

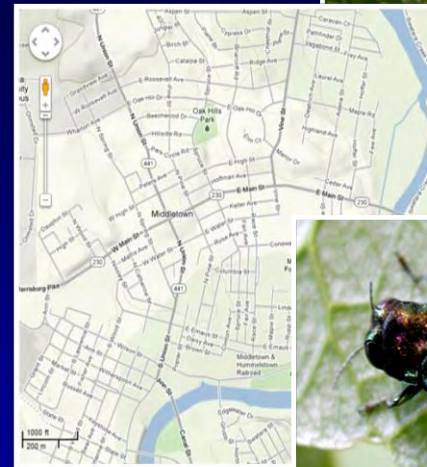
Introduction to the Emerald Ash Borer Community Management Plan

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**PA Urban & Community Forestry
Lunchtime Webinar**

May 7, 2013



Outline

1. Emerald Ash Borer
2. Potential Impact
3. Other Native Species
4. Survey & Detection
5. Management Options
6. PA Community Plan

Emerald Ash Borer

Agrilus planipennis Fairmaire (Coleoptera: Buprestidae)



Native range of Emerald Ash Borer in Asia



EAB Native Range

Presence of emerald ash borer has also been reported in adjacent Mongolia and Russia.

2000

0

2000

Miles



map provided by
USDA Forest Service



North Carolina
Research Station

Host Species in Asia



Fraxinus mandshurica

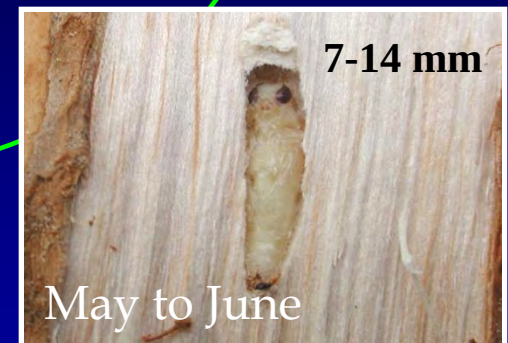


Fraxinus chinensis



Fraxinus rhynchophylla

Life Cycle



Distribution in North America

Home ▶ News ▶ Local News

Invasive Emerald ash borer found in New Hampshire

Story

Comments (2)

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6

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1

Posted: Sunday, April 7, 2013 8:00 am

By Kyle Jarvis Sentinel Staff

| 2 comments

Posted on April 7, 2013

by Kyle Jarvis



The emerald ash borer, an invasive species of beetle that attacks and kills ash trees, was spotted in New Hampshire for the first

time last month, officials from the N.H. Department

New Hampshire Sentinel Source.com



(USDA/APHIS/PPQ)
-Canadian Food Inspection Agency (CFIA)

DISCLAIMER: The U.S. Department of Agriculture's Animal and Plant Health Inspection Service collected the data displayed for internal agency purposes only. This data may be used by others; however, they must be used for their original intended purposes.

0 50 100 200 Miles

- Initial county EAB detection
- ◆ Federal EAB quarantine boundaries
- State quarantine-generally infested area
- State quarantine (MI)
- State quarantine-other (MI)
- National Forests
- Canadian EAB regulated areas

