



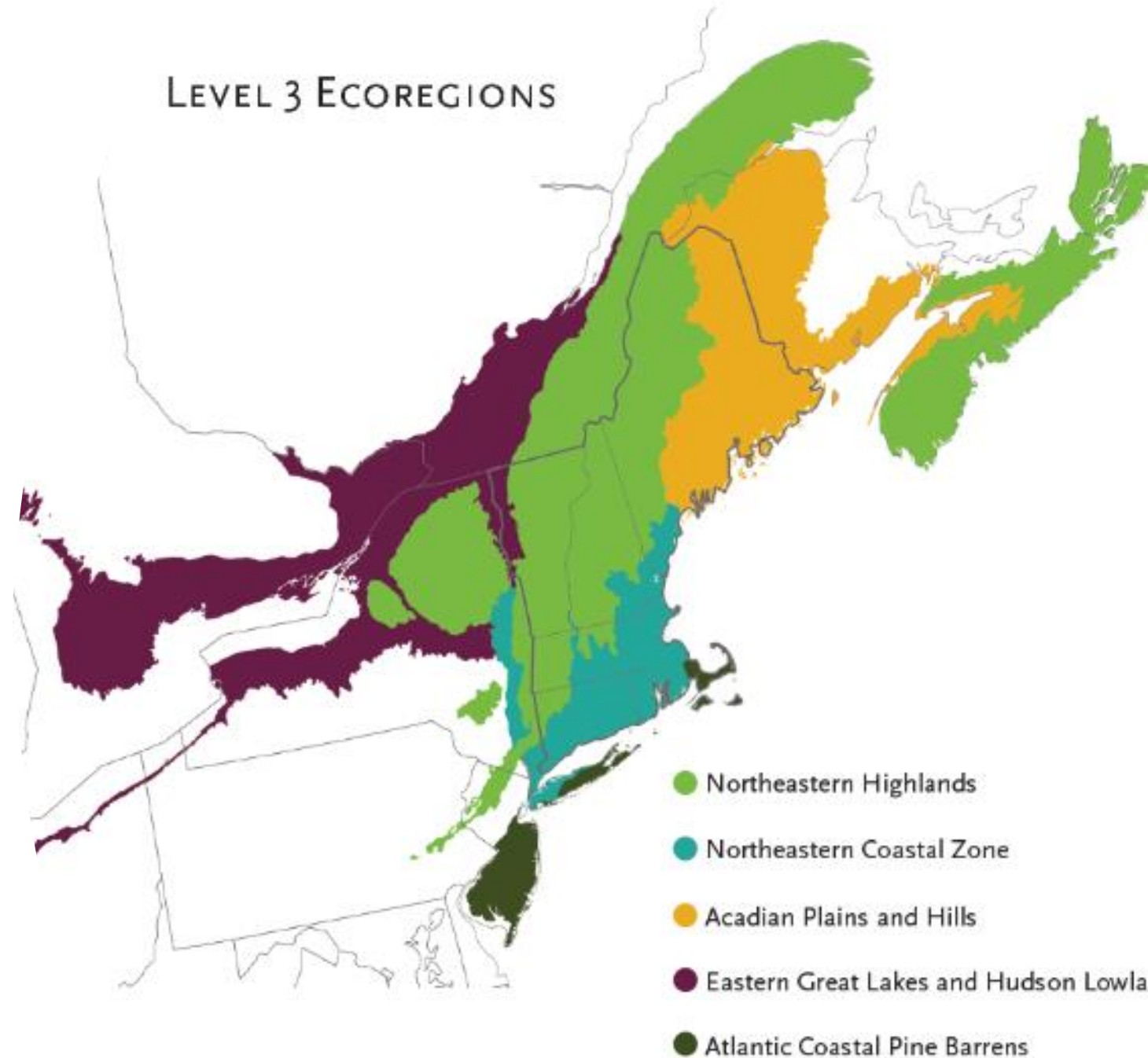
Plants, bugs & worms

Slowing the spread of invasive species?



Definition

An "invasive species" is defined as a species that is non-native to the ecoregion; and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.





Native species are NOT invasive species



Why be concerned about
invasive species?

Because we
love Maine!



Invasive
species don't
fit into Maine's
ecological
puzzle



Terrestrial invasive plants

What is an Invasive Plant?

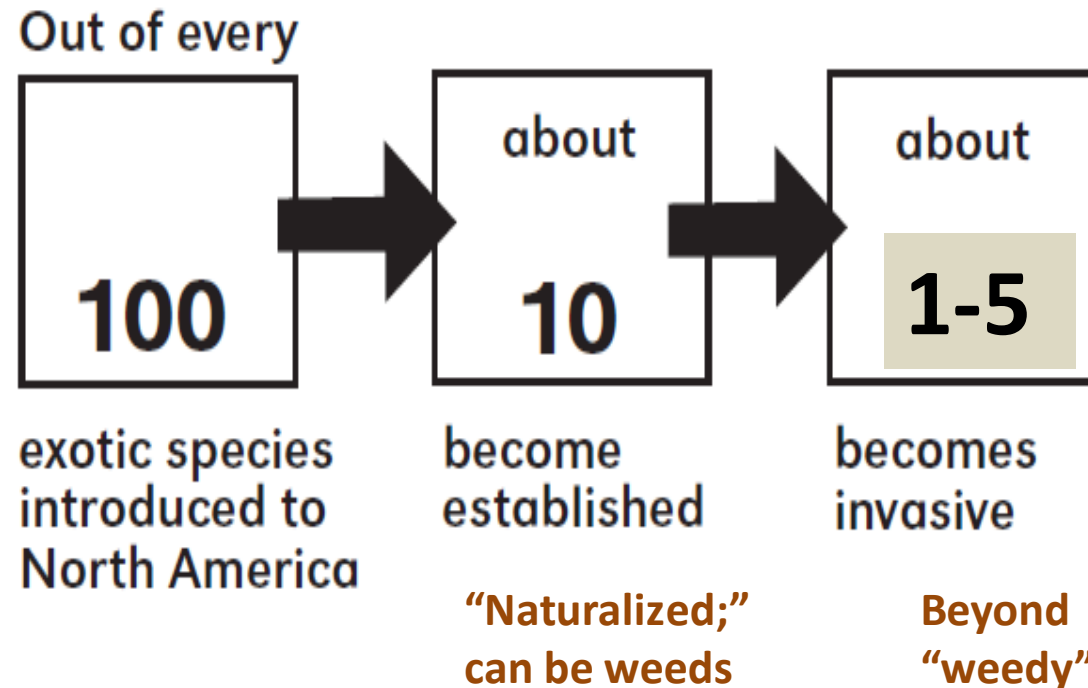
A non-native species whose introduction causes economic or environmental harm, or harm to human health, and which can establish and spread in minimally managed habitats.



Most non-native species are not invasive

FIGURE 1.1

Number of Exotic Species That Become Invasive



What harm do invasive plants cause?



Out-compete native plant species, overrun habitats



**Damage or kill plants
directly or indirectly**



Displace native trees, shrubs, and wildflowers

**Alter wildlife
habitat &
prevent forest
regeneration**



Harm food webs that depend on native plants

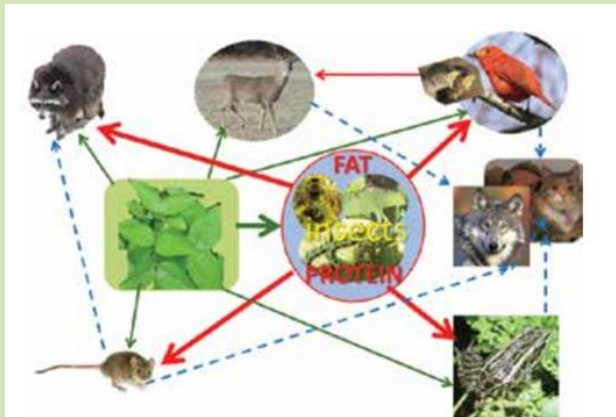


Figure 4. A simple food web showing the importance of insects in transforming plant material into food for many other animals.



Figure from Jordan 2014, Novel ecosystems, invasion and the forgotten food web, Quarterly Newsletter of the Long Island Botanical Society, Spring edition.

WHAT CAN WE DO ABOUT INVASIVE SPECIES?

Key steps in addressing invasive species

- Prevent new introductions
- Identify, assess,
- Report (horticulture@maine.gov) (iMapInvasives.org)
- Prioritize
- Control
- Monitor
- (repeat)

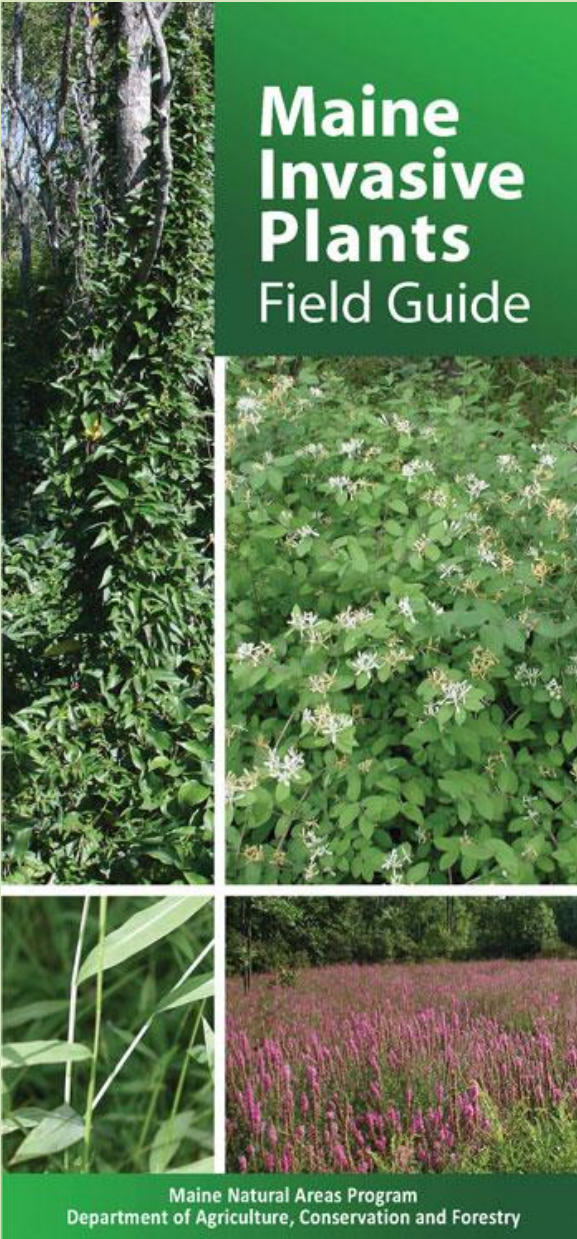


Identification of invasive plants

- Plant ID requires practice
- Go outside, look at plants
- Use the MNAP field guide
- Use the GoBotany website to look at photos



Maine Invasive Plants Field Guide



SEVERELY INVASIVE

GOUTWEED

(Bishop's weed)
Aegopodium podagraria
Status in Maine: widespread



Description: Herbaceous, perennial ground cover, 1-2' tall, with many common names. **Leaves:** Compound with variable triternate leaflets; pointed leaflets have serrate margins. Most leaves are basal with long petioles. Wild type is a medium green color while the variegated form is pale bluish green with white margins. **Flowers/seeds:** Typical carrot family flowers; 2-5" diameter umbels of tiny white flowers atop 2-3' stalk. Plants require at least partial sun to flower. Seeds are brown, small and flat. **Roots:** Fleshy long white rhizomes, like quackgrass (*Elymus repens*).

Native range: Europe & Northern Asia. **How arrived in U.S.:** As an ornamental.

Reproduction: While research shows that goutweed's insect pollinated flowers can produce viable seed, seedlings are rarely encountered. Its branching network of rhizomes allows it to grow aggressively away from plantings or colonize a new site via contaminated soil.

Habitat: Moist soil and light shade are preferred garden spots, but goutweed is content in many habitats. It typically enters forests from runaway plantings or via fill contaminated with rhizome fragments.

Similar native species: Golden alexanders (*Zizia aurea*) has somewhat similarly shaped leaves but yellow flowers. Anisewood and sweet-cicely (*Osmorhiza* spp.) also have somewhat similarly shaped leaves but are anise-scented.

herbs & grasses



- Essential ID and control information
- 46 species
- Waterproof, small
- \$30 including S&H
- Visit MNAP website to order
- Read the “Managing Invasive Plants” section in the back!

Five-Year Review of the Do Not Sell List of Invasive Plants

- ▶ Chapter 273 was originally adopted in January of 2017
- ▶ Rule prescribes a five-year review to add new plants
- ▶ In November 2021 DACF established a new stakeholder committee
 - ▶ The committee developed a list of potential plant additions and changes to the rule
 - ▶ Committee met six times
- ▶ The changes were proposed on March 30, 2022
- ▶ A public hearing was held on April 22, 2022

MAINE DEPARTMENT OF
AGRICULTURE, CONSERVATION & FORESTRY

MAINE FOREST SERVICE

Woods Wise Wire

DACF to do Five-Year Review of the Do Not Sell List of Invasive Plants

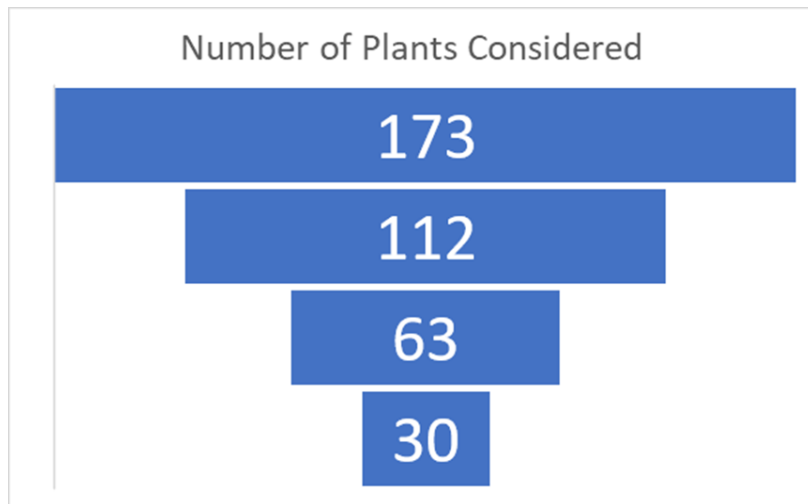
Chapter 273, Criteria for Listing Invasive Terrestrial Plants was adopted in January of 2017. The final section of the rule prescribes a five-year review of the listed species. 2021 begins that fifth year and the DACF Horticulture Program is beginning to organize that effort.

One important task is developing the stakeholder committee that will review the rule and suggest additions and/or subtractions to the list of regulated species. The makeup of the previous stakeholder group is below. We would like feedback on this template and will be looking for volunteers to fill the slots once the stakeholder group positions are solidified.

The projected timeline is to develop a list of potential additions and/or subtractions over the winter, spring and summer and then narrow that list to the actual species that would go into the proposed rule. If necessary, proposed rule changes would be available in November or December of 2021 for public comment. As with the original rules, a one-year phase-in to allow newly listed plants to be sold out of inventory would be proposed.

Please contact Gary Fish, State Horticulturist, at gary.fish@maine.gov if you have ideas regarding the makeup of the stakeholder committee or if you are interested in serving.

Terrestrial Invasive Plant Committee



- ▶ The committee started with a list of 173 species which was reduced to (112) - 81 priority plants to evaluate and another 31 seemingly lower risk plants to evaluate if time permitted
- ▶ 49 hitchhiker plants were removed from the list because it is very difficult to detect them, reducing the list to 63
- ▶ We are doing this training partly to help address the concern for hitchhiker plants

| |
|-------------------------------------|
| About Us |
| Focus Areas |
| Communities, Plants and Animals |
| Natural Communities and Ecosystems |
| Rare Plants |
| Invasive Plants |
| Invasive Plant List and Fact Sheets |
| Ecological Inventory and Monitoring |
| Rare Animals |
| State and Global Rarity Ranks |
| Survey Forms |
| Maps, Data, and Technical |

Maine Natural Areas Program

Invasive Plants

[Gallery / Advisory List](#)

[Advisory List of Invasive Plants - 2019](#)

This is a list of non-native plants found to pose a threat to habitats and natural resources in Maine. The Advisory List is an informal tool for landowners, wildlife biologists, foresters, land stewards, conservation commissions, and others interested in controlling invasive plants and preventing their spread. It is intended for education and outreach, land management, and other non-regulatory uses. Please see the [2019 Official Endorsement](#).

