



i-Tree

Storm

i-Tree Storm Interface

File Help



Plot Look-up Table

Add/Edit

Import from Tiger Line

Reset Database

Work w

Export Data to

B	C	D	E	F	G	H	I
						Report Date:	22-Jul-09

Setup Questions: i-Tree Storm Hurricane Adaptation (Beta)

1. What is your cost per CuYd for total debris management? Help
2. Will you calculate tree removal separately from debris? No Help
3. Will you calculate tree pruning separately from debris? No Help
4. What is the street mileage of all roads you manage? 0.0 Help
5. Which debris rate do you want to use? Medium Help

6. How many hours does it take to remove and prune a tree for each size class?

DBH class	Removal Hours	Pruning Hours
6-12	3.70	0.75
13-18	5.10	1.00
19-24	7.70	1.50
25-30	10.20	2.00
31-36	12.50	3.00
37-42	20.40	4.00
43+	28.00	5.00
Rural (All Trees)	6.20	2.50

TOTAL DAMAGE ESTIMATE	\$0	
<i>Component</i>	<i>Estimate</i>	<i>= SE *</i>
Removal Hours	0	
Removal Cost	\$0	
Pruning	0	
Pruning Hours	0	
Pruning Cost	\$0	
Debris cu yds	N/A	N/A
Debris Cost	N/A	N/A

**Total Debris cu yds is calculated only on direct*

i-Tree Storm

Community: _____ Setup Date: 21/Jul/2009

PRE-STORM ESTIMATE OF MAJOR STORM DAMAGE \$0

COMMUNITY VALUES		
Total Street Miles		0.0
Removal Cost/hr		\$55.00
Pruning Cost/hr		\$55.00
Brush Cost/cu yd		\$15.00

Numbers on the right need to be filled in for each community

Estimate components	
Removal Hours	0.0
Removal Cost	\$0
Pruning Hours	0.0
Pruning Cost	\$0
Brush cu yds	0.0
Brush Cost	\$0
Total Cost	\$0