USDA/APHIS/PPQ
APR 11 2013
1PM 01 00000

Damages and Symptoms



Dieback



Serpentine gallery



Epicormic shoots



Bark splits



Tree Mortality



D-shaped exit hole

Host Species in NA



Fraxinus pennsylvanica



Fraxinus quadrangulata



Fraxinus profunda



Fraxinus nigra



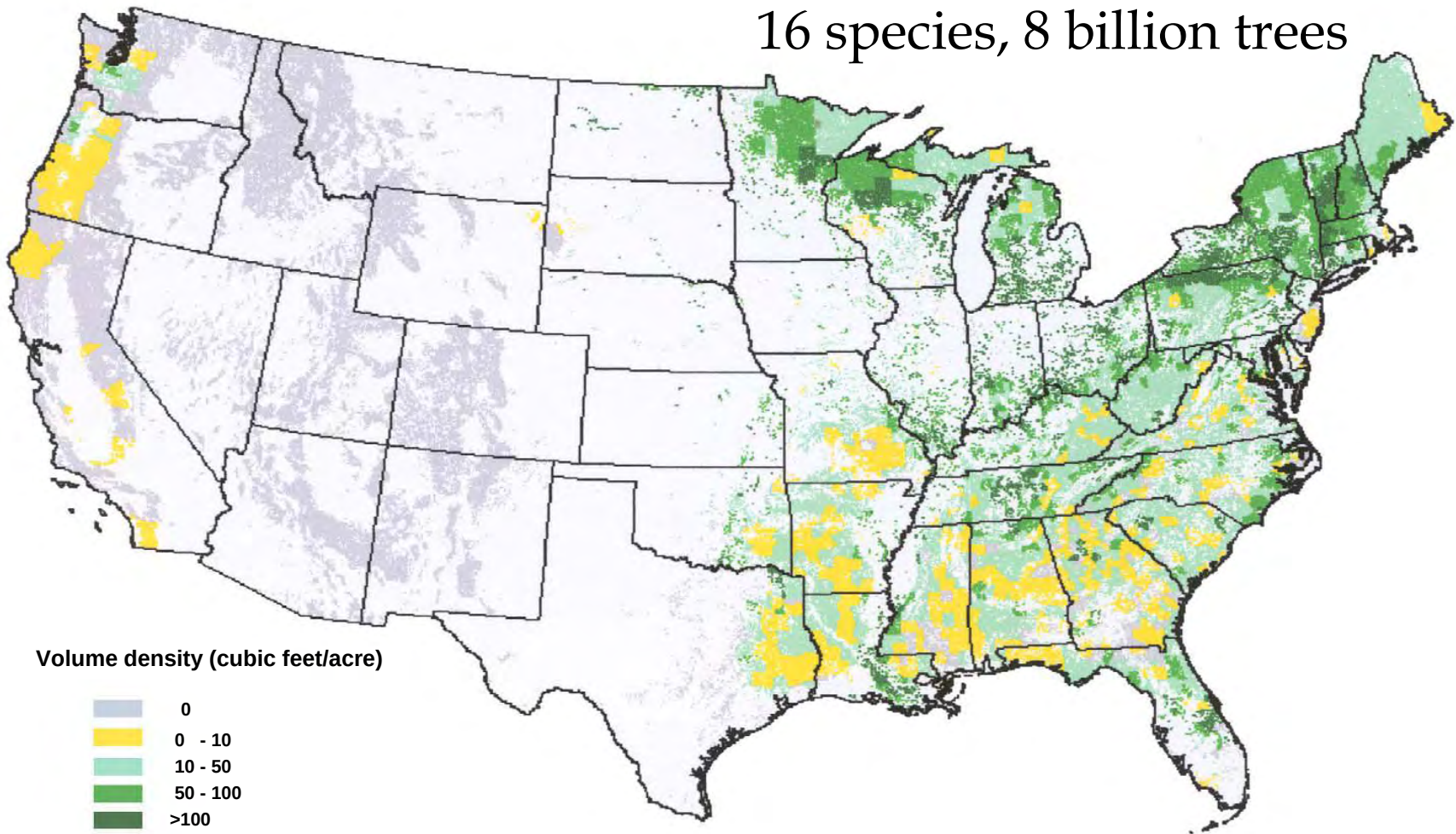
