

Vermont Forest Health Trends

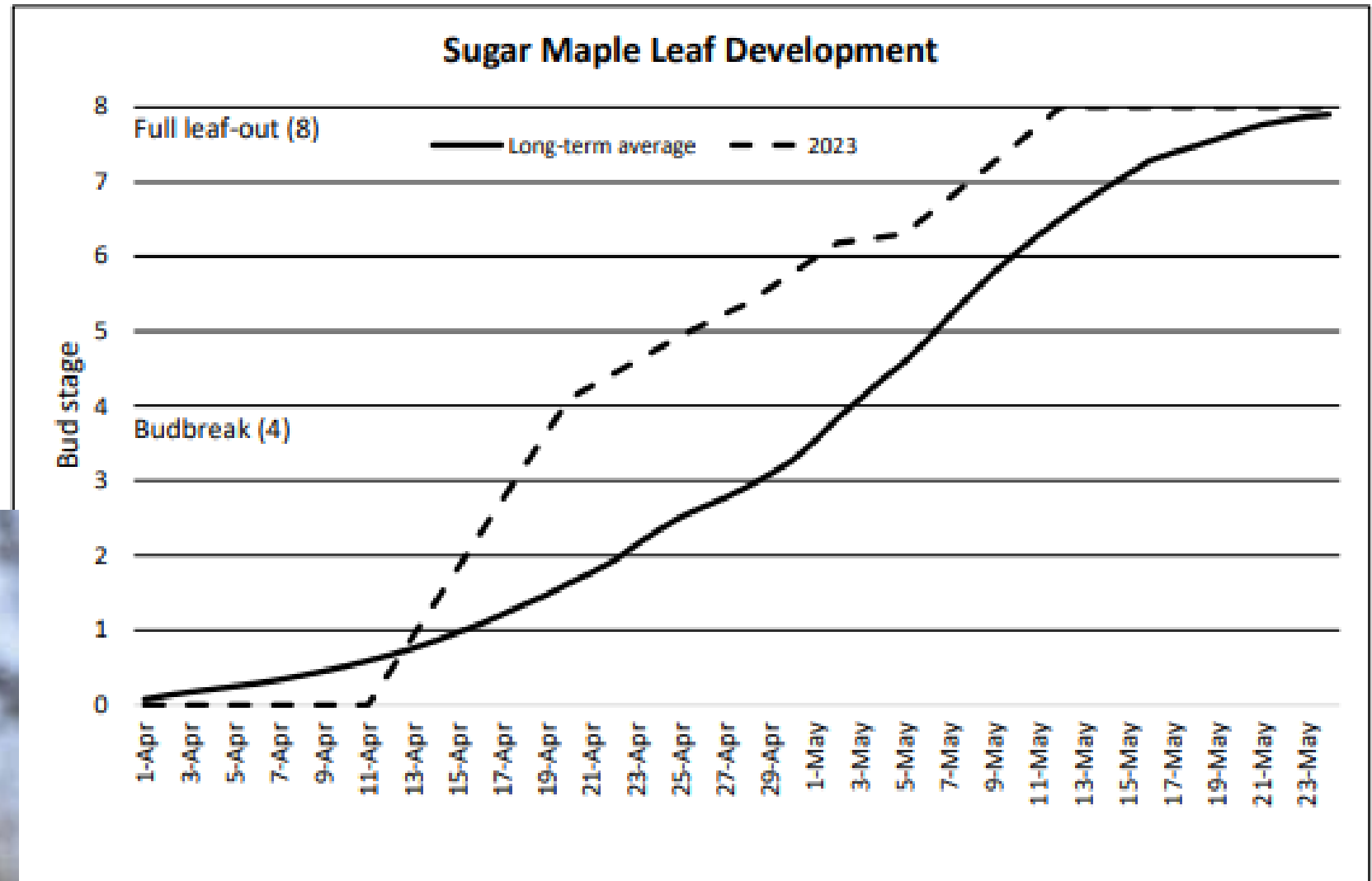
Savannah L. Ferreira

Forest Health Specialist

Department of Forests, Parks & Recreation

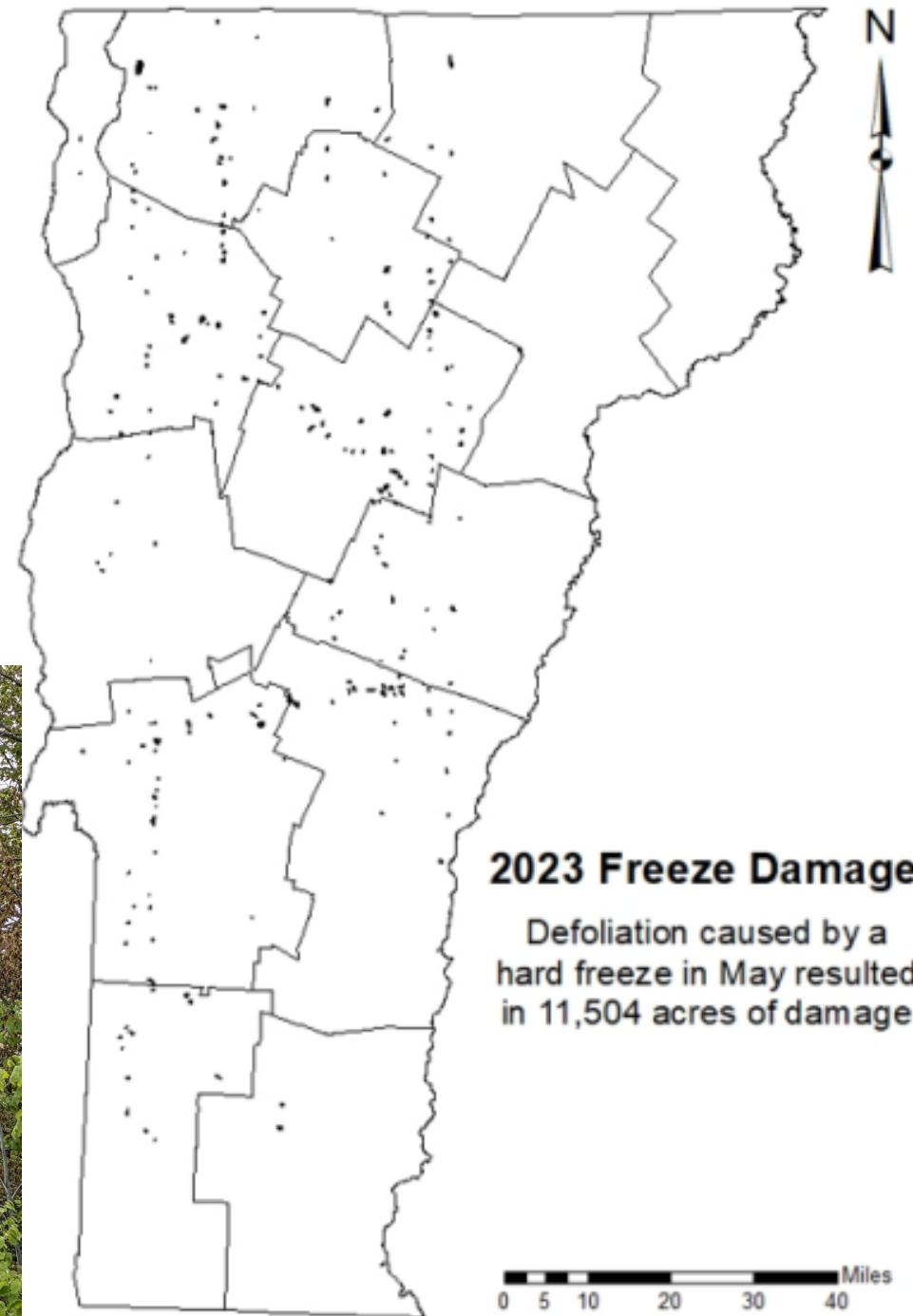
2023 Phenology

- Budbreak
 - April 20th
 - 2 weeks early
- Leaf-out
 - May 12th
 - 6 days early



2023 Freeze Damage

- When: May 17-18, 2023
- Hosts: Beech, oak, apples and other hardwoods
- Damage: leaf necrosis and leaf drop



July Flooding

- When: July 10-11, 2023
- Hosts: many
- Damage: uprooting, mechanical damage, blowdown, standing water



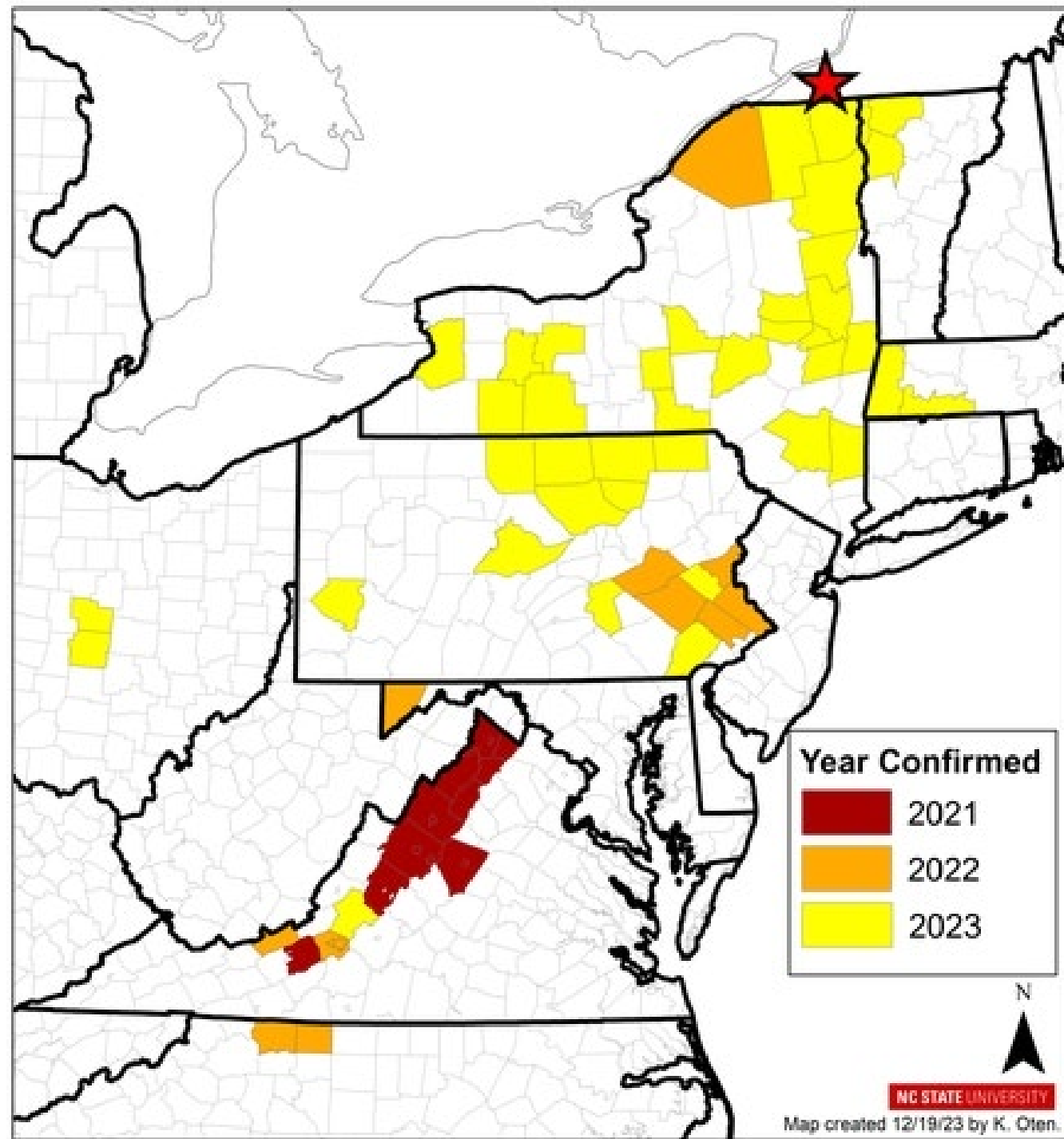
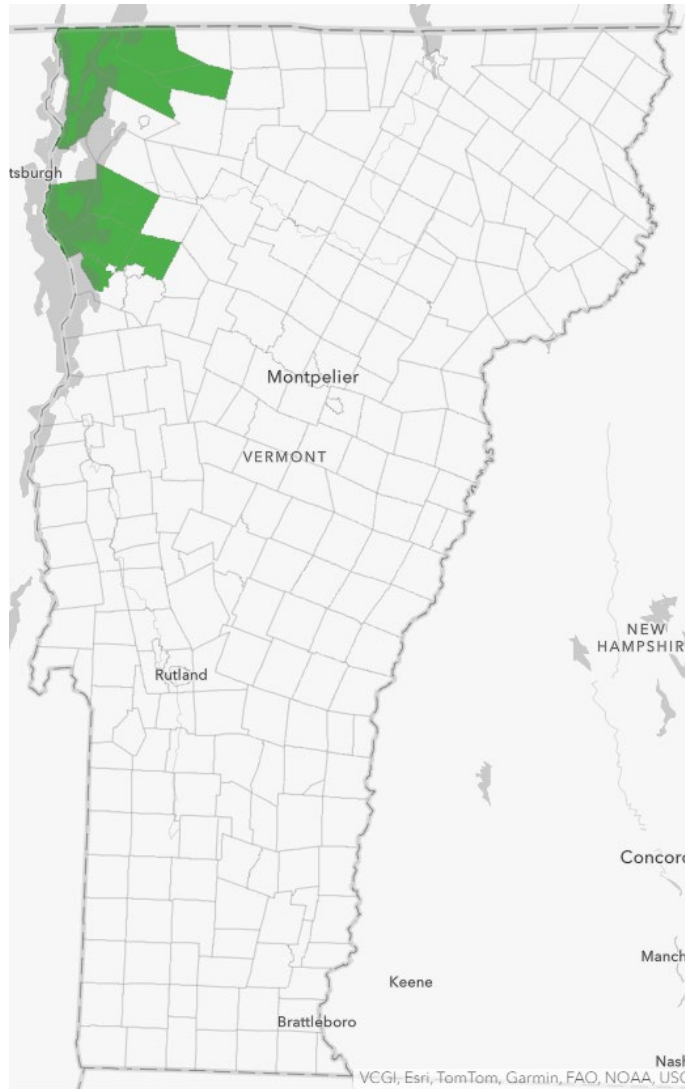
Elm Zigzag Sawfly

Aproceros leucopoda

- Origin: East Asia – **Invasive**
 - 2021 Canada
- Hosts: all elms
- Damage: defoliator
- Outbreak: multiple generations a year- strong fliers
- 2023 Observations: defoliation detected
- Control: *Beauvaria* and dinotefuran undergoing research



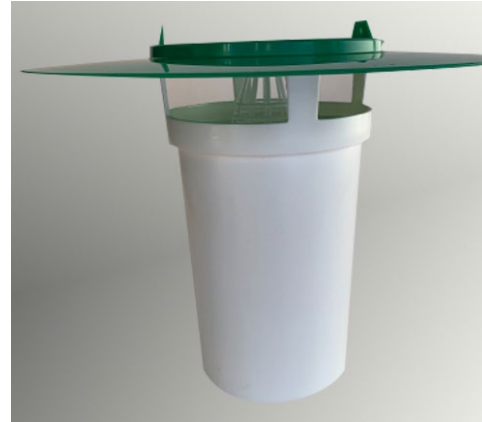
Distribution



Forest Tent Caterpillar

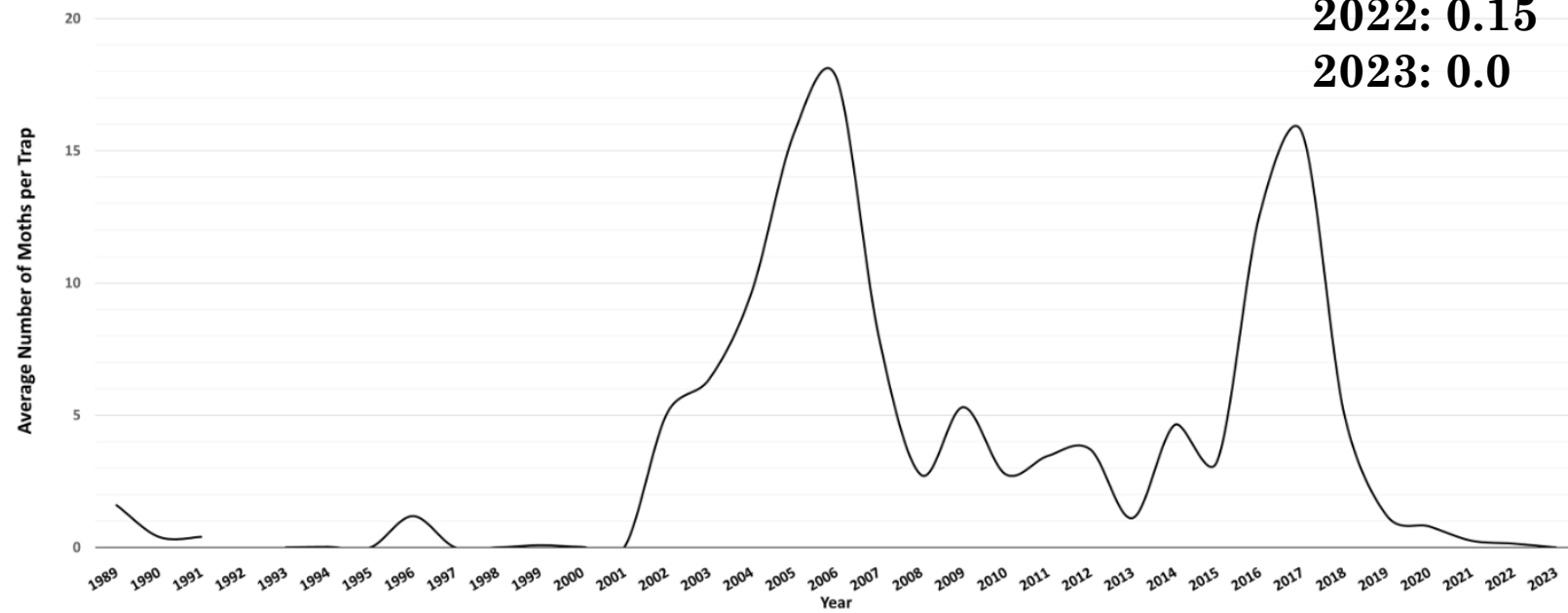
Malacosoma disstria

- Origin: Native
- Hosts: sugar maple, ash, other hardwoods
- Damage: defoliator
- Outbreaks: 2-6 years; approx. 6–16-year outbreak cycle
- 2023 Observations: defoliation was not detected
- Control: natural factors (starvation, disease, parasitism and predation), chemical (*Bacillus thuringiensis* (*Bt*))



