Invasive Forest Insects In Maine

Colleen Teerling
Forest Entomologist
Maine Forest Service

Browntail Moth

Browntail Moth

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

Browntail Moth Life Cycle

April-June
Larvae feeding
LOTS of HAIRS

July
Cocoons
LOTS of HAIRS in cocoons

July-August
Adults & Eggs

Hairs toxic up to 3 years

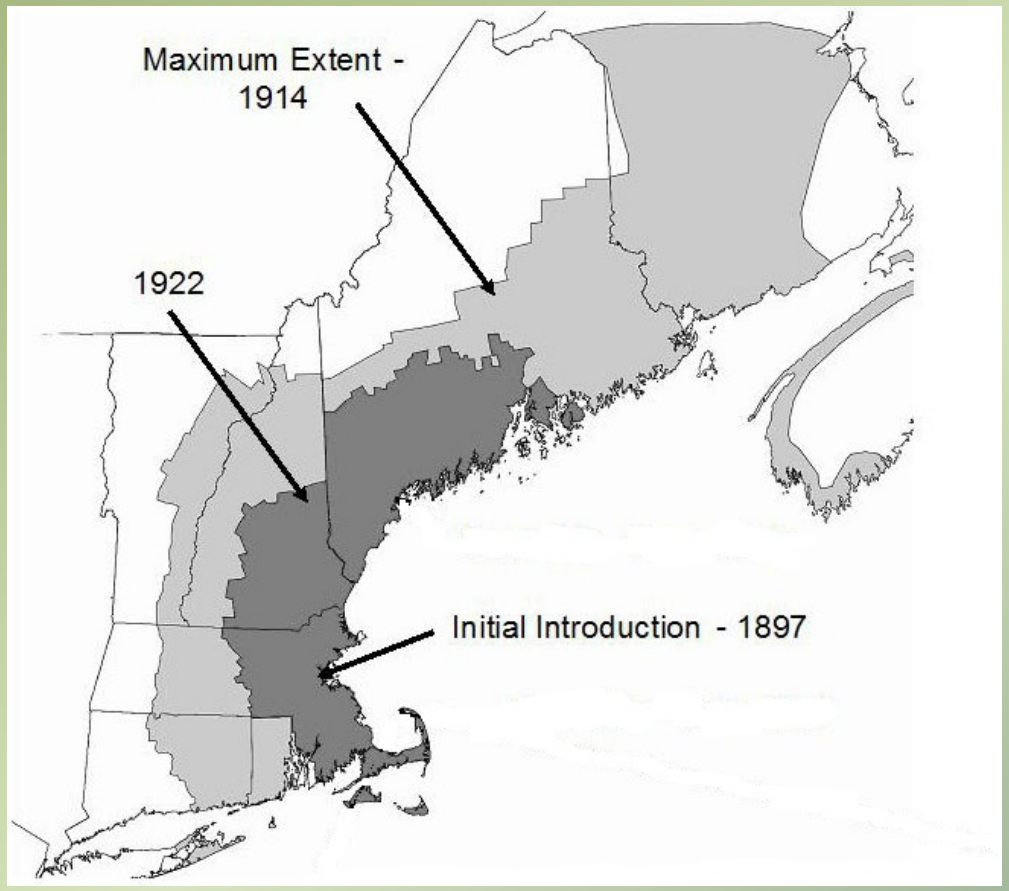
August-September
Tiny larvae skeletonize leaves
& form winter webs