What is an invasive plant?

An invasive plant is defined as a plant that is not native to a particular ecosystem, whose introduction does or is likely to cause economic or environmental harm or harm to human health. There are currently approximately 2,100 plant species recorded from Maine. Approximately one third of those are not native. Of those plants that are not native, only a small fraction are considered invasive, but these have the potential to cause great harm to our landscape. Please visit our [list of fact sheets](#) to determine if a particular species is considered invasive in Maine, and [our new invasive plant brochure](#) for a general overview, including the do not call list.

INVASIVES RESOURCES



[iMapInvasives in Maine](#)
You can help map invasive species!



[iMap login or sign up](#)
Log in for registered users. Please visit our [iMap page](#) for more information and to register.

Why those 173 plant species?

► Our pipeline for plant suggestions included:

► The MNAP Advisory List of Invasive Plants -

https://www.maine.gov/dacf/mnap/features/invasive_plants/invsheets.htm

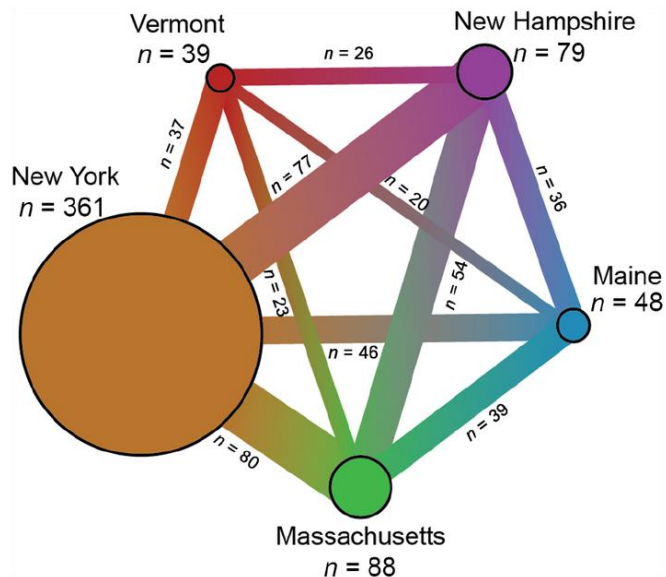
► NE RISCC Network impactful range shifting species

► <https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.4014>

► Plants listed by other Northeast states

► Plants nominated through the online form

► https://www.maine.gov/dacf/php/horticulture/documents/MaineInvasivePlantNominationForm_Dec2016.pdf



Terrestrial Invasive Plant Committee

- ▶ After a deep dive into the evaluations, the committee decided to:
 - ▶ Move forward by adding 30 species to the do-not-sell list and
 - ▶ To create a “Watch List” with 29 plants
 - ▶ The committee struggled with what to do with *Rosa rugosa* and decided to put it in its own category - Invasive Species of Special Concern
 - ▶ Recommended clarifying the requirements to petition for removal of a cultivar, hybrid, or subspecies
- ▶ The rule was adopted May 24, 2022
- ▶ As of January 1, 2024, 30 additional plants are banned from sale or import

Have You Seen These Plants?

Wanted for crimes against nature. State horticulturalist Gary Fish on the state's newest horticultural outlaws (and a warning label for beach roses).



ABOVE Beach roses, which have been given the ominous designation, “Invasive Terrestrial Plant of Special Concern.” Photograph by Benjamin Williamson.

TEXT BY AURELIA C. SCOTT
PHOTOGRAPHS COURTESY OF THE MAINE NATURAL AREAS PROGRAM

<https://mainehomes.com/have-you-seen-these-plants/>

Change to
the variance
section of
the Invasive
Plant rules

C. Varieties, cultivars, hybrids and/or subspecies that have been shown not to be invasive through scientific research and analysis may be considered exempt from this rule after review by a committee established by the Department.

1. Data submitted must include sources with no financial interest in the species, such as universities, agricultural experiment stations, cooperative extension, USDA or botanical gardens; and
2. Regulatory status in nearby states shall also be considered.

Invasive Plants Prohibited from Sale or Import in Maine What you need to Know



CMR 01-001 Chapter 273: Criteria for Listing Invasive Terrestrial Plants makes it illegal to sell, import, export, buy or intentionally propagate for sale the 33 plant species listed below.

| | |
|--|---|
| <i>Acer ginnala</i> (amur maple) | <i>Impatiens glandulifera</i> (ornamental jewelweed) |
| <i>Acer platanoides</i> (Norway maple) | <i>Iris pseudacorus</i> (yellow iris) |
| <i>Aegopodium podagraria</i> (bishop's weed) | <i>Ligustrum vulgare</i> (common privet) |
| <i>Ailanthus altissima</i> (tree of heaven) | <i>Lonicera japonica</i> (Japanese honeysuckle) |
| <i>Alliaria petiolata</i> (garlic mustard) | <i>Lonicera maackii</i> (amur or bush honeysuckle) |
| <i>Amorpha fruticosa</i> (false indigo bush) | <i>Lonicera morrowii</i> (Morrow's honeysuckle) |
| <i>Ampelopsis glandulosa</i> (porcelain berry) | <i>Lonicera tatarica</i> (Tatarian honeysuckle) |
| <i>Artemisia vulgaris</i> (common mugwort) | <i>Lythrum zalicaria</i> (purple loosestrife) |
| <i>Berberis thunbergii</i> (Japanese barberry) | <i>Microstegium vimineum</i> (Japanese stilt grass) |
| <i>Berberis vulgaris</i> (common barberry) | <i>Paulownia tomentosa</i> (paulownia, princess tree) |
| <i>Celastrus orbiculatus</i> (Asiatic bittersweet) | <i>Persicaria perfoliata</i> (mile-a-minute) |
| <i>Elaeagnus umbellata</i> (Autumn olive) | <i>Phellodendron amurense</i> (amur cork tree) |
| <i>Euonymus alatus</i> (winged euonymus) | <i>Populus alba</i> (white cottonwood) |
| <i>Euphorbia cyparissias</i> (cypress spurge) | <i>Robinia pseudoacacia</i> (black locust) |
| <i>Fallopia baldschuanica</i> (Chinese bindweed) | <i>Rosa multiflora</i> (multiflora rose) |
| <i>Fallopia japonica</i> (Japanese knotweed) | |
| <i>Frangula alnus</i> (glossy buckthorn) | |
| <i>Hesperis matronalis</i> (dame's rocket) | |

Quick Facts

- The sale/import ban includes the listed species and all cultivars, varieties and hybrids.
- Variations may be applied for and granted for scientific research and for varieties, cultivars or hybrids that have been shown to not be invasive through peer reviewed scientific research.
- The invasive plant rule and included prohibited plant list will be reviewed every 5 years.
- Recent changes to the rule will prohibit the sale of an additional 30 species starting January 1, 2024 (see back).
- Find more information at www.maine.gov/dacf/nphhorticulture/ma-she-plants.shtml



FOR MORE INFORMATION:
MAINE DEPARTMENT OF AGRICULTURE,
CONSERVATION AND FORESTRY
DIVISION OF ANIMAL AND PLANT HEALTH
28 STATE HOUSE STATION
AUGUSTA, ME 04333
207-287-3391
HORTICULTURE@MAINE.GOV
WWW.MAINE.GOV/HORT

| Scientific name | Common name | Effective Date |
|-----------------------------------|--|----------------|
| <i>Alnus glutinosa</i> | European alder | 1/1/2024 |
| <i>Angelica sylvestris</i> | Woodland angelica | 1/1/2024 |
| <i>Anthriscus sylvestris</i> | Wild chervil, raven's wing | 1/1/2024 |
| <i>Aralia elata</i> | Japanese angelica tree | 1/1/2024 |
| <i>Butomus umbellatus</i> | Flowering rush | 1/1/2024 |
| <i>Elaeagnus angustifolia</i> | Russian olive | 1/1/2024 |
| <i>Euonymus fortunei</i> | Wintercreeper, climbing spindle tree | 1/1/2024 |
| <i>Festuca filiformis</i> | Fine-leaved sheep fescue | 1/1/2024 |
| <i>Ficaria verna</i> | Lesser celandine | 1/1/2024 |
| <i>Glaucium flavum</i> | Yellow hornpoppy | 1/1/2024 |
| <i>Glechoma hederacea</i> | Ground ivy, creeping charlie | 1/1/2024 |
| <i>Glyceria maxima</i> | Great manna grass, reed manna grass | 1/1/2024 |
| <i>Hippophae rhamnoides</i> | Sea buckthorn | 1/1/2024 |
| <i>Ligustrum obtusifolium</i> | Border privet | 1/1/2024 |
| <i>Lonicera xylosteum</i> | Dwarf honeysuckle | 1/1/2024 |
| <i>Lythrum virgatum</i> | European wand loosestrife | 1/1/2024 |
| <i>Miscanthus sacchariflorus</i> | Amur silvergrass | 1/1/2024 |
| <i>Petasites japonicus</i> | Fuki, butterbur, giant butterbur | 1/1/2024 |
| <i>Phalaris arundinacea</i> | Reed canary grass, variegated ribbon grass | 1/1/2024 |
| <i>Photinia villosa</i> | Photinia, Christmas berry | 1/1/2024 |
| <i>Phragmites australis</i> | Common reed | 1/1/2024 |
| <i>Phyllostachys aurea</i> | Golden bamboo | 1/1/2024 |
| <i>Phyllostachys aureosulcata</i> | Yellow groove bamboo | 1/1/2024 |
| <i>Prunus calleryana</i> | Callery ("Bradford") pear | 1/1/2024 |
| <i>Ranunculus repens</i> | Creeping buttercup | 1/1/2024 |
| <i>Rubus phoenicolasius</i> | Wineberry | 1/1/2024 |
| <i>Silphium perfoliatum</i> | Cup plant | 1/1/2024 |
| <i>Sorbus aucuparia</i> | European mountain-ash | 1/1/2024 |
| <i>Tussilago farfara</i> | Coltsfoot | 1/1/2024 |
| <i>Valeriana officinalis</i> | Common valerian | 1/1/2024 |

Invasive Terrestrial Plant Species of Special Concern

| Scientific Name | Common Name |
|--------------------|-------------------------|
| <i>Rosa rugosa</i> | Rugosa rose, beach rose |

Rosa rugosa - invasive species of special concern starting 1/1/2024



1. Must provide signage or plant tags (next slide)
 - A. The plant vendor must provide species specific guidance at the time of sale to notify the purchaser about the invasive potential of the species and what habitat types to avoid when installing the plant.
 - B. No person selling or offering for sale an invasive terrestrial plant species of special concern shall conceal, detach, alter, deface, or destroy any label, sign, or notice required under this section.

New requirements for *Rosa rugosa*



Rosa rugosa

Invasive Species – Harmful to the Environment

Ask About Alternative Plants

Follow Species Specific Instructions Provided by the Vendor

Protect native species; do not plant in coastal areas, especially on or near sand dunes.

Alternative plants include: virginia rose and other roses, bayberry, sweet fern, red chokeberry, beach plum and sand cherry.



Plants on the “Watch List”

- ▶ Hardy kiwi
- ▶ Chocolate vine
- ▶ Italian arum
- ▶ Paper mulberry
- ▶ Butterfly bush
- ▶ Sweet autumn
- ▶ Indian yam
- ▶ Chinese yam
- ▶ Weeping lovegrass
- ▶ Queen of the meadow
- ▶ Two-colored bush clover
- ▶ California privet
- ▶ Honeyberry
- ▶ Ragged robin
- ▶ White mulberry
- ▶ Sawtooth oak

Plants on the “Watch List”

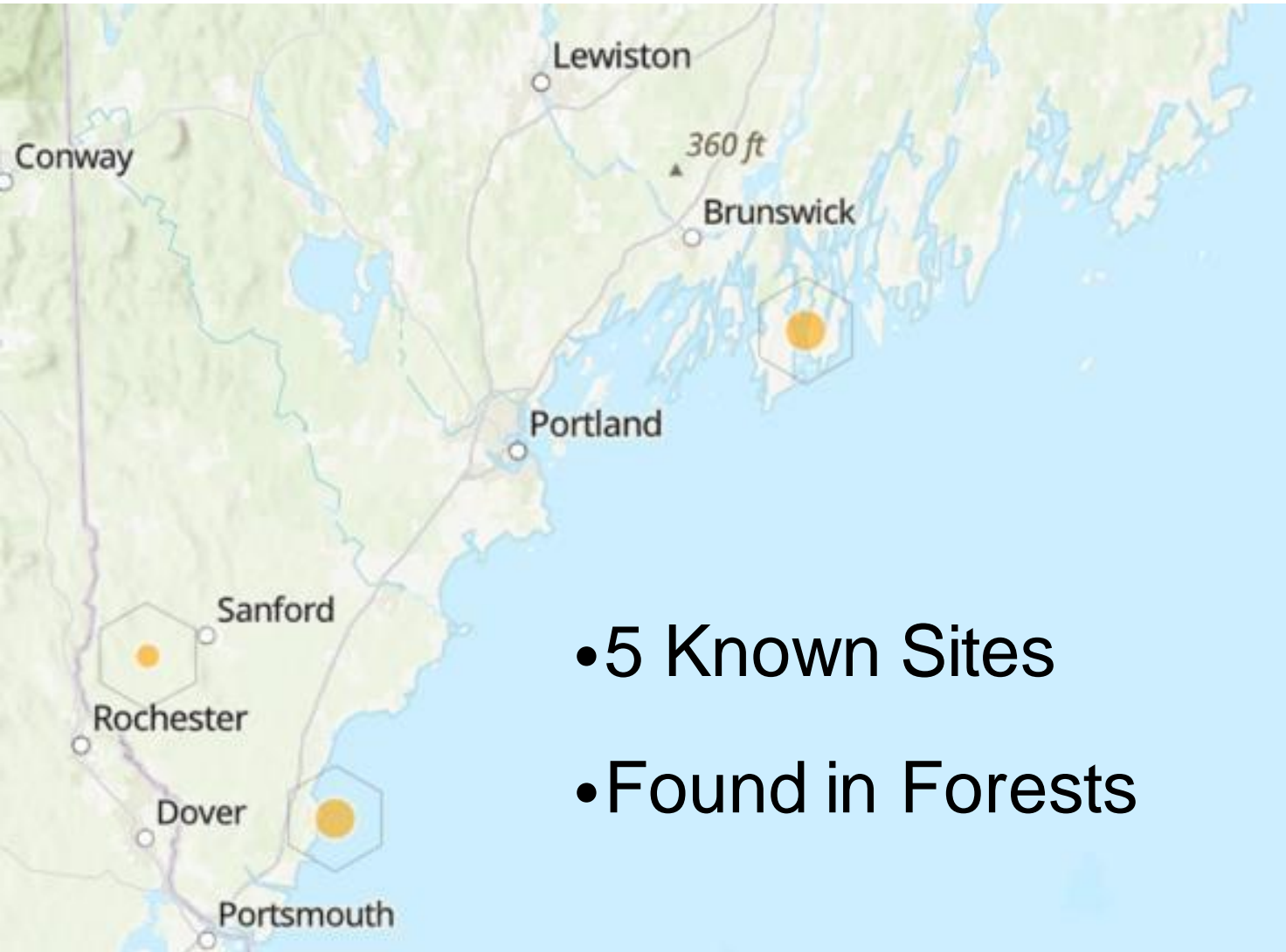
- ▶ Rosa rugosa
- ▶ Hardy pampas grass
- ▶ Sticky sage
- ▶ Milk thistle
- ▶ Japanese spiraea
- ▶ Sapphire-berry
- ▶ Japanese tree lilac
- ▶ Chinese cedar
- ▶ Siberian elm
- ▶ Linden arrowwood
- ▶ Siebold viburnum
- ▶ Japanese wisteria
- ▶ Chinese wisteria

STILTGRASS (*MICROSTEGIUM VIMINIUM*)

- Found at York county nursery and two Georgetown properties
- Be on the lookout for dense patches of unfamiliar grass
- Built up thatch is fire risk
- Crowds out natives



Stiltgrass



- 5 Known Sites
- Found in Forests



Invasive Stiltgrass

Microstegium vimineum



Have you seen this plant?