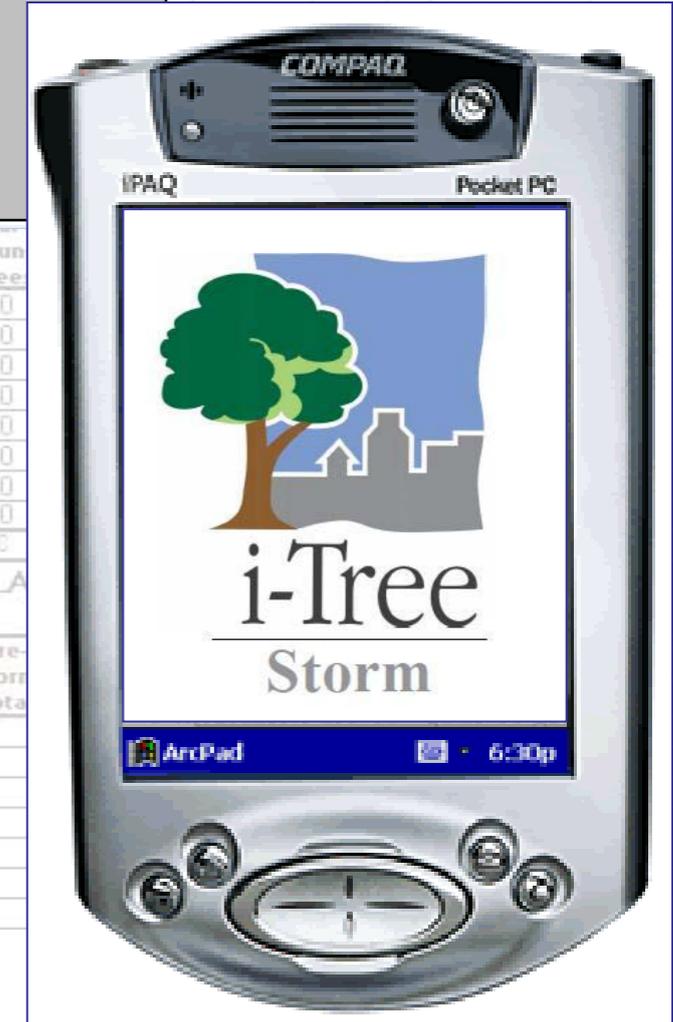
% Street Miles Sampled 0.0%

CALCULATION 1: Removals and Hazard Pruning

ROW Trees (Count trees on both sides of the street)						OFF ROW Trees (Within 50 feet)		Total (ROW & Off ROW Trees)
DBH Class (inches)	Total Number of Trees	Estimated Time per Tree for Removal	Total Hours for Removal	Estimated Time Per Hazard Prune	Total Hours for Hazard Prune	DBH Class	Off ROW Trees	
6-12	0	3.70	0.0	0.75	0.0	6-12	0	0
13-18	0	5.10	0.0	1.00	0.0	13-18	0	0
19-24	0	7.70	0.0	1.50	0.0	19-24	0	0
25-30	0	10.20	0.0	2.00	0.0	25-30	0	0
31-36	0	12.50	0.0	3.00	0.0	31-36	0	0
37-42	0	20.40	0.0	4.00	0.0	37-42	0	0
43+	0	28.00	0.0	5.00	0.0	43+	0	0
Rural (All Trees)	0	6.20	0.0	2.50	0.0	NA	NA	0
Totals	0		0.0		0.0	Totals	0	0

DETAILED POST-STORM CALCULATION

Plot Length (feet)	Tree Density per 100 ft.	Pre-Storm Est. Brush (gd3 per 100 feet)	Pre-Storm Total
		0.0	
		0.0	
		0.0	
		0.0	
		0.0	
		0.0	
		0.0	
		0.0	
		0.0	
		0.0	



About Storm



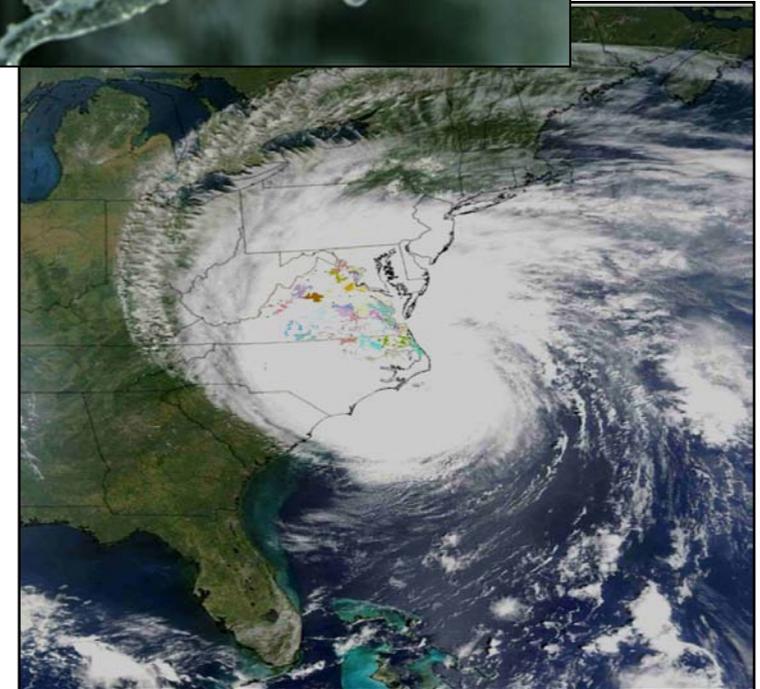
What Does Storm Do?



- 🌳 Easy and accurate estimate
- 🌳 Tree storm damage
- 🌳 Costs for recovery
- 🌳 Data quality and integrity
- 🌳 Simple method
- 🌳 Quick reporting



Why Prepare?





Tornados



Thunderstorms & Wind



Snow



How Does Storm Work?



- 🌳 Context of Use
- 🌳 Sampling
- 🌳 Data Collection
- 🌳 PDA & Desktop Features

Context of Use



Planning

-  Framed by overall natural disaster plan
 -  FEMA funding: Pre-Disaster Mitigation Program
 -  Tree Emergency Plan Worksheet (Burban)

Recovery

-  First 24-36 hours
-  Response to state emergency agency



The SDAP Process

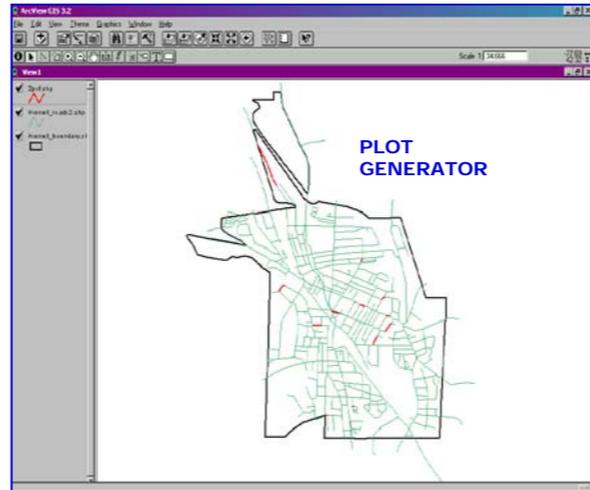
An Initial Storm Damage Assessment Protocol for Urban and Community Forests

