Emerald Ash Borer: Management and Challenges for Municipalities

March 13, 2014

Onondaga County Planning Federation

Presented by Jessi Lyons, David Coburn, Mark Burger & Stephen Harris

David Cappaert, Michigan State University, bugwood.org

Emerald Ash Borer Management and Challenges for Municipalities

Jessi Lyons- jel264@cornell.edu

Natural Resources Team Coordinator

Cornell University
Cooperative Extension
Onondaga County

The Emerald Ash Borer is a small green beetle whose larva feed on the living tissue of ash trees between the bark and the wood.

Once infested, the tree is killed in 2-7 years.

Howard Russell,
Michigan State University,
Bugwood.org

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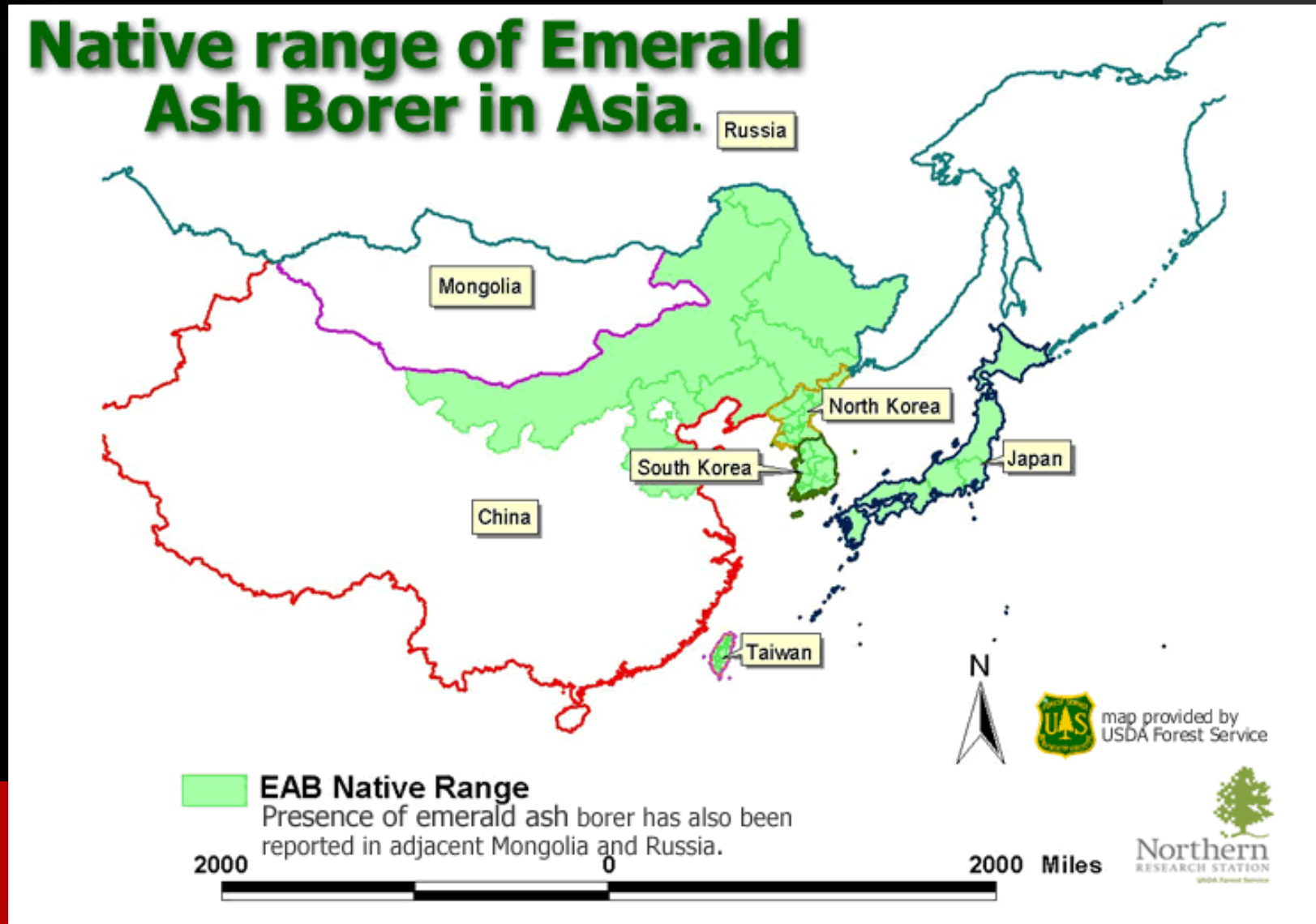
EAB is native to Asia

The emerald ash borer is native to eastern Russia, northern China, Japan and the Korean peninsula.

Before 2002, EAB had never been found in North America.

It's now also spreading devastation to Europe.



Karen Snover-Clift, Cornell University

Francis Gwyn Jones, Bugwood.org

EAB likely entered the US in the early 1990s in solid-wood packing material used to transport manufactured goods from China.

The initial population was small and went unnoticed until 2002 when it was first discovered killing native ash trees in Detroit, Michigan.

Ash and only Ash – Fraxinus sp.

Keith Kanoti, Maine Forest Service, Bugwood.org

green ash

Fraxinus pennsylvanica

Tom DeGomez
University of Arizona
Bugwood.org

- **White Ash, Green Ash, Black Ash, Blue Ash**
- **Other species of ash across the world are all being decimated**
- **Mountain Ash is *Sorbus sp.*, and EAB will NOT eat *Sorbus***

American mountain ash

Sorbus americana

- Most damage is done in the fall and early winter before pupation
- Adults emerge after 450 degree days.
- Usually in late June, when black locust start to bloom

black locust

Robinia pseudoacacia)

Vern Wilkins
Indiana University
Bugwood.org

When infested wood is moved, what might take 10 years is achieved in an afternoon

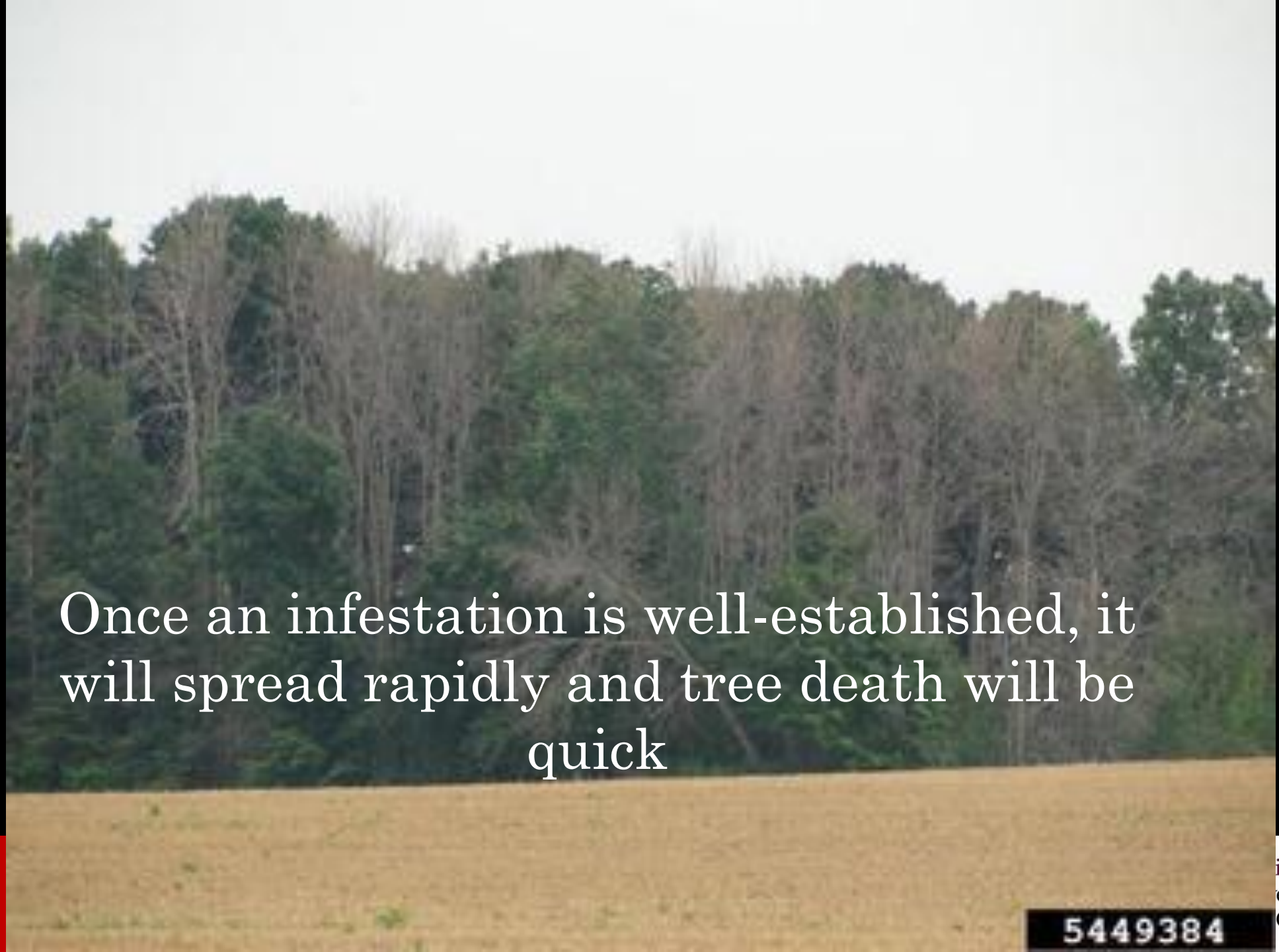
- Populations grow exponentially
- Adults lay 60-90 eggs
- They only travel 0.5 miles, rarely up to 12 miles

Detection is Difficult

It may take 2+ years to detect an infestation, then it's often too late to treat the tree.

Symptoms are similar to "ash yellows" and other insects.

This tree was looks like many others in the region, and likely has been infested just 2 or 3 yrs.



Once an infestation is well-established, it will spread rapidly and tree death will be quick

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e Extension
County

Ash trees infested with EAB break down quickly and fall apart in large pieces, or often from the base of the tree. This 90 ft tall tree lost the top 60 ft

In 2009, a golf course mechanic experienced in tree felling and pruning was killed when the dead ash he was cutting fell unpredictably because of the decayed wood.

EAB is a Public Health Hazard

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An ash tree in Ohio, dead from EAB, fell on a moving school bus, injuring 5 children and the driver

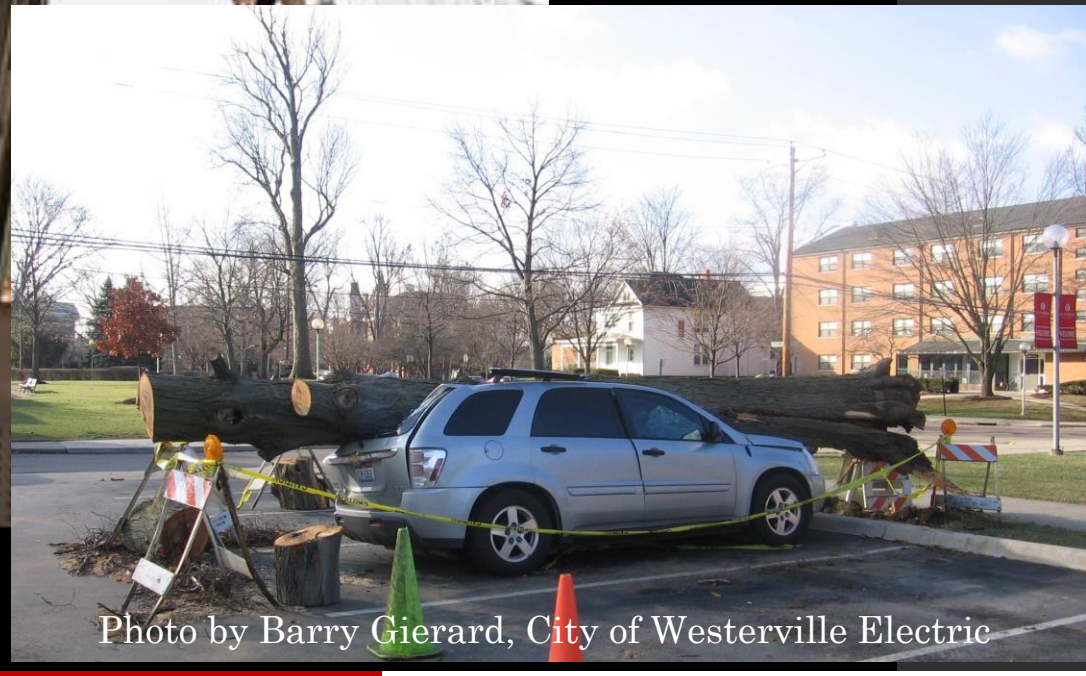

Photo by Barry Gierard, City of Westerville Electric

EAB is a Public Health Hazard

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National Grid reports that utility managers in Ohio expect 3 days of power outages after windstorms over 30 mph in areas infested with EAB

EAB is a Public Health Hazard

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Dead ash begin dropping large branches after being dead for only one year. These trees must be removed quickly to minimize the hazard posed to public health.

