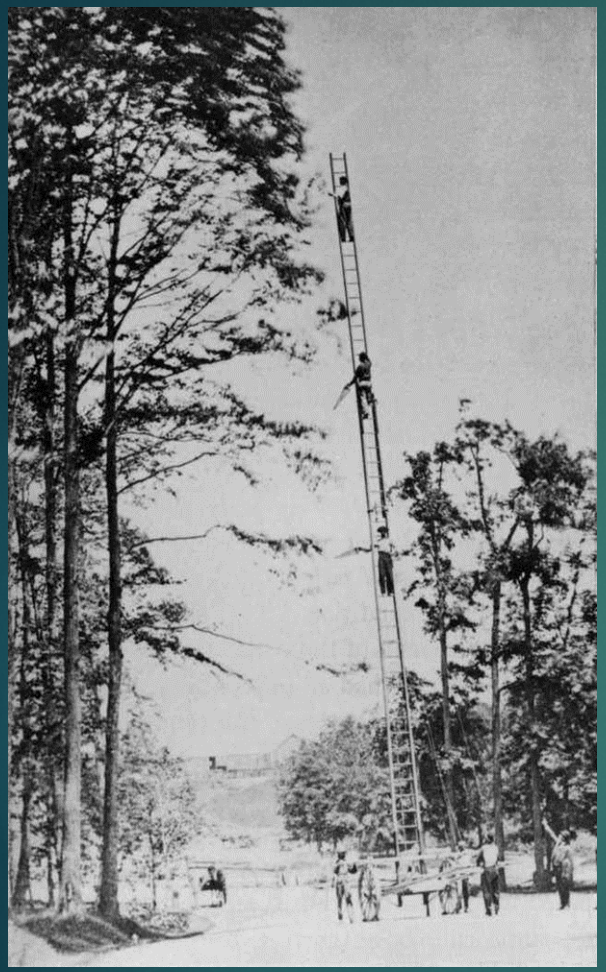


TOM SCHMEELK
MIKE PARISIO
COLLEEN TEERLING

MAINE FOREST SERVICE

DEPARTMENT OF AGRICULTURE, CONSERVATION AND FORESTRY

maine DEPARTMENT OF Agriculture Conservation & Forestry
FOREST SERVICE

Emerald Ash Borer (EAB)

Emerald Ash Borer

- First detected in Maine in 2018
- Northern (Aroostook county) and southern (York county) Maine

Why is EAB a problem?

- EAB attacks all species of ash (*Fraxinus spp.*) grown in N.A.
  - None of our species are tolerant against attack
  - Almost all attacked ash trees die
  - Millions of ash trees have died since EAB was discovered in 2002

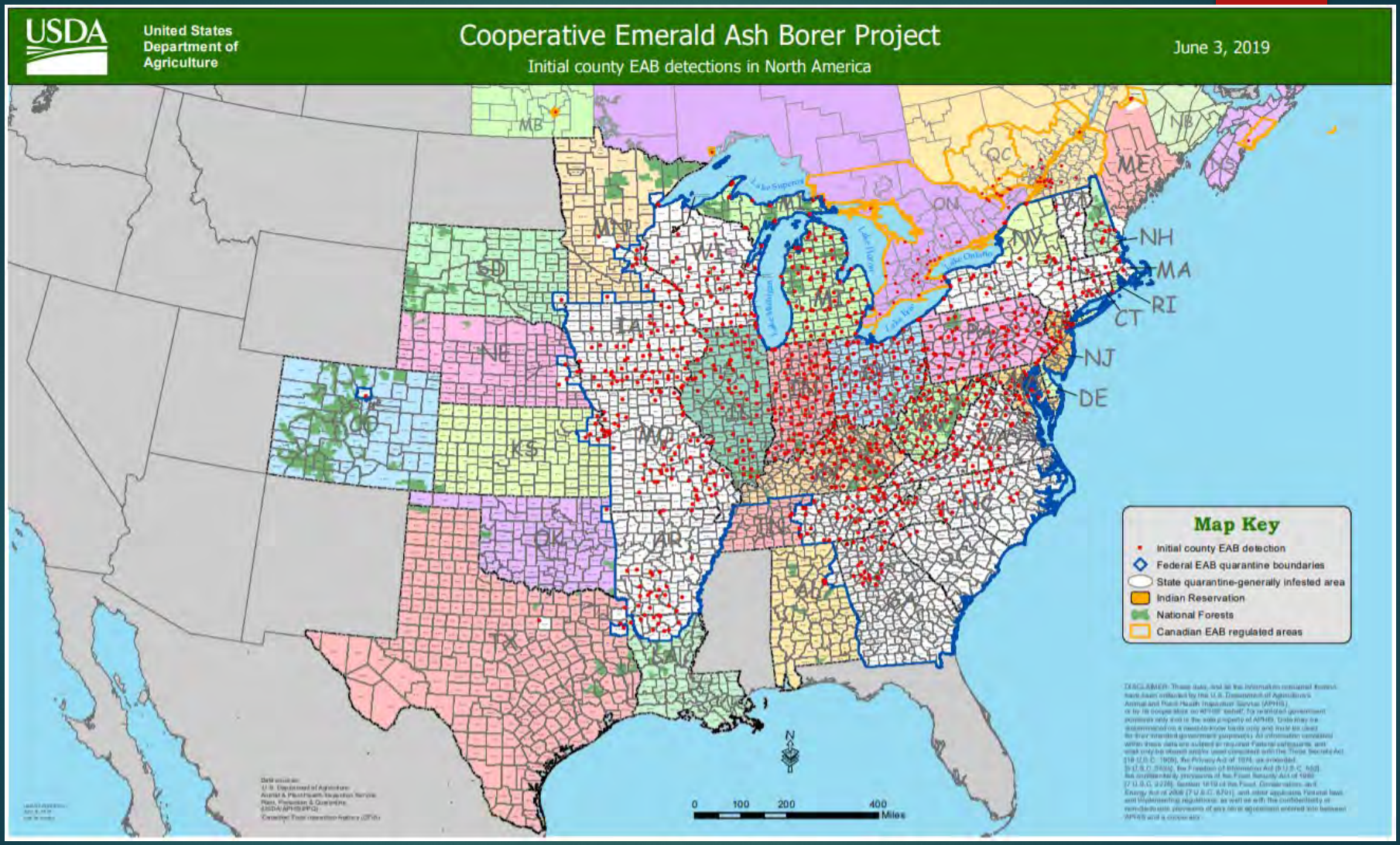
Maine Department of Agriculture

- Numerous industries affected:
  - Furniture / flooring
  - Tool making
  - Sports equipment
  - Native American basket making

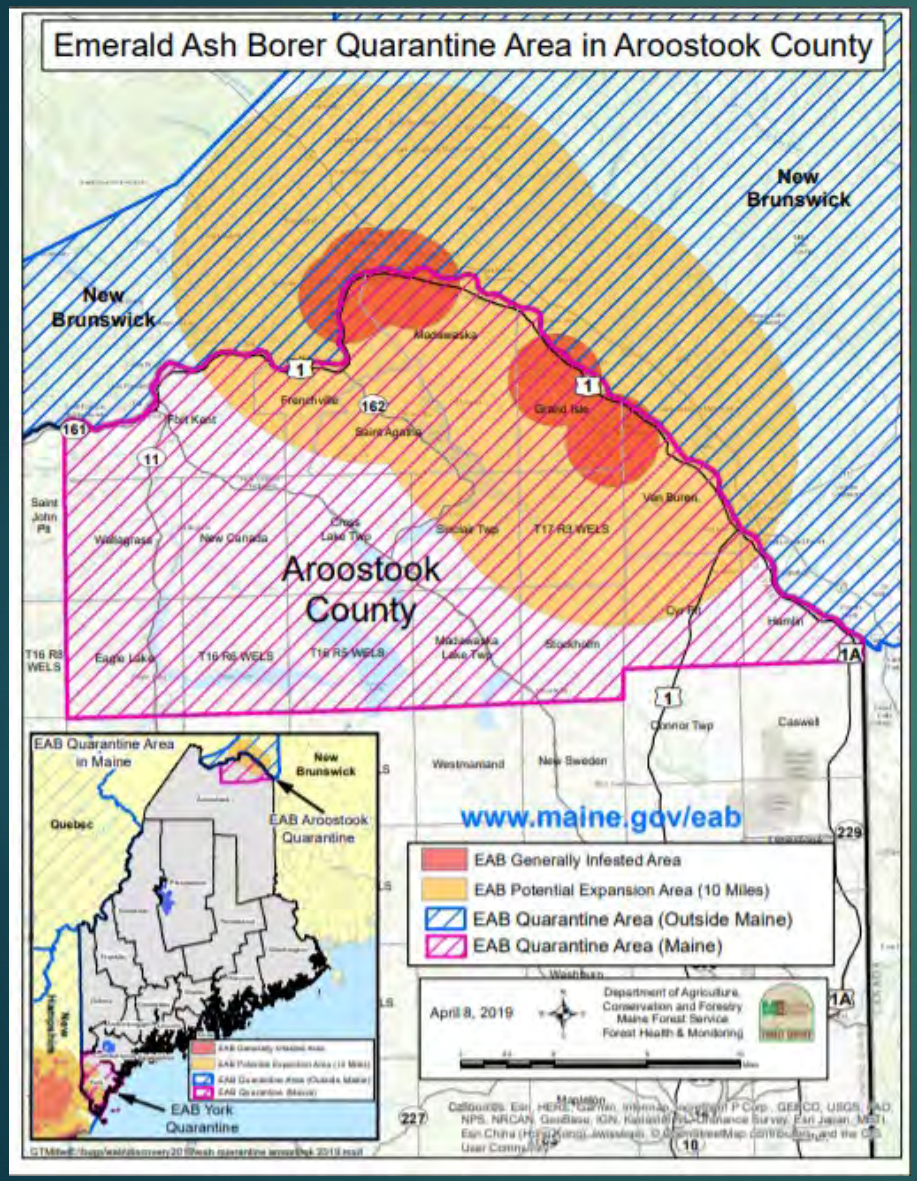
Why is EAB a problem?