September-April
Larvae in webs on tips of branches

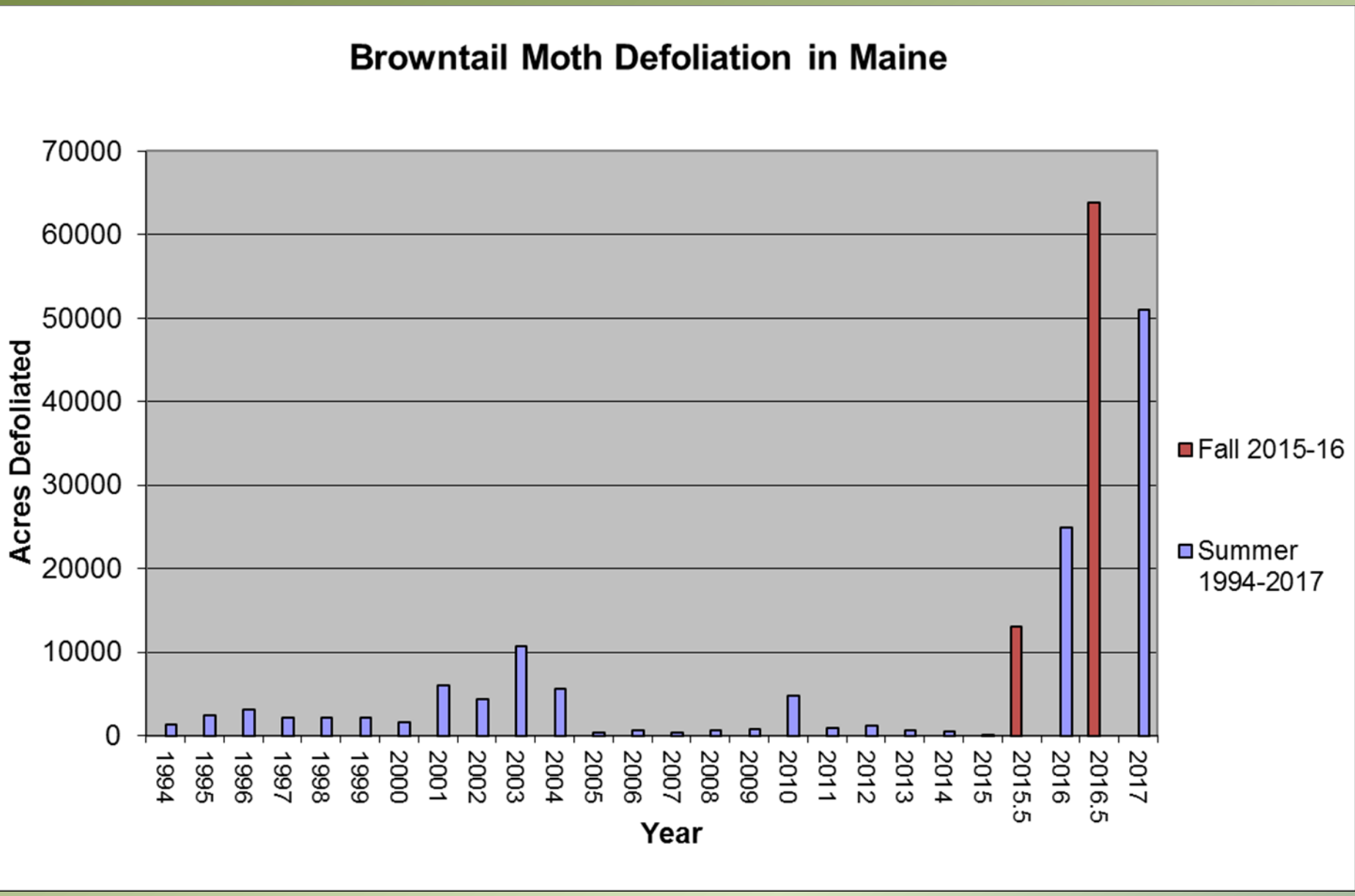
Browntail Moth - History

Euproctis chrysorrhoea

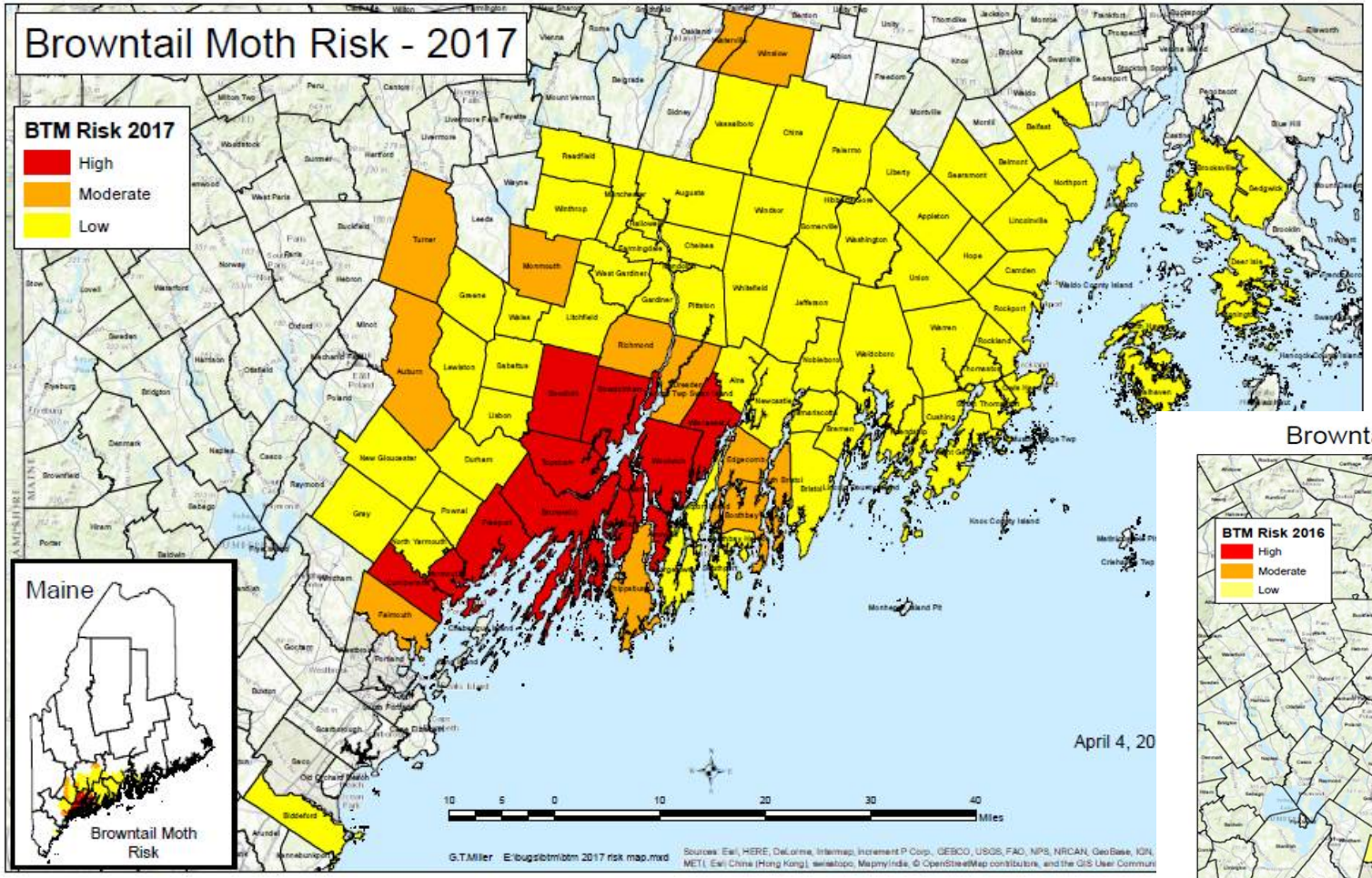
- First established in Somerville, Massachusetts in 1897
- By 1914 found from Vermont and Connecticut to New Brunswick and Nova Scotia