Mark Whitmore, Cornell University

Dead and dying ash trees pose a direct **public health hazard** particularly in urban areas.

Home values and community character will decrease as trees are removed.

EAB is a Public Health Hazard

We can’t afford to ignore EAB

When Emerald Ash Borer infests a tree, the tree will die without treatment.

Resistant trees *have not* been documented.

It won’t skip over your trees.

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Removal and Replacement Costs

In 2009 the US Forest Service estimated that the cost of removal and replacement of trees in affected communities will be over $10.7 billion, with 17 million trees removed.

That estimate is doubled if you include developments outside human communities – rural roads, airports, industrial parks, etc.

They found that pesticide treatment can efficiently postpone these costs.

EAB will be expensive

OPEN ACCESS Freely available online

PLoS one

Economic Impacts of Non-Native Forest Insects in the Continental United States

Juliann E. Aukema[1*], Brian Leung[2,3], Kent Kovacs[4], Corey Chivers[2], Kerry O. Britton[5], Jeffrey Englin[6], Susan J. Frankel[7], Robert G. Haight[8], Thomas P. Holmes[9], Andrew M. Liebhold[10], Deborah G. McCullough[11], Betsy Von Holle[12]

Costs of Emerald Ash Borer Damage (and invasive borers in general), and the percent of the total cost that each will be responsible for.

Table 1. Annualized damage in U.S. $1,000,000 associated with each guild and cost category.

Guild	Federal Government Expenditures	Local Government Expenditures	Household Expenditures	Residential Property Value Loss	Forest Landowner Timber Loss
BORERS ($N = 71$, $N_i = 14$)					
Poster: emerald ash borer damages ($10^6)	38	850	350	380	60
Total damage ($10^6)	92 [62–97]	1700 [1100–1900]	760 [460–820]	830 [510–900]	130 [81–150]
Percentage of overall cost	2.3%	50.7%	20.9%	22.6%	3.6%

EAB will be expensive

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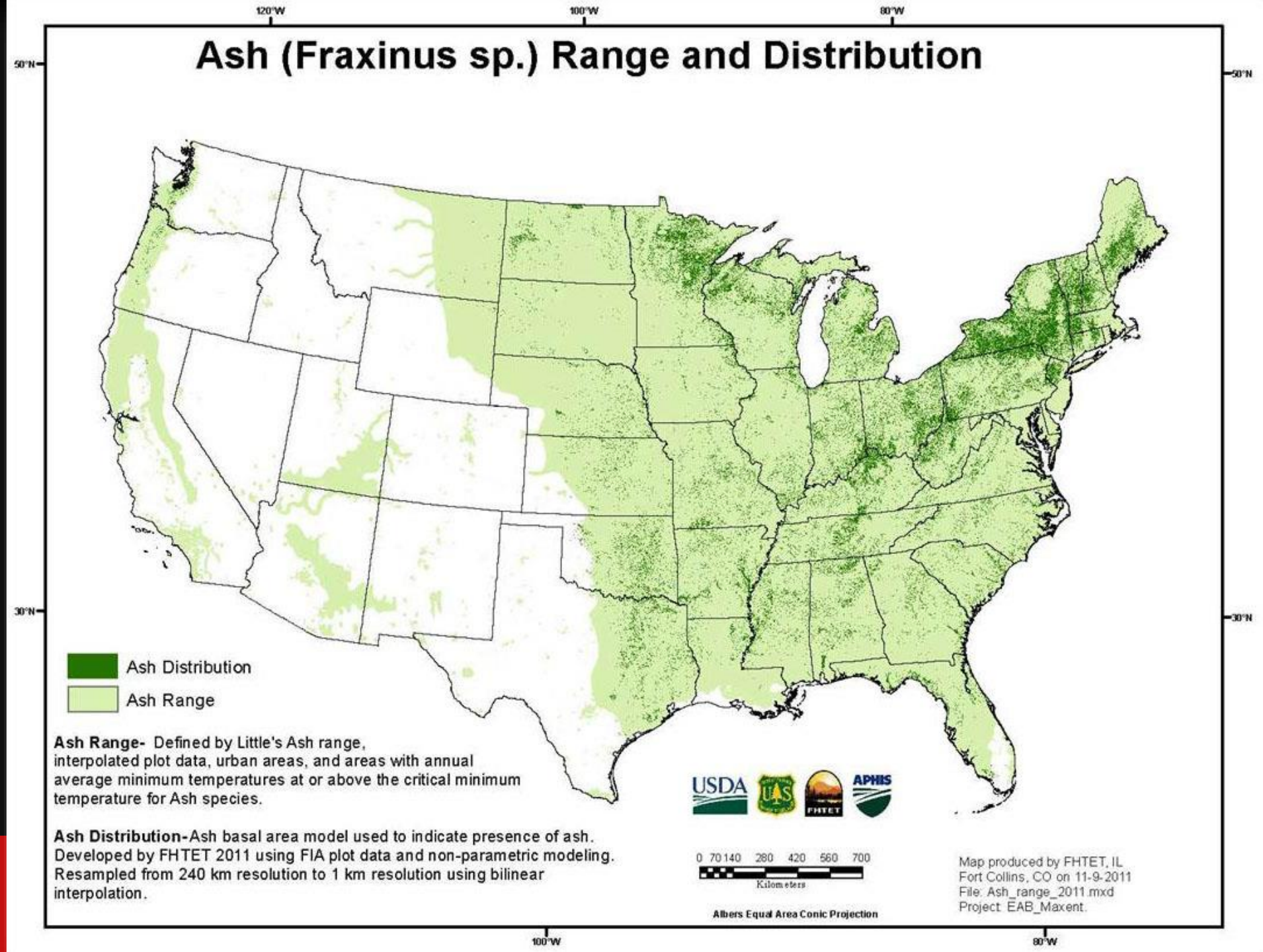
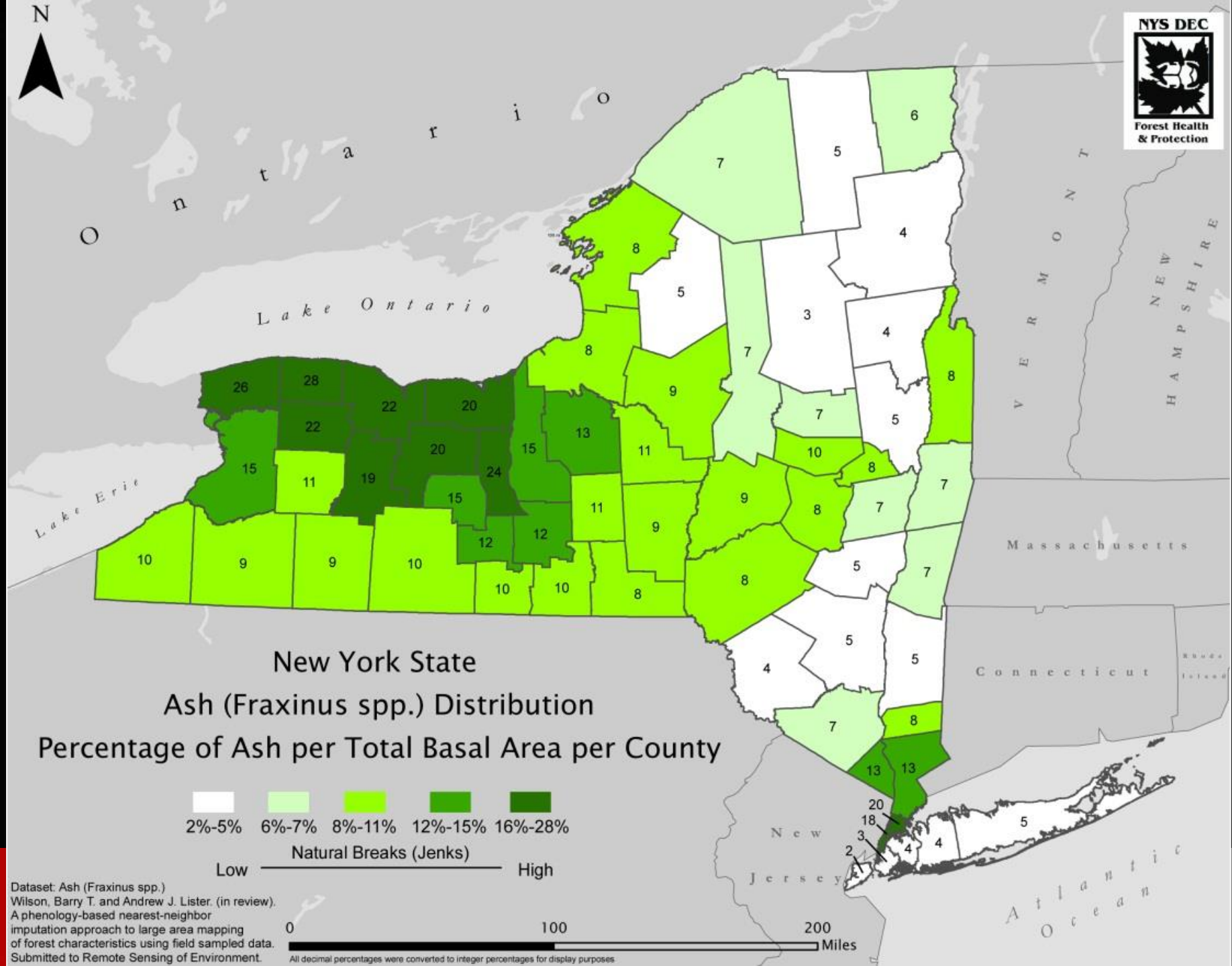
Ash are a prominent species in our landscapes

- Ash comprise roughly 5% of Syracuse street trees.
- Some blocks are nearly 50% ash.
- Ash are also prominent landscape trees on private property.