Fraxinus americana

Potential Impact



Resources at Risk: USA

16 species, 8 billion trees



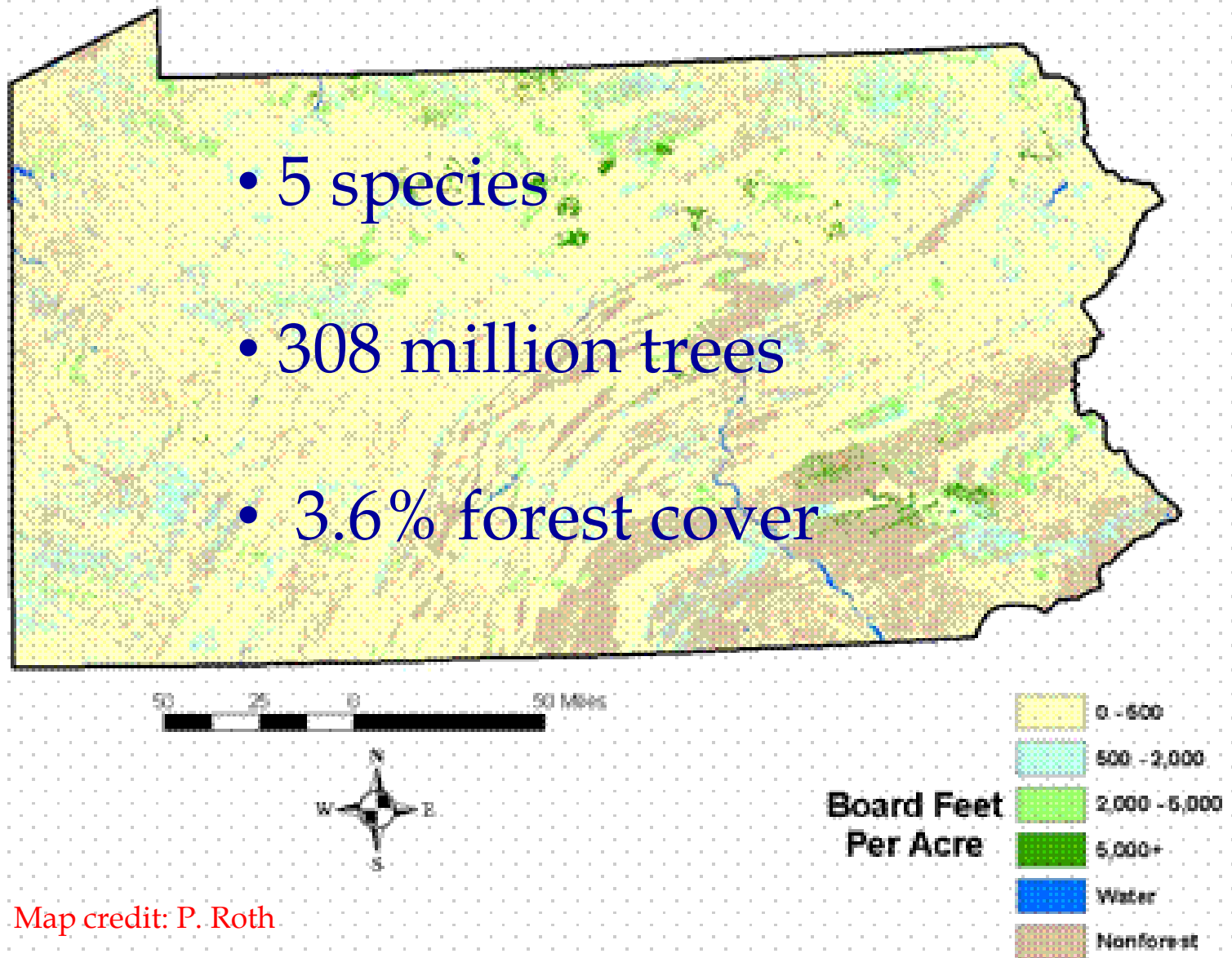
USDA Forest Service data sources:

County-level estimates of ash densities derived from Forest Inventory and Analysis (FIA) Data.

Forest/non-Forest overlay derived from AVHRR satellite Imagery.

