

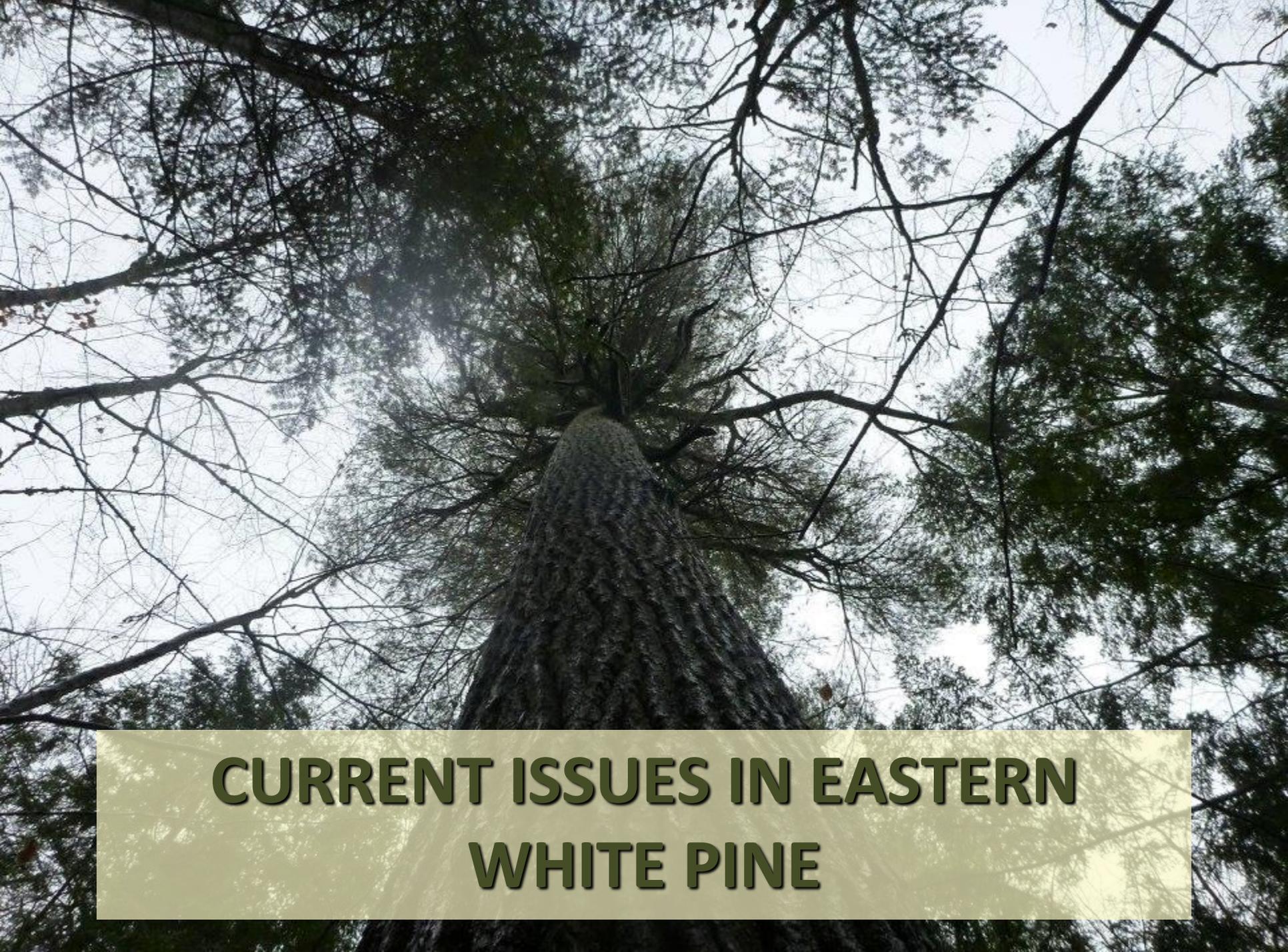
Forest Insects and Diseases Update

Allison Kanoti

DACF, Maine Forest Service

Old Town, ME





**CURRENT ISSUES IN EASTERN
WHITE PINE**



White Pine Needle Disease Complex

Lecanosticta acicola—brown spot
needle-blight

(*Mycosphaerella dearnessii*)

Lophophacidium dooksii

(*Canavirgella banfieldii*)

Bifusella linearis

White Pine Needle Diseases

- Year 9 (?) and counting
- Previous year needles turn yellow by mid-June
- Most drop by early July
- Infection of current-year needles occurs in late spring/early summer
 - Moisture important for dissemination/germination



Lecanosticta acicola– Brown spot



*Lophophacidium
dooksii*

Bifusella linearis



USFS-Funded Study of White Pine Needle Damage



Acknowledgements

- USFS Evaluation Monitoring grant NE-EM-B-13-03
- Northern Research Station & Massabesic Experimental Forest
- Edward Jordan, Michael Simmons, & Justin Williams-USFS STEP/Pathway Program
- Needle collection & permanent plot establishment: William Ostrofsky, Jennifer Weimer, Barbara Burns, Wayne Searles, Jim Esden, Tess Greaves, Tom Simmons, and Jay Lackey
- Forest Watch: <http://www.forestwatch.sr.unh.edu/>

- Brown spot needle-blight pathogen most frequently associated with WPND
- Summer defoliation by WPND results in growth reduction of trees already in decline

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)



Shoot Damage on White Pine
Photo: Jensen Bissell, BSP



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

Where is Pine Leaf Adelgid a Problem?