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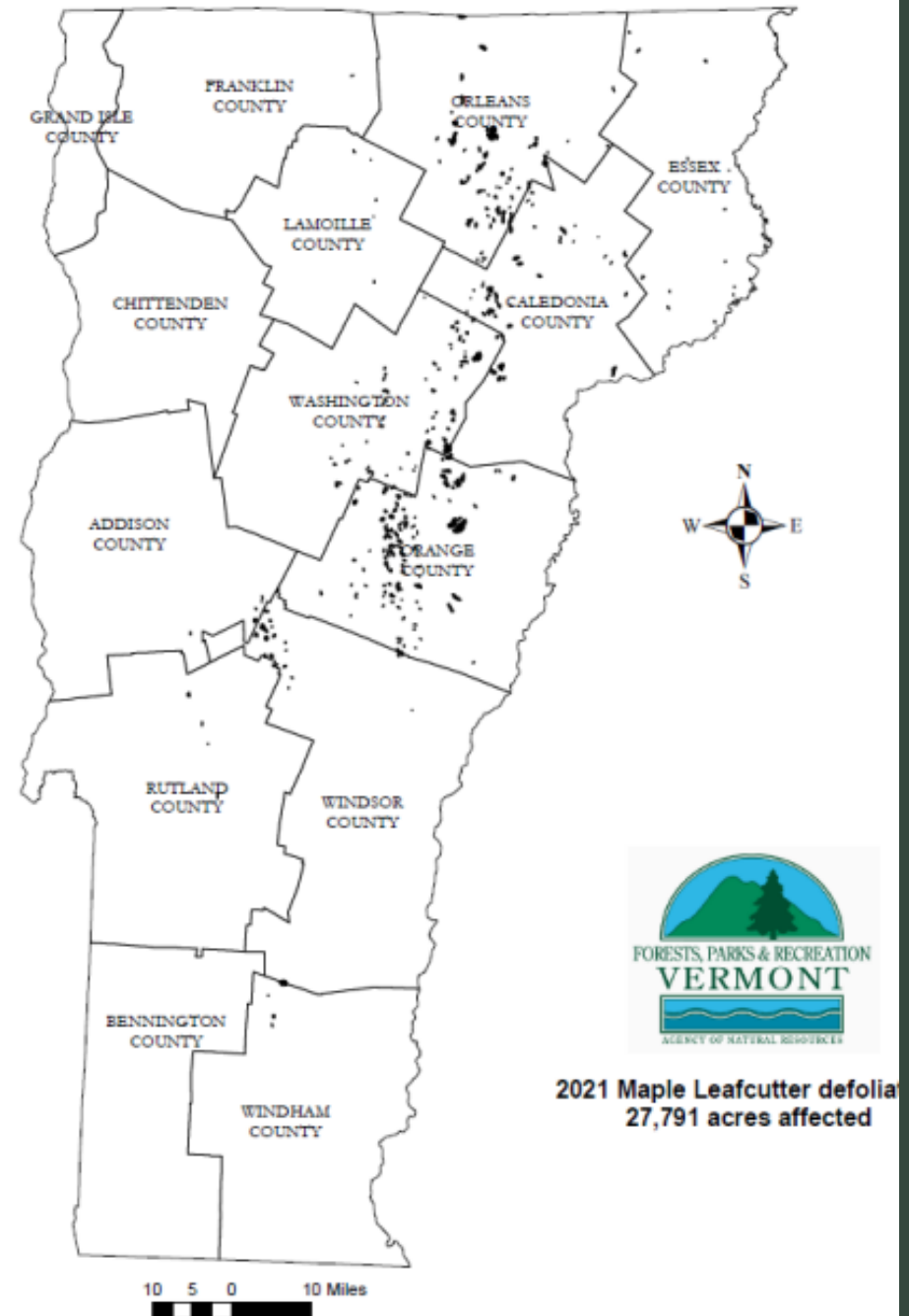
Average FTC Moths Captured



Maple Leafcutter

Paraclemensia acerifoliella

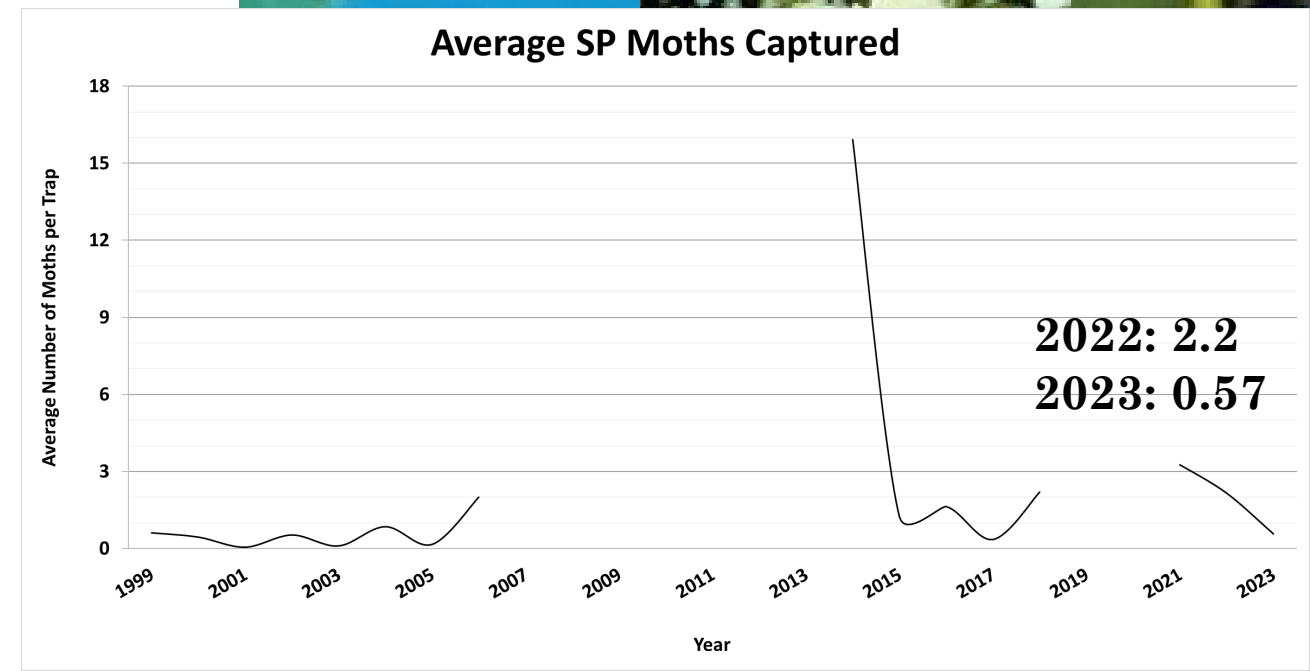
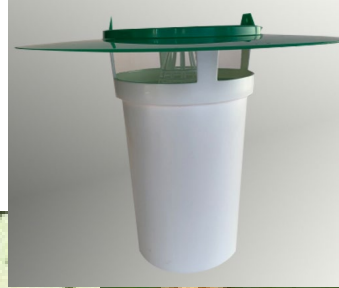
- Origin: Native
- Hosts: Sugar maple, red maple, beech and birch
- Damage: late season defoliator
- 2023 Observations: 0 acres detected



Saddled Prominent

Heterocampa guttivitta

- Origin: Native
- Hosts: Sugar maple, American beech, birches, maples, and other hardwoods
- Damage: defoliator
- Outbreaks: 1-3 years; not a recurring cycle
- 2023 Observations: defoliation was not detected
- Control: natural factors (starvation, disease, parasitism and predation), chemical (*Bacillus thuringiensis (Bt)*)

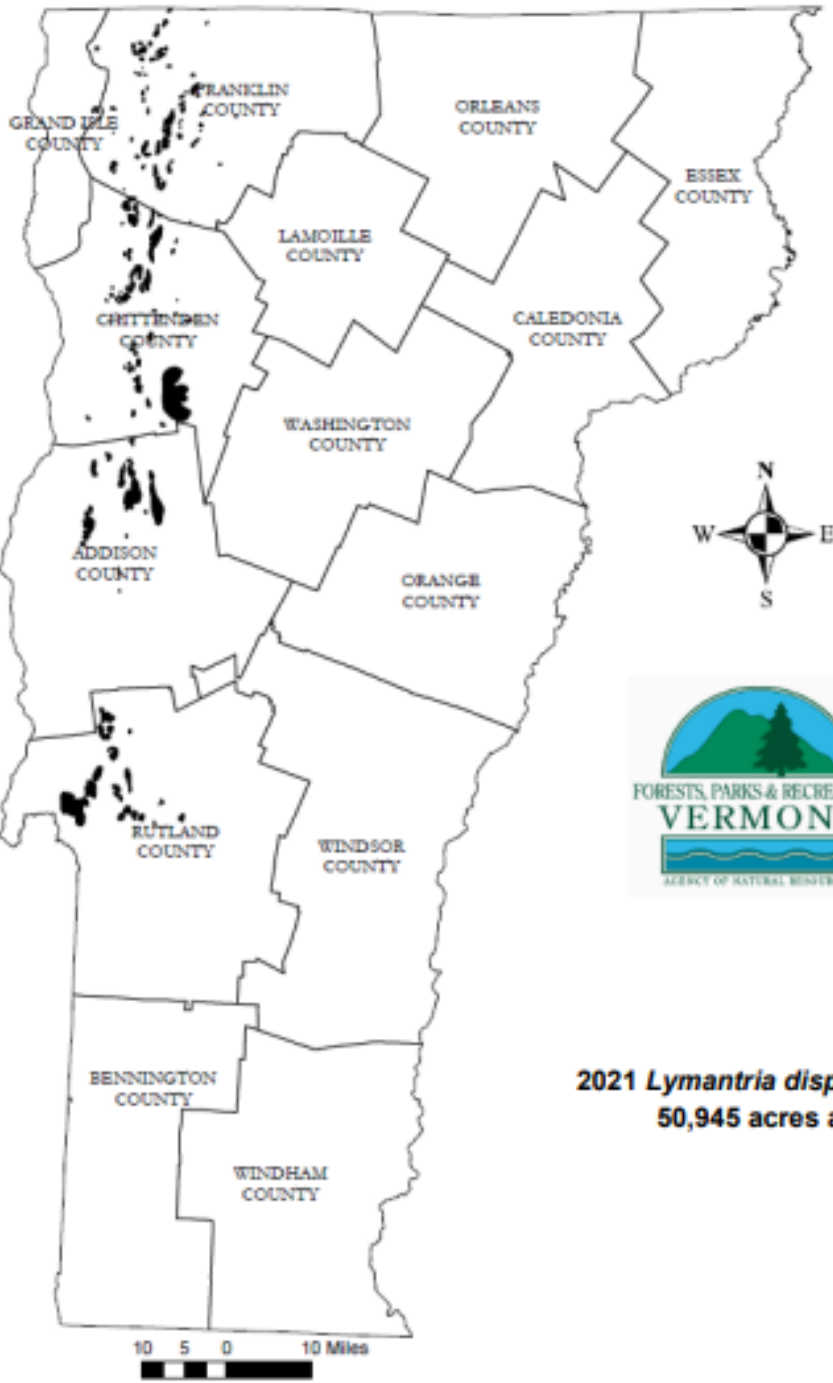


Spongy Moth

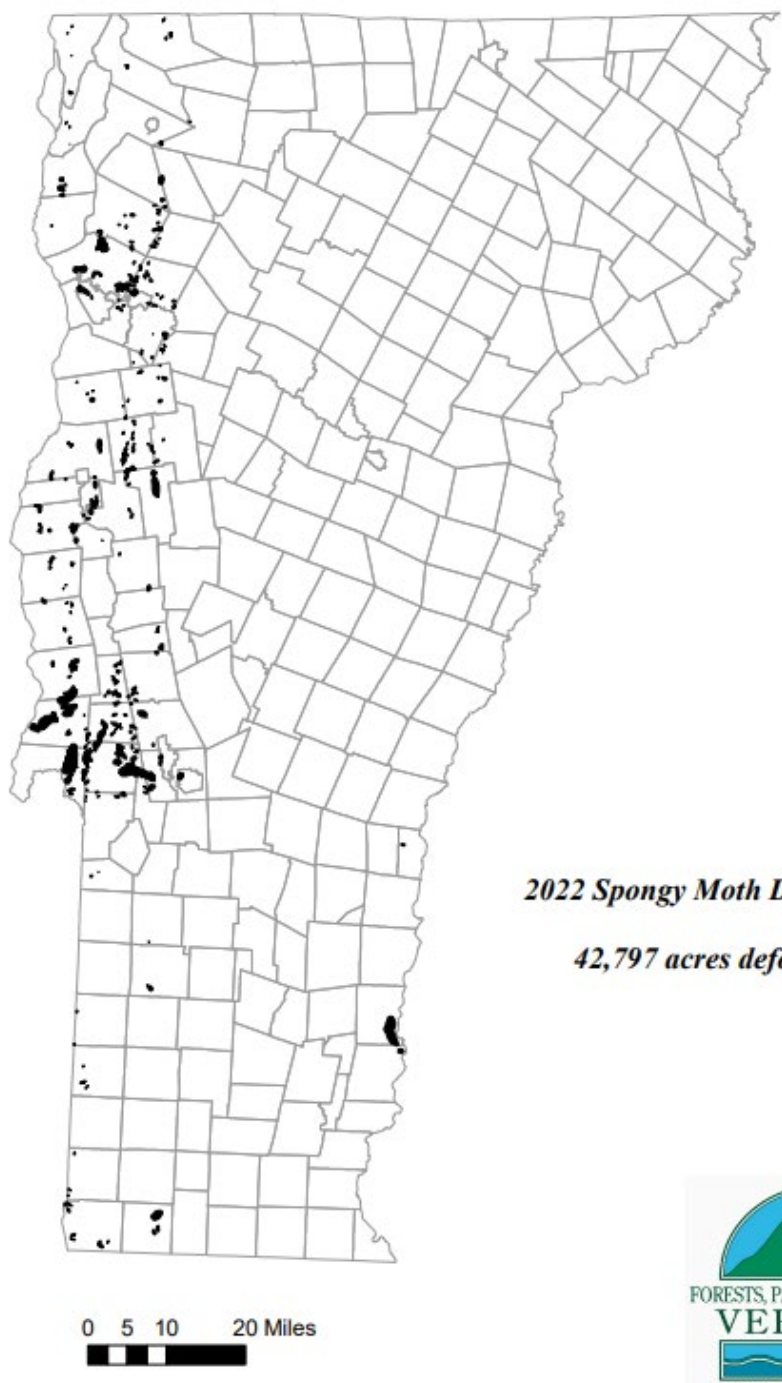
Lymantria dispar dispar

- Origin: Eurasia - **Invasive**
- Hosts: Many hardwood species, softwood species when populations are high
- Damage: defoliator
- Outbreaks: 3-5 years; approx. 10-15 year cycle
- 2023 Observations: 93 acres of defoliation
- Control: Biocontrol NPV, *E. maimaiga*, chemical (*Bacillus thuringiensis* (*Bt*))





