

Cornell Campus Tree Inventory



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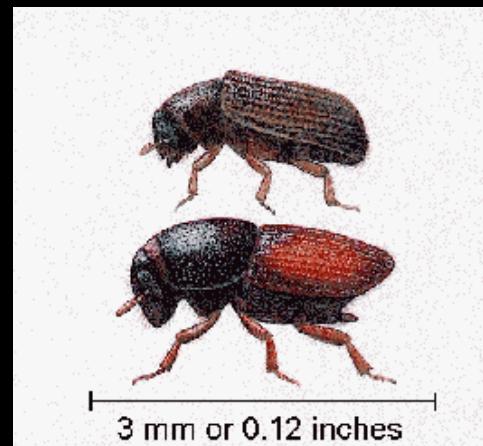
Tree Inventory Rationale

- Context for new tree plantings
- “What should I plant?”
- “What have you got?”
- “Manage proactively rather than reactively”

Species Diversity and Invasive Pests



Elm Bark
Beetle



Emerald Ash Borer

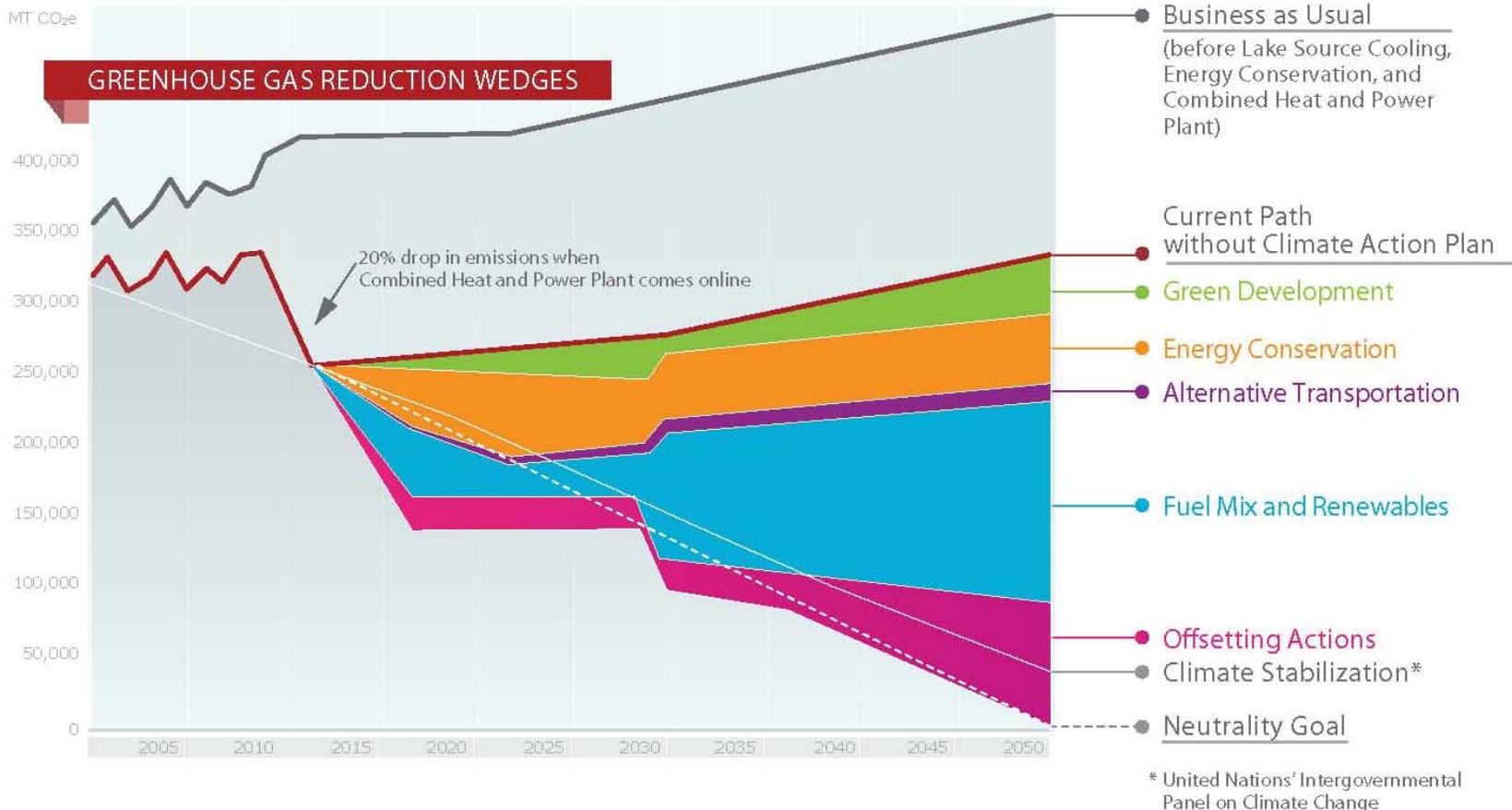


Asian Longhorned Beetle

Sustainability and Climate Change



American College and University Presidents
Climate Commitment



Cornell: Action Plan for Climate Neutrality



Tools for assessing and managing Community Forests

[About i-Tree >>](#)



[Get the i-Tree Tools Installation CD-ROM >>](#)

[Resource/Learning Center](#)

[Support](#)

[Quick Links](#)

[User Forum](#)

[What's New?](#)

We are hard at work improving i-Tree based on your feedback from this spring and summer field season! Here are some of the updates to expect in the coming months.

The i-Tree Academy and Mid-Atlantic workshop materials are now available. [Download](#) all presentations, handouts, and exercises individually or in their entirety.

Have you visited the new [User Forum](#) yet? It is the place to share your experiences, communicate with other users, and get all your i-Tree questions answered.

[Find out more >>](#)

[Assessing Urban Ecosystems](#)

Find out how to assess your community's *entire urban forest*.

[click here to begin](#)

[Assessing Street Tree Populations](#)

Learn how to assess the *street tree component* of your community's urban forest.

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[Applications and Utilities](#)

Access tools to help you strengthen your community's *tree management efforts*.

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STRATUM (Street Tree Management and Analysis Tool for Urban Forest Managers)

STRATUM Calculated Street Tree Benefits

- Energy Conservation
- Stormwater Reduction
- Air Quality Improvement
- CO₂ Reduction
- Stored Carbon
- Aesthetic/Other

How does a campus tree inventory differ from a typical street tree inventory?