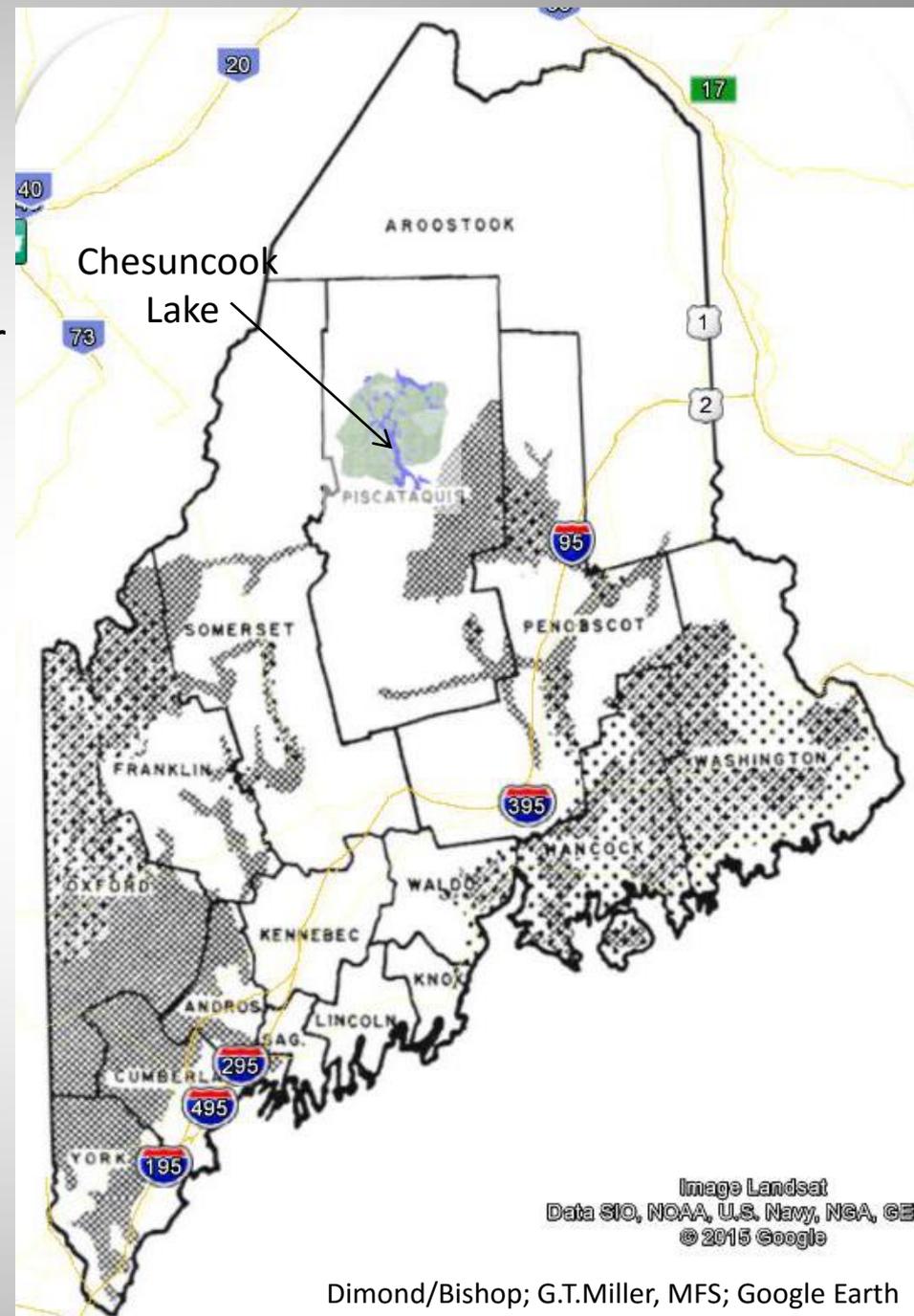
Currently Heaviest Damage West of Baxter
(scattered across ~1/4 million acres)



2015 Damage
Photo: Jeff Harriman, MFS



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



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



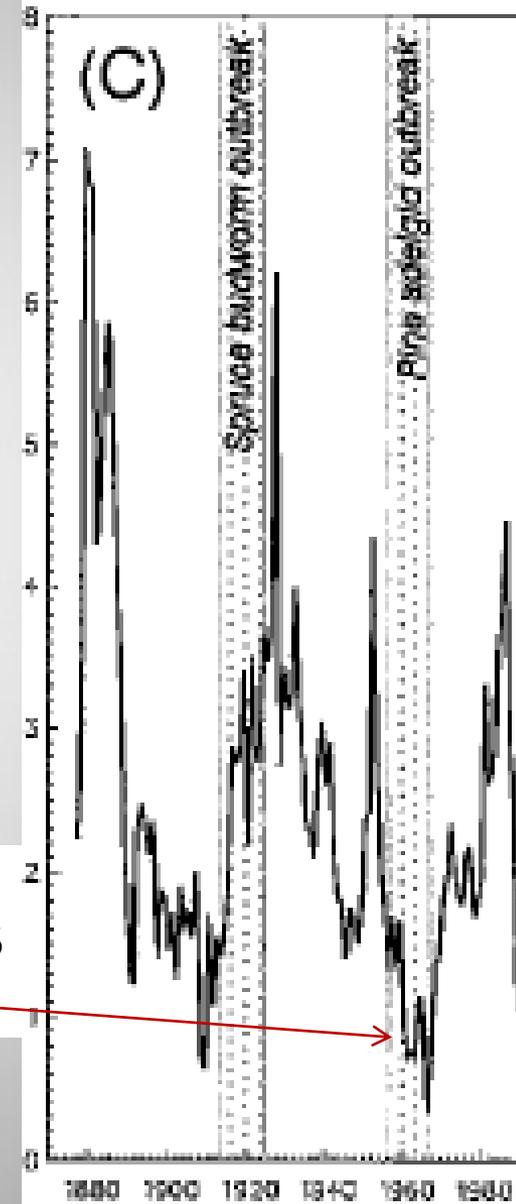
Fajvan, M.A., Seymour, R.S. 1993. Canopy stratification, age structure, and development of multicohort stands of eastern white pine, eastern hemlock, and red spruce. *Can. J. For. Res.* 23: 1799-1809.

