The Value of Your Urban Forest:

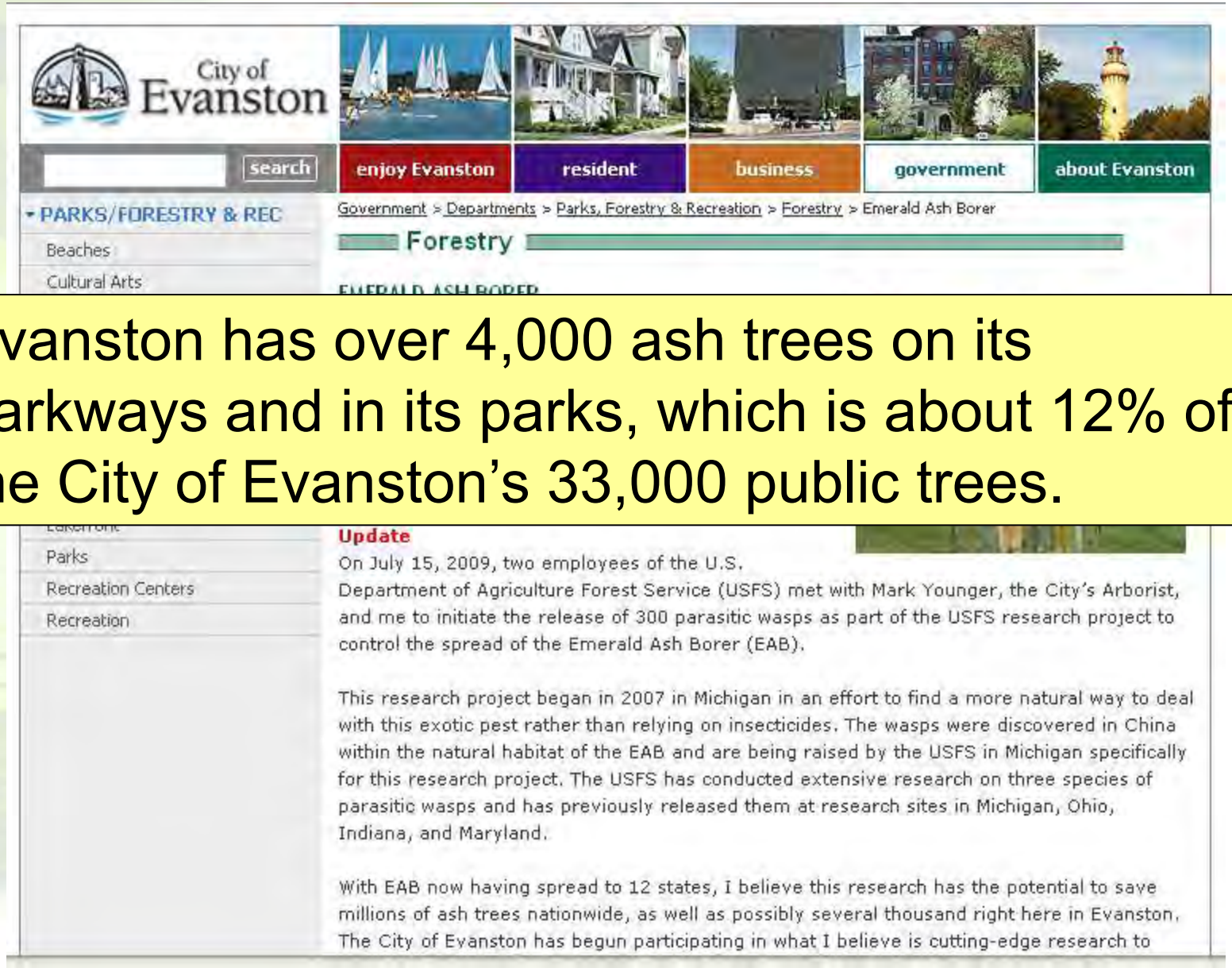
i-Tree Tools

www.itreetools.org

Al Zelaya

The Davey Institute

How do we communicate the value of the resource at risk?



Evanston has over 4,000 ash trees on its parkways and in its parks, which is about 12% of the City of Evanston's 33,000 public trees.

Evanston resource at risk to EAB

- 3500 ash street trees
- 10.5 % of public trees
- $3.18 million structural value
- 4.9 million gal/yr of rainfall intercepted worth $135,000/yr
- $122,000/yr energy savings
- $20,350/yr in air quality improvement
- $113,000 annual CO2 value

Can you justify your needs

WEDNESDAY
JOURNAL
of Oak Park and River Forest

home : news : news

7/14/2009 10:00:00 PM

Email this article ▪ Print this article

No new trees in 2009?

Oak Park to decide whether it will replant this year

By MARTY STEMPNIAK
Staff Reporter

Oak Park should decide by September whether it wants to completely prune $100,000 from its budget for planting new trees, or leave it in.

Back in the spring, trustees agreed to cut some $1.5 million from the village's budget to respond to slumping tax revenues. Along with layoffs, Oak Park decided to defer its spring planting of new trees throughout the village.

Oak Park also does a fall planting, and it remains to be seen whether the village will do any new planting.

Timber: Tree felled for Dutch Elm disease last year on the 100 block of South Ridgeland.
File 2008