In many ways they are the same
We still need to know Tree ID



Maples are not the only trees out there

We still measure DBH the same

DBH (diameter at
breast height) –
approx 4 $\frac{1}{2}$ feet



We still need to establish parameters



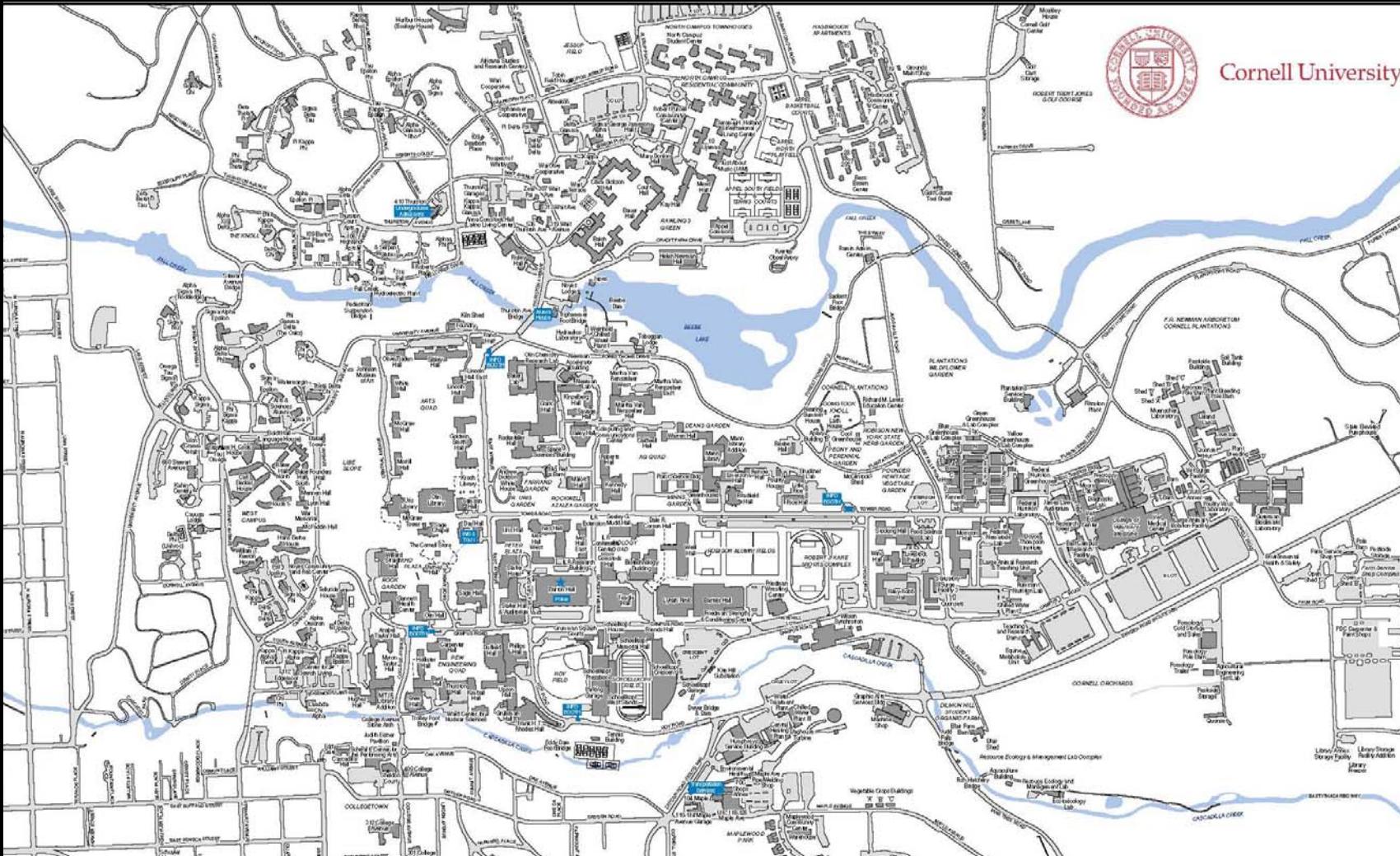
What data fields besides species and DBH?

We still need to establish parameters



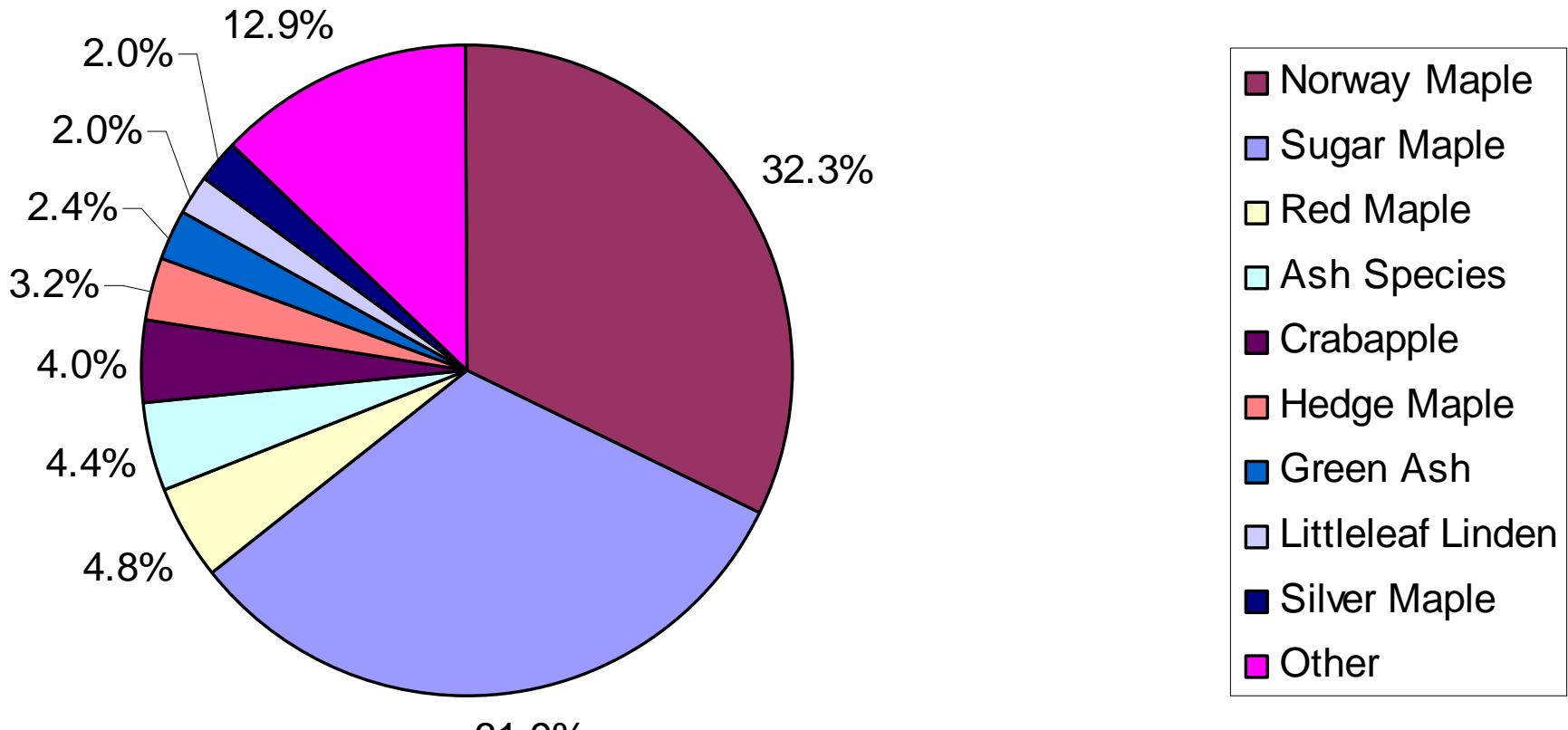
Are we counting shrubs as well as trees?

