



# i-Tree Streets: Assessing Street Tree Populations



**Arbor Day Foundation™**



# Overview of STREETS...

- 🌳 Why i-Tree Streets
- 🌳 Streets Background & Methods
- 🌳 Streets Project Phases



# Why i-Tree Streets?

## W E D N E S D A Y JOURNAL *of Oak Park and River Forest*

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7/14/2009 10:00:00 PM

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### No new trees in 2009?

*Oak Park to decide whether it will replant this year*

**By MARTY STEMPIAK**  
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*

**April 18, 2007**

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

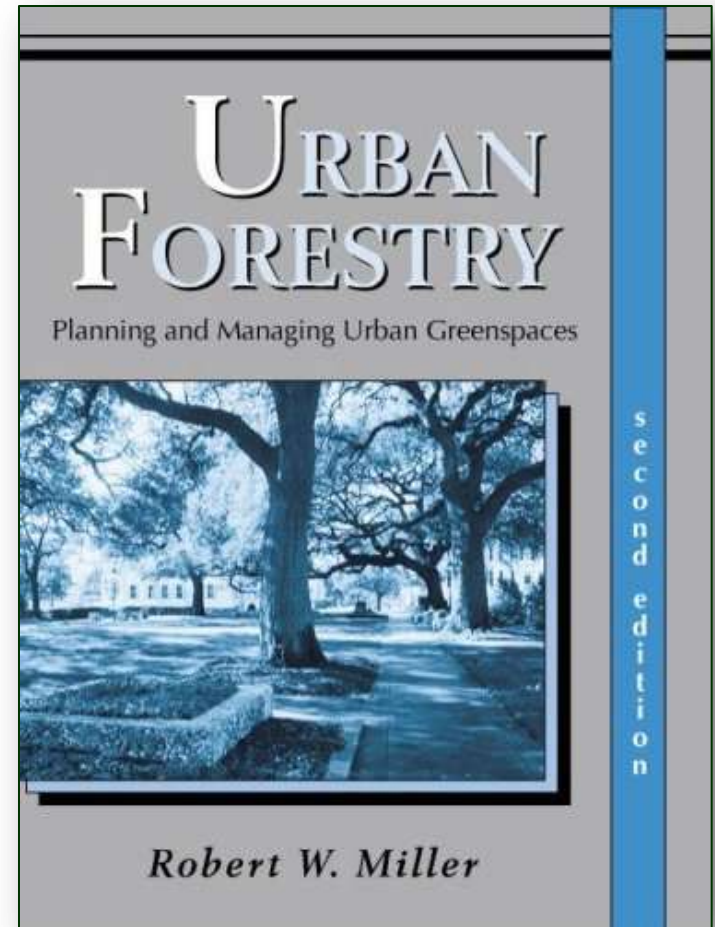
- 🌳 Public health
- 🌳 Energy conservation
- 🌳 Storm water mgt.
- 🌳 Pollution mitigation
- 🌳 Carbon strategies
- 🌳 Climate change
- 🌳 Green job creation...