Invasive stiltgrass (*Microstegium vimineum*) is a highly invasive annual weed that causes ecological and economic harm by forming a thick thatch layer that makes it difficult for native trees, shrubs and wildflower seeds to establish and grow. The presence of invasive stiltgrass in a forest may also increase fire risk.

Please help us find this Early Detection, Rapid Response plant in Maine. **You can help!** If you suspect invasive stiltgrass, **note the location** and **send a photo** to invasives.mnap@maine.gov. Look for these characteristics:

1. 2-4" long leaves that are ½" wide and alternate along the stem.
2. Upper leaf surface has a stripe of reflective hairs along the mid-rib.
3. Leaf edges that feel smooth to the touch. Unlike some native grasses that have stiff hairs that make the leaf edges feel rough or sticky.
4. Plants that flower and set seed late in the season (September-October), much later than many other grasses. Seed spikes are similar to crabgrass.
5. Stems may develop a reddish tint late in the season.



MILE-A-MINUTE VINE (*Persicaria perfoliata*)

- Not yet established in Maine
- Several reports/interceptions in 2023
- Climbing/sprawling annual vine
- Can grow 6" in one day
- Produces seeds June-Sept
 - Be vigilant in cutting back
- Seeds viable up to 6yrs
- Lots of look-a-likes

Photo credit: Richard Gardner, Bugwood.org

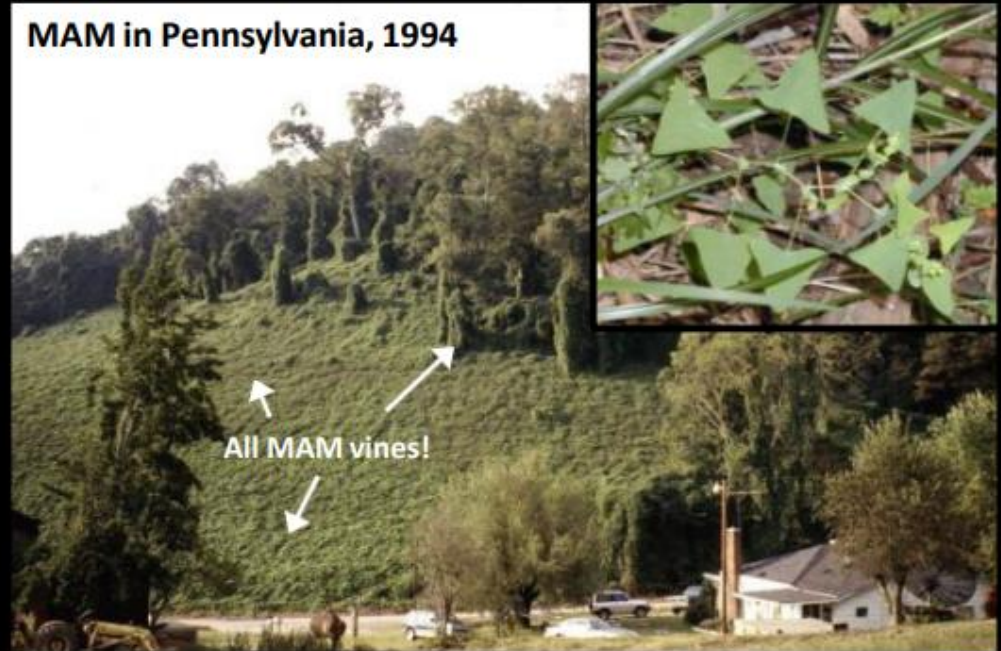
Mile-a-minute Vine (MAM)

Persicaria perfoliata

1. Triangular leaves- no lobes or indentations



MAM in Pennsylvania, 1994



2. Small barbs along stems



3. Saucer-shaped leaves (called ocrea) at nodes

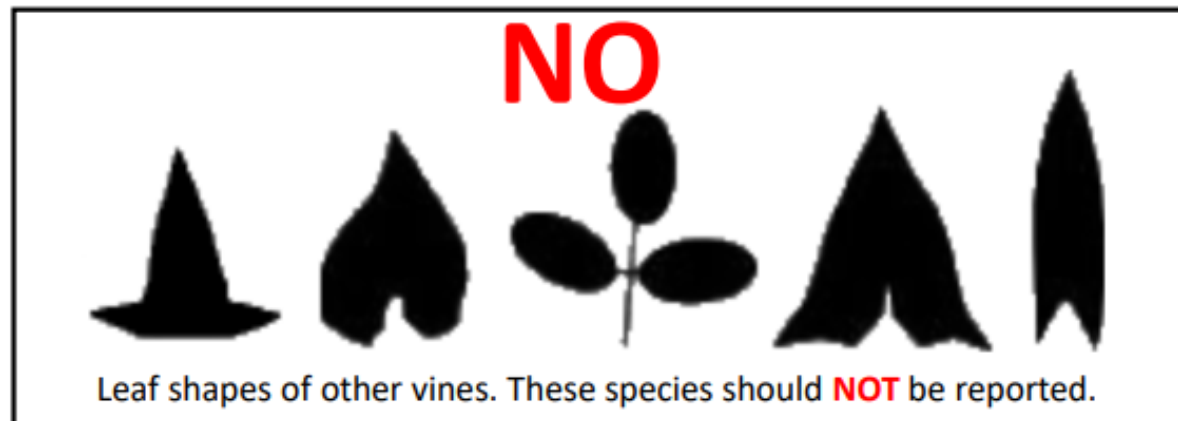


Have you seen this plant?



Mile-a-minute vine (*Persicaria perfoliata*) is a highly invasive annual weed that causes ecological and economic harm by out competing and overgrowing native species. A single mile-a-minute vine can grow up to 6 inches per day and will climb trees and posts and scramble over other vegetation.

Please help us find this Early Detection, Rapid Response plant in Maine. **You can help!** If you see a vine with **all three** of these characteristics (1) very triangular leaves, (2) very sharp barbs on the stem, and (3) clasping ocrea, **note the location** and **send a photo** to invasives.mnap@maine.gov.



Photos & thanks to Todd Mervosh, Les Mehrhoff, Hope Leeson, Judy Hough-Goldstein, Renee Sullivan & the CT Invasive Plant Working Group

MILE-A-MINUTE LOOK-A-LIKES

Tearthumbs are closely related to Mile-a-Minute vine. Many have prickles on the stem, but their leaves are longer, less triangular, and often lobed at the base. There are many species, most lack the clasping bract. Top photos of **Halberd-leaved Tearthumb**, bottom photos of **Arrow-leaved Tearthumb**.



Photos: Bruce Patterson | Glen Mittelhauser | Arthur Haines | Arieh Tal

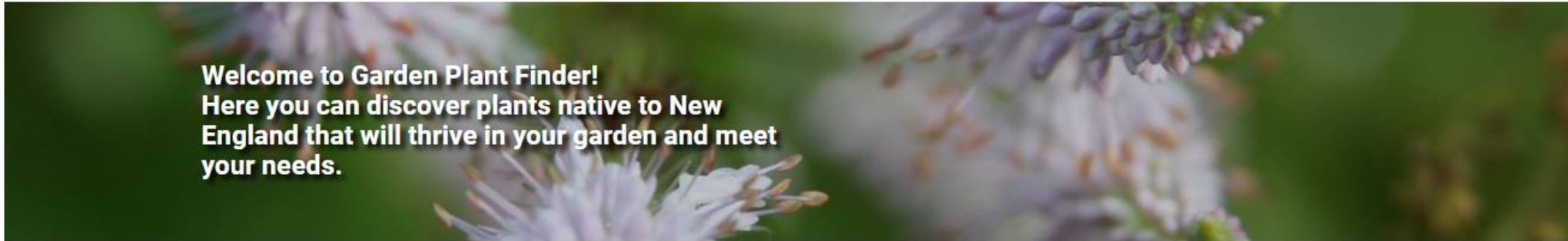


https://www.maine.gov/dacf/mnap/features/invasive_plants/mile-a-minute.pdf

Fringed Bindweed, Climbing Bindweed, and Black Bindweed are similar vining plants in the genus *Fallopia*. The first two are native, though Black Bindweed is non-native and weedy. These three species have nodes along their stems and superficially resemble each other. The nodes are fringed in Fringed Bindweed but not the other two. Keels on flower petals and fruit texture distinguish the other two species.



Fringed Bindweed (left and right above): Don Cameron | Frank Bramley



Additional Information

- About Ecoregions, Cultivars and More

Search for plants by name using "quick search," or narrow your results based on plant type, flower color, **New England Level 3 ecoregion**, exposure, moisture, bloom season, and even **cultivation status**. Specify whether to show results that meet *all* or *any* of your search criteria by toggling the box at the bottom of the page. You can also use our search tool to access information about the full range of plants sold at Garden in the Woods and Nasami Farm.

Check out our [Important Definitions](#) page to learn more about ecoregions, cultivation status, and why certain plants are included in this database.

<https://plantfinder.nativeplanttrust.org/Plant-Search>

Many great plant choice sources today



Where to Buy Native Plants

The native plant movement is gaining traction in much of the U.S. — and that is fantastic! It can still be difficult, though, to source local native plants and seeds; so to help, we've carefully curated the following directory of where to buy northeastern native plants by state, including:

- Wholesale and retail nurseries that specialize in or include a wide selection of native plants
- Native plant sales hosted by nonprofits and co-ops annually or seasonally

While we include the highest quality plant nurseries in this directory, it is still important that you do your own research to find out what native plants are in stock, if the plants are grown from seed, and if the nurseries use



Where to buy native plants

A close-up photograph of tree bark, showing a rough, cracked, and layered texture in shades of brown and grey. The bark is the background for the text.

Tree, Forest & Agricultural Insects and Diseases





Beech Leaf Disease – a newer concern



BEECH LEAF DISEASE

- First reported in OH, 2012
- American, European, and Oriental beech are susceptible



- Perhaps caused by a foliar nematode, *Litylenchus crenatae*



BLD leaf

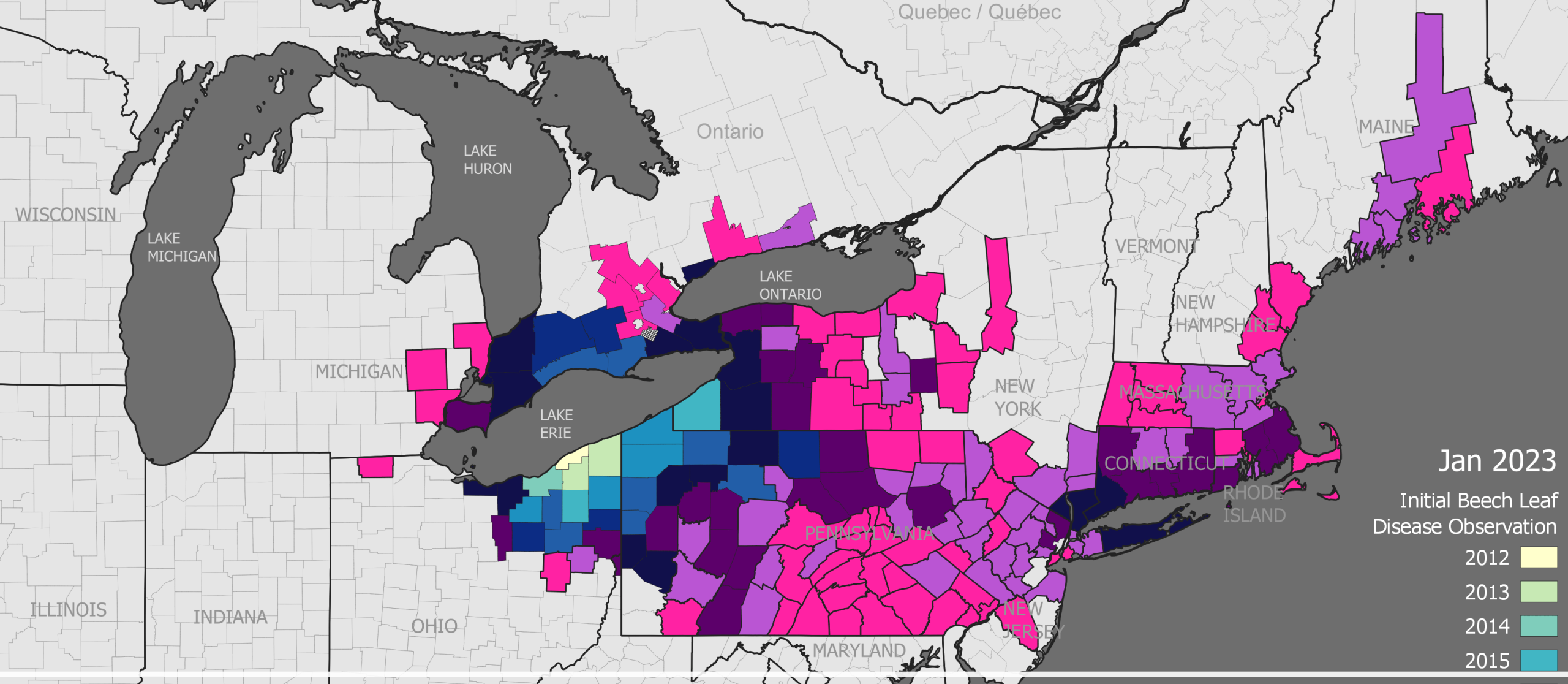


Late summer - fall season

Nematodes collected from 10-15 BLD leaves



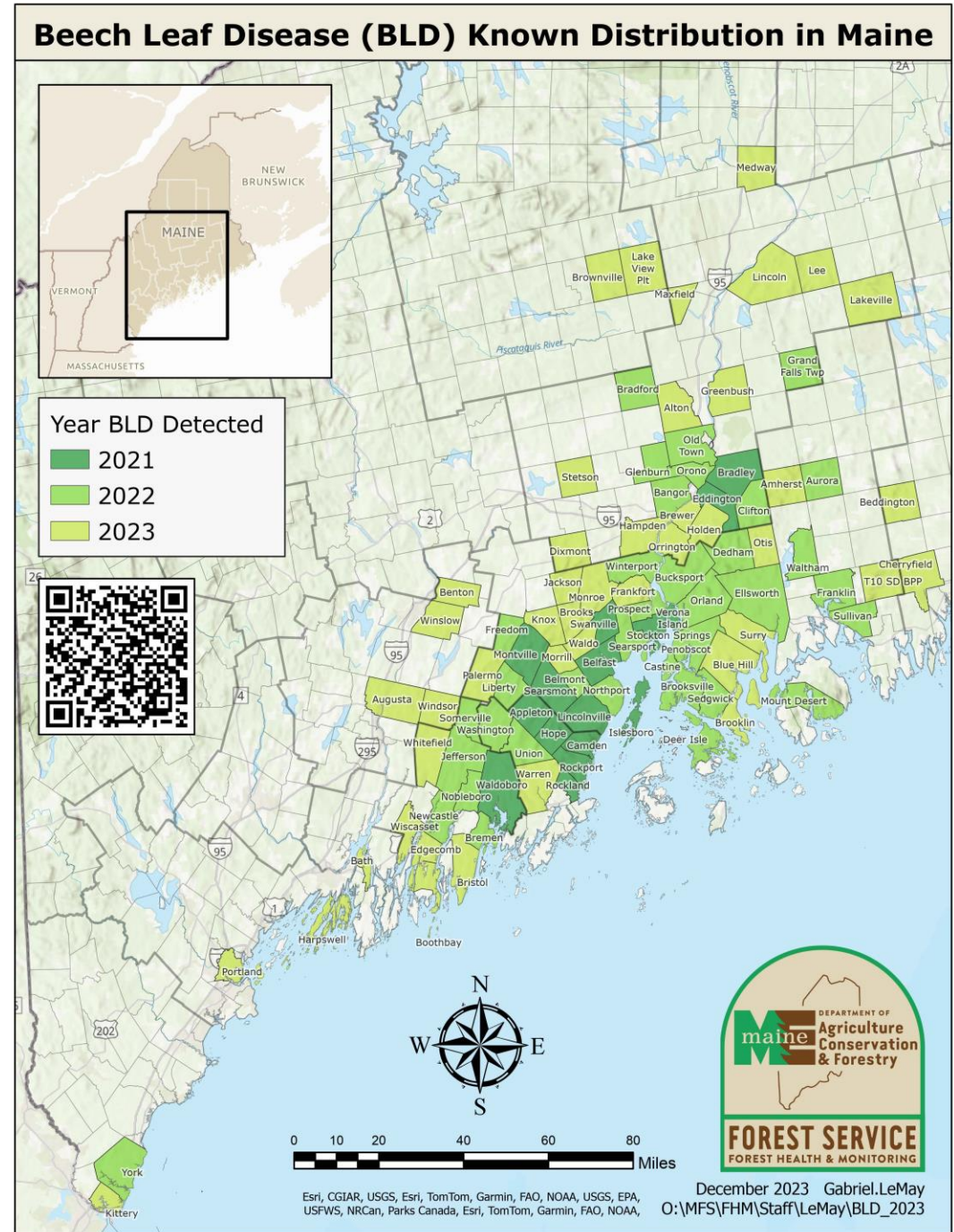
Nematode-wool: typical agglomeration of nematodes within this family



Fast spread – Unknown pathway

First reported in Maine – June 2021

- Cumberland Co. – 2023
- Hancock Co. – 2022
- Kennebec Co. – 2023
- Knox Co. – 2021
- Lincoln Co. – 2021
- Penobscot Co. – 2021
- Piscataquis Co. – 2023
- Sagadahoc Co. – 2023
- Waldo Co. – 2021
- Washington Co. – 2023
- York Co. – 2023



Beech leaf disease symptoms

- Early symptoms - interveinal dark bands as leaves emerge in spring
- Later, leaves thicken, shrivel, curl
- Reduced bud and leaf production
- Mortality
 - 2 – 5 years – saplings
 - ~6 years – mature trees





Accident caused by falling ash in Hudson, NH Image: WMUR



Emerald ash borer – A reason for concern?

