



Kentucky

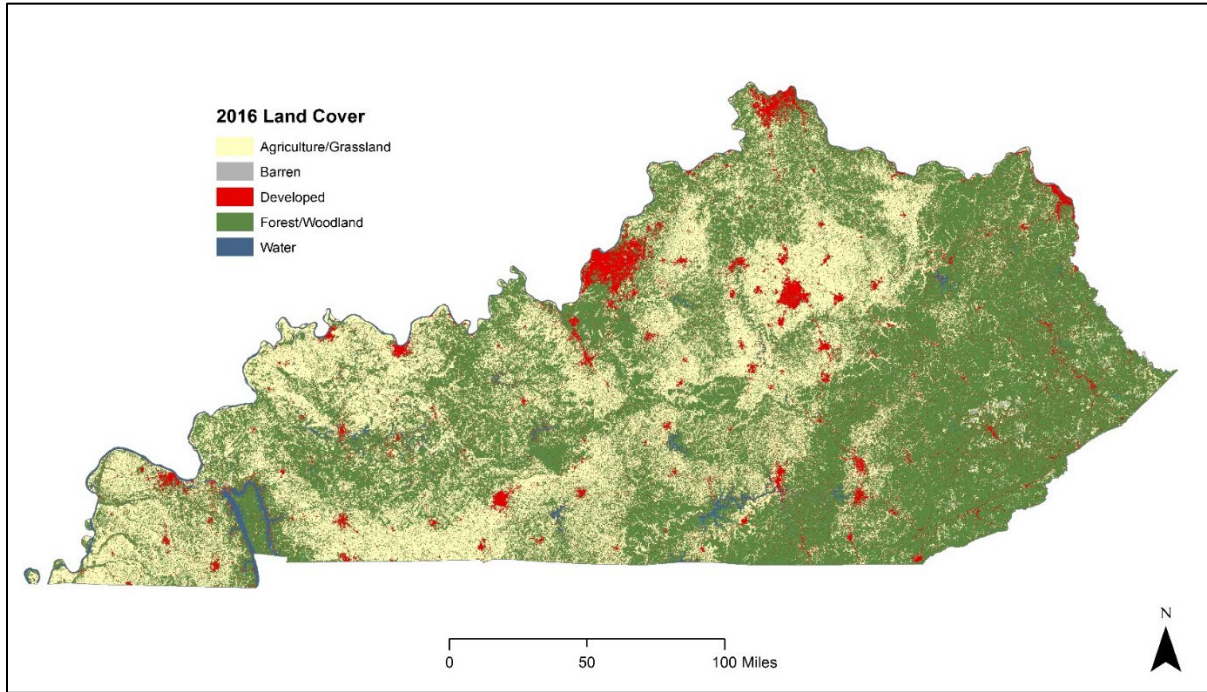
Forest Health Highlights 2021



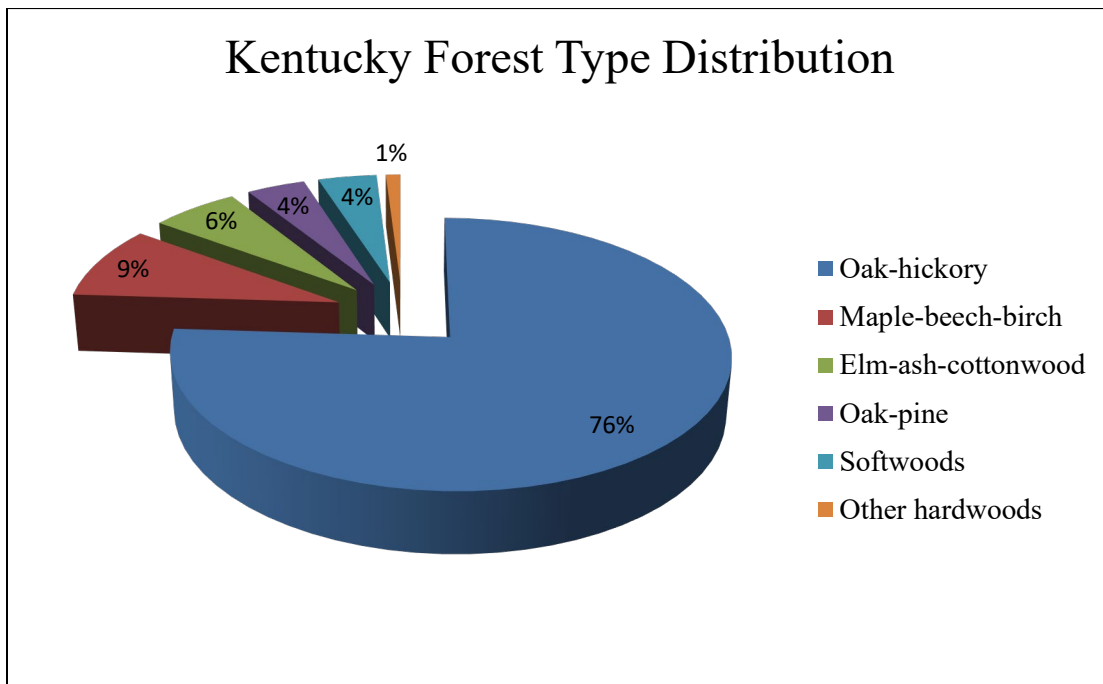
The Resource

Kentucky is home to vast forestlands that are filled with approximately 7.44 billion live trees, which contain 26.69 billion cubic feet of wood. This makes Kentucky's forests a vital source of aesthetic, economic, and ecological value. They provide scenic beauty, support outdoor recreation and tourism, and provide critical wildlife habitat from the eastern Appalachian Mountains to the western Mississippi Valley. Woodlands cover an estimated 12.38 million acres within the state, which equates to 48% of Kentucky's land area. The eastern portion of the state, specifically counties within the Appalachians and the Cumberland Plateau, represent the most heavily forested areas. Many of these counties contain woodlands that cover more than 80% of the land area. The majority of the state's forestland, approximately 88%, is privately owned. While approximately 10% of forestland is federally owned and the remaining 2% owned by state and local entities. Kentucky has one of the most diverse hardwood mixes in the nation, yet the

predominant forest type is oak-hickory, which covers nearly 9.5 million acres or 76% of the forested land. The most common species are red maple, sugar maple, and yellow poplar.



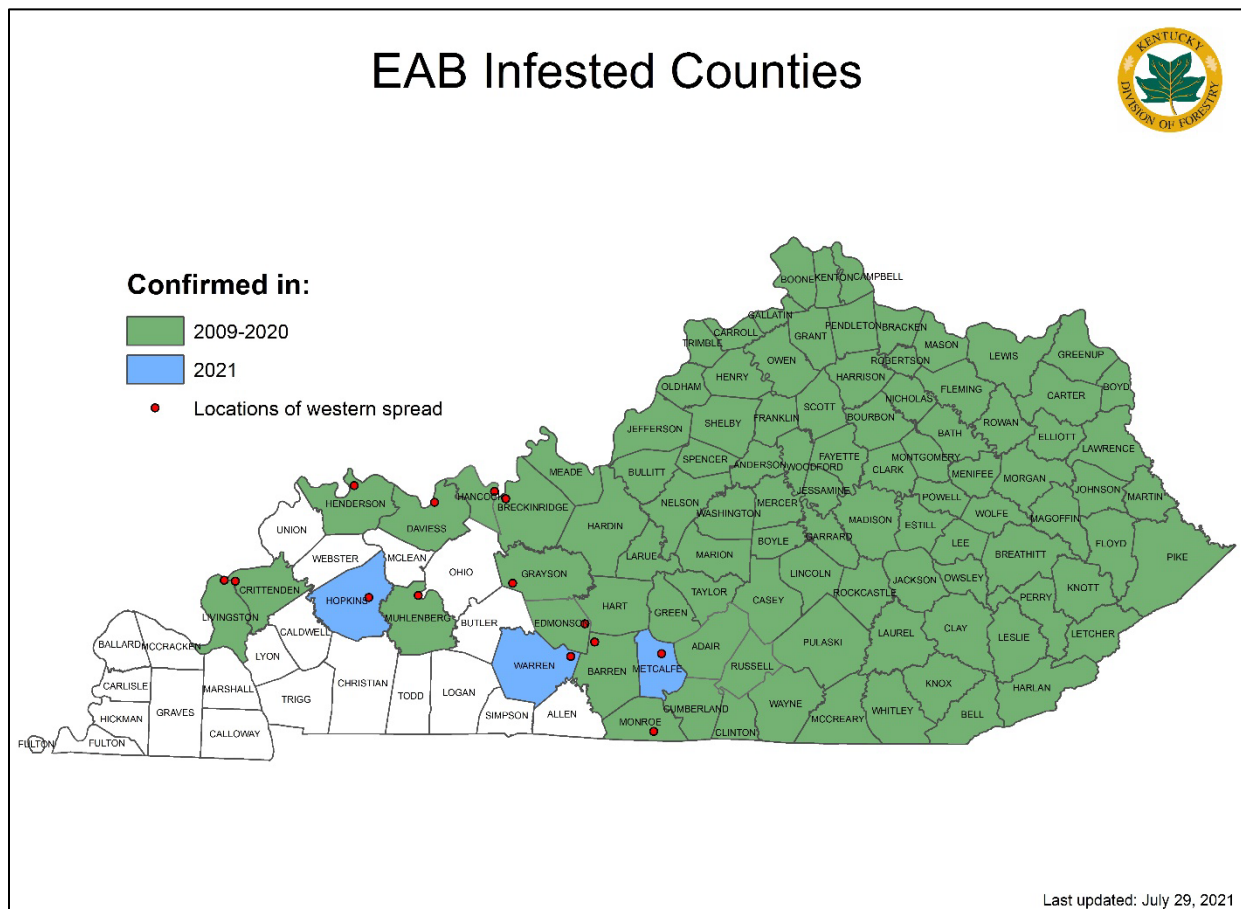
Kentucky Land Cover



Insects

Emerald Ash Borer

Infestations of the emerald ash borer (EAB) were first confirmed in Kentucky in 2009. A quarantine of 20 northern Kentucky counties, located in the region between Louisville and Lexington, was initially established. In the following years, additional EAB infestations were found in nearby counties and the state quarantine was expanded. In April of 2014, the county quarantine system was rescinded and the entire state was added to the USDA APHIS list of regulated areas. In September of 2018, APHIS published a proposal to remove domestic quarantine regulations for EAB. This proposal was approved after a public comment period and the ruling officially took effect on January 14, 2021. Currently, EAB has been confirmed in 99 Kentucky counties. In 2021, EAB was detected in three new counties: Hopkins, Metcalfe, and Warren. EAB will eventually impact ash resources across the entire state as the infestation continues to spread into western Kentucky. Infestations in neighboring states of Indiana, Illinois, Missouri, and Tennessee can only aid this expansion within the coming years.

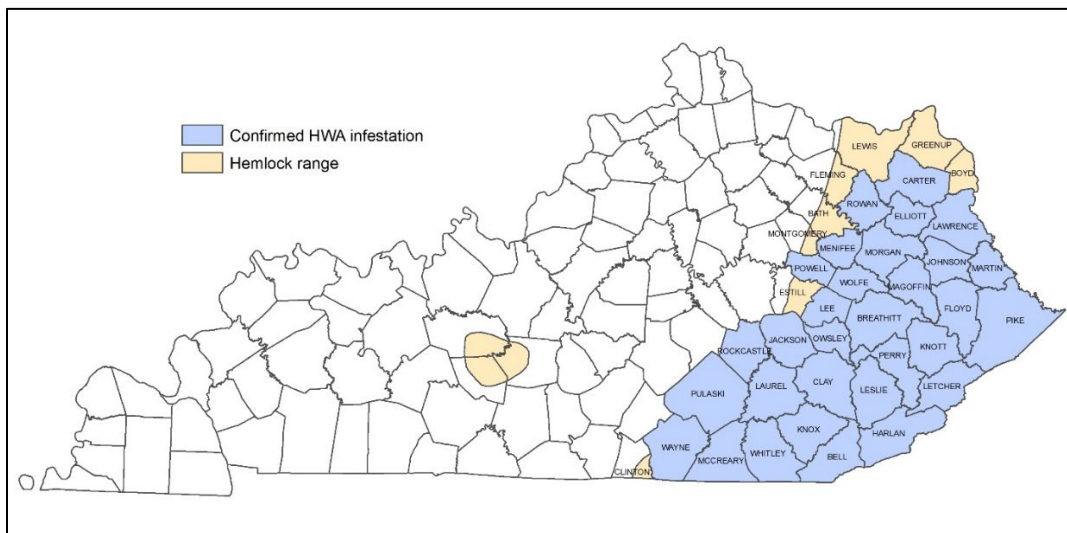


Hemlock Woolly Adelgid

The hemlock woolly adelgid (HWA) was first discovered in Kentucky in 2006. Approximately 98% of Kentucky's hemlocks are found in the eastern one-third of the state. In this region, infestations currently occur in 31 counties. The counties include Bell, Breathitt, Carter, Clay, Elliott, Floyd, Harlan, Jackson, Johnson, Knott, Knox, Laurel, Lawrence, Lee, Leslie, Letcher, Magoffin, Martin, McCreary, Menifee, Morgan, Owsley, Perry, Pike, Powell, Pulaski, Rockcastle, Rowan, Wayne, Whitley, and Wolfe.

The Kentucky Division of Forestry (KDF) has a field crew responsible for treating hemlocks to prolong the survival of this ecologically significant tree. Chemical insecticide treatments are employed in order to suppress hemlock woolly adelgid populations. Treatments began in 2009 on Kentucky State Forests and has since expanded to include properties managed by the Kentucky State Parks, Office of Kentucky Nature Preserves, KDFWR Wildlife Management Areas, and USFS Daniel Boone National Forest (DBNF). Since 2009, KDF has chemically treated over 200,000 hemlock trees.

KDF has also continued the release of two species of predatory beetles that feed exclusively on HWA within the DBNF in hopes of establishing field insectary sites. In the past, Kentucky has struggled with predatory beetle establishment. However, in 2020 KDF made the first-ever recovery of both the adult and larval forms of the *Laricobius osakensis* species. Identification was confirmed in 2021 by the Beneficial Insects Lab at Virginia Tech. Future releases will take place adjacent to previous release sites to augment the formerly established population.



Hemlock Woolly Adelgid Distribution 2021

Scarlet Oak Sawfly

This year browning oak trees in central Kentucky, specifically Bullitt and Franklin counties, were reported for the first time. Normally, this damage type has most often been observed in the eastern portion of the state. After further investigation, this native forest pest's feeding damage was found to be the causal agent. Limited ground surveys were conducted to determine the extent of the damage. No major decline has been noted, though recent extreme weather events could lead to future localized decline.



Oak Shothole Leafminer

After an extensive outbreak of this native forest pest last year, relatively minimal damage was detected in 2021. In 2020, cosmetic damage from this native fly species was detected across the entire state, whereas this year, damage was sporadic and not widespread. No formal surveys took place to record this damage in Kentucky this year, but rather general observations and outside agency reports were used to record locations that experienced localized damage.



Oak Lace Bug

During the late summer months of 2021, browning oak trees were reported across the northern portion of the state. Upon closer examination, feeding damage from the native oak lace bug was found to be responsible. General observations and ground surveys were used to determine the extent of damage from this pest. The majority of northern Kentucky and some parts of central Kentucky, primarily along ridgetops where mature oaks are common, saw at least some level of damage. Symptoms ranged from stippling to bleaching of foliage with light to moderate feeding, and in cases of heavy feeding, defoliation was observed. This should only be a cosmetic problem with no impact to the tree's vigor. However, this damage paired with recent extreme weather events could potentially lead to future decline.



Lymantria dispar

Lymantria dispar surveys have been conducted since 2005 through various agencies and programs. This pest is not yet established in Kentucky, although it has been detected every year since the surveys began. The USFS and Kentucky's Office of the State Entomologist annually trap for this invasive species using detection surveys through USDA APHIS and Slow the Spread programs. In 2021, traps were placed in 85 counties across the state. 29 positive traps were found across 15 counties with a total of 30 moths captured. Counties with positive traps include Bath, Boone, Campbell, Clark, Elliott, Fayette, Harrison, Jefferson, Lewis, Rowan, Scott, Floyd, Lawrence, Martin, Pike. Positive trap catches were up from 4 moths captured in 2020, yet substantially lower than 68 moths in 2016, and 171 moths in 2015.



Asian Longhorned Beetle

The Asian longhorned beetle (ALB) continues to be a potential pest of concern for Kentucky. Although ALB has not been found in Kentucky, it was discovered in 2011 in Clermont County, Ohio, which is only 10 miles from the Kentucky border. More recently, ALB was confirmed in Charleston County, South Carolina in 2020. Eradication efforts are still underway. KDF works with various agencies to educate the public on ALB identification and signs of infestation.



Spotted Lanternfly

The spotted lanternfly (SLF) is a relatively new invasive insect to the US with origins from Asia. It was only first discovered in Pennsylvania in 2014. This insect is actually a hemipteran which uses its characteristic piercing and sucking mouthpart to steal sap from its host. It is thought that tree of heaven is their primary host species, but they also show preference towards red maple, black walnut, and various other fruiting trees and vines. Damage from this insect's aggregate feeding behavior can weaken the host, leaving it susceptible to other stress agents. These insects also produce ample amounts of honeydew, or liquid excrement, that transforms into black sooty mold. Although SLF hasn't been found in Kentucky, it was recently discovered just two miles north of the border in Vevay, Indiana in July 2021. KDF works with various agencies to educate the public on SLF identification and signs of infestation.



Diseases

Thousand Cankers Disease and the Walnut Twig Beetle

This season KDF did not deploy traps to monitor for the walnut twig beetle associated with thousand cankers disease (TCD). However, neither the fungus nor the insect vector have been confirmed in Kentucky to date even though the disease has been confirmed in the neighboring states of Indiana, Ohio, and Tennessee for a number of years. New ground surveys and trapping efforts will continue in the 2022 field season.



Bacterial Leaf Scorch

Bacterial leaf scorch is vectored by various leafhopper and treehopper species and it affects multiple tree species including elm, maple, sycamore, and oak. This disease is common on many urban landscapes throughout the state. This year numerous landowner reports, predominantly from central Kentucky, came in pertaining to this issue. Symptoms include a scorched leaf appearance that can begin to appear in July and progressively gets worse through the end of summer. Symptoms occur annually as the disease progresses through the crown. Reduced growth and branch dieback soon follow, resulting in slow decline and eventual death of the tree.



Laurel Wilt Disease and the Redbay Ambrosia Beetle

In 2019, Laurel Wilt Disease (LWD) was first documented in Kentucky in Christian, Todd, and Logan counties. After this initial detection, ground surveys were used to learn the extent of the outbreak. LWD has now been confirmed in counties ranging from the extreme southern and northern borders of Kentucky. It appears that the positive detections are following major interstate corridors, such as I-65 which travels from southwestern Kentucky into the city of Louisville. Investigation of these potential vector pathways will be a top priority next season.

Redbay ambrosia beetles vector LWD by boring into species of the Laurel family, such as sassafras and spicebush. A single female can transmit enough spores of the lethal fungus, *Raffaella lauricola* to kill a tree. The fungus infects the xylem which blocks off the vascular system causing rapid wilt and mortality. Mortality can occur within weeks to months after being infected. Signs of beetle activity include very small circular holes in the bark, occasionally accompanied by thin sawdust toothpicks of waste. Other symptoms caused by the fungal pathogen include early fall coloration or wilting of leaves on suspect trees that may remain attached for months. In most infected trees and shrubs, the fungus causes distinctive dark staining within the sapwood.

Next year, a pilot study in cooperation the University of Kentucky and Bartlett Tree Experts will examine the efficacy of a fungicide treatment as a method to combat this disease in municipal trees. Trials will begin in spring of 2022.

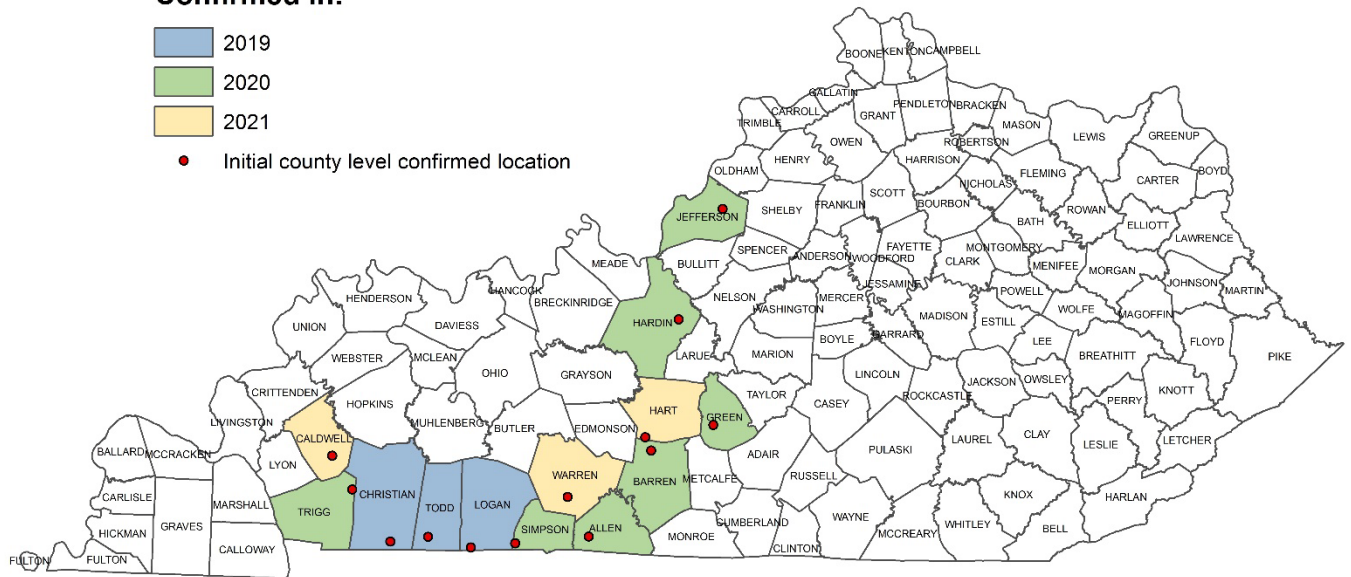


Laurel Wilt in Kentucky



Confirmed in:

- 2019
- 2020
- 2021
- Initial county level confirmed location



Last updated: October 21, 2021

Other Damages

Ice/Snow/Storm Damage

Beginning on February 10, 2021 three consecutive winter storms, bringing all forms of precipitation (e.g. snow, sleet, freezing rain, and ice), hit Kentucky over the course of a week's time. The hardest hit counties included Elliot, Lawrence, and Jackson which received approximately 0.4 - 0.7 inches of ice as well as additional snow accumulation. This was enough weight to cause severe damage to trees and power lines. The impact to these areas was so great that 44 KDF foresters were called to duty and deployed on 30 saw teams, in addition to 5 plow operators, to aid in debris clearance from vital roadways and power lines.

While these counties received the brunt of the first storm, the bout of extreme weather continued within the Commonwealth along with further damages. All regions of the state received some level of damage from this trifecta of storms, but certain regions of the state were more severely impacted. The most critical damages occurred in the eastern portion of the state. From Monticello in the south to Ashland in the north, and any counties falling in-between these two locations, received the most extreme impacts.

Ground surveys were completed in the northeast, which resulted in the following observations. Uprooted pines along roadway edges were reported in Carter and Lawrence counties as well as injuries to hardwood crowns in the area. These damages ranged from broken tops to branch damage. A threshold in branch diameter size was observed, in that branches which were approximately eight to ten inches in diameter broke most often. It is also important to note that this damage was not uniform across the landscape. In fact, it was sporadic in severity and patchy in distribution. Evidence from Grayson Lake State Park suggests that aspect and slope dictated the level of impact to trees in these mountainous regions. These two characteristics determined the amount of ice that accumulated on trees, with trees on steeper inclines collecting more which also encouraged trees to uproot more easily. Further aerial detection surveys of the widespread damage resulted in the same findings. Another general observation made during the ground surveys was that edge habitats and roadsides were also damaged more frequently. Smaller to medium-sized trees in these areas had broken tops, whereas more mature trees had mostly branch breakage. Snapped branches tended to be 10 inches in diameter or larger, while smaller-sized branches were more pliable and able to bend with the extra weight. This was a reoccurring threshold that was seen across the landscape during the broader aerial surveys.

Merely two weeks after these devastating winter storms that left some Kentuckians without power for several days, the Commonwealth was hit again with torrential downpours. This precipitation event set records for the state with new benchmarks established for the amount of rainfall over a short duration and historic levels of flooding spanning from the west to the east. On February 28 heavy rains, in addition to the recent run-off from the snow and ice storms, started accumulating in all Kentucky River tributaries. Flooding occurred in all locations, which resulted in the largest flash flooding event ever documented in the state record books.

Extreme weather events that used to be few and far between are now becoming a common occurrence year to year. While no major decline was recorded this year, documentation of these events will be essential for future forest health monitoring efforts.





References:

- [Kentucky's Office of the State Entomologist](#) provided data from their *Lymantria dispar* survey.
- 2016 Land Cover data was obtained through NRCS from the [National Land Cover Database](#).
- 2017 FIA One-Click Factsheet for Kentucky from the [USDA USFS](#)
- Photos with image numbers taken from Bugwood.org

Forest Health Assistance in Kentucky

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