

Emerald Ash Borer:

The Poster Child for the Northeastern Area Invasive Species Response Plan

Forest Health Protection

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The National Invasive Species Strategy and Implementation Plan

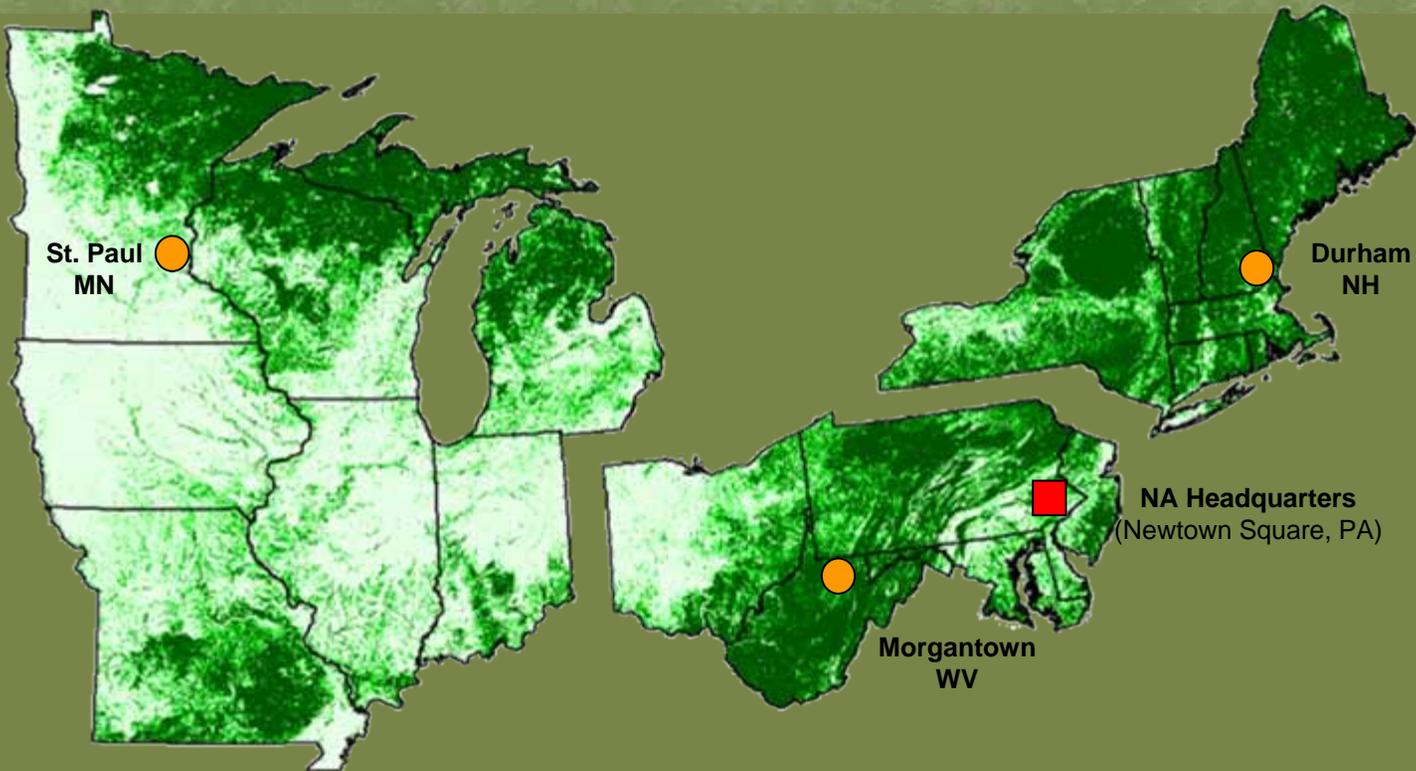
**Invasive species are a
“catastrophic wildfire in slow motion”**

**Consequences cost the American public
an estimated \$138 billion annually**

Take Home

- **NA has extreme exposure for new pest introductions**
- **Mechanisms are in place to effectively accomplish our role**
- **The Forest Service role is critical to minimize the impacts of invasive species**

What does this mean within NA?