**2021 *Lymantria dispar* defoliation
50,945 acres affected**



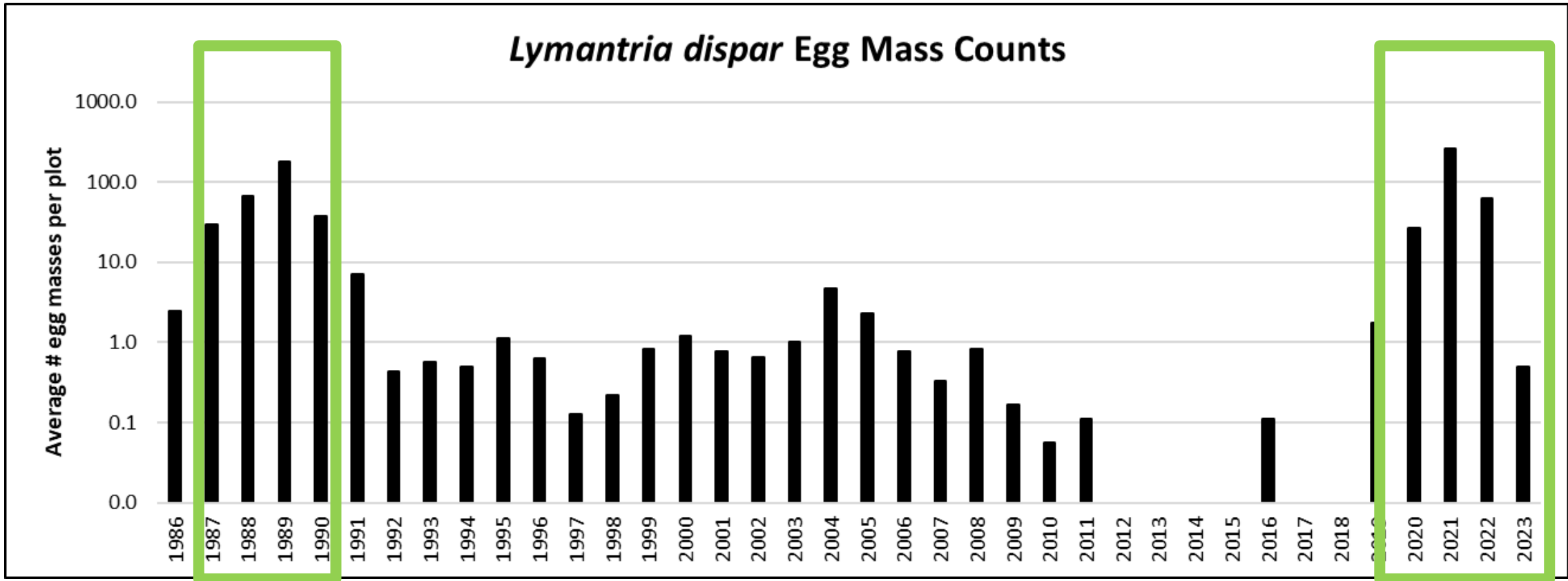
**2022 *Spongy Moth* Defoliation
42,797 acres defoliated**



2023
98 acres
defoliated

1987: 29.4
1988: 67.8
1989: 183.1
1990: 37.4

2020: 26.3
2021: 261.7
2022: 62.1
2023: 0.5



Lymantria dispar Egg Mass Counts

275.0
250.0
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0



2016 2017 2018 2019 2020 2021 2022 2023

2021: 261.7

2022: 62.1

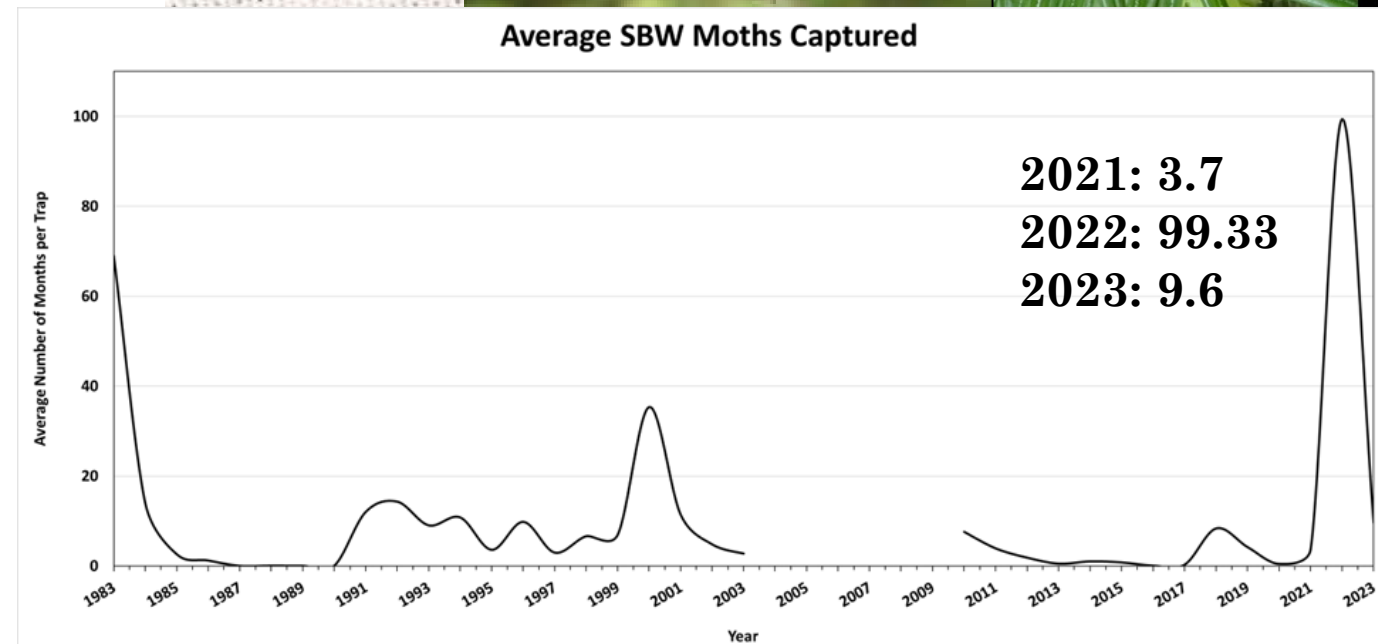
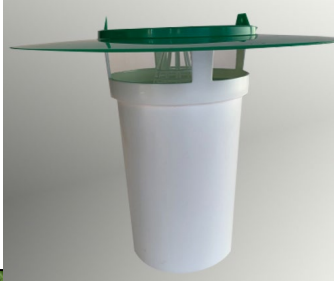
2023: 0.5



Spruce Budworm

Choristoneura fumiferana

- Origin: Native
- Hosts: balsam fir, spruce, larch, pine, hemlock
- Damage: defoliator
- Outbreaks: 10 years; approx. 30-50 year cycle
- 2023 Observations: defoliation was not detected
- Control: natural factors (starvation, disease, parasitism and predation), chemical (*Bacillus thuringiensis* (*Bt*))

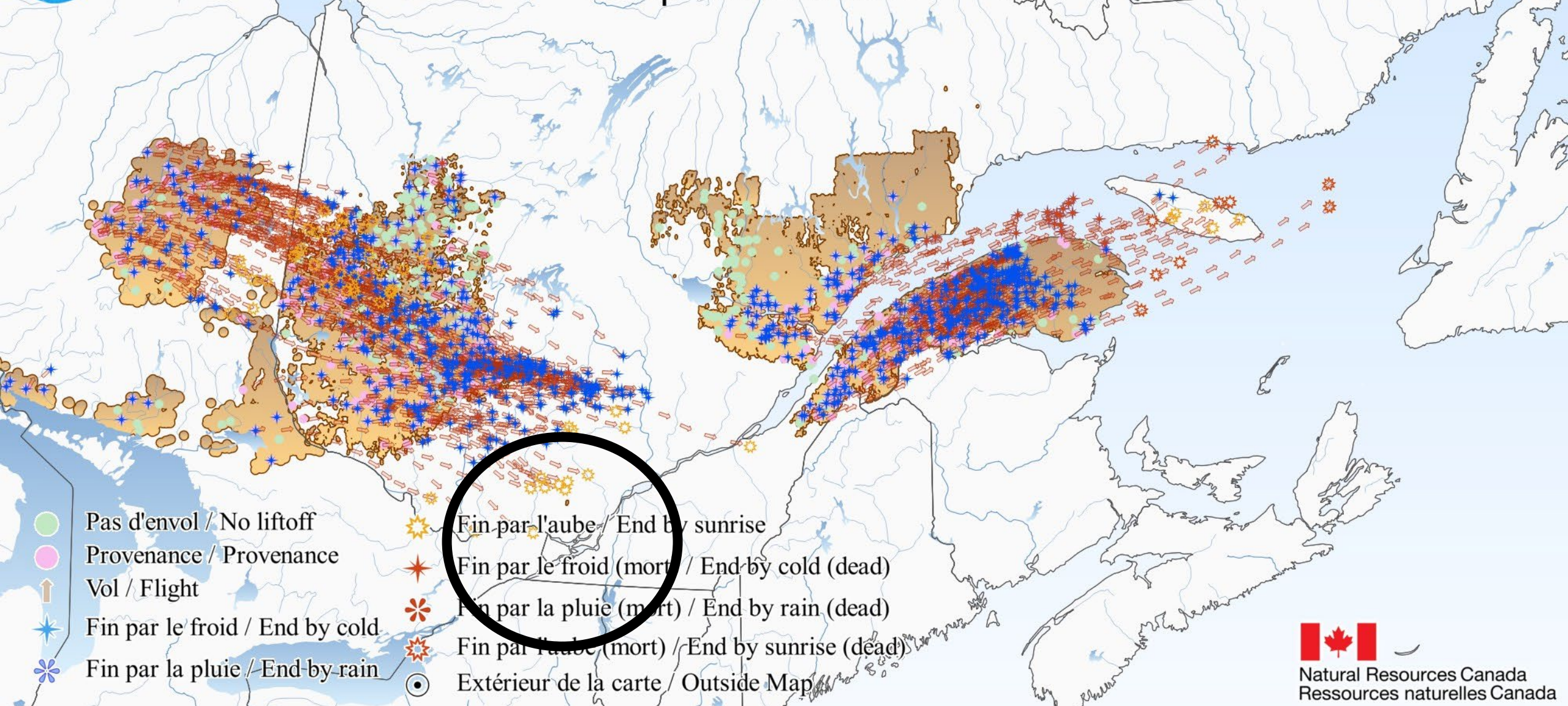




BioSIM

Tordeuse des bourgeons de l'épinette Spruce Budworm

2022-07-16



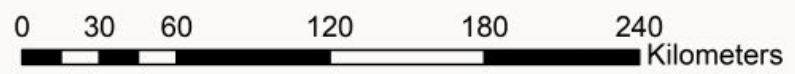
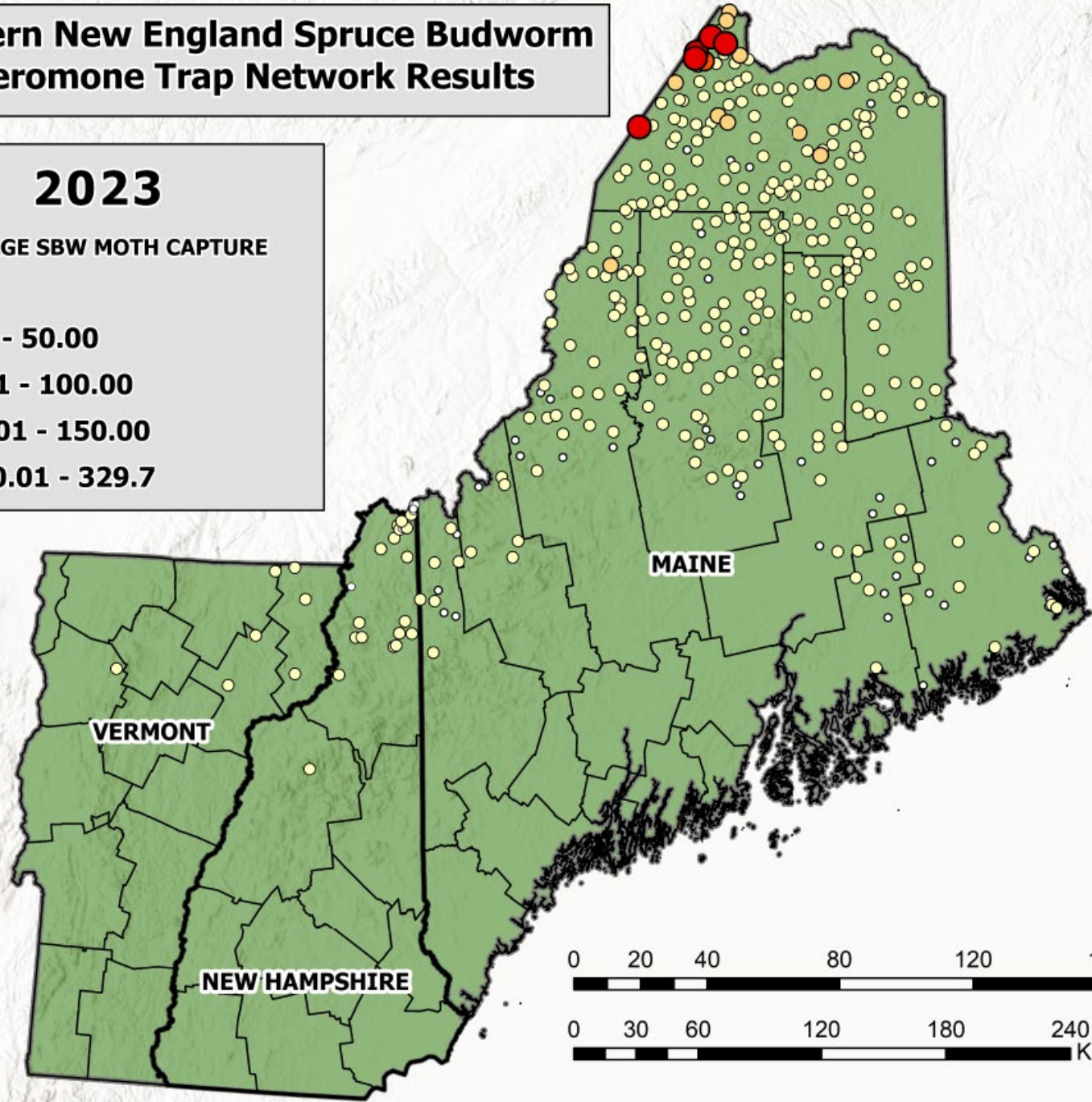
- Pas d'envol / No liftoff
- Provenance / Provenance
- Vol / Flight
- Fin par le froid / End by cold
- Fin par la pluie / End by rain
- Fin par l'aube / End by sunrise
- Fin par le froid (mort) / End by cold (dead)
- Fin par la pluie (mort) / End by rain (dead)
- Fin par l'aube (mort) / End by sunrise (dead)
- Extérieur de la carte / Outside Map

Northern New England Spruce Budworm Pheromone Trap Network Results

2023

AVERAGE SBW MOTH CAPTURE

- 0.00
- 0.01 - 50.00
- 50.01 - 100.00
- 100.01 - 150.00
- >150.01 - 329.7



Esri, CGIAR, USGS

Balsam Woolly Adelgid

Adelges piceae

- Origin: Europe- **Invasive**
- Hosts: true firs
- Damage: sapsucking insect: gouting, dieback, mortality
- Distribution: found in all VT counties

County	Acres Mapped							
	2016	2017	2018	2019	2020	2021	2022	2023
Addison	107	0	0	0	X	0	0	0
Bennington	69	0	0	17	X	0	0	5
Caledonia	1,096	412	807	211	X	79	346	261
Chittenden	51	0	0	0	X	0	631	0
Essex	736	20	1,082	0	X	336	475	41
Franklin	59	0	5	0	X	0	1,798	4
Grand Isle	0	0	0	0	X	0	0	0
Lamoille	683	13	188	174	X	15	231	0
Orange	1,101	320	322	53	X	0	6	41
Orleans	518	399	316	252	X	147	132	27
Rutland	240	122	88	0	X	12	0	19
Washington	895	279	561	235	X	0	332	2
Windham	57	4	9	0	X	0	0	0
Windsor	4	72	56	0	X	0	0	0
Total	5,616	1,641	3,434	942	X	589	3,945	400