Over 100 million ash trees killed

Recognizing EAB

Up close

Bark splitting



Michigan Dept. of Agriculture, Bugwood.org

S-shaped galleries under bark



John Obermeyer, Purdue

EAB

NOT EAB



Pennsylvania Dept. of Conservation and Natural Resources



D-shaped exit holes

Recognizing EAB

From afar

Woodpecker activity!!!



USDA APHIS PPQ, Bugwood.org

Crown dieback



USDA APHIS PPQ, Bugwood.org



J. Ellis, Purdue University

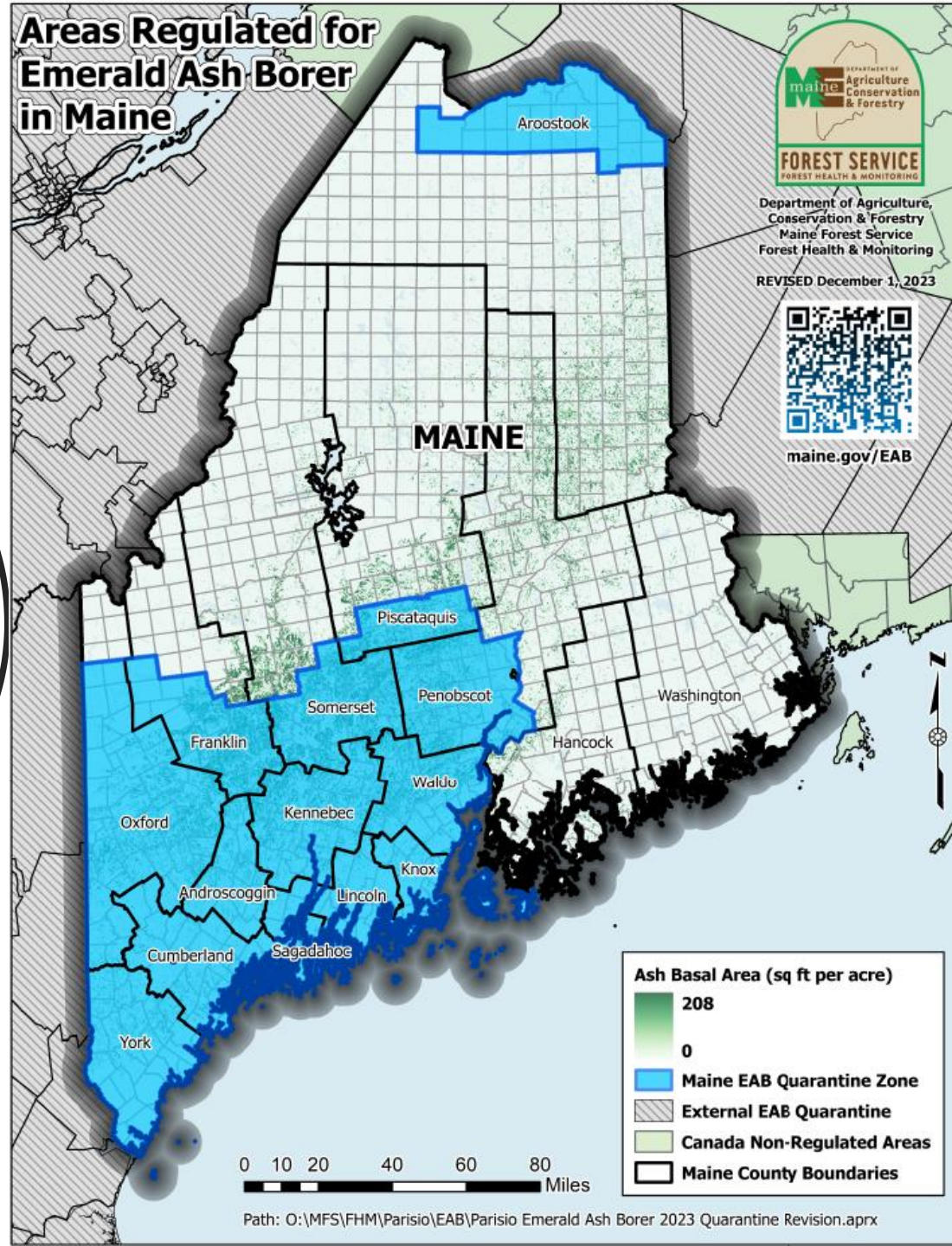
Epicormic shoots

What to look for in the winter

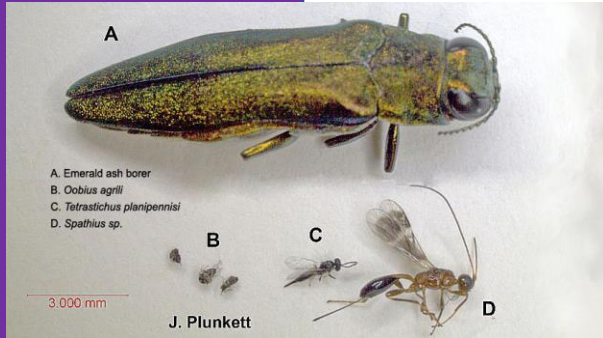


Emerald Ash Borer Quarantine

Expanded Quarantine Adopted 11/26/2023

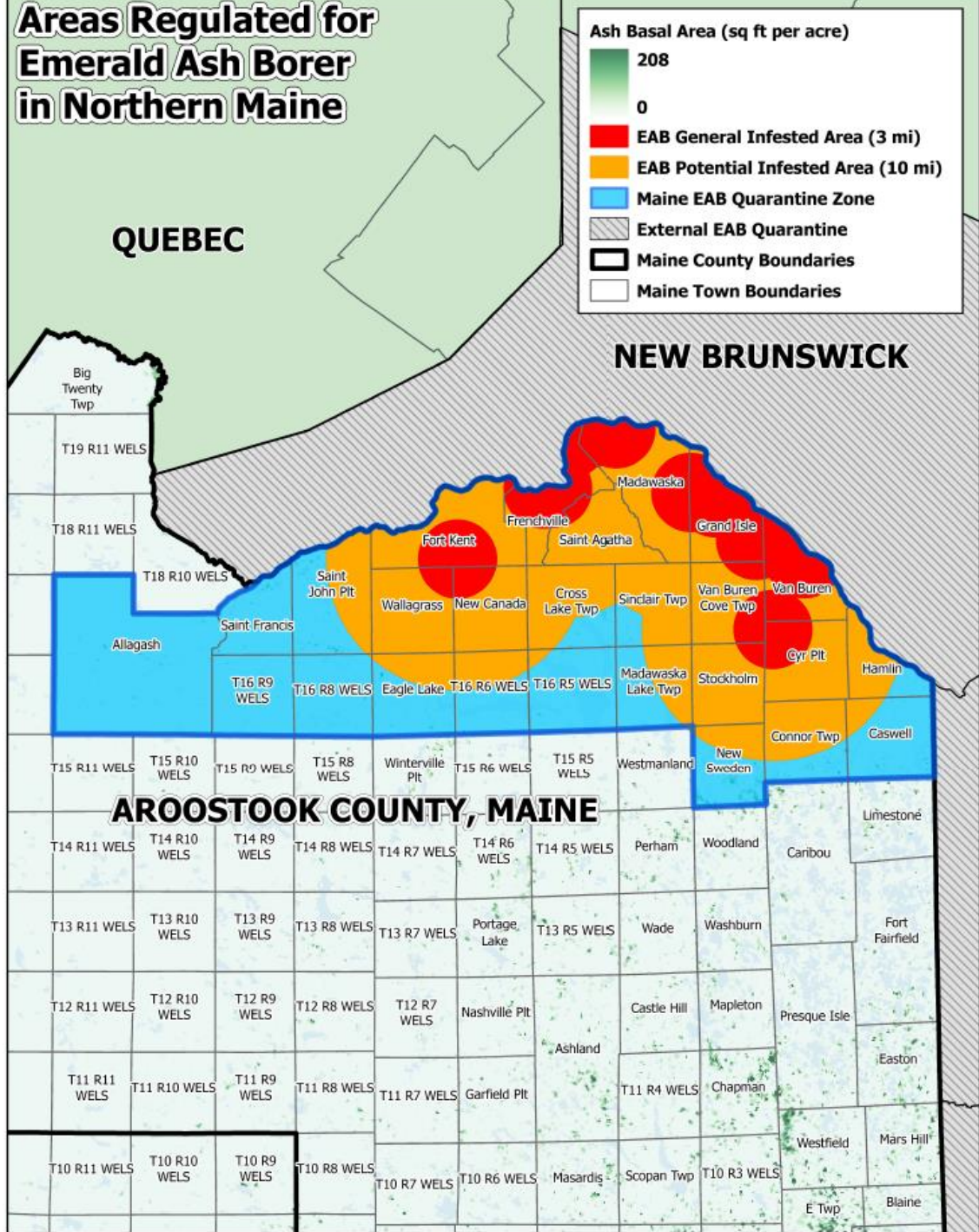


- Quarantine expanded in the northern and southern regions
- 40% of ash still uninfested
- 13 counties now have towns within the EAB quarantine area



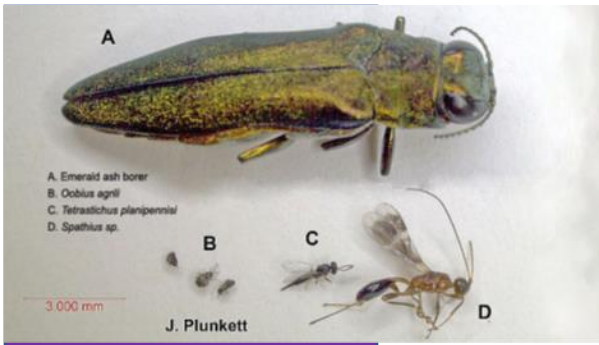
Emerald Ash
 Borer
 Quarantine
 Northern
 Maine