We still need to establish parameters



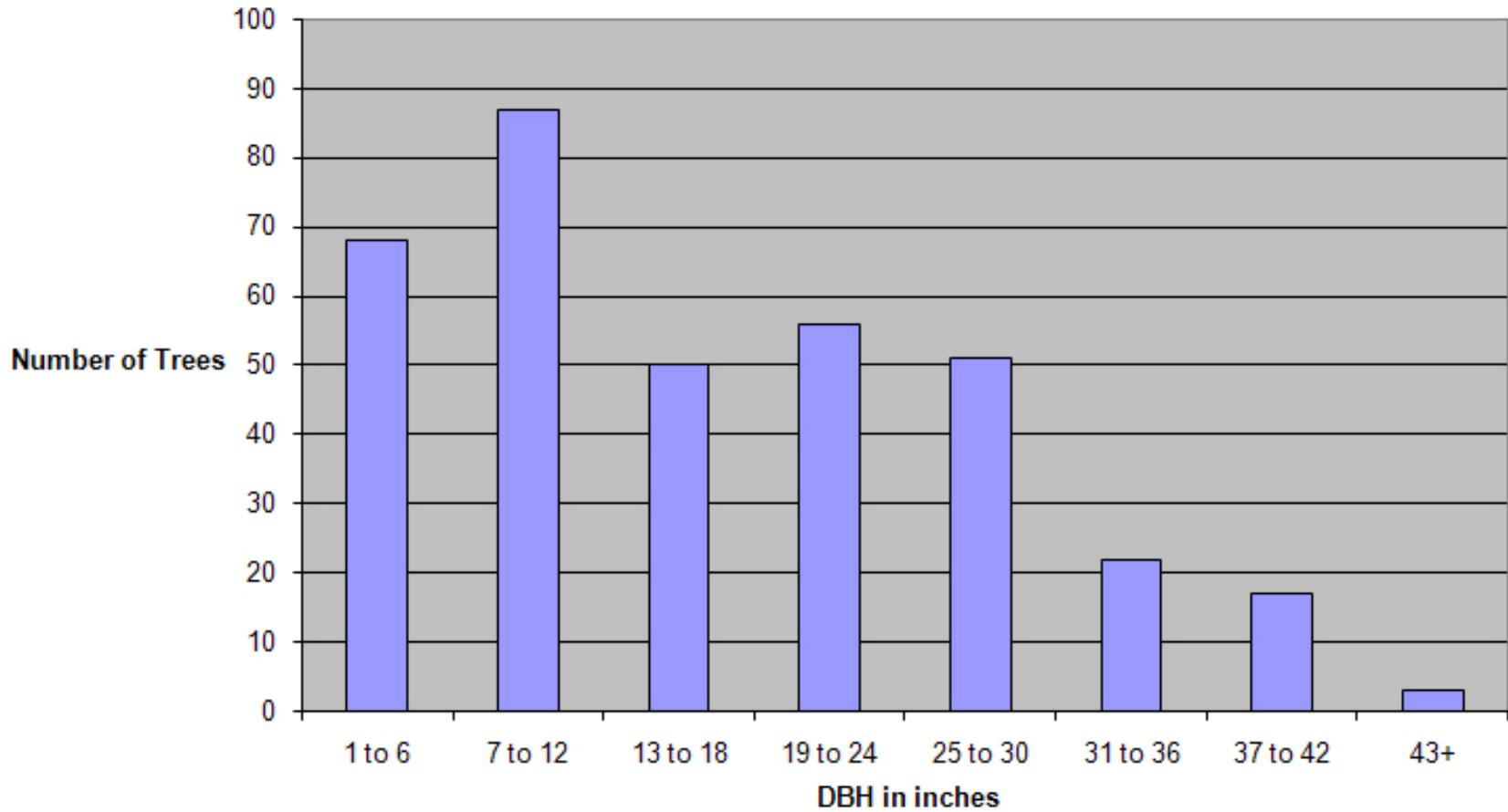
What is the extent of the inventory?