White pine radial growth impact during 1955-1965 PLA outbreak

Eastern white pine

DBH = 57 cm

Age = 113



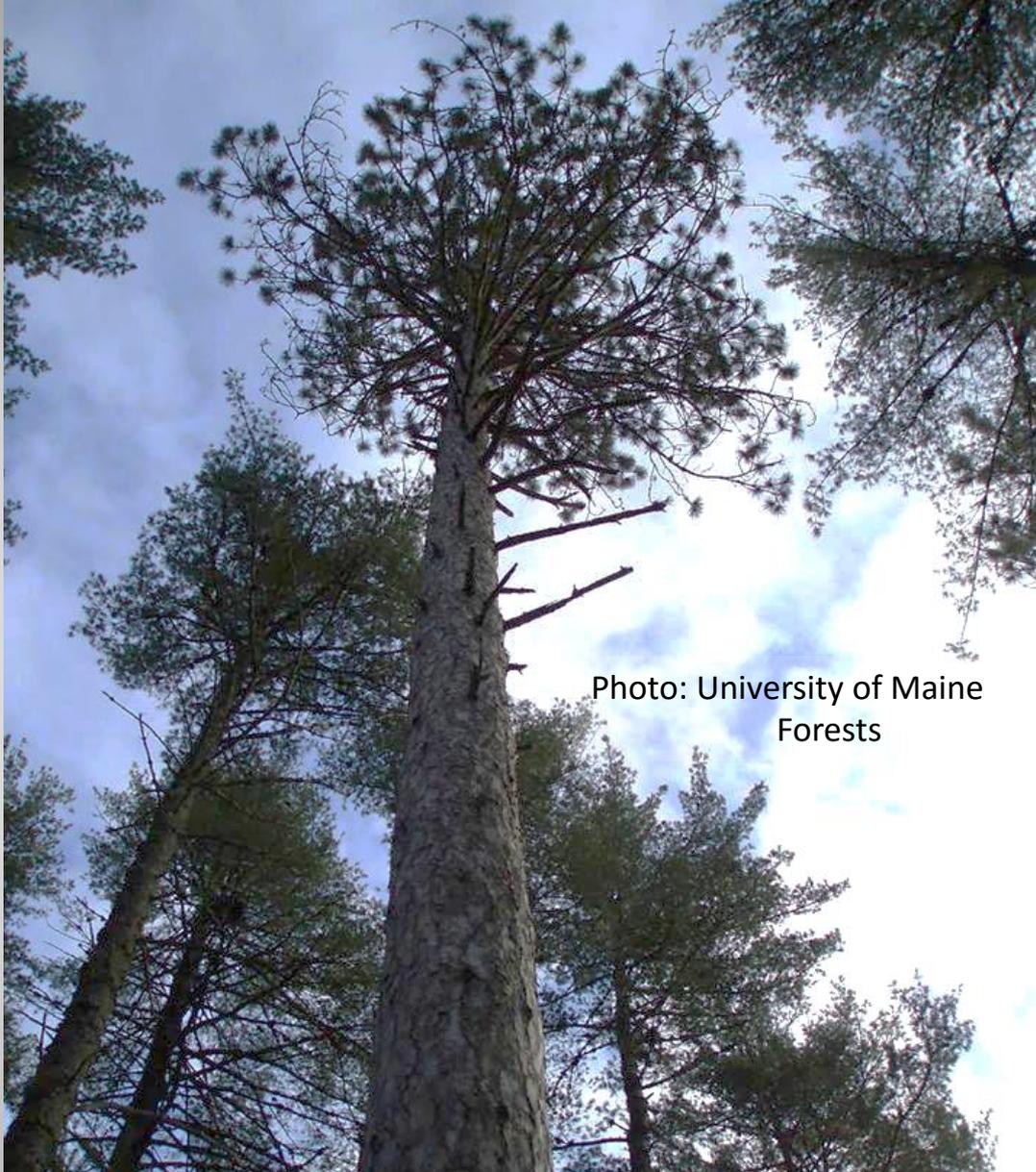


Photo: University of Maine
Forests

Current Issues in Red Pine



Sirococcus and Diplodia
Shoot Blights



Root Rot of Pines
Heterobasidion irregulare
(*Fomes annosus*)



