2025 New Hampshire Forest Health Program Report

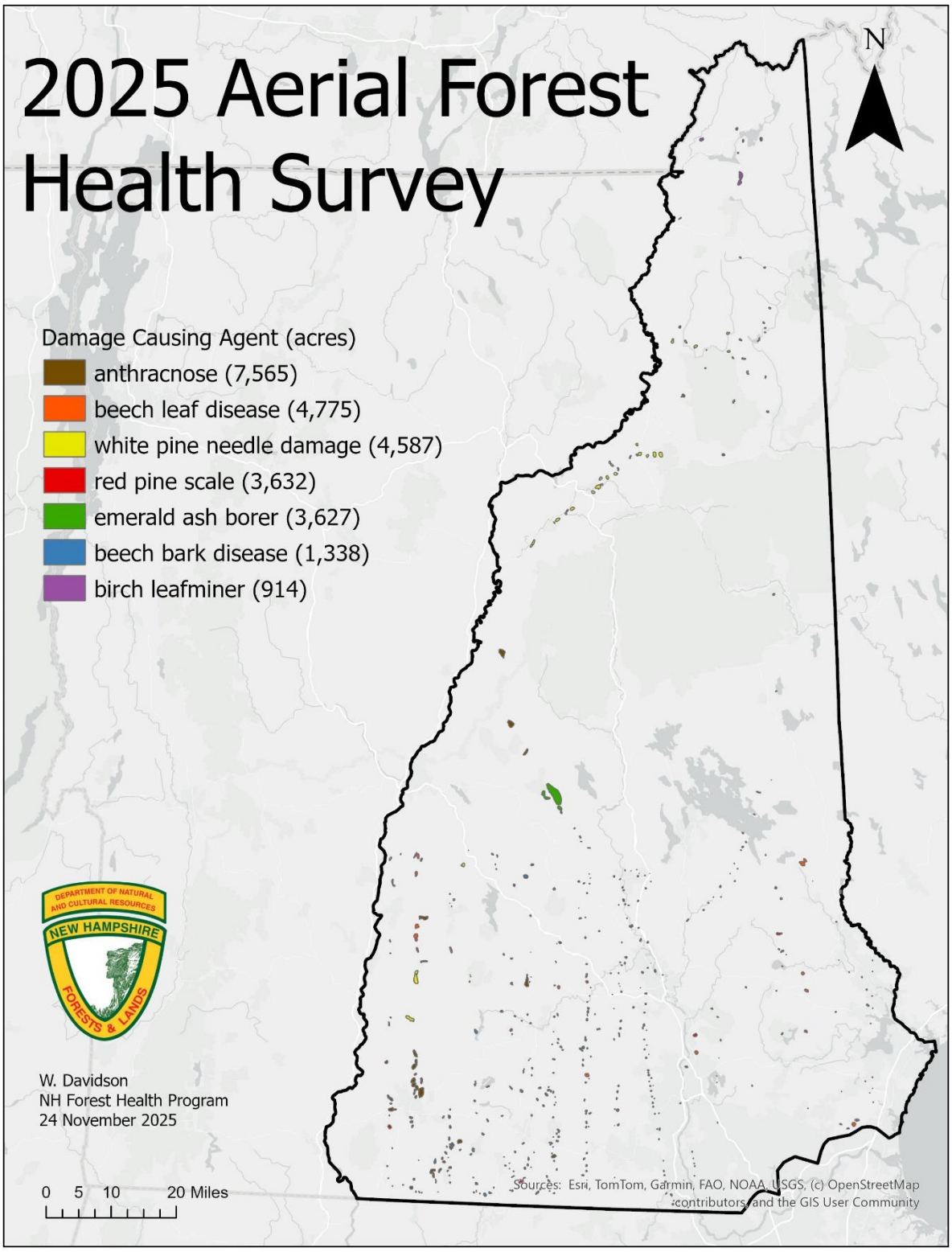
William Davidson, Ryan Crandall, Kyle Lombard

This is a PDF version of the online Story Map available here:
https://storymaps.arcgis.com/stories/bc436532d0b64d879186ede7d5a96988

Aerial Survey

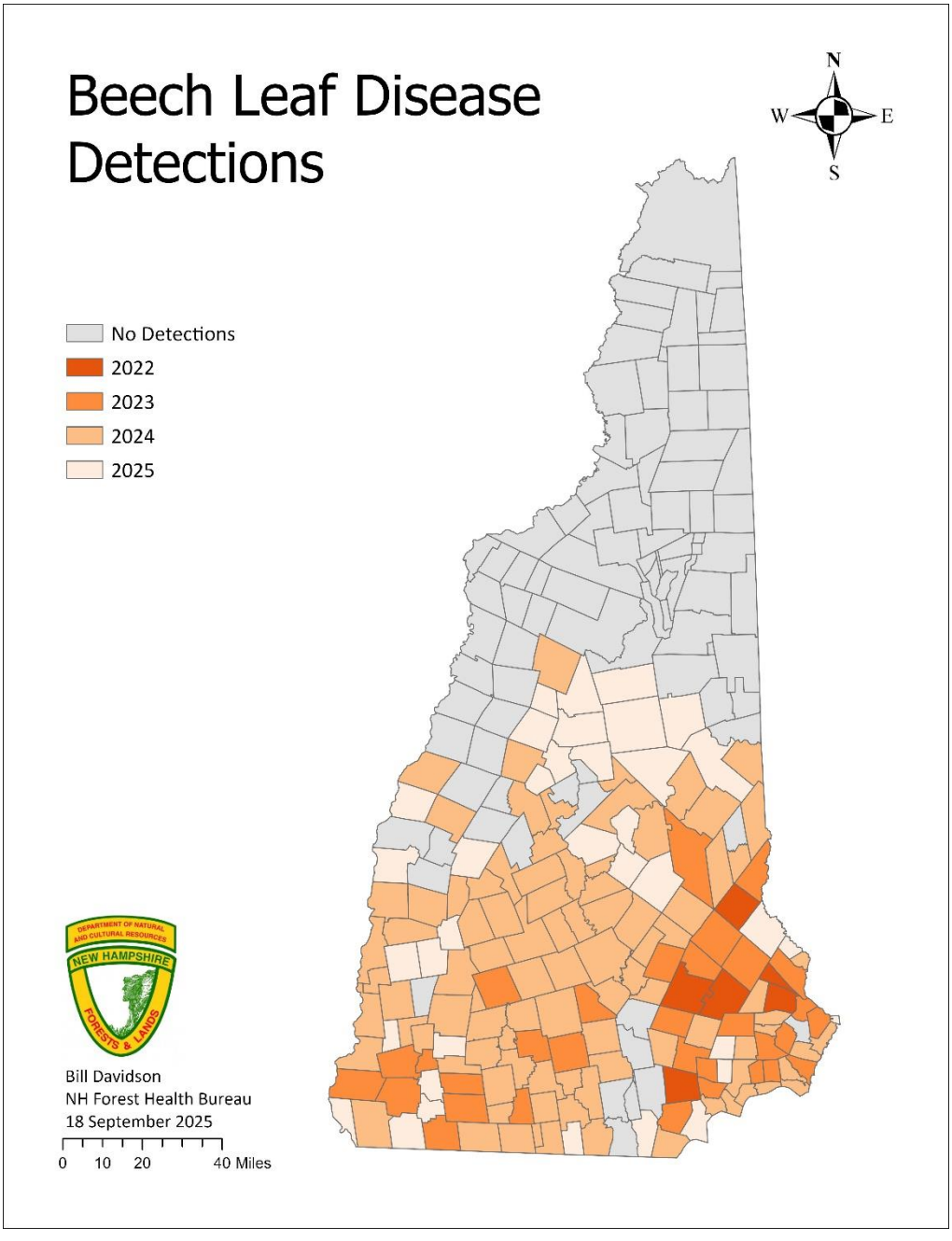
2025 saw a reduction in the amount of damage mapped during the Forest Health Program's aerial survey flights compared to recent years. The reduction was driven by lack of any widespread damage causing agents such as a region-wide outbreak of white pine needle damage (2024), frost (2023), and spongy moth (2022 & 2021). In total, we mapped just over 26,000 acres of mortality, defoliation, or discoloration. The largest damage causing agent was anthracnose, which is a group of foliar diseases that thrive in warm, wet weather like New Hampshire experienced this spring. This was the first year any significant beech leaf disease was recorded during aerial surveys. 4,775 acres of the disease were mapped in southern New Hampshire. This disease has rapidly spread throughout southern New Hampshire and anticipated to worsen throughout the range of beech in coming years.

Damage Causing Agent	Acres	Areas mapped
Anthracnose	7,565	
Beech Leaf Disease	4,775	111
White Pine Needle Damage	4,587	108
Red Pine Scale	3,632	55
Emerald Ash Borer	3,267	166
Beech Bark Disease	1,338	25
Birch Leafminer	914	20


2025 Aerial Forest Health Survey
N
Damage Causing Agent (acres)
anthracnose (7,565)
beech leaf disease (4,775)
white pine needle damage (4,587)
red pine scale (3,632)
emerald ash borer (3,627)
beech bark disease (1,338)
birch leafminer (914)
DEPARTMENT OF NATURAL AND CULTURAL RESOURCES
NEW HAMPSHIRE
FORESTS & LANDS
W. Davidson
NH Forest Health Program
24 November 2025
0 5 10 20 Miles
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community

Beech Leaf Disease:

In 2025 there were 36 new towns identified with beach leaf disease. However, no large jumps occurred, and most detections were made in towns adjacent to others previously known to be infested.