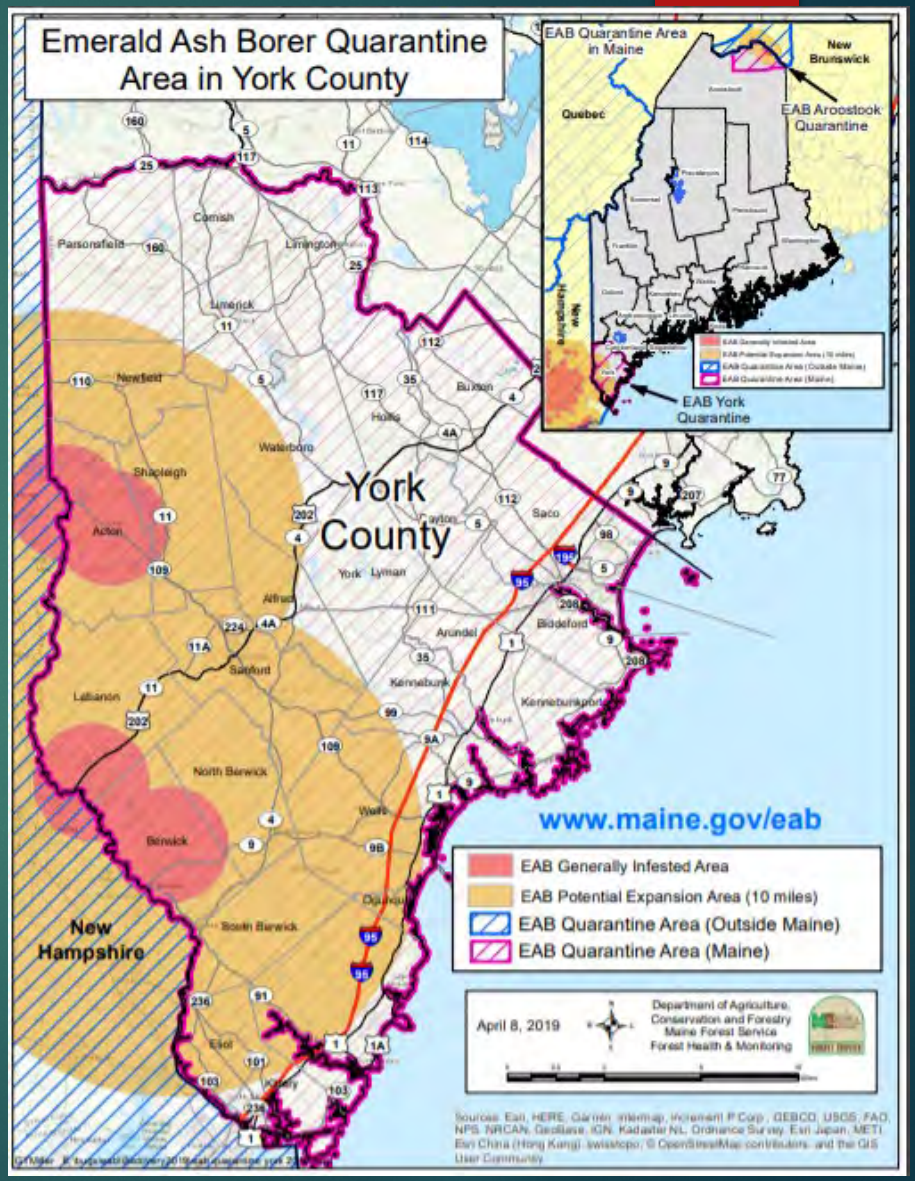
- Early detection is difficult:
  - Adult beetle is tiny
  - Signs are hard to see
  - Symptoms are confusing

- Spreads easily via firewood movement
  - >>75% of detected infestations are due to movement of firewood


USDA
United States Department of Agriculture
Cooperative Emerald Ash Borer Project
Initial county EAB detections in North America
June 3, 2019
MB
ON
QC
NB
ME
MN
WI
MI
NY
VT
NH
MA
RI
CT
NJ
DE
SD
NE
IA
IL
IN
OH
PA
MD
WV
VA
NC
SC
GA
KS
MO
KY
TN
AR
MS
AL
LA
OK
TX
Map Key
Initial county EAB detection
Federal EAB quarantine boundaries
State quarantine-generally infested area
Indian Reservation
National Forests
Canadian EAB regulated areas
0 100 200 400
Miles

EAB – Quarantine





Recognizing signs of EAB

Woodpecker Activity

"blonding"

Larval Galleries

- **Larvae tunnel under bark and feed on cambium in S-shaped galleries**
- **Feed from July to October**
- **Extensive larval feeding disrupts translocation**

Browntail Moth

Current situation

- Browntail moth populations continue to increase and expand inland in Maine affecting more towns
- It has been found in 12 of Maine's 16 counties through various surveys
- Aerial surveys during the fall and spring revealed more than 126,000 acres of damage continuing a steady increase over the last 3 years

Survey, Clip and Destroy Webs before Mid-April, Line up Insecticide Treatment

Insecticide Treatment BEFORE June, Personal Protection Precautions*

Personal Protection Precautions*

Personal Protection Precautions*, Limit Outdoor Lights

Next Year's Problems Appear, Treatment May be Possible (Not Recommended Near Marine Waters)

