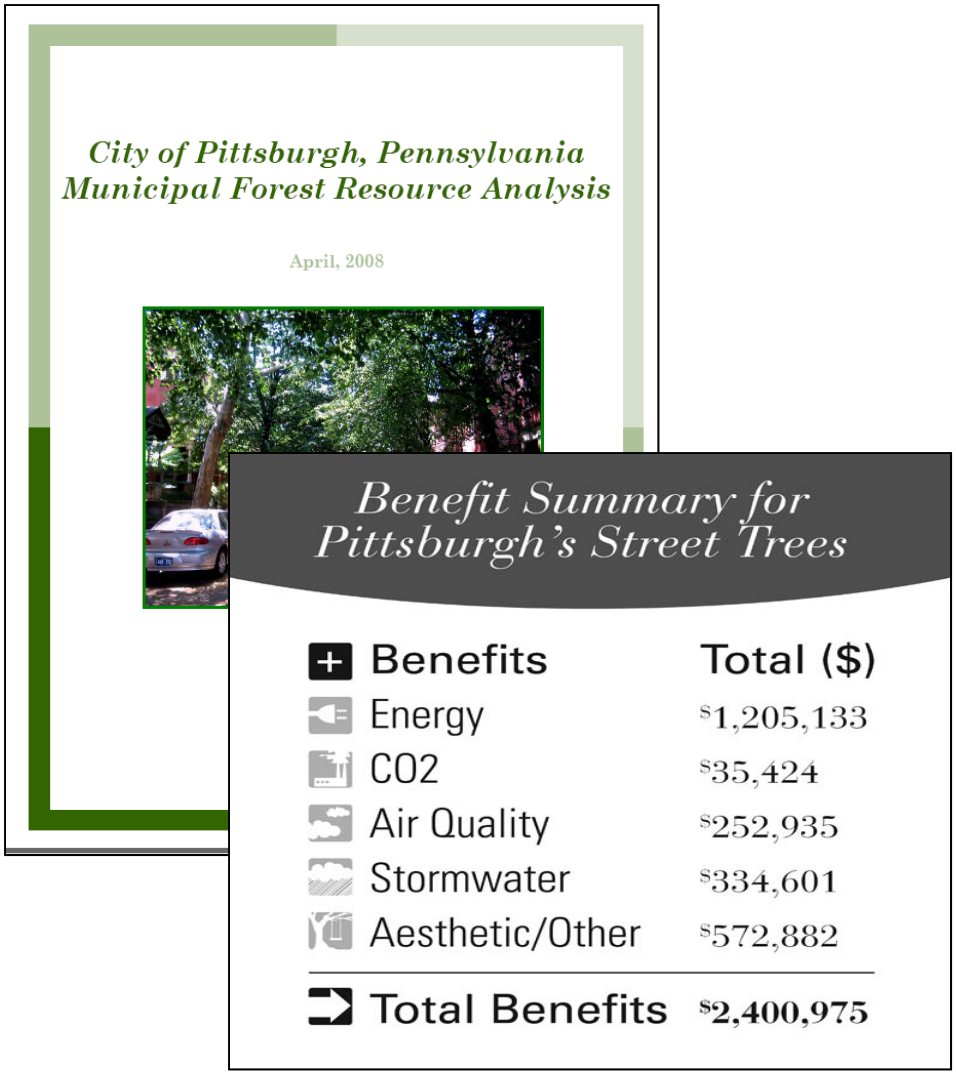
i-Tree V. 4.0

Overview and STREETS

i-Tree: Demonstrating That Trees Pay Us Back!

Credit: Waldo Nifio



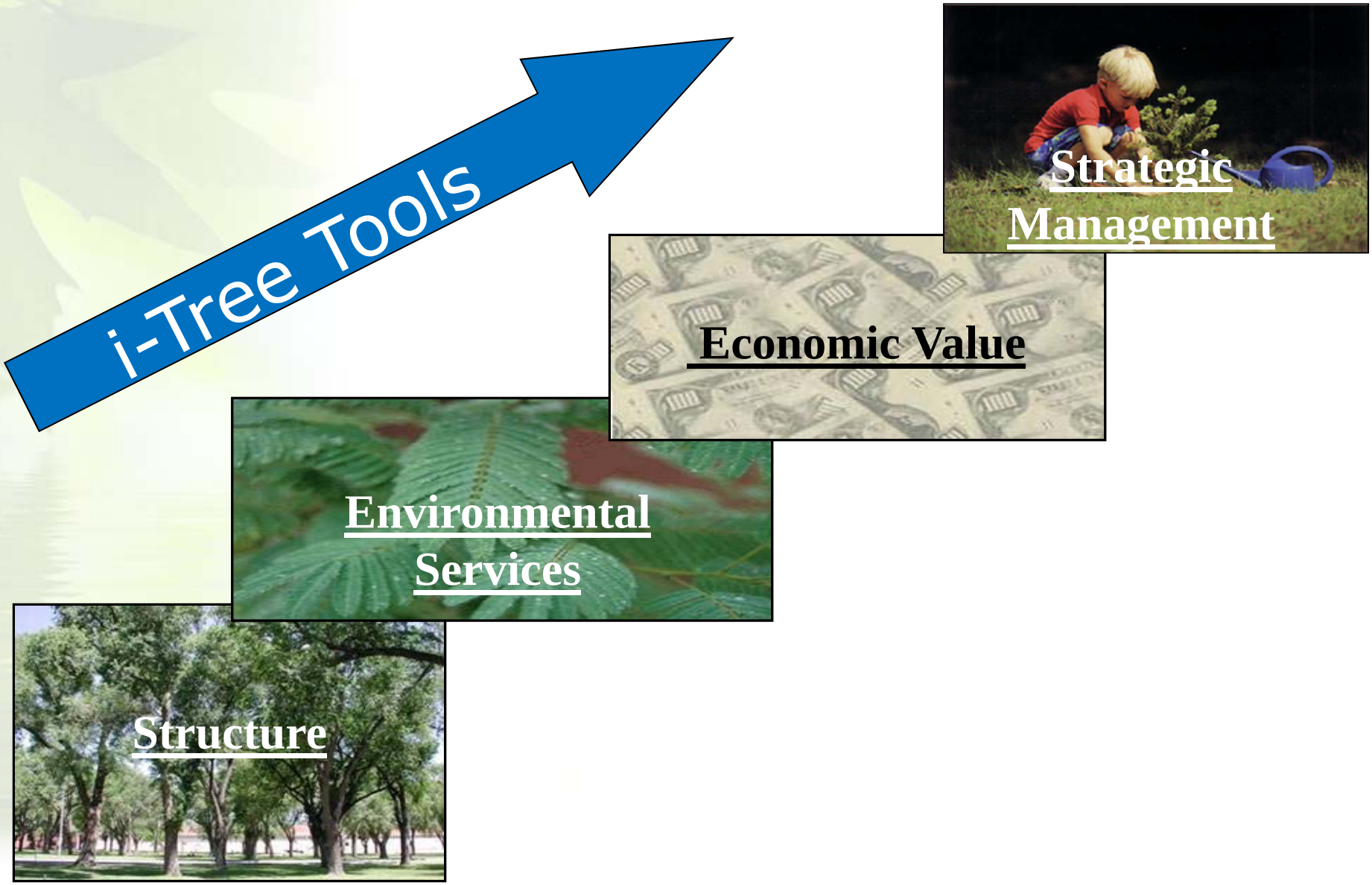
"$2.94 in benefits for every $1 spent"

i-Tree is…

Development, Dissemination, Support, & Refinement

- Credible, USDA FS peer-reviewed tools
- Public Domain Software
- Accessible
- Technical Support