Hemlock Woolly Adelgid

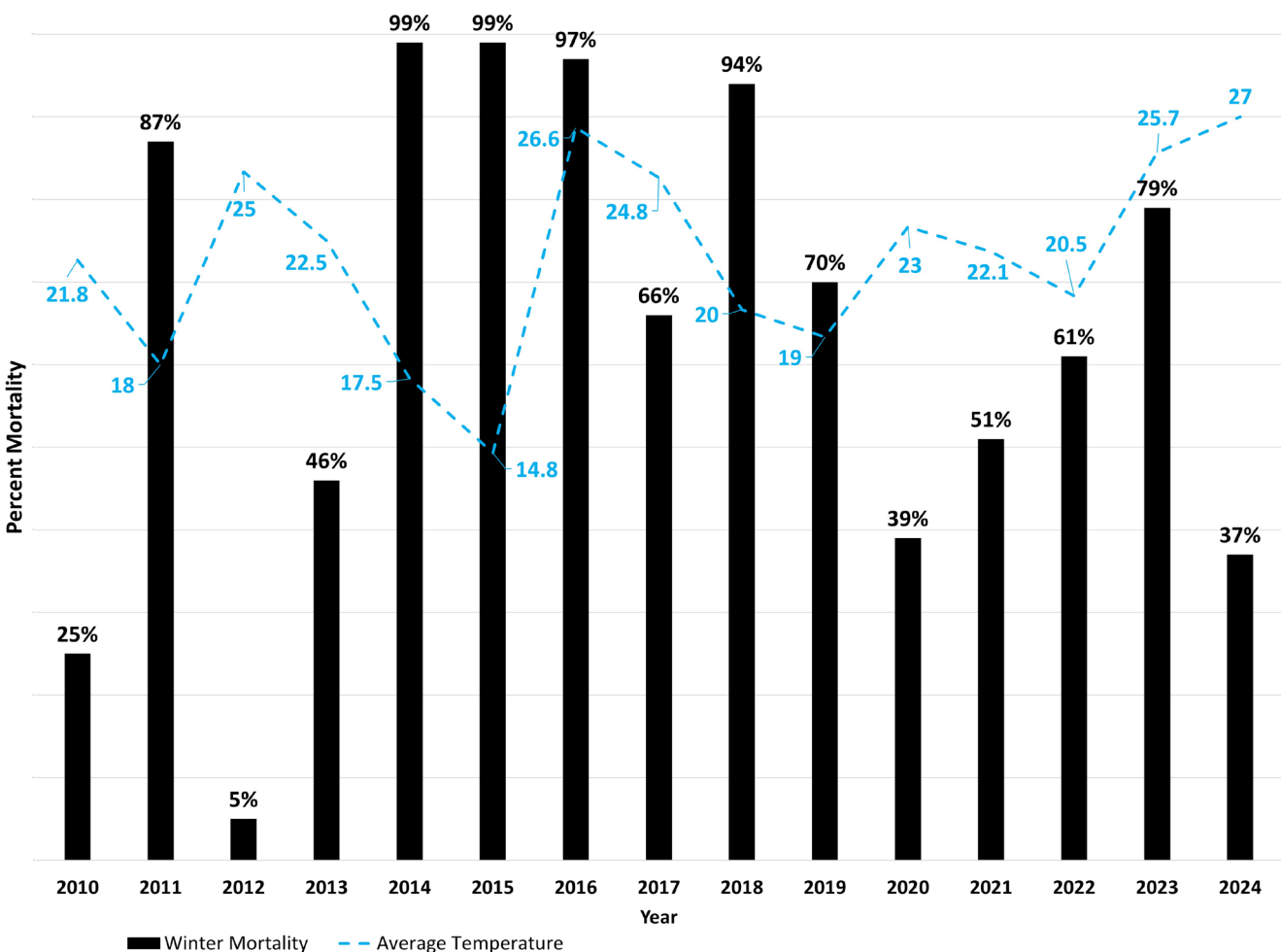
Adelges tsugae

- Origin: Japan – **Invasive**
 - Virginia 1951
- Hosts: Hemlock (all species)
- Damage: sap-sucking; yellowing needles, dieback, mortality
- Distribution: Vermont 2007

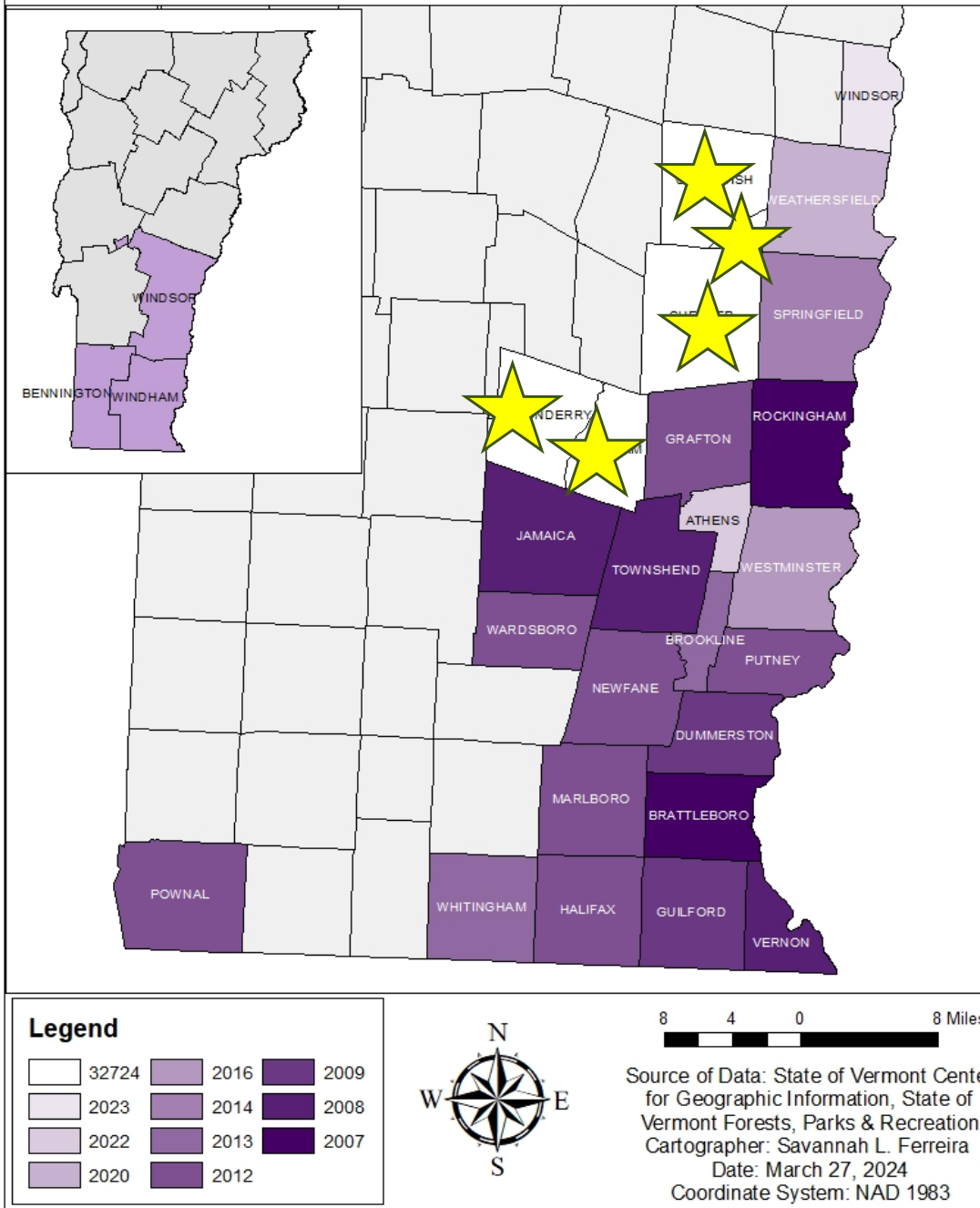


Survey Efforts

Winter Mortality of Hemlock Woolly Adelgid: 2010 - 2024

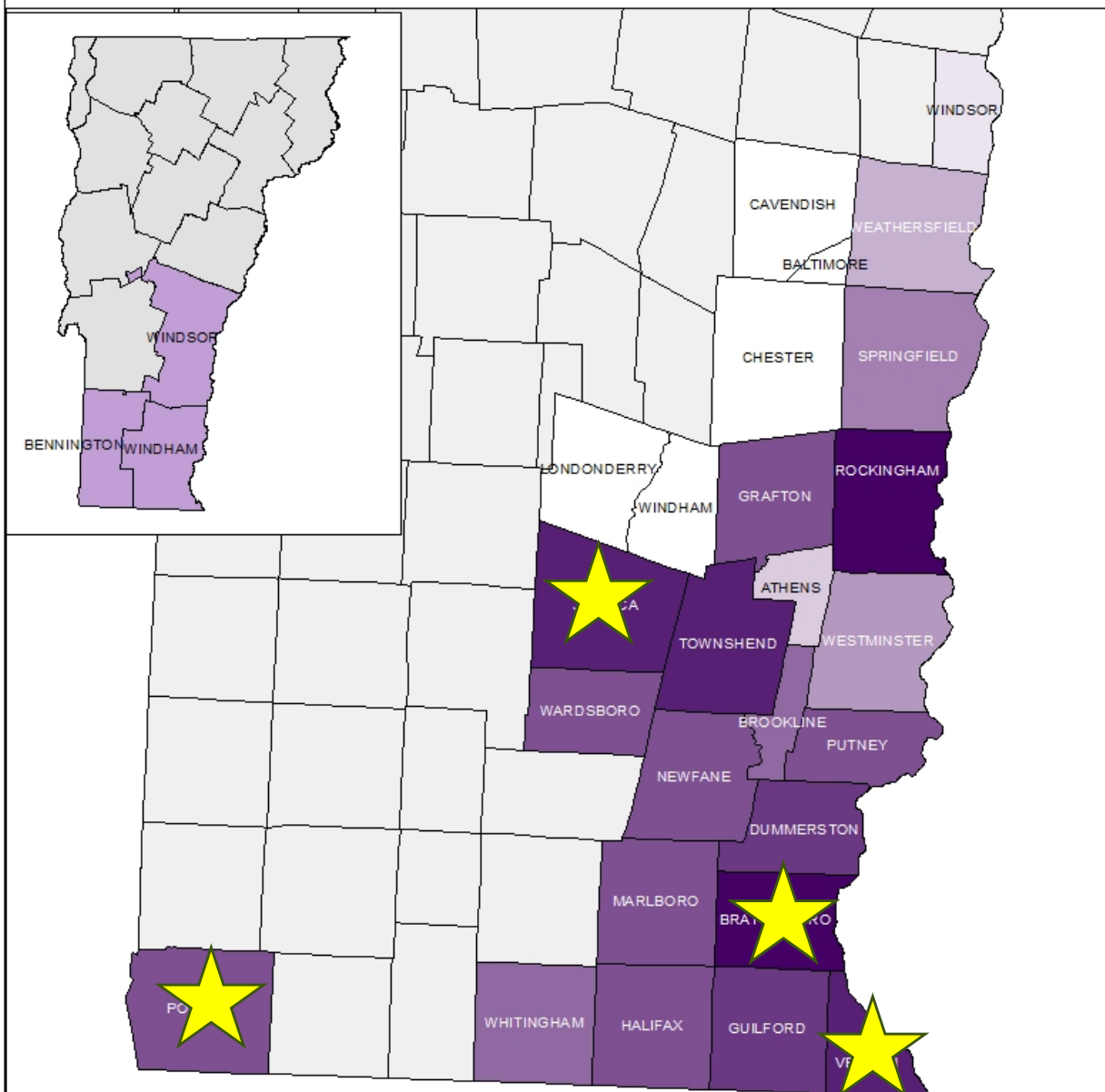


HWA Infestation in Vermont



HWA Biocontrol

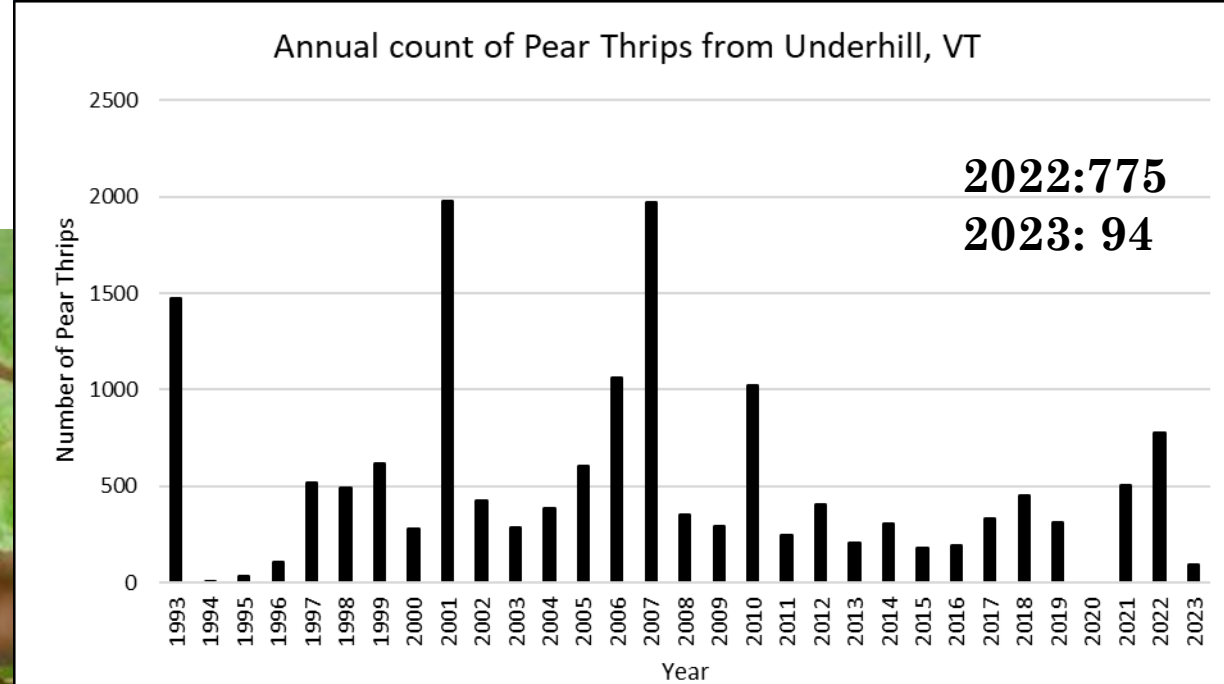
Laricobius nigrinus



Pear Thrips

Taeniothrips inconsequens

- Origin: Europe- **Invasive**
- Hosts: sugar maple, other hardwoods
- Damage: piercing-sucking insect; leaf tatter/ flower damage
- 2023 Observations: Scattered damage across the state



Emerald Ash Borer

Agrilus planipennis

- Origin: Asia -**Invasive**
- Hosts: Ash (all species)
- Damage: wood boring insect: S-shaped galleries, woodpecker flecking, dieback, epicormic sprouting, mortality
- 2023 Observations: Increase in damage and mortality



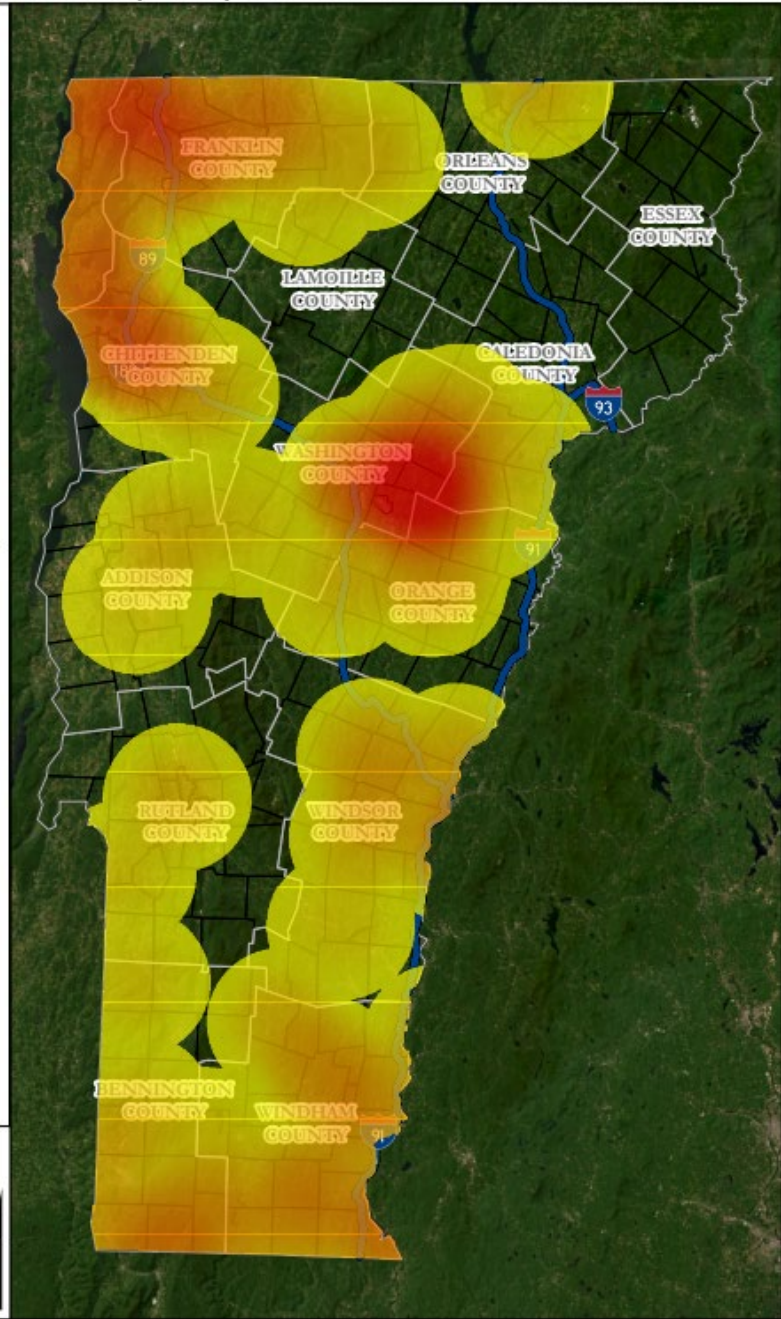
Emerald Ash Borer (EAB) Infested Area in Vermont

The shaded circles on this map delineate Vermont's EAB Infested Area. Each infested area represents a 10-mile radius around a known EAB infestation. While symptoms may not be obvious, it is likely that EAB is present in much of this area.

For each infested area, the relative EAB infestation severity is represented along a color spectrum. A yellow infested area indicates a less severe infestation. This map was last updated on **4/18/2024**.

Lower severity infested areas are not yet showing infestation symptoms or decline but EAB has been found. A red infested area indicates a more severe infestation, multiple detections of EAB in a close area, or both. Higher severity infested areas are exhibiting visible infestation symptoms or tree death. The severity of infestation in each infested area will be assessed annually by staff from the Department of Forests, Parks, and Recreation and the map will be adjusted as needed.