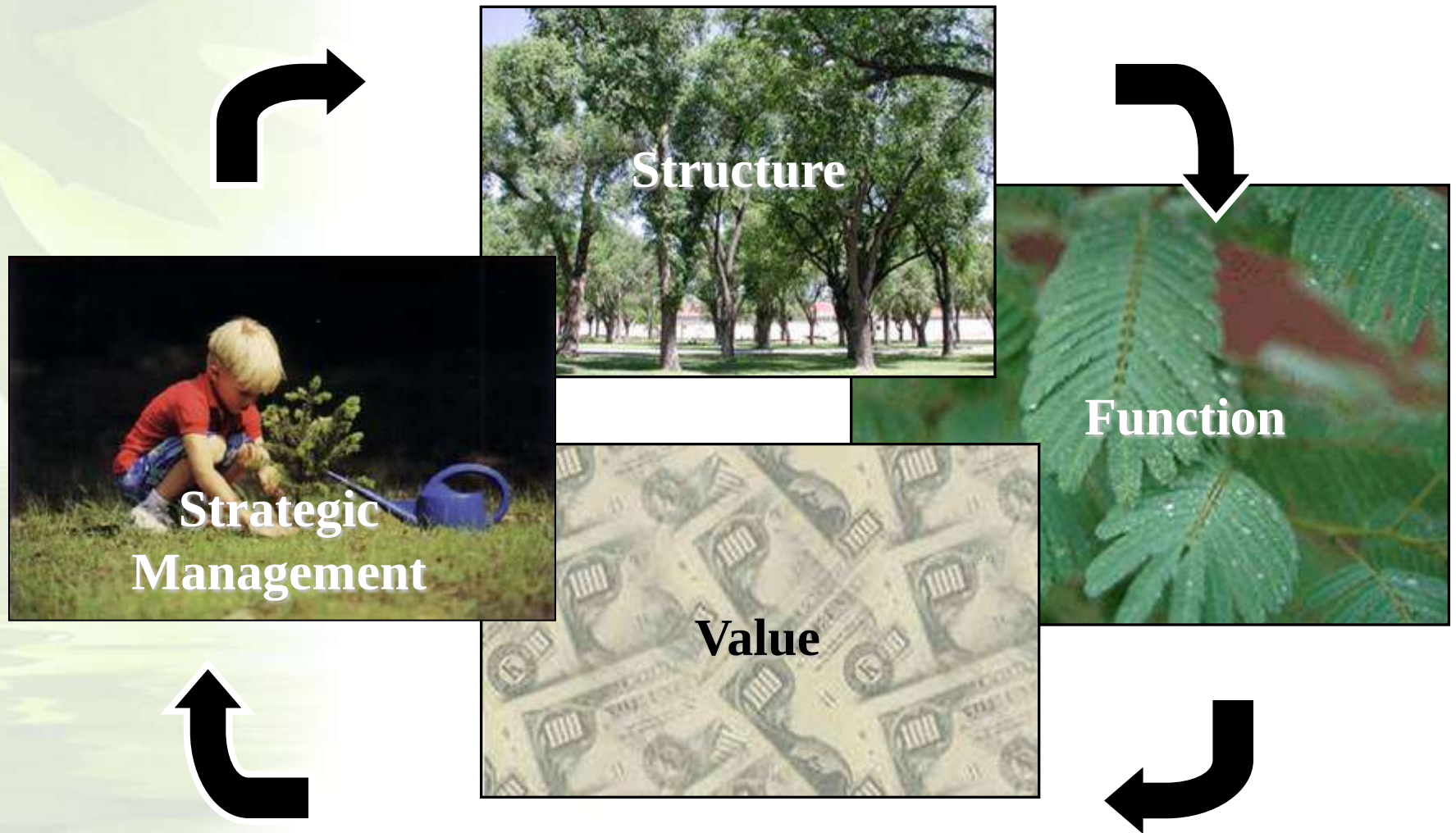


# Improving Management Decision Making

🌳 “The primary objective of a good street management plan should be to *maximize public benefits from street trees and to minimize public expense in achieving these benefits*”



# Benefit-Based Approach



# Assessing Street Tree Populations

Streets assesses:

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



# Conserving Energy





# Improving Air Quality

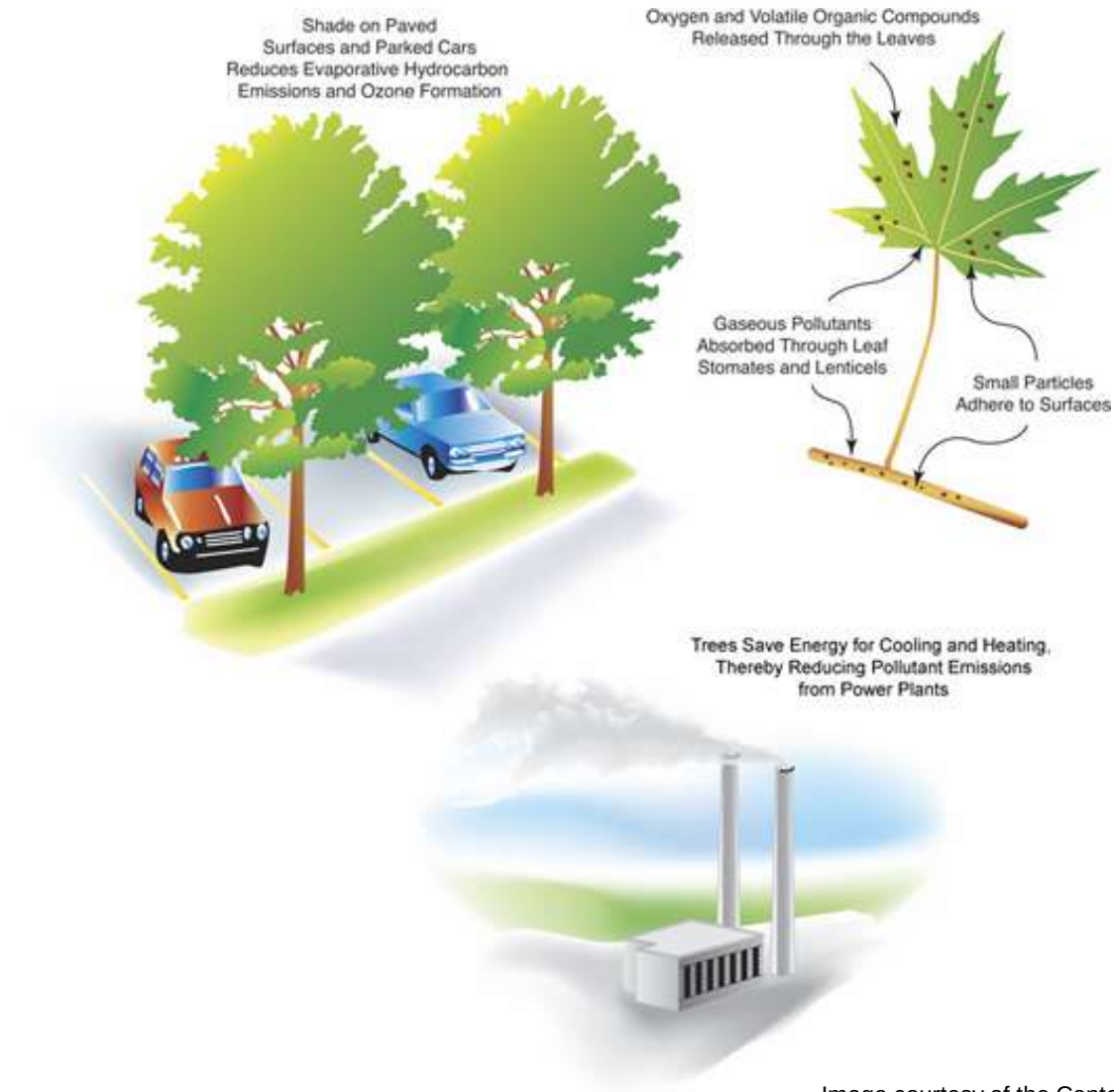


Image courtesy of the Center for Urban Forest Research

# Reducing Stormwater Runoff

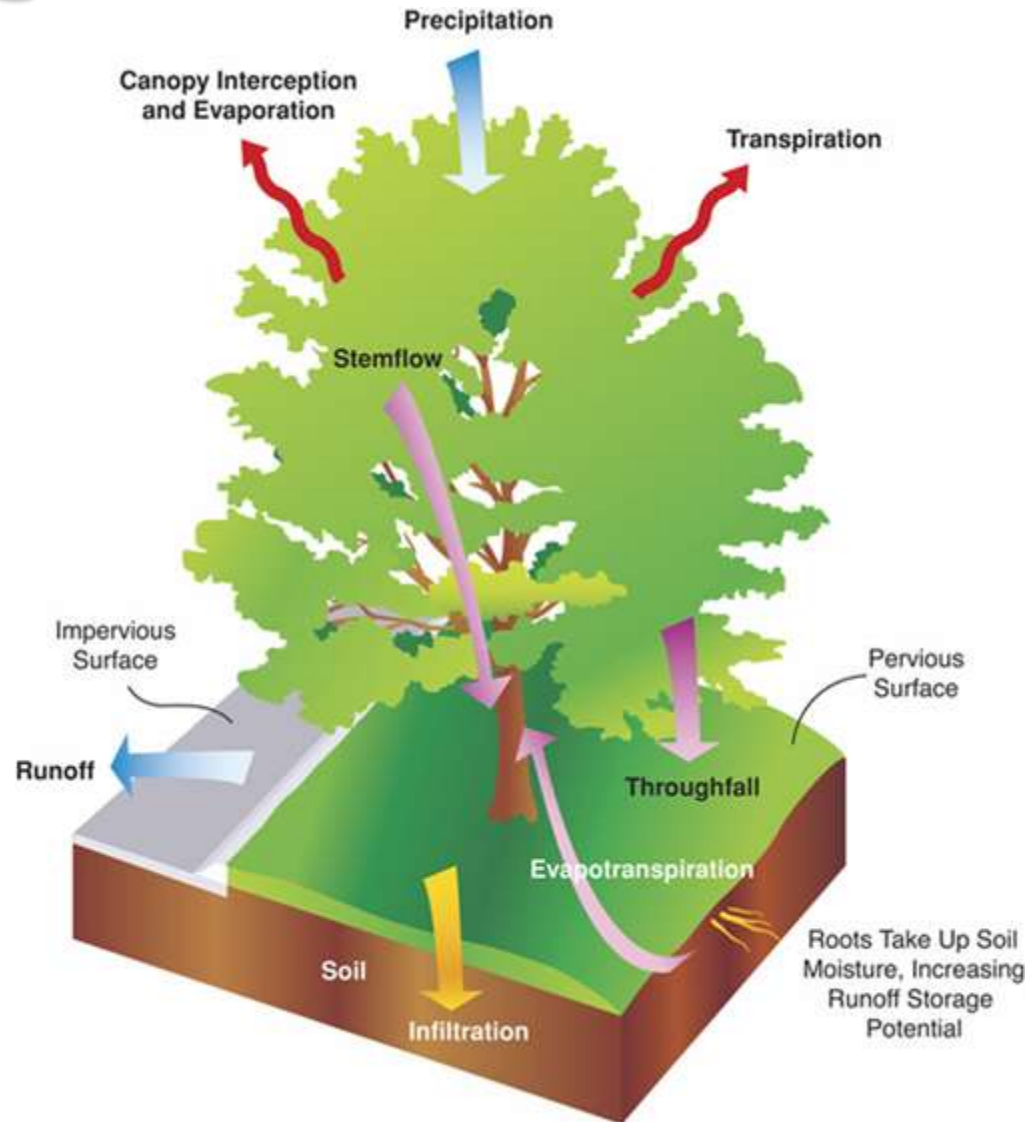


Image courtesy of the Center for Urban Forest Research

# Reducing Atmospheric Carbon Dioxide





# Aesthetic and Other Benefits





# Streets Background & Methods



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

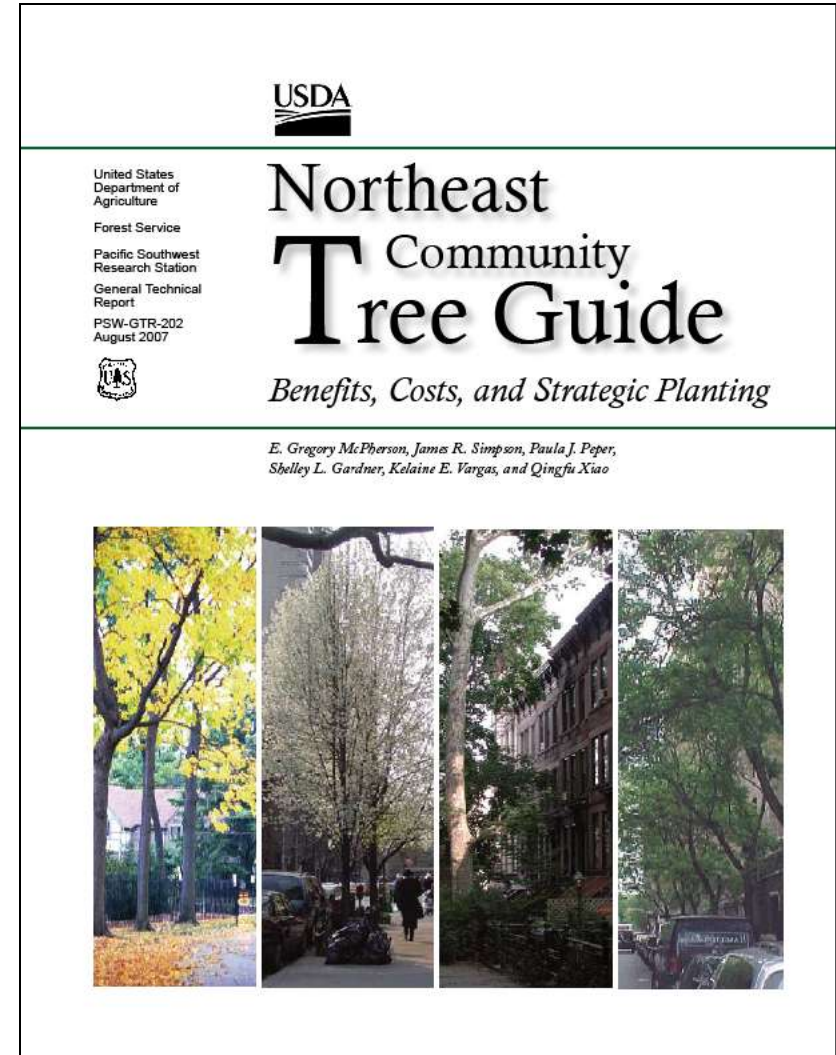
Center for Urban Forest Research

USDA Forest Service  
PSW Research Station



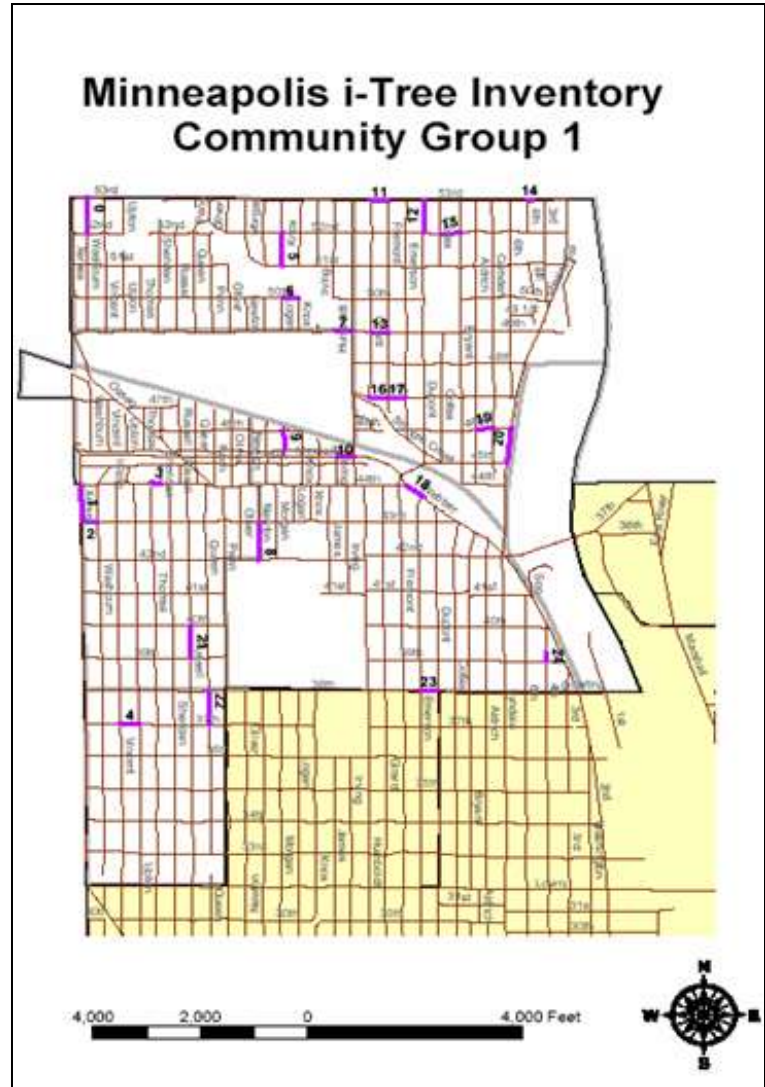
# Streets Foundation: Reference City Research

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



[www.treesearch.fs.fed.us/pubs/25927](http://www.treesearch.fs.fed.us/pubs/25927)

# Sample Based Assessment





# Street Segment Example





# Research Process—Structural Analysis

- 🌳 Data collection 25 field measurements for each tree