A Benefit-Based Assessment



Version 4.1: Suite of Tools

i-Tree Eco

i-Tree Streets

i-Tree Hydro

Utilities

i-Tree Pest

i-Tree Storm

Mapping

i-Tree Design

i-Tree Vue

i-Tree Canopy

What's are they using?

i-Tree

i-Tree™

Eco

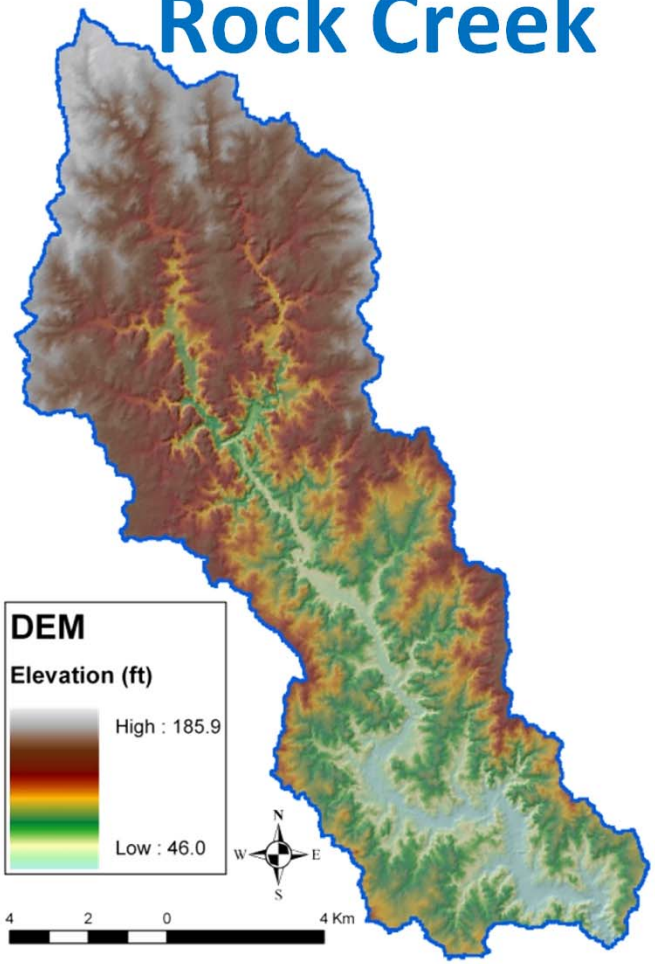
i-Tree™

Streets

i-Tree™

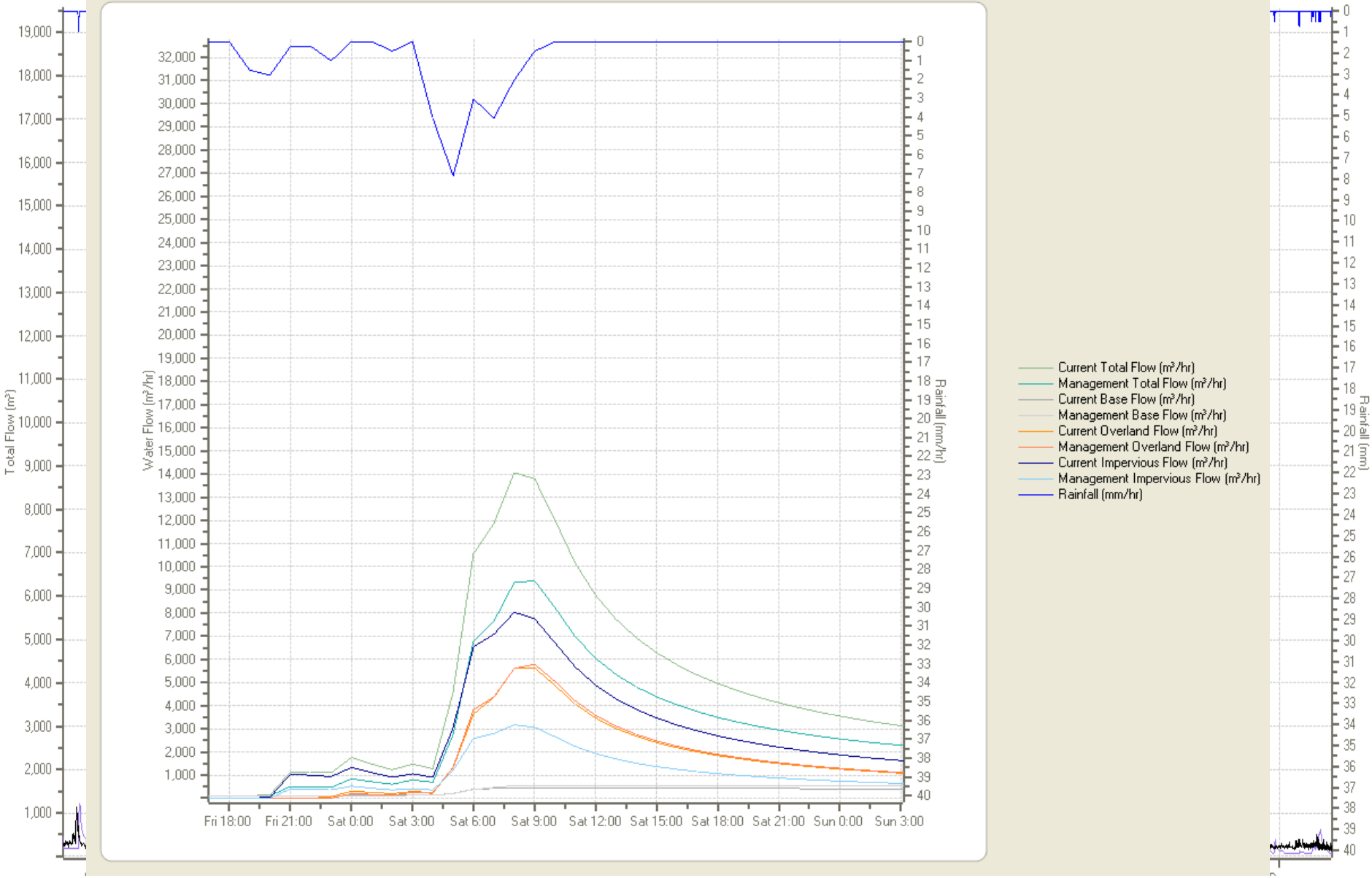
Hydro

Rock Creek



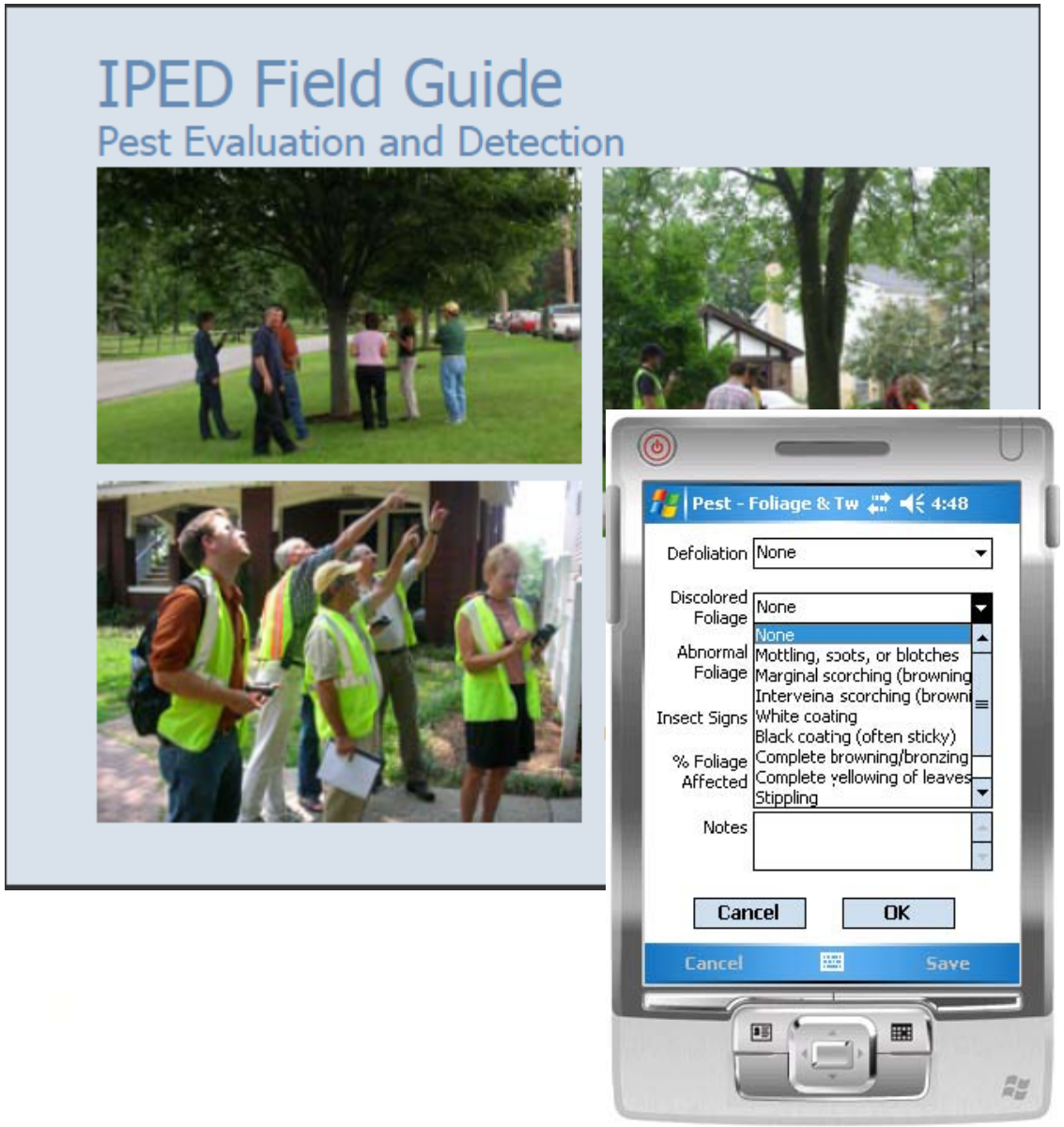
Watershed Area (m2)	**161,653,50 0**
Percent Impervious cover	**15.8**
Percent Tree Cover	**27**
Percent of Tree Cover over Impervious Area	**10**
Percent Water Cover	**0.3**
Average Tree Leaf Area Index (LAI)	**3.5**
Percent Shrub Cover	**7.8**
Percent Grass Cover	**33.8**
Percent Evergreen Trees	**4.2**
Percent Evergreen Shrubs	**21**
Shrub LAI	**3.9**
Leaf on Day	**80**
Leaf off Day	**294**

Hydro Reporting



Pest detection Protocol

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