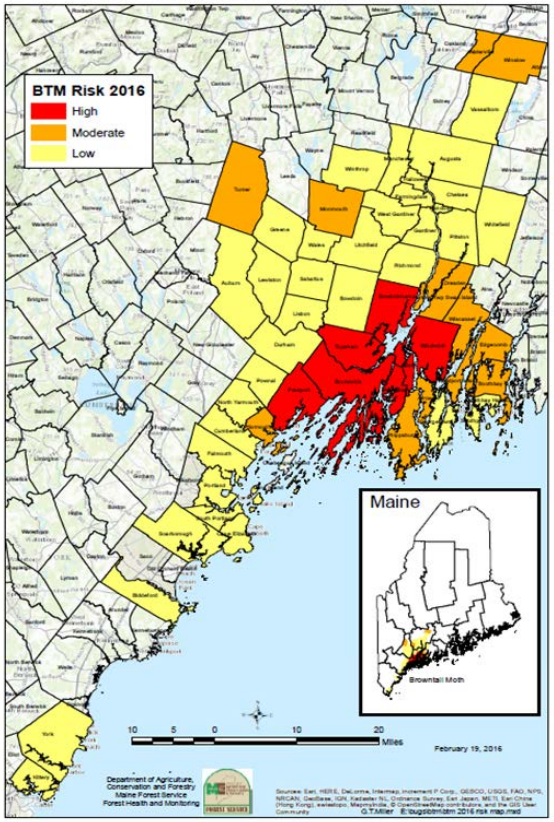
Browntail Moth Expansion by Year



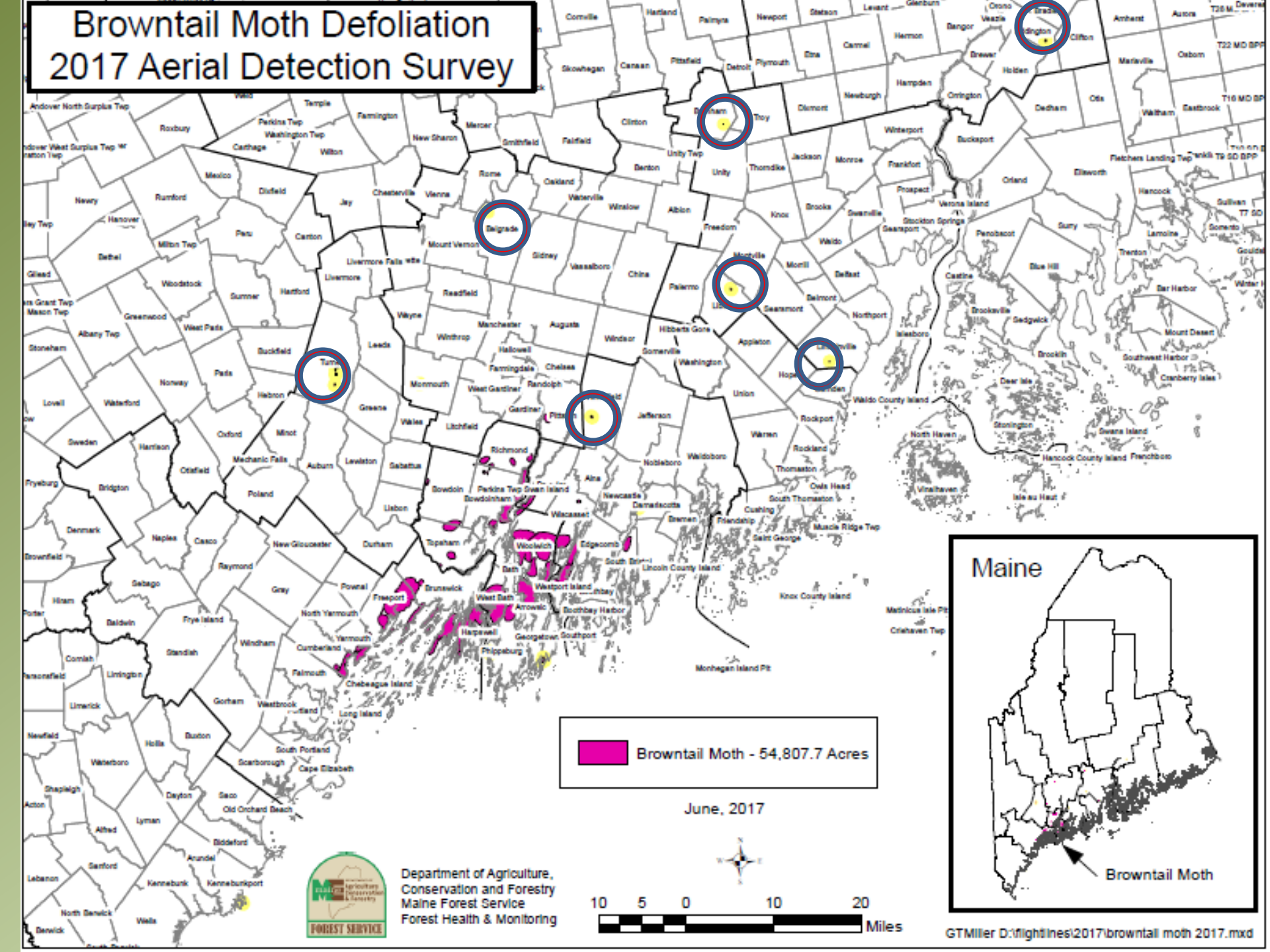
Maine Forest Service Aerial Survey



Browntail Moth Risk - 2016



Browntail Moth Defoliation
2017 Aerial Detection Survey



Browntail Moth Exposure Risk 2018

Disclaimer: Survey is not complete.

Ratings based on current knowledge of defoliation, winter web surveys and other observations at the township level. Some townships are rated based on surrounding conditions versus surveys. Conditions within each township are variable.

Normal: Be aware of the risk of browntail moth exposure. Moths have been found in light traps in all corners of the state. Areas rich in host trees, especially apples and other fruit trees and oaks, are more likely to have populations.

Alert: Town is near locations with detections of browntail moth. Survey has not been conducted or has not revealed established populations.

Trace: A small number of webs were found.

Low: Webs were frequently encountered, or patches of trees with webs were found.

Moderate: Defoliation was mapped and/or continuous stretches of overwintering webs were found.

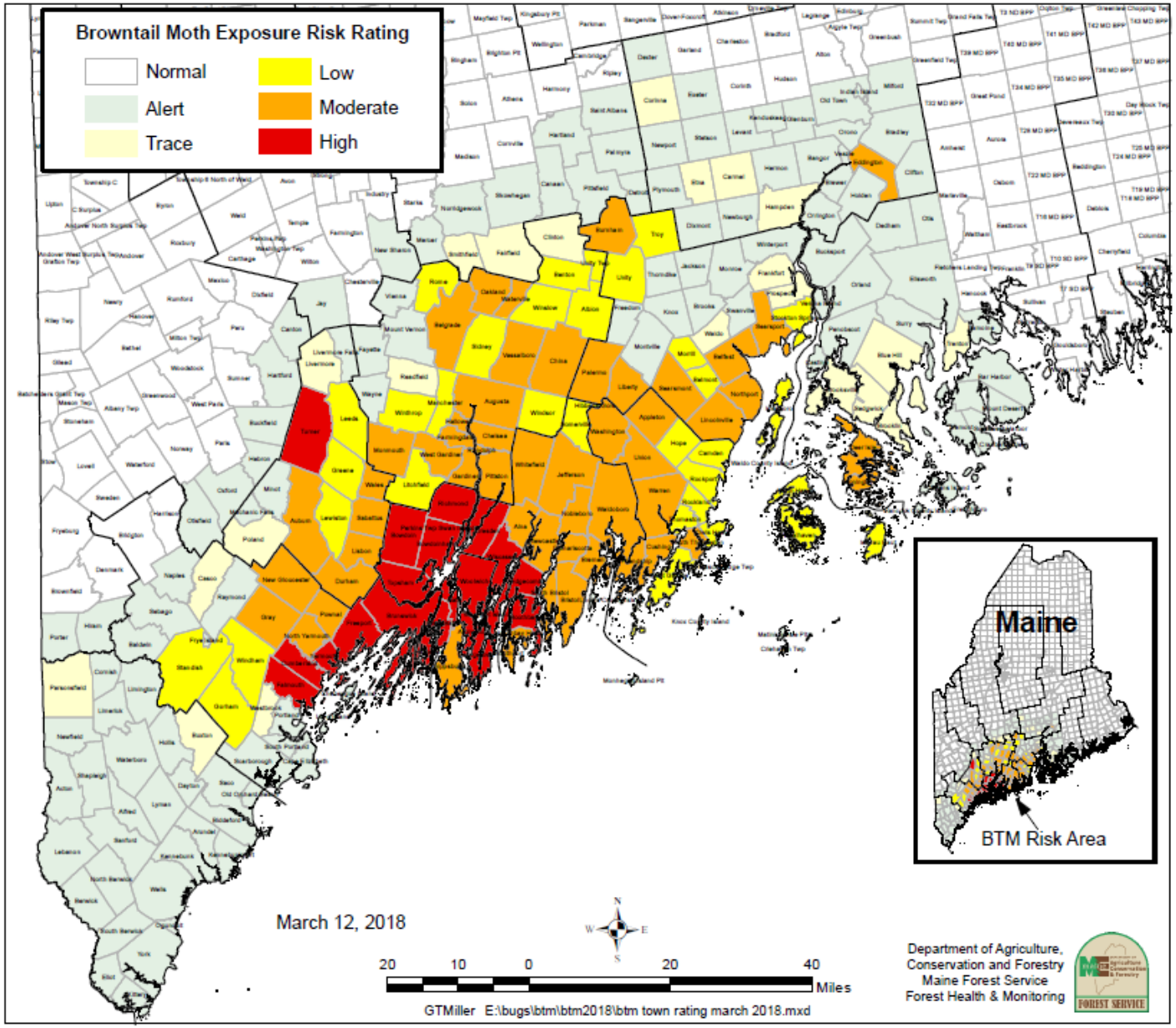
High: Defoliation was mapped and continuous stretches of high populations of winter webs were found.