Increasing Public Scrutiny

CASPER, WY

TREE PLANTING - INCREASE TREE CANOPY TO REDUCE URBAN HEAT ISLAND EFFECT

$250,000.00 - 12 JOBS - ENERGY PROGRAM

Is this project critical? Yes or No

31% voted critical - 69% voted not critical - 45 votes cast

CINCINNATI, OH

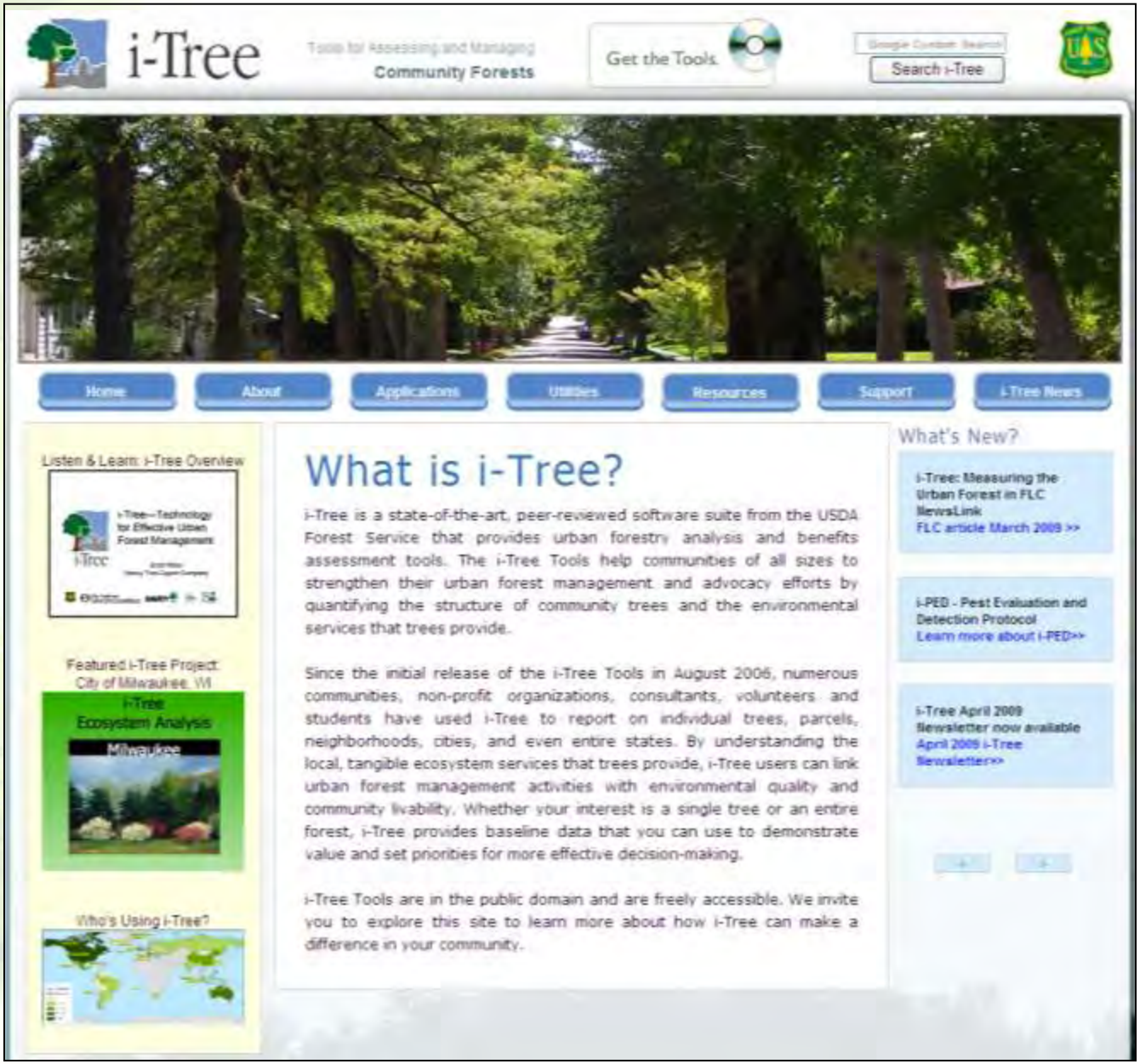
FOREST CARBON SEQUESTRATION. A PLAN THAT COVERS THE PLANTING OF 17,000 TREES; COMPLETE. TREE PLANTING IN PROCESS

$2,460,000.00 - 25 JOBS - ENERGY PROGRAM

Is this project critical? Yes or No

49% voted critical - 51% voted not critical - 213 votes cast

i-Tree Background



i-Tree Includes…

- 2 Urban Forest Assessment Tools

i-Tree Eco

i-Tree Streets

- 3 Urban Forest Management Utilities

i-Tree Vue

i-Tree Storm

i-Tree Species

Inventory vs. Assessment Tools

i-Tree

Data Entry for Park Tree Inventory

Inventory Entry | New Location Entry

Tag: (008)0001 (First three numbers are Preserve ID)

Scientific Name: Quercus alba

Cultivar:

Preserve: 008

Location: Shelter D

Classification: M

Find Another Tag

Return to Previous Form

Open Maintenance Data

Maintenance

Tag: (008)0001

Date:

Remarks:

Structural Pruning:

Cabling/Bracing:

Lightning Protection:

Tree Growth Regulator:

Construction Damage:

Removal:

Beaver Protection:

Pest Control:

Disease Control:

Return to Previous Form

Find Tag*

*Cursor must be in Tag field to run search

Open Park Inventory Data

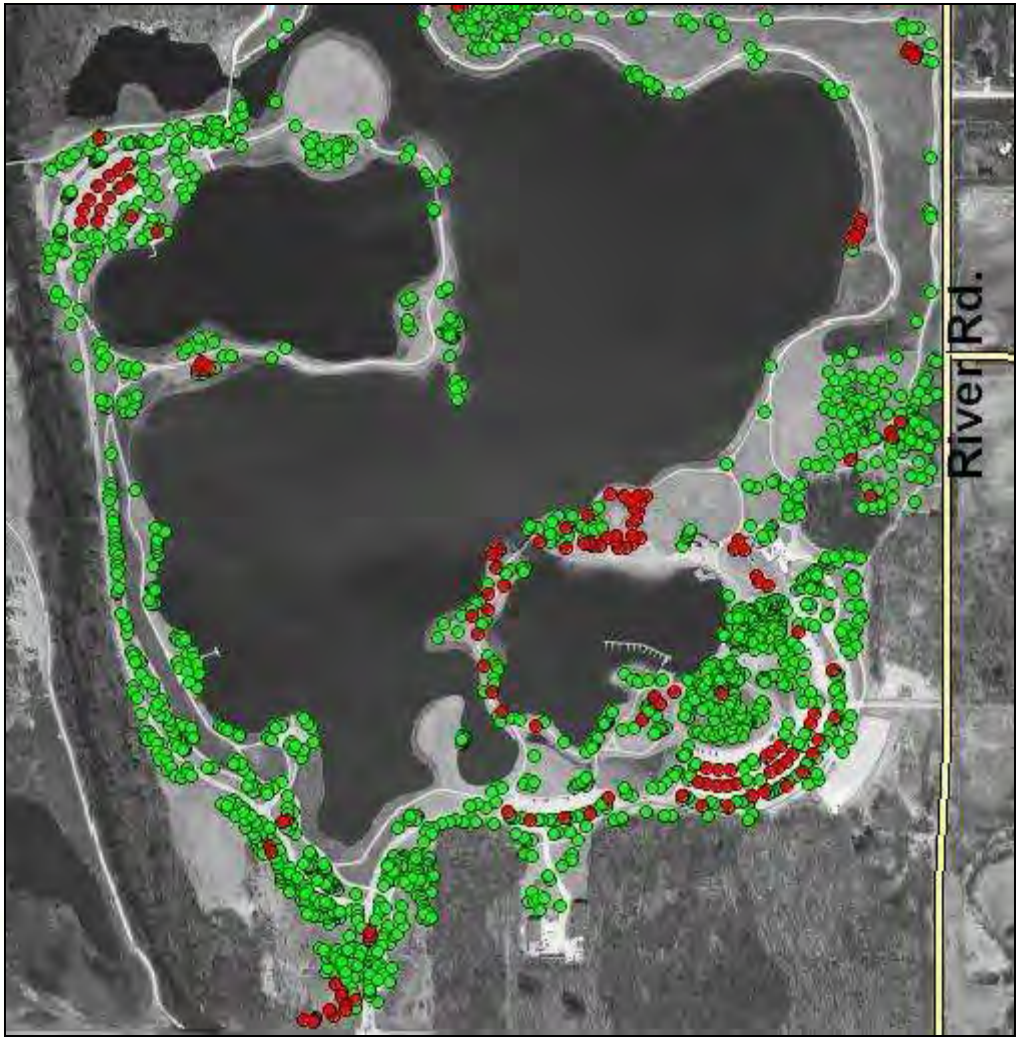
Plant Health Care Details

Work History:

Tag	Date	Work Order No	Crew/Vendor	Maintenance
(008)0001	5/5/2005		FOR_az_ms_bh	No Visible egg masses found, but also found (1) early instar GM larva on leaf of lower branch.
(008)0001	4/18/2004	20709	NRC (AZ)	Sprayed lower scaffold branch egg masses with golden pest oil.
(008)0001	4/2/2004		Lakewood Maint	General inspection. Noticed gypsy moth egg masses reported to NRC by

Record: 1 of 3

Inventory vs. Assessment Tools



Park ash trees at risk

Value of Resource at Risk

EAB Structural Impacts:

Milwaukee Ecosystem Assessment (2008)

- 17.4% Canopy Loss
- $221 Million structural damage (citywide)

EAB Functional Impacts:

- $243,785 less pollutant removal
- $138,000 less energy savings (cooling costs)
- $261,000 reduction in storm water benefits (1996 study)

Benefits-Based Approach

i-Tree Eco Overview

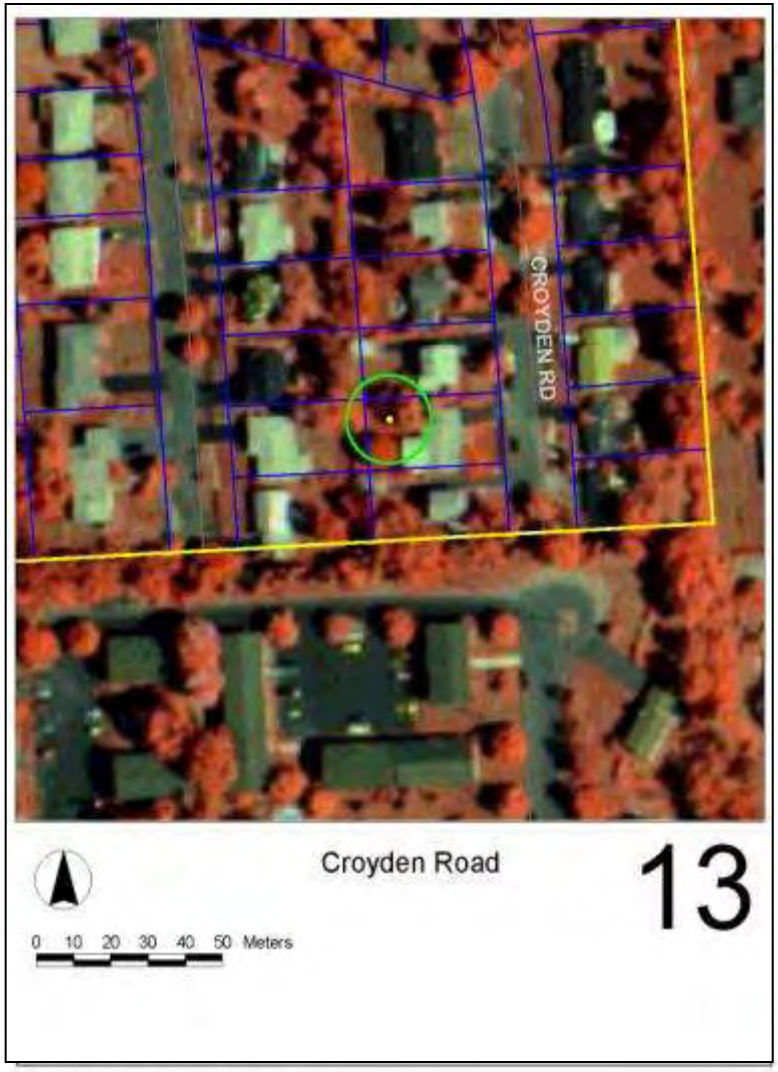
(UFORE)

Assessing Urban Ecosystems

i-Tree Eco

assesses:

- Structure
- Function
  - ✓ Energy
  - ✓ Air pollution
  - ✓ Carbon
- Value
- Management
  - ✓ Health
  - ✓ Pest impacts

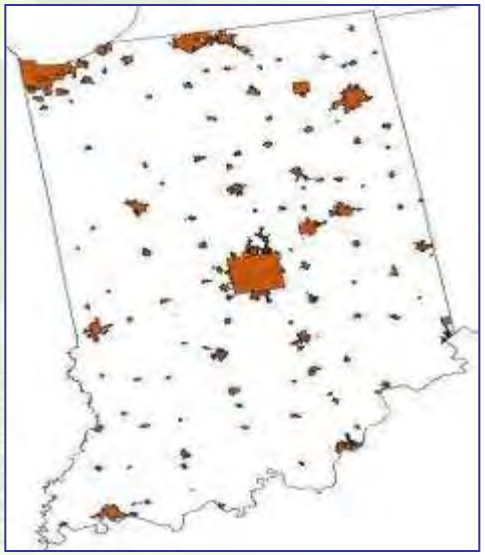


Eco Foundation: Local Data

- Sample or Inventory
- Local information:
  - Weather
  - Pollution
  - Environmental variables
- Hourly simulations

Using i-Tree Eco

Step 1 - Determine Study Area



Using i-Tree Eco

- Step 2 - Determine What Data to Collect
  - Sample or inventory?
  - Required core variables (spp, dbh)
    - Crown parameters
    - Tree health (dieback)
    - % Canopy Missing
    - Crown Light Exposure
  - Optional variables
    - Distance to buildings
    - Shrub data
    - Ground cover data

