December 2011
Year in Review

Iowa's Forest Health Highlights

IDNR, Forestry Bureau/ 515-281-4915

Special Interest Articles:

- USFS 20 Major Forest Insect and Diseases.
- Gypsy moth mating disruption.
- Thousand Cankers Disease Survey.
- Flooding Update

Individual Reports:

Introduction:

Each year the Iowa DNR Bureau of Forestry cooperates with numerous agencies to protect Iowa's forests from insects, diseases, and other damaging agents. These programs involve ground and aerial surveys, setting up sentinel trees, setting up pheromone traps, following transects for sampling, collecting samples for laboratory analysis, and directing treatments for specific problems during the growing season. After each growing season, the Forestry Bureau issues a summary report regarding the health of Iowa's forests.

This year's report begins with a brief summary of weather events, Iowa's land characteristics, and several survey summaries for insects, diseases, and invasive plants that have the potential to impact the health of Iowa's forests. The 2011 Forest Health Highlights will focus first on the Forest Service's Twenty Major Forest Insect and Disease List (Page 3) and then covers the additional damaging agents that IDNR surveyed.

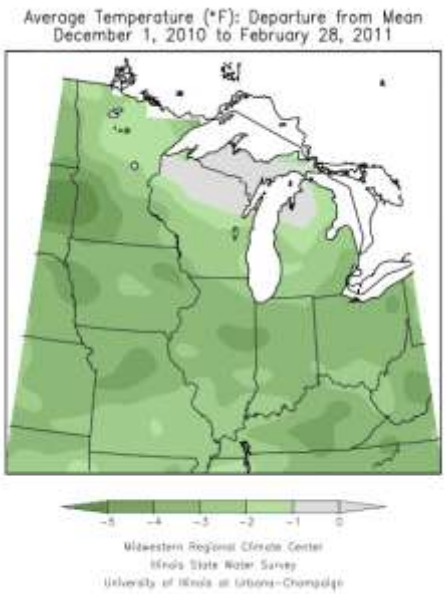
Weather Review:

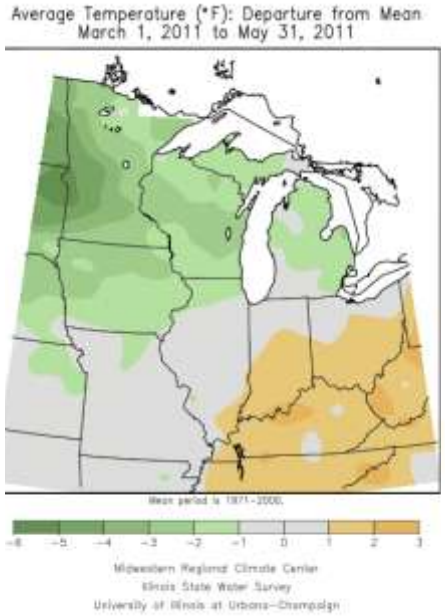
This winter did bring about several challenges for Iowa with colder than average temperatures and a slightly heavier than normal snow load (see figures below). The heaviest snow falls were in the northern 1/3 of the state. States to the west and northwest of Iowa also experienced very heavy snow loads (the Dakotas and Nebraska), which contributed to heavy flooding of the Missouri River in western Iowa.

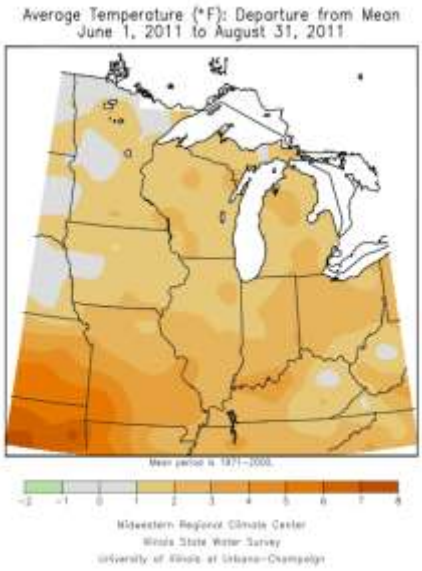
The entire state experienced a much cooler than normal spring; with most all of Iowa having slightly heavier than expected rainfall events. The cool moist spring lead to chlorosis in many species. The species hit the hardest include: silver maple, river birch, hackberry, hickory, and some oaks. The heavier rainfall events, combined with the cool wet spring, resulted in leaf drop in hackberry and a higher than normal amount of Anthracnose (a fungal leaf disease) on sycamore and maple throughout the state. Hackberry, maple, and sycamore trees produced a new flush of leaves within a few weeks, as expected. Western Iowa had higher rainfall events that also contributed to heavy flooding of the Missouri River.

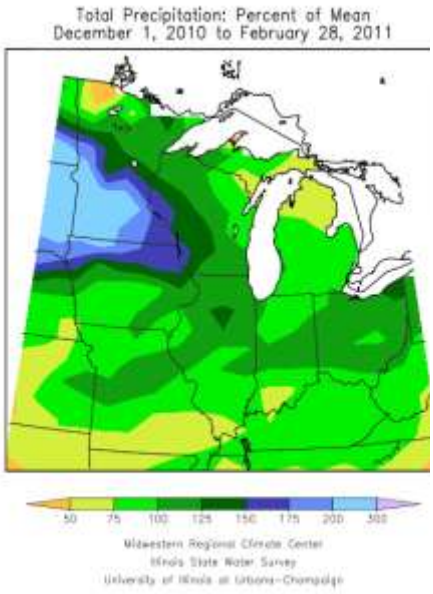
Most of the state experienced a warmer than normal summer. Although the summer was slightly warmer than average, the rainfall events remained normal for most of Iowa. Western Iowa had higher rainfall events that also contributed to heavy flooding of the Missouri River.

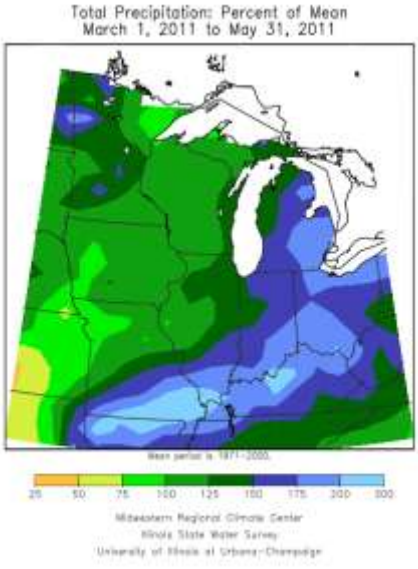
Weather Review Continued:

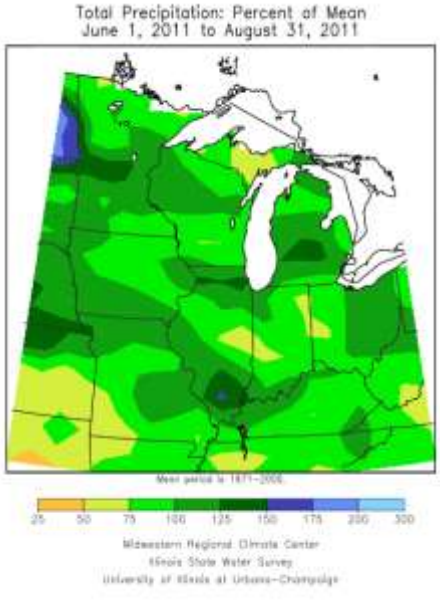












Images provided by Midwest Climate Watch http://mcc.sws.uiuc.edu/cliwatch/watch.htm.

Land Characteristics:

Iowa has approximately 3.1 million acres of forested land representing a steady increase over the past few decades. Most of Iowa's forests are native hardwood with oak, hickory, maple, basswood, walnut, ash, elm, cottonwood and many other hardwood species. Less than 3% of Iowa's forests are conifer forests.

Even though Iowa's forests are increasing in acreage, the oak component is decreasing in some areas of the state, as forest succession drifts toward more shade-tolerant species, such as maple, in the absence of forest disturbance. There are currently 1.15 million acres of oak-forest in Iowa. Succession to shade tolerant hardwoods eventually replaces shade intolerant hardwoods, like oak, in the absence of disturbance. An annual decrease of 6,800 acres of red and white oak from 2003-2008 has been observed. This is an alarming trend.

Currently, there are 186 businesses in Iowa which utilize the wood grown in Iowa's forests. The forest products industry contributes over $3.9 billion each year to Iowa's economy, including over 18,000 jobs for Iowans (Analysis by E.M. (Ted) Bilek, Economist, USDA Forest Service, Forest Products Laboratory, Madison, WI). Additional detail can be found on page 192 of *Iowa's Forests Action Plan*.

United States Forest Service List of Twenty Major Forest Insects and Diseases

(This is a national list; pests highlighted in red do not pertain to Northern Area and do not need to be reported on.)

Asian long-horned beetle
Beech bark disease
Butternut canker
Dogwood anthracnose
Dwarf mistletoes
Emerald ash borer
Fusiform rust
Gypsy moth
Hemlock woolly adelgid
Laurel wilt disease/redbay ambrosia beetle
Mountain pine beetle
Oak wilt
Sirex woodwasp
Southern pine beetle
Spruce beetle
Spruce budworm
Sudden oak death
White pine blister rust
Western bark beetles
Western spruce budworm

Plus:
Tomicus beetle or pine shoot beetle

Twenty Major Forest Insects and Diseases: Asian long-horned beetle

Year 2011
State: Iowa

Forest Pest
Common Name: Asian long-horned beetle
Scientific Name: *Anoplophora glabripennis*

Hosts: Maple, horsechestnut/buckeye, willow, elm, birch and sycamore.

Setting: N/A

Counties: N/A

Survey Methods: N/A

Acres Affected: N/A

Narrative: Asian long-horned beetle has not been identified in Iowa. No additional funds were available to conduct survey work. No suspect samples were submitted to IDNR or the ISU Plant Diagnostic Clinic. No other survey work was conducted for Asian long-horned beetle. If beetles are found (Figure 1.) contact Christine Markham (USDA National Coordinator) at 919-855-7328 and Robin Pruisner (State Entomologist) at 515-725-1465. http://www.aphis.usda.gov/plant_health/plant_pest_info/asian_lhb/index.shtml.

Figure 1. Adult Asian long-horned Beetle (Image: Dennis Haugen, USDA Forest Service, Bugwood.org).

Twenty Major Forest Insects and Diseases: Beech Bark Disease

Year 2011
State: Iowa

Forest Pest
Common Name: Beech bark disease
Scientific Name: *Nectria coccinea* var. *faginata*

Hosts: American Beech.

Setting: N/A

Counties: N/A

Survey Methods: N/A

Acres Affected: N/A

Narrative: American beech is not a native tree to Iowa. Iowa is well outside of the native range of American beech and no survey work was conducted for beech bark disease. If a landowner has beech trees that they believe have beech bark disease please contact Tivon Feeley (IDNR Forest Health Program Leader) at 515-281-4915 or Robin Pruisner (State Entomologist) at 515-725-1465. http://na.fs.fed.us/spfo/pubs/fidls/beechbark/fidl-beech.htm.

Figure 2. Beech bark disease "tarry spot" or flux. (Image: Joseph O'Brien, USDA Forest Service, Bugwood.org).

Twenty Major Forest Insects and Diseases: Butternut Canker

Year 2011
State: Iowa

Forest Pest
Common Name: Butternut Canker
Scientific Name: *Sirococcus clavigignenti-juglandacearum*

Hosts: Butternut

Setting: Rural Forest

Counties: Statewide

Survey Methods: General Observation

Acres Affected: Eastern half of Iowa (Scattered throughout roughly 2 million acres)

Narrative:

The U.S. Forest Service has made selections of native butternuts throughout the northeastern U.S. over the past 20 years. Branches (scions) are collected from these trees to capture the exact genetics of these desirable trees. Scions have been grafted onto black walnut root stock to help create seed orchards that can produce more seeds to maintain a viable population of native butternut and to test for resistance to butternut canker. The Forest Service selections were made from butternut trees that survived around other butternut trees that died from canker, giving hope that this is a sign of resistance. Iowa planted 150 of these seedlings in 2007 and 2008 (41 families) in two different areas in the Loess Hills State Forest and on one site in Yellow River State Forest. In 2009 Iowa along with 4 other states (IN, CT, VT, and PA) put together a grant to fund more butternut survey and research. Through the grant, additional butternut trees have been GPS/GIS recorded in these states. DNA testing is performed to determine which trees are native and not exotics or hybrids. The native selections are tested for tolerance to butternut canker through direct inoculations.

Iowa planted an additional 350 seedlings grown by the Hardwood Tree Improvement and Regeneration Center (HTIRC) in the spring of 2010. These seedlings come from trees growing throughout the northeastern U.S. in an effort to continue to preserve more butternut seedlings. The 350 seedlings were measured for growth and no sign of butternut canker were found on them in 2011.

IDNR has collected seed from 20 native butternut trees and has established an Iowa butternut orchard in the Loess Hills. The 20 butternut trees displayed outstanding growth in Western Iowa (where the canker is rarely found) and no signs of butternut canker were found in 2011.

An additional 150 native Iowa butternut trees were identified and DNA tests showed that they were not hybrids. IDNR hopes to add seeds from these 150 trees to the native orchard and start testing for tolerance. This pathogen is common and does not need to be reported to any authorities. http://na.fs.fed.us/spfo/pubs/howtos/ht_but/ht_but.htm.

Figure 3. Examples of canker found on butternut trees (Image: Minnesota Department of Natural Resources Archive, Minnesota Department of Natural Resources, Bugwood.org).

Twenty Major Forest Insects and Diseases: Dogwood Anthracnose

Year 2011
State: Iowa

Forest Pest
Common Name: Dogwood Anthracnose
Scientific Name: *Discula destructiva*

Hosts: Flowering Dogwood and Pacific Dogwood

Setting: N/A

Counties: N/A

Survey Methods: N/A

Acres Affected: N/A

Narrative: Flowering Dogwood and Pacific Dogwood are not native to Iowa. There are some flowering dogwoods planted as ornamentals in Iowa that are currently not at risk. However, this pathogen tends to be an Eastern United States Pest. Dogwood anthracnose does not affect Iowa's native dogwoods. No survey activities were done. No reporting on this pest is necessary. http://na.fs.fed.us/spfo/pubs/howtos/ht_dogwd/ht_dog.htm

Figure 4. Example of a flowering dogwood that is defoliated and declining from anthracnose. (Image: Charles Hoysa, Virginia Cooperative Extension, Bugwood.org).

Twenty Major Forest Insects and Diseases: Dwarf Mistletoe

Year 2011
State: Iowa

Forest Pest
Common Name: Dwarf Mistletoe
Scientific Name: *Arceuthobium*

Hosts: Ponderosa pine, lodgepole pine, western larch, Douglas-fir, western hemlock, mountain hemlock, rarely western white pine, and spruce.

Setting: Rural Forest

Counties: Dubuque

Survey Methods: Ground

Acres Affected: None

Narrative: White Pine Hollow was surveyed for dwarf mistletoe (parasitic plant) in 2011. White pine is scattered throughout the 712 acre park. No evidence of dwarf mistletoe was found. No samples were submitted to the ISU Plant Diagnostic Lab. If a landowner finds dwarf mistletoe, please contact Tivon Feeley (IDNR Forest Health Program Leader) at 515-281-4915 or the ISU Plant Diagnostic Clinic at 515-294-0581.
http://na.fs.fed.us/pubs/fidls/ed_mistletoe/ed_mistletoe.pdf

Figure 5. Example of dwarf mistletoe growing on white pine (Image: William M. Ciesla, Forest Health Management International, Bugwood.org).

Twenty Major Forest Insects and Diseases: Emerald Ash Borer

Year 2011
State: Iowa

Forest Pest
Common Name: Emerald Ash Borer
Scientific Name: *Agrilus planipennis*

Hosts: All Ash (*Fraxinus)* species

Setting: Rural Forest, Nursery, Urban

Counties: Statewide

Survey Methods: Ground, General Observation, and Trapping

Acres Affected: Approximately 285 acres.

Narrative:

Emerald ash borer (EAB) was identified and confirmed in Iowa on May 14, 2010 on Henderson Island in Allamakee County. Allamakee County remains the only county quarantined for EAB in Iowa.

In addition, IDNR visually surveyed 1,216 acres of urban forest canopy for signs and symptoms of emerald ash borer. IDNR visually inspected 1,290 ash trees in 58 counties at 237 high risk campgrounds and 19 sawmills. Lastly, IDNR bark peeled 412 sentinel trap trees in December 2010. PPQ placed 1,484 purple detection traps throughout the state. All visual surveys, purple traps, and sentinel trees were negative for emerald ash borer. The 416 sentinel trees setup for bark peeling in 2011 have been peeled and no emerald ash borer larvae were identified. The 2011 416 sentinel trees are located in 46 counties and at 158 high risk camp sites. No movement of emerald ash borer was detected in 2011.

It appears that the emerald ash borer infestation remains on Henderson Island. If a landowner has an ash tree that they believe has emerald ash borer please contact Tivon Feeley (IDNR Forest Health Program Leader) at 515-281-4915 or Robin Pruisner (State Entomologist) at 515-725-1465.
http://www.emeraldashborer.info/

Emerald Ash Borer Background:

Emerald Ash Borer (EAB; *Agrilus planipennis*) is a small green invasive wood boring beetle that attacks and kills ash trees. The adults live on the outside of ash trees feeding on the leaves during the summer months. The larvae are white and feed on the living plant tissue (phloem and cambium) underneath the bark of ash trees. The trees are killed by the tunneling activity of the larvae under the tree's bark, which disrupts the vascular flow.

EAB is a highly invasive forest pest that has the potential to kill nearly 100% of the native ash trees of any size, age, or stage of health where it is present. Over 50 million ash trees outside of Iowa have been killed where EAB is present. Much of Iowa's forestland is populated with ash trees, and Iowa's community street trees are heavily planted with ash cultivars. The US Forest Service's 2008 inventory indicates that there are 52 million woodland ash trees and 3.1 million urban ash trees in Iowa. Trees attacked by EAB can die within two years. Once trees that have been killed by EAB are discovered in a community, nearly all ash trees in that community will be dead in five to six years.

Economic Impacts

• The total impact of Emerald Ash Borer to Iowa's forest landowners and wood products businesses is over **$27 million** or an annualized loss of **$1 million** in perpetuity for Iowa's economy.

• Other economic losses include non-timber products such as reduced wildlife habitat and an over **$2.5 billion** cost for tree removal and tree replanting, along with the loss of community tree derived benefits, such as energy savings, property value, storm water retention and carbon sequestration. Communities and homeowners will bear the cost burden of removing dead trees caused by EAB.

Wildlife Impacts

Ash has moderate importance to wildlife as a food source. Seeds are known to be eaten by wood ducks, finches, and cardinals.

Management Solution

Proper woodland and community tree management have a critical role in creating healthy trees. The best insurance policy a landowner can have when managing their woodlands is by maintaining a diversity of tree species, while ensuring an appropriate number of trees are growing on each acre. The best course of action for communities is to have a tree inventory and a community tree resource plan.

Good woodland and tree care under the direction of a forester or an arborist is the best defense against all forest health threats. (Images from top to bottom:Howard Russell, Michigan State University, Bugwood.org, James W. Smith, USDA APHIS PPQ, Bugwood.org, and David Cappaert, Michigan State University, Bugwood.org)

Figure 6. Location of the May 14, 2010 emerald ash borer find on the Henderson Island series. To date, this island is the only positive find in Iowa. Emerald ash borer has not been detected inland in Allamakee County and Allamakee County remains the only county quarantined (Image: Tivon Feeley, IDNR).

Figure 7. Locations of the current quarantined counties or states for emerald ash borer (Image provided by USDA-APHIS-PPQ and posted here http://www.emeraldashborer.info/).

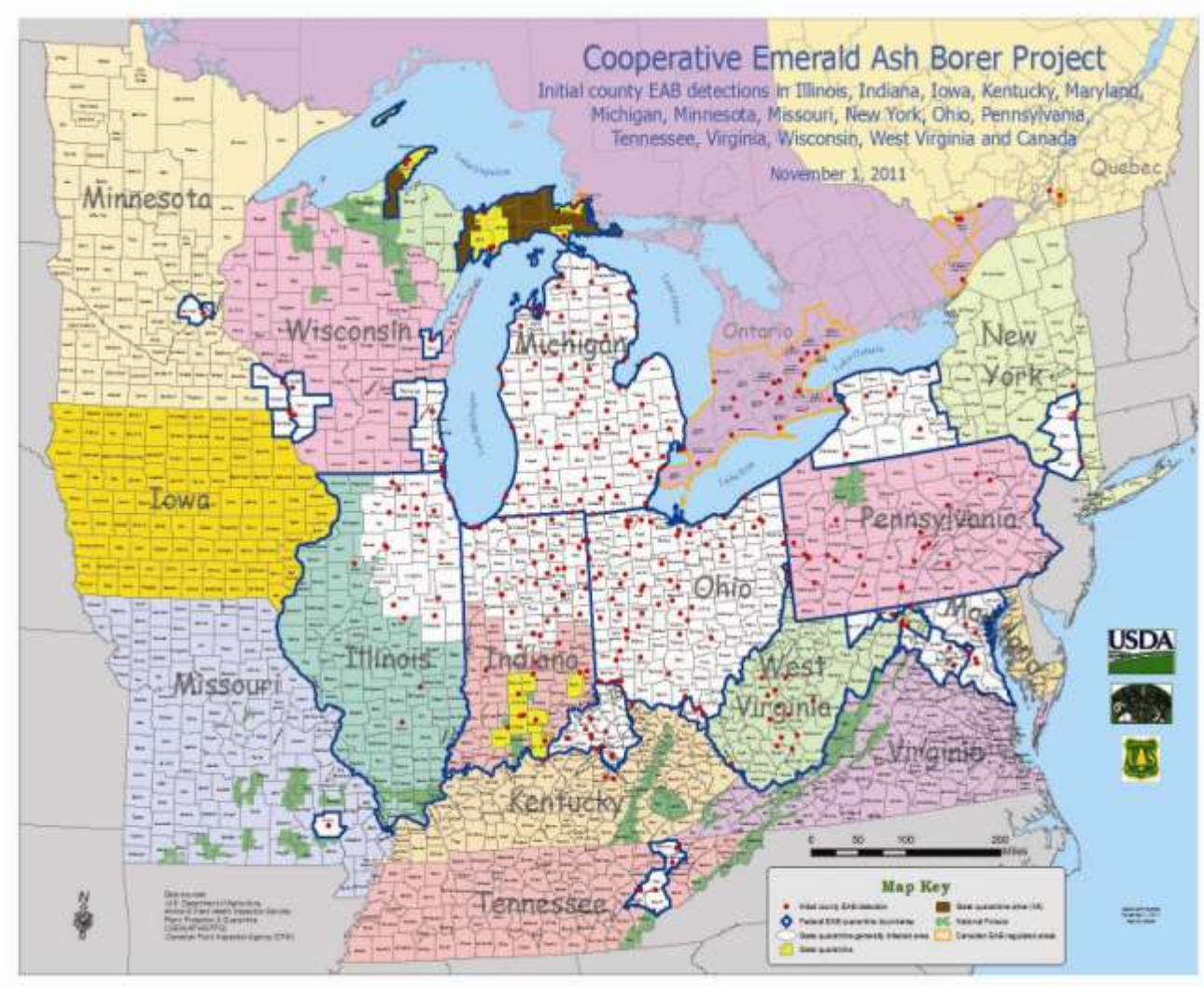


Figure 8. The map below details the location of 1,290 ash trees that were visually surveyed for the presence of emerald ash borer in Iowa. There were 218 high risk campgrounds and 19 high-risk sawmills that were surveyed. The level of risk for campgrounds was determined by the amount of campers visiting from quarantined states. Every active sawmill in Iowa was visited and ash nearby were examined for emerald ash borer. A total of 3 trees were flagged as possible suspect infestations for emerald ash borer. Branches were bark peeled from those 3 trees, and no evidence of emerald ash borer was found. All 1,290 ash trees were negative for emerald ash borer for the 2011 survey season. (Image: Tivon Feeley, IDNR).

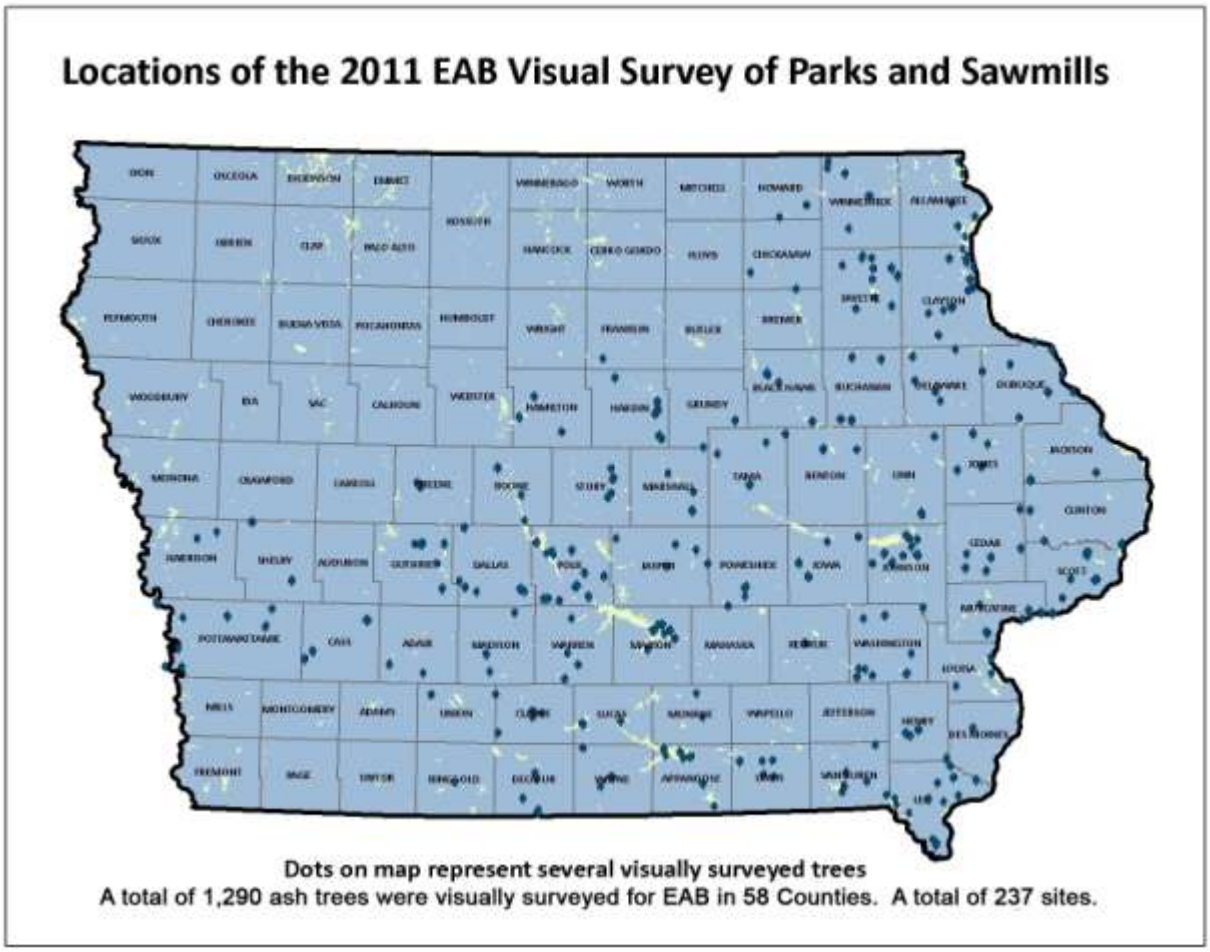


Figure 9. The map below details the locations where the sentinel ash trees are located. A sentinel tree is an ash tree that had been double girdled at the base of the tree in 2010 and allowed to decline throughout the 2011 growing season. The declining trees help lure in nearby wood boring beetles. The trees were taken down in the fall of 2011 and the bark removed to examine the trees for the presence of beetle larvae. Bark beetles were present in all of the sentinel trees and 78 native wood boring beetles were found. However, no emerald ash borer larvae were found and all sentinel trees were negative for EAB in the 2011 trapping season. (Image: Tivon Feeley, IDNR).

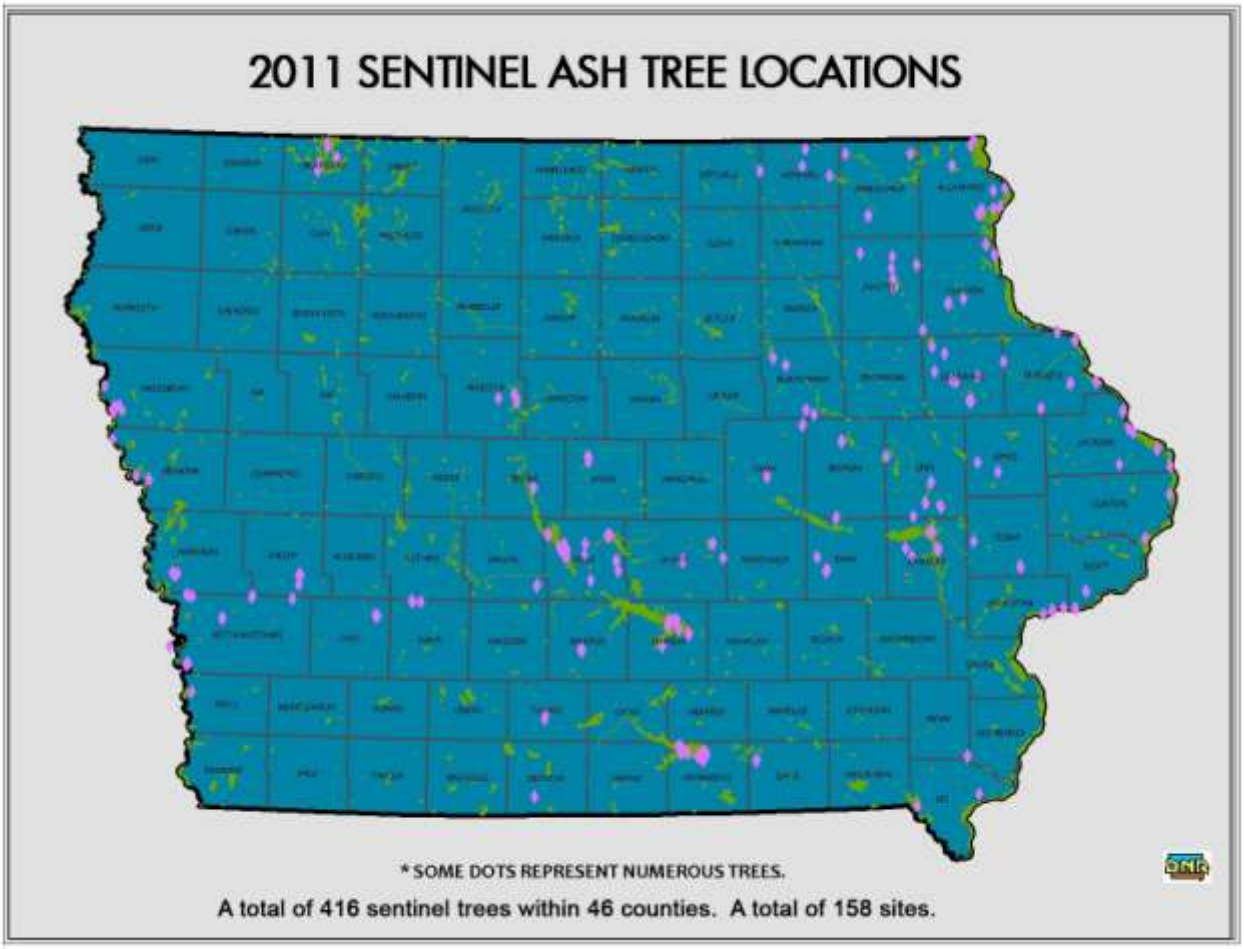


Figure 10. The map below details the locations where the community street tree inventories have been conducted. Every publicly owned ash street tree was inspected for signs and symptoms of emerald ash borer following the US Forest Service's Emerald Ash Borer Survey Guidelines. Each community received management plans that include ash phloem reduction and tree diversification. No emerald ash borers have been found in any of the ash that were surveyed. (Image: Emma Bruemmer, IDNR).

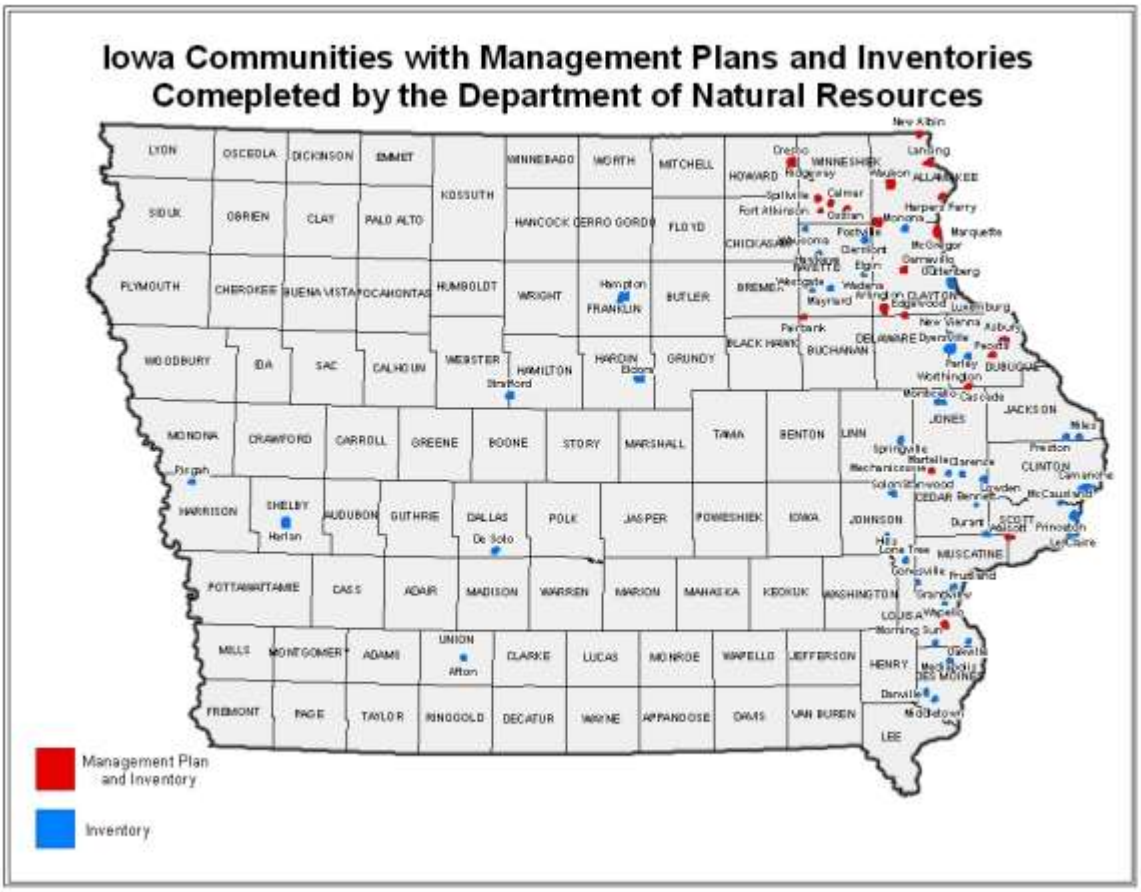


Figure 11. The map below details the locations of where the emerald ash borer purple sticky traps are located. These traps utilize tree scents and the color purple, which seems to attract emerald ash borer, to capture adult beetles. All 1,484 purple traps, placed by USDA APHIS Plant Protection and Quarantine and the Iowa Department of Agriculture and Land Stewardship, were negative for emerald ash borer in 2011. (Image: Mark Hollister, USDA-APHIS-PPQ, Iowa).

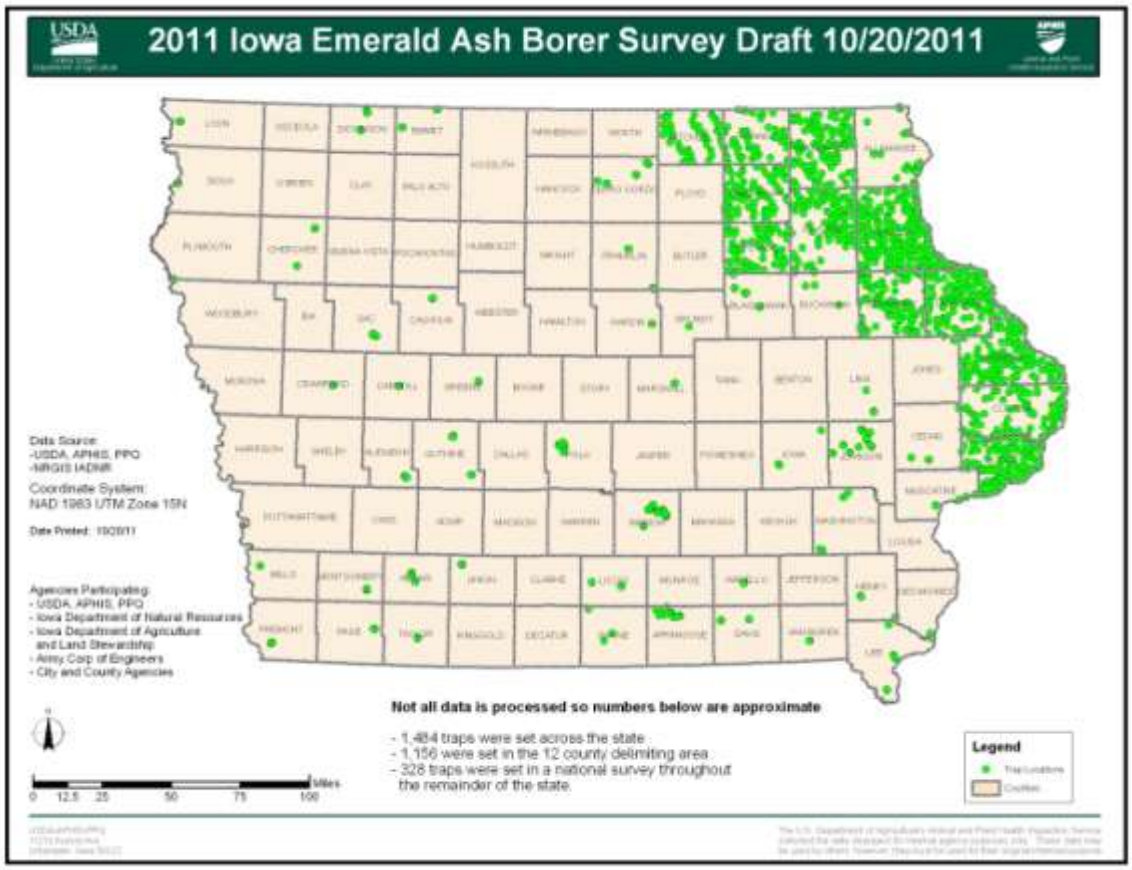


Figure 12. The picture below shows a purple emerald ash borer trap in a tree. (Image: Dr. Mark Shour, ISU Extension Entomology).

Twenty Major Forest Insects and Diseases: Fusiform Rust

Year 2011
State: Iowa

Forest Pest
Common Name: Fusiform Rust
Scientific Name: *Cronartium fusiforme*

Hosts: Southern Pine

Setting: N/A

Counties: N/A

Survey Methods: N/A

Acres Affected: N/A

Narrative: Fusiform rust and the southern pine species they are found on are not native to Iowa. No survey work was done. If a landowner has a Southern Pine that they believe has fusiform rust please contact Tivon Feeley (IDNR Forest Health Program Leader) at 515-281-4915 or ISU Plant Diagnostic Clinic at 515-294-0581.

http://na.fs.fed.us/spfo/pubs/fidls/fusiform/fidl-fusi.htm

Figure 13. Example of Fusiform rust causing branch damage on a southern pine. (Image: USDA Forest Service - Region 8 - Southern Archive, USDA Forest Service, Bugwood.org)

Twenty Major Forest Insects and Diseases: Gypsy Moth

Year 2011
State: Iowa

Forest Pest
Common Name: Gypsy Moth
Scientific Name: *Lymantria dispar*

Hosts: Oak, spruce, maples, elms, and many more
Setting: Rural Forests and Urban

Counties: Statewide

Survey Methods: Pheromone Delta Traps

Acres Affected: None

Narrative: Gypsy moth has been detected for several years in Iowa. The trapping program in Iowa started in 1972. The moth counts remained low throughout the years. However, in 2010 Iowa had a record capture of 2,260 male gypsy moths. In cooperation with the Gypsy Moth Slow the Spread Foundation (STS), a total of 158,000 acres were identified for treatment using mating disruption. The mating disruption utilized both pheromone flakes and Splat to help reduce the populations. A total of 9,579 acres were treated with Splat and a total of 63,475 acres were treated with Disrupt II. No moths were captured within the treatment blocks in 2011. During the 2011 trapping season, a total of 7,189 traps were place (4,453 were STS). A total of 347 traps captured 478 male moths. It appears that Iowa will be treating some areas in 2012 to control gypsy moth depending on the STS Budget.

About STS: This nonprofit organization was established for the purpose of aiding in the implementation of the U.S.D.A. National Slow the Spread of the Gypsy Moth Project. The National Slow the Spread Project is part of the U.S.D.A.'s national strategy for gypsy moth management. http://www.gmsts.org/

- STS reduces spread of this destructive pest to 3 miles per year, which will prevent infestation of more than 150 million acres over the next 20 years (compare maps).
- STS protects the extensive urban and wildland hardwood forests in the south and upper mid-west.
- STS protects the environment through the use of gypsy moth specific treatment tactics.
- STS unifies the partners and promotes a well coordinated, region-wide action based on biological need.
- STS yields a benefit to cost ratio of more than 4 to 1 by delaying the onset of impacts that occur as gypsy moth invades new areas.

Gypsy Moth Background:

Gypsy Moth is a European insect species introduced in Boston, MA in 1869 as an experiment to help provide silk for the textile industry. This exotic insect continues to spread west from that introduction site and defoliate native forests.

Establishment of gypsy moth in Iowa will affect the survival of mature trees. The larvae of this insect will feed on the leaves of over 300 host species during the important summer growing season, a time when a trees leaves are converting sunlight to energy. Repeated defoliation that occurs several years in a row on the same tree will deplete the stored nutrients, leading to the decline of that tree. In 2010 a record number of 2,260 male gypsy moths were captured in 31 Iowa counties.

Economic Impacts

• The total estimated impact of Gypsy Moth to Iowa's forest landowners and wood products businesses is over $551 million or an annualized loss of over $22 million in perpetuity for Iowa's economy.
• Other economic losses include non-timber products like seed production, reduced wildlife habitat and a $4.1 billion cost for tree removal and tree replanting, along with the loss of community tree derived benefits such as energy savings, property value, and storm water retention and carbon sequestration. Communities and homeowners will bear the cost burden of removing dead trees caused by Gypsy Moth.
• The loss of oaks and other preferred tree species of gypsy moth will negatively impact the economic contribution of $1.5 billion that fish and wildlife recreation provides to Iowa's economy.

Wildlife Impacts

Oak leaves are a preferred food source for Gypsy moth caterpillars. Acorns produced by oaks are eaten by many species of birds and mammals. A reduction in the number of oak trees in Iowa's forests caused by repeated defoliation from gypsy moth caterpillars will affect a wide variety of game and non-game species of wildlife.

Management Solution

Proper woodland and community tree management have a critical role in creating healthy trees. The best insurance policy a landowner can have when managing their woodlands is by maintaining a diversity of tree species, while ensuring an appropriate number of trees are growing on each acre. The best course of action for communities is to have a tree inventory and a community tree resource plan. (Images: Aron Flickinger, IDNR, USDA APHIS PPQ Archive, USDA APHIS PPQ, Bugwood.org, and Tivon Feeley, IDNR).

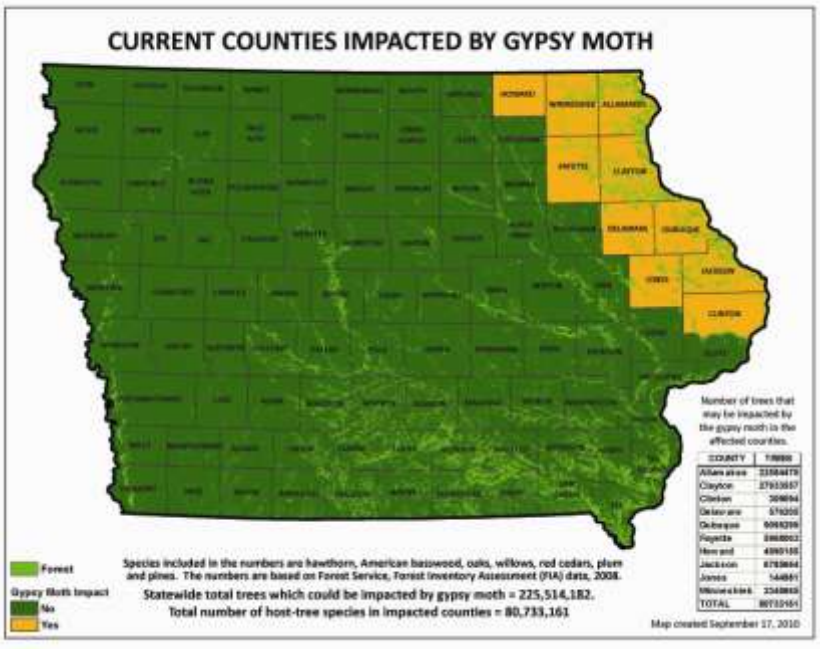


Figure 14. The map below detail the locations of all the gypsy moth delta traps and the number of moths captured in them during the 2011 trapping season. The total male moth capture was 478 male moths. This number is down from the 2010 capture of 2,260 male moths. The reduction in the population can be contributed to the cool moist spring that allowed *Entomophaga maimaiga* (a natural occurring disease causing fungi) and the success of the use of pheromone flake to reduce the expanding populations. (Image: Tivon Feeley, IDNR).

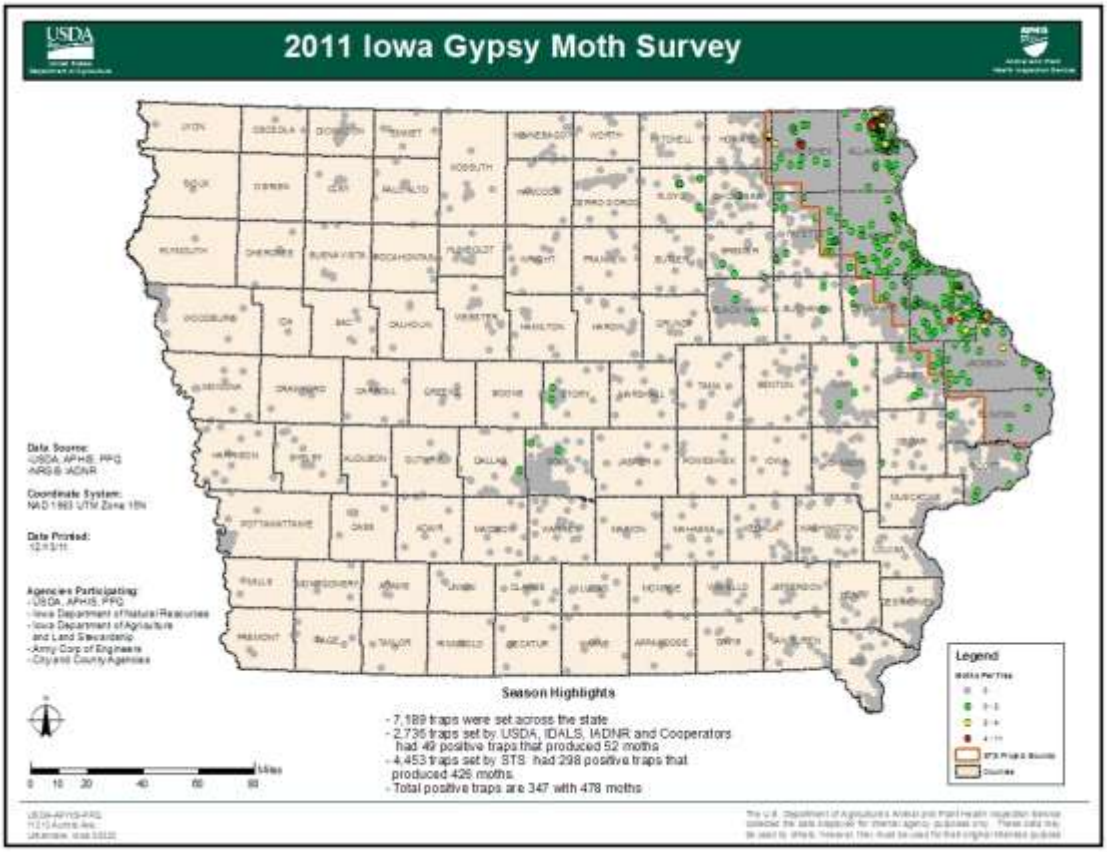


Figure 15. The map below details the 2011 treatment blocks, outlined in blue, where mating disruption was used to control the gypsy moth. A total of 158,649 acres were flown over. A total of 73,054 forest type acres were treated, the remaining acres were row crops, pastures, and waterways that were not treated. The Freeport block was split between Disrupt II and Splat. The Harpers Ferry Block and La Motte Block were treated solely with Splat. The Andrews block was treated only with Disrupt II. (Image: Tivon Feeley, IDNR).

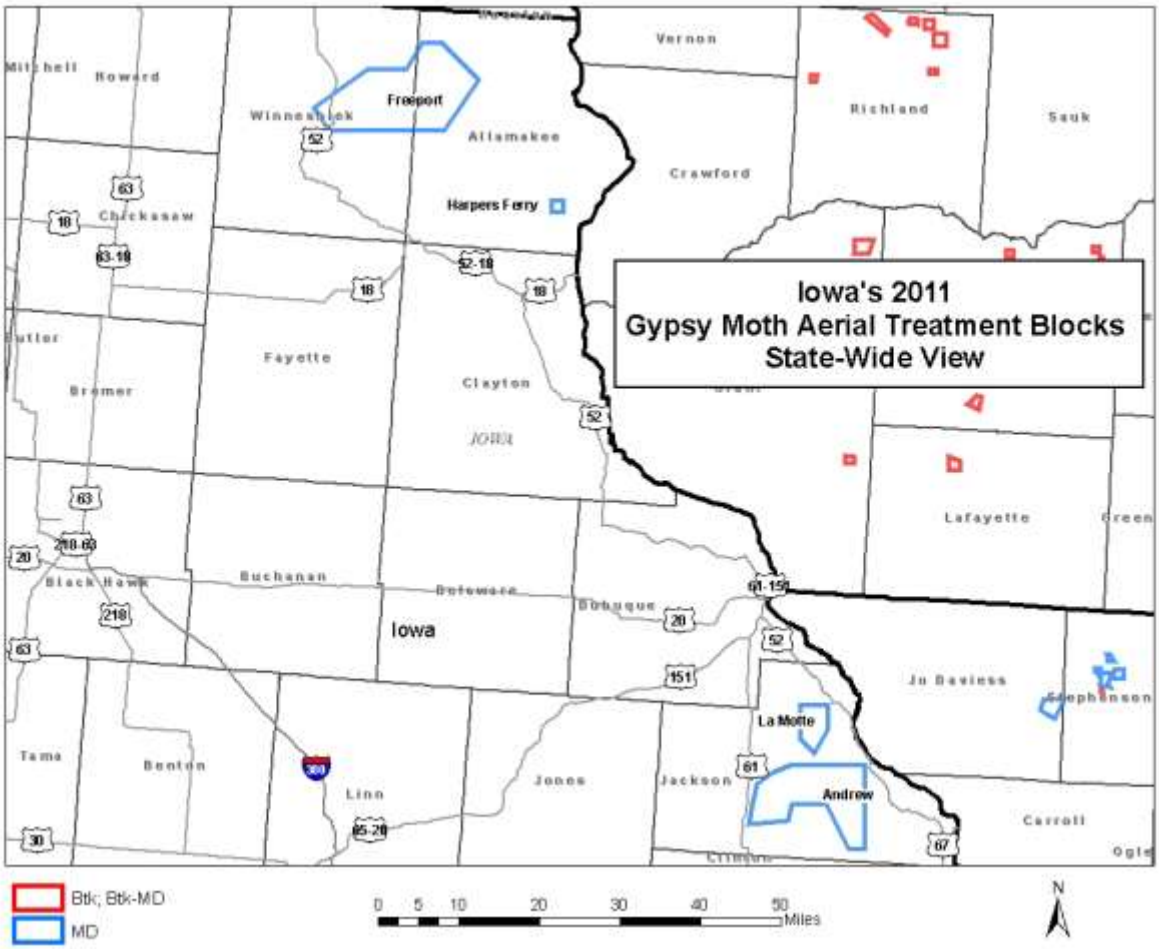
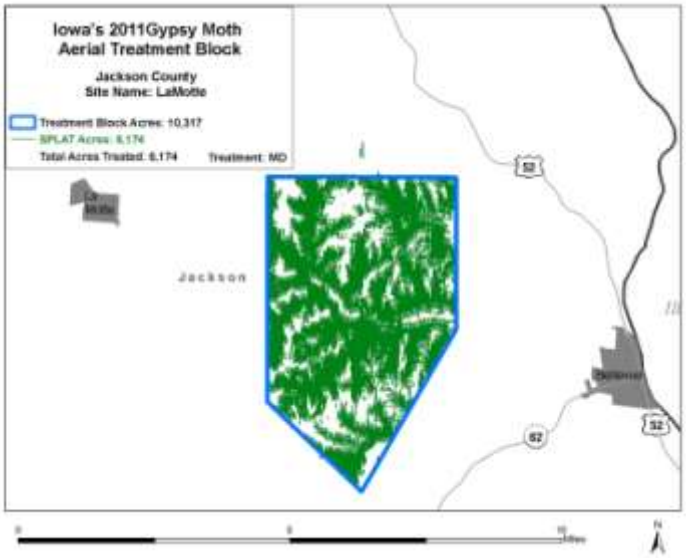
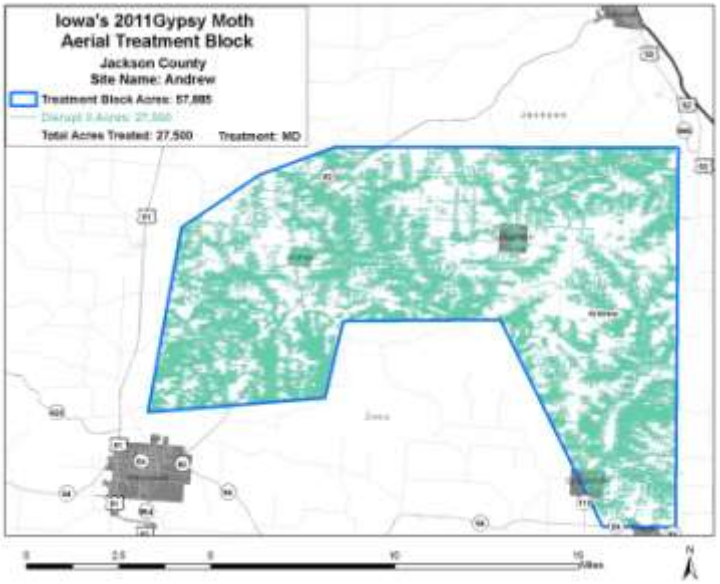
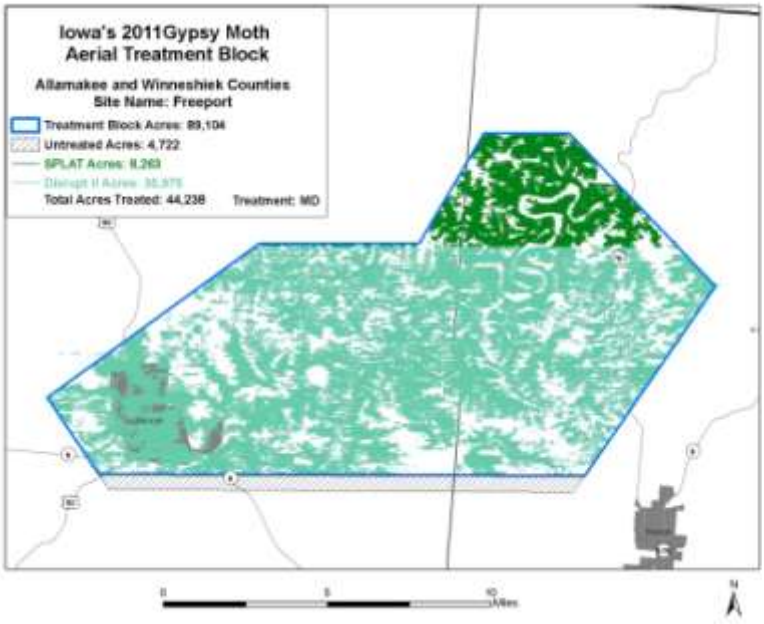
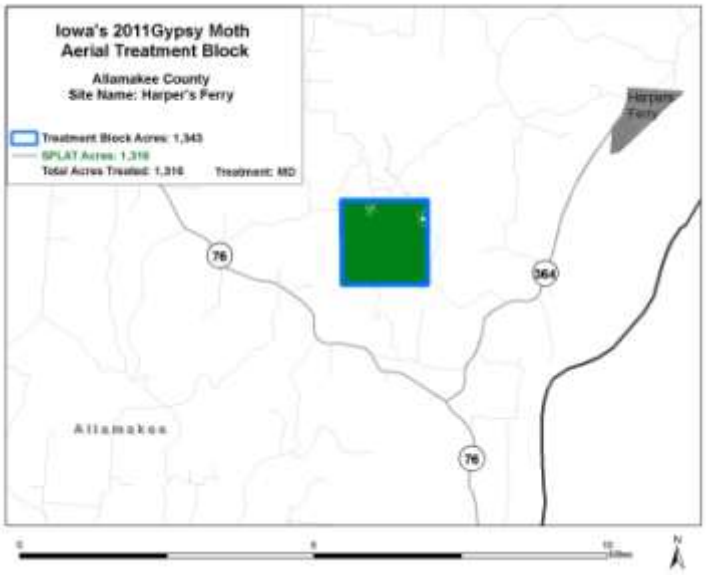


Figure 16. The images below detail the areas where forest type was treated and the product used to disrupt the mating. (Images: Tivon Feeley, IDNR).









Twenty Major Forest Insects and Diseases: Hemlock Wooly Adelgid

Year 2011
State: Iowa

Forest Pest
Common Name: Hemlock woolly adelgid
Scientific Name: *Adelges tsugae*

Hosts: Hemlock (All)

Setting: N/A

Counties: N/A

Survey Methods: N/A

Acres Affected: N/A

Narrative: Hemlock is not a native tree found in Iowa. Hemlock woolly adelgid is known to occur only in the Eastern and Northern part of the United States. No survey methods were needed. No need to contact authorities on this pest.

http://na.fs.fed.us/fhp/hwa/

Figure 17. Example of Hemlock woolly adelgid, feeding on hemlock needles. (Image: Connecticut Agricultural Experiment Station Archive, Connecticut Agricultural Experiment Station, Bugwood.org)

Twenty Major Forest Insects and Diseases: Laurel Wilt

Year 2011
State: Iowa

Forest Pest
Common Name: Laurel Wilt Disease
Scientific Name: *Raffaelea lauricola*

Hosts: Redbay.

Setting: N/A

Counties: N/A

Survey Methods: N/A

Acres Affected: N/A

Narrative: Redbay is not a native tree found in Iowa. Laurel wilt disease is known to occur only in the Southeast United States. No survey methods were needed. No need to contact authorities on this pest.

http://www.fs.fed.us/r8/foresthealth/laurelwilt/

Figure 18. Example of a redbay killed by laurel wilt disease. (Image: Albert (Bud) Mayfield, USDA Forest Service, Bugwood.org)

Twenty Major Forest Insects and Diseases: Oak Wilt

Year 2011
State: Iowa

Forest Pest
Common Name: Oak Wilt
Scientific Name: *Ceratocystis fagacearum*

Hosts: All Oak Species

Setting: Woodlands and Urban

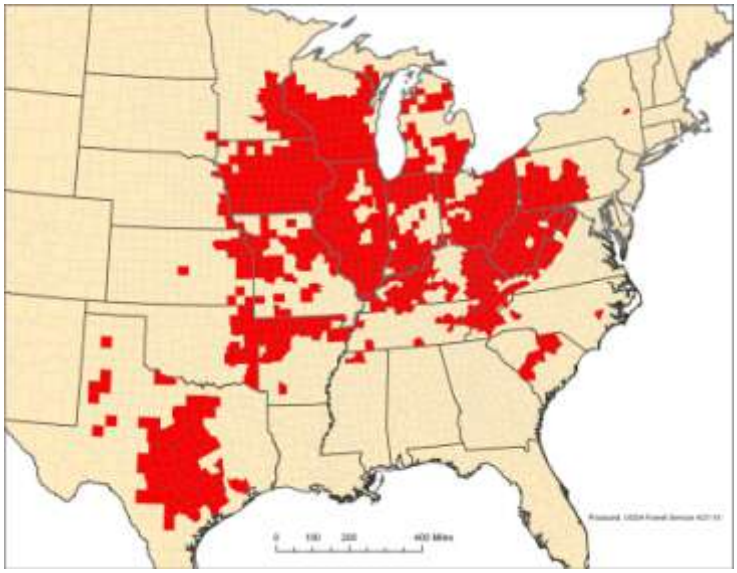
Counties: Statewide

Survey Methods: Aerial and Ground

Acres Affected: 39,000 canopy acres

Narrative: Oak wilt is fairly common in Iowa. Large pockets were found in Hardin County following a severe hail storm, Allamakee County at Yellow River State Forest, and in Louisa County. Salvage cuts and chemical control techniques have been used to control the larger woodland populations. Urban trees are managed via removal and prevention injections. All oak wilt samples were confirmed by the ISU Plant Diagnostic Clinic.
http://na.fs.fed.us/pubs/howtos/ht_oakwilt/identify_prevent_and_control_oak_wilt_print.pdf

Figure 19. The map below details the counties in Iowa with confirmed oak wilt. (Image: Quinn Chavez, USFS).



Twenty Major Forest Insects and Diseases: Sirex Woodwasp

Year 2011
State: Iowa

Forest Pest
Common Name: Sirex Woodwasp
Scientific Name: *Sirex noctilio*

Hosts: All Spruce

Setting: N/A

Counties: N/A

Survey Methods: N/A

Acres Affected: N/A

Narrative: Sirex woodwasp has not been identified in Iowa. No additional funds were available to conduct survey work. No suspect samples were submitted to IDNR or the ISU Plant Diagnostic Clinic. No other survey work was conducted for sirex woodwasp. If a landowner suspects sirex woodwasp, please contact the ISU Plant Diagnostic Clinic at 515-294-0581 or Robin Pruisner (State Entomologist) at 515-725-1465.

http://na.fs.fed.us/spfo/pubs/pest_al/sirex_woodwasp/sirex_woodwasp.htm

Figure 20. Images from left to right: Adult sirex woodwasp, and a female sirex woodwasp laying her eggs inside of a pine tree. The woodwasp hatch and feed inside the tree before exiting. (Images: Vicky Klasmer, Instituto Nacional de Tecnologia Agropecuaria, Bugwood.org).

Twenty Major Forest Insects and Diseases: Spruce Beetle

Year 2011
State: Iowa

Forest Pest
Common Name: Spruce Beetle
Scientific Name: *Dendroctonus rufipennis*

Hosts: All Spruce

Setting: N/A

Counties: N/A

Survey Methods: N/A

Acres Affected: N/A

Narrative: Spruce is not a native tree found in Iowa and has been introduced into the landscape. Spruce beetle is a Northern and Western pest and not known to occur near Iowa. No survey methods were needed. No reporting needs to be done.
http://na.fs.fed.us/spfo/pubs/fidls/sprucebeetle/sprucebeetle.htm

Figure 21. An example of an adult spruce beetle and the damage they cause on mature trees. (Images: Tim Ebata, BC Ministry of Forests, Forest Practices branch).

Twenty Major Forest Insects and Diseases: Blister Rust

Year 2011
State: Iowa

Forest Pest
Common Name: White Pine Blister Rust
Scientific Name: *Cronartium ribicola*

Hosts: White Pine

Setting: N/A

Counties: N/A

Survey Methods: N/A

Acres Affected: Unknown

Narrative: White pine blister rust has been identified in Iowa, and is a pest that can occur throughout the native white pine range in Iowa. No additional funds were available to conduct survey work. No suspect samples were submitted to IDNR or the ISU Plant Diagnostic Clinic. No other survey work was conducted for white pine blister rust. If a landowner suspects white pine blister rust, they should contact the ISU Plant Diagnostic Clinic at 515-294-0581.

http://na.fs.fed.us/spfo/pubs/howtos/ht_wpblister/toc.htm

Figure 22. The range map for known areas of white pine blister rust and the rust spores on an infected tree. (Map: USFS Morgantown. Image: Brian Geils, USDA Forest Service, Bugwood.org)

Twenty Major Forest Insects and Diseases: Spruce Budworm

Year 2011
State: Iowa

Forest Pest
Common Name: Spruce Budworm
Scientific Name: *Choristoneura fumiferana*

Hosts: All Spruce

Setting: N/A

Counties: N/A

Survey Methods: N/A

Acres Affected: N/A

Narrative: Spruce is not a native tree found in Iowa and has been introduced into the landscape. Spruce budworm is a Northern and Eastern pest and is not known to occur near Iowa. No survey methods were needed.

http://na.fs.fed.us/spfo/pubs/fidls/sbw/budworm.htm

Figure 23. An example of spruce budworm larva and the damage they cause on mature trees. (The first image was scanned from the book "Recent Advances in Spruce Budworms Research" edited by C.J.Sanders et al. Ottawa (Ontario), 1985. The second image is from Joseph O'Brien, USDA Forest Service, Bugwood.org)

Twenty Major Forest Insects and Diseases: Sudden Oak Death

Year 2011
State: Iowa

Forest Pest
Common Name: Sudden Oak Death
Scientific Name: *Phytophthora ramorum*

Hosts: All Oaks

Setting: Rural Forests, Nursery, and Urban

Counties: Statewide

Survey Methods: Ground, Water Testing, Soil Testing

Acres Affected: N/A

Narrative: Sudden oak death has not been found in Iowa. All stream/river testing has been negative for sudden oak death. In addition, 30 SOD samples have been taken based on pre-notifications that were sent to the Iowa Department of Agriculture. The pre-notifications are for nursery stock being shipped from the west to Iowa. All samples were sent to Kansas State University to the national identifiers. All samples have been negative by PCR testing. If a landowner suspects that they sudden oak death, please contact Tivon Feeley (IDNR Forest Health Program Leader) at 515-281-4915 or Robin Pruisner (State Entomologist) at 515-725-1465.
http://na.fs.fed.us/spfo/pubs/pest_al/sodeast/sodeast.htm

Figure 24. An example of the oozing canker found on an infected tree. The black lines under the bark are also symptomatic of sudden oak death. (Images: Joseph O'Brien, USDA Forest Service Pest Alert, and Bugwood.org)

Ooze bleeds from a canker on an infected oak.

Black zone lines are found under diseased bark in oak.

Twenty Major Forest Insects and Diseases: Pine Shoot Beetle

Year 2011
State: Iowa

Forest Pest
Common Name: Pine Shoot Beetle
Scientific Name: *Tomicus piniperda*

Hosts: All Pines

Setting: Rural Forests, Nursery, and Urban

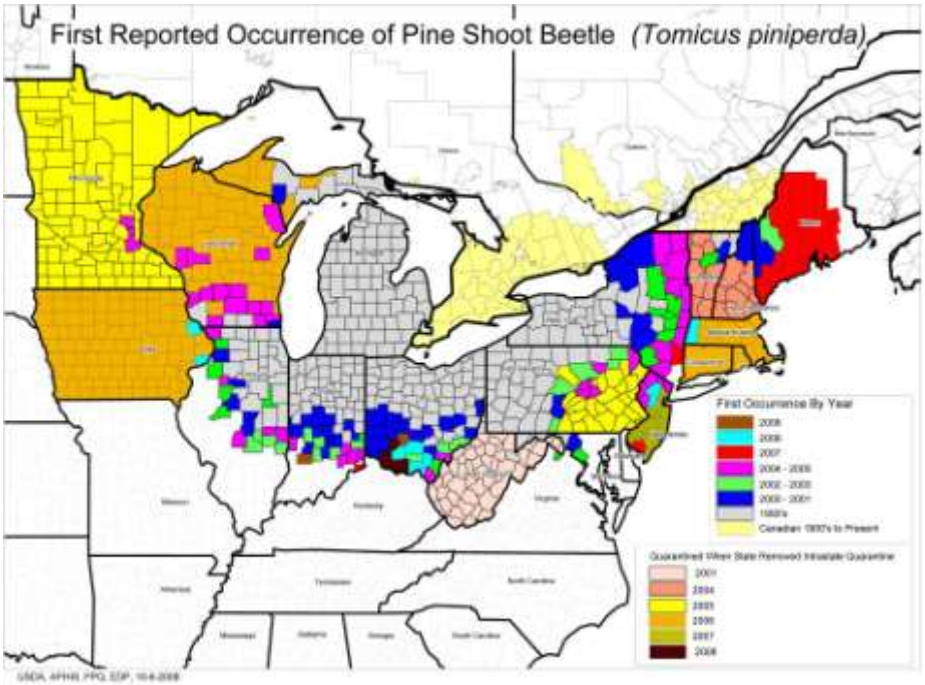
Counties: Statewide

Survey Methods: N/A

Acres Affected: Unknown

Narrative: Pine Shoot Beetle was identified September 18, 2006 and all counties in Iowa were quarantined for pine shoot beetle. Since the entire state is quarantined, no further monitoring has been needed. If a landowner needs assistance with management options for the pine shoot beetle, please contact the ISU Plant Diagnostic Clinic at 515-294-0581.
http://www.aphis.usda.gov/plant_health/plant_pest_info/psb/index.shtml

Figure 25. The map below shows the quarantined areas for pine shoot beetle. (Image: by USDA-APHIS-PPQ, http://www.aphis.usda.gov/plant_health/plant_pest_info/psb/index.shtml).



Pine Shoot Beetle Background:

The pine shoot beetle (*Tomicus piniperda* L.) is an introduced pest that attacks pines. It was first discovered in the US at a Christmas tree farm near Cleveland, Ohio, in July 1992. A native of Europe, the beetle attacks new shoots of pine trees, stunting the growth of the trees. The pine shoot beetle may also attack stressed pine trees by breeding under the bark at the base of the trees. The beetles can cause severe decline in the health of the trees, and in some cases, kill the trees when high populations of the beetle exist.

In May, 2006, USDA-APHIS-PPQ confirmed the presence of pine shoot beetle (PSB) in Dubuque and Scott counties. A Federal Order was issued effective June 22, 2006 placing Dubuque and Scott counties under a Federal quarantine for interstate movement of PSB regulated articles. Iowa Department of Agriculture and Land Stewardship (IDALS) was provided a copy of the Federal Order as well as additional information concerning the pine shoot beetle, and was requested to consider placing a state PSB quarantine for intrastate movement of PSB regulated articles from Dubuque and Scott Counties. However, after considerable review, IDALS declined to implement an intra-state quarantine for PSB. Therefore, a Federal Order was issued effective September 18, 2006 for quarantine of the entire state of Iowa for PSB, *Tomicus* piniperda.

The quarantine affects the following pine products, called "regulated articles":

- Pine nursery stock
- Pine Christmas trees
- Wreaths and garlands
- Pine logs/lumber (with bark attached)

All pine nursery stock shipped from Iowa to a non-regulated state must be inspected and certified free from PSB. This inspection and certification must occur just before shipping. Small pine seedlings (less than 36 inches tall, and 1 inch in diameter) and greenhouse grown pines require a general inspection of the whole shipment. All other (larger) pine nursery stock shipments must have 100% tip-by-tip inspection.

Figure 26. The picture below shows the pine shoot beetle and the damage it causes to branches. (Images: Steve Passoa, USDA APHIS PPQ, Bugwood.org)

Additional Pest Surveyed: Thousand Canker Disease

Year 2011
State: Iowa

Forest Pest
Common Name: Thousand Cankers Disease
Scientific Name: *Pityophthorus juglandis and Geosmithia morbida*

Hosts: Walnut

Setting: Rural Forests, Nursery, and Urban

Counties: Statewide

Survey Methods: Ground, General Observation, and Culturing

Acres Affected: None

Narrative: A total of 850 black walnut trees were visually surveyed for the symptoms of thousand cankers disease. These trees were located in 45 counties. Each county had a least one declining black walnut that was surveyed. There are 99 counties in Iowa so this survey addressed 45 % of the counties. There were 64 urban communities surveyed and 140 rural sites that were surveyed. All walnut trees in the urban sites were identified and samples taken from the severely declining trees. Only severely declining walnuts were surveyed in the rural sites. A total of 13 trees were flagged as possible suspect trees for having thousand canker disease. Samples were taken by the USFS and sent to the St Paul field office for further testing. No evidence of walnut twig beetle (*Pityophthorus juglandis)* activity was identified and all 13 trees were negative for canker fungi *Geosmithia morbida.* New grants have been submitted to continue the survey efforts. Should the grants be funded, Iowa will be able to more efficiently survey for the walnut twig beetle utilizing new pheromone traps that will be available for the 2012 season. Without these grant funds, it is very unlikely that IDNR will be able to continue to monitor for thousand cankers disease. If a landowner has walnut trees that they believe have thousand cankers disease, please contact the ISU Plant Diagnostic Clinic at 515-294-0581.

http://na.fs.fed.us/pubs/palerts/cankers_disease/thousand_cankers_disease_screen_res.pdf

Thousand Cankers Disease Background:

Since the 1990's, black walnut has been dying in the Western U.S. The deaths are caused by a walnut twig beetle (Pityophthorus juglandis) that carries a fungus (Geosmithia morbida) which is spread as the beetle tunnels through tree tissues. The insect disease complex is named Thousand Cankers Disease (TCD).

The introduction of TCD into Iowa would have disastrous effects economically to the wood industry in the state and the rest of the nation. Iowa has the third largest volume (979 million board feet) of saw log size black walnut in the world. Some experts believe that TCD has the potential to decimate black walnut in the same way Dutch elm disease, emerald ash borer and chestnut blight have destroyed their respective hosts.

Economic Impacts

• The estimated total impact of TCD to Iowa's forest landowner and wood products businesses is more than $1.8 billion or an annualized loss of $72 million in perpetuity for Iowa's economy.

• Other economic losses would include non-timber products like nut production, reduced wildlife habitat and an $859 million cost for tree removal and tree replanting, along with the loss of community tree derived benefits such as energy savings, property value, and storm water retention and carbon sequestration. Communities and homeowners will bear the cost burden of removing dead trees caused by TCD.

Wildlife Impacts

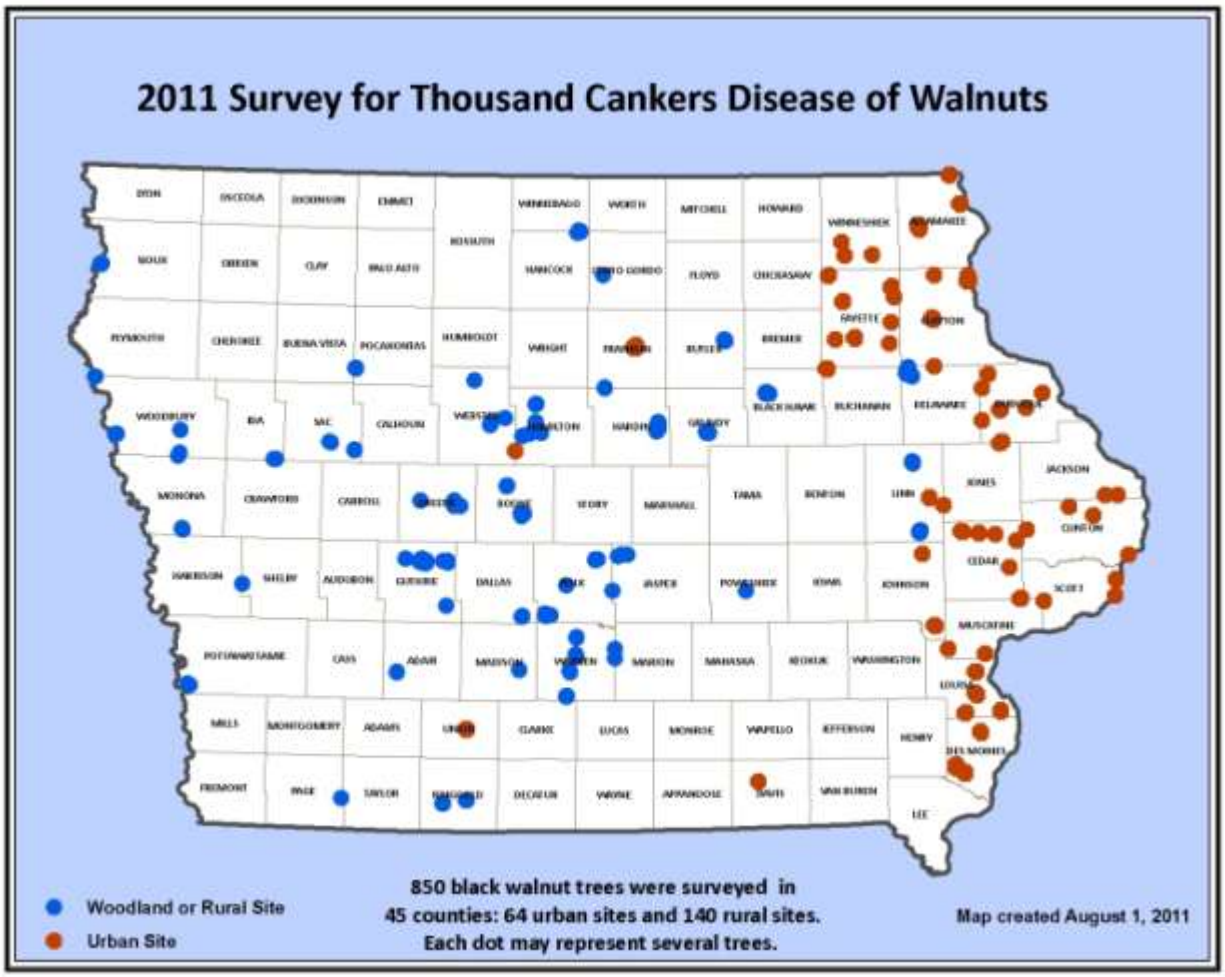
Black walnut has moderate importance to wildlife as a food source. Seeds are eaten by woodpeckers, foxes, and squirrels.

Management Solution

Proper woodland and community tree management have a critical role in creating healthy trees. The best insurance policy a landowner can have when managing their woodlands is by maintaining a diversity of tree species, while ensuring an appropriate number of trees are growing on each acre. The best course of action for communities is to have a tree inventory and a community tree resource plan. Good woodland and tree care under the direction of a forester or an arborist is the best defense against all forest health threats.

(Images top to bottom: Bruce Blair, IDNR, Steven Valley, Oregon Department of Agriculture, Bugwood.org, and Whitney Cranshaw, Colorado State University, Bugwood.org.)

Figure 27. The map below details the survey locations for declining walnut to survey for signs and symptoms of thousand cankers disease. All sawmills that process black walnut were near a community site that was inventoried or a surveyed rural site. The survey resulted in 13 suspect trees that tested negative for thousand canker disease. (Map: Tivon Feeley, IDNR)



Additional Pest Surveyed: Bur Oak Blight

Year 2011
State: Iowa

Forest Pest
Common Name: Bur Oak Blight
Scientific Name: *Tubakia iowensis*

Hosts: Bur oak

Setting: Rural Forests, Nursery, and Urban

Counties: Statewide

Survey Methods: Ground, General Observation, and Culturing.

Acres Affected: Approximately 1,000 acres

Narrative:

Bur oak blight has been recognized in Iowa for only the last 7 years. However, it is suspected that the fungus that causes the disease has probably been here much longer. Theories on why bur oak blight has increased include: a shift in climate temperatures, more frequent rain events, older mature trees might be more susceptible, and that trees are more susceptible on sites that have a history of grazing or construction.

The disease usually starts in the lower branches and then progresses up the tree. As the infection intensifies over several years, individual trees die. The mortality does not appear solely from bur oak blight. The mortality is likely a combination of bur oak blight and secondary pests (two-lined chestnut borer) that attack and kill the tree.

Chemical injections with propiconazole (Alamo) seem to control bur oak blight. However, some chemical burning (phytotoxic effects of the chemical) does occur. Treatments need to be carefully measured following the labeled rate to prevent further damage. It is expected that trees will not need to be injected again until severe bur oak blight symptoms occur. This could be 2-5 years after the initial injections.

Currently, control measures have not been identified for woodland trees. Severely declining bur oaks should be harvested (salvaged) before they die. Research is being conducted on various native bur oaks that may have some tolerance to the bur oak blight fungus. All samples of bur oak blight should be sent into the ISU Plant Diagnostic Clinic at 515-294-0581.
http://na.fs.fed.us/pubs/palerts/bur_oak_blight/bob_screen.pdf

Bur Oak Blight Background:

Bur oak (Quercus macrocarpa) is common across Iowa. In 2008, bur oak ranked second among all tree species as measured in volume of saw timber on forest land. Bur oak provides substantial value for wood products and is an important source of wildlife habitat and mast (acorns) to many game and nongame species. Bur oak blight (BOB; Tubakia spp.) is a newly named disease that can cause severe defoliation, leading to mortality of branches or entire trees. Bur oak blight is caused by the fungus *Tubakia iowensis*.

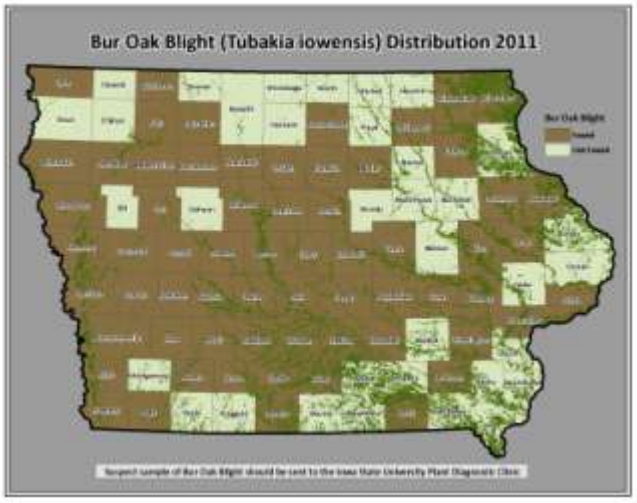
• Based on reports of BOB to the Iowa State Plant Insect and Disease Clinic in 2011, 64 counties in Iowa reported the presence of the disease.

Economic Impacts

• The total impact of BOB to Iowa's forest landowners and wood products businesses is more than $19 million or an annualized loss of close to $770,000 in perpetuity for Iowa's economy.
• Other economic losses include non-timber products like nut production, reduced wildlife habitat and a $613 million cost for tree removal and tree replanting, along with the loss of community tree derived benefits such as energy savings, property value, storm water retention and carbon sequestration. Communities and homeowners will bear the cost burden of removing dead trees caused by BOB.
• The loss of bur oak within the oak-hickory forest type will negatively impact the economic contribution of $1.5 billion that fish and wildlife recreation provides to Iowa's economy.

Wildlife Impacts

Acorns produced by bur oaks are eaten by many species of birds and mammals. A reduction in the number of bur oak trees in Iowa's forests caused by bur oak blight will affect a wide variety of game and non-game species of wildlife. A primary fall and winter food for deer is acorns, composing around 54% of a deer's yearly diet during years acorn seed is available—otherwise the next preference is corn.



Management Solution

Proper woodland and community tree management have a critical role in creating healthy trees. The best insurance policy a landowner can have when managing their woodlands is by maintaining a diversity of tree species, while ensuring an appropriate number of trees are growing on each acre. The best course of action for communities is to have a tree inventory and a community tree resource plan. Good woodland and tree care under the direction of a forester or an arborist is the best defense against all forest health threats. (Images: Aron Flickinger, IDNR; Map: Created by IDNR based on locations provided by Dr. Harrington, ISU. A full map can be found here: http://www.public.iastate.edu/~tcharrin/BOB.html).

Additional Pest Surveyed: Dutch Elm Disease

Year 2011
State: Iowa

Forest Pest
Common Name: Dutch Elm Disease
Scientific Name: *Ophiostoma ulmi or Ophiostoma novo-ulmi*

Hosts: Elm

Setting: Rural Forests and Urban

Counties: Statewide

Survey Methods: Ground, General Observation, and Culturing

Acres Affected: All native elm

Narrative:

Dutch elm disease was introduced to North America in the 1930's and began killing millions of native elm trees. Dutch Elm Disease has been identified in all of Iowa's counties, and it's estimated that just over 95 percent of the urban elm trees have succumbed to this disease.

The fungus is native to Asia and was introduced to Europe shortly after World War I. From Europe, it traveled to North America in the 1930's in crates made from infected elm logs. The disease quickly infected elms across the United States since our native elms did not have natural resistance to the introduced pathogen.

There may still be a glimmer of hope for those that want to have native elms as part of their landscape. Researchers have been selecting and developing elms that are tolerant of the disease. Some of these elms are hybrids with Asian varieties, and some are true native American elms that have shown resistance. However, the elms that sprout up in yards and woodlands are extremely unlikely to be tolerant and should be managed or removed before they grow into larger shade trees that are expensive to cut down.

http://na.fs.fed.us/spfo/pubs/howtos/ht_ded/ht_ded.htm

Additional Pest Surveyed: Hickory Decline

Year 2011
State: Iowa

Forest Pest
Common Name: Hickory Decline
Scientific Name: *Fusarium solani* and *Ceratocystis smalleyi*

Hosts: Bitternut Hickory and Occasionally Shagbark Hickory

Setting: Rural Forests and Urban

Counties: Statewide

Survey Methods: Ground, General Observation, and Culturing

Acres Affected: Statewide

Narrative:

Submitted by: Jennifer Juzwik, Northern Research Station, USDA Forest Service, St. Paul, MN, and Ji-Hyun Park, formerly with Dept. of Plant Pathology, University of Minnesota, St. Paul.

A five year investigation of the cause of rapid crown decline and mortality of bitternut hickory was concluded in September 2011. Results of a series of related studies found that multiple cankers and xylem (the water conducting tissue) dysfunction caused by *Ceratocystis smalleyi* are correlated with rapid crown decline typical of a limited vascular wilt disease. Because reproductive attacks by the hickory bark beetle (*Scolytus quadrispinosus*) also are correlated with canker and xylem lesion occurrence, the synergistic interaction of the beetle and the fungus in combination with host stress (e.g. drought) is important in disease development. This disease has been referred to as hickory decline or hickory dieback in the past several decades; however, the researchers propose hickory wilt as a more appropriate name based on their recent findings. A brief synopsis of the key results supporting these conclusions is presented in this report.

Hundreds to over one thousand Hbb attacks were found on the main stem of three bitternut hickory with active crown decline (40, 55 and 80% decline rating) that had been felled and debarked. The extent of beetle colonization ranged from aborted to fully successful (i.e. full gallery system). Between 26 and 585 bark cankers and xylem lesions also were found on the main stems of the same trees. *C. smalleyi* is frequently isolated from such damaged tissues. A high percentage (92 to 94) of these cankers and lesions were associated with Hbb attacks. Female Hbbs captured while creating entry tunnels during initial attacks

were found to commonly carry viable propagules of *C. smalleyi* on their bodies. These results indicate that fungus spores dislodge from the beetles during tunneling, germinate, and infect the wounded bark and sapwood tissue, resulting in bark cankers and xylem lesions.

Bark cankers up to 25 inches long were produced on hickory stems within 12 months of inoculation with a water suspension of the *C. smalleyi* spores. Long, narrow reddish-brown discoloration of sapwood was always associated with each fungus- inoculated point. In cross-section, corresponding discoloration in the sapwood was observed in a wedge-shaped pattern. The fungus was commonly observed in multiple elements of the xylem tissue, including vessel, parenchyma cells and fibers. Tyloses (balloon-like structures) were abundant in early-wood vessels of the fungus-inoculated trees. Multiple, contiguous tyloses were found to plug many more vessels in fungus-inoculated trees compared to the fewer ones formed in response to water-inoculation. Gelatinous materials produced in response to fungal infection were also found to plug late-wood vessels. Thus, over-expressed tree response to infection induces physical plugging of the water-transport system of infected bitternut hickory.

The resulting impact of numerous bark cankers and xylem lesions on sap flow rate was experimentally tested in non-Hbb attacked, but fungus inoculated, bitternut hickory in two natural stands. Sap flow rates were measured in both *C. smalleyi*-inoculated and water-inoculated trees 13 months after treatment. Fifty inoculations were made between 6 and 13 feet above ground on the main stem of each poletimber-sized study tree. Significantly lower sap flow rates during mid-day were found for fungus-inoculated trees compared to the water-inoculated and non-inoculated controls. Statistical analyses found significant interactions between average maximum sap flow rate and abundance of tyloses in the outer two annual rings of study trees in both experimental sites. Significantly fewer tyloses were found in the water-inoculated trees than the fungus-inoculated ones. Correlation analysis also detected significant interactions between maximum sap flow rate and proportion of cankered bark area of the study trees. Thus, reduced sap flow rates in bitternut hickory with numerous stem infections apparently result from fungus-induced and fungus-produced obstructions in the xylem vessels. Furthermore, multiple cankers and xylem lesions and resulting tree response can logically explain the symptom of rapid crown decline with wilting foliage observed in affected bitternut hickory. This disease situation is similar to that of infections of oaks in Japan by the fungus *Raffaelea quercivora* following attacks by an ambrosia beetle species in a disease known as Japanese oak wilt. Thus, hickory wilt is a logical name for this particular disease of hickory based on its similarities to the Japanese oak wilt.

In summary, the results from the above series of studies document the deleterious effects of multiple cankers and xylem dysfunction caused by *C. smalleyi* on the health of bitternut hickory. The synergistic interaction of Hbb and *C. smalleyi*

results in numerous bark cankers and debilitating xylem lesions of affected trees that the researchers hypothesize leads to rapid crown decline and tree death, especially following predisposing events such as drought that lead to build-up of the beetle population.

http://na.fs.fed.us/spfo/pubs/pest_al/hickory/hickory.htm

Figure 28. The pictures below shows the hickory bark beetle attack and associated cankers. (Image: Dr. Jennifer Juzwick, USFS).

Additional Pest Surveyed: Forest Tent Caterpillar

Year 2011
State: Iowa

Forest Pest
Common Name: Forest Tent Caterpillar
Scientific Name: *Malacosoma disstria*

Hosts: Many tree species

Setting: Rural Forests and Urban

Counties: NE Iowa

Survey Methods: Ground and General Observation

Acres Affected: Approximately 2,000 acres
Narrative: Iowa DNR started receiving reports of forest tent caterpillars in Northeast Iowa in late May. Forest tent caterpillars are native and commonly found throughout the United States. The forest tent caterpillars have regional outbreaks every 6 to 16 years. 2011 was an outbreak year for Allamakee, Winneshiek, Clayton, Fayette, Dubuque, and Delaware counties.

The caterpillars feed on the foliage of sugar maple, aspen, oaks, birch, cherry, basswood, ash, and willow in Iowa. The defoliation can last up-to 3 years before a natural population crash occurs. Extreme cold temperatures and several species of flies and wasps help keep this pest under control. Control measures are typically not needed for this pest, and none were utilized during the 2011 season.

http://na.fs.fed.us/spfo/pubs/pest_al/ftc/ftc.htm

Figure 29. The picture below shows the forest tent caterpillars on the main stem of a young tree. (Image: Robert Honeywell, IDNR)

Additional Pest Surveyed: Invasive Plants

Exotic invasive species are plants that are non-native to an ecosystem and cause or are likely to cause economic or environmental harm to humans, crops, livestock, or natural plant and animal communities. Some examples of non-native species found to be a problem in Iowa forests are buckthorn, garlic mustard, honeysuckle, multifora rose, oriental bittersweet, autumn olive and Japanese knotweed. These invasive and exotic plants are out competing native forest species, diminishing fisheries and wildlife habitat, reducing water quality, reducing economic returns from forest management and tourism, and threaten long term forest sustainability and bio-diversity. In 2011 Oriental bittersweeet and Japanese knotweed were identified as upcoming threats to Iowa's Forest Health.

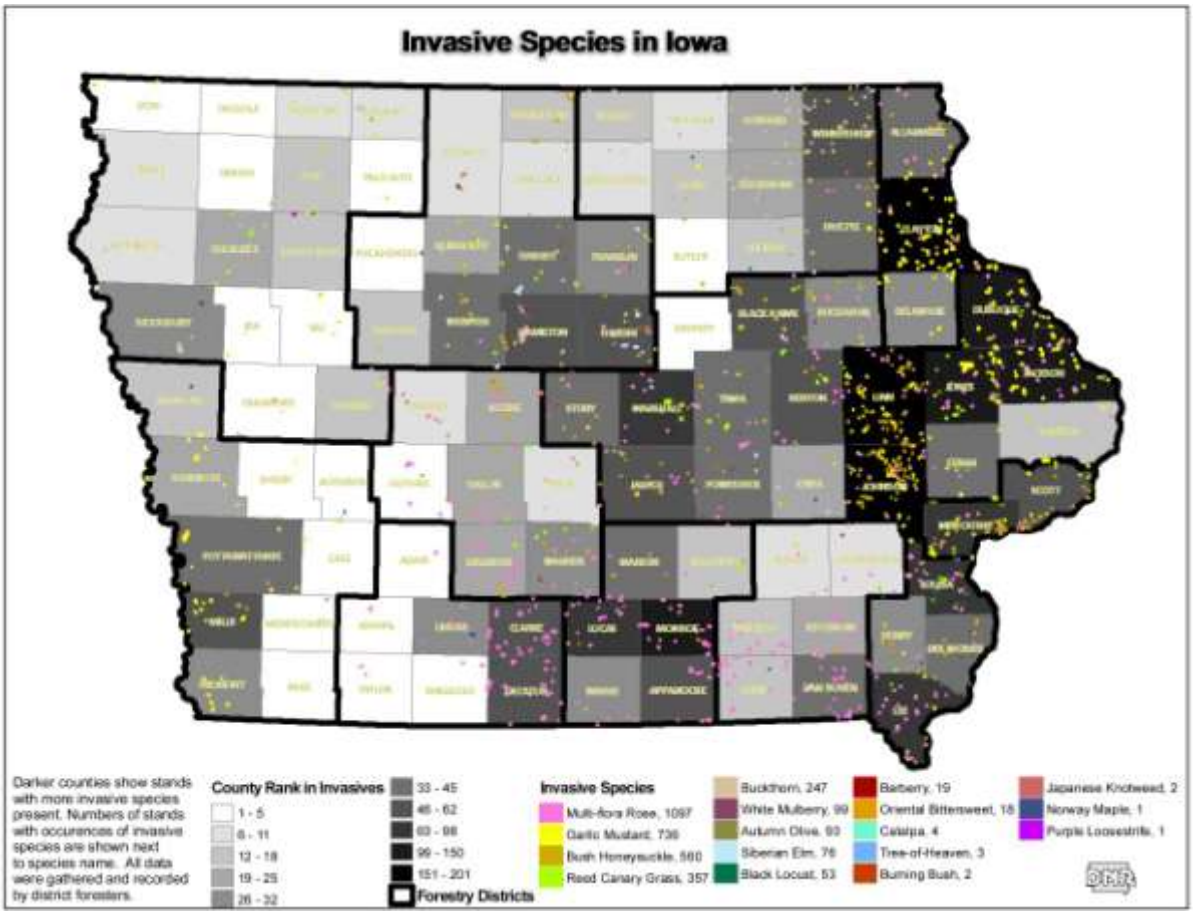
Known Invasive Plants in Iowa 2011

Key: NP= Not Present- Not known to exist in Iowa
I= Isolated- the species is infrequent, not commonly seen
LA= Locally Abundant- the species is present but is not in the majority of the counties
W= Widespread- commonly seen in the majority of counties in large or small populations

Species	Common Name	Abundance
Abutilon theophrasti	velvetleaf	W
Ailanthus altissima	tree-of-heaven	W
Alliaria petiolata	garlic mustard	W
Berberis thunbergii	Japanese barberry	W
Bromus tectorum	cheatgrass	W
Butomus umbellatus	flowering rush	I
Carduus acanthoides	plumeless thistle	I
Carduus nutans	Musk thistle	W
Celastrus orbiculata	Oriental bittersweet	LA
Centaurea maculosa/ biebersteinii	spotted knapweed	LA
Centaurea repens	Russian knapweed	I
Centaurea solstitialis	yellow starthistle	I
Cirsium arvense	Canada thistle	W
Cirsium spp.	thistle	W
Cirsium vulgare	bull thistle	W
Conium maculatum	poison hemlock	I
Coronilla varia	crown vetch	W
Daucus carota	Queen Anne's lace	W
Dipsacus fullonum/sylvestris	common teasel	I
Dipsacus laciniatus	cutleaf teasel	I
Dipsacus sativus	Indian teasel	NP
Elaeagnus angustifolia	Russian olive	I
Elaeagnus umbellate	autumn olive	LA
Euonymus alatus	burning bush	LA
Euphorbia esula	leafy spurge	W
Fallopia japonica	Japanese knotweed	LA
Frangula alnus/Rhamnus frangula	glossy buckthorn	I
Heracleum mantegazzianum	giant hogweed	NP
Hesperis matrionalis	dame's rocket	W
Lespedeza cuneata	Sericea lespedeza	I

Ligustrum japonicum	Japanese privet	NP
Ligustrum obtusifolium	blunt-leaved or border privet	I
Ligustrum sinense	Chinese privet	NP
Ligustrum vulgare	common or European privet	I
Lonicera fragrantissima	fragrant honeysuckle	NP
Lonicera japonica	Japanese honeysuckle	LA
Lonicera maackii	Amur honeysuckle	W
Lonicera morrowii	Morrow's honeysuckle	I
Lonicera standishii	Standish's honeysuckle	NP
Lonicera tatarica	Tatarian honeysuckle	W
Lonicera x *bella*	Bell's honeysuckle	I
Lonicera xylosteum	European fly honeysuckle	NP
Lythrum salicaria	purple loosestrife	W
Morus alba	white mulberry	W
Pastinaca sativa	wild parsnip	W
Potamogeton crispus	curlyleaf pondweed	I
Pueraria montana	kudzu	I
Rhamnus cathartica	common buckthorn	W
Rosa multiflora	multiflora rose	W
Tamarix spp.	salt cedar	I

Figure 30. The map below details the locations of invasive species as identified by DNR District Foresters in 2011.



Aerial Survey

Each year the IDNR utilizes an airplane and a laptop with sketch mapping software on it to track forest health issue from above the tree canopy. A total of 512,474 acres of land were surveyed this year. The 2011 survey found severe tree damage and mortality along the Missouri River from this year's flooding. Silver maple and cottonwood trees throughout the state showed chlorotic leaves from their water saturated soils.

Most counties along the route also showed signs of Dutch elm disease and bur oak blight. A large population of lace bugs caused oak leaves to look discolored in late July. Scattered trees with lace bug damage were noticed throughout the state, with most of the tree damage occurring in Eastern Iowa. The aerial flights found the same levels of pine wilt and slightly higher levels of oak wilt than those that were noted in the 2010 aerial survey. In addition, the aerial flight continued to find large pockets of aspen continuing to decline in NE Iowa. The cause of the aspen decline is unknown at this time.

Figure 31. The map below shows the flight lines where the aerial mapping took place.

Flooding Along Missouri River:

The aerial flights and remote sensing imagery found roughly 19,000 acres of flooded woodlands. It is estimated that there are about 2,500 board feet per acre totaling 31,788,333 board feet. The timber sale bids in the area have been 10 cents per board foot (conservatively). Using these conservative estimates, this timber would have a sale value of 31,788,833 (3.2 million dollars of timber). However, since the standing water from the flooding lasted past 4 month it is expected that the tree mortality rate will be 50-80%.

IDNR estimated (conservatively) 50 large trees per acre (50 trees x 19,000 acres). That would equal 950,000 dead trees. This estimate is on the low side. We know there are smaller trees and denser stands in the area. The need for salvage cuts and follow up timber management plans in the area is critical for the forest type to survive. IDNR has applied for an evaluation monitoring grant in cooperation with North and South Dakota, Nebraska, and Missouri. The goal of this grant, if funded, is to follow disease and insect trend on permanent community and woodland monitoring plots. Check for more updated information in the 2012 Forest Health Highlights.

Figure 32. The picture below is an example of the flooding impacts on a rural farm site where the water had been standing just short of four months.

Figure 33 and 34. The two pictures below are typical examples of the flooding that occurred on woodlands in western Iowa.

Conclusion:

Management plays an important role in creating a healthy Iowa forest. The best insurance a person can have when managing their woodlands is diversity of tree species with the appropriate number of trees per acre. These simple management strategies may help prevent excessive tree loss from a single pest and help maintain the trees' vigor, which may make them more resistant to potentially destructive insects and diseases. The best management plan for community forests is to not have more than 10% of any one species represented. Iowa forests provide an important role by providing abundant forest products and amenities, including outdoor recreation opportunities, wildlife habitat, water quality, and the economic benefits of a vast array of wood and wood fiber products.

Iowa's forests are facing an unprecedented level of invasive pests, chemical damage, wildlife pressure, and improper management. Emerald ash borer, gypsy moth, bur oak blight, and thousand cankers disease on walnut could have a 91.6 billion dollar impact on Iowa's woodlands and community trees. No longer will passive management allow for woodlands to be "preserved" in the condition that they are in today. Learning about your woodlands and how each component affects another will make it easier for Iowa's woodlands to be managed for long term health. If you need technical assistance with your woodlands contact your district forester for assistance at http://www.iowadnr.gov/Environment/Forestry/ForestryLandownerAssistance/DistrictForesterContacts.aspx.

The Bureau of Forestry, through cooperation with other agencies, has programs in place to monitor forest stressors which have potential to move into Iowa and damage our forests. Those programs operated vigorously during 2011, and plans are in place for a similar continued vigorous forest health program operation in 2012. However, budget constraints prevented further research of oak tatters, oak wilt control in Hardin County, aspen decline in Allamakee County, and community assistance in managing flood damaged trees along the Missouri River. Additional funds are needed for these important forest health issues to be addressed in 2012.

IDNR would like to thank its collaborators from USDA-APHIS-PPQ, Iowa State University Extension, Iowa Department of Agriculture and Land Stewardship, and Department of Natural Resources Foresters.

Useful Phone Numbers and Websites

IDNR Forestry Bureau has an updated forest health page. Check us out on the web http://www.iowadnr.gov/Environment/Forestry/ForestHealth.aspx.

IDNR maintains an emerald ash borer resource page available at http://www.iowadnr.gov/Environment/Forestry/ForestHealth/EmeraldAshBorer.aspx.

Iowa Department of Agriculture and Land Stewardship Tree Health Page http://iowatreepests.com/.

Iowa State University's Pest Management and the Environment page host information on emerald ash borer, gypsy moth and much more http://www.extension.iastate.edu/pme/.

The Iowa State University Plant Disease Clinic has been assisting Iowan's for nearly 50 years and is still available to answer plant disease questions. From flowers to trees they are ready to help. Contact them at 515-294-0581 or check them out on the web at http://www.extension.iastate.edu/Pages/plantpath/pdcintro.html.

For the creepy and crawling things on your plants, don't forget to contact Iowa State University Extension Entomology. They can help you identify the insect and discover the best control measures. Contact them 515-294-1101 or on the web at http://www.ent.iastate.edu/clinic/.

IDNR landowner assistance with their woodland is located here http://www.iowadnr.gov/Environment/Forestry/ForestryLandownerAssistance.aspx.

Be sure to look at the updated Iowa DNR website at http://www.iowadnr.gov/.

Additional web resources for learning about invasive species are:

- Center for Invasive Plant Management- www.weedcenter.org Invasive Plant Management on-line textbook
- National Invasive Species Information Center- www.invasivespeciesinfo.gov
- USDA-APHIS web site- www.invasive.org
- Forest Service web site: www.na.fs.fed.us/fhp/invasive_plants/links/index.shtm
- Natural Resource Conservation Service web site: http://plants.usda.gov
- Woodland invasive species in Iowa brochure produced by Iowa State University- https://www.extension.iastate.edu/store/ItemDetail.aspx?ProductID=6497&SeriesCode=&CategoryID=&Keyword=invasive%20species

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