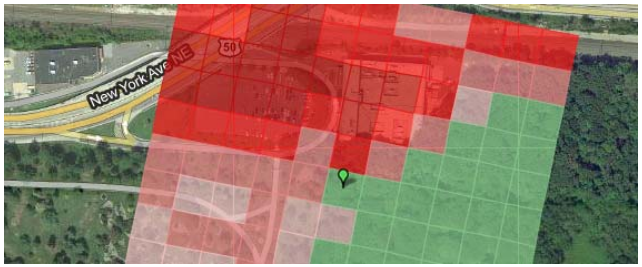
Vue - GIS-Based Canopy Assessment Tools

Cost, Resolution, Time

less

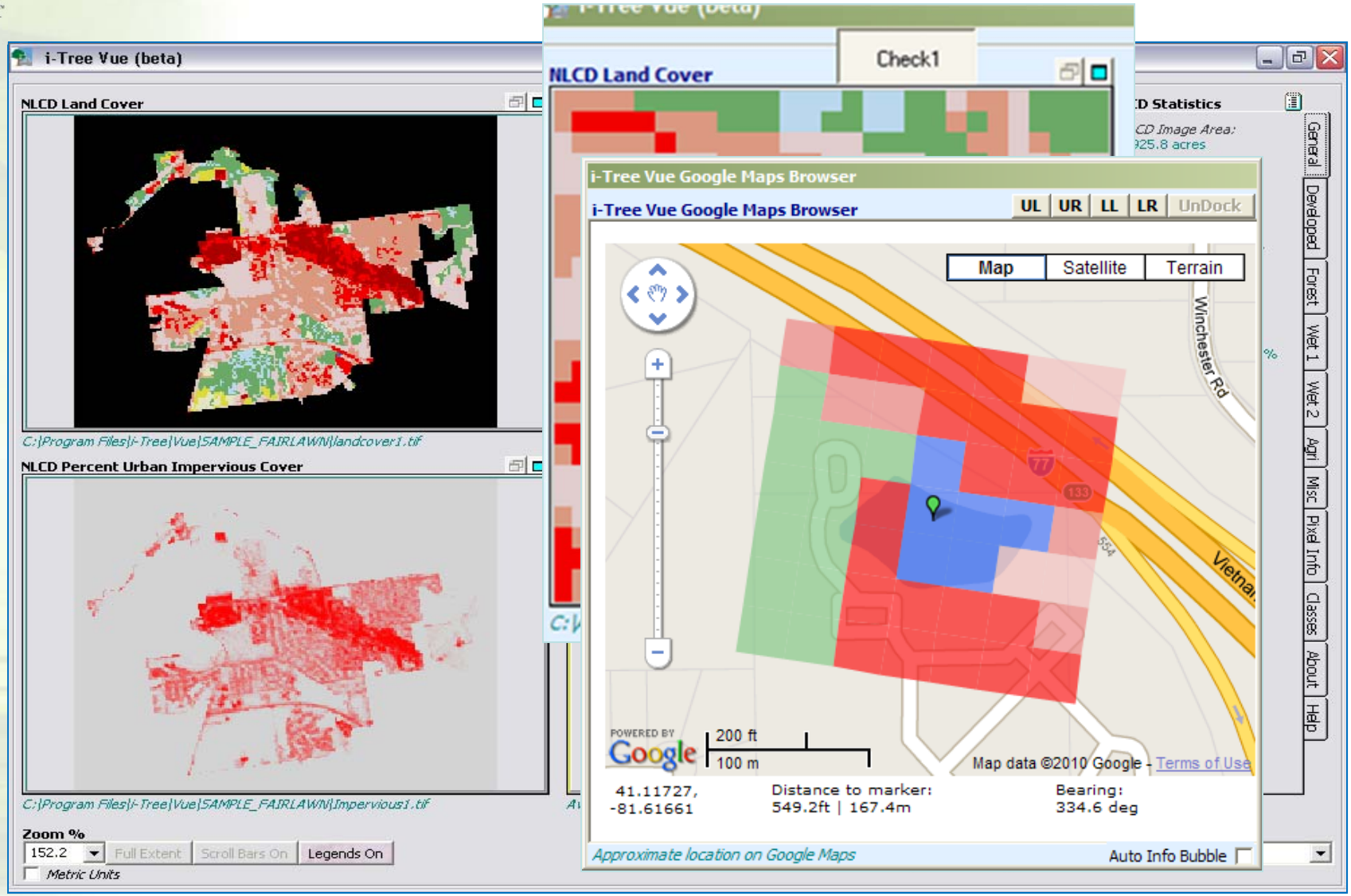
more

- Satellite Based
  - ✓ i-Tree Vue



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

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


i-Tree Vue (beta)
NLCD Land Cover
C:\Program Files\i-Tree\Vue\SAMPLE_FAIRLAWN\landcover1.tif
NLCD Percent Urban Impervious Cover
C:\Program Files\i-Tree\Vue\SAMPLE_FAIRLAWN\Impervious1.tif
Zoom %
152.2
Full Extent
Scroll Bars On
Legends On
Metric Units
Check1
i-Tree Vue Google Maps Browser
UL
UR
LL
LR
UnDock
Map
Satellite
Terrain
Winchester Rd
POWERED BY Google
200 ft
100 m
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
General
Developed
Forest
Wet 1
Wet 2
Agri
Misc
Pixel Info
Classes
About
Help

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.

