North Dakota
Forest Health Highlights
2015

North Dakota Forest Service

NDSU

North Dakota Forest Service,
North Dakota State University

Overview

This report summarizes forest health highlights observed in North Dakota during 2015.

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 health surveys, aerial surveys and personal communication with natural resource and community forestry professionals.

An additional purpose of this report is to provide 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.

Table of Contents

Report was compiled and written by Aaron Bergdahl, Forest Health Manager, ND Forest Service and formatted by Dave Haasser, Graphic Designer, NDSU Agricultural Communications.

Cover images: Limber Pine Research Natural Area, Slope County, ND. (Background image and lower right image by Aaron Bergdahl, ND Forest Service, and top right image by Jim Walla, Northern Tree Specialties)

Section |

Forest Health Surveys

2015 Aerial Forest Health Survey

Sheyenne River, Red River, Pembina Gorge and Devils Lake Forested Areas

The North Dakota Forest Service (NDFS) Forest Health Program contracted with the Minnesota Department of Natural Resources' Resource Assessment group from Grand Rapids, MN, to conduct an aerial survey of forest resources in selected areas in June 2015. The areas surveyed in 2015 were the Sheyenne River, Red River, Pembina Gorge and forested areas around Devils Lake.

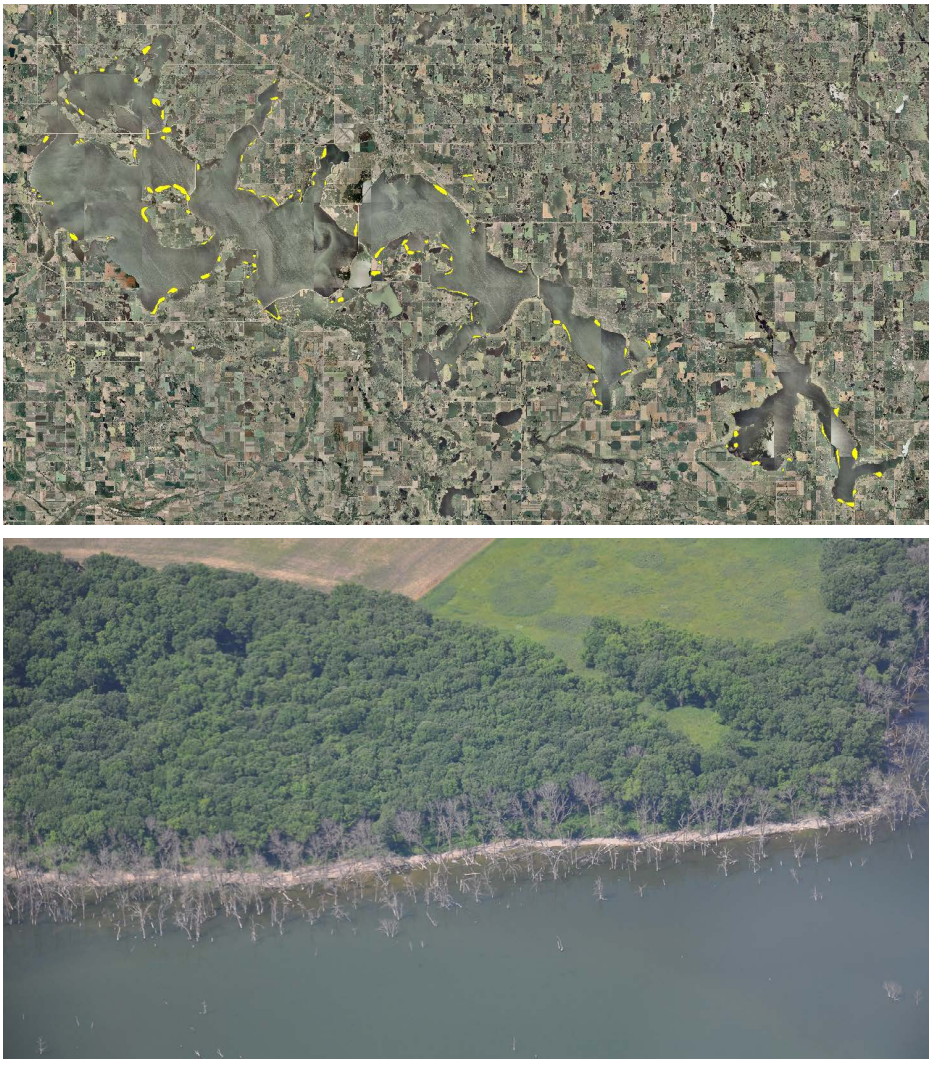


Figure 1. Top: Geographic information system (GIS) image of aerial survey results showing tree mortality (yellow areas) along the shores of Devils Lake. Bottom: Photo of an area on the GIS map. (Aaron Bergdahl, ND Forest Service)

The following results of interest were obtained from aerial survey and GIS analysis:

- Devils Lake: 8,225 acres of dead trees due to past rising of water levels (Figure 1)
- Pembina Gorge: 6,953 acres of a mix of defoliation by insects and injury from the late freeze in May 2015 (Figure 2)
- Red River: 1,326 acres of forest tent caterpillar (FTC) defoliation (see aerial photos in appendix)
- Sheyenne River: 607 acres of FTC defoliation, mostly to the east of Lisbon (see aerial photos in appendix)

Aerial survey plans for 2016 include the Turtle Mountains, a follow-up survey of the Pembina Gorge, and the ponderosa pine resource and limber pine stand in southwestern North Dakota.

