Forest Insect Update

Allison Kanoti
DACF, Maine Forest Service
Old Town, ME

Adelgids

- Conifer-feeding
- One or two hosts
  - Spruce is primary host
  - Other conifer is secondary
- No known parasitoids
- Predators/diseases/weather are important natural control factors
- Several introduced and native pests in this group
  - Balsam woolly adelgid, hemlock woolly adelgid (exotic)
  - Pine bark adelgid, pine leaf adelgid (native)

HWA-USFS

Management in the Landscape

- Management on spruce tends to be removal of galls (replacement should be considered for small, heavily galled trees)
- On secondary hosts (non-spruce conifers), natural enemies often catch up with native adelgids before significant damage is done
- Oils and soaps are often effective on secondary hosts
- Neonicitinoids are also effective against many species

Pine Leaf Adelgid

- Pine Leaf adelgid
  - 1° host = red and black spruce
  - 2 ° host = eastern white pine
- Causing growth loss and mortality in white pine
- Causes galls on spruce (red/black)

Developing Gall on Spruce
Photo: W. Cranshaw, CSU, www.bugwood.org

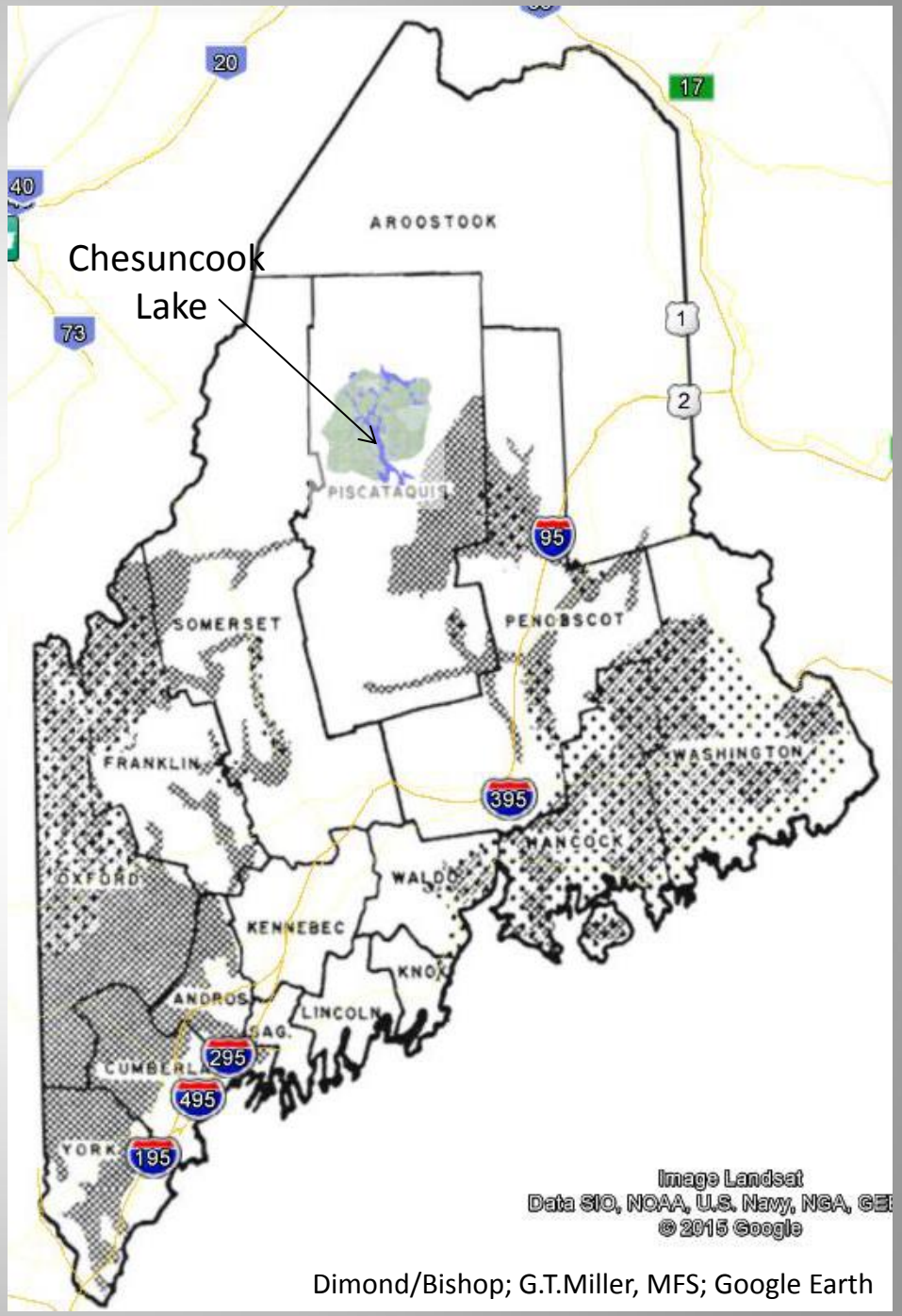
Shoot Damage on White Pine
Photo: J. Bissell, BSP

Where is Pine Leaf Adelgid a Problem?

Currently Heaviest Damage West of Baxter

(scattered across ~1/4 million acres)

Ronald S. Kelley, VT Department FP&R, Bugwood.org



Dimond/Bishop; G.T.Miller, MFS; Google Earth

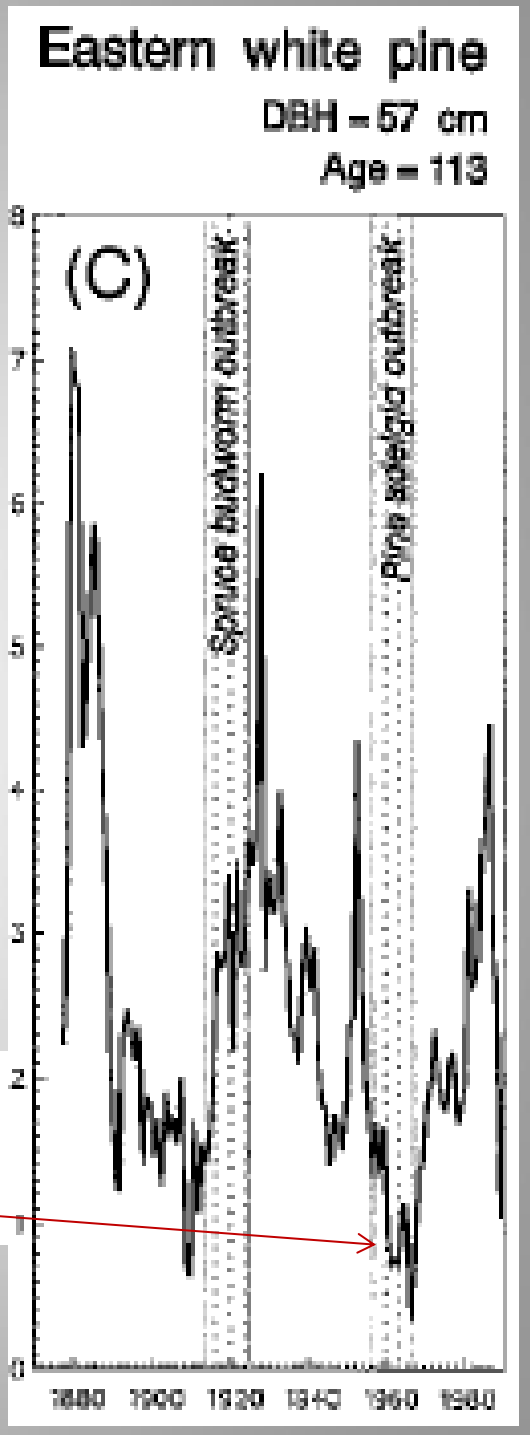
Where is Pine Leaf Adelgid a Problem?

- Mixed spruce/pine (significant component of each)
- Developing stands (5’ tall to small pole-sized)
- Worse in 2-storied stands
- Impact primarily to pine


Photo: Jeff Harriman, MFS

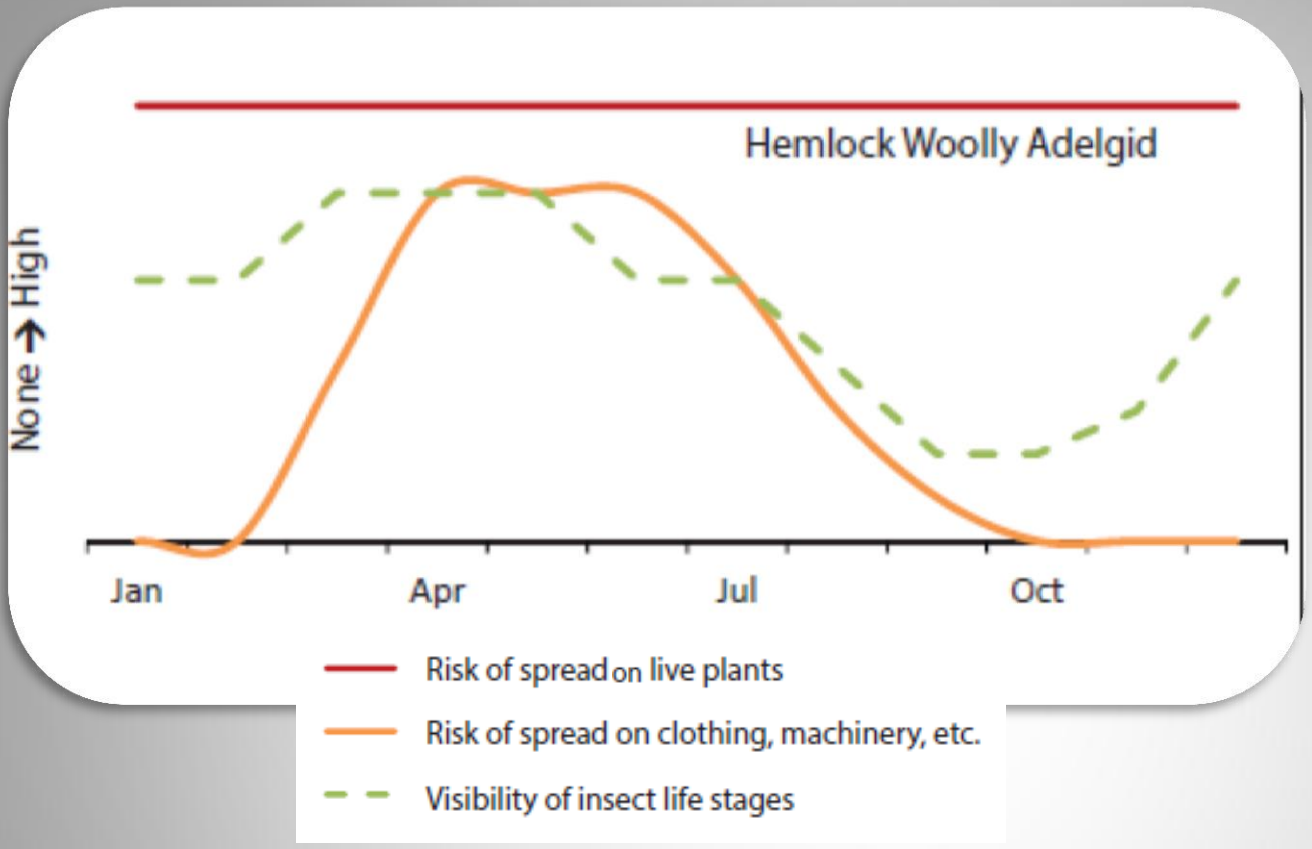
Fajvan, M.A., Seymour, R.S. 1993. Canopy stratification, age structure, and development of multicohort stands of eastern white pine, eastern hemlock, and red spruce. Can. J. For. Res. 23: 1799-1809.

White pine radial growth impact during 1955-1965 PLA outbreak



Hemlock Woolly Adelgid– *Adelges tsugae*

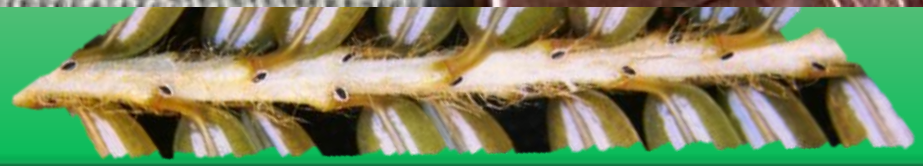
- Native to Japan and PNW
- Known in Maine forests hemlocks from Kittery to Camden
- Difficult to Detect



CAUTION:
You can carry this pest when it is an egg or crawler
(~Mar through Early Aug)

Sometimes Hard to See!

