         | 231       | Douglas fir (Pseudotsuga menziesii)  | Vacant   | 32.3       |
| 12 | Planted | 8.00          | 235       | Western hemlock (Tsuga heterophylla) | Vacant   | 8.5        |
| 13 | Planted | 18.00         | 241       | English holly (Ilex aquifolium)      | Vacant   | 3.3        |

Reference Objects Ground Covers Land Uses Trees



# Data import



AutoSave Off | Roc... | Henning, Jason | [Icons]

File | Home | Insert | Draw | Page | Form | Data | Review | View | Autor | Devel | Help | Acrot | Powe | [Icons]

Clipboard | Font | Alignment | Number | Conditional Formatting | Format as Table | Cell Styles | Cells | Editing | Analyze Data | Styles | Analysis | Sens

B9 | Maackia

| Zone  | Species                     | Scientific Name             | DBH | CONDITION |
|-------|-----------------------------|-----------------------------|-----|-----------|
| 1 NE  | Hackberry                   | Celtis occidentalis         | 22  | Poor      |
| 3 NE  | MapleNorway                 | Acer platinoides            | 15  | Good      |
| 4 NW  | Honeylocust                 | Gleditsia triacanthos       | 24  | Good      |
| 5 NW  | Crabapplespp                | Malus                       | 4   | Good      |
| 6 SE  | Redbud, Eastern             | cercis canadensis           | 3   | Poor      |
| 7 SE  | Pinespp.                    | Pinus                       | 15  | Poor      |
| 8 SE  | LindenOrnamental            | Tilia cordata               | 18  | Good      |
| 9 SE  | Maackia                     | Amur maackii                | 4   | Dead      |
| 10 SE | MapleNorway                 | Acer platinoides            | 6   | Poor      |
| 11 SE | Redbud, Eastern             | cercis canadensis           | 3   | Poor      |
| 12 SE | Honeylocust                 | Gleditsia triacanthos       | 17  | Fair      |
| 13 NW | Hawthorn spp.               | crataegus                   | 2   | Good      |
| 14 SE | Crabapplespp                | Malus                       | 6   | Dying     |
| 15 SE | Redbud, Eastern             | cercis canadensis           | 3   | Fair      |
| 16 NW | AshGreen                    | Fraxinus Pennsylvanica      | 19  | Good      |
| 17 NE | AshGreen                    | Fraxinus Pennsylvanica      | 18  | Good      |
| 18 NW | MapleSugar                  | Acer sachrum                | 28  | Dying     |
| 19 NW | MapleNorway                 | Acer platinoides            | 9   | Good      |
| 20 NW | MapleSilver                 | Acer sacharinum             | 35  | Excellent |
| 21 SE | Ulmus americana 'princeton' | Ulmus americana 'princeton' | 7   | Good      |
| 22 SE | MapleSilver                 | Acer sacharinum             | 38  | Good      |
| 23 NW | Crabapplespp                | Malus                       | 7   | Dying     |
| 24 NE | MapleNorway                 | Acer platinoides            | 19  | Good      |
| 25 SW | Crabapplespp                | Malus                       | 8   | Good      |
| 26 SE | LindenOrnamental            | Tilia cordata               | 15  | Good      |
| 27 NE | Ginkgo                      | Ginkgo biloba               | 2   | Fair      |
| 28 SE | Honeylocust                 | Gleditsia triacanthos       | 5   | Poor      |
| 29 SE | MapleNorway                 | Acer platinoides            | 17  | Fair      |
| 30 NE | Hackberry                   | Celtis occidentalis         | 2   | Fair      |

Rochester Street Trees



[Project: Adrian] [Series: Adrian\_2012] [Year: 2012] - i-Tree Eco v6.0.4

File | Project Configuration | Data | View | Reports | Forecast | Support

Paper Form | Submit to Mobile | Retrieve from Mobile | Plots | Trees | Shrubs | Check Data | CSV | KML | Benefit Prices | Annual Costs | Editing Mode: Off

Data Collection | Inventory Data | Export | Inventory Value

Help

Data > Inventory Data > Plots

The Plots function seen in the action panel to the right is where you can enter or edit the plot data that you collected in the field (see Notes below). The upper table displays your plot data. While working in this table, you may use the tools in the Actions group to help manually enter new data or edit data that has already been added.