Figure 2. Top: Areas in the Pembina Gorge affected by insect defoliators or a late-season frost event highlighted on a GIS map (orange areas). Bottom: Photo of affected trees. (Aaron Bergdahl, ND Forest Service)

Spruce Health Survey 2014: Results

The following text was selected from a formal report prepared by Jim Walla of Northern Tree Specialties in Fargo, ND. NDFS Forest Health contracted with Walla to do an in-depth survey of spruce tree health in North Dakota.

At least 10 spruce plantings in each of 10 counties distributed across North Dakota were examined in July and August 2014 (Figure 3). The purpose primarily was to determine incidence and severity of spruce needle diseases, and also to document other spruce health problems.

Stigmina needlecast (*Stigmina lautii*) or Rhizosphaera needlecast (*Rhizosphaera kalkhoffii*) (hereafter simply referred to as Stigmina and Rhizosphaera) were found in seven of the 10 counties, 55 percent of plantings and 38 percent of trees. Needlecast was prevalent in eastern counties, less common in central counties and not found in western counties.

Average disease severity ratings of Stigmina and Rhizosphaera were 2.1 and 1.8, respectively, on a scale of 3 (severe infection) to 0 (no damage) (Figure 3). Blue spruce and white spruce (Black Hills spruce) had similar incidence and severity of Stigmina. White spruce had much less Rhizosphaera than blue spruce. Stigmina was severe on one red spruce, a previously unknown host.

Average natural and problem-associated crown porosity (area of openings visible through the crown) was 38 percent. The portion of crown porosity of trees with needlecast that was attributed to needlecast averaged 21 percent. Needlecast also damaged trees by decreasing vigor and killing weakened branches.

Stigmina was present on most trees (94 percent) with needlecast, and usually appeared to be the predominant pathogen when present. Rhizosphaera was present on 52 percent of trees with needlecast.

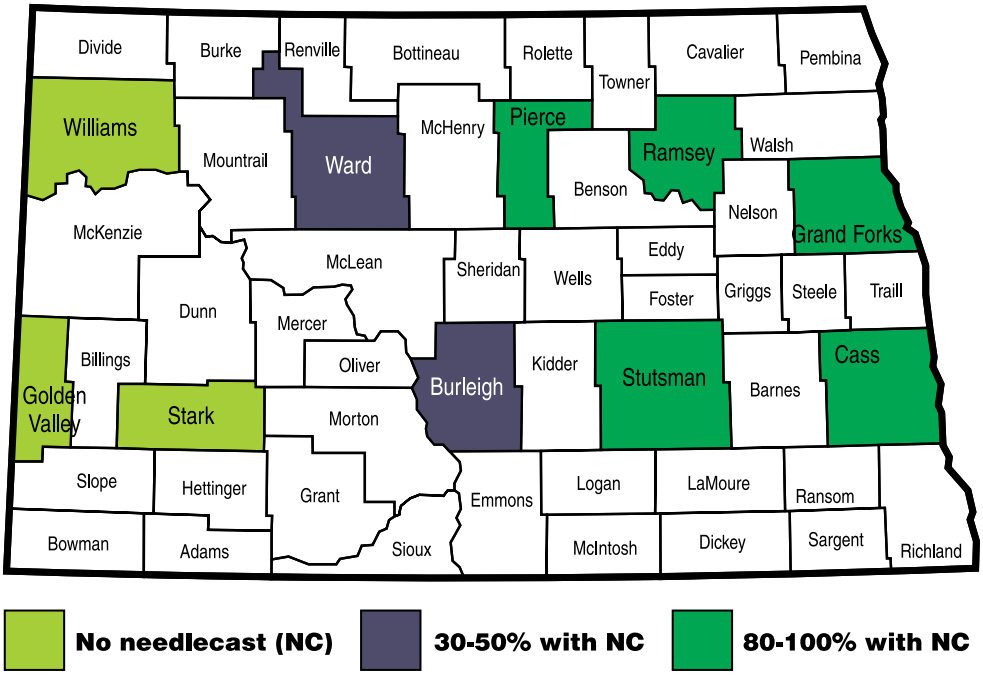


Figure 3. Incidence of needlecast in 10 counties surveyed in 2014. (NDSU)

Because Stigmina is more damaging than Rhizosphaera, and fungicide management for Stigmina would be effective for Rhizosphaera, but not vice versa, field or laboratory diagnosis of Stigmina needlecast at a site would make the presence of Rhizosphaera of little consequence in disease management decisions.