EAB is not necessarily present throughout any given infested area, and it can rarely be found at low population densities. Often, by the time the insect is detected, it has already dispersed. Therefore, this map indicates the likelihood of EAB based on where it has actually been observed. Applying Slow the Spread recommendations reduces the risk of spreading EAB and provides time to conduct management activities.



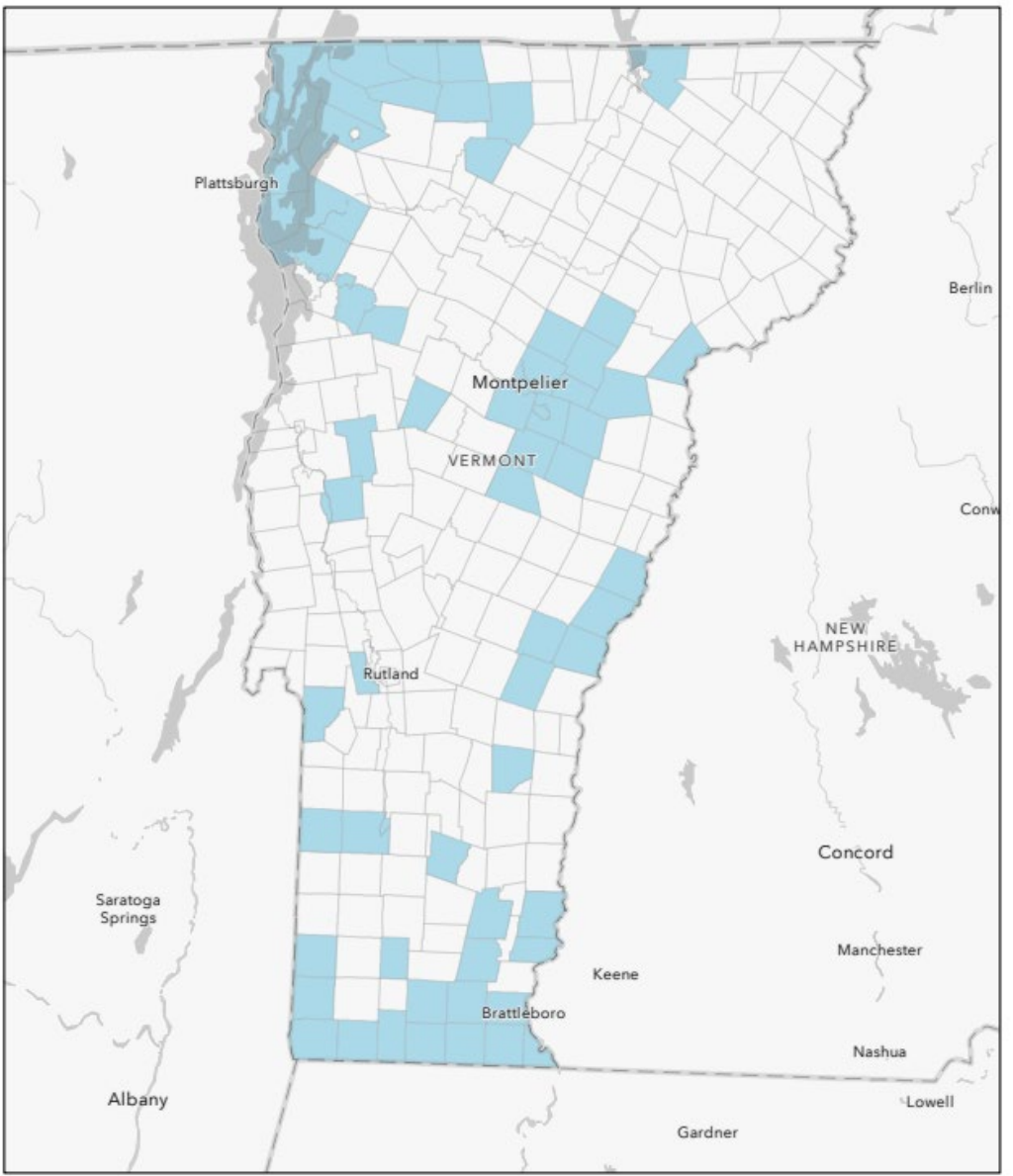
EAB Areas

Relative Infestation Severity



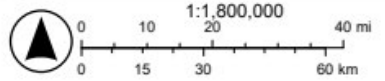
This map of the EAB Infested Area was accurate as of **4/18/2024**. The Infested Area will expand. Prior to basing action on the location of the Infested Area, visit vtinvasives.org/eab to confirm the current status of the EAB Infested Area.

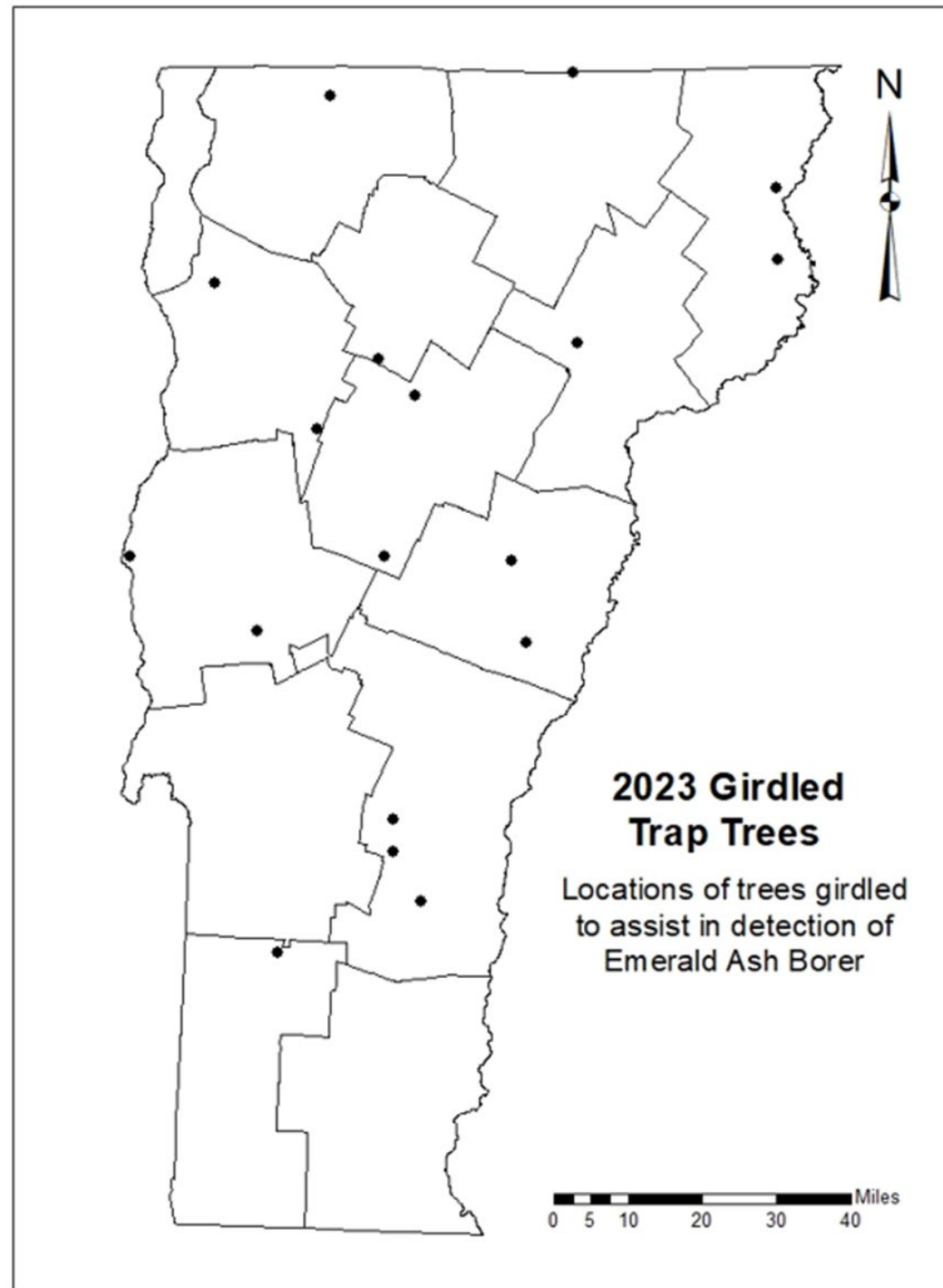
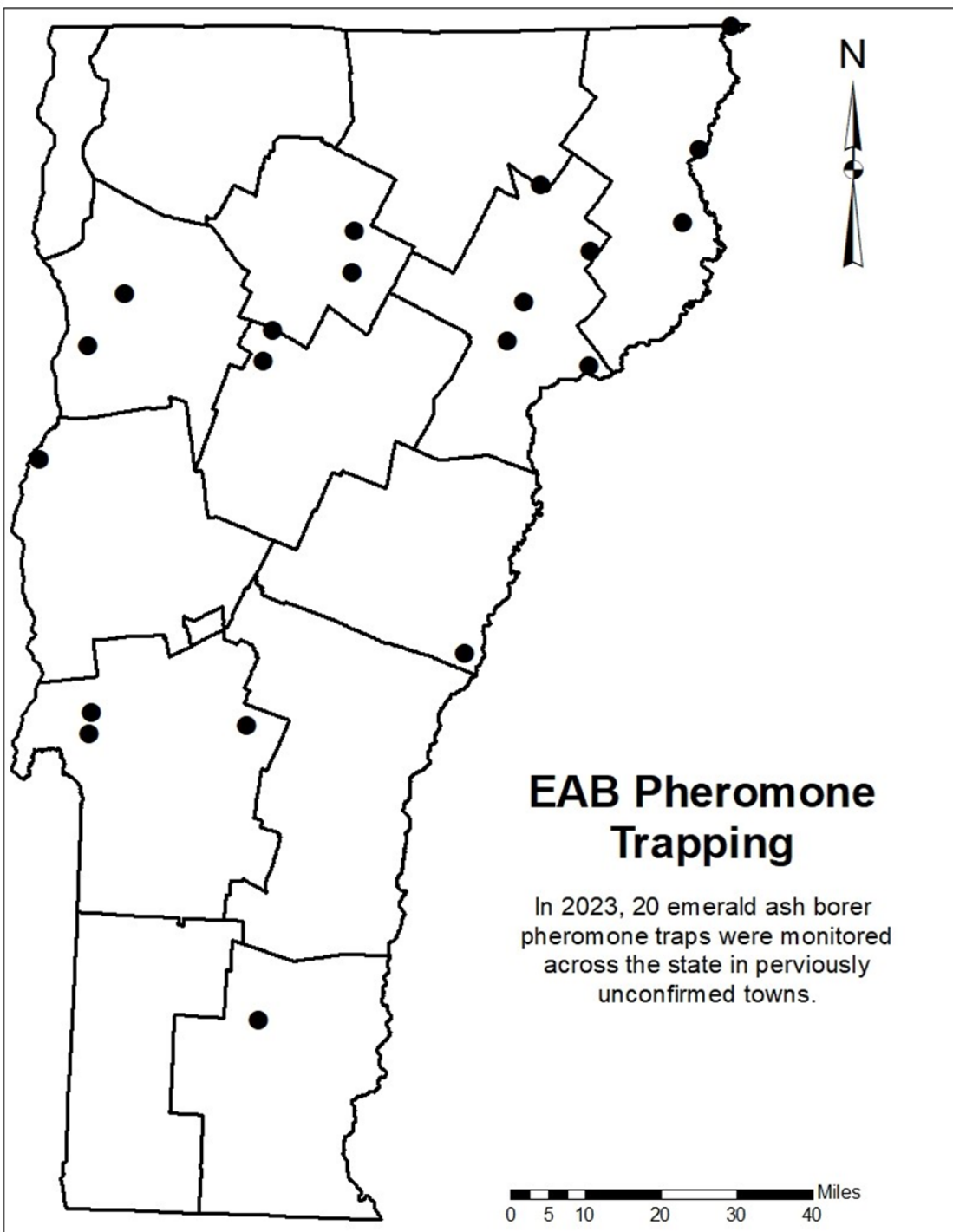
Vermont Emerald Ash Borer Status Map



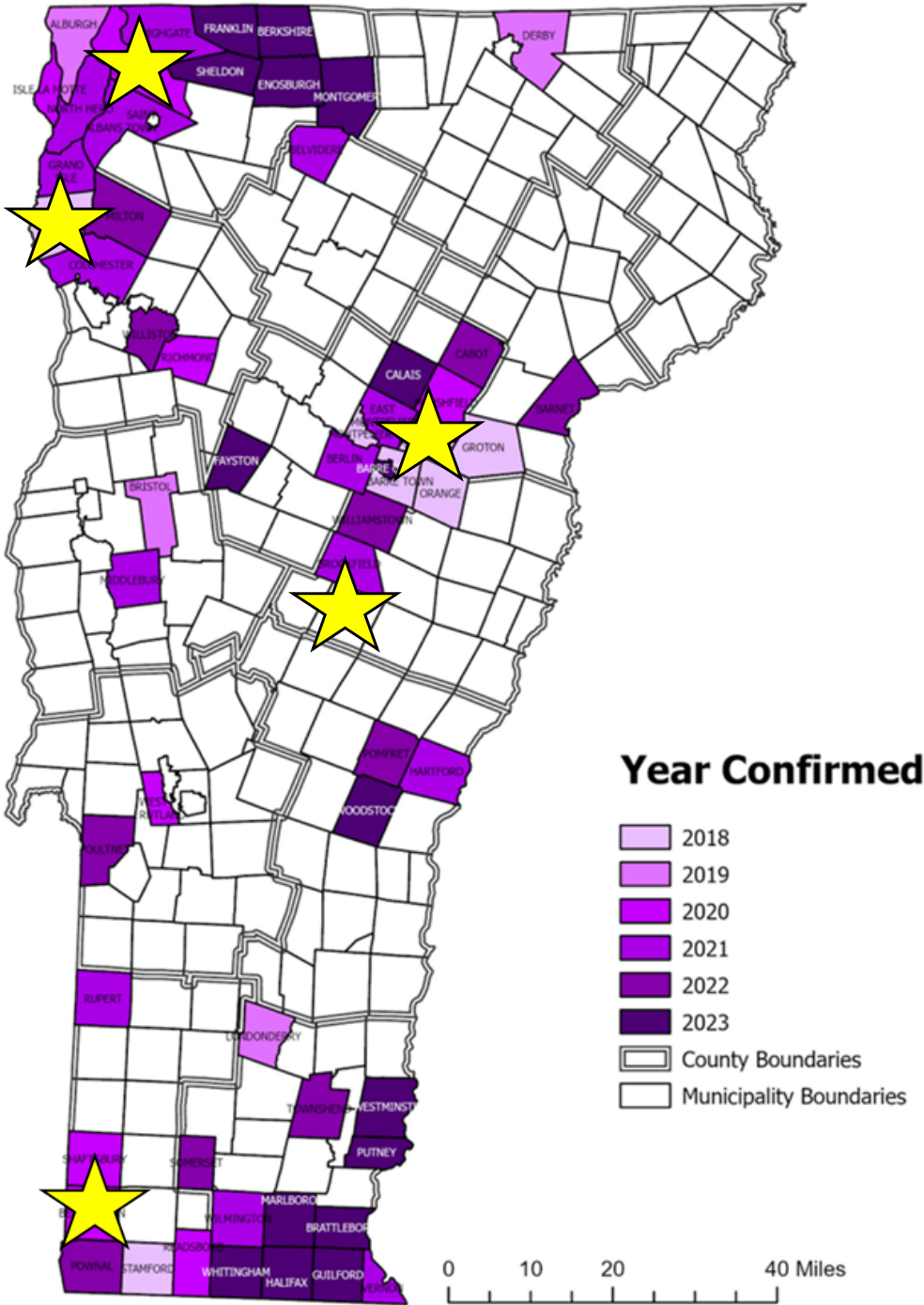
5/1/2024, 10:23:55 AM

Emerald Ash Borer





EAB Biocontrol

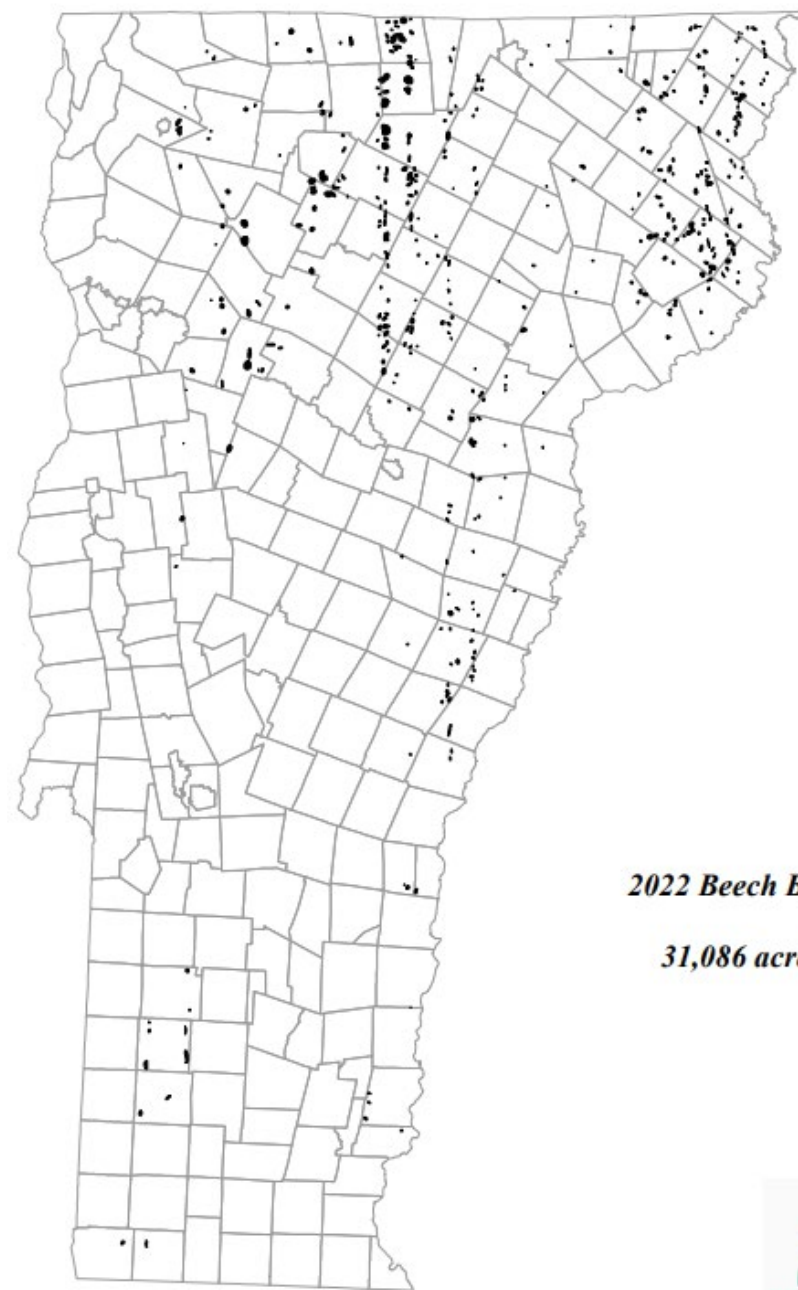


Beech Bark Disease

Cryptococcus fagisuga and *Nectria* spp.

