Informational Webcast
Urban Heat Island Group

Greg McPherson
USDA Forest Service, Center for Urban Forest Research
April 25, 2006

i-Tree: Demonstrating That Trees Pay Us Back!

The National Arbor Day Foundation

DAVEY RESOURCE GROUP
A Division of The Davey Tree Expert Company

i-Tree

i-Tree: Pulling it Together

Public-private partnership was formed to deliver US Forest Service Urban Forestry applications in a single software suite called i-Tree:

- Developed with public funds by USDA Forest Service Research and Development
- Based upon 20+ years of peer reviewed research
- Available on the internet in the public domain
- Training and support provided so all may benefit from the technology

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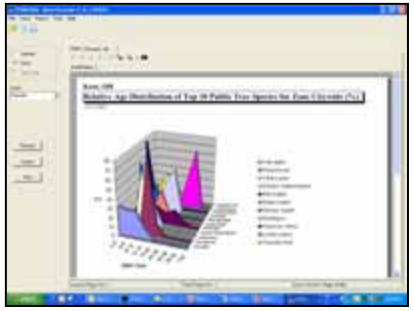
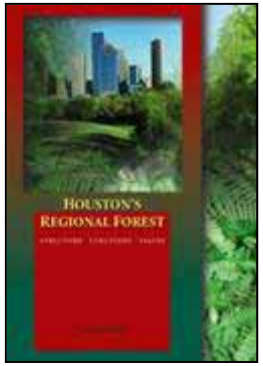
What's Included?





- Two urban forest assessment tools:
  - Assessing urban ecosystems
  - Assessing street tree populations
- Multiple Utilities:
  - Data collection & management
  - Inventory management
  - Storm damage assessment
  - Reporting

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Who will use i-Tree?

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STRATUM

USDA Forest Service, Center for Urban Forest Research

Pacific Southwest Research Station, Davis, CA

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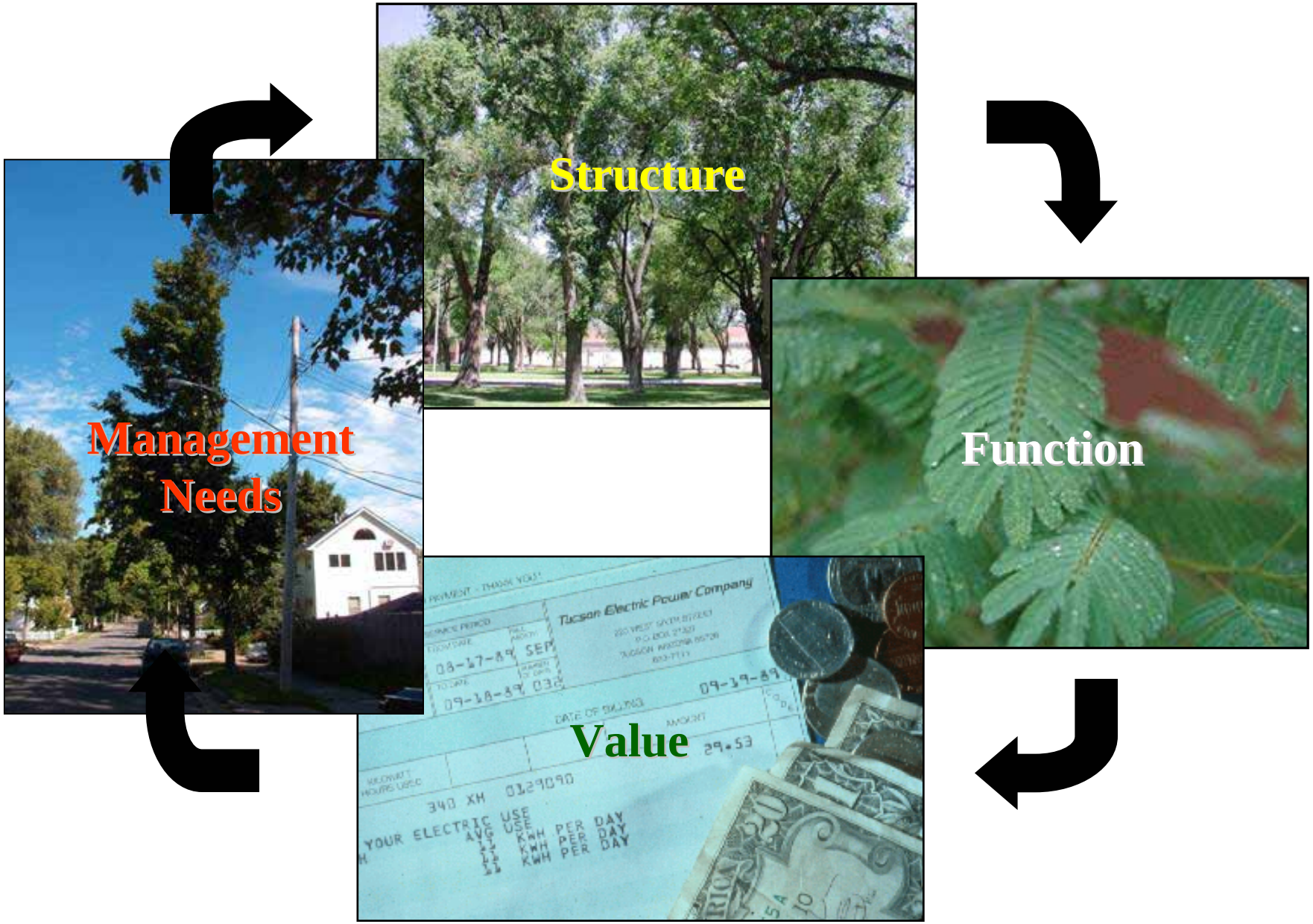

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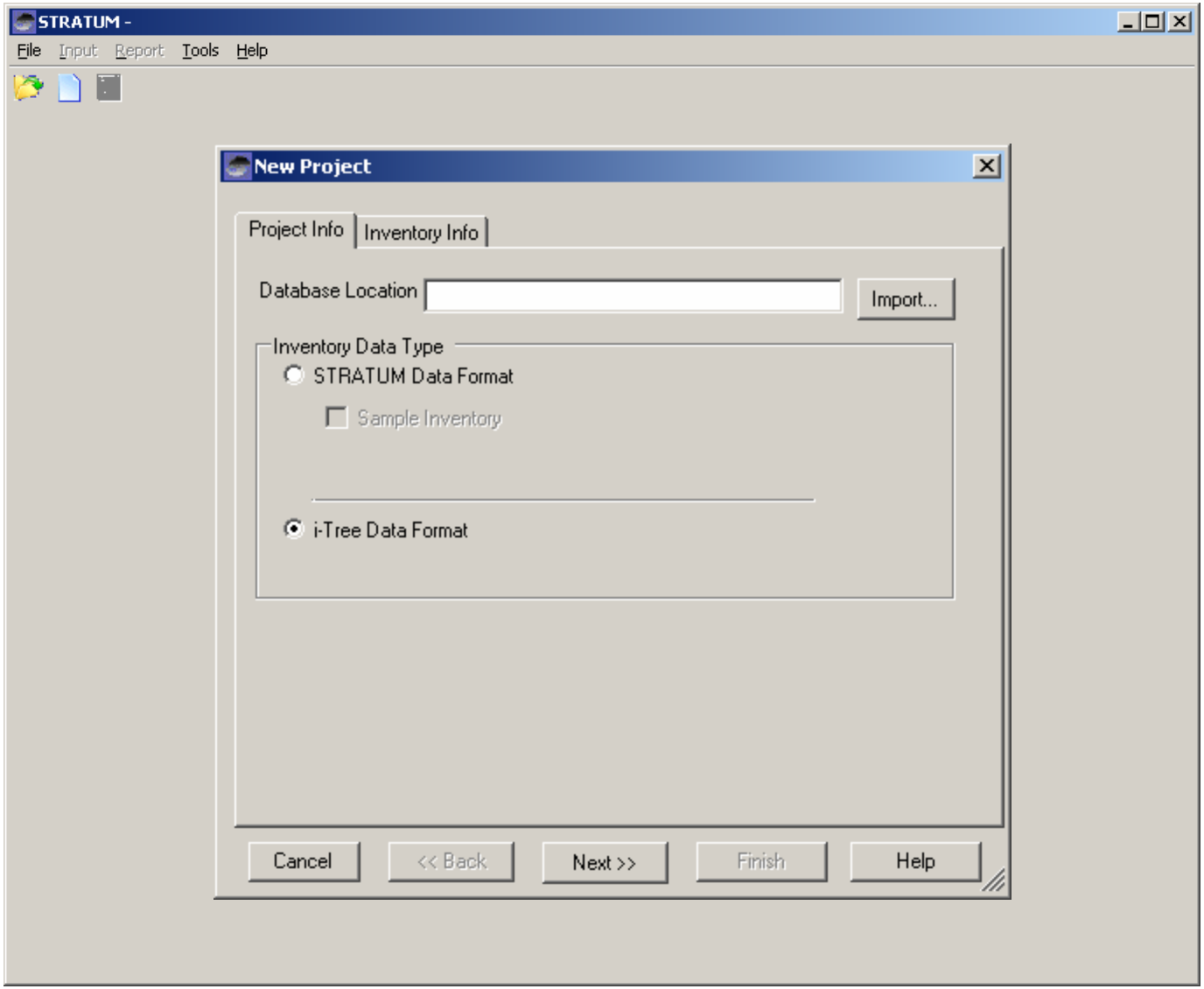

