Community Detectors

Invasive Tree Pests to Know

Karen Coluzzi, Maine DACF, Division of Animal and Plant Health

U.S. History of Invasive Tree Pests

American Chestnut

> 3 billion mature trees in Eastern U.S.

U.S. History of Invasive Tree Pests

Chestnut Blight

discovered 1904 in NY; killed nearly all 3 billion by 1940s

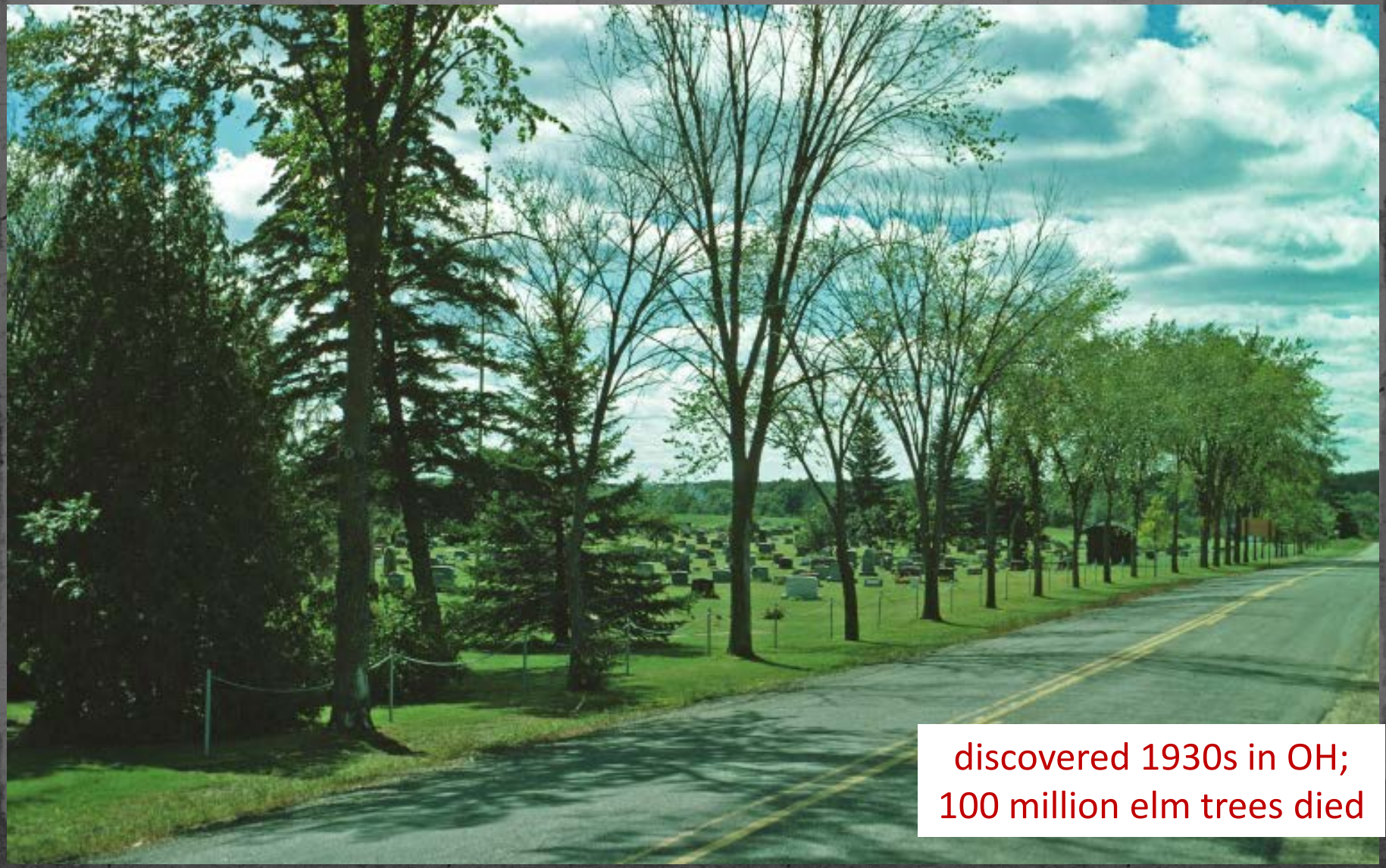
U.S. History of Invasive Tree Pests

American Elm

Predominant street tree – provides beauty and shade

U.S. History of Invasive Tree Pests

Dutch Elm Disease



discovered 1930s in OH;
100 million elm trees died

U.S. History of Invasive Tree Pests

Gypsy Moth

Intentionally introduced

We are always on the lookout for new threats!

Cooperative Agricultural Pest Survey (CAPS)

PEST DETECTION

The Cooperative Agricultural Pest Survey (CAPS) is a national pest detection program funded through a cooperative agreement between the Maine Department of Agriculture, Conservation and Forestry, Division of Animal and Plant Health and the U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS). The goal of the program is to provide an early warning system for pest detection and response that is critical for safeguarding our nation's agricultural and natural resources. Typical surveys target exotic and invasive pests and pests of export significance.

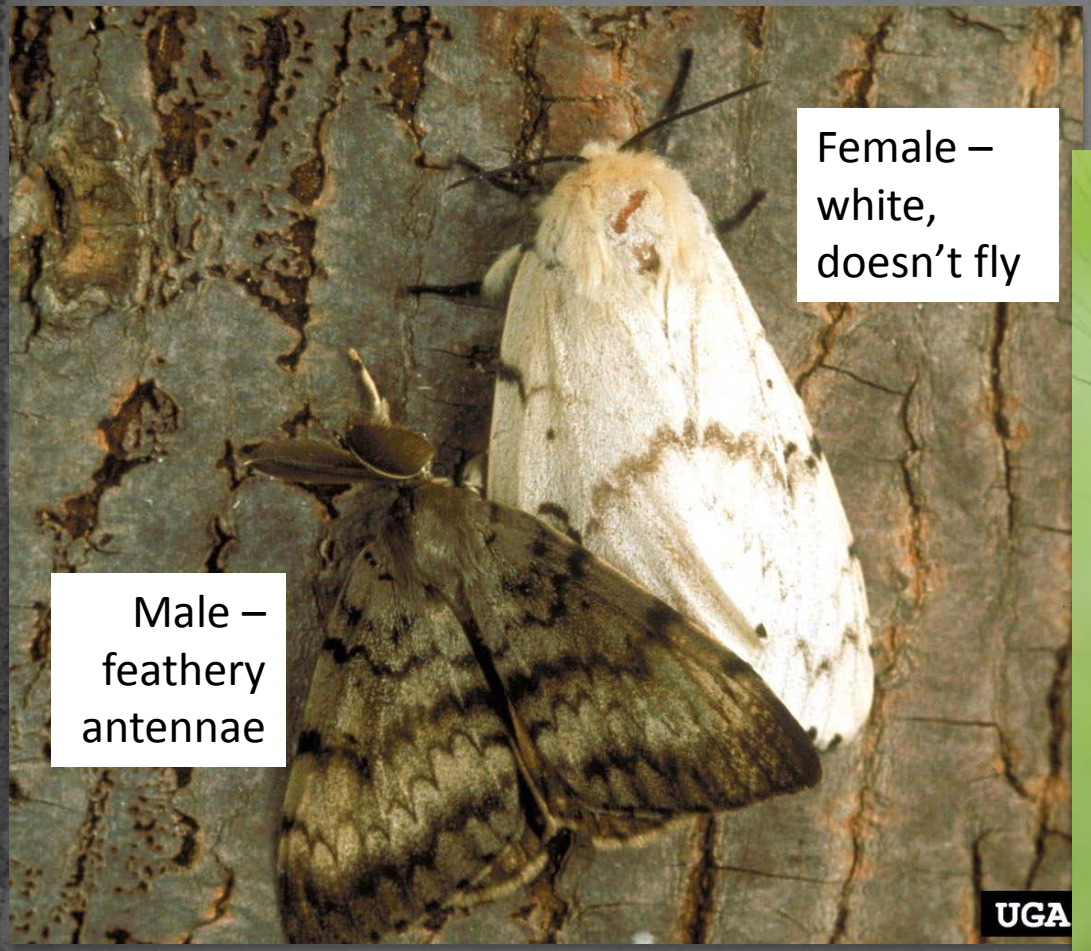
State cooperators (including personnel in the State Agriculture, Forestry, and Natural Resources agencies, the University of Maine, and Cooperative Extension) and USDA personnel conduct pest surveys throughout the State of Maine. Data collected from these surveys are organized and stored in the National Agricultural Pest Information System (NAPIS) database, which is accessible to the public and provides a wealth of information on exotic pests and pests of export significance.