Areas Regulated for Emerald Ash Borer in Northern Maine

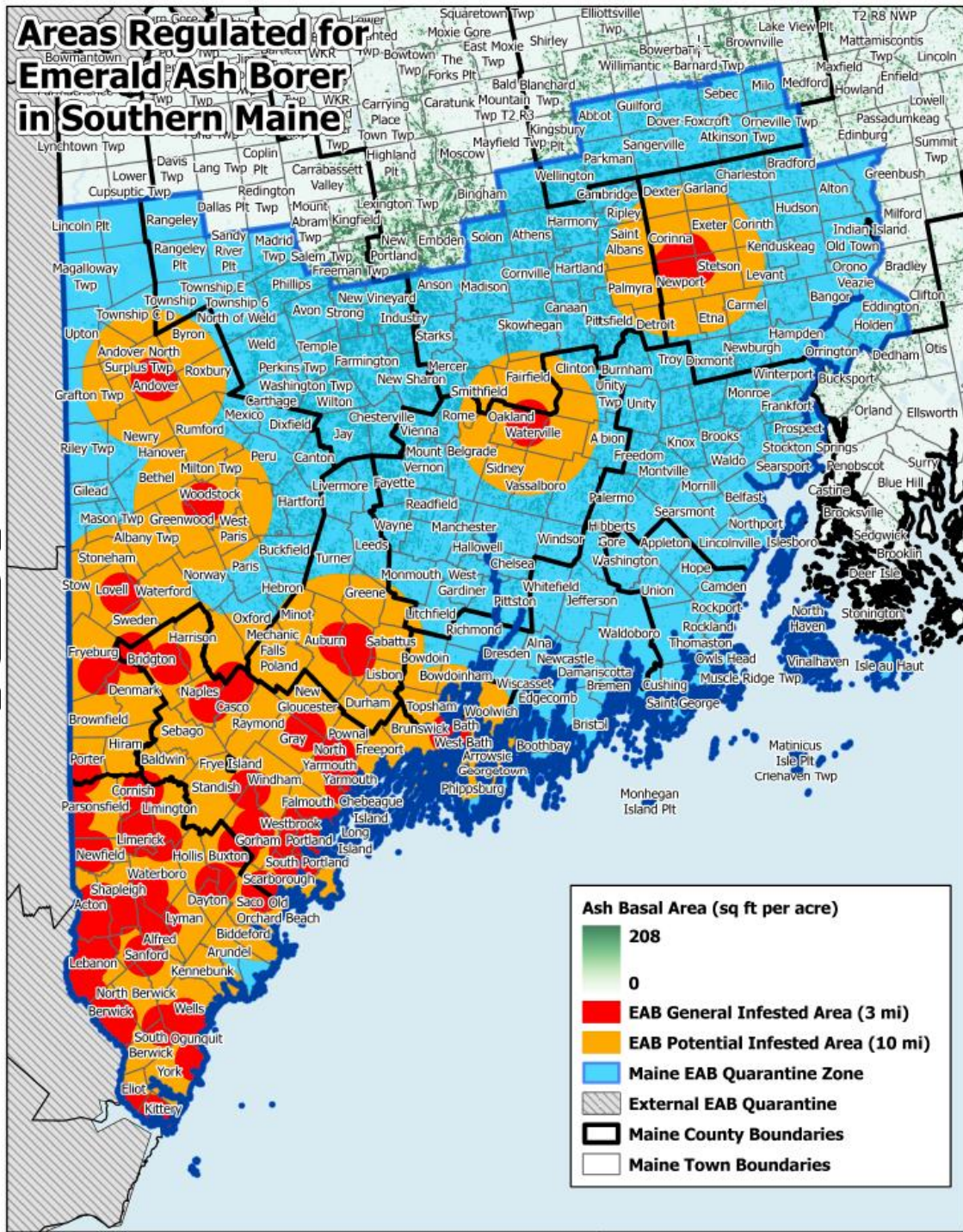


**Two Townships
 Added to the
 Quarantine in
 Northern Maine**
 New townships include:
T16 R8 WELS, T16 R9 WELS





Areas Regulated for Emerald Ash Borer in Southern Maine



Many New Towns Added to Quarantine

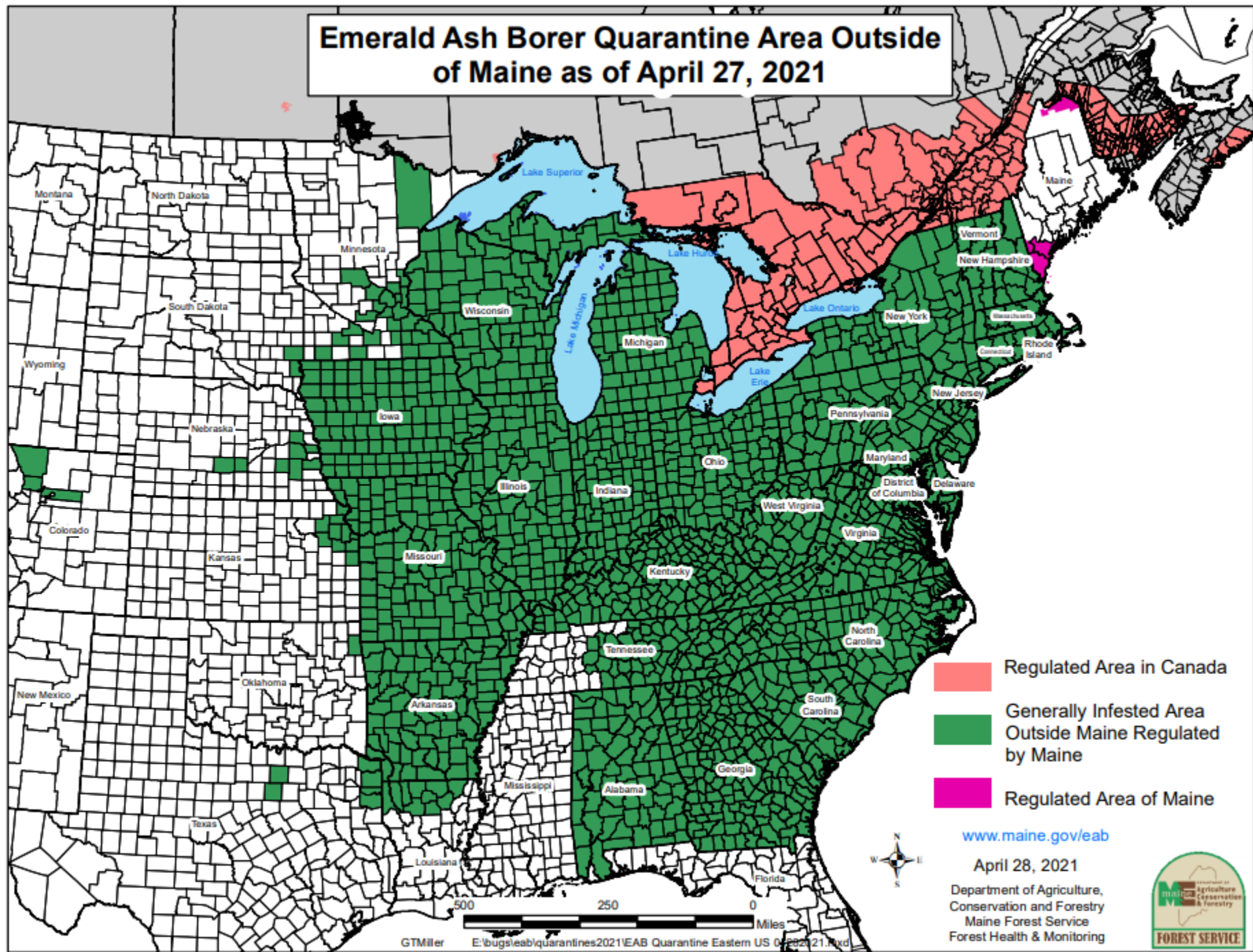
- All of Androscoggin, Knox, Lincoln, Sagadahoc, and Waldo Counties
- 22 towns in southern Franklin County
- All but 7 northern towns in Oxford County
- 31 Towns in southern Penobscot County

Emerald Ash Borer Quarantine Southern Maine

Many New Populations Found

<https://www.aphis.usda.gov/aphis/maps/plant-health/eab-map>

<https://inspection.canada.ca/plant-health/invasive-species/insects/emerald-ash-borer/areas-regulated/eng/1347625322705/1367860339942>



Biological controls may save our ash

Is it safe to release wasps since they are non-native insects?

Before the wasps were released, research in China and in the United States revealed that the wasps prefer EAB over other insects

No adverse effects were found or raised through the environmental assessment process



SPATHIUS GALINAE



SPATHIUS AGRILI



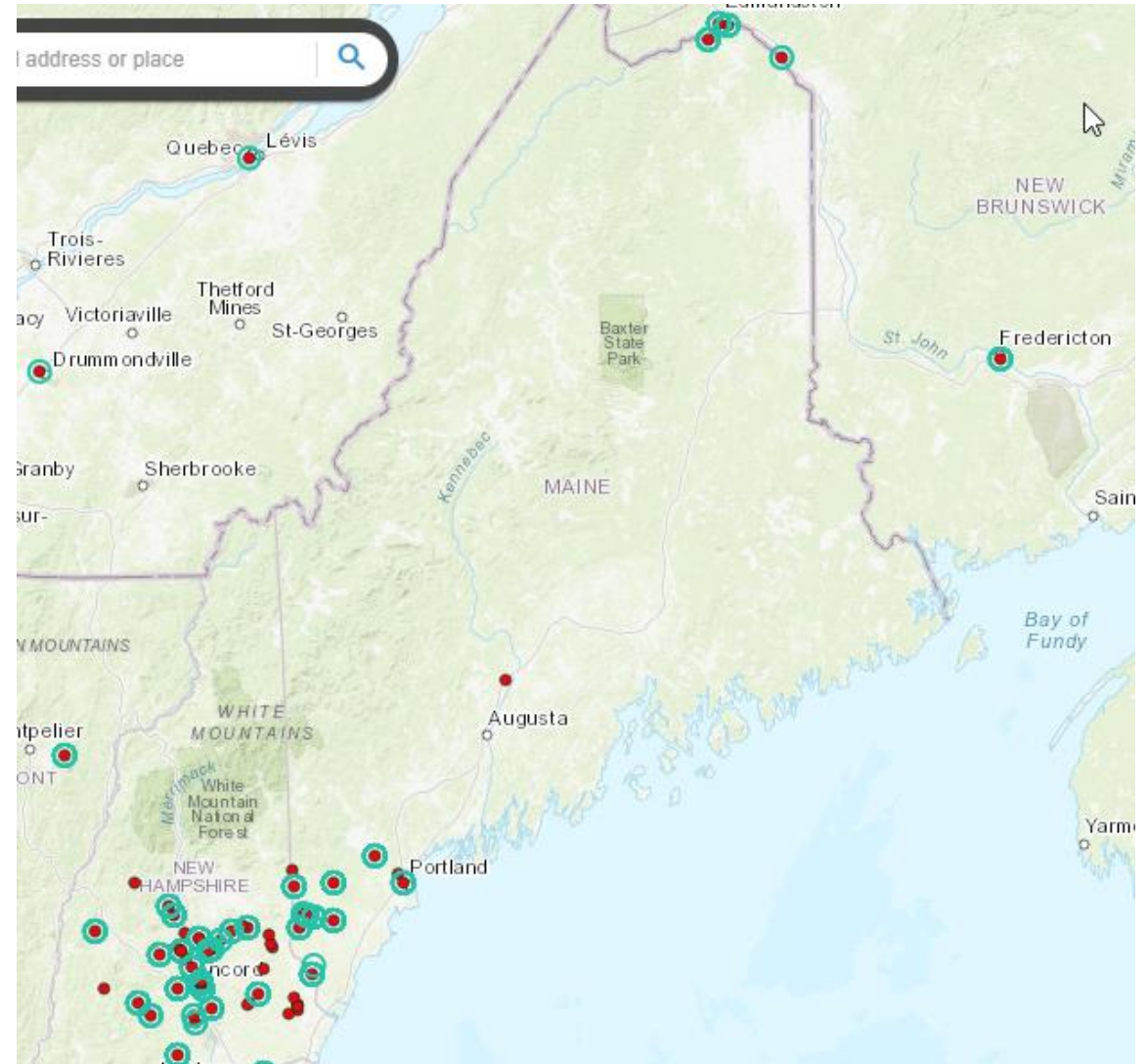
OBIUS AGRILI



TETRASTICHUS PLANIPENNISI

You can read the documents and public comments by visiting <https://www.regulations.gov/docket?D=APHIS2014-0094>

Parasitoid wasp release sites for control of emerald ash borer



<https://msugis.maps.arcgis.com/apps/webappviewer/index.html?id=255045037dbb455a8f836a19e9d4a172>

Winter Moth

Geometrid moth; "inchworm"

Adults
emerge
late Fall



Tom Murray, BugGuide.net

Nov - Jan



Waltham Services

Eggs
overwinter



Gyorgy Csoka,
Hungary Forest
Research Institute,
Bugwood.org

Dec - Apr

Pupa looks
like soil



Maine Forest Service



Hannes Lemme, Bugwood.org

Jun - Nov



Cape Cod Times/Steve Heaslip

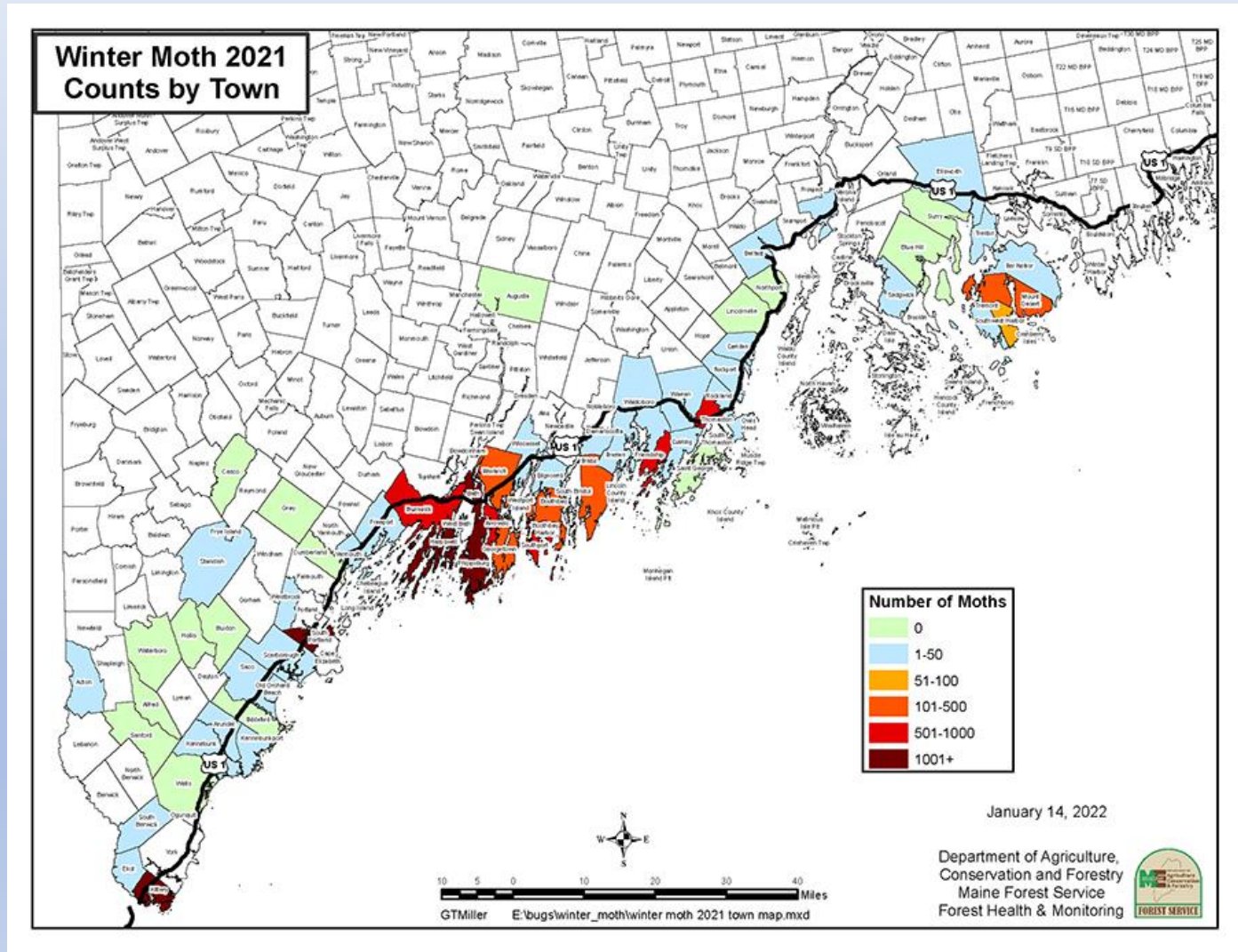
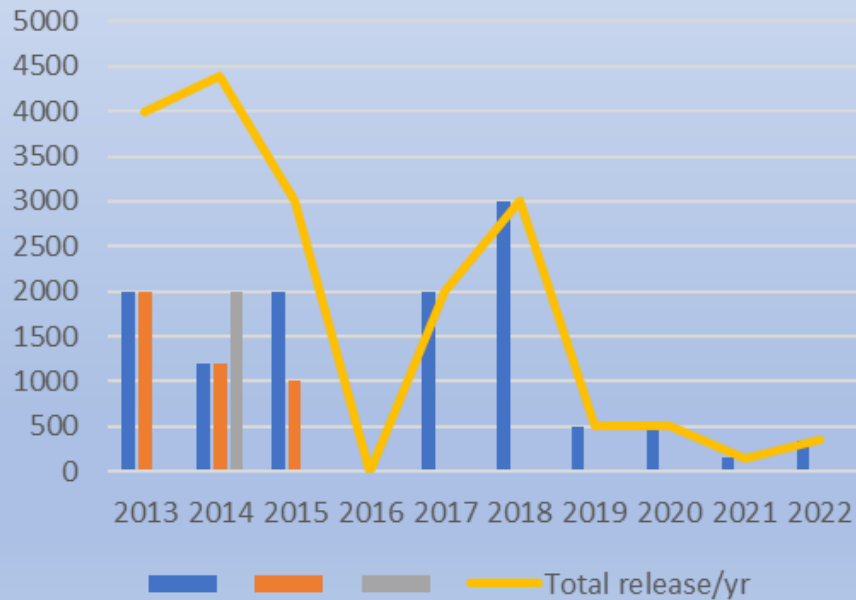
Apr - Jun

Caterpillars
chew leaves

Winter Moth

Damage reported in coastal locations from Kittery to MDI

Cyzenis albicans Releases



Biological control for winter moth

| CATERPILLAR COLLECTION SITE | 2023 PARASITISM RATES |
|---------------------------------|-----------------------|
| Bath | 18% |
| Boothbay Harbor | 6% |
| Cape Elizabeth | 0% |
| East Boothbay (first recapture) | 41% |
| Harpswell | 2% |
| Kittery (Release Site) | 34% |
| Kittery (Braveboat Harbor Rd) | 23% |
| South Bristol (first recapture) | 36% |
| South Portland | 14% |

| Town | County | Release Dates | Number of <i>Cyzenis albicans</i> Released | Recovery Comments |
|----------------------|------------|-----------------------|--|---|
| Cape Elizabeth | Cumberland | 1-May-2013 | 2,000 | First recovery 2016; 27.4% parasitism in 2020 |
| Harpswell | Cumberland | 16 & 22-May-2014 | 1,200 | Survival not good |
| Kittery | York | 16 & 23-May-2014 | 1,200 | First recovery 2016; 35.75% parasitism in 2021 |
| Vinalhaven | Knox | 21-May-2014 | 2,000 | First recovery in 2018 |
| Portland | Cumberland | 15-May-2015 | 2,000 | First recovery in 2018, 4.7% parasitism in 2020 |
| Cape Elizabeth | Cumberland | 15-May-2015 | 1,000 | In 2021 parasitism rates at 10.95% |
| Harpswell | Cumberland | Cage set: 15-Nov-2016 | 2,000 | First recovery 2020 0.85% parasitism in 2021 |
| South Portland | Cumberland | Cage set: 29-Nov-2017 | 3,000 | 0.84% parasitism in 2021 |
| Bath | Sagadahoc | 21-May- 2020 | 500 | Few flies emerged; cage was tampered with. 5.71% parasitism in 2021 (first recovery) |
| Boothbay Harbor | Lincoln | 29-April-2020 | 500 | Great emergence |
| East Boothbay Harbor | Lincoln | 17-May-2021 | 150 | Good emergence |
| South Bristol | Lincoln | 5-May- 2022 | 329 | Great emergence with breeding observed |
| South Bristol | Lincoln | May 1 2023 | 447 | Great emergence |
| West Bath | Sagadahoc | Cage set: oct 13,2023 | 1300 | To be released May 2024 |



Cyzenis albicans

Browntail Moth

Euproctis chrysorrhoea

- Invasive insect from Europe
 - Order: Lepidoptera (moths)
 - Family: Lymantriidae
- Caterpillars have toxic hairs



BTM Dashboard



Browntail Moth (BTM) Dashboard

The Department of Agriculture, Conservation and Forestry's [Maine Forest Service](#) has assembled this browntail moth (BTM) monitoring dashboard to provide information about where we know BTM is located in Maine. If you see BTM in other areas of Maine, please help us improve this information and report your detection to the Maine Forest Service by going to [this online form](#). You can find more information about BTM on our [website](#).