– crawlers are microscopic, summer stage aestivates



Elongate 'Hemlock' Scale – *Fiorinia Externa*

- Also look for this one on **fir**, spruce and other conifers.
  - Especially near residential areas
  - Especially where hemlock woolly adelgid is established

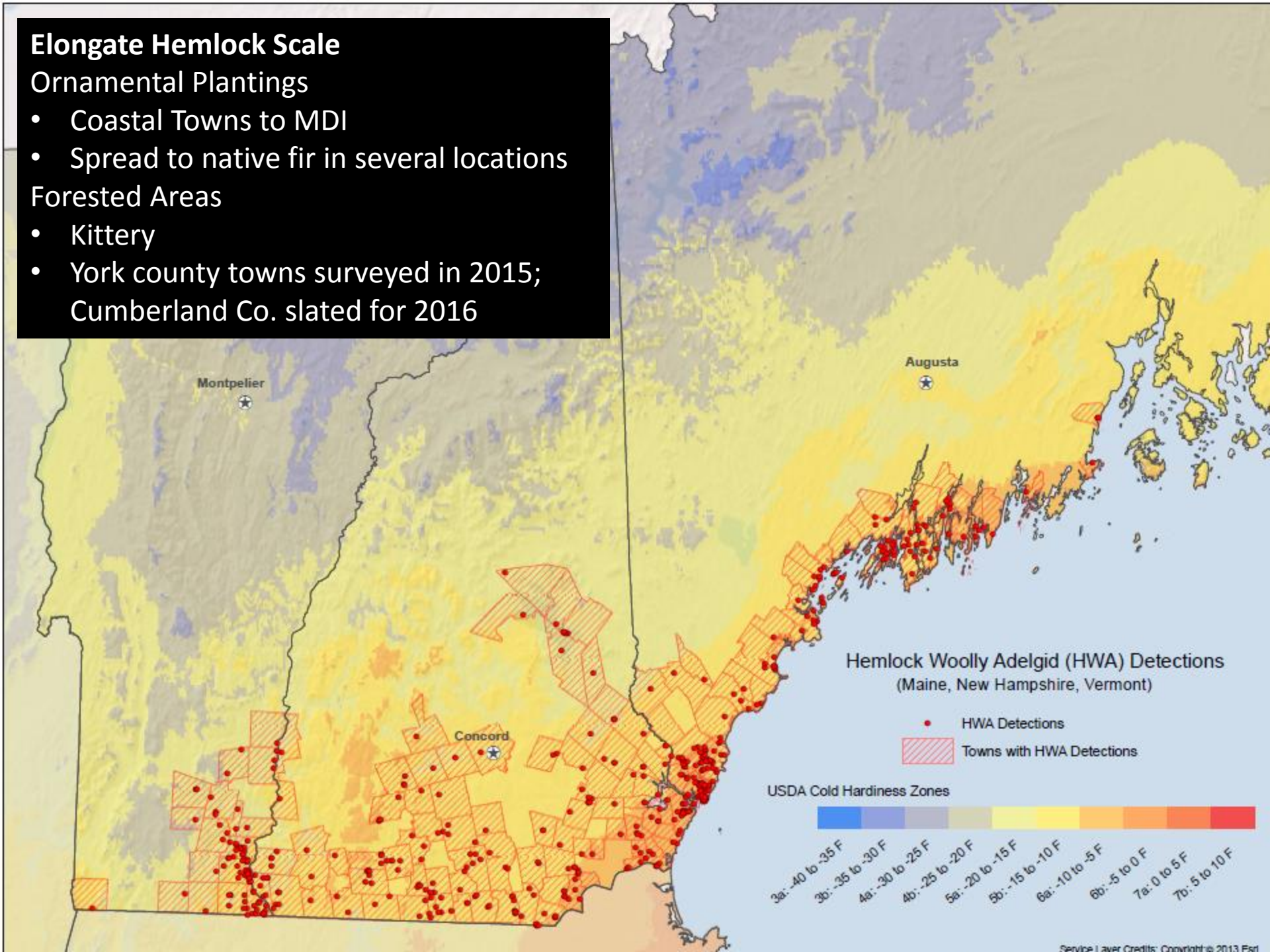
Elongate Hemlock Scale

Ornamental Plantings

- Coastal Towns to MDI
- Spread to native fir in several locations

Forested Areas

- Kittery
- York county towns surveyed in 2015; Cumberland Co. slated for 2016



Red Pine Scale

Matsucoccus mastsumurae

Piercing sucking insect

Identified on Mount Desert Island Sept. 2014

Associated with red pine decline and mortality

Treatment

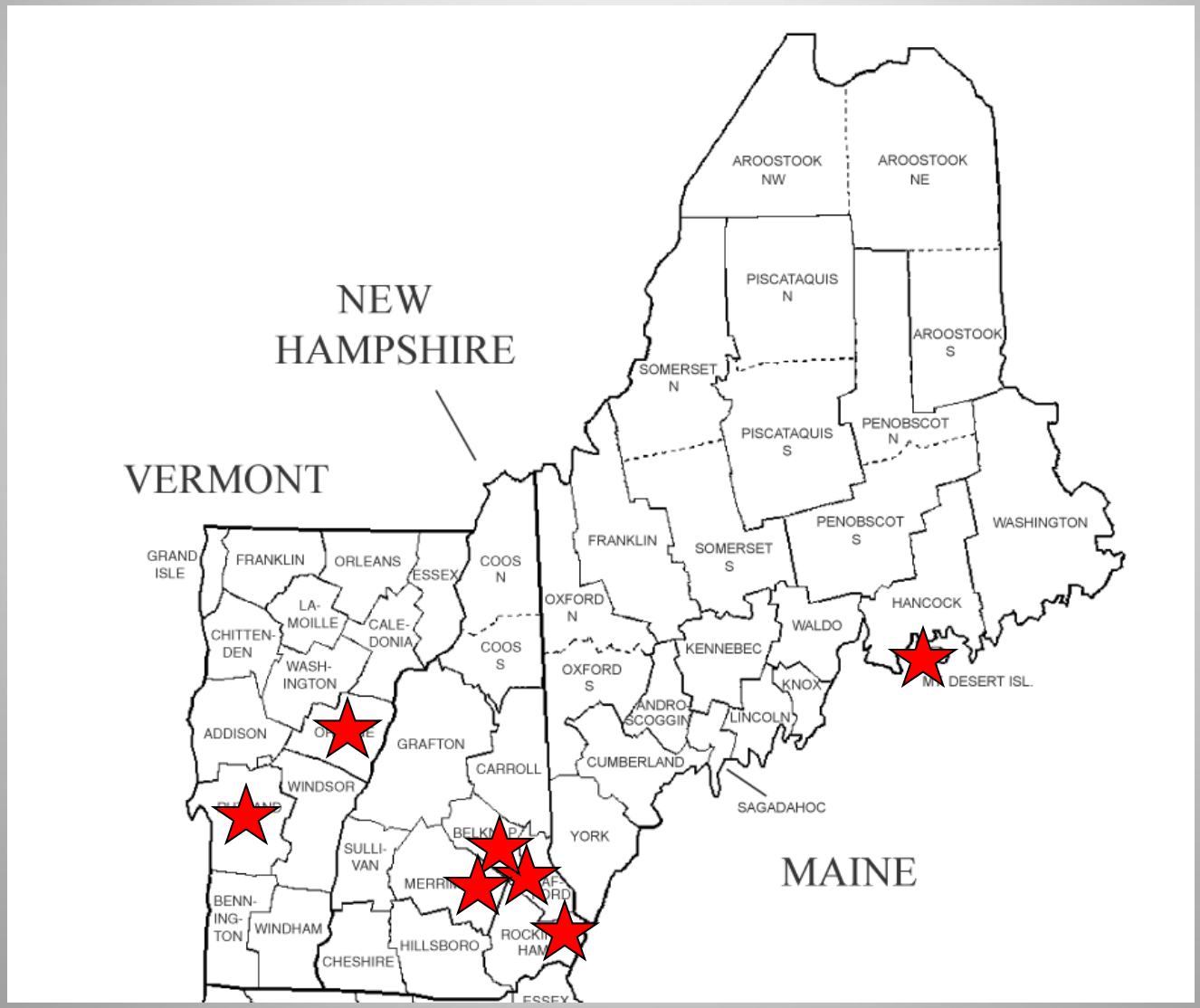
- Little or no treatment happening in S. NE ornamental
- Oil may be effective (crawlers throughout growing season); multiple applications/season likely necessary
- Salvage harvests common in forest stands
  - Should know more about forest impacts in a couple of years
  - Current conditions: widespread mortality in coastal/S.NE forests; mortality in scattered stands in VT

Red pine showing typical pattern in shoots of declining tree– red needles inner, green needles outer

Red Pine Scale

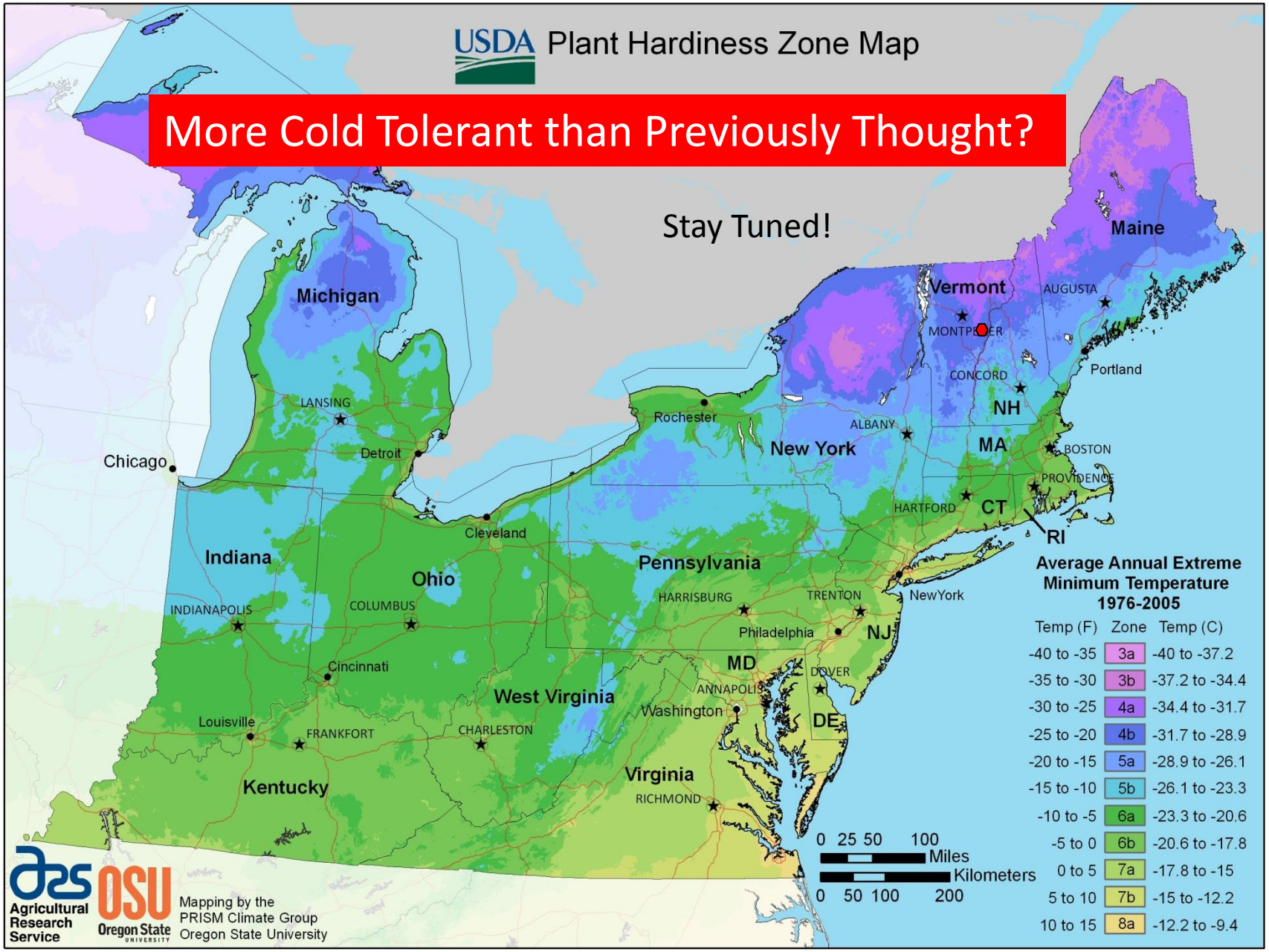
- Rapid mortality

Where is Red Pine Scale a Known Problem?