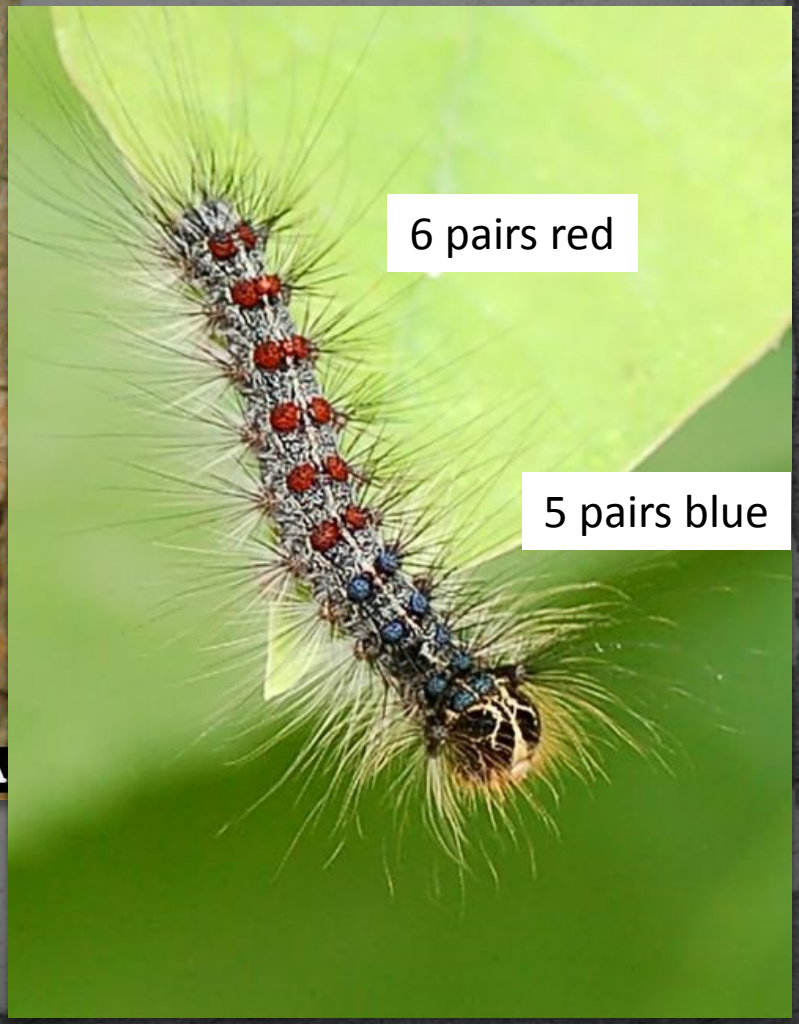
Survey activities in Maine for 2016 will focus on the following:

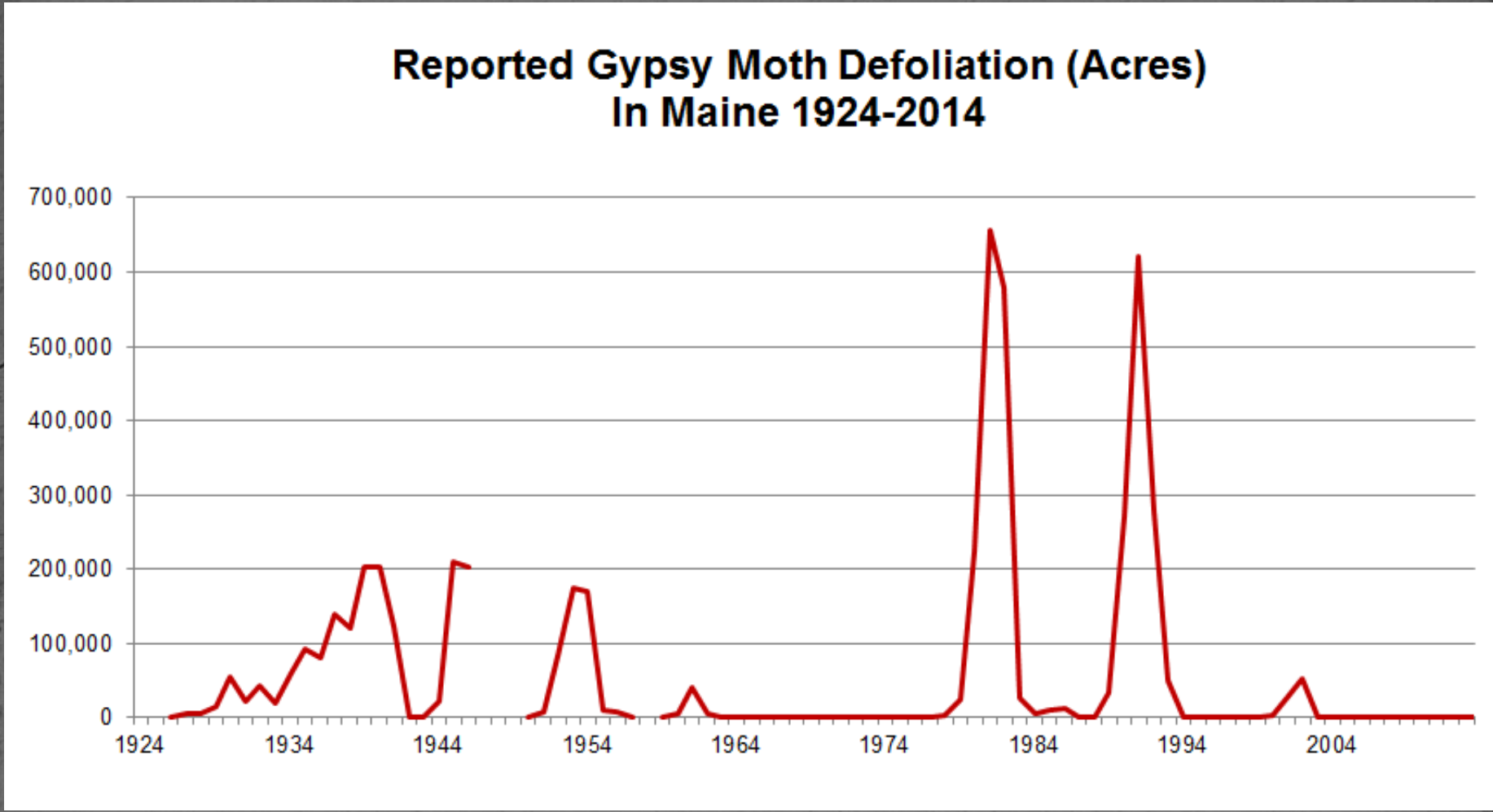
Search:

Survey	Common Name	Scientific Name
Exotic Nursery Pest Survey	Rosy Moth	*Lymantria mathura*
Exotic Nursery Pest Survey	Variegated Golden Tortrix	*Archips xylosteanus*
Exotic Nursery Pest Survey	Green Oak Tortrix	*Tortrix viridana*
Exotic Nursery Pest Survey	City Longhorned Beetle	*Aeolesthes sarta*
Exotic Nursery Pest Survey	Asian Longhorned Beetle	*Anoplophora glabripennis*
Exotic Nursery Pest Survey	Emerald Ash Borer	*Agrilus planipennis*
Exotic Nursery Pest Survey	Goldspotted Oak Borer	*Agrilus auroguttatus*
Exotic Nursery Pest Survey	Oak Splendour Beetle	*Agrilus biguttatus*
Exotic Nursery Pest Survey	Japanese Pine Sawyer	*Monochamus alternatus*
Exotic Nursery Pest Survey	Black Fir Sawyer	*Monochamus urussovii*
Exotic Nursery Pest Survey	Sakhalin Pine Sawyer	*Monochamus saltuarius*
Exotic Nursery Pest Survey	Small White-Marmorated Longhorned Beetle	*Monochamus sutor*
Exotic Small Fruit Pest Survey	European Grapevine Moth	*Lobesia botrana*
Exotic Small Fruit Pest Survey	Light Brown Apple Moth	*Epiphyas postvittana*
Exotic Small Fruit Pest Survey	European Grape Berry Moth	*Eupoecilia ambiguella*
Exotic Small Fruit Pest Survey	Christmas Berry Webworm	*Cryptoblabes gnidiella*
Exotic Small Fruit Pest Survey	Silver Y Moth	*Autographa gamma*
Exotic Small Fruit Pest Survey	Cotton Cutworm	*Spodoptera litura*
Exotic Small Fruit Pest Survey	Egyptian Cottonworm	*Spodoptera littoralis*
Exotic Small Fruit Pest Survey	False Codling Moth	*Thaumatotibia leucotreta*
Exotic Small Fruit Pest Survey	Spotted Lanternfly	*Lycorma delicatula*
Exotic Woodborer/Bark Beetle Survey	Sixtoothed Bark Beetle	*Ips sexdentatus*
Exotic Woodborer/Bark Beetle Survey	European Spruce Bark Beetle	*Ips typographus*
Exotic Woodborer/Bark Beetle Survey	Sixtoothed Spruce Bark Beetle	*Pityogenes chalcographus*
Exotic Woodborer/Bark Beetle Survey	Black Spruce Beetle	*Tetropium castaneum*
Exotic Woodborer/Bark Beetle Survey	Brown Spruce Bark Beetle	*Tetropium fuscum*

Gypsy Moth


Female – white, doesn't fly
Male – feathery antennae
UGA


6 pairs red
5 pairs blue



0 acres of defoliation
2003-2012, 2015
But…

In Massachusetts last year

Gypsy Moth Caterpillars Wreak Havoc On Cape Cod

July 6, 2015 5:16 PM **By Bill Shields**

SouthCoast TODAY

By Kathleen McKiernan
kmckiernan@s-t.com
July 09. 2015 8:00PM

Gypsy moths ravage hardwood trees on SouthCoast

CAPE COD TIMES

By Doug Fraser
dfraser@capecodonline.com
September 28. 2015 2:00AM

Defoliation hammers Cape trees

EASTHAM — Sue and John Fischer paid $1,400 to remove three mature oak trees from their property this
The trees had previously appeared healthy, but they didn't really leaf out and died within the past year.

So, look for egg masses

So, look for egg masses… not just on trees…

Invasive Pests - Deciduous

In Maine!

Winter Moth

Browntail Moth

NOT in Maine... yet

Emerald Ash Borer

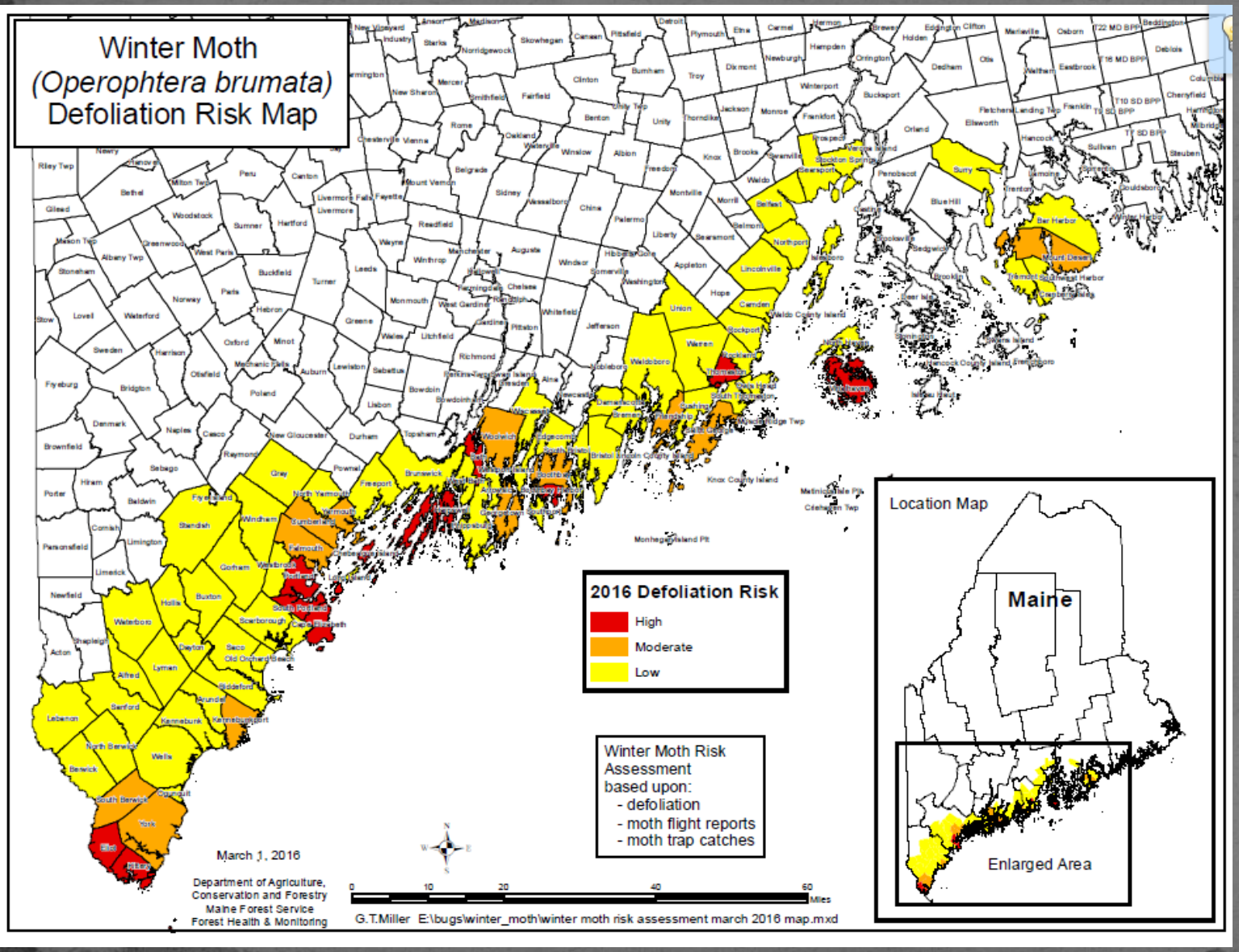
Asian Longhorned Beetle

Winter Moth

Massachusetts

- Now defoliating 100's of thousands of acres
  - Primarily eastern MA
- Killing thousands of trees – <u>especially oaks</u>
  - In Nova Scotia, 40% red oak mortality after 4 years of defoliation
- Has just started to kill trees in Maine
- *Cyzenis albicans*, the parasitic fly released in 2012-14 has been recovered in Kittery and hopefully in other locations as well.

