North Dakota Forest Service

North Dakota Forest Health Highlights 2013

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Forest Health Program
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Overview

This report summarizes forest health highlights observed in North Dakota during 2013.

Weather trends of significance, forest pest and health surveys are summarized, and specific forest insects, diseases and damaging abiotic agents of current concern are described.

The information presented in this report was compiled from various sources and methods, including site visits, on-the-ground forest surveys, aerial surveys and personal communication with natural resource professionals.

The conclusion of this report contains an overview of the most notable emerging forest health issues in relation to their effects on the sustainability and societal value of North Dakota's tree and forest resources (see Appendix 1).

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Cover Photo: A. Bergdahl, North Dakota Forest Service.

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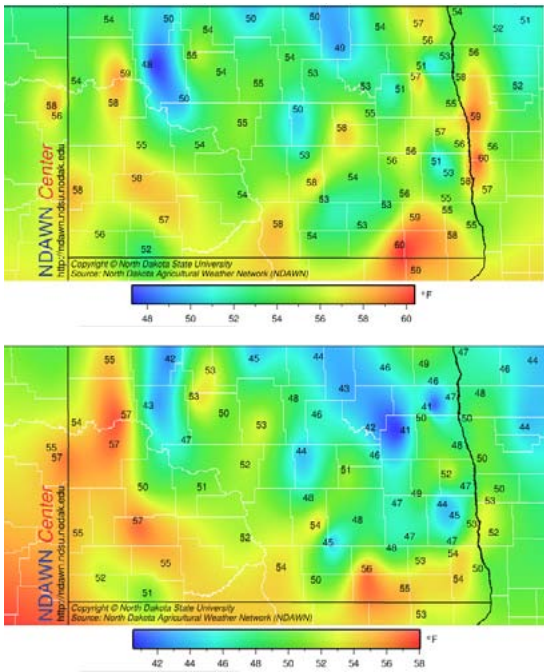
Weather-related Trends

Weather trends in 2013 presented a unique set of tree health problems, starting in the spring with a late warmup keeping soil temperatures lower for a longer duration than usual across most of the state. (See, for example, the comparison of the average soil temperatures for May in 2012 vs. 2013 in Figure 1.)

This was accompanied by saturated soils across most of North Dakota, with most areas receiving more than 100 percent above-normal rainfall amounts in May. The southwestern corner of the state saw the greatest above-normal precipitation. It received 440 percent of normal rainfall (Figure 2).

This led to a higher than normal incidence and reports of chlorosis in trees, particularly maples. This was especially reported around Bismarck, where environmental conditions (cool and wet soils) favored chlorosis.

Figure 1: Comparison of soil temperatures for May 2012 and 2013.



Also, ample spring moisture favored development of various fungal diseases. This included the development of some diseases that seldom are recorded as causing notable damage (see *Kabatina shoot blight* in the *Pathogen Trends of Concern* section of this report).

Following the more or less uniformly cool and wet spring across the state, weather patterns changed to a far more mosaic pattern, with some areas (Adams, Bowman, Hettinger, Slope and Ward counties) receiving record rainfalls and some areas (Eddy and Foster counties, especially at the Carrington Research Extension Center in Carrington) becoming extremely dry (Figure 3).

Figure 2: Percentages of normal rainfall in May show much higher than normal precipitation for the month in most areas, notably the southwest corner.

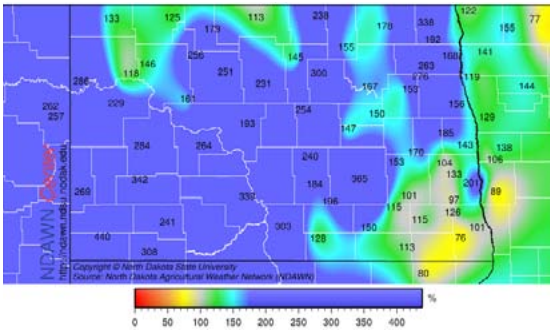
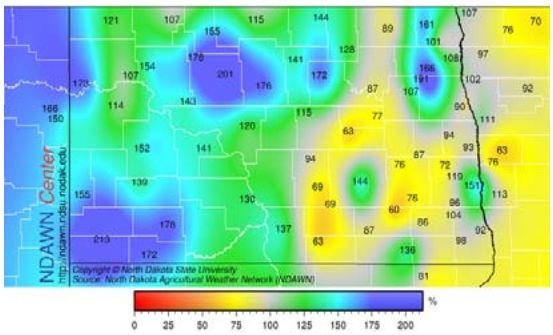


Figure 3: Percentages of normal rainfall in 2013 highlight the patchiness of moisture conditions and, therefore, possible pathogen incidence.



Section II

Invasive Insect Detection and Forest Health Surveys

Gypsy Moth

In 2013, 380 traps were placed, with an effective sampling range of about 750,000 acres (the lure is effective at a one-mile radius). No gypsy moths (*Lymantria dispar*) were detected in 2013. No positive finds of gypsy moth have occurred in North Dakota since 2005 (Mike Kangas, personal contact).