- Origin: Europe
- Hosts: American beech
- Damage: fungal canker & sapsucking insect: numerous cankers, dieback, mortality
- Distribution: found in all VT counties

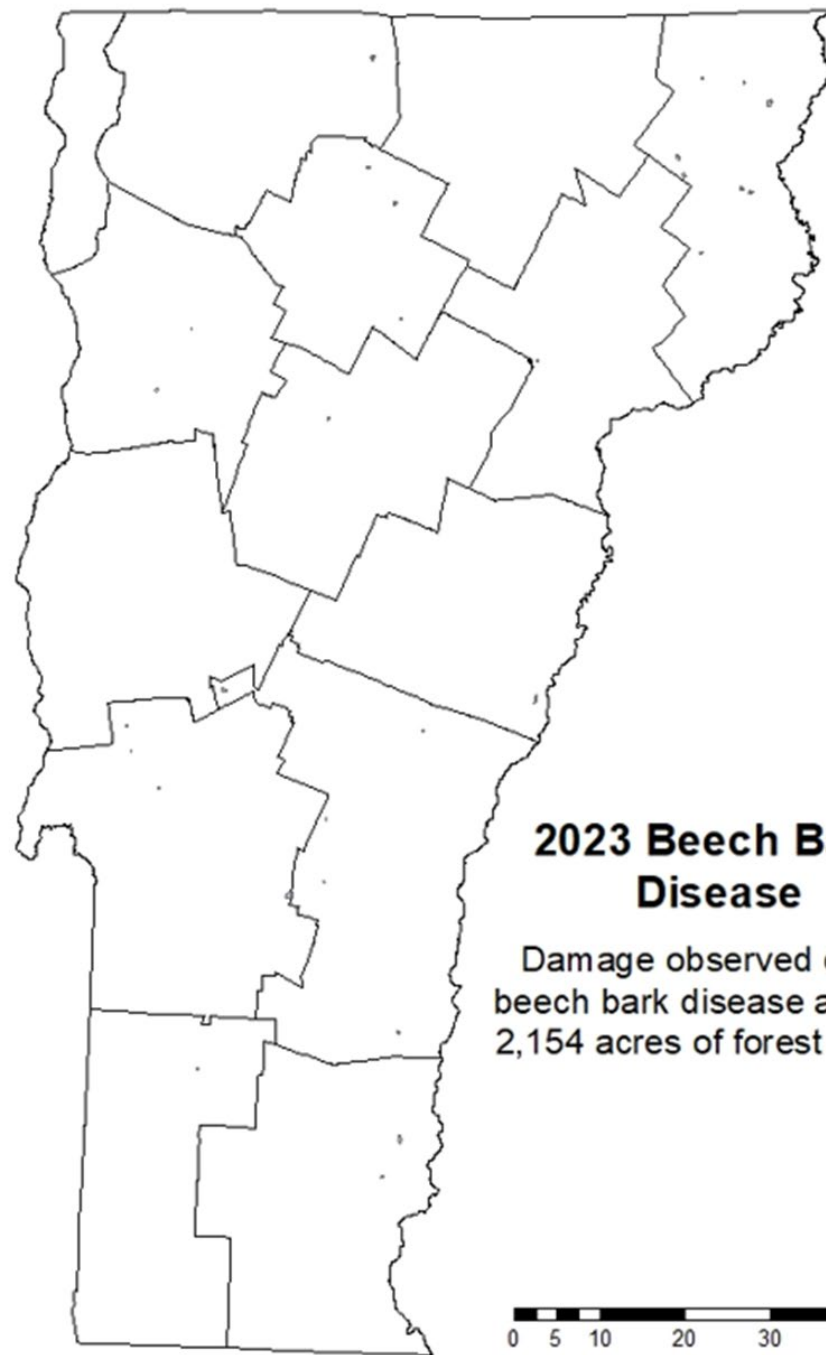




2022 Beech Bark Disease

31,086 acres affected

0 5 10 20 Miles



2023 Beech Bark Disease

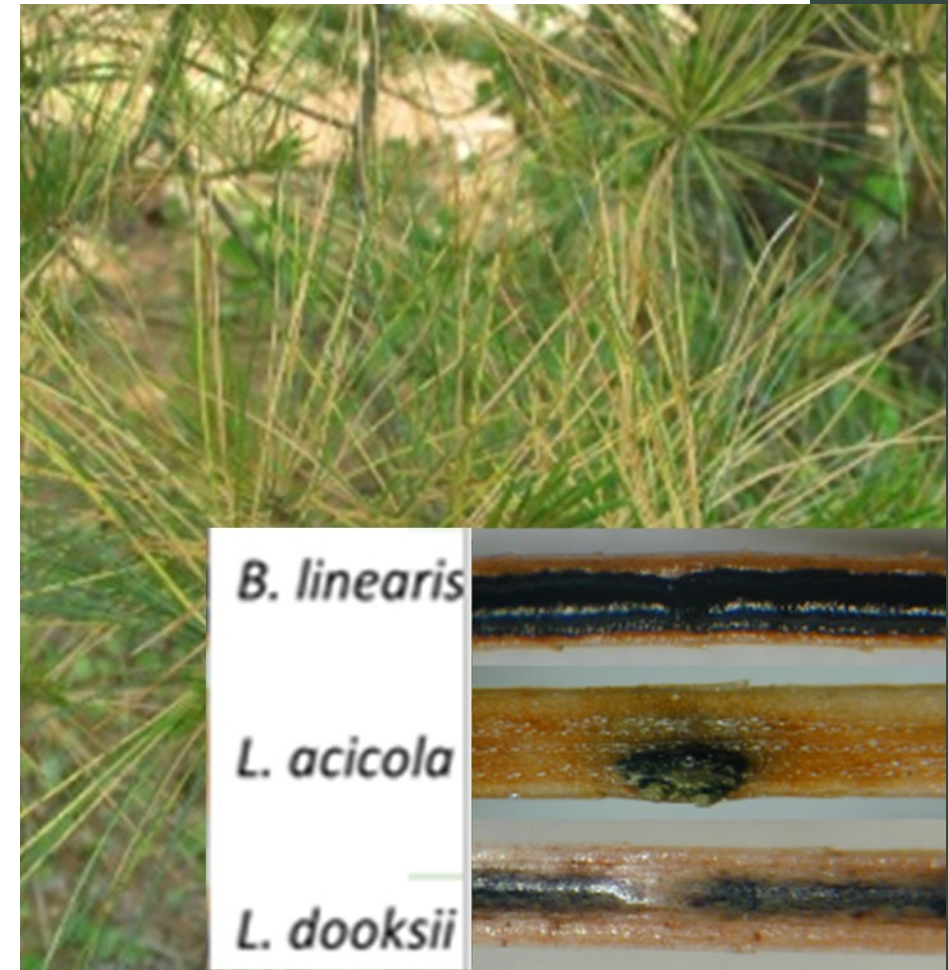
Damage observed due to beech bark disease affected 2,154 acres of forest in 2023

0 5 10 20 30 40 Miles

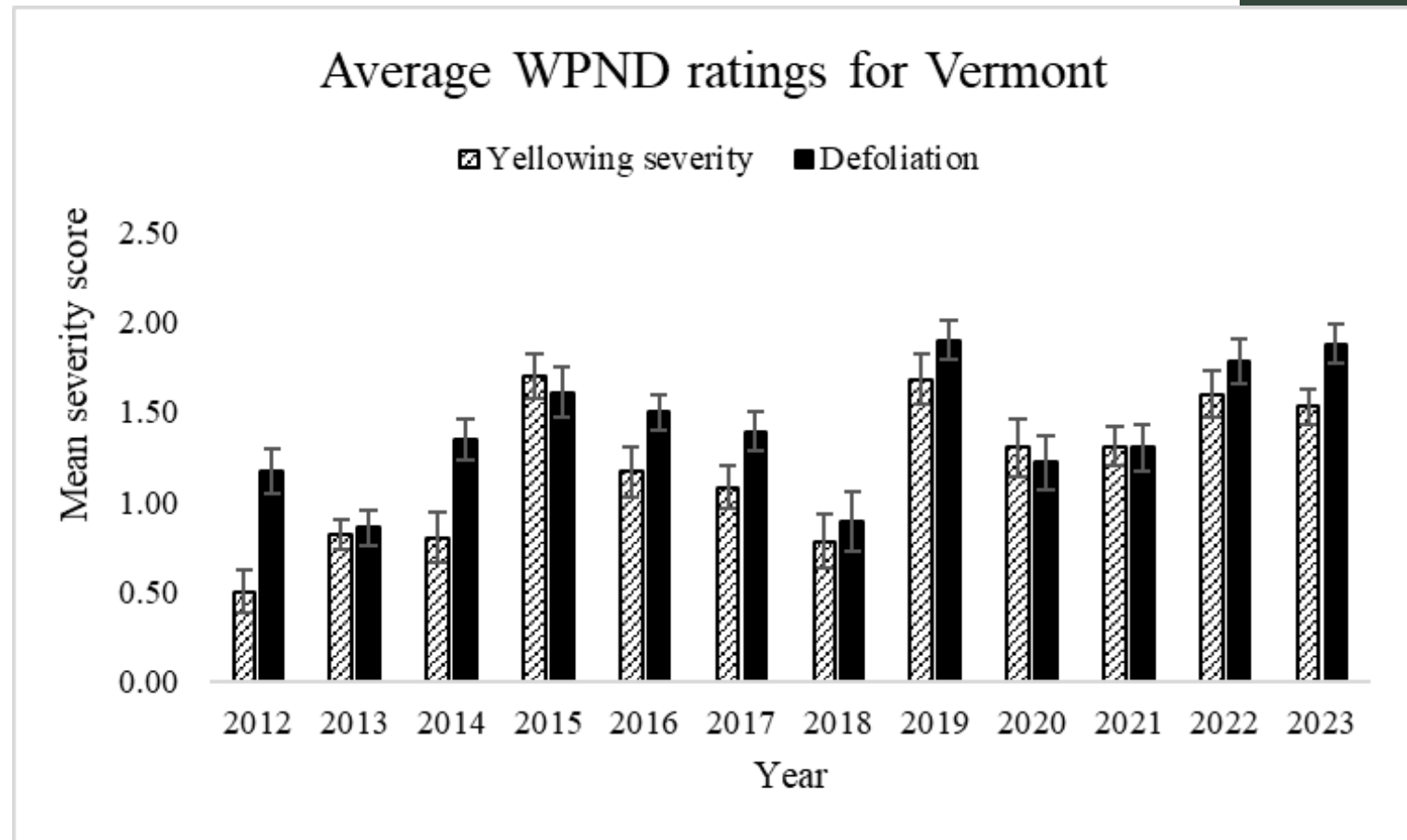
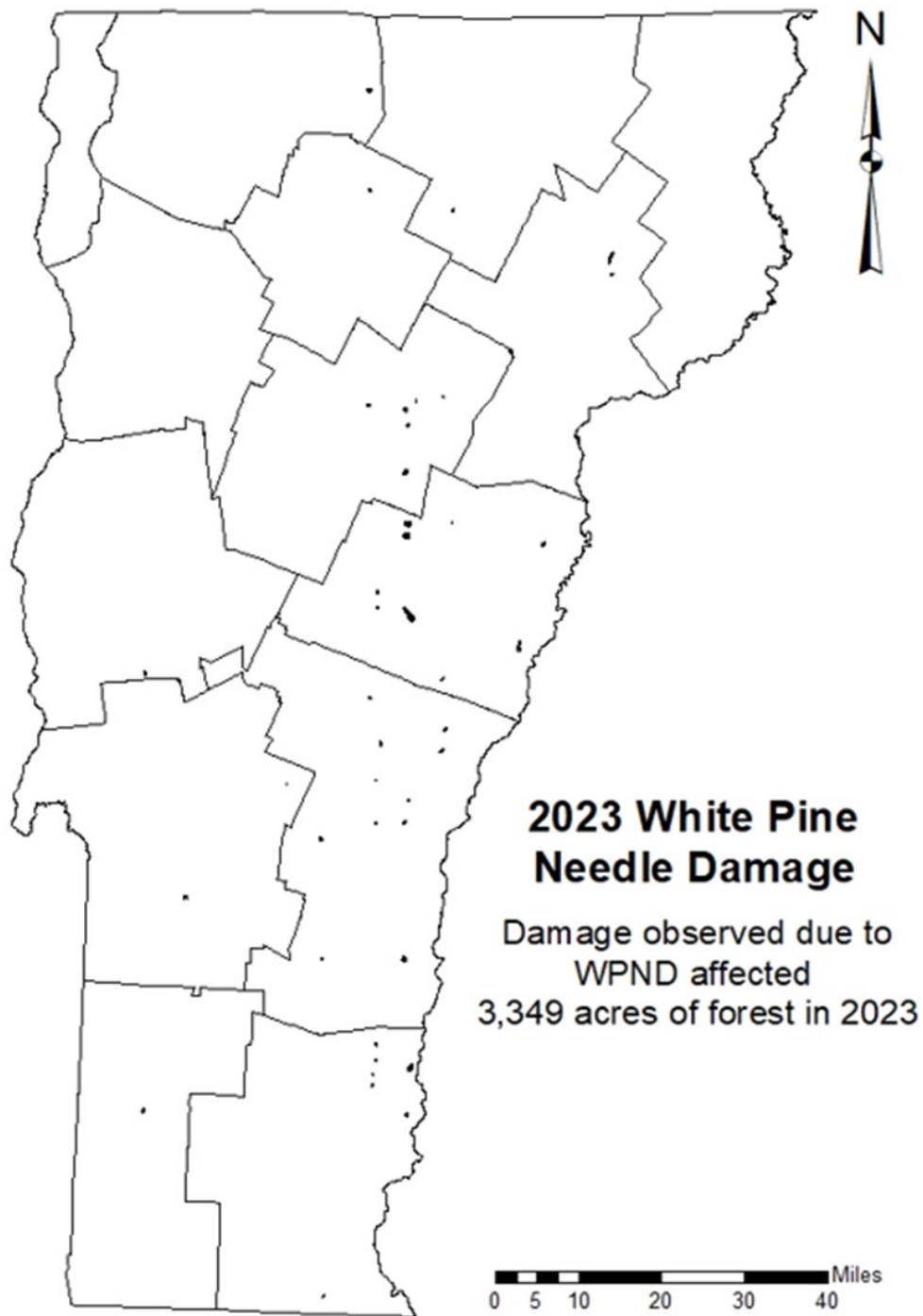
Survey Efforts

White Pine Needle Damage

- Origin: Unknown; regional problem since 2010
- Host: eastern white pine
- Fungi Involved:
 - *Bifusella linearis* – needle cast
 - *Lecanosticta acicola* – Brown spot needle blight
 - *Lophophacidium dooksii* – needle cast
 - *Septorioides strobii* – needle blight
- Damage: Chlorosis, necrosis, growth reduction, tree decline
- 2023 Observations: increase in damage