NOTE: destruction of winter webs within reach should be considered in all areas, but will be **especially** fruitful in areas with trace to low populations, or for detections in the normal or alert areas.

For More Information:
www.maine.gov/forestpests#btm

BTM Larva

BTM Webs Clipped



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

Browntail Moth - Control

- Low winter webs can be clipped and burned
- Chemical control in the spring – BEFORE the end of May
  - Later spraying does not reduce exposure to hairs
- More effective if control is widespread

Winter Moth - *Operophtera brumata*

- Invasive insect from Europe
  - Order: Lepidoptera (moths)
  - Family: Geometridae
- Larvae are inchworms


Photo: Kaitlyn O'Donnell


Photo: Maine Forest Service

Hungary Forest Research Institute, Bugwood.org

Eggs: November-April

Larvae: April -June

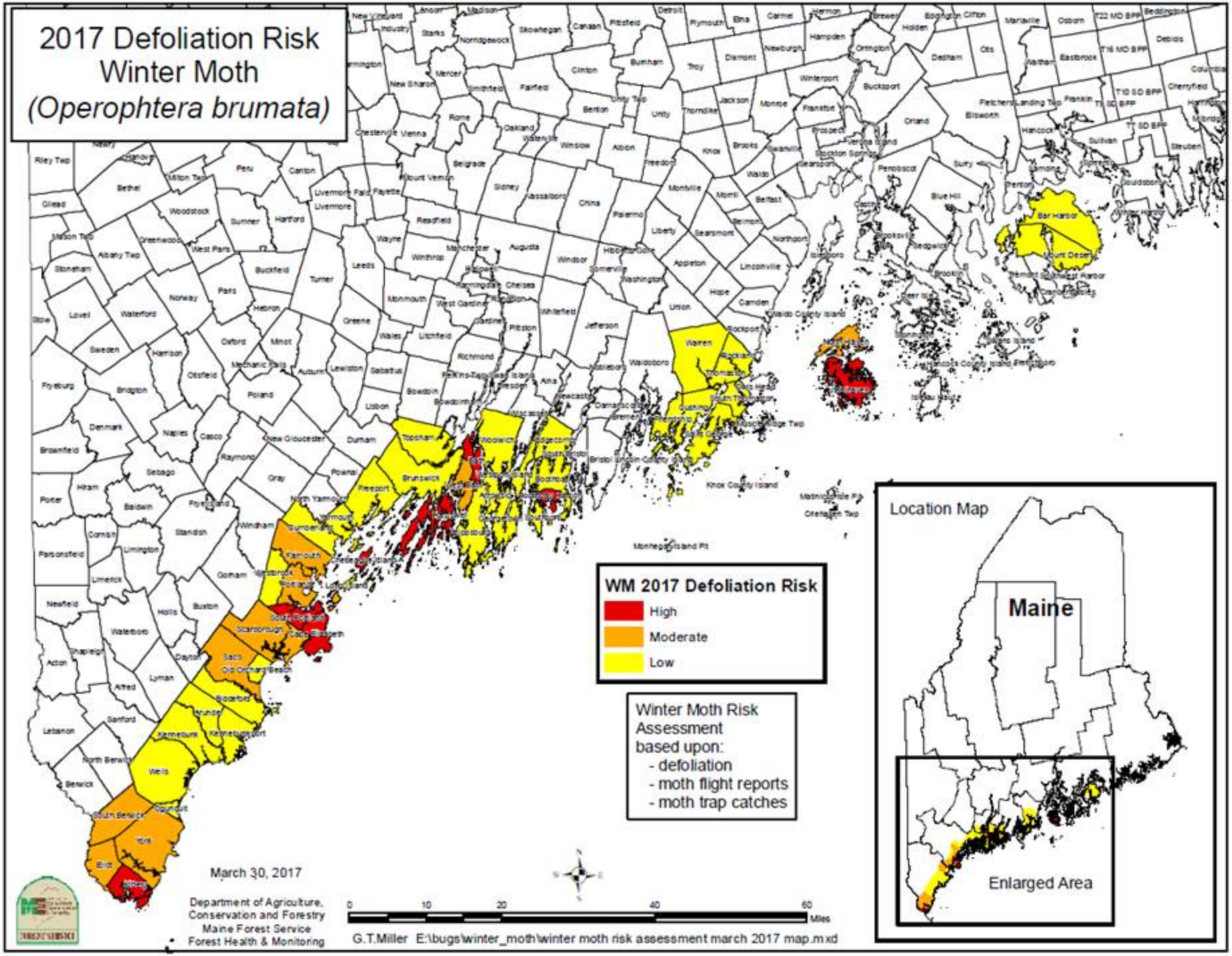
Photo: P. Johnson

Photo: P. Johnson

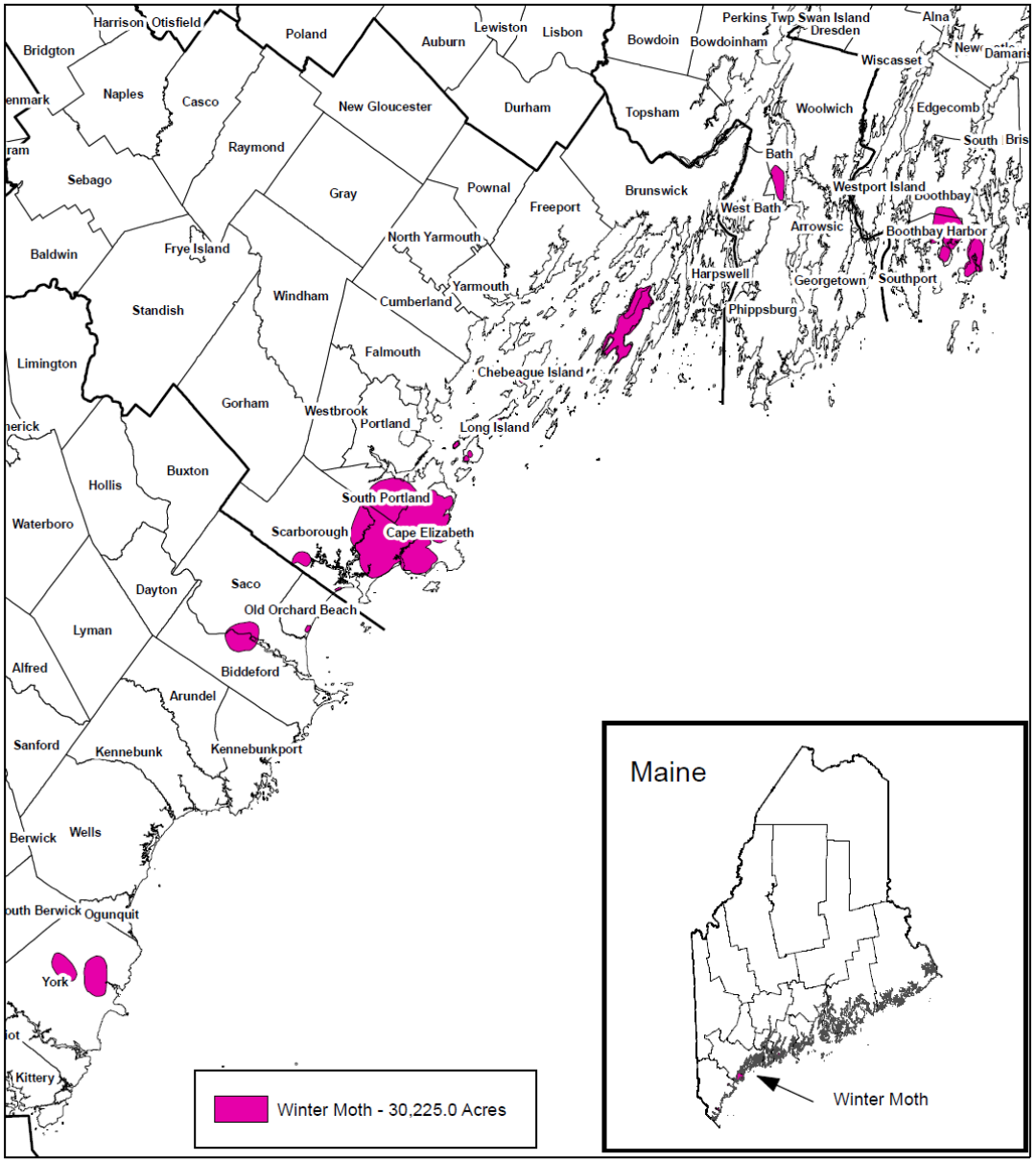
Pupae: June-November

Adults: November-January

2017 Defoliation Risk
Winter Moth
(Operophtera brumata)



Winter Moth Defoliation
2017 Aerial Detection Survey



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

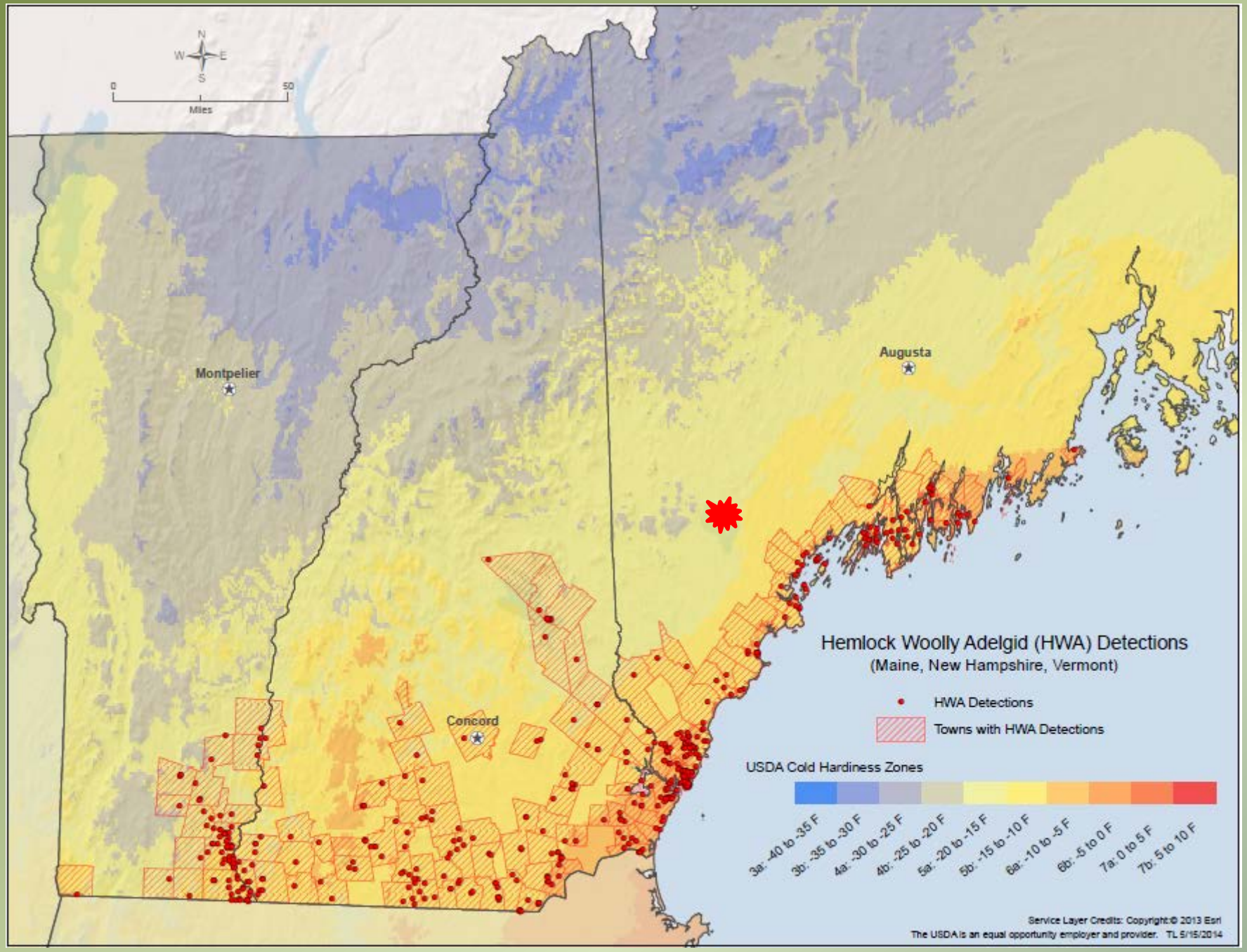
November 29, 2017

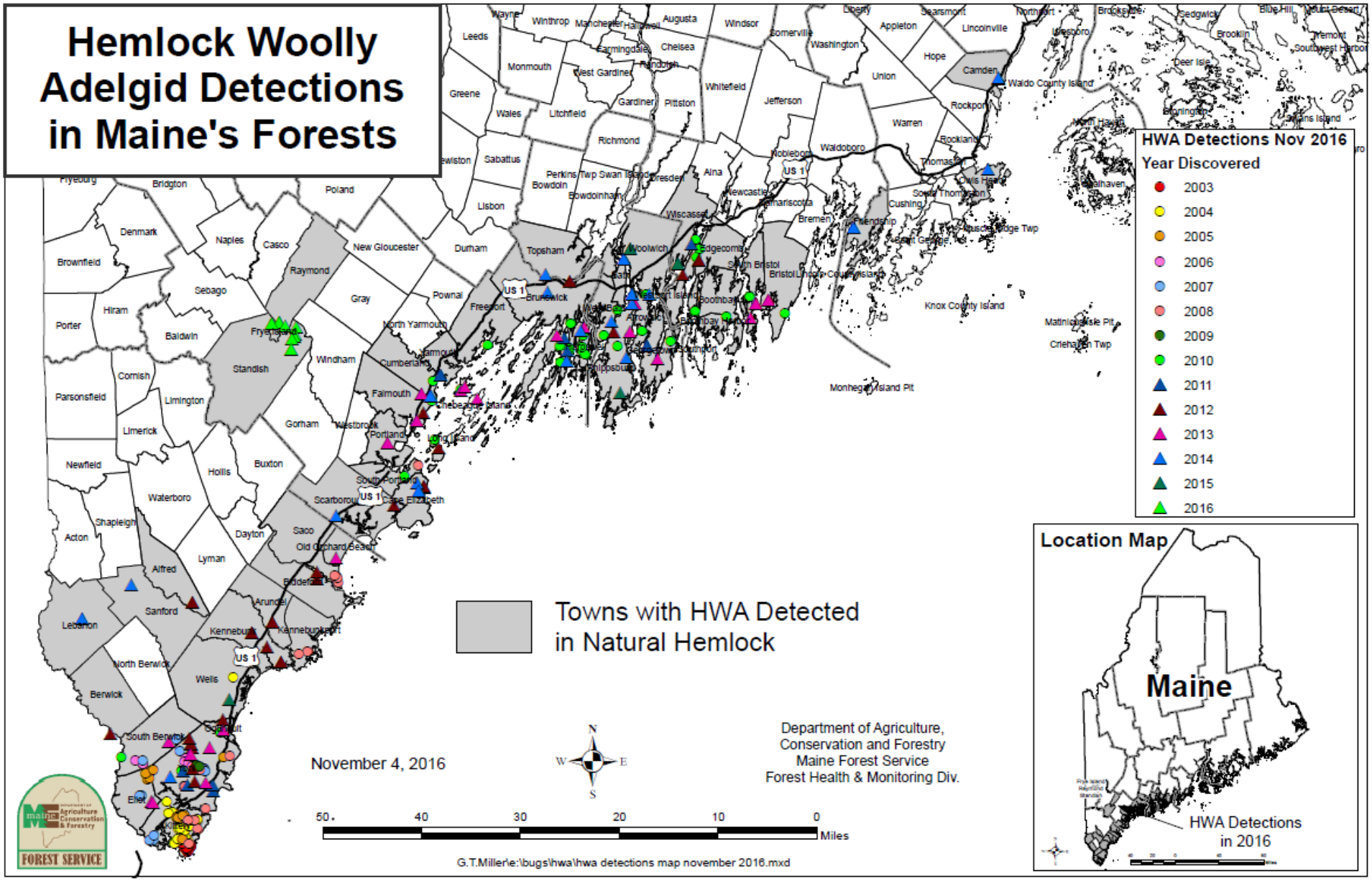
10 5 0 10 Miles

GTMiller D:\flightlines\2017\winter moth 2017.mxd

Hemlock Woolly Adelgid, *Adelges tsugae*

- Aphid-like
- Invasive Species
- Only known on hemlock in US & Can.


N
W
E
S
0
50
Miles
Montpelier
Augusta
Concord
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
Service Layer Credits: Copyright© 2013 Esri
The USDA is an equal opportunity employer and provider. TL 5/15/2014


Hemlock Woolly Adelgid Detections in Maine's Forests
HWA Detections Nov 2016
Year Discovered
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Location Map
Maine
HWA Detections in 2016
Towns with HWA Detected in Natural Hemlock
November 4, 2016
N
W
E
S
50
40
30
20
10
0
Miles
Department of Agriculture, Conservation and Forestry
Maine Forest Service
Forest Health & Monitoring Div.
FOREST SERVICE
G.T.Miller\e:\bugs\hwa\hwa detections map november 2016.mxd




How do WE move them?

- Year Round - **Live plants**
- **March-July** (crawlers/eggs)
  - Severed hemlock
  - Clothing, Machinery, etc

What about natural spread?