Incidence of Stigmina was about 1.5 times greater than Rhizosphaera on blue spruce (37 percent, 24 percent, respectively), and was four times greater than Rhizosphaera on white spruce (32 percent, 8 percent, respectively) (Figure 4).

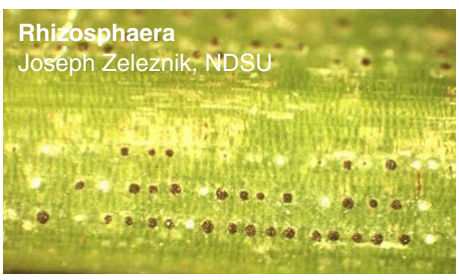
Figure 4. Incident of Stigmina and Rhizosphaera

		Stigmina				Rhizosphaera			
County	Number of sites	% sites	% trees	ANSR	INSR	% sites	% trees	ANSR	INSR
*Grand Forks	10	100	72	1.5	2.3	90	34	0.1	1.3
*Ramsey	10	100	69	1.4	2.0	70	21	0.1	2.0
*Pierce	10	100	83	1.3	2.3	100	52	0.4	1.9
Ward	13	42	19	0.5	2.2	42	14	0.1	1.0
Williams	10	0	0	0	x	0	0	0	x
*Cass	10	80	59	1.2	2.2	70	25	0.3	1.8
*Stutsman	10	100	65	1.3	2.1	100	54	0.9	2.0
Burleigh	10	30	11	0.1	1.0	20	3	0.02	1.0
Stark	11	0	0	0	x	0	0	0	x
Golden Valley	10	0	0	0	x	0	0	0	x
Average	Total 104	54	35	0.7	2.1	49	20	0.2	1.8

*Core needlecast counties.
ANSR = Average Needlecast Severity Rating (over all surveyed trees);
INSR = Infected-tree Needlecast Severity Rating (over needlecast-infected trees).
Rating scale:
3 = Severe (≥50% of foliage or crown affected);
2 = Moderate (10-49%);
1 = Light (1-9%); 0: No damage.


Shelterbelt with needlecast. (Aaron Bergdahl, ND Forest Service)


Stigmina
Aaron Bergdahl, ND Forest Service


Rhizosphaera
Joseph Zeleznik, NDSU

Underbark Temperatures of Green Ash Trees Across North Dakota

The underbark temperature of ash trees at five sites in North Dakota was monitored during the winter of 2014-2015 to gain information about patterns of temperature fluctuations of the ambient environment and how these influence the inner temperature of trees. This was done primarily to better understand the potential temperatures experienced by underbark-inhabiting insects, primarily wood-boring beetles. With the potential threat of the emerald ash borer, NDFS forest health staff thought this information could be very useful when cross-referenced with field studies on the cold hardiness of the emerald ash borer.

Figure 5. (left) The typical setup of the underbark temperature sensors pictured at the NDFS Field Station in Walhalla, ND. (right) A Temperature sensor installed at a NDSU campus location downtown Fargo. (Aaron Bergdahl, ND Forest Service)

In December 2014, temperature sensors were installed (Figure 5) at the following locations statewide (a reason for each site's selection is provided):

- Fargo, Trefoil Park: This area represents a typical riparian forest environment in North Dakota with a high number of ash trees. The area also is close to North Dakota State University, so it can be monitored easily. This area is representative of the climate of eastern North Dakota.
- Fargo, downtown: This area represents a typical urban environment surrounded by mostly asphalt and concrete. This area provides an excellent contrast to rural and natural environments (Figure 5).
- Bottineau and Walhalla: The locations were chosen as areas that experience cold temperature extremes - some of the coldest temperatures in the United States. Also, these areas contain our largest contiguous native forest resources.
- Mandan, Agricultural Research Station: This was a convenient location just outside the Bismarck/Mandan metropolitan area, and due to the high population of the cities of Bismarck and Mandan, this is an area with greater potential for the introduction of emerald ash borer by unintentional human transport. This area also is representative of the climate of western North Dakota.

The ambient temperatures and the inner-bark temperatures on the south side (warmest side) of ash trees in a park setting and an

urban setting were recorded throughout the winter of 2014. The temperature data during a one-day period when temperatures in eastern North Dakota dropped drastically are presented as a line graph in Figure 6.

One point of interest to note is the approximately 12-degree difference between the ambient temperatures and the temperature on the south side of the trees. Also interesting is the warmer southside inner-bark temperature measured in the urban setting, compared with the same measurement in the park.

The coldest temperature registered in 2014 was an ambient temperature of minus 30.4 F at the Walhalla site. The inner-bark temperature on the south side of the tree on that day was a full 10 degrees warmer.

In a study by Venette and Abrahamson (2010), the following information about EAB cold hardiness was published: When larvae reach minus 17.8 C (0 F), 5 percent will die; at minus 23 C (minus 10 F), 34 percent will die; at minus 29 C (minus 20 F), 79 percent will die; and at minus 34 C (minus 30 F), 98 percent will die. This would indicate that just less than 30 percent of EAB larvae, which tend to be found in greater density on the south side of trees, would have survived this temperature extreme.