**Steps to Viewing Plot Data:**

- When you click on a record in the plot table, additional plot data will be displayed in the table below it.
- Use the tabs located at the bottom of the action panel to view different plot data in the lower table.
- Hide the lower table by clicking on the pin button in the upper right-hand corner of the table.
- Unhide the lower table by clicking on one of the tabs at the bottom of the action panel and clicking on the pin button again.

**Steps to Manually Add/Edit Data:**

- Click in the box where you would like to enter data and begin typing.
- Use the Tab key on your keyboard or the left and right arrows to move from

| ID | tude (Y) | Longitude (X)  | Date      | Crew   | Contact Info | Size (i) | Photo ID | Stake | % Tree    | % Shrub   | % P    |
|----|----------|----------------|-----------|--------|--------------|----------|----------|-------|-----------|-----------|--------|
| 1  | 8656011  | -84.0385827151 | 4/24/2... | Team 2 | fda fdsa fgr | 0.10     |          |       | 10% - 15% | 1% - 5%   | 30% -  |
| 2  | 38815014 | -83.9977850608 | 4/18/2... | Team 1 |              | 0.10     |          |       | 1% - 5%   | 65% - 70% | 10% -  |
| 3  | 15508679 | -84.0575169972 | 4/25/2... | Team 2 |              | 0.10     |          |       | 1% - 5%   | 10% - 15% | 30% -  |
| 4  | 4037655  | -84.0336271443 | 4/23/2... | Team 1 |              | 0.10     |          |       | 1% - 5%   | 1% - 5%   | 0%     |
| 5  | 78022666 | -84.0433420921 | 4/24/2... | Team 1 |              | 0.10     |          |       | 0%        | 5% - 10%  | 0%     |
| 6  | 797495   | -84.0694443259 | 4/19/2... | Team 1 |              | 0.10     |          |       | 0%        | 0%        | 30% -  |
| 7  | 10326133 | -84.0622901734 | 4/19/2... | Team 2 |              | 0.10     |          |       | 45% - 50% | 1% - 5%   | 5% - 1 |
| 8  | 08126706 | -84.0363356381 | 4/24/2... | Team 1 |              | 0.10     |          |       | 15% - 20% | 0%        | 15% -  |
| 9  | 96562689 | -84.069754892  | 4/19/2... | Team 2 |              | 0.10     |          |       | 0%        | 0%        | 100%   |
| 10 | 1926253  | -84.0396421345 | 4/24/2... | Team 1 |              | 0.10     |          |       | 0%        | 0%        | 0%     |

Trees

| ID | Survey Date | Status   | Distance (ft) | Direction | Species                             | Land Use |
|----|-------------|----------|---------------|-----------|-------------------------------------|----------|
| 1  | 4/27/2012   | Ingrowth | 11.80         | 338       | Shellbark hickory (Carya laciniosa) | Vacant   |
| 2  | 4/27/2012   | Ingrowth | 19.20         | 338       | Black cherry (Prunus serotina)      | Vacant   |
| 3  | 4/27/2012   | Ingrowth | 34.60         | 352       | American elm (Ulmus americana)      | Vacant   |
| 4  | 4/27/2012   | Ingrowth | 10.00         | 0         | American elm (Ulmus americana)      | Vacant   |
| 5  | 4/27/2012   | Ingrowth | 17.70         | 10        | Black cherry (Prunus serotina)      | Vacant   |
| 6  | 4/27/2012   | Ingrowth | 35.20         | 20        | Silver maple (Acer sacharinum)      | Vacant   |



# Data entry: mobile, manual, or import

## Mobile

- Useful for citizen science
- Multiple people can do data entry
- Need internet connected device, battery, safety
- Tedious for plots with lots of trees