Winter Moth in Maine



Aerial Survey:

10,264 acres defoliated (2015)

Ground Survey:

Defoliation detected from Kittery to Rockland

What does WM do?

Larvae feed in early spring

- On newly forming buds
- Then free-feed on expanded foliage
- Causes “swiss cheese” effect

P. Johnson

Favored hosts:

- oak
- apple
- maple
- birch
- basswood
- blueberry
- cherry

Back Bay Garden Club

Maine Forest Service

Winter Moth

Geometrid moth; “inchworm”

Adults emerge late Fall

Tom Murray, BugGuide.net

Nov - Jan

Waltham Services

Eggs overwinter

Gyorgy Csoka, Hungary Forest Research Institute, Bugwood.org

Dec - Apr

Pupa looks like soil

Maine Forest Service

Hannes Lemme, Bugwood.org

Jun - Nov

Cape Cod Times/Steve Heaslip

Caterpillars chew leaves

Apr - Jun

Browntail Moth

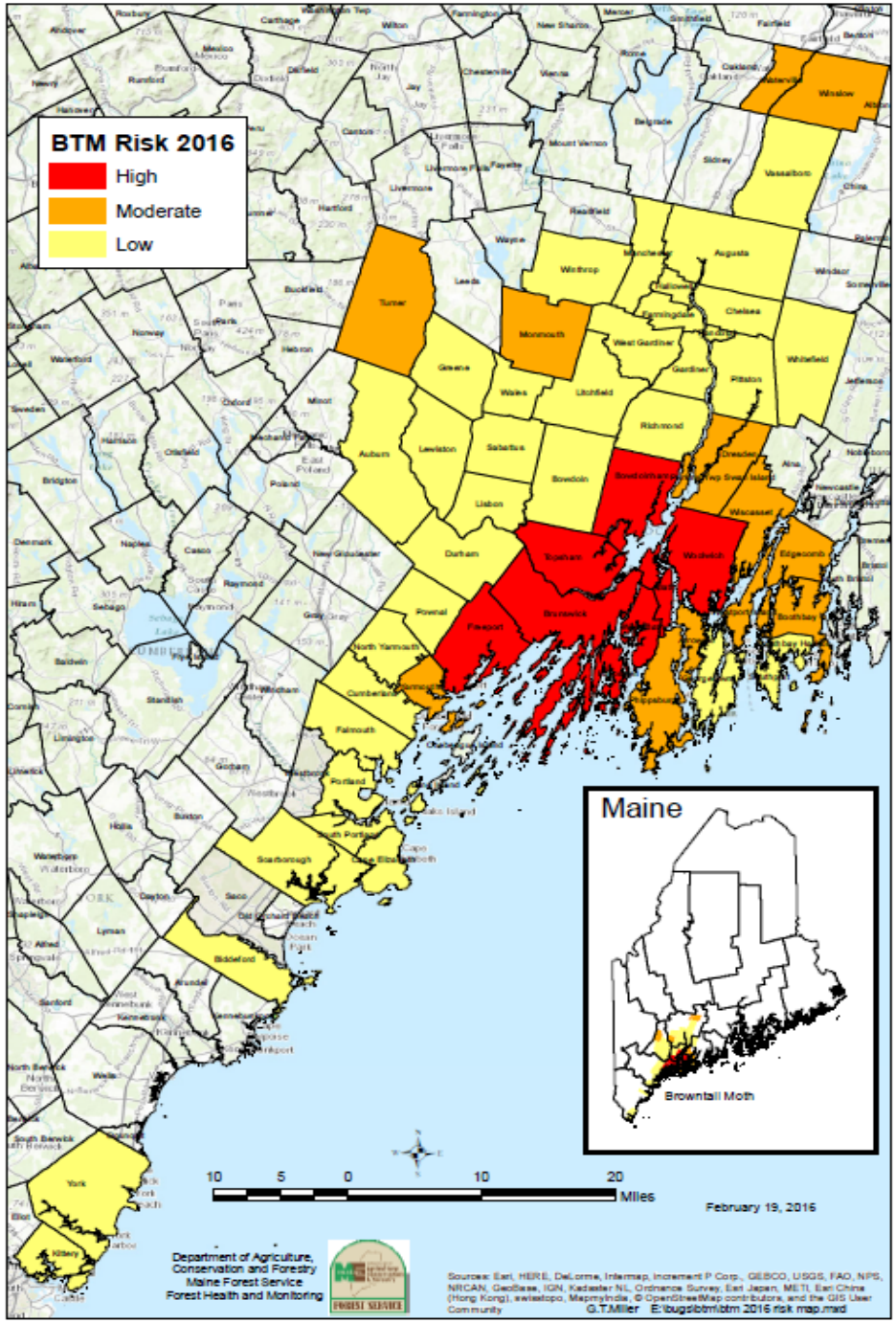
Euproctis chrysorrhoea

- Invasive insect from Europe
  - Order: Lepidoptera (moths)
  - Family: Lymantriidae
- Caterpillars have toxic hairs

Browntail Moth

concern

- Major defoliator
  - Huge host range
  - Prefers hardwood trees and shrubs; oak, apple, cherry, hawthorn, beach plum, rugosa rose…
- BTM caterpillar hairs are urticaceous
  - Can cause severe rashes
  - Can cause respiratory problems



Browntail Moth Risk Map

Towns with High Populations/Risk

Bath
Bowdoinham
Brunswick
Freeport
Harpswell
Topsham
West Bath
Woolwich

Towns with Moderate Populations/Risk

Arrowsic
Boothbay
Cumberland
Dresden
Edgecomb
Monmouth
Phippsburg
Swan Island
Turner
Waterville
Westport Island
Winslow
Wiscasset
Yarmouth

Browntail Moth

Recognizing

- Adult moth
  - White with tuft of brown at tip of abdomen
  - Active July-August

- Caterpillar
  - Brown with red & white markings
  - Very hairy
  - August-following June
  - Make nests out of autumn leaves to <u>overwinter</u>

Browntail Moth

Look for winter webs

Webs

- White
- Tightly woven around leaves
- Tips of branches, esp. oak and apple
- Seen *late fall thru early spring*

Browntail Moth

Self Protection

- Take a cool shower and change clothes after outdoor activities
- Dry laundry inside June thru July
- Wear a respirator, goggles and coveralls when performing activities that stir up caterpillar hairs
- Perform those tasks on damp days
- Use caution when cleaning debris left by caterpillars; it remains a hazard for a number of years
- Consult your physician if you develop a severe reaction
- Be aware dry, windy conditions make exposure more likely

Emerald Ash Borer (EAB)