Questions that still require investigation relate to the time period during which EAB larvae are exposed to low temperatures and the accumulative effects of cold stress during a prolonged winter. However, based on the most current information available, we reasonably can expect that EAB will be able to survive North Dakota winters.

With the same sensors installed at the same locations to monitor temperatures during the 2015-2016 winter, more information is expected to provide an even clearer picture of EAB's ability to survive North Dakota winters.

Because the invasive pest is not found in North Dakota, the message of the North Dakota Forest Service to not move firewood or unprocessed wood products into North Dakota or within North Dakota remains consistent. Citizens must remain informed and vigilant of EAB and continue to report situations where symptoms and signs of EAB are suspected.

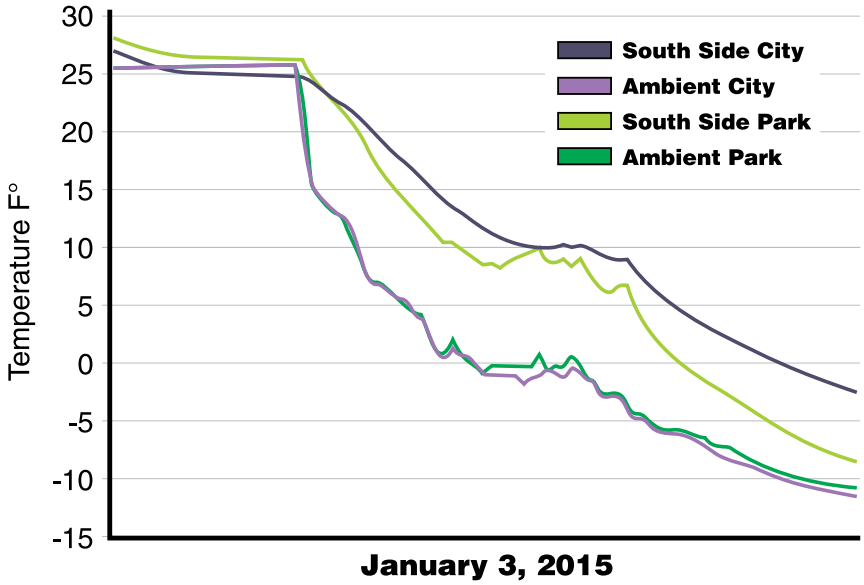


Figure 6. Graphic representation of the ambient air temperature and the under-bark temperature of the south side of a green ash tree in Trefoil Park and downtown Fargo on Jan. 3, a day that experiences a drastic temperature drop during a 24-hour period. Temperature was recorded every 15 minutes. (ND Forest Service)

Health Assessment in Limber Pine Research Natural Area, Slope County, ND, June 23, 2015

Jim Walla, a forest pathologist from Northern Tree Specialties, guided the trip to the limber pines stand because he had familiarity with the area. He provided a formal report following the health assessment of the stand. Here is a synopsis of his written report.

In general, the limber pine trees appeared to be in as good or better condition than in past observations. Also, the trees appeared to have less porcupine and salt damage than in previous observations.

A portion of the limber pines appeared to have Dothistroma needle blight; however, this later was disproved by microscopic analysis in the lab, and efforts continue to identify this needle fungus that appeared to be pathogenic in the stand (Figure 7).

A rough estimation of the trees affected by this needle blight was 10 to 20 percent of the trees distributed throughout the observed areas. Some trees with notable defoliation had very short, new-shoot growth and appeared to be at risk of dying within the next two years if such defoliation continues.

Figure 7. Top: Unknown limber pine needle blight. Bottom: Limber pines in the Limber Pine Research Natural Area. (Aaron Bergdahl, ND Forest Service)

A *Pityophthorus* species (twig beetle) that had been observed in a previous trip with US Forest Service staff was seen on some shoots of some trees in 2015. After collection, the twig beetle was confirmed as *Pityophthorus pinguis* by NDSU entomologist Gerald Fauske, who also visited the limber pine area.

Although the twig beetle was said to be less prevalent than observed during the previous visit, perhaps 3 to 5 percent of the trees distributed throughout the observed areas had notable twig boring. A few trees had nearly all twigs affected, top to bottom.

A perennial canker of unknown cause was observed in 2007 on limber pine. In 2015, photos of these cankers were taken and the cankers were searched for fruiting bodies of a possible causal agent. No fruiting bodies were found, so the cause remains unknown.

As in the past, white pine blister rust was not found in this stand. A witches'-broom that was seen in a past trip is now known possibly to have been caused by *Candidatus Phytoplasma pini*, a pathogen that was found in North Dakota in 2014 in spruce for the first time in North America. No witches'-brooms were seen on limber pine during observations in 2015.

Oak Seedlings Shredded by Woodpeckers

Oak shredding first was reported in North Dakota in 2006 and the causal agent was undetermined. Severe symptoms again were noted and reported widely in 2010-2011. In 2014, regional reports of similar injuries came from North Dakota, Iowa, Minnesota, Wisconsin and Montana.