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Username | Password | Login

Forgot Username or Password? | Register

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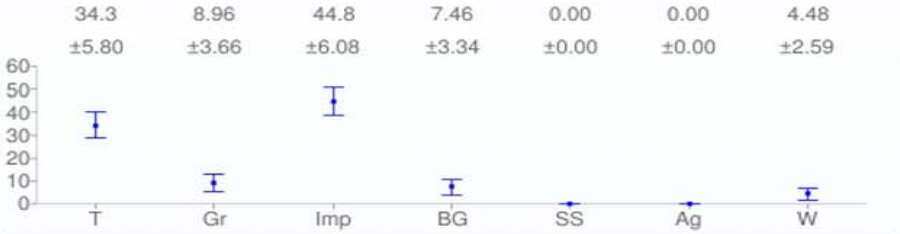
Technical Notes | Report | Export | Start Over | Exit | ?

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!

i-Tree™

Design

i-Tree

Tools for Assessing and Managing **Community Forests**

Get the Tools.

Google Custom Search | Search

Username | Password | Login

Forgot Username or Password? | Register

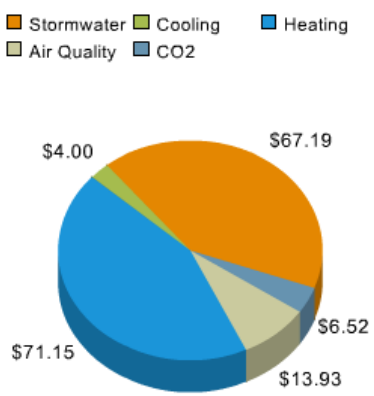
Home | About | Applications | Utilities | Resources | Support | News

i-Tree Benefit Calculator

1500 N Mantua St, Kent, OH 44240, USA

Home
Calculate another tree

Overall Benefit | Storm Water | Energy | Air Quality | CO2 | About Model



Breakdown of your tree's benefits

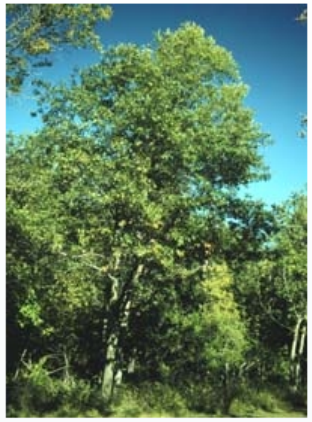
Click on one of the tabs above for more detail

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

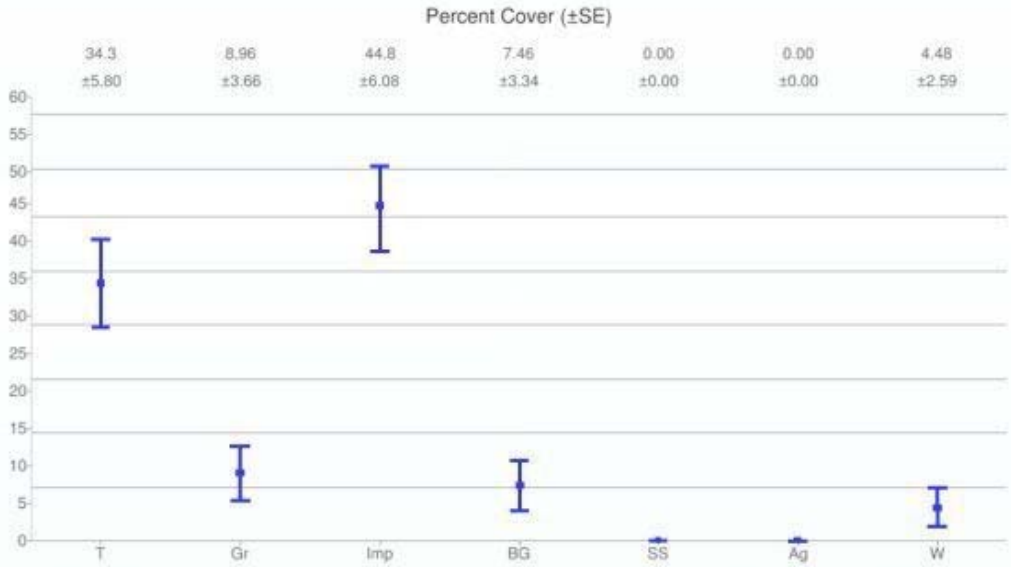
File Edit View History Bookmarks Tools Help

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

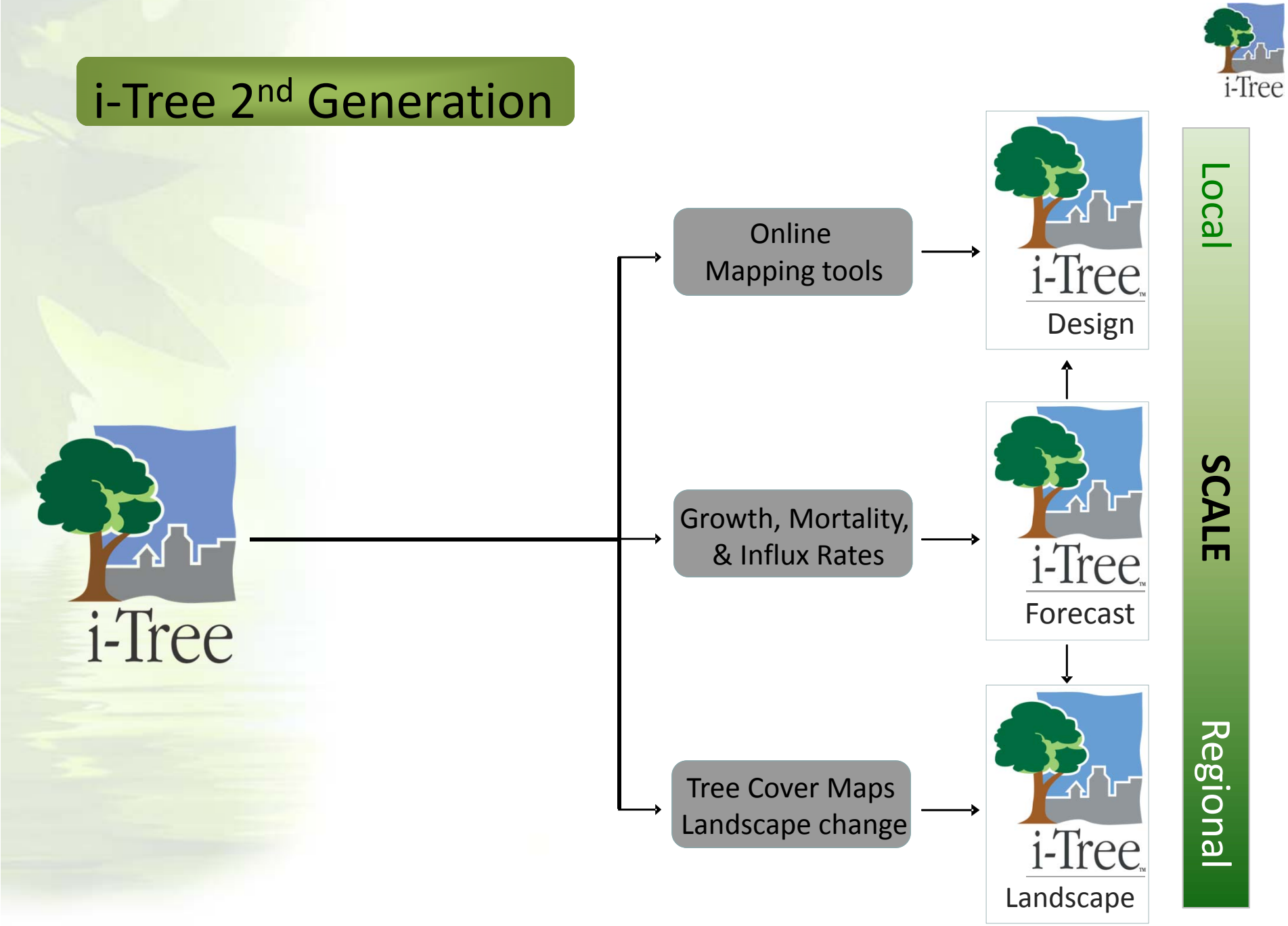
The accuracy of the analysis depends upon the ability of the user to correctly classify each point into its correct class. As the number of points increase, the precision of the estimate will increase as the standard error of the estimate will decrease. If too few points are classified, the standard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