Agrilus planipennis

David Cappaert, Michigan State University, Bugwood.org

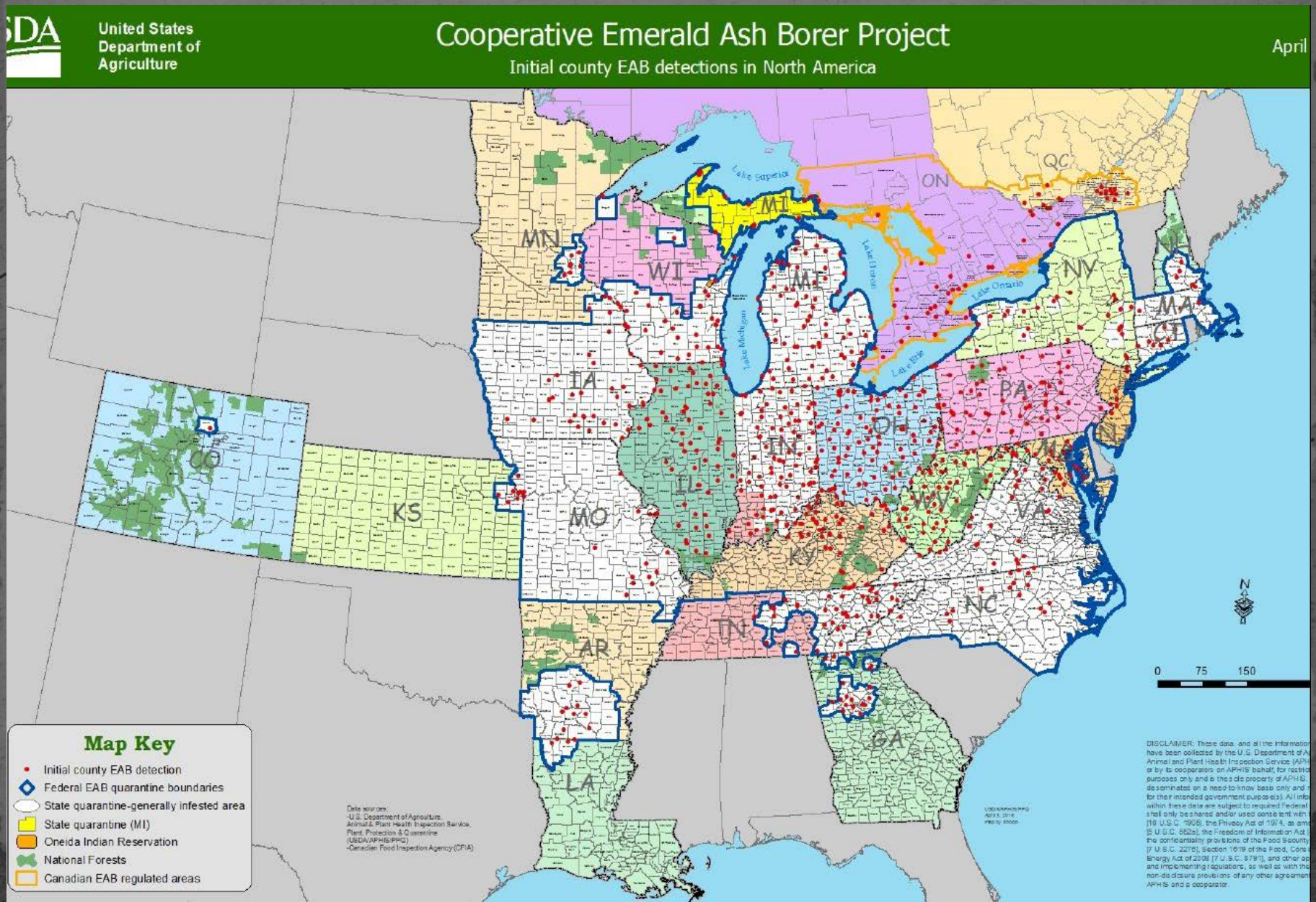
Troy Kimoto, Canadian Food Inspection Agency, Bugwood.org

From: Asia

How it Got Here: SWPM

NOT FOUND IN MAINE

- EAB is now in 25 states – not Maine
- Closest infestations to Maine – NH, MA



What does EAB do?

Attacks **all species of ash** (*Fraxinus*) in North America.

Now known to attack white fringetree (*Chionanthus virginicus*)

Kills trees in as little as 2 years.

- Girdles the tree by extensive feeding in the cambium layer.

Spreads easily in firewood

- 75% of new infestations due to infested firewood.

Mike Kelley via Flickr

Hamilton, Ontario
Some trees were injected with neem seed extract but they still died
Over 7000 ash trees lost

Recognizing EAB

From afar

Woodpecker activity!!!

USDA APHIS PPQ, Bugwood.org

Crown dieback

USDA APHIS PPQ, Bugwood.org

J. Ellis, Purdue University

Epicormic shoots

Woodpecker Activity

Recognizing EAB

Up close

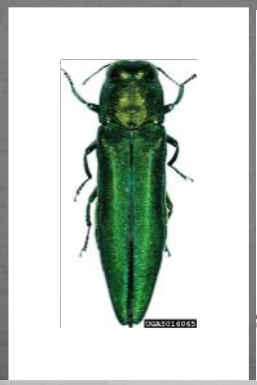
Bark splitting

Michigan Dept. of Agriculture, Bugwood.org

S-shaped galleries under bark

John Obermeyer, Purdue

EAB



NOT EAB

Pennsylvania Dept. of Conservation an Natural Resources

D-shaped exit holes

Monitoring Tools for EAB

- Trap/lure (purple traps)
  (>600 in 2015; contractor in 2016)

- Biosurveillance

Cerceris fumipennis **capturing a buprestid**

- Sensitized Public – this tool *is* you!

Biological control of EAB

- Two parasitoids look promising, new one for North
  - *Tetrastichus planipennisi*
  - *Oobius agrili*
  - *Spathius galinae*

http://www.nrs.fs.fed.us/disturbance/invasive_species/eab/control_management/biological_control/

Photo of S. galinae by Jian Duan, Research Entomologist, USDA ARS Beneficial Insects Introduction Research Unit

Oobius agrili adult parasitizing EAB egg (Dr. Houping Liu).

Asian Longhorned Beetle (ALB)