Red Pine Scale

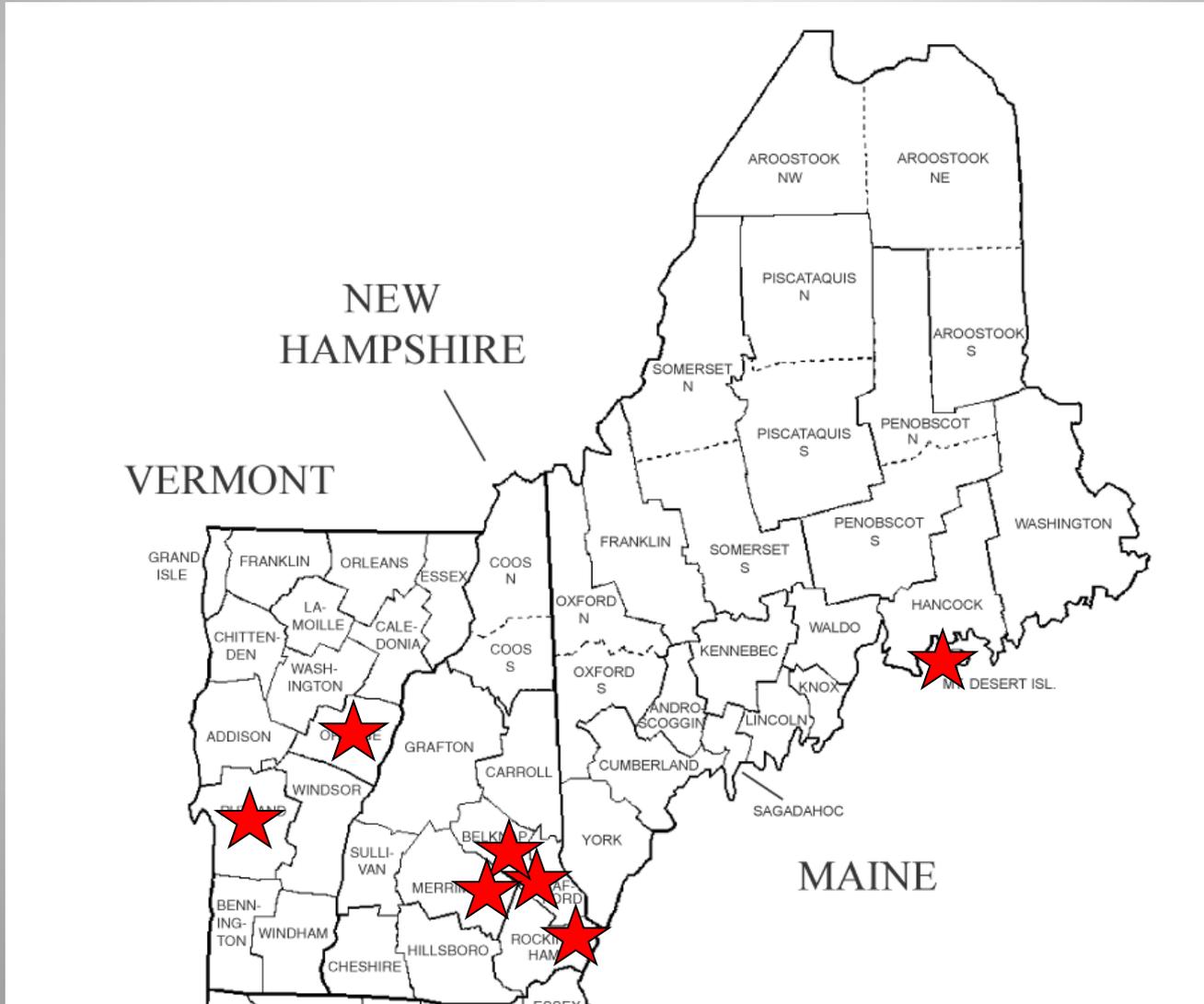
Matsucoccus mastsumurae

Identified on Mount Desert
Island Sept. 2014

Associated with red pine
decline and mortality



Where is Red Pine Scale a Known Problem?

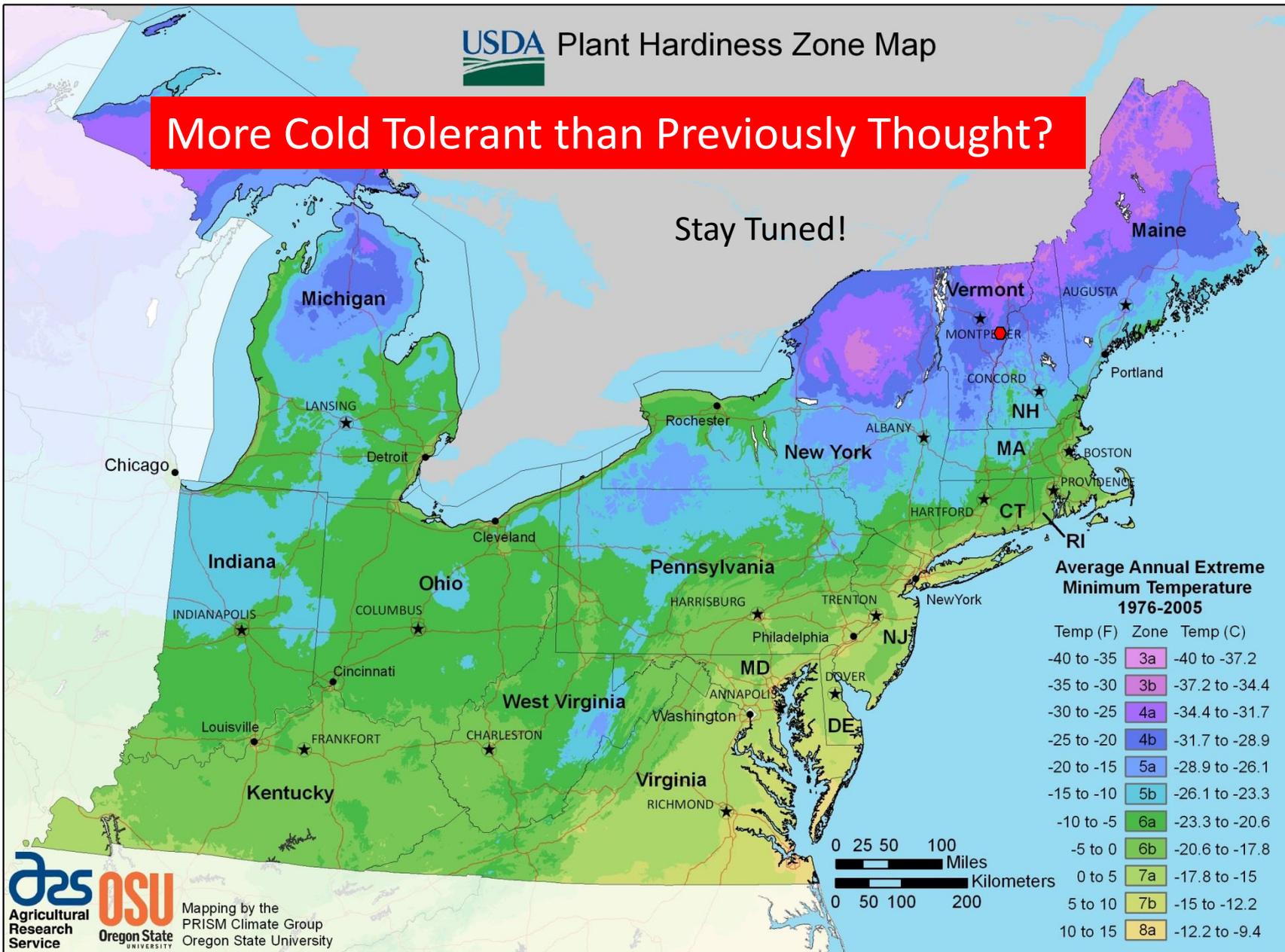


And...

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

More Cold Tolerant than Previously Thought?

Stay Tuned!