Resources at Risk: Pennsylvania

- 5 species
- 308 million trees
- 3.6% forest cover

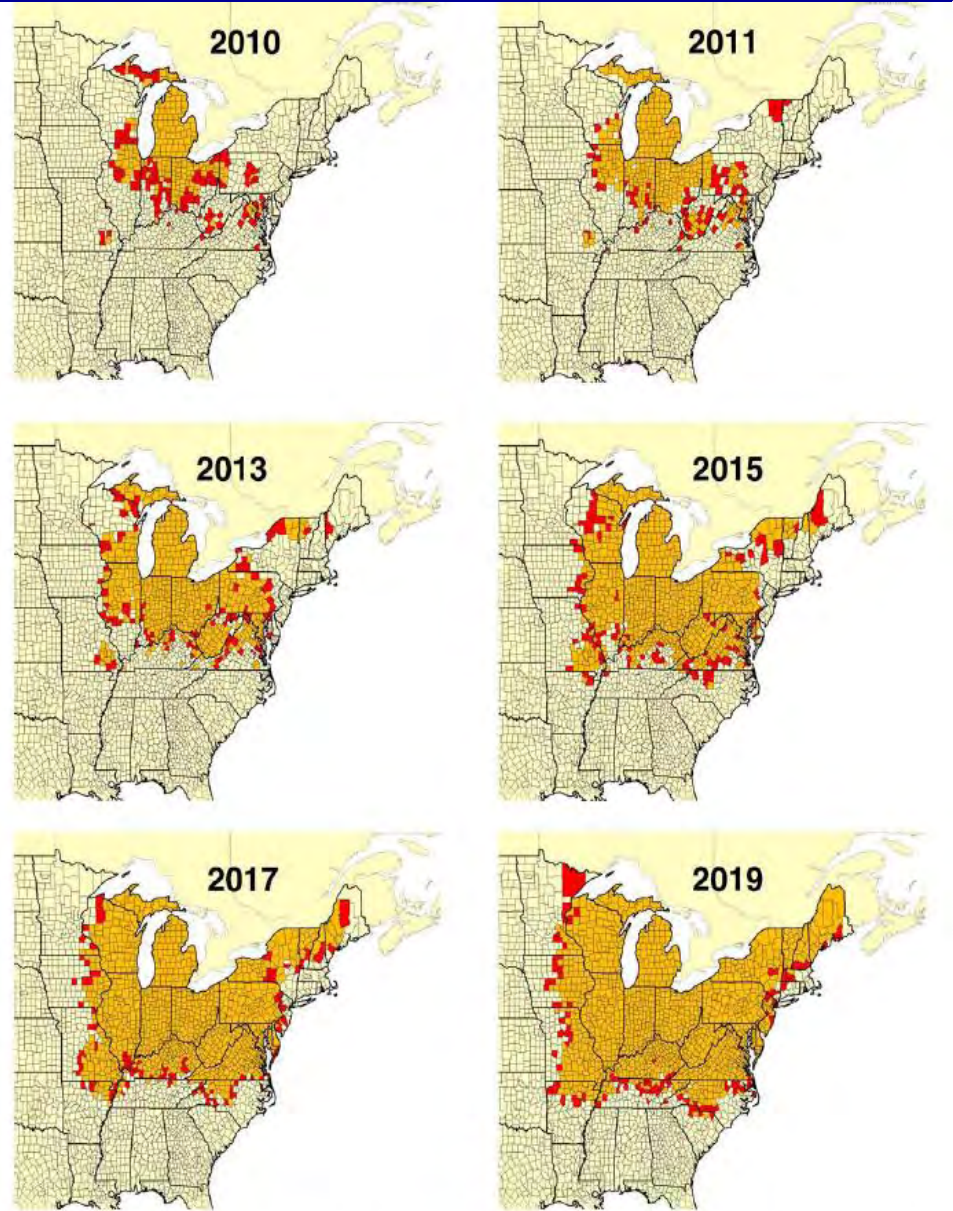


Map credit: P. Roth

53 million ash trees were killed by 2009

Kovacs et al. (2010)

- 25 states
- 38 million trees
- 2009-2019
- 17 million trees
 - Treatment
 - Removal
 - Replacement
- \$10.7 billion



tion of emerald ash borer distribution in counties from March 2010 to March 2019. Darker counties are newly invaded while lighter counties became
aps represent only a single realization of 100 stochastic simulations.

Other Native Agrilus Species

Bronze Birch Borer

A. anxius Gory

- Bronze-black
- Length 12-13 mm
- Host: *Betula* spp.



Two-lined Chestnut Borer

A. bilineatus (Weber)

- Pubescent lines on elytra
- Length 11 mm
- Host: *Quercus* spp.



A. subcinctus Gory

- Pubescence on elytra
- Length 4 mm
- Host: *Fraxinus* spp.



A. cyanescens Ratzeburg

- Metallic blue
- Length 8 mm
- Host: *Lonicera* spp.

Other Native Ash Borers



Ash/Lilac borer
Podosesia syringe (Harris)



Ash and privet borer
Tylonotus bimaculatus Haldeman



Banded ash borer
Neoclytus caprea (Say)



Banded ash clearwing
P. aureocincta Purrington & Nielson



Eastern ash bark beetle
Hylesinus aculeatus Say



Redheaded ash borer
N. acuminatus (Fabricius)

Other EAB Look-alikes



Six-spotted tiger beetle
Cicindella sexguttata Fabricius



Metallic wood-boring beetle
Dicerca divaricata (Say)



Japanese beetle
Papillia japonica Newman



Caterpillar hunter
Calosoma scrutator (Fabricius)