i-Tree 2nd Generation



i-Tree Streets: Assessing Street Tree Populations

Al Zelaya & Kelaine Vargas

Davey Institute

Overview

- Introductions & Training Expectations
- Streets Background & Methods
- Streets Resources

Assessing Street Tree Populations

Streets assesses:

- Structure
- Function
  - ✓ Energy
  - ✓ Air pollution
  - ✓ Stormwater *
  - ✓ Carbon
  - ✓ Aesthetic Value *
- Value
- Management needs *
- Pest Detection* Module

i-Tree™ Streets

Streets Background & Methods

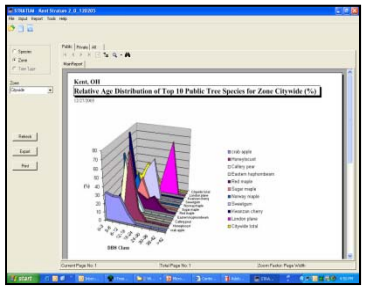
- To demonstrate new ways that trees add value - quality of life - to communities.

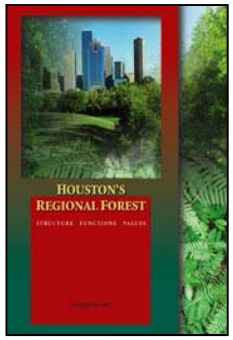
Center for Urban Forest Research
USDA Forest Service
PSW Research Station

Regional model with local adjustments

Phase I: Getting Started

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





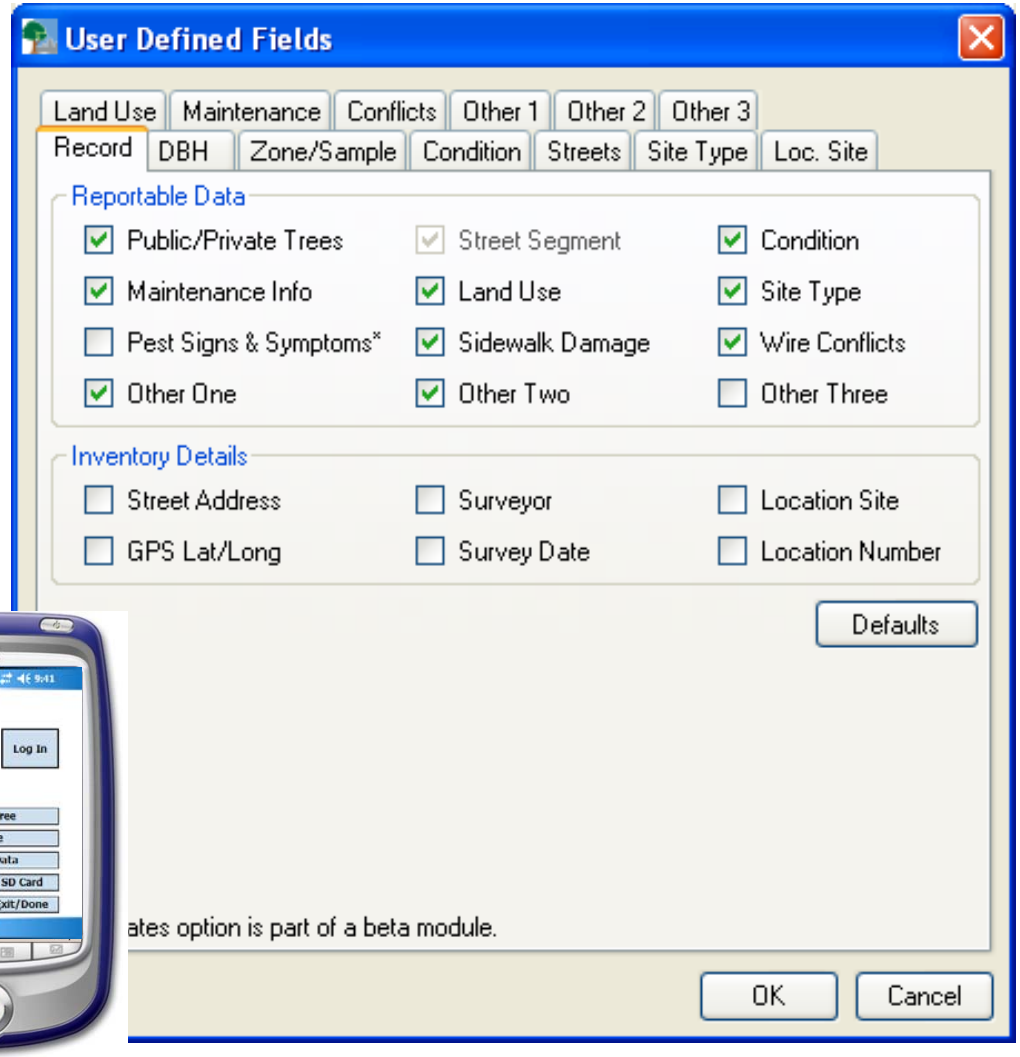
Working with Existing Inventories

- Must be random sample or full
- Must include at least species and DBH
- Many custom fields depending on what you need
- Any starting format is OK but must be imported into Access before use
- Old inventories will yield out-of-date results