In winter 2013-2014, an assessment was conducted of 200 oak trees in eight neighborhoods in Fargo. Samples of gall wasps emerging from wood collected in North Dakota, Montana, Colorado and Calgary, Alberta, in spring 2014 were confirmed as *Callirhytis flavipes*.

The damage actually is caused as woodpeckers (downy woodpecker, *Picoides pubescens*) forage on the bark-infesting stages of this insect during winter (Figure 8C). The damage results in branch desiccation and death; often the leader is affected (Figure 8 A, B).

After looking at the gathered data, the following analysis was made: *Callirhytis flavipes* have a preference for older age class, more corky-barked branches, resulting in greater damage ratings for oak trees in the 2- to 11-inch diameter class (Figures 9 and 10).

In a follow-up anecdotal survey in summer 2015, areas with the heaviest damage were revisited. Those conducting the assessment noted that while some trees had been pruned in an attempt to salvage them, most of the trees in the smallest diameter at breast height classes with the highest severity rating had been removed.

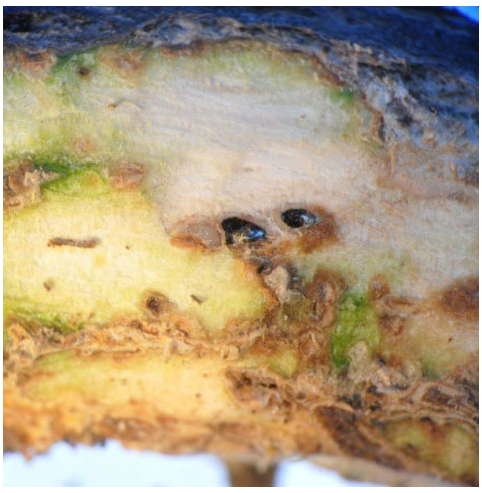


Figure 8. Top: Typical downy woodpecker foraging damage to a young bur oak planting. Middle: Desiccated upper portion of a young bur oak planting, making the tree unsalvageable. Bottom: Overlapping generations of Callirhytis flavipes overwintering as prepupae (black) and larvae (white) in small pockets underneath the corky bark of a young bur oak planting. (Aaron Bergdahl, ND Forest Service)

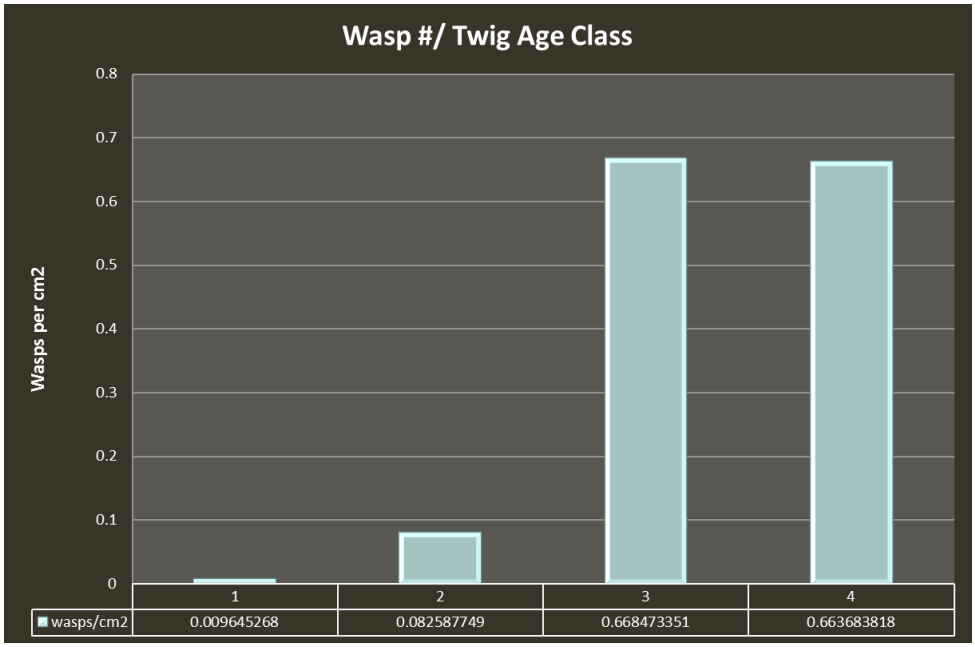


Figure 9. Infestation severity of *Callirhytis flavipes* per twig age class showing a preference for older, more corky wood (1 = current year's growth, 2 = last year's growth, 3 = growth from three years earlier, 4 = growth from four years earlier).

