

North Dakota Forest Service



North Dakota Forest Health Highlights 2011

An account of forest health issues of interest in the state of North Dakota.



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Introduction

This report summarizes forest health highlights observed in North Dakota during 2011. Forest pest surveys are summarized and specific forest insects, diseases and damaging abiotic agents are described. The information presented in this report was compiled from various sources and methods including: site visits, forest surveys and personal communication with natural resource professionals. The conclusion of this report is 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.

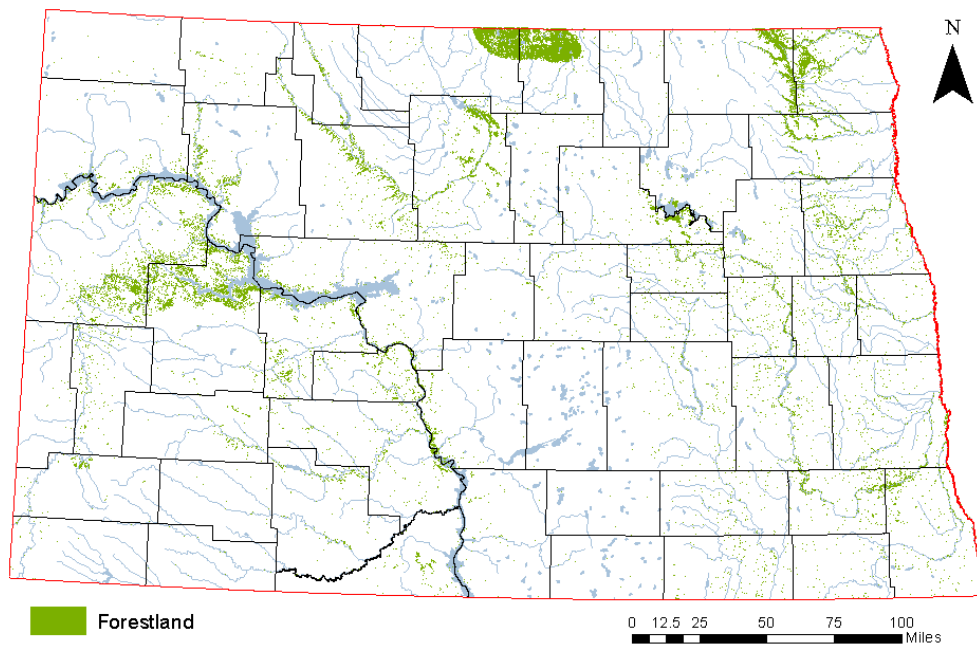


Figure 1: Forest Land in North Dakota

Section |

Weather-related Trends

Remote sensing of flooded forestland in the Missouri and Souris River basins

The North Dakota State University Geosciences Department, with direction and support from the North Dakota Forest Service, utilized remote sensing technologies to create maps of inundated forestland during the crest of floodwaters for the entire Missouri and Souris River floodplains in 2011. Using Geographic Information Systems (GIS) and tools for geospatial analysis, it was possible to identify areas of flooded forest and quantify the acreage of inundated forestland along the Missouri and Souris Rivers. This provides the State of North Dakota with accurate information that could be used for a number of purposes, including the establishment of long-term forest health monitoring plots in flooded forest areas. Very limited previous information on the effects of flooding on forest health in the Northern Plains further emphasizes the importance of this information and its potential for future use. In total, there were 25,015 acres of inundated forestland along the Missouri River and 11,531 acres along the Souris River.

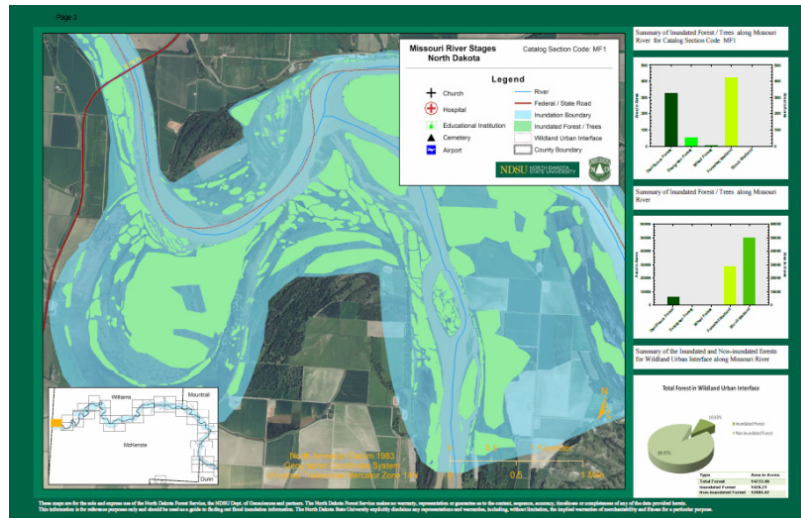


Figure 2: An example of a section of the Missouri River highlighting inundated forestland created using satellite imagery and geographic information systems (GIS).