Several different application rates of a phosphate-based fungicide are being tested on state lands, Forest Society lands, and University of NH lands. Preliminary results will likely be available in 2026.

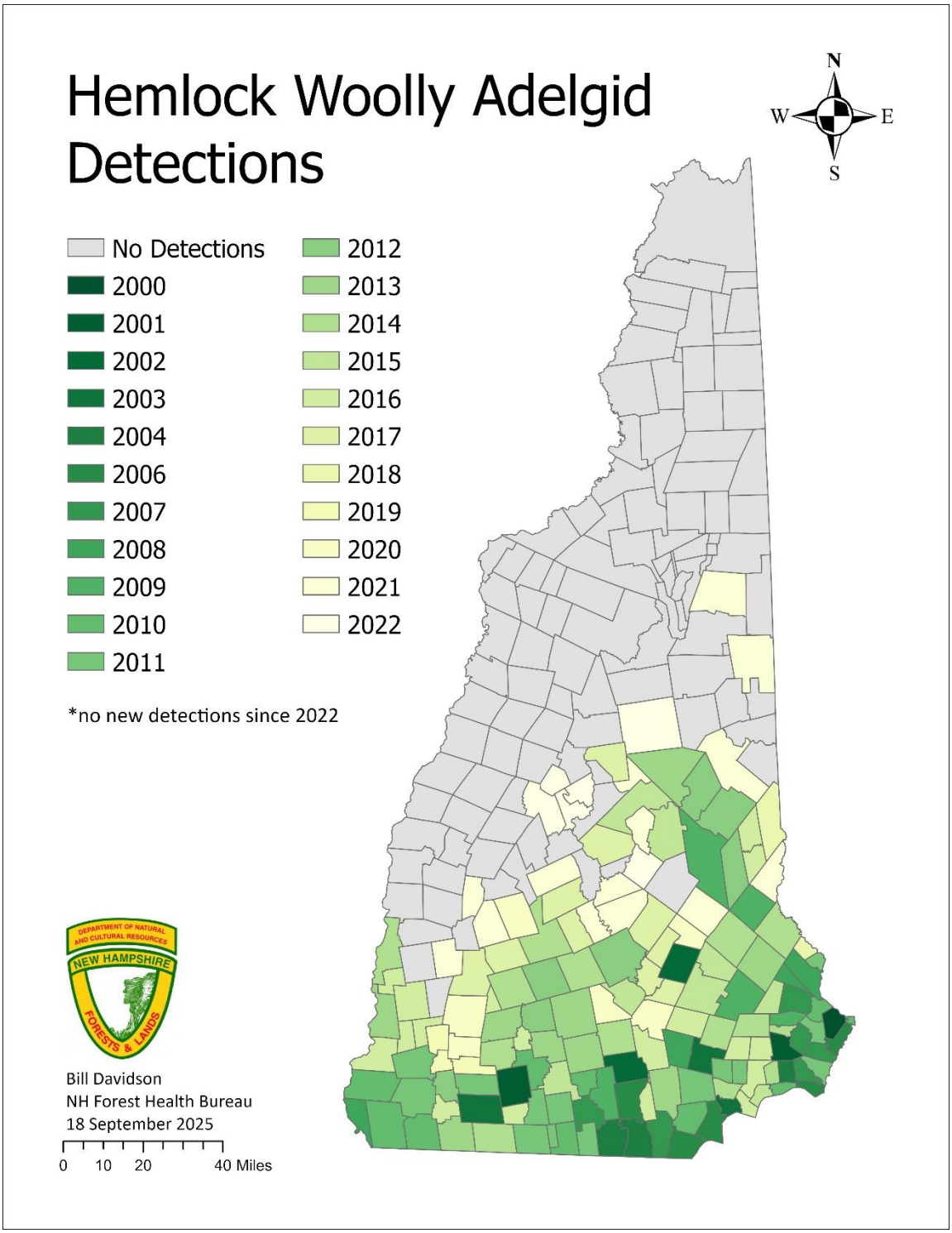
Left: Steve Junkin, SPNHF Forester, treats a mature beech with signs of bear usage. Right: Leaf curling aphid damage on beech leaves.

There seemed to be many lookalike pests in 2025. Some of the most common were beech woolly aphid. Foliar anthracnose and leaf-curling aphids were also common this year.

Left: Beech woolly aphids on beech leaves. Right: Discoloring of beech leaves due to a foliar disease, likely anthracnose.

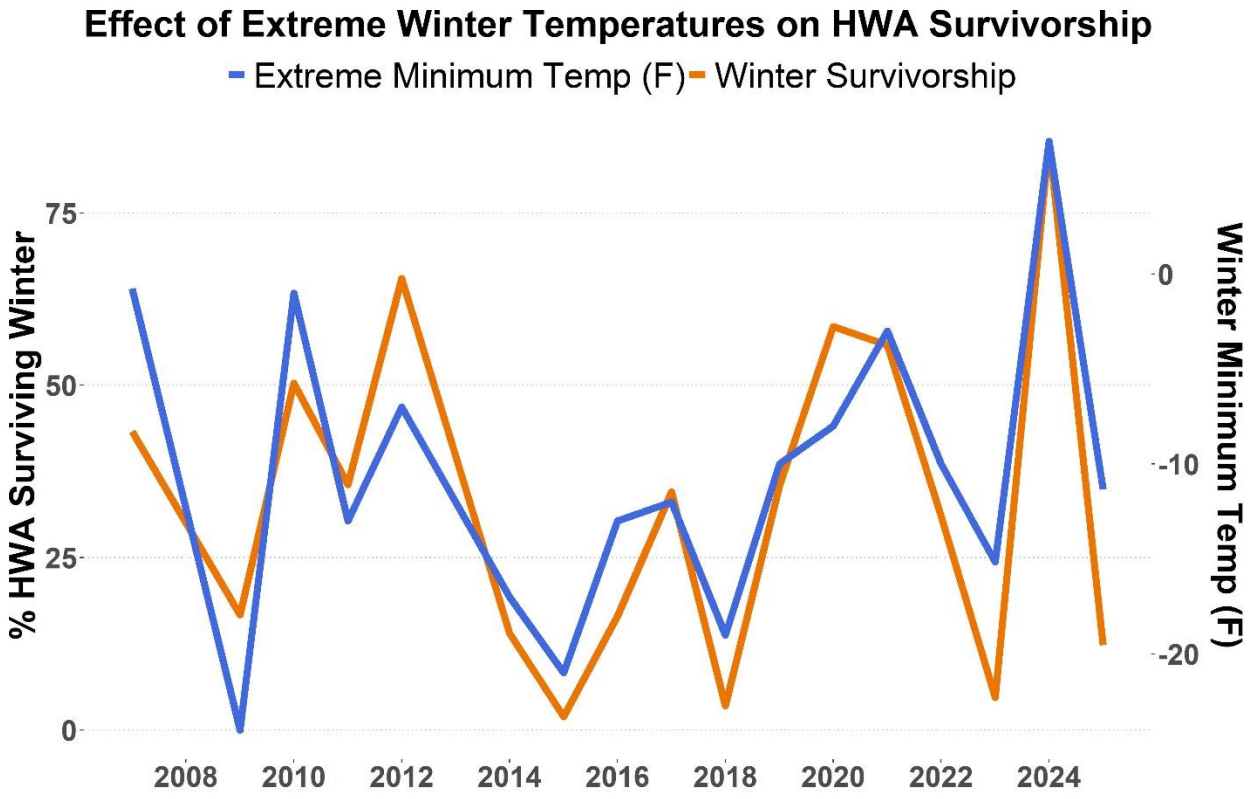
Hemlock Woolly Adelgid

For the third consecutive year, there were no new-town detections of hemlock woolly adelgid in New Hampshire.



Hemlock trees in warmer states south of New England experience heavier, more persistent adelgid infestations because the insect's winter survival is higher. Consequently, southern hemlocks typically survive for only one or two decades after infestation. However, in New Hampshire hemlock woolly adelgid is at the northern limit of its range, and low winter survival, averaging about 20%, helps suppress outbreaks. As a result, New Hampshire hemlocks can persist for decades after initial infestation.

Recent winters illustrate how temperature patterns directly influence HWA survival. Winter 2024 was very mild, and HWA survival was very high at about 85%. Winter 2025 was the coldest we have experienced in the last decade, and adelgid winter survival was 12%. Survival varied widely across the state, ranging from 37% to as low as 4%. Winter temperatures have been warming over the last few decades and cold-protection against the adelgid is slowly diminishing. As conditions in New Hampshire become more suitable for HWA, we expect to see increased infestation levels as well as an expansion of their northern range.



To help manage HWA, specialist adelgid predators have been released in the eastern US, including New Hampshire. The HWA biological control program utilizes four species. Two beetles: *Laricobius nigrinus* and *Laricobius osakensis,* and two species of *Leucotaraxis* silver flies.

To date, 3,927 *L. osakensis and* 20,749 *L. nigrinus* and beetles have been released in New Hampshire. Over 4,100 L. nigrinus were released in 2025 alone. We have not yet identified any established populations of *L. osakensis* in New Hampshire, but *L. nigrinus* has established in Rockingham, Strafford, and Carroll Counties.