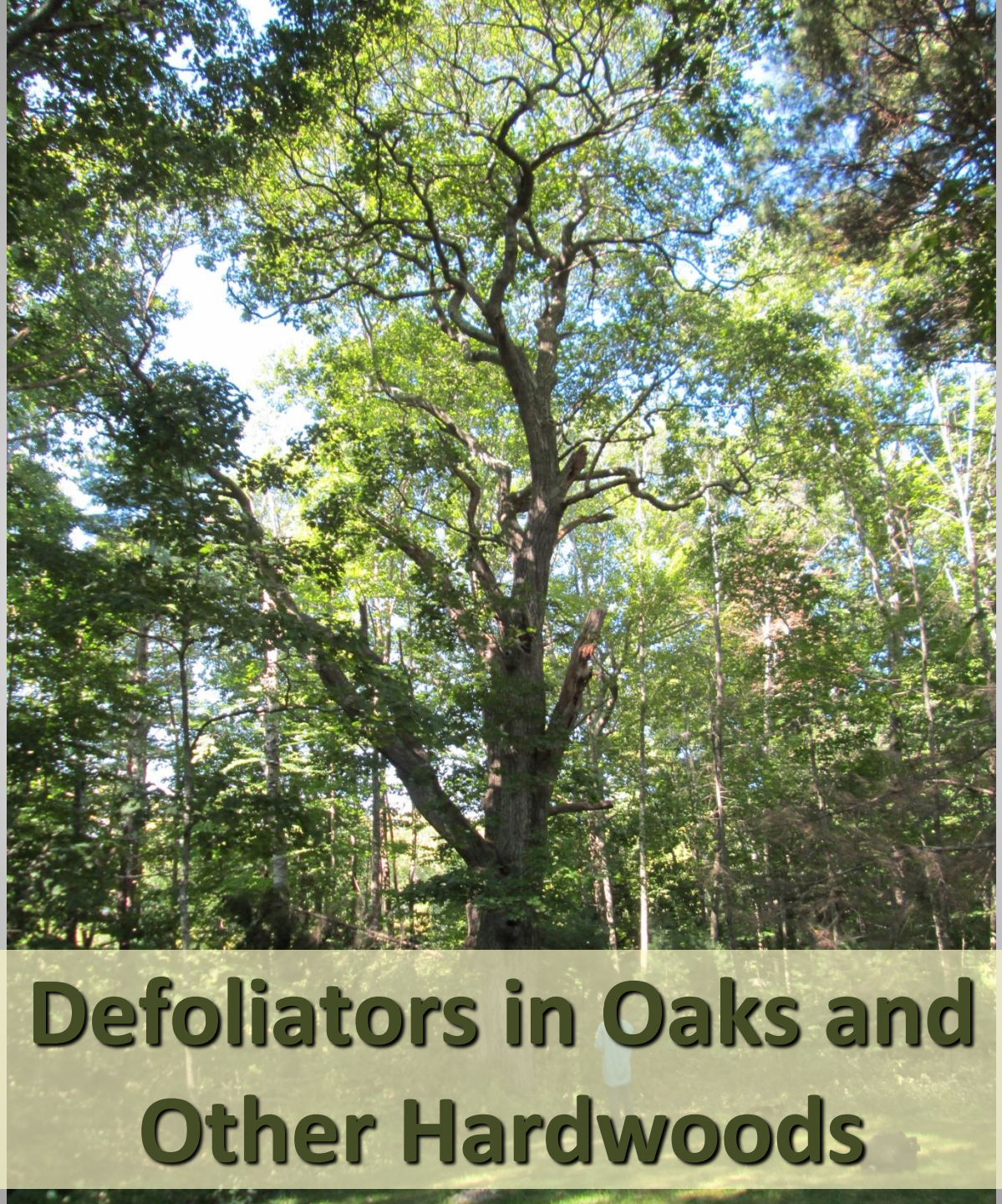


And…

- S.NE
- NY
- NJ
- PA
- China
- Korea



Recently confirmed spot in Orange Co. VT in PHZ **4b** (Avg Annual Min: -25F to -20F)



Defoliators in Oaks and Other Hardwoods

Treatment (Lepidopteran pests)

- Usually foliar application of a labelled contact or stomach poison
- Acephate (systemic) often used against browntail moth—usually used too late to alleviate human health impacts
- Early season defoliators can be a challenge b/c of weather/leaf expansion

Winter Moth

Defoliates hardwood trees and shrubs in early spring

Favored hosts:

- oak
- apple
- maple
- birch
- basswood
- blueberry
- And others


Photo: Maine Forest Service


Photo: P. Johnson


Photo: Maine Forest Service


Photo: P. Johnson

Winter Moth - Life Cycle - Late Fall & Winter

- Adults emerge from soil
- Beginning in November
- **Peak in December**
  (weather favored WM in Dec 2015)
- A few in January


Photo: Maine Forest Service


Photo: P. Johnson

Hungary Forest Research Institute, Bugwood.org

Eggs: November-April

Larvae: April -June

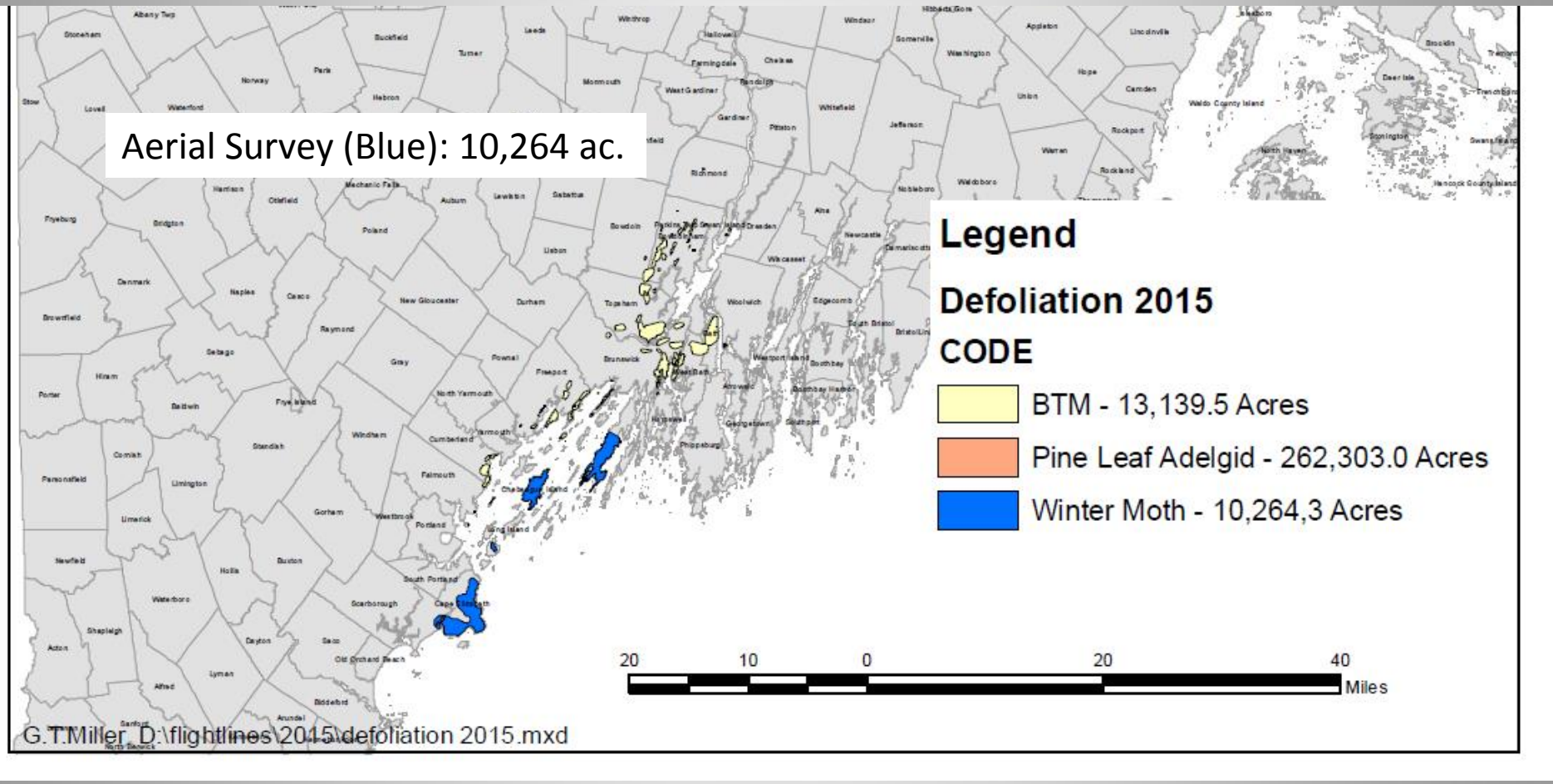
Photo: P. Johnson

Photo: P. Johnson

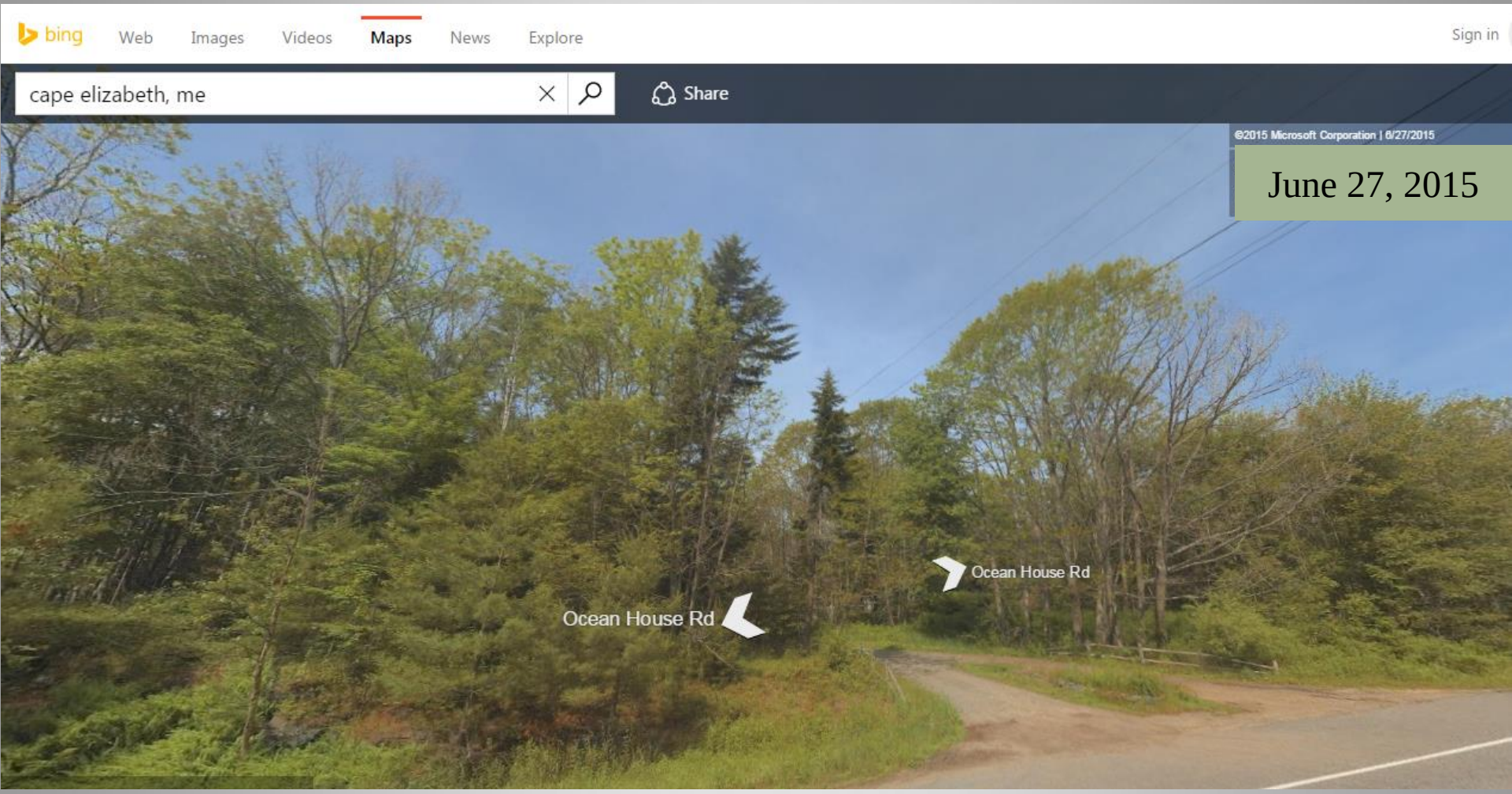
Pupae: June-November

Adults: November-January

2015 Winter Moth Defoliation



- Aerial Survey (Blue): 10,264 acres mapped
- Ground Survey: Defoliation detected from Kittery to Rockland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Web
Images
Videos
Maps
News
Explore
Sign in
cape elizabeth, me
Share
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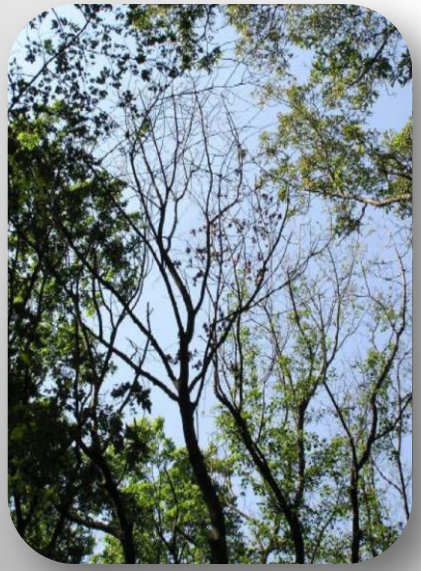
June 27, 2015
Ocean House Rd
Ocean House Rd