Winter Webs → Feeding Larvae → Pupae → Adults → Eggs → Feeding Larvae

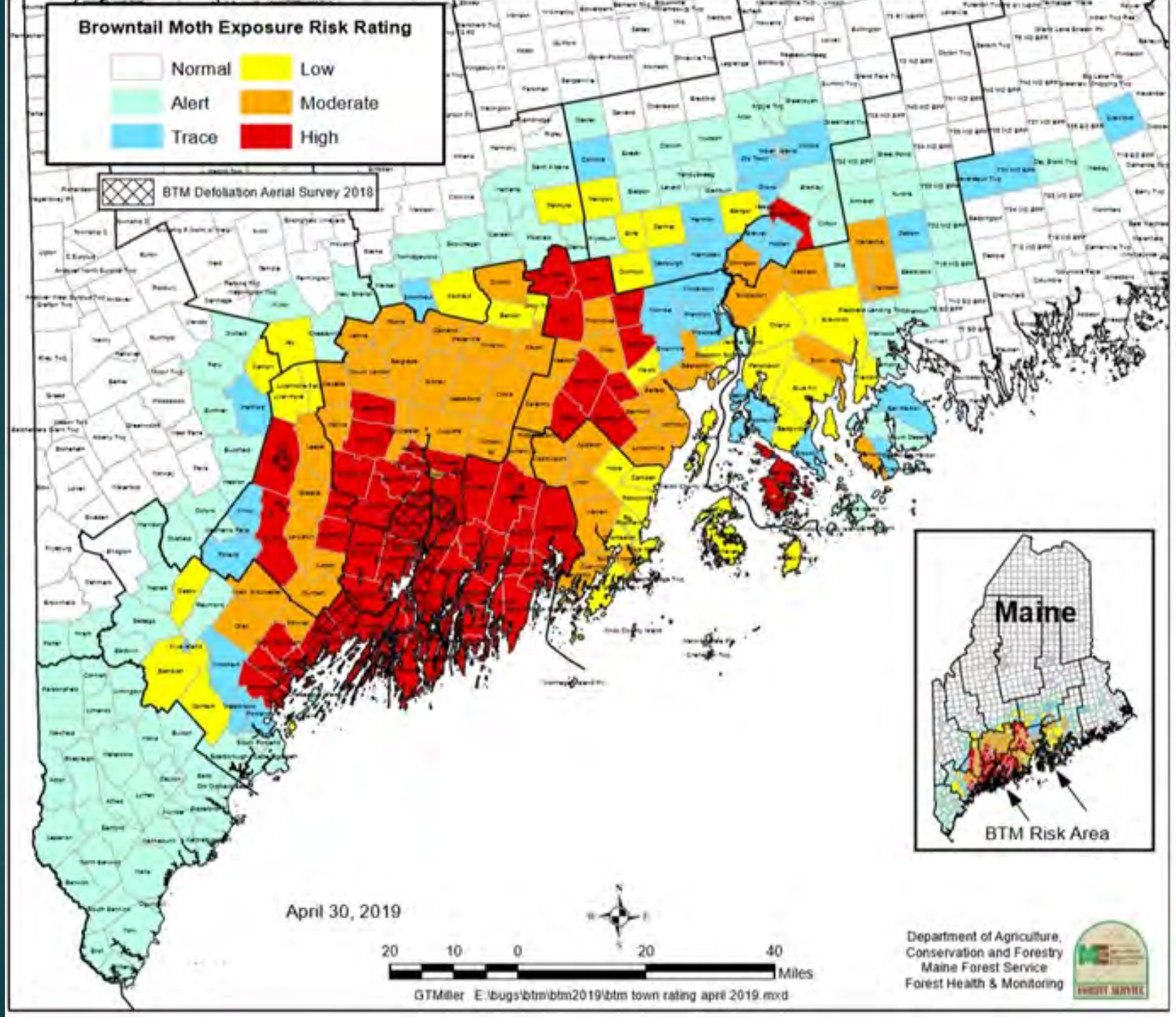
Highest Exposure Risk for Hairs*

Sept-April | April-June | June-July | July-Aug | July-Aug | Aug-Sept

* Toxin in hairs is extremely stable (**3+ yr**); exposure most likely in dry conditions. In infested areas use PPP whenever conducting activities that might stir up hairs.

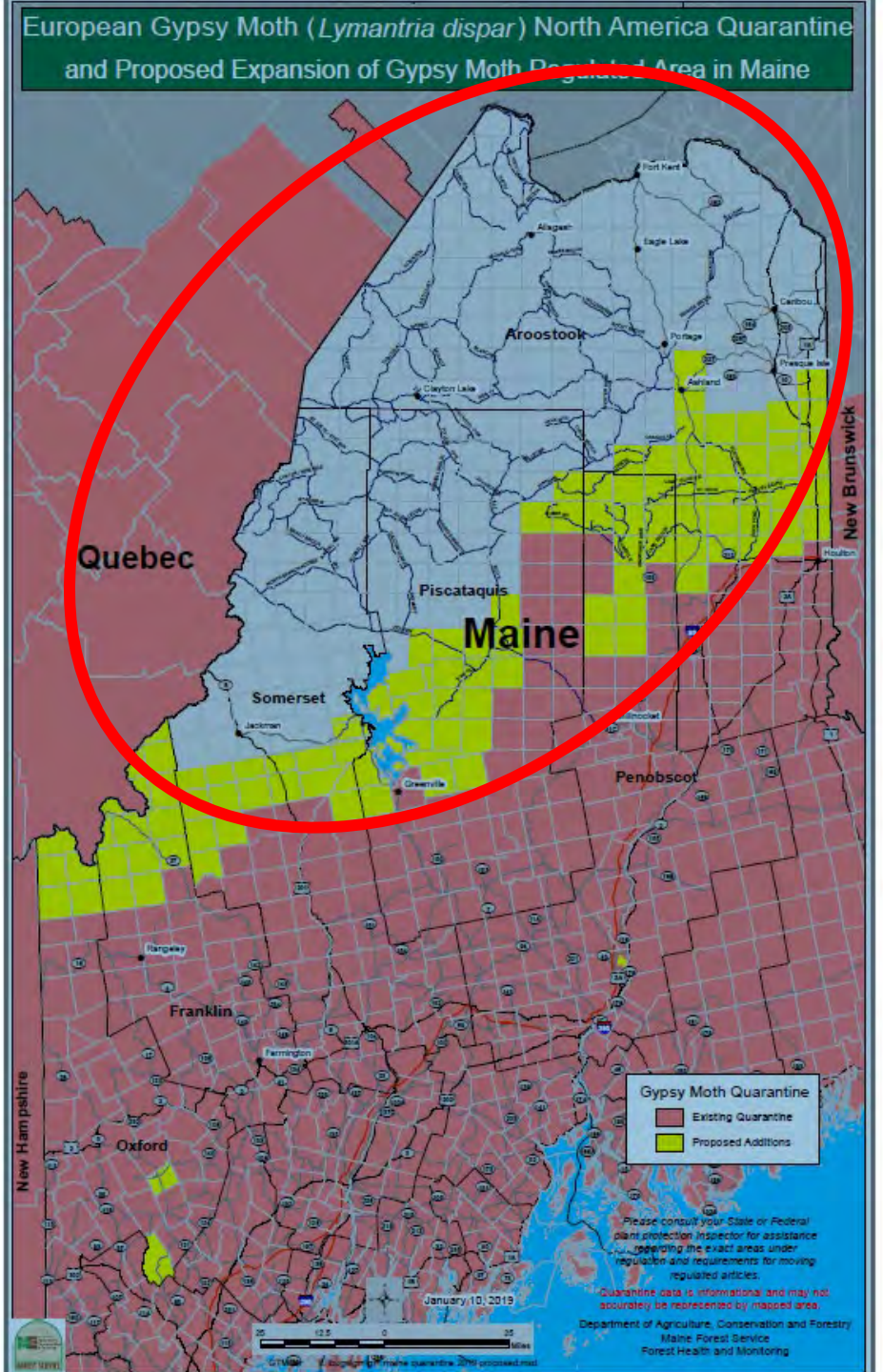
Maine Department of Agriculture, Conservation & Forestry — FOREST SERVICE

Photos by MFS except: Adult: Anne Burton, Egg mass: Bath Division of Forestry


Browntail Moth Exposure Risk Rating
Normal
Low
Alert
Moderate
Trace
High
BTM Defoliation Aerial Survey 2018
Maine
BTM Risk Area
April 30, 2019
20 10 0 20 40
Miles
GTMiller E:\bugs\btm\btm2019\btm town rating april 2019.mxd
Department of Agriculture, Conservation and Forestry
Maine Forest Service
Forest Health & Monitoring

Gypsy Moth

- Intentionally brought over from Europe in 1869
- USFS spends 13 million annually to control it
- Quarantine has now expanded to include all of Maine (new map not yet available)



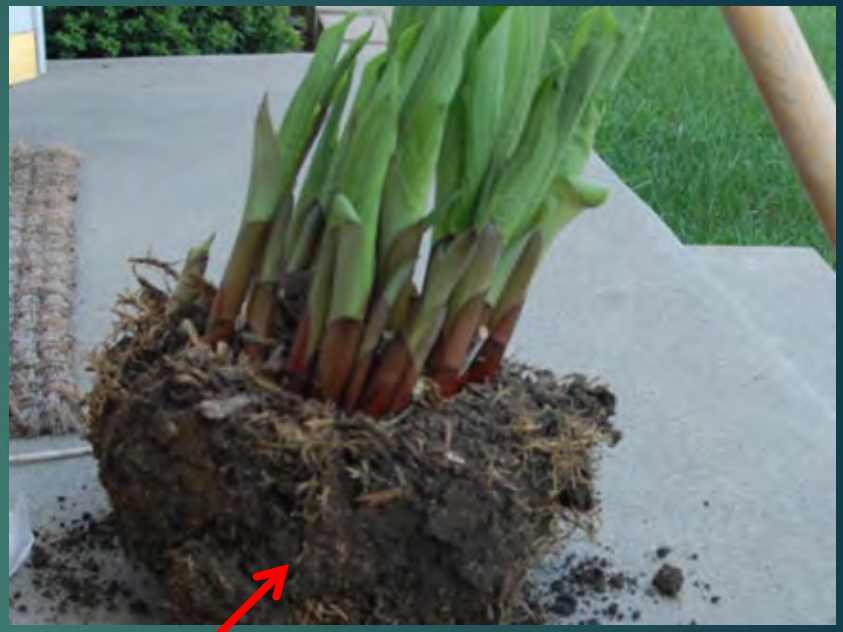
Winter Moth

- Non-native from Europe, brought over in soil
- Found from Kittery – Bar Harbor
- Released *Cyzenis albicans* in Bath ME in May 2019, other towns since 2013
- Flies recovered 2016-2018
- Ongoing efforts to sample for parasitoid

DO NOT MOVE LANDSCAPE MATERIAL

from infested areas as the cocoons of winter moth are in the soil from **June through November.**