January 2001

Developed by
USDA Forest Service
Northeast Center for Urban and Green
University of Massachusetts,
Amherst, MA 01003

Davey Resource Group
6000 Hicks Road
Naples, NY 14512

i-Tree
Storm



Random Plots

Form 2A
PRE-Storm Field Data Collection Sheet (Populated Areas)

Community Name: _____ Plot Number: _____

ON Street: _____ FROM Street: _____ TO Street: _____

Date: _____ Plot Length (ft/mi): _____

ROW Width (feet): _____ Collected by: _____

65

Complete this section only if the plot is less than the full blockside.

Start of plot description: _____

End of plot description: _____

ON Right-of-Way Trees (Count trees on both sides of the street)						ROW + 50' Trees ¹			TOTALS
DBH Class	Tall of Plot/Street	Number of ROW Trees	Time per Tree for Removal ²	Total Hours for Removal (to be trees + time per tree)	Time per Hazard Prune ³	Total Hours for Pruning (to be trees + time per tree)	DBH Class	Tall of Plot/Street	Total Off ROW Trees
6-12		3.2	0.75		6-12				
13-18		5.1	1.0		13-18				
19-24		7.7	1.5		19-24				
25-30		10.2	2.0		25-30				
31-36		12.5	3.0		31-36				
37-42		20.4	4.0		37-42				
43+		28.0	5.0		43+				
Totals									

¹ Rate all trees as a group that fall within 50 feet of the edge of the right-of-way.
² Record each tree with a tally mark, then place the total number of marks in the next column.
³ Time for removal does not include stump removal (see Protocol).
⁴ Time for hazard pruning is for removal of broken or hazardous branches greater than 2 inches only (see Protocol).

Pre-Storm Sample Survey

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

COMMUNITY VALUES			
Street Miles	0	Removal Cost/hr	55
Pruning Cost/hr	55	Brush Cost/100 yd	6

Check the numbers to the right, and correct if necessary.

DETAILED POST-STORM CALCULATION 1: Removals and Hazard Pruning

DBH Class (inches)	ON Right-of-Way Trees		Tree Pruning		Plot Info
	Total of Removal Trees	Removal Time per Tree	Total Hours for Removal	Total Hours for Hazard Prune	
6 to 12	0	3.2	0	0.75	Method Pct Street Miles in Sample 0.00%
13-18	0	5.1	0	1	
19-24	0	7.7	0	1.5	
25-30	0	10.2	0	2	
31-36	0	12.5	0	3	
37-42	0	20.4	0	4	
43+	0	28	0	5	
All Rural	0	6.2	0	2.5	
Totals	0		0	0	

Estimating Engine

Form 5A
POST-Storm Field Data Collection Sheet (Populated Areas)

Community Name: _____ Plot Number: _____

ON Street: _____ FROM Street: _____ TO Street: _____

Date: _____ Plot Length (ft/mi): _____

ROW Width (feet): _____ Collected by: _____

Start of plot description: _____

End of plot description: _____

DBH Class	Tree Removals		Tree Pruning		Debris Estimate ⁴	
	Total of Removal Trees	Removal Time per Tree	Total Hours for Removal	Total Hours for Hazard Prune	CRW Loss (100-foot segments)	OSRD YARDS
6-12	3.2	0.75	0	0	0-100	
13-18	5.1	1.0	0	0	101-200	
19-24	7.7	1.5	0	0	201-300	
25-30	10.2	2.0	0	0	301-400	
31-36	12.5	3.0	0	0	401-500	
37-42	20.4	4.0	0	0	501-600	
43+	28.0	5.0	0	0	601-700	
Totals					701-800	

¹ If plot boundaries were recorded during set up, just fill in same and plot number.
² Rate all trees as a group that fall within 50 feet of the edge of the right-of-way.
³ Crown loss is the crown loss of crown loss for the whole plot.
⁴ For plots larger than 800 feet, report average crown loss of total crown loss yards of the perimeter of the plot (you'd 800 feet is the correct crown loss).
⁵ Average = Total ÷ number of 100-foot segments examined.