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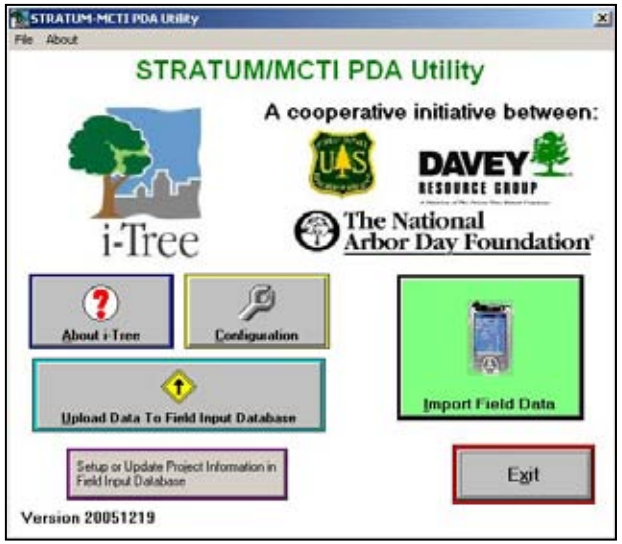
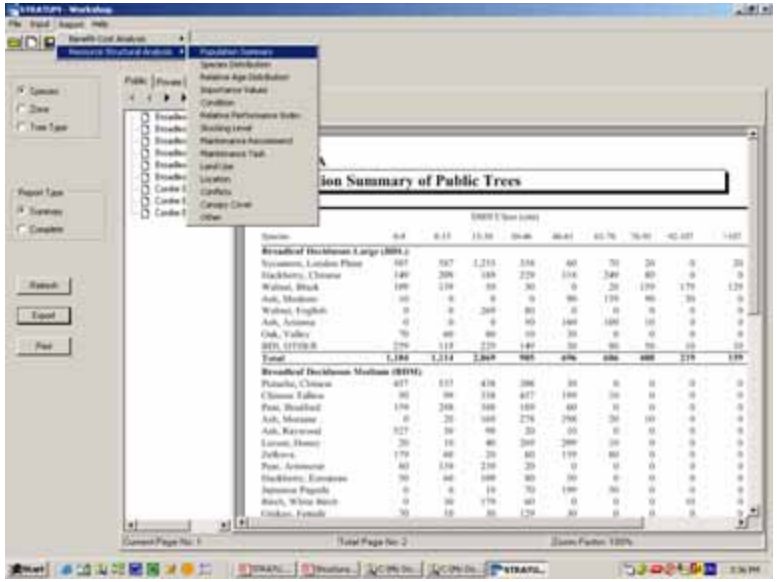
PDA to Desktop Data Transfer

STRATUM





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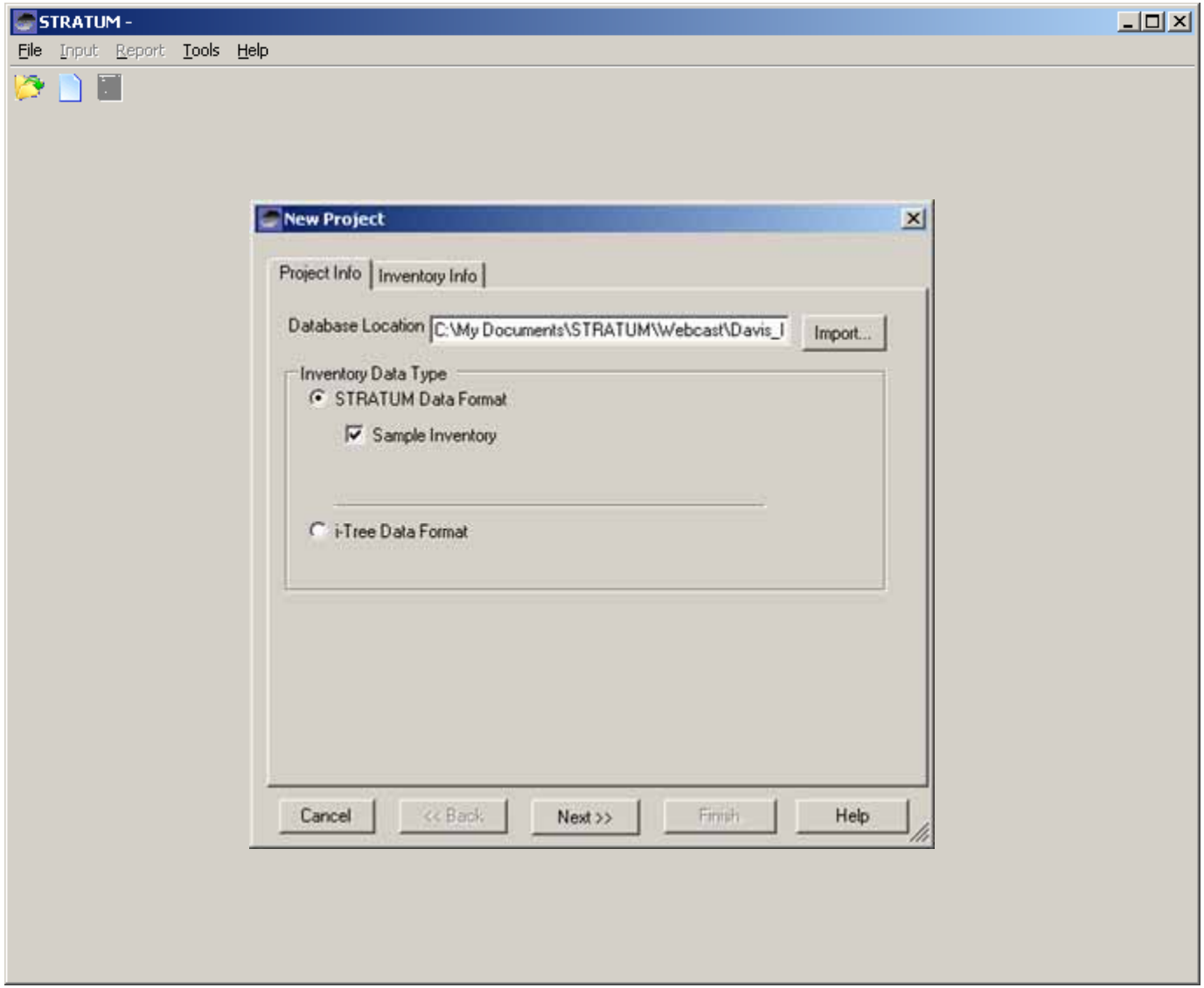

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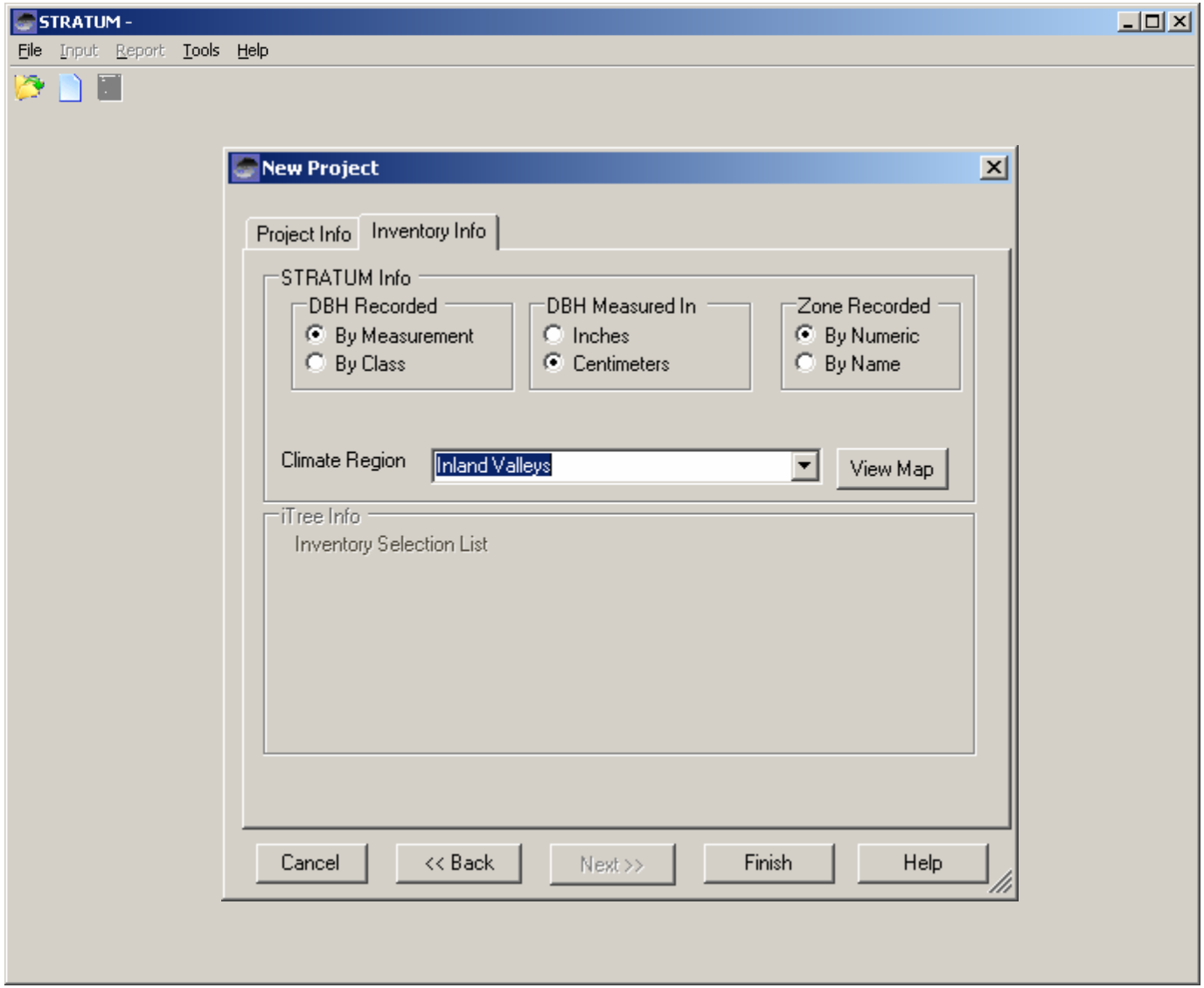