20 States

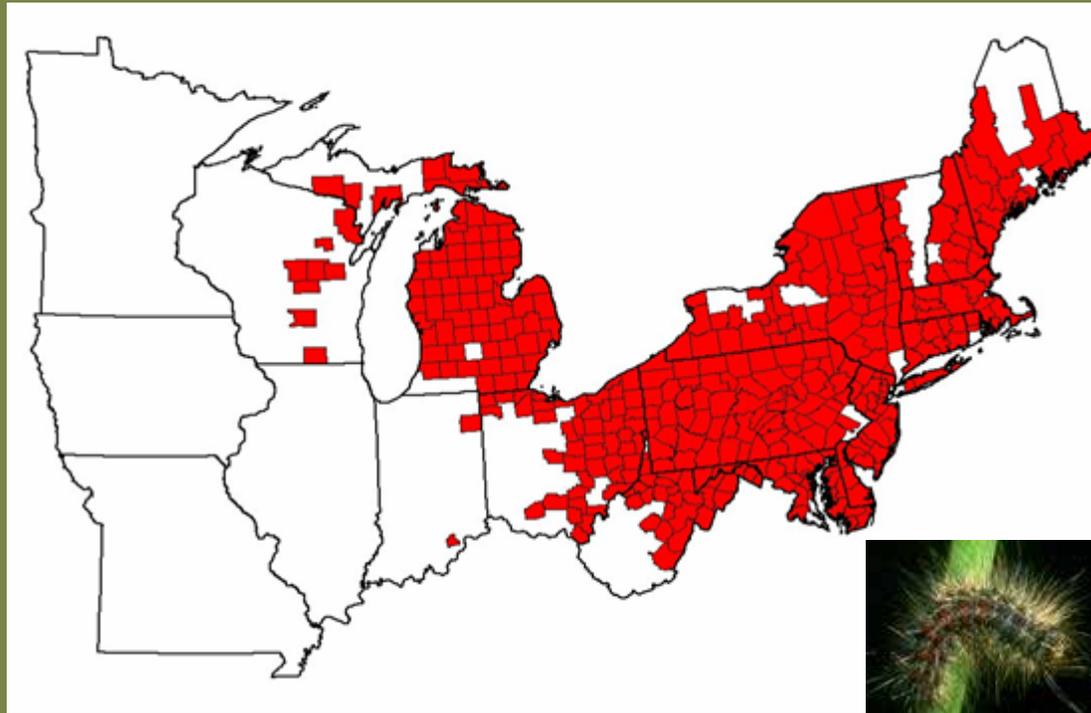
25% of the Nation's Forest Land

93% is Non-Federal

43% of the Nation's Population

Gypsy Moth

Lymantria dispar (Linnaeus)

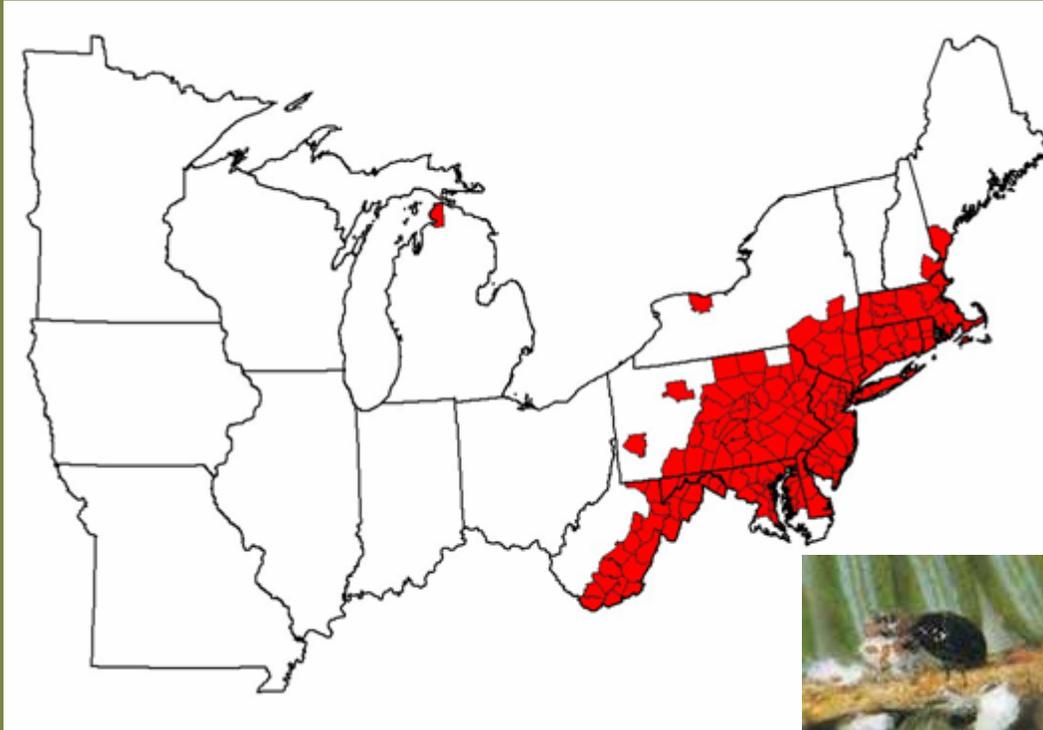


Results:

- 60% reduction in the historical rate of spread
- Eradication of isolated infestations caused by artificial spread
- Biological controls in place within the control zone
- Impacts are minimized through suppression actions