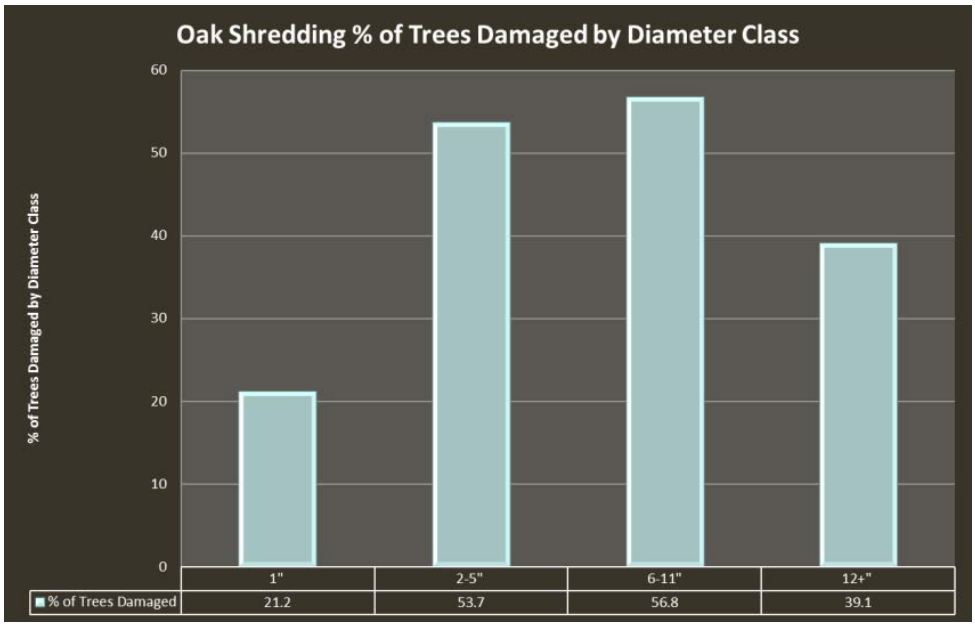


Figure 10. Percent of trees damaged trees by diameter class showing higher damage in the 2- to 11-inch size classes.

Section II

General Insect, Disease, Abiotic and Undetermined Trends of Significance in North Dakota, 2015

Weather-Related Trends

The cool and wet spring of 2015 enhanced the development of a number of leaf diseases across the state (Figure 11, top). Ash anthracnose levels led to premature defoliation being reported in several areas across the state. The cool, wet weather in early spring also continued the trend of reported incidence of kabatina shoot blight of junipers (*Kabatina juniperi*) in conservation plantings in the southwest.

Bacterial leaf spots of chokecherry and fungal oak leaf diseases were prevalent in 2015, although no more prevalent than they have been in years with similar patterns of spring precipitation. Foliar pathogens characterized by cyclic infection were perpetuated in a few specific areas of the state remaining wet, while dry conditions prevailed across most of the state, bringing these diseases to a halt.

During the growing season of 2015, 165 hail events and 34 tornados were reported across the state. Especially the hail events translated into tree health concerns, with increased reports of fungal cankers affecting Russian olive. Hail events also have the potential to worsen infection by pathogens such as diplodia shoot blight (*Diplodia pinea*) of ponderosa pine and fire blight (*Erwinia amylovora*) in Rosaceous hosts. While not immediately apparent, this damage may be more prevalent in the coming years.

Drier weather later in the summer across most of the state (Figure 11, bottom) contributed to preventing further development of foliar diseases, characterized by recurrent infection cycles, later in the growing season.

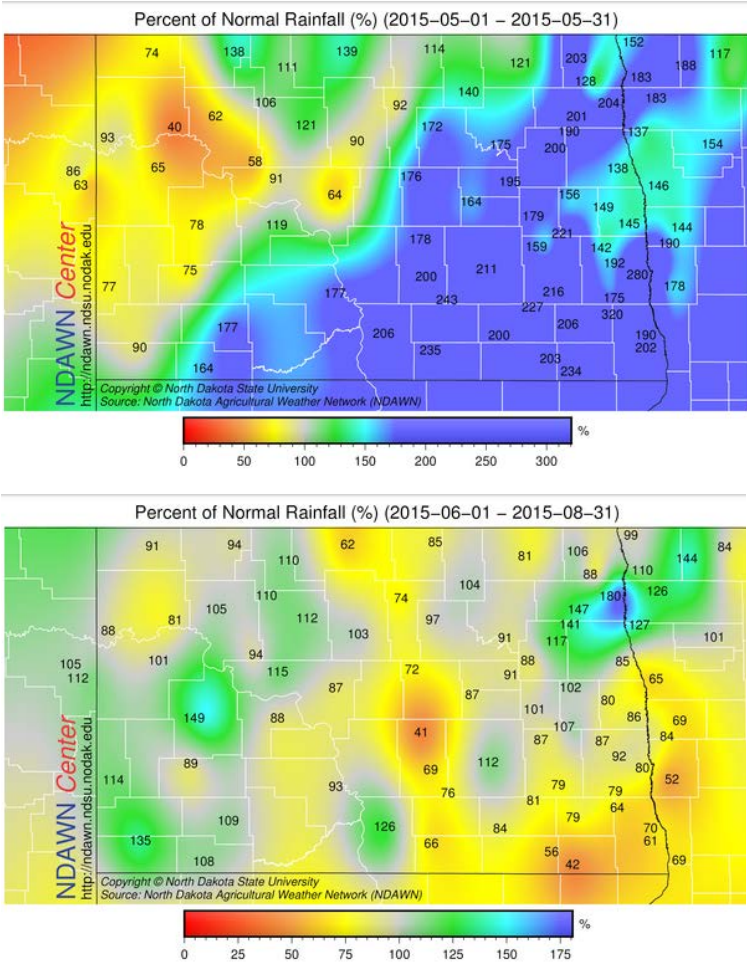


Figure 1. Climate maps showing patterns of precipitation in May (top) and throughout the remainder of the growing season (bottom). (North Dakota Agricultural Weather Network maps)

Chlorosis of Maples a Consistent Problem

Chlorosis of maples continues to present problems to trees, primarily maples and birches, in North Dakota (Figure 12). In most cases, this is likely due to highly alkaline soil conditions.