- **March-July** (crawlers/eggs)
  - Wind and weather
  - Animals

Impact of crawlers being moved by vehicles:

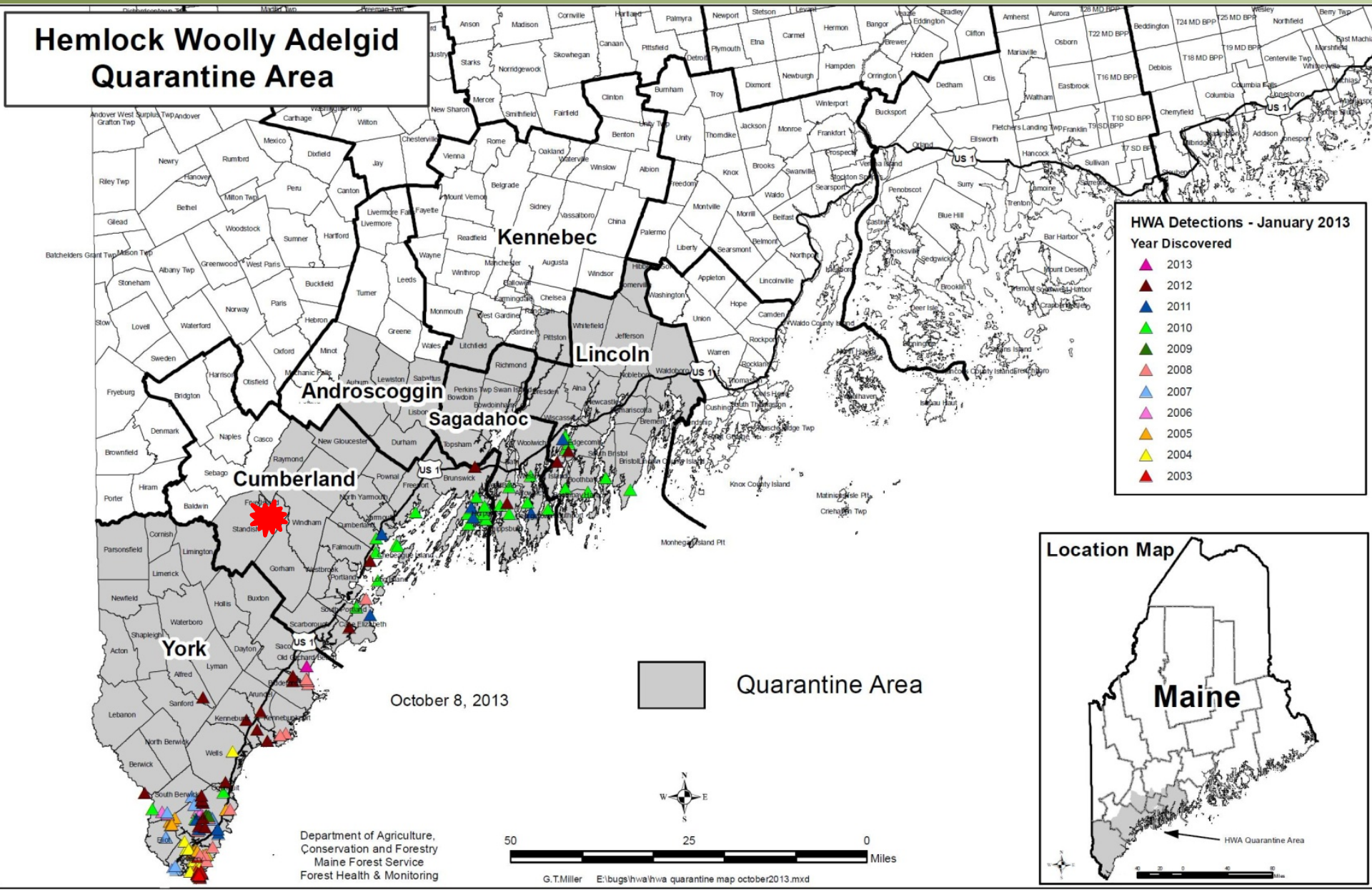
Chemical Options

- Necessary to maintain health/aesthetics for ornamental trees.
- Limited application in the forest (but labelled).
  - Foliar spray-horticultural oils/soaps; conventional pesticides
    - Repeat every 1-2 years (population dependent)
  - Systemics: soil drench, soil injection, stem injection, basal bark
  - Repeat every 2-10 years (product, population dependent)


Foliar Application
(Credit MFS)


Basal Bark Application
(Credit NH DFL)