BTM Aerial Survey

Aerial surveys (mapping of damaged areas from a fixed-wing plane) provide a coarse overview of areas with moderate to high BTM caterpillar populations. This survey takes place up to two times a year:

- Mid-June to July: defoliation by spring-feeding caterpillars is mapped.
- Early-September: damage by late-summer-feeding caterpillars is mapped. This damage is often not

BTM Map Tools

Use the layer tools in the upper right corner of the map to

- display the legend
- toggle layers on and off

BTM Winter Web Surveys

These surveys help predict the intensity of BTM infestations for the following spring over a broad area. Between December and April, teams of two drive some of the major roads within and near areas known to have BTM. The passenger collects information on the host tree(s), pattern of web

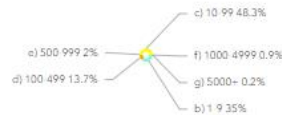
BTM 2022 Town List (Aerial Survey)

Select town for detail

Unselect town to clear selection

- Auburn
- Augusta
- Chelsea
- Greene
- Leeds
- Lewiston
- Litchfield
- Livermore
- Livermore Falls
- Monmouth
- Pittston
- Sabattus

Percentage by Web Survey Count (2023) Category



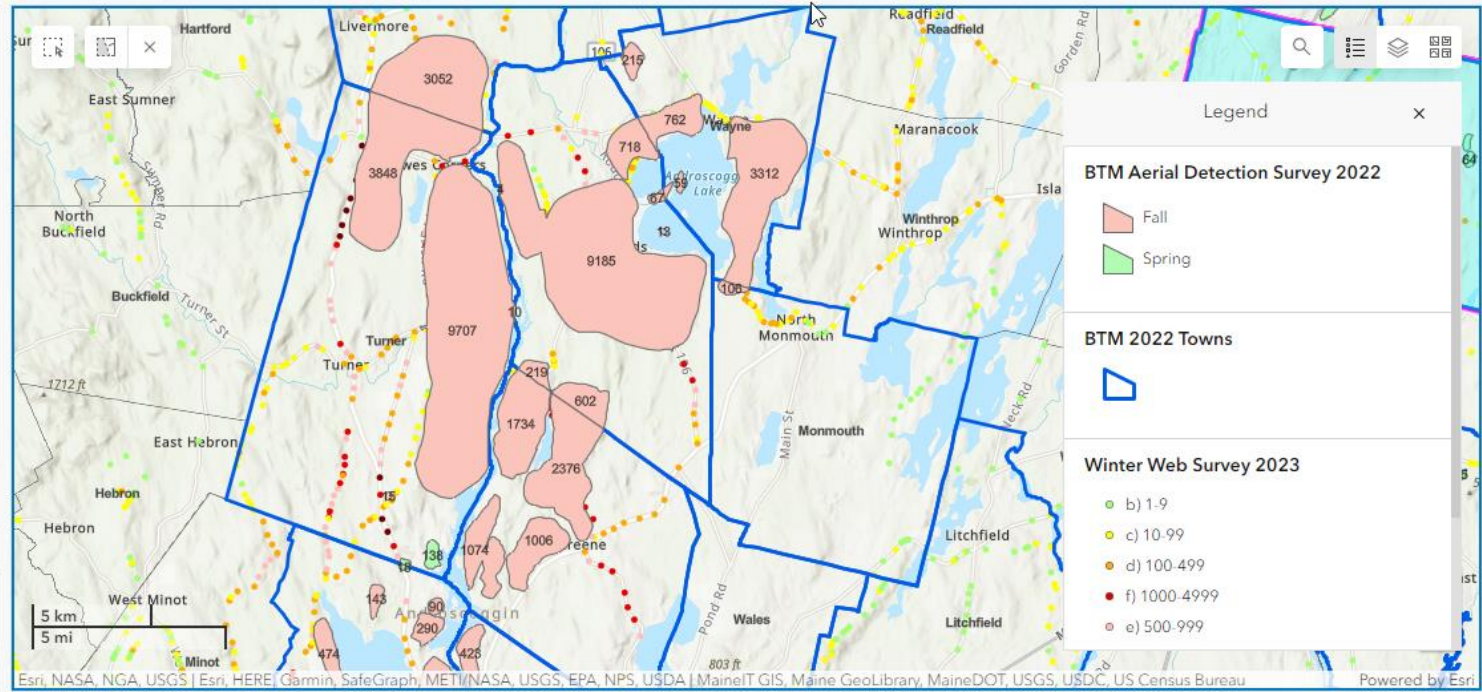
Each data point in the winter web survey is assigned a range of numbers based on how many webs are estimated to be in a given area around that point.

2023 2022 2021

2022 BTM Acreage

42.5k

displayed represents current map extent.



- <https://www.arcgis.com/apps/dashboards/8f2931a691374ac9853636e71cbb1f40>

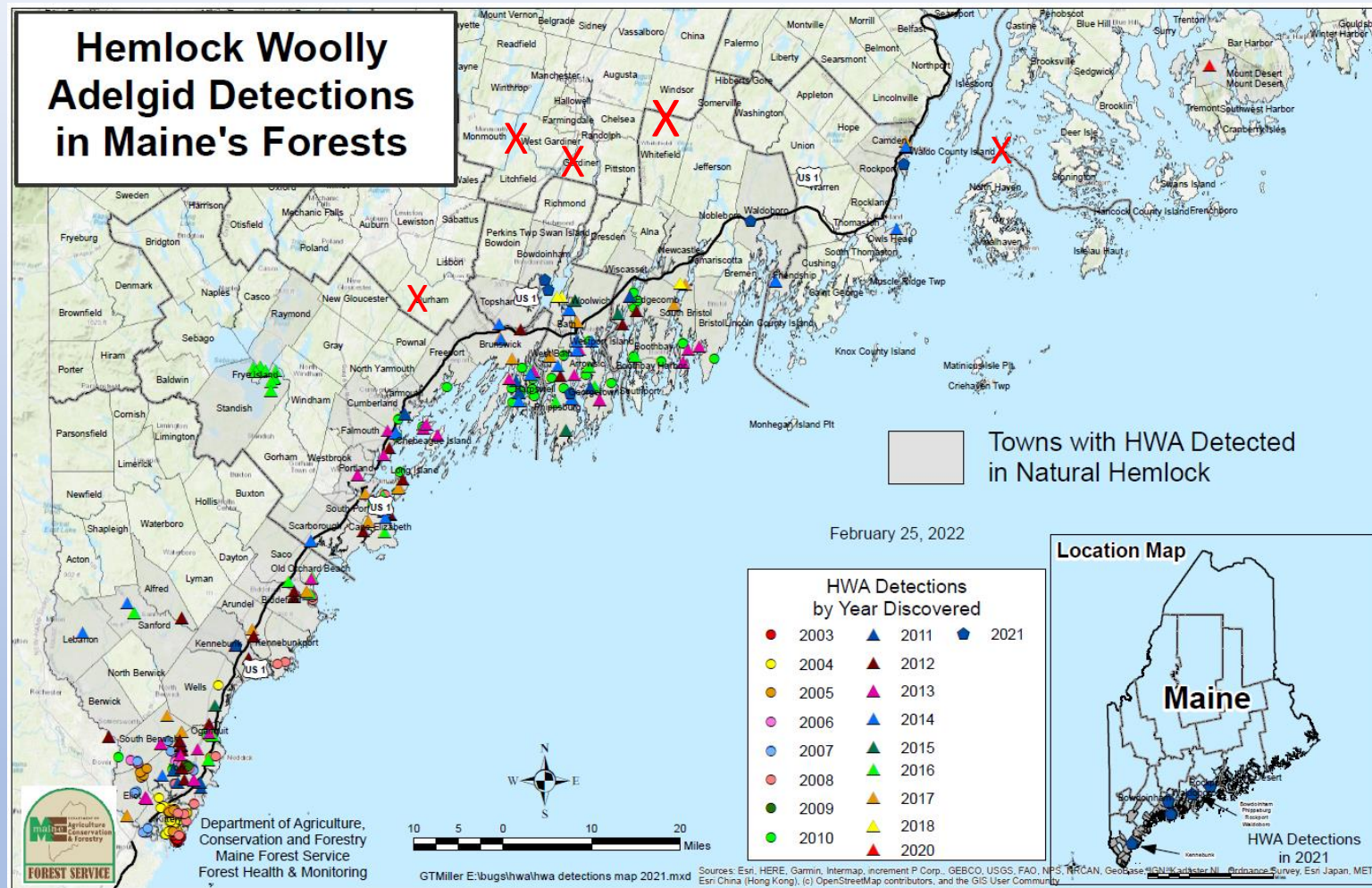
Hemlock Woolly Adelgid

new towns –
2022 (X)

- Gardiner (outside the quarantine)
- Whitefield
- Pownal
- North Haven
- Litchfield (New County, Kennebec)
- Also first detection in Acadia National Park

2021

- Bowdoinham
- Rockport
- Waldoboro



Drought/HWA impacts accelerating decline of hemlock (coastal peninsulas); still very hard to detect in aerial survey



Areas Regulated for Hemlock Woolly Adelgid in Maine

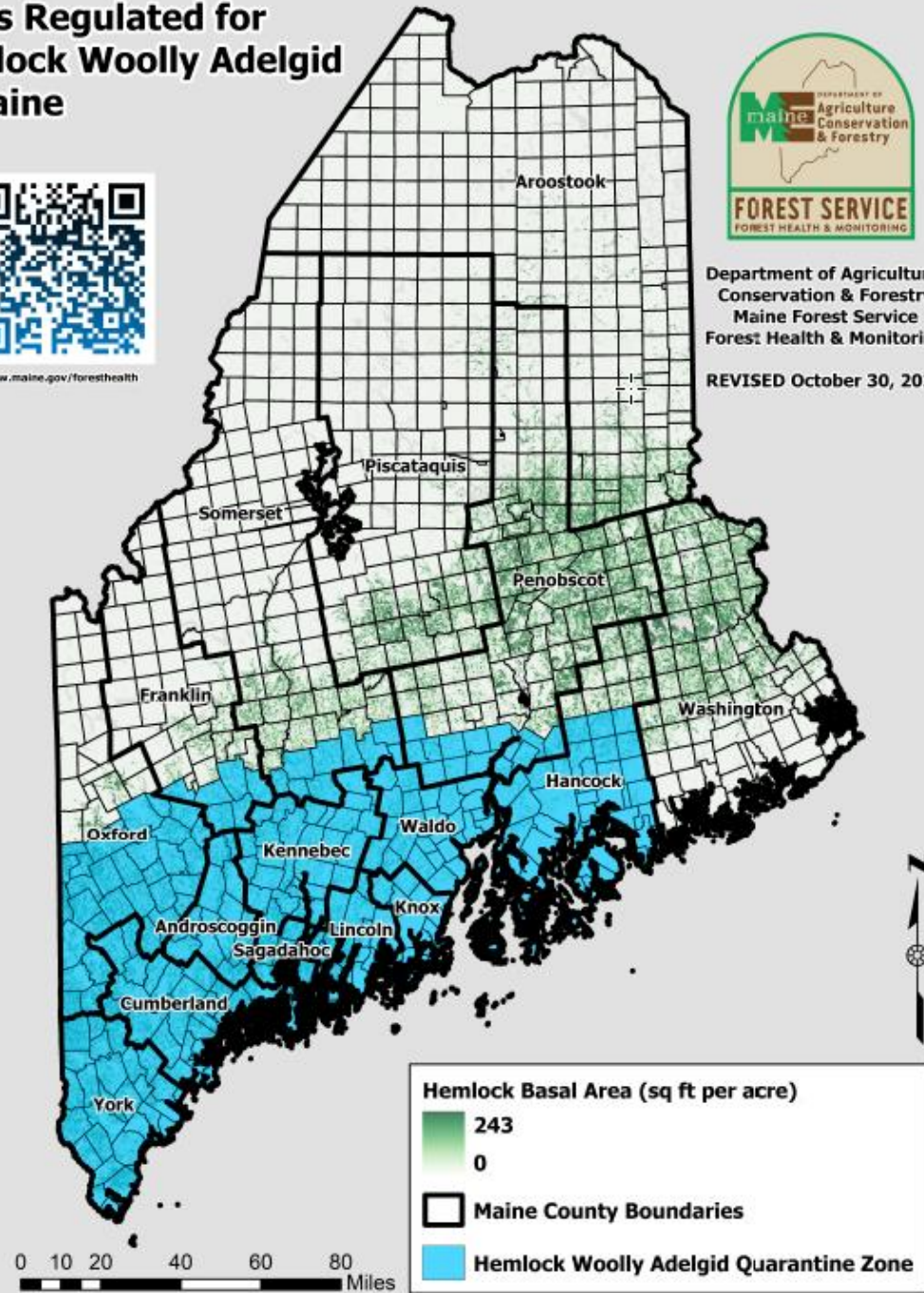


www.maine.gov/foresthhealth



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

REVISED October 30, 2023



Path: O:\MFS\FHM\Parisio\HWA\Parisio Hemlock Woolly Adelgid 2023 Quarantine Revision.aprx

Hemlock Woolly Adelgid Quarantine

Adopted
November 1, 2023

- 15 new detections in 2022 - 2023
- Expanding east and inland
- 12 Counties now have towns within the HWA quarantine area

Hemlock Woolly Adelgid

Look at undersides of HEMLOCK twigs



- Discrete white cottony balls at BASE of needles
- found in newer growth
- most visible November thru July

1 – 2 punch for hemlocks

Hemlock Woolly Adelgid



Hemlock tree infested with
Hemlock Woolly Adelgid



Look for white cottony masses
on the undersides of branches

Elongate Hemlock Scale



Hemlock tree infested with
Elongate Hemlock Scale



Hemlock tree infested with Elongate
Hemlock Scale and Hemlock Woolly Adelgid

Firewood is a major source of deadly forest insects & diseases

Don't
Move
Firewood!

Signs at border crossings
& visitor centers



Help Slow the Spread of **Invasive Pests** in Maine Forests

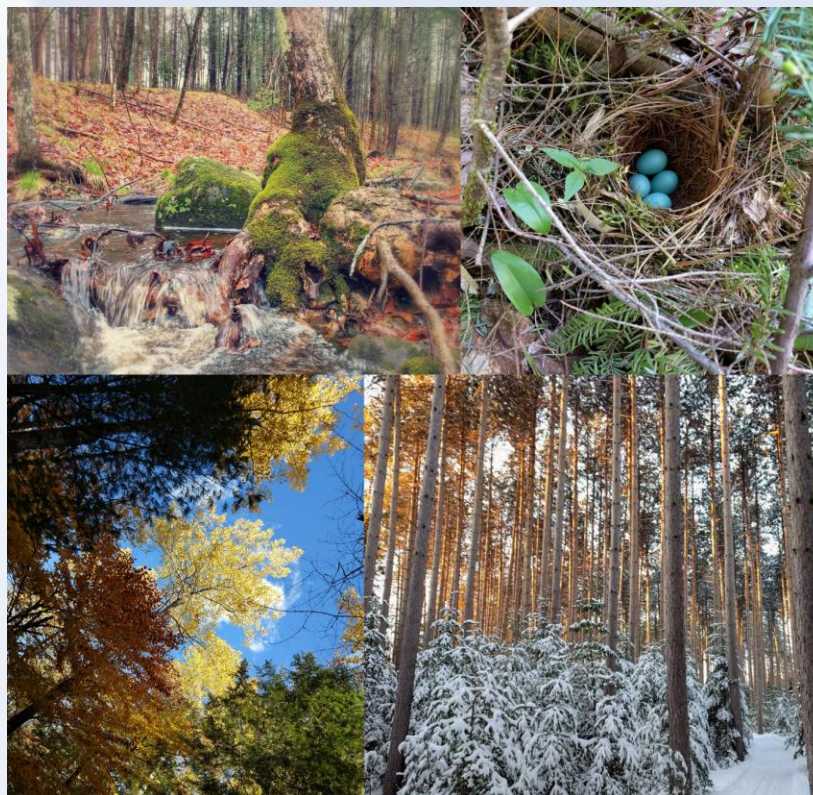
Forests cover 89 % of the land in Maine. They provide:

Environmental benefits...