Impacts

With several years of moderate to severe defoliation:

- Branch dieback
- Decline
- Mortality



MA DCR

Outlook

2016:

- Expect increased defoliation
- Some dieback may be seen in harder-hit areas

Long Term:

Biological control is a potential solution—effective in Can. Maritimes

ME Towns with *Cyzenis albicans* Releases

Location	Year
Harpswell	2013, 2014
Cape Elizabeth	2013, 2015
Kittery	2014
Vinalhaven	2014
Portland (Peaks Island)	2015

Browntail Moth is Roaring Back

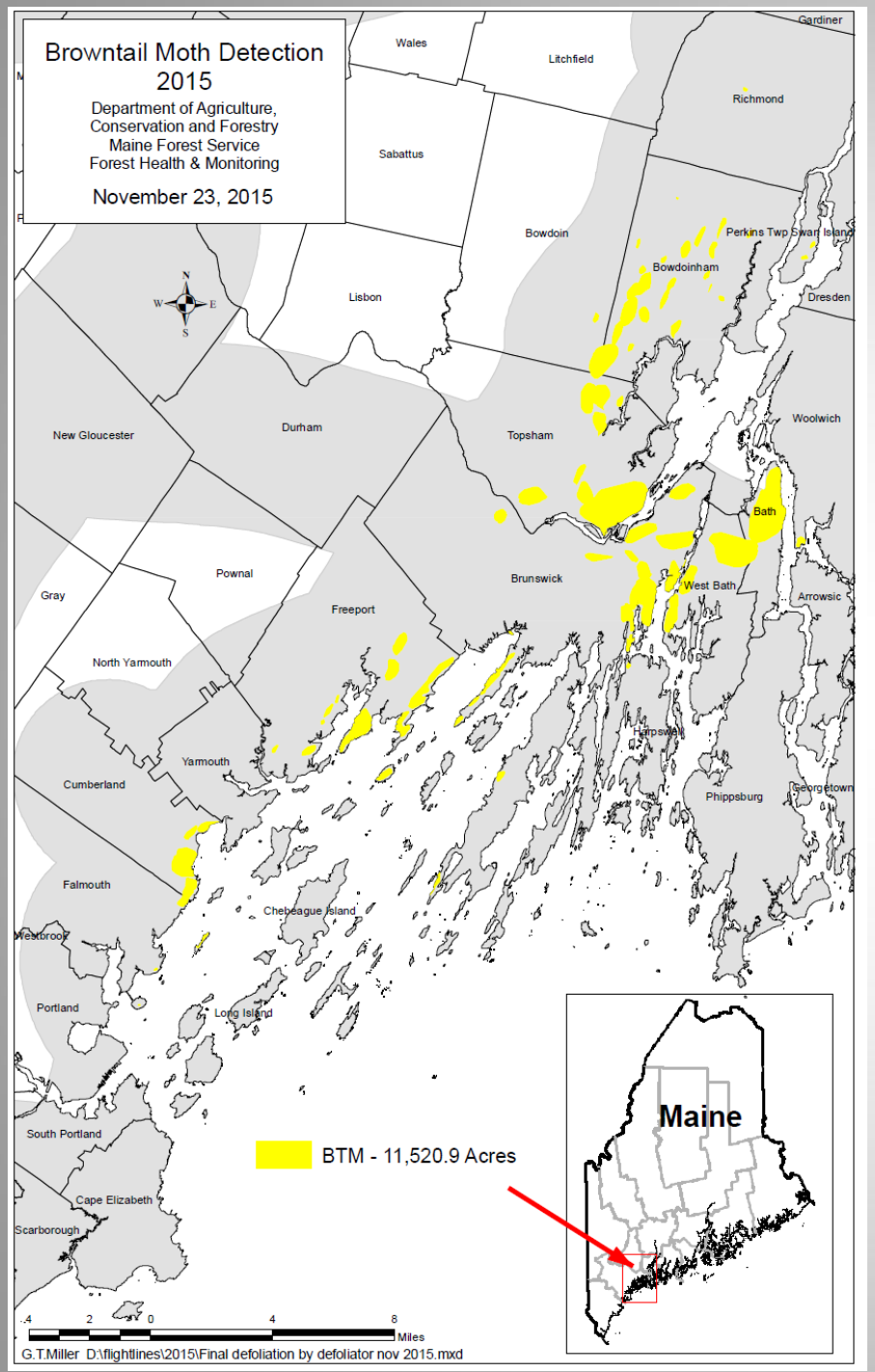
Browntail Moth Caterpillar

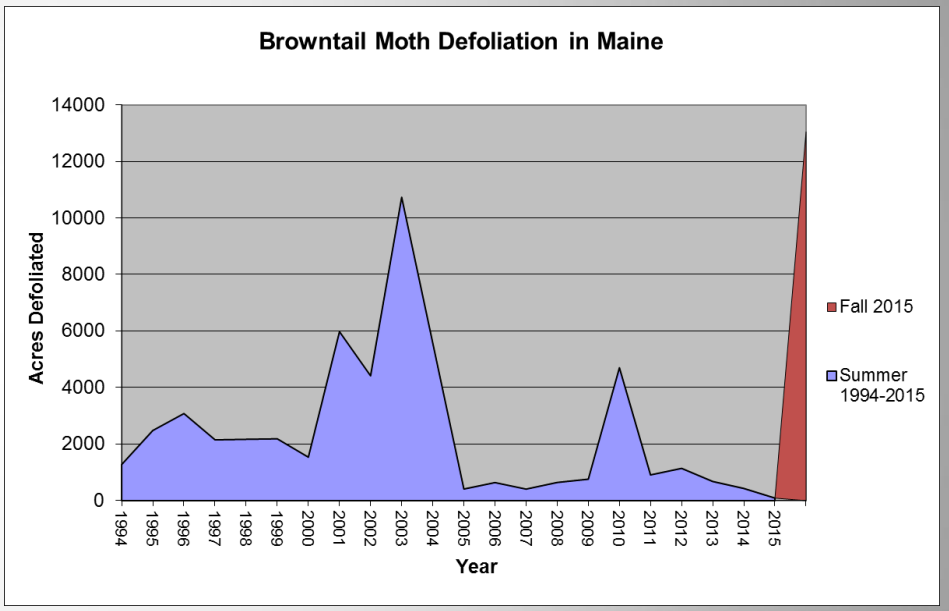
Browntail Moth

- Caterpillars have toxic hairs that cause:
  - Rash
  - Respiratory distress
- Caterpillar feeding causes
  - branch dieback
  - tree mortality

Browntail Moth - Distribution

- Remnant always held fast in Brunswick area
- **Population increasing again along coast**
- **Inland** in: Augusta, Gardiner, Lewiston, Monmouth, Turner, Vassalboro, Waterville and Whitefield…others?


Browntail Moth Detection
2015
Department of Agriculture,
Conservation and Forestry
Maine Forest Service
Forest Health & Monitoring
November 23, 2015
Wales
Litchfield
Gardiner
Richmond
Sabattus
Bowdoin
Perkins Twp
Swan Island
Bowdoinham
Lisbon
Dresden
New Gloucester
Durham
Topsham
Woolwich
Bath
Pownal
Brunswick
West Bath
Arrowsic
Gray
Freeport
North Yarmouth
Yarmouth
Cumberland
Phippsburg
Georgetown
Falmouth
Chebeague Island
Westbrook
Portland
Long Island
South Portland
Cape Elizabeth
Scarborough
BTM - 11,520.9 Acres
Maine
Miles
G.T.Miller D:\flightlines\2015\Final defoliation by defoliator nov 2015.mxd


Browntail Moth Defoliation in Maine
Acres Defoliated
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12000
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8000
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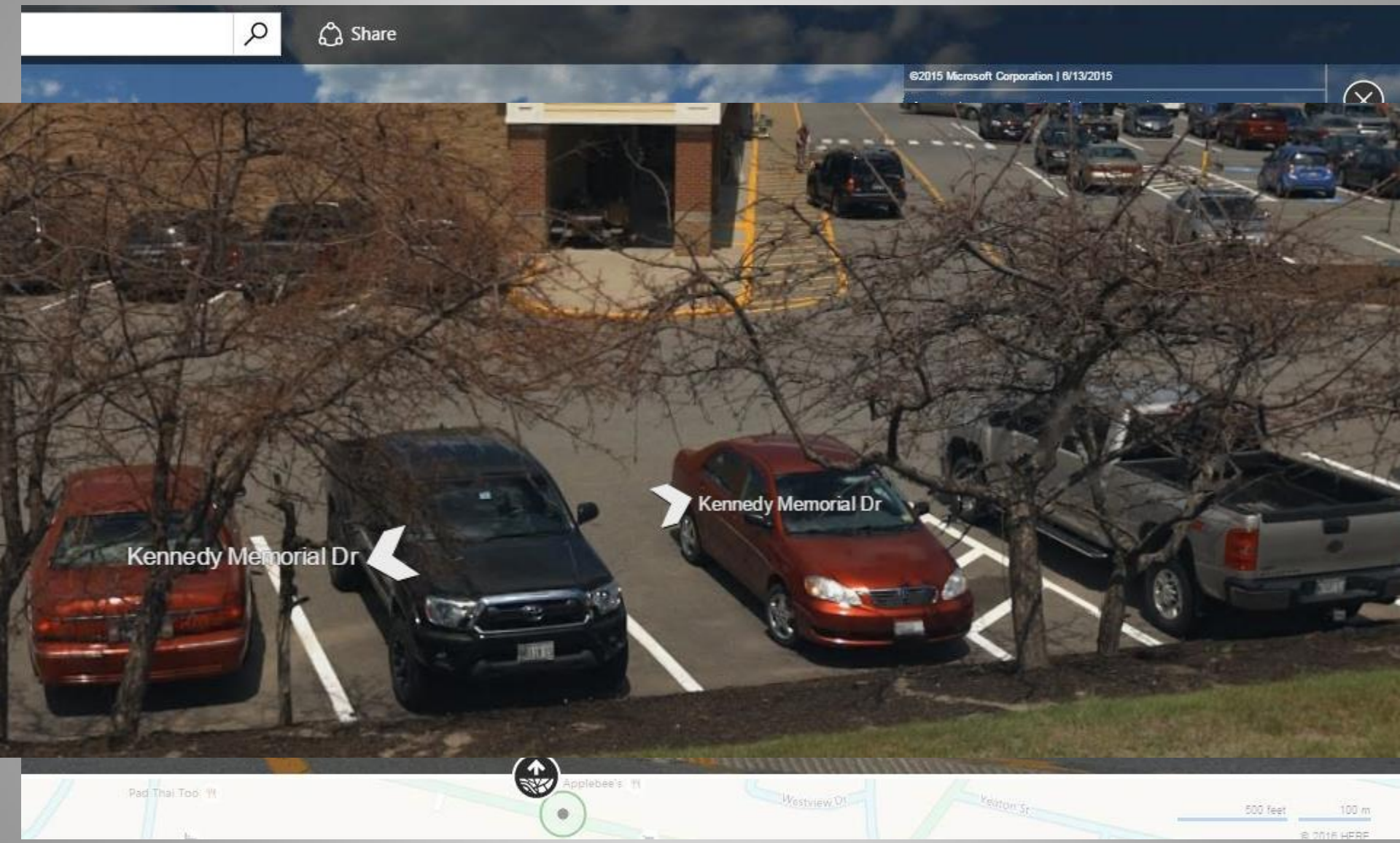

