2013 Illinois
Forest Health Highlights

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I. Illinois' Forest Resources

Illinois forests provide many recreation and wildlife benefits. In addition, over 32,000 people are employed in primary and secondary wood processing and manufacturing. The net volume of growing stock has increased by 40 percent since 1962, a reversal of the trend from 1948 to 1962. The volume of elms has continued to decrease due to Dutch elm disease, but red and white oaks, along with black walnut, have increased by 38 to 54 percent since 1962.

The area of forest land in Illinois is approximately 5.3 million acres and represents 15 percent of the total land area of the State (figure 1). Illinois' forests are predominately hardwoods, with 90 percent of the total timberland area classified as hardwood forest types (figure 2). The primary hardwood forest types in the State are oak-hickory at 65 percent of all timberland; elm-ash-cottonwood at 23 percent; and maple-beech, which covers 2 percent of Illinois' timberland.

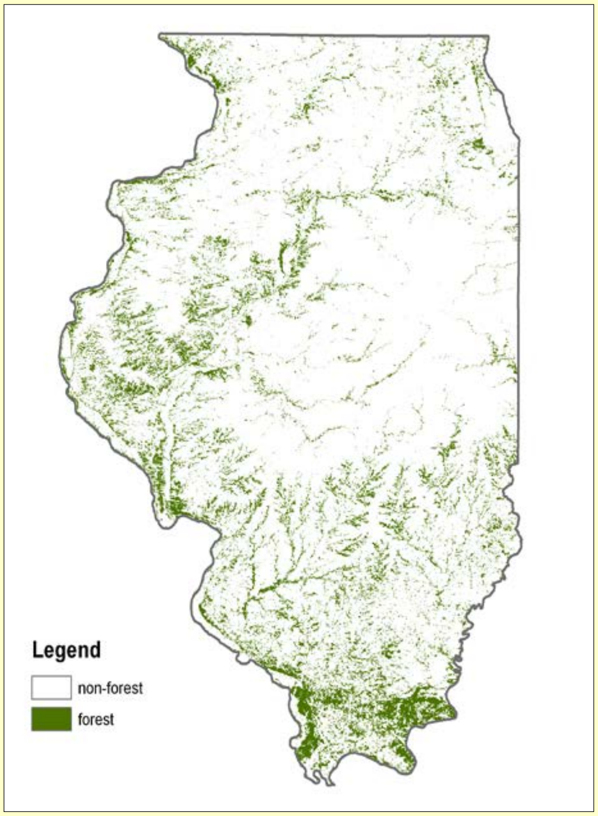


Figure 1. Illinois Forest Areas

[1] Stand-alone numbers in parentheses indicate references, which are listed on page 18 of this publication.

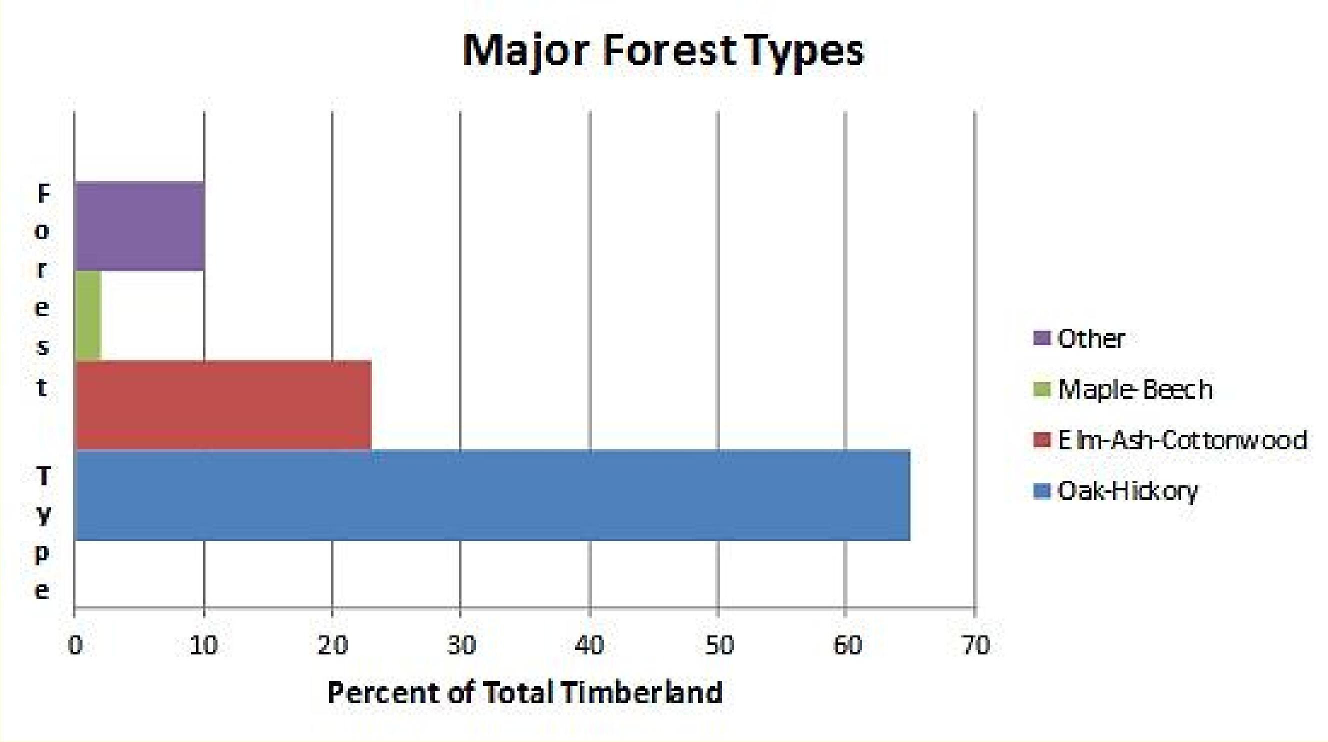


Figure 2. Major forest types by percent of total timberland. Source: Illinois' Forest 2005, NRS–29

2013 Illinois Forest Health Highlights

Arthropod Pests

Overall, the 2013 growing season was relatively quiet with no serious arthropod pest outbreaks, with the exception of ongoing infestations of gouty oak gall (GOG) on pin and shingle oaks (*Quercus palustris* and *Q. imbricaria*) in central, western, and southern Illinois.

Gouty Oak Gall (GOG)

Gouty oak gall (GOG) is a woody gall that forms on small twigs and branches of scarlet, red, pin, and black oaks (*Quercus* spp). The tiny native wasps (*Callirhytis cornigera* and *C. quercuspunctata*) are responsible for forming the galls (figures 3 and 4) (10).

Like most gall-forming wasps, their lifecycles can be rather complex and complicated, and GOG is no exception. Adults emerge in May and June, and lay eggs in major veins of oak leaves. GOG larvae form blister-like galls with adults emerging in July. After mating, the adult female lays eggs in young oak twigs. Young GOGs appear as small, brown marbles that grow to 2-inch diameter brown galls. Later, adults emerge from the gall to complete the 2-year lifecycle (figures 3 and 4).

Galls can be physically removed on small trees in the northern part of the insect's range (northern Illinois), but in southern Illinois, galling can be quite heavy, and pruning may not be practical, especially on large trees. Heavy galling can cause death of twigs and branches, but generally does not kill a mature, healthy tree (10).

Heavy galling was observed again in 2013 along the I-57 corridor south of I-70 (Effingham, IL) as far south as the Dixon Springs area, between the I-57 and I-55 corridors from the Shawnee National Forest north to I-70, and west from Springfield along I-74 to the Mississippi River. Heavy GOG populations and tree death were observed in south-central Illinois (Eldon-Hazlett and S.A. Forbes State Parks) as well as in the Springfield, IL, area. GOG-affected trees were in all stages of decline from newly infested trees to dead trees.

Stress agents, such as drought, soil compaction, and poor drainage, are probably the predisposing agents for extensive dieback and death of pin oaks in south-central Illinois, but death of individual branches by GOG was evident. Further study is needed to determine the contributing factor(s) for extensive death of oaks in the affected areas.

Figure 3. Heavy infestation of GOG

Figure 4. Close up of GOG

Plant Diseases

Foliar, Root Rot, Vascular, Decline, and Canker Diseases. Overall, disease incidence was more typical for 2013. Near-normal spring temperatures and abundant precipitation were favorable for most common foliar diseases. Stress-related diseases like *Cytospora*, *Botryosphaera*, *Thyronectria*, and *Fusarium* cankers; oak wilt; and white pine decline were more prevalent, particularly later in the season, which was probably related to the 2012 drought. *Phytophthora* root rots were present probably due to overwatering, poor drainage, and wrong plant siting. *Phomopsis* tip blight of juniper and arborvitae was observed statewide (1, 11).

Ash Decline and Dieback. Considerable ash (*Fraxinus* spp.) decline of both green and white ash continued to be observed along the I-57 corridor south of I-70 to extreme southern Illinois (Dixon Springs area). Declining ash trees were also observed later in the season (July–August) along the I-64 corridor from south-central Illinois (Mt. Vernon area) west to East St. Louis, IL. Most trees showed thinning canopies and dieback. Death was also a common symptom. Trees were examined periodically throughout the summer, but there was no evidence of EAB. This trend has been going on since 2008 and may be caused by ash decline and/or ash yellows. Luley and others (1994, ref. #6) documented an outbreak of ash yellows in this geographic area.

Ash decline was specifically noted in east-central Illinois (Kickapoo State Park) in July and August. Ash decline was also observed in other areas of east-central and southern Illinois (Fox Ridge, S.A. Forbes, and Wayne-Fitzgerrell State Parks).

Pine Decline. IDNR district foresters reported cases of white pine (*Pinus strobus*) decline statewide, particularly in western Illinois. In addition, dying and dead Scots (*P. sylvestris*) and Austrian (*P. nigra*) pines were common in both urban and forested areas. Individual trees were not specifically examined, but most contained evidence of bark beetles and Carolina pine sawyer beetles, and probably died of pine wilt disease. The droughts and hot weather of 2010 and 2011, followed by the severe and extreme 2012 drought, continue to predispose these trees to the above pests and diseases.

Oak Decline. In addition to oak trees infested with GOG, drought effects were evident. Chronic oak decline and some mortality were reported in western Illinois. This area of Illinois has been under an extended drought for the last number of years. Missouri also reported similar observations in eastern Missouri in areas that adjoin portions of Illinois. Drought-stressed oaks will be susceptible to Armillaria root rots, oak borers, and bark beetles.

Weather and Abiotic Factors

The 2013 winter was more normal with most of the snowfall in February and March, especially in central Illinois. From February to June of 2013, precipitation was plentiful and helped alleviate some of the drought conditions from 2012. April 2013 was the fourth wettest on record, and January–July of 2013 was the second wettest. However, dry and droughty conditions returned in late July–October statewide. August was the third driest and September was the 14th driest. Parts of east-central Illinois (Champaign area) only received ¼ inch of precipitation. Beginning in November, some moisture did return; most of it occurred south of I-70 and around Chicago. Even still, November was the fifth month with below-average precipitation (5.4 in). This period ranks as the 15th driest July–November on record. In contrast, January–June was the wettest on record with 29.0 inches. Snowfall has been present across most of Illinois as we approach the end of 2013.

III. Exotic Pests

The emerald ash borer (EAB) continues to spread throughout Illinois, particularly to the west. New positive finds for 2013 include Rock Island and Jo Daviess Counties in western and northwestern Illinois, respectively. To date, 45 Illinois counties are under quarantine and 31 counties have known EAB infestations (figure 5). Beginning in 2012, purple and green Lindgren funnel traps (LFTs) were deployed at 60 sites in Illinois State parks, forests, natural areas, forest preserves, and on private property of forest landowners. This is a change from using the purple panel traps in previous years.

EAB is a phloem-feeding, wood-boring insect that kills its host by destroying the vascular system of the tree. Unlike many other borers, EAB has the capability to attack both healthy and stressed ash trees.

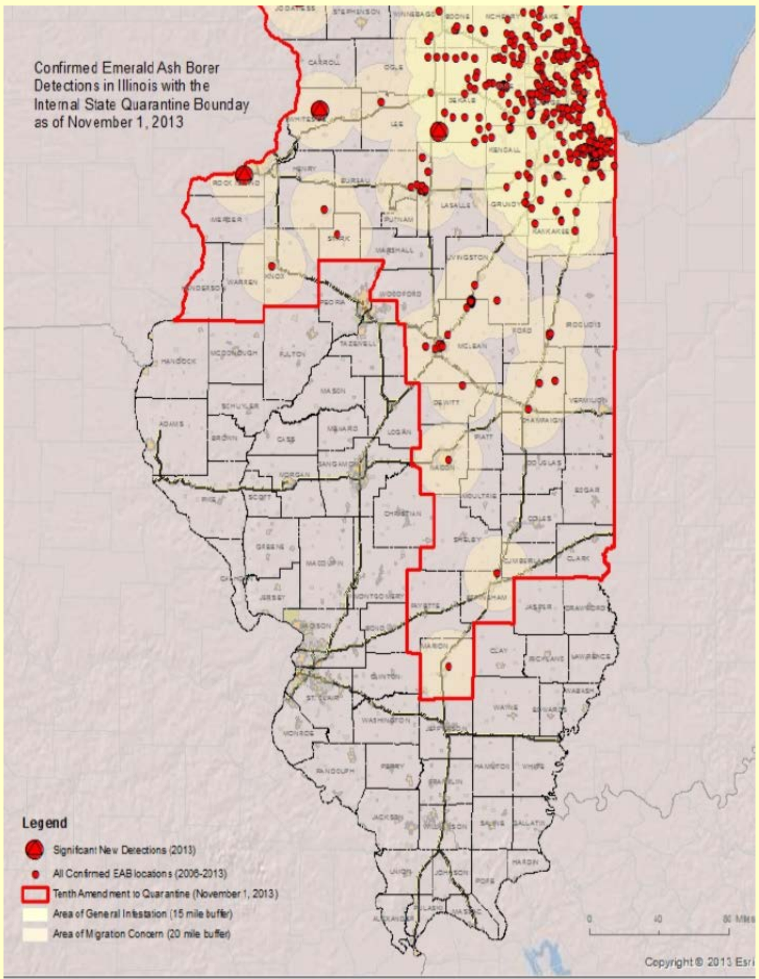


Figure 5. EAB Quarantine Map and 2013 New Finds

Asian Longhorned Beetle (ALB). To date, no new sightings of ALB have been discovered. The original ALB-infested areas are no longer under quarantine. The Illinois quarantine is now lifted since ALB has not been found since 2007. Visual surveys and newly developed ALB traps were deployed in 2013 in selected areas of northeastern Illinois. Visual monitoring efforts are ongoing.

Brown Marmorated Stink Bug (BMSB). This newest exotic insect pest has been found in Illinois in Cook and Kane Counties as early as 2010. This insect has a broad range of hosts that include tree fruit, vegetable, and woody landscape plants (3). As of 2013, the BMSB has been found in 14 counties in Illinois, primarily in the northeastern, central, and southwestern Illinois program. Five new counties were added to the list in 2013 (16).

Viburnum Leaf Beetle (VLB). As reported in the 2009 Forest Health Highlights, the viburnum leaf beetle (VLB) was found in 2009 in an urban Cook County landscape. The viburnum leaf beetle feeds on a variety of commonly planted viburnums and has the potential to become a major pest of these ubiquitous woody landscape plants. The VLB has been added to our watch list.

Chinese Longhorned Beetle (CLHB). Another invasive longhorned beetle, *Hesperophanes campestris* (synonym *Trichoferus campestris* and similar to ALB), appeared for the first time in 2009 near O'Hare airport and in Crawford County in east-central Illinois (figure 6). Its arrival at O'Hare is not surprising since the airport is a major point of entry, but the east-central Illinois find is unsettling. The CLHB was captured near a pallet-making plant, which is consistent with the movement of infested green wood and wood products. CLHB has also been found near Minneapolis, MN, and in Quebec, Canada. The insect is originally from Asia and parts of Eastern Europe and spreads through movement of infested wood. It has a similar life cycle as the Asian longhorned beetle and causes similar damage to trees. Preferred hosts of the CLHB are presented in table 1 (9). In cooperation with APHIS, Illinois conducted an intensive trapping effort in 2013 using 12-unit LFTs in 60 sites, including State parks, forests, natural areas, and county forest preserves.

Table 1. Preferred hosts of the Chinese longhorned beetle (12)

Apple	Mulberry	Maple	Birch
Beech	Ash	Locust	Walnut
Larch	Fir	Cedar	Oak
Willow	Elm	Cut wood of spruce and pine	

Figure 6. Adult Chinese Longhorned Beetle

Thousand Cankers Disease of Walnut (TCD)

To date, TCD has not been found in Illinois. Beginning in early summer 2013, four-unit LFTs were deployed along with a newly developed pheromone for detection of the walnut twig beetle (WTB). Traps were placed at sites, including 60 State parks, forests, natural areas, county forest preserves, private woodlots, and wooded areas near mills (figure 7). In addition to trapping, visual assessments of declining walnut trees and documentation of walnut plantings and walnut natural stands are being conducted and developed.

Sudden Oak Death (SOD). SOD is a deadly disease that attacks primarily oaks, but also rhododendron and other woody ornamental trees and shrubs. The fungus causes cankers on stems that contribute to plant decline and eventual death. Beginning in spring 2012, a stream-baiting sampling program was conducted as per the USDA-SOD protocol. Another sampling period (October–November 2012) was conducted; no SOD inoculum was found. Stream-baiting sampling was not conducted in 2013.

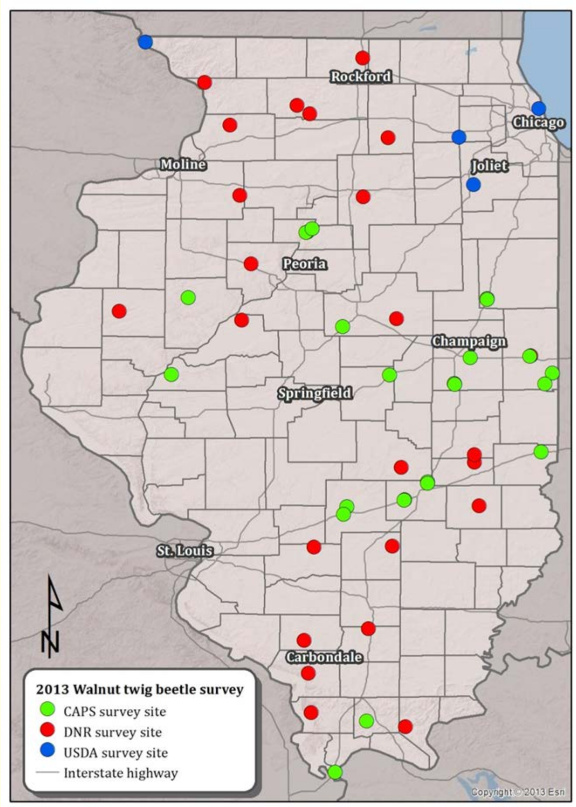


Figure 7. 2013 Walnut Twig Beetle Survey
Green dot = CAPS Survey Site
Red dot = DNR Survey Site
Blue dot = USDA Survey Site

Dutch Elm Disease (DED). This vascular wilt disease has been with us for decades. It continues to kill American and red elms throughout Illinois. Based on reports provided by the University of Illinois Plant Clinic (UIPC) and Morton Arboretum Plant Clinic (MAPC), DED cases continue to be a problem, and 2013 levels were comparable to 2012 levels (1, 11).

Oak Wilt (OW). The dreaded oak wilt is found in every Illinois county. It has become a major urban and forest tree disease. Reports for 2012 by the UIPC indicate that 2012 OW disease incidence was higher compared to previous years (11). It is very likely that the 2012 drought contributed to or even accelerated the development of OW in predisposed trees.

Verticillium Wilt (VW). This very ubiquitous and opportunistic vascular wilt fungus was common in 2013 and at levels seen in previous years. Flooding and drought over the last 7 years, including the severe 2012 drought, have and will continue to predispose woody plants to VW. Sugar maple, red maple, ash, smoketree, Japanese maple, saucer magnolia, and three-flowered maple are just a few examples of VW-susceptible hosts (3).

Bacterial Leaf Scorch (BLS). Bacterial leaf scorch resembles abiotic scorch, but is caused by a bacterium, *Xylella fastidiosa* (figure 8). It is thought to be spread by leafhoppers and spittlebugs (figure 9). Tree hosts include elm, hackberry, maple, mulberry, oak, sweetgum, sycamore, and planetree (table 2) (5). Since 1999, UIPC records show that BLS has tested positive in 10 Illinois counties stretching from Jefferson, Madison, and St. Clair Counties in southern Illinois through parts of central Illinois (i.e. Sangamon, Champaign, Douglas-Moultrie, and Iroquois Counties), north to Cook and DuPage Counties, and to Jo Daviess County in extreme northwest Illinois (11). With the exception of Champaign County with 40 positive samples, the remaining 9 counties have had 1–3 positive cases confirmed. In terms of hosts, BLS has been found in bur, northern red, pin, white, swamp white, and shingle oaks from 1999–2008. In 2008, BLS was found in seven oak positive samples, including northern red, swamp white, pin, and several unidentified oak species. Eleven BLS samples were submitted in 2010 to the MAPC. Of those 11 samples, two were positive, one was inconclusive, and eight were negative (1). The positives were found on oaks growing in DuPage and Cook Counties.

In 2011, a total of 22 trees were tested for *Xylella fastidiosa*. One sample, taken from an American elm (*U. americana*), tested positive (Cook County); six were elevated and inconclusive. Eleven samples were taken from trees growing at The Morton Arboretum. Additional samples were received from western and northwestern suburbs of Chicago as well as western Illinois, but were negative (1). Reports received from the UIPC indicate BLS symptoms were more pronounced in 2012, probably due to drought stress. **No new BLS positive finds were recorded for 2013.**

Figure 8. Bacterial leaf scorch symptoms

Figure 9. Spittle bug

Susceptible Species	**Non-Susceptible Species** (*Based on Observations*)
American elm	European black alder
Gingko	Northern catalpa
Hackberry	Kentucky coffeetree
Red maple	Amur cork tree
Silver maple	Chinese elm
Sugar maple	Sugar hackberry
Black oak	Shagbark hickory
Bur oak	Shellbark hickory
English oak	Pignut hickory
Northern red oak	Katsuratree
Pin oak	Littleleaf linden
Swamp white oak	Cucumbertree
White oak	Black maple
American sweetgum	Chinkapin oak
American sycamore	Sawtooth oak
	Common sassafras
	Tulip tree
	Japanese zelkova

IV. Plant Diseases

Bur Oak Blight (BOB). Bur oak leaf blight is a fungal disease that attacks bur oak (*Quercus macrocarpa*) with severe symptoms occurring on *Q. macrocarpa* var. *oliviformis* (figure 10). It has been found in Kansas, Nebraska, Minnesota, Iowa, Wisconsin, Illinois, and Missouri. In 2011, BOB was found isolated from a tree in Winnetka, IL (north shore area of Chicago) and in 2012 from a single tree in Lake County, Illinois. **No BOB samples were received in 2013 and no new finds were recorded.**

BOB is caused by the *Tubakia* sp. fungus resulting in blighting of the tree over a period of years. It starts in the lower portions of the tree and moves upward. Leaf symptoms usually do not show up until late summer (figure 11). Severely affected trees may die after protracted years of defoliation. Bur oaks growing in established savannahs and upland areas appear to be more vulnerable. Oaks growing in bottomlands and/or dense forests appear to be less affected (4, 12).

Figure 10. BOB tree symptoms

Figure 11. BOB foliar symptoms

Needle Cast Disease. Two very common diseases affecting conifers, *Rhizosphaera* needlecast and *Diplodia* (i.e. *Sphaeropsis*), were present in 2013. Both of these fungal leaf diseases attack the needles of cone-bearing tree species, causing premature needle cast or a browning and/or death of the growing tip, respectively. While not outright fatal, they stress the trees and reduce overall ornamental qualities and growth rates. When coupled with chronic drought, a deadly combination may result (1, 11).

Stress-related Canker Diseases. *Cytospora* canker of spruce is definitely a stress-related disease, particularly of Colorado blue spruce. Spruces are a common urban forest and landscape species. The cankers are initially found on the undersides of the branches and result from some type of stress. Spruce trees growing in urban environments are very prone to this canker. While not fatal, the cankers cause branches to die distal to the canker, resulting in a loss of ornamental quality and landscape function (1). In addition, there has been an increase of *Thyronectria* canker on honeylocust as well as the honey locust borer in areas of northeast Illinois. It is anticipated that other cankers will make their appearance in 2014 and beyond due to the 2012 drought (1).

Hickory Decline. In recent years, reports of hickory dieback and mortality have been reported in areas of the Upper Midwest (figure 12). Bitternut hickory (*Carya cordiformis*) and shagbark hickory (*C. ovata*) appear to be most affected. Symptoms include thinning canopies, dead branches, and eventually tree death (13).

Historically, death of hickory trees was attributed to the hickory bark beetle (*Scolytus quadrispinosus*) following droughts. Recent research seems to indicate that hickory decline may include a complex of biotic and abiotic factors such as bark beetles (*Xylobiopsis basilaris*), borers (*Agrilus otiosus*), and the fungus *Ceratocysis smalleyi*. In some cases, the Armillaria root rot fungus has been found associated with recently dead trees (13).

Hickory decline and dieback are most common in overstocked stands. Current management practices include sanitation by removing dead and dying trees to reduce bark beetle breeding habitat and insecticide applications to the trunk of individual trees. Widespread use of insecticides for forest stands is neither economical nor practical (13).

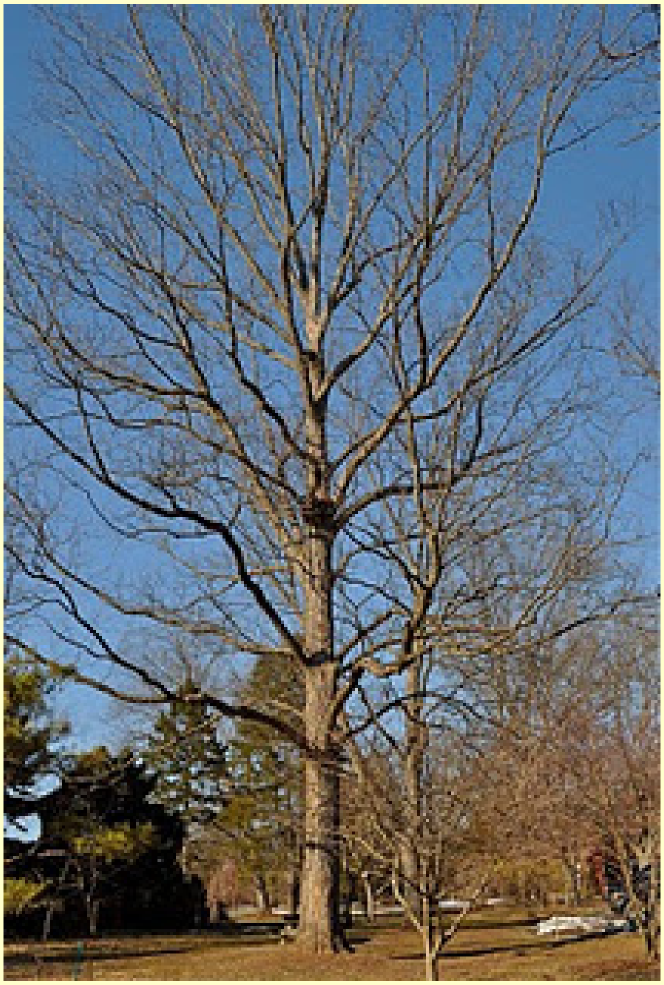


Figure 12. Hickory decline

***Heterobasidion* spp. of Red Pine.** The fungus is a root and basal stem rotting fungus that colonizes cut stumps and then moves through root systems to adjoining trees. The fungus eventually colonizes the lower stem, leading to wind throw and death of affected trees. In the Midwest, white, red, and jack pines are most susceptible (figure 13). Thinned and/or harvested pine stands are prone to this disease. Prevention is the best approach. Treating freshly cut stumps with a fungicide along with good sanitation and stump removal are important management tactics.

Aerial and ground surveys from 1962 to 1971 by Hanson and Lautz [no ref.] confirmed the presence of *Heterobasidion annosum* in southern Illinois. Since 1971, there is no record of further *H. annosum* surveys. Statewide surveys in 2013 did not indicate any new finds of *Heterobasidion* spp. in red pine.

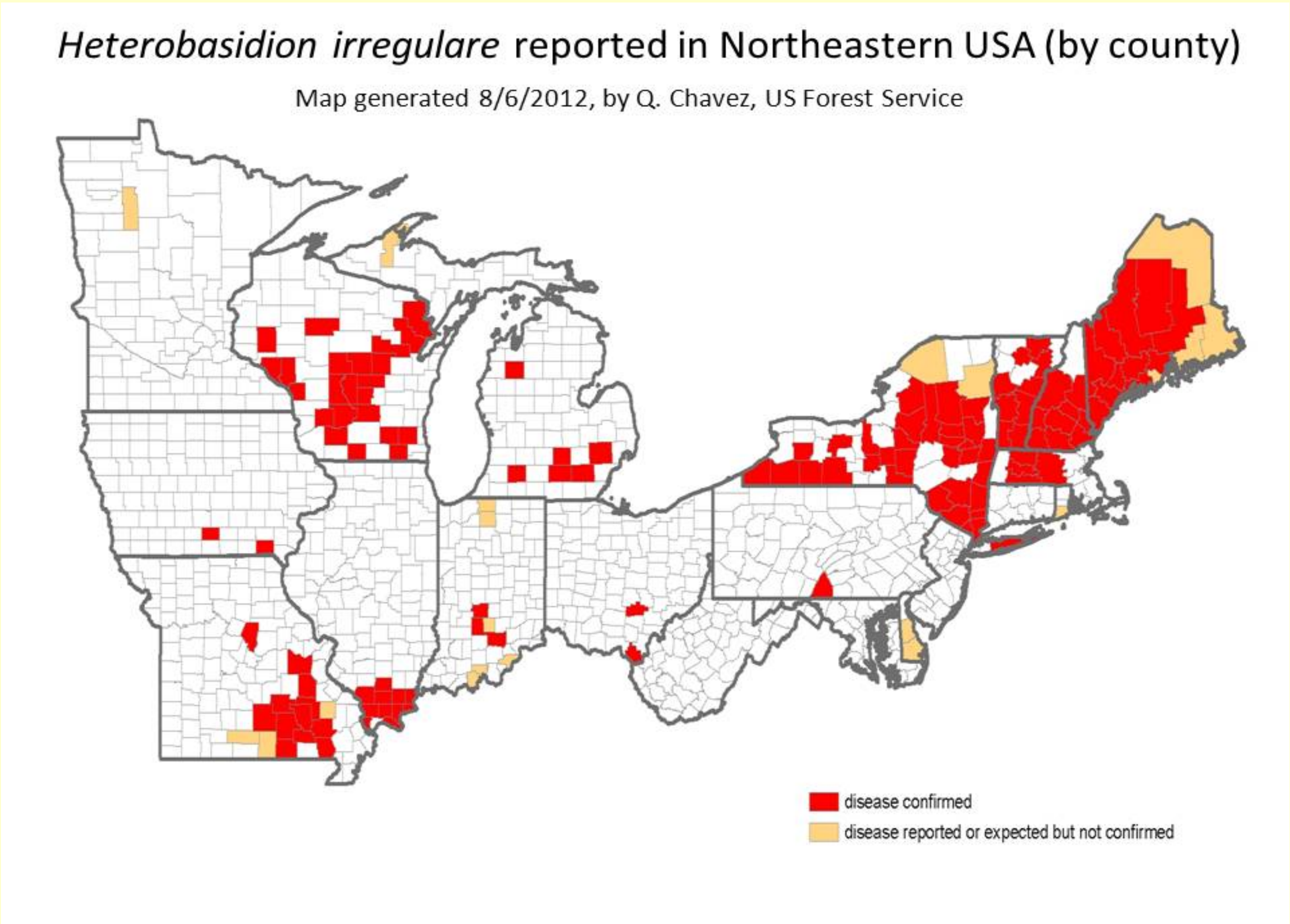


Figure 13. Distribution of *Heterobasidion annosum* or *irregulare* in the Northeastern United States

V. Insect Pests

Bark Beetles (BB) and Woodborers (WB). Bark beetles attack primarily stressed trees, including both hardwoods and conifers. Prolonged drought or a variety of abiotic and biotic stresses may predispose trees to bark beetle attacks.

Based on field observations and in conversations with green industry members and foresters, 2012 appeared to be a “normal year” for bark beetle activity. No major bark beetle outbreaks were observed or reported. However, that may change very quickly starting with the 2013 field season. Due to extremely dry conditions, trees are still stressed and may be attacked by bark beetles and/or borers. Weakened trees may lack the ability to fight off these attacks and succumb.

In addition, engraver beetles and the Zimmerman pine moth continue to be chronic problems for many of our urban forest conifer species, particularly Scots, Austrian, and mugho pine. As noted above, both of these insect pests tend to attack stressed conifers growing on poor sites (poor drainage) along with drought stress, soil compaction, and construction damage, among others.

Expanding on 2011 trapping efforts, 12-unit LFTs were placed in 60 State parks, forests, and natural areas; on private land; and near wood mills during the 2012 field season. The results of these trapping efforts are presented in table 3. Bark beetles (conifer, engraver, and hardwood insect species) made up the majority of insects trapped. Longhorned beetles and flat-headed borers accounted for only 5 percent of trap catches.

Table 3. Summary of Lindgren Funnel Trap (LFT) catches for the 12-Unit EAB trap, 12-Unit Exotic Bark Beetle trap, and 4-Unit Walnut Twig Beetle trap (May–September 2012)

Trap Type	N	Trap Specimens				
		EAB	Bark Beetles[1]	Weevils	Longhorn Beetles	Flat-Headed Borers
12-Unit EAB LFT	60	3				
Percent of Total		(<1%)				
4-, 12-Unit LFT	60		4,203	93	184	45
Percent of Total			(73%)	(2%)	(4%)	(1%)

[1]Bark beetles include members of the *Scolytus* and *Ips* genera

Fall Webworm (FWW) and Eastern Tent Caterpillar (ETC). Small, scattered pockets of fall webworm (FWW) and eastern tent caterpillar (ETC) nests were seen at State parks and forests in southeastern Illinois (Lincoln Trail State Park) and southern Illinois (Lake Murphysboro and Pyramid State Parks). Populations were comparable to previous years.

Japanese Beetle (JB). Japanese beetle was evident throughout the State, but defoliation was sporadic and not nearly as extensive as in previous years. Heavy Japanese beetle damage (50–75 percent defoliation) was common on lindens and crabapples throughout central, western, and southern Illinois (south of I-80 between the I-57, I-39, and I-55 corridors, and north and south between the I-70 and I-80 corridors).

Elm Flea Weevil (EFW). The European Elm flea weevil (EFW) (*Orchestes alni*) has been a pest in the upper Midwest since 2003, but has been in the U.S. since 1982. The EFW is a very tiny insect (1/16 inches long) with the characteristic long snout (figure 14). Adults are reddish-brown with black heads. Adult EFWs emerge in May and early June and begin feeding on young leaves, chewing small holes in the leaf (figure 15). Adult females lay eggs, and the young larvae begin mining the leaf tip that eventually becomes a blotch-like mine. Larvae pupate within the leaf and emerge as adults in mid to late summer. Adults overwinter under loose bark and in litter under infested trees (2).

Figure 14. Adult flea weevil

EFW feeding damage should not be confused with the elm leafminer (*Kaliofenusa ulmi*), which is a blotch-mining sawfly. Although the adult elm leafminer (ELM) emerges about the same time as the EFW, there are subtle differences in larval feeding and biology. ELM larvae typically form blotch-like mines throughout the leaf in contrast to the leaf tip mines associated with EFW larvae. In addition, by mid-June, mature ELM larvae drop from the leaf and enter the soil to pupate. Adult emergence does not occur until the following spring with one generation per year.

Figure 15. Adult flea weevil feeding damage

Larval and adult feeding by EFW are usually considered an aesthetic issue; however, when EFW feeding is coupled with heavy Japanese beetle feeding damage, preferred hosts can be completely defoliated by mid to late summer.

Research conducted at The Morton Arboretum (7, 8) and by Condra and others (2010, ref. #2) indicate that *U. pumila* (Siberian elm) and ‘Homestead’ elm are the most susceptible to EFW feeding damage. In addition, long-term field feeding preference studies conducted at The Morton Arboretum have indicated that EFW strongly prefer elm hybrids with Siberian elm and *U. carpinifolia* parentage (8). Refer to table 4 for a listing of highly preferred hosts and host preference by geographic origin.

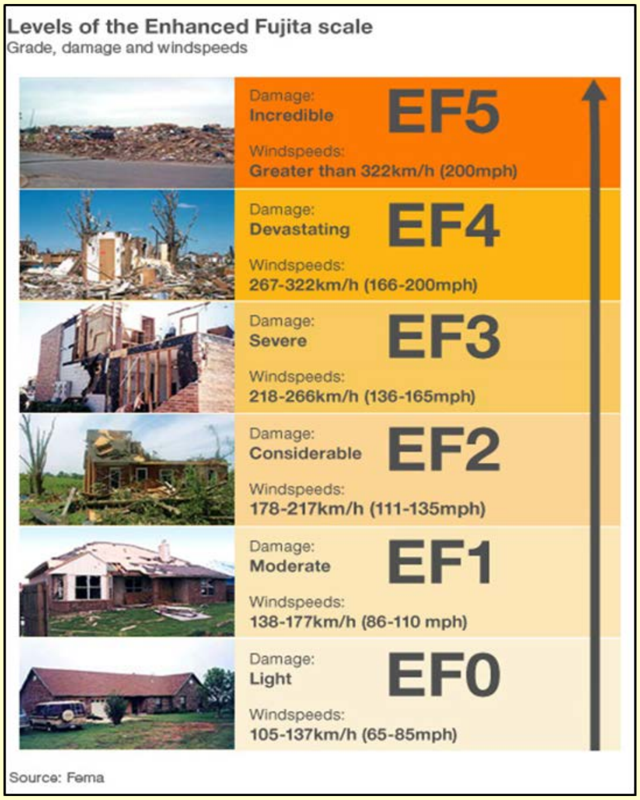
Table 4. Summary of elm biotypes (*Ulmus* spp.) that sustained elm flea weevil medium to heavy feeding damage and very low to low feeding damage, and Field Feeding Damage Rating by biotype geographic origin (The Morton Arboretum (2004-2009)).

Elm Biotype (*Medium to Heavy Feeding Damage*)	**Elm Biotype (*Very Low to Low Feeding Damage*)**
U. laevis	*U. propinqua* var. *suberosa*
U. Morton Glossy 'Triumph'	*U. glabra*
U. davidiana var. *manshurica*	*U. alata*
U. americana f. pendula	*U. macrocarpa*
U. lamellose	*U. thomasii*
U. castaneifolia	*U. crassifolia*
U. foliaceae	*U. parvifolia* var. *coreana*
U. procera	*U. americana* 'Moline'
U. berganniana	*U. 'Morton Plainsman'* x *U. parvifolia*
U. pumila	*U. japonica* x *U. wilsoniana*
U. davidiana x *U. pumila*	*U. pumila* x *U. americana*
U. pumila x *U. rubra*	'Sapporo Autumn Gold' (*U. pumila*)
U. carpinifolia x *U. pumila*	*U. carpinifolia* hybrids

Origin	**Field Feeding Damage Rating (FFDR)**[1]
• Asia	2.2
• Complex Asian hybrids	2.0
• Europe	3.9
• North America	0.4
• Zelkova spp.	0.7
• Simple and complex hybrids of *U. pumila* and *U. carpinifolia*	4.5

[1]FFDR is based on the following scale: 0=no feeding damage, 1=very low, 2=low, 3=moderate, 4=heavy, and 5=severe feeding damage

VI. Weather/Abiotic Related Damage



Over the years, I have witnessed the 1993 flood, the effects of Hurricane Sandy on the Eastern Seaboard, and the severe Midwestern droughts of 1988 and 2012. However, nothing compares with the aftermath of the tornado outbreak on 17 November 2013. I am still trying to get my head around all that I saw and to realize this event will have a long life long after this fall and winter have passed. In this brief article, I will attempt to share with you what I saw and what we can learn from such tragedies.

We do not normally think about tornados in November. It is usually snow and cold weather, but on 17 November 2013, the Midwestern States were ravaged by numerous tornados and heavy thunderstorms. These widespread storms did major damage to property, community infrastructure, and trees, and caused numerous human fatalities. Due to my limited personal observations, the comments in this article will be confined to Illinois, but many other States were also greatly impacted.

In Illinois, the NWS confirmed 24 tornados, including two Enhanced Fujita (EF)-0s, eight EF-1s, nine EF-2s, three EF-3s, and one EF-4. To provide perspective on how tornado damage is rated, an EF rating chart and associated damage is shown above.

Beginning in late morning on 17 November 2013, tornado activity extended along a 300-mile-long line from the extreme southern tip (i.e. Massac and Pope Counties) of Illinois with EF-3 damage extending all the way to Will and Kankakee Counties in northeastern Illinois with EF-1 and EF-2 tornados damaging homes, trees, and infrastructure.

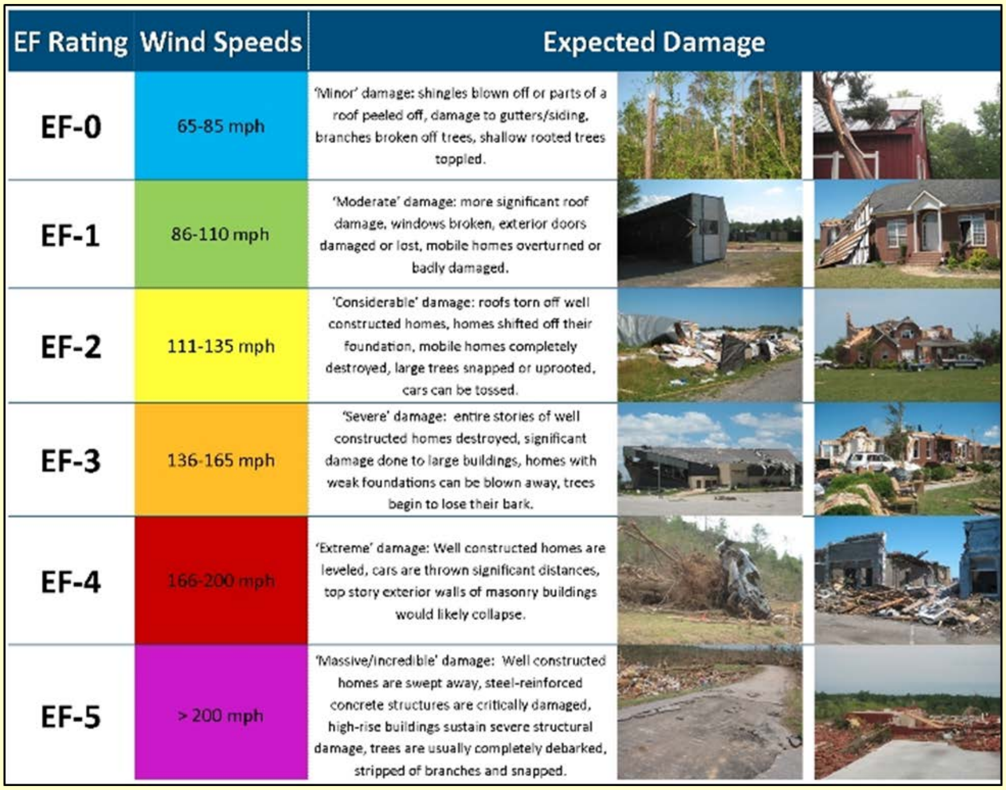
The most powerful tornado (EF-4) that struck Washington, IL, just east of Peoria, had a path length of 46.2 miles and did tremendous damage. The EF-3 tornado that touched down in Massac and Pope Counties, in extreme southern Illinois, had a total track of 42 miles with 31 miles in Kentucky and 11 miles in Illinois. Other tornado tracks ranged from <1 mile up to nearly 20 miles. As of 26 November 2013, a total of six fatalities were recorded with 180 people injured (NWS).

On 27 November 2013, I traveled to the Washington, IL, (central Illinois) and Coal City-Diamond, IL, (northeast Illinois) areas to visually perform a very preliminary urban forest storm damage assessment. Of course, in the big picture, storm damage to trees is way down the list of priorities at this point compared to loss of life, injuries, utter destruction to people's homes and businesses, and community infrastructure, but it is important to witness the damage and to begin to appreciate the long road ahead that many communities will have before their lives return to "normal." Some estimates for hard-hit areas indicate 2 to 4 years. After seeing the damage, it is a miracle there was no loss of life in Washington, IL.

Washington, IL (EF-4). Having never seen tornado damage up close and so soon after the event, it was hard to take in and extremely disheartening. For those of you who have witnessed or experienced such as event, you know what I am talking about. In Washington, IL, the tornado's path created a strip of total destruction approximately ½ mile wide and several miles long (at least from my vantage point). It tore apart homes and cinder block structures, and left trees twisted, gnarled, and broken apart. The only way I can describe it is a huge "shredder" passed through with debris everywhere. To the northeast of the affected area, tens of people were combing the farm fields picking up debris and looking for belongings. Ten days after the event, most areas were still off limits and secured, so an accurate assessment was compromised. Future assessments will be needed in 2014.

Regarding tree damage, large pine trees (30–40 feet tall) growing on a golf course in the tornado's path where broken off at about 8 to 10 feet above the ground like they had been topped. Other trees (i.e. honey locust) in the storm's path only had a few 6- to 8-foot-long main scaffold branches left with the tops ripped out. The fact they were even standing was surprising. The criteria for assessing tornado damage to structures and trees was a good guide (refer to the chart below), quite accurate, and well correlated with what I observed on the ground. Most trees in the affected area will not be salvageable, and extensive replanting will be required in the future.

Coal City–Diamond, IL (EF-2). Traveling north to the Coal City–Diamond, IL, area, the damage was less severe. In no way do I mean to minimize the impact of the storm on the residents or their homes, but structural damage was noticeably less. As in Washington, IL, we were not allowed access to affected areas. Visual observations from a distance of ½ mile indicated considerable roof damage to homes and significant structural damage to signs and other property. A nearby golf course, just north of the Coal City–Diamond, IL, area, had considerable wind throw of trees, particularly conifers. Trees were not torn apart and shredded as in Washington, but were blown over with the tree intact.



EF Rating	Wind Speeds	Expected Damage
EF-0	65-85 mph	'Minor' damage: shingles blown off or parts of a roof peeled off, damage to gutters/siding, branches broken off trees, shallow rooted trees toppled.
EF-1	86-110 mph	'Moderate' damage: more significant roof damage, windows broken, exterior doors damaged or lost, mobile homes overturned or badly damaged.
EF-2	111-135 mph	'Considerable' damage: roofs torn off well constructed homes, homes shifted off their foundation, mobile homes completely destroyed, large trees snapped or uprooted, cars can be tossed.
EF-3	136-165 mph	'Severe' damage: entire stories of well constructed homes destroyed, significant damage done to large buildings, homes with weak foundations can be blown away, trees begin to lose their bark.
EF-4	166-200 mph	'Extreme' damage: Well constructed homes are leveled, cars are thrown significant distances, top story exterior walls of masonry buildings would likely collapse.
EF-5	> 200 mph	'Massive/incredible' damage: Well constructed homes are swept away, steel-reinforced concrete structures are critically damaged, high-rise buildings sustain severe structural damage, trees are usually completely debarked, stripped of branches and snapped.

What can we learn from such tragic events?

- Tornado damage can be extremely localized. One location may be totally destroyed while an area across the street is literally untouched.
- Wooden and cinder block and brick structures, as well as most trees, are no match for EF-4 tornados.
- Roof damage, wind throw, and uprooting of trees are common with EF-2-level tornados.
- While we all value trees, they are way down the priority list in terms of recovery.
- Do not rush in to do assessments right away. Even 10 days after the event, many areas of Washington, IL, were inaccessible. Streets were covered and blocked with downed power lines and debris, and hazardous situations were common.
- Realize and appreciate that the human need is enormous, including housing, drinking water, and food; these are critical, particularly when storms hit in late fall and early winter.
- Communities will need assistance for a number of years long after the media has moved on to other stories, so please do not forget about affected areas.
- Be prepared, where possible and practical, to provide long-term forest health assistance to smaller communities that have limited or no resources to restore their urban tree resource.

VII. Invasive Plant Species

No formal statewide surveys or studies were conducted in 2013 related to invasive plant species.

VIII. Professional Training Clinics and Public Outreach

Four diagnostic training and EAB management workshops were conducted in spring, late summer, and early fall of 2013. Locations included northeastern Illinois; Mt. Vernon; and Decatur, IL. Attendees included commercial and municipal arborists, IDNR district foresters, consultants, master gardeners, allied members of the green industry, and natural resource managers. Workshop participants received classroom instruction and hands-on field training on proper pest and disease identification, diagnosis, and sampling techniques. Training topics included EAB management, TCD, BLS, BOB, common Arthropod pests, and abiotic diseases.

Five public outreach events for 2013 included seminars and workshops addressing management options for EAB and how individual homeowners and communities can prepare for tree mortality and subsequent effects of EAB on urban forests and shade trees.

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PLEASE NOTE: *The data presented in this summary are not to be considered as comprehensive or all inclusive studies. The narrative reported here is based on visual and observational surveys by Dr. Fredric Miller, IDNR Forest Health Specialist; IDNR Forest Health field technicians; IDNR district foresters; Stephanie Adams of The Morton Arboretum Plant Diagnostic Clinic; and informal conversations with consultants and members of the green, natural resources, and forest industries.*

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