Currently, *L. nigrinus* is the most successful released predator of HWA. Unfortunately, it has not solved the problem, and large-scale outbreaks of HWA continue to occur. Despite this, it is believed that they extend the life of adelgid infested hemlocks.

Silver flies are a new predator being released to control hemlock woolly adelgid. Silver flies feed on both the winter and summer adelgid generations, whereas *Laricobius* beetles only feed on the winter generation. Research suggests that predators feeding on both generations may be necessary for control. To date, we have released 5,000 silver flies, all *Leucotaraxis piniperda*, in New Hampshire across three locations. No established populations of silver flies have been identified yet.

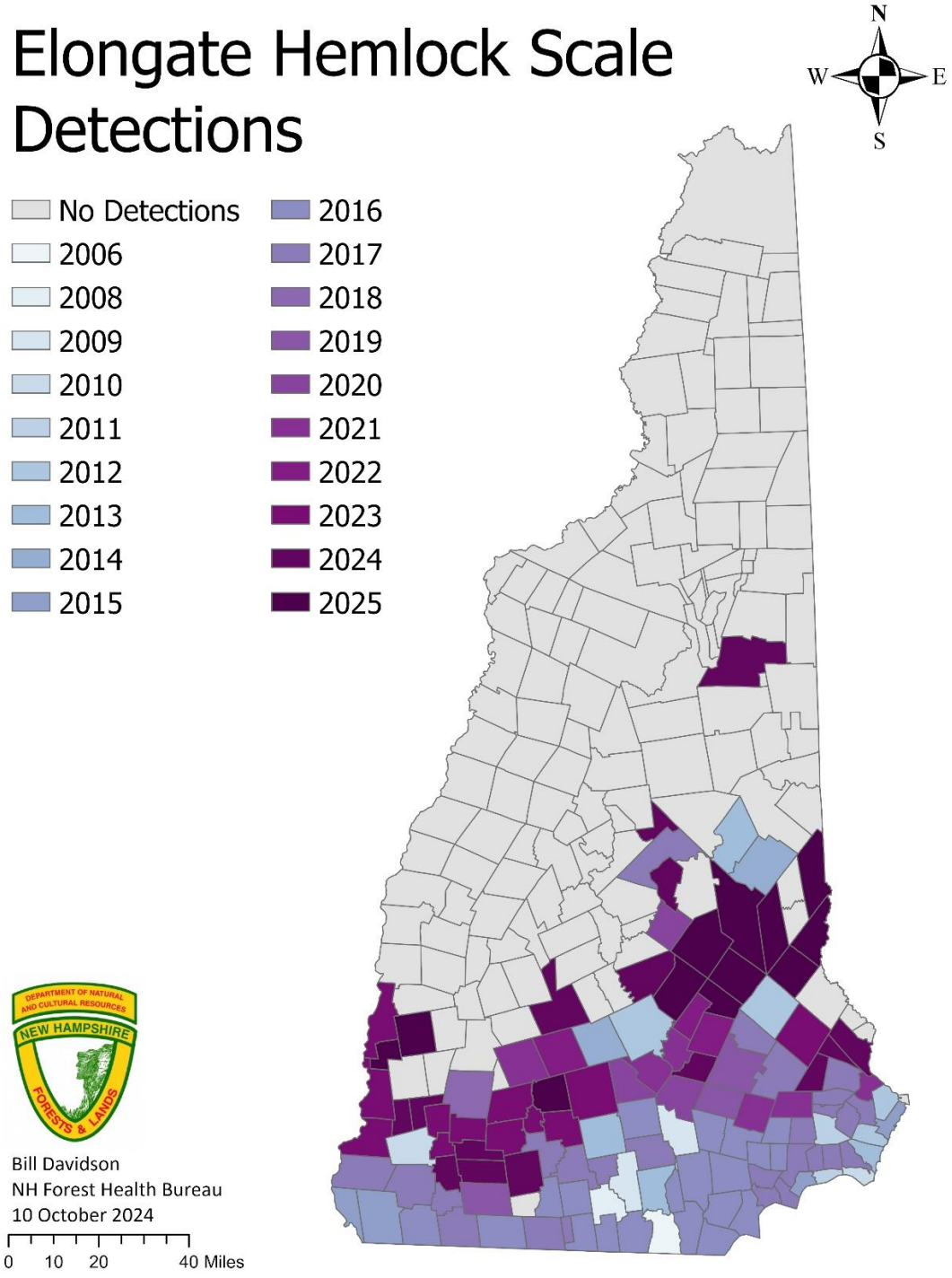
Left: Laricobius nigrinus; Center: Leucotaraxis piniperda adult; Right: Leucotaraxis piniperda larva

Silviculture is another tool that can be used to improve health and longevity of infested hemlocks. By removing weak or dying trees, remaining hemlocks receive increased light, improving their health and ability to infestation.

We are partnered with the US Forest Service and US Army Corps of Engineers on a project examining how hemlock silviculture may benefit the health of hemlocks infested with adelgid. A subset of the trees were treated with pesticides to assess how silviculture alone, and in combination with chemical treatments, affects tree health.

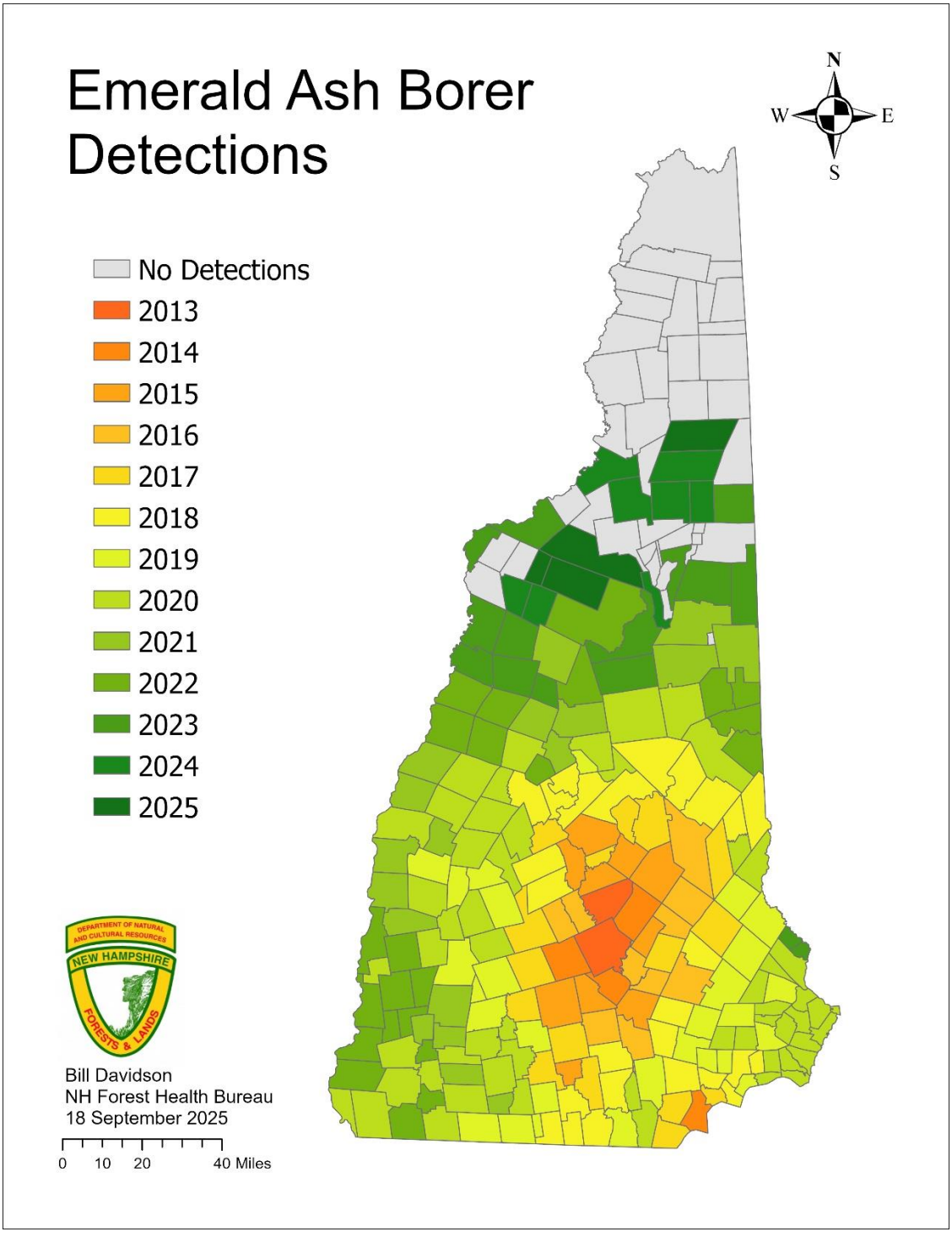
Elongate Hemlock Scale:

Elongate Hemlock Scale was detected in 15 new towns in 2025, primarily in the east-central portion of the state.