- 🌳 900 trees, 20 predominant regional species
  - age, species, dbh, ht., crown dia., condition, digital photos, foliar biomass samples, etc.
- 🌳 Calculate leaf area and foliar biomass
- 🌳 Regression models predict growth.



# Research Process—Functional Analysis

🌳 Models use structural data – (size at various ages).

🌳 To determine magnitude of annual benefits:

- Energy saved
- Atmospheric CO<sub>2</sub> reduction
- Air pollutants removed
- Rainfall intercepted
- Aesthetics & other



## Define Species

| Species Code | Common Name        | Scientific Name         | Assigned Sp. Value | Non-Tree?                |
|--------------|--------------------|-------------------------|--------------------|--------------------------|
| ACSA1        | Silver maple       | Acer saccharinum        | ACSA1              | <input type="checkbox"/> |
| ACSA2        | Sugar maple        | Acer saccharum          | ACSA2              | <input type="checkbox"/> |
| AEGL         | Ohio buckeye       | Aesculus glabra         | ACPL               | <input type="checkbox"/> |
| AEHI         | Horsechestnut      | Aesculus hippocastan... | BDL OTHER          | <input type="checkbox"/> |
| AIAL         | Tree of Heaven     | Ailanthus altissima     | BDL OTHER          | <input type="checkbox"/> |
| AL           | Alder              | Alnus species           | MA2                | <input type="checkbox"/> |
| ALJU         | Mimosa             | Albizia julibrissin     | BDS OTHER          | <input type="checkbox"/> |
| BDL OTHER    | Broadleaf Decid... | Broadleaf Deciduous ... | FRPE               | <input type="checkbox"/> |
| BDM OTHER    | Broadleaf Decid... | Broadleaf Deciduous ... | ACPL               | <input type="checkbox"/> |
| BDS OTHER    | Broadleaf Decid... | Broadleaf Deciduous ... | MA2                | <input type="checkbox"/> |

