

OHIO – 2023

Forest Health Highlights

The Resource

Ohio encompasses 26,209,700 acres, and 30 percent of these acres are forested, not including the urban forest. Forests have increased dramatically since 1940, including an increase from 7.1 to 8.0 million acres since the late 1970s. Ohio's forests are 85 percent privately owned and the predominant forest type group is oak-hickory, occupying 64 percent of Ohio's forest land. Ohio's forest industries generate \$27 billion in economic activity annually. The Ohio Division of Forestry manages 24 state forests totaling more than 200,000 acres.

Aerial Forest Health Survey

Each year, the Ohio Division of Forestry, with the use of Ohio Division of Wildlife aircraft, conducts an aerial survey over the majority of the more forested parts of the state to survey Ohio's forest health. This year's survey began on June 5 and concluded on June 15. Flight lines were flown in an east to west direction with spacing of about 6 miles. Each flight day, two observers were equipped with digital mobile sketchmap (DMSM) tablet computers containing a GIS/GPS mapping system. The observers identified sites from the air with discoloration, defoliation, or mortality. The majority of these sites were inspected on the ground by Ohio Division of Forestry staff. Total acreage of damage-causing agents (DCA) was not yet tabulated at the writing of this report. The top DCA in 2023 was likely eastern white pine needle damage followed by sycamore anthracnose.

Eastern white pine needle damage is a suite of native fungal pathogens that infect eastern white pine needles causing discoloration, premature needle loss, and can weaken trees leading to dieback and mortality. This issue appears to be most severe in southeastern Ohio and is likely related to a variety of factors including recent years of above normal rainfall, aging trees, and loss of tree vigor due to competition for sunlight with surrounding trees.

Special Issues

Elm Zigzag Sawfly

The first detection of elm zigzag sawfly in Ohio was made in July by staff at the U.S. Forest Service Northern Research Station (NRS) lab in Delaware, Ohio (Delaware County). Shortly after, an additional finding was made nearby in northern Franklin County. The sawfly larvae chew distinctive zigzag paths through the leaves of elms (*Ulmus* spp.) and are capable of major defoliation, but their overall impact to elms and forest health is still being studied. The insect appears to be well-established in the elm plantations at the NRS lab in Delaware, which have been used for research on Dutch elm disease for several decades. The overall defoliation by elm zigzag sawfly was very low (<1%). Adult elm zigzag sawflies are strong fliers, capable of dispersing long distances (potentially over 50 miles). Possible feeding damage by elm zigzag sawfly was reported from sites in Ashland and Licking counties, however, no life stages of elm zigzag sawfly were observed at those sites. The Ohio Division of Forestry will continue to monitor for elm zigzag sawfly across the state and studies investigating the insect's lifecycle, phenology, natural predators, impacts to tree health, and chemical controls are

being planned by the U.S. Forest Service NRS, Ohio State University, Bowling Green State University, and others.



Figure 1. Zigzag pattern on elm leaf (left) and elm zigzag sawfly larva (right) (Credit: Ohio Division of Forestry).

Spotted Lanternfly

This planthopper insect is native to Asia and was first documented in North America in southeastern Pennsylvania in 2014. It has since spread to several other Northeastern and Mid-Atlantic states. Ohio's first known spotted lanternfly infestation was discovered in 2020. Eleven counties are currently under a spotted lanternfly quarantine by the Ohio Department of Agriculture to reduce the spread of the insect (eight counties added in 2023). In 2023, confirmed sightings of spotted lanternfly increased in many parts of the state and efforts to delineate infestations are ongoing.



Figure 2. Adult spotted lanternfly (Credit: Ohio Division of Forestry)

The spotted lanternfly poses a significant threat to the agricultural industry (particularly grape and hops vineyards) and potentially native forest ecosystems. Most of the known Ohio spotted lanternfly infestations appear to be associated with railroads and the non-native tree-of-heaven (*Ailanthus altissima*). Railroads seem to be a potential pathway of introduction, as spotted lanternflies lay their cryptic egg masses on nearly any flat surface including train cars, buildings, fences, rocks, and tree trunks. An interagency team, led by the Ohio Department of Agriculture, and including the USDA Animal & Plant Health Inspection Service, Ohio Department of Natural Resources, Ohio State University Extension, and Ohio Grape Industries Committee, is assisting with survey, management, and education and outreach efforts.