We still analyze the data



Species Distribution

We still analyze the data



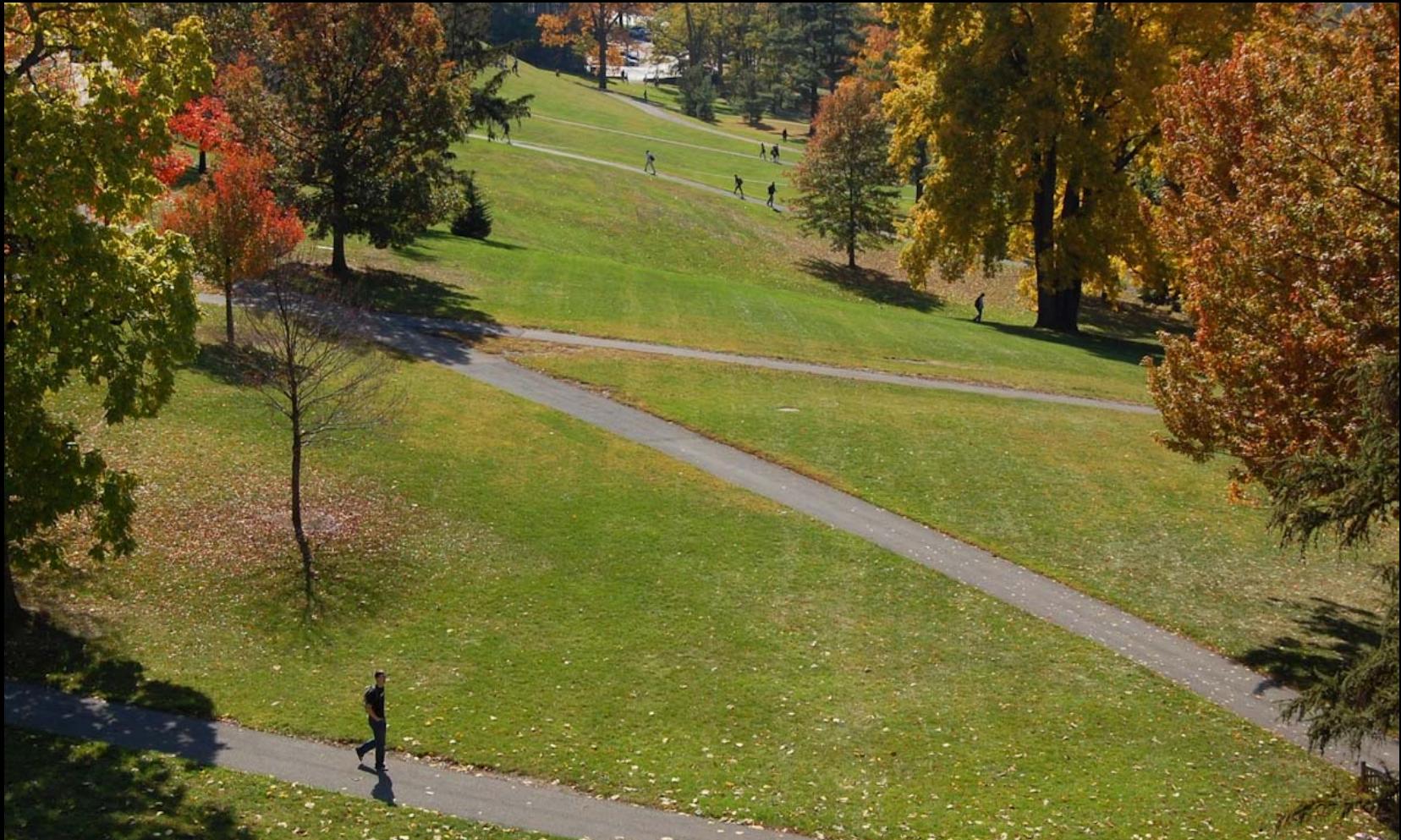
DBH Distribution

Major difference: location – how to locate trees

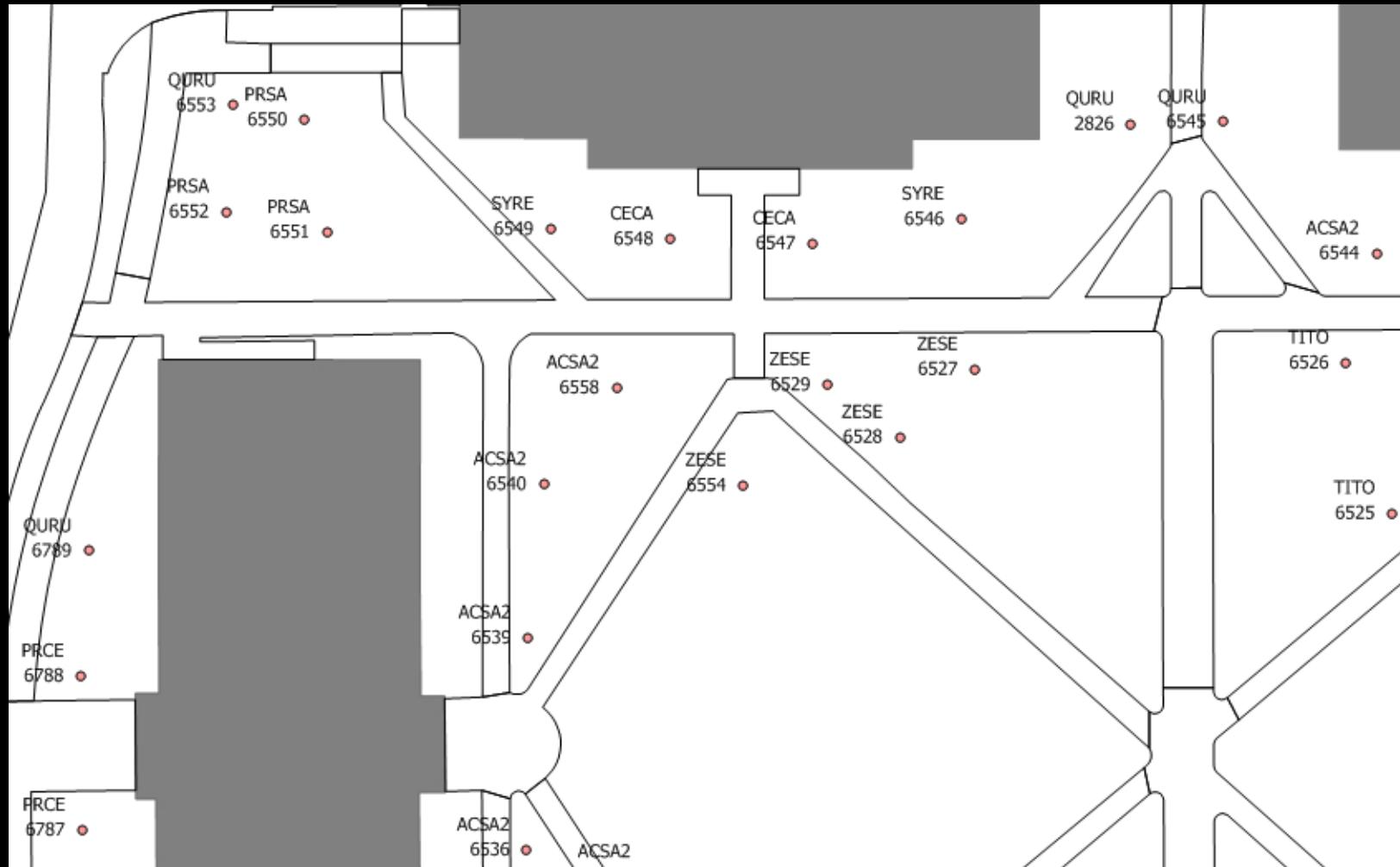


Street name and address # associated with parcel

What is the “address” for these trees?



Solution: GPS to locate trees on a map



Each tree has X and Y coordinates

Another difference: right-of-way



Is the tree “in” or “out”?

Right-of-way usually not relevant



Within the campus, most trees are “in”

Cornell Campus Tree Inventory

Time Frame: Summer 2009

- Extent: “Main Campus”
 - ≠ Plantations + City of Ithaca
- Managed Trees (≠ “Natural Areas”)

Cornell Campus Tree Inventory

Data Collected:

- Species
- DBH
- Location (GPS)

Cornell Campus Tree Inventory

STRATUM Analysis

- Data Deliverable: GIS Shapefile
 - “Ground-truthing”

Cornell Campus Tree Inventory

Methodology:

- Data: Paper Form

Cornell Campus Tree Inventory

Date _____

Page _____

Tree #	SpCode	DBH	Comments	Tree #	SpCode	DBH	Comments
1				36			
2				37			
3				38			
4				39			
5				40			
6				41			
7				42			
8				43			
9				44			
10				45			
11				46			
12				47			
13				48			
14				49			
15				50			
16				51			
17				52			
18				53			
19				54			
20				55			
21				56			
22				57			
23				58			
24				59			
25				60			
26				61			
27				62			
28				63			
29				64			
30				65			
31				66			
32				67			
33				68			
34				69			
35				70			

Heet Campus

Cornell Campus Tree Inventory

Date 6/3/09

Page 1

Tree #	SpCode	DBH	Comments	Tree #	SpCode	DBH	Comments
1	DWU	2	upfront by Day	36	CRUY	7	
2				37	ACPL	6	
3				38	V.	17	
4				39	AM	3	
5	PLAC	6		40	COPL	2	
6	n	6		41	OURU	2	
7	CECA	9		42	PCPL	9	
8	n	2		43	CBGA	2	Purple
9	n	2		44	ACPL	6	
10	SCTR	24		45	AM	2	MS
11	n	27		46	1	2	n
12	ACSL	10	Papertail	47	ACPL	17	
13	SCTR	11		48	AM	2	MS
14	PEGL	15		49	A	4	FRNI
15	SCTR	24		50	COPL	3	
16	"	15		51	PCPL	3	
17	"	25		52	AM	2	MS
18	MASU	4	MS	53	FROB	3	
19	ACSAZ	17		54	PCPL	18	
20	MASU	3	MS	55	AM	3	MS
21	"	3		56	CECA	4	MS
22		8		57	FLMZ	4	
23		4		58	CBGA	8	
24	PRPB	9		59	FROB	6	
25		9	8 7	60	AM	3	MS
26		5	0 9	61	OURU	5	
27		6	1	62	1	3	
28		6	6 3	63	1	4	
29	ULCAT	18	5 1	64	CBGA	6	
30	n	15	30 1 1 25	65	n	6	
31	AM	4		66	CEOL	4	
32	ACPL	16		67	TSCA	5	
33	COPL	3		68	n	1	
34	n	4		69	1	4	
35	ACPL	7		70	n	3	

Reshoots

Advantages of paper:

- Quick and easy
- Assumes:
 - Knowledge of species codes
 - Few data fields

Disadvantages of paper:

- Manual entry of data into digital format (e.g. Excel spreadsheet)
- Time-consuming and boring
- Errors in data entry

Cornell Campus Tree Inventory

Methodology:

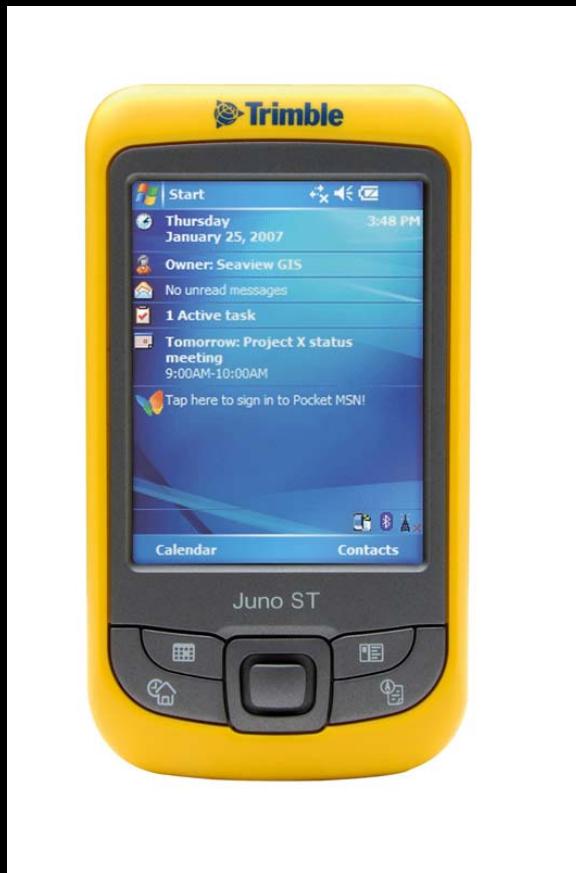
- GPS: Handheld Unit

GPS: Handheld unit



Garmin 60CSx GPS – accurate 3 to 5 meters
Waypoints download into GIS shapefile

Greater Accuracy



Higher Cost



GPS Coordinates → Rectify to Aerial Imagery



Ithaca orthoimagery: .5 ft resolution + 2007

GPS Coordinates → Rectify to Aerial Imagery



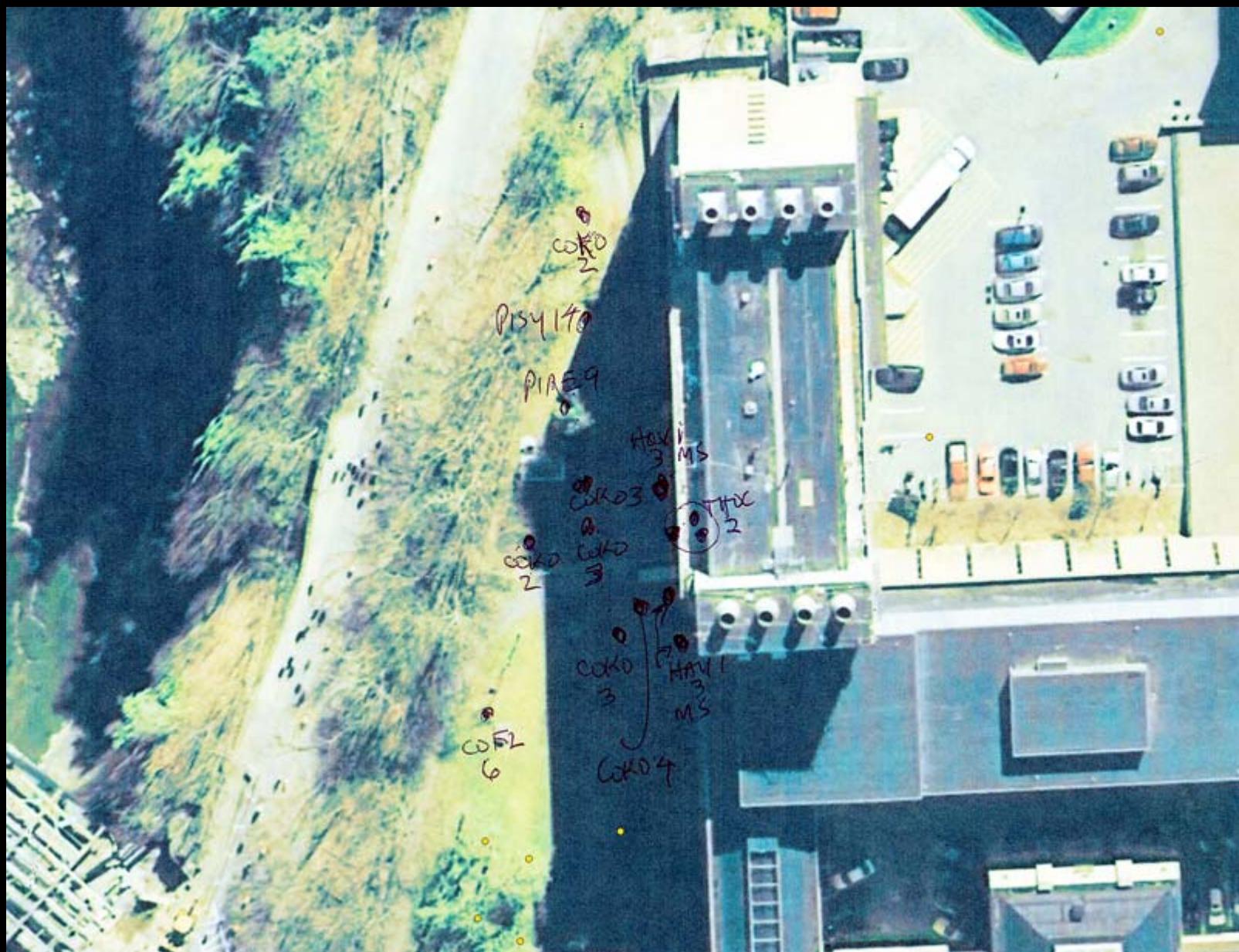
Ithaca orthoimagery: .5 ft resolution + 2007