OR apple or blueberry



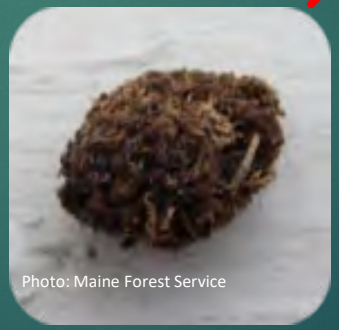
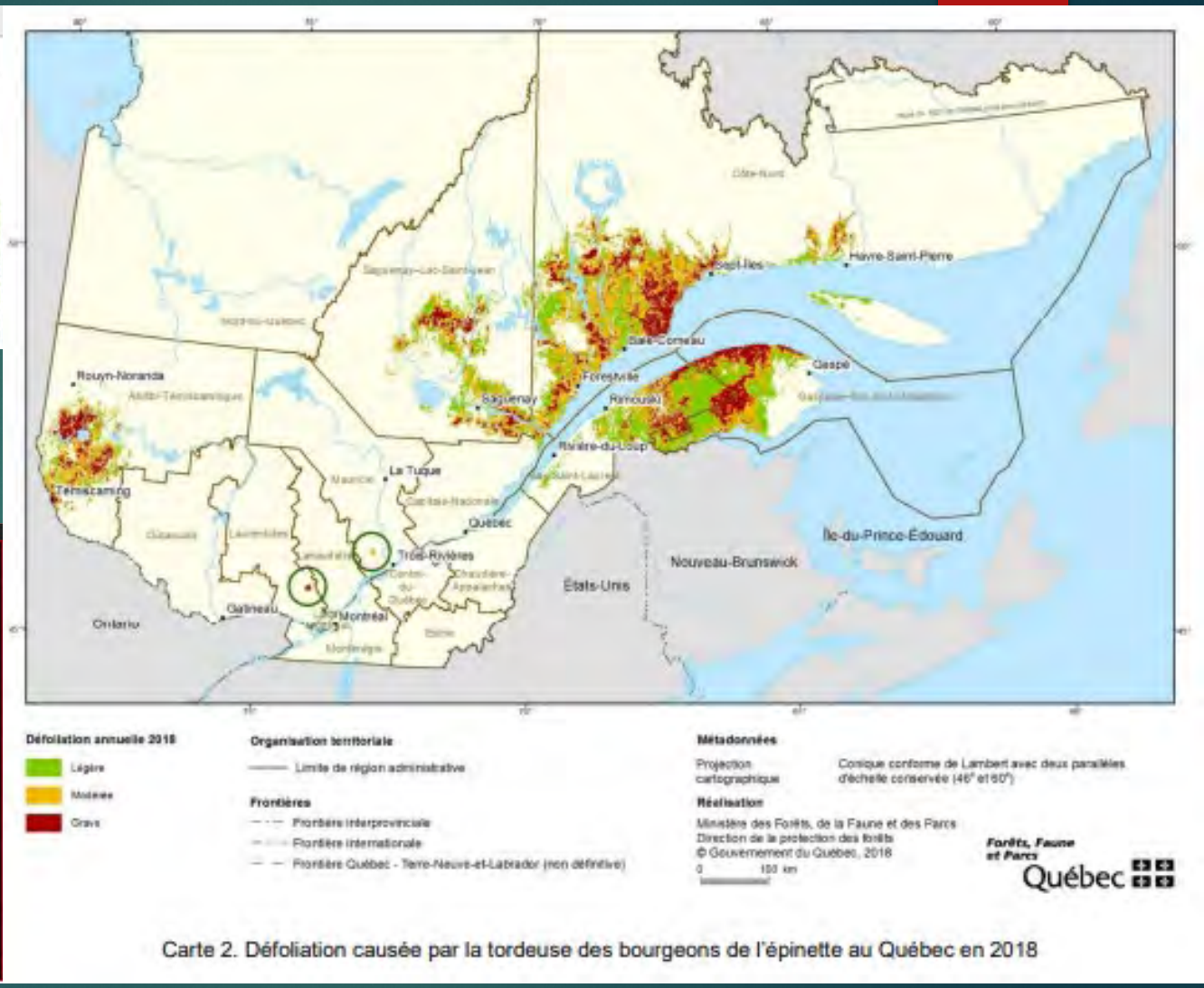


Photo: Maine Forest Service

Approx. 17 million acres of defoliation in Quebec since 2006

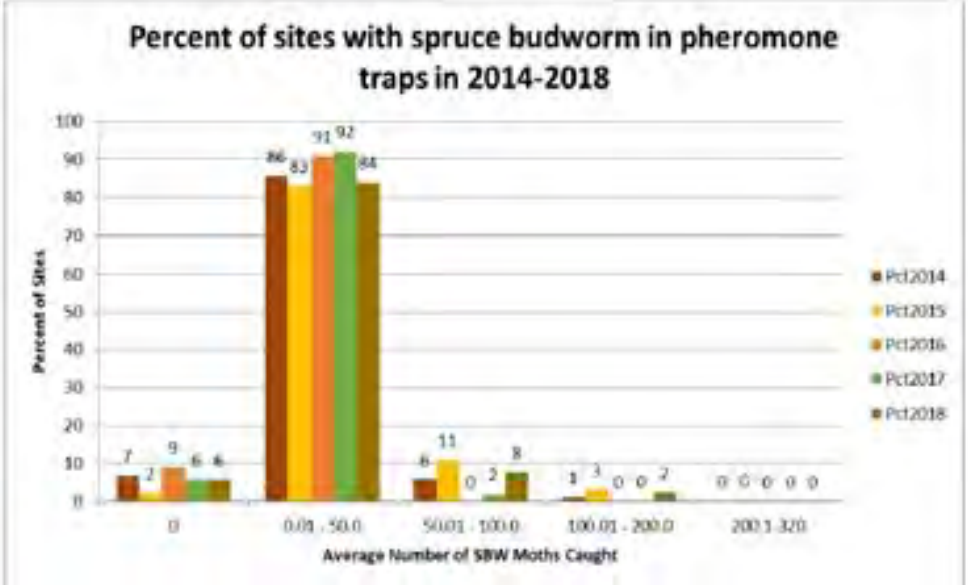


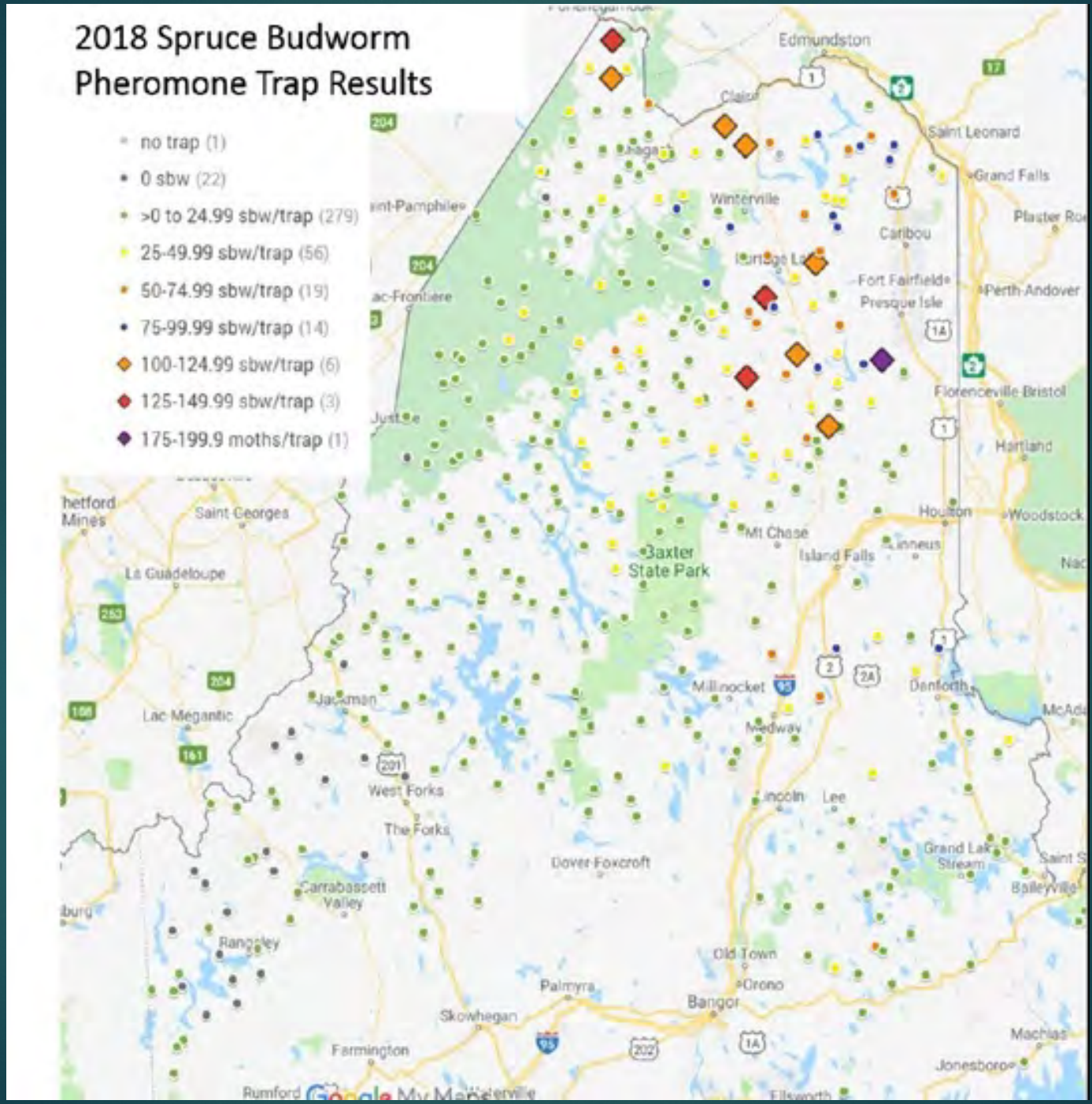
Carte 2. Défoliation causée par la tordeuse des bourgeons de l'épinette au Québec en 2018