Assigned Species Value

Common Name: 
 Scientific Name: 
 Tree Type:



# Sweetgum in (3) climate zones at age 40



Inland Empire



Coastal S. CA



Central Valley

# i-Tree Streets v3.0 Highlights

🌳 Pest & disease module (beta)

🌳 GPS enabled

🌳 Two-way data transfer

🌳 Added & improved  
functionality



# What makes Streets different?

- 🌳 Street trees, not entire urban forest
- 🌳 Costs, not only benefits
- 🌳 Management tool, not only for advocacy
- 🌳 Tree inventory-based, not GIS
- 🌳 Answers the question: do the accrued benefits of street trees outweigh the cost of their management?





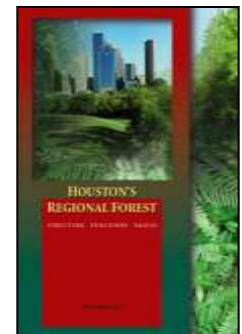
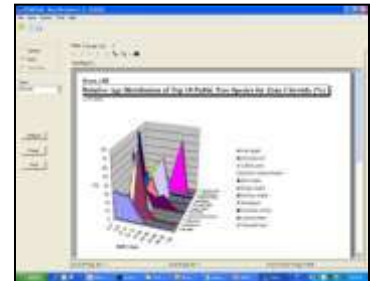
# i-Tree Streets – General Project Phases