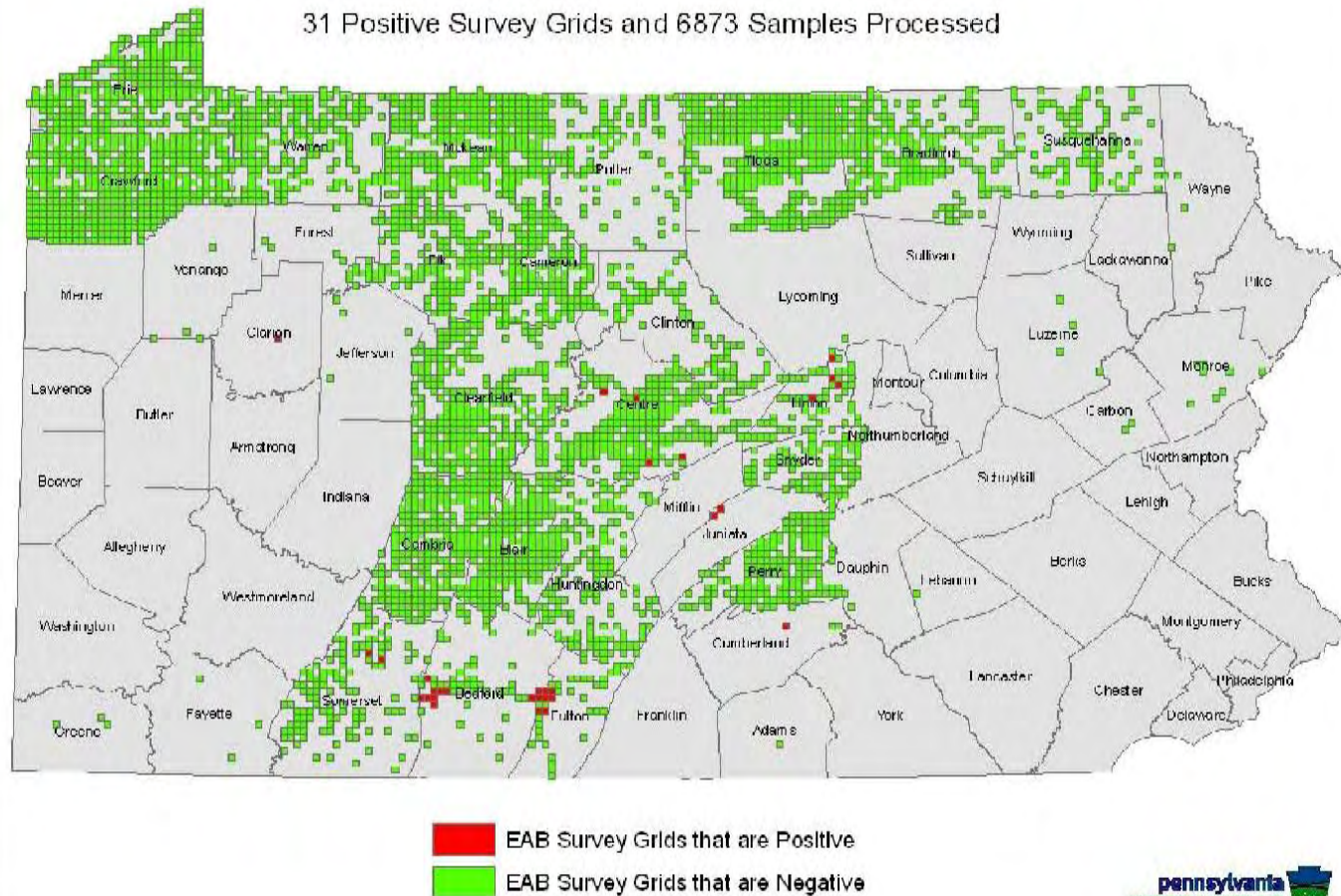


Green June beetle
Cotinis nitida (L.)

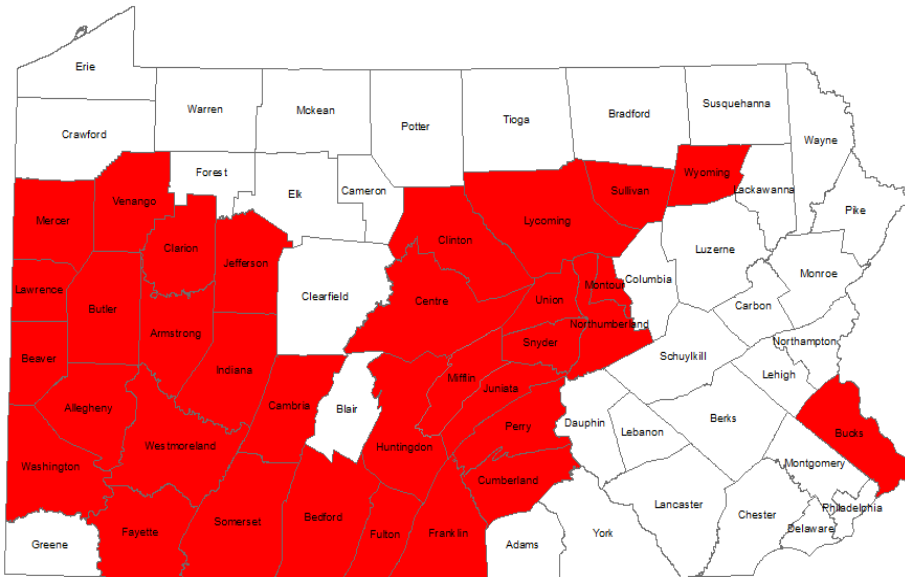
Survey & Detection

2010 Pennsylvania Emerald Ash Borer Surveillance Lab Results

31 Positive Survey Grids and 6873 Samples Processed



Confirmed in 33 counties



- June 22, 2007 in Cranberry, Butler
- Allegheny, Beaver, Butler & Lawrence quarantined
- 2008 Mercer
- 2009 Armstrong, Indiana, Juniata, Mifflin, Washington, Westmoreland.
- 2010 Bedford, Centre, Clarion, Cumberland, Fulton, Somerset, Union
- 2011 Huntingdon, Lycoming, Sullivan, Wyoming
- 2012 Bucks, Clinton, Franklin, Jefferson, Montour, Northumberland, Perry, Snyder, Venango
- 2013 Cambria, Fayette