Hemlock Woolly Adelgid

Adelges tsugae Annand

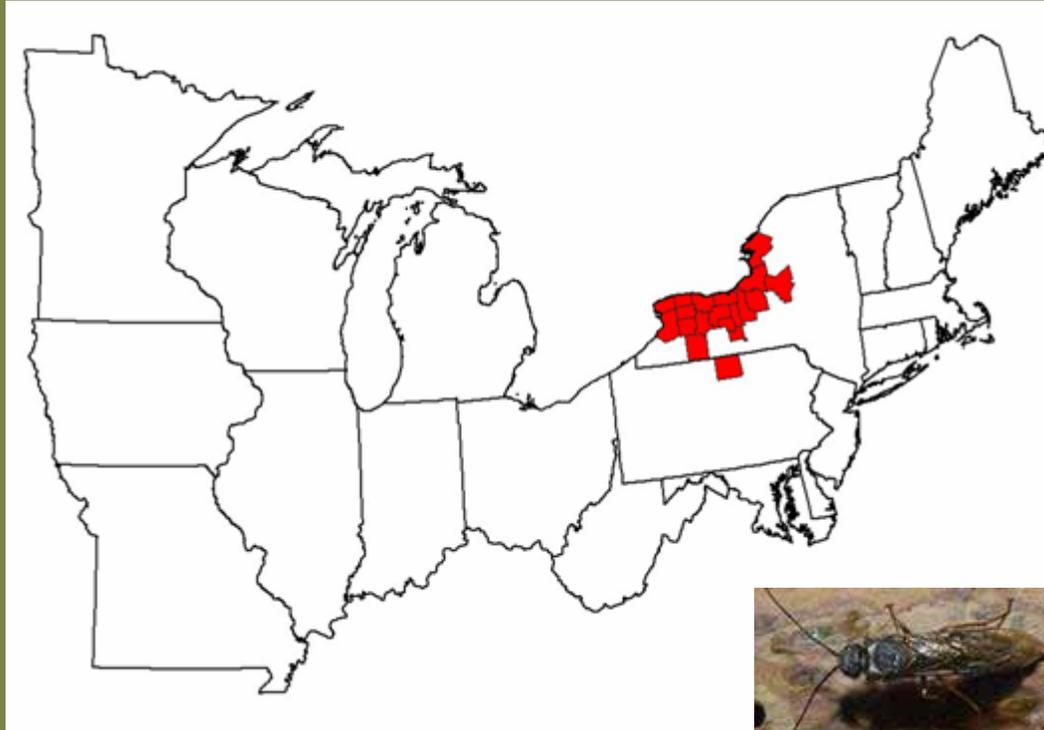


Results:

- Unique ecosystems are protected through tree treatments
- Bio-control releases are minimizing impacts
- Bio-control development is continuing

Sirex Woodwasp

Sirex noctilio Fabricius



New:

- Response processes are in place
- Multi-agency surveying in 11 States to determine infestation extent

Asian Longhorned Beetle

Anoplophora glabripennis (Motschulsky)

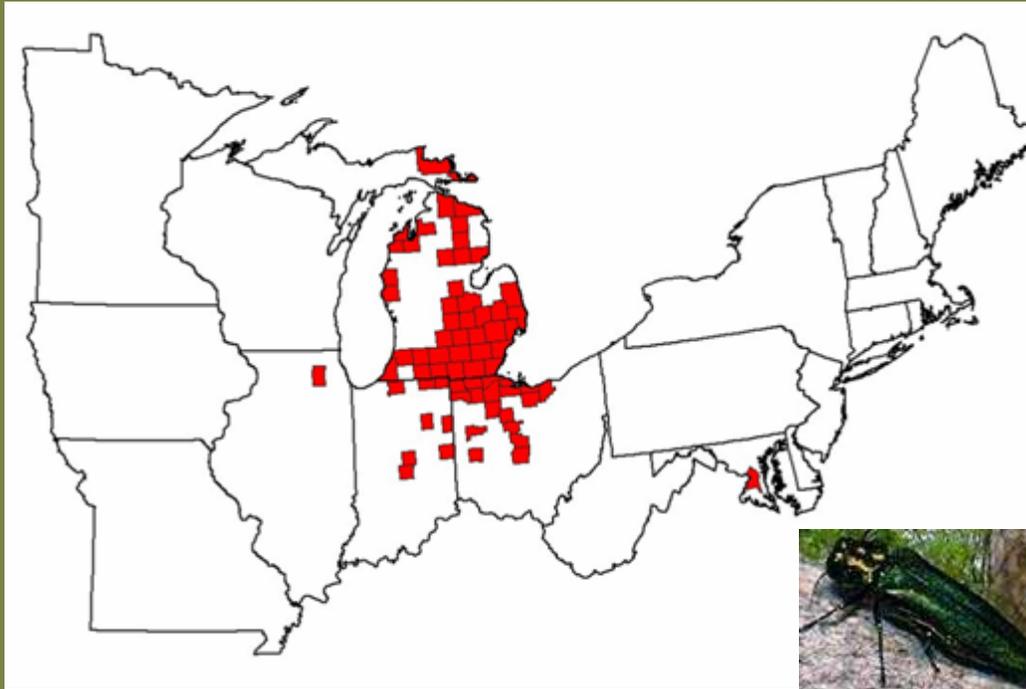


Results:

- Quarantines lifted in Chicago
- Movement towards eradication in NY and NJ

Emerald Ash Borer

Agrilus planipennis Fairmaire



One at-risk resource:
30-90 million urban trees
(\$20-60 billion)

New:

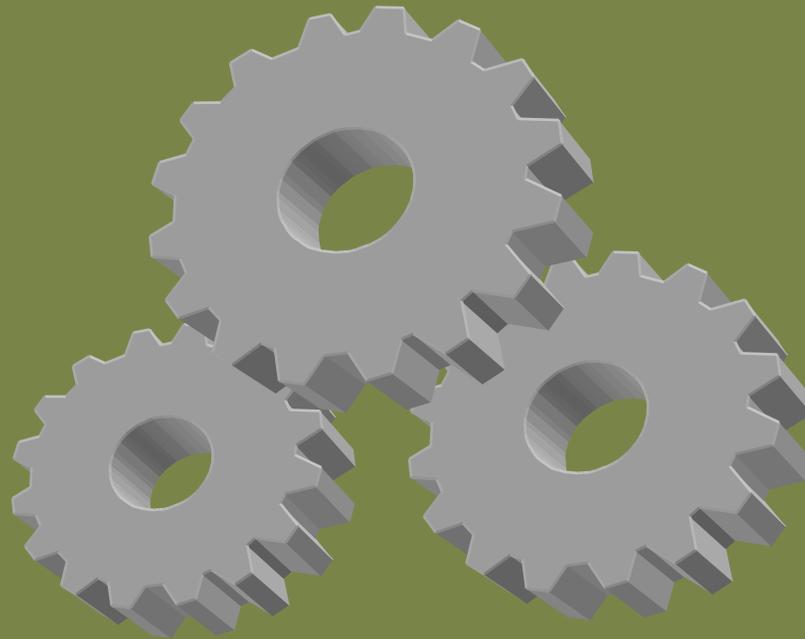
- Surveying in 14 States
- Evaluation of new detection tools, control methods, and bio-controls is ongoing
- Education and outreach are increasing awareness of the risk posed by moving firewood
- EAB/invasive response plans are being developed in many States

Response efforts include:

Many Cooperators with Linked Responsibilities

Federal

USDA APHIS
USDA Forest Service



State

State DOA
State DNR
Universities
Plant Boards

Local Partners

How does it all work?

- APHIS has primary leadership as the Federal plant pest regulatory agency
- The State department of agriculture is the lead State regulatory agency
- The Forest Service provides support to these processes at both the State and Federal level



Sequence of Events

APHIS establishes a New Pest Advisory Group and National Science Panel to:

- Determine the scope of the issue
- Assemble known information (biology and potential impacts)
- Develop recommendations for quarantines, surveys, and eradication actions

Forest Service Role

State and Private Forestry

- Active role on NPAG (Incident Leadership)
- Active role on Science Panel (applied technical information)

Research

- Active role on Science Panel (scientific information)

State and Private Forestry Role

In the beginning – New Pest Advisory Group/Science Panel

- Expertise (270 FH specialists nationally, NA 45 – 16%)
 - Delimiting surveys
 - Base information assembly
 - Control Strategy Development
- Coordination for initial actions

As the program develops – Mgmt Team/Science Panel

- Survey/Monitoring coordination
- Education and outreach efforts
- Methods Development (refining the tool box)
- Facilitate tree replacement (Fed/State agreements)
- Assist State-level control implementation

Forest Service role is key – technical/scientific support, educational and outreach coordination, implementation facilitation

How Activities are Coordinated

- Describes the New Pest Advisory Group process
- Clarifies the Forest Service role
- Describes an Incident Command System coordination structure

Puts into practice response actions described in the National Invasive Species Plan



Key Components

Incident Leadership – *Invasive Species Coordinator*

- Provides Area wide programmatic link to APHIS and others

Management Team – *Field Office Forest Health Group Leaders*

- Provides Area Office/Field Office structured link to skill pool
- Provides structured link State-level cooperators for implementation

