

2018 Forest Health Highlights

Kentucky Division of Forestry



The Forest Health Highlights provide a review of the most important pests and diseases currently impacting Kentucky's forests. Updated distributions of pests and diseases are reported along with background information on potential invaders not yet found in Kentucky.



Non-native insect pests

Emerald ash borer (EAB)

The emerald ash borer continues to spread across much of the eastern United States. It was most recently confirmed in South Dakota, Vermont, and Maine (Figure 1). EAB can only spread a few miles per year naturally but its dispersal has been greatly increased by movement of infested material, such as firewood. EAB was first confirmed in Kentucky in 2009. An EAB quarantine of 20 counties located in the region between Louisville, Lexington, and northern Kentucky was initially established. In the following years, additional EAB infestations were found in nearby counties and the state quarantine was expanded accordingly. In April of 2014, the county quarantine system was rescinded and the entire state was added to the Animal and Plant Health Inspection Service (APHIS) list of regulated areas.

EAB has since continued its spread through Kentucky and has now been confirmed in 89 counties. In 2018, infestations were found in four new counties, all of which were found on the western edge of the invasion front (Figure 2). It is only a matter of time until EAB moves into the remaining parts of western Kentucky.

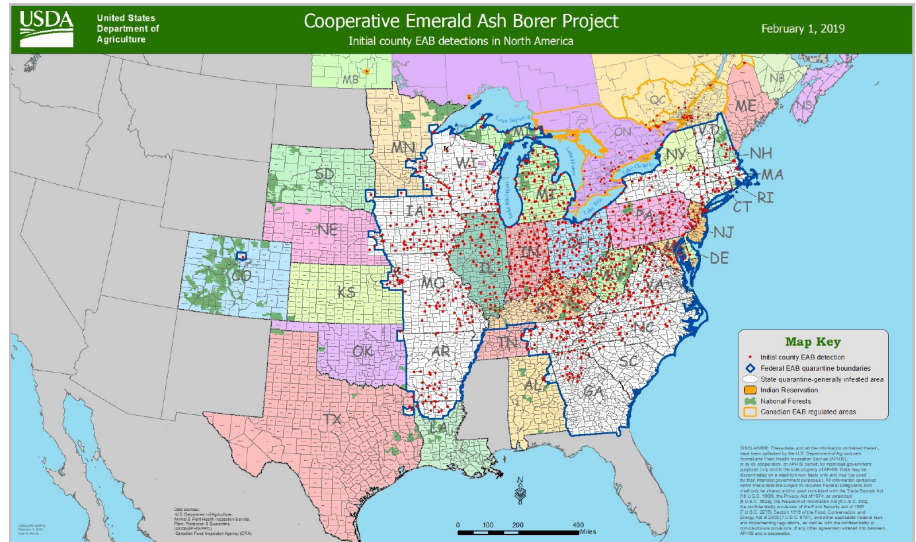


Figure 1. EAB map (red dots indicate infested counties and blue line is the federal quarantine boundary)

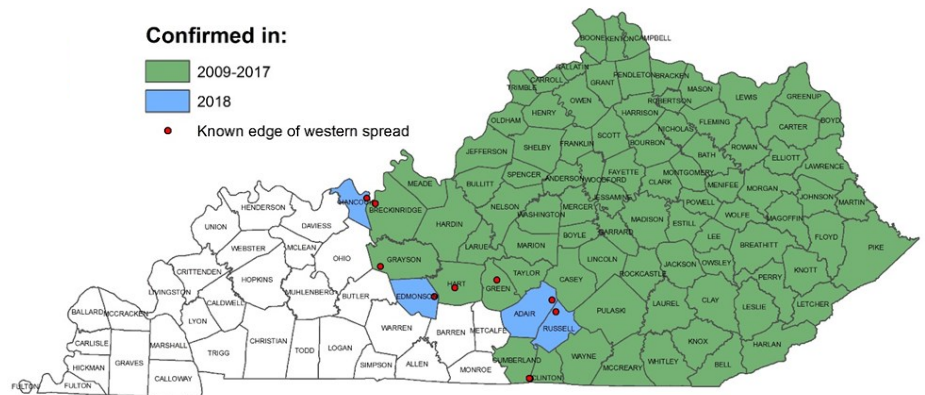


Figure 2. Counties with confirmed EAB infestations

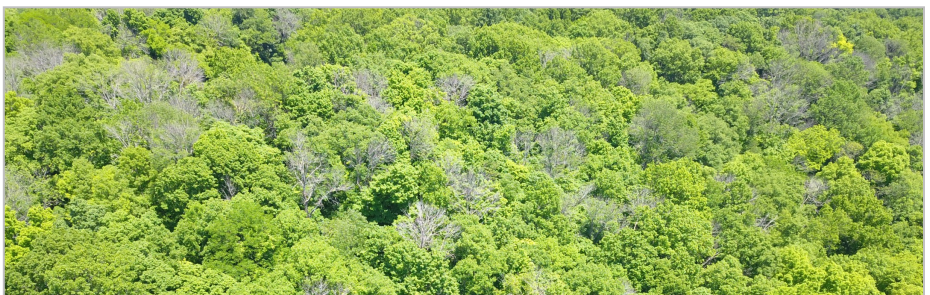


Figure 3. Woodland with ash trees killed by EAB

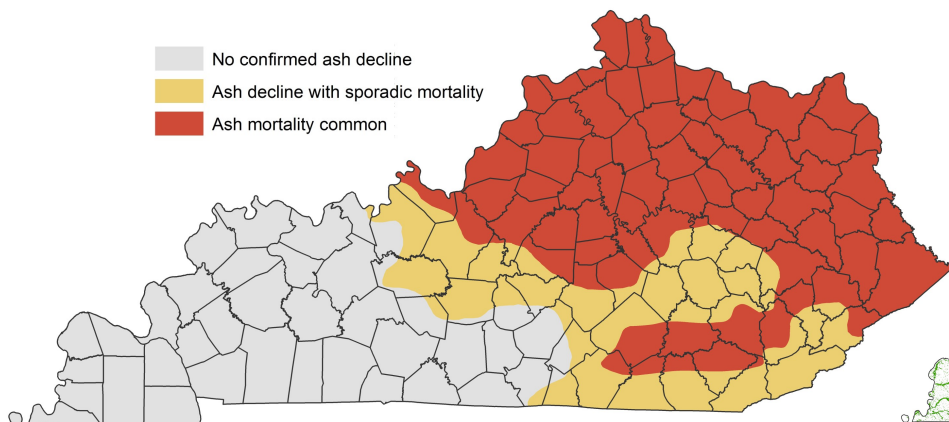


Figure 4. Areas of ash decline and mortality from EAB

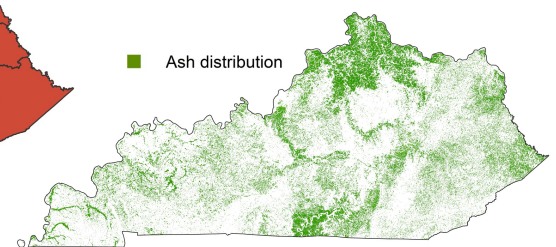


Figure 5. General distribution of ash in Kentucky

Hemlock woolly adelgid (HWA)

The hemlock woolly adelgid was first discovered in Kentucky in 2006. The vast majority of Kentucky's hemlocks are found in the eastern third of the state and HWA can now be found in 31 of these counties (Figure 6). HWA population levels were temporarily reduced in parts of the region after the 2013-2014 polar vortex caused a frigid cold front to move through the area. Unfortunately, adelgid populations rebounded in the years following and hemlock decline and mortality has since continued to progress in the region (Figure 7).

In response to the invasion of HWA, the Kentucky Division of Forestry began treating hemlocks on Division of Forestry managed properties in 2009 to conserve pockets of this ecologically significant tree. This work was developed into a treatment program in 2011 in which a dedicated crew was hired for treating hemlocks across additional state and federal properties. The program has continued its work into 2018/2019, with over 160,000 treatments to date. Over 23,000 trees were treated in 2018 alone.

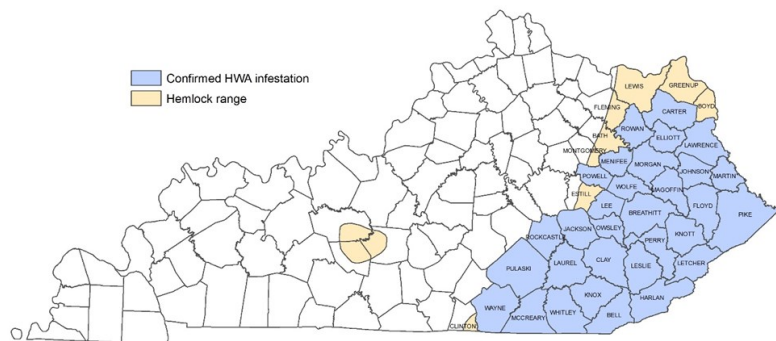


Figure 6. Counties confirmed with HWA infestations



Figure 7. Declining hemlock trees

Asian longhorned beetle

The Asian longhorned beetle has not been found in Kentucky. However, it was discovered in 2011 in Clermont County, Ohio, only ten miles from the Kentucky border. Adult beetles chew oviposition pits on host trees, most commonly maple, and then lay a single egg under the bark. Larvae feed in the sapwood for a short period of time before moving into the heartwood. When adults emerge they create noticeable round exit holes (Figure 8). This pest can be transported through firewood movement and therefore is a major pest of concern for Kentucky.



Figure 8. Asian longhorned beetle and exit hole

Gypsy moth

The gypsy moth is also not established in Kentucky. However, quarantined counties and established populations occur in many of our neighboring states (Figure 9).

Trapping efforts to monitor and slow the spread of the gypsy moth are undertaken by Kentucky's Office of the State Entomologist through USDA APHIS and Slow the Spread Programs. Gypsy moth adults have been captured in varying numbers and counties for many years across the state. In 2018, four total moths were captured from four traps.

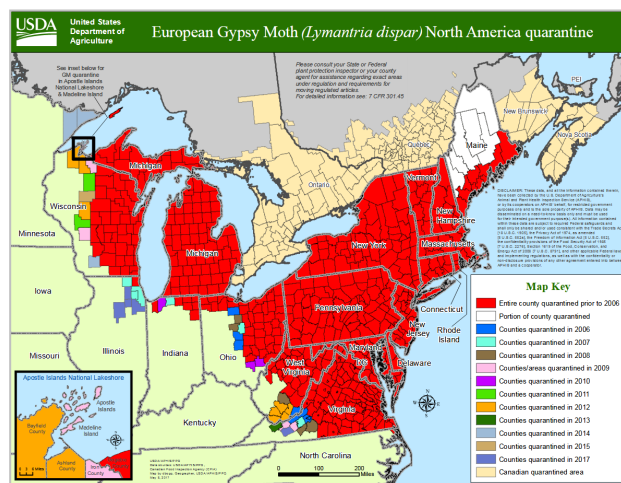


Figure 9. Counties currently quarantined for gypsy moth

Native insect pests

Scarlet oak sawfly

In late June, multiple reports of browning oak trees in Magoffin County were received (Figure 10). Initial picture evidence suggested the browning to be caused by insect feeding. A ground survey was conducted in Magoffin County in July and insects later identified as scarlet oak sawfly were found feeding on oaks in the area (Figure 11). Aerial surveys of the region also found isolated spots of feeding damage in Letcher and Pike Counties. No long term damage is expected from this periodic pest of oak trees.



Figure 10. Canopy browning of oak trees from insect feeding damage



Figure 11. Scarlet oak sawfly larvae feeding on an oak leaf

Larger elm leaf beetle, walnut caterpillar, locust leaf miner and bagworms

Other insect activity, but at local levels and with minimal impacts, was reported throughout the state. The larger elm leaf beetle was identified as the culprit of minor defoliation on elm in woodlands and along roadways in northeast Monroe County (Figure 12). A separate localized defoliation event occurred in Marion County in which walnut caterpillar feeding caused minor damage to a walnut plantation.



Figure 13. Bagworm defoliation

Damage from the locust leaf miner is common almost every year in parts of Kentucky. Outbreaks vary in intensity and location from year to year. General observations are used to record areas that experience damage each year. In 2018, most of the damage occurred in north central and north eastern Kentucky counties. No damage was reported in south central Kentucky, though it has been common in the past. Another frequently reported pest, especially of landscape trees, is the common bagworm. Reports of damage on eastern red cedar from this pest were higher than normal in 2018. Minor defoliation occurred in parts of Anderson, Casey, Mercer, and Washington Counties with pockets of extensive feeding damage in some of these areas (Figure 13).



Figure 12. Larger elm leaf beetle larvae



Figure 14. Bagworm

Yellow-poplar weevil

The final native pest of note for 2018 is the yellow-poplar weevil (Figure 15). Generally this native insect is considered a minor pest but the weevil was reported at higher than normal levels this year. Reports of yellow-poplar trees with browning tops began in June. Ground surveys concluded that the majority of counties in south eastern Kentucky had either minor or intermediate levels of damage (Figure 16). In areas of heavy feeding trees experienced partial defoliation. No long term damage is expected though, as impacted trees did not ex-



Figure 15. Yellow-poplar weevil adult

perience other stressors such as drought this season. General observations indicated that many of the impacted trees had put on a new flush of leaves by August to replace those defoliated earlier in the season. Eastern Kentucky experienced a similar outbreak in 2015 in which no obvious signs of decline immediately followed.



Figure 16. Yellow-poplar weevil feeding damage

Diseases

Thousand cankers disease

Thousand cankers disease, a disease of eastern black walnut, is caused by the fungus *Geosmithia morbida*. Thousand cankers disease was first found in the eastern United States in Tennessee in 2010. The disease has not yet been found in Kentucky, though many neighboring states have confirmed cases (Figure 17). Thousand cankers disease is vectored by the walnut twig beetle. Trapping for the walnut twig beetle was conducted in portions of Kentucky in 2018 and so far no beetles have been found.

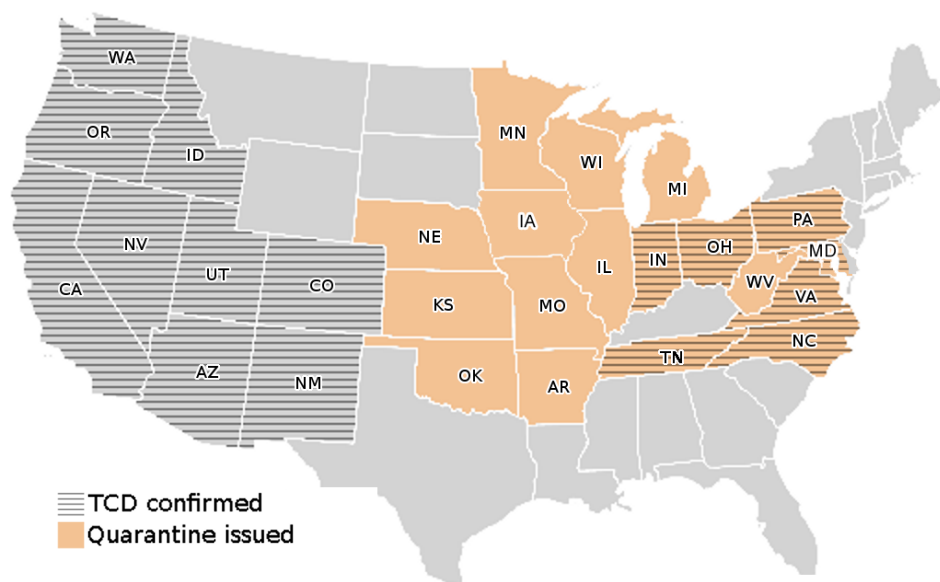


Figure 17. Distribution of thousand cankers disease



Figure 18. Walnut twig beetle trapping

Anthracnose and cedar apple rust

Foliar diseases are common every year in Kentucky. Reported impacts fluctuate though, often based on weather trends and amount of precipitation each region receives. Anthracnose and cedar apple rust are two diseases that benefited from the wetter than average spring over most of Kentucky. Anthracnose is caused by a number of different species of fungi that are associated with specific plants but all generally cause similar symptoms. Common tree groups impacted include ash, oak, maple, dogwood and sycamore. Symptoms can be seen in the spring and include irregular brown spots on leaves and leaf distortion (Figure 19). Another disease, cedar apple rust, was a minor issue on eastern red cedar trees across much of north central and north east Kentucky. Again, the increased occurrences of this disease is likely attributed to the heavy and prolonged rains from March and April.



Figure 19. Oak anthracnose damage

Bacterial leaf scorch

Bacterial leaf scorch is caused by a disease that impacts a number of tree species including elm, maple, oak, and sycamore. Symptoms include a scorched leaf appearance that can



Figure 20. Bacterial leaf scorch damage

begin to appear in July and progressively gets worse through the end of summer (Figure 20). Symptoms occur annually as the disease progresses through the crown (Figure 21). Leaf scorch occurs as a result of a bacteria growing inside the tree's vascular tissue where it blocks water movement. Reduced growth and branch dieback soon follow, resulting in a slow decline and eventual death of the tree. Bacterial leaf scorch is common on red oak species, especially pin oak, in urban areas.



Figure 21. Bacterial leaf scorch

Guignardia leaf blotch and *Tubakia* leaf spot

Other diseases can be common when there are periods of persistent rain during the summer and early fall months. Two such examples from 2018 are *Guignardia* leaf blotch and *Tubakia* leaf spot. These diseases were observed in certain parts of the state that received higher than average rain fall this year. Disease symptoms of *Guignardia* leaf blotch start as small lesions on buckeye leaflets and over time expand into larger dark brown blotches (Figure 22). The majority of trees impacted by this disease were in shaded



Figure 22. *Guignardia* leaf blotch

cove areas in Cumberland and Monroe Counties. *Tubakia* leaf spot was common on sporadic oak trees in northern Kentucky. Symptoms of the disease include dark brown or reddish brown spots (Figure 23). Boone and Gallatin Counties seemed to be particularly impacted by this disease in 2018, likely because of the prolonged rains that occurred in the area during August.



Figure 23. *Tubakia* leaf spot

Weather

2018 started with an extreme cold snap in early January that eventually gave way to an early warm up in February which saw parts of north central Kentucky reach temperatures as high as 70 degrees. Some species, such as ornamental flowering cherry, blossomed in late February in response to this early warm weather. A late snow occurred in March with six to ten inches of snow falling in the central region of Kentucky. Late frosts that soon followed during the end of March and early April may have impacted some species that began leaf development early in response to the to the warm periods of February (Figure 24).



Figure 24. Oak leaf deformities



Figure 25. Wind damage (Credit - National Weather Service)

2018 also had it's fair share of extreme weather events. The first tornado occurred in February and the last was recorded in November. In addition to a number of tornados, multiple hail/ice events were also reported. Typically a few of these storms each year, whether it be from hail, ice, or strong winds, cause minor forest damage in Kentucky

(Figure 25). One particular instance occurred in April in which straight line winds of 75-95 mph felled trees and damaged structures in Edmonson, Grayson, Hardin, and Larue Counties. In November, a freezing rain event occurred across central Kentucky, with many locations receiving between a tenth and a quarter of an inch of ice accumulation on trees/shrubs.

Much of Kentucky also received higher than normal amounts of precipitation. In particular, Louisville, Lexington, and Frankfort reported their wettest years on record, with all three cities receiving 20 plus inches of rain more than normal. Lastly, increased precipitation in other parts of the state had a major impact on the Division of Forestry's Wildland Fire Program, as they reported one of their lowest ever periods of fire occurrences for the 2018 fall fire season.



Figure 26. Urban tree damage from a late season snow

References:

- [Kentucky's Office of the State Entomologist](#) provided data from their gypsy moth survey
- Pictures with image numbers were downloaded from Bugwood.org
- Weather information was obtained from the National Weather Service