Tree = any woody vegetation, except vine, with a DBH ≥ 1 in

Using i-Tree Eco

- Step 3a– Determine number of plots
  - Typically 200 1/10 acre plots

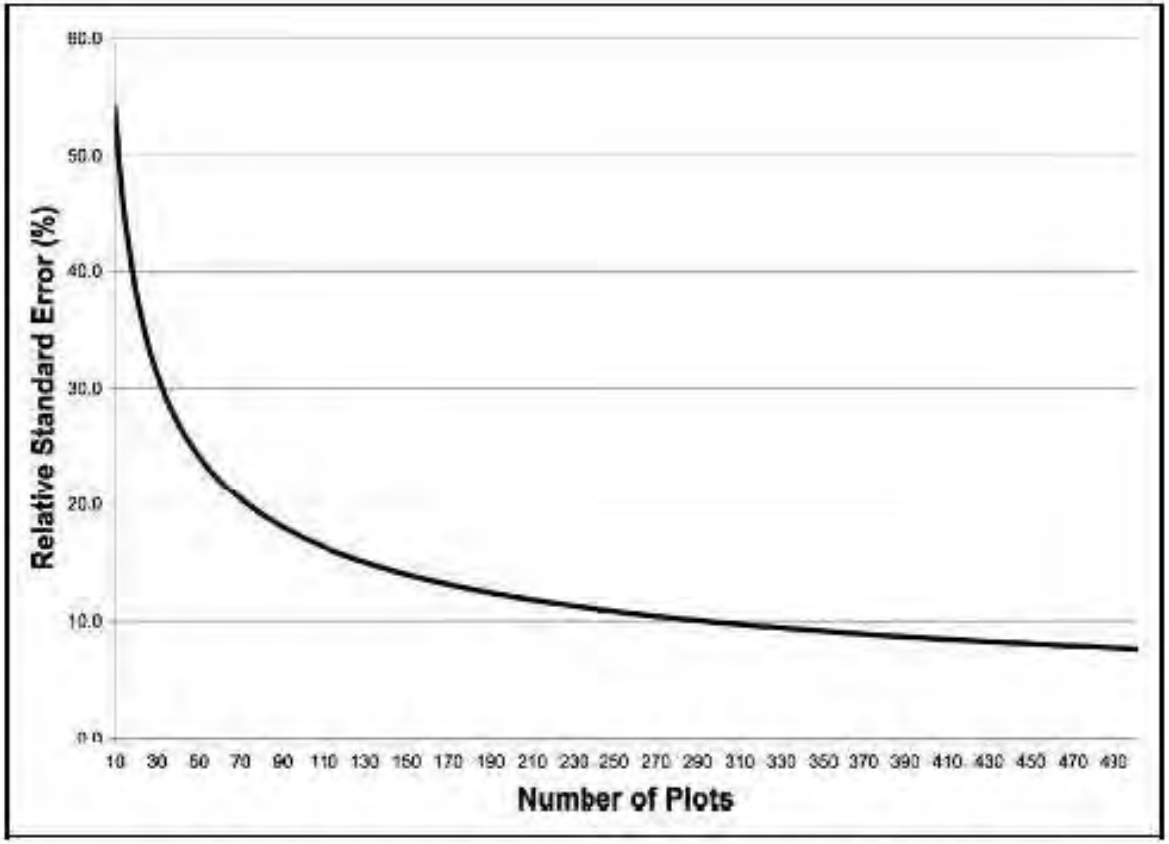
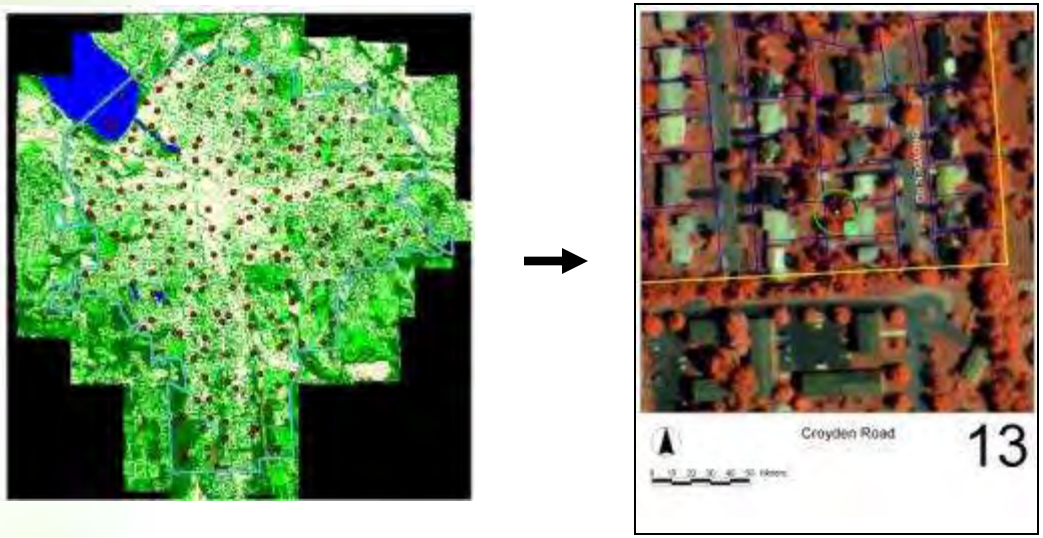
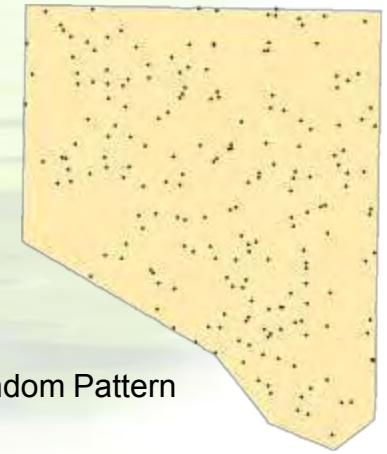


Figure 1. Estimated relative standard error (SE/total × 100) of total number of trees based on varying number of total one-tenth acre (0.04 ha) field plots.

