2024 Forest Health Highlights

The Connecticut Agricultural Experiment Station

INSIDE

Summary

This report synthesizes challenges and efforts in maintaining Connecticut's forest health in the face of multiple stressors, including pest and pathogen invasions and environmental changes.

Aerial detection surveys are the primary method for observing statewide damage. Significant issues identified through the aerial survey in 2024 include beech leaf disease (BLD), spongy moth defoliation, and tree mortality from emerald ash borer (EAB) infestations. BLD affects all beech trees statewide, leading to reduced foliage and tree growth. Spongy moth continues to cause oak defoliation in northwestern Connecticut, which was centered around Kent in 2024. EAB has caused significant ash mortality throughout the state although efforts to manage EAB through biological control are promising. Parasitoid wasps that target EAB have spread beyond their initial release sites, and EAB populations have crashed in the vicinity of the first detection site in New Haven County.

Other forest health concerns include hemlock woolly adelgid (HWA) and white pine needle disease (WPND). Elm zigzag sawfly (EZS) is a newly identified pest in Connecticut that has caused local defoliation to individual elm trees. Southern pine beetle (SPB) remains at endemic levels, potentially due to the small remaining pitch pine population in Connecticut. Monitoring and preparation efforts continue for oak wilt although it is not currently known to be present in the state. Sugar maples exhibited premature leaf drop for the second year in a row, likely due to wetter, warmer conditions in late summer.

A severe fall drought and elevated temperatures led to a dramatic increase in wildfires in October and November 2024, prompting a state of emergency and fire bans. Connecticut experienced 154 wildfires in October and 177 in November, exceeding historical averages.

The Resource

Connecticut's forest resources cover nearly 1.78 million acres, or 57% of the state's land area. In addition, nearly 71% of all forestland in Connecticut, or 1.26 million acres, is privately owned.

Although the dominant forest cover type is oak-hickory, the forest consists of a mixture of hardwood and softwood species, including maple, birch, beech, oak, hickory, tulip-poplar, white pine and eastern hemlock.

Connecticut's maturing woodlands provide essential wildlife habitat, support outdoor recreation, and contribute to the state's economy through timber production and tourism. Further, they play a vital role in water quality management, soil conservation and carbon sequestration and storage, making them an important asset for the state.

Several threats pose a challenge to maintaining the health of Connecticut's forest resource, including environmental stressors, plant pathogens and diseases, and invasive insects and plants.

Aerial Survey

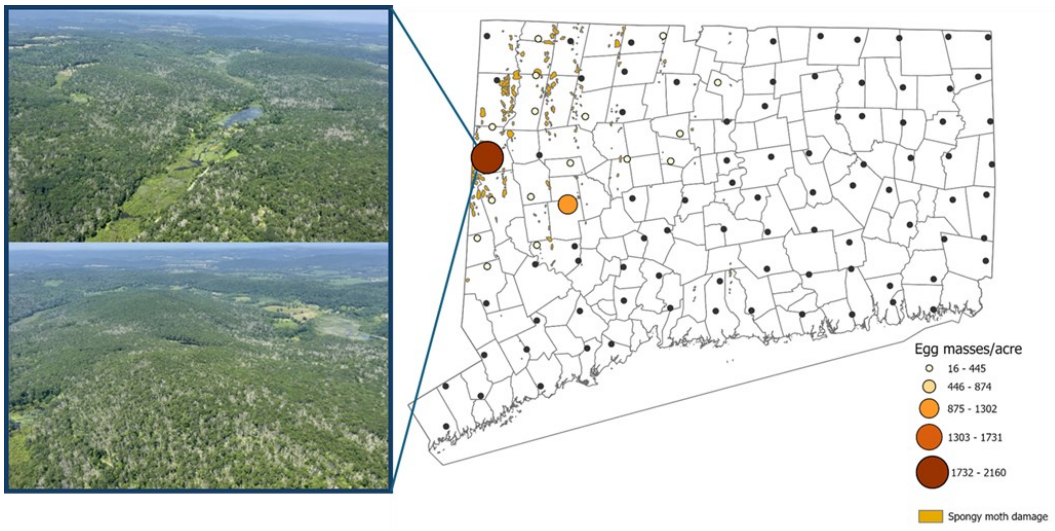
We documented 82,214 acres of new damage in the 2024 aerial survey. BLD was the greatest damage causing agent, followed by oak defoliation and mortality by spongy moth. WPND also affected nearly all the white pine throughout the state. EAB continues to cause substantial ash mortality in the northeastern and northwestern corners of Connecticut, which still have some living ash trees since they were invaded by EAB in 2019-2020.

We note that the acreage reported through the aerial detection survey is likely an underestimate of the true extent of damage in Connecticut's forests, particularly for certain agents. For instance, all beech trees in Connecticut are being affected by BLD and show signs of severe defoliation. However, beech is primarily present in the subcanopy of some of Connecticut's forests, making its detection through aerial surveys difficult. Areas with reported damage are therefore restricted to areas where beech make up a larger component of the canopy in eastern Connecticut. Likewise, damage caused by diseases that affect species that typically occur as single individuals in mixed species stands, such as WPND and EAB, are also likely to be underestimated given the high number of stressors affecting different species in these forests and the difficulty of simultaneously reporting them all.

Spongy Moth

Defoliation from spongy moth continues to cause substantial oak defoliation and mortality in northwestern Connecticut. Since the onset of the current outbreak in 2016, spongy moth damage gradually spread from the eastern to western portions of the state.

Overall, however, the 2023 – 2024 winter egg mass counts remain relatively low compared to past outbreaks in 2016 – 2017 and 2021 and are primarily restricted to sites in the vicinity of Kent and Bethlehem/ Woodbury, which also experienced substantial oak mortality in 2024.



2024 spongy moth damage to oaks (images, left) documented in the aerial survey overlain with the 2023-2024 winter egg mass survey results (graphic, right).

Beech Leaf Disease (BLD)

BLD continues to be a leading forest health concern in Connecticut. The first detection of BLD was in Fairfield County in 2019, and by 2021 BLD was present in all remaining counties. Since 2021, the severity of BLD has rapidly increased and likely affects all beech trees in the state.

For the past several years, scientists at the Connecticut Agricultural Experiment Station have been monitoring the effects of tree size, canopy light exposure, co-occurrence with beech bark disease, and forest management history on changes in tree

A typical beech stand in Connecticut dominated by subcanopy beech thickets with severe leaf deformation and defoliation.

growth and mortality from BLD. The assessment includes annual remeasurement of ~2,500 beech trees at 16 sites from five long-term studies to compare changes in tree growth and mortality to historic trends.

Preliminary data from long-term monitoring plots shows a steady increase in BLD severity over time. In 2024, the percentage of foliage infected by BLD was lower for trees in the upper canopy compared to the subcanopy. Dominant and codominant trees had an average of 46% and 67% of infected foliage, whereas intermediate and suppressed trees had 82% and 79%, respectively.

The rapid increase in BLD severity decreased the percentage of normal foliage, which dropped from an average of 43% in 2023 to 26% in 2024. Again, these effects were more pronounced for subcanopy trees than for upper canopy trees. The decline in annual growth, however, was more pronounced in the upper canopy than in the subcanopy owing to the higher initial growth rates of dominant and codominant individuals prior to the outbreak of BLD. In 2024, average annual growth for dominant trees had declined by ~75% (1.5 mm/yr) relative to pre-BLD growth rates (5.8 mm/yr), making them comparably low to the growth rates of subcanopy trees.

Despite the dramatic increase in BLD severity and declines in the percentage of normal foliage and annual growth rates, we have not yet seen any substantial changes in tree mortality rates. The 2024 mortality rate (2.1%) was comparably low to that of 2023 (3.1%).

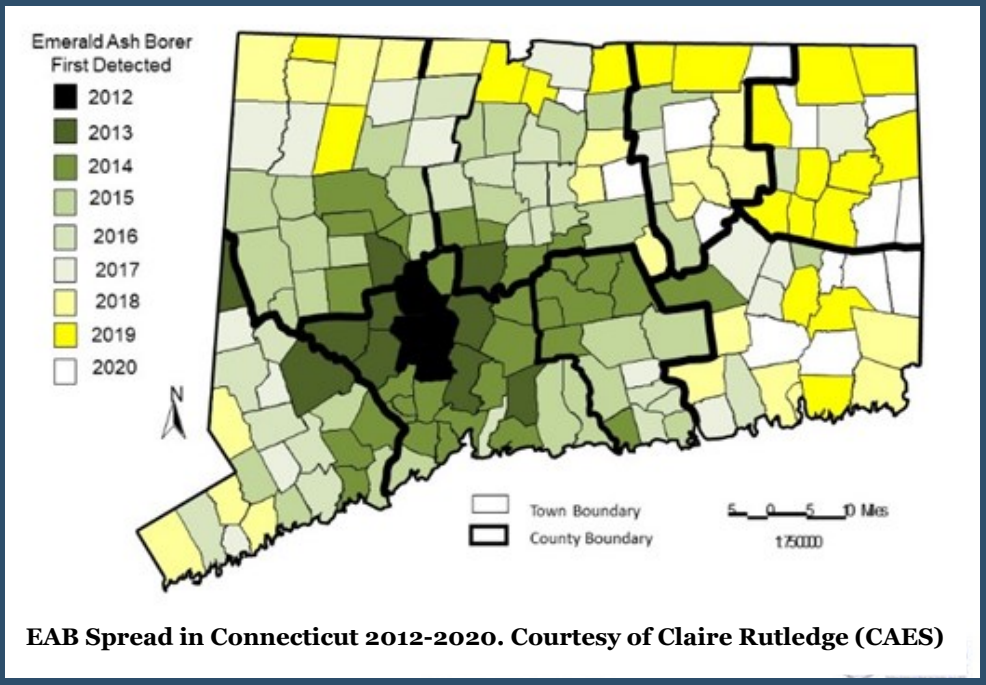
Emerald Ash Borer (EAB)

Emerald ash borer was first detected in northern New Haven County, Connecticut in 2012. It has since spread to the rest of the state and has reached all towns. EAB is a destructive invasive pest that feeds on ash trees.

Biological control agents have been successfully used in North America for over a century on a variety of invasive species. Beginning in 2013, three EAB parasitoids have been released in Connecticut in collaboration with the national EAB biological control program. Since that time, releases have been made at 17 sites.

These selective biological control insects target specific life stages of EAB. Over 175,000 *Tetrastichus planipennisi* (a larval parasitoid), 62,000 *Oobius agrili* (an egg parasitoid) and 14,793 *Spathius galinae* (a larval parasitoid), have been released. Parasitoids have been recovered from all but 2 of the release sites. We have documented parasitoid spread from release sites up to 14 km and have captured individual *Spathius galinae* 28 km from their release sites. Studies in 2020 – 2022 recovered parasitoids at release sites regardless of time since EAB detection and EAB larval density. Even at extremely low larval densities, parasitism rates were similar to parasitism rates in areas with high EAB larval densities.

To assess the longer-term impacts of EAB on understory plant composition (native versus non-native species), tree regeneration, and stand dynamics, we established 81 plots at 27 sites across an estimated time since EAB detection gradient in 2024. This sampling effort included 3 sites per EAB detection year from 2012 through 2020, and within each site, we established 3 plots that ranged in relative ash basal area (<30%, 30-50%, ≥50%) to capture differences in canopy gap sizes and understory light regimes following overstory ash mortality. At each of the 81 plots, we characterized overstory, midstory, and understory forest structure and composition and measured environmental variables, including canopy transparency and soil conditions.



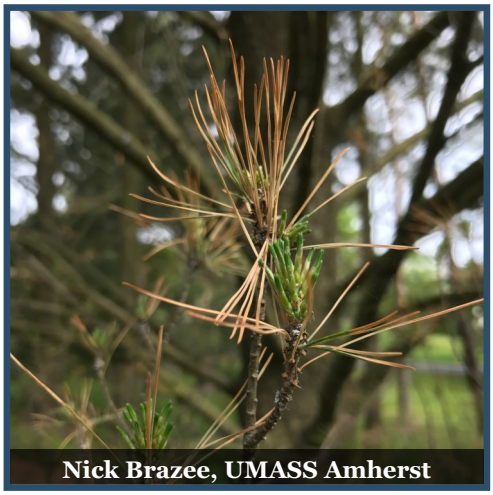
EAB Spread in Connecticut 2012-2020. Courtesy of Claire Rutledge (CAES)

In total, this sampling effort included 387 ash trees, the vast majority of which were in the overstory (diameter at breast heigh [DBH] ≥ 10 cm; n = 383) rather than the midstory (DBH = 1-10 cm; n = 4). Of the 387 ash trees, 73 were alive and 314 were dead, and the percentage of living trees increased in later EAB detection years. We observed no living overstory or midstory ash in sites where EAB was first detected in 2012 or 2013. From 2014 through 2019, the average percentage of surviving ash ranged from 5 to 23%, and in the 2020 sites, 78% of ash were still alive. We will continue to monitor these sites to assess the potential for the longer-term recovery of regenerating ash in the aftermath of EAB.

White Pine Needle Disease (WPND)

Eastern white pine is the most common and economically valuable conifer in Connecticut. Four fungal pathogens make up a disease complex that can cause premature needle shedding in late spring and early summer.

In June 2024, WPND affected the majority of white pines throughout the state, and similar impacts were observed in other northeastern states. Increased precipitation and other changing weather patterns in May and June may be creating favorable conditions for WPND damage.



Nick Brazee, UMASS Amherst

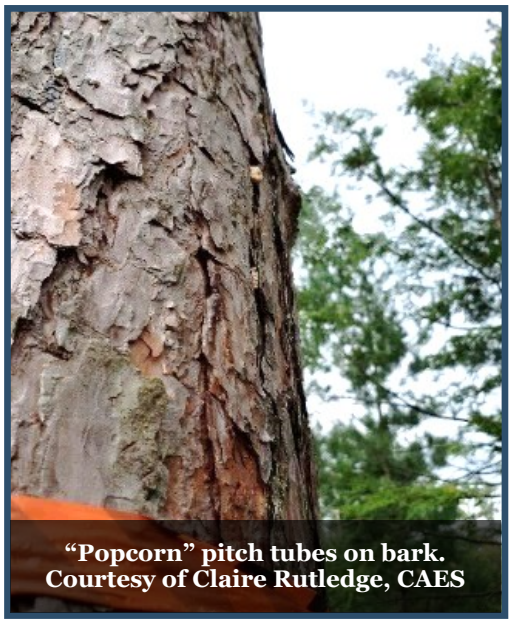
Hemlock Woolly Adelgid (HWA)

Connecticut's experience using *Sasajiscymnus tsugae*, a specialist predator of HWA from Japan, as the sole HWA biological control agent since 1995 has helped sustain the state's hemlock resource with minimal hemlock mortality over three decades. Connecticut continues to manage HWA and expand biological control of HWA from state lands to privately-owned forests, lake communities, town open space, land trusts, and the general public.

Over 64,700 *S. tsugae* were released in 2024 at 177 sites throughout Connecticut. Treesavers, PA donated many thousands of *S. tsugae* to Connecticut in summer 2024, and to date, >327,700 *S. tsugae* have been released in Connecticut since 1995.

Photos showing *S. tsugae* larva (left, Carole Cheah) and adult (Right, USDA-NPS)

In 2024, however, there was no observed HWA winter mortality in Connecticut as there were no subzero winter temperatures. As a consequence, there was some resurgence and new invasions of HWA.



"Popcorn" pitch tubes on bark. Courtesy of Claire Rutledge, CAES

Southern Pine Beetle (SPB)

SPB was first detected in Connecticut in early 2015, the apparent result of a weather pattern that rained SPB down on Long Island, NY and southern New England. Initial detections were made in all 8 counties, and SPB impacted 5 species of conifers. Trapping has been conducted each year thereafter. Limited numbers were captured in 2015 – 2017, and it was unclear if SPB was established in Connecticut, or if individuals were being wafted over from the large outbreaks in Long Island. In 2018 an exponential increase started, and levels in 2021 were quite high. Only a few attacked trees have been found since 2015, despite the rising numbers of beetles in the traps. In 2024, there were no reported attacks. The beetles are still in their endemic, or non-outbreak phase. It is unknown if and/or when they might reach sufficient numbers to cause an outbreak. The major species of concern in Connecticut is pitch pine (*Pinus rigida*), whose habitat is one of 13 ecosystem types of concern in the state. The patchy distribution of pitch pine in the state may help to limit outbreaks compared to other surrounding states with more substantial outbreaks, such as Massachusetts, New York, and Rhode Island.

Oak Wilt

Oak wilt is a vascular disease caused by the fungus *Bretziella fagacaerum* that primarily affects trees in the red oak group. Once established, oak wilt can kill infected trees within a year and rapidly spread to other nearby host species. Although oak wilt is well-established in the Midwest and Pennsylvania and has been detected in parts of New York, it has not been confirmed in Connecticut.

An oak wilt working group has been formed in Connecticut to enhance early detection, monitoring, and outreach efforts and prepare a response plan in case a future detection occurs. The best diagnostic symptom of oak wilt is unusually early leaf flagging and/or senescence of red oak leaves in July and August. Photos of suspect trees with these symptoms should be submitted to Nate Westrick nathaniel.westrick@ct.gov at the Connecticut Agricultural Experiment Station for further investigation.

Paul A. Mistretta, USDA-FS

Elm Zigzag Sawfly (EZS)

EZS is an invasive defoliating insect native to East Asia that has been detected in North America since 2020. Prior to 2024, EZS was confirmed in the Northeast in Vermont, New York, and Massachusetts. EZS feeds on trees in the Ulmaceae family and has the potential to completely defoliate host trees, though mortality of infested trees has not yet been observed. No pesticides are currently labeled specifically for controlling the insect.

EZS was first detected in Connecticut in 2024. Expanded monitoring around the initial detection site confirmed the presence of EZS in three Connecticut counties (Litchfield, Fairfield, and New Haven), and damage from EZS was documented in nine towns.

Gallery Feeding of Elm Zigzag Sawfly. Courtesy of Jacob Ricker, CAES

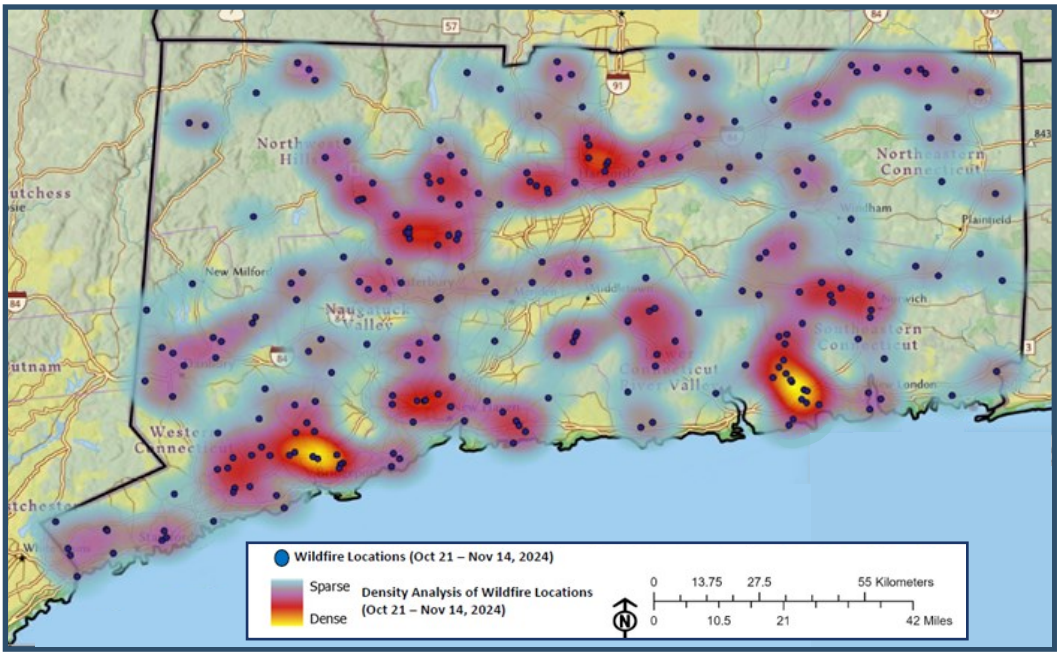
Sugar Maple Trees Exhibiting Discoloration in September, 2023. Courtesy of Emery Gluck, CT-DEEP (Retired)

Premature Leaf Drop on Sugar Maple

In fall 2023 and 2024 widespread premature leaf discoloration and senescence of sugar maples occurred throughout Connecticut. These observations are consistent with reports from other states in the Northeast. Although the cause is not currently known, wetter and warmer conditions in the late summer could be promoting damage from foliar pathogens that affect sugar maple.

Fall Wildfires and Drought

Sustained drought conditions in fall 2024 combined with higher than average temperatures greatly increased wildfire activity in Connecticut in October and November 2024 relative to historic norms. 154 fires were reported in October (relative to an average of 17 from 2018 to 2023), and 177 fires were reported in November (relative to an average of 32 from 2018 to 2023).



***Graphic courtesy of* CT-DEEP, Division of Forestry**

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