Treatment of this condition has been very challenging, and successful methods to reverse this condition have been shown to have only temporary results. Treating chlorosis due to reasons other than alkalinity have a better chance of success.

Figure 12. Main image: Yellow trees (maples) throughout a larger area clearly showing symptoms of chlorosis. (Dylan Roberts, ND Forest Service) Close-up of maple leaves showing chlorosis symptoms. (Aaron Bergdahl, ND Forest Service)

Yellow-bellied Sapsucker Damage to a Variety of Trees

More yellow-bellied sapsucker (*Sphyrapicus varius*) damage was reported in 2015 than in any other year, at least since 2009. The reasons for this are not clear. However, many people reported heavy damage to trees of several species by sapsuckers in several areas across North Dakota (Figure 13).

Figure 13. Yellow-bellied sapsucker damage to a Japanese elm at North Dakota State University's Dale E. Herman Research Arboretum near Absaraka, ND, and a birch tree in Bottineau County, ND. (Aaron Bergdahl, ND Forest Service)

Forest Health Issues of Concern

- Overabundance of green ash, in the context of the potential of introduction of EAB, is a major concern because the tree species is the most numerous and is a major component of riparian forest areas. In some areas, green ash is more than 50 percent of species composition. Green ash also is a major component of community forest resources in most North Dakota communities.
- Overmaturity of aspen stands in the absence of harvesting or natural disturbance has led to a significant proportion of older-age aspen stands that have accumulated substantial insect and disease issues.
- Lack of regeneration and invasive weed establishment, especially in the Mouse/Souris River basin, where extensive flooding during the 2011 growing season killed vast areas of forest.

Other Insect, Disease and Abiotic Trends

- Forest tent caterpillar (*Malacosoma disstria*) and large aspen tortrix (*Choristoneura conflictana*) continue to maintain populations in aspen resources where they are found in North Dakota, impacting forest resources. Other defoliators such as fall webworm (*Hyphantria cunea*) and yellow-headed spruce sawfly (*Pikonema alaskensis*) continue to have negative impacts on the effectiveness of shelterbelts and other conservation plantings.
- Dutch elm disease (*Ophiostoma ulmi*) continues to be an issue of primary importance, especially in western areas of North Dakota.
- Black knot of cherry (*Apiosporina morbosa*) has proven to be a significant and challenging disease problem for private homeowners and municipal forestry programs across the state.
- Diseases of fruit trees, especially apples and crabapples, have compounded due to the moisture levels in the spring during the past several years. These diseases include the fungal diseases of black rot (*Botyrosphaeria obtusa*), apple scab (*Venturia inaequalis*) and plum pockets (*Taphrina communis*), and the bacterial disease fire blight.
- Canker diseases continue to be prolific in North Dakota, with susceptibility brought on by environmental and human-induced stressors. Canker diseases commonly encountered in North Dakota include Cytospora canker of spruce (*Cytospora kunzei*), black rot and cytospora of hardwoods (*Cytospora spp.*).
- The most common disease agents encountered in North Dakota in 2015 are: spruce needle casts caused by mostly Stigmina needle cast and less often Rhizosphaera needle cast; cytospora canker of spruce; oak leaf blister (*Taphrina caerulescens*); oak anthracnose (*Apiognomonia quercina*); ash anthracnose (*Gnomoniella fraxini*); apple scab; fire blight; and black rot and black knot of cherry.
- The most common insect agents and their associated problems encountered in North Dakota in 2015 are: forest tent caterpillar, various aphid and scale species, fall webworm and ips beetles (*Ips spp.*) primarily in stressed ponderosa pine windbreaks.
- The most common abiotic agents and their associated problems encountered in North Dakota in 2015 are: herbicide exposure via drift and misapplication; effects of past flooding events during past growing seasons, in particular the Missouri and Souris River basins in central and northcentral North Dakota, respectively; winterburn, especially in newer plantings; and high pH and salinity soil conditions.

Section III

Forest Health Program Events in 2015

Forest Health Internship Program

The forest health internship program continued in 2015, marking the fourth year of the program. In addition to forest health efforts, the interns, Dylan Roberts from Warren Wilson College in North Carolina and Anthony Pappas from the University of West Virginia (Figure 14), were involved in Keystone Pipeline mitigation planting inspections and forest stewardship tax law compliance inspections. Both activities were affiliated with the Forest Stewardship program.