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



Current Issues in Oaks and Other Hardwoods

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: P. Johnson



Photo: Maine Forest Service



Eggs:
November-
April



Larvae:
April -June



Photo: P. Johnson



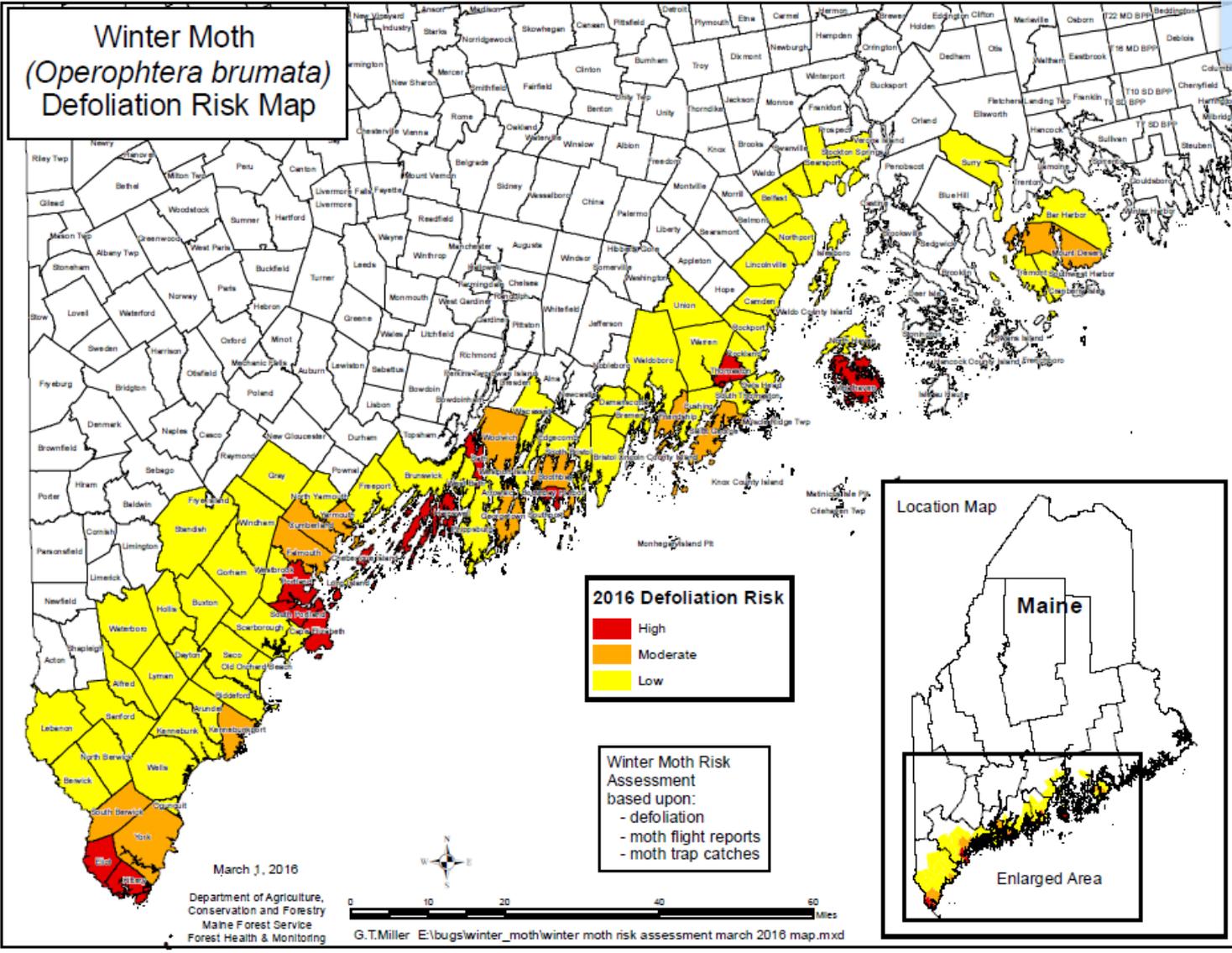
Pupae:
June-
November



Adults:
November-
January



Photo: P. Johnson



- High Risk Towns**
- Bath
 - Boothbay Harbor
 - Cape Elizabeth
 - Chebeague Island
 - Eliot
 - Harswell
 - Kittery
 - Portland
 - South Portland
 - Thomaston
 - Vinalhaven

- Moderate Risk**
- Boothbay
 - Cumberland
 - Falmouth
 - Friendship
 - Georgetown
 - Kennebunkport
 - Mount Desert
 - Saint George
 - South Berwick
 - Woolwich
 - Yarmouth
 - York

- Aerial Survey: 10,264 acres defoliation mapped 2015
- Ground Survey: Defoliation detected from Kittery to Rockland