Communication Coordination – *Invasive Species Information Officer*

- Provides focused invasive information development/coordination
 - APHIS Information Group
 - Multistate Communication Groups
 - Individual State Organizations

Local Contact – *Emerald Ash Borer Liaison*

- Provides onsite coordination with APHIS and other cooperators for a host of tactical implementation actions

Overview

- EAB History
- Current Situation and Impacts
- NA Forest Health Protection Role
- Results
- Summary

EAB History

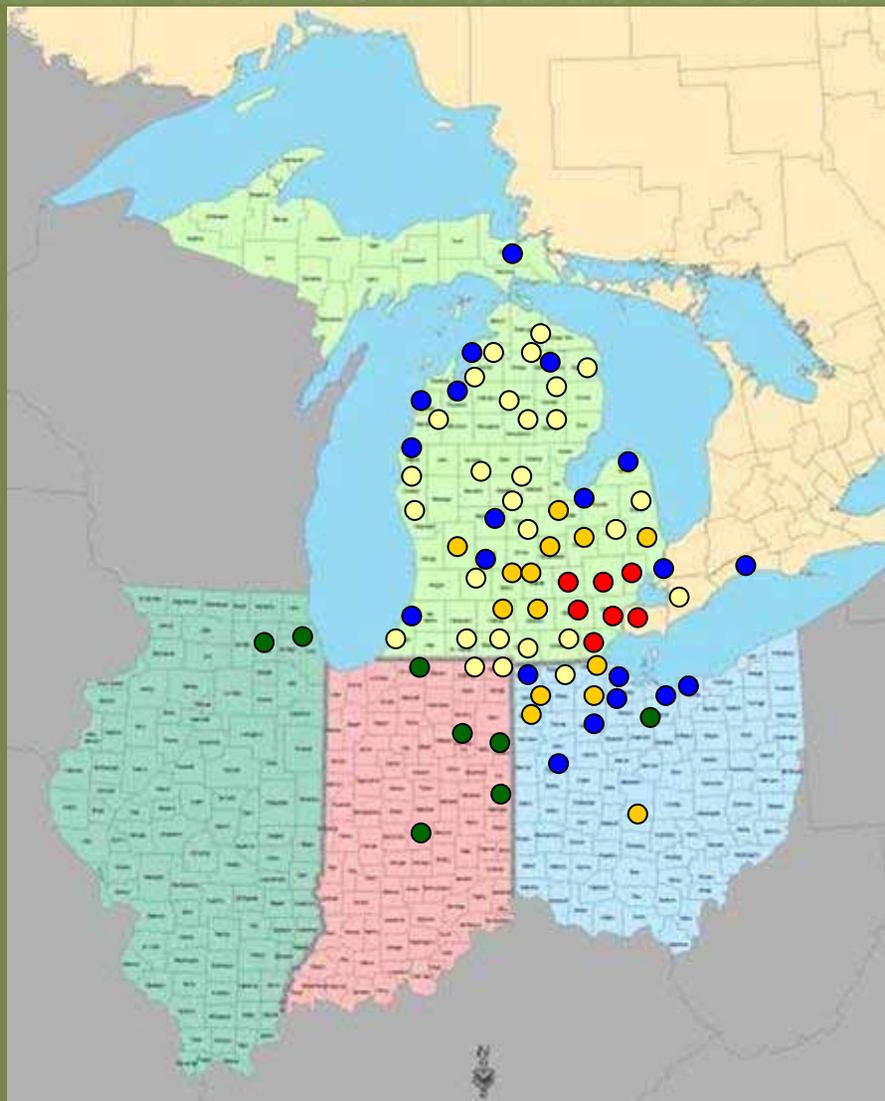
- Identified in 2002
- Previously unknown on the North American continent
- What we have learned since 2002
 - Difficult to detect
 - Fatal to all *Fraxinus*
 - Occurs over a broader area than originally thought