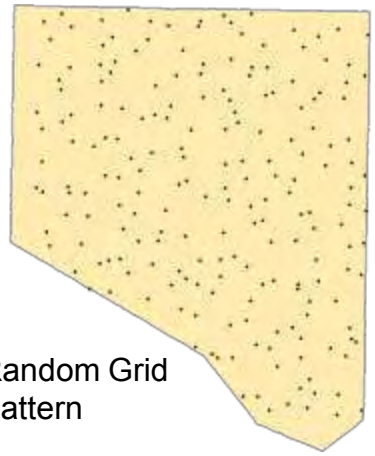
Using i-Tree Eco

- Step 3b– Lay Sample Points

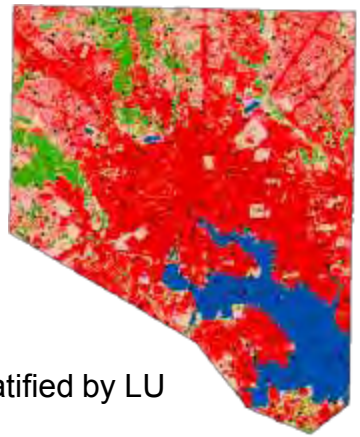




Random Pattern



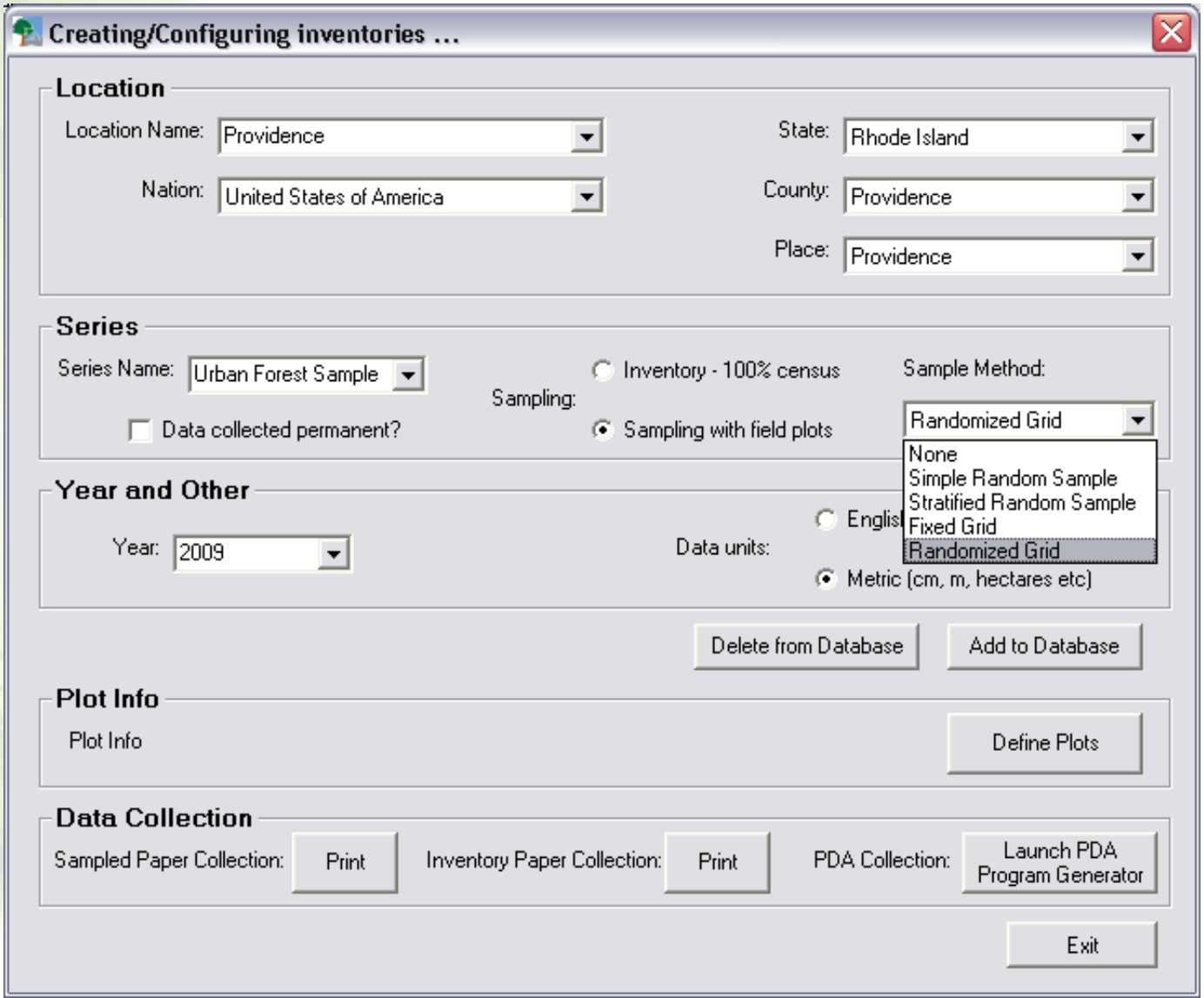
Random Grid Pattern



Stratified by LU

Using i-Tree Eco

Step 4 – Set Up Project



Using i-Tree Eco

- Step 5– Train Crews / Collect Field Data / QA-QC

Using i-Tree Eco

Step 6– Enter Data and Submit to F.S.

Paper Data Entry for Sampled Plots

PlotID	PlotAddress	XCoordinate	YCoordinate	Date	Crew	Comment
10		1622181.42	1916249.19			
31		1621800.24	1916683.97			
32		1622197.07	1916545.98			
52		1621592.86	1917837.02			
53		1622251.54	1918012.74			
73		1621856.59	1918096.52			
74		1622558.28	1918798.13			

Add Plot

Edit Plot

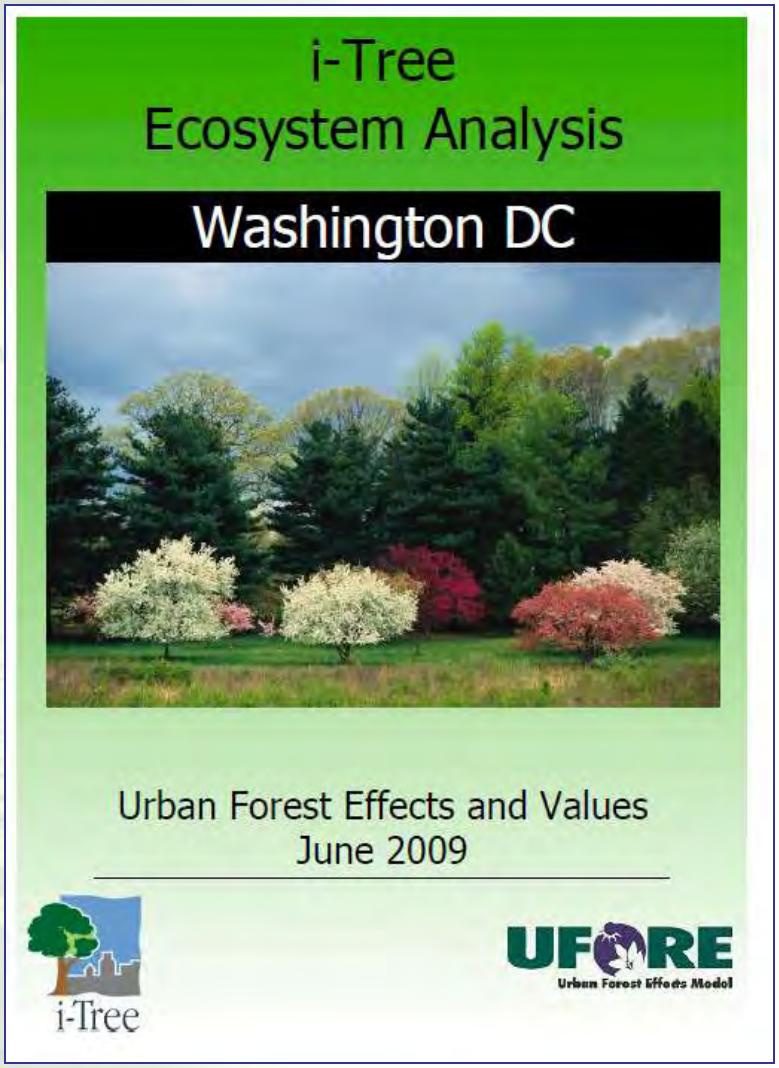
General Plot Info | Shrub Info | Tree Info