Post-Storm Survey

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

COMMUNITY VALUES			
Street Miles	0	Removal Cost/hr	55
Pruning Cost/hr	55	Brush Cost/100 yd	6

Check the numbers to the right, and correct if necessary.

DETAILED POST-STORM CALCULATION 1: Removals and Hazard Pruning

DBH Class (inches)	ON Right-of-Way Trees		Tree Pruning		Plot Info
	Total of Removal Trees	Removal Time per Tree	Total Hours for Removal	Total Hours for Hazard Prune	
6 to 12	0	3.2	0	0.75	Method Pct Street Miles in Sample 0.00%
13-18	0	5.1	0	1	
19-24	0	7.7	0	1.5	
25-30	0	10.2	0	2	
31-36	0	12.5	0	3	
37-42	0	20.4	0	4	
43+	0	28	0	5	
All Rural	0	6.2	0	2.5	
Totals	0		0	0	

Final Damage Estimate

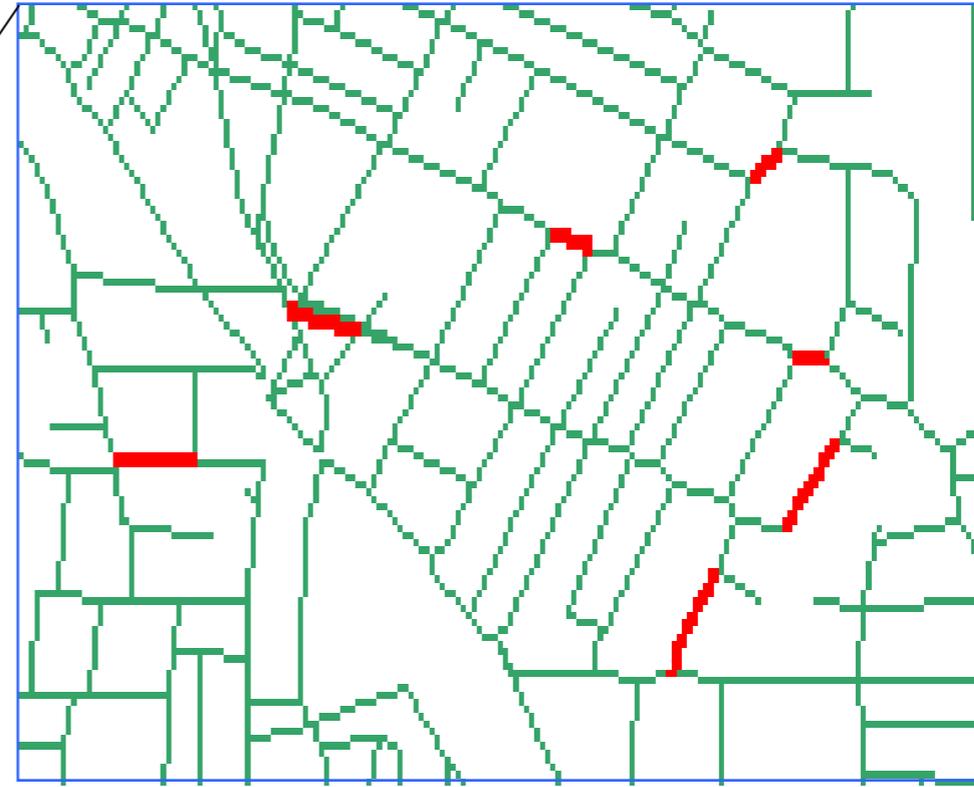




Sampling Methods

- 🌳 2-3% of blockside mileage
 - 🌳 Blockside = street segment between road/street corners or ends
- 🌳 Manual Method or Computerized Process
 - 🌳 Random selection
 - 🌳 10 blockside minimum needed for analysis

Sampling Methods



Data Collection

Form 5A
POST-Storm Field Data Collection Sheet (Populated Areas)

Community Name ¹ :			
ON Street:		Plot Number ¹ :	
FROM Street:	TO Street:		
Date:	Plot Length (ft/mi):		
ROW Width (feet):		Collected by:	

Start of plot description:			
End of plot description:			

ROW Trees ONLY								ROW + 50' Trees ²			
DBH Class	Tree Removals			Tree Pruning				Debris Estimate ³			
	Tally Number of Removal Trees	Total All Removal Trees	Time Per Tree (hours)	Total Hours for Removal (to tally trees x time per tree)	Tally Hazard Prune Trees	Total All Hazard Prune Trees	Time Per Tree (hours)	Total Hours Haz Prune (to tally trees x time per tree)	Rate In 100-Foot Segments	CROWN LOSS	CUBIC YARDS
6-12			3.2				0.75		0-100		
13-18			5.1				1.0		101-200		
19-24			7.7				1.5		201-300		
25-30			10.2				2.0		301-400		
31-36			12.5				3.0		401-500		
37-42			20.4				4.0		501-600		
43+			28.0				5.0		601-700		
Totals									701-800		
										Extra ⁴	
										Total CL	
										Average ⁵	
										Total CY	

¹ If plot information was recorded during set up, just fill in name and plot number.