Current Situation and Impacts



20 Million Dead or Dying Ash Trees

Discovery of Emerald Ash Borer Over Time

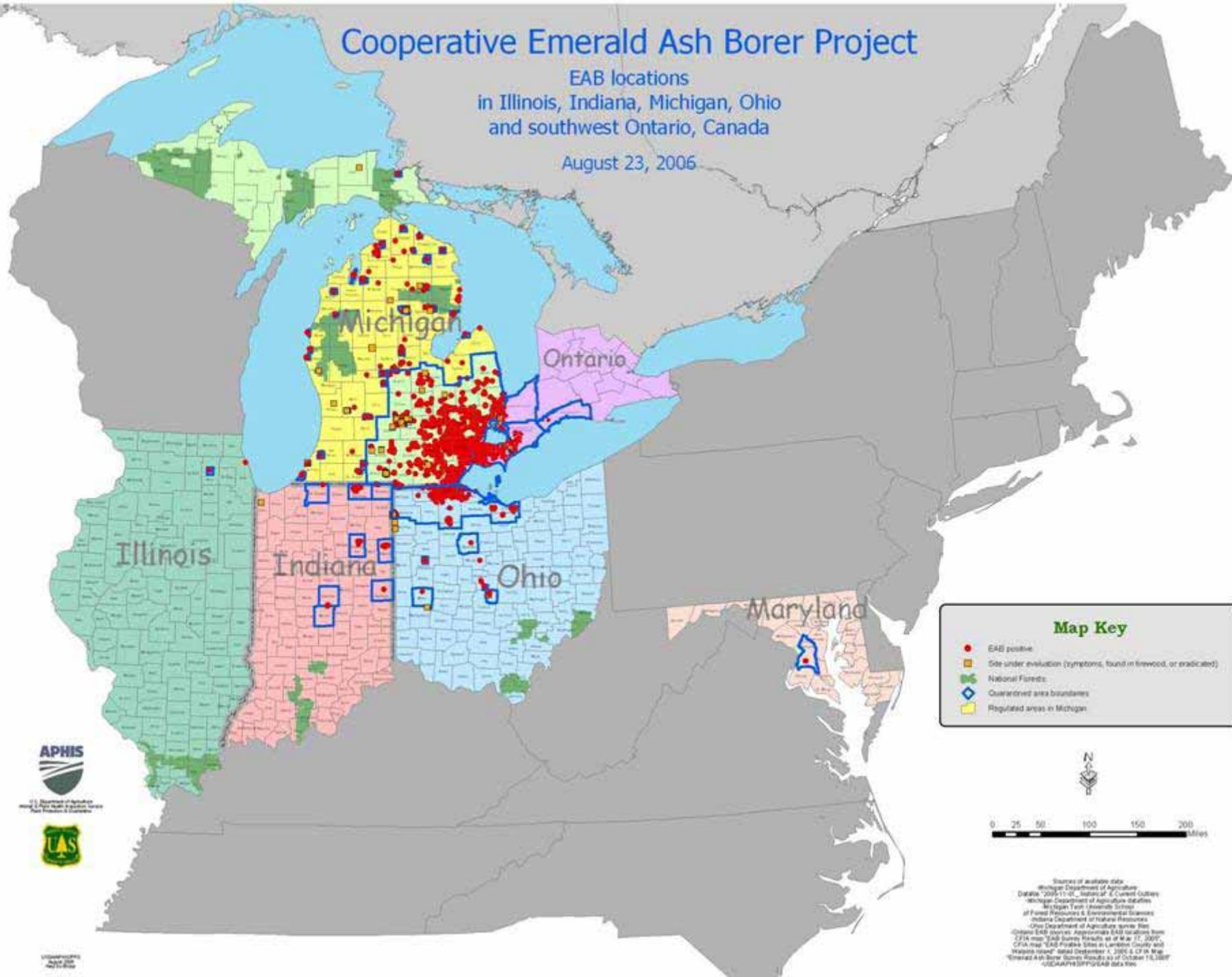


- 2002 ●
- 2003 ●
- 2004 ●
- 2005 ●
- 2006 ●

Cooperative Emerald Ash Borer Project

EAB locations
in Illinois, Indiana, Michigan, Ohio
and southwest Ontario, Canada

August 23, 2006



Map Key

- EAB positive
- Site under evaluation (symptomatic, found in firewood, or eradicated)
- National Forests
- ◆ Quarantined area boundaries
- Regulated areas in Michigan



0 25 50 100 150 200 Miles

Sources of available data:
Michigan Department of Agriculture
Database: 2005-11-05, Status of E Current Outbreak
Michigan Department of Agriculture Database
Michigan Tech University School
of Forest Resources & Environmental Sciences
Indiana Department of Natural Resources
Ohio Department of Agriculture species files
Ontario EAB inventory: Anonymous EAB locations from
CFIA map: EAB Survey Results as of May 17, 2005
CFIA map: EAB Flightline Sites in Lambton County and
Walpole Island, dated December 1, 2005 & CFIA Map
"Emerald Ash Borer Survey Results as of October 18, 2005"
©2006 APHIS/USFS/USDA data files

APHIS

U.S. Department of Agriculture
Forest & Plant Health Inspection Service
Forest Protection & Quarantine