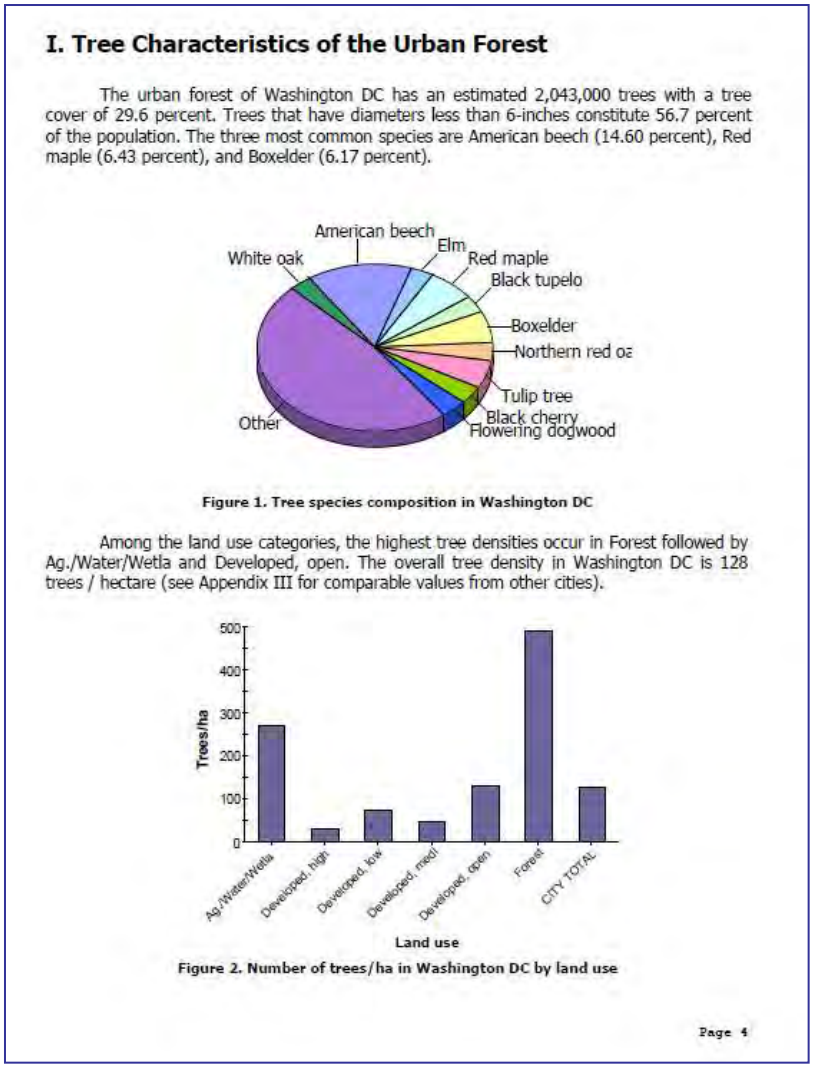
Tree ID	NR	DR	DS	TreeSpecies	Land Use	HT DBH	DBH DBH1	DBH2	DBH3	DBH4	DBH5	DBH6	Height TOTHT	LiveTopCr
1	0	-1	-1	Morus alba	Park	-1	59						10.	10.07
2	0	-1	-1	Morus alba	Park	-1	11.8	15.3	9.3				8	8
3	0	-1	-1	Viburnum	Park	-1	4.3	6.9	4.1	3	2.9	1.9	3.4	3.48
4	0	-1	-1	Morus alba	Park	-1	59						10.	10.1
5	0	-1	-1	Morus alba	Park	-1	11.8	15.3	9.3				8	8
6	0	-1	-1	Morus alba	Park	-1	12.5	18.9	14.8	9.8	11.6	8.1	12.	12.5
7	0	-1	-1	Morus alba	Park	-1	11.1	13.9	12.3	7.2			10.	10.4
8	0	-1	-1	Viburnum	Park	-1	4						3.7	3.71
9	0	-1	-1	Morus alba	Park	-1	9.3	9.8	9.1				5.7	5.7
10	0	-1	-1	Acer negundo	Park	-1	24.8						10.	10.28
11	0	-1	-1	Morus alba	Park	-1	59						10.	10.07
12	0	-1	-1	Morus alba	Park	-1	11.8	15.3	9.3				8	8

Add a page

Save Edits | Abort | Exit

Automatic Report Generator





I. Tree Characteristics of the Urban Forest

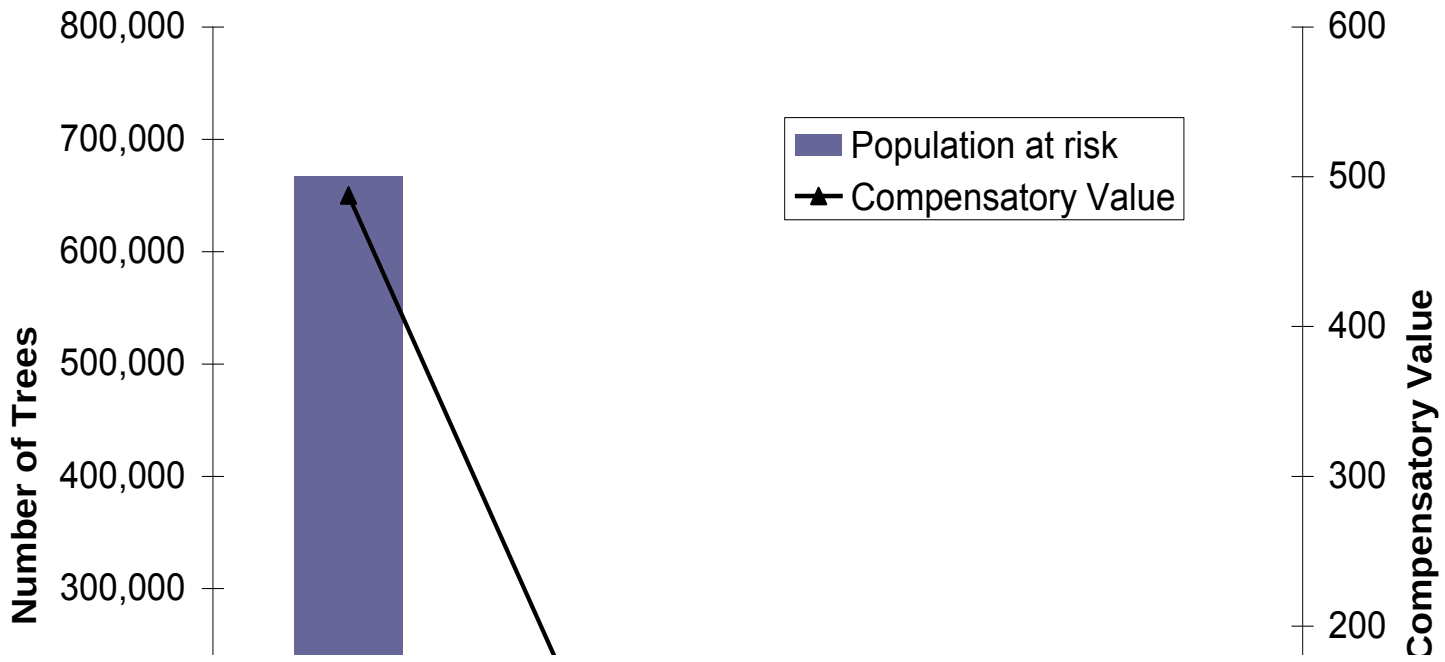
The urban forest of Washington DC has an estimated 2,043,000 trees with a tree cover of 29.6 percent. Trees that have diameters less than 6-inches constitute 56.7 percent of the population. The three most common species are American beech (14.60 percent), Red maple (6.43 percent), and Boxelder (6.17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

