



# Central States Forest Health Watch



Current forest health information for land managers in Illinois, Indiana, Iowa, and Missouri

January 22, 2016

This collaborative effort of the U.S. Forest Service Northeastern Area State and Private Forestry; Missouri Department of Conservation; and Indiana, Iowa, and Illinois Departments of Natural Resources provides technical updates on forest health issues of regional interest. Useful information can also be found in previous editions, which are available at <http://na.fs.fed.us/fhp/fhw/>.

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## Important Regional Forest Health Issues

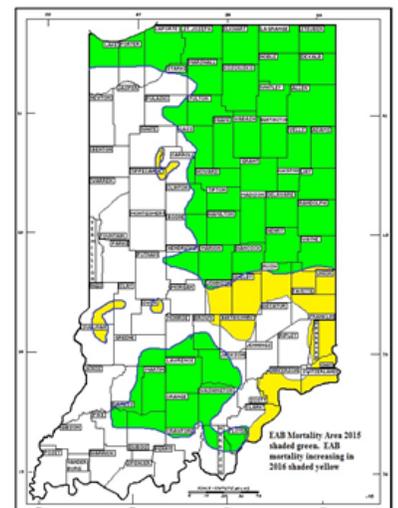
Nonnative insects and pathogens continue to be highly significant forest health issues in our region. In the face of this onslaught, our mantra to both urban tree managers and woodland foresters continues to be “Diversify!” closely followed by the corollary, “Plant Appropriate Trees for the Site!” In keeping with the adage “Know your enemy,” in this edition you will find updates on emerald ash borer, gypsy moth, thousand cankers disease, and Asian longhorned beetle.

### **Emerald Ash Borer (EAB)**

The large APHIS map on the following page gives a visual summary of the current EAB situation and what new counties were added in 2015. All four of the Central States (Missouri, Illinois, Indiana, and Iowa) are now wholly included in one large Federal quarantine area. Even when a State is fully under Federal quarantine, individual States may have separate internal State quarantine boundaries in place to try to slow the movement of EAB to counties that are currently unaffected. Indiana is the only one of our four Central States that currently has an internal quarantine, and it is expected to be repealed by summer 2016.

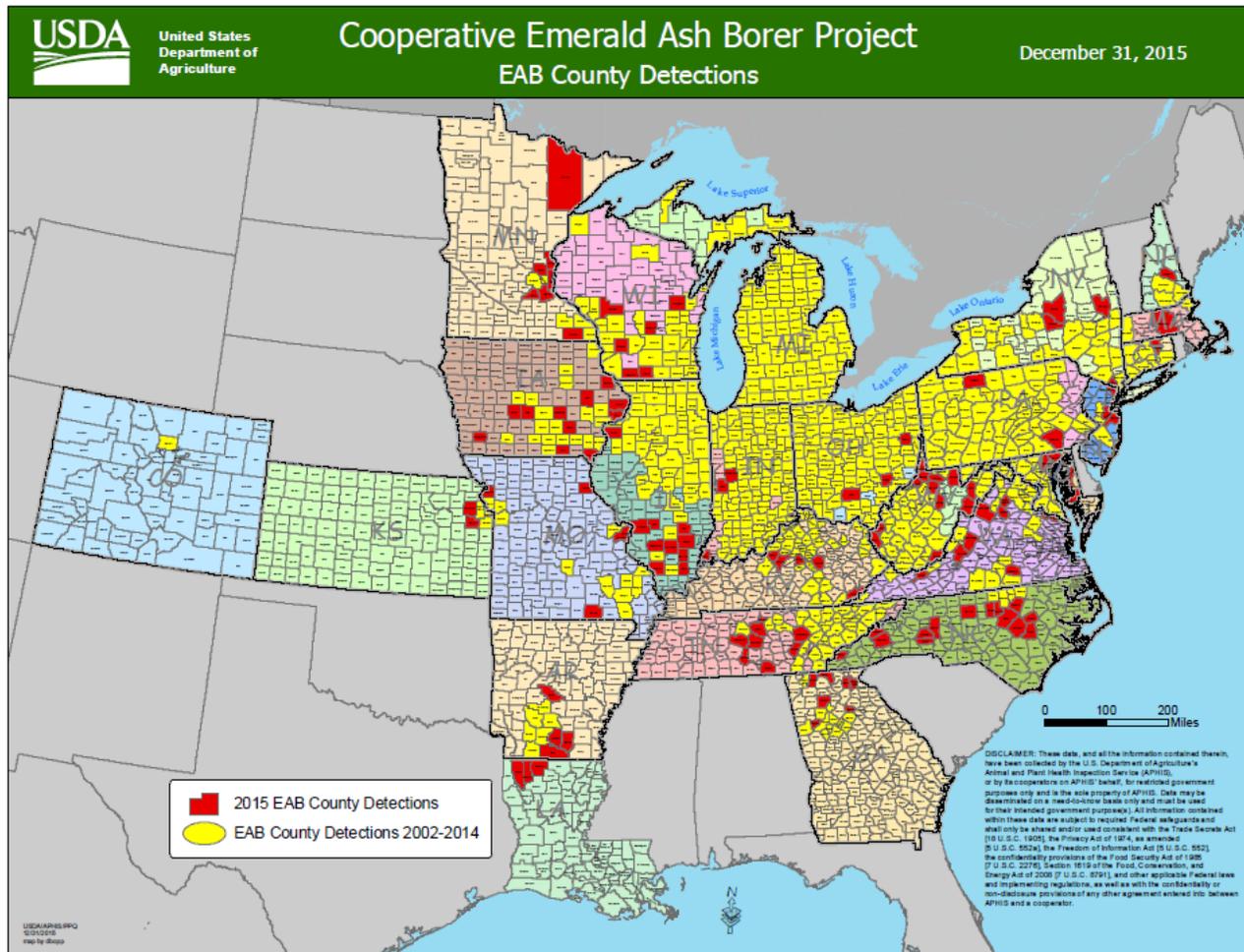
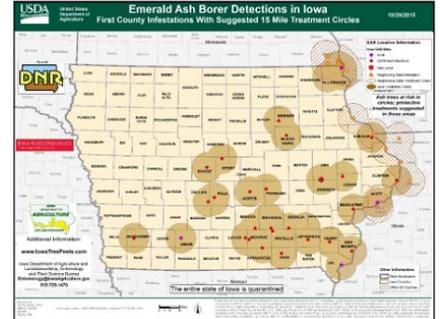
Illinois: In October 2015, Illinois discontinued their internal quarantine, meaning they will no longer restrict the movement of ash products or any cut, nonconiferous firewood within the State. EAB was confirmed in 10 new Illinois counties in 2015, bringing the total to 60 out of 102 counties. Illinois is urging residents to maintain vigilance against human-assisted spread of EAB and all other invasive pests. For more information on EAB in Illinois, visit the Illinois Department of Agriculture’s EAB page at <http://www.agr.state.il.us/eab/>.

Indiana: EAB was detected for the first time in Parke and Posey Counties. By the end of 2015, EAB had been detected in 84 of the 92 Indiana counties. Aerial survey detected nearly 29,000 forested acres with EAB mortality, concentrated within colored areas on the map to the right. There are 131,422 total forested acres with mortality since 2009. For information on quarantine and reporting EAB in Indiana, see the Indiana DNR Web page at <http://www.in.gov/dnr/entomolo/3443.htm>. For information on how to respond to EAB for your management situation, see the Purdue University Extension EAB page at <http://extension.entm.purdue.edu/EAB/>.



Missouri: The 2015 detections bring the total of EAB positive counties to 15, plus the city of St. Louis. EAB populations in Missouri are centered in the southeast quarter of the State and near the cities of St. Louis, Kansas City/St. Joseph, and Hannibal. A new “Emerald Ash Borer Management Guide for Missouri Homeowners” is available at <http://extension.missouri.edu/treepests/EABhomeowners.aspx>.

Iowa: By the end of 2015, 29 Iowa counties have been confirmed to have EAB. The map to the right of known locations, with 15-mile radius circles in tan, indicates the areas where protective treatments are recommended for high-value trees. A statewide quarantine, issued in 2014, restricts the movement of hardwood firewood, ash logs, wood chips, and ash tree nursery stock out of Iowa into nonquarantined areas of other States. Iowans are urged to be vigilant in reporting suspicious symptoms in counties that are not yet known to be infested. More information for Iowa landowners can be found at <http://www.iowadnr.gov/Conservation/Forestry/Forest-Health/Emerald-Ash-Borer>.



The APHIS map above shows cumulative and new county detections. People should be vigilant in reporting suspicious symptoms in counties that are not yet known to be infested by EAB because awareness of the presence of EAB signals a need for landowners to adjust their management from preemptive to responsive activities. Preemptive strategies include survey and diversification of tree species. Responsive activities include protective injections with insecticides and salvage harvests. If a landowner is interested in protecting a valuable and healthy ash tree within 15 miles of a known infestation, the next window for preventive treatment measures (trunk injection, soil injection, soil drench, or basal trunk sprays) will open early spring 2016 (mid-April to mid-May).

Woodpecker flecking is a highly visible indicator of insect presence. If you are seeing a lot of woodpecker activity (e.g. the bark pecked off sections of the stem) in the upper crowns of ash trees, it warrants a closer look to see if EAB is present. The presence of EAB can be verified by observation of galleries and larvae, and reported through the hotlines listed on the EAB Web site <http://www.emeraldashborer.info>.

Even when a county or State is under quarantine, it does not necessarily mean that the entire area is infested by EAB. Movement of infested material can enhance the dispersal of EAB because our vehicles can carry these pests much farther and faster than they disperse on their own. Avoid transporting firewood across county or State lines, since the movement of firewood throughout your own State or to other States poses a threat to quickly spread EAB and other plant pests.

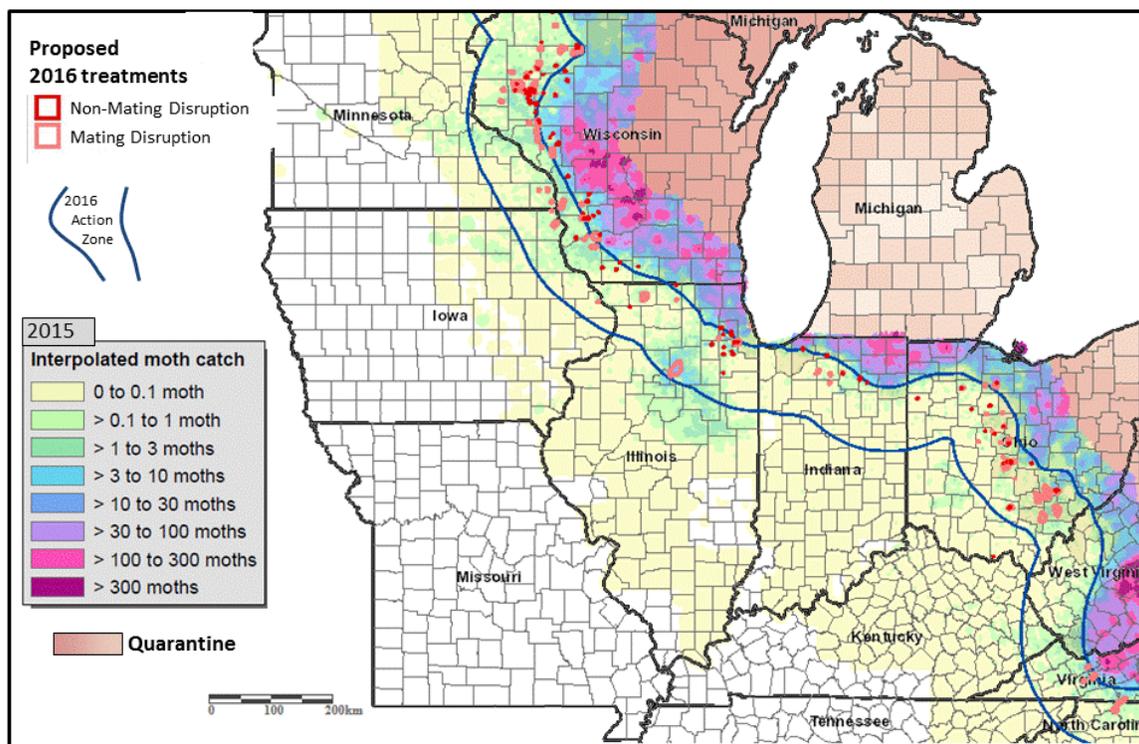
### Gypsy Moth (GM) Activities – 2015 Trap Catches, Summer 2016 Proposed Treatments

Three levels of gypsy moth treatment activity are present in our Central States:

- In uninfested areas, detection traps are placed in strategic locations; if trapping results detect an area of concern, delimit traps are placed the following year. If an outlying population is detected, eradication treatments will be applied to try to extirpate that population. Missouri falls in this category because occasional male moths are captured.
- In generally infested areas, the only activity is suppression treatments to try to minimize the impact of defoliation. This is the situation in parts of northeast Illinois where GM has been present for some time.
- The transition area is in between and is where “Slow the Spread” (STS) is implemented. An intensive grid of traps helps define the “hot spots” of building gypsy moth populations, and treatments are applied to greatly reduce these reproducing populations. In 2015, STS treatments took place in Indiana and Illinois.

The map below also shows relative moth catches in traps in 2015, with brighter pink/magenta indicating high numbers of moths and bluish tones indicating building populations. The 2016 Action Zone and Proposed Treatments are also shown on the map. The 2015 moth catch numbers were used to define the 2016 Action Zone, which has shifted very little since 2014. Based on 2015 trapping results, STS treatments for 2016 are being proposed in the Central States of Iowa, Illinois, and Indiana. For customized maps and details on past and proposed STS treatments, visit the STS Decision Support Web site at <http://yt.ento.vt.edu/da/>.

STS Gypsy Moth: Action Zone for 2016, Proposed Treatments in Summer 2016, and Moth Catches in Summer 2015 (which determine 2016 Action Zone).



Additional state-specific information on 2015 treatments and trapping is in the following table.

**States without established populations:**

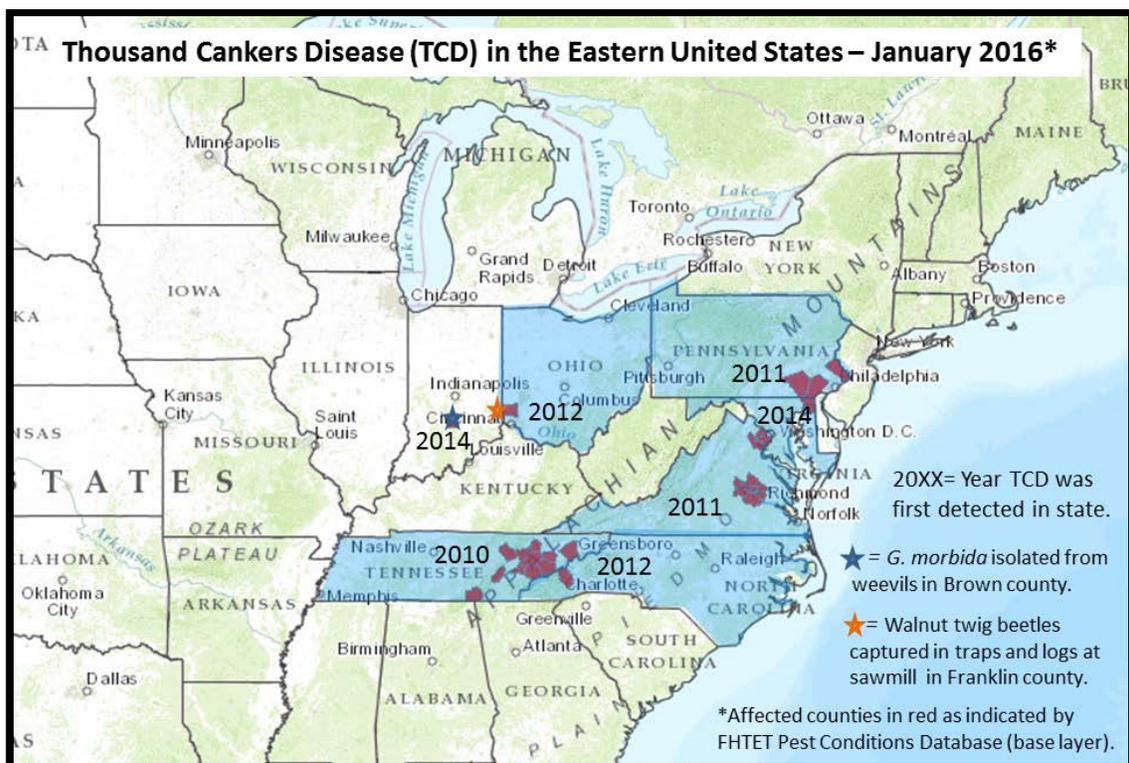
State	Treatment Activities	Trapping Activities
Iowa	No STS treatments were needed for 2015. STS treatments are planned for 3 sites in eastern Iowa in 2016.	Gypsy moth detection traps are placed across the State in a joint effort by State and Federal agencies. Iowa captured only 338 male moths during 2015, which is up from 46 male moths in 2014 and 269 male moths in 2013. No feeding damage has been observed on Iowa trees.
Missouri	No gypsy moth populations are known to be established in Missouri.	Over 6,100 pheromone traps were monitored in 51 counties in 2015, including delimit trapping at 4 sites where moths were captured in 2014. No moths were captured in the delimit areas. Only 2 male moths were captured statewide (1 each in Camden and St. Louis Counties). Annual trap catches have been less than 10 moths since 2009.

**States with established populations:**

State	Treatment Activities	Trapping Activities
Illinois	STS treatments during 2015 consisted of 2 mating disruption sites (approx. 5,000 acres) and 2 Btk sites (approx. 2,555 acres). For 2016, 20 treatment areas are proposed, totaling about 49,500 acres (~5,500 Btk, ~44,000 mating disruption).	For 2015, IL Department of Agriculture and APHIS placed 10,253 traps and caught 23,568 moths. This total is up from ~5,200 moths in 2014. No defoliation was noticed in aerial surveys.
Indiana	STS treatments during 2015 included 5 Btk sites (1,676 acres) and 5 Mating Disruption sites (11,500 acres). In 2016, STS treatments are proposed on 8 sites in 7 counties (Kosciusko, LaPorte, St. Joseph, Whitley, Fulton, Marshall, and Starke).	Trapping continued in the STS area and the uninfested area of the State, with 11,025 traps set and 15,330 moths caught, which is slightly lower than 2014. Aerial surveys detected no noticeable GM defoliation in 2015.

**Thousand Cankers Disease of Black Walnut**

Thousand cankers disease (TCD) results from the combined activity of the walnut twig beetle (WTB, *Pityophthorus juglandis*) tunneling through the bark and delivering a canker-causing fungus (*Geosmithia morbida*), which together can cause tree mortality, primarily in eastern black walnut (*Juglans nigra*). TCD was described as a disease in the Western U.S. in 2008, but was not discovered on native black walnut in the East until 2010. The map below indicates the known locations of TCD in the Eastern United States. A state-by-state summary is followed by a regional overview.



Indiana: The fungus *Geosmithia morbida* has been found on weevils (but not WTB) at one site. The WTB has been found in logs and in 2014 and 2015 traps at one sawmill, but TCD has not yet been found with both the fungus and the WTB present; no damage to trees has been observed. Local quarantines have been issued only for the plantation in Yellowwood State Forest where *G. morbida* was found and for the sawmill in Franklin County where WTB was found; the remainder of the State is not under quarantine. Indiana has an external quarantine that regulates the movement of walnut material into the State. Indiana continues to conduct trapping surveys around high-risk sites and visual surveys to evaluate declining walnut trees in urban areas. More information on TCD in Indiana is available at <https://secure.in.gov/dnr/entomolo/6249.htm>.

Illinois: No TCD, WTB, or *G. morbida* has been detected in Illinois. In 2015, the State implemented a survey with pheromone-baited Lindgren funnel traps at 50 State parks, forests, and other wooded areas. Visual assessments were also conducted of declining walnut trees. Trapping surveys for WTB and other beetles were also conducted in 2014 with no recovery of WTB. Illinois has an external quarantine that restricts movement of walnut material into the State.

Iowa: No TCD, WTB, or *G. morbida* has been detected in Iowa. In 2015, 1,126 walnut trees were selected for a trapping survey. Lindgren funnel traps baited with pheromone were left on each tree for 3 weeks during the putative active period of WTB. A total of 7,577 ambrosia beetles, Pityophthorus beetles, and weevils were collected, but no WTB. Iowa has conducted visual surveys in 2011 and trapping surveys since 2012. Over 4,000 black walnut trees have been surveyed since 2011. Iowa does not have an external quarantine.

Missouri: No TCD, WTB, or *G. morbida* has been detected in Missouri. In 2015, collaborating State agencies placed 185 pheromone-baited traps at high-risk locations in 44 counties. The survey is rotated to different regions of the State each year. Since 2010, they have deployed 618 WTB traps and visually surveyed 1,566 locations, with no evidence of WTB or TCD detected. Other wood-boring insects that commonly attack stressed walnut have been observed, consistent with drought stress and site-related tree stress. Missouri has an external quarantine that restricts movement of walnut material into the State. For more information and resources on TCD in Missouri, visit the Missouri Department of Conservation Web site at <http://mdc.mo.gov/thousand-cankers>.

Our Central States have been looking intently for the disease for several years, and the fact that no established areas of TCD have yet been found is very encouraging. There is still concern that undetected populations remain, or that the insect and/or pathogen will be moved into our States, so surveys are ongoing. A vigilant forestry community is one of our best detection tools; if you see something suspicious, report it to your State forest health agency.

### **Asian Longhorned Beetle (ALB)**

ALB has the potential to be a serious pest of all maple species plus birches, buckeyes, elms, and willows in the United States. ALB has already been introduced multiple times via commercial shipping, but the current intention is to eradicate any introductions. ALB was detected in Chicago, IL, in 1998, but has been eradicated. It has not been detected in Iowa, Missouri, or Indiana.

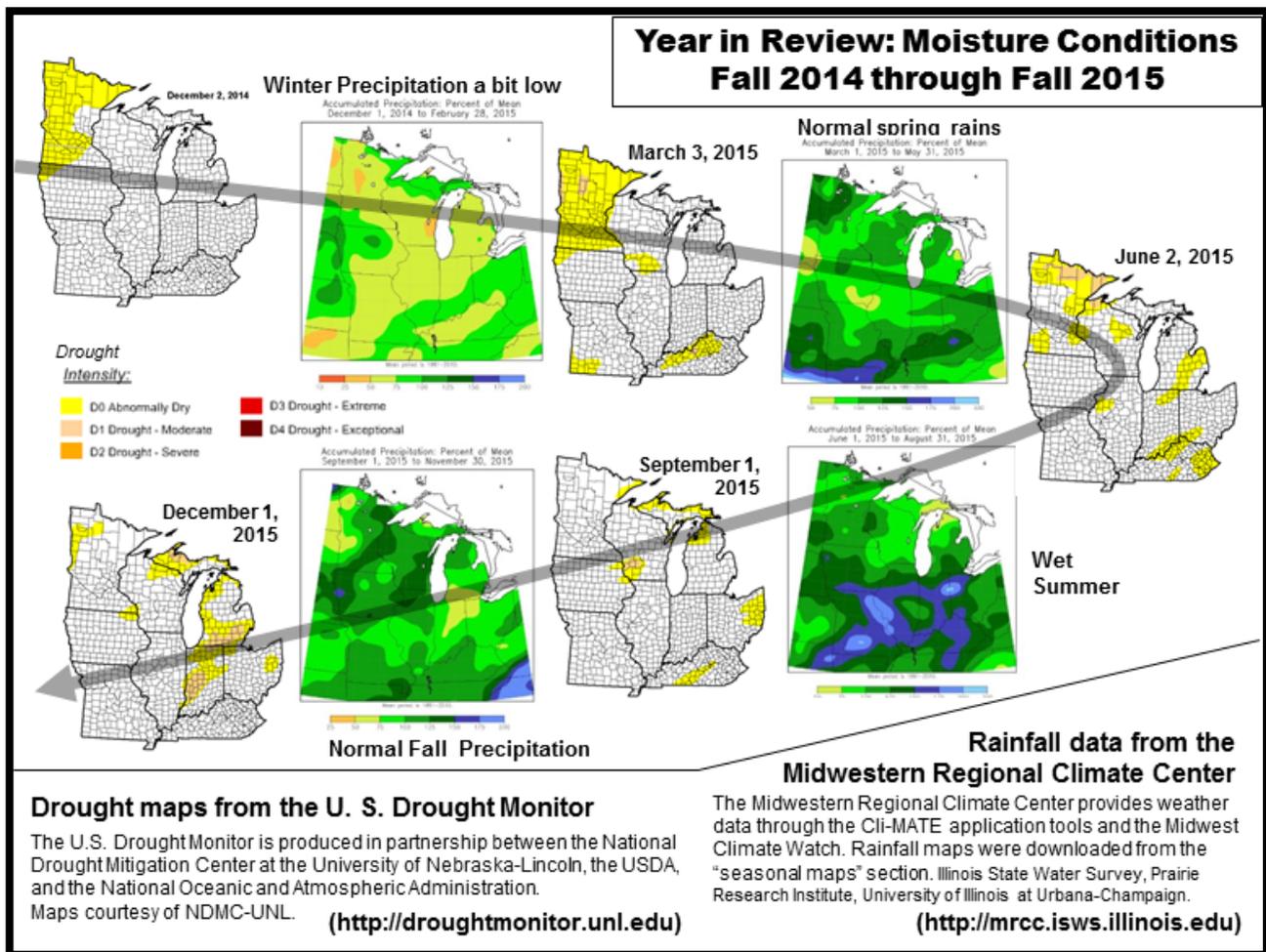
It is important to detect new ALB infestations early to quickly contain the ALB and reduce the loss of infested trees during eradication efforts. Now (with leaf off) is a good time to have a quick look at the upper canopy of maple trees for signs of ALB (e.g. large exit holes). Another check in July/August for adult beetles is also recommended.

There are currently ongoing eradication programs in three States: New York, Massachusetts, and Ohio. The Ohio infestation was first detected in June 2011. The overall regulated area is 61 square miles within Clermont County. To date, 77,595 trees have been removed: 16,362 infested trees and 61,163 high-risk hosts. They continue to survey and remove infested trees within the regulated area. The Massachusetts infestation was first detected in August 2008, and the regulated area currently stands at 110 square miles. They continue to survey for and remove infested trees in Worcester County. The New York infestation was first detected in August 1996, and they are hoping to be near eradication. The current regulated area in New York is 137 square miles.

## Weather Overview\*

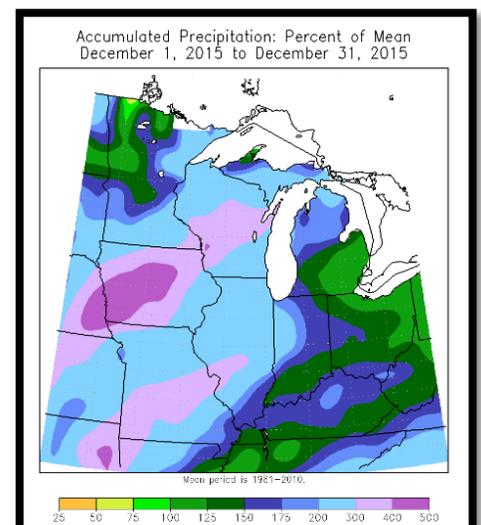
\*All rainfall and drought graphics are taken from the Midwest Regional Climate Center.

We began last year with no areas of significant drought in the Central States. The 2015 growing season provided adequate moisture for most areas (see seasonal precipitation and drought map below; green shades represent near normal conditions).



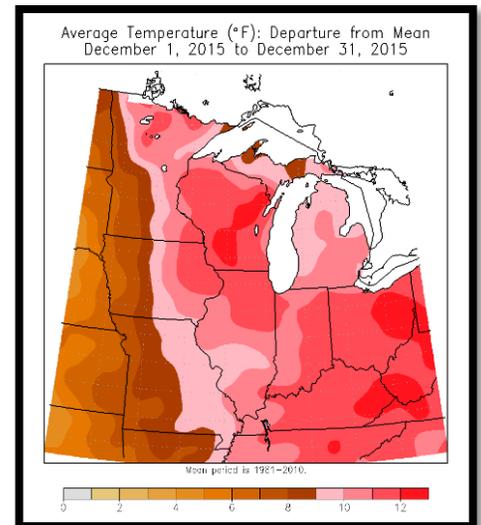
In December 2015, three storm systems (December 12-14, December 23, and December 26-29) dumped huge amounts of precipitation on Iowa, Illinois, Indiana, and Missouri, resulting in catastrophic floods in many places. The map of accumulated December precipitation to the right shows that these storm events resulted in most of Iowa, Missouri, and Indiana receiving 2 to 5 times normal precipitation. The flooding that occurs during dormant season generally doesn't affect tree roots. However, if floodwaters were extreme enough to cause scouring and/or stem damage, we could see some lingering effects on trees. Much of the rainfall that comes in extreme events runs off of our sites as overland flow, rather than being captured on the site as soil moisture, so total rainfall may give an overestimation of the moisture available for plant growth.

December temperatures were well above normal in much of our region. The extreme warmth of December may have induced some trees to begin to break dormancy, but it has been followed by at least some typical winter temperatures. Thus we might see some cold temperature injury to buds that were supposed to be dormant, but weren't.



El Niño 2015-16 is one of the strongest on record, meaning that surface water temperatures are warmer than usual in the equatorial Pacific Ocean. This affects the jet stream and flow of weather patterns across the continental U.S. Typically we expect the effects of a strong El Niño to bring below normal precipitation in the small area around southern Illinois, Indiana, and Ohio. We also expect above normal temperatures in the northern States, and wetter and cooler than normal conditions in the far southern tier of States. The gap in between north and south, which encompasses much of our “Central States,” does not typically have predictable effects except the drier conditions in Indiana and southern Illinois.

The potential of weather to impact our forests goes far beyond the stress of droughts or the damage from flooding and temperature extremes. Weather conditions also impact the survival of insect pests or the beneficial organisms that keep them in check, and moisture conditions most definitely affect development of leaf pathogens. Storm damage may have cascading impacts on trees because the wounding can lead to introduction of diseases or decay organisms. Many of the impacts are highly localized and unpredictable.



## What Else is Being Reported Across the Region

### Forest Health Highlights

Each State has completed its annual document that highlights forest health issues. Consult these documents for more detailed information on each State.

- **Missouri:** [http://mdc.mo.gov/sites/default/files/resources/2016/01/mo\\_fh\\_update\\_dec-2015.pdf](http://mdc.mo.gov/sites/default/files/resources/2016/01/mo_fh_update_dec-2015.pdf)
- **Iowa:** [Iowa's Forest Health Web page](#) (look for the link to 2015 FHH about half way down the page)
- **Illinois:** 2015 Illinois Forest Health Highlights – see document attached to Illinois distribution
- **Indiana:** 2015 Indiana Forest Health Highlights – will soon be posted on the Indiana DNR Web site

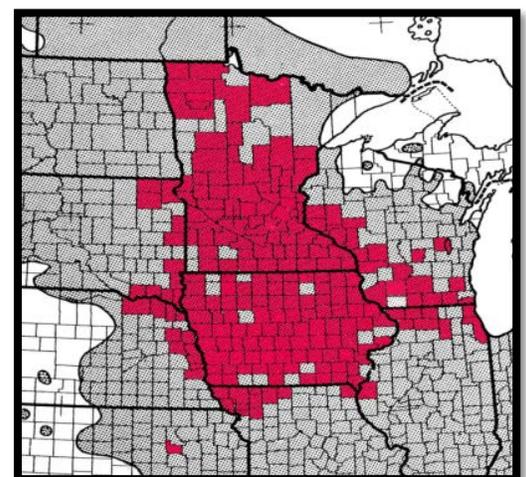
Eventually all State Forest Health Highlights will also be posted on the Forest Health Monitoring Web page at <http://www.fs.fed.us/foresthealth/fhm/fhh/ncregion.shtm>.

### Damage to Conifer Windbreaks

In Iowa, observations over the past 6 years have shown that conifer windbreaks are suffering from multiple stressors. One issue is winter desiccation, which occurs when conifer foliage is losing water that cannot be replaced from dry or frozen winter soils. The effects of this are particularly severe when abnormally warm periods during the winter induce the conifers to break dormancy, as occurred during January 2015. Another impact is needle diseases; these are exacerbated by wet conditions in spring and early summer, which have increased in recent years (see notes about this in BOB section below). To maintain the function of windbreaks, it may be helpful to use more deciduous species than conifers.

### Bur Oak Blight (BOB)

*Tubakia iowensis* was officially recognized in 2012 as a unique disease that causes late-season leaf death of bur oak, e.g. bur oak blight. Doug McNew of Iowa State University has been mapping counties in which the pathogen has been identified, and the map to the right represents the known locations as of May 2015. This disease is not new, yet the recognition of severe damage by this disease is. One hypothesis is that climate change, toward wetter spring conditions, has led to a buildup of inoculum and disease caused by this pathogen. Iowa State University climate scientist Eugene Takle has published climate analyses that document a shift in seasonal distribution of precipitation over the past 20+ years toward more rainfall in spring and early summer and less in late summer and fall.



The extent of impacts of BOB is not yet fully known. Because defoliation occurs late in the season, BOB is not expected to cause outright tree death;

however, repeated severe defoliation may lead the trees to succumb to other mortality agents that affect stressed trees, like two-lined chestnut borer and Armillaria root disease. For high-value individual trees, macroinjection with the fungicide propiconazole in the spring when leaves are nearing full expansion may offer significant relief from the disease. In forest stands, the current management alternatives are limited to removal of highly impacted trees. Eventually scientists hope to determine whether some sources of bur oak have higher resistance to the pathogen, which might lead to additional management options.

### **Periodical Cicadas**

Two broods of periodical cicadas emerged in the Central States in 2015. Brood IV, which is the “Kansan Brood” of 17-year cicadas, emerged from southwestern Iowa to northern Texas, including a high emergence in western Missouri. Brood XXIII, which is the “Lower Mississippi Valley Brood” of 13-year cicadas, emerged in southeast Missouri, southern Illinois, and other places south to Louisiana. Periodical cicadas cause damage to recently planted seedlings and to small branches when female cicadas cut slits in which to deposit their eggs (e.g. oviposition wounds). Our next expected significant emergence of periodical cicada in the Central States is not until 2021, when brood X, the “Great Eastern Brood” of 17-year cicadas, emerges in Indiana, Ohio, and other places farther east.

### **Rapid White Oak Mortality (RWOM)**

Significant white oak mortality has been reported since 2011 in central, east-central, and southeast Missouri. It has also been reported in southeast Iowa. Unlike classic oak decline that usually affects red oaks on poorer sites, this mortality disproportionately affects white oaks on better quality sites. U.S. Forest Service-funded research at the University of Missouri is seeking to determine the cause of this new problem. The work is ongoing, but early indications are that previous stressors, including episodes of extreme wetness, drought, freeze events, and native defoliators, are involved. The pathogen *Phytophthora cinnamomi* has been detected at some RWOM sites. This pathogen has been implicated in white oak decline in Ohio in previous studies, but it is too early to tell what role it may have in this mortality. Affected trees deteriorate rapidly and should be salvage harvested as soon as possible to avoid loss from decay.

### **Sucking Insects in Illinois**

Tree health specialists in Illinois observed heavier than normal damage from several sap-feeding insects in 2015. The honeylocust plant bug sucks sap from the leaves of honeylocust early in the growing season, resulting in “thin crowns” from damaged foliage. Lecanium scale was heavier than usual. This scale attaches to the twigs and sucks sap from many woody plants, weakening the plant. Later in the season, magnolia scale was active on magnolias. In addition to sucking sap, these soft scales also excrete “honeydew” that is high in sugars and provides a food source for sooty mold to grow on the surface of leaves and stem. If you observe a black coating of sooty mold on leaves and stems, look closely for the presence of sucking insects on the twigs. In most cases, treatment for these scale insects is not necessary.

### **Aerial Survey of the National Forests**

Between August 25 and September 2, 2015, the U.S. Forest Service conducted aerial sketch map surveys over most of the Mark Twain National Forest (Missouri), the Shawnee National Forest (Illinois), and the Hoosier National Forest (Indiana). During these surveys, new mortality that is visible from 1,500 feet in the air (viewing a swath approximately 1.5 miles wide on each side of the plane) is recorded on a digital map. On the Mark Twain National Forest, there was evidence of some lingering effect from past drought conditions, but the amount of new oak mortality was much lower than in previous years. No significant damage was noted on the Shawnee National Forest. On the Hoosier National Forest, there was very little oak mortality. The main damage that was recorded was decline and mortality of ash caused by EAB.

## **Other Issues Outside the Region**

### **Winter Moth**

Winter moth is an exotic defoliator that has been causing significant damage to hardwoods in parts of New England. It has also been introduced to Oregon and Washington. The female moths are flightless, which helps to slow the expansion of infestations. The males are strong fliers, and their swarming around lights during warmer time periods in the winter months creates quite a nuisance, which is also the reason for their name, “winter moth.” The caterpillar, a “looper” or “inchworm”, is the life stage that causes damage to trees. The early instar larvae feed within flower and leaf buds, often totally killing the buds. As the leaves emerge, the larvae continue to feed on leaves. When winter moth first began causing damage in New England, it was presumed to

be one of our native defoliators because it looks similar to fall cankerworm and bruce spanworm, which underscores the importance of keenly observing what pests are causing damage.

**The States of New York and Massachusetts have fact sheets that provide good information on this insect:**  
<http://www.agriculture.ny.gov/caps/pdf/Winter%20Moth%20Pest%20Alert.pdf>  
<http://www.massnrc.org/pests/pestFAQsheets/winter%20moth.html>

## Other Resources and Sources of Information

For current updates on pests of national importance, visit the Forest Health Technology Enterprise Team Pest Portal at <http://foresthealth.fs.usda.gov/portal#>.

### Emerald Ash Borer University Webinar Series

Spring 2016 Schedule at [emeraldashborer.info](http://emeraldashborer.info) (most begin at 11:00 am ET)

Date	Title /Highlights	Speaker
January 28	Beech Bark Disease: Efforts to Look For and Cultivate Host Plant Resistance <ul style="list-style-type: none"> <li>Genetic breeding program</li> <li>Future outlook</li> </ul>	Jennifer Koch and Paul Berrang, USDA Forest Service Northern Research Station
February 11	Setting EAB Management Priorities in Maryland <ul style="list-style-type: none"> <li>Planning efforts for urban and rural areas</li> <li>Coordinating efforts</li> </ul>	Ann Hairston Strang, Maryland Department of Natural Resources Forest Service
February 25	Staging an Urban EAB Infestation to Improve Protection and Planning Efforts <ul style="list-style-type: none"> <li>Techniques for assessing status of invasion</li> <li>Management implications</li> </ul>	Cliff Sadof, Department of Entomology, Purdue University
March 10	EAB Preparedness and the Early Years in Colorado <ul style="list-style-type: none"> <li>How a Western State responds</li> <li>Adapting recommendations to an arid area</li> </ul>	Kathleen Alexander, Boulder City Forester and Rob Davis, Denver City Forester
March 24	Update of EAB Woodland Population and Damage Dynamics <ul style="list-style-type: none"> <li>Results from long-term forest monitoring program</li> <li>Insights useful for developing management programs</li> </ul>	Kathleen Knight, USDA Forest Service Northern Research Station
April 14	Is Firewood Still a Vector of Invasives? A Case Study of Firewood Movement Through the New Hampshire Speedway <ul style="list-style-type: none"> <li>Surprising results reinforce need for “Don’t Move Firewood” message</li> </ul>	Piera Siegert, State Entomologist, New Hampshire Division of Plant Industry, Department of Agriculture

The fall lineup of EAB University Webinars was recorded. They can be viewed at [http://www.emeraldashborer.info/eab\\_university.cfm#sthash.pCOLKOE6.dpuf](http://www.emeraldashborer.info/eab_university.cfm#sthash.pCOLKOE6.dpuf).

The recorded sessions include:

- **Great Lakes Restoration Initiative** September 15, 2015, by Jill Johnson, Midwest Urban Forestry Coordinator, U.S. Forest Service
- **Effects of EAB Treatment on Pollinators** Thursday, October 1, 2015, by Reed Johnson, Ohio Agriculture Research and Development Center
- **Manage EAB, or Manage the Forest?** Thursday, October 15, 2015, by Mark Abrahamson, Minnesota Department of Agriculture
- **Walnut Twig Beetle & Thousand Cankers Update** Thursday, October 29, 2015, by Matt Ginzel, Purdue University
- **Biological Control of EAB: Putting it into Perspective** Thursday, November 12, 2015, by Roy van Driesche, University of Massachusetts
- **Fringe Tree EAB Infestation Update** Thursday, December 3, 2015, by Don Cipollini, Wright State University

**Extension Plant Clinics** are also a diagnostic resource in your State. Web sites for the respective clinics include:

- Iowa State University Plant and Insect Diagnostic Clinic: <http://www.ent.iastate.edu/pidc/>
- University of Missouri Plant Diagnostic Clinic: <http://plantclinic.missouri.edu/>
- Purdue University Plant and Pest Diagnostic Lab: <http://www.ppd.l.purdue.edu/PPDL/>
- University of Illinois Plant Clinic: <http://web.extension.illinois.edu/plantclinic/>
- Within Illinois, the Morton Arboretum also provides Diagnostic Lab Services on the same fee schedule as the University of Illinois: <http://www.mortonarb.org/trees-plants/plant-clinic>

**This newsletter is also available on the WWW at <http://na.fs.fed.us/fhp/fhw/>.**

				
<b>For More Information:</b> <b>Forest Health Protection</b> <b>USDA Forest Service</b> <b>1992 Folwell Avenue</b> <b>St. Paul, MN 55108</b> <b>(651) 649-5029</b> <a href="mailto:lhaugen@fs.fed.us">lhaugen@fs.fed.us</a>				