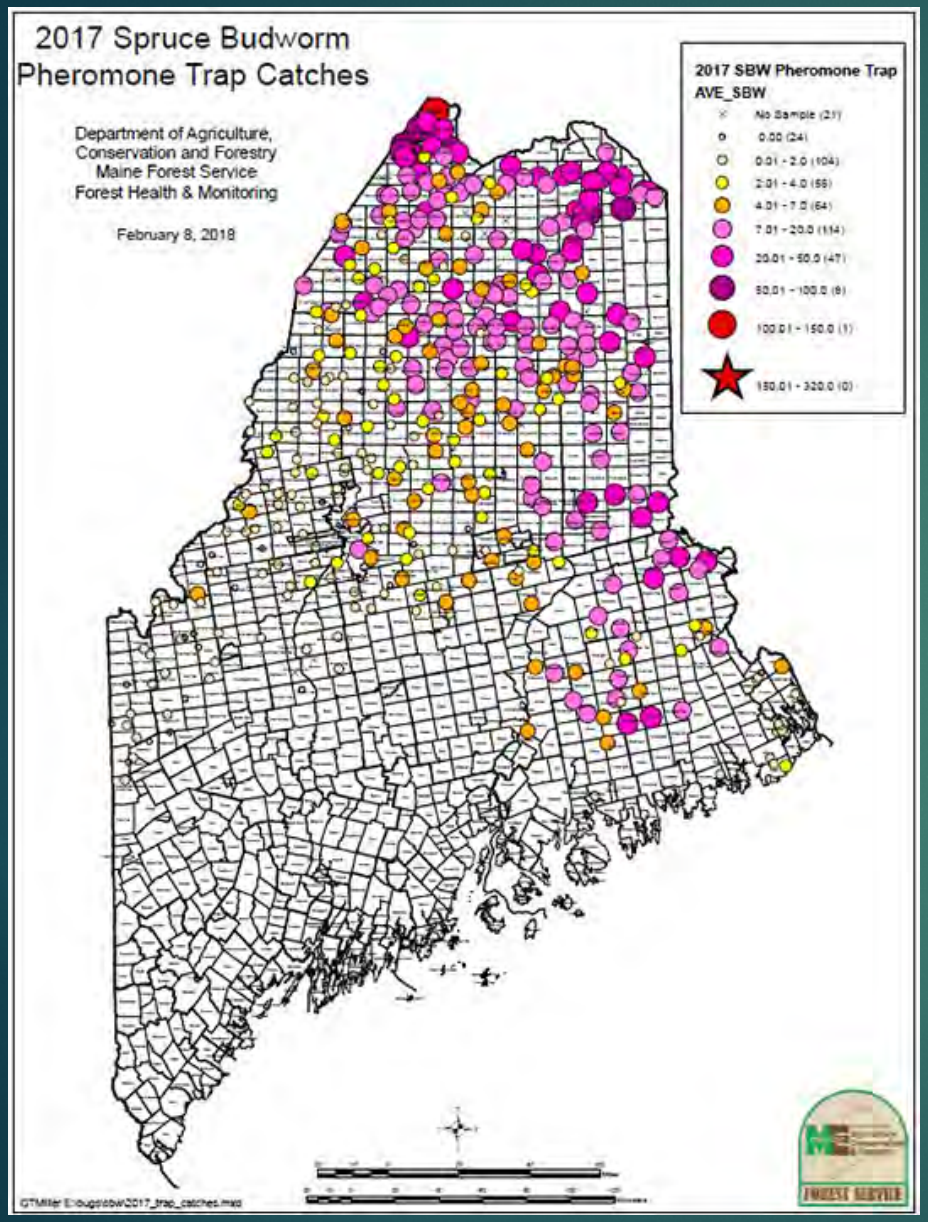
Spruce Budworm

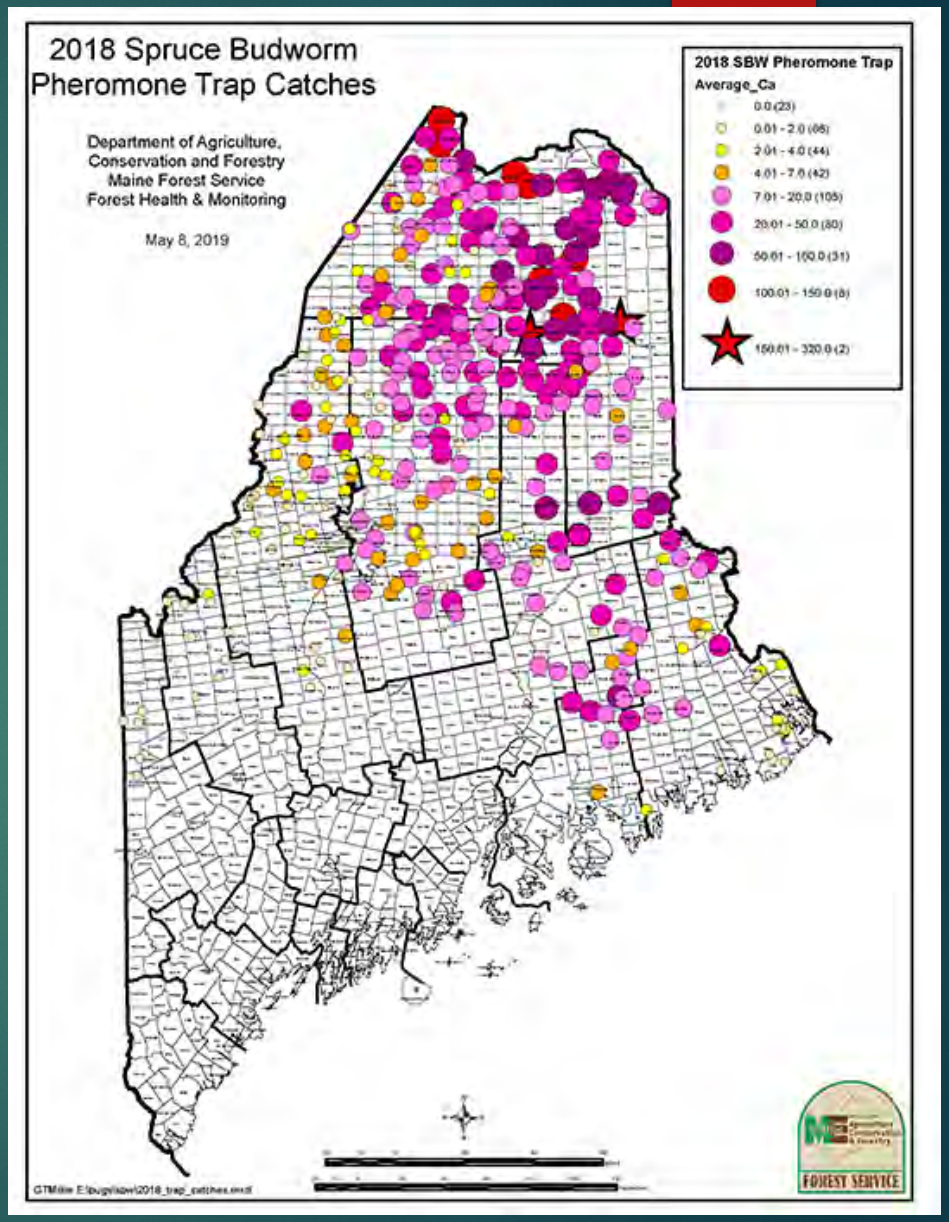
PHEROMONE TRAP SURVEY

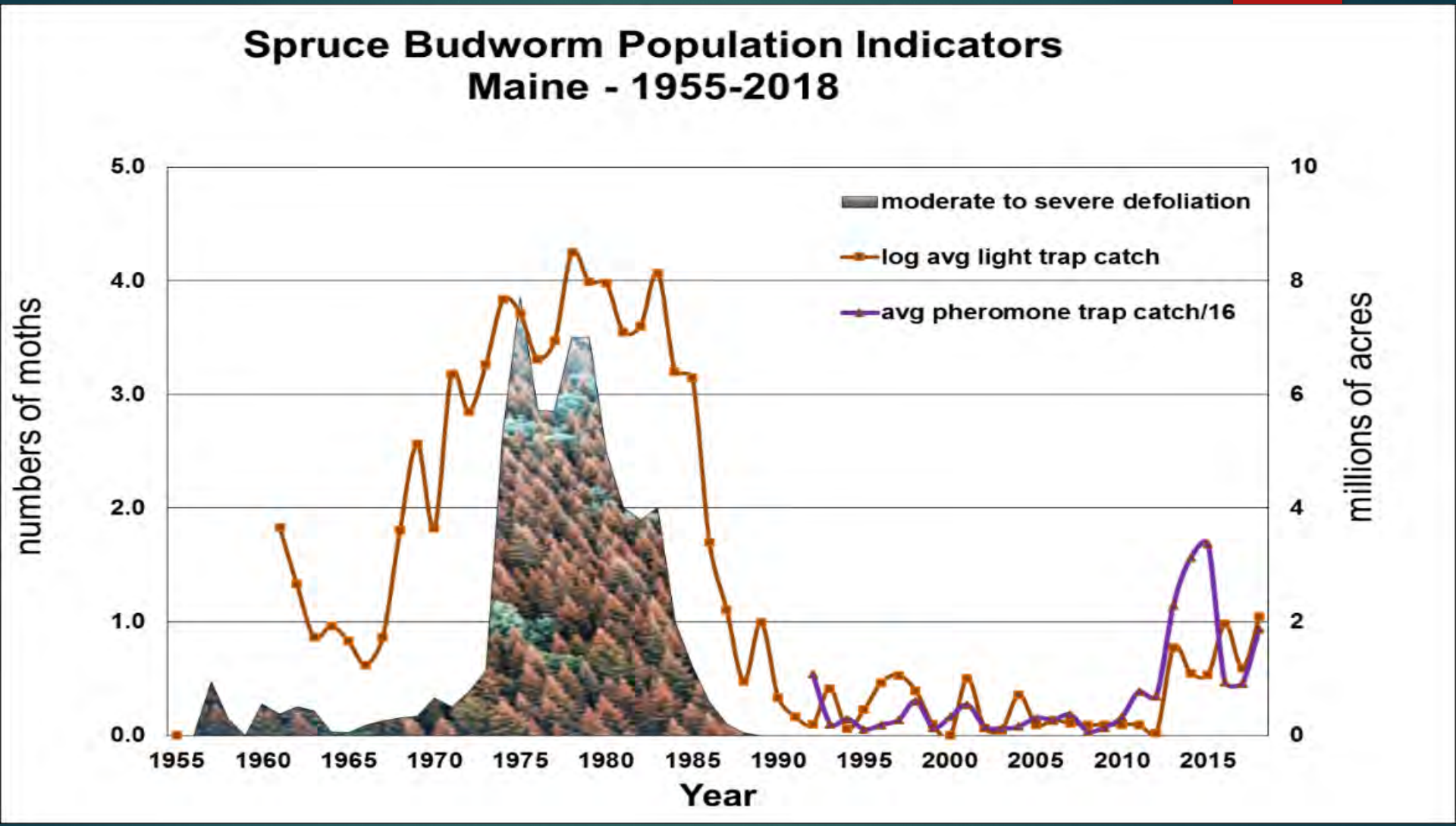
- Average catch up compared to 2017 (from ~10 to ~20)
- Most still <50 moths/trap (357/401)
- 10/401 above 100 moths/trap
  - Diamonds on map
  - Similar areas to higher catches in previous years



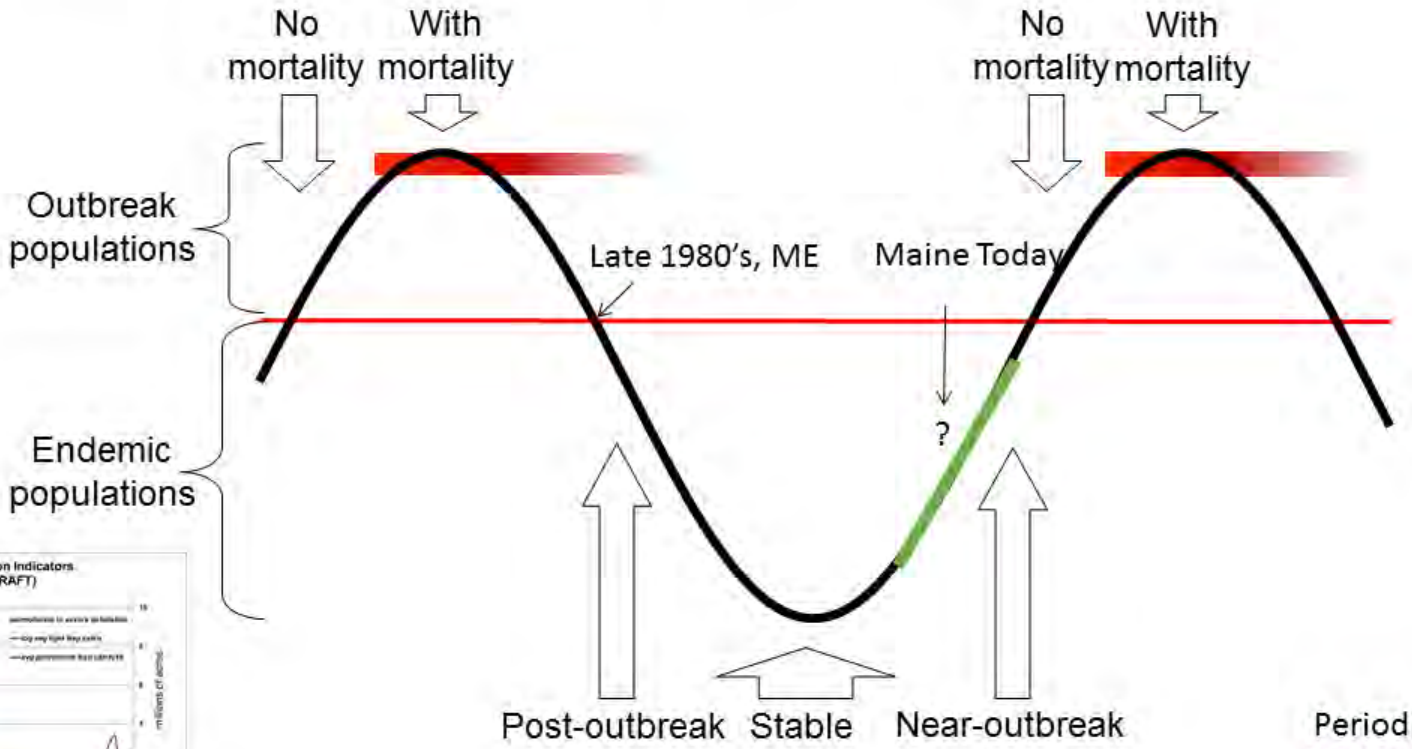

2018 Spruce Budworm
Pheromone Trap Results
no trap (1)
0 sbw (22)
>0 to 24.99 sbw/trap (279)
25-49.99 sbw/trap (56)
50-74.99 sbw/trap (19)
75-99.99 sbw/trap (14)
100-124.99 sbw/trap (6)
125-149.99 sbw/trap (3)
175-199.9 moths/trap (1)
Edmundston
Saint Leonard
Grand Falls
Winterville
Caribou
Fort Fairfield
Presque Isle
Perth-Andover
Florenceville Bristol
Hartland
Houlton
Woodstock
Mt Chase
Island Falls
Baxter State Park
Millinocket
Danforth
Medway
Lincoln
Lee
Grand Lake Stream
Saint Georges
La Guadeloupe
Lac-Megantic
Jackman
West Forks
The Forks
Dover-Foxcroft
Carrabassett Valley
Rangeley
Old Town
Orono
Bangor
Palmyra
Skowhegan
Farmington
Machias
Jonesboro
Rumford