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

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



Browntail Moth



Browntail Moth Caterpillar



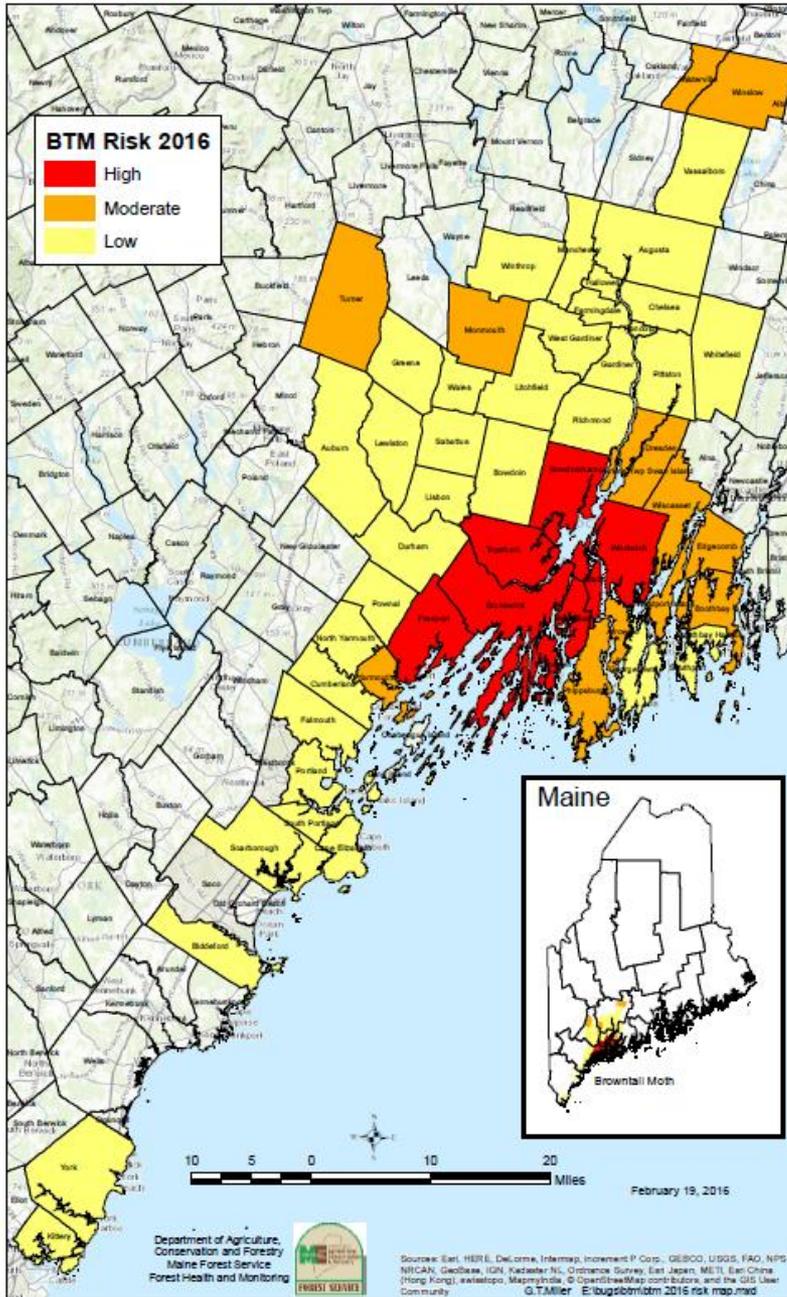
Browntail Moth Winter Web

Browntail Moth

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



Browntail Moth Risk - 2016



Town-Wide Risk

(does not reflect individual property risk)

Six Counties with Confirmed Active Infestations

- Androscoggin (Low-Mod)
- Cumberland (Low-High)
- Kennebec (Low-Mod)
- Lincoln (Low-Mod)
- Sagadahoc (Low-High)
- York (Low)

Towns with High Populations/Risk

Bath
Bowdoinham
Brunswick
Freeport
Harpswell
Topsham
West Bath
Woolwich

Towns with Moderate Populations/Risk

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



Homegrown Trouble For Fir and Spruce on the Horizon

Spruce Budworm

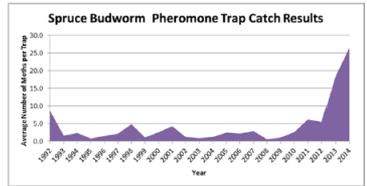
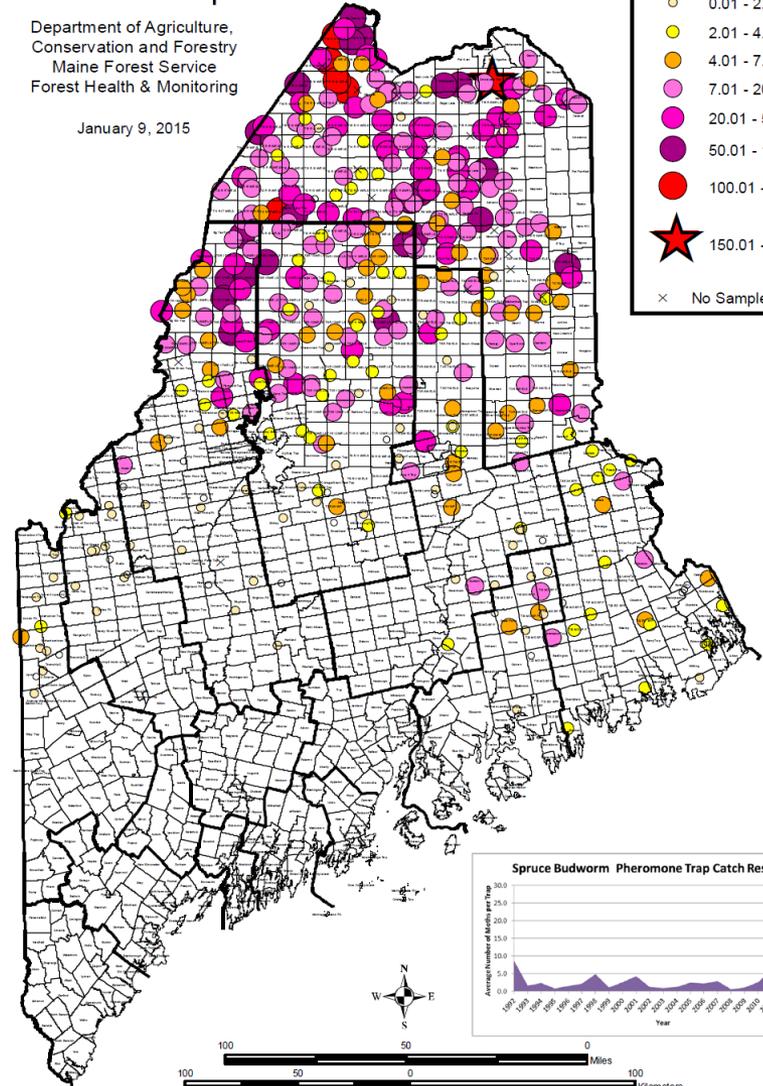
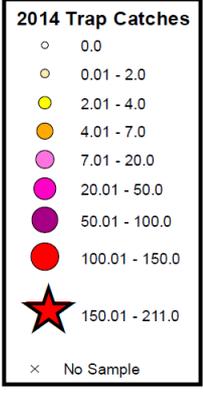
Native

Outbreak-Prone Defoliator

2014 Spruce Budworm Pheromone Trap Catches

Department of Agriculture,
Conservation and Forestry
Maine Forest Service
Forest Health & Monitoring