Anoplophora glabripennis

City of Bowling Green, OH

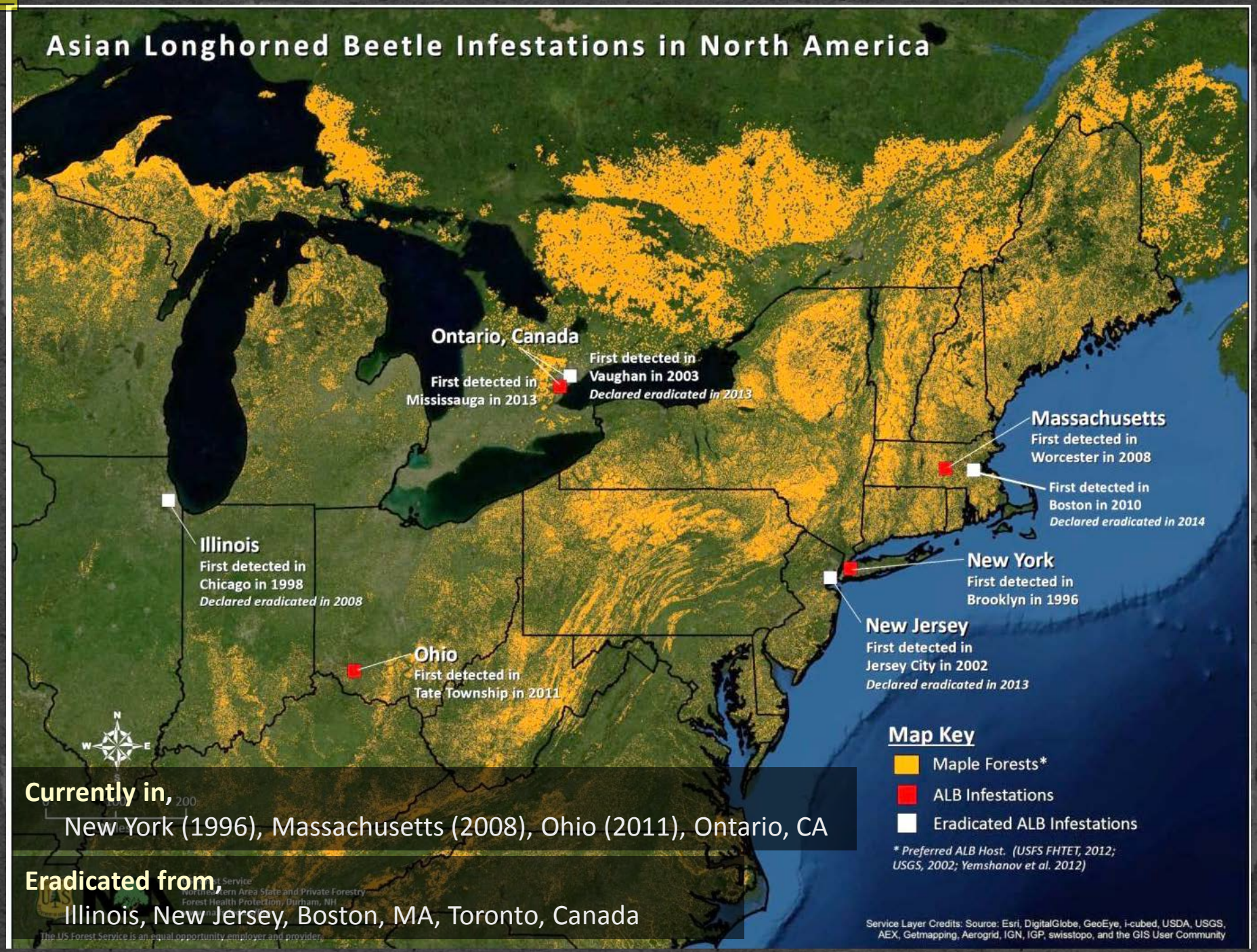
MA Dept. of Agricultural Resources

USDA Forest Service

From: Asia

How it Got Here: SWPM

NOT FOUND IN MAINE



Currently in,

New York (1996), Massachusetts (2008), Ohio (2011), Ontario, CA

Eradicated from,

Illinois, New Jersey, Boston, MA, Toronto, Canada

What does it do?

Attacks **healthy hardwood trees**

- Preferably maple
- But also elm, willow, birch, horsechestnut...

Weakens, eventually killing, trees

- Girdles the tree by young larvae feeding in the cambium layer
- Compromises structure by older larvae boring into heartwood

Can spread in firewood

- Some Ohio and Long Island infestations

Joe Boggs, Bugwood.org

Bark Problems

Grubs Inside

Nobody Home

Oviposition Sites (egg niches)

She's got strong mandibles!

Oviposition Sites (egg niches)

Exit (emergence) Holes

Super bug, even chews through metal tags!

Adult Feeding Damage

Frass

Robert A. Haack, USDA Forest Service, Bugwood.org

Michael Bohne, US Forest Service

ALB vs. Native Longhorned Beetle

Asian longhorned beetle

Christine Peterson, AP

Hardwoods

White spotted sawyer

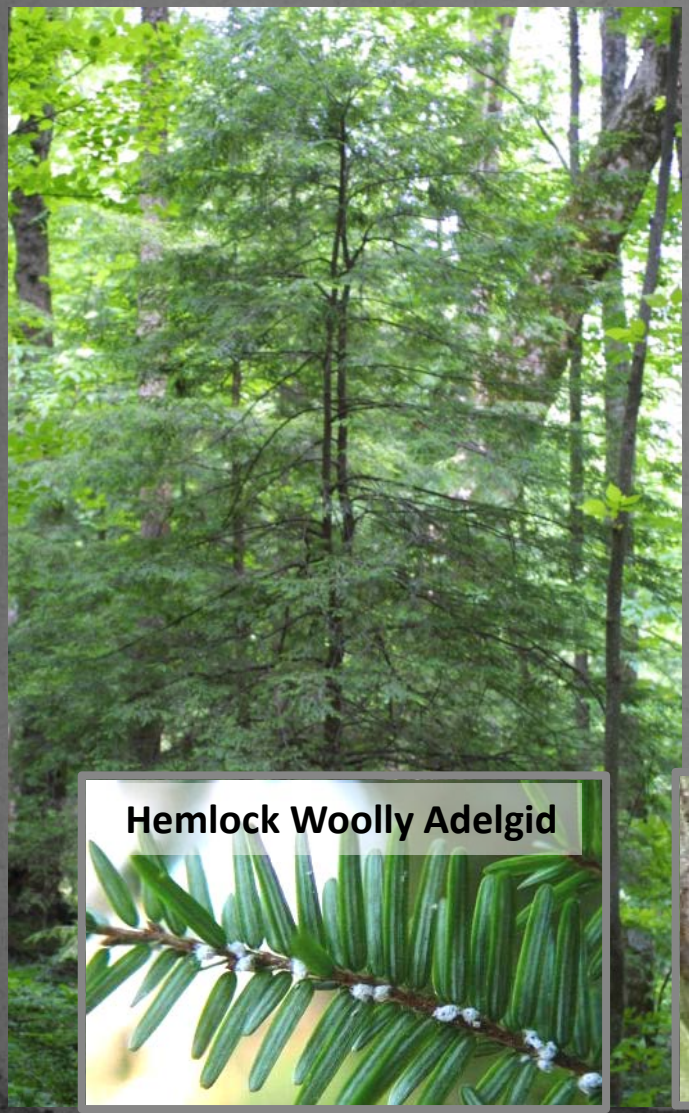
N. Slainesville, BugGuide.net

Conifers

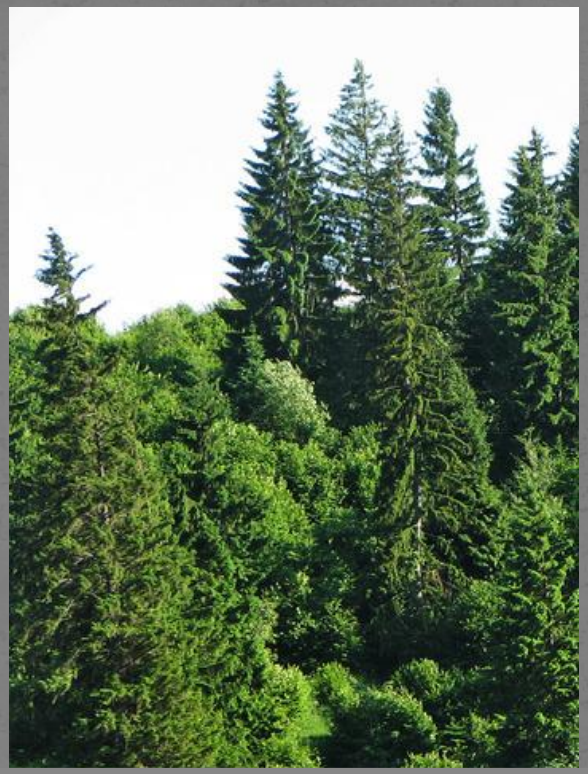
ELYTRA Shiny black	ELYTRA Dull black
ANENNAE Stark B/W contrasting bands	ANTENNAE Dim B/W contrasting bands
SPOTS Distinct white	SPOTS indistinct off-white or none
LEGS Blue tinge	LEGS no tinge