Management Option A: *Tree Removal*



Management Option B: Chemical Control

Method	Insecticides
Soil Treatment	Imidacloprid (<i>Merit, Xytect</i>)
Trunk Injection	Emamectin Benzoate (<i>Tree-äge</i>); Imidacloprid (<i>IMA-jet, Imicide, Pointer</i>); Bidrin (<i>Inject-A-cide</i>)
Bark Spray	Dinotefuran (<i>Safari</i>)
Cover Spray	Pyrethroids (<i>Astro, Onyx, Tempo</i>); Carbaryl (<i>Sevin</i>)



- Used as trunk injection
- 0.10-0.40 g a.i. /dbh inch
- 99% control for current year
- Effective for 2 years
- Price tag ~ \$500/L (40 g a.i.)

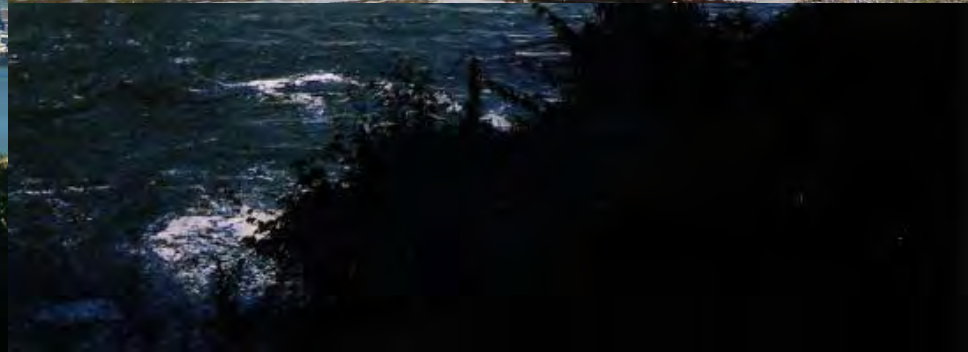
Management Tools C: Biological Control

Year	No. Parasitoids Released (states)		
	<i>Oobius agrili</i>	<i>Spathius agrili</i>	<i>Tetrastichus planipennisi</i>
2009	0 (0)	9,900 (3)	4,100 (4)
2010	5,452 (5)	55,200 (8)	106,000 (8)
2011	26,276 (12)	92,257 (12)	147,111 (12)
2012	<u>77,480 (14)</u>	<u>77,488 (14)</u>	<u>120,670 (14)</u>



All infested states but
CT, KS, MA, VA, NH





What can you do
as a community?

Management Strategies

Strategy	Tree Removal	Chemical Control	Biological Control	Cost	Ash Protection
<i>No Action</i>	<i>Maximum (later)</i>	<i>No</i>	<i>No</i>	<i>High (later)</i>	<i>No</i>
<i>Selective</i>	<i>Moderate (gradual)</i>	<i>Yes</i>	<i>No/Yes</i>	<i>Moderate (lasting)</i>	<i>Only high priorities</i>
<i>Preemptive</i>	<i>Maximum (now)</i>	<i>No</i>	<i>No</i>	<i>High (now)</i>	<i>No</i>
<i>Aggressive</i>	<i>Minimum (gradual)</i>	<i>Yes</i>	<i>Yes</i>	<i>High (lasting)</i>	<i>Maximum</i>

Lessons Learned: *No Action*

Windsor, ON

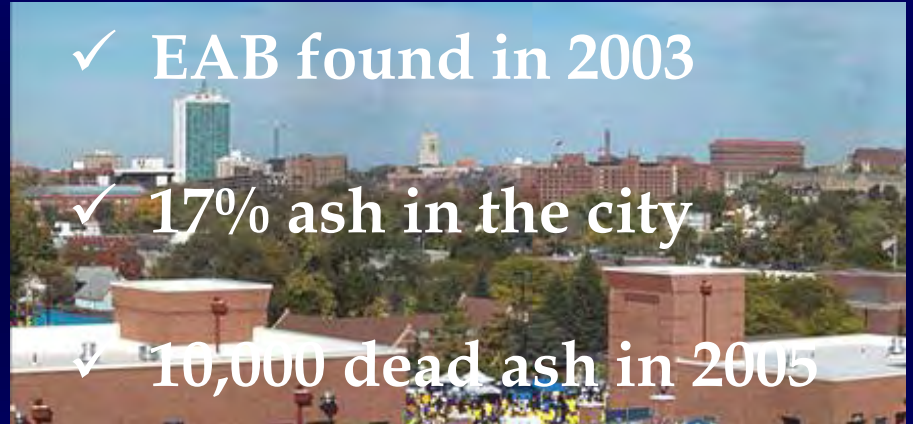
- ✓ EAB found in 2002
- ✓ 9% ash in the city
- ✓ 6000 dead ash in 2005