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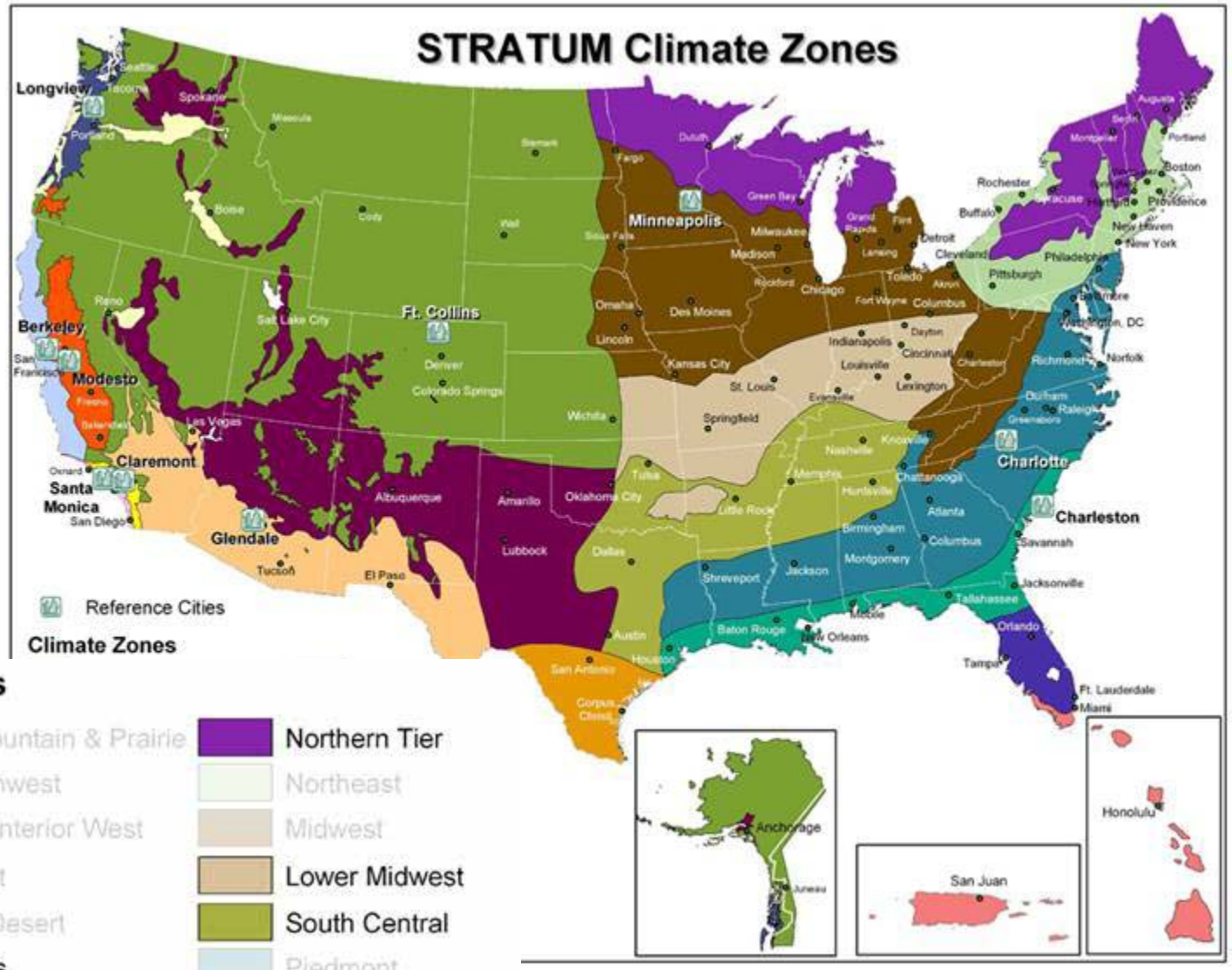

Climate Zones

- Northern Mountain & Prairie
- Pacific Northwest
- Temperate Interior West
- Interior West
- Southwest Desert
- Texas Plains
- Inland Valleys
- Inland Empire
- Southern California Coast
- California North & Central Coast
- Northern Tier
- Northeast
- Midwest
- Lower Midwest
- South Central
- Piedmont
- Gulf Coast
- Central Florida
- Tropical

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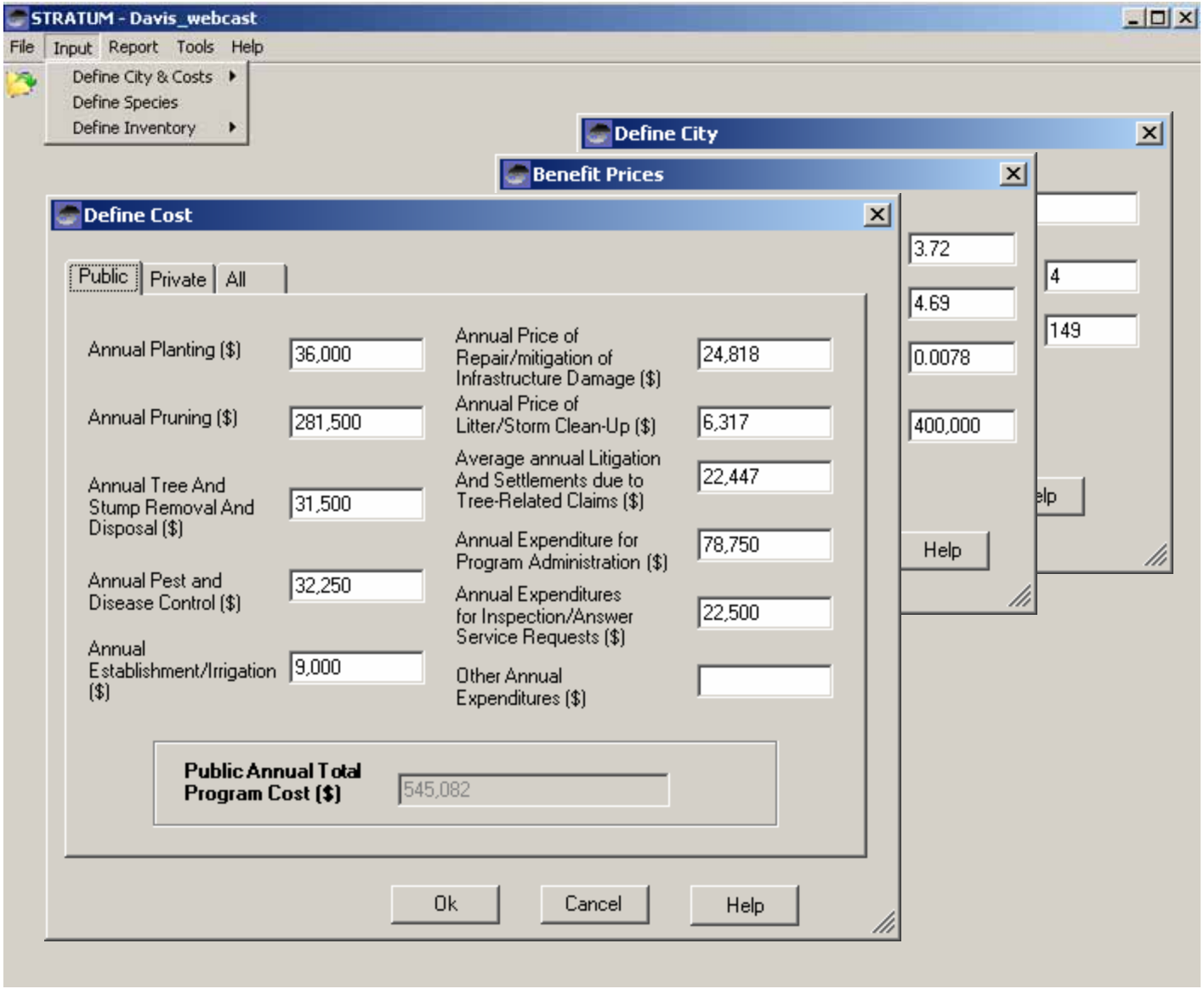