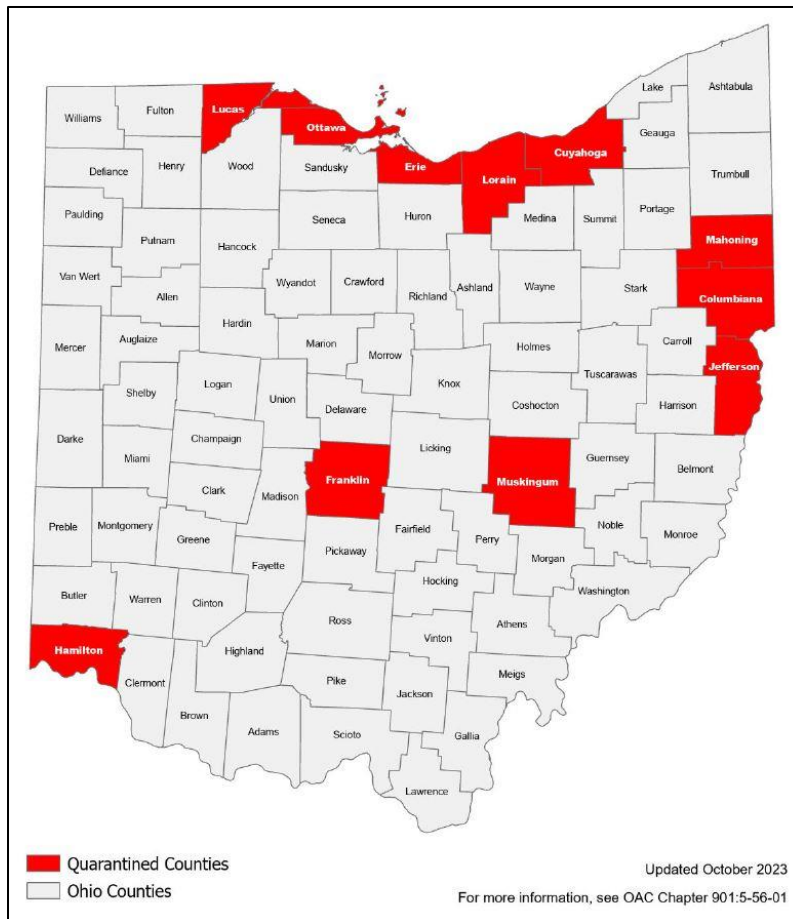


Figure 3. Ohio spotted lanternfly quarantine map (Credit: Ohio Department of Agriculture).

Forest Pest & Disease Issues

Oak Wilt

The fungal pathogen *Bretziella fagacearum*, which causes the disease oak wilt, has been known to occur in Ohio since at least 1950, but there has been a concerning increase in oak wilt infected areas since 2019, with some new infected areas reported in 2023. New and existing infections were identified in all regions of the state. This disease is deadly to oaks and the fungal spores can spread between trees aboveground via sap-feeding beetles and belowground through root systems of neighboring trees that have grown together, or “grafted.” Ohio Division of Forestry is working with landowners to help manage oak wilt infections on private land as well as on Ohio Department of Natural Resources (ODNR)-owned properties. The ODNR Division of Forestry convened an



Figure 4. Pin oaks killed by oak wilt in northeastern Ohio (Credit: Ohio Division of Forestry)

Ohio Oak Wilt Working Group in 2022 for the purpose of bringing together agencies, organizations, and professionals that may work on some aspect of oak wilt, to increase education and outreach about oak wilt and management options and improve the mapping of oak wilt across the state.

Beech Leaf Disease



Figure 5. Forest understory heavily impacted by beech leaf disease (Credit: Ohio Division of Forestry).

A decline of American beech (and potentially several other non-native beech species) has been documented in northern Ohio since 2012. This decline is being referred to as beech leaf disease (BLD) and was first noted in Lake County and is now known to be present in parts of northern Ohio, the Canadian province of Ontario, and several Northeastern states. In 2023, beech leaf disease was detected in nine new counties in Ohio. Symptoms are first noticeable as dark interveinal striping on leaves, and progress over a period of one or more years to stunted and distorted leaves, reduction in leaf and bud production, and branch dieback. Mortality of understory trees and saplings has been documented. The causal agent of beech leaf disease is believed to be a species of foliar nematode (*Litylenchus crenatae* ssp. *mccannii*). Since 2021, the Ohio Division of Forestry in partnership with Holden Forests & Gardens, has sampled American beech (as well as maple and oak species) buds from 24 counties across the state. Analysis identified nematode DNA at roughly half the sites, fairly evenly distributed across the state, including areas far from where beech leaf disease symptoms are known to occur. Nematode DNA was also detected from some oak and maple buds. Those sites that were positive for nematode DNA were re-visited in order to be examined for beech leaf disease symptoms as

well as leaf sample collection for the identification of live nematodes. Long-term monitoring plots have been established in the area of the known extent of beech leaf disease in Ohio to better track tree damage progression over time and document impacts and changes to forest ecosystems.