² Rate all trees as a group that fall within 50 feet of the edge of the right-of-way.

³ Choose either Crown Loss or Cubic Yards for the whole plot.

⁴ For plots longer than 800 feet, report average (Crown Loss) or total (Cubic Yards) of the remainder of the plot beyond 800 feet in the correct column here.

⁵ Average = Total ÷ number of 100-foot segments examined.



Overview: Pre-storm setup

- 🌳 Create random sample
 - 🌳 Before emergency!
 - 🌳 Use electronic or manual means
- 🌳 Measure tree density and size class
 - 🌳 Within ROW
 - 🌳 Also 50' back from ROW edge
- 🌳 Take final steps
 - 🌳 Pre-Storm report form: useful estimate
 - 🌳 Storage for future use



Form 5A
POST-Storm Field Data Collection Sheet (Populated Areas)

Community Name ¹ :		Plot Number ¹ :
ON Street:		
FROM Street:	TO Street:	
Date:	Plot Length (ft/mi):	
ROW Width (feet):	Collected by:	

Start of plot description:

End of plot description:

ROW Trees ONLY								ROW + 50' Trees ²			
Tree Removals				Tree Pruning				Debris Estimate ³			
DBH Class	Tally Number of Removal Trees	Total All Removal Trees	Time Per Tree (hours)	Total Hours for Removal (total trees x time per tree)	Tally Hazard Prune Trees	Total All Hazard Prune Trees	Time Per Tree (hours)	Total Hours Haz Prune (total trees x time per tree)	Rate in 100-Foot Segments	CROWN LOSS	CUBIC YARDS
6-12			3.2				0.75		0-100		
13-18			5.1				1.0		101-200		
19-24			7.7				1.5		201-300		
25-30			10.2				2.0		301-400		
31-36			12.5				3.0		401-500		
37-42			20.4				4.0		501-600		
43+			28.0				5.0		601-700		
Totals									701-800		
										Extra ⁴	
										Total CL	
										Average ⁵	
										Total CY	

¹ If plot information was recorded during set up, just fill in name and plot number.
² Rate all trees as a group that fall within 50 feet of the edge of the right-of-way.
³ Choose either Crown Loss or Cubic Yards for the whole plot.
⁴ For plots longer than 800 feet, report average (Crown Loss) or total (Cubic Yards) of the remainder of the plot beyond 800 feet in the correct column here.
⁵ Average = Total ÷ number of 100-foot segments examined.

Form 5B
POST-Storm Field Data Collection Sheet (Rural Areas)

Community Name ¹ :		Plot Number ¹ :
ON Road:		
Intersection nearest to plot start:		
Approximate distance to intersection:		
Date:	Plot Length (feet):	
ROW Width (feet):	Collected by:	

Start of plot:

End of plot:

ON Right-of-Way Trees (Count trees on both sides of the road)							
Tally of hazardous removal ROW trees	Total Number of hazardous removal ROW Trees	Avg. Time ⁴ per Removal	Total Hours Removal (total trees x time per removal)	Tally of hazardous prune ROW trees	Total Number of hazardous prune ROW trees	Avg. Time ⁴ Per Prune	Total Hours Hazard Prune (total trees x time per prune)
		6.2				2.5	
Totals							