Share
©2015 Microsoft Corporation | 6/13/2015
Kennedy Memorial Dr
Kennedy Memorial Dr
Pad Thai Too
Applebee's
Westview Dr
Kenton St
500 feet
100 m

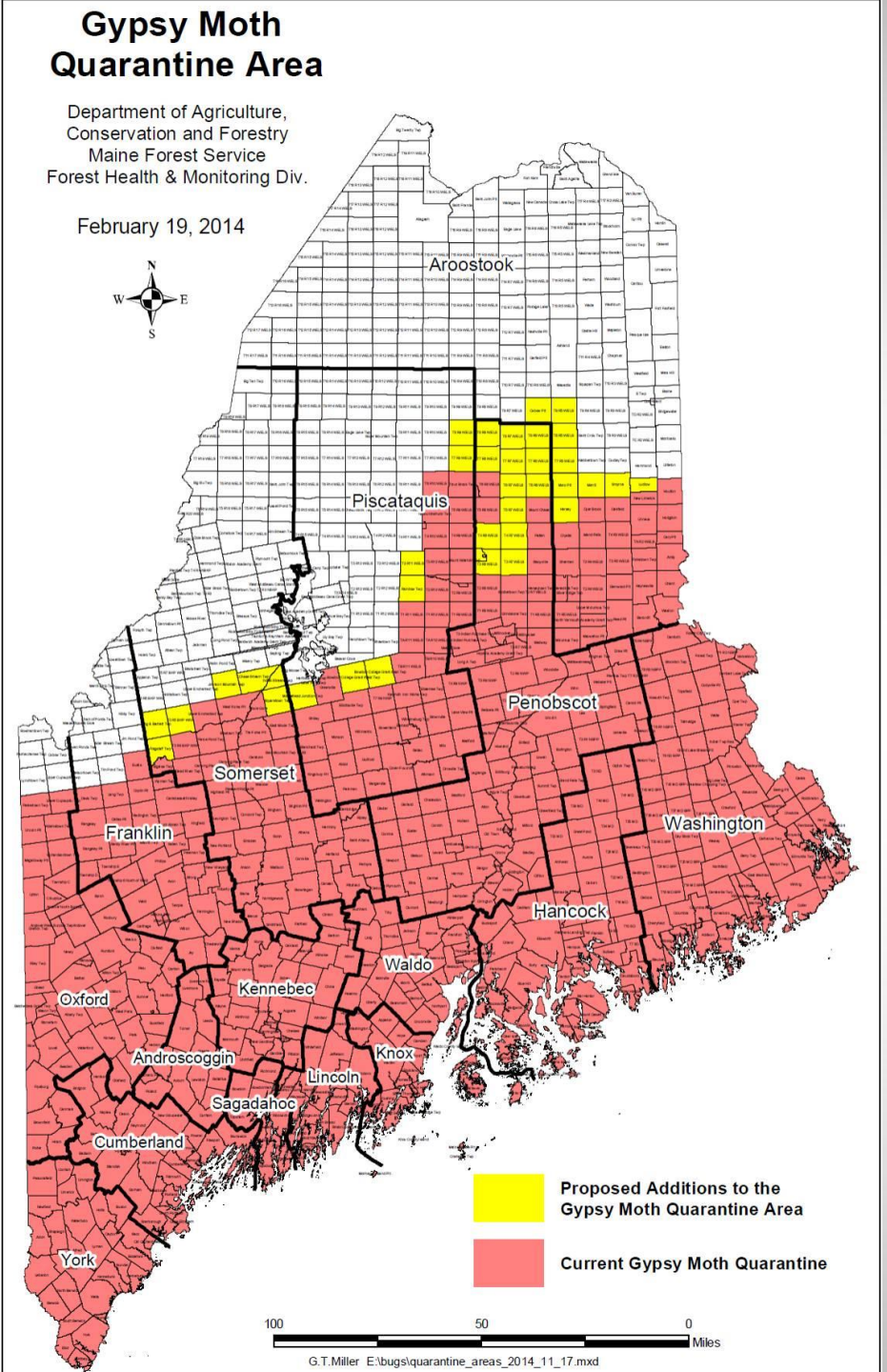
Gypsy Moth

Many host trees/shrubs

Introduced— populations somewhat regulated

Gypsy Moth

- 2015: Significant defoliation in S.NE
- Stopped at NH border
- No defoliation recorded in ME* in 2015
- Worth watching (dry conditions favor buildup)



Gypsy Moth

- Look for egg masses
  - Destroy now through April to reduce defoliation
  - Report if in Northern ME (photos/location)

The Elephant in the Room

Spruce Budworm

Native
Outbreak-Prone Defoliator

When populations are low, you'd be hard-pressed to find a spruce budworm without pheromone traps.

Spruce Budworm Defoliation 1974
T4 R14 WELS, ME West Branch of the Penobscot River

Pheromone Trap Deployment 2014

During outbreaks budworm caterpillar feeding is so heavy that tree growth is reduced or trees are killed.

Allison Kanoti, MFS

Spruce budworm larva and feeding damage.

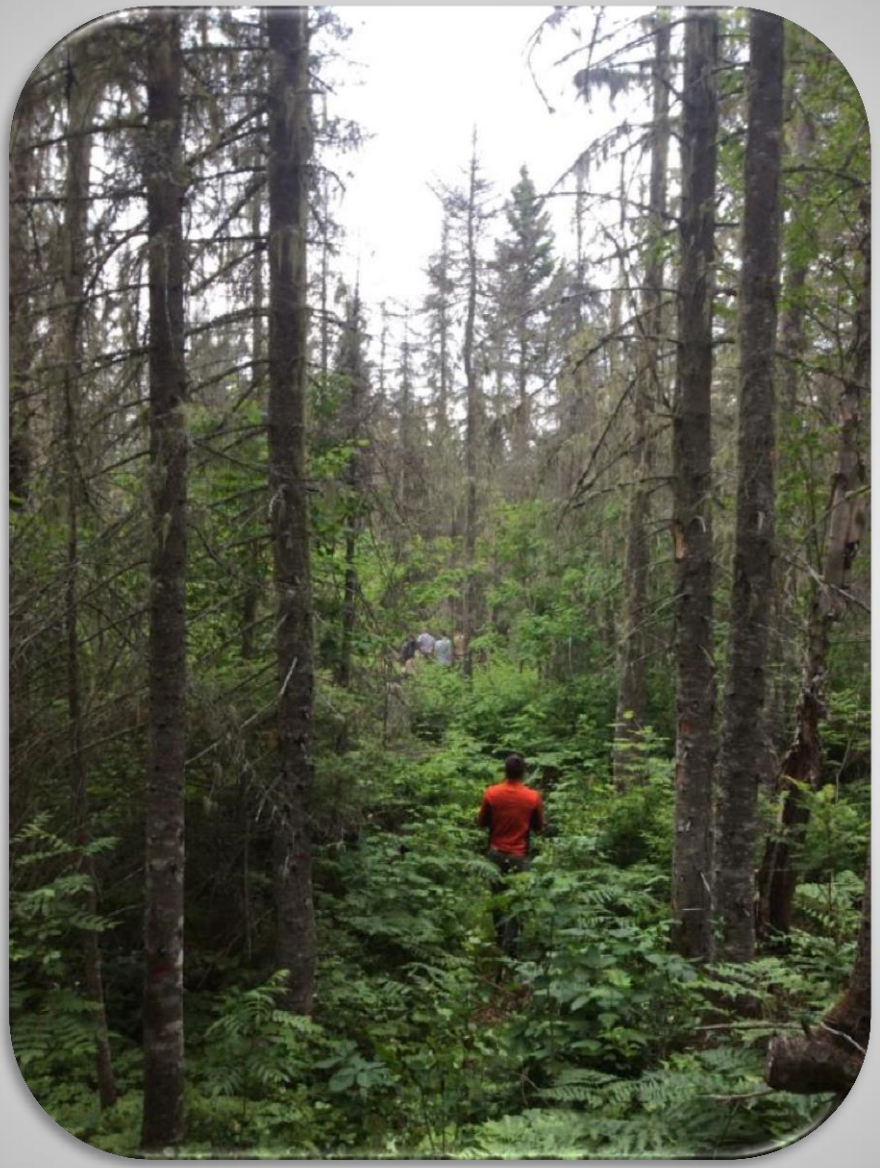
Allison Kanoti, MFS

Spruce budworm pupa.

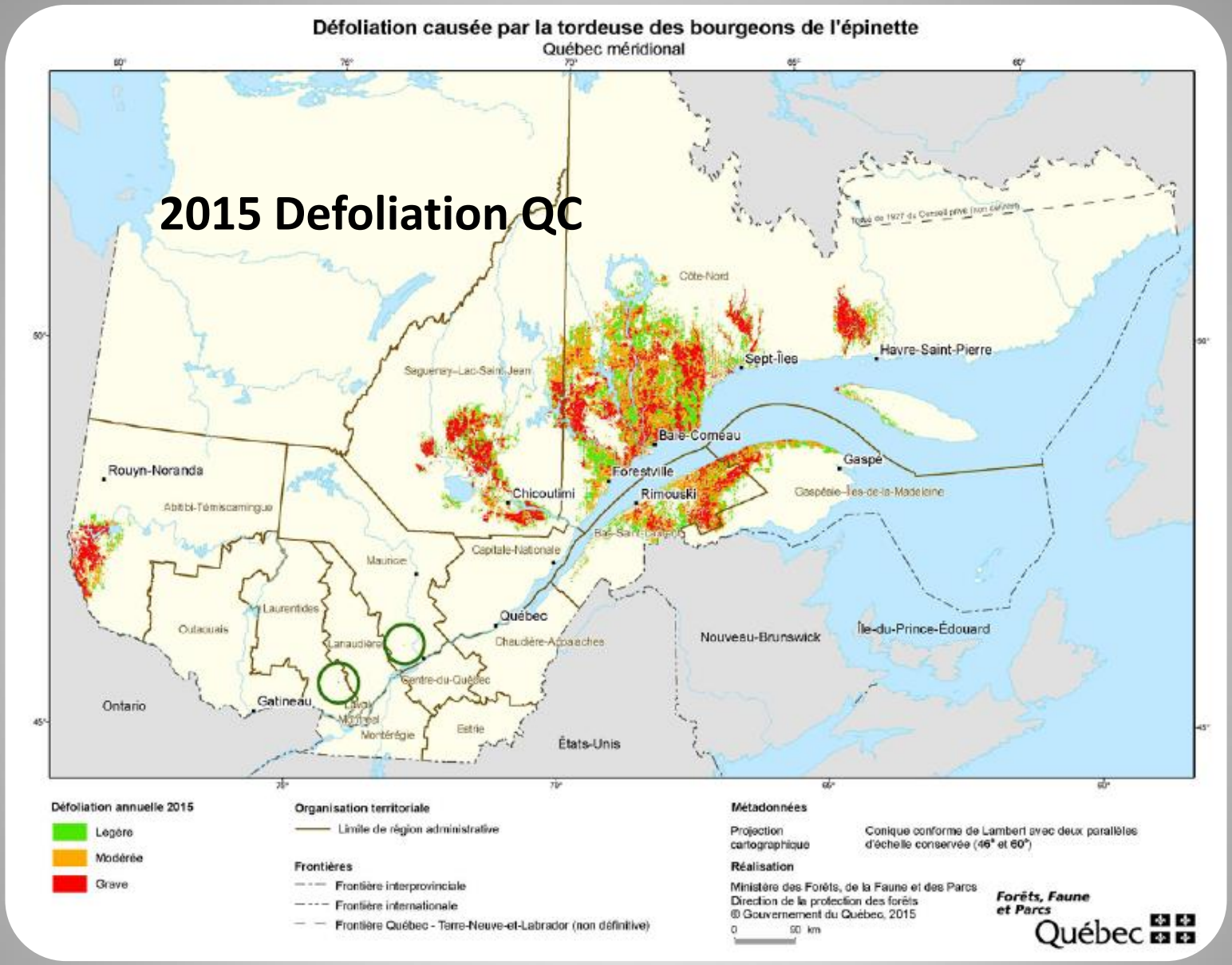
Brian Roth, CFRU

Spruce budworm moth. The dark horizontal bar at arrow is a good characteristic for recognition.