Emerald Ash Borer:

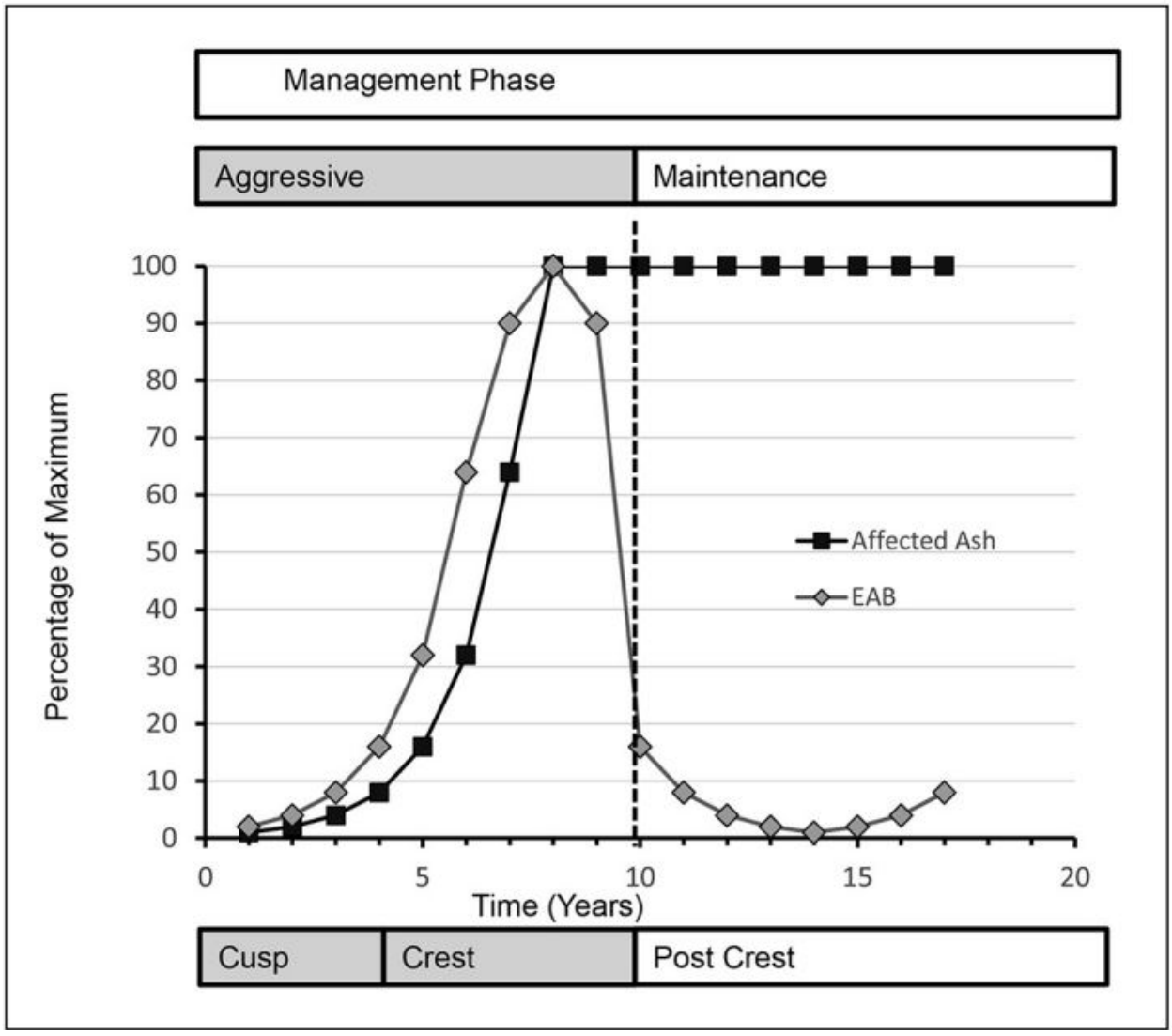
Emerald ash borer was detected in 4 additional towns in 2025: Bethlehem, Franconia, Milan, and Sugar Hill. The gap in detection just south of the northern most detections is due to the White Mountains creating a barrier to effective surveys. Emerald ash borer is likely present in many of those towns but has yet to be detected.



Insecticide treatments to protect pockets of forested ash continued throughout the summer of 2025. 91 sites, including five in Coos county that were treated for the first time in 2025, have been protected since the program was initiated in 2017. Many sites are receiving their second or third round of treatment and are still healthy despite severe decline in the surrounding forests.

Forest Health summer technician, Liz McGranaghan, prepares a large ash for treatment in Effingham, NH.

This graph shows theoretical population models for emerald ash borer (grey diamonds) and ash trees (black squares) throughout the course of an infestation. As ash mortality nears 100%, beetle populations drop precipitously as they exhaust their food source. After this crash (dashed vertical line), the ash borers don't disappear entirely but persist at a low level on seedlings and saplings that were too small to be attacked during the initial wave (1" diameter), but have since reached an attackable size, a condition known as an "aftermath forest".



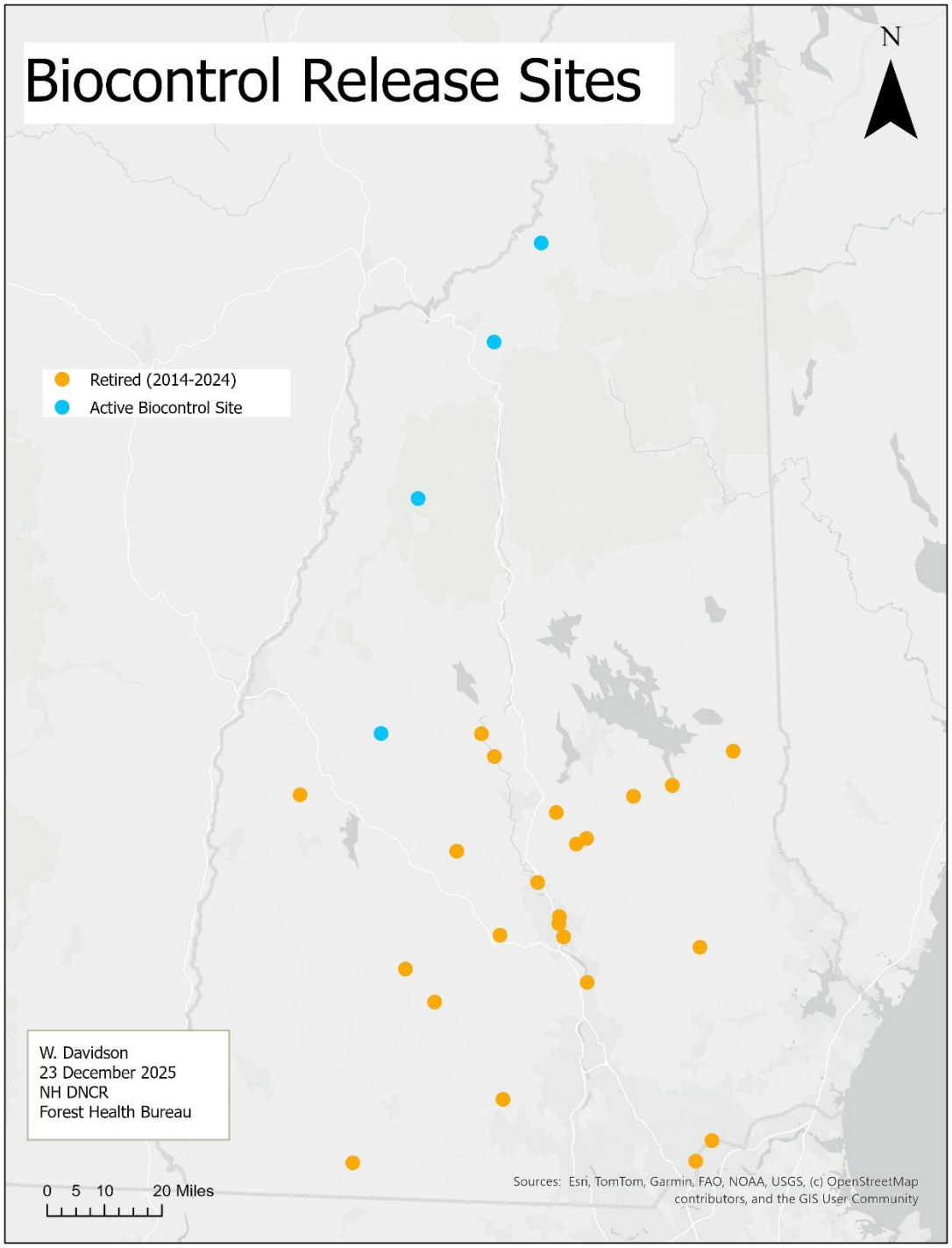
Many treatment sites have reached now reached the "aftermath" stage and the only live mature ash in the stands are those that have been treated. Treated trees at sites that have reached the aftermath state may be able to survive on their own without further chemical treatments due to lower beetle populations, lack of mature ash on the landscape capable of supporting an outbreak population of beetles, and top-down pressure exerted by introduced parasitic wasps and natural enemies of the ash borer such as woodpeckers and native parasitoids. A handful of sites that were due to be re-treated in 2025 were left untreated to determine if scaling back on treatments in aftermath forests is a viable management strategy.

This spring, the New Hampshire Forest Health Program planted ash seedlings that were grown from seed collected across the state in 2022 and sewn at the State Forest Nursery in Boscawen. In total, ~1,300 seedlings were distributed across 13 sites. Evaluations in the fall found good survivorship of the trees despite droughty conditions throughout the summer. These seedlings provide hope for jump-starting the next generation of ash following removal of mature trees due to emerald ash borer. Once the overstory trees are killed off, ash borer populations plummet due to lack of food. It is in this environment, with ash sparse on the landscape and low ash borer populations, that planted seedlings will hopefully be able to thrive. There is additional hope that as the seedlings grow large enough to be attacked by emerald ash borer, populations of the parasitic wasps released through the biocontrol program will be high enough to provide protection for the trees.