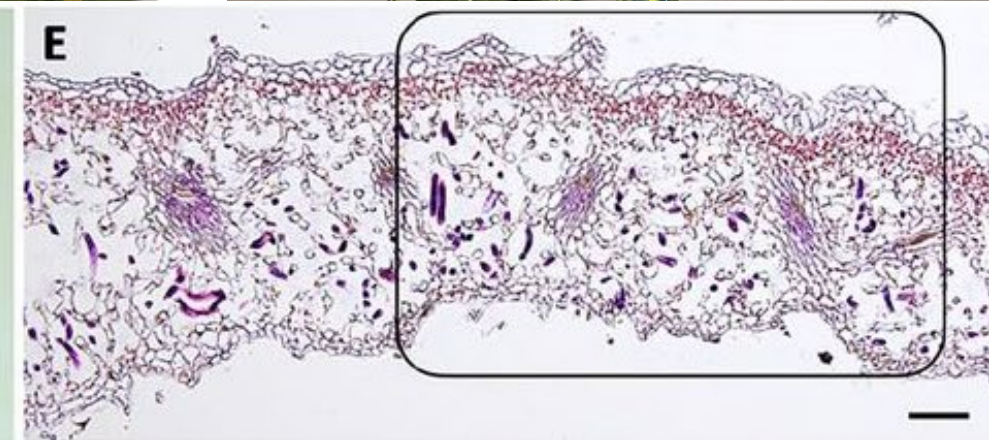
Survey Efforts

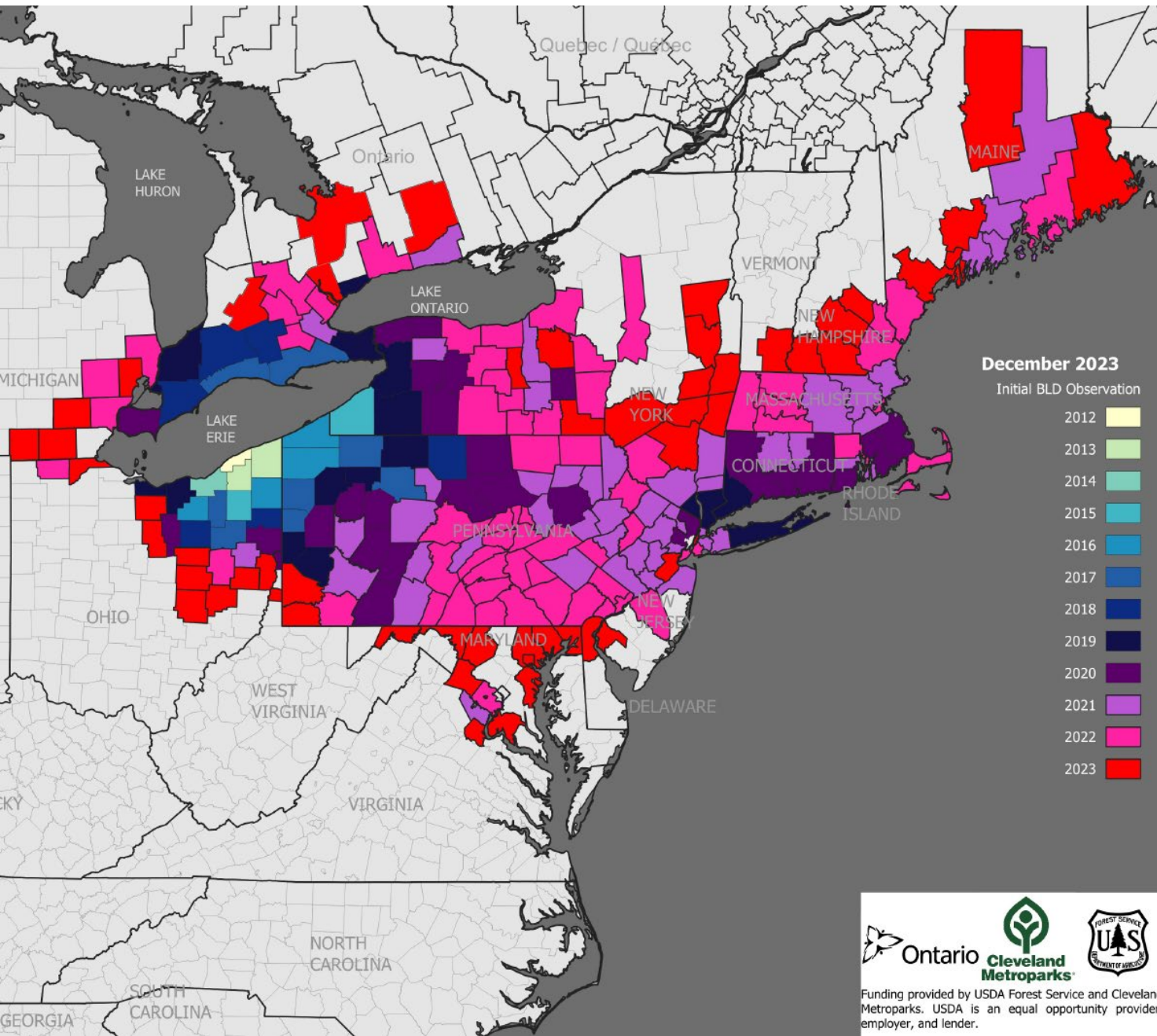


Beech Leaf Disease

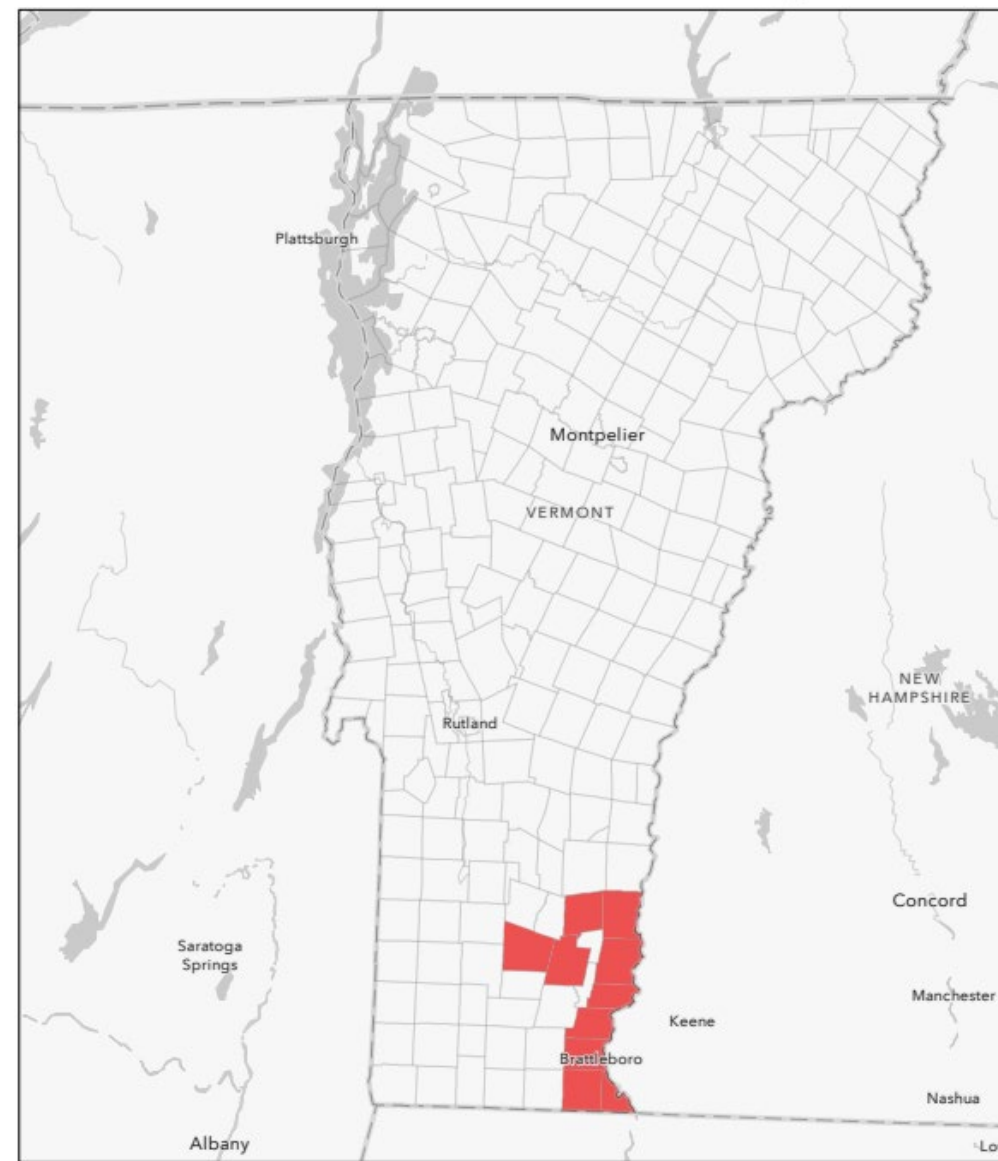
Litylenchus crenatae mccannii

- **Origin:** Japan
 - Detected in Ohio, USA in 2012
- **Host(s):** American, European, Oriental and Chinese beech
- **Damage:** leaf deformation, mortality
- **2023 Observations:** First detected in VT

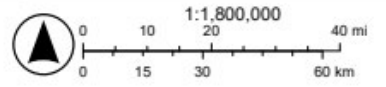




Vermont Beech Leaf Disease Status Map



5/22/2024, 1:07:04 PM



VCGI, Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, NPS, USFWS

Signs and Symptoms

Striping in Leaves



Leaf Deformation



- Striping in leaves
- Dieback
 - Starts on lower branches progressing upwards
- Leaves will become disformed in later stages of infection
- Bud abortion
- Higher mortality in saplings
 - Can die within a year

Look-a-likes

Erineum Patch



Anthracnose



Aphid Feeding



Herbicide Injury

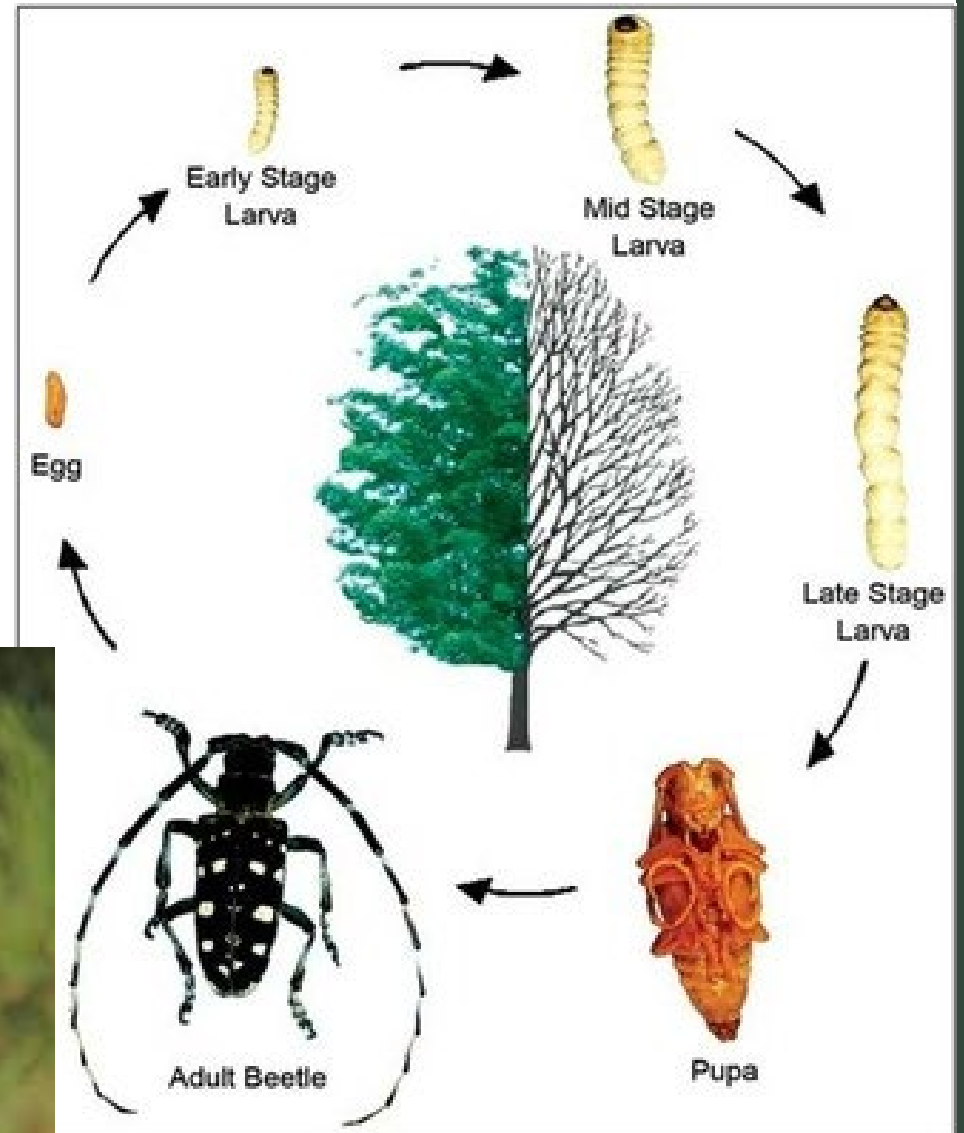


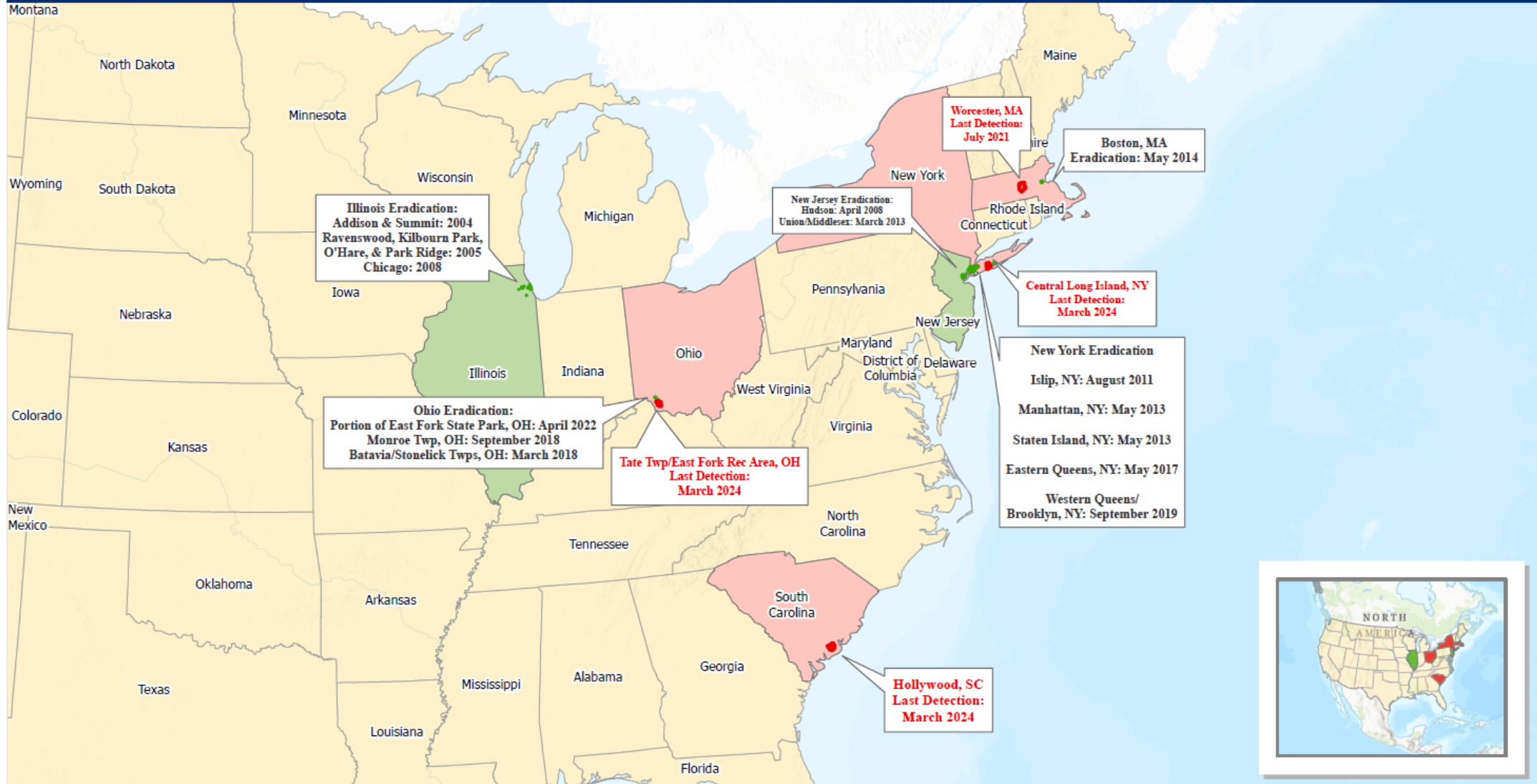
Pests on the Horizon

Asian longhorned beetle

Anoplophora glabripennis

- Origin: China
 - Detected in NY in 1996
 - Not detected in VT
- Spread: long distances by humans
 - Short distance by flight
- **Host(s):** maple, ash, birch, elm poplar and other hardwoods

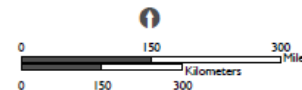




Asian Longhorned Beetle Federal Quarantine Boundary

- Active Federal Quarantine
- Rescinded Federal Quarantine

- State Boundary - ALB Eradication Declared
- State Boundary - ALB Quarantine Active
- State Boundary