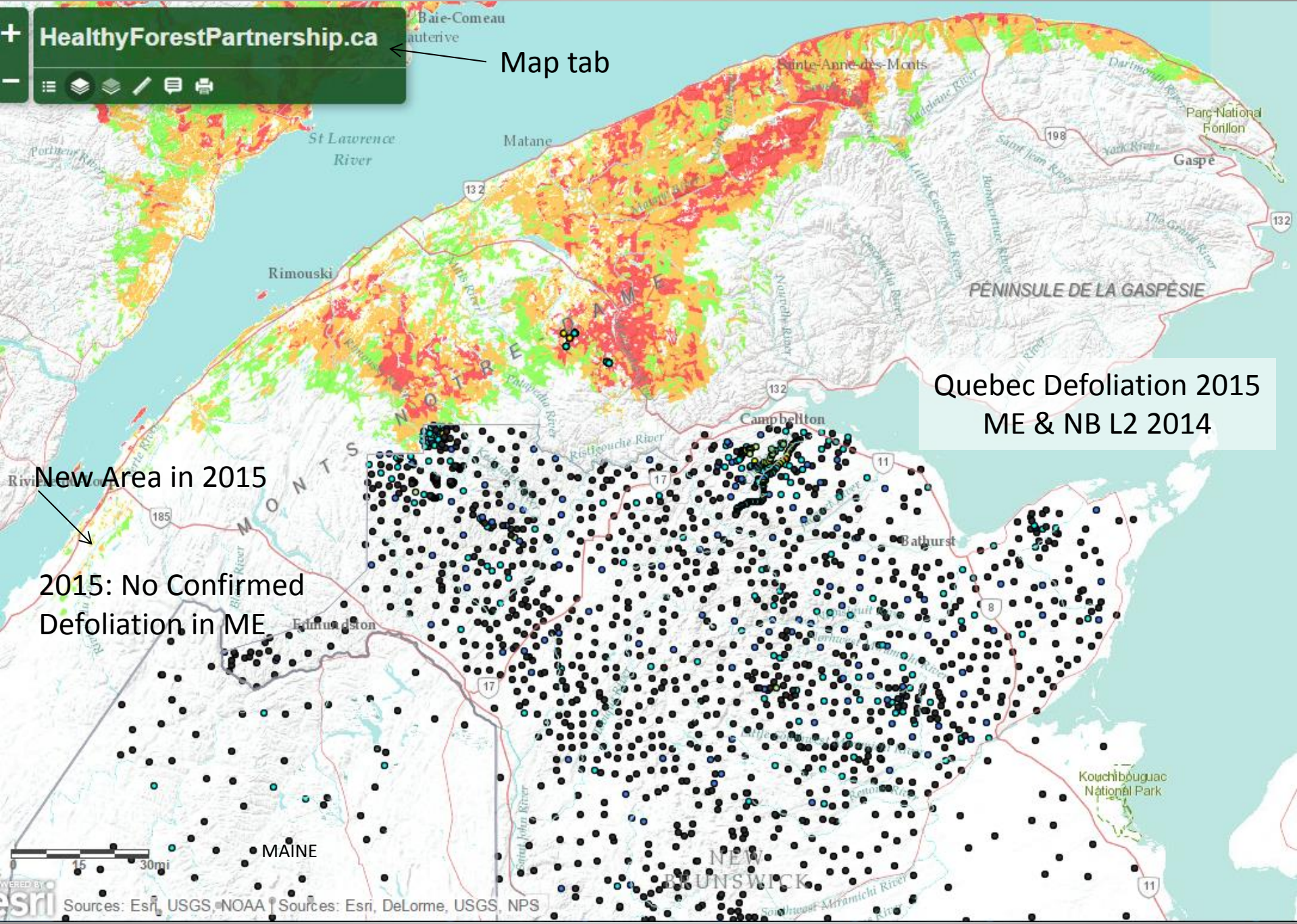
Two color-phases of spruce budworm. The black bar is visible on both.



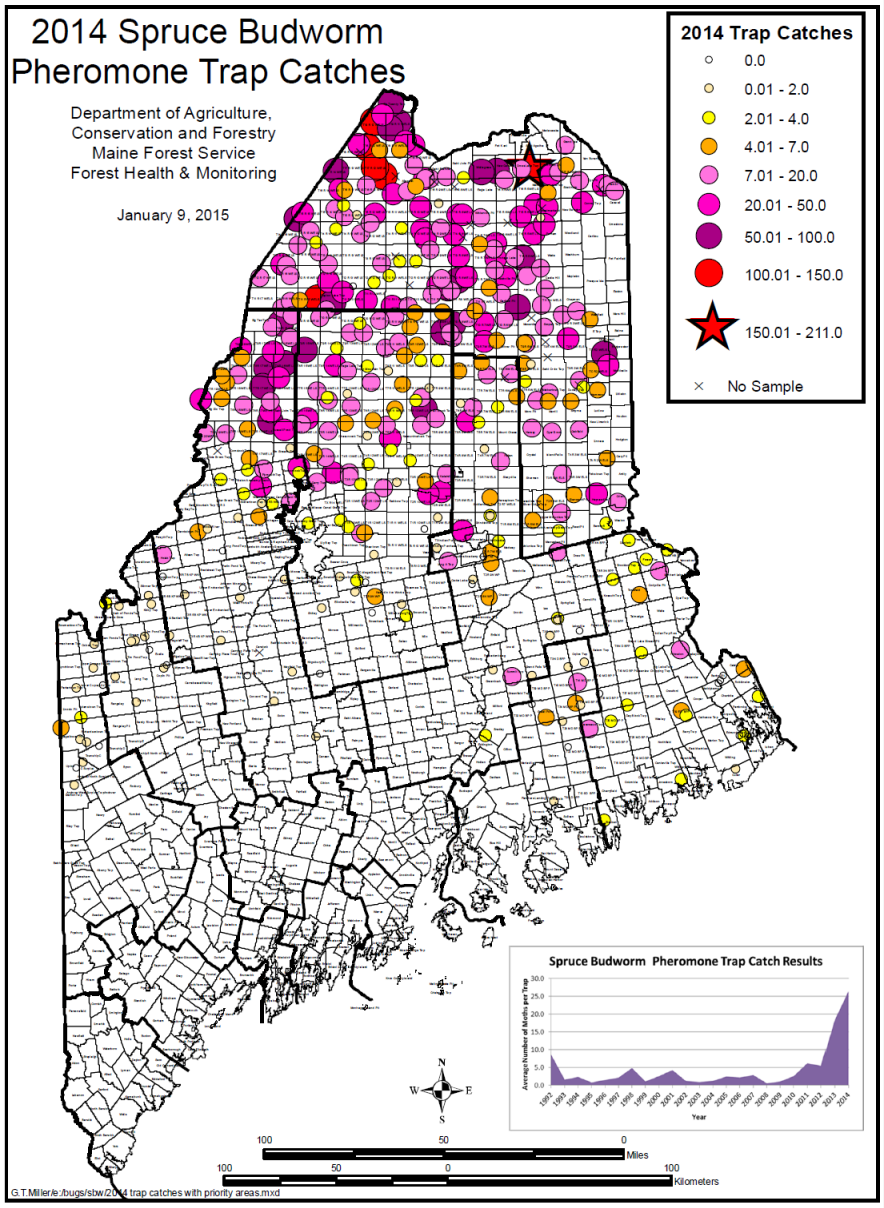
Fir Mortality, Spruce Survival; Outbreak began in 2006 in this stand.



Increase of over 2 million hectares of defoliation in the province as a whole (~5million acres). (E-mail to CFRU from Forest Protection Limited)



Gaspé went from around 500 000 ha to over 1.1 million hectares (2.7 million acres) (FPL)


2014 Spruce Budworm
Pheromone Trap Catches
Department of Agriculture,
Conservation and Forestry
Maine Forest Service
Forest Health & Monitoring
January 9, 2015
2014 Trap Catches
0.0
0.01 - 2.0
2.01 - 4.0
4.01 - 7.0
7.01 - 20.0
20.01 - 50.0
50.01 - 100.0
100.01 - 150.0
150.01 - 211.0
No Sample
Spruce Budworm Pheromone Trap Catch Results
Average Number of Moths per Trap
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Miles
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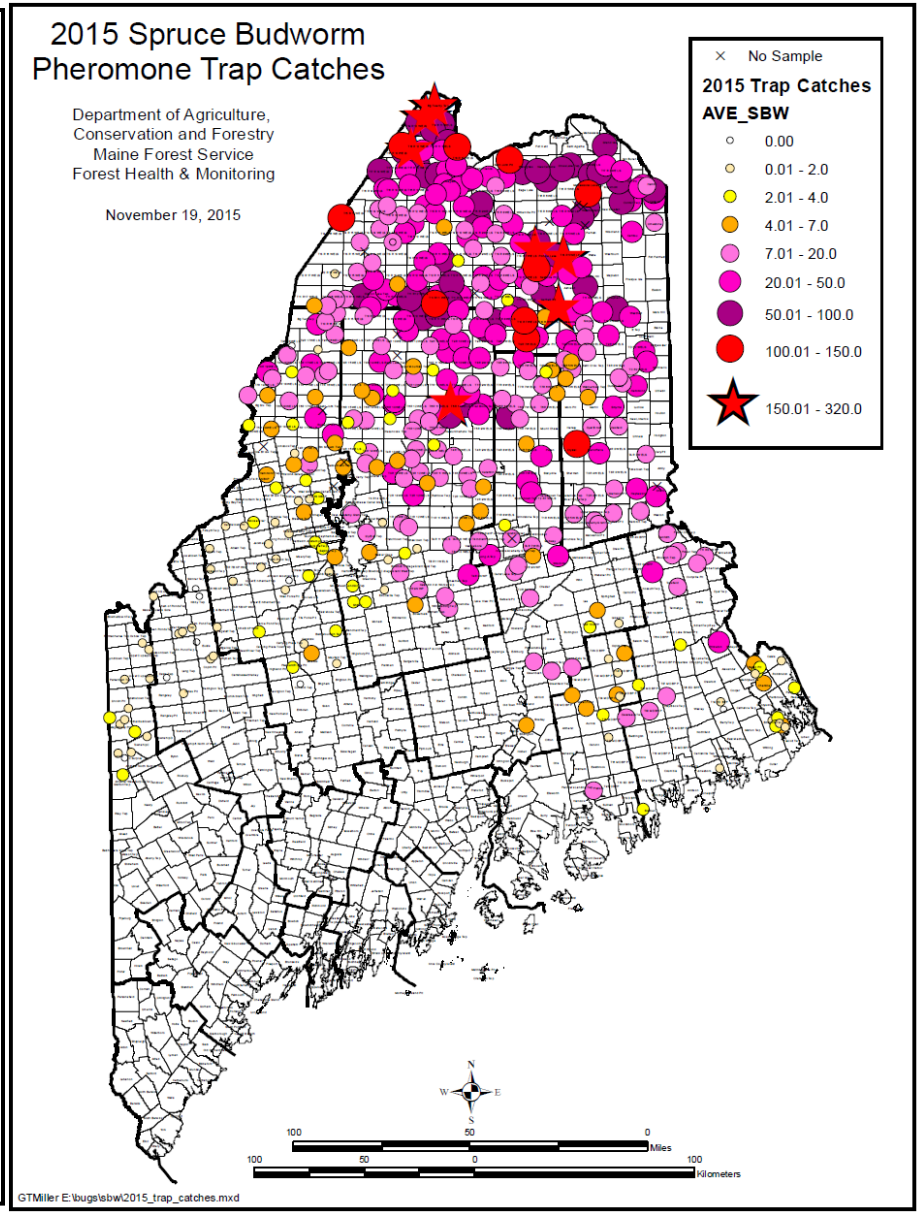
0
100
Kilometers
G:\T.Miller\e:\bugs\sbw\2014 trap catches with priority areas.mxd


2015 Spruce Budworm
Pheromone Trap Catches
Department of Agriculture,
Conservation and Forestry
Maine Forest Service
Forest Health & Monitoring
November 19, 2015
No Sample
2015 Trap Catches
AVE_SBW
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4.01 - 7.0
7.01 - 20.0
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100.01 - 150.0
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Maine Spruce Budworm Predictions

Outbreak in 1 to 3 years

(Yes, we've been saying that for a while—it still feels right)

Less severe timber losses than last outbreak:

- Less contiguous fir distribution
- Infrastructure in place to facilitate targeted harvest
- Warmer fall weather may reduce larval survival

Less Severe ≠ Insignificant →Planning Key

- Take advantage of the window before red trees
  - Stands with $ invested (tending)
  - Stands with mature fir dominating
- Markets?