New Invasive Pests - Conifers

Hemlock



Fir

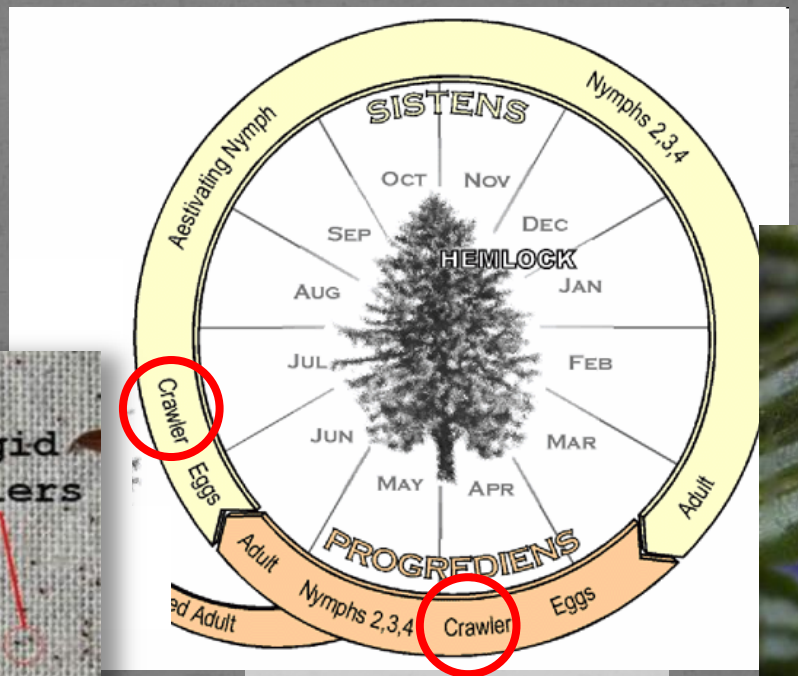


Spruce

What is HWA

An aphid-like, sap-sucking insect

Dormant in summer



Vince D'Amico & Michael Montgomery

USDA Forest Service

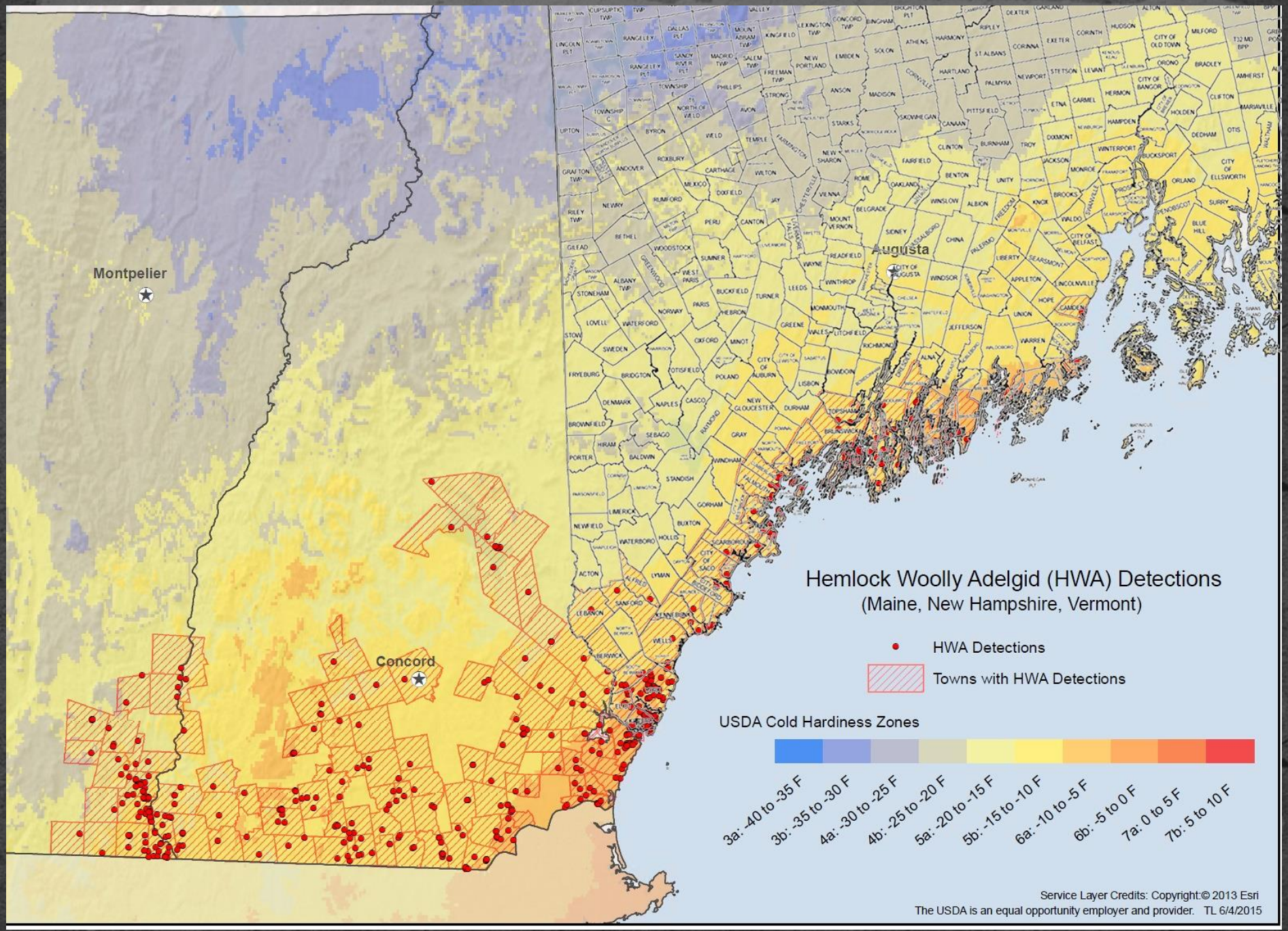
Feeding nymph

Older nymphs/adults produce "woolen" balls (fall/winter)