Data Source:
USDA APHIS PPQ
ESRI Basemap

Date Created:
3/26/2024

USDA APHIS
2150 Centre Ave
Fort Collins, Co 80526

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Signs and Symptoms

Adult



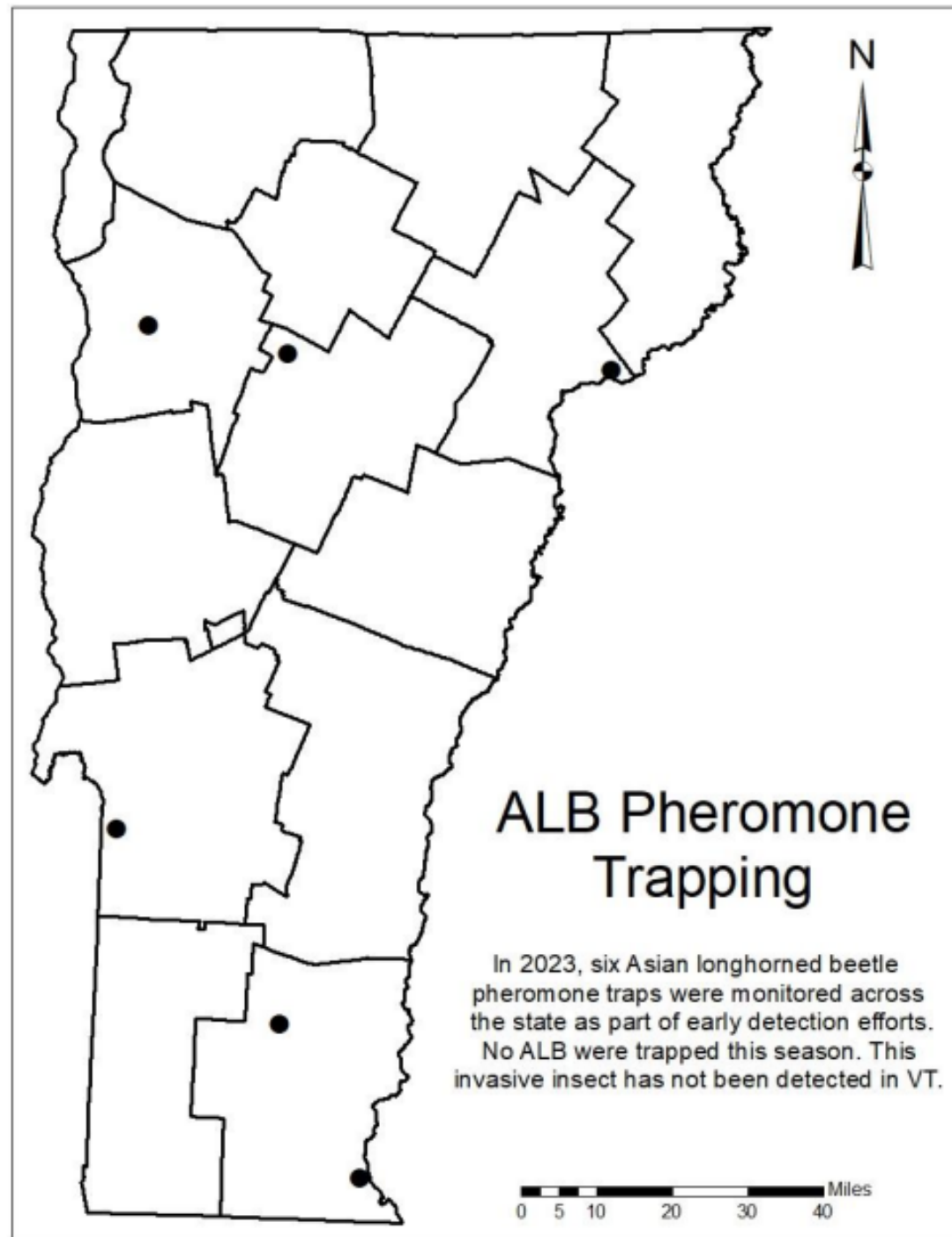
Exit holes/ Oviposition sites



Dieback



Surveys



Oak Wilt

Bretziella fagacearum

- **Origin:** Unknown
 - Detected in WI, USA in 1944
- **Spread:** Oak bark beetles, *Pseudopityophthorus* spp., root grafts & can be spread long distances by humans transporting wood
 - Not currently in VT
- **Hosts:** All species of oak
 - White Oak Family Members: more resistant (tyloses)
 - Red Oak Family Members: more lethal

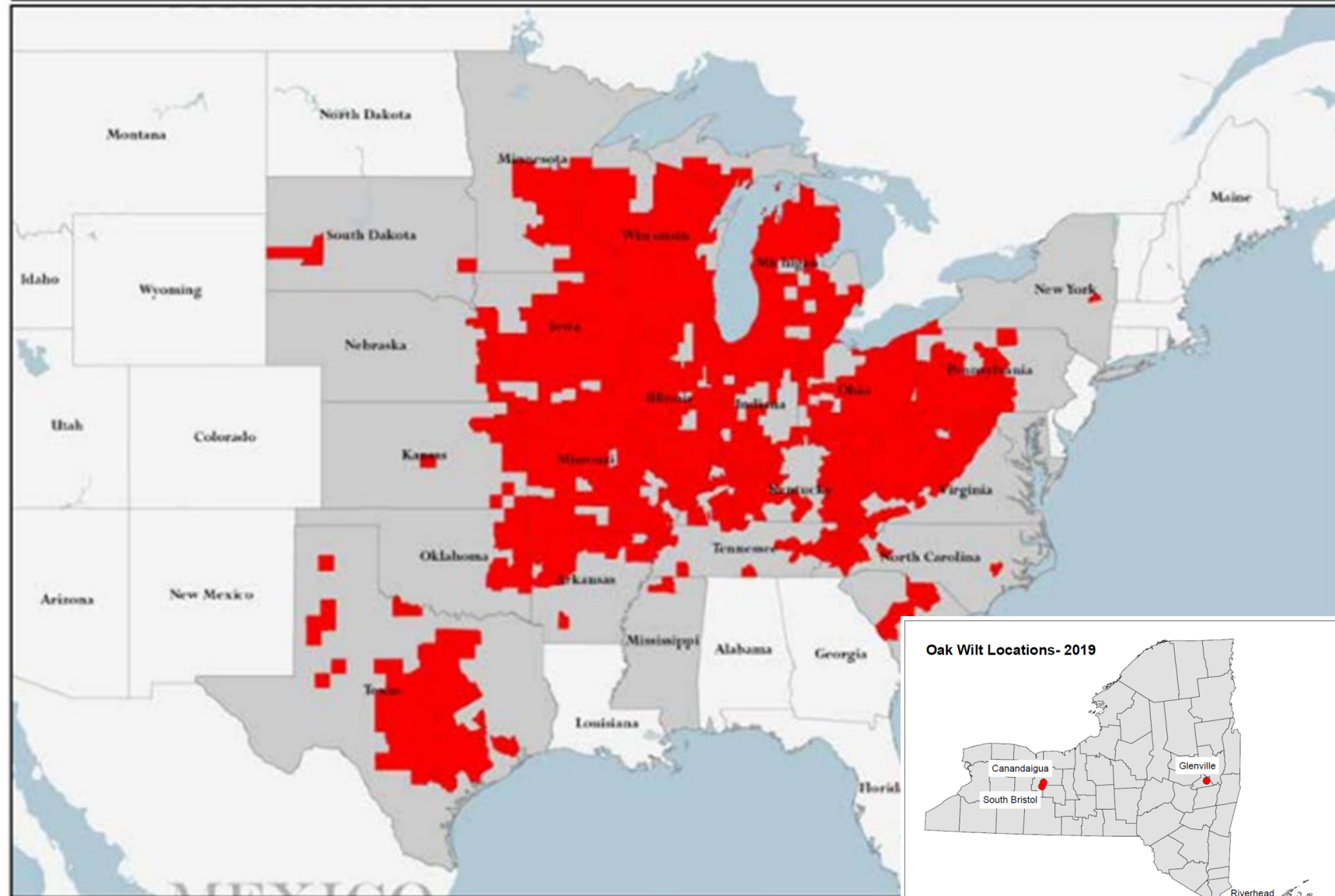




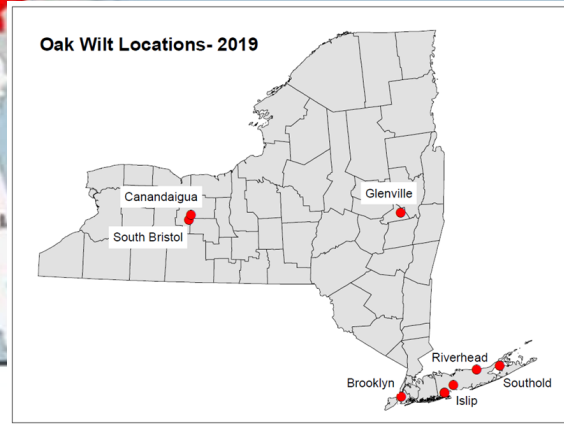
Oak Wilt

Ceratocystis fagacearum (Bretz) J. Hunt

Distribution



State level report
 County level observation



Signs and Symptoms

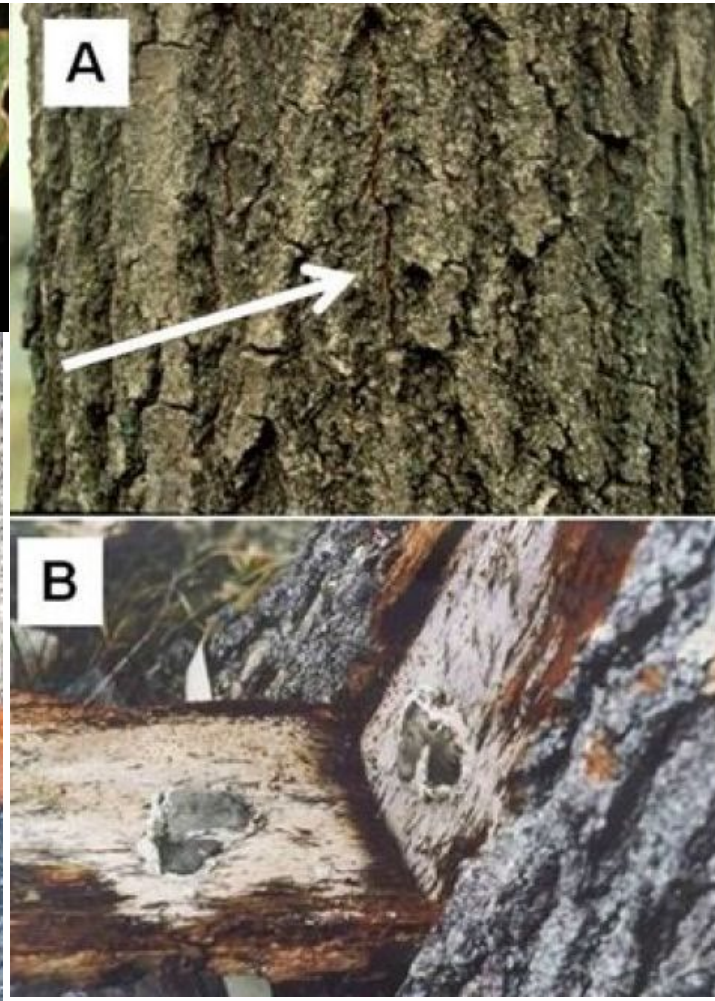
Tyloses: WO only



Wilting/ Browning



Bark Crack/ Hyphal Mat



Xylem Streaking



Spotted Lanternfly

Lycorma delicatula

- Origin: China
 - Detected in 2012
 - Infestation in PA in 2014
- Spread: long distances by humans
 - Not currently in VT
- **Host(s):** Reported on 103 + plant species
 - Almonds, apples, apricots, cherries, **grapes**, hops, maple, nectarines, oak, peaches, pine, plums, poplar, sycamore, walnut, willow...
 - **Does not need TOH to complete its lifecycle**



Eggs: Oct. to June



First to third Instar: June to July



Fourth Instar: July to Sept.



Adult: July to Dec.

Additional Signs

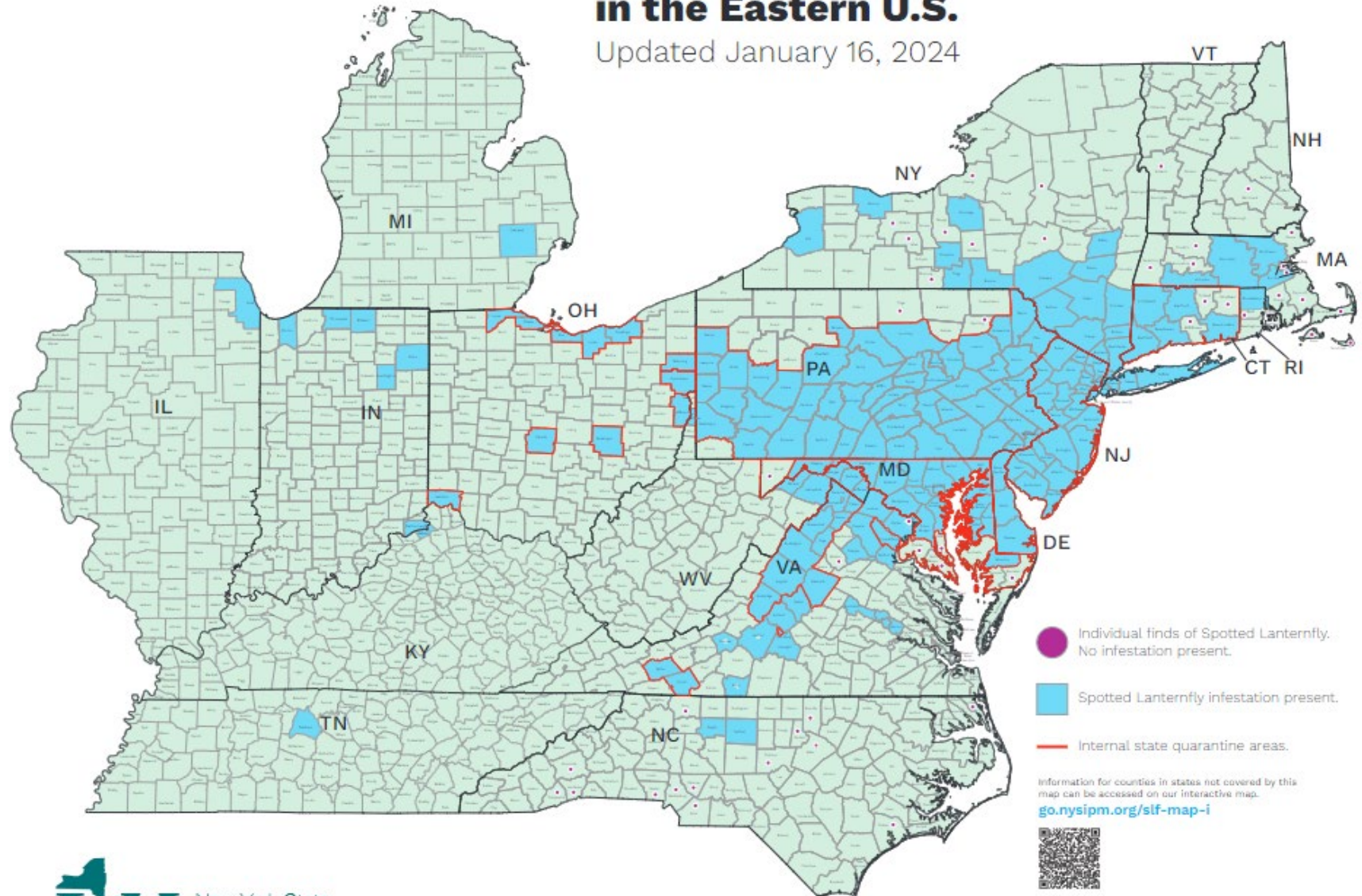
- Piercing/ sucking mouthpart ingests phloem contents
- Honeydew is secreted
- Increased bee and wasp activity due to exposed sap and honeydew
- Sooty mold grows on honeydew
- Aggregation of adults in fall



Distribution:

Spotted Lanternfly Reported Distribution in the Eastern U.S.

Updated January 16, 2024



Questions?

The screenshot shows the website interface for reporting invasive species. At the top, the URL vtinvasives.org/get-involved/report-it is visible in the browser's address bar. Below the address bar is a navigation bar with three tabs: 'GET INVOLVED', 'HOME', and 'MANAGE', with 'REPORT IT!' being the active tab. A sidebar on the left contains a 'Report' section with links for 'REPORTING UPLAND PLANTS', 'REPORTING A TREE DISEASE', 'REPORTING AN AQUATIC ANIMAL', 'REPORTING AN AQUATIC PLANT', and 'REPORTING AN INVASIVE INSECT'. The main content area features a large heading 'Report It!' and a paragraph: 'Think you've found an invasive species? There are some t about.' Below this are four buttons: 'I FOUND AN AQUATIC PLANT', 'I FOUND AN UPLAND PLANT', 'I FOUND AN AQUATIC ANIMAL', and 'I FOUND A TREE DISEASE'.



Agency of
Natural
Resources

Savannah Ferreira

Forest Health Specialist

[phone] 802-565-1585

[cell] 802-505-8259

[email] savannah.ferreira@vermont.gov

State of Vermont

Department of Forests, Parks & Recreation

163 Admin Drive

Randolph Center, VT 05061

www.fpr.vermont.gov