Trouble From Away

As far as we know not in ME

…Yet

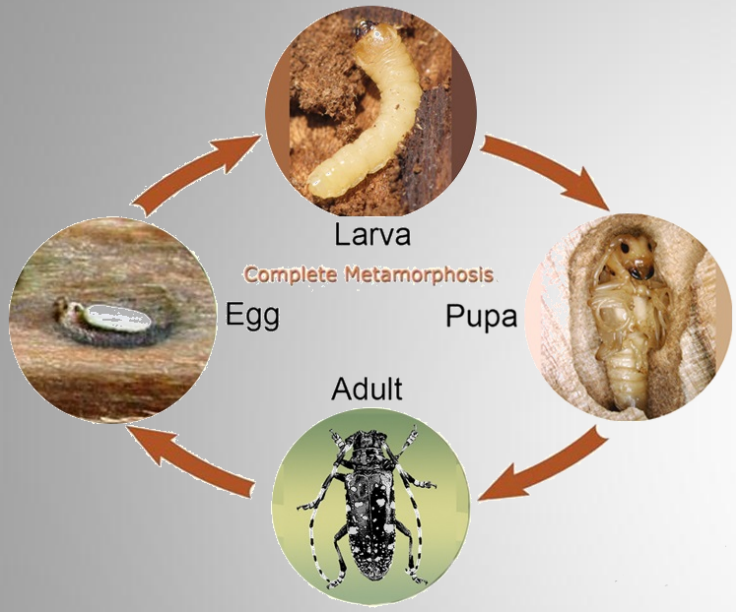
Invaders with Potential to Move on Firewood and Survive all Maine Winters

Brown Spruce Longhorn Beetle

Asian Longhorn Beetle

Emerald Ash Borer

Asian Longhorned Beetle (ALB) Update

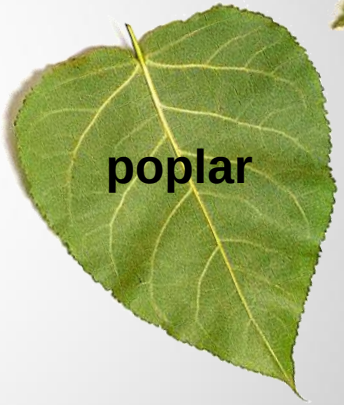


Dennis Haugen, USDA Forest Service, Bugwood.org

- Has not been detected in Maine
- Risk is high
  - >20 years in Worcester, MA
  - Lots of opportunity for legal movement of infested wood (pre-regulation)
- Learn to recognize the beetle and its signs

Beetle Food:
aka: ALB Host Trees in Maine

- ***Maple (including boxelder)***
- Birch
- Elm
- Horsechestnut
- Mountain-ash
- Poplar
- Willow
- etc….Not softwoods



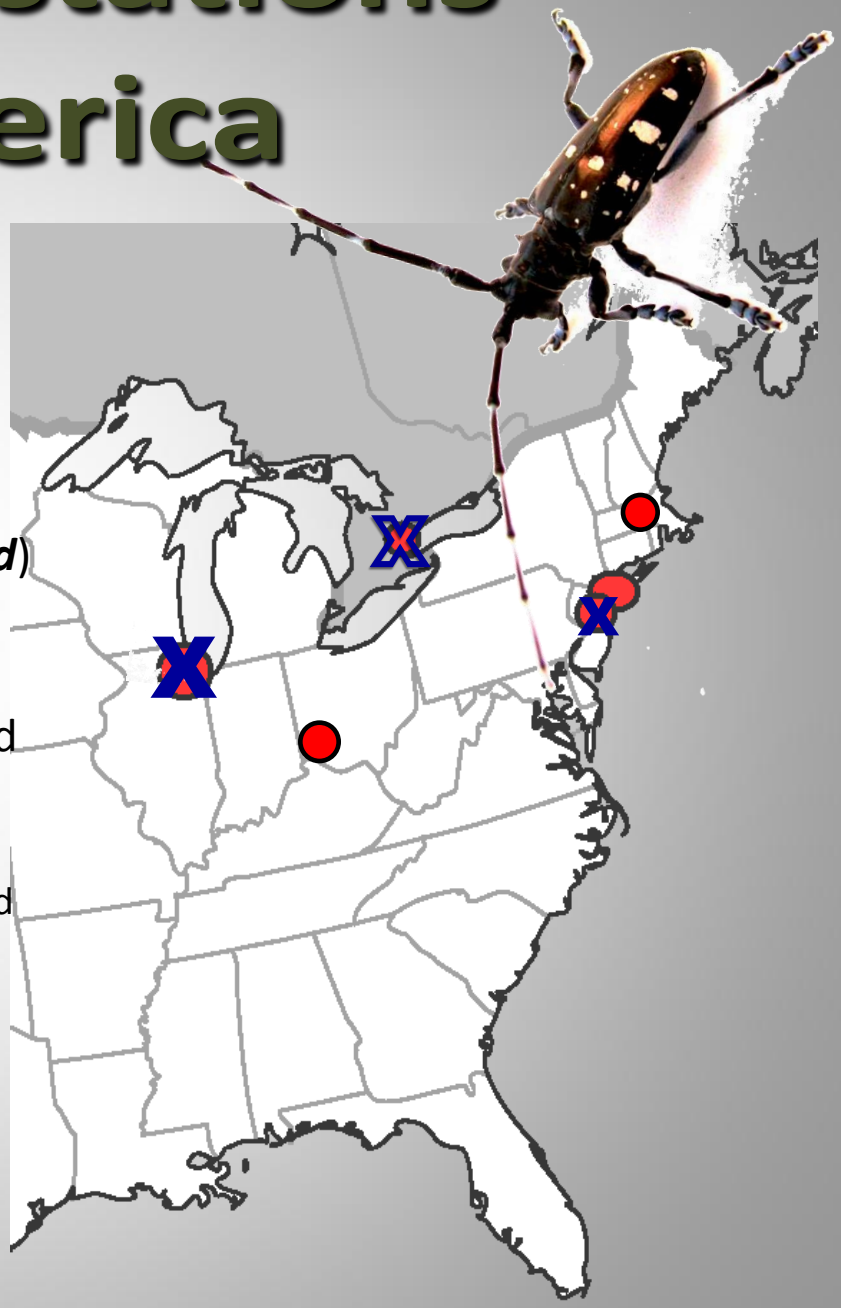
Known ALB Infestations in North America

ERADICATED:

- Illinois – Chicago
- New Jersey – Jersey City, Carteret
- New York – Staten Island, Manhatten, Islip
- Ontario – Toronto/Vaughn,(2003)
- Massachusetts – Boston (2010) (***6 trees removed***)

ACTIVE:

- **New York** (1996) – Brooklyn, Central Long Island
  - 137 sq. mi; ~23,700 removed; ~7100 infested
- **Massachusetts** – Worcester (2008)
  - 110 sq. mi; ~35,000 trees removed; ~24,400 infested
- **Ohio** – Clermont Co. (2011)
  - 61 sq. mi; ~77600 trees removed; ~16,500 infested
- **Ontario** – Mississauga/Toronto (2011)



Recognizing Adult ALB (July thru Nov)

Adult Beetles

female

- Large over 1”; females larger than males
- Shiny black like patent leather shoes
- White markings strong alternating bands on antennae; splotches on body
- Blue tinge on legs

male

ALB Signs in Winter

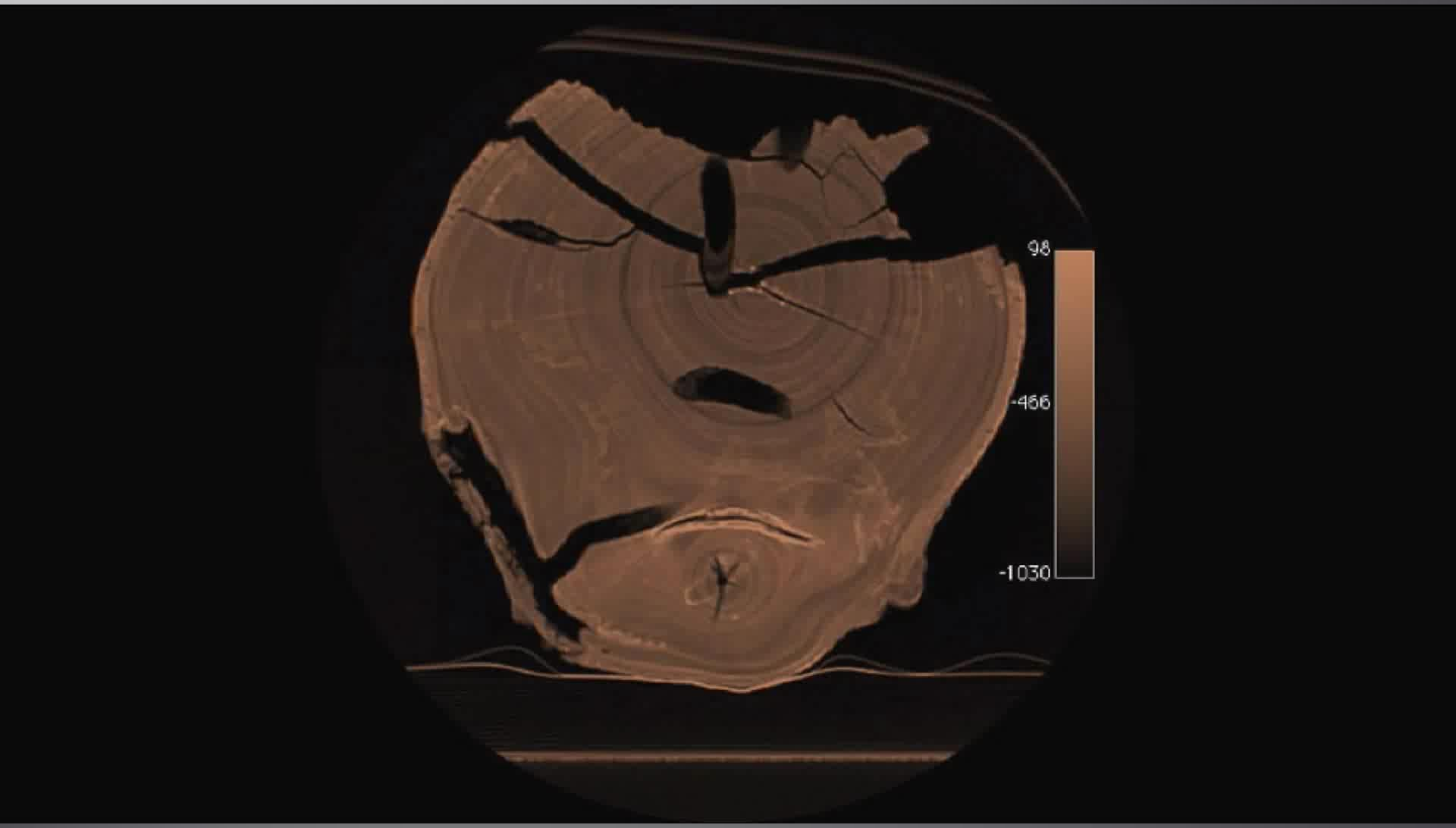
- Egg Niches
- Exit holes (circular)
- Bark problems (missing, cracked)
- Tunnels/Galleries

Photos of callused exit holes.

Photos: USDA Forest Service, UVM. 2012. Asian longhorned beetle and its host trees.

CT SCAN OF ALB INFESTED WOOD

ECOTARIUM, Worcester, MA/Tufts University


98
-466
-1030

Report Suspected ALB—early detection saves trees!

State Resources:

- www.maine.gov/alb
- (207) 287-2431

Emerald Ash Borer (EAB) Update

- Metallic woodboring beetle (Buprestidae)
- Native to Asia
- 1-2 year lifecycle in N. America
- Eats ash (Fraxinus spp.) and fringe-tree (ornamental in ME)
  - Doesn't eat mountain ash (Sorbus spp.)