A new filmlike lure replaced the rope lure that has been deployed in the past. This new lure is baited with the same gypsy moth pheromone as in previous years and will be used again in 2014 (Figure 4).

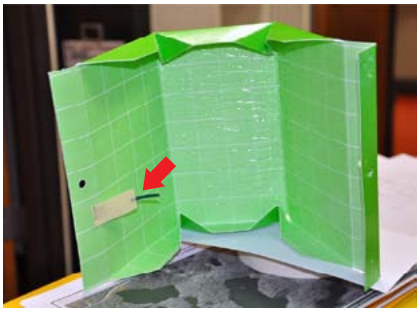


Figure 4: (Top) Assembled gypsy moth trap and (bottom) the new filmlike lure with an attachment system (red arrow) devised by forest health intern, Alec Miller (*A. Bergdahl, NDFS*).

EAB

In 2013, a cooperative effort by the North Dakota Department of Agriculture (NDDA), U.S. Department of Agriculture Animal and Plant Health Inspection Service Plant Protection and Quarantine (APHIS PPQ) and the North Dakota Forest Service (NDFS) placed 364 “purple sticky prism” traps throughout North Dakota (Figure 5). No emerald ash borers (EAB) (*Agrilus planipennis*) were detected in 2013.

A new EAB pheromone lure was tested in 25 traps placed in selected sites across the state in 2013. The lure, (3Z)-lactone (aPhinity EAB, Sylvar Technologies Inc., New Brunswick, Canada) is a female-produced pheromone that has shown higher trapping rates in low-density EAB populations. This new lure was used in combination with the 3(Z)-Hexanol and manuca oil lures, as directed (Figure 3).

No EAB were detected with the new pheromone lure and no distinguishable differences were discovered in the collateral insects that were collected (no native *Agrilus* spp., such as the two-lined chestnut borer, *Agrilus bilineatus,* were found in the traps when inspected at the conclusion of the trapping season).

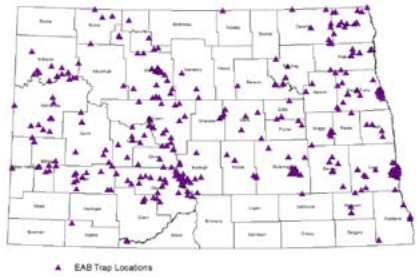


Figure 5: (Top) Emerald ash borer trapping locations in 2013. (*North Dakota Department of Agriculture*). (Bottom) An EAB trap with a small orange EAB pheromone lure tab next to the usual lures (*A. Bergdahl, NDFS*).

2013 Aerial Forest Health Survey of the Forested Areas of the Pembina Gorge and the Red River

The North Dakota Forest Service's Forest Health Program contracted with the Minnesota Department of Natural Resources' resource assessment group from Grand Rapids, Minn., to do an aerial survey of forest resources in selected areas in June 2013. The survey did not take place until July due to the late phenology of trees resulting from the longer cool spring.

The survey focused on the Red River corridor and the Pembina Gorge in northeastern North Dakota. A 300-meter buffer zone along the Red River from Wahpeton, N.D., north to the Canadian border (roughly 90,000 acres) was surveyed. In addition, the Pembina Gorge, comprising roughly 40,000 acres of forestland, was surveyed (Figure 6).

The purpose of the survey was to identify forest health threats in specific areas for later ground truthing. Ground truthing for this particular survey began in the fall of 2013 and will continue during the 2014 field season. This process allows confirmation of the presence/absence of forest pests/disorders and quantifies the extent of impact on the forest resource. Management options will be outlined for forestland owners/managers if needed or requested.

The main deliverables of the project were aerial mapping of the identified forest resources via a geographical information system (GIS). GIS shapefiles containing polygons coded according to damage type were given to the NDFS for use in reports and mapping. Pictures also were taken from the air by the forest health specialist for use in NDFS publications (Figures 7 and 8).

The main findings of the survey were approximately 2,000 acres of forest tent caterpillar (FTC)(*Malacosoma disstrium*) defoliation and roughly 1,300 acres of flooding mortality along the Red River. Dutch elm disease (DED)(*Ophiostoma ulmi/ O.novo-ulmi*) was seen scattered throughout the Pembina Gorge and along the Red River.

Several hundred acres of uncategorized "decline" were reported in the Pembina Gorge area. These sites will be visited to determine the actual agents of decline. From the air, these areas appeared to be predominantly aspen.

An aerial survey of Missouri and Mouse River riparian areas is planned for field season 2014. A follow-up survey of the Turtle Mountains also will be done to see if forest health conditions have changed since the previous survey in 2011.

Figure 6: Aerial survey areas for 2013: Green arrow indicates the Pembina Gorge survey area. The area between the blue arrows indicates the Red River survey area (NDFS).

Figure 7: A section of the Pembina Gorge in northeastern North Dakota (*A. Bergdahl, NDFS*).

Figure 8. A typical Red River riparian forest pictured from the air during the 2013 aerial survey of the Red River corridor (*A. Bergdahl, NDFS*).

Survey of Ips Damage in Slope County, N.D.

A request was made to the NDFS to evaluate the health of ponderosa pine (*Pinus ponderosa*) trees on a privately owned ranch in Slope County in late winter 2013. The NDFS forest health specialist visited the landowner to provide assistance.

Two sites were visited, and the trees and the site were evaluated. Also, branch samples were taken and later peeled and more closely examined. In the areas visited on the ranch, slash piles had not been taken care of properly and thoroughly (Figure 9) within a time frame that would mitigate insect outbreaks and damage to other trees in the approximate area.

Bark beetle galleries in patterns typical of pine engraver beetle (*Ips pini)* and the red turpintine beetle (*Dendroctonus valens*) were encountered frequently in the branches of declining trees, main stem of dead trees and slash piles. Various other signs of additional beetles and insects in adult and larval stages, including one species (*Pityogenes carinulatus*) never before reported in North Dakota, also were found. This newly reported species is not of primary concern to tree health. Management recommendations were made and shared with forestland managers in the form of a report.

Figure 9: Ponderosa pine trees showing signs of engraver beetle attack next to a slash pile that serves as a concentration of breeding material. Beetle populations increase rapidly, and large populations cause increased damage to adjacent trees and sometimes decline leading to tree mortality (*A. Bergdahl, NDFS*).

Zimmerman Pine Moth at Icelandic State Park

Zimmerman pine moth (*Dioryctria zimmermanii*) incidence has been noted to be high in the region around Icelandic State Park in Pembina County for a number of years. Icelandic Sate Park managers identified this as a major tree health problem that is causing damage, dieback and stem breakage (Figure 10) in the park and asked NDFS Forest Health for assistance.

Traditional management recommendations for Zimmerman pine moth require very specifically timed applications of insecticide. Degree day information on Zimmerman pine moth life cycles that would enable proper timing of a treatment was not available for North Dakota. Further, the type of traditionally recommended insecticide and the rate at which it is applied makes treatments impractical and dangerous to applicators and nontarget organisms, including park users. For these reasons, a new approach was tried.

In talking with tree health managers in other parts of the U.S., it was learned that granular applications of imidacloprid (watered into the soil under trees) have been shown to control boring insects. This type of application fit well with the objectives of park managers and the criteria set by the Department of Health, which was consulted and gave approval prior to insecticide application.

Additionally, the single registered beekeeper in a several-mile radius of the park was made aware of the trial and did not voice concern. This extra precaution was taken because chemicals containing neonicotinoids (such as imidacloprid) have been shown to harm bees. However, because pine trees are wind-pollinated and bees do not collect pine pollen, the threat to bee populations was not a concern.

Tree health evaluations were conducted on a total of 100 trees at five different sites to establish baseline information (Figure 11). Following this, the systemic insecticide Criterion (Bayer Environmental Science) was applied in granular form within the drip line of pine trees on the five sites in accordance with the rate and precautionary measures indicated on the label. The treated area was watered directly after application of the granular to aid its incorporation into the soil and uptake into the tree.

The coordinates of the first and last trees in the treated rows were recorded using GPS (global positioning systems). A follow-up rating and insecticide application will be conducted during the 2014 field season in cooperation with Icelandic State Park managers.

Figure 10: Pitch masses at a branch whorl (yellow arrows), which are characteristic of boring damage sites made by Zimmerman pine moth larvae (*A. Bergdahl, NDFS*).

Figure 11: Stewardship forester Steven Burdick and forest health intern Alec Miller lend a hand during tree health inventories at Icelandic State Park (*A. Bergdahl, NDFS*).

Section III

General Insect, Disease, Abiotic and Undetermined Trends of Significance in N.D., 2013

A. Insect Trends of Concern

Forest Tent Caterpillar and Large Aspen Tortrix Defoliator Populations Lower in the Turtle Mountains and Northeastern N.D. in 2013

The populations of the commonly encountered defoliator of aspen in North Dakota, the forest tent caterpillar (FTC), seemed to be down in 2013, judging from an aerial survey of the Pembina Gorge and Red River corridor. This indicates that we are likely in a population-building year of the FTC's boom/bust life cycle.

The large aspen tortrix (LAT) (*Choristoneura conflictana*) population in the Turtle Mountains seemed to be down as well in 2013, with few reports of damage. This was judged from on-the-ground surveys of areas of the Turtle Mountains with a known history of LAT, such as the Hartley Boundary area, where severe defoliation was seen in 2011. The aerial survey of the Turtle Mountains scheduled for the summer of 2014 should allow a better estimation of current defoliation acreages.

Elm Bark Beetles: Population Changes

An apparent shift in populations of elm bark beetles that vector the Dutch elm disease fungus (Figure 12) has been occurring during the past years. The smaller European elm bark beetle (*Scolytus multistriatus*) has all but disappeared in results from trapping carried out by the NDSU Entomology Department in eight locations throughout North Dakota.

Native elm bark beetle (*Hylurgopinus rufipes*) and banded elm bark beetle (*Scolytus shevyrewi*) were trapped in roughly equal frequency. Only one European elm bark beetle was found in traps in 2013 (Gerald Fauske, personal communication).

This may have implications affecting the rate of mortality in DED-infected trees and the rate of spread of the DED fungus. This inference is based on literature that states the banded elm bark beetle (BEBB) prefers feeding on larger-diameter branches and more frequently utilizes the main stem. This translates to introduction of the DED fungus lower in the canopy (closer to the main stem) and in the main stem, which would lead to rapid decline and death of elms infected in this way.

Further, BEBB life history information indicates that the insect is capable of multiple life cycles in a growing season, increasing the potential for vectoring the DED fungus.

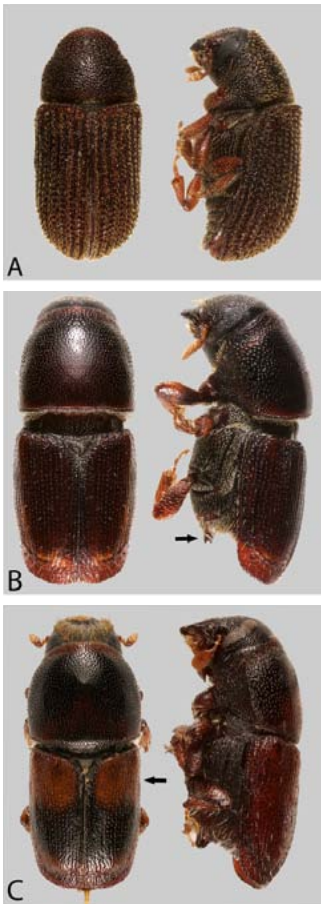


Figure 12: A) Native elm bark beetle; B) European elm bark beetle, arrow indicating distinguishing feature; C) Banded elm bark beetle, arrow indicating distinguishing feature (A composite of *images separately taken by Guy Hanley, Minot State University*).

Redheaded Ash Borer (RHAB): Found in Large Numbers in N.D. in 2013

In beetle trapping that the NDSU Entomology Department conducted, RHAB (*Neoclytus acuminatus*) (Figure 13) was collected in record numbers in 2013. The amount of RHAB found in 2013 was several hundred percent higher than has been found on average in previous years of the survey using the same trapping protocol (same traps, lures, locations, etc.) (Gerald Fauske, personal contact).

Researchers do not know why this indicated population surge has occurred. They think it may be due to adverse environmental conditions in past years, in particular, flooding during the growing season.

Figure 13: RHAB adult and characteristic round exit holes (*H. E. Evans, Colorado State University, www.Bugwood.org*).

Bronze Birch Borer (BBB)

Bronze birch borer (*Agrilus anxius*) (Figure 14A) has been a consistent damaging agent of birch trees across North Dakota. Because this pest is attracted to trees weakened by stress conditions, especially drought (and conceivably stress due to excess moisture), BBB populations have been on the rise for the past few years.

A high incidence of damage (Figure 14B) was seen in the west, especially in Williston, where a sizable proportion of older birch trees showed various stages of decline. The droughty conditions in the summer of 2013 in specific areas of the state could mean a continuation of high BBB incidence.

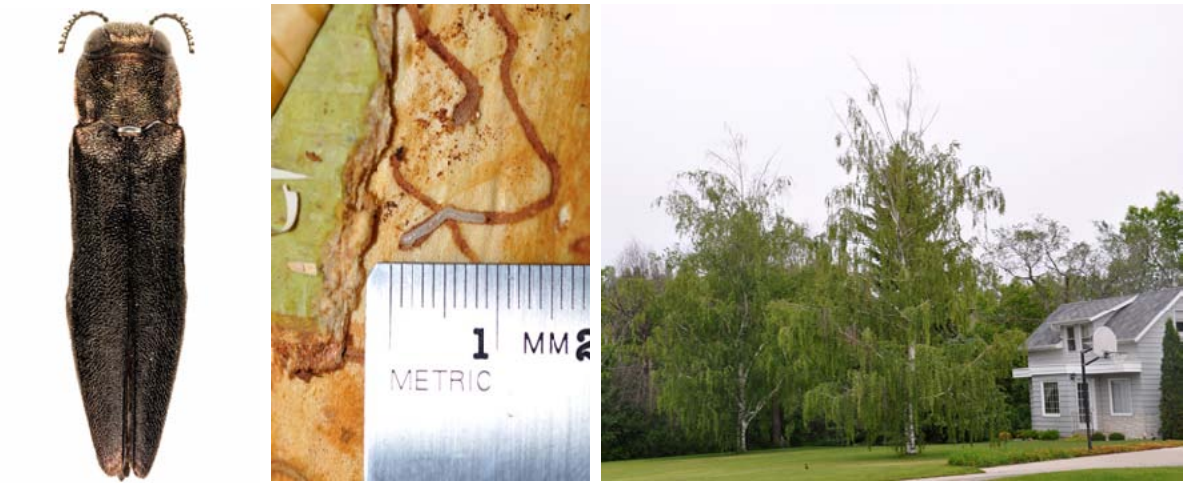


Figure 14: (Left) Adult BBB (*G. Hanley, Minot State University*). (Middle) Exposed BBB larvae feeding under the bark. The larva is in an earlier stage of development and, therefore, is small. (Right) Birch trees with top dieback, typical of BBB attack, in Washburn, N.D. (*A. Bergdahl, NDFS*).

Pine Moths

The incidence of pine-feeding moths is seen consistently in North Dakota ponderosa pine plantings, with lower frequency on other pine hosts. Although many are familiar with the Zimmerman pine moth (*Dioryctria zimmermani*), whose larvae frequently attack the main stem, North Dakota has other similar species and genera of pine moths. Differentiating among these often is not easy, but the following list should provide some insight to these less-understood pine pests present in North Dakota:

- Pitch nodule moth (*Retinia spp.*) larvae cause pitch nodules to form as they feed inside the tips of twigs.
- Pine coneworm (*Dioryctria spp.*) larvae cause damage to the tips of twigs and fine branches. Later they bore into cones, causing them to fall apart easily. The life cycle of these insects in the genus Dioryctria is considerably different from the other tip moths, with much later emergence times.
- Western pine tip moth (*Ryacionia bushnelli*) larvae primarily cause damage to ponderosa pine. R. buoliana also is thought to occur in North Dakota, but it has not been collected as of 2013.
- Southwestern pine tip moth (*Ryacionia neomexicana*) larvae primarily attack ponderosa pine branch tips (lodgepole pine also is a common host).

Populations of tip moth can reach infestation levels, although they often are brought into balance by natural processes/predators, and management seldom is required. Damage by this suite of pests (Figure 15) commonly is reported by homeowners but also is common in conservation plantings.

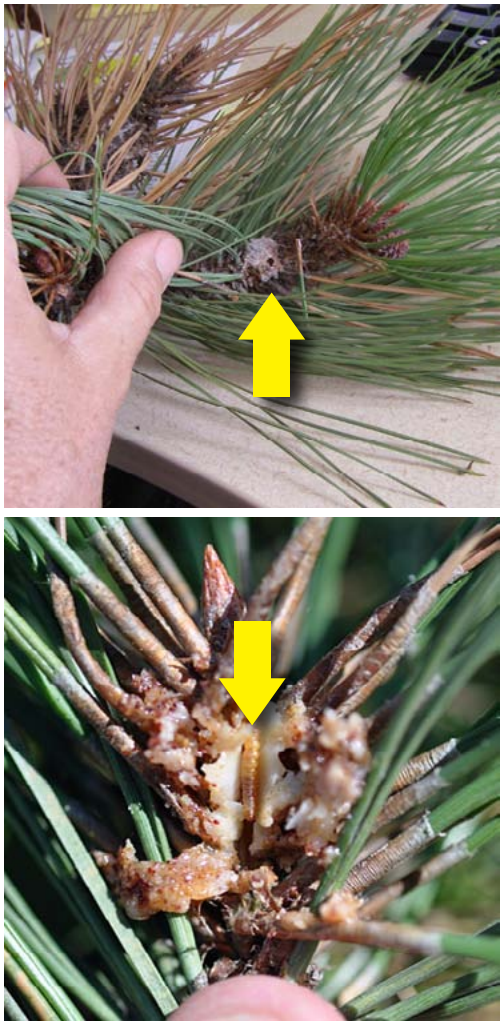


Figure 15: (Left) Pitch mass on current year gowth (*C. Stange, Natural Resources Conservation Service*) and (Right) a close-up of a tip boring pine moth larva (*A. Bergdahl, NDFS*).

Japanese Beetle

Japanese Beetle (Figure 16) was detected in a few locations in North Dakota in 2013. The highest number trapped in the survey was in Bismarck. The pest is of concern to tree health due to its strong feeding preference for the foliage of American basswood (*Tilia americana*) and little-leaf linden (*Tilia cordata*). It also is a serious pest of many woody horticultural plants. The Japanese beetle introductions have come from nursery stock. The pest is not considered to be established in North Dakota.

Figure 16: Japanese beetle adult (*C. Elhard, NDDA*)

B. Pathogen Trends of Concern

- **Kabatina shoot blight** (*Kabatina juniperi*) (Figure 17) was reported in Rocky Mountain juniper (*Juniperus scopulorum*) conservation plantings in southwestern North Dakota for the first time in many years. The unusually wet spring (440 percent above normal rainfall in May, Figure 2) and early summer in that region led to a number of moisture-dependent leaf disorders not usually encountered in the typically drier region. This disease also was reported in the northeastern part of North Dakota.
- Disease levels of **anthracnose of green ash** (*Gnomoniella fraxini* on *Fraxinus pennsylvanica*) and **bur oak** (*Apiognomonia quercina* on *Quercus macrocarpa*) were seen at elevated levels in western and central regions of North Dakota due to prime weather during the initial infection period in the spring. Greater than usual disease development was followed by favorable weather, allowing for reinfection cycles to occur throughout early summer. This led to quite severe leaf necrosis and desiccation symptoms, especially in oak, by late summer.
- **Stigmina needle cast** (*Stigmina lautii*) continues to be the most prevalent disease of spruce (*Picea spp.*) trees in conservation and homeowner plantings. Needle cast fungi were encountered commonly in 2013. A survey of needle cast incidence in North Dakota tentatively is scheduled for 2014. Additionally, a survey of Meyer spruce (*Picea meyeri*) disease susceptibility to needle cast fungi is planned. Meyer spruce is purported to have higher needle cast disease resistance, but this has not been verified in North Dakota.

Figure 17: Kabatina tip blight of juniper (*Oregon State U. Plant Clinic Collection*). Orange Arrows indicate the points of infection where small black spore-producing structures can be seen.

- **Dutch elm disease (DED)** (*Ophiostoma ulmi*), which is present in all 53 North Dakota counties, continues to be a disease of significance (Figure 18). This is especially true in western communities, where the DED epidemic is in its first wave of new infections and mortality of mature trees is common and widespread.

  Controlling this disease is challenging, especially in towns lacking municipal forestry programs or funds to remove and dispose of diseased trees promptly. Further, tree-care workers are in short supply throughout the western half of the state due to the availability of higher-paying jobs in the oil producing region.

  DED also was prevalent in central North Dakota and was among the most common tree health disorders identified from the aerial survey of Red River riparian forests.

  Dutch Elm Disease – See also: Elm Bark Beetles: Population Changes

Figure 18: (Top) Dutch elm disease in a Williston, N.D. park and (left) outside of Carrington, N.D. (*A. Bergdahl, NDFS*)

- **Armillaria root rot** (*Armillaria spp.*) is expected to continue to increase in the coming years. The disease is linked to the stress caused by the various statewide flooding events that occurred (or continued to occur) since 2009 and especially during the 2011 growing season. No information is available on the species occurrence and distribution of armillaria root rot species in North Dakota. In 2013, armillaria was encountered a number of times. The disease was associated with previously flooded areas and in areas that have experienced other significant stressors in natural forest areas and conservation plantings.

- **Fire blight** (*Erwinia amylovora*) (Figure 19) continues to be a commonly encountered problem on apple trees, caragana and pear trees in North Dakota. This was especially true in 2013 in areas experiencing higher than normal precipitation. The opposite was seen in areas, such as Carrington, that experienced a very dry growing season. The same was true for other common diseases of apple, such as **black rot** (*Botryosphaeria obtusa*) and **apple scab** (*Venturia inaequalis*). These diseases also remained significant in areas receiving normal to above-normal precipitation while disease occurrence was notably lower in the driest areas of the state. Foresters suspect that the high levels of these diseases still was encountered in the driest regions due to homeowner irrigation practices. Homeowners who do not take measures to avoid spraying water directly on the crown of trees and unintentionally prolong periods of leaf wetness, unknowingly create favorable conditions for the development of these diseases. Efforts continue to encourage homeowners to irrigate at night and avoid spraying irrigation water directly on tree foliage.

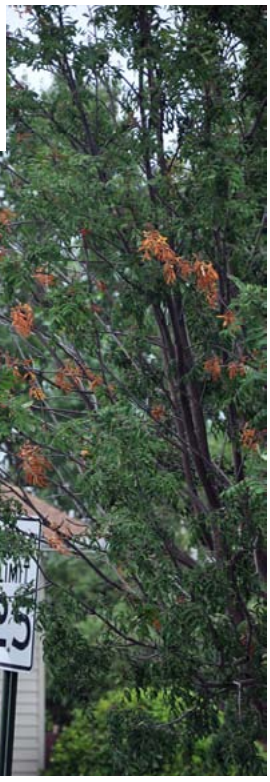


Figure 19: (Top) Bacterial fireblight on cotoneaster in Bismarck. (Right) A "shepherd's crook" symptom of fireblight on the same shrub (Bottom) Fireblight on mountain ash in Cavalier showing flagging of infected branch tips. (*A. Bergdahl, NDFS*).

C. Abiotic Trends of Concern

- An **early October blizzard** hit the southwest of North Dakota causing widespread damage to primarily hardwood trees in Adams, Bowman, Hettinger and Slope counties (Figure 20). The severe weather prompted a federal disaster declaration from the U.S. government to help the area. A North Dakota Forest Service Representative toured the affected areas after the storm to assess damage and take pictures to document the storm's effects. Conservation plantings were severely impacted by heavy snow loads leading to limb failure and stem breakage. This damage will possibly lead to future increased incidence of wood decay fungi in affected plantings. The stress to trees may also make them more susceptible to bark beetle infestation. These areas will be visited again in 2014 to monitor tree health conditions.
- **Herbicide damage** (Figure 21) continues to be a commonly encountered abiotic agent of damage to trees and shrubs in urban and rural environments. Improper or careless selection and/or application of pesticides constitute a substantial percentage of homeowner inquiries regarding tree and shrub health in North Dakota.
- Various species of trees and shrubs commonly experience significant health problems due to the high alkalinity of many North Dakota soils. A major tree and shrub health issue resulting from these high pH soil conditions is **chlorosis**. While a number of things can cause chlorosis, the spring of 2013 was characterized by moist, below-average soil temperatures (Figure 1). Forest health personnel in the Plains have suggested that this combination of high moisture and cooler than normal soils in the spring exacerbates chlorosis symptoms. This led to an increase in iron chlorosis incidence and severity, with numerous reports from Bismarck, Mandan and surrounding areas in 2013.

Figure 20: The 2013 early October blizzard stripped braches and broke stems of trees throughout the affected counties. (*T. Claeys, NDFS*)

Figure 21: Glyphosate damage to oak and spruce growing side by side (*A. Bergdahl, NDFS*).

D. Undetermined Trends of Concern

- **Cultural practices**, such as improper planting, mulching, pruning, watering, fertilization practices and failure to remove landscape fabric, mostly by private homeowners, constitute a major proportion of tree health issues responded to by the forest health specialist in North Dakota. Continued efforts to educate the public about proper tree care continues to be a priority of the North Dakota Forest Service, North Dakota State University, and state and municipal entities involved in the care of tree resources.

- **Undetermined Ponderosa Pine Windbreak Decline in Burleigh, Kidder and Stutsman Counties —** The decline of mature ponderosa pine windbreaks has been seen increasingly in the past years in Burleigh, Kidder and Stutsman counties. Decline, such as that pictured in Figure 22, has been reported to be quite rapid and has been associated with damage that appears to be of a "wilting" type. No signs of root pathogens were discovered following digging around the base of several trees, and soil tests were within a normal range.

  This is unlikely to be pine wilt disease (PWD), as some suspected, because PWD should not affect native pine species under normal conditions (although it will readily kill non-native pines like Scotch and Austrian). Further, PWD has not been detected in North Dakota. PWD is caused by a disease complex including the pinewood nematode and a longhorned beetle vector. The disease is present in the bordering states of Minnesota and South Dakota. There are at least two long-horned beetle insect vectors of the nematode that are native to North Dakota. For these reasons, pine wilt continues to be a disease of concern to (non-native pine) Scotch pine plantings in the state. Monitoring for this disease by the NDFS is ongoing in hopes of an early detection.

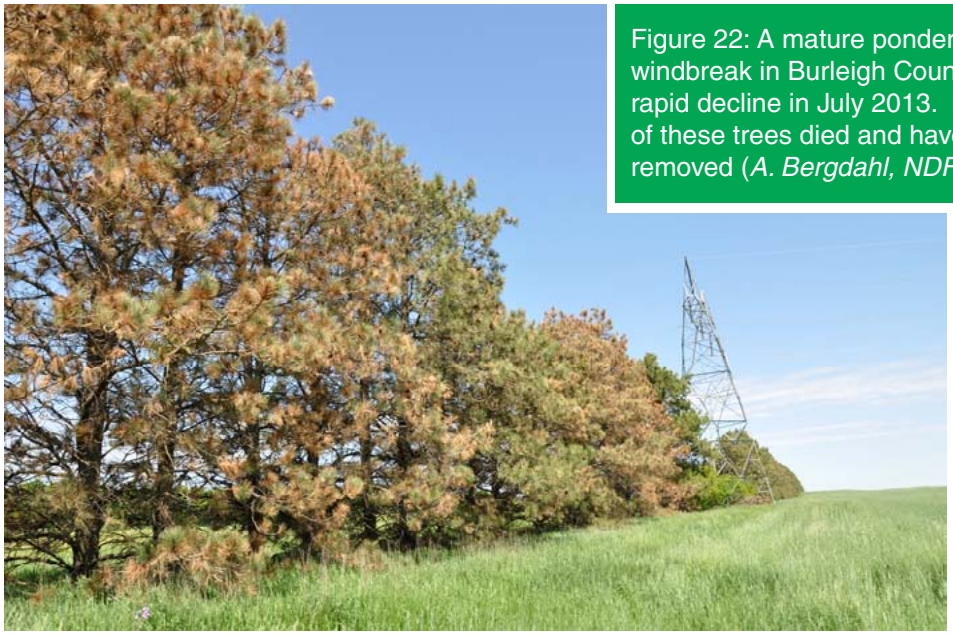


Figure 22: A mature ponderosa pine windbreak in Burleigh County showing rapid decline in July 2013. Most of these trees died and have been removed (*A. Bergdahl, NDFS*).

- **Unconfirmed Golden Willow Decline in Cavalier County —** An informal survey of golden willows in Cavalier County was requested by a member of the Cavalier County Extension Service. A day was spent inspecting numerous golden willow conservation plantings in various states of decline.

  A canker fungus, likely a species of *Cytospora*, was found to be well-established in the plantings (Figure 23). The nursery stock was estimated to have originated from Lincoln Oaks Nursery in Bismarck, where the willow stock is propagated clonally via cuttings and supplied throughout the state.

  A survey of golden willow conservation plantings in other parts of North Dakota did not show a similar extent or pattern of golden willow decline. The problem in Cavalier County likely was due to abiotic stress (unfavorable site suitability, herbicide damage, etc.), predisposing the golden willows to establishment of a secondary canker fungus. A report was made and submitted to the Cavalier County agent.

Figure 23: (Above) A declining golden willow windbreak and (below) a close-up of a cankered branch typical of the dieback branches in the windbreak (*A. Bergdahl, NDFS*).