Associating GPS with Tree Data

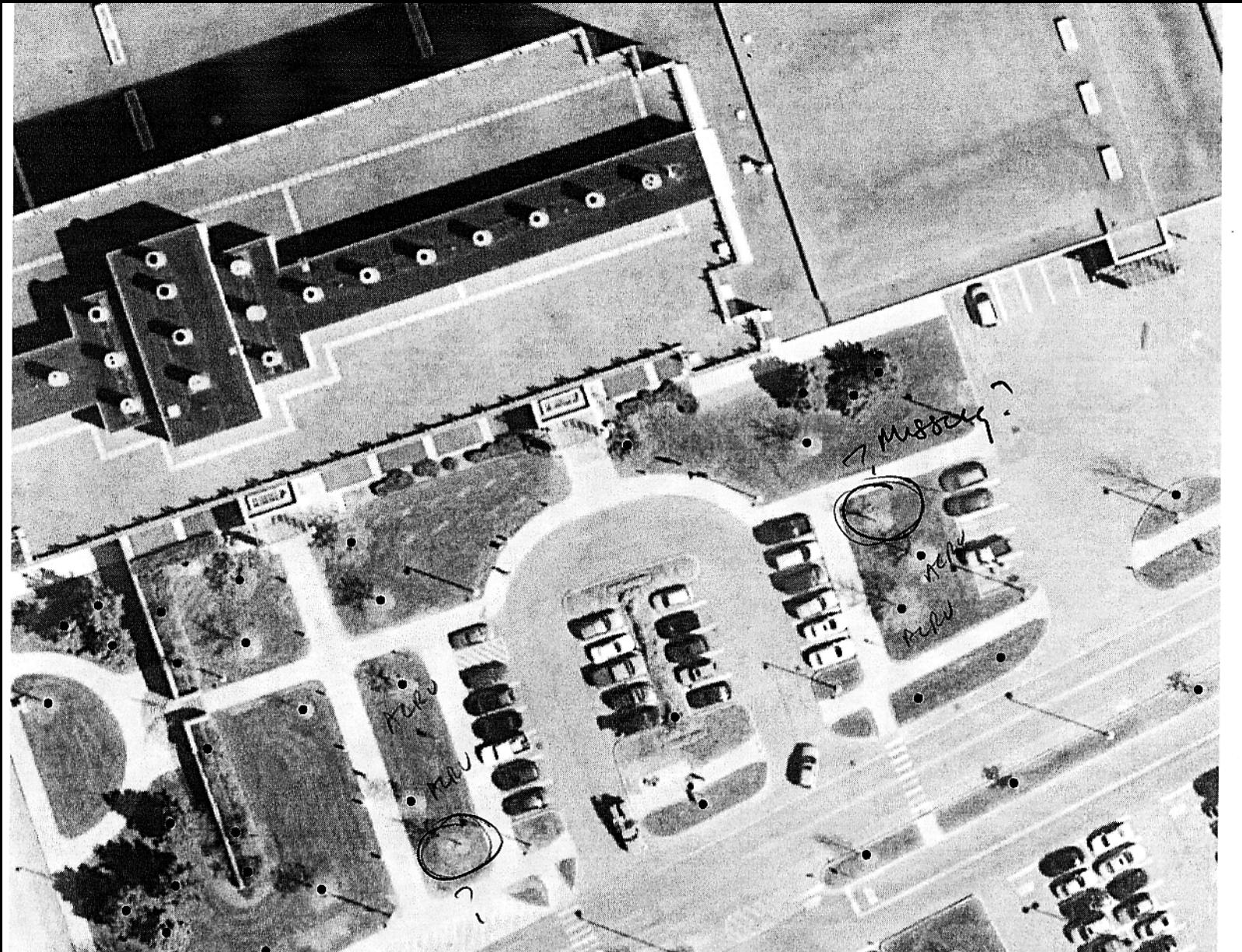
ID	TYPE	IDENT	LAT	LONG
176904	WAYPOINT	001	42.45846321	-76.47527402
176905	WAYPOINT	002	42.45857595	-76.47535876
176906	WAYPOINT	003	42.45888633	-76.47528064
176907	WAYPOINT	004	42.45903754	-76.47558818
176908	WAYPOINT	005	42.45907811	-76.47539799
176909	WAYPOINT	006	42.45921297	-76.47546815
176910	WAYPOINT	007	42.45935018	-76.47551626
176911	WAYPOINT	008	42.4597567	-76.4755909
176912	WAYPOINT	009	42.45976903	-76.475558
176913	WAYPOINT	010	42.45978495	-76.47558256
176914	WAYPOINT	011	42.45980867	-76.47558306
176915	WAYPOINT	012	42.45982912	-76.47559985
176916	WAYPOINT	013	42.45986106	-76.4757036
176917	WAYPOINT	014	42.45990967	-76.47588531
176918	WAYPOINT	015	42.45995368	-76.47586587
176919	WAYPOINT	016	42.45974564	-76.47590619
176920	WAYPOINT	017	42.45974857	-76.47587232
176921	WAYPOINT	018	42.45972443	-76.4758388
176922	WAYPOINT	019	42.45925723	-76.47636132
176923	WAYPOINT	020	42.45924365	-76.4763148
176924	WAYPOINT	021	42.45925865	-76.47627834
176925	WAYPOINT	022	42.45911138	-76.47621372
176926	WAYPOINT	023	42.45912613	-76.47584701
176927	WAYPOINT	024	42.45909034	-76.47579622
176928	WAYPOINT	025	42.45910032	-76.47644145
176929	WAYPOINT	026	42.45905866	-76.47680154
176930	WAYPOINT	027	42.45880092	-76.47759447
176931	WAYPOINT	028	42.45878574	-76.47755457
176932	WAYPOINT	029	42.45882053	-76.47747318
176933	WAYPOINT	030	42.45880435	-76.47744586

Cornell Campus Tree Inventory				Date	Page		
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35				70			

Waypoint #s and Tree #s must be synchronized when tables are joined!



GPS “dead zones”



Ground-truthing: missing trees?

Cornell Campus Tree Inventory

- Species, DBH, and GPS for each tree
- 1st data taken – May 15, 2009 – 15 records
- May 26 to June 5 – 5898 records
- June 25 -- Initial data to Planning Dept
(7000 trees)
- Sept 22 – “Final” version of data delivered
(7900 trees)





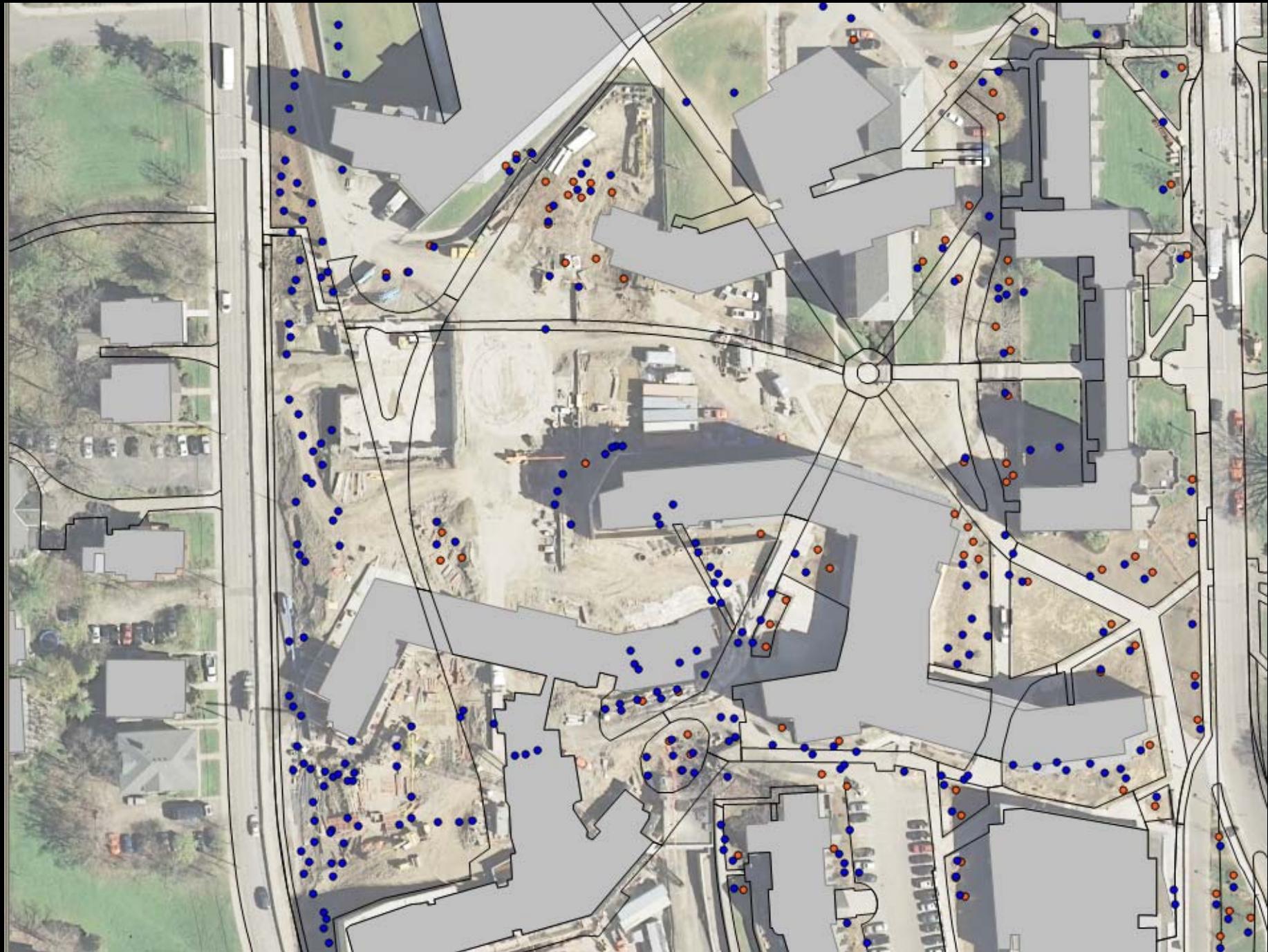








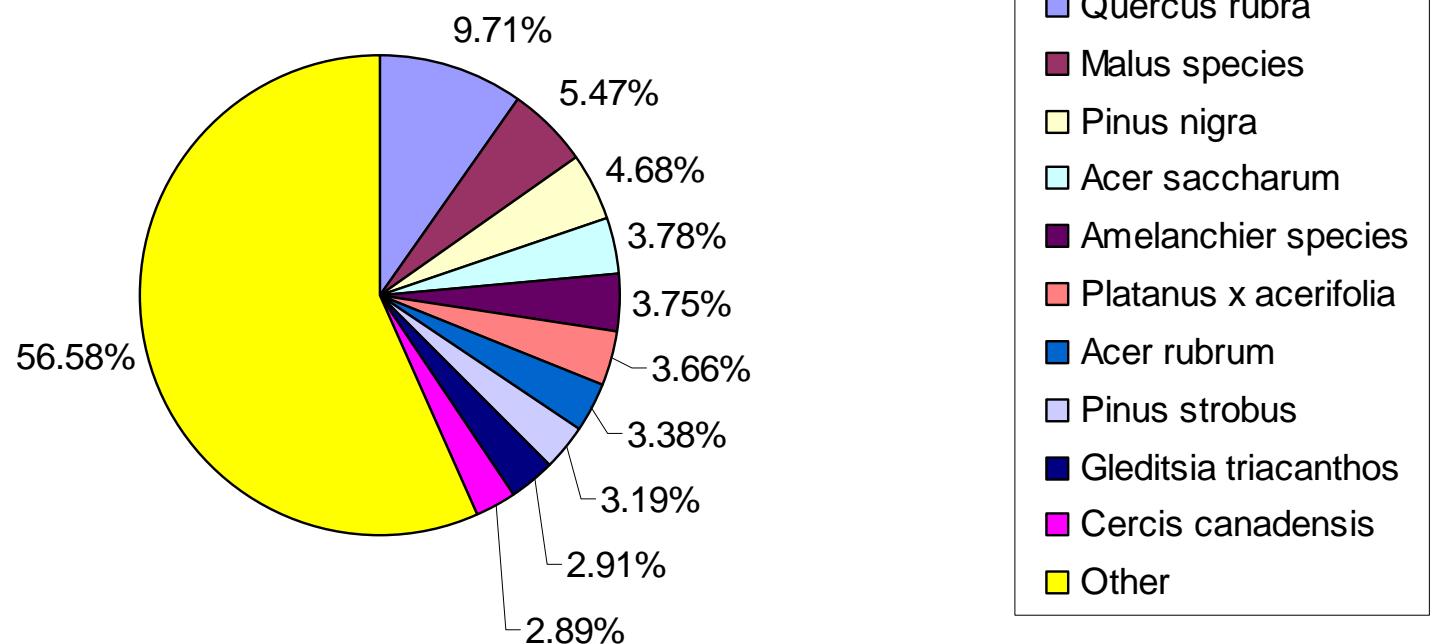






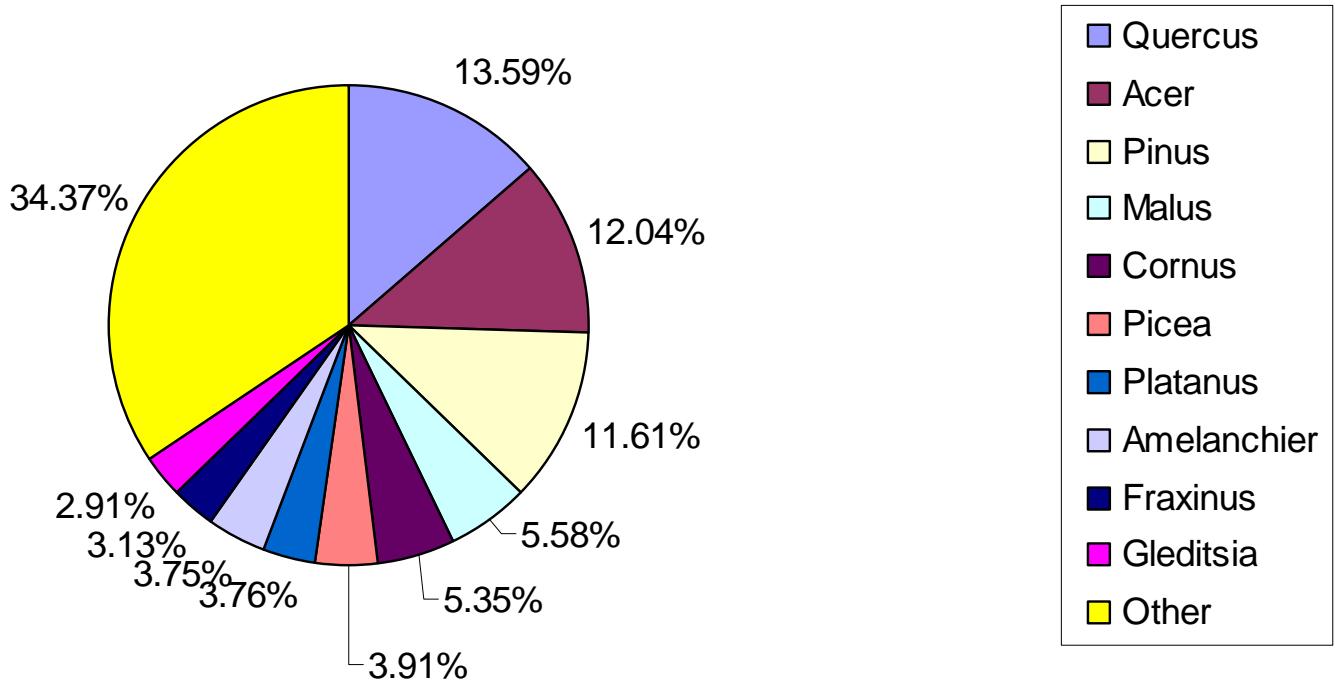
Cornell Campus Tree Inventory – Results

**Cornell Campus Tree Inventory 2009
10 Most Prevalent Species**



Cornell Campus Tree Inventory – Results

Cornell Campus Tree Inventory 2009 10 Most Prevalent Genera



Cornell Campus Tree Inventory – Results

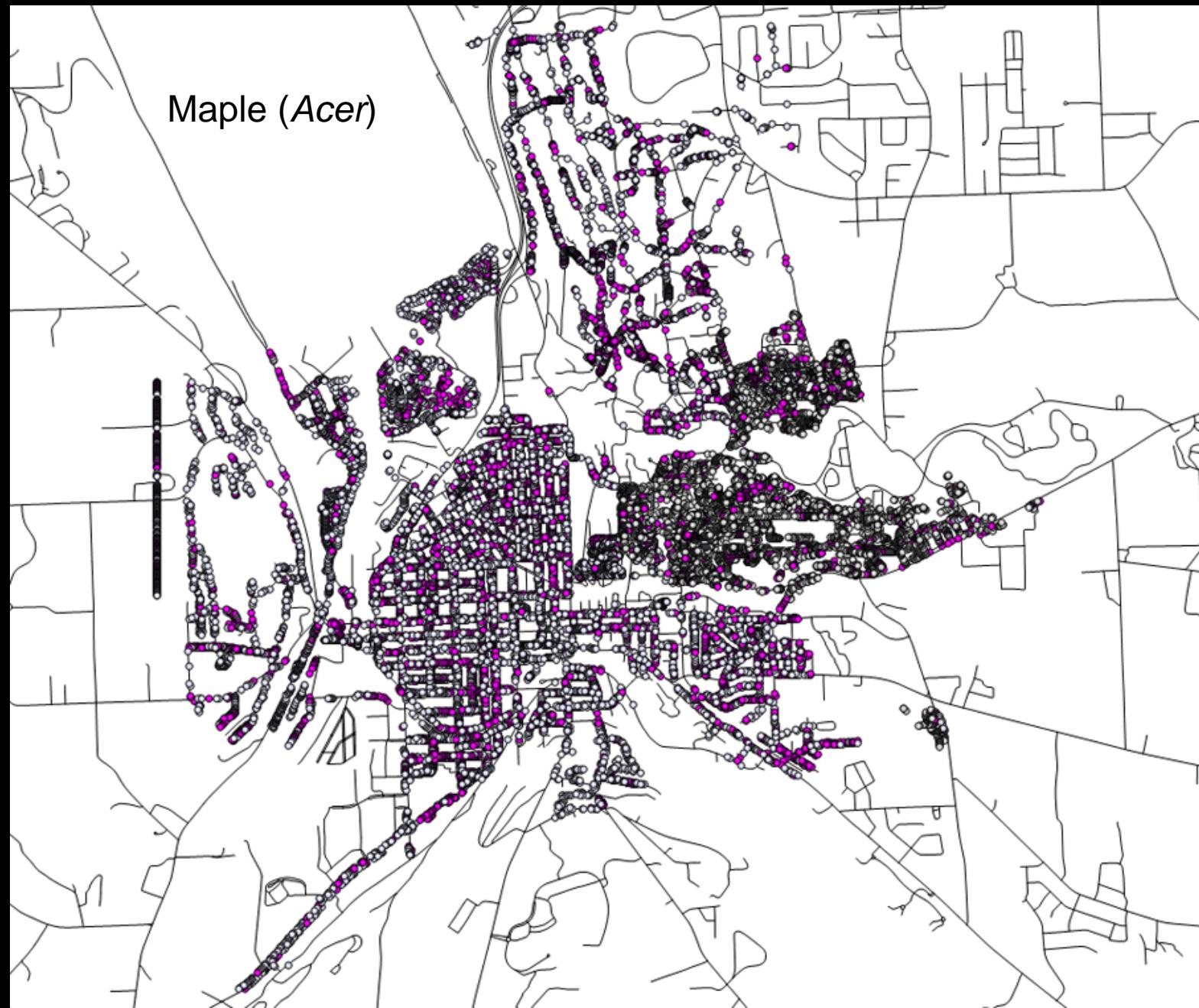
Species	Sequestered (lb)	Sequestered (\$)	Decomposition Release (lb)	Maintenance Release (lb)	Total Released (\$)	Avoided (lb)	Avoided (\$)	Net Total (lb)
Quercus rubra	176,914	591	-31,859	-8,024	-133	220,019	735	357,049
Malus species	25,150	84	-6,450	-2,786	-31	39,886	133	55,799
Pinus nigra	16,772	56	-5,054	-2,909	-27	52,555	176	61,363
Acer saccharum	37,419	125	-9,471	-2,345	-39	47,832	160	73,435
Amelanchier species	15,699	52	-3,011	-1,207	-14	16,020	54	27,500
Platanus x acerifolia	25,742	86	-3,730	-2,190	-20	51,697	173	71,520
Acer rubrum	16,149	54	-3,551	-1,343	-16	24,275	81	35,530
Pinus strobus	7,861	26	-1,988	-1,703	-12	26,107	87	30,276
Gleditsia triacanthos	24,971	83	-7,364	-1,741	-30	54,288	181	70,155
Cercis canadensis	14,122	47	-3,008	-1,007	-13	13,308	44	23,414
Picea abies	8,722	29	-2,389	-1,613	-13	28,768	96	33,488
Fraxinus pennsylvanica	10,551	35	-1,873	-1,047	-10	23,574	79	31,204
Pinus resinosa	9,394	31	-3,087	-1,504	-15	29,357	98	34,160
Tsuga canadensis	12,994	43	-2,559	-941	-12	12,644	42	22,138
Cornus florida	7,362	25	-1,492	-562	-7	7,400	25	12,708
Cornus mas	16,725	56	-4,495	-945	-18	12,804	43	24,090
Cornus kousa	9,555	32	-2,044	-639	-9	8,512	28	15,384
Acer platanoides	27,720	93	-4,796	-1,142	-20	24,236	81	46,018
Thuja occidentalis	10,081	34	-1,769	-752	-8	9,086	30	16,646
Prunus sargentii	8,675	29	-1,863	-605	-8	8,053	27	14,260
Acer x freemanii	8,019	27	-1,506	-671	-7	12,064	40	17,906
Syringa reticulata	16,919	57	-4,842	-872	-19	12,014	40	23,219