- Clean water and air
- Provide habitat and food
- Stabilize soil
- Remove CO₂ from atmosphere

...and economic benefits.

- \$8.5 billion and 33,500 jobs in the forest economy
- Additional jobs and \$ in Maine agriculture, tourism, and recreation economies



What can **you** do?

- ✓ Use local or heat-treated firewood
- ✓ Check trees for signs of pests and diseases
- ✓ Report signs of invasive pests to Bugwatch@maine.gov
- ✓ Visit www.maine.gov/firewood to learn more

What **else** can **you** do?

- ✓ Use native, locally grown planting material
- ✓ Don't move soil/compost with pests (winter moth, jumping worms)
- ✓ Use an integrated approach to pest management, reduce use of pesticides
- ✓ Use pollinator-friendly practices
- ✓ Learn more, sign up for our newsletters at www.maine.gov/foresthealth
- ✓ **Spread the word, not the pests!**

What is SLF

A “true bug”; Fulgoridae = **planthopper**

- 1 generation/year
- Adults are large – 1” long
- Nymphs have 4 stages
- Eggs overwinter under a protective coating



Egg mass

SEEN: October-June



1st instar nymph

May-July



4th instar nymph

July-September

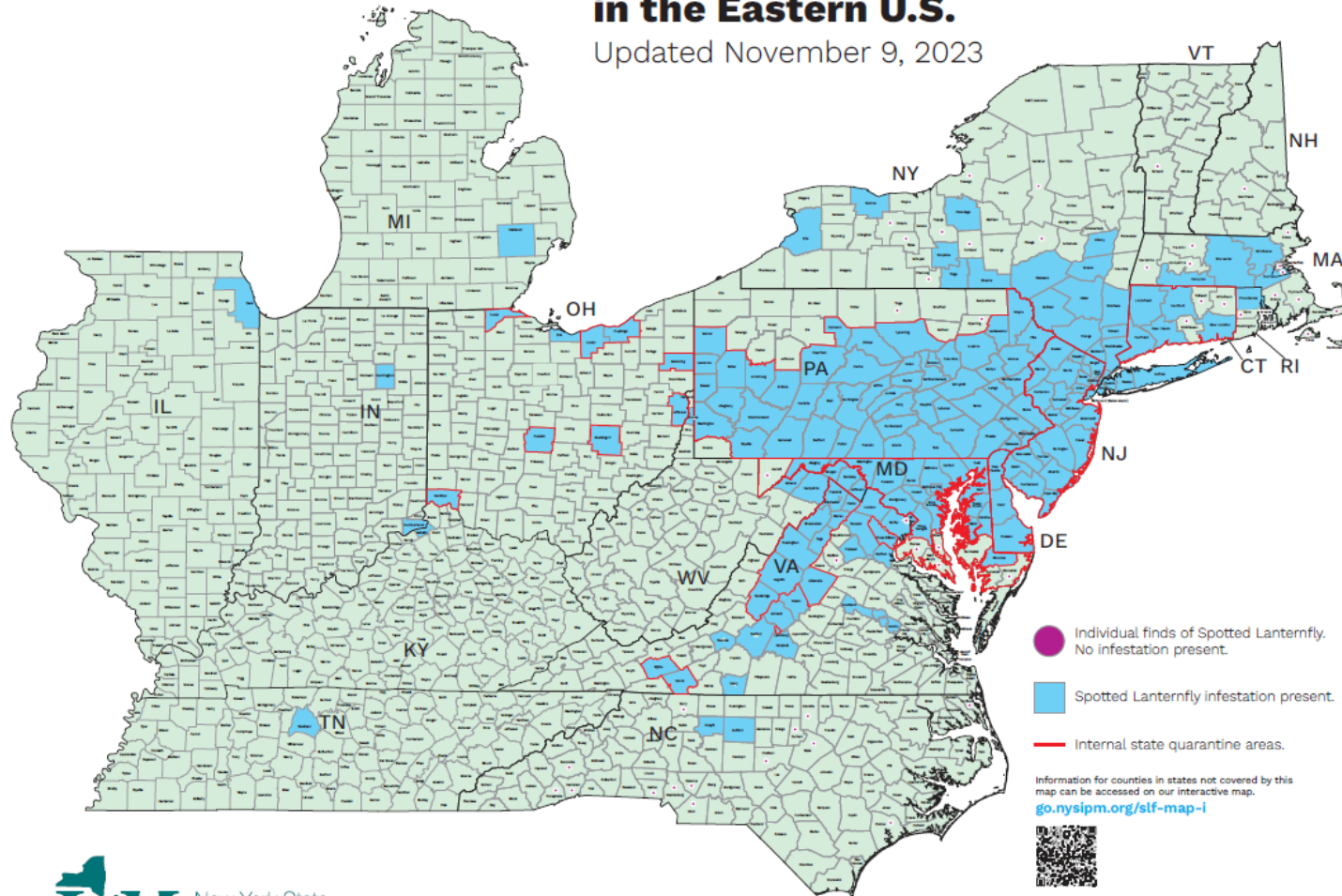


Adult

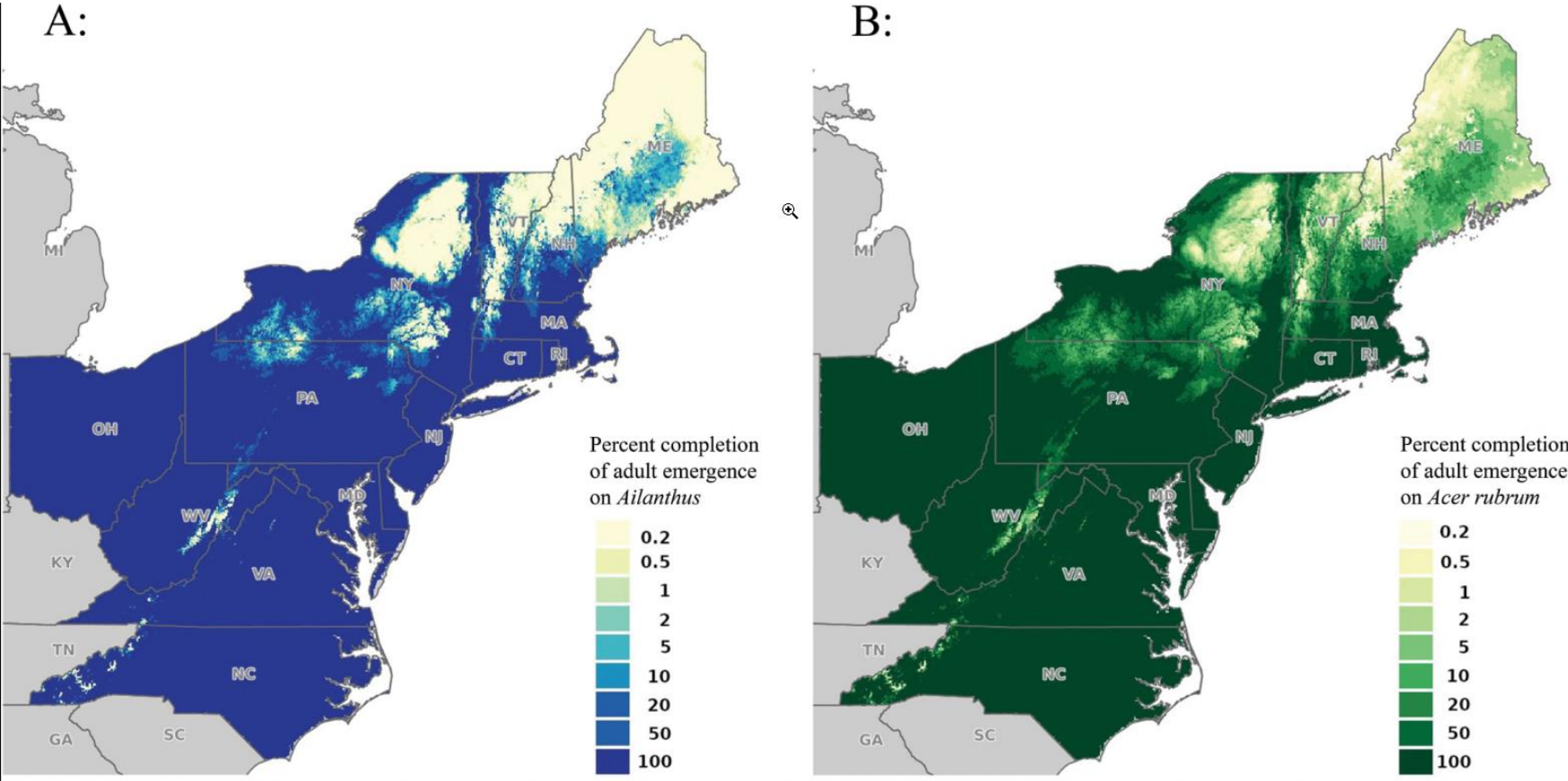
August-November

Spotted Lanternfly Reported Distribution in the Eastern U.S.

Updated November 9, 2023



SLF risk in Maine



Tree of Heaven (*Ailanthus altissima*)

Feeding on TOH improves female maturity



What could SLF damage?

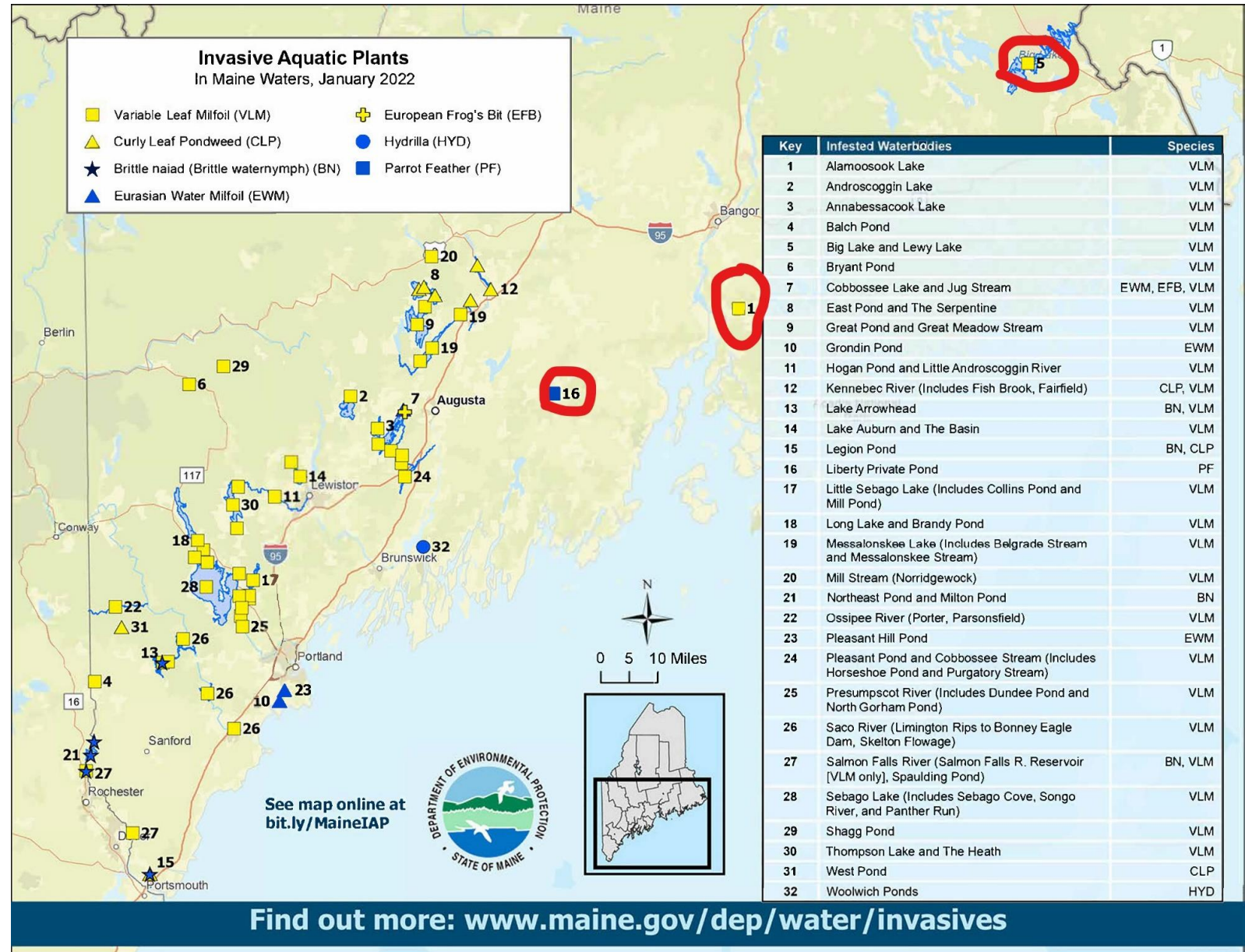
1. Vineyards - highest known risk
2. Apples
3. Nurseries
4. Maple syrup production
5. Structures



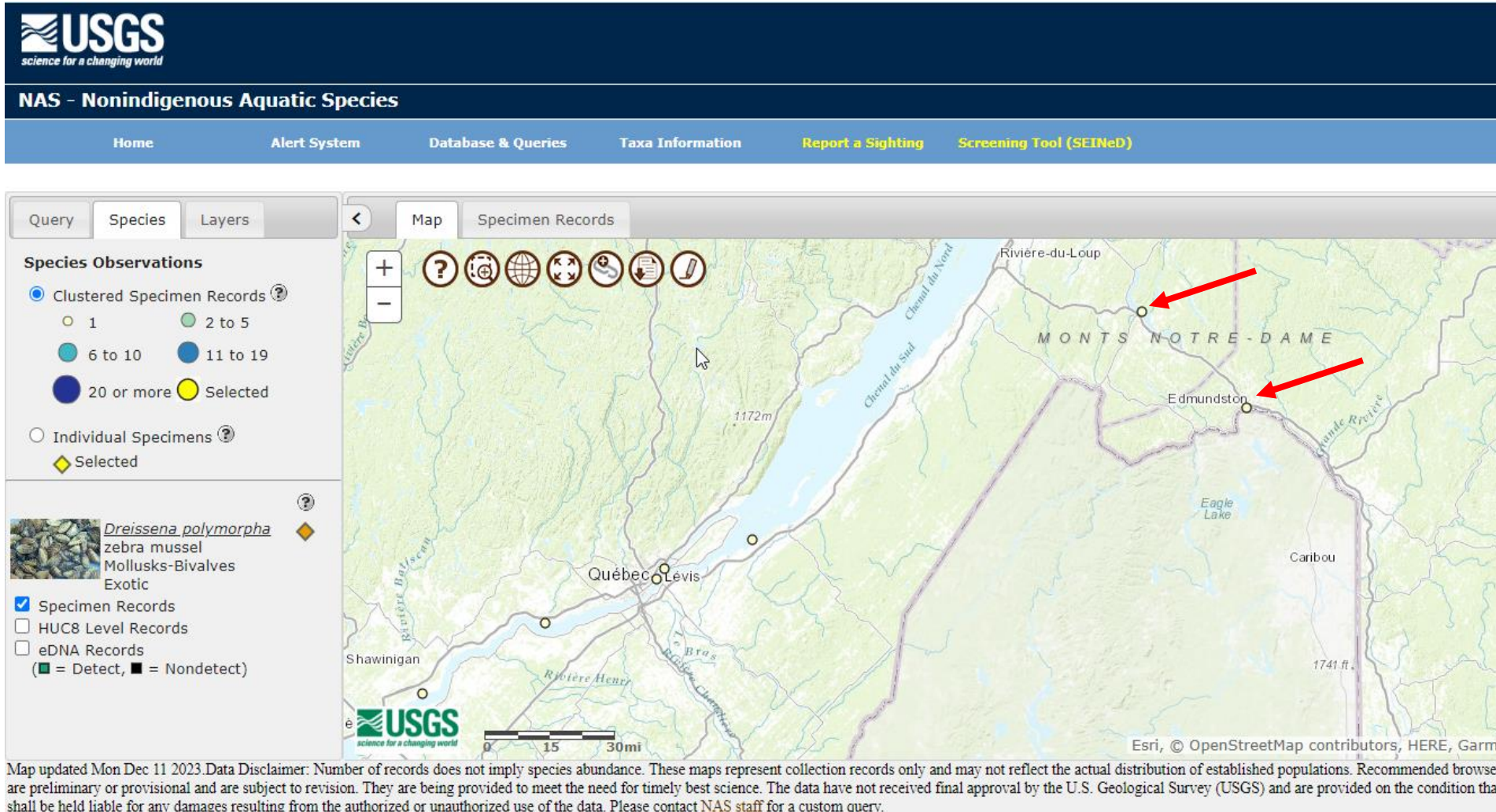
Spotted lanternflies. Photo by Erica Smyers.