branches, or entire seedlings, saplings, and small trees. Lastly, dieback and mortality of Colorado blue spruce (a non-native, ornamental tree in Ohio) continues to occur throughout the state due to various needlecast and canker diseases. All of these fungal issues impacting conifers in Ohio and the region are believed to be, in large part, due to changing climatic conditions – specifically greater moisture during the spring and summer months.

Hemlock Woolly Adelgid and Elongate Hemlock Scale

Two non-native, invasive insects of concern that infest eastern hemlock trees are present in Ohio. Hemlock woolly adelgid (HWA) is known to be present in 21 counties (one new county identified to date in 2023; Ross), while elongate hemlock scale (EHS) is present on yard and planted hemlock trees in several parts of Ohio, but only known to be infesting hemlock forests in northeastern Ohio. In 2023, the Ohio Division of Forestry treated roughly 5,000 eastern hemlock trees across 600 acres with the insecticide



Figure 8. Eastern hemlock branch infested with hemlock woolly adelgid (Credit: Ohio Division of Forestry).

imidacloprid to protect them from HWA. Since 2013, the Ohio Division of Forestry and partners have conducted HWA biocontrol predator beetle releases. Over 15,000 beetles (*Laricobius nigrinus* and *L. osakensis*) have been released in HWA-infested areas. Monitoring of treatment success and additional predator beetle releases will be ongoing. Silver flies (*Leucotaraxis* spp.) are another approved biological control for hemlock woolly adelgid, and were released for the first time in Ohio in 2021. Continued hemlock pest detection surveys are planned for this winter. The ODNR Hemlock Conservation Plan was completed in 2017, with the Ohio Division of Forestry as the lead agency. The plan is guiding the management of HWA and other hemlock pests in Ohio and includes a prioritization of Ohio’s hemlock stands. All counties with confirmed HWA infestations are quarantined by the Ohio Department of Agriculture to prevent the movement of potentially infested hemlock materials out of the infested areas.

