

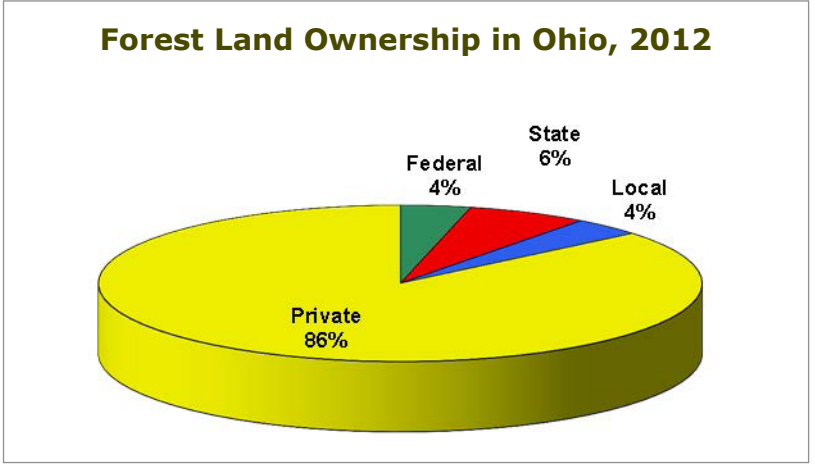
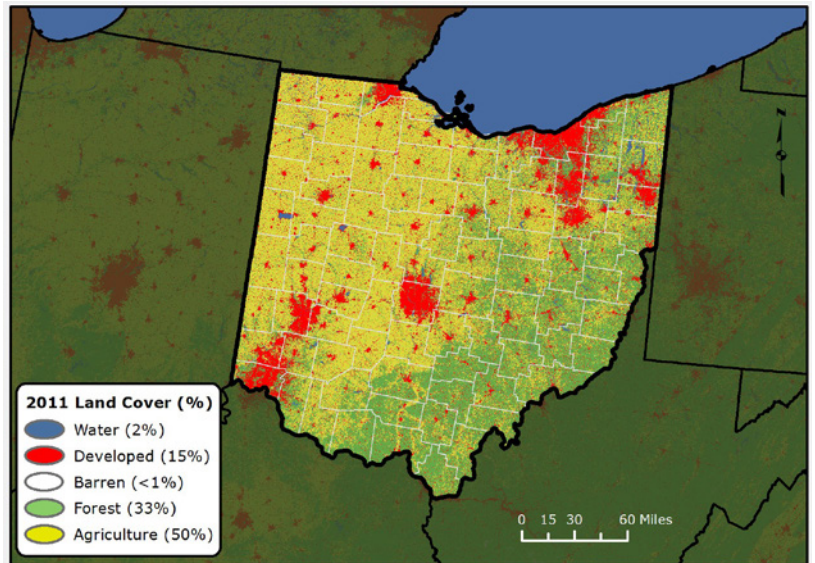


2016 Forest Health highlights

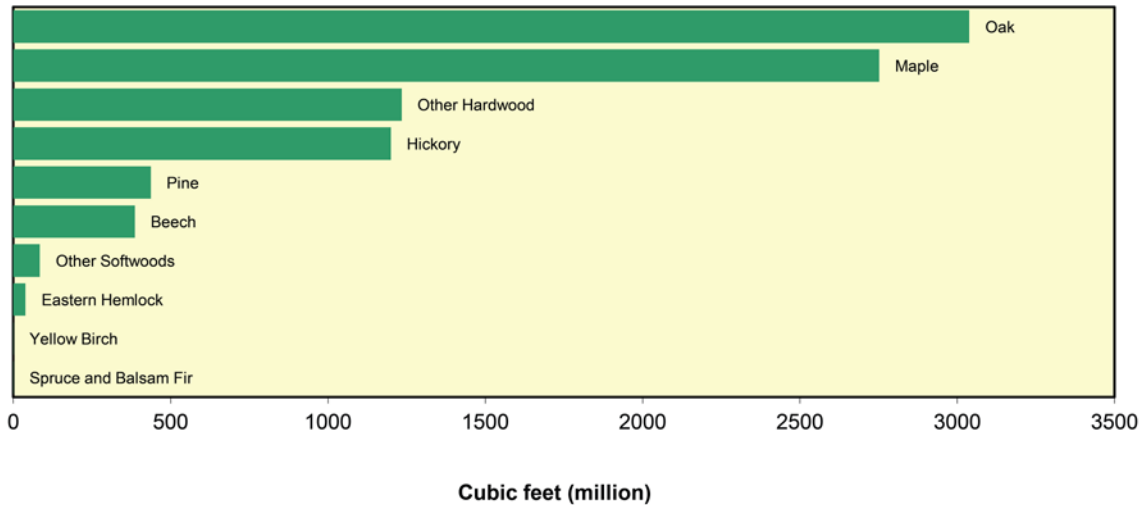
OHIO

Forest Resource Summary

Ohio encompasses 26,209,700 acres, 31.1 percent of which are forested, not including the urban forest. Forests have increased dramatically since 1940, including an increase from 7.1 to 8.1 million acres since the late 1970s. Ohio's forests are 86 percent privately owned. The predominant forest type group is oak-hickory, which occupies 63 percent of Ohio's forest land. Ohio's forest industries contribute over \$22 billion to the State's economy. The Ohio Department of Natural Resources (DNR) Division of Forestry manages 21 State Forests totaling more than 200,000 acres.



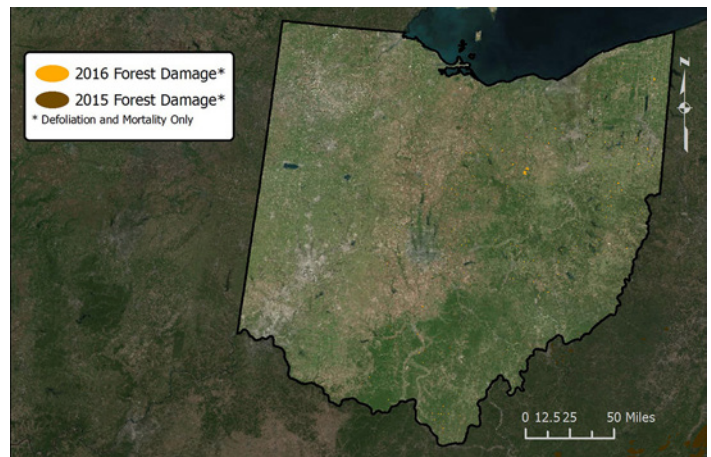
Net Volume of Growing Stock on Timberland by Species in Ohio, 2012



Forest Health Surveys

Each year, the Ohio DNR Division of Forestry conducts an aerial survey over the majority of the State to survey Ohio’s forest health using Ohio Division of Wildlife aircraft. This year’s survey began on June 13 and concluded on June 24. Flight lines were flown in an east-to-west direction with a spacing of about 4 miles. Each flight day, two observers were equipped with digital mobile sketchmap (DMSM) tablet computers containing a GIS/GPS mapping system. The observers identified 260 different sites on a total of 7,652 acres that had discoloration, defoliation, or mortality. Ohio DNR Division of Forestry staff inspected 136 of these sites on the ground. The top five damage-causing agents and associated acreage are in the accompanying table. (There were also “unknown” damage-causing agents, which affected a total of 867 acres.)

Damage-causing agent	Acres
Water/flooding damage	2,574
Emerald ash borer	2,085
Diplodia tip blight	788
Oak decline	361
Anthracnose	275



Forest health survey observations in Ohio in 2015 and 2016.

Private Lands Forest Management

The primary source of forestry assistance for private woodland owners in the State of Ohio is the Ohio Division of Forestry's Service Forestry program. Ohio's service foresters provide one-on-one assistance to woodland owners, helping them prepare for timber sales, create habitat for forest wildlife, evaluate forest health issues, plant trees for future forests, and better understand the many benefits that their forests provide. Service foresters also assist landowners by developing woodland stewardship management plans that include descriptions and maps of their woodlands and recommendations and timelines for their woodland management activities. There are currently 322,113 acres of private woodlands being managed under woodland management plans in Ohio. Not only do the plans help landowners maintain healthy, productive woods, they also qualify them for programs like the Ohio Forest Tax Law, which reduces property taxes for managed forest land in Ohio. Service foresters work with many partners, including the USDA Natural Resources Conservation Service, local Soil & Water Conservation Districts, Wayne National Forest, Ohio Division of Wildlife, and Ohio State University Extension.

Special Issues

Periodical Cicadas

Brood V of the 17-year periodical cicadas emerged across much of eastern Ohio in the spring of 2016. Peak activity for the cicadas was during most of the month of June. Flagging damage as a result of oviposition by female cicadas was readily visible starting in early July across the range of the emergence on many tree and shrub species. While visually striking, the damage will most likely not cause significant harm to established trees and shrubs. Mortality of newly planted seedlings and saplings was observed in some areas.



Adult periodical cicada (Photo: Ohio Division of Forestry)



Flagging damage caused by periodical cicada oviposition (Photo: Ohio Division of Forestry)

Summer Drought

Rainfall amounts for June and July were about 25 percent below normal across Ohio with some local areas experiencing more severe drought. This drought, in combination with 30 percent higher than normal rainfall in the spring of 2015, stressed many plants. Diseases of ornamental conifers such as *Rhizosphaera* needlecast, *Cytospora* canker, and *Phomopsis* canker, particularly on blue spruce, were commonly reported. Anthracnose was evident on such tree species as sycamore, silver maple, and ash. It is possible that these fungal diseases proliferated during the wet spring of 2015, and their effects became readily observed with the additional heat and drought stress in 2016. Aside from non-native ornamentals, significant impacts to tree health are not expected.

Forest Pest and Disease Issues

Asian Longhorned Beetle

In June of 2011, an Asian longhorned beetle (ALB) infestation was identified in Tate Township in Clermont County (southwest Ohio). The USDA Animal and Plant Health Inspection Service (APHIS) and Ohio Department of Agriculture enacted a quarantine area of 61 square miles to prevent the movement of regulated items, including wood from any hardwood tree species, out of the area. The quarantine area is centered over Tate Township and includes East Fork State Park and Wildlife Area. Surveys as of November 12 had located 18,710 infested trees out of more than 2 million trees surveyed. As of November 12, 18,158 infested trees had been removed. The Ohio DNR Division of Forestry initiated a replanting project in the fall of 2012 to make non-host tree species available to landowners who were impacted by landscape tree removals as part of the Ohio ALB program. Since the start of this program, approximately 1,600 trees have been distributed. In 2014, the USDA Natural Resources Conservation Service offered a special Environmental Quality Incentives Program (EQIP). The ALB EQIP is a cost-share program just for affected landowners within the quarantine area to assist them with tree planting and invasive plant control.

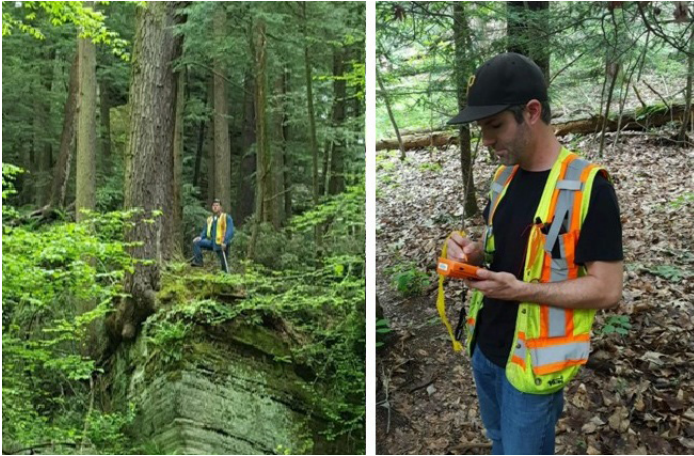
Hemlock Woolly Adelgid

In 2012, hemlock woolly adelgid (HWA) was discovered in southeast Ohio in Shade River State Forest (Meigs County). This was the first detection of HWA in a natural stand of eastern hemlock. Since 2012, HWA infestations have been discovered in seven southeastern Ohio counties. Since 2013, the Ohio DNR Division of Forestry, with assistance from several governmental and nongovernmental partners, has protected over 1,300 eastern hemlock trees with insecticide (220 trees treated in 2016 at the writing of this report). Treatment methods consisted of either soil drench or

trunk injection with imidacloprid or basal bark spray with dinotefuran. Winter mortality of HWA from 2015–16 was assessed from two locations in southern Ohio. Mortality rates from these locations averaged 28 percent, compared to 82 percent in the winter of 2014–15. Since 2013, the Ohio Division of Forestry and partners have also released biocontrol predatory beetles. Over 3,700 beetles (*Laricobius nigrinus* and *L. osakensis*) have been released on HWA-infested trees. Both beetle species were collected in the field from North Carolina and Washington and shipped to Ohio from the Virginia Tech HWA predator beetle rearing facility. Monitoring of treatment success and additional predatory beetle releases are expected over the next several months. Continued hemlock surveys are planned for this winter. The Ohio Department of Agriculture has quarantined all counties with confirmed HWA infestations to prevent the movement of potentially infested hemlock materials out of infested areas.



Laricobius osakensis beetles on HWA-infested tree (Photo: Ohio Division of Forestry)



HWA survey work being completed as part of the Ohio Hemlock Conservation Partnership (Photo: Ohio Division of Forestry)

In late 2015, a partnership known as the Ohio Hemlock Conservation Partnership received funding from The Nature Conservancy, Hocking Hills Tourism Association, and the Crane Hollow Nature Preserve for the Ohio Division of Forestry to hire two temporary positions. The temporary employees inventoried hemlock stands and surveyed for HWA, mainly in the Hocking Hills region. Seventy-eight percent of hemlock stands on public land in the Hocking Hills were surveyed and over 2,000 acres were inventoried.

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. New EAB confirmations in 2016 were made in Adams and Vinton Counties. In northwest Ohio, where EAB was discovered in 2002, the vast majority of native ash species have been killed. Significant mortality of ash is now occurring in central, southwest, and northeast Ohio. In late 2014, a researcher at Wright State University discovered EAB infesting white fringetree. Subsequent experiments have confirmed the ability of EAB to complete its lifecycle within white fringetree as well as in cultivated olive. The impact EAB will have on

these tree species needs further research. The Ohio DNR Division of Forestry is working with several partners to monitor native populations of white fringetree in southern Ohio. The Division of Forestry continues to help woodland owners manage their forests and utilize their ash resources, assist communities that are dealing with current and future EAB issues, and work to increase public awareness about the insect.

Walnut Twig Beetle/Thousand Cankers Disease

In late 2012, walnut twig beetle (WTB), the insect vector of thousand cankers disease (TCD), was caught in Ohio DNR Division of Forestry traps in Butler County (southwest Ohio). The fungal pathogen that causes TCD, *Geosmithia morbida*, was subsequently confirmed from infested trees in Butler County in 2013. In 2014, the known infested black walnut trees were removed and examined as part of a U.S. Forest Service research project. The Ohio Division of Forestry has been monitoring more than 30 Lindgren funnel traps from spring through fall across the State in black walnut plantations and forested areas with a large component of black walnut. Traps were checked at least every 2 weeks, and samples are sent to Ohio State University's Ohio Agricultural Research & Development Center for analysis. The Ohio Department of Agriculture monitors over 100 traps within Butler County in addition to traps at wood-processing facilities around the State. No WTB has been detected in any Ohio traps since 2013 (including 2016). The Ohio Department of Agriculture has quarantined Butler County to prevent the movement of potentially infested walnut material out of the county. Further research on this pest will help guide future management activities.

Gypsy Moth

The European gypsy moth decreased in abundance in 2016. In Ohio, gypsy moth occurs in the majority of the eastern half of the State, with the edge of the infested area extending generally from northwest Ohio to southeast Ohio. The Ohio Department of Agriculture has quarantined 51 of Ohio's 88 counties to prevent the movement of gypsy moth out of those counties. No additional counties were added to the quarantine in 2016. Male gypsy moth catch was down 15 percent from 2015. The Ohio Department of Agriculture continued its treatment efforts within the Slow the Spread transition zone with four types of treatments occurring in 2016: Gypchek (gypsy moth virus), Foray 48b (Btk bacterium), Mimic 2LV (chemical insecticide), and Disrupt II (mating disruption pheromone). A total of 2,853 acres were treated with chemical larvacide treatments (Foray, Mimic, or Gypchek). Disrupt II mating disruption was applied to 142,993 acres. The Ohio Department of Agriculture will continue to monitor gypsy moth populations and assess treatment effectiveness.

Notable occurrences

Forest Insect Pests

Several pests of oak species were widely reported throughout the State in 2016. Damage by oak shothole leafminer and spiny oak sawfly was very common across Ohio this spring. While the effects of these fly and sawfly species, respectively, were obvious, they did little or no harm to their host oak species. Oak lace bug populations were high in late summer, but, like the oak shothole leafminer and spiny oak sawfly, had little to no effect on tree health. Viburnum leaf beetle, which has been established in northeastern Ohio for several years, was discovered in central Ohio in 2016 defoliating highbush cranberry, arrowwood, and other viburnum species. Similarly, basswood leafminer, which has mainly been observed in the northern half

of the State, was discovered in southwestern Ohio skeletonizing foliage of American basswood.



Holes in oak leaves created by oak shothole leafminer (Photo: Ohio Division of Forestry)



Adult viburnum leaf beetle (Photo: Ohio Division of Forestry)

Beech Leaf Disease

An as yet unidentified decline of American beech has been observed for the last several years in northeastern Ohio and is being referred to as "beech leaf disease". Beech leaf disease was also reported from northwestern Pennsylvania in 2016. The decline is first expressed as banding of dark interveinal leaf tissue that progresses to leaf curling, callousing, and disfigurement. Eventually branch dieback and lack of bud production are noticed. Personnel from several groups and agencies, including the U.S. Forest Service Northeastern Area State and Private Forestry, Ohio DNR Division of Forestry, Ohio Department of Agriculture, Ohio State University, USDA APHIS PPQ, Lake County Metroparks, Cleveland Metroparks, and Holden Arboretum, have been investigating this decline and continue to monitor decline progression.



Leaf wilting symptoms of beech leaf disease (Photo: Ohio Division of Forestry)

Non-native Invasive Plants

Non-native invasive plants are a threat to the biodiversity of forests throughout Ohio. Some forests are already declining due to severe infestations of invasive plants such as *Ailanthus*, bush honeysuckles, autumn-olive, multiflora rose, and Japanese stiltgrass, while other areas remain largely uninvaded. Aerial mapping of *Ailanthus* in southern Ohio has allowed for targeted treatments to reduce

infestations on State forest, national forest, and neighboring lands. The Ohio DNR Division of Forestry has partnered with researchers from the U.S. Forest Service Northern Research Station to examine the efficacy of *Verticillium nonalfalfae*, a soil-borne fungus, as a potential biocontrol for *Ailanthus*. The Division of Forestry promotes invasive plant control by working with Ohio's only Cooperative Weed Management Area, the Appalachian Ohio Weed Control Partnership, and on private land through its Service Forestry Program and other outreach events.



Japanese stiltgrass (Photo: Ohio Division of Forestry)

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Forest Health Programs

State forestry agencies work in partnership with the U.S. Forest Service to monitor forest conditions and trends in their State and respond to pest outbreaks to protect the forest resource.

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