Potential Pest Impacts Report



i-Tree Eco Helps You:

- Quantify ecosystem services and values
- Determine magnitude and distribution of resource
- Improve planning and management
- Empower advocacy
- Link with environmental regulations
- Monitor change

i-Tree Streets Overview

(STRATUM)

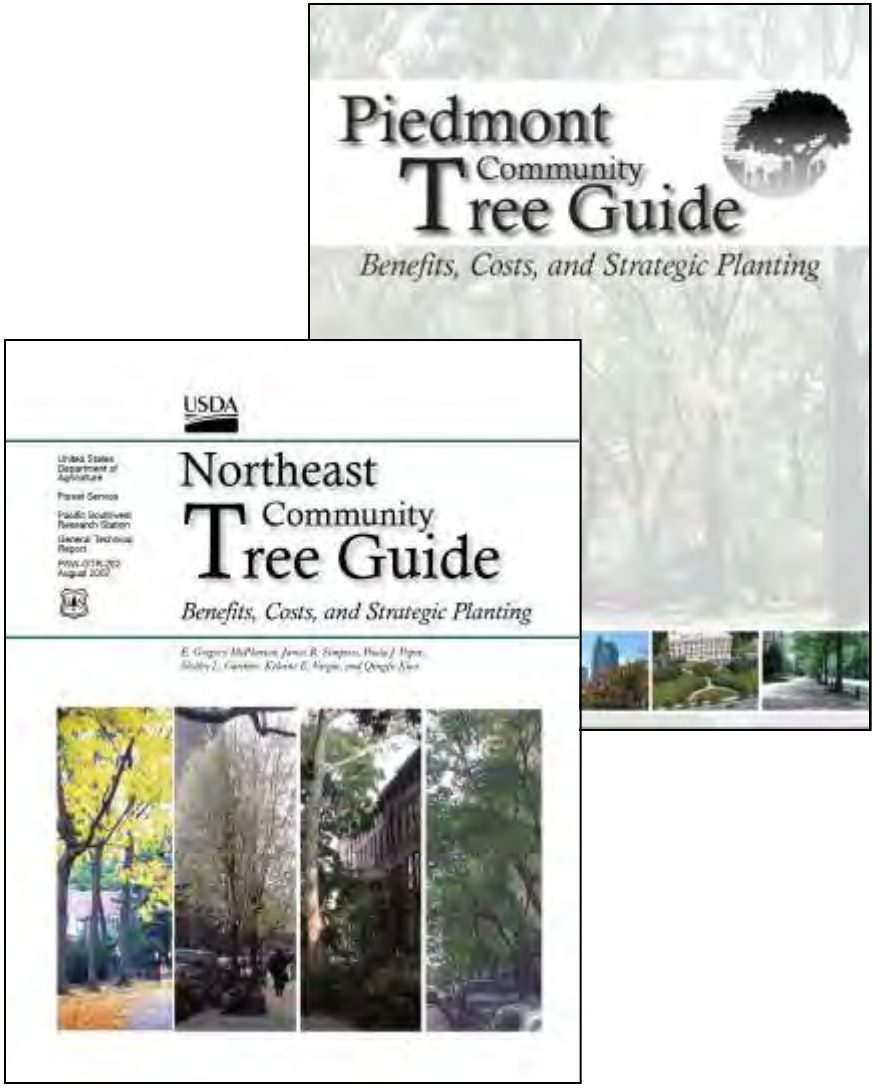
Assessing Street Tree Populations

Streets assesses:

- Function
  - ✓ Energy
  - ✓ Air pollution
- Structure
  - ✓ Stormwater
  - ✓ Carbon
  - ✓ Property Value
- Value
- Management needs
- Pest Detection Module (Beta)

Streets Foundation: Reference City Research

- Regional ***Tree Guide*** studies to develop growth models of representative street trees and their dimensions as a basis for Benefit-Cost Analysis.



i-Tree Streets Climate Zones
Longview
Boise
Minneapolis
Fort Collins
Berkeley
Modesto
Santa Monica
Claremont
Glendale
Albuquerque
Indianapolis
Queens
Charlotte
Charleston
Orlando
Honolulu
Reference Cities
Climate Zones
North
Interior West
Temperate Interior West
Pacific Northwest
Inland Valleys
Southwest Desert
Southern California Coast
Northern California Coast
Inland Empire
Tropical
Central Florida
Coastal Plain
South
Northeast
Lower Midwest
Midwest
Anchorage
San Juan

i-Tree Streets: Information for Better Tree Management

- **Input**:
  - Sample street segment inventory (3-6%)
  - Or import an existing inventory
  - Price adjustments, mgmt. costs
- **Output**:
  - Graphs, charts, tables
- **Benefit**:
  - Baseline data to more effectively manage & advocate for the street tree resource

$2.94 in benefits for every $1 spent

Benefit Summary for Pittsburgh's Street Trees

Benefits	Total ($)
Energy	$1,205,133
CO2	$35,424
Air Quality	$252,935
Stormwater	$334,601
Aesthetic/Other	$572,882
Total Benefits	**$2,400,975**