2 generations / year

spreads more easily during crawler stage

Maine Dept. of Agriculture, Conservation & Forestry


Hemlock Woolly Adelgid (HWA) Detections
(Maine, New Hampshire, Vermont)
HWA Detections
Towns with HWA Detections
USDA Cold Hardiness Zones
3a: -40 to -35 F
3b: -35 to -30 F
4a: -30 to -25 F
4b: -25 to -20 F
5a: -20 to -15 F
5b: -15 to -10 F
6a: -10 to -5 F
6b: -5 to 0 F
7a: 0 to 5 F
7b: 5 to 10 F
Montpelier
Concord
Augusta
Service Layer Credits: Copyright:© 2013 Esri
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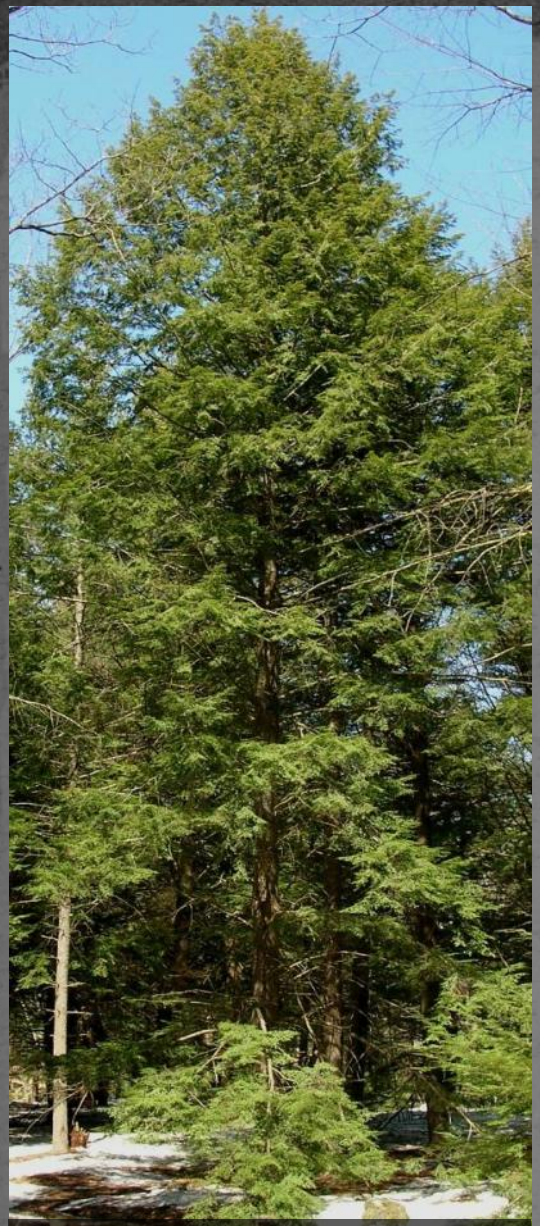


Westbrook ME
(Uninfested)
April 2008

Healthy hemlock
(no HWA)

HWA infested
hemlock

Wolfe Neck Woods
State Park
March 2012

Recognizing HWA

Look at undersides of HEMLOCK twigs

- Discrete white cottony balls at BASE of needles
- found in <u>newer growth</u>
- most visible November thru July

Recognizing HWA

From Afar

- premature needle drop
- lack of new growth
- lush green color fades
- branch dieback
- dead tree

And, while you are looking at hemlocks . . .

Elongate Hemlock Scale

(Fiorinia externa)

- -Hemlock and Fir
- -Spruce
- *-Other Conifers*

Elongate Hemlock Scale

- Armored scale insect
- Found on **hemlock**, **fir**, sometimes other conifers
- First U.S. detection - 1908 (NY)
- First Maine detection – 2009
- Appearance:
  - Female: yellow/brown waxy coating, immobile adult
  - Male, white waxy "cocoon"
  - Threadlike "floss"
  - Along the length of needle

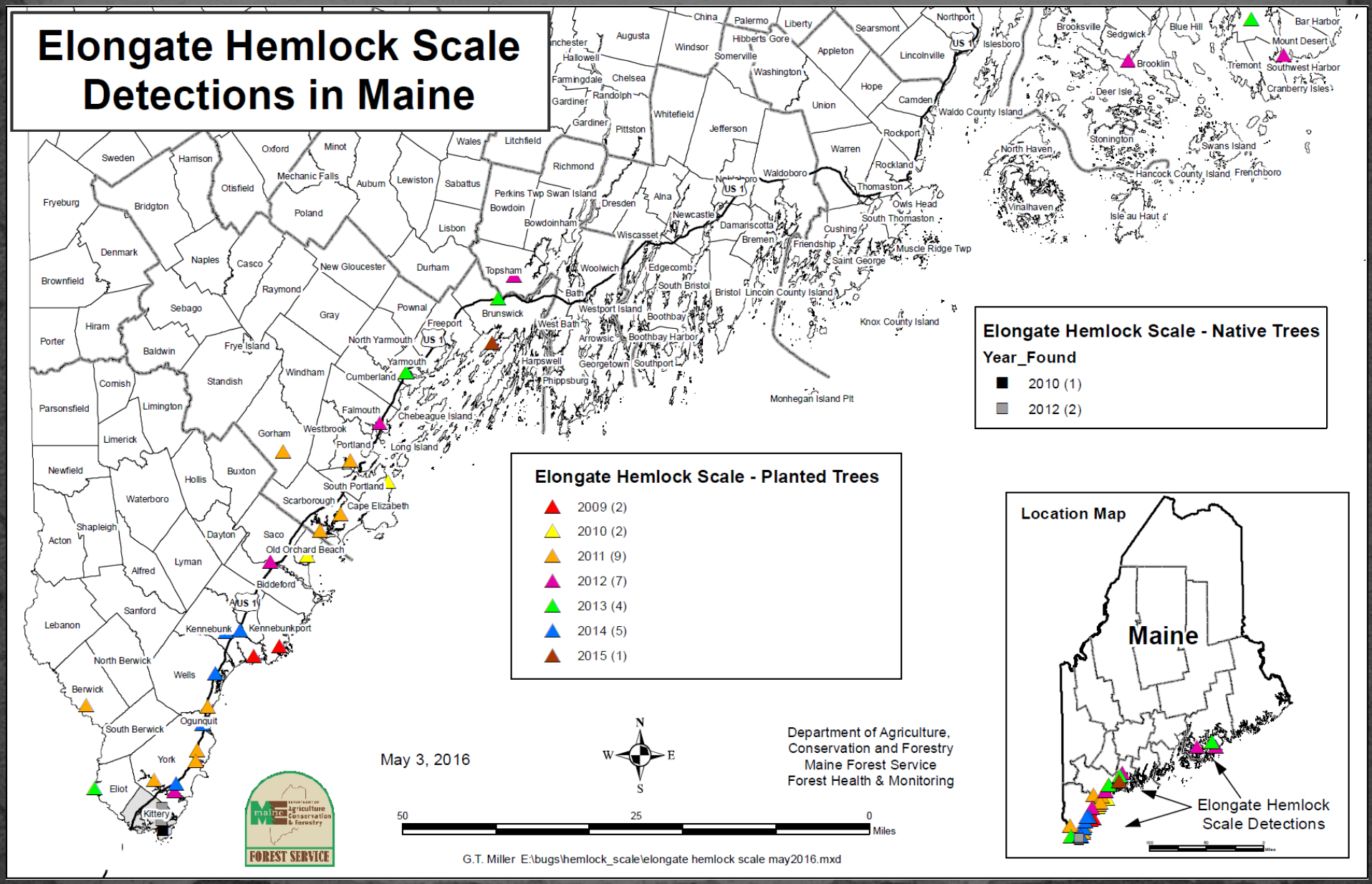
Elongate Hemlock Scale

- **What to look for**
  - Waxy deposits – “gray” colored needles on upper surface
  - Thinning foliage
  - Scale coverings/floss undersurface
- **Where to look**
  - Hemlock and Fir
  - Older branches
  - Planted trees
  - Forests infested w/HWA

On trees with HWA…

See the sneaky scales?

Elongate Hemlock Scale Detections in Maine



For further information, or to report any of these insects, call:

Maine Department of Agriculture, Conservation and Forestry; 287-3891

James E. Appleby, University of Illinois

Questions?