Report any potential sightings to bugwatch@maine.gov

Invasive Aquatic Plants



Zebra mussels found in St. John watershed





Arion vulgaris (from Dänisch Nienhof, Germany: photo courtesy I. Richling)

CREEPY CRAWLIES

Amyntas worm spp.

Jumping Worm, Crazy Worm, Snake Worm, Alabama Jumper

Characteristics

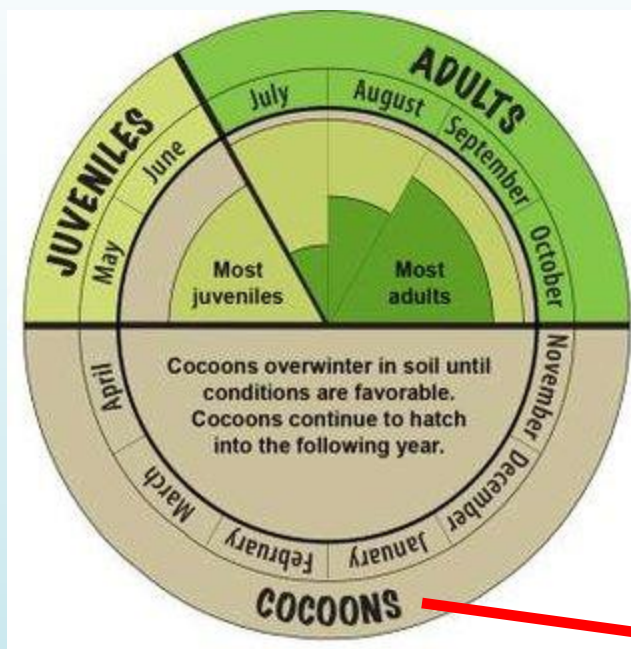
- Darker in color – appearing almost gray
- Glossy smooth skin
- Light milky white clitellum smooth to the body
- Very active, thrashing and jumping
- Moves like a snake
- Sheds its tail when handled
- Parthenogenic – asexual reproduction so it only takes one worm to start a family.





Amynthus tokioensis

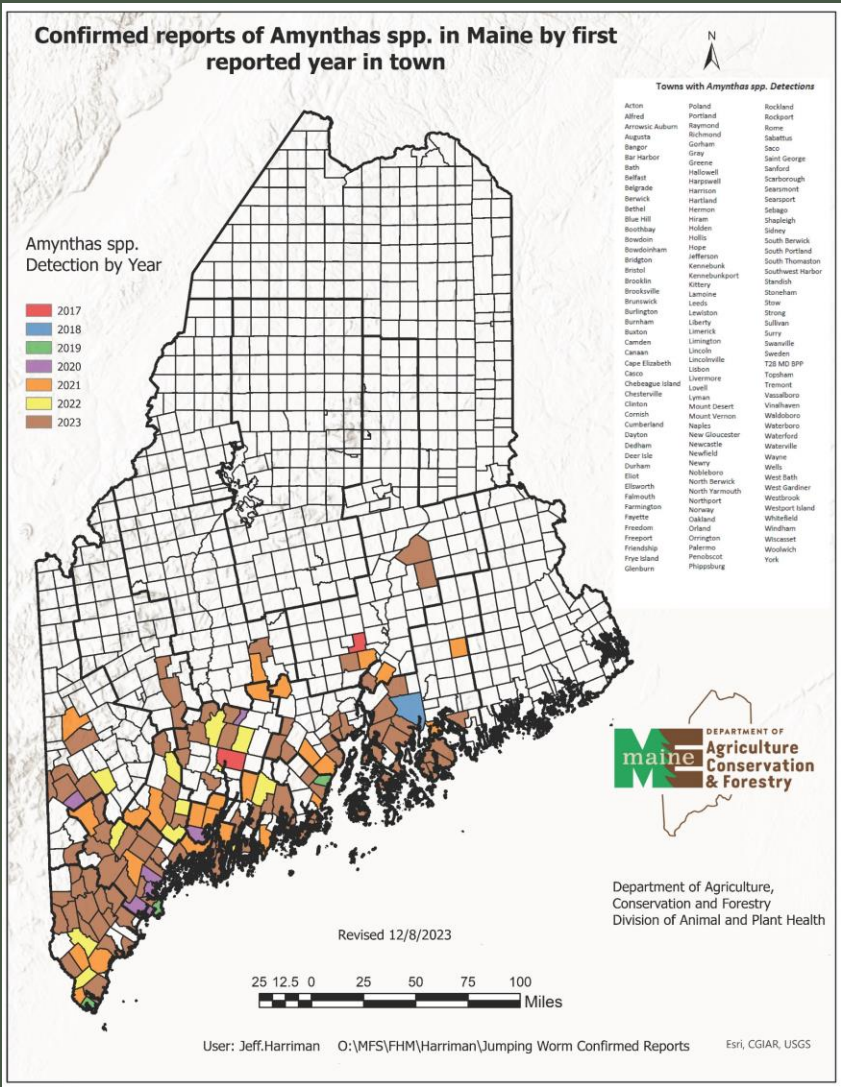
Amynthus agrestis



Life Cycle



Jumping worms are now reported in 13 of 16 Counties

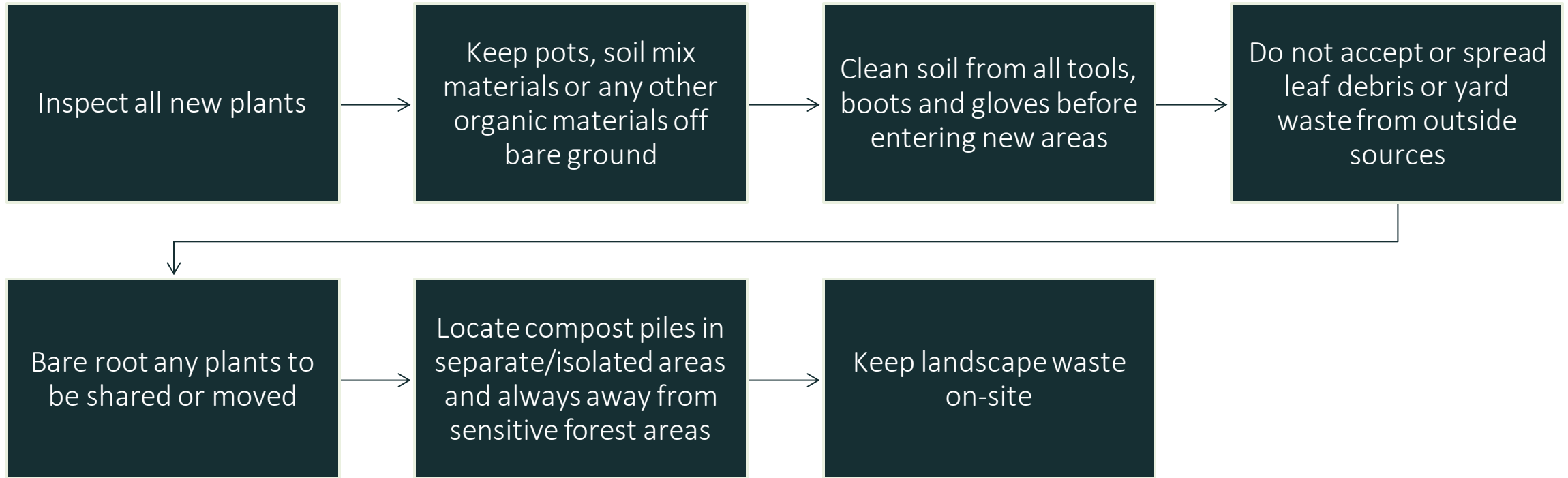


HOW ARE THEY SPREADING?



**Earthworms in the genus
Amyntas soil amendments many
which may be used in landscaping
and horticulture.**





BMPs to slow the spread of *Amynthas* worms



I pledge to protect our waters
from invasive species

Never Release Bait

I will always **DISPOSE**
of unwanted bait
in the trash.

EWR_0039_22



BOLO for slugs

- ❖ *Arion vulgaris* – in Quebec City and Toronto
- ❖ *Arion ater* – only on Vinalhaven
- ❖ *Vulgaris* – considered a severe vegetable pest
- ❖ *Ater* – Appears to mainly feed on dead vegetation in the forest
- ❖ *Vulgaris* and *ater* – known to hybridize



Arion vulgaris (from Dänisch Nienhof, Germany: photo courtesy I. Richling)



Arion ater - Photo by Karen Coluzzi

Arion vulgaris



- ❖ It has spread widely in Europe
- ❖ May be partially due to its hybridization with the two other members of the *Arion ater/rufus/vulgaris* complex (ARVC)
- ❖ The hybrids are aggressive and highly adaptable to new environments
- ❖ It should be emphasized that “pure” *Arion vulgaris* is a serious pest; hybridization with *A. ater* and *A. rufus* just increases its potential to spread to new environments

Invasive Species Investigators

WE NEED YOU

Exotic Snail & Slug Scavenger Hunt

You Found It!

- How Many Were There?

- What Did You Find It On (e.g. plant, soil)?

- What Was It Doing (e.g. eating, crawling)?

- Where Did You Find It? (address? coordinates?)

Please email a photo to bugwatch@maine.gov, or collect one and let us know!



PLACE
STAMP
HERE

To:

Maine Bug Watch
28 State House Station
Augusta, ME 04333

Black slugs & other exotic mollusks



These invasive species are considered major agricultural threats.



Black slugs (*Arion ater*, *Arion rufus*, and *Arion vulgaris*). LARGE (adults > 3"). Color may be black, brown, orange, or yellow. Prefer cool, moist habitats. Often found near campgrounds, parks, trails, and roads.



Other invasive mollusks (L to R): Chinese slug (*Meghimatium pictum*), hygromiid snails (*Cernuella spp.* and *Monacha spp.*), cochlicellid snails (*Cochlicella spp.*).

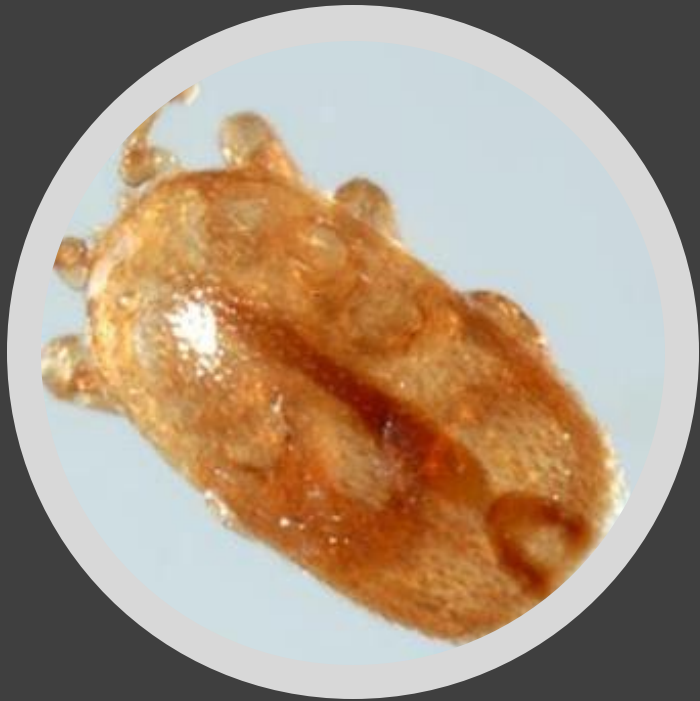
Have you seen any of these in Maine? Please take photos, record the exact location, and email Bugwatch@maine.gov!



Photo credits: (1) © A.J. Silverside, lastdragon.org; (2) © J. Herder, www.digitalnature.org; (3) Paulo Lenhard, Project AM, <http://terrrslugs.lifedesks.org/pages/31164>; (4) © L. Kolouch, www.biolib.cz; (5) Vmenkov, Wikipedia; (6) L. Poggiani, HU www.lavalle.delmatauro.it; (7) © Dr. Roy Anderson, MolluscIreland; (8) <https://www.maine.gov/dacf/php/caps/Arion/index.shtml>



BEE BULLIES



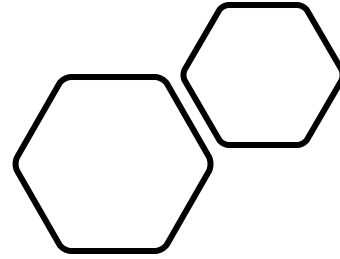
Tropilaelaps mites

Tropilaelaps
mites
compared to
varroa mites



Tropilaelaps mite (left) with two Varroa mites (right) on a honey bee larva. Denis Anderson, www.beesdownunder.com.au

What you can
do!



Report invasive species

- bugwatch@maine.gov
- <https://appengine.egov.com/apps/m/e/dacf/mfs-tree-ailment>
- invasives.mnap@maine.gov
- milfoil@maine.gov
- <https://www.maineogt.org/>
- <https://survey123.arcgis.com/share/da099be43ba642799f9c359345257b2f>



Resources

Search Maine.gov

TOP ONLINE SERVICES

[Birth, Marriage, & Death Record Searches](#)

[Public Criminal History Records](#)

[Ask a Maine Reference Librarian](#)

[Ask a Law or Legislative Reference](#)

[Home](#) » [About Maine](#) » [Invasive Species](#)

INVASIVE SPECIES

What is an invasive species?

An invasive species is a non-native species (including seeds, eggs, spores, or other propagules) whose introduction causes or is likely to cause economic harm, environmental harm, or harm to human health. The term "invasive" is used for the most aggressive non-native species. These species grow and reproduce rapidly, and can spread with or without human help, causing major disturbance to the areas where they are present.

Pest management resources

Got Pests?

Pests can be insects, weeds, fungi, mice and other animals, or microorganisms, like bacteria and viruses. Before you swat, stamp, or spray, know your enemy and, **most importantly, know that it is an enemy, and not a beneficial or harmless plant or animal.**

Do you know the name of your pest?

Search by name of your pest:

If not, select from the options below.

Where is it found?

- HOME
- LAWNS & YARDS
- TREES & SHRUBS
- FLOWERS
- FRUIT
- VEGETABLES
- PEOPLE & PETS

What kind of pest is it?

- WEED
- PLANT DISEASE
- BUG
- OTHER CRITTER

Teaching kids to identify and manage pests?
[K-12 IPM Curricula](#)

Featured Links

- [Maine Integrated Pest Management Council](#)
- [Maine Board of Pesticides Control](#)
- [Maine Natural Areas Invasive Plants](#)
- [Maine Center for Disease Control & Prevention](#)
- [Maine Department of Agriculture, Conservation and Forestry](#)
- [Maine YardScaping](#)
- [University of Maine Cooperative Extension IPM for Maine Homeowners](#)
 - [Have Your Pest Identified \(Diagnostic Lab\)](#)
- [USDA APHIS Wildlife Services](#)

<https://www.maine.gov/dacf/php/gotpests/index.shtml>

Home and Garden IPM from Cooperative Extension

Home Critter ID Photo Gallery Alphabetical List of Critters Fact Sheets Frequent Specimens and Inquiries Invasive Species More

Identification of Pests and Critters for People in Maine

Don't Transport Firewood from Out-of-State!

Critter Identification Photo Gallery Alphabetical List of Frequent Specimens

<https://extension.umaine.edu/home-and-garden-ipm/>



Questions?

Gary Fish

Maine State
Horticulturist

gary.fish@maine.gov

207-287-7545