Provided courtesy of City of Oconomowoc, WI

Phase II: Project Establishment

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



Phase III: Out in the Field

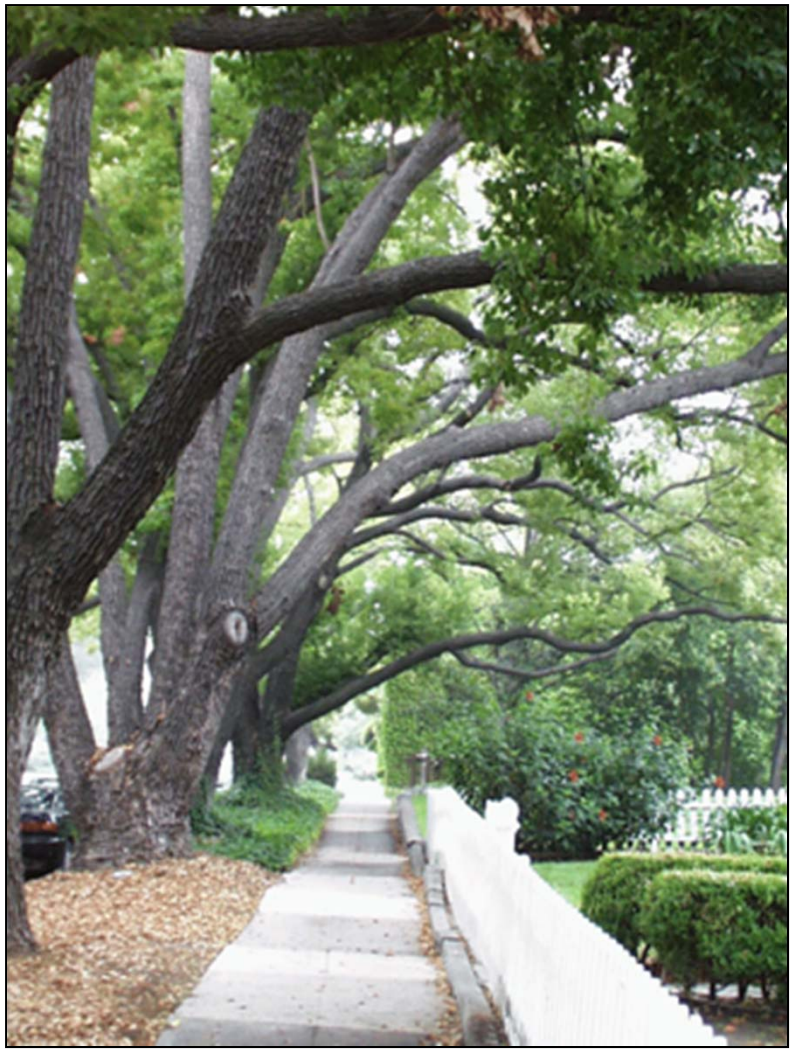
- Locate trees or sample segments
- Data definitions
- Data collection
- QA/QC

Typical Resources Needed

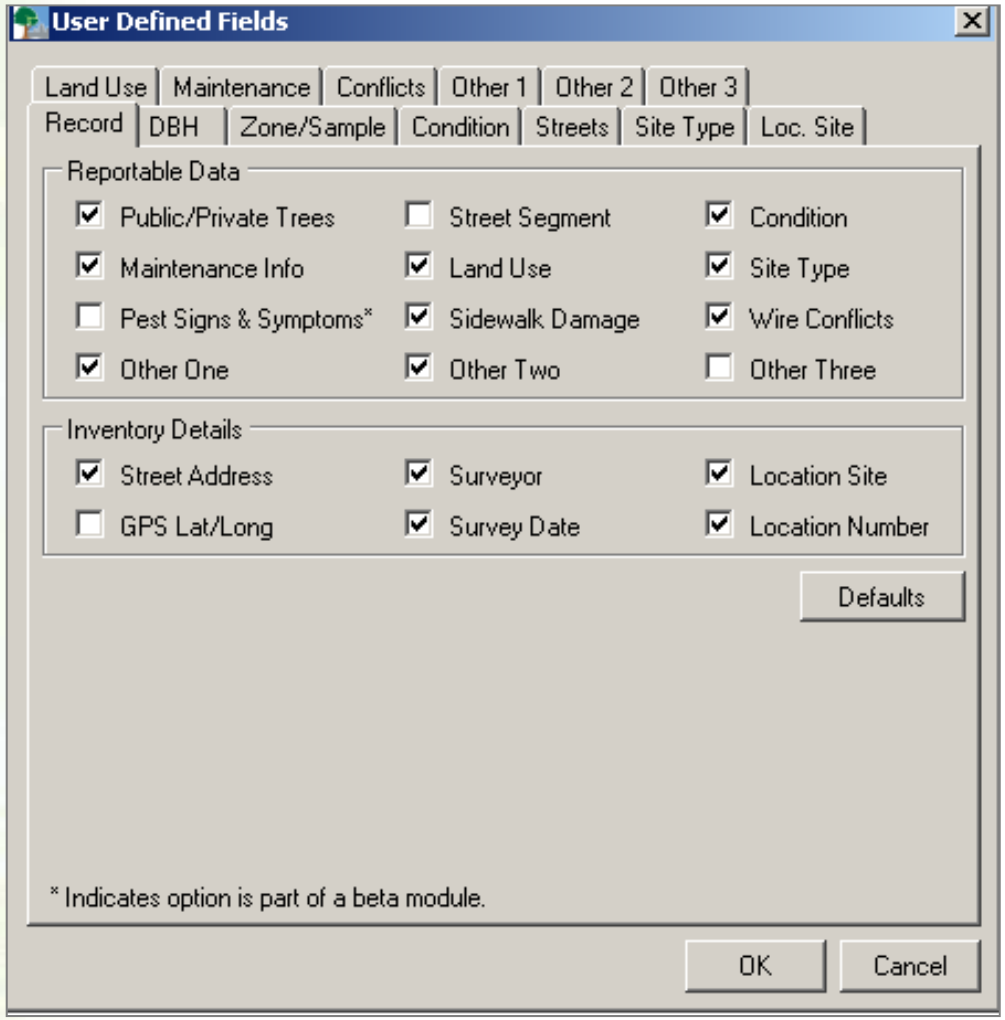
- Transportation
- Detailed street segment maps
- Project leader (create maps, manage/coordinate volunteers, data upload, QA/QC)
- Expertise:
  - ✓Minimal
  - ✓6-8 hrs training is adequate
  - ✓Tree ID knowledge desired
- Equipment:
  - ✓DBH tape (tree diameter) or equivalent (e.g., Biltmore stick)
  - ✓PDAs, smartphones, clipboards, etc.

Streets Helps You:

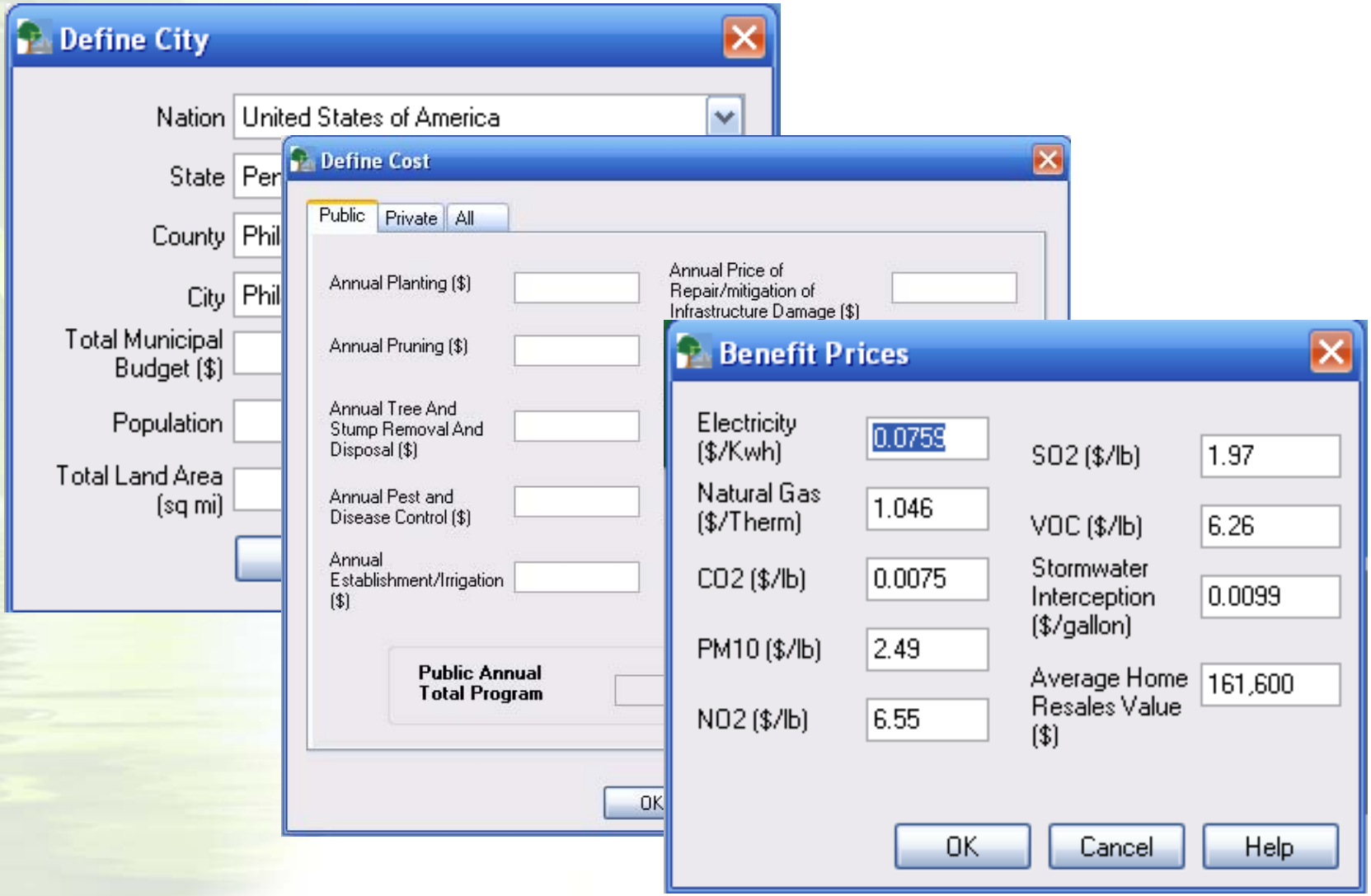
- Justify and leverage funds
- Highlight benefits to public & decision makers
- Plan, prioritize, and budget
- Benchmark progress
- Build partnerships