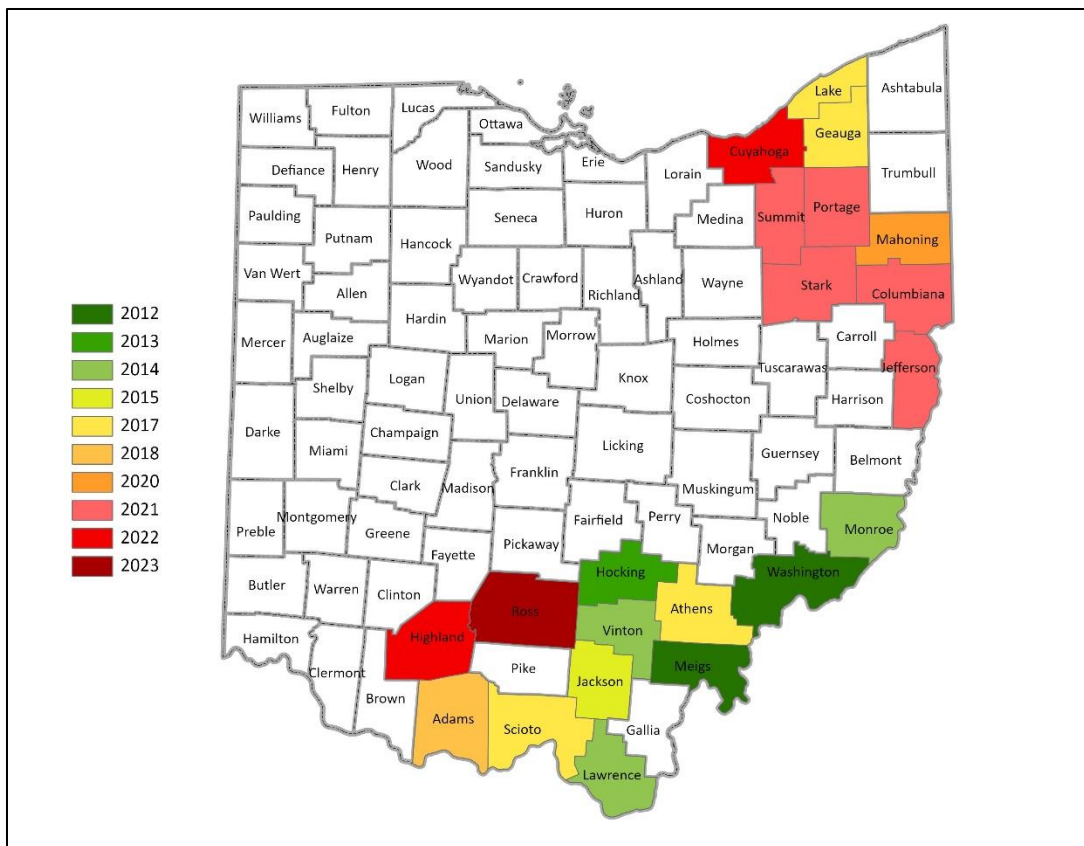


Figure 9. Hemlock woolly adelgid distribution in Ohio (Credit: Ohio Division of Forestry).

Asian Longhorned Beetle

The USDA Animal & Plant Health Inspection Service (APHIS) and Ohio Department of Agriculture cooperatively manage the Ohio Asian longhorned beetle (ALB) eradication program and enforce a quarantine area of 49 square miles, centered over Tate Township in Clermont County, including parts of East Fork State Park and Wildlife Area, to prevent the movement of regulated items including wood from any hardwood tree species out of the infested area. Surveys as of November 4 have located 21,768 infested trees, out of over 4.4 million trees surveyed. As of November 4, 21,744 infested trees have been removed.

Emerald Ash Borer



Emerald ash borer (EAB) has been the most devastating forest pest in Ohio in recent years, and quite possibly in history. As of 2016, all 88 of Ohio's counties have confirmed infestations. In northwest Ohio, where EAB was discovered in 2002, the majority of mature native ash trees have been killed. Significant mortality of ash is now occurring throughout Ohio. In 2023, The Ohio Division of Forestry, in cooperation with the U.S. Forest Service Northern Research Station

Figure 10. Adult emerald ash borer (Credit: Ohio Division of Forestry).

and the Great Lakes Basin Forest Health Collaborative, conducted survey and site visits for surviving mature ash trees (termed “lingering ash”). Healthy lingering ash were identified in several counties and are planned to be sampled for testing against emerald ash borer and possible future propagation in a breeding program for emerald ash borer tolerance. The Ohio Division of Forestry continues to help woodland owners manage their forests and utilize their ash resources, assist communities that are dealing with EAB issues, and promote the identification and reporting of lingering ash.



Figure 11. Healthy “lingering ash” (on right) amongst ash trees killed by emerald ash borer in southwestern Ohio (Credit: Ohio Division of Forestry).

Notable Occurrences

Non-native Invasive Plants



*Figure 12. Forest infestation of tree-of-heaven (*Ailanthus altissima*) (Credit: Ohio Division of Forestry).*

Non-native invasive plants are a threat to the biodiversity of forests throughout Ohio. Some forests contain dense infestations of invasive plants such as *Ailanthus*, Asian bush honeysuckles, autumn-olive, multiflora rose, and Japanese stiltgrass, while other areas remain largely uninvaded. In 2022, new infestations of Japanese angelica tree (*Aralia elata*) and a hybrid crabapple (*Malus* spp.) were identified and reported in parts of eastern and central Ohio, respectively. Efforts are underway to document the extent of these species and explore treatments to reduce their populations. In 2018, over 30 species of invasive plants were banned from sale and propagation in Ohio. Callery pear (*Pyrus calleryana*; including the popular ‘Bradford’ variety), which had a 5-year phase out period, was banned from sale starting in January 2023. In early 2023, the Ohio Division of Forestry hired two new 3-person crews focused largely on invasive plant control, based at Shawnee and Zaleski state forests. To date, they have completed over 600 acres of

invasive plant control work. The Ohio Division of Forestry promotes invasive plant control by working with Ohio’s Cooperative Weed Management Areas (CWMAs), Cooperative Invasive Species Management

Areas (CISMAs), Partnerships for Regional Invasive Species Management (PRISMs), and on private land through its Service Forestry Program and through other outreach events.