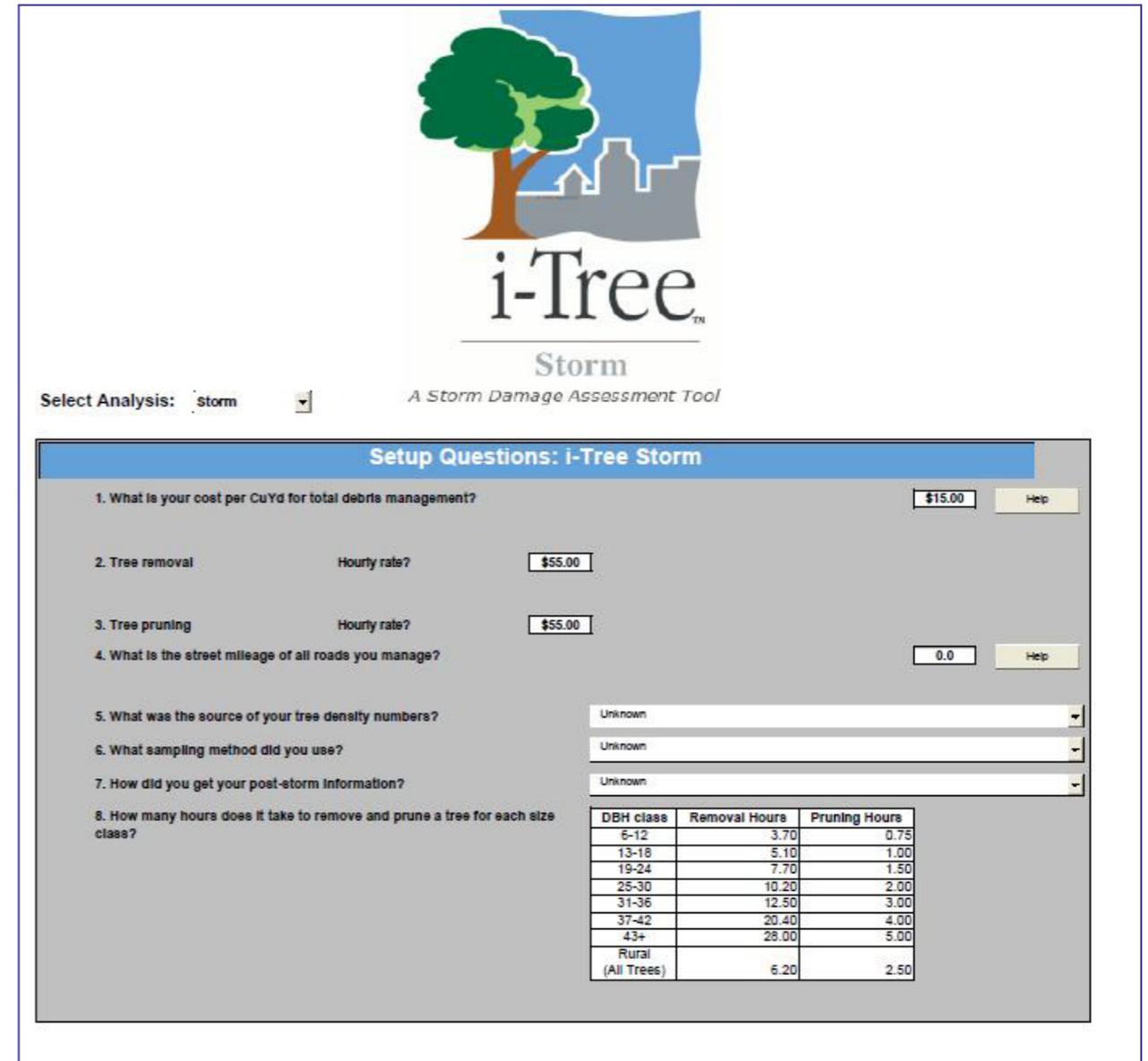
Debris estimate ⁴		
Rate in 100-Foot Segments	Crown Loss	Cubic Yards
0-100		
101-200		
201-300		
301-400		
401-500		
501-600		
601-700		
701-800		
Extra ⁵		
Total CL		
Average ⁶		
Total CY		

¹ If road and plot information was recorded during set up, just fill in name and plot number.
² On rural roads, removals are only recorded for large trees already in fallow. Time has been reduced 50% from the urban rate, and excludes stump removal.
³ On rural roads, time per prune is for pruning of broken or hazardous branches greater than 4 inches only. Time has been reduced 50% from urban rate, and does not include other pruning.
⁴ Choose Crown Loss or Cubic Yards for the plot. Estimate Crown Loss with one of these values: 12.5 (0-25%), 37.5 (26-50%), 62.5 (51-75%), or 87.5 (76-100%).
⁵ For plots longer than 800 feet, report average (Crown Loss) or total (Cubic Yards) of the rest of the plot beyond 800 feet in the correct column here.
⁶ Average = Total CL ÷ # of 100' segments



Data Collection: Desktop Interface

- 🌳 Manage Users
- 🌳 Community Values
- 🌳 Reference Data
 - 🌳 TIGER
 - 🌳 manual
- 🌳 ROW Info
- 🌳 Export Data