- **Undetermined Infestation of Bur Oak Plantings in Several N.D. Cities —** Boulevard oak trees planted in the last decade have shown evidence of infestation by an undetermined insect. The very numerous insect larvae do not seem to cause severe damage to the trees. However, foraging from woodpeckers has left some trees with shredded bark that may have serious tree health effects.

  Hundreds of trees Fargo have been affected, with reports also from several other North Dakota communities. A survey of these trees is planned for the early 2014 field season. Samples have been collected and placed in totes so emerging insects can be identified.

Figure 24: Oak tree bark shredded by woodpeckers foraging for the larva of a yet-unidentified insect (*A. Bergdahl, NDFS*).

Section IV

Forest Health Program Events in 2013

Emerald Ash Borer First Detector Training

Emerald ash borer first detector training was held during the joint meeting of the North Dakota Urban and Community Forestry Association (NDUCFA) and North Dakota Nursey and Greenhouse Association in Fargo, N.D. This earlier-than-usual January training included an informational session, an indoor hands-on ash log-peeling session and firewood identification session. The program has trained more than 250 people since it began in 2010.

Emerald Ash Borer Awareness Week

EAB Awareness Week 2013 was observed during May 19 to 25. Activities included a governor's proclamation of the event and statewide cooperation with several communities and state parks. Those participating hung weatherproof fliers on ash trees to highlight information about EAB, its potential to change local tree resources and other messages, such as "Don't Move Firewood" and increase tree diversity in tree resources (Figure 25).

Figure 25: EAB Awareness Week flier on an ash tree at Lake Metigoshe State Park (*A. Bergdahl, NDFS*).

Great Plains Tree Pest Council Meeting Held in Fargo

The Great Plains Tree Pest Council annual meeting was held in Fargo in early July 2013. The three-day event featured guest speakers, state forest health reports and field trips focusing on Fargo's Dutch elm disease management and the Dale E. Herman Arboretum at the Absaraka Horticultural Research Farm (Figure 26).

The third day of the meeting was devoted to work with the disease publication "Diseases of Trees in the Great Plains," scheduled to be printed in late 2014.

Figure 26: Great Plains Tree Pest Council members on a tour at the Dale E. Herman Arboretum led by Todd West and Greg Morgenson (*A. Bergdahl, NDFS*).

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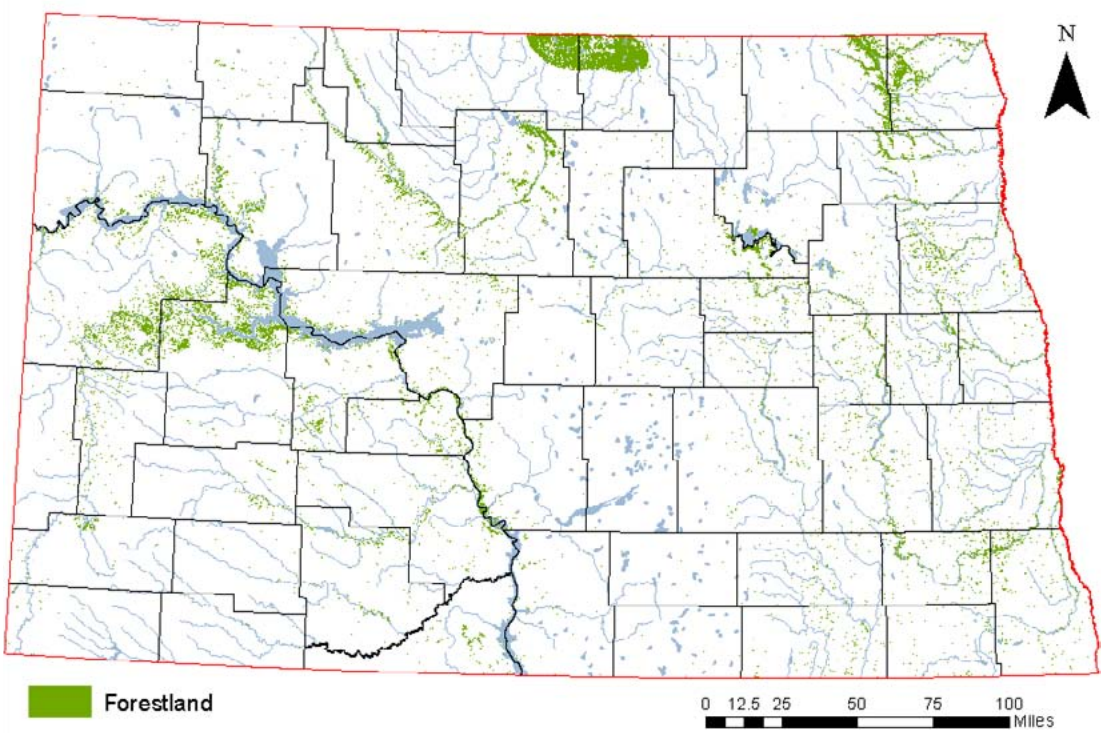
Appendix

Forestland cover in North Dakota. (North Dakota Forest Service).



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