January 9, 2015

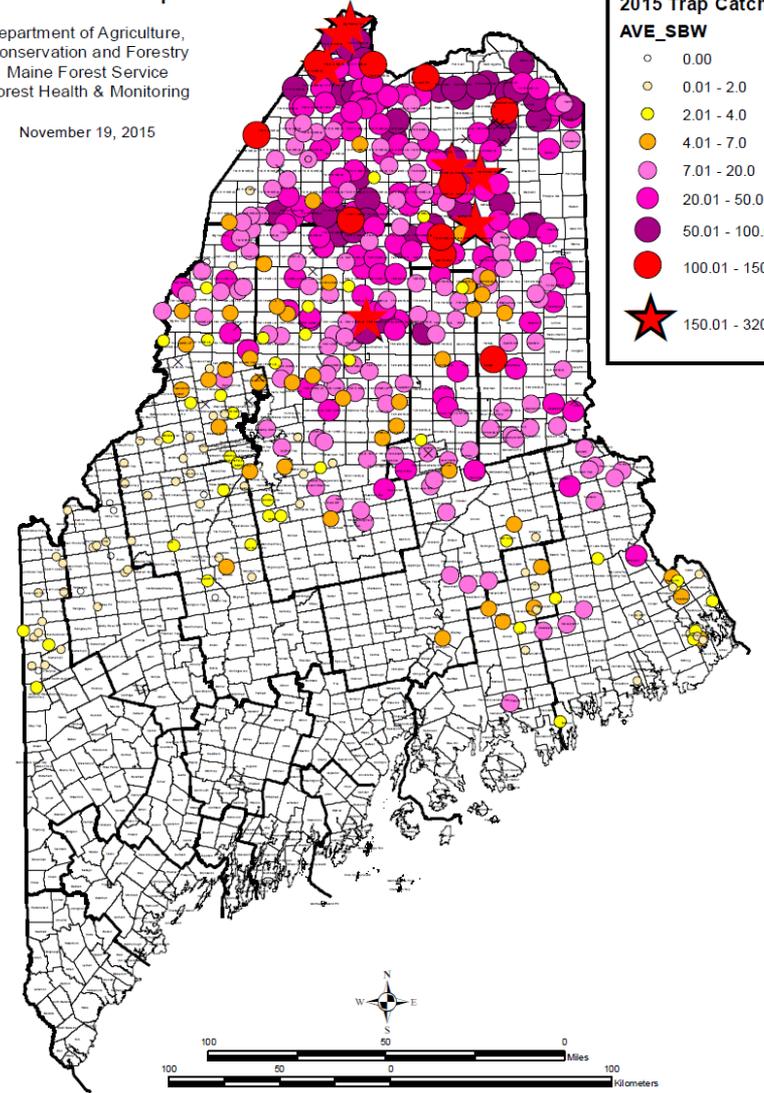
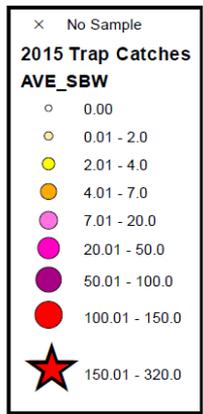


G.T.Miller/E:\bugs\sbw\2014 trap catches with priority areas.mxd

2015 Spruce Budworm Pheromone Trap Catches

Department of Agriculture,
Conservation and Forestry
Maine Forest Service
Forest Health & Monitoring

November 19, 2015



G.T.Miller/E:\bugs\sbw\2015_trap_catches.mxd

Recognizing SBW



Allison Kanoti, MFS

Spruce budworm larvae and feeding damage.



Late Instar Larva

Photo Used By Permission:

D. Gordon Mott

Recognizing SBW



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

COLLECT SAMPLES AND REPORT MOTH STORMS



Recognizing SBW

Yellow Hue Reduced



Photo: C. Donahue, MFS



Hemlock Suckers

Hemlock Woolly Adelgid– *Adelges tsugae*



CAUTION:

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

Sometimes Hard to See!

- crawlers are invisible, 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



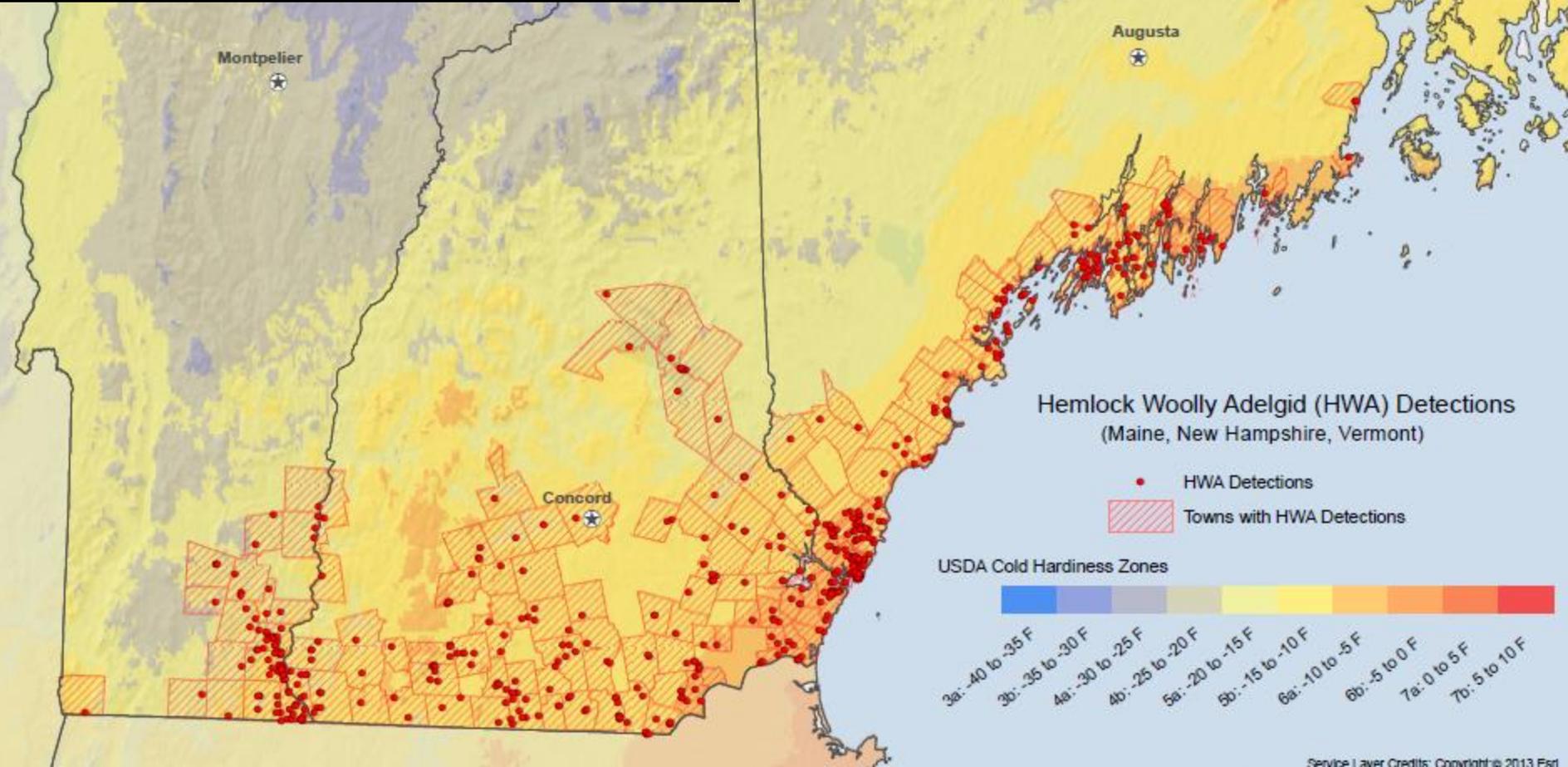
Elongate Hemlock Scale

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



New Hemlock Mgmt. Publication

From USFS, ME, NH, VT



Managing Hemlock in Northern New England Forests Threatened by Hemlock Woolly Adelgid and Elongate Hemlock Scale



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Elongate Hemlock Scale.....