A screenshot of the i-Tree Storm desktop interface. At the top, there is the i-Tree logo and the text "Storm" and "A Storm Damage Assessment Tool". Below this, there is a dropdown menu for "Select Analysis:" with "storm" selected. The main area is titled "Setup Questions: i-Tree Storm" and contains several numbered questions with input fields and buttons. Question 1 asks for the cost per CuYd for total debris management, with a value of \$15.00 and a "Help" button. Question 2 asks for the hourly rate for tree removal, with a value of \$55.00. Question 3 asks for the hourly rate for tree pruning, with a value of \$55.00. Question 4 asks for the street mileage of all roads you manage, with a value of 0.0 and a "Help" button. Questions 5, 6, and 7 ask for the source of tree density numbers, the sampling method used, and how post-storm information was obtained, all with "Unknown" selected in dropdown menus. Question 8 asks for the hours to remove and prune a tree for each size class, with a table provided below it.

DBH class	Removal Hours	Pruning Hours
6-12	3.70	0.75
13-18	5.10	1.00
19-24	7.70	1.50
25-30	10.20	2.00
31-36	12.50	3.00
37-42	20.40	4.00
43+	28.00	5.00
Rural (All Trees)	6.20	2.50



Data Collection: Desktop Interface

Setup Questions: i-Tree Storm

1. What is your cost per CuYd for total debris management? Help

2. Tree removal **Hourly rate?** \$55.00

3. Tree pruning **Hourly rate?** \$55.00

4. What is the street mileage of all roads you manage? 0.0 Help

5. What was the source of your tree density numbers? Unknown

6. What sampling method did you use? Unknown

7. How did you get your post-storm information? Unknown

8. How many hours does it take to remove and prune a tree for each size class?

DBH class	Removal Hours	Pruning Hours
6-12	3.70	0.75
13-18	5.10	1.00
19-24	7.70	1.50
25-30	10.20	2.00
31-36	12.50	3.00
37-42	20.40	4.00
43+	28.00	5.00
Rural (All Trees)	6.20	2.50