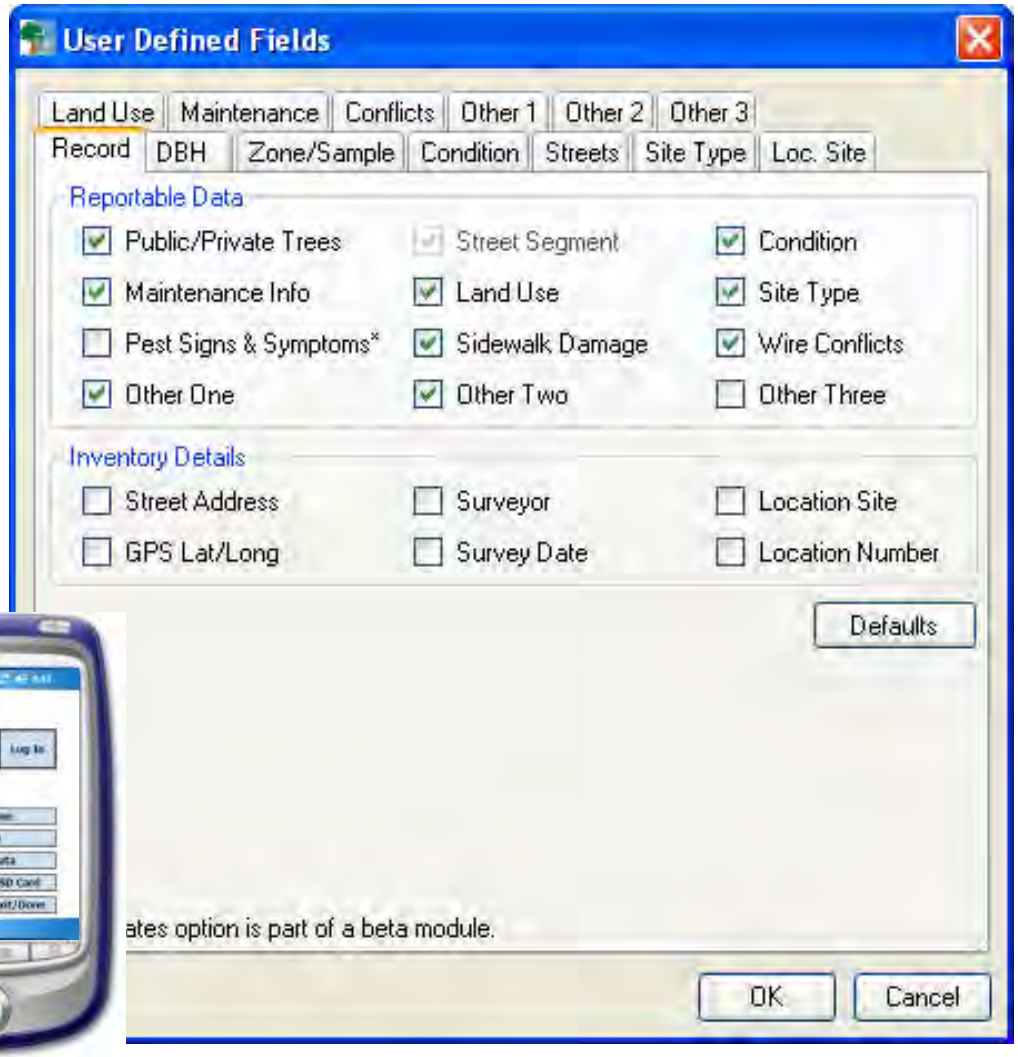
Using i-Tree Streets

Phase I: Getting Started

- Existing inventory?
- Conduct inventory?
  - Study area
  - Inventory type
    - ✓Sample or complete
  - Data collection
    - ✓PDA, paper or other
  - Project parameters
    - ✓Data fields (Species & DBH)
    - ✓Other inputs: benefit prices, city data

Phase II: Project Establishment

- Configure project inputs:
  - City Info
  - Annual Costs
  - Benefit prices
  - Data fields
  - Species
- Set-up PDA

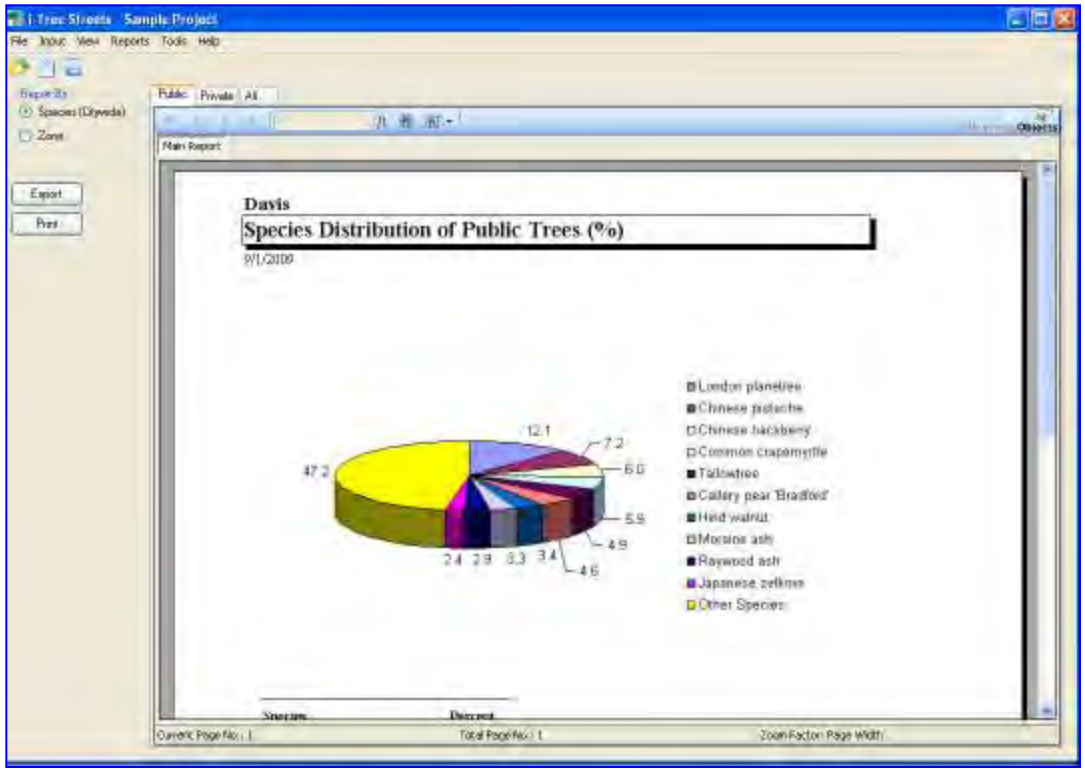


Phase III: Out in the Field

- Locate trees or sample segments
- Data collection
  - PDA or Paper forms
- Data definitions
- QA/QC

Phase IV: Running i-Tree

- Upload or manual data entry
- Import existing inventories
- Error checking
- Rechecking data in the field
- Reporting results
- Exporting results



I-PED Pest Detection Module (beta)

- Standard protocol for pest & disease recording
- Portable
- Future integration with data repository

Streets Helps You:

- Justify and leverage funds
- Quantify Street tree benefit values
- Empower Advocacy
- Plan, prioritize, and budget
- Benchmark progress

Linking Trees to Community Values

EAB Structural Impacts

- 17.4% Canopy Loss
- $221 Million structural damage (citywide)

EAB Functional Impacts

- $243,785 less pollutant removal
- $138,000 less energy savings (cooling costs)
- $261,000 reduction in storm water benefits (1996 study)

www.itreetools.org *for more information*

al.zelaya@davey.com