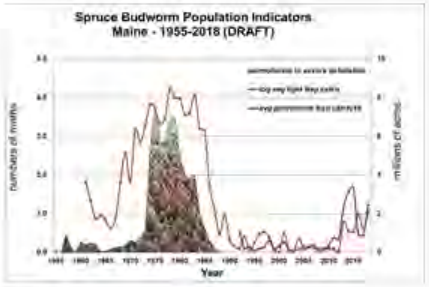

2017 Spruce Budworm
Pheromone Trap Catches
Department of Agriculture,
Conservation and Forestry
Maine Forest Service
Forest Health & Monitoring
February 8, 2018
2017 SBW Pheromone Trap
AVE_SBW
No Sample (21)
0.00 (24)
0.01 - 2.0 (104)
2.01 - 4.0 (55)
4.01 - 7.0 (64)
7.01 - 20.0 (114)
20.01 - 50.0 (47)
50.01 - 100.0 (9)
100.01 - 150.0 (1)
150.01 - 320.0 (0)
FOREST SERVICE


2018 Spruce Budworm
Pheromone Trap Catches
Department of Agriculture,
Conservation and Forestry
Maine Forest Service
Forest Health & Monitoring
May 8, 2019
2018 SBW Pheromone Trap
Average_Ca
0.0 (23)
0.01 - 2.0 (66)
2.01 - 4.0 (44)
4.01 - 7.0 (42)
7.01 - 20.0 (105)
20.01 - 50.0 (80)
50.01 - 100.0 (31)
100.01 - 150.0 (8)
150.01 - 320.0 (2)
FOREST SERVICE


Spruce Budworm Population Indicators
Maine - 1955-2018
numbers of moths
millions of acres
5.0
4.0
3.0
2.0
1.0
0.0
10
8
6
4
2
0
moderate to severe defoliation
log avg light trap catch
avg pheromone trap catch/16
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year

When is Spruce Budworm Coming?