An ash seedling

Speaking of biocontrol…

The three species of parasitic wasp, totaling 14,000 individual wasps, were released across 4 sites in 2025. Release sites in Lancaster and Bethlehem were new in 2025 and represent the farthest north the parasitic wasps have been released.

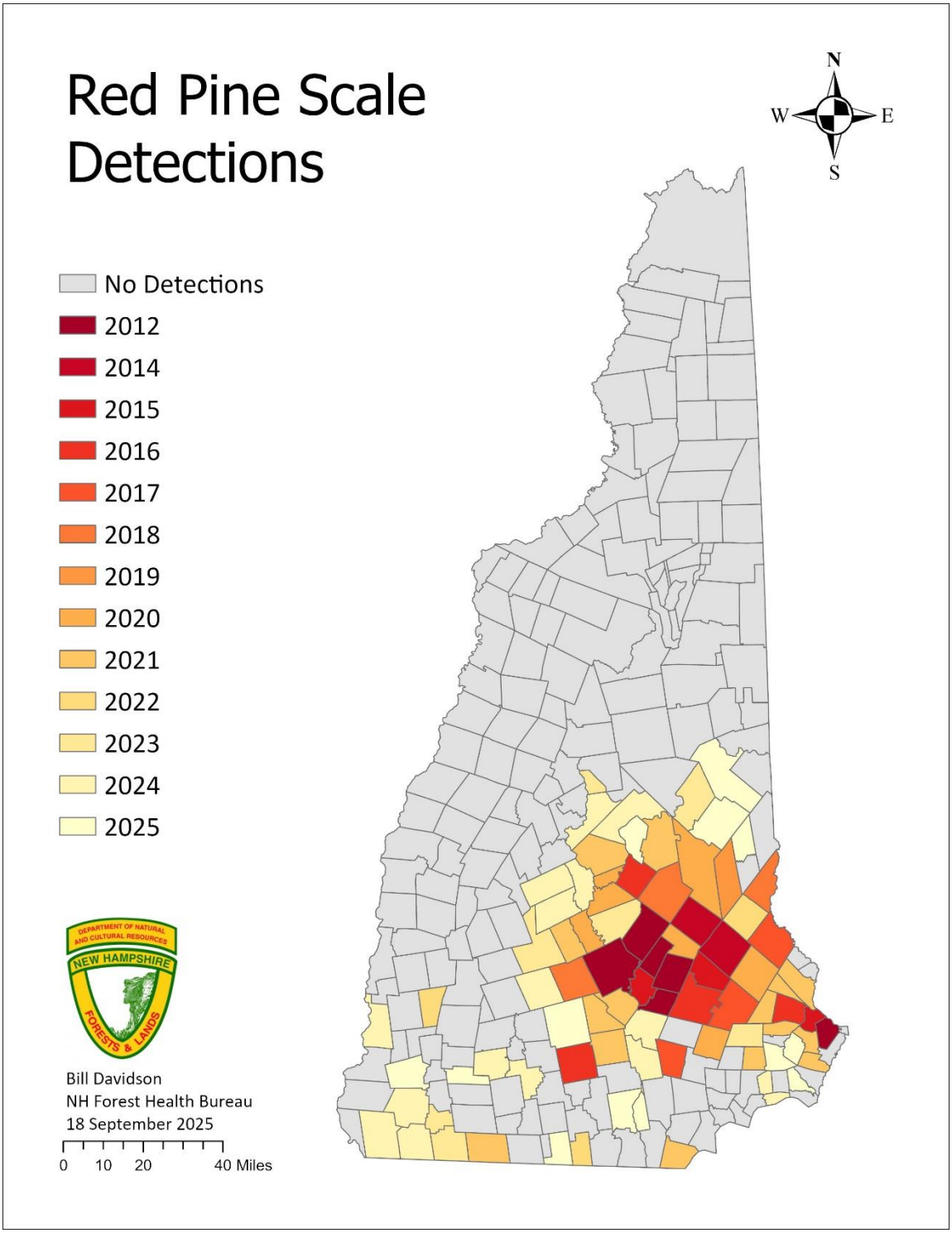


2025 was a banner year for monitoring the spread of the introduced wasps which were consistently recovered up to 20 miles from the nearest release site, over three times farther than they had previously been found. These findings are highly encouraging and demonstrate that these wasps are taking a liking to the forests of New Hampshire. Their presence will help protect young trees that were too small to be attacked by the initial wave of emerald ash borer.

Pupae of Spathius galinae, an introduced parasitoid of emerald ash borer

Red Pine Scale:

Red Pine scale was detected in 13 towns in 2025.



Butternut Restoration

In May approximately 150 hybrid butternut seedlings were planted at 23 locations throughout New Hampshire. Thanks to all the volunteers who picked up these seedlings from the State Forest Nursery and planted them!

A hybrid butternut seedling

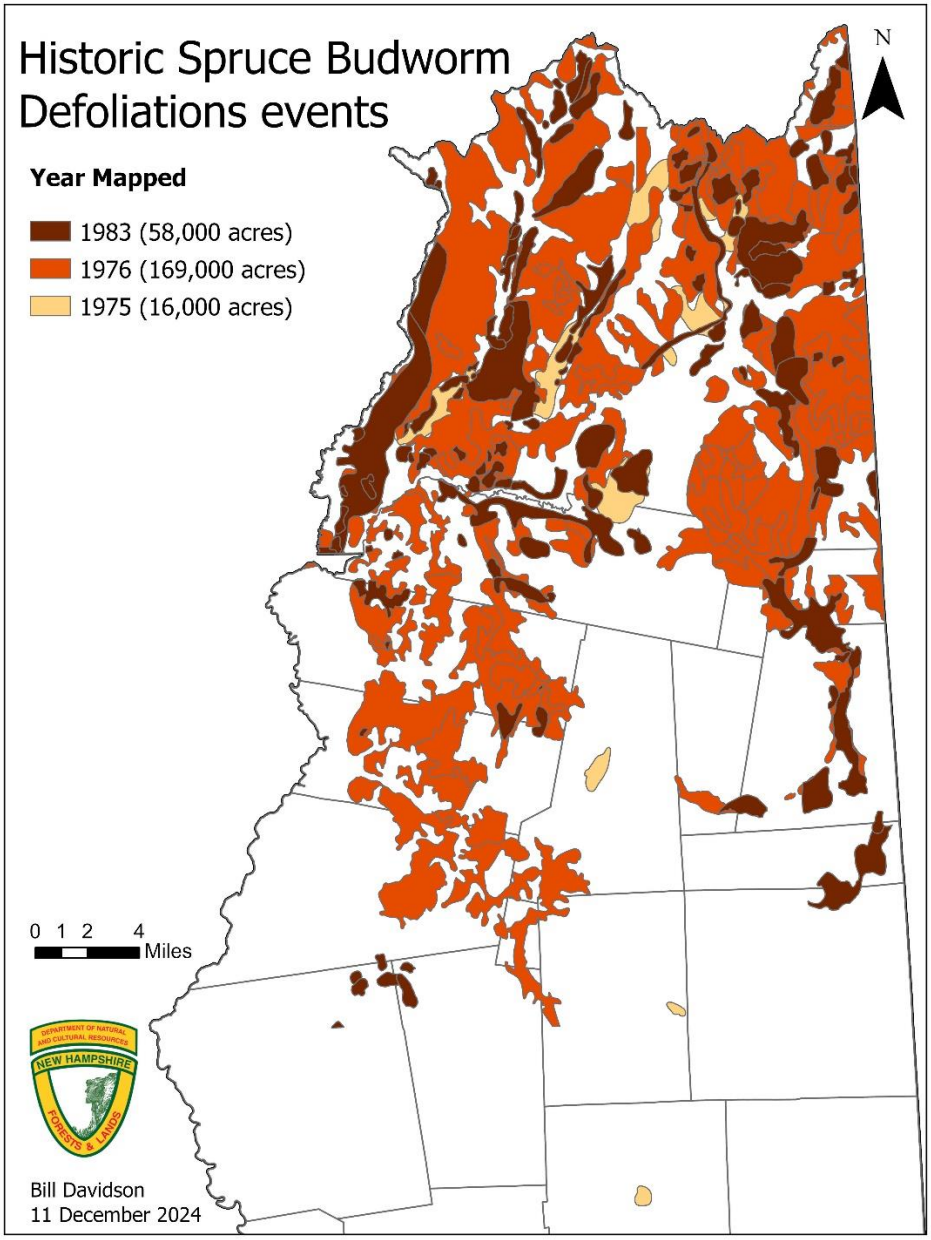
Nut collections this summer were limited as most mother trees did not produce well. However, we did find two new hybrid trees thanks to Dave and Ruby Kent in New Boston. Their amazing hybrid butternut trees produced very well. This will allow us to make available a good number of seedlings in 2027

A hybrid butternut "mother tree" that produced many of the nuts that were collected for this project.