## Manual

- Use paper for permanent record
- Fewer potential issues
- Single user
- Slow

## Import

- Ultimate flexibility
- Add value to existing inventories
- Quick
- Works for samples or complete inventory

Let's get some data into i-Tree Eco



# Let's get some data into i-Tree Eco

Mobile data entry

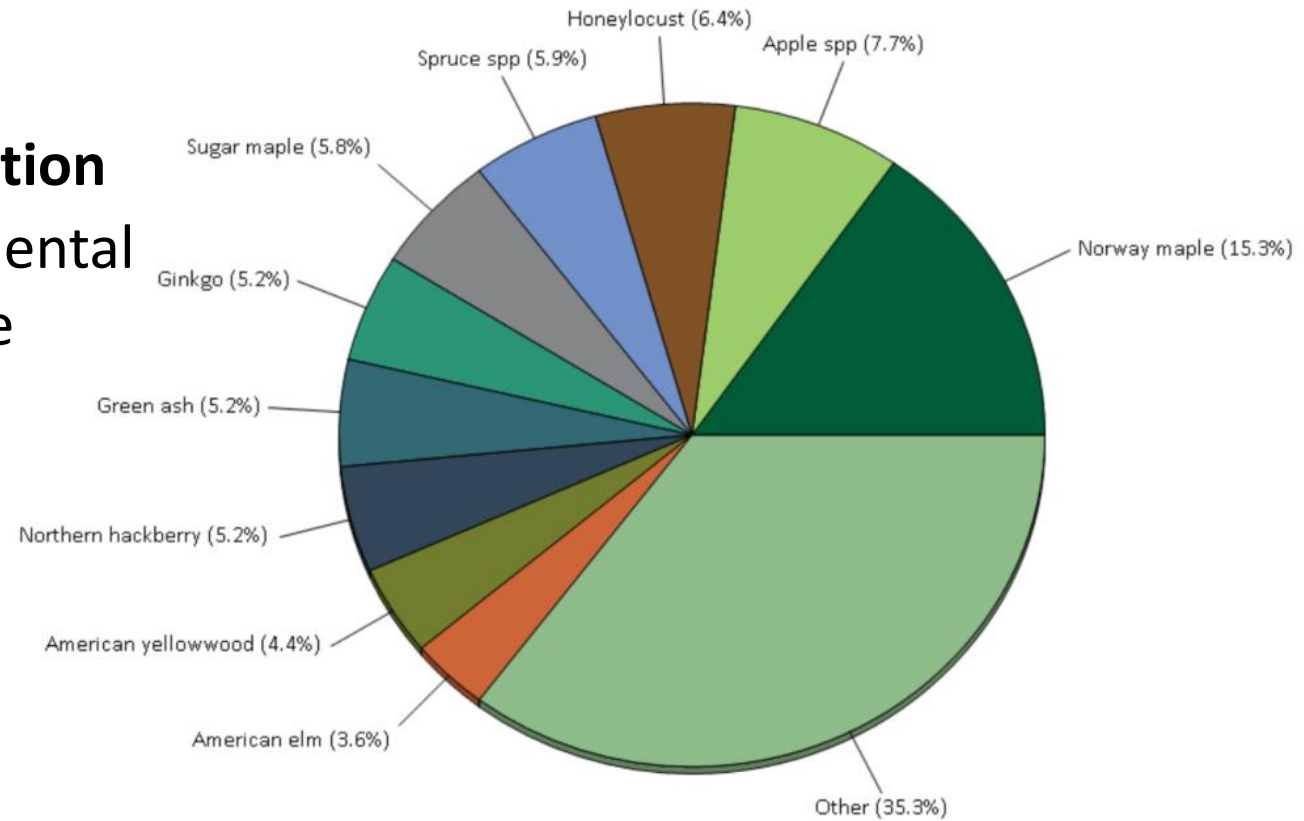
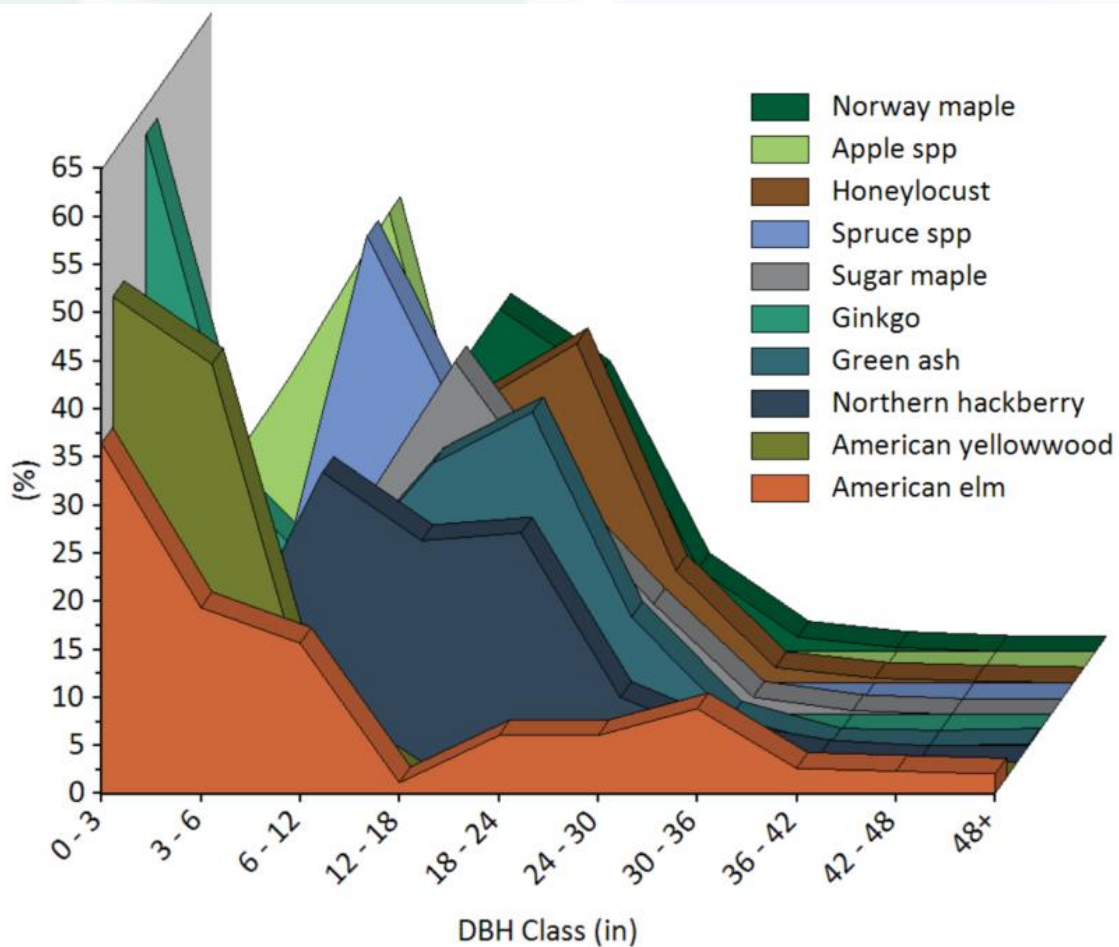


<https://bit.ly/i-TreeSummer>

# i-Tree Eco structure results

## Species Diversity/Composition

Diversity reduces environmental threats, increases resilience



## Size/Age Class Distribution

Distribution of age informs sustainability



## Use i-Tree Eco ...

- ... when you have existing data.
- ... when you have resources for a large-scale project.
- ... if you can make good use of the wealth of results.
- ... to support management.
- ... when interested in a plot-based sample.
- ... for centralized project management.

## Try another i-Tree tool ...

- ... when working with students or the public.
- ... to show that trees have benefits.
- ... when time is limited.
- ... to start conversations on trees and tree benefits.
- ... when you are interested in canopy cover.
- ... for priority planning.



i-Tree Eco is flexible