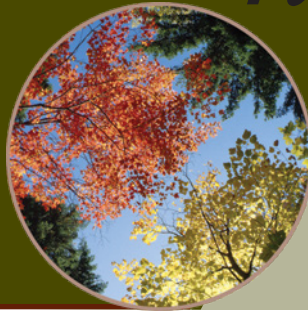


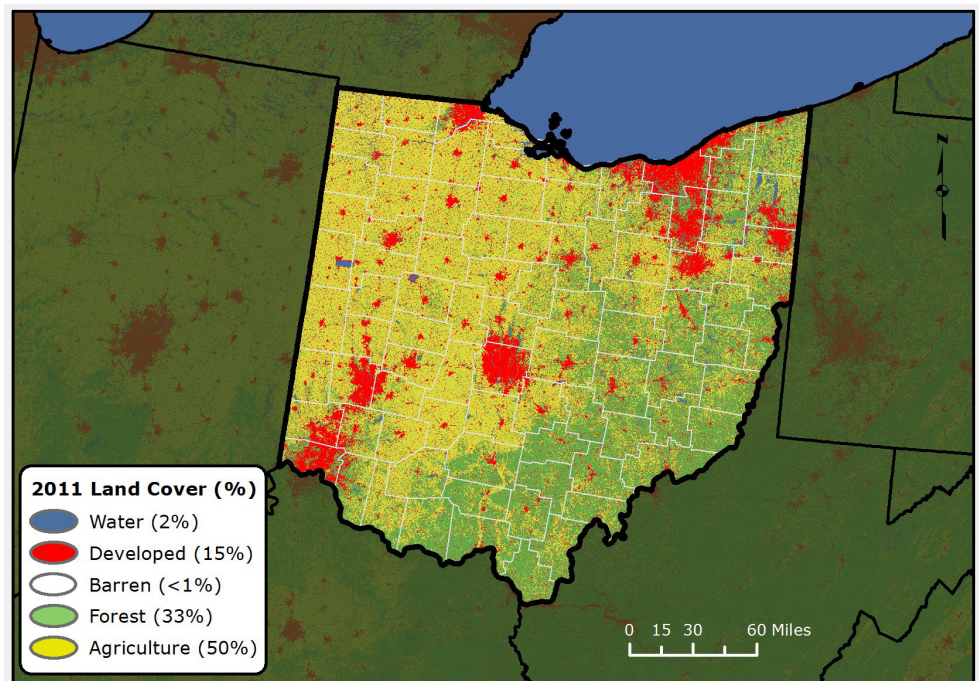
2014 Forest Health highlights

OHIO

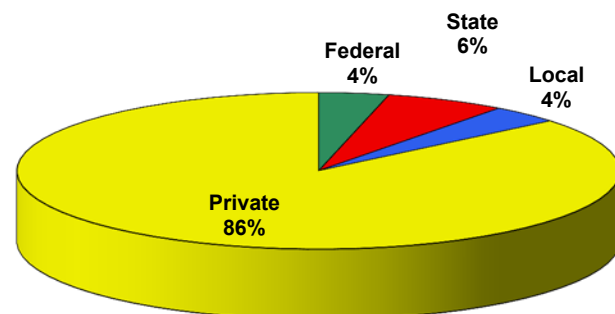


Forest Resource Summary

Ohio encompasses 26,209,700 acres, of which 31.1 percent are forested, not including the urban forest. Forests have increased dramatically since 1940, including an increase from 7.1 to 8.2 million acres since the late 1970s. Ohio's forests are 86 percent privately owned and 96 percent deciduous forest types. Ohio's forest industries contribute over \$22 billion to the State's economy. The Ohio Department of Natural Resources Division of Forestry manages 21 State Forests totaling more than 200,000 acres.



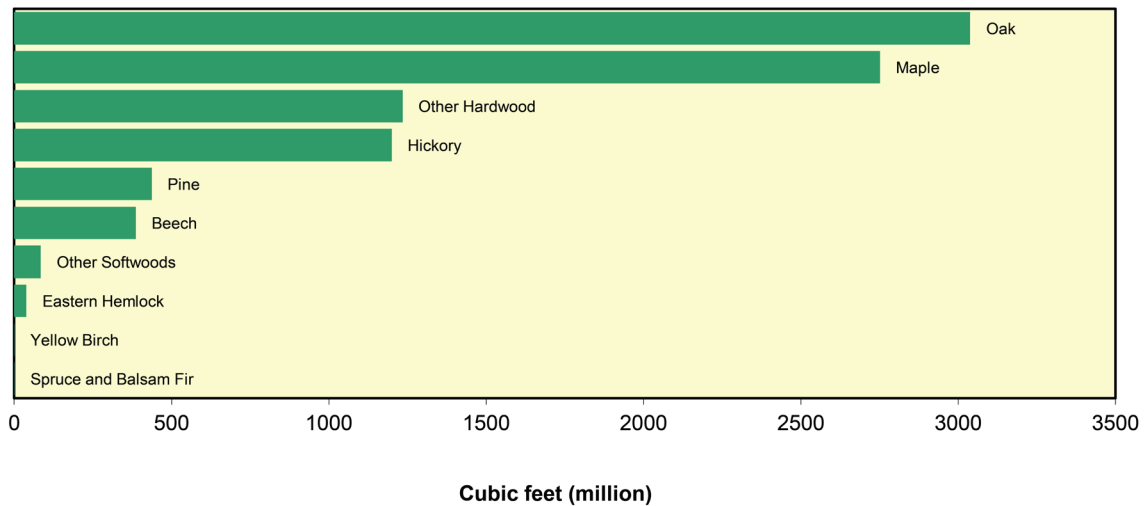
Forest Land Ownership in Ohio, 2012



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.

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



Urban Forestry

Ohio is home to 11,536,504 people (2010 U.S. Census). Ohio’s 938 incorporated places (cities and villages) occupy 11 percent of the land area and represent a substantial urban forest resource. Ohio leads the Nation with 244 Tree City USA communities. These communities represent over half of the 80 percent of Ohioans living and/or working in urban areas and a significant commitment to their quality of life. Throughout most of the State, these Tree City USA communities planted more trees than they removed, while maintaining more trees than they planted. This was true everywhere except northwest Ohio, where the emerald ash borer has become established. Cities, villages, and townships in this region are faced with the reality of removing dead and dying ash trees. To proactively address the economic and environmental burden presented by this pest, all Ohio communities are being encouraged to develop emerald ash borer management plans. To date, at least 90 of these plans have been completed in Ohio.

Special Issues

Asian Longhorned Beetle

In June of 2011, an 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 (DOA) have 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 quarantine area. The quarantine area is centered over Tate Township and includes the East Fork State Park and Wildlife Area.

The Ohio Department of Natural Resources (DNR) Division of Forestry has partnered with APHIS and the Ohio DOA to conduct intensive ground surveys of the area. Surveys as of November 8, 2014, had located 15,168 infested trees out of over 1.3 million trees surveyed. Two small satellite infestations in Monroe and Stonelick Townships were found to be the direct result of firewood movement out of the main quarantine area prior to the discovery of ALB.

Infested tree removals began in November 2011. As of November 8, 2014, 13,784 infested trees had been removed. Landowners living inside the quarantine area have the option to have all high-risk host tree species removed from their property. The Ohio DNR is currently offering professional forestry assistance to all residents in the ALB quarantine zone for reestablishing tree cover following removals.

A replanting project was initiated in the fall of 2012; nonhost tree species were made available to landowners who were impacted by landscape tree removals by the Ohio ALB program. Since the start of this program, over 1,200 trees have been distributed. In 2014, the USDA Natural Resources Conservation Service offered a special Environmental Quality Incentives Program. This cost-share program was only for affected landowners within the quarantine area to help them plant trees and remove invasive plants.

Hemlock Woolly Adelgid (HWA)

In early 2012, HWA was discovered in southeast Ohio in Shade River State Forest (Meigs County), the first detection of HWA in a natural stand of eastern hemlock. At that time, it was also found to be well established in landscape settings in towns along the Ohio River in Washington County. The second infestation of a natural stand of eastern hemlock was discovered in 2013 during Ohio DOA surveys in the Cantwell Cliffs area of Hocking State Park in Hocking County. In 2014, additional HWA infestations were discovered in Lawrence, Monroe, and Vinton Counties, which are all in southeast Ohio.

Since 2013, the Ohio DNR Division of Forestry, with assistance from several governmental and nongovernmental partners, has protected over 800 eastern hemlock trees with insecticide (276 trees treated in 2014). Treatment methods consisted of either soil drench or trunk injection with imidacloprid or basal bark spray with dinotefuran.

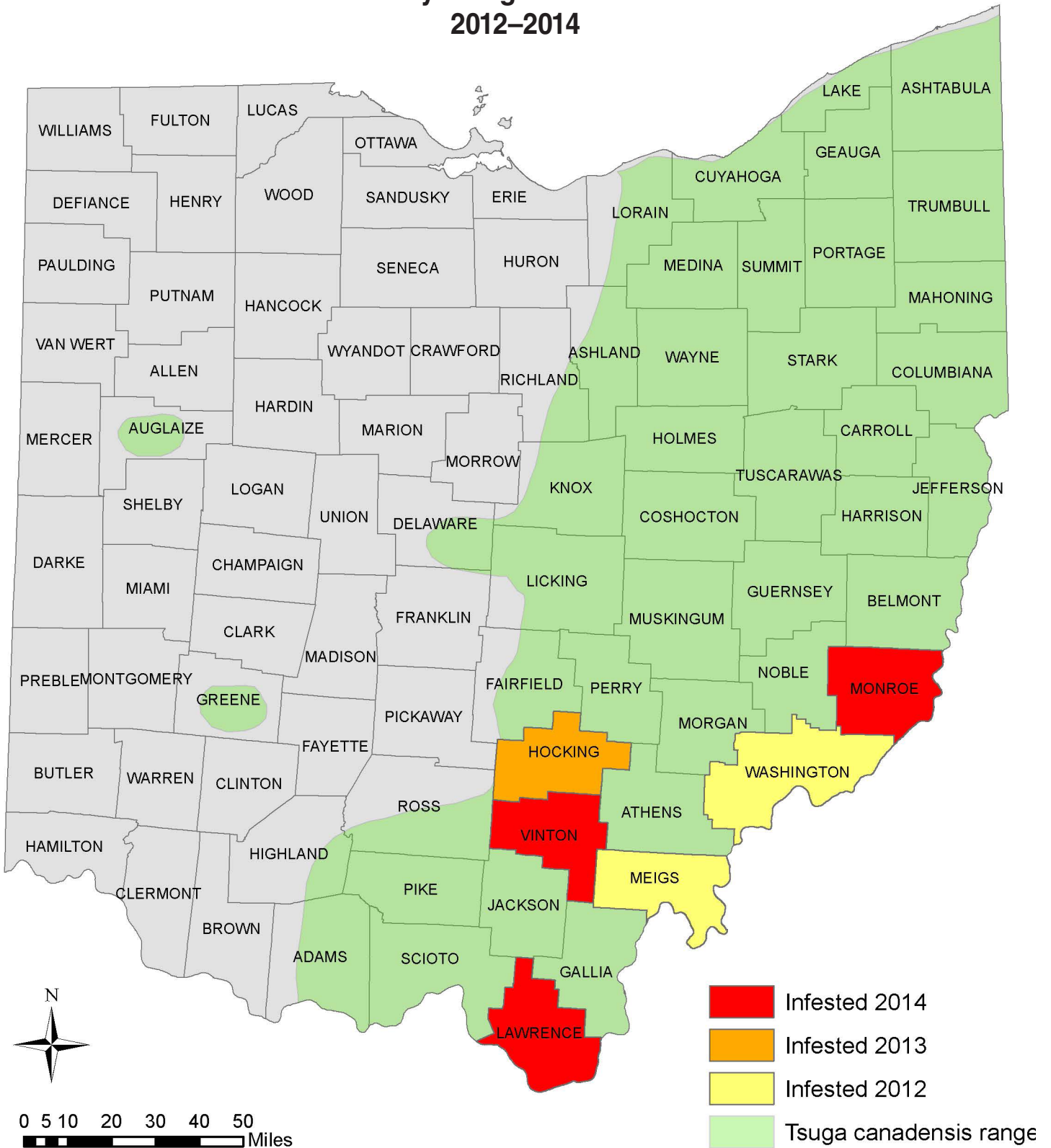
Since 2013, the Ohio DNR Division of Forestry and partners have also released biocontrol predatory beetles. Nearly 2,000 beetles (*Laricobius nigrinus* and *L. osakensis*) have been released on HWA-infested trees. These beetles were both collected in the field from North Carolina and shipped to Ohio from the Virginia Tech HWA predator beetle rearing facility. Monitoring treatment success and releasing additional predatory beetles are expected over the next several months.

Continued hemlock surveys are planned for this winter. The Hocking Hills Conservation Association, formed in 2013 in response to the discovery of HWA in Ohio, is a collaborative group with representation from governmental, nongovernmental, and academic institutions focused on raising awareness of HWA and the value of eastern hemlock, particularly in the Hocking Hills Region of Ohio. The Ohio DOA has quarantined all counties with confirmed HWA infestations to prevent the movement of potentially infested hemlock materials out of the infested areas.



Hemlock woolly adelgid infests an eastern hemlock branch.
(Photo: Michael Montgomery, U.S. Forest Service, Bugwood.org)

Hemlock Woolly Adelgid Infestations in Ohio 2012–2014



Range of eastern hemlock in Ohio and counties with confirmed HWA infestations as of 2014. (Map credit: Ohio DNR Division of Forestry)

Forest Pest and Disease Issues

Emerald Ash Borer (EAB)

EAB has been the most devastating forest pest in Ohio in recent years, and quite possibly in history. Today, 80 of 88 counties have confirmed infestations, but EAB is suspected to occur throughout the State. 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. Over 5,000 acres of damage due to EAB was indicated in this year's aerial forest health survey, but because the western portion of the State was not included in the survey, the actual area affected is likely much greater. New county EAB confirmations in 2014 include Athens, Harrison, Jackson, Meigs, and Washington, with Gallia County pending sample verification.

Research by the U.S. Forest Service Northern Research Station is examining "lingering ash," the fewer than 1 percent of ash trees that have remained alive in northwest Ohio and southeast Michigan following the large wave of EAB infestation. This work will be extremely important for the possibility of breeding native ash trees with resistance or tolerance to EAB. USDA APHIS and others have carried out research on and releases of EAB parasitoid wasp species in Ohio. Work by researchers at The Ohio State University, Michigan State University, and others has been instrumental in developing excellent insecticide treatment recommendations for landowners and communities. Ohio DNR Division of Forestry personnel continue to help woodland owners manage their forests and use their ash resources, help communities 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. Ohio DNR Division of Forestry has been monitoring over 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 were sent to The Ohio State University's Ohio Agricultural Research and Development Center for analysis. Ohio DOA monitors over 100 traps in Butler County in addition to traps at wood processing facilities around the State.

Although not all 2014 trap samples had been processed at the writing of this report, no WTB has been detected in any Ohio traps in 2014. Ohio DOA 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 increased in abundance in 2014. 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. Ohio DOA has quarantined 51 of Ohio's 88 counties to prevent the movement of gypsy moth out of those counties.

Ohio DOA did not add additional counties to the quarantine in 2014. Cold temperatures over the winter of 2013/2014 and buildup of the gypsy moth fungus, *Entomophaga maimaiga*, are credited for a 31-percent decrease in the number of male moths caught in traps in 2014 relative to 2013.

Ohio DOA continued its treatment efforts within the Slow the Spread transition zone with four types of treatments occurring in 2014: Gypchek (gypsy moth virus), Foray 48b (Btk bacterium), Dimilin 4L (chemical insecticide), and Disrupt II (mating disruption pheromone). A total of 5,470 acres were treated with chemical larvacide treatments (Foray, Dimilin, or Gypchek). Disrupt II mating disruption was applied to 120,073 acres. Ohio DOA will continue to monitor gypsy moth populations and assess treatment effectiveness.

Nonnative 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.

As part of an ongoing study, an aerial survey to delineate infestations of the invasive *Ailanthus* (tree-of-heaven) is planned for the winter of 2014/2015 within and around the Wayne National Forest in southeast Ohio. Resulting infestation maps will be developed and used to target *Ailanthus* control efforts on the ground.

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 also 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.

White Oak Decline

Mortality and decline of white oaks continue to occur in southern Ohio. Several insect pests began defoliating white oak trees in 2002. Severe defoliation, coupled with drought conditions in 1999 and 2002, caused significant tree mortality, especially in some Ross County white oak stands. While no significant new findings of white oak decline were reported in 2014, it remains a significant concern for forest health in Ohio. The half-wing geometer, common oak moth, and tent caterpillars joined forces to cause the initial defoliation damage. A jumping oak gall outbreak in 2010 and again in 2013 further compounded the complex. Gypsy moth may now be a factor in weakening the trees further. Two-lined chestnut borer, *Armillaria* root rot, *Hypoxylon* canker, and *Phytophthora cinnamomi* work together as a group of secondary pests to kill already weakened trees.

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Net Volume of Growing Stock on Timberland by Species:

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U.S. Department of
Agriculture
Forest Service
Northeastern Area
State and Private Forestry
11 Campus Blvd., Suite 200
Newtown Square, PA 19073
<http://www.na.fs.fed.us>

Forest Health Protection
Northeastern Area
State and Private Forestry
180 Canfield Street
Morgantown, WV 26505
304-285-1545



Ohio Department of Natural Resources
Division of Forestry
2045 Morse Road
Building H-1
Columbus, OH 43229-6693
614-265-6694
[http://ohiodnr.com/Home/health/OhioForestHealth/
tabid/5203/Default.aspx](http://ohiodnr.com/Home/health/OhioForestHealth/tabid/5203/Default.aspx)

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