Adapted from: Quebec Ministry of Forests, Parks and Wildlife Graphic

- Populations appear to be building in Maine
- Defoliation remained undetectable during 2018 aerial survey

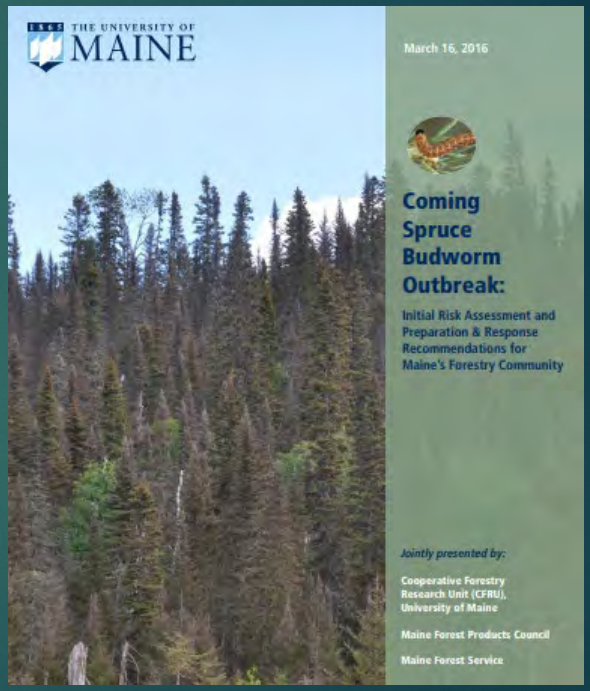
Spruce Budworm Task Force in Maine

sprucebudwormmaine.org

@SpruceBudwormMaine on Facebook

Maine Forest Service

maineforestservice.gov



Hemlock Woolly Adelgid

- Aphid-like
- Invasive Species from Asia
- Kills tree through feeding over a period of years

HWA Biocontrol

Sasajiscymnus tsugae (St)

St, a lady beetle (Coccinellidae), is an important predator of HWA in Japan. Releases of St in Maine against HWA began in 2004. It has since become established at many sites. Unlike some other lady beetles, this insect does not invade homes in the winter.

Color: Black
Shape: Oval
Size: 1/16th inch
Origin: Japan

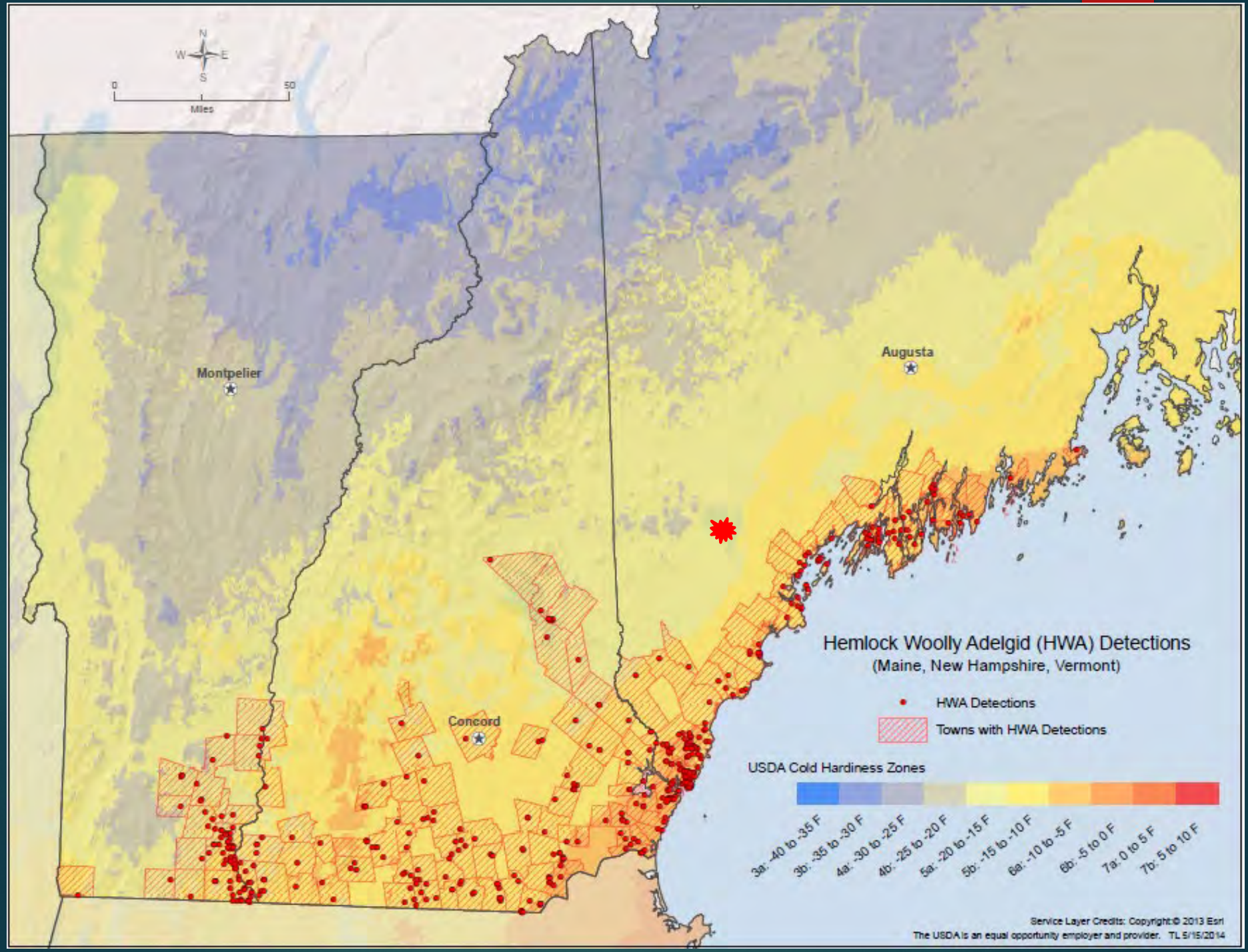
Laricobius osakensis (Lo)

Lo is a tooth-necked fungus beetle (Derodontidae). It is an important predator of HWA in Japan. This species was first released in Maine in 2016.

Color: Black
Shape: Oval
Size: 1/10th inch
Origin: Japan

Predatory Beetles:

- One commercial vendor (~2.50 each) for St -- costly
- Long horizon
- Uncertain results
- Not compatible with insecticide-intensive residential areas


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

Questions?

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(207) 287-3244

Michael.Parisio@maine.gov
(207) 287-2094

Colleen.Teerling@maine.gov
(207) 287-3096

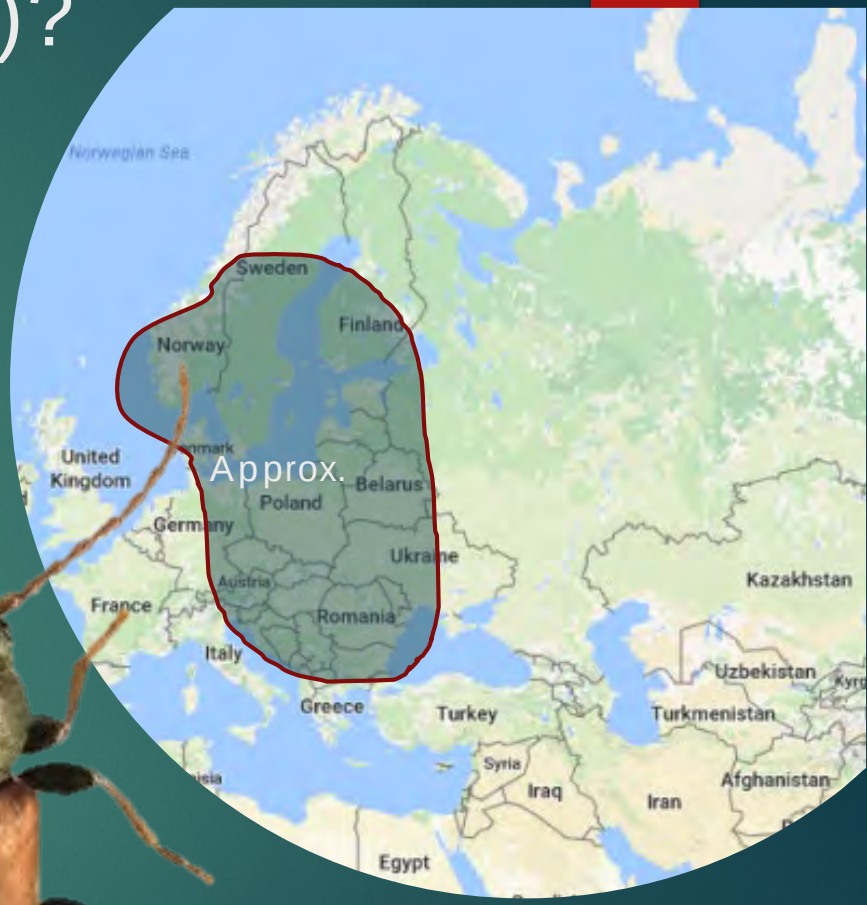
Invasives not yet in Maine:

Thinning crowns

Not EAB: dead ends, Y-forks

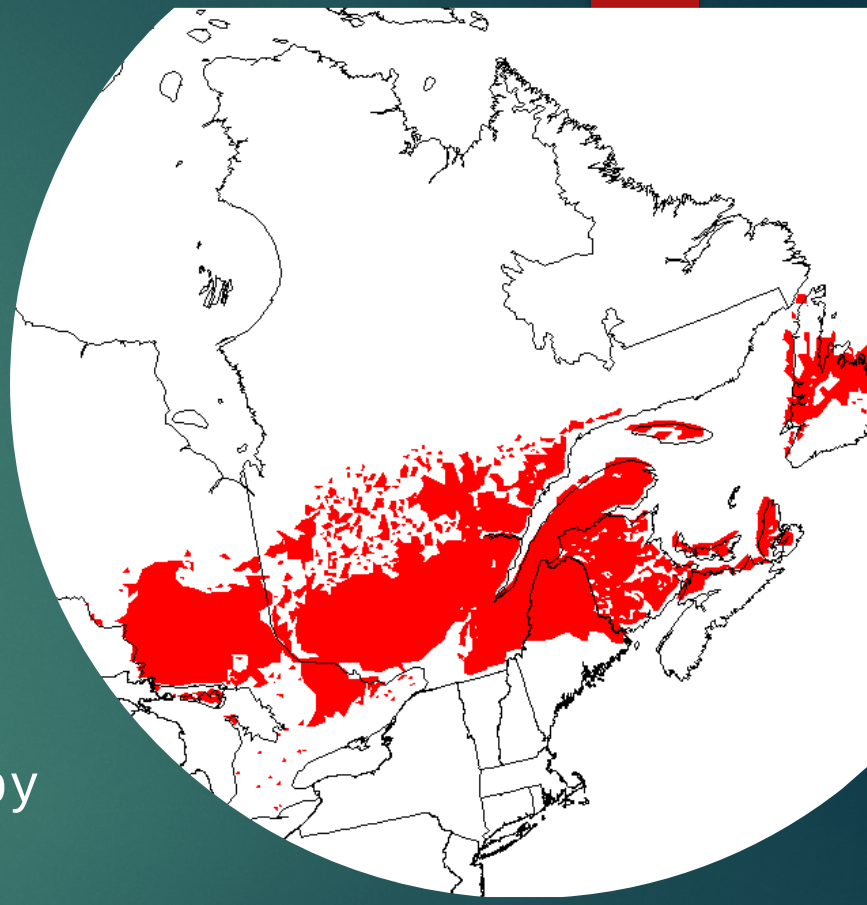
What is Brown Spruce Longhorned Beetle (BSLB)?

- Native to northern and central Europe and western Siberia
- Feeds on stressed, dying and <u>healthy</u> spruce



How Serious a threat is BSLB?

- Has not spread as quickly as some
- Does spread in camp firewood
- May have a strong preference for stressed trees
- May thrive in wake of stress caused by native defoliators (eg sprucebudworm)
- Will tolerate Maine's winter climate well



1975 Spruce Budworm Defoliation Eastern US & Canada

D.W. Williams & R.A. Birdsey, Richard . 2003. USDA FS Gen. Tech. Rep. NE-308

Where in North America is BSLB found?

Beech leaf mining weevil (*Orchestes fagi*)

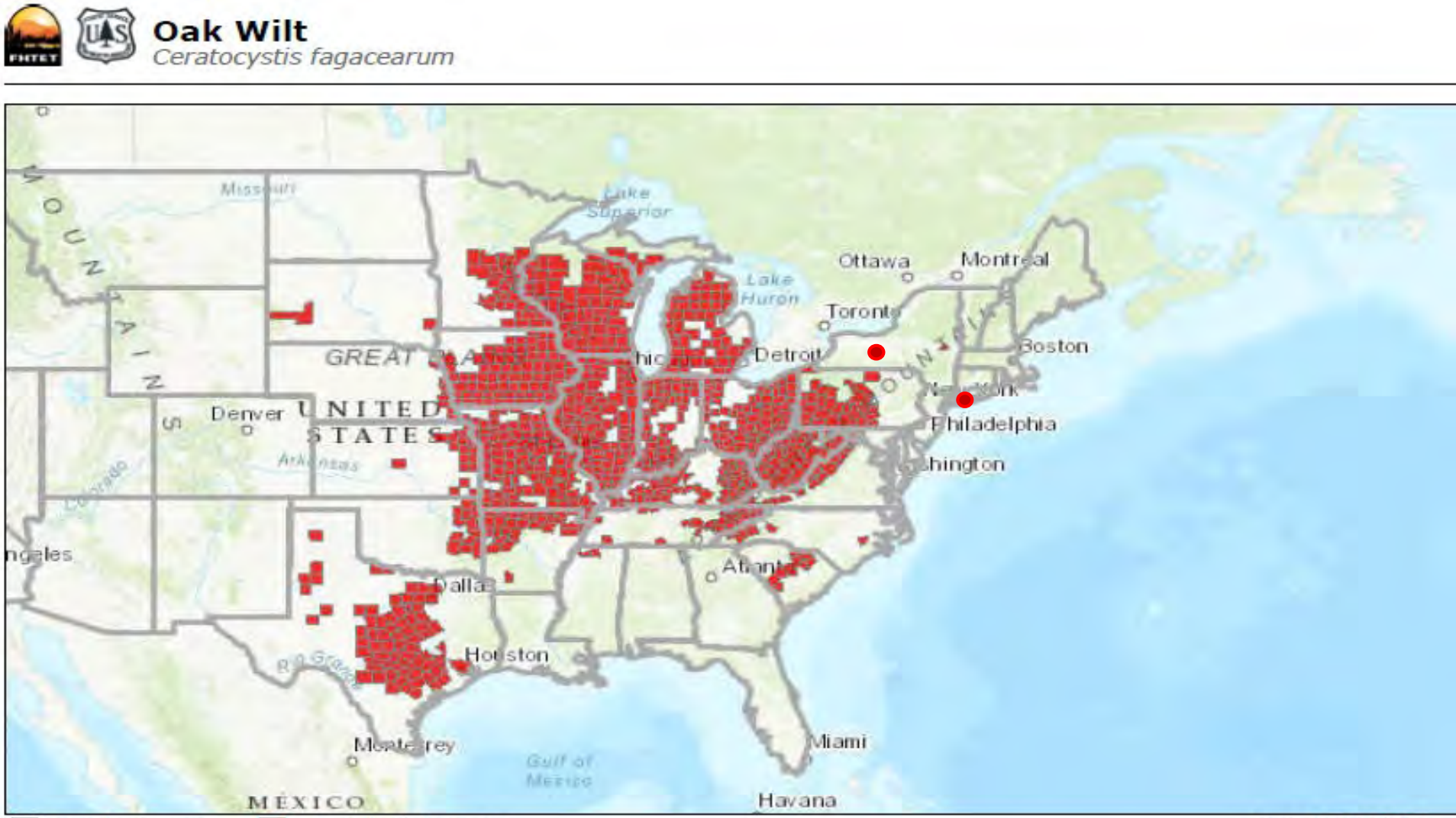
- Native to Europe
- 2012 found in Nova Scotia Sydney and Halifax
- Attacks American and European beech causing mortality

Image: Siga/Wikimedia Commons

Oak Wilt

- Vascular Wilt
- Vectored by beetles; sprea by root grafts
- Potential movement in logs/firewood (sites in NY strongly suggest firewood origin)
- Primary Cue: Significant Early Leaf Drop on Oak (July = prime time)

Oak Wilt



Forest Health Protection (FHP) and its partners strive to maintain an accurate Aerial Detection Survey (ADS) Dataset, but due to the conditions under which the data are collected, FHP and its partners shall not be held responsible for missing or inaccurate data. ADS are not intended to replace more specific information. An accuracy assessment has not been done for this dataset; however, ground checks are completed in accordance with local and national guidelines. Maps and data may be updated without notice. Please cite "USDA Forest Service, Forest Health Protection and its partners" as the source of this data in maps and publications.