Large-scale flooding on the Oahe Wildlife Management Area. Photo by North Dakota Game and Fish.

The Turtle Mountains

Large areas of the Turtle Mountains experienced flooding throughout the growing season in 2011. Many forested areas bordering bodies of water were negatively impacted. It is predicted that a full growing season of inundated roots has led to significant root dieback, severe stress and some mortality. The effects of 2011 flooding in the Turtle Mountains will be apparent during the 2012 growing season and beyond.

The Red River and Sheyenne River

In earlier years, flooding of the Red River and Sheyenne River has mostly occurred in early-spring, before the onset of the growing season. Aside from the mechanical damage caused by floodwaters and the debris they carry, the impacts on the health of trees in these flooded areas have been moderate in previous years.

In 2011, floodwaters were high and remained high well into the beginning of the growing season, causing significant stress to trees in the floodplain. Exposure of roots and root dieback due to long-term soil inundation likely will lead to noticeable negative tree health impacts.

Devils Lake

The water level of Devils Lake continues to rise due to the absence of a natural outlet. Based on predictions, if the level of the lake reaches 1,452 feet mean sea level, 1.6 million trees would be destroyed and 5,800 acres of forest would be lost (Kotchman et al., 1999). The annual mortality of trees has not been quantified, although the yearly advance of the Devils Lake shoreline continues to cause significant tree mortality.



High water levels leading to aspen mortality in the Turtle Mountains. *Photo by Bob Harsel.*



Trees flooded by increasing water levels at Devils Lake.

Section II

2011 Forest Pest Surveys

Emerald Ash Borer

In 2011, 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 approximately 243 'purple sticky prism traps' throughout North Dakota. There were no emerald ash borer (EAB) (*Agrilus planipennis*) detections in 2011.

As well as serving as a detection tool, the purple traps also have proven to be a powerful tool for increasing public awareness of the potential threat of EAB. Cooperative trapping and outreach efforts are ongoing and focus on larger communities, parks, campgrounds and areas along major transportation routes. Due to the abundance of ash in North Dakota communities, natural forests and conservation plantings, continued cooperative efforts to monitor for EAB will be prioritized.

Gypsy Moth

Cooperative trapping efforts involving the NDDA, APHIS PPQ NDFS devised and carried out a trapping plan consisting of 341 traps surveying approximately 218,240 acres. There were no detections of gypsy moth (*Lymantria dispar*) in 2011.

Emerald Ash Borer National Survey 2011

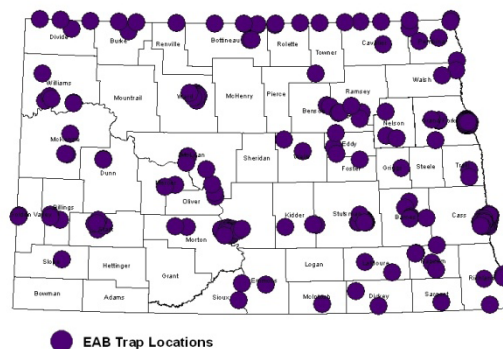


Figure 6: Emerald ash borer trapping locations in 2011. Map courtesy of the North Dakota Department of Agriculture.

Section III

Insect Trends

Forest Tent Caterpillar

A 2011 winter egg mass survey, carried out in accordance with previously described methods (Minnesota DNR), of areas in the Turtle Mountains where heavy defoliation by forest tent caterpillar (FTC) (*Malacosoma disstria*) was reported yielded zero egg masses. This, in addition to other physical evidence, such as firsthand reports from across the region of heavy webbing at the branch tips and numerous 'rappelling' larvae, led to the inference that defoliation was caused by an agent other than FTC in north-central North Dakota. FTC was still present in the northern and eastern parts of North Dakota, and populations were expected to remain high in areas around Turtle River State Park where defoliation was severe in 2011.

Large Aspen Tortrix

An aerial survey on June 22, 2011 and further ground truthing efforts revealed that widespread defoliation observed in the Turtle Mountains was caused by the large aspen tortrix (LAT) (*Choristoneura conflictana*). Approximately 20,500 acres of defoliation was recorded in the Turtle Mountains¹. In retrospect, it is likely that a major proportion of the reported defoliation in 2009 and 2010 was the result of LAT and not FTC. Communication with a North Dakota State University entomologist revealed LAT had been collected in large amounts in the Turtle Mountains as early as in 2008. This information raises questions about the actual extent of earlier reports citing defoliation caused by FTC. Concurrent defoliation by FTC and LAT has been earlier reported in other areas of the U.S. and Canada; this may also have been occurring in the Turtle Mountains to varying extents in past years.