🌳 Street tree assessment



# 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
    - ✓ Other inputs: benefit prices, city data

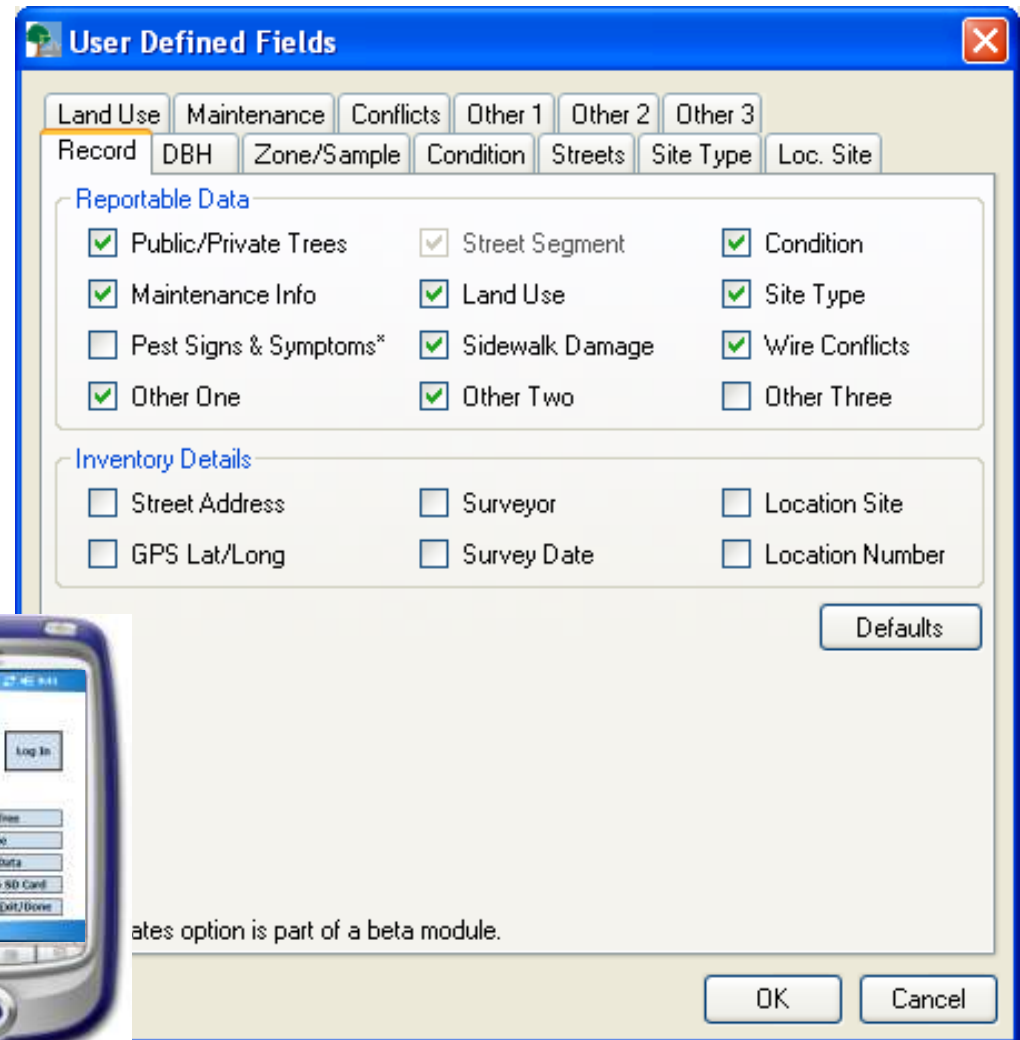


# Phase II: Project Establishment

## 🌳 Configure project inputs:

- City Info
- Annual Costs
- Benefit prices
- Data fields
- Species

## 🌳 Set-up PDA



The 'User Defined Fields' dialog box is shown, allowing configuration of data fields. It features a blue title bar with a close button (X). Below the title bar are several tabs: 'Land Use', 'Maintenance', 'Conflicts', 'Other 1', 'Other 2', 'Other 3', 'Record', 'DBH', 'Zone/Sample', 'Condition', 'Streets', 'Site Type', and 'Loc. Site'. The 'Record' tab is currently selected. The dialog is divided into two main sections: 'Reportable Data' and 'Inventory Details'. The 'Reportable Data' section contains a grid of checkboxes for various data fields, with some already checked. The 'Inventory Details' section contains a grid of checkboxes for additional data fields. A 'Defaults' button is located at the bottom right of the dialog. At the very bottom of the dialog are 'OK' and 'Cancel' buttons.

| Reportable Data                                          |                                                     |                                                    |
|----------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------|
| <input checked="" type="checkbox"/> Public/Private Trees | <input checked="" type="checkbox"/> Street Segment  | <input checked="" type="checkbox"/> Condition      |
| <input checked="" type="checkbox"/> Maintenance Info     | <input checked="" type="checkbox"/> Land Use        | <input checked="" type="checkbox"/> Site Type      |
| <input type="checkbox"/> Pest Signs & Symptoms*          | <input checked="" type="checkbox"/> Sidewalk Damage | <input checked="" type="checkbox"/> Wire Conflicts |
| <input checked="" type="checkbox"/> Other One            | <input checked="" type="checkbox"/> Other Two       | <input type="checkbox"/> Other Three               |

| Inventory Details                       |                                      |                                          |
|-----------------------------------------|--------------------------------------|------------------------------------------|
| <input type="checkbox"/> Street Address | <input type="checkbox"/> Surveyor    | <input type="checkbox"/> Location Site   |
| <input type="checkbox"/> GPS Lat/Long   | <input type="checkbox"/> Survey Date | <input type="checkbox"/> Location Number |

ates option is part of a beta module.