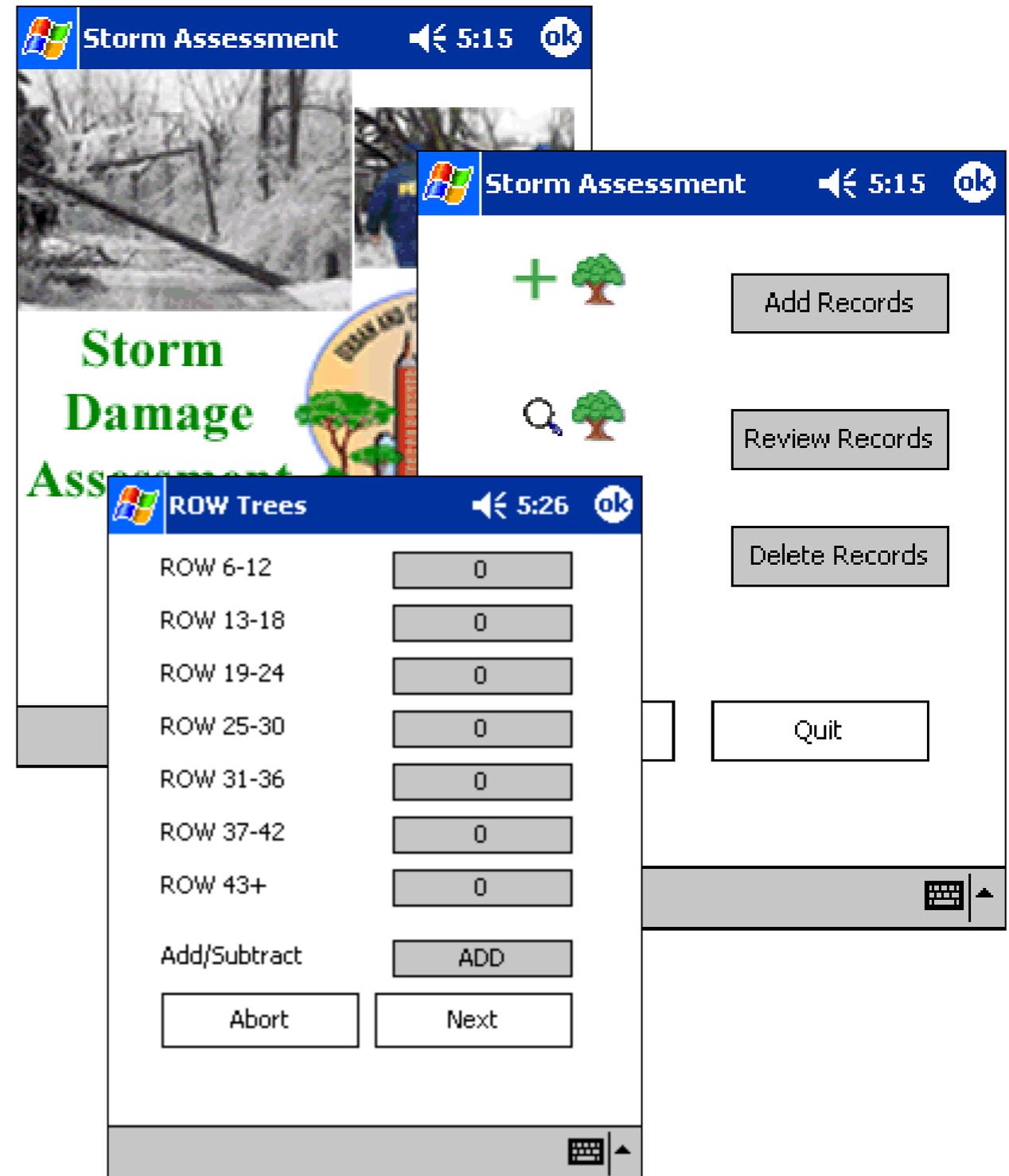
PDA Setup Interface

- 🌳 Management of process, data and applications
- 🌳 Simple, intuitive



Data collection: PDA

- 🌳 Pocket PC only
- 🌳 Installed on handheld through Start menu
- 🌳 Data uploaded automatically during synchronization



Overview: Post-storm work

Revisit sample segments

Storm or Hurricane: choose estimation method

-  Indirect by average crown loss class

 -  0-25%, 26-50%, etc.

 -  Loss category images available from FS

 -  All trees within 50' of ROW

-  Direct as CY of debris

Only trees within ROW

-  Hazard pruning by size class

-  Hazard removal by size class

Enter data, report results



Estimating Costs

i-Tree Storm



Community: Burlington

Report Date: 22-Jul-09

This report was generated by i-Tree Storm v3.0.
 Source: <http://www.itreetools.org>

STORM DAMAGE COST ESTIMATE		\$10,079,769	
Component	Estimate	± SE *	
Removals	94,240	832	
Total Removal Hours	94,240	10,852	
Total Removal Cost	\$5,183,174	\$596,865	
Hazard Prune	7,100	665	
Total Pruning Hours	14,769	1,407	
Total Pruning Cost	\$812,322	\$77,397	
Total Debris cu yds	272,285	27,155	
Total Debris Cost	\$4,084,273	\$407,325	

COMMUNITY VALUES			Sampling
Correct numbers to right as needed	Street Miles	125.0	TL
	Removal Cost/hr	\$55.00	
	Pruning Cost/hr	\$55.00	% Street Miles
	Brush Cost/cu yd	\$15.00	1.6%
Based on Sample Data	I tree density per 100' (ROW + 50')	5.6	No. Samples
Precision Level *	Low		20

* SE of Total Debris cu yds is calculated only on direct CY estimates; crown loss estimates are ignored

* Precision Level indicates overall reliability of input data (see User's Manual)

DETAILED POST-STORM CALCULATION: Hazard Removal and Pruning

DBH Class (inches)	ON Right-of-Way Trees							
	Hazard Tree Removal				Hazard Tree Pruning			
	Total of Removal Trees	Removal Time per Tree	Total Hours for Removal	Total Hours SE	Total of Prune Trees	Hazard Prune Time per Tree	Total Hours for Hazard Prune	Total Hours SE
6-12	9	3.70	33.3	±19.11	8	0.75	6.0	±1.35
13-18	29	5.10	147.9	±29.67	26	1.00	26.0	±5.76
19-24	25	7.70	192.5	±38.47	24	1.50	36.0	±7.87
25-30	31	10.20	316.2	±56.31	23	2.00	46.0	±10.02
31-36	24	12.50	300.0	±52.68	12	3.00	36.0	±9.36
37-42	12	20.40	244.8	±103.78	12	4.00	48.0	±11.48
43+	9	28.00	252.0	±99.33	7	5.00	35.0	±8.73
All Rural	0	6.20	0.0	±0.00	0	2.50	0.0	±0.00
Totals	139		1486.7	±171.20	112		233.0	±22.20





Storm User's Manual