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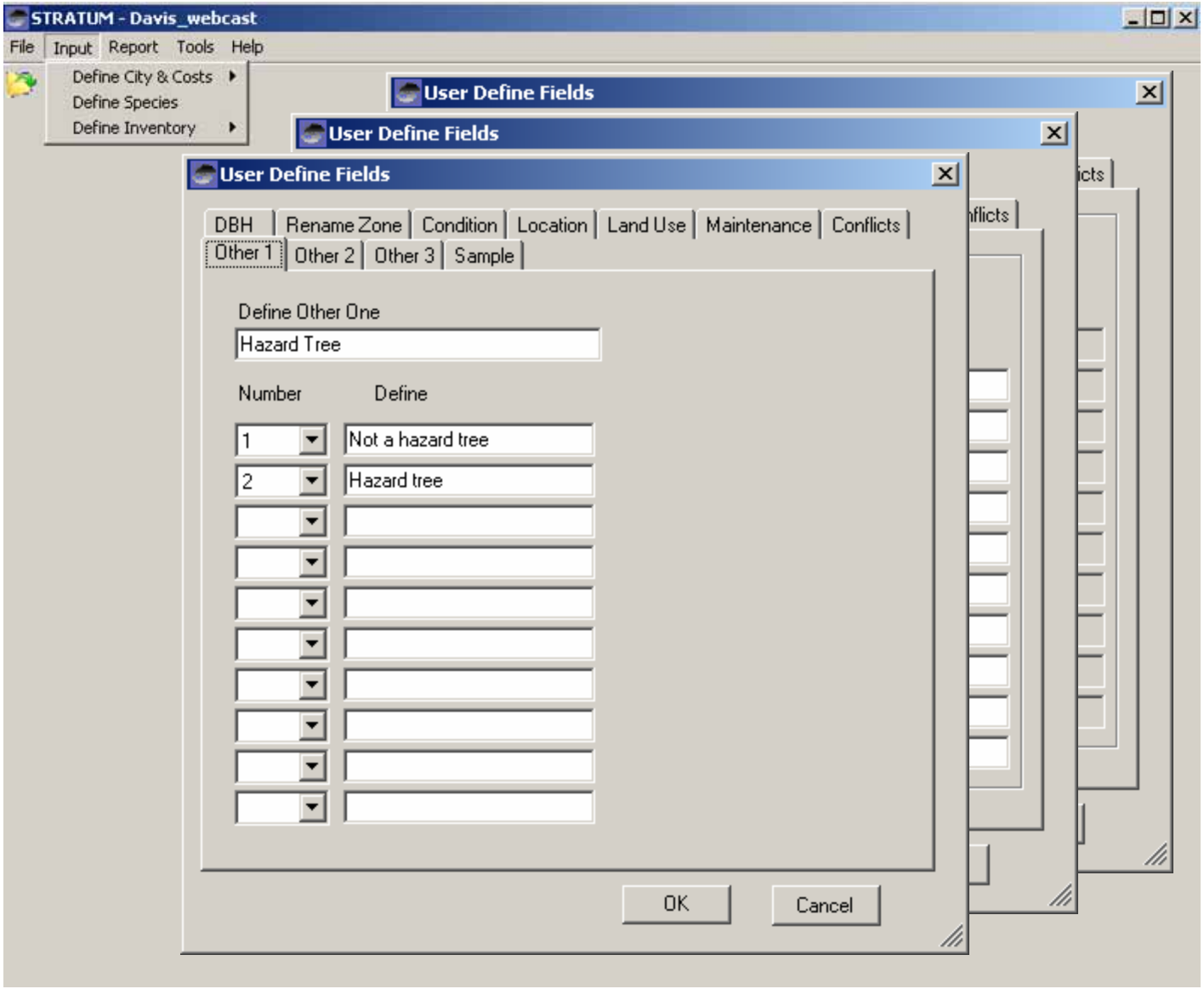

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STRATUM - Davis_webcast

File Input Report Tools Help

Species
Zone
Tree Type

Report Type
Summary
Complete

Refresh
Export
Print

Public | Private | All

Broadleaf Deciduous
Broadleaf Deciduous
Broadleaf Deciduous
Broadleaf Evergreen
Broadleaf Evergreen
Broadleaf Evergreen
Conifer Evergreen La
Conifer Evergreen Me
Conifer Evergreen Sn
Palm Evergreen Larg
Palm Evergreen Med
Palm Evergreen Sma

MainRepor Search Text

Davis, CA

Page 1 of 2

Population Summary of Public Trees

1/6/2006

Species	DBH Class (cm) 0-8	8-15	15-30	30-46	46-61	61-76	76-91	91-107	>107	Total	Standard Error
Broadleaf Deciduous Large (BDL)											
London planetree	513	592	1,243	355	59	69	20	0	20	2,871	(±438)
Chinese hackberry	148	207	187	227	316	247	79	0	0	1,411	(±294)
Hind walnut	109	138	49	30	0	20	158	178	128	809	(±516)
Honeylocust	20	10	39	266	207	10	0	0	0	553	(±184)
Modesto ash	10	0	0	0	89	158	89	30	0	375	(±138)
English walnut	0	0	266	79	0	0	0	0	0	345	(±308)
Velvet ash	0	0	0	49	168	109	10	0	0	335	(±210)
California white oak	69	59	79	10	30	0	0	0	0	247	(±78)
BDL OTHER	276	237	257	148	30	79	49	10	10	1,095	(±251)
Total	**1,145**	**1,243**	**2,121**	**1,164**	**898**	**691**	**405**	**217**	**158**	**8,042**	**(±898)**
Broadleaf Deciduous Medium (BDM)											
Chinese pistache	464	533	434	306	30	0	0	0	0	1,766	(±309)
Chinese tallow	49	99	355	454	197	10	0	0	0	1,164	(±356)
Callery pear 'Bradford'	168	286	385	197	59	0	0	0	0	1,095	(±263)
Moraine ash	0	20	168	276	296	20	10	0	0	789	(±258)
Raywood ash	533	30	89	20	10	0	0	0	0	681	(±195)
Japanese zelkova	178	59	20	59	168	79	0	0	0	562	(±144)
Callery pear 'Aristocrat'	79	158	237	20	0	0	0	0	0	493	(±137)
European hackberry	49	59	109	79	49	0	0	0	0	345	(±86)
Japanese pagoda tree	0	0	10	69	197	49	0	0	0	326	(±192)
European white birch	0	30	187	59	0	0	0	10	0	286	(±125)
Ornamental pear	49	89	109	30	0	0	0	0	0	276	(±80)
Ginkgo	69	10	30	128	30	0	0	0	0	266	(±97)
Purple robe tree	69	118	69	0	0	0	0	0	0	257	(±101)
BDM OTHER	395	326	266	493	168	10	0	0	0	1,658	(±242)
Total	**2,102**	**1,816**	**2,467**	**2,191**	**1,204**	**168**	**10**	**10**	**0**	**9,966**	**(±717)**
Broadleaf Deciduous Small (BDS)											
Crapemyrtle	691	612	89	0	0	0	0	0	0	1,391	(±296)
Cherry plum	197	59	49	0	0	0	0	0	0	306	(±88)