# 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

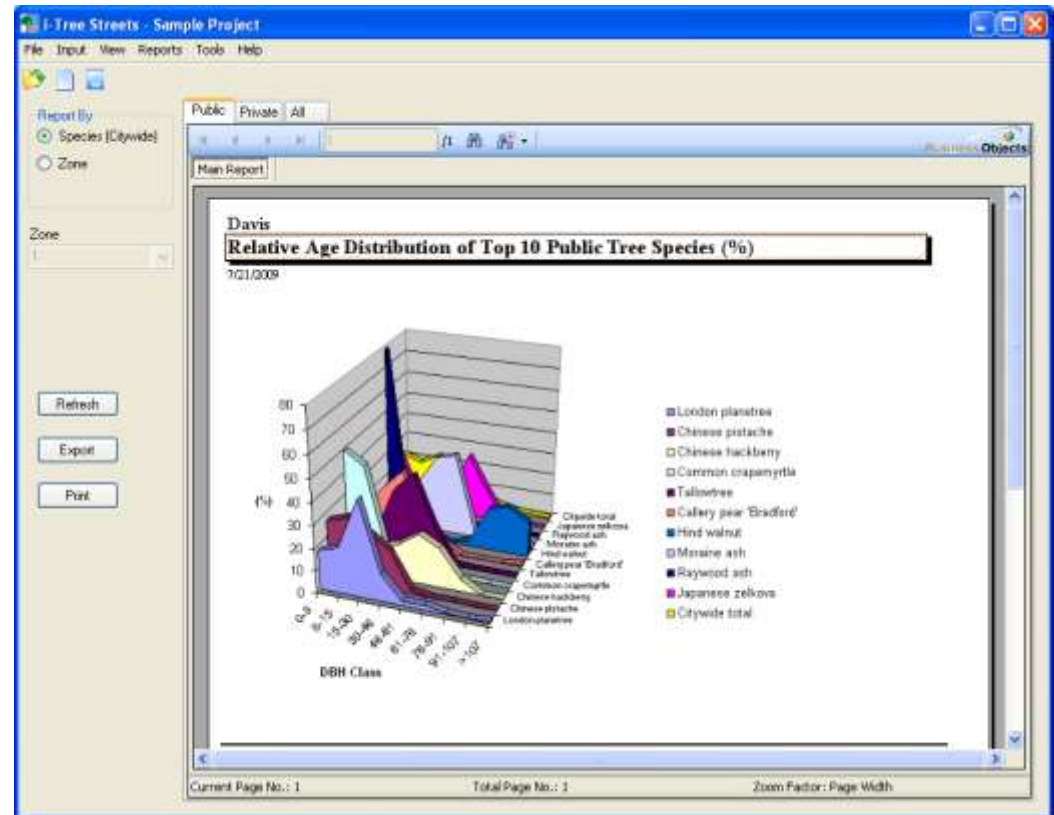
🌳 Import existing inventories

🌳 Error checking

🌳 Rechecking data  
in the field

🌳 Reporting results

🌳 Exporting results



# 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, Clipboard, etc.

# Trained Volunteer Data Collection



City of 60,000  
20,000 Trees

3-5% Sample = 600-1,000  
trees

4 min / tree = ~50 hrs

4 teams of 3 →  
Two 6-hr days + 1 day  
training



# i-Tree Streets: Information for Better Tree Management

## 🌳 Input:

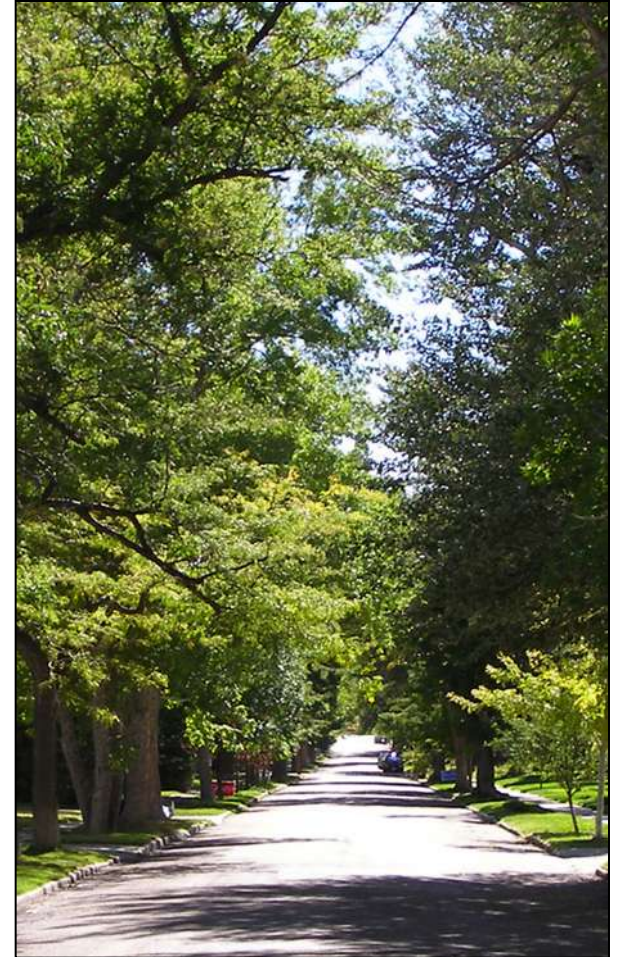
- Sample street segment inventory (3-6%)
- Or import an existing inventory data
- Price adjustments, mgmt. costs

## 🌳 Output:

- Graphs, charts, tables

## 🌳 Benefit:

- Baseline data to more effectively manage & advocate for the street tree resource



# Streets Helps You:

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



Before we move on...



... to the i-Tree IPED Module