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Timing.....

Targeting Risk.....

Maximizing Chances of Detection.....

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Moisture.....

A Combination of Factors.....

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Common HWA Imposters

It is easy to confuse HWA with similar looking things on hemlock. A close look at the location, texture, and other characters can eliminate some of the imposters. Some frequently mistaken identities include conifer sap (figure 2), bird droppings, lichen, spider egg sacs (figure 3), spittlebugs (figure 4), caterpillar signs (figures 5 and 6), and tip blight (figure 7).



Figure 2. Puck from other conifers is often mistaken for HWA. (NR-DNR)



Figure 3. Spider egg sacs are silky in texture, and are firmly attached to the twig. (USDA-FWS)



Figure 4. Ales. Woolly masses are created by spittlebugs, not HWA (more like HWA wool on twigs). (DNR-DNR)



Figure 5. Cocoons of Bucculatrix sp. (eliminating caterpillars) on hemlock needles. (DNR)



Figure 6. Brown needle tip, caused by the fungus Siroconium tragace. (USDA Forest Service, Eugene, OR)



Figure 7. Siroconium white blight, caused by the fungus Siroconium tragace. (USDA Forest Service, Eugene, OR)

Timber Management Scenarios

Pre-Infestation:

- **Follow Existing Management Plan:** No change is needed if the timber is located in cooler climate zones or access is good.
- **Reduce Hemlock Stocking:** Where hemlocks are unhealthy or exceed 20% of basal area, reduce the hemlock component through appropriate silvicultural systems. The density of hemlock is often irregular within stands, so the percentage of residual hemlock can be locally higher.

Infested/Pre-decline (Light Decline or better condition):

- **Delay Cutting:** Lightly infested trees may continue to grow adequately. Unnecessary disturbance may put additional trees at risk.
- **Continue Cutting Schedule:** Use harvesting systems or equipment that leave residual trees, such as removing trees in groups to allow for hemlock growth over the next cutting.



Figure 22. Hemlocks will continue to provide some value as cover as long as they are still alive. (VT DFR)

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Light Decline (Light Decline or better condition):

- **No Cutting:** Hemlocks will continue to provide some value as cover while still alive (figure 22). Avoid any disturbance, which could accelerate decline. Consider insecticide treatments and/or biological control.
- **Establish Regeneration:** Where no regeneration is established, remove unhealthy trees in groups to provide additional light on the forest floor. To maintain cover, limit the area of tree removals to what can be regenerated sustainably.

Infested/Post-Decline (Moderate Decline or worse condition):

- **No Cutting:** Hemlocks will continue to provide some value as cover while still alive. Avoid any disturbance, which could accelerate decline. Consider insecticide treatments.
- **Establish Regeneration:** Where hemlocks are declining, remove unhealthy trees in groups. Consider planting softwoods to continue functions that hemlock had provided. Some hemlock hybrids may be less vulnerable to HWA than native hemlocks.

valuate diameter objectives given
d reduce the hemlock component through
Release advanced regeneration of desirable

Decline or worse condition):
may not justify stand disturbance.
ups, as they decline. Ensure regeneration of

hemlocks. Ensure regeneration of desirable

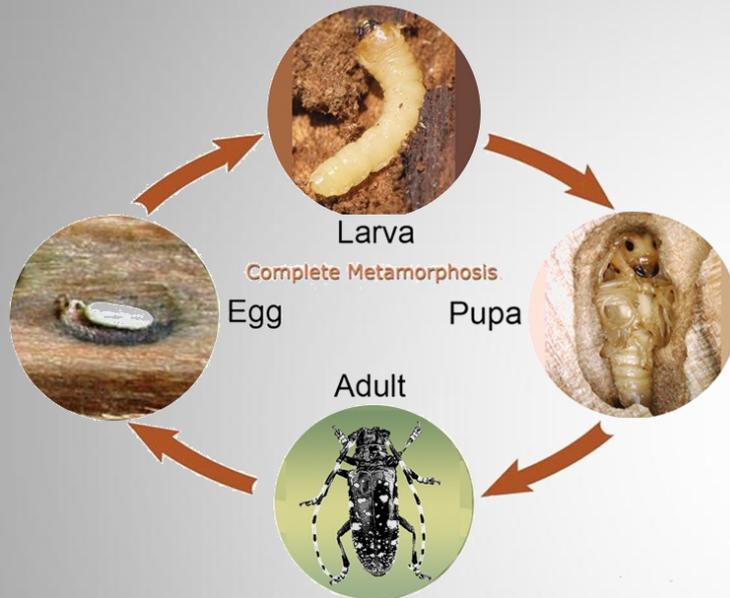
between early August and late February
hemlock woolly adelgid.

id tree value is high, insecticides can be an
ostly and is most often used at small scales
es. Treatment costs are influenced by size
d, and accessibility.

by those who have knowledge of State and
te application equipment, and understand
ctors are required to have State pesticide
afety equipment, and must follow all

Limited Hardcopies Available

Asian Longhorned Beetle (ALB) Update



- Not 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



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

Report Suspected ALB—early detection saves trees!

State Resources:

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



Emerald Ash Borer (EAB) Update

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



Volunteer for 2016 Trap Tree Network

Contact Patti Roberts

Patti.Roberts@maine.gov

(207) 287-2431



Spread the Word: Leave Your Firewood at Home!



Kennebunk, ME

Photo: Dave Hobbins