Current Page No: 1 | Total Page No: 2 | Zoom Factor: Page Width

STRATUM - Davis_webcast

File Input Report Tools Help

Species
Zone
Tree Type

Zone

Refresh
Export
Print

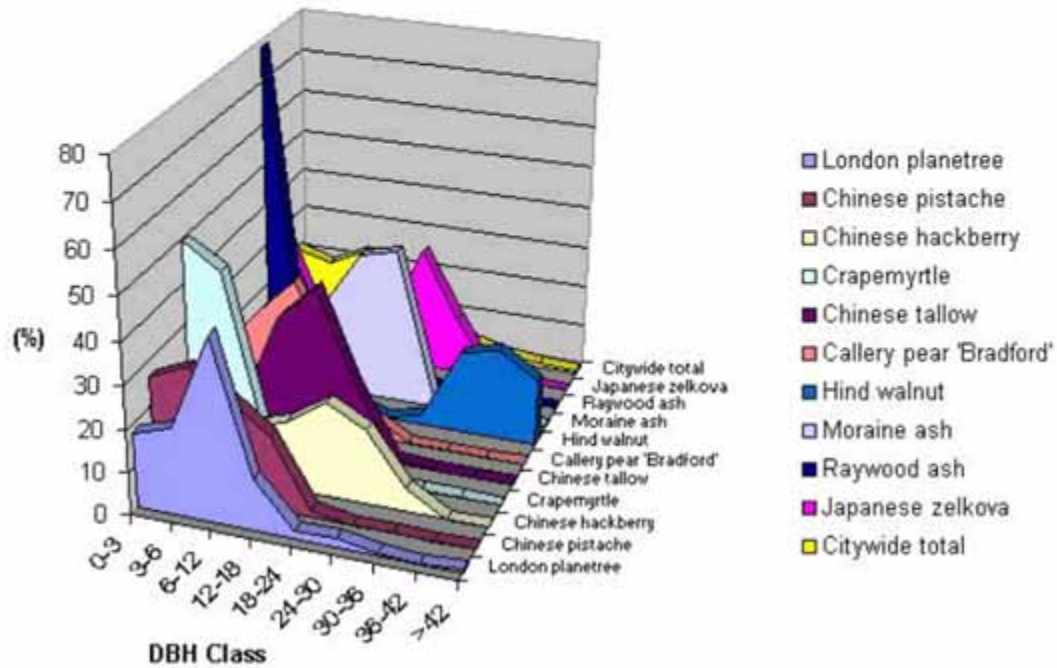
Public | Private | All

MainReport

Davis, CA

Relative Age Distribution of Top 10 Public Tree Species (%)

1/6/2006



Current Page No: 1 | Total Page No: 1 | Zoom Factor: Page Width

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STRATUM - Davis_webcast

File Input Report Tools Help

Species
Zone
Tree Type

Maint. Recommended
Pruning needed

Report Type
DBH
Top 5

Refresh
Export
Print

Public | Private | All

MainReport

Davis, CA

Recommended Maintenance for Public Trees (Pruning needed)

1/9/2006

DBH Class (in)

Zone	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	>42	Total
1	109	89	69	89	0	20	109	178	99	760
2	10	10	69	49	39	0	10	0	0	187
3	0	20	109	99	39	30	0	0	0	296
4	0	10	10	79	158	59	0	0	0	316
5	0	0	0	79	276	158	79	30	0	622
6	0	0	49	59	99	10	0	0	0	217
7	30	0	30	39	197	109	10	0	0	414
8	10	39	138	197	69	20	0	0	0	474
9	89	10	39	39	10	0	0	0	0	187
10	266	20	69	10	0	0	0	0	0	365
11	0	30	20	20	39	59	0	0	0	168
Citywide total	513	227	602	760	928	464	207	207	99	4,006

DBH Class (in)

Maintenance Type	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	>42	Total	% of Total Population
No pruning needed	4,569	4,203	4,894	3,414	1,520	602	266	20	69	19,557	83.00
Pruning needed	513	227	602	760	928	464	207	207	99	4,006	17.00
Citywide total	5,082	4,430	5,496	4,174	2,447	1,066	474	227	168	23,563	100.00

Current Page No: 1 | Total Page No: 1 | Zoom Factor: 100%

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File Input Report Tools Help

Species
Zone
Tree Type

Benefits
Stormwater
Energy
Stormwater
Air Quality
Carbon Dioxide
Aesthetic/Other Value
Summary
Summary By DBH

Refresh
Export
Print

Public | Private | All

MainReport

Davis, CA

Annual Stormwater Benefits of Public Trees by Species

1/6/2006

Species	Total rainfall interception (cu.m.)	Total (S)	Standard Error	% of Total Trees	% of Total S	Avg. S/tree
London planetree	5,189	10,692	(±1,632)	12.2	10.1	3.72
Chinese pistache	2,286	4,709	(±824)	7.5	4.5	2.67
Chinese hackberry	4,754	9,795	(±2,042)	6.0	9.3	6.94
Crapemyrtle	297	612	(±130)	5.9	0.6	0.44
Chinese tallow	3,189	6,570	(±2,007)	4.9	6.2	5.64
Callery pear 'Bradford'	1,653	3,406	(±817)	4.7	3.2	3.11
Hind walnut	5,078	10,463	(±6,675)	3.4	9.9	12.93
Moraine ash	2,007	4,135	(±1,353)	3.4	3.9	5.24
Raywood ash	284	585	(±167)	2.9	0.6	0.86
Japanese zelkova	1,623	3,344	(±855)	2.4	3.2	5.95
Honeylocust	1,874	3,862	(±1,286)	2.4	3.7	6.99
Callery pear 'Aristocrat'	520	1,072	(±297)	2.1	1.0	2.17
Southern magnolia	376	775	(±421)	1.7	0.7	1.92
Modesto ash	1,678	3,458	(±1,274)	1.6	3.3	9.22
Coast redwood	720	1,484	(±363)	1.6	1.4	3.96
Canary Island pine	1,020	2,102	(±625)	1.5	2.0	5.92
European hackberry	725	1,494	(±371)	1.5	1.4	4.32
English walnut	612	1,261	(±1,123)	1.5	1.2	3.65
Velvet ash	1,315	2,711	(±1,697)	1.4	2.6	8.08
Japanese pagoda tree	1,602	3,301	(±1,947)	1.4	3.1	10.14
Cherry plum	67	139	(±40)	1.3	0.1	0.45

Current Page No: 1 | Total Page No: 1 | Zoom Factor: Page Width

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STRATUM - Davis_webcast

File Input Report Tools Help

Species
Zone
Tree Type

Public | Private | All

MainReport

Refresh

Export

Print

Davis, CA

Total Annual Benefits, Net Benefits, and Costs for Public Trees

1/6/2006

Benefits	Total ($) Standard Error	$/tree Standard Error	$/capita Standard Error
Energy	313,889 (±14,065)	13.32 (±.6)	4.89 (±.22)
CO2	29,033 (±1,301)	1.23 (±.06)	0.45 (±.02)
Air Quality	300,944 (±13,484)	12.77 (±.57)	4.69 (±.21)
Stormwater	105,520 (±4,728)	4.48 (±.2)	1.64 (±.07)
Aesthetic/Other	1,703,082 (±76,311)	72.28 (±3.24)	26.52 (±1.19)
Total Benefits	2,452,468 (±109,889)	104.08 (±4.66)	38.19 (±1.71)
Costs			
Contract Pruning	281,500	11.95	4.38
Tree & Stump	31,500	1.34	0.49
Pest Management	32,250	1.37	0.50
Irrigation	9,000	0.38	0.14
Inspection/Servic	22,500	0.95	0.35
Planting	36,000	1.53	0.56
Administration	78,750	3.34	1.23
Litter Clean-up	6,317	0.27	0.10
Infrastructure	24,818	1.05	0.39
Liability/Claims	22,447	0.95	0.35
Other Costs	0	0.00	0.00
Total Costs	545,082	23.13	8.49
Net Benefits	1,907,386 (±109,889)	80.95 (±4.66)	29.70 (±1.71)
Benefit-cost ratio	4.50 (±.2)		

Current Page No: 1 | Total Page No: 1 | Zoom Factor: Page Width

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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 →
2 6-hr days + 1 day training

Summer Interns

Pair of interns ♦ Sample inventory

Conduct inventory, analyze data, write reports
= ~1-2 months

Urban Advantage

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Urban Advantage

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UFORE

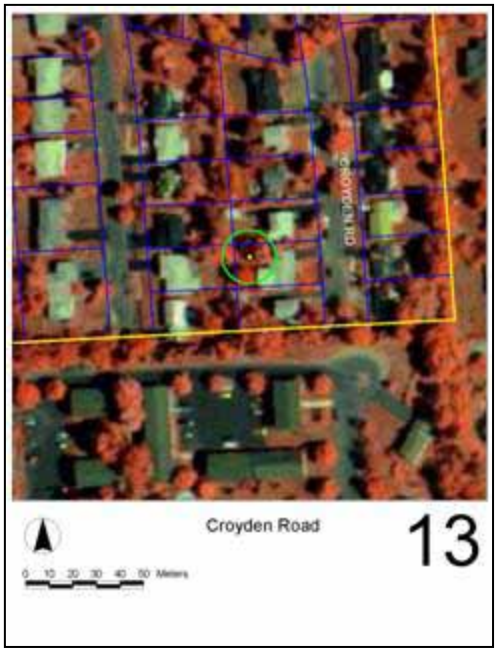
David Nowak – USDA Forest Service

What Does UFORE Quantify?