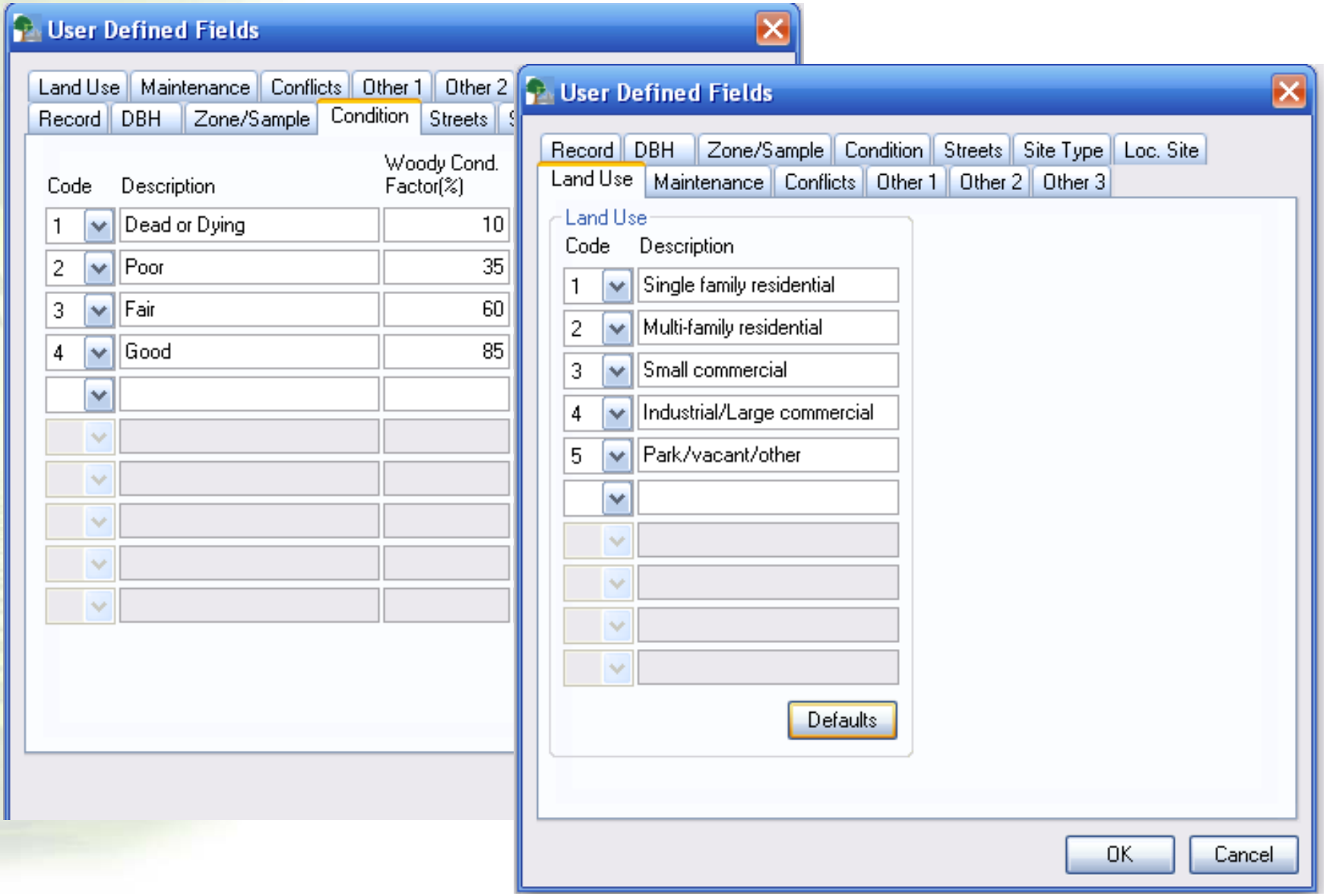
Deciding What Field Data to Collect



Gathering Cost & Price Information



Customizing Streets Fields



New inventory: sample or complete?

Sample

- Fewer resources required
- Quicker
- Less accurate
- Yields estimated values with standard deviations
- Better as a starting point for demonstrating value of forest

Complete

- More expensive
- More time-consuming
- More accurate
- Better for actual management and planning decisions

Data collection options

PDA

- Well-tested
- Potentially better GPS capabilities
- Data saved to memory card
- Battery life possible concern
- Weather complications

Webforms

- Accessible via any web-enabled device
- Some limitations to memory when connectivity is poor
- Battery life can be limited
- Weather complications
- Data costs?

Paper

- Almost free!
- No problems in poor weather
- Challenging to incorporate GPS coordinates
- Two chances for data entry error

Inventory & Maintenance Data

oc/Oconomowoc.asp

Zoom In | Zoom Out | Zoom Last | Zoom Full | Pan | OV Map | ID Parcel | ID Feature | Query | Clear Map | Measure | Buffer | Legend | Print | Help

Street Tree Data Form - Windows Internet Explorer

http://rmgis2.ruekert-mielke.com/oconomowoc/TreeMaintain.asp?mode=Maintain&TreeID=37

Street Tree Data Maintenance Form

Tree ID	House Number	Street Name	Species
37	704	elizabeth st.	Butternut
Year Planted		Inspection Date	6/1/2006
Diameter (in.)	29.7	Planting Depth	N/A
Growth space	8'	Height Class	45'-60'
Deadwood Present	0	Condition Rating	Good
Primary Maint. Need	Routine Prune	Secondary Maint. Need	N/A
Priority Rating	OK	Private Tree Problems	None
Clearance	OK	Utilities Present	None
Quadrant	SE	Crown Spread (ft.)	0

