

OHIO – 2022

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 8 and concluded on June 17. 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 378 different sites from the air with discoloration, defoliation, or mortality, totaling 10,759 acres. Additional flights were conducted in targeted areas to map wind damage (88 sites totaling 1,813 acres) and oak wilt discoloration and mortality (25 sites totaling 97 acres). The majority of these sites were inspected on the ground by Ohio Division of Forestry staff. The top five damage-causing agents (DCA) and associated acreage are below:

Damage causing agent	Acres
Eastern white pine needle damage	7,435
Wind/tornado damage	2,278
Diplodia canker	1,040
Yellow-poplar weevil	852
Flooding	262

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.



Figure 1. Discoloration caused by eastern white pine needle damage (Credit: Ohio Division of Forestry)

Special Issues

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. Three counties – Cuyahoga, Jefferson, and Lorain – are currently under a spotted lanternfly quarantine by the Ohio Department of Agriculture to reduce the spread of the insect. In 2022, confirmed sightings of spotted lanternfly increased in many parts of the state and efforts to delineate infestations and determine if reproducing populations are present are ongoing. The spotted lanternfly poses a significant threat to the agricultural industry (particularly grape and hops vineyards and fruit orchards) 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 2. Adult spotted lanternfly (Credit: Ohio Division of Forestry)



Figure 3. Spotted lanternfly egg mass on branch (Credit: Ohio Division of Forestry)

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 2022. 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 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.



Figure 4. Red oak leaf showing “scorch” symptom of oak wilt (Credit: Ohio Division of Forestry)

Forest Pest & Disease Issues

Beech Leaf Disease

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 2022, beech leaf disease was detected in one new northwestern Ohio county; Fulton. 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. In 2019, scientists and researchers with several agencies and organizations including the USDA Forest Service, Holden Arboretum, and cooperating Canadian agencies made progress in identifying the possible causal agent, believed to be a newly described species of foliar nematode (*Litylenchus crenatae* ssp. *mccannii*). Since 2021, the Ohio Division of Forestry in partnership with Holden Arboretum, 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. The results of the sampling efforts are currently pending. 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.

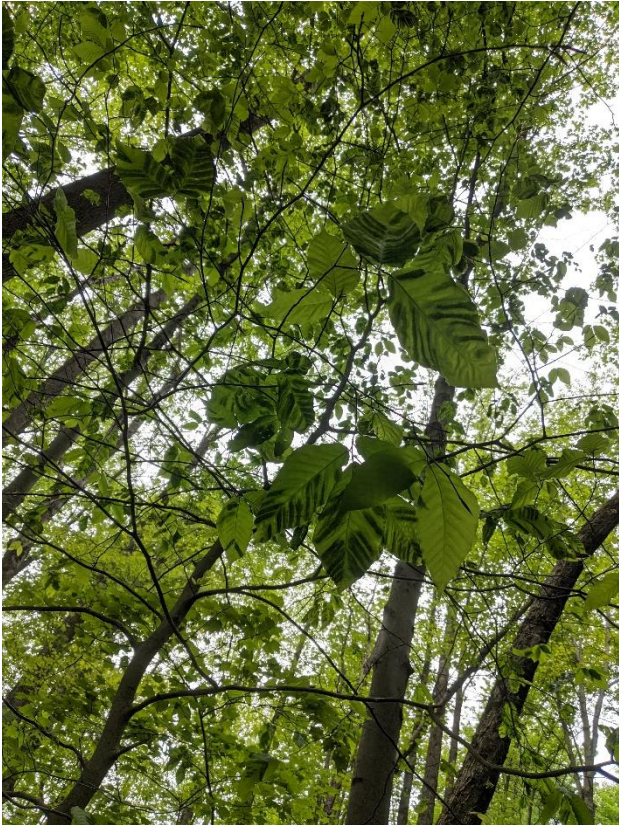


Figure 5. Beech leaf disease damage symptoms (Credit: Ohio Division of Forestry)

Conifer Fungal Diseases

Several coniferous tree species have been increasingly affected by various fungal diseases in recent years in Ohio. White pine needle damage results in needle discoloration and defoliation and can contribute to dieback and mortality. Multiple native fungi have been identified as contributing to white pine needle damage. This problem seems to be most prevalent in southeastern Ohio at this time. In addition to eastern white pine, eastern hemlock is being impacted by several different fungal pathogens. Fabrella needle blight causes discoloration and premature needle drop in late-summer, particularly on lower branches. Sirococcus tip blight causes shoot dieback. Since 2020, there has been a significant increase in the occurrence of Rosellinia needle blight on eastern hemlock, particularly in southeastern Ohio on lower slopes and near water, where relative humidity tends to be higher. Rosellinia needle blight infections create fungal “mats” on needles and cause the death of needles on large sections of 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 20 counties (2 new counties identified to date in 2022), 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 2022, the Ohio Division of Forestry, with assistance from several governmental and non-governmental partners, treated roughly 4,000 eastern hemlock trees across 400 acres with the insecticide 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 and a supplemental release of 55 flies was made in 2022 at Lake Katharine State Nature Preserve in Jackson County. 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 6. Insecticide application to an eastern hemlock tree for protection from HWA (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. Because of several rounds of survey without any evidence of ALB infestation, part of the quarantine area at East Fork State Park was

removed in 2022. Surveys as of October 29 have located 21,610 infested trees, out of over 4.2 million trees surveyed. As of October 29, 21,468 infested trees have been removed. A tree replanting project was initiated by the Ohio Division of Forestry in the fall of 2012, with non-ALB host tree species available to landowners who were impacted by landscape tree removals by the Ohio ALB program. Since the start of this program, approximately 1,600 trees have been distributed for planting.

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 late 2014, a researcher at Wright State University discovered EAB infesting white fringetree. Subsequent studies have confirmed the ability of EAB to complete its lifecycle within white fringetree in the natural environment as well as in cultivated olive in the laboratory. The impact EAB will have on these tree species requires further research. 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 work to increase public awareness about the insect.

Notable Occurrences

Severe Weather

In June and July, several severe weather events included high winds and tornadoes that caused significant damage to trees and forests. These storm events were widespread across the state, but some of the most impactful were in north-central Ohio (south of Mansfield), western Ohio (north of Dayton), and southeastern Ohio (east of Chillicothe). Thousands of acres of forest saw damage in the form of tree breakage or blow-down and uprooting. Mapping of storm damage at Mohican-Memorial State Forest from a tornado on June 13-14 via unmanned aerial system (UAS), helicopter, and high-resolution satellite imagery identified over 500 acres of impacted forest. Aerial video footage of the damage can be viewed online here:

<https://www.youtube.com/watch?v=hdVcNevq9k&t=1s>.



Figure 7. Tornado damage at Mohican-Memorial State Forest (Credit: Ohio Division of Forestry)

Non-native Invasive Plants

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.



Figure 8. Infestation of the non-native invasive Japanese angelica tree (*Aralia elata*) in eastern Ohio (Credit: Ohio Division of Forestry)

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, will be banned from sale starting January 1, 2023. 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.



Figure 9. Infestation of Callery pear (*Pyrus calleryana*) along a highway (Credit: Ohio Division of Forestry)