- Statistically calculates basic tree information (tree biomass, leaf area, leaf biomass)
- Models basic tree functions (gas exchange, interception, transpiration, tree growth) based on local environmental data
- Uses this basic information to quantify:
  - Carbon storage and sequestration
  - Building energy conservation
  - Air quality effects
  - Stream flow & water quality
  - Risk to pests
  - Replacement value

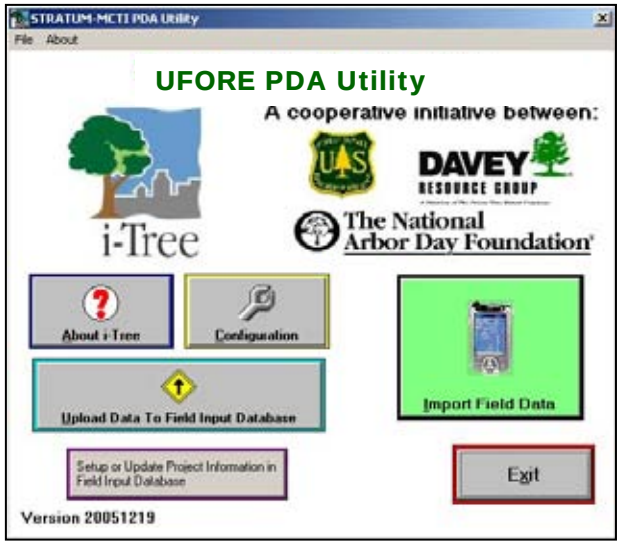
How does UFORE work?

1) Determine study area and locate plots

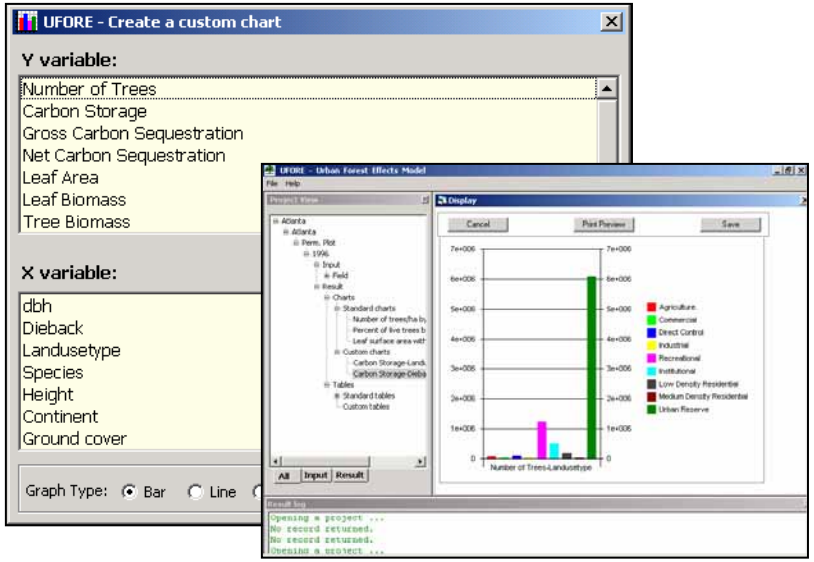


2) Collect field data

PDA to Desktop Data Transfer



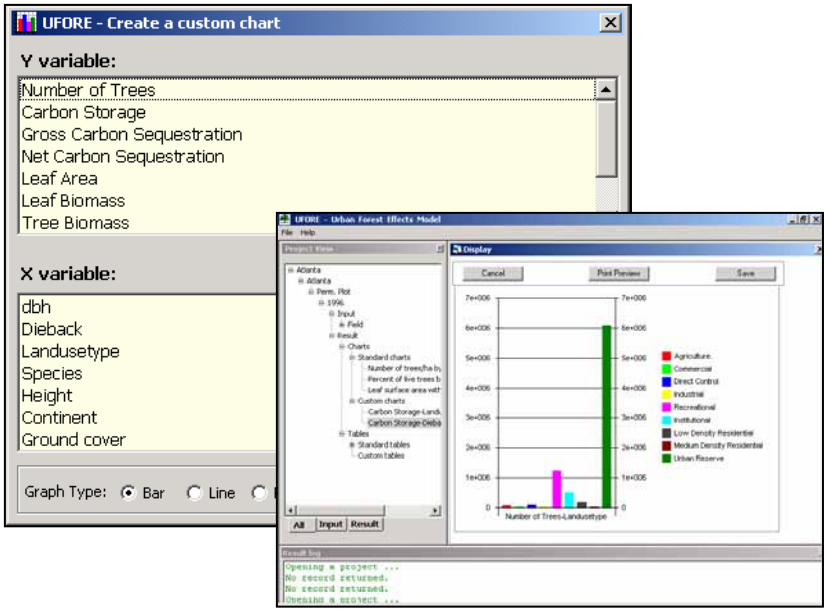
UFORE



How does UFORE work?

3a) Send data to Forest Service for analysis

3b) Analyze data with new i-Tree Window's program (2006)



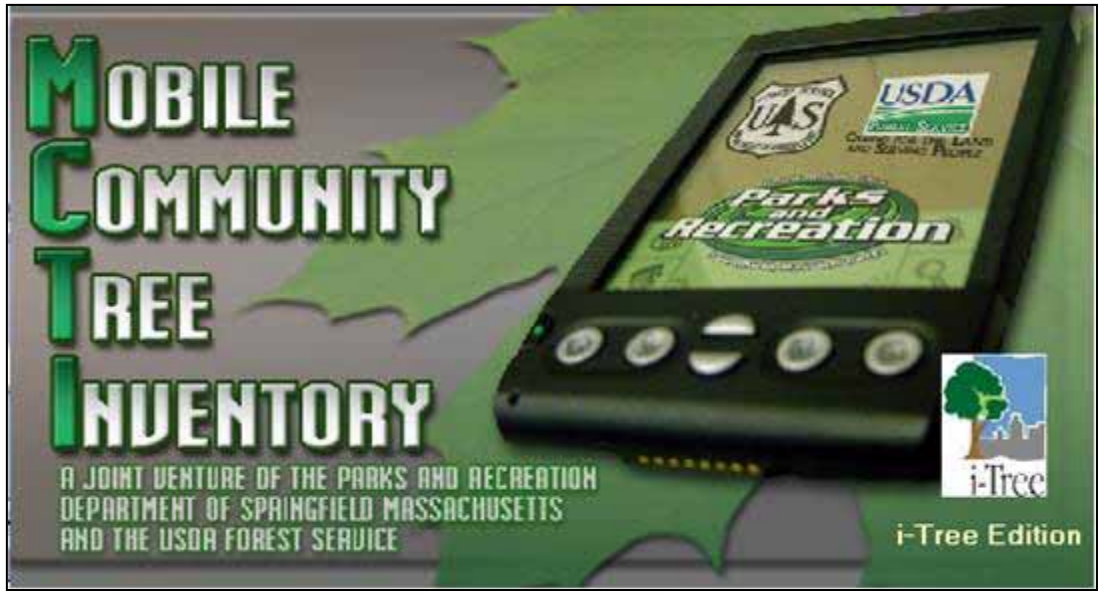
What is new for i-Tree 2006?

- Automatic plot selection program
- PDA data collection program
- UFORE Windows GUI with GIS mapping
- Automatic report generator
- UFORE-Hydro

The i-Tree Utilities: MCTI & SDAP

David Bloniarz – USDA Forest Service

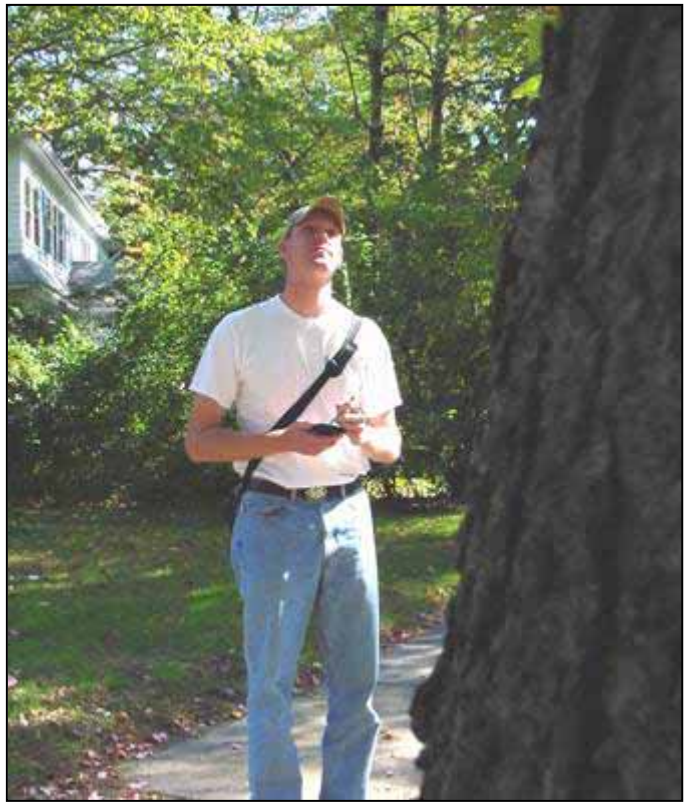
The MCTI Inventory Utility



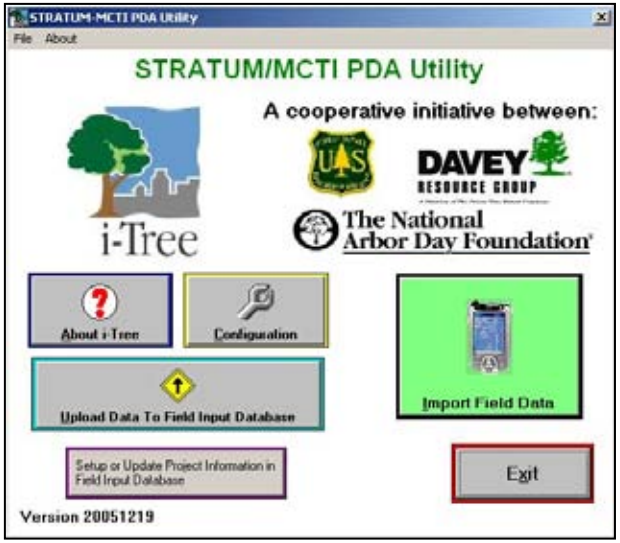
Meeting the Data Collection and Management Needs of Your Community's Trees