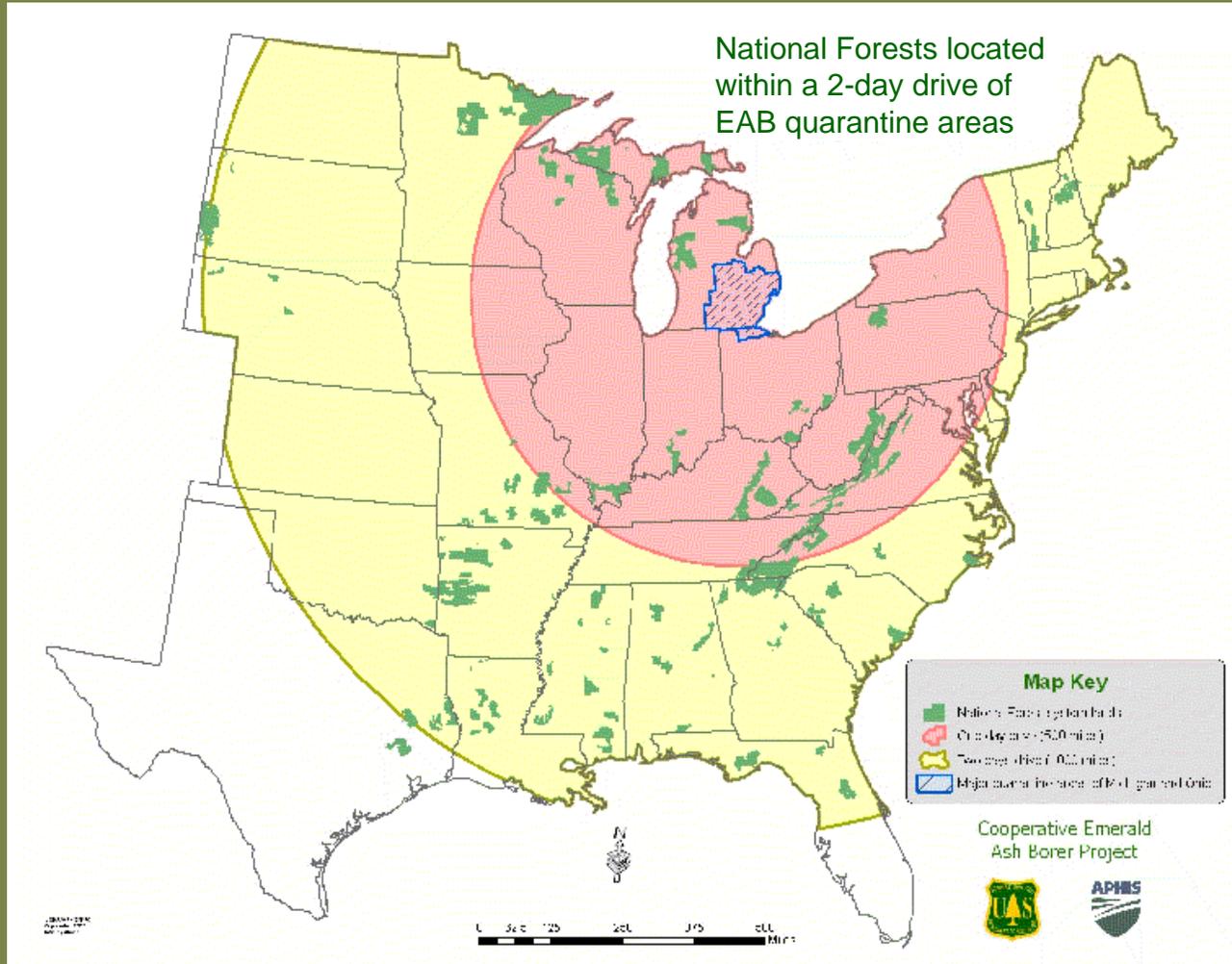
Emerald Ash Borer
Map for EAB

The Spread of EAB

- Solid Wood Packing Material
- Nursery Stock
- Firewood
- Natural



Driving Distance from Quarantine



NA Forest Health Protection Roles

- **Technical and scientific support to the EAB program**
- **Early detection and monitoring of new EAB infestations**
- **Helping affected communities replant trees**
- **Coordination with the National Forest System, R&D, and other Federal landowners**

Information Coordination

- Multistate Communication Group (5 States)
- Green Menace DVD
- ID Kits – 4,000
- ID Cards – 600,000
- Pest Alerts – 1 million
- EAB Web site - 14 million visits

Pest
Alert

United States
 Department of Agriculture
 Forest Service
 State and Private Forestry
 Northeastern Area
 NA-PH-02-04
 January 2004

Emerald Ash Borer



An exotic beetle from Asia was discovered in July 2002 feeding on ash (*Fraxinus* spp.) trees in southeastern Michigan. It was identified as *Aglyptinus planipennis* Fairman (Coleoptera: Buprestidae). Larvae feed in the cambium between the bark and wood, producing galleries that eventually girdle and kill branches and entire trees. Evidence suggests that *A. planipennis* has been established in Michigan for at least six to ten years. More than 1000 square miles in southeast Michigan are infested and more than 5 million ash trees are dead or dying from this pest. This exotic pest is also established in Windsor, Ontario, Canada. In 2003, newly established populations were detected in other areas of southern Michigan and several locations in Ohio. Infested ash nursery trees were also found in Maryland and Virginia.