☐ Staked ☐ Mulch Rings ☐ Wrapped ☐ Gypsy Moth Signs

Special Conditions

☐ BS-Basal Suckers	☐ BW-Basal Wound	☐ CC-Concreted Cavity	☐ C/D-Cavity/Decay
☐ CD-Crown Dieback	☐ CR-Consider Removal	☐ CT-Codominant Trunks	☐ DFP-Decay Fungi Pres.
☐ DL-Dead Leader	☐ DP-Deep Planting	☐ DW-Deadwood(2"+)	☐ HG-Hanger
☐ IA-Invasives Around	☐ IB-Included Bark	☐ IM-Improperly Mulched	☐ IP-Improperly Pruned
☐ LB-Low Branched	☐ LC-Low Crotched	☐ DS-Disease Present	☐ LML-Lost Main Limb
☐ LN-Leaning	☐ LS-Lightning Struck	☐ MD-Mechanical Damage	☐ MS-Multi-Stemmed
☐ ND-Nutrient Deficiency	☐ OG-Overgrowing Growspace	☐ OS-Overshadowed	☐ PL-Poor Location
☐ PP-Pest Problem	☐ PS-Poor Structure	☐ RD-Root Damage	☐ RP-Raised Planter
☐ RR-Root Rot	☐ SP-Suckers Present	☐ TP-Topped	☐ TS-Trunk Split
☐ TW-Trunk Wound	☐ UP-Utility Pruned	☐ WA-Wooded Area	☐ WG-Weak Growth

Notes

Submit Close

Trees Maintenance History Report

Done | Internet | 100%

Street Tree Inventory Raw Data

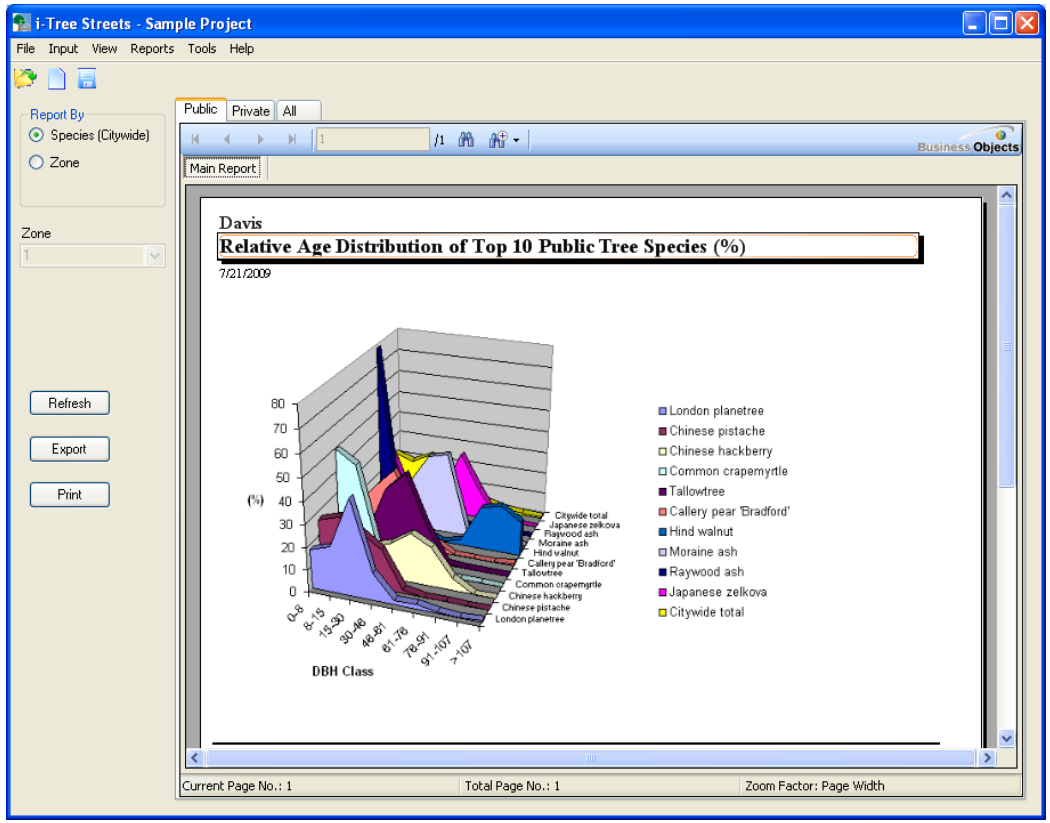
http://rmgis2.ruekert-mielke.com/oconomowoc/TreeReport.asp?action=sendReport

Street Trees Data Report (Click Here to download CSV file.)

ID	House #	Street	Species	Common Name	Year Planted	Growth Space	Diameter	Deadwood Present	Height Class	Condition	Planting Depth	Primary Maint. Need	Secondary Maint. Need	Priority Rating	Clearance	Utilities Present	Private Tree Problems	Quadrant	CRSpread	NOTES
26	704	elizabeth st.	601	Butternut		8'	29.7	0	45'-60'	Good	N/A	Routine Prune	N/A	OK	OK	None	None	SE	0	
40	418	oak st.	541	White Ash		Open	27	0	60'+	Good	N/A	N/A	N/A	OK	OK	None	None	SE	0	
42	318	oak st.	760	Cherry and Plum Spp.		8'	3.1	0	0'-15'	Good	N/A	N/A	N/A	OK	OK	None	None	SE	0	east most
43	318	oak st.	833	Northern Red Oak		8'	2.5	0	0'-15'	Poor	N/A	N/A	N/A	OK	OK	None	None	SE	0	tree has anthracnose, 2nd from east
44	318	oak st.	760	Cherry and Plum Spp.		8'	3.2	0	0'-15'	Good	N/A	N/A	N/A	OK	OK	None	None	SE	0	3rd from east
45	318	oak st.	833	Northern Red Oak		Open	0	0	N/A	Fair	N/A	N/A	N/A	OK	OK	None	None	SE	0	anthracnose present
59	518	union st.	317	Silver Maple		9'	36.2	0	60'+	Good	N/A	N/A	N/A	OK	OK	None	None	SE	0	
67	426	charlest st.	316	Red Maple		7'	17.1	0	30'-45'	Fair	N/A	N/A	N/A	OK	OK	None	None	SE	0	
69	423	charles st.	450	Catalpa Spp.		7'	33.6	0	45'-60'	Good	N/A	N/A	N/A	OK	OK	None	None	SE	0	north most
75	422	lyman st.	320	Norway Maple		8'	9	0	15'-30'	Good	N/A	N/A	N/A	OK	OK	None	None	SE	0	
76	562	summit ave.	068	Eastern Redcedar		10'	13	0	15'-30'	Good	N/A	N/A	N/A	OK	OK	None	None	SE	0	
85		wisconsin ave.	661	Crab Apple Spp.		Open	19.8	0	15'-30'	Good	N/A	N/A	N/A	OK	OK	None	None	SE	0	apple scab, ea: most
95		wisconsin ave.	661	Crab Apple Spp.		Open	16.4	0	15'-30'	Good	N/A	N/A	N/A	OK	OK	None	None	SE	0	apple scab, 11t from east
105		wisconsin ave.	661	Crab Apple Spp.		Open	9.3	0	15'-30'	Good	N/A	N/A	N/A	OK	OK	None	None	SE	0	21st from east
122		thackeray trail	541	White Ash		Open	16.5	0	15'-30'	Fair	N/A	N/A	N/A	OK	OK	None	None	SE	0	median width 1 ft., sparse leaves, roots exposed, 3rd from east
123		thackeray trail	540	Ash Spp.		Open	13.2	0	15'-30'	Fair	N/A	N/A	N/A	OK	OK	None	None	SE	0	median width 1 ft., 4th from east
129		thackeray trail	542	White Ash Var.		Open	8.8	0	15'-30'	Fair	N/A	N/A	N/A	OK	OK	None	None	SE	0	median width 1 ft., 10th from east
135		thacker trail	541	White Ash		Open	10.1	0	15'-30'	Good	N/A	N/A	N/A	OK	OK	None	None	SE	0	median width 1 ft., 16th from east
153		thackeray trail	541	White Ash		Open	16.1	0	30'-45'	Fair	N/A	N/A	N/A	OK	OK	None	None	SE	0	median width 1 ft., ash flower

Who will your data manager be?

- One Data Manager
- One Computer
- One Project File

Phase IV: Running i-Tree

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