From left to right: large aspen tortrix larva, cocoon, cocoon folded and webbed in a leaf and adult (photo of the adult by Ed Holsten, USDA Forest Service).

¹An aerial survey was conducted in June 2011 by the United States Forest Service, Region 1. Forest health-related GIS data collected during the flight was used by the North Dakota Forest Service to estimate defoliated acres. This information has not been officially published as of December 31, 2011.

Section IV

Disease Trends

Dothistroma Needle Blight

Dothistroma needle blight (*Dothistroma pini*) was first reported in North Dakota in 2010 in a ponderosa pine (*Pinus ponderosa*) planting in Pembina County. Since then, the disease has been discovered in three more counties in North Dakota: Cass, Cavalier and Stutsman. At the Absaraka Horticultural Research Farm, the disease was found on *P. albicaulis*, *P. ayacahuite*, *P. cembra*, *P. contorta* var. *latifolia*, *P. flexilis*, *P. mugo*, *P. nigra*, *P. ponderosa* and *P. uncinata*. Outside of the research farm, the disease was only able to be confirmed on *P. ponderosa*.



Dothistroma needle blight in Jay Wessels Wildlife Management area, Pembina County.

Brown Spot Needle Blight

The needle disease, brown spot needle blight (*Scirrhia acicola*), was detected for the first time in North Dakota in 2011. A small-scale disease outbreak occurred in a Christmas tree plantation outside of Enderlin in Ransom County. The infected Scotch pine (*Pinus sylvestris*) trees were six to eight years old. The source of the outbreak has not been determined.



Brown spot needle blight found in Ransom County.

Lirula Needle Blight

Reports of lirula needle blight (*Lirula macrospora*) on spruce (*Picea spp.*), which have been rare during the past five years or so, increased in 2011. This may indicate that the prevalence of this disease is on the rise in the eastern half of North Dakota. The future development of this disease complex will be monitored.

Section V

Other General Tree Health Trends

Insects

- Pine tip moths continue to be regularly encountered across North Dakota.
- Pine saw fly incidence, according to a number of reports, seems to be on the rise in parts of the state.
- Fall webworm (*Hyphantria cunea*) defoliation was commonly seen in 2011, especially in Shubert (Canada Red) chokecherry (*Prunus virginiana* var. *Shubert*) plantings in urban and rural areas in the eastern half of the state.
- Native borers of ash trees, especially ash bark beetles (*Hylesinus* spp.), redheaded ash borer (*Neoclytus acuminatus*) and ash-lilac borer (*Podosesia syringae*), continue to contribute to the decline of ash trees in urban and rural environments. Green ash (*Fraxinus pennsylvanica*) windbreaks stressed by herbicide drift from adjacent agricultural areas are in especially poor condition and often are targeted by these secondary pests.

Diseases

- Anthracnose of green ash (*Fraxinus pennsylvanica*) and bur oak (*Quercus macrocarpa*) continued to be a significant problem during the unusually wet summer of 2011. Oak leaf blister reports also were very common in 2011.
- Stigmata needle cast continues to be the most prevalent disease of spruce (*Picea* sp.) trees in conservation and homeowner plantings. Prevalence of stigmata is quite high, which was reflected in a number of reports from the eastern half of North Dakota in 2011.
- Dutch elm disease (DED) (*Ophiostoma ulmi*), which is present in all 53 North Dakota counties, continues to be a disease of significance. This is especially the case in communities in the western half of the state. DED was first reported in the west in the 1990s, so the disease cycle is at a point where new infections of mature trees are very common and the devastation of this disease is apparent. This poses significant challenges for urban tree managers, especially in small towns where funds are not available for prompt removal and proper disposal of infected trees.
- Armillaria root rot (*Armillaria* spp.) is expected to increase in the coming years, linked to the various statewide flooding events that occurred (or continued to occur) during the 2011 growing season. Currently, there is no information on the species occurrence and distribution of Armillaria root rot species in North Dakota.
- Ash heart rot (*Perenniporia fraxinophila*) is extensively found in association with mature green ash trees statewide. This seems to be more of a natural phenomenon linked to increasing tree age. While green ash trees with extensive heart rot provide crucial habitat for avian and mammalian cavity nesters in forest settings, it should be realized that ash heart rot represents a risk to life and property in inhabited rