Statewide Urban Forest Inventory

Integrating 3 Levels of Data to Optimize Management

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Overview

- Where we've been
  - Traditional Urban Forestry
  - Traditional State Programs
- Shifting our viewpoint
  - Wisconsin's Urban Forests
  - Wisconsin's New State Strategy
- Where we are going
  - Developing a New System Framework
  - Question and Answer

Traditional focus – public trees

Traditional Inventory: Individual trees

- Street Trees
- Park Trees

Traditional Management: The care of a population of individual public trees

- Planting
- Maintenance
- Removal

Traditional State UF Programs

Assist communities to develop public tree management programs

- Staff
- Ordinance
- Advocacy
- Inventory & Management Plan

Traditional State UF Inventories:

Assessment of community <u>programs</u>

- **S**taff
- Budget
- **O**rdinance
- **A**dvocacy
- Inventory & Management **P**lan
- Operations

Two national measures:

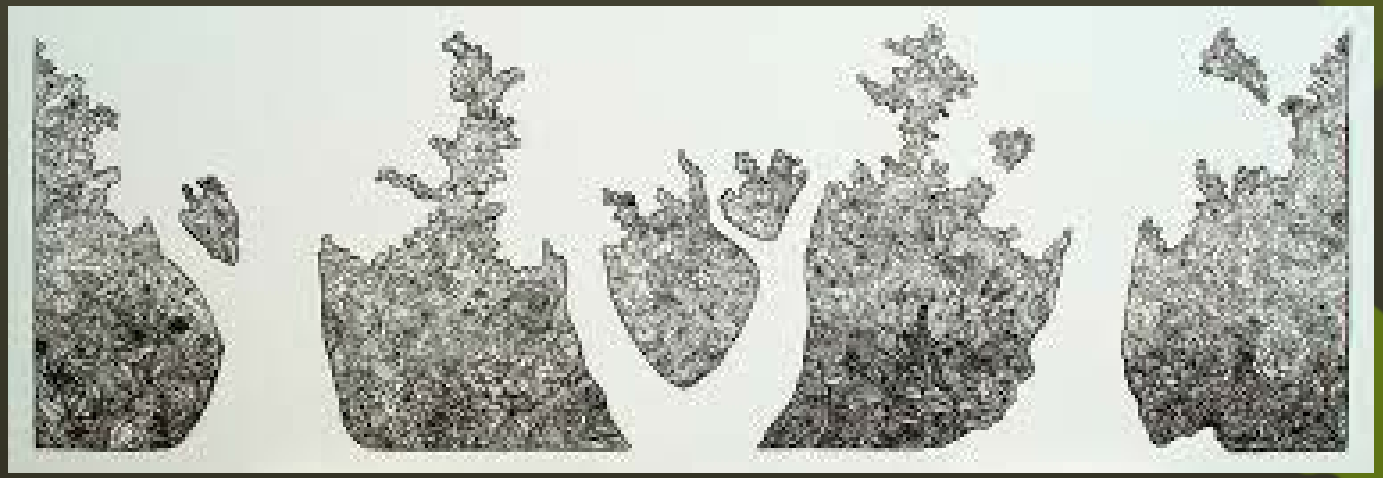
- CARS – "SOAP"
- Tree City USA

Result:

State urban foresters became program managers not forest managers.

But WDNR's mission is to: Sustainably manage Wisconsin's forests to provide the full array of benefits...

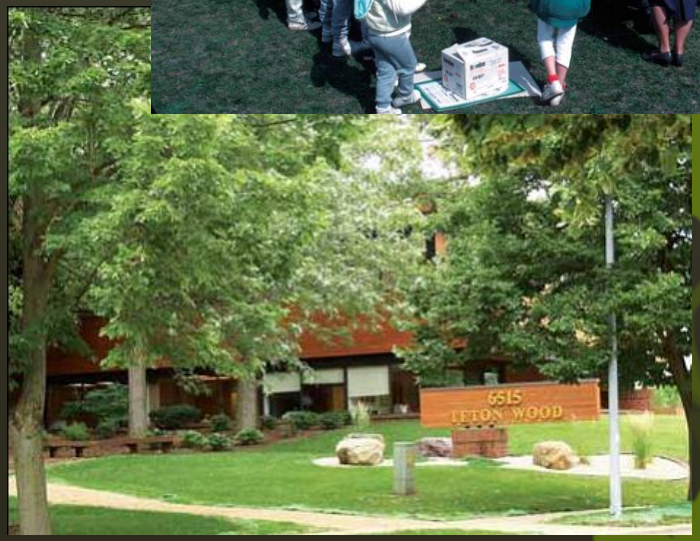
Shifting our Perspective



Shifting definition

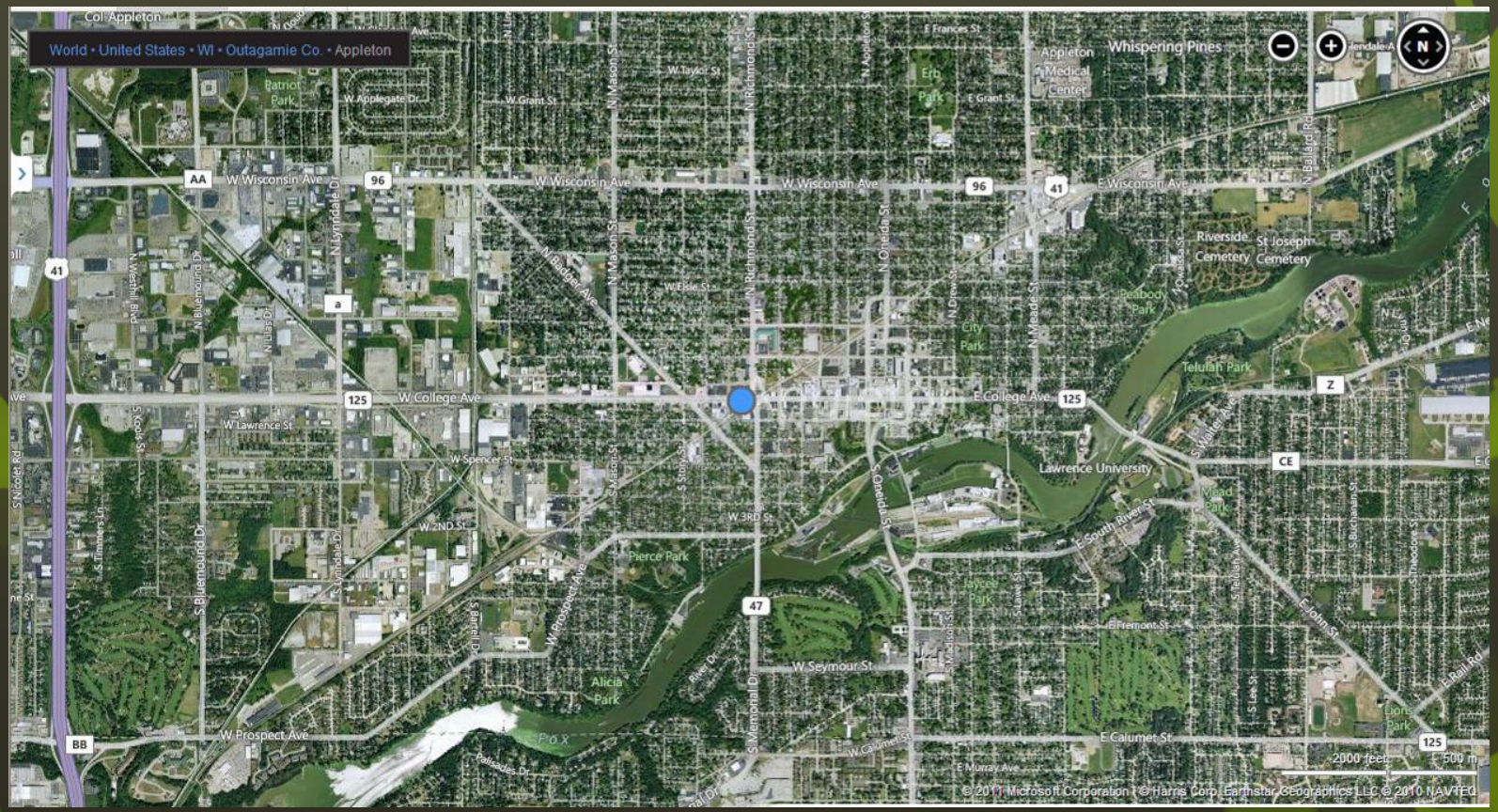
Urban Forest:
All the trees and other vegetation in and around a city, village or town development.

It includes all the trees:



Shifting view from street to air:

The urban forest is a canopy of green.



Shifting purpose from How to How and Why

Environmental benefits

- Erosion control
- Air purification
- Storm water management
- Energy/CO_2 reduction

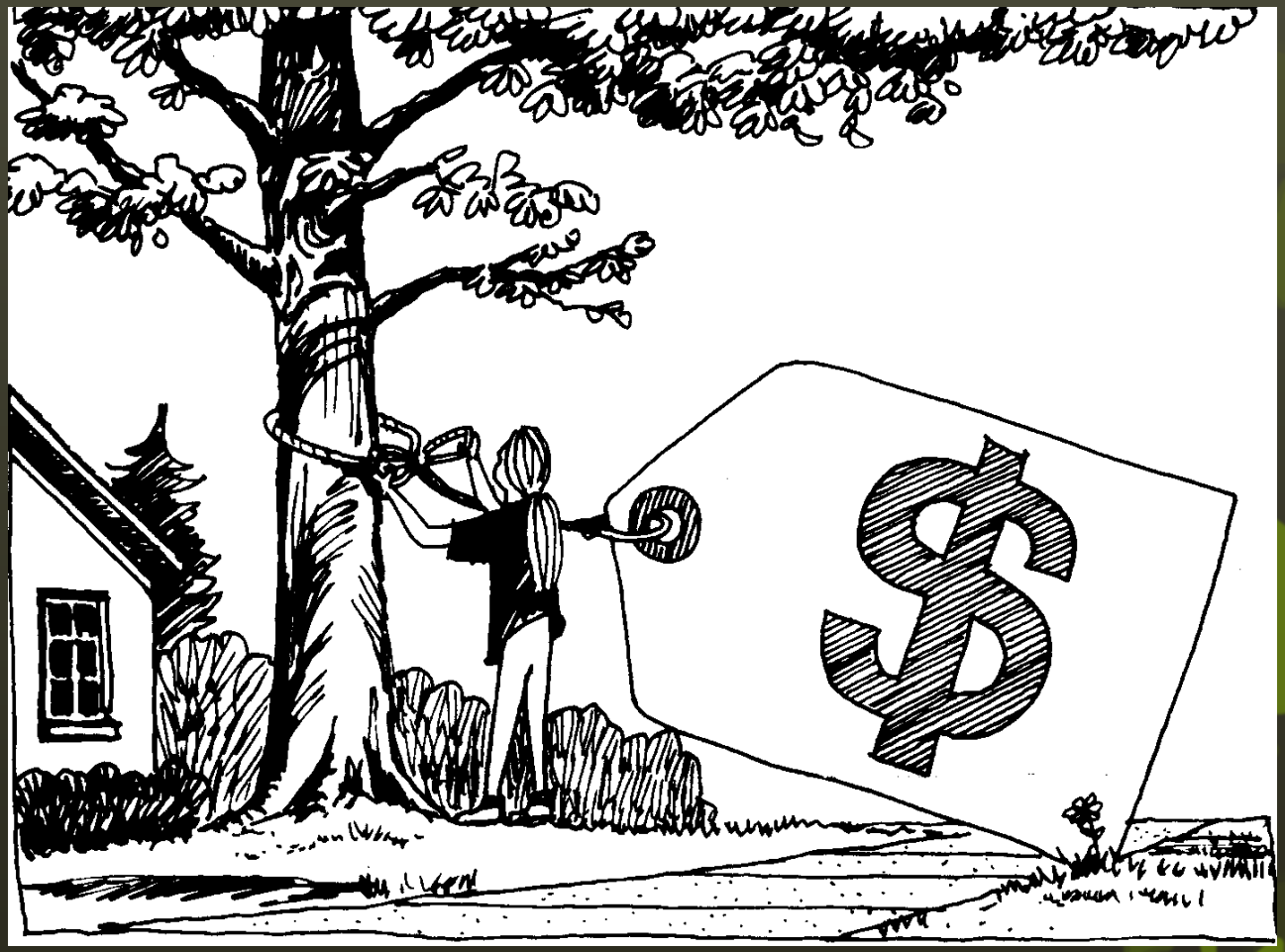
Economic benefits

- Higher property values
- Environmental savings
- More money spent
- Jobs

Social benefits

- Human health
- Lower crime
- Sense of Place
- Beauty

How do we quantify all this?



NATIONAL FOREST HEALTH MONITORING PROGRAM

Wisconsin Street Tree Assessment 2002-2003

United States
Department of Agriculture
Forest Service
Northeastern Area
State and Private Forestry
NA–FR–02–08 Brief
December 2008

Street Tree Inventory

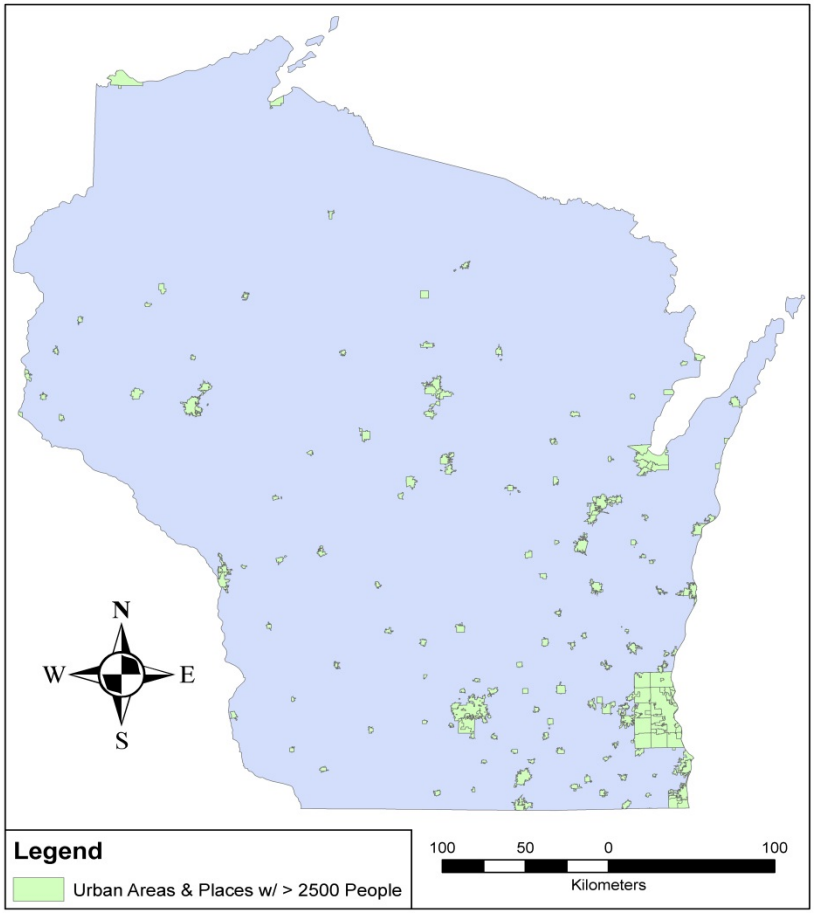
Urban Areas Sampled

- 1000 people / sq. mi.
- “Places” over 2500 pop

900 street segments

Forest character

UFORE value analysis



Value of Public Street Trees

1.1 Million Trees:

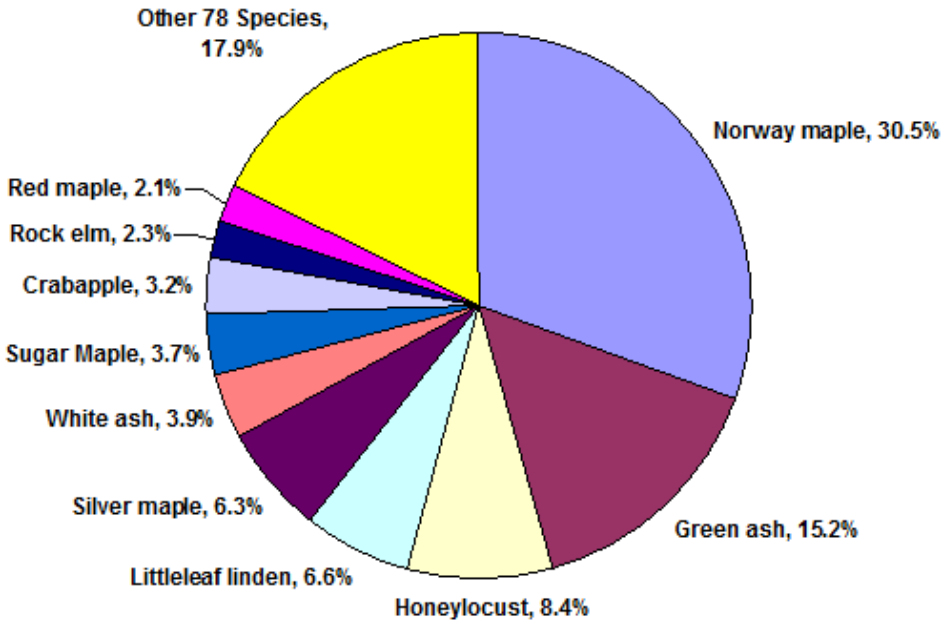
Replacement cost: $1.8 billion

Carbon Storage: $7.3 million

Carbon Sequestration per year: $200,000

Pollution Removal per year: $1.7 million

Risk: Species Diversity



88 Different Species

Maple – 44%; Ash – 20%

A Serendipitous Opportunity

National Forest Health Monitoring Program
Urban Forests of Wisconsin: Pilot Monitoring Project 2002

An Urban Forest Inventory

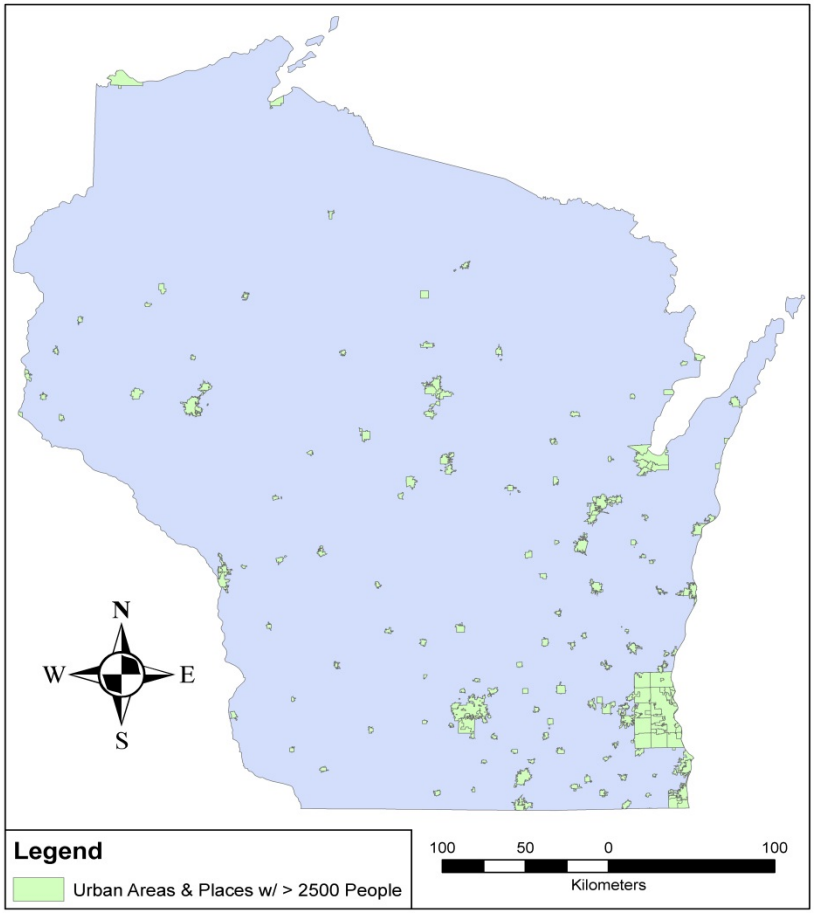
Urban Areas Sampled

- 1000 people / sq. mi.
- “Places” over 2500 pop

111 plots crossing all ownerships

Forest character

UFORE value analysis



Value to Communities of all Public and Private Trees

27 Million Trees:

Replacement cost: $10.9 billion

Carbon Storage: $41 million

Carbon Sequestration per year: $2.9 million

Pollution Removal per year: $36.3 million

Additional Benefits Provided by Private Trees

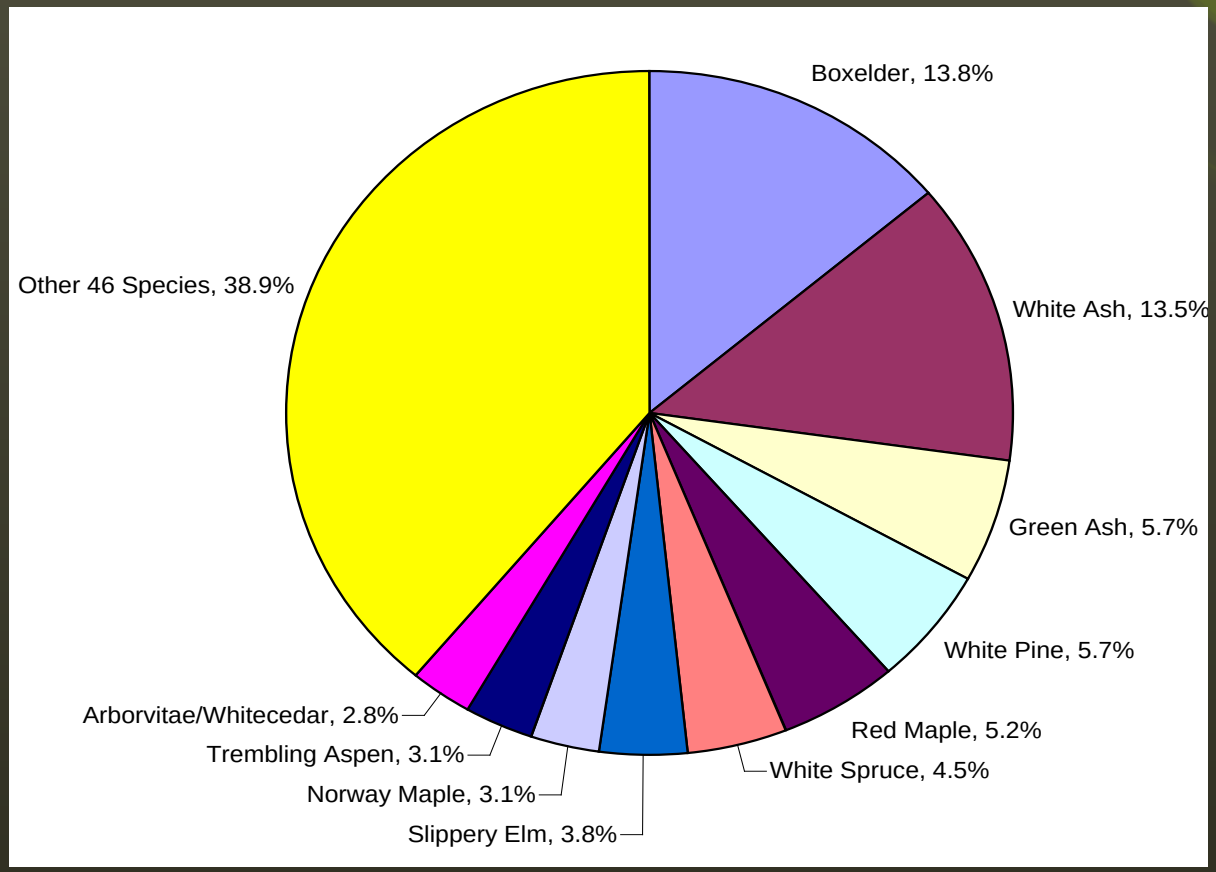
Shading of buildings:

Reduced Heating Costs per year: $13 million

Reduced Cooling Costs per year: $11 million

Carbon Emissions Avoided per year: $1 million

Risk: Species Diversity



56 Different Species

Maple – 23%; Ash – 20%

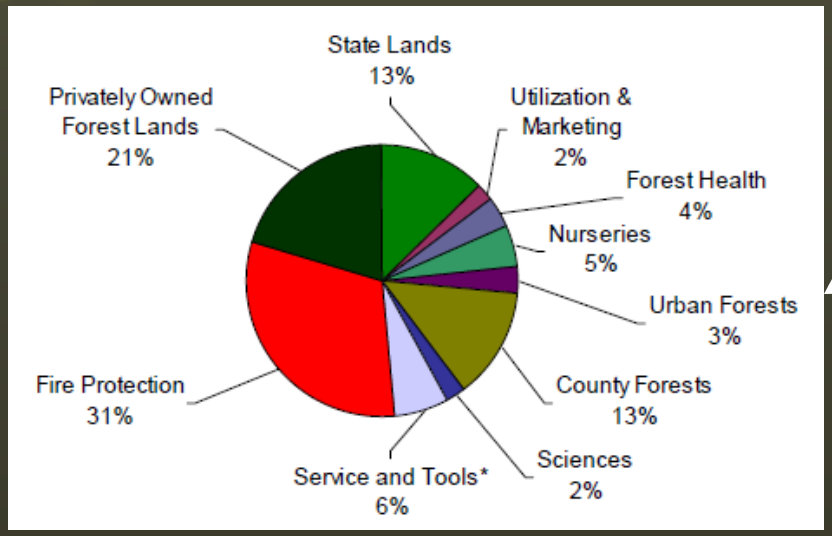
So What? Emerald Ash Borer!

- 5.2 million ash
- Value of the ash: $1.5 billion
- Removal & disposal: 2-3X
- Lost Canopy = Lost Benefits

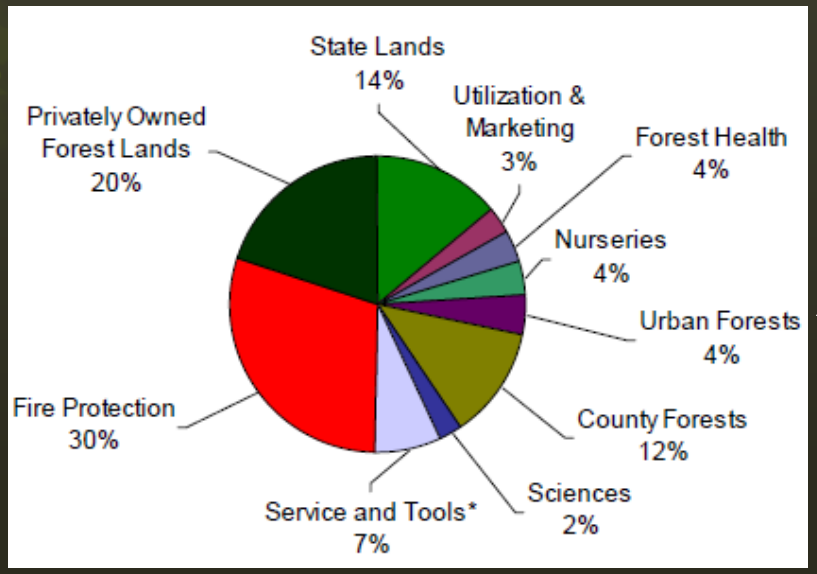
Conclusion:

- EAB is a major economic environmental and social risk

Data Captured Forestry Leaders:



Before – 3%



After – 4%

Value and Threat captured the Legislature:

WI Urban Forestry Grant Program

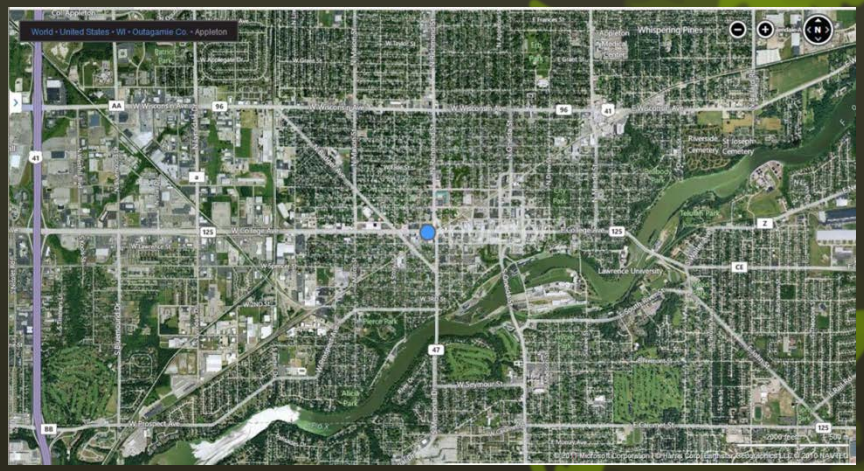
Before testimony: $0 (-100%)

After testimony: $524,400 (+99%)

These results changed our strategy

From: only helping community governments manage their public trees

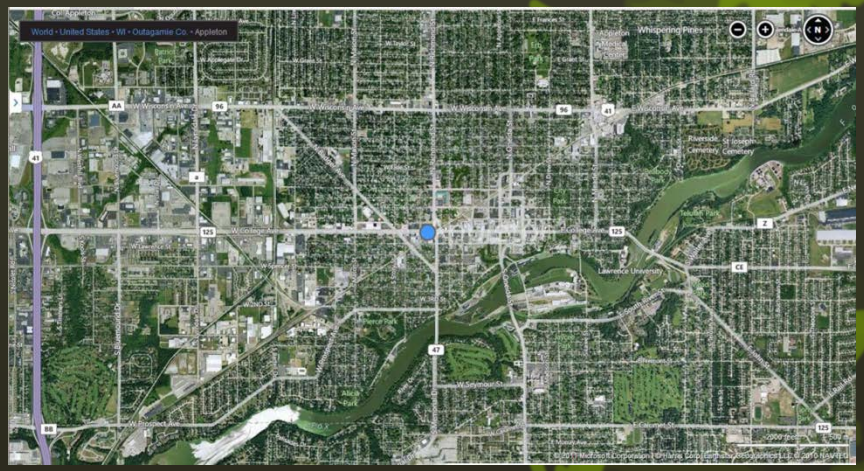
To: helping entire communities maximize benefits and services from their urban forest canopy



These results changed our policies

From: Funding tree management, e.g. planning, planting, maintenance, removal

To: Funding forest resilience, e.g. no grants for planting over-represented genera: maple & ash



Where are we going?

Developing a Wisconsin Continuous Urban Forest Inventory & Analysis System

Serendipity

- Re-measurement of 2002 Inventory
- Aggregated tree inventories (e.g. UFORHIC)
- Vibrant Cities & Urban Forests Task Force
- Farm Bill direction to the Forest Service
- Restructuring the WiDNR UF grant program

Ten-year Change in Value to Communities of all Public and Private Trees

	2002	2012
Area:	729,000 ac	933,000 ac
# of Trees:	27 million	43 million
Replacement cost:	$10.9 billion	$19.3 billion
Carbon Storage:	$41 million	$285 million
Carbon Seq./yr:	$2.9 million	$15 million
Pollution Rem. /yr:	$36.3 million	$27.1 million
Energy Savings:	$25 million	$86 million

Goals

- Manage a healthy statewide urban canopy in a sustainable manner to provide a full array of benefits for the people of Wisconsin.
- Our niche is to collect, collate and analyze data, prioritize statewide management goals based on that information and to provide this information to our partners to guide their management decisions.

Goals

- In order to do that, we need to:
  - To better understand and quantify those the benefits of a healthy urban forest
  - Monitor urban forest characteristics to help assess those benefits as well as forest health, resilience and sustainability etc.
  - Monitor and assess changes through time
  - Adapt as new technologies or data becomes available.

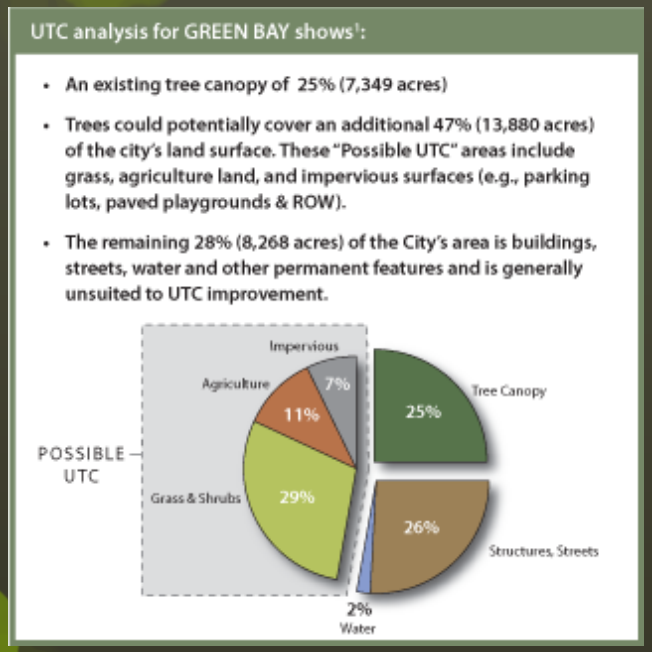
What do we really want to know, anyway?

- Some questions we already know:
  - Quantitatively, what is the urban forest canopy cover, and how does it change over time?
  - What is the canopy composition, and how does it change over time?
  - What are the reasons for canopy and composition change?
  - What is the value (and values) of the urban forest of this state?
  - Is our urban forestry program effective?

What do we really want to know, anyway?

- Some questions we don't already know:
  - What do our traditional clientele want to know?
    - Traditional timber volume and value estimation?
    - Applications in WUI?
    - Early pest and disease detection?
  - We will be soliciting input from our partners through the Urban Forestry Council to find out what questions need to be answered in order to best manage the State's urban forests

Factsheets

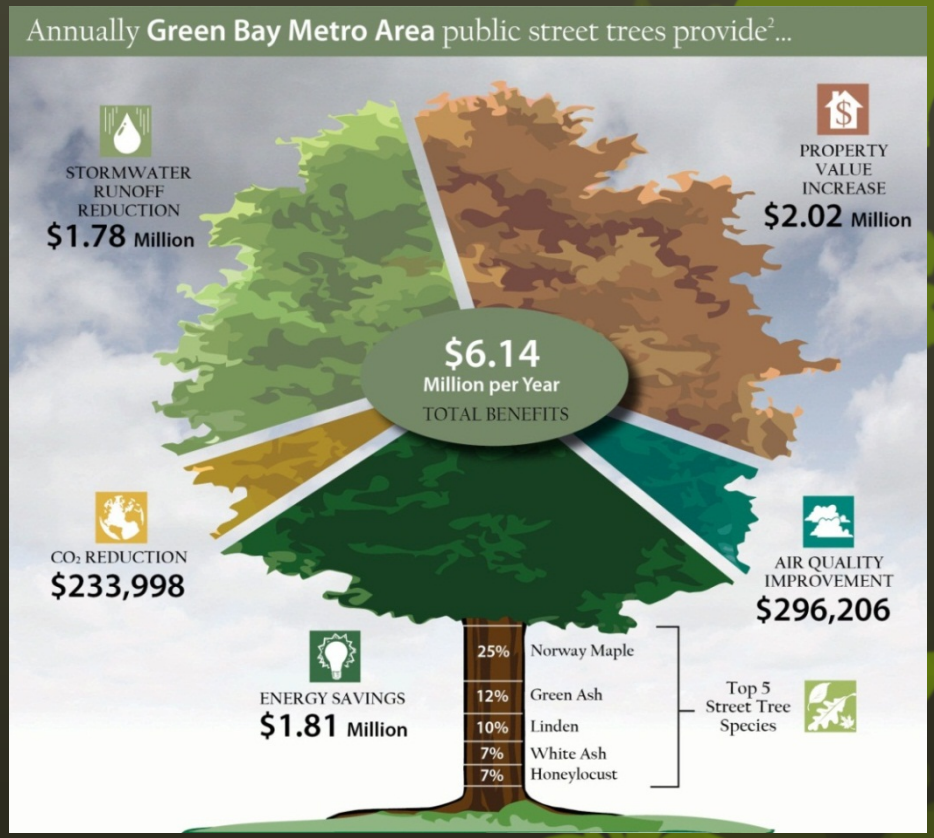


Green Bay Metropolitan Area

Annual Stormwater Benefits of All Trees by Zone

01/20/2012

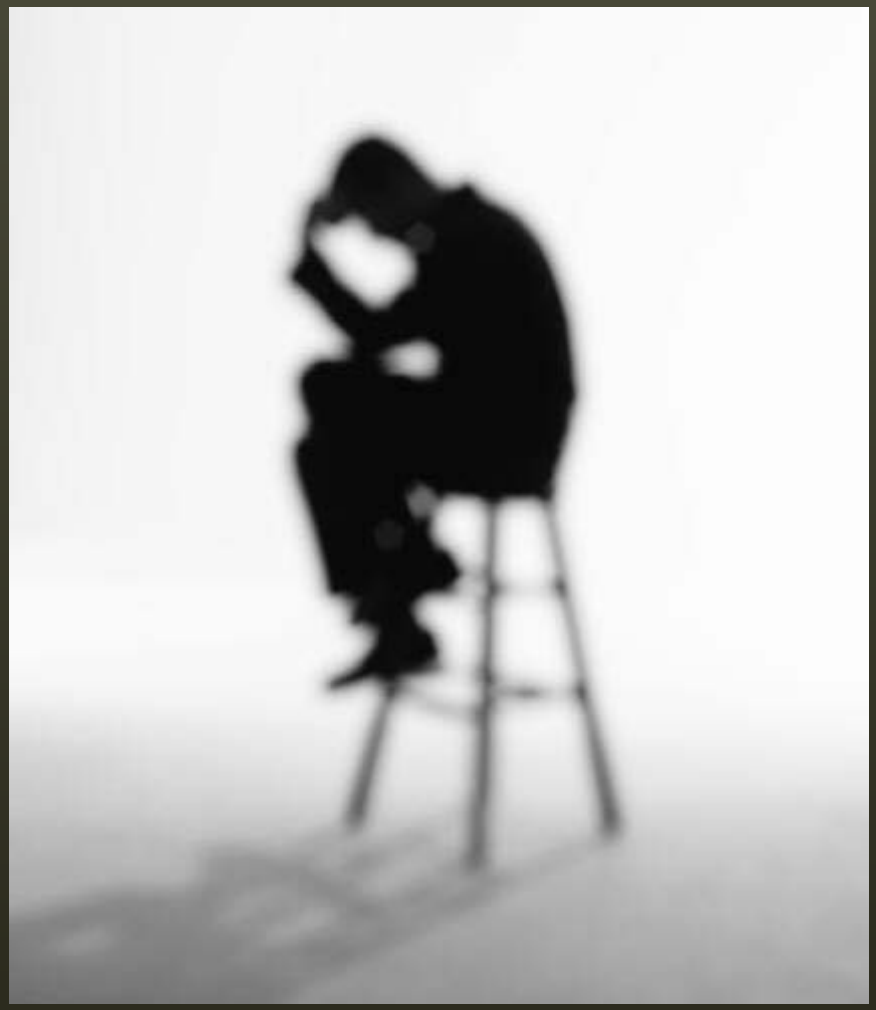
Zone	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
1 – Green Bay	42,827,625	1,160,709	(N/A)	51.3	65.2	34.70
2 - Ashwaubenon	5,303,908	143,746	(N/A)	9.2	8.1	23.93
3 - DePere	7,654,472	207,451	(N/A)	14.4	11.7	22.12
4 - Howard	1,666,519	45,166	(N/A)	10.3	2.5	6.70
5 - Bellevue	429,871	11,650	(N/A)	3.3	0.7	5.46
6 - Hobart	1,510,164	40,928	(N/A)	3.7	2.3	17.07
7 -Allouez	6,291,143	170,502	(N/A)	7.8	9.6	33.70
Citywide total	65,683,701	1,780,152	(N/A)	100.0	100.0	27.32



Pilot street tree and canopy analysis factsheets were created to stimulate community questions.

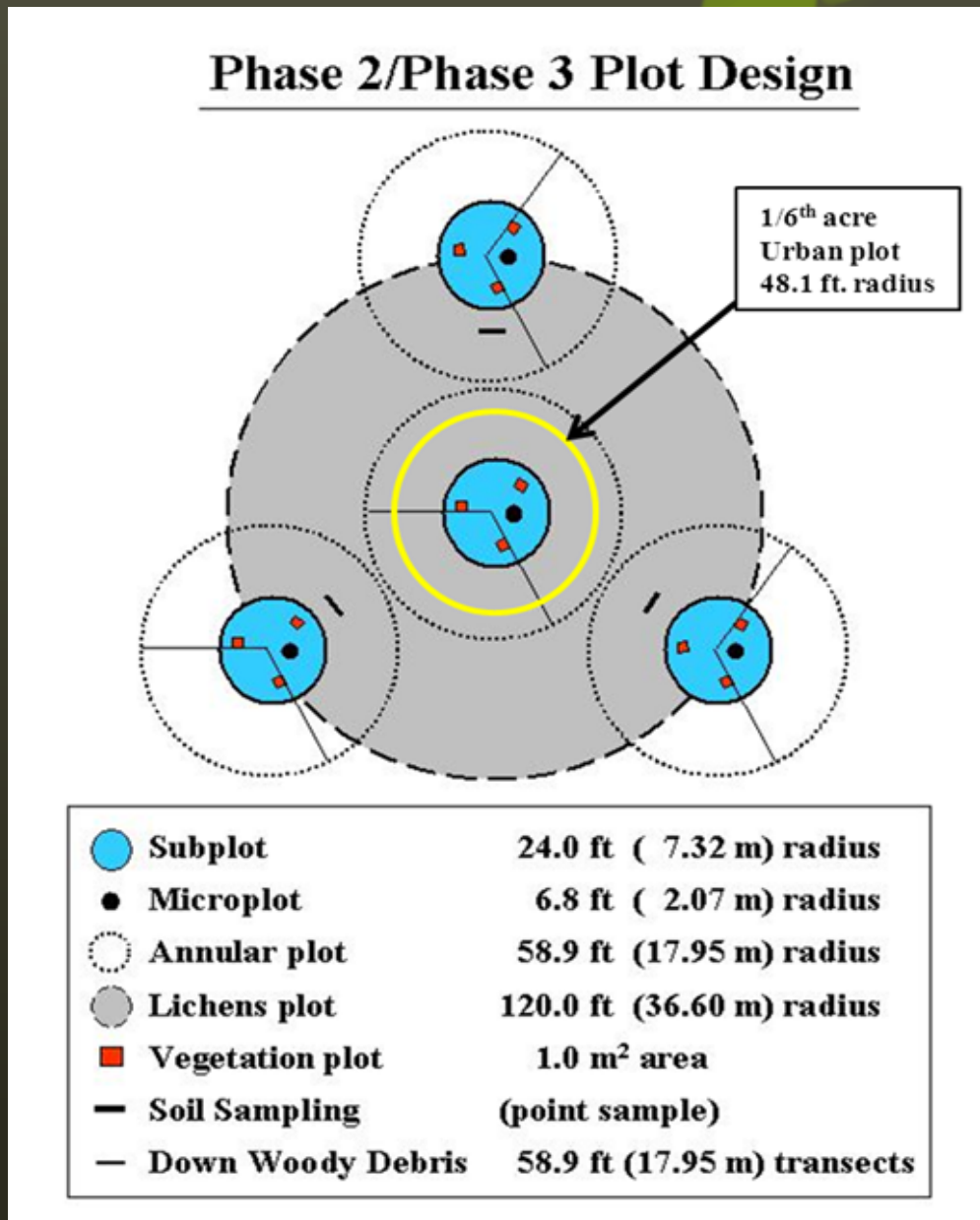
General framework

The “three legged stool”



"The first leg"

- Plot-based, continuous inventory and analysis on all ownerships to characterize the urban forest and its benefits

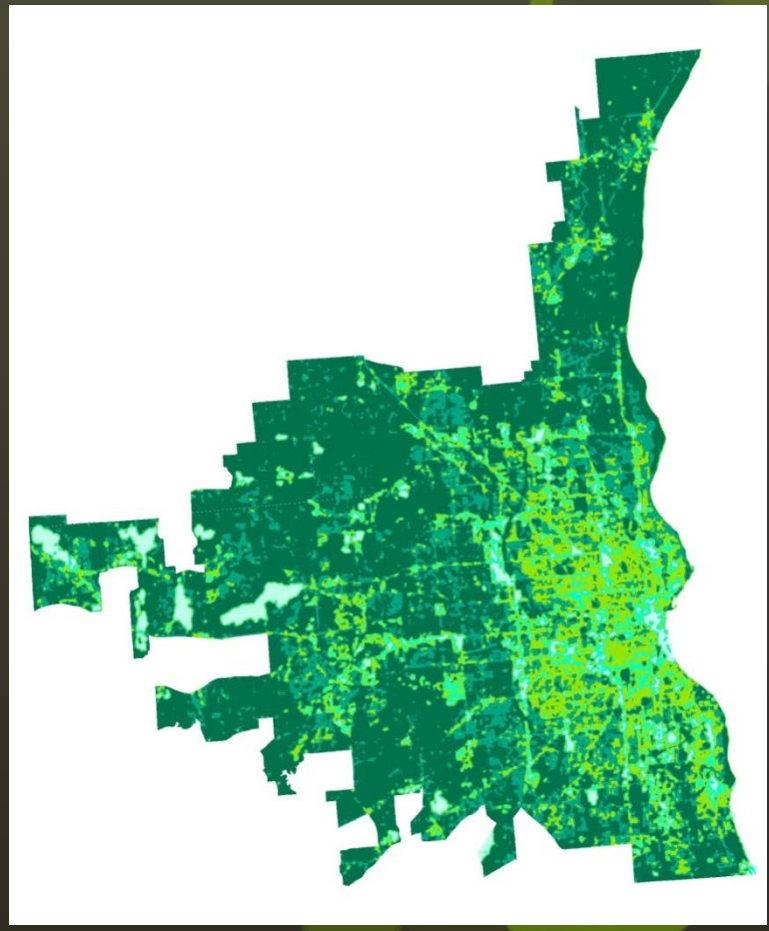


“The second leg”

- Aggregation of existing municipal tree inventories to advise municipalities
- These datasets are very useful in certain ways, but also have drawbacks
- Other data sources may also become available

“The third leg”

- Remotely sensed data to measure canopy change and spatially prioritize service



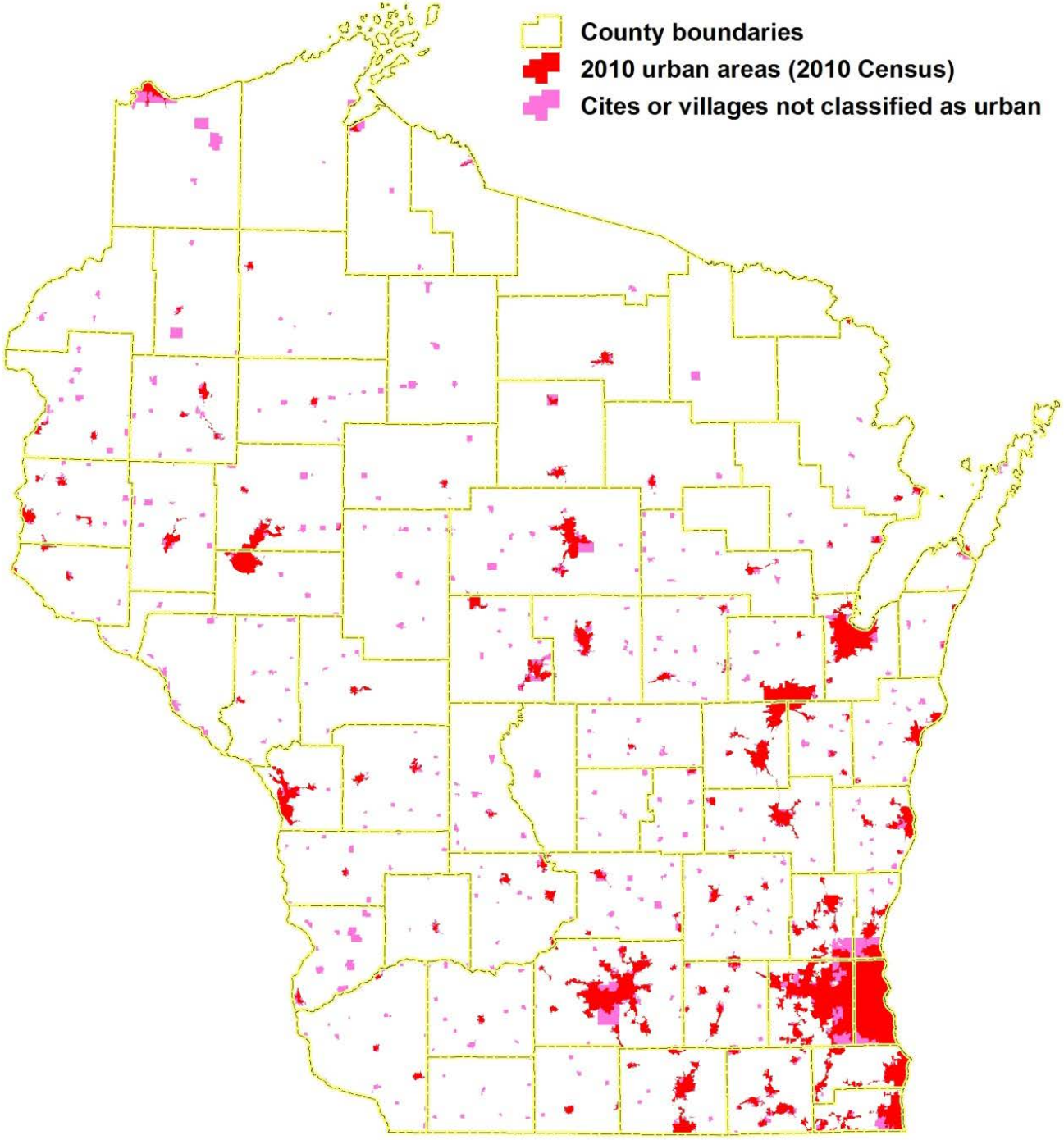
Synthesizing these datasets: a few ideas…

- Comparison of canopy cover and diversity across similar sized municipalities in a region
- Effect of storms, disease etc. on canopy cover and diversity
- Growth rates of differing species regionally
- Benefits (or lack thereof) of canopy and ecosystem services by demography
- EAB example

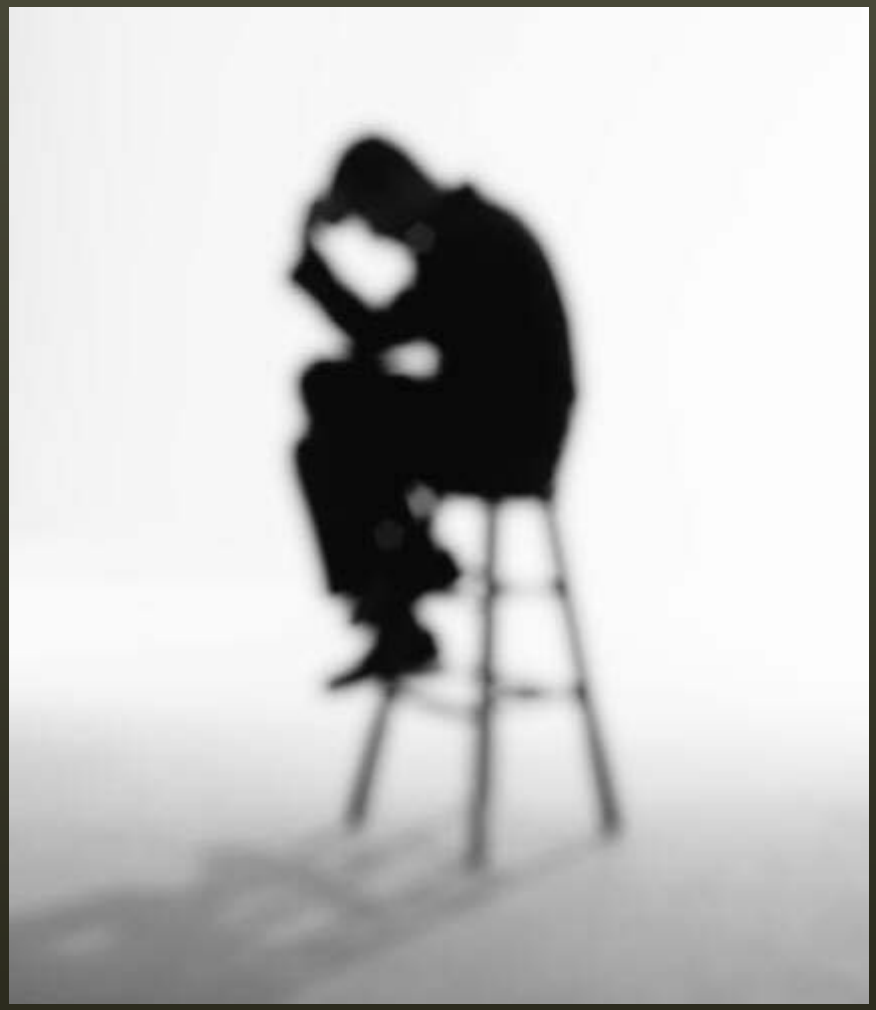
Timeline

- Municipal tree data aggregation is ongoing
- We are currently funding a study with UW-Madison about finding the most accurate, cost-effective method for assessing canopy via remotely sensed data, and expect to have a plan in place by the end of 2014
- In cooperation with the Forest Service, we will begin plot measurements in Milwaukee and Madison in the Spring of 2015
- We will begin expanding plots statewide in 2016

Issues


County boundaries
2010 urban areas (2010 Census)
Cites or villages not classified as urban

Issues

Syzygium grande - ‘Sea apple’

“The fourth leg?”