Magnolia x soulangiana	10,683	36	-2,758	-616	-11	8,382	28	15,691
Crataegus crus-galli	6,404	21	-1,481	-449	-6	6,038	20	10,512
Other street trees	302,447	1,010	-64,839	-18,156	-277	429,708	1,435	649,160
Citywide total	827,049	2,762	-177,279	-55,770	-778	1,178,629	3,937	1,772,628

Cornell Campus Tree Inventory – Results









Maple (*Acer*)



Community
Forestry
Program
Work Team,
Cornell Univ.



[Community Forestry
Home Page](#)

[Community Forestry Planning](#)

- [Developing a Master Plan](#)
- [Acknowledgments \(work team members\)](#)

Conducting a Street Tree Inventory

- [Street Tree Project History](#)
- [Hiring the SWAT Team](#)
- [Using the Inventory](#)
 - [Inventory Methodology](#)
 - [Using Excel 2003](#)
 - [Using Excel 2007](#)
 - [Using STRATUM](#)
- [Updating the Inventory](#)

[Resources](#)

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Community Forestry Conducting a street tree inventory

Introduction

This program offers smaller communities in New York State a cost-effective opportunity to obtain an inventory of all trees and planting spaces within the municipal right-of-way. Having an inventory is essential to developing a master plan to promote the long term health of the community forest and maximize the benefits it provides. Depending on the size of your community and the availability of personnel, the SWAT Team can be hired to conduct an inventory. Consult the pages in this section to learn more about the SWAT approach to street tree inventories and to determine whether a SWAT inventory would be appropriate for your community.



Student Weekend Arborist Team (SWAT) - In 1 or 2 weekend days, trained groups of individuals consisting of Cornell University students and Master Gardeners from Cooperative Extension perform an inventory of your community trees for a fee plus expenses:

Cornell Campus Tree Inventory



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