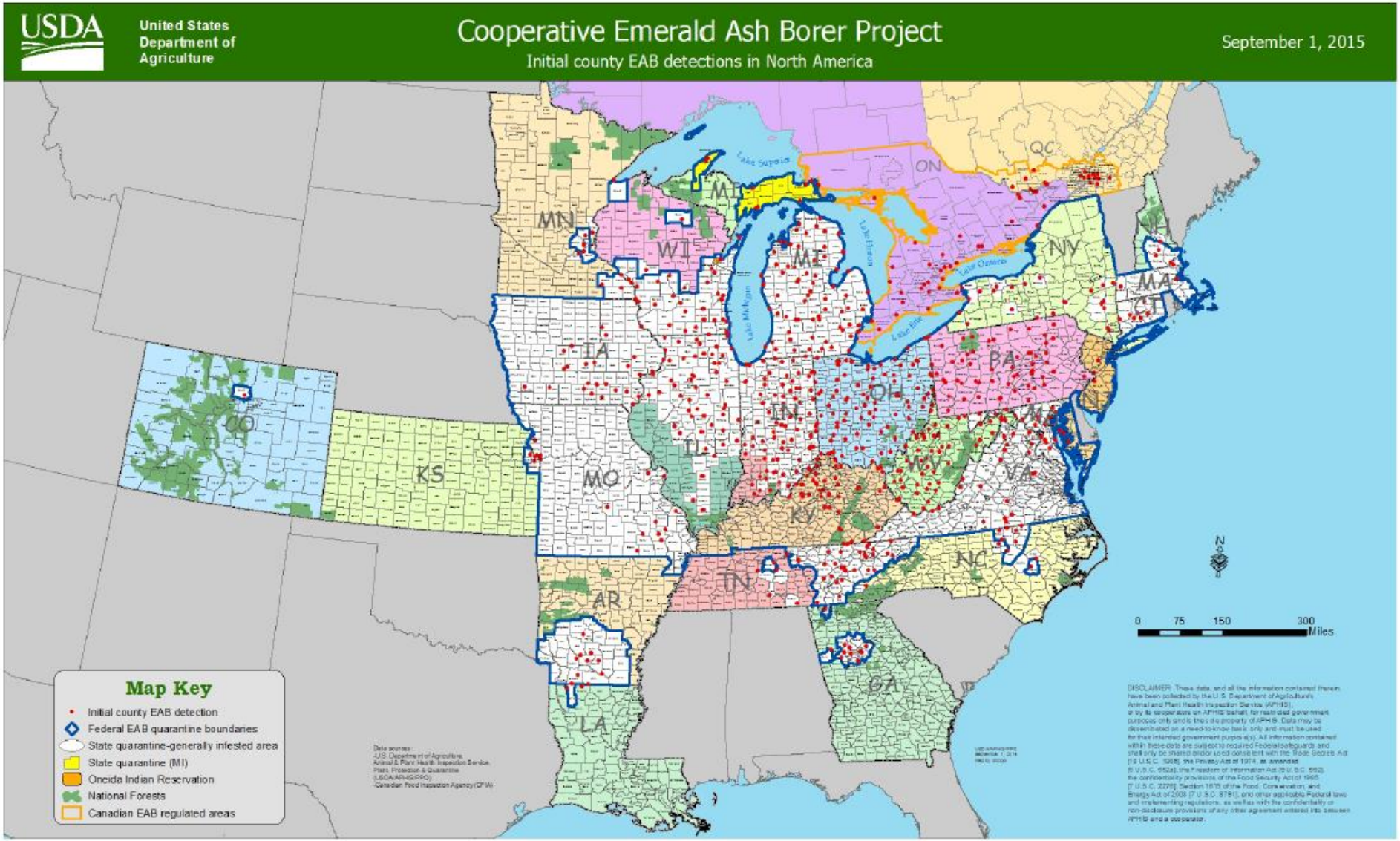
Not yet Detected in Maine! Likely to be found soon.

ASH PEELING WORKSHOPS:
January 27th 2016 – Bar Harbor, ME
February 10th 2016 – Augusta, ME

Volunteer for 2016 Trap Tree Network

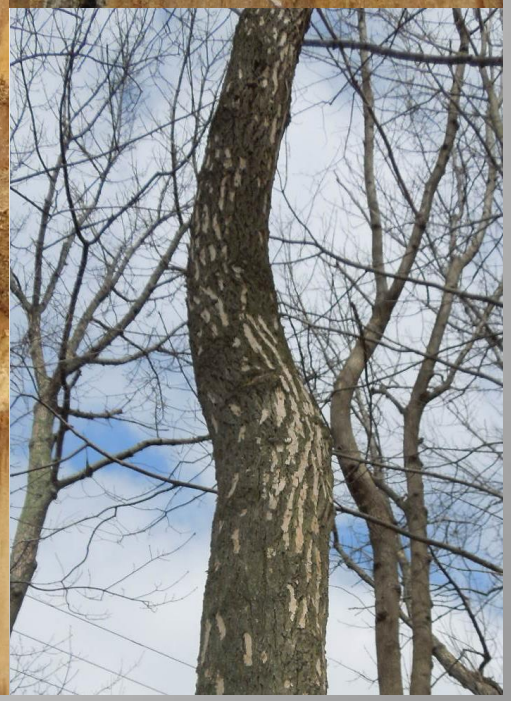
Contact Patti Roberts
Patti.Roberts@maine.gov
(207) 287-2431

www.emeraldashborer.info



Recognizing EAB Larvae

- Under bark of ash
- Flattened (except pre-pupa)
- Cream-colored
- Bell-shaped segments
- Dark cerci (spines at rear)
- Hunted by woodpeckers



Monitoring Tools for EAB

- Trap/lure (purple traps) (>500 in 2015; contractor in 2016)

- Trap tree –this tool's *for* you!

ASH PEELING WORKSHOPS:
January 27th 2016 – Bar Harbor, ME
February 10th 2016 – Augusta, ME

<u>Volunteer</u> for 2016 Trap Tree Network
Contact Patti Roberts
Patti.Roberts@maine.gov
(207) 287-2431

- Biosurveillance

***Cerceris fumipennis* capturing a buprestid**

- Sensitized Public – this tool *is* you!

Monitoring Tools for EAB

Sensitized public!!!!!!

REPORT: www.maine.gov/eab

N. Andover Ma Detection by a customer at the restaurant across the street

Google.com

Forest Management and Emerald Ash Borer

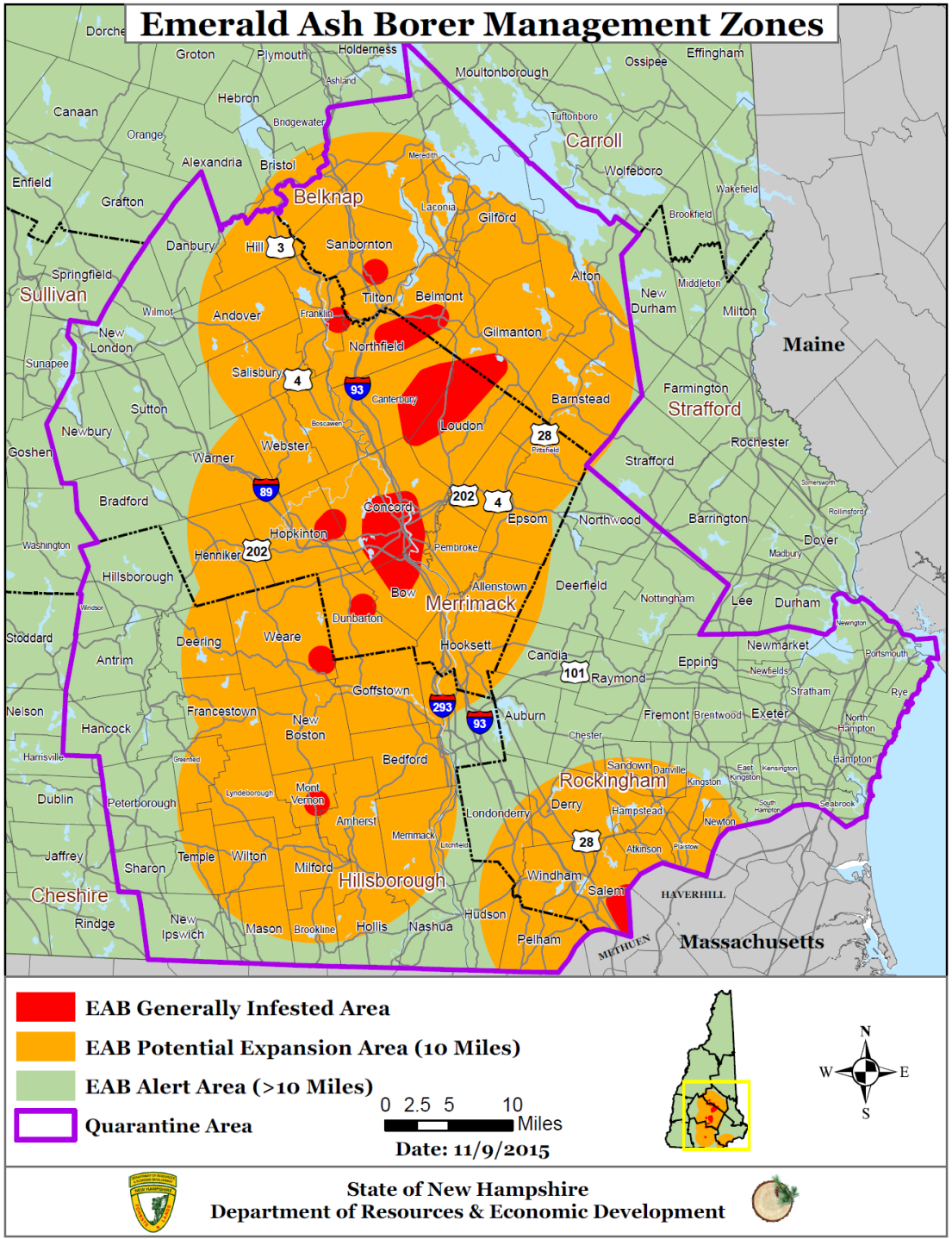
The right way to kiss your ash goodbye
8/3/2015

www.forestworksme.org
York Co. based org.
Blog post from August

The triage that Siegert recommends is to salvage the most commercially valuable trees now, if convenient. [Forest Strategy ≠ Community Tree Strategy]

"I don't want people to go in and prematurely harvest. Some people almost freak out because it's in the region and want to go clear-cut ash," he said.

His recommendation is for a landowner to harvest any tree larger than ten inches in diameter at breast height if they are already conducting a scheduled harvest. More aggressive harvesting is warranted only if the infestation is physically present in York County, he said. Smaller trees won't fetch much income anyway and they may survive an infestation in better numbers than larger trees, he said.



NH EAB Infested Area (red)

Spread the Word:
Leave Your Firewood at Home!

Kennebunk, ME

Photo: Dave Hobbins

WEBSITE:
www.maine.gov/forestpests
http://www.maine.gov/dacf/mfs/forest_health/index.htm

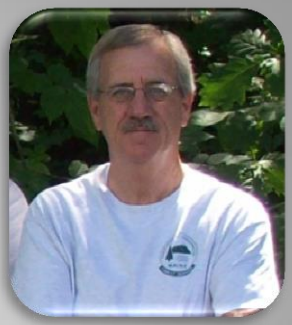
Maine Forest Service

Insect & Disease Lab
168 SHS
Augusta, ME 04333
(50 Hospital Street)
Tel 207 287-2431

Insect and Disease Management Personnel

Dave Struble
State Entomologist,
Forest Health and Monitoring
Director

Mike Devine
Forest Health and Monitoring
State Supervisor






Insect & Disease Lab, Augusta
Entomologists: Charlene Donahue, Colleen Teerling
Administrative Support: Patti Roberts
Technician: Amy Ouellette

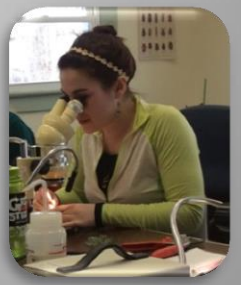
STAFF NEWS

Recent Transfer
Allison Kanoti--MFS
PO Box 415
Old Town, ME 04468
(207) 827-1813

***RETIRED* (10/2015)**
Forest Pathologist
William Ostrofsky

Field Technicians

New Gloucester
Wayne Searles



Portland
Regina Smith