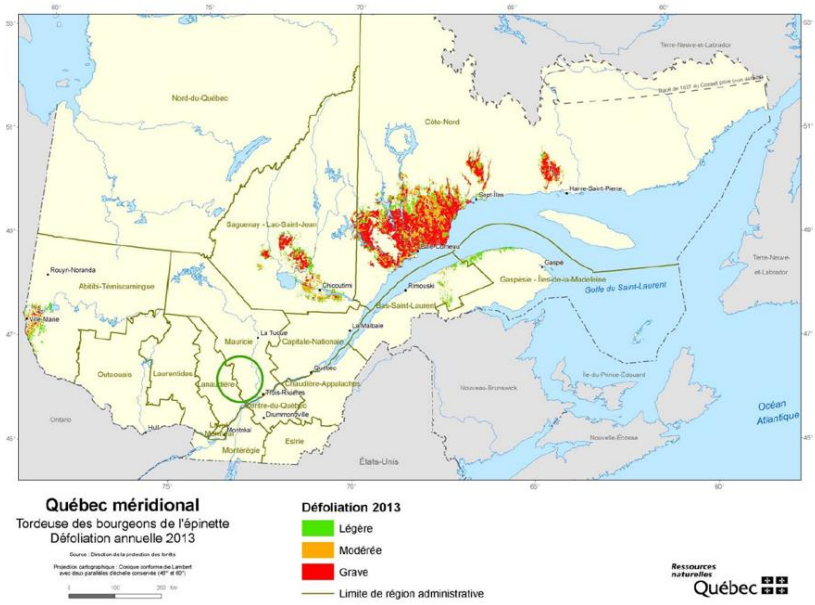
In 2025, the State Forest Nursery in cooperation with UNH Cooperative Extension and the Forest Health Program cleared and prepared a four-acre piece of land to be developed as a seed orchard for several different species deemed important to the future resiliency of our forest. White oak, butternut, and white spruce will be planted and used for seed production and progeny testing. Hybrid butternut seedlings will be for sale at the State Forest Nursery in 2026. The on-line catalog will open by December of 2025.

Spruce Budworm:

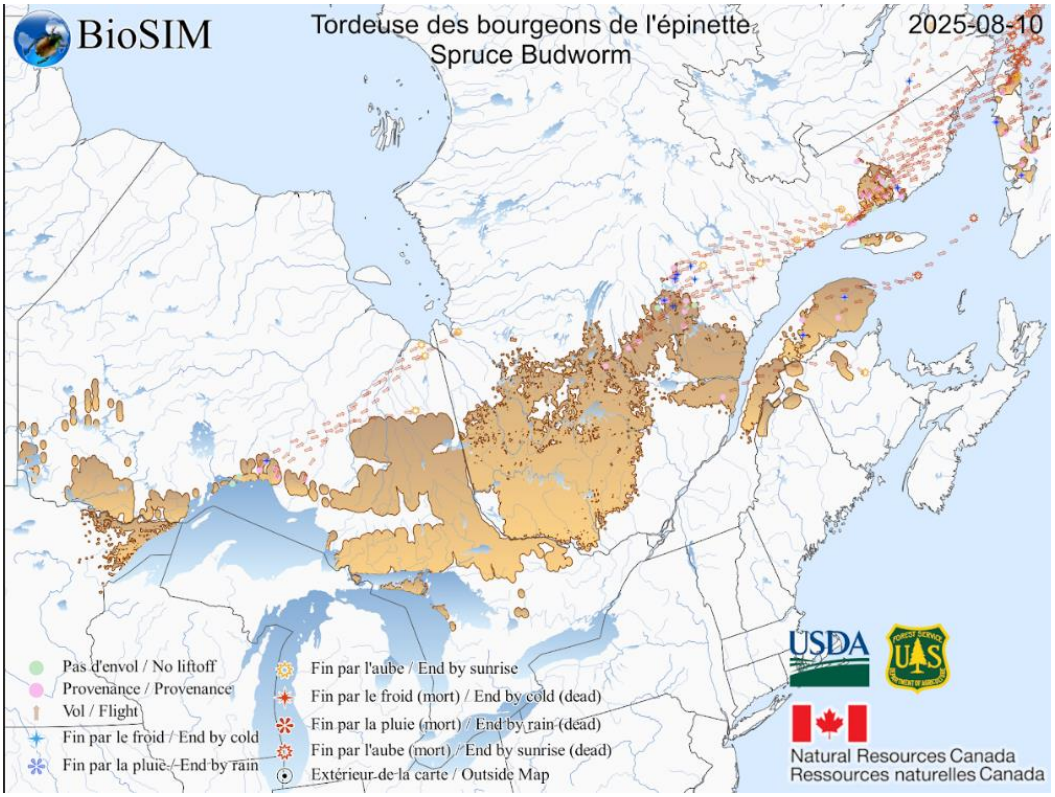
Spruce budworm is a native moth which feeds primarily on spruce and fir trees. At endemic population levels this insect is hardly noticeable in the forest, but when conditions are right, massive outbreaks can result in widespread defoliation of its preferred hosts. These outbreaks can last for over a decade and result in significant tree mortality. The most recent outbreak in New Hampshire ran its course from the mid 1970s-1980s in the northern part of the state.



There has been an ongoing spruce budworm outbreak in Canada which began in 2013 in Quebec.



In 2024, this outbreak spread over the border into Maine where it caused 3,500 acres of defoliation. This past summer, the outbreak grew to 35 million acres, with the majority of the damage in Quebec and Ontario.



With outbreaks near our northern forests in New Hampshire many different monitoring programs were implemented. The first activity in mid-June was to perform an aerial survey across all forests north of the White Mountain National Forest looking for spruce budworm defoliation. None was observed.

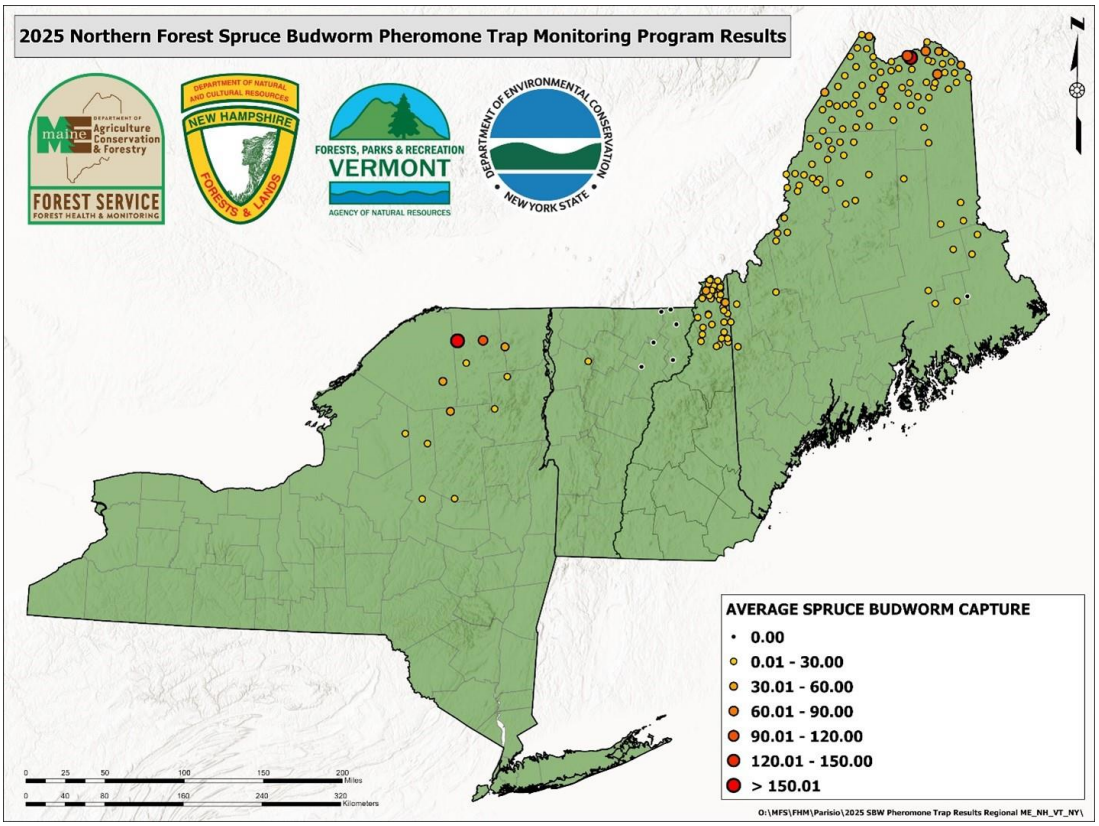
Caterpillars feed early in the spring on new foliage and buds. Despite its name, balsam fir is the preferred food for spruce budworm.

This tree has very little current-year foliage due to budworm feeding. Repeated defoliations can cause tree mortality in a little as three years.

In July, 200 traps were deployed across 50 sites in northern Coos County. These bucket traps have a chemical lure which mimics the mating pheromone emitted by female moths to attract males. While not an effective control mechanism, trapping is useful for monitoring moth populations.