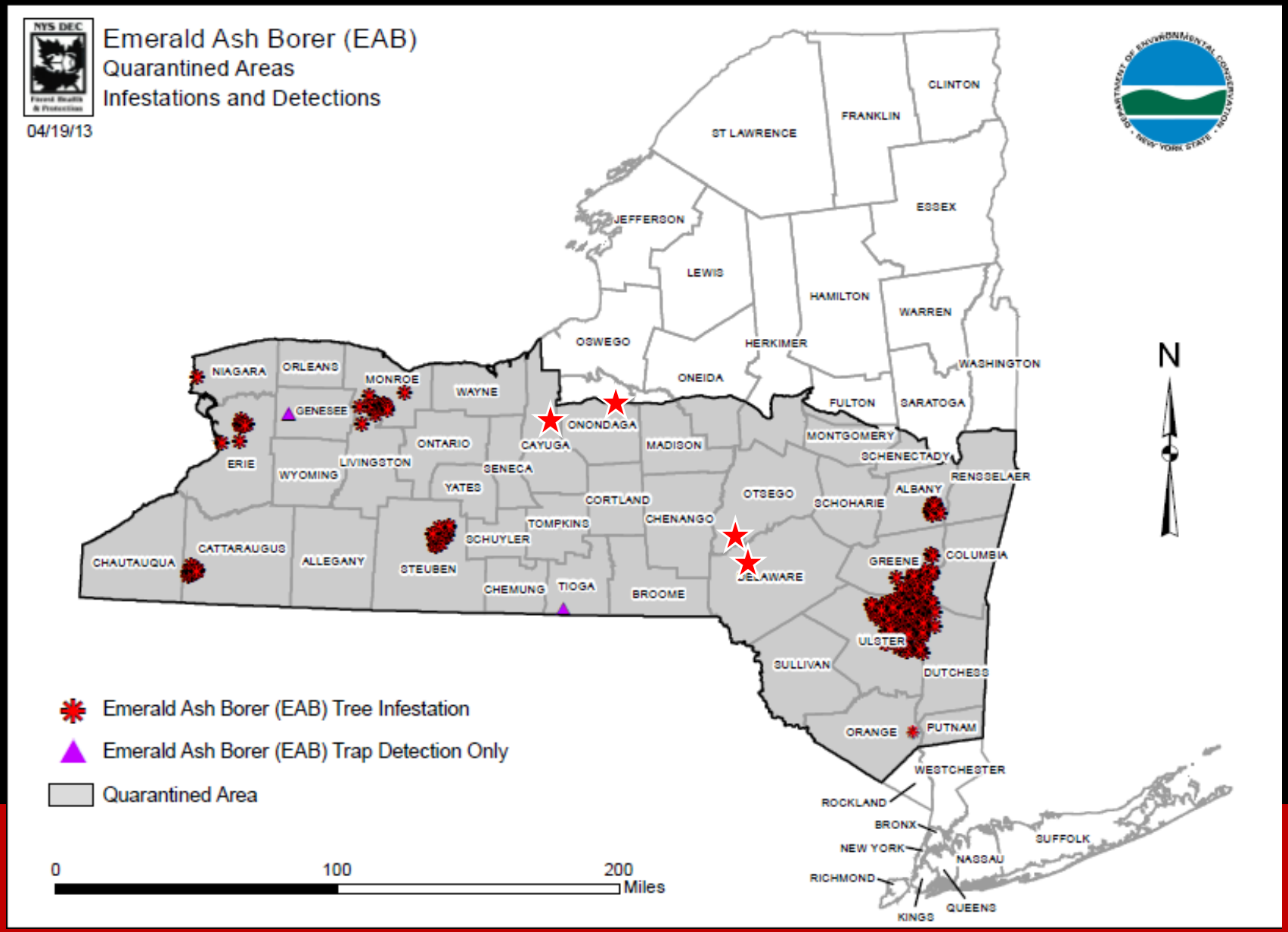
- Ash is all over the US
- The highest distribution of ash in the US is in New York State



- About 13% of all trees in Onondaga County are Ash
- The County north of I-90 has a much higher density of ash



Confirmed in Onondaga - July 2013



- Gray areas are currently quarantined
- Red are know infestations
- Stars are infestations found in 2013

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- Residential areas and parks tend to have more ash than streets, especially near wooded areas.
- Onondaga Lake Park has nearly 4,500 ash trees that will need to be managed.

EAB is an ecological Challenge

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“Black and green ash are keystone species in wetland ecosystems – Their loss could mean the loss of whole ecosystems” –www.nyis.info

Black ash is less common, but also has cultural importance to Native Americans.

Ash are an early successional species that compete with non-native invasives.

EAB is an ecological Challenge

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White ash are an upland species that serve as wildlife habitat and food source

EAB is an ecological Challenge

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Ash help to stabilize banks and absorb stormwater

As ash die we can expect more:

- bank erosion,
- sedimentation
- flooding caused by debris in waterways and less groundwater absorption

EAB is an ecological Challenge

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Retain & Replace Beauty

- Our hope is that we can retain tree canopy as long as possible
- Replacement can be coordinated with the timing of removal to ensure constant canopy
- Species diversity is critical to limiting future crises
- If not EAB, then what? If we remove all ash, then we just set ourselves up to have a denuded landscape when the next bad invasives arrives.

In Worcester, MA these maples were killed by Asian Long-horned beetles. EAB will cause a similar change to the character of our neighborhoods.

EAB is a Planning Challenge

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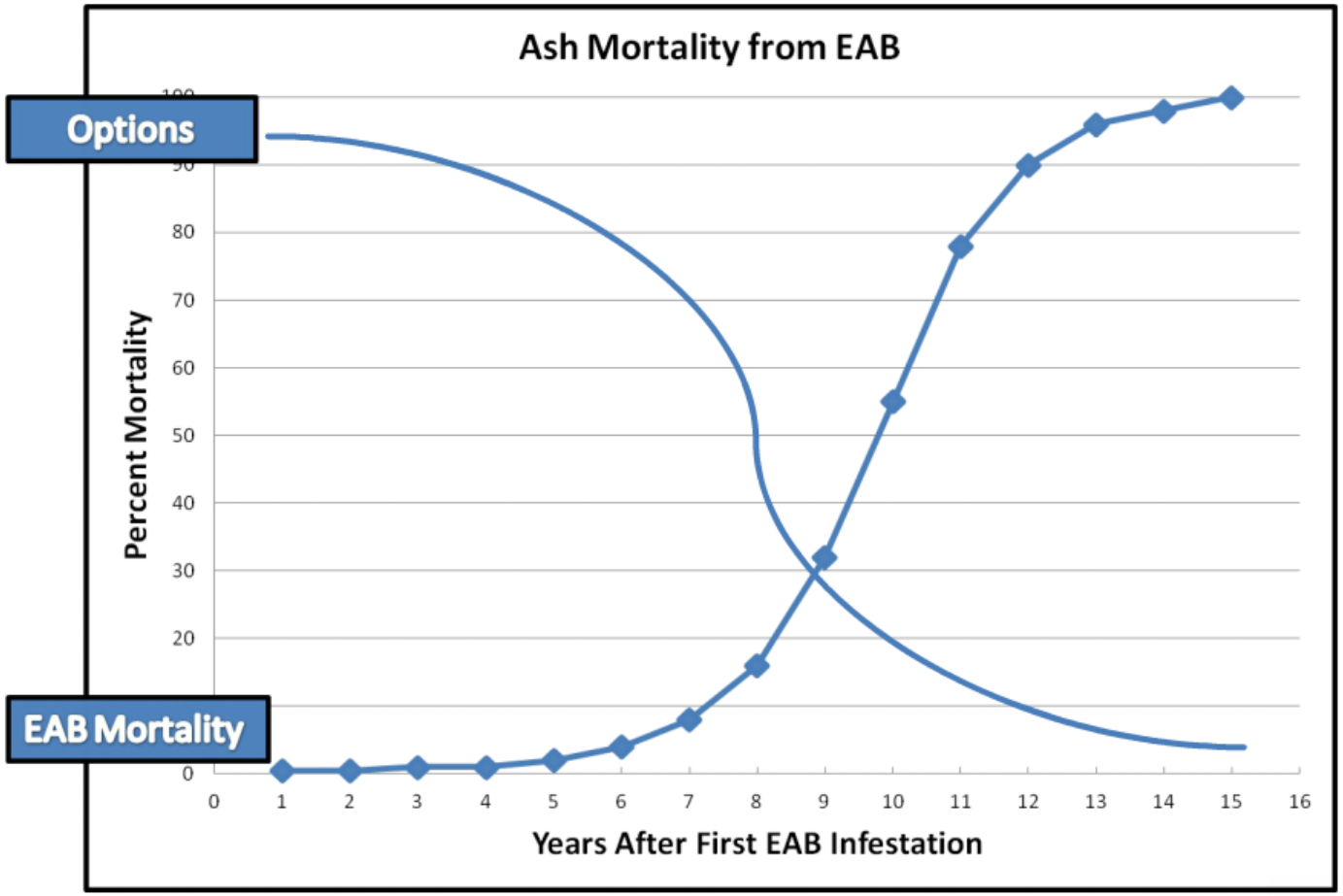
An Inverse Relationship



The longer EAB has been around the fewer management options you'll have

And they'll be more expensive

DAVEY

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Trees within 10 miles of a known infestation should be managed now!

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xtension
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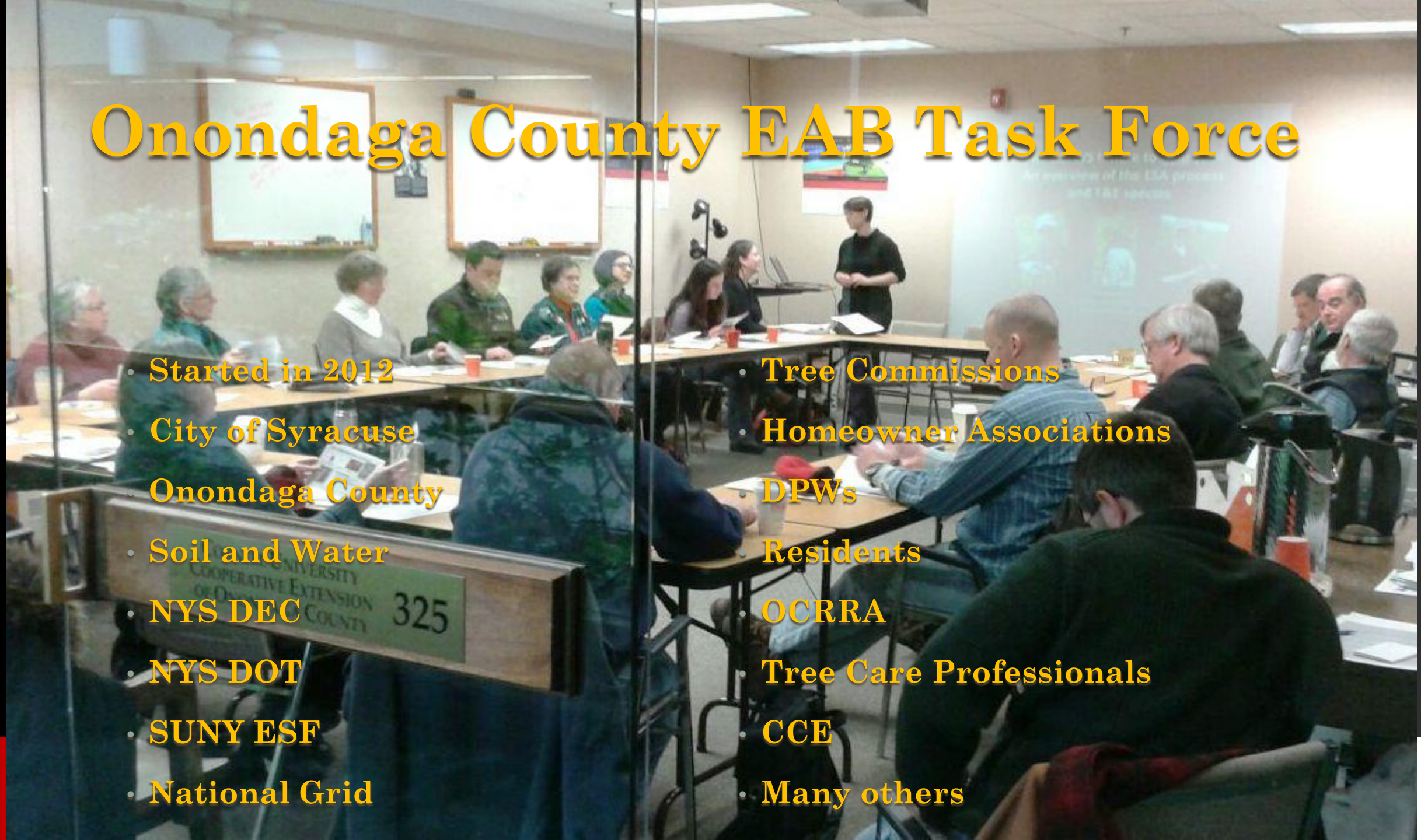
How is your municipality managing public ash trees?

Onondaga County EAB Task Force



- Started in 2012
- City of Syracuse
- Onondaga County
- Soil and Water
- NYS DEC
- NYS DOT
- SUNY ESF
- National Grid
- Tree Commissions
- Homeowner Associations
- DPWs
- Residents
- OCRRA
- Tree Care Professionals
- CCE
- Many others

The Task Force has increased the resources to address EAB through:

- Increased monitoring and detection
- Interagency collaboration and support
- Technical assistance from agencies and universities
- Volunteer education and deployment
- Municipal engagement
- Industry input and collaboration

Taking down or treating thousands of trees across many ownership lines with limited money isn't as easy as it sounds

Management Options

- Remove
- Treat
- Selective Removal and Treatment
- Nothing

Northern long-eared bat
Myotis sodalis

Photo by New York Department of Environmental Conservation; Al Hicks

Removal is best Oct 1 –April 30

- Indiana and Northern long-eared bats will be in their winter hibernacula
- EAB isn't flying and can't infest new trees if they are moved
- Removed trees should be chipped, burned or milled before April 30 to prevent EAB from emerging

Indiana bat (*Myotis sodalis*

Jerry A. Payne, USDA Agricultural Research Service, Bugwood.org

Trees should be removed while they are sound and alive

- Dead and decayed trees are extremely dangerous
- It's very costly to remove dead and decayed trees
- Large equipment may be needed and this isn't possible on all sites

EAB is a Planning Challenge

Management Options

- Remove
- Treat with Pesticides
- Selective Removal and Treatment
- Nothing

Option 2: Insecticides

- Very effective and can used on trees already infested
- 4 Methods:
  - Trunk Injection
  - Bark Spray
  - Soil injection
  - Soil drench

1/3 Strategy

- Treatment of some trees will still offer protection to the untreated trees
- Research has shown 75% protection if 1/3 of the trees are treated annually
- Treatment of private trees will have a public benefit. In areas with high quantities of public trees, there is a net benefit.

Treat or Remove?

Treat trees to:

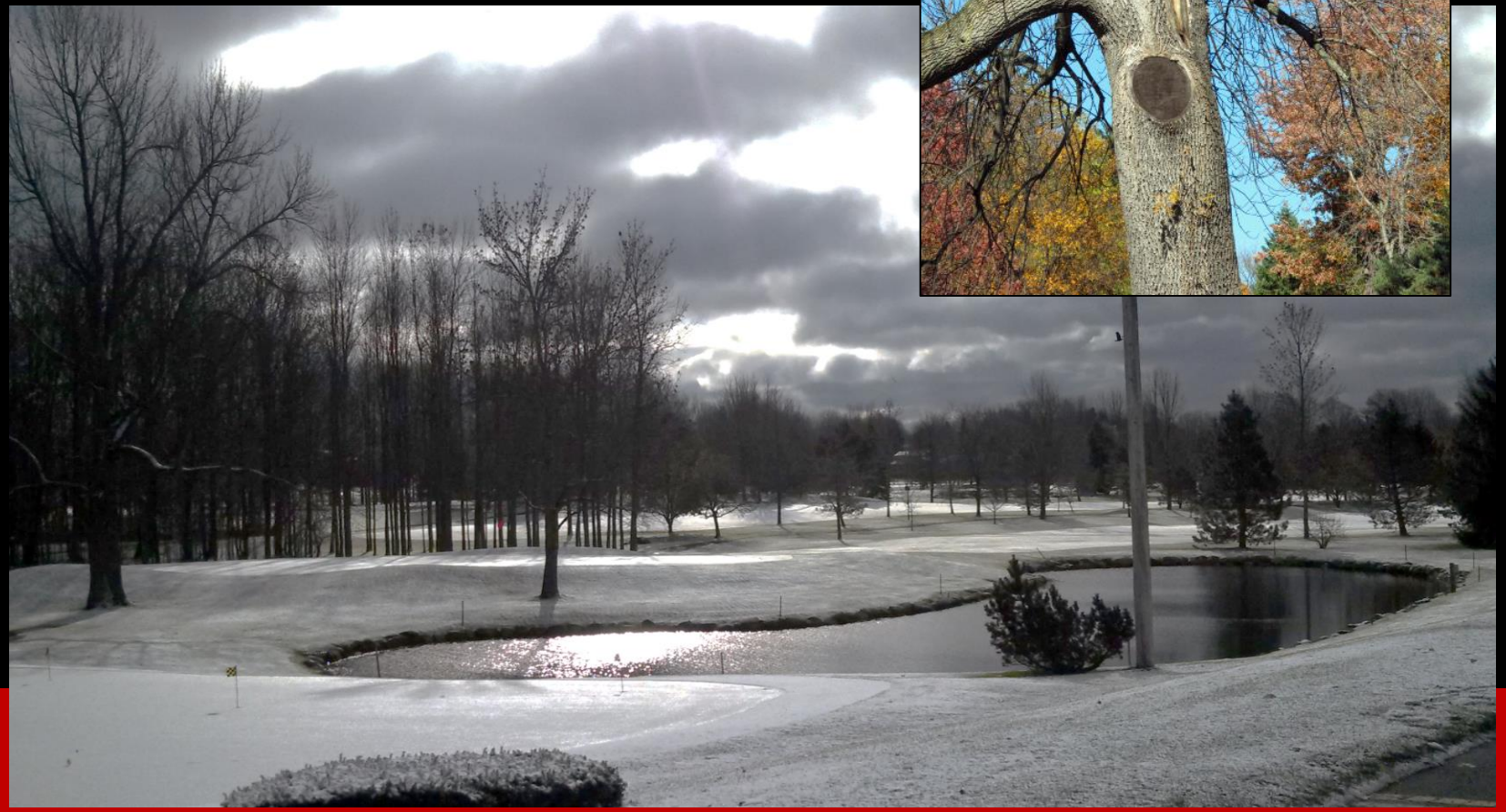
- Retain property value
- Retain ecological value
- If removal would be too risky
- If there are no mature trees nearby

Treat or Remove?

Treat trees to:

- Retain Shade
- Stretch life of tree while deciding on management plan
- While waiting for new trees to grow

Treat or Remove?



Remove trees if:

- Other trees provide same services
- They are a hazard
- Pesticides are a poor option
  - The tree is already unhealthy
  - Pesticide shouldn't be applied to the site

Treat or Remove?

Remove trees if:

- You can get value from tree removal
- As logs
- Firewood
- Chips

Option 3: Treat and remove

- Keep trees as long as you can
- You can treat now and plan to remove later
- Or treat the best and remove the rest

Don’t Remove if You Don’t Have To!

- Don’t be left without any trees
- There are other bad bugs on the horizon!

The Asian Long-horned beetle prefers maple trees but also eats birch, sycamore, willow, ash and others

Option 4: Do Nothing

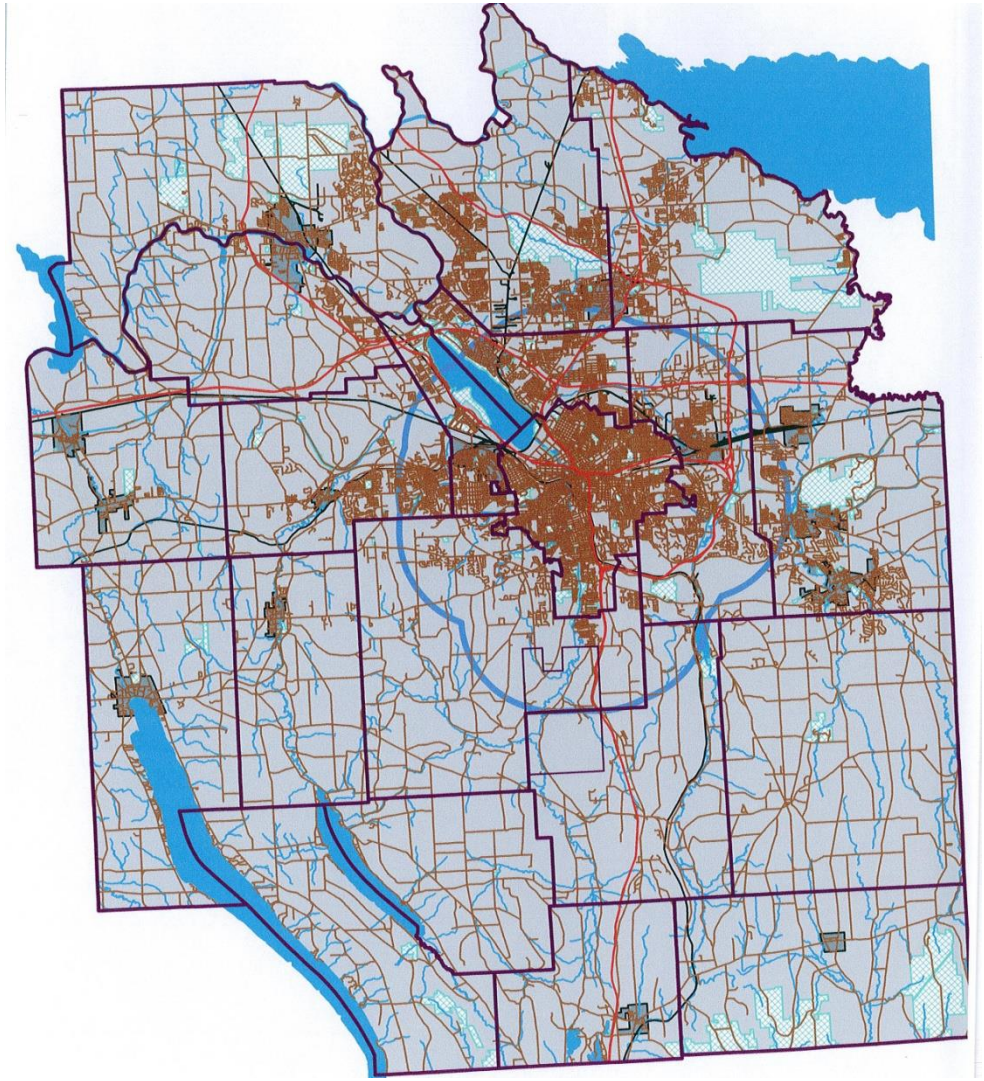
- In forested and unused areas this is a fine option.
- Removal will not protect other ash trees, but will create wildlife habitat.

How does this affect planners?

- EAB will leave gaping holes in our public and private landscapes
  - You need to learn where is it critical to retain or replace trees
  - Do you know how you'll replace those services?
  - Tree management should be thoughtfully included in future planning projects
- Planners can help reduce future invasives by promoting diverse native plants
- Tree Ordinances are an important tool to communicate public & private responsibility
- Inventories will be needed to determine not just how many ash you have, but where can falling ash become critical hazards
  - Riparian areas
  - Sensitive structures
  - Culturally important areas
  - Near transportation corridors

ONONDAGA COUNTY
ASH TREE MANAGEMENET STRATEGY

ONONDAGA COUNTY



- Approximately 400 parcels
- Just under 8,000 acres
- Just under 800 miles of highway right-of-way

TENTATIVE TABLE OF CONTENTS

Preparing for Emerald Ash Borer

- Helped establish EAB Task Force
- Reached out to communities across the United States
- Conducted public meetings
- Established aggressive monitoring
- Appropriated funding to carry out an inventory of ash trees on County-owned property

Inventory of Ash Trees on County-Owned Land

Inventory of Ash Trees on County-Owned Land

Ash Tree Management Alternatives Available to the County

1) Do nothing. Allow nature to take its course.

NOT!!!

Ash Tree Management Alternatives Available to the County

2) Preemptive removal of all ash trees

Ash Tree Management Alternatives Available to the County

3) Pre-emptive removal of all ash trees with some percentage of replacement/restoration plantings

Ash Tree Management Alternatives Available to the County

4) Preservation of all ash trees that can be protected from EAB by use of pesticides

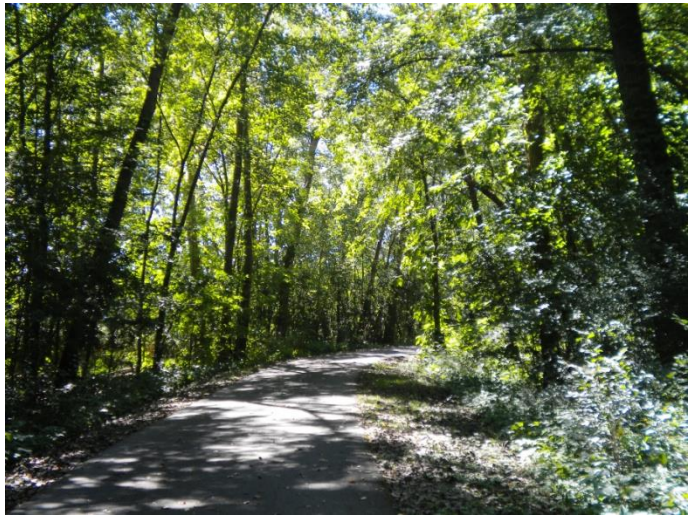
Ash Tree Management Alternatives Available to the County

5) Some combination of pre-emptive removal, tree replacement and tree preservation through use of pesticides.

Ash Tree Management

Management decisions could differ from one location to the next based on site conditions and use of the site.

Ash Tree Management Alternatives Available to the County



Regulatory Requirements/Considerations

U.S. Animal & Plant Health Inspection Service

New York State Dept of Ag & Markets

- Regulation of infested wood materials (quarantines)

U.S. Fish & Wildlife Service

- Protection of Rare and Endangered Species

New York State DEC

- Use of Pesticides
- Movement of Firewood (Wood Waste)
- Protection of Rare and Endangered Species

Timing Considerations

Timing considerations with respect to ash tree management decisions could involve the following:

- **The location of confirmed EAB infestations within and in proximity to County-owned ash trees**
- **The age of EAB infestations (which impacts EAB populations and their impact on the rate of tree mortality)**
- **The timing of “treatment” with respect to tree removal, replacement planting and inoculation**

Projecting Costs

Considerations:

- Number, size, location and condition of ash trees to be managed (Inventory of ash trees).
- In-house vs outsourcing
- Time frame within which management actions are expected to occur.

NOTE: ***It is important to account for tree growth in order to account for increasing costs associated with removing or preserving larger diameter trees over time)***

- The number and size of replacement trees expected to be planted over time (costs will include tree stock, materials, labor and maintenance).

Ash Tree Cutting
& Contractor Considerations

Mark Burger, Executive Director

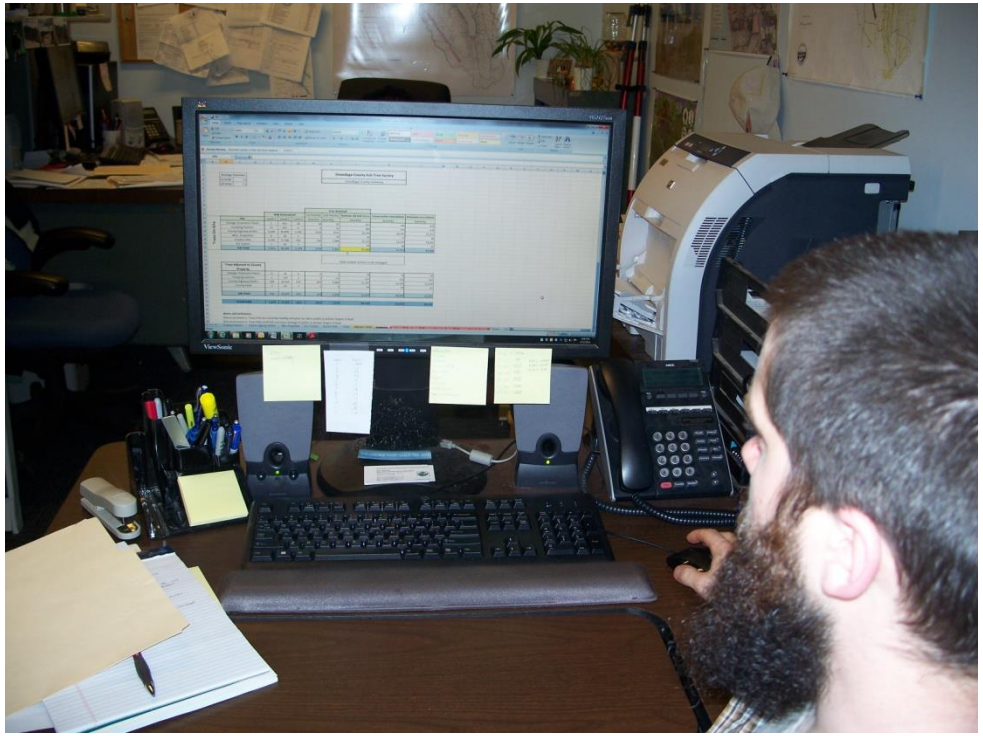
Onondaga County SWCD

Tel. 315-457-0325 mburger@ocswcd.org

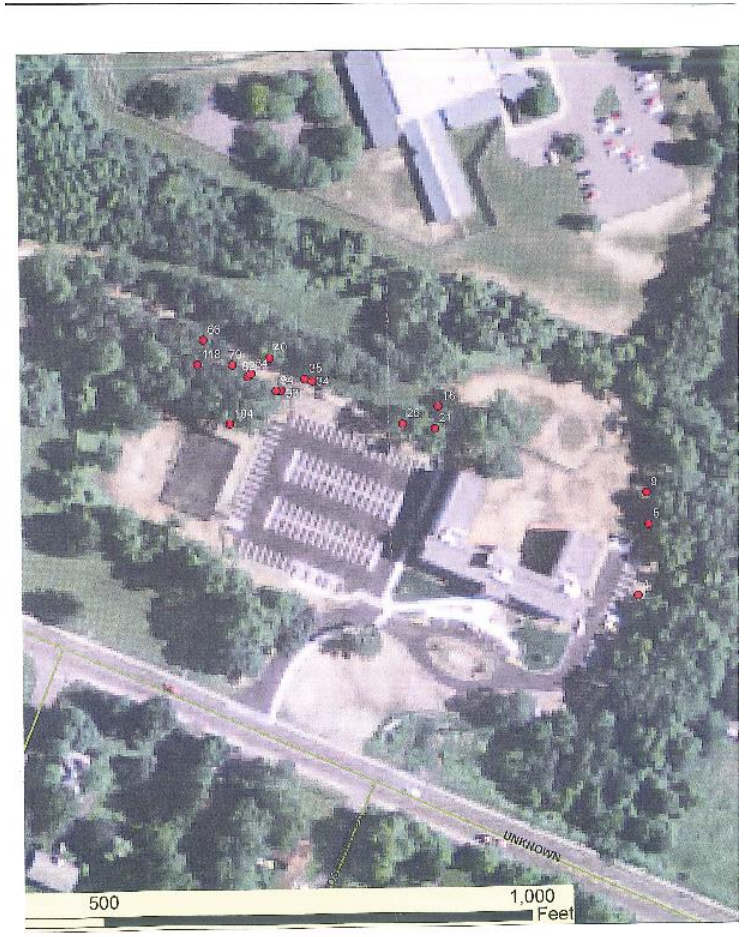
You Need An Inventory

Need data to make decisions

- Pt ID
- Town
- # Trees
- DBH
- Risk Assessment
- Targets
- Health
- Comments



You Need to Develop a Plan & Implement It



- What trees to cut
- When to cut
- Other considerations
- Get that plan on paper so that you can implement it

Identify trees for cutting

Each Bid MUST Have:

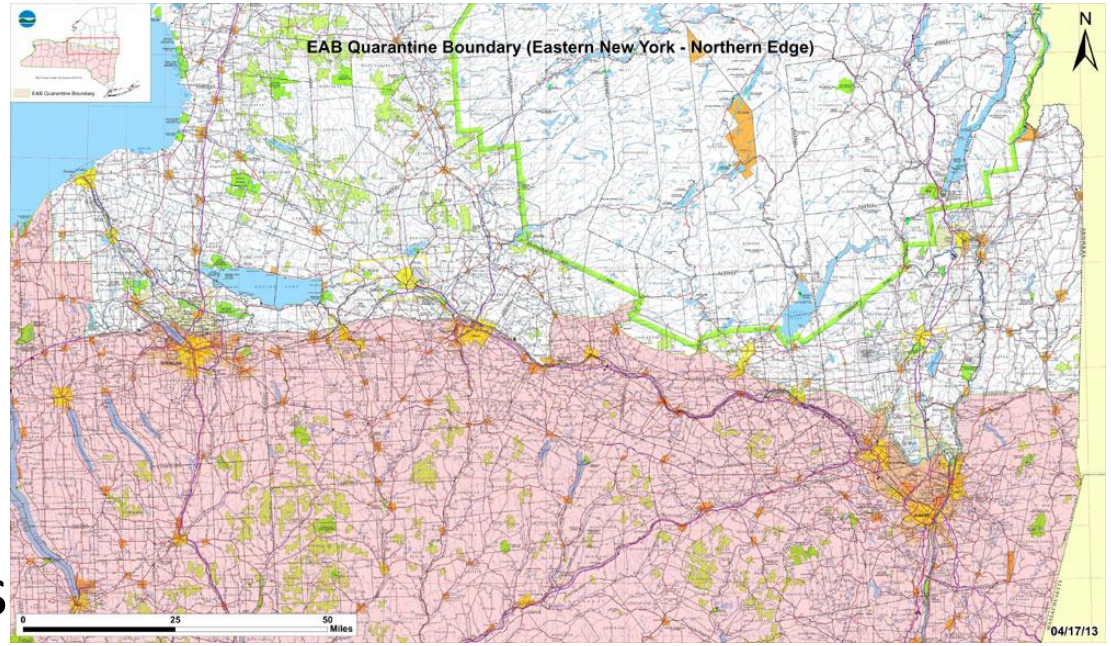
- Qualified Line Clearance Tree Trimmers/First Aid/CPR (copies of current certificates)
- Pricing Pages
- Contractor Info
  - Number of employees
  - Equipment owned/rented by company
- Insurance ($1,000,000) w/ SWCD/County as additional Insured
  - Workers Comp
  - Disability
  - Commercial General Liability
- Will you offer this price to the public?
- *IMPORTANT THAT BIDDERS ARE ON EQUAL GROUND

Each Contract Has:

- General Provisions
- **NYS DOL Prevailing Wage Requirements**
- Damage / Restoration (contractor responsibility clauses)
- Environmental (wildlife, EAB Quarantine, DEC firewood)
- **SAFETY** = OSHA 1910.269 /ANSI 133 for qualified line clearance tree trimmers & First Aid/CPR (each crew has min 2)
- Amount of payment for # trees to cut & stumps to grind

NO, You cannot have the wood!

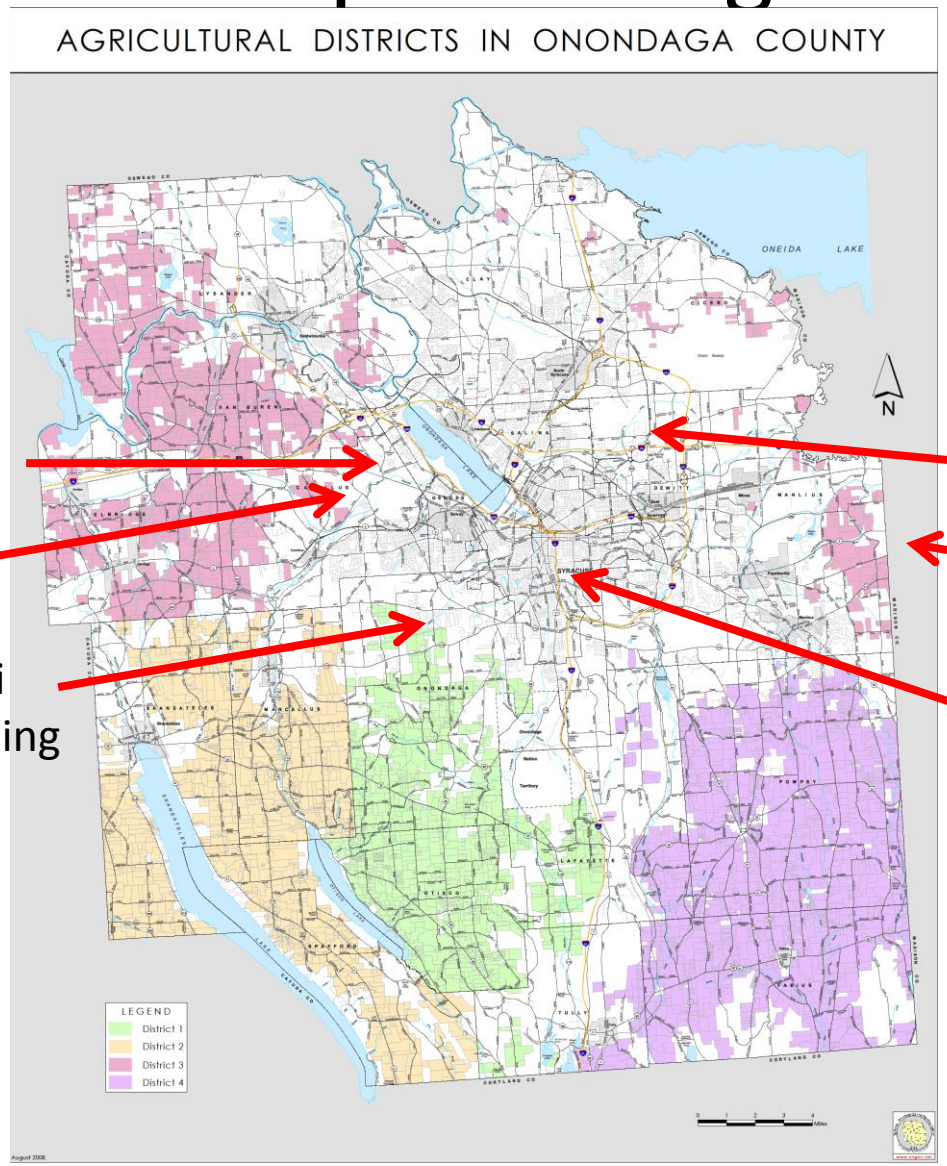
- NYS DAM Quarantine
- @ NYS Thruway (south)
- ***Only keep wood generated on your property***
- Contractor will only put tree to the ground
- Landowner has 2 weeks to move it out of County ROW



Contractor Monitoring

- Job Safety Briefing
- Need to check
  - Names of employees working
  - Duties performed by employee at time of inspection
  - Equipment being used
- Compare to Certified Payroll Sheets
- **SAFE WORK SITE**

Wood Management Companies w/ NYS DAM Compliance Agreements



OCRRA-Amboy

Tree Landers

Gasparini Landscaping

Clifton Recycling

Aspinall's Nursery

OCRRA-Jamesville

Emerald Ash Borer Management Update

Steve Harris (City-County Arborist)
Syracuse Department of Parks, Recreation & Youth Programs

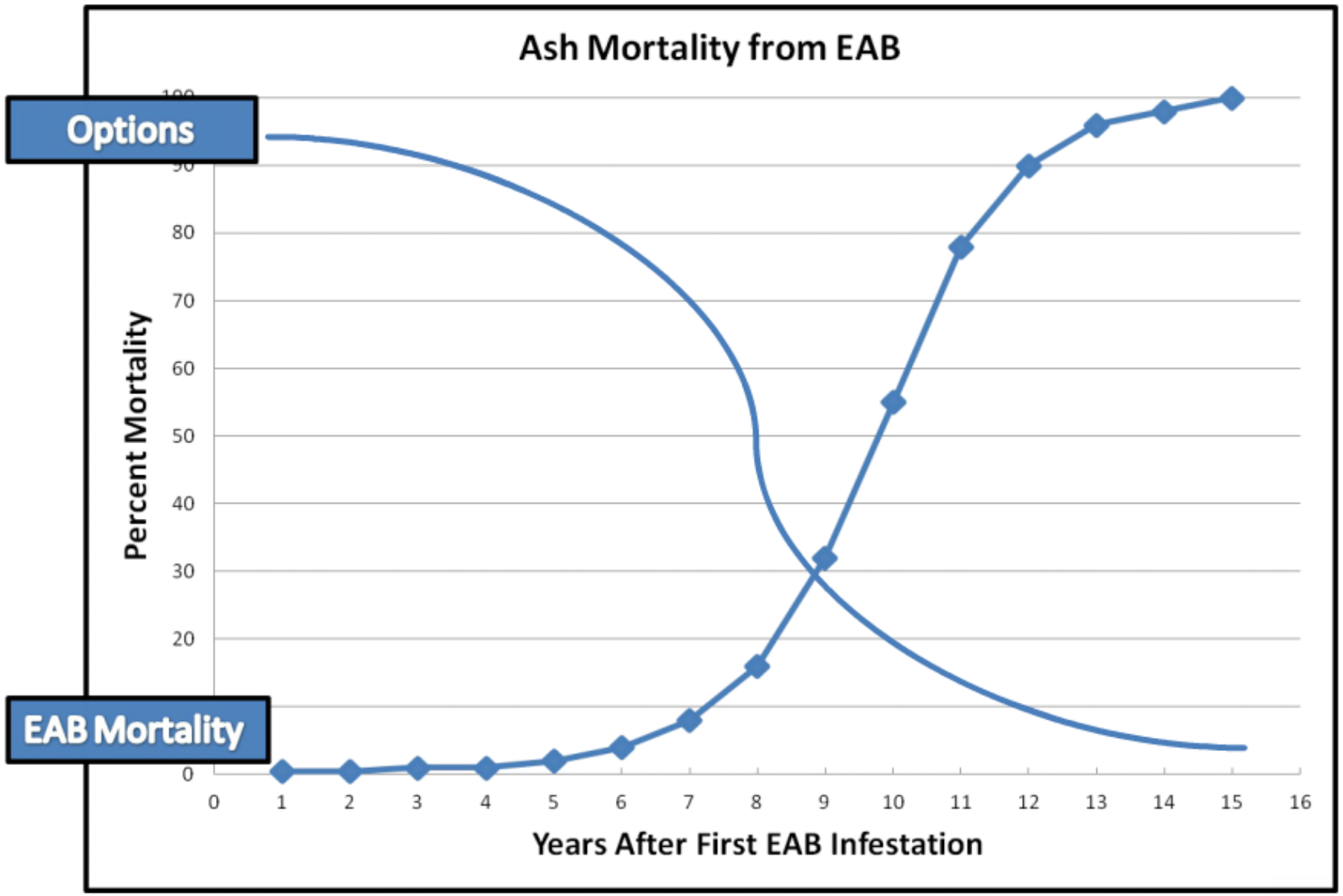
David Cappaert, Michigan State University, bugwood.org

Presentation Content

- Goals Ash inventory and assessment
- Categorization of trees (treat or remove)
- Implementation


GOAL
Avoid EAB Trap
Manage on Our Schedule
Maintain Canopy

An Inverse Relationship



DAVEY

Goal: Maintain Canopy

TREES ARE INFRASTRUCTURE

- Essential to quality of life (street trees)
- Quantifiable environmental benefits
- Accrue value over their life
- We can’t cut our way out (from exotic pest problems)

Inventory and Assessment

- 100% Street Tree Inventory in 2013
- Inspected 1700 ash trees Oct-March
- “Infested” if woodpecker damage
- Assessed, categorized treats and removals
- Notified property owners (Handout)

SYRACUSE'S URBAN FOREST
Street Tree Population

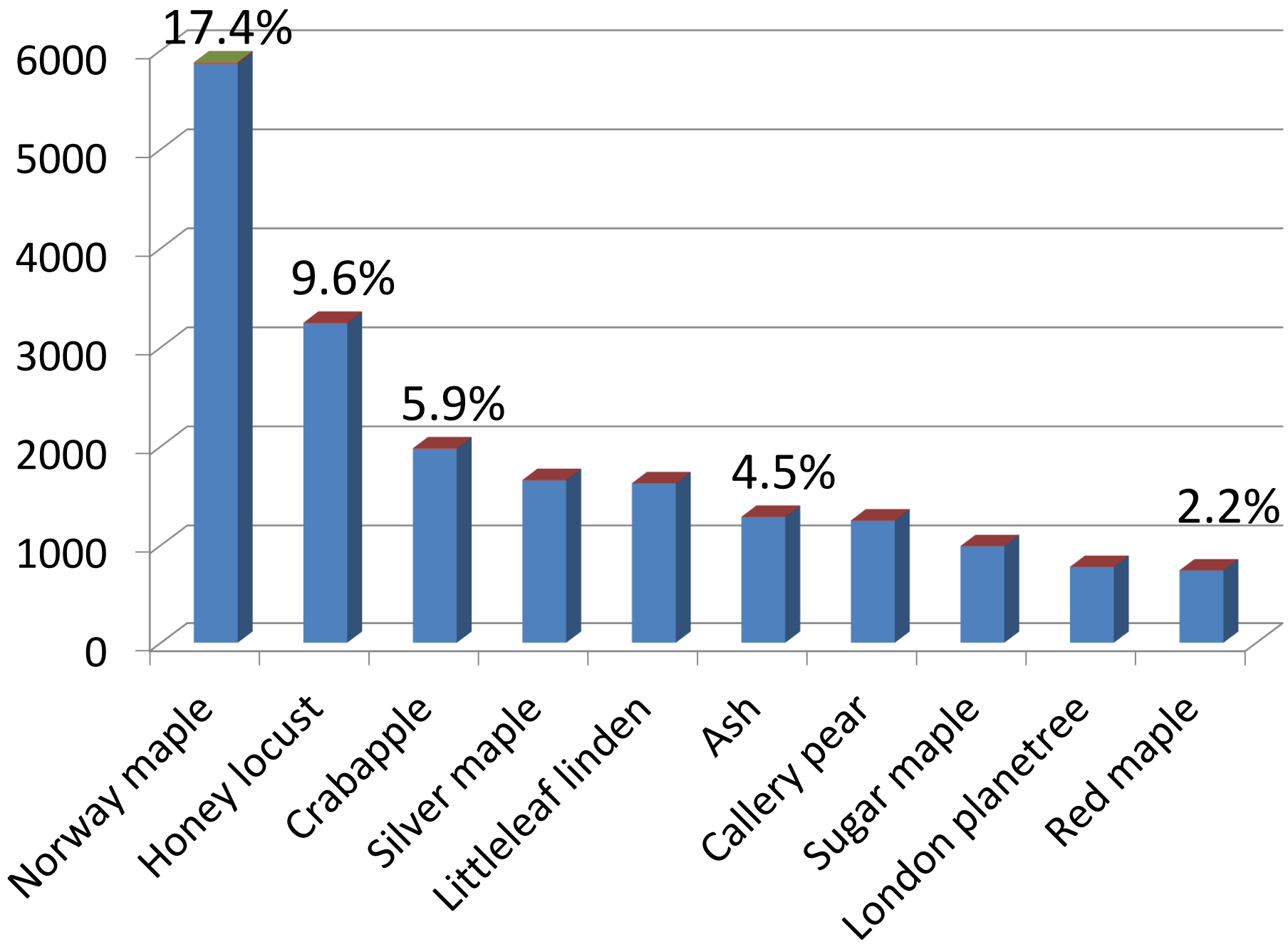
1951 = 49,000

1978 = 39,000 ← Loss of elm

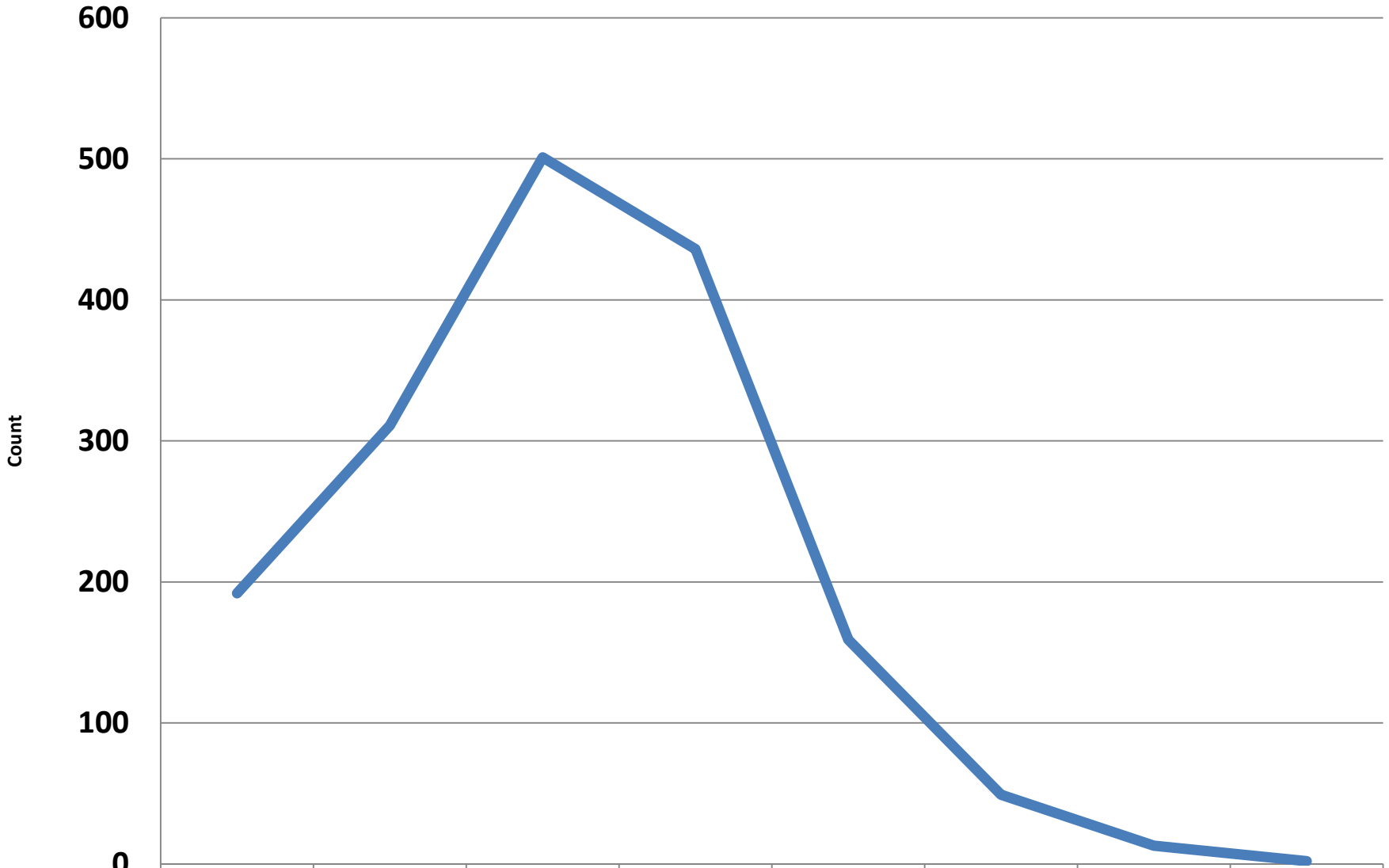
1999 = 32,000 ← Labor Day Storm

2013 = 32,000

Remove 300 more trees per year than plant


17.4%
9.6%
5.9%
4.5%
2.2%
6000
5000
4000
3000
2000
1000
0
Norway maple
Honey locust
Crabapple
Silver maple
Littleleaf linden
Ash
Callery pear
Sugar maple
London planetree
Red maple

Distribution of ash size classes



	1 to 6	7 to 12	13 to 18	19 to 24	25 to 30	31 to 36	37 to 42	43 to 54
Count	192	311	501	436	159	49	13	2

i-Tree

Annual Environmental Benefits Ash

- Energy Savings: $ 100,000
- Storm water $ 22,000
- Air Quality (ozone) $ 18,000

$3+ in benefit for every $1 in cost

What Trees to Keep?
What to Remove?

Inventory and Assessment

Wood pecker damage

Inventory and Assessment Categorizations

Too much lean
Remove

Inventory and Assessment Categorizations

Storm damage
Remove

Inventory and Assessment Categorizations

Trunk damage > 25% circumference

Remove

Inventory and Assessment Categorizations

Wire Conflicts Too Great

Remove

Inventory and Assessment Categorizations

Infrastructure Conflicts

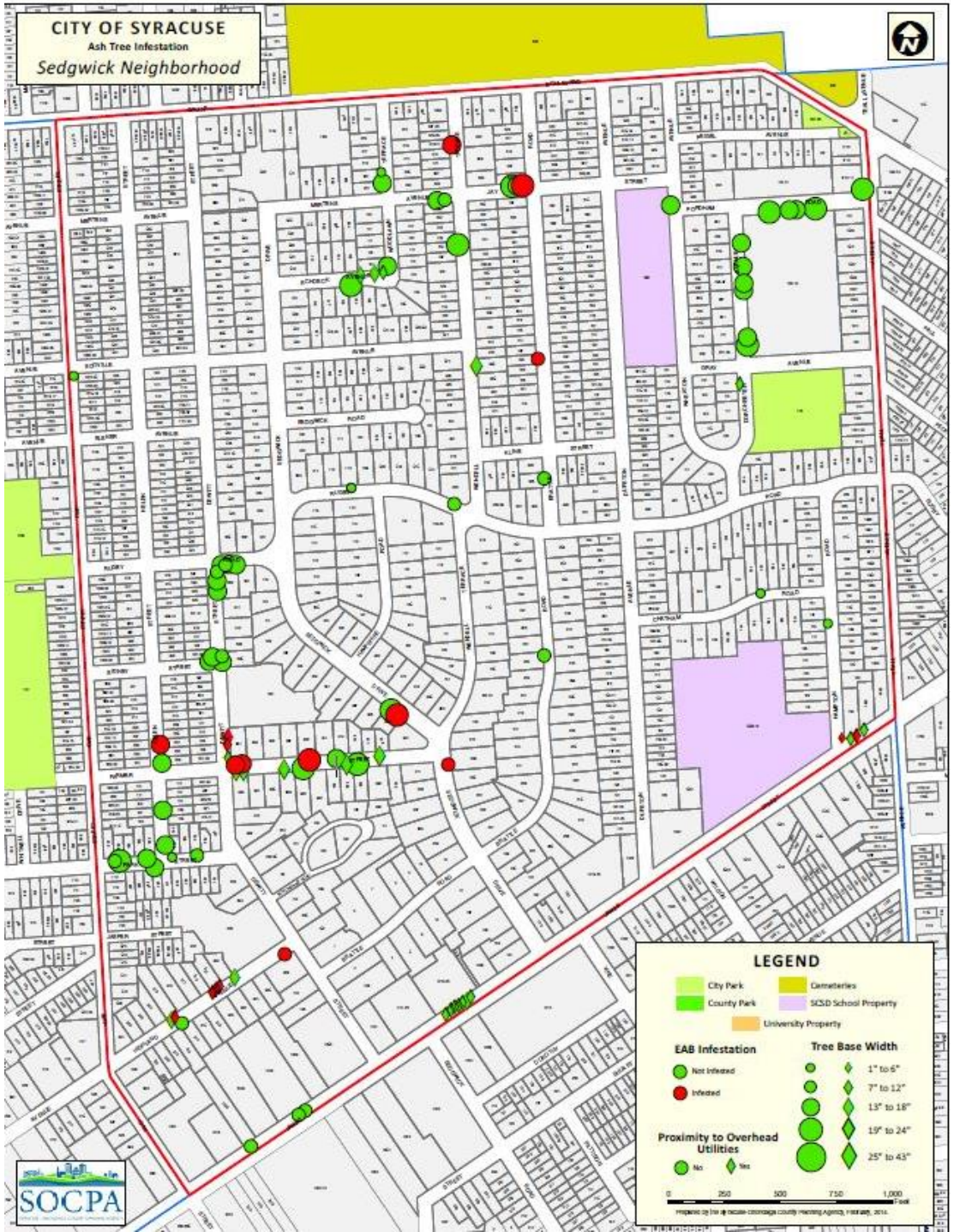
Removal is case by case

Candidates for treatment

Candidates for treatment

Infested Neighborhoods	% Infest	Total Ash	No. Infest
Prospect Hill	32	25	8
Washington Square	28	25	7
Sedgwick	24	97	23
Lincoln Hill	19	43	8
Hawley-Green	17	6	1
Meadowbrook	11	149	16
Northside	7	70	5
Eastwood	6	159	9
Court-Woodlawn	6	36	2
University Neighborhood	1	93	1
Westcott	1	100	1
Grand Total	**15**	**490**	**74**

Infested Trees Sedgwick



Syracuse's Response Plan

1. Remove 500 trees (over 2 years)
2. Treat 1100 trees in 2014
    - Stage removals for future budget cycles
    - Preserve option to keep long term
3. Enforce codes (private property)

Syracuse's Response Plan

NYS Ag & Mkts COMPLIANCE AGREEMENT

"Chips only" at city dump site

Logs greater than 4":

- Clifton Recycling
- TreeLanders

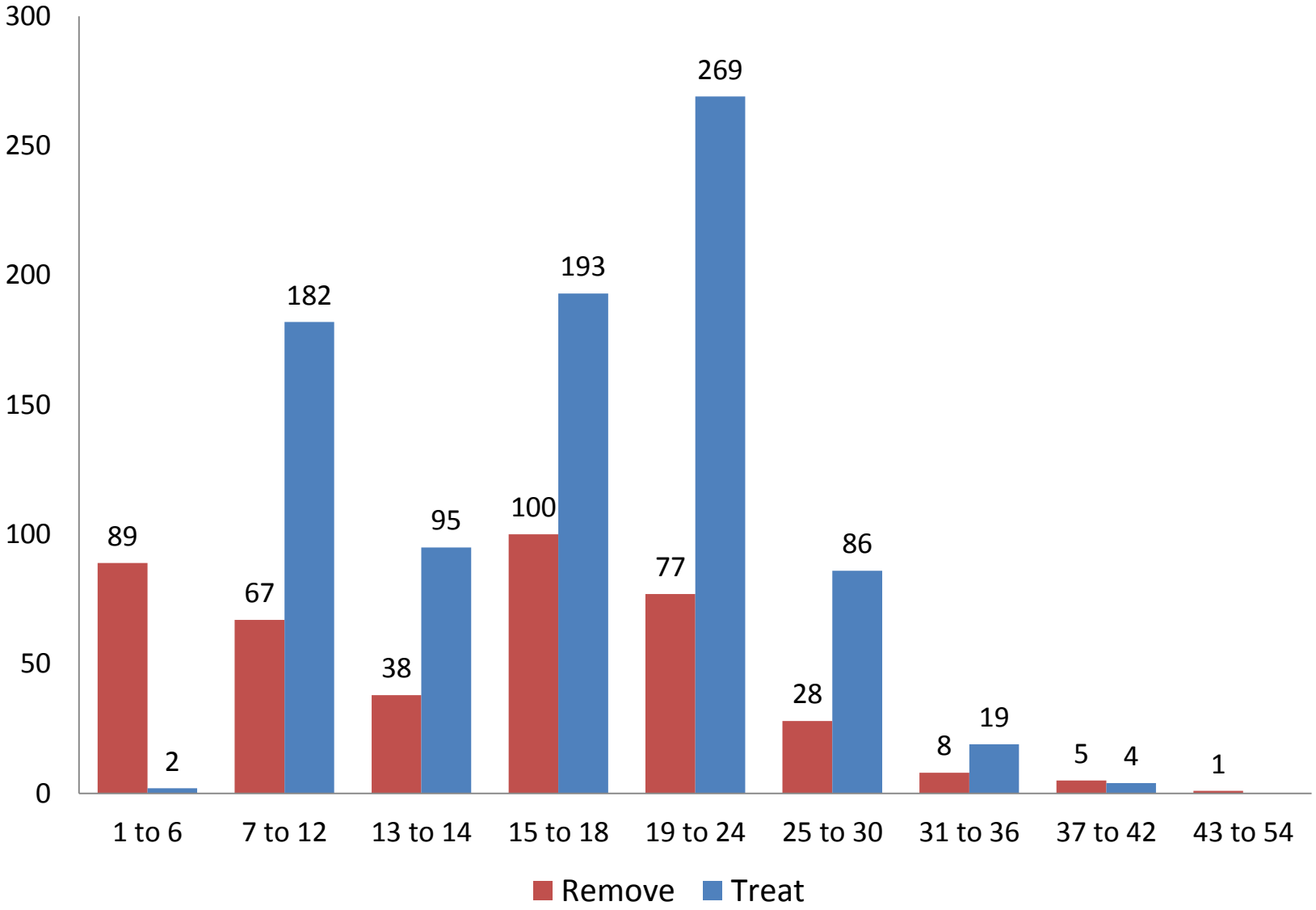
Syracuse's Response Plan

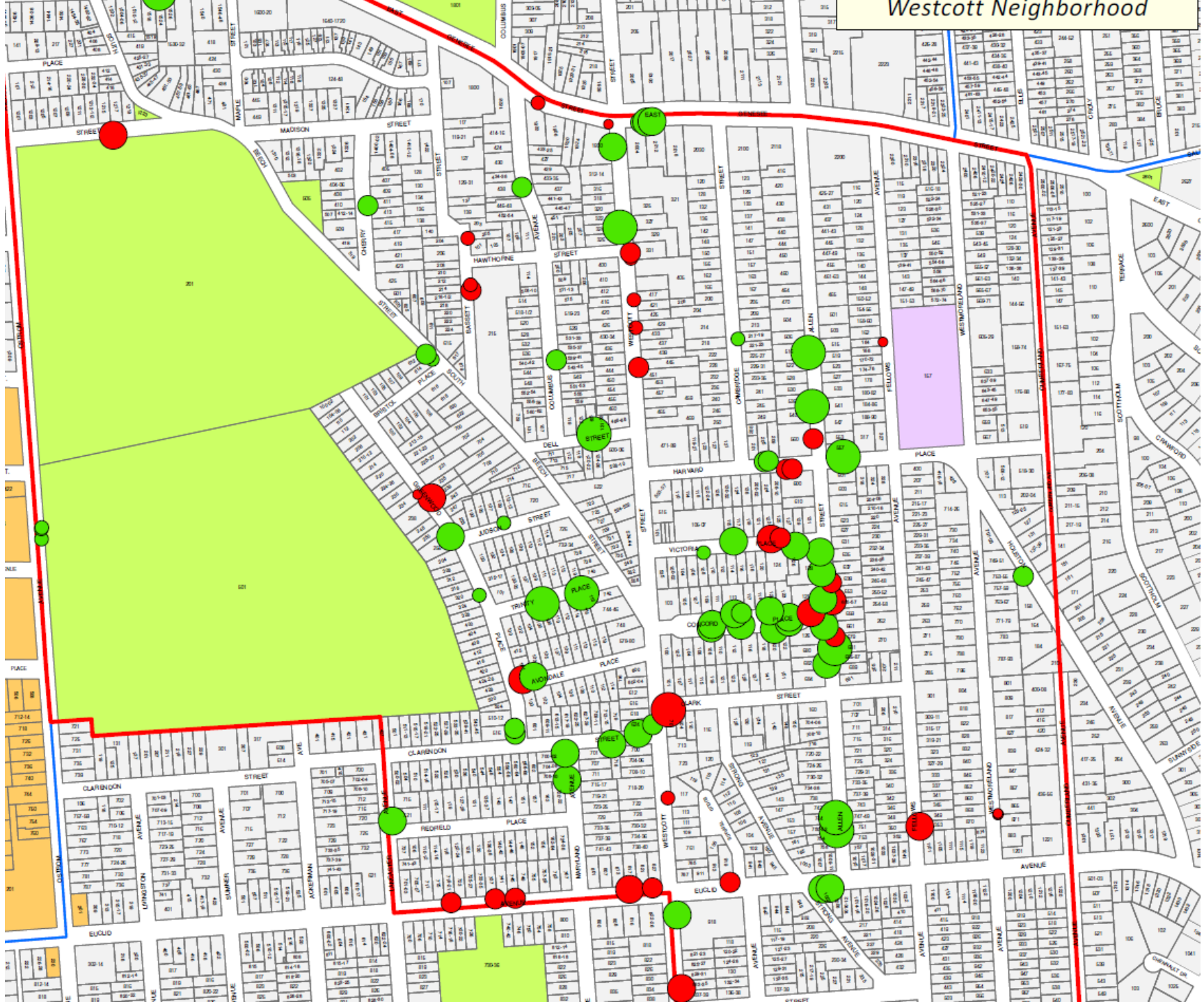
- Infested trees removed by April 30th
- We may suspend all EAB removals
- Uninfested and hazard trees (anytime)
- Resume October 1st
- In-House Crew: 14" dbh and less
- Contractor 15"+

Syracuse's Response Plan

1. Remove about 500 trees in 2014
2. Treat 1050 trees in 2014
   - Stage removals for future budget cycles
   - Preserve option to keep long term
3. Enforce codes (private property)

Removals and Treatments City-wide




Westcott Neighborhood

What is the chemical used for treatment?

Emamectin benzoate

- Derived from naturally occurring soil bacterium
- In use for over 10 years
- Stem injected, no chemical drift

Treatment Costs – Trunk Injection

- $6 - 10 per inch
- 2-3 years protection
- Allows management on OUR schedule not EABs

Inventory and Assessment Categorizations

Cost Benefit Analysis

13-18” tree (growing 1” every 3 years)

- Remove = $ 450
- Plant = $ 400
  = $ 850
- Treat ($8* inch) = $ 104 – 136
- Removal + plant = 5 to 8 treatments

*3% cost increase annually

Code Enforcement

Sec. 22-10. Tree removal or tree trimming on private property.

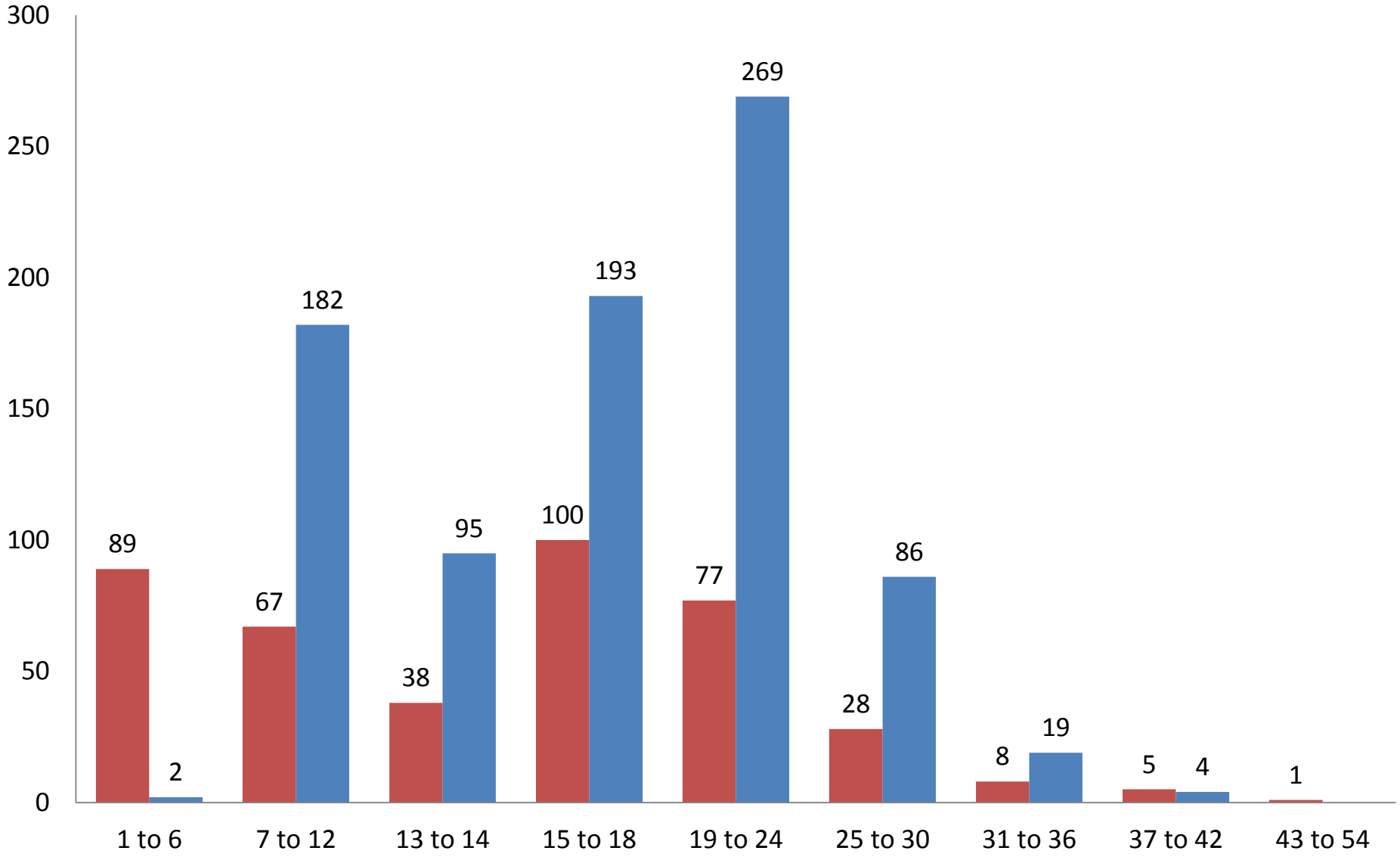
(a) The commissioner of parks and recreation shall have the authority to notify in writing the owner of any property containing any hazardous or diseased trees which require trimming or removal when such trees constitute a hazard to life, property or public safety or when such trees are host to insect pests or disease which constitute a threat to other trees within the city of Syracuse.

(b) In the event of failure of any property owner to trim or remove a hazardous or diseased tree after such time as designated in the notification, the commissioner of parks and recreation shall have the authority to cause the trimming or removal of said tree and the expense incurred shall be assessed against the property owners tax notice.

Replacement Strategy

- City in midst of record tree planting campaign (Save The Rain)
  - 1400 trees per year until 2018
- Diversity goals: No more than
  - 5% per species or cultivar (Sugar maple)
  - 10% of the genus (Maple)
  - 20% of the family (Aceraceae)

Removals and Treatments City-wide



Replacement Strategy

- City in midst of record tree planting campaign (Save The Rain)
  - 1400 trees per year until 2018
- Diversity goals are 5-10-20. No more than
  - 5% per species or cultivar (Sugar maple)
  - 10% of the genus (Maple)
  - 20% of the family (Aceraceae)

Private Ash Trees

- Direct questions to Jessi Lyons
  - http://www.extendonondaga.org/natural-resources/emerald-ash-borer-agrilus-planipennis-fairmaire/
  - **jel264@cornell.edu**
  - 315-424-9485 ext. 233

Cornell University
Cooperative Extension
Onondaga County

What does history teach us?

- Knowledge evolves
- Perception changes
- Plans change
- Stay nimble