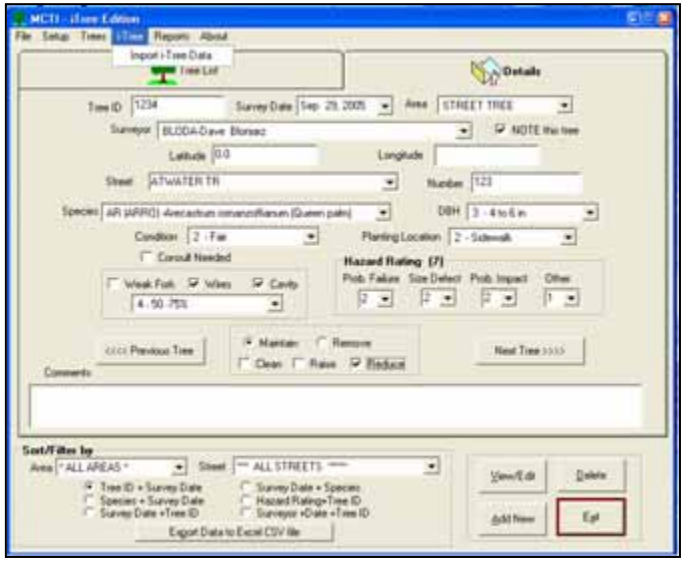
MCTI Inventory Utility

- Variable level of applicability
  - Complete Inventory
  - Street trees, park trees, other custom locations
  - Sampling studies
- Variable inventory protocols
  - Condition
  - Maintenance
  - Risk tree
- Ease of use
  - Good for Volunteers
  - Time savings

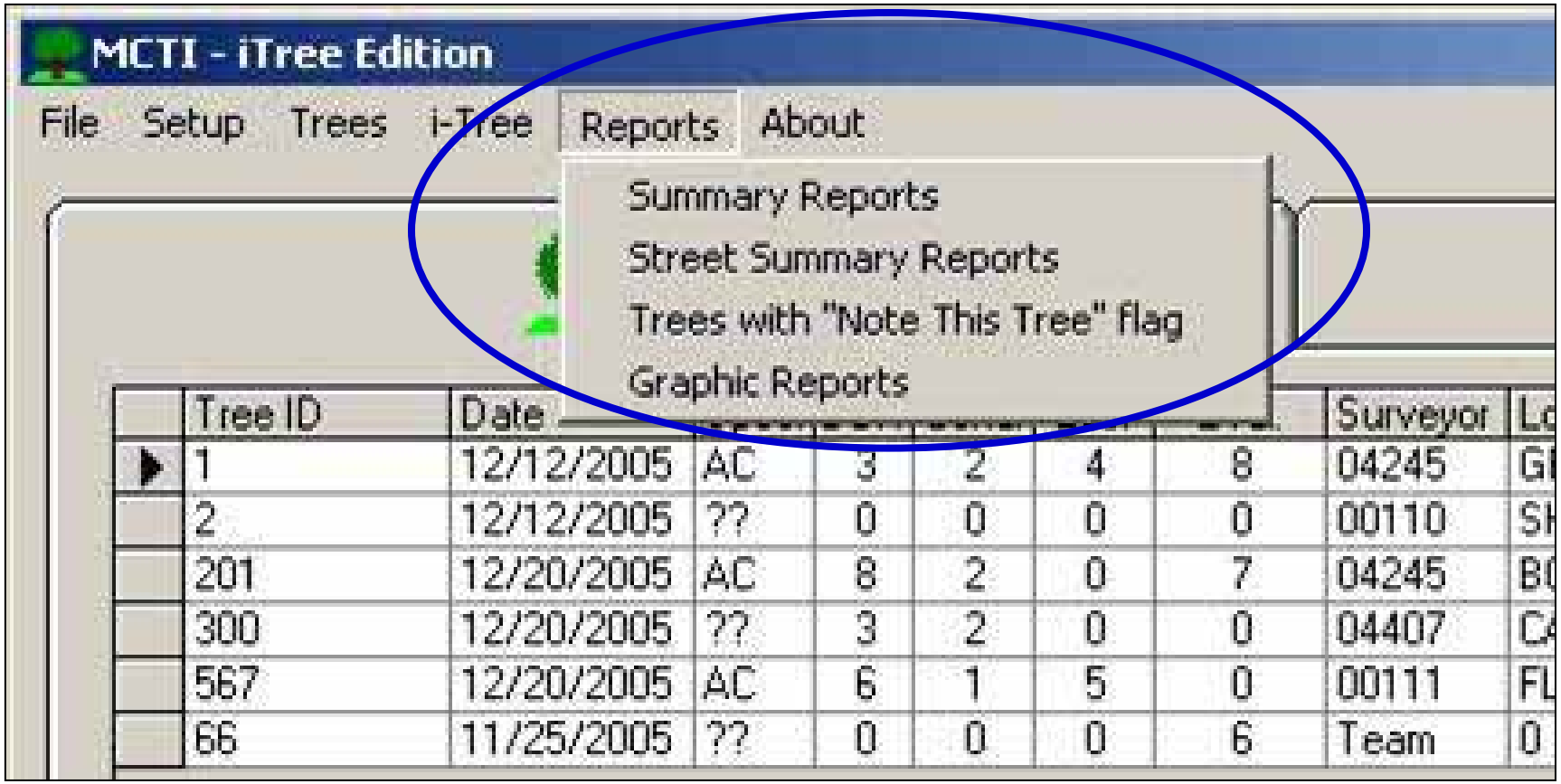


PDA to Desktop Data Transfer





Reporting Options



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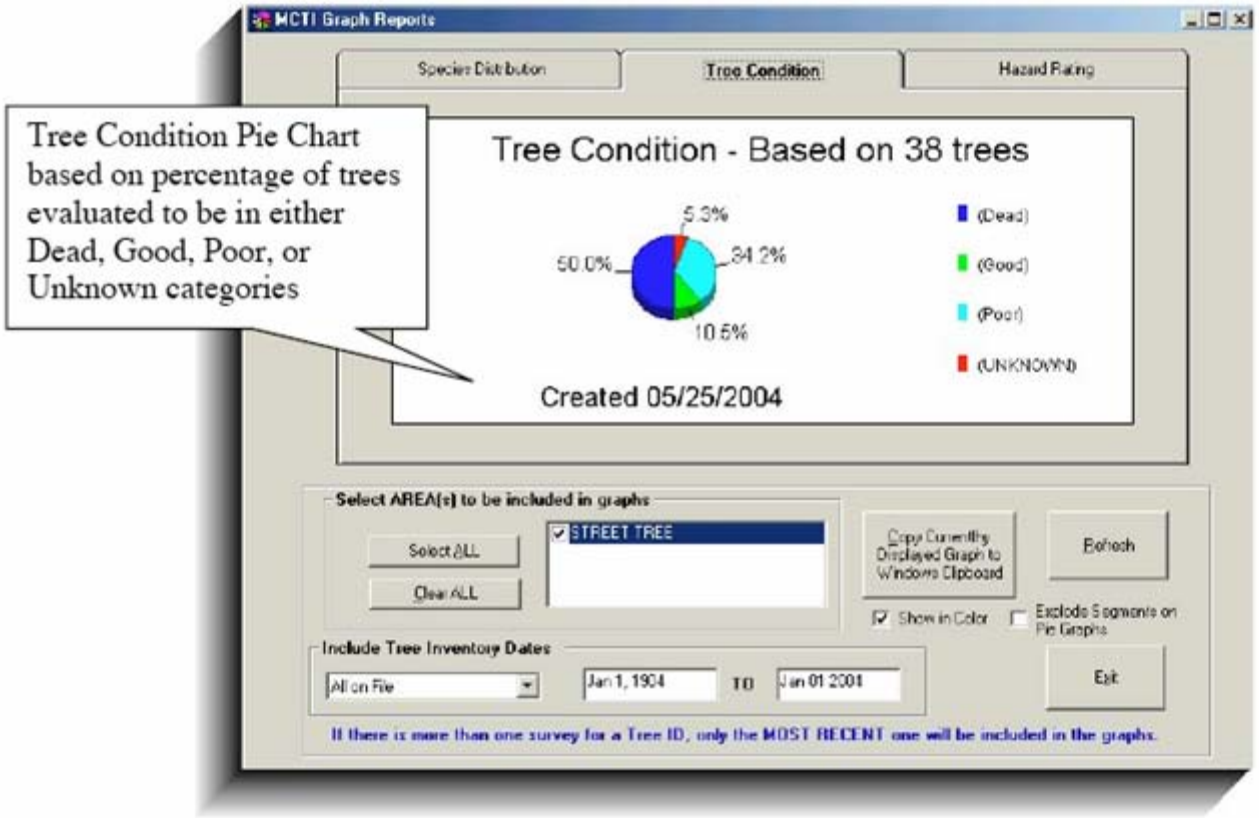
Reporting Screen – Condition