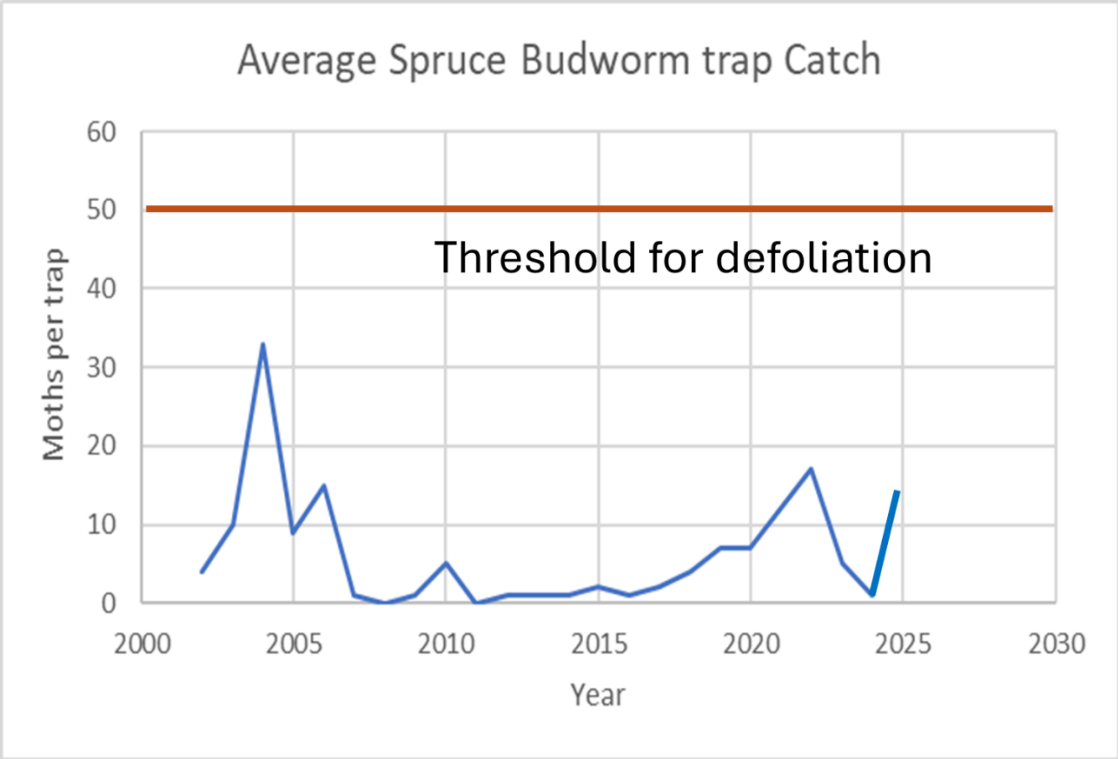
Spruce budworm traps ready to be deployed

This map depicts the region-wide distribution of traps and the abundance of moths captured throughout the area.



Most traps in NH were at endemic levels with average trap catch per site at 1-10 moths per trap. We did have two sites with elevated counts worthy of further evaluation. Those sites were in Magalloway and at the northern end of Perry stream.

Statewide, we did not approach the trap-catch thresholds indicative of defoliation in the subsequent year. Based on research done in the 1980's and 90's, 50 moths per trap are required for defoliation.



Sampling branches of balsam fir to evaluate abundance of spruce budworm caterpillars is a more accurate measure of budworm populations than trapping, but this method is also much more labor intensive. Therefore, locations with elevated trap catch are prioritized for branch sampling.

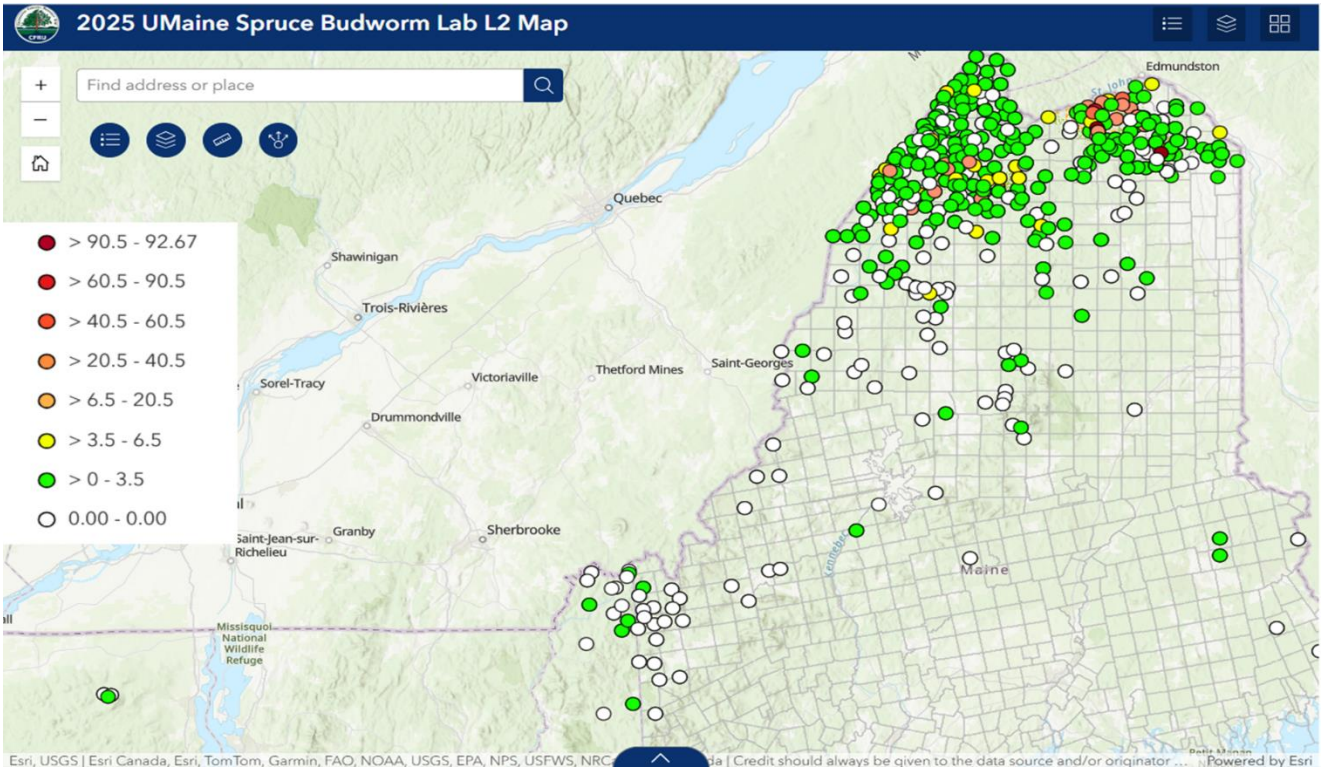
Insect larvae go through several stages of development throughout their life cycle. These stages are called larval instars. Larvae freshly hatched from eggs are in their first stage of development which is termed "larval instar 1" and can be shortened simply to "L1". Larvae advance one instar level after each molt.

Spruce budworm caterpillars emerge from their eggs in late summer and immediately molt. The resulting "L2" caterpillars then tie themselves into the foliage of their host tree where they will spend the winter. It is this stage of caterpillar that we are looking for in the branch samples.

"L2" budworm caterpillars viewed through a microscope adjacent to 12-point type.

Branch samples are shipped to a laboratory in Orono, Maine, where they are put through a series of sodium hydroxide baths to dissolve insect silk holding the larvae to the branches. Once the larvae are free, they fall out of the sample and can be counted.

The threshold for predicting light defoliation is 7 larva per sample. In New Hampshire our samples averaged less than one larva per branch. Results for 2025 are posted on the Maine Spruce Budworm Interactive Map website .



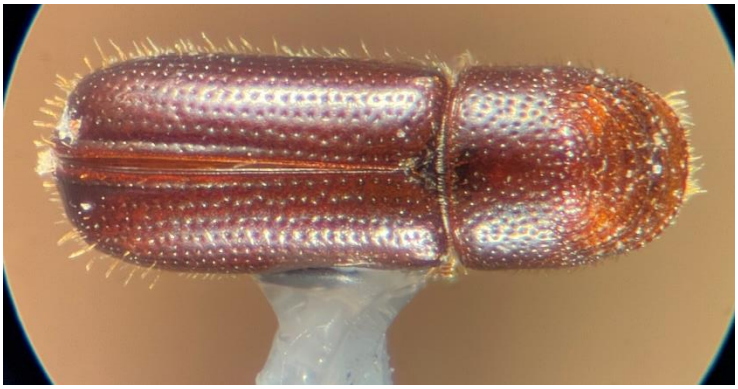
With aerial survey, pheromone trapping, and L2 sampling complete, the data convincingly suggest there will not be any defoliation in 2026. However, there are warning signs such as elevated pheromone trap catches and moth flight simulators in Canada showing moth migration into Pittsburg, NH.

All monitoring will continue in 2026 and landowners with spruce/fir forest resources in northern Coos County should be working to reduce their risk of serious economic or biological damage. Preventative activities include updating maps and inventory of spruce/fir acreage, reducing balsam fir volumes in favor of spruce, and preparing a treatment response in case defoliation thresholds are met in the future.

Trapping Surveys:

Each year we deploy insect traps to monitor the spread and introduction of invasive insect species in New Hampshire. Additionally, we have been working with cooperators at the US Forest Service, University of New Hampshire and The Ohio State University on their pilot program to detect fungal tree pathogens using spore traps. Spore traps are being explored to detect tree pathogens by sampling airborne fungal DNA

In summer 2024, traps in New Hampshire detected DNA from a wide range of native fungi as well as the oak wilt and thousand cankers disease pathogens, whose nearest known occurrences are in New York and in Pennsylvania/Ohio, respectively. These detections do not confirm the diseases' presence as the spores can travel long distances in the wind, but the results help us target survey and vector trapping efforts.



The walnut twig beetle (Pityophthorus juglandis) is the primary vector for the thousands canker disease, a weak pathogen of black walnut. Detection of spores of the fungus prompted trapping surveys across the state for the beetle vector, however, no walnut twig beetles were detected.