Figure 14. 2015 forest health interns Dylan Roberts and Anthony Pappas at the Pembina Gorge, ND. (Aaron Bergdahl, ND Forest Service)

Invasive Insect Trapping

For the first time in more than a decade, the NDFS did not participate in emerald ash borer (EAB) or gypsy moth trapping in the state. This was due to changes for EAB trapping, lessening trapping support needs of state regulatory authorities.

Instead, forest health interns contributed to monitoring the trapping of Japanese beetle in northeastern North Dakota, placing 112 traps. None of the NDFS traps gave a positive result for Japanese beetle, although the beetle was trapped in several other areas of the state (see Japanese Beetle section of this report).

Japanese Beetle

Japanese beetle is a potential threat to tree resources in North Dakota. It feeds on many plant hosts, and favors some of North Dakota's more popular native trees, such as American linden and crabapple.

Monitoring the trapping coordinated by the North Dakota Department of Agriculture and supported by the NDFS in several counties in 2015 resulted in finding the beetle in several areas across the state from Fargo to Williston. We believe the beetle is overwintering successfully in North Dakota (Figure 15).

Figure 15: Japanese beetles collected in traps in 2014. (Aaron Bergdahl, ND Forest Service)

Training

No formal emerald ash borer first detector training was conducted in 2015. The program has trained more than 300 people in the identification of EAB since 2010. Preliminary plans to continue EAB training are being discussed for 2016.

Other types of training were conducted throughout the 2015 field season, including sessions with International Society of Arboriculture certification applicants, garden clubs and Master Gardener groups.

EAB Awareness Week

EAB Awareness Week 2015 was observed May 17-23. Activities included a governor's proclamation of the event and cooperation with the North Dakota Forest Service's Community Forestry Program in 40 communities and several state parks.

Those participating hung weatherproof fliers on ash trees to highlight information about EAB and its potential to alter tree resources drastically. Messages focused on issues including the danger of transporting invasive tree pests such as EAB in firewood and increasing species diversity of community tree resources (Figure 16).

The 2015 fliers also focused on monetary value that trees represent to communities. Fact sheets and EAB talking points for use when addressing the news media also were provided to community contacts on flash drives.

Future Awareness Week efforts will continue to involve cooperation among North Dakota Forest Service, Forest Health and Community Forestry programs, the North Dakota Department of Agriculture and North Dakota State University Extension Forestry.

Figure 16. An EAB Awareness Week flier at Mt. Carmel Damn in Langdon, ND, (left) and an example of the new 2015 fliers. (Aaron Bergdahl, ND Forest Service)

Selected References

Akyüz, A., Ritchison, D., Shlag, A., Gust, G., and Mullins, B.A. 2015 North Dakota Climate Bulletin, North Dakota State University, Department of Soil Science, summer 2015.

North Dakota Agricultural Network: http://ndawn.ndsu.nodak.edu/

Riffle, J., and Peterson, G., technical coordinators. 1986. Diseases of Trees in the Great Plains. Rocky Mountain Forest and Range Experiment Station, USDA Forest Service. GTR RM-129. 149 p.

Sinclair, W.A., and Lyon, H.H. 2005 Diseases of Trees and Shrubs (Ed. 2). Comstock Publishing Associates

Venette, R.C., and Abrahamson, M. (May 2010). Cold hardiness of emerald ash borer, Agrilus planipennis: a new perspective. In Black ash symposium, Bemidji, Minn.

Aaron Bergdahl, ND Forest Service

Appendix

Appendix 1. Tree mortality due to a history of rising water in Devils Lake.
(Anthony Pappas, ND Forest Service)

Appendix 2. Forest resource typical of the Sheyenne River valley.
(Dylan Roberts, ND Forest Service)

Appendix 3. Pembina Gorge forest resources. (Aaron Bergdahl, ND Forest Service)

Appendix 4. Red River forest resources. (Aaron Bergdahl, ND Forest Service)

Thanks to the following agencies and people for their contributions to the information and the completion of this report: Region 1 Forest Health Management USDA US Forest Service, North Dakota State University, North Dakota Department of Agriculture, Jim Walla, Joe Zeleznik, David Haasser, Ellen Crawford, Larry Kotchman, Tom Claeys, Mike Kangas, Gerri Makay, Tom Nowatzki, Scott Liudahl, Mike Fugazzi, Brian Johnson, Bruce Johnson, Craig Stange, USDA Agricultural Research Service Station in Mandan, North Dakota Game and Fish Department, North Dakota Parks and Recreation Department and North Dakota Association of Soil Conservation Districts. The activities of the North Dakota Forest Health Program and this report are supported by funds from Region 1 Forest Health Management USDA US Forest Service.

Partial funding for this report is made available through support from the USDA Forest Service State and Private Forestry Program.

Any inquiries about the North Dakota Forest Service insect trapping or the Forest Health Program in general can be directed to Aaron.D.Bergdahl@ndsu.edu or (701) 231-5138. This publication is available in alternative formats by calling (701) 231-5138.