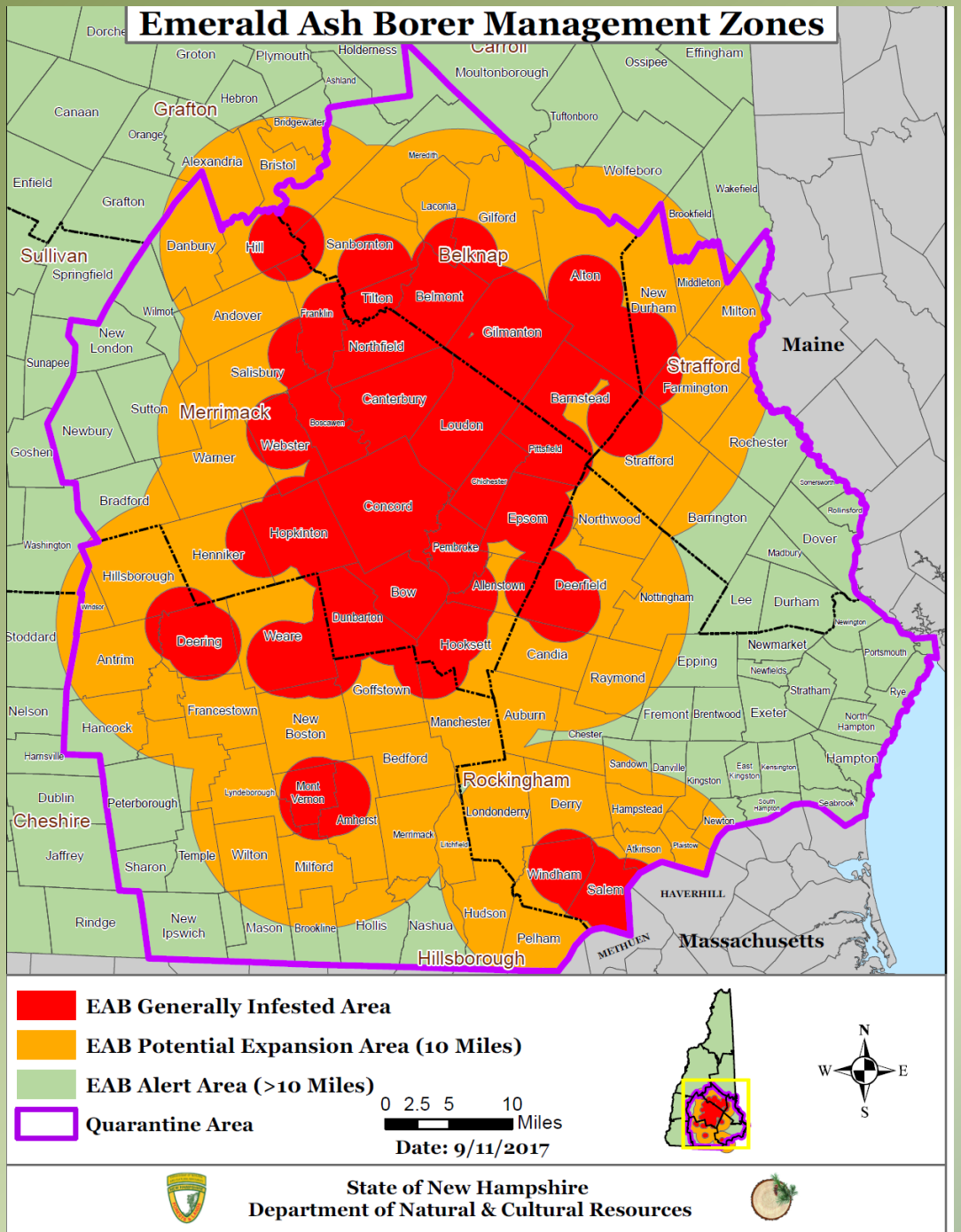
Quarantine

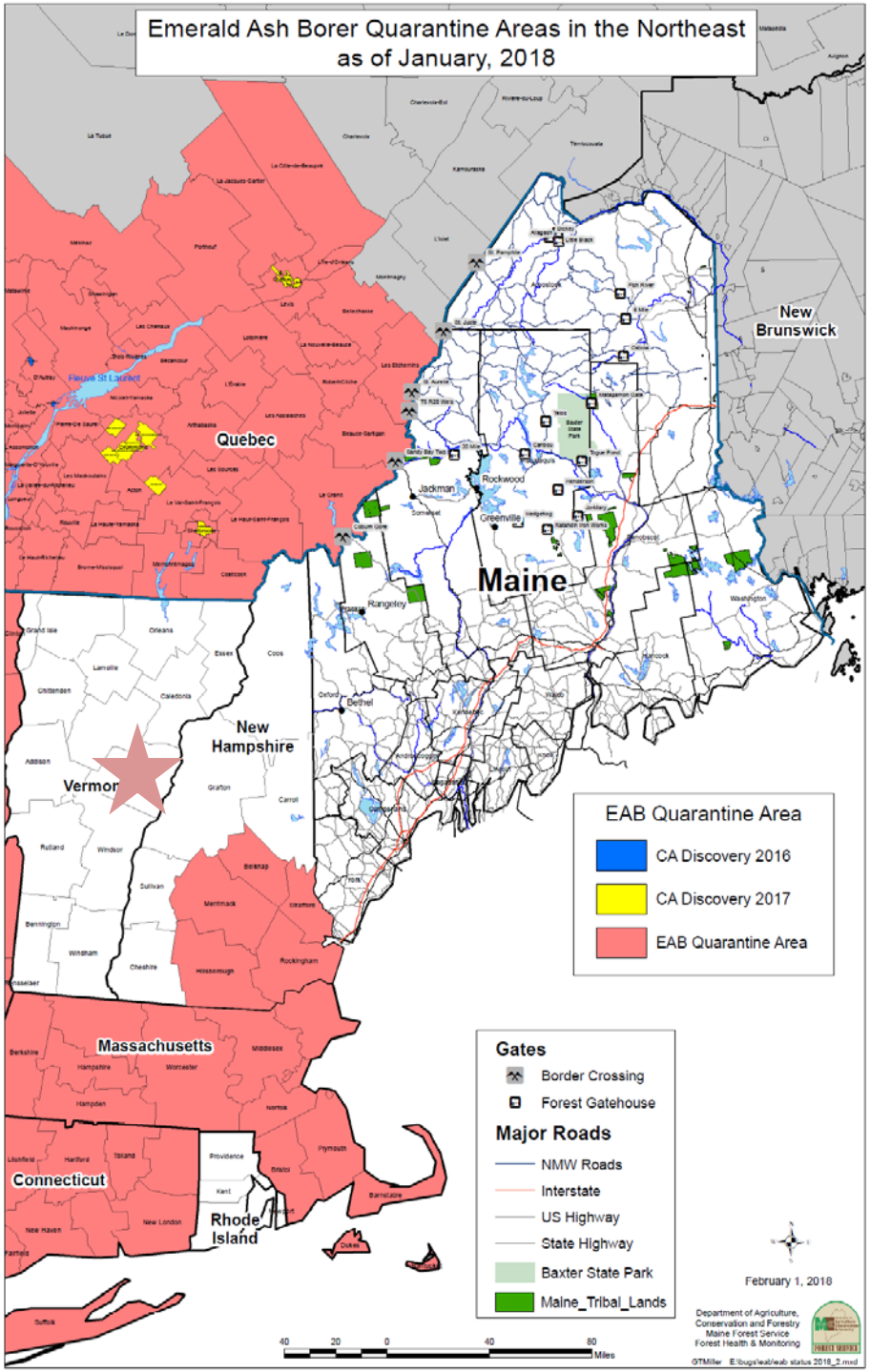

Hemlock Woolly Adelgid
Quarantine Area
HWA Detections - January 2013
Year Discovered
2013
2012
2011
2010
2009
2008
2007
2006
2005
2004
2003
Kennebec
Lincoln
Androscoggin
Sagadahoc
Cumberland
York
Quarantine Area
October 8, 2013
Location Map
Maine
HWA Quarantine Area
Department of Agriculture,
Conservation and Forestry
Maine Forest Service
Forest Health & Monitoring
50
25
0
Miles
G.T.Miller E:\bugs\hwa\hwa quarantine map october2013.mxd

And, while you are looking closely at hemlocks . . .

<u>Elongate Hemlock Scale</u>
Fiorinia externa
-Hemlock and Fir
-Spruce
-*Other Conifers*

EAB in New Hampshire




Emerald Ash Borer Quarantine Areas in the Northeast
as of January, 2018
New Brunswick
Quebec
Maine
New Hampshire
Vermont
Massachusetts
Connecticut
Rhode Island
Fleuve St Laurent
Jackman
Rockwood
Greenville
Rangeley
Bethel
EAB Quarantine Area
CA Discovery 2016
CA Discovery 2017
EAB Quarantine Area
Gates
Border Crossing
Forest Gatehouse
Major Roads
NMW Roads
Interstate
US Highway
State Highway
Baxter State Park
Maine_Tribal_Lands
40 20 0 40 80
Miles
February 1, 2018
Department of Agriculture, Conservation and Forestry
Maine Forest Service
Forest Health & Monitoring
GTMiller E:\bugs\leab\eab status 2018_2.mxd