Oak wilt is an aggressive fungal pathogen that disrupts the flow of water within oak trees causing the leaves to wilt. Infected trees that were healthy in spring wilt and drop their leaves by mid-summer, ultimately dying within a few months of infection. The disease can spread below ground if oak trees are growing close enough that their roots touch and form grafts. Overland, nitidulid "sap" beetles are known to vector the disease when they visit a spore mat and then fly to a fresh wound on an oak tree.

To date, there have been no detections of oak wilt in trees in New Hampshire. The closest known incidence of oak wilt are in New York's Capital Region and Long Island. In New Hampshire, visual surveys from the air and the ground have been used for the last decade to look for symptomatic oak trees. More recently we have been trapping and testing nitidulid "sap" beetles for the presence of Bretziella fagacearum DNA. These sampling efforts have come back negative for detection of the disease.

Three Glischrochilus fasciatus sap beetles (Family: Nitidulidae) that can vector oak wilt disease.

Thousand Cankers Disease is caused by the fungus *Geosmithia morbida* and spread primarily by the walnut twig beetle, *Pityophthorus juglandis*. The disease affects walnut trees, with black walnuts the most susceptible. Walnut twig beetles are essential for disease expression because they use chemical signals call in more beetles to “mass attack” the host tree. As thousands of beetles burrow into the tree, each one inoculates the tree with *G. morbida*, resulting in the formation of thousands of cankers. Numerous cankers coalesce, disrupting the trees vascular system, leading to crown dieback and tree mortality. The closest known cases of the disease, and detections of walnut twig beetle to New Hampshire are in Pennsylvania and Ohio.

The disease is more prevalent in the western US where black walnuts are planted and often experience drought stress, allowing twig beetles to successfully attack trees. In the eastern US, where the disease is present, trees are most susceptible during drought years but can recover as drought subsides. Following detection of *G. morbida* DNA on spore traps in 2024, an insect-trapping survey was conducted in summer 2025 at 14 sites, but no walnut twig beetles or thousand cankers disease symptoms were detected. Additionally, *G. morbida* is known to exist beyond the range of walnut twig beetle but symptoms of the disease are not observed.

A walnut twig beetle

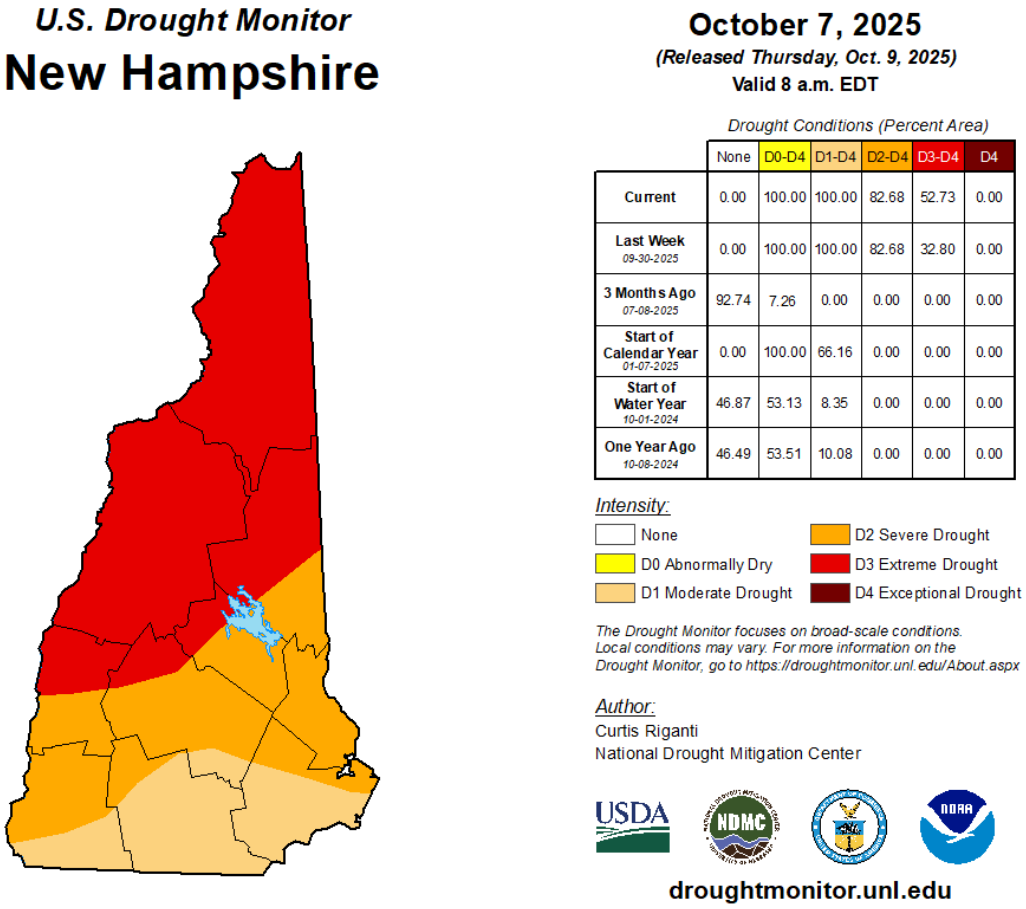
Southern pine beetle, a bark beetle native to the southeastern US, is expanding its range northward as our winters warm. In the Northeast, it strongly prefers pitch pine, with recent outbreaks occurring in pitch pine stands on Long Island, NY and Martha's Vineyard, MA.

A Southern Pine Beetle

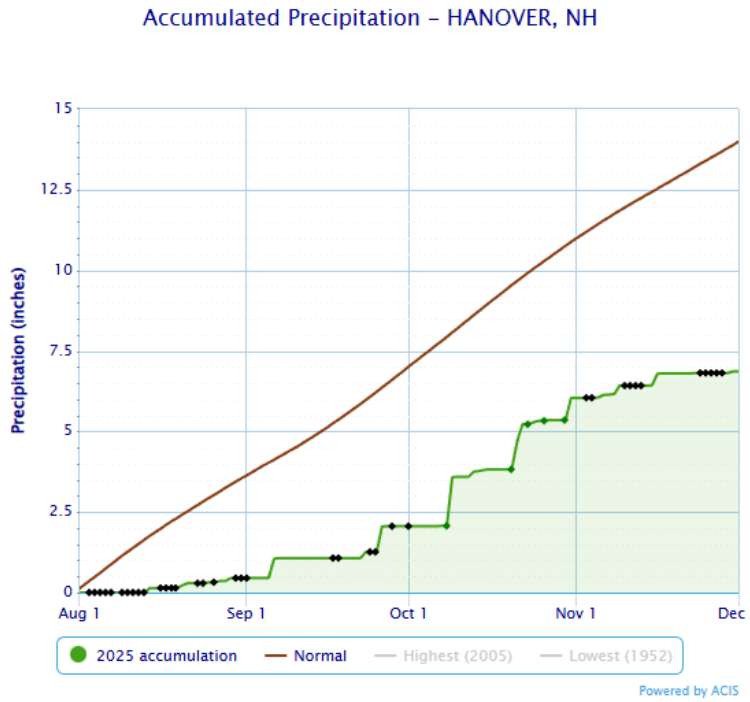
Though we did not detect any SPB or WTBs in our traps, bycatch does give us an opportunity to see what other wood boring insects happened to be collected. From the bycatch of these two trapping programs, one species of ambrosia beetle was detected for the first time in NH. *Hylocurus rudis*, an eastern US native that breeds weakened or freshly dead trees, as well as recently dead wood. The species range historically was the eastern united states south of New England, but the range has been expanding northward in recent years. In the last decade, the species has been detected for the first time in Massachusetts, Vermont, and now New Hampshire. This species is not a pest, but this detection is likely an example of insect species expanding their range northward as our climate warms.

Drought:

Despite a wet spring across much of the state, an abnormally dry summer resulted in the entire state experiencing moderate drought or worse by the beginning of October, with over half of the state in extreme drought.



Drought conditions were more severe in the northern half of the state. This graph provides a striking visualization of the dry summer experienced across the state. The brown line represents the 30-year average precipitation from August 1st - December 1st, and the green line shows precipitation recorded in Hanover, NH in 2025. During this 4-month period, Hanover received over 7 inches less precipitation than the average.



This graph provides a striking visualization of the dry summer experienced across the state. The brown line represents the 30-year average precipitation from August 1st - December 1st, and the green line shows precipitation recorded in Hanover, NH in 2025. During this 4-month period, Hanover received over 7 inches less precipitation than the average.

Drought stress can have a negative impact on tree health, especially in areas with thin soils such as ridgetops or ledgy ground. Vegetation in drought-stricken areas can turn brown prematurely, wilt, and in severe cases die.

Conifers on several mountain sides were seen turning brown and dropping their needles due to drought stress. Many of these trees will likely not recover and we hope to quantify the extent of this damage via aerial survey in 2026.

Spruce on Mount Cardigan have dropped their needles. A carpet of fallen needles covers the trail. Similar conditions were observed throughout the state.

NH Forest Health Program Contacts:

Kyle Lombard
603-419-0075
kyle.d.lombard@dncr.nh.gov

Bill Davidson
603-892-5156
william.davidson@dncr.nh.gov

Ryan Crandall
603-419-0079
ryan.s.crandall@dncr.nh.gov