- ✓ only 5% ash survived
- ✓ cost \$4 million
(remove and replace)

Ann Arbor, MI

- ✓ EAB found in 2003
- ✓ 17% ash in the city
- ✓ 10,000 dead ash in 2005



- ✓ 7000 removed so far
- ✓ cost \$2 million
(remove only)

Lessons Learned: *Selective*

Fort Wayne, IN

- ✓ EAB found in 2006
- ✓ 13,500 city ash trees
- ✓ 15 yr plan (2009)
- ✓ Remove dead trees
- ✓ Protect 1,000 with imidacloprid
- ✓ Annual cost \$900 K (remove, treat and replace)



Northbrook, IL

- ✓ EAB found in 2010
- ✓ 3,000 parkway trees
- ✓ 4 year plan (2010)
- ✓ Remove 730 weak trees
- ✓ Protect 268 with emamectin benzoate
- ✓ Total cost \$426,500 (remove, treat, and replace)



Lessons Learned: *Preemptive*

Toledo , OH



- ✓ EAB found in 2004
- ✓ 9,100 city trees
- ✓ 1,100 tree removed w/ federal funds
- ✓ Eradication abandoned in 2005
- ✓ More dead trees
- ✓ Future cost unknown

Grand Rapids, MI



- ✓ 10,000 city trees
- ✓ 10 year plan (2007)
- ✓ Replace all ash trees
- ✓ Total cost \$7-12 millions
- ✓ EAB found in 2009
- ✓ Dead tree removal
- ✓ \$600 K spent

Lessons Learned: *Aggressive*

Milwaukee, WI

- ✓ EAB close by in 2008



- ✓ 33,000 city trees

- ✓ Treat all trees with emamectin benzoate



- ✓ Cost \$1.6 million (2 yr)

- ✓ Remove them in 20 yr



- ✓ Total cost \$25 million (remove, treat and replace)

London, ON

- ✓ EAB found in 2006

- ✓ 9,938 city trees

- ✓ 15 year plan (2011)

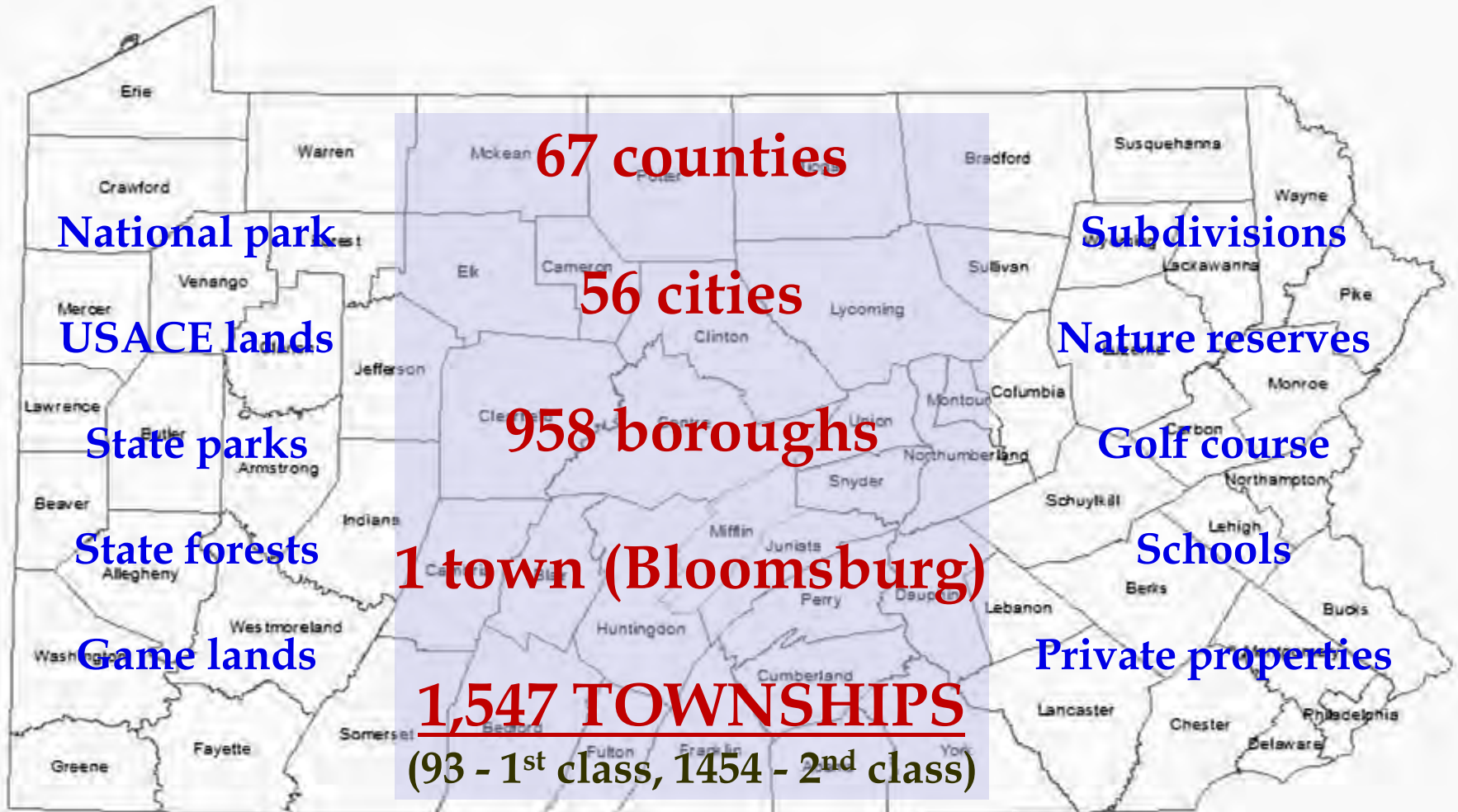
- ✓ Protect 384 trees with Azadirachtin



- ✓ Remove & replace others

- ✓ Total cost \$14.3 million

Communities in Pennsylvania



Why Community Plan ?

Urban trees

- ✓ Have compensatory values
- ✓ Part of the community
- ✓ Being cared by professionals
- ✓ Resource worthy
- ✓ Legal requirement



*Photo courtesy
D. Herms, OSU*



Untreated ash trees after EAB peak, Belvedere Dr., Toledo, OH, June 2009.

A Community EAB Management Plan is:

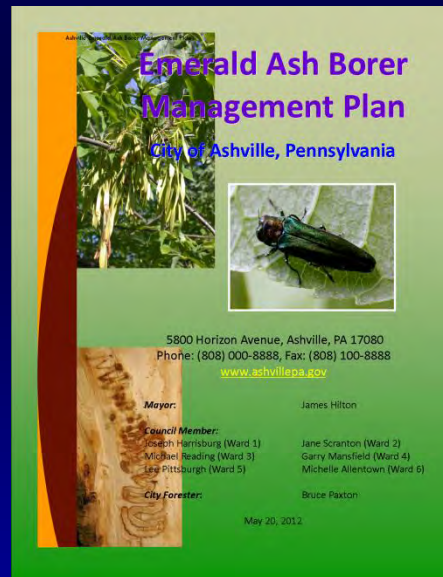


a written document specifically drafted to deal with current or anticipated EAB infestations in its urban forests. It contains clear objectives and viable approaches in the management of EAB at the community level. When adopted, it becomes the official action plan for the community to use in its battle against EAB for the protection of its ash resources.

Plan Components

<http://www.dcnr.state.pa.us/forestry/insectsdisease/eab/index.htm>

- ✓ Administration
- ✓ Executive summary
- ✓ Authority
- ✓ Introduction
- ✓ Ash resources
- ✓ EAB infestation
- ✓ Approaches
- ✓ Wood utilization



- ✓ Material disposal
- ✓ Replanting
- ✓ Community outreach
- ✓ Cost/benefit analysis
- ✓ Fiscal planning
- ✓ Time table
- ✓ Data Collection
- ✓ Reporting

Implementation

Tree Inventory

Tree Removal

Chemical Control

Biological Control

Cost / Benefit Analysis

Outreach / Public Education

Material Disposal

Replanting



Model Plan: *Greenwood Furnace State Park*



- ✓ EAB found in 2011
- ✓ Initiate plan 2/12
- ✓ Selective approach
- ✓ Inventory 4/12
- ✓ Tree removal 5/12
- ✓ Parasitoids release 5-9/12
- ✓ Chemical control 6/12
- ✓ Crown rating 7/12
- ✓ Official plan 12/12
- ✓ Removal & replanting 04/13

Model Plan:

Borough of West Chester



- ✓ EAB not found
- ✓ Partnered w/ WCU
- ✓ Initiate plan 2/12
- ✓ Selective approach
- ✓ Tree inventory 5/12
- ✓ Crown rating 7/12
- ✓ Tree removal (TBA)
- ✓ Parasitoids release (?)
- ✓ Official plan 12/12
- ✓ Chemical control 2013

Summary

- ✓ EAB is NOT just another forest pest
- ✓ Can kill apparently healthy ash trees
- ✓ Close to 100% infested trees die within 4-5 yr
- ✓ Massive ash mortality and increased safety hazard
- ✓ Need a plan if ash is found in your area
- ✓ Select appropriate strategies to meet your goals
- ✓ Contact DCNR for more info and help