Identification

Adult beetles are generally larger and a brighter green than the native North American species of *Aglyptinus* (Fig. 1). Adults are slender, elongate and 7.5 to 13.5 mm long. Males are smaller than females and have fine hairs on the ventral side of the thorax, which the females lack. Color varies but adults are usually bronze or golden green overall, with darker, metallic, emerald green wing covers. The top of the abdomen under the wings is metallic, purplish red and can be seen when the wings are spread. The prothorax, the segment behind the head to which the first pair of legs is attached, is slightly wider than the head but the same width at the base of the wing covers.

Larvae reach a length of 26 to 32 mm, are white to cream-colored and dorso-ventrally flattened (Fig. 2). The brown head is mostly retracted into the prothorax and only the mouth-parts are visible externally. The 10-segmented abdomen has a pair of brown, pencil-like appendages on the last segment.

Biology

The emerald ash borer generally has a one-year life cycle in southern Michigan but could require two years to complete a generation in colder regions. In 2003, adult emergence began in early June, peaked in late June and early July, and continued into late July. Beetles usually live for about 3 weeks and are present into mid-August. Adult beetles are active during the day, particularly when conditions are warm and sunny. Most beetles remain in protected locations in bark crevices or on foliage during rain, heavy cloud cover, high winds, or temperatures above 32°C (90°F). Beetles feed on ash foliage, usually in small, irregularly-shaped patches along the margins of leaves. Females can mate multiple times and egg laying begins a few days after the initial mating. Females can lay at least 60 to 90 eggs during their lifetime. Eggs are deposited individually in bark crevices on the trunk or branches. Eggs hatch in 7 to 10 days.

After hatching, first instar larvae chew through the bark and into the cambial region. Larvae feed on phloem and the outer sapwood for several weeks. The S-shaped feeding gallery winds back and forth, becoming progressively wider as the larva grows (Fig. 3). Galleries are packed with fine, sawdust-like frass. Individual galleries often extend over an area that is 20 to 30 cm in length, though the length of the affected area can range from 10 to 50 cm or longer.

Feeding is completed in autumn and prepupal larvae overwinter in shallow chambers excavated in the outer sapwood or in the bark on thick-barked trees. Pupation begins in late April or May. Newly eclosed adults often remain in the pupal chamber for 1 to 2 weeks before emerging head-first through a D-shaped exit hole that is 3-4 mm in diameter (Fig. 4).



Figure 1. Adult emerald ash borer.



Figure 2. Second, third, and fourth stage larvae.



Figure 3. Galleries excavated by larvae.

Results

Survey Work

- Support surveys in areas with a high risk of EAB introduction (14 States)

Tree Peeling Training

- 100 people have been trained to detect low levels of EAB infestation

Wood Utilization

- Ongoing efforts to increase markets and utilization of ash



Results

Firewood Forum

- Response to State requests
- Attended by 100 people from 14 States and Canada
- Coordination to reduce the movement of firewood

DON'T MOVE FIREWOOD

Our forests are threatened by nonnative insects that can kill large numbers of trees. Three recently introduced insects—emerald ash borer, Asian longhorned beetle, and Sirex woodwasp—are wood-infesting species that can be transported long distances in firewood. Once transported into new areas, these insects can become established and kill local trees. We must **STOP THE SPREAD** of these insects and protect our forests and trees.

How you can help:

- Leave firewood at home—do not transport it to campgrounds or parks.
- Use firewood from local sources.
- If you have moved firewood, burn all of it before leaving your campsite.



HELP STOP INVASIVE PESTS

For more information, visit the following Web sites:
www.emeraldashborer.info
www.na.fs.fed.us/lrp
www.sirex.usda.gov/sgp/

USDA Forest Service
 Northeastern Area
 State and Private Forestry
 RA-010-03-06
 April 2006
www.ra.fs.fed.us

The USDA is an equal opportunity provider and employer.

2007 Strategies

- Technical and scientific support
- Early detection surveys
- Outreach and awareness efforts to promote early detection
- Ash utilization
- Replanting assistance to affected communities



Take Home

- **NA has extreme exposure for new pest introductions**
- **Mechanisms are in place to effectively accomplish our role**
- **The Forest Service role is critical to minimize the impacts of invasive species**

**Invasive species know no boundaries;
Protection requires a long-term coordinated effort;
Our forests are worth the effort.**



For More Information

Contact:

USDA Forest Service
Northeastern Area
11 Campus Blvd, Suite 200
Newtown Square, PA 19073

Or visit:

www.na.fs.fed.us/fhp
www.emeraldashborer.info