*Tab Two – Tree Condition

Pie Chart for the percentage of trees in a given condition
(Good, Fair, Poor, etc)



Tree Condition Pie Chart based on percentage of trees evaluated to be in either Dead, Good, Poor, or Unknown categories

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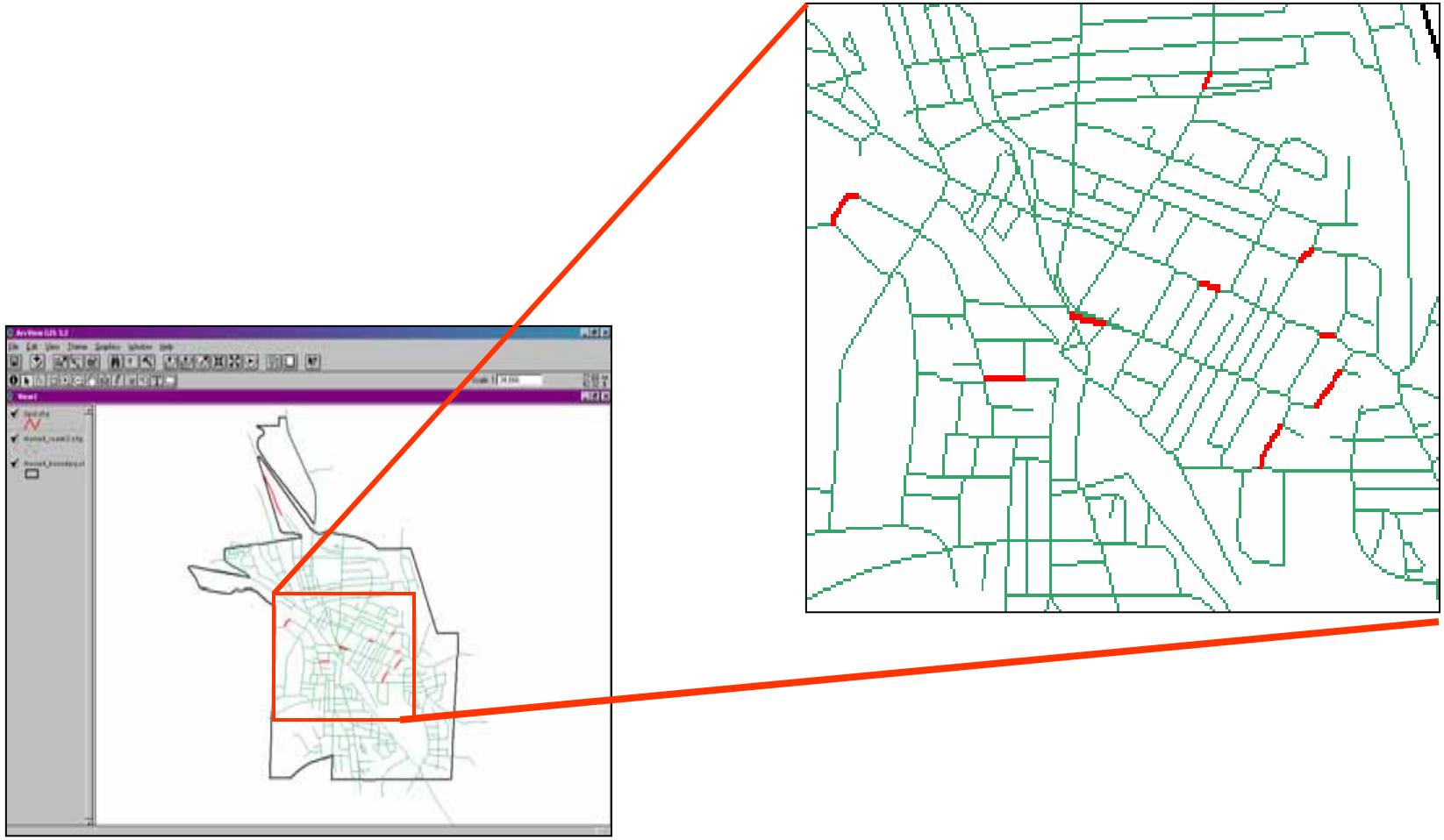
Storm Damage Assessment Protocol Utility

Storm Damage Assessment Protocol Utility

- Standardized method to assess widespread storm damage in a simple, credible, and efficient manner immediately after a severe storm.
- Adaptable to various community types and sizes, and provides information on the time and funds needed to mitigate storm damage.

Pre-Storm Sampling



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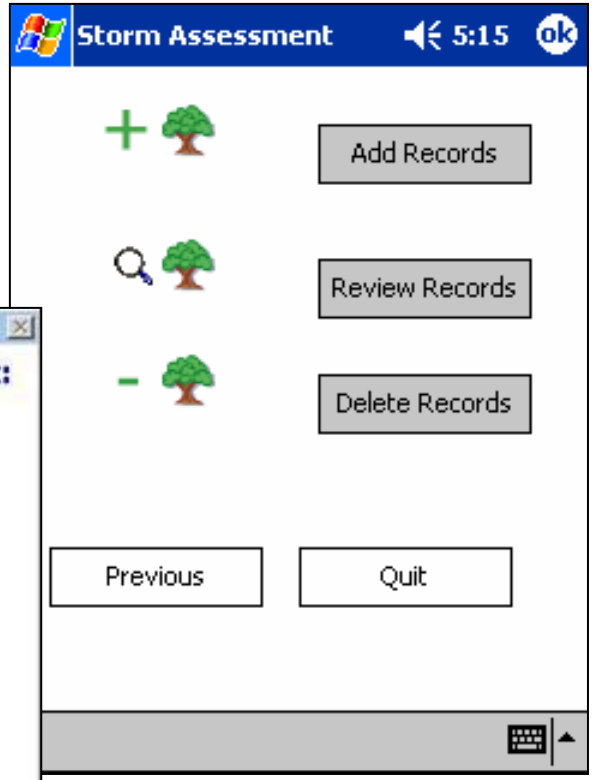
Post-Storm Assessment



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Analyze costs based on local variables

Community:		Report Date:	5/Jan/2005

Note: numbers on this page were generated by a "Storm Damage Estimate Template" as revised in 2004 by the USDA Forest Service and Davey Resource Group using post-storm field observations of random plots

ESTIMATED COST OF TREE DAMAGE **$0**

Estimate components	
% Street Miles Sampled	0
Removals	0
Total Removal Hours	0.0
Total Removal Cost	$0
Hazard Prune	0
Total Pruning Hours	0.0
Total Pruning Cost	$0
Total Canopy Loss	0
Total Brush cu yds	0.0
Total Brush Cost	$0
Total Cost	$0

COMMUNITY VALUES		
Check the numbers to the right, and correct if necessary	**Street Miles**	0
	Removal Cost/hr	55
	Pruning Cost/hr	55
	Brush Cost/cu yd	6

DETAILED POST-STORM CALCULATION 1: Removals and Hazard Pruning

ON Right-of-Way Trees						
	Tree Removal			*Tree Pruning*		
DBH Class (inches)	**Total of Removal Trees**	**Removal Time per Tree**	**Total Hours for Removal**	**Total Hazard Prune Trees**	**Time Per Hazard**	**Total Hours for Hazard Prune**
6 to 12	0	3.2	0	0	0.75	0
13-18	0	5.1	0	0	1	0
19-24	0	7.7	0	0	1.5	0
25-30	0	10.2	0	0	2	0
31-36	0	12.5	0	0	3	0
37-42	0	20.4	0	0	4	0
43+	0	28	0	0	5	0
All Rural	0	6.2	0	0	2.5	0
Totals	0		0	0		0

Plot Info
Method
Pct Street Miles in Sample
0.00%

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DAVEY RESOURCE GROUP

i-Tree

i-Tree Supports Local U&CF Programs

- Highlight value of trees
- Justify investment in tree programs
- Leverage funds from other sources
- Develop management plans
- Baseline for tracking progress

Timeline

- Beta release in mid-February
- Telephone, website, and email technical support available at time of beta release
- Initial public release of i-Tree in Summer 2006

Workshops

- Scheduled workshops
  - March 21 – 22 Clemson SC
  - May 17 – 18 Golden CO
  - November 14 – 17 Minneapolis MN
- Seats still available
- Contact Scott Maco, 425-605-0383, smaco@davey.com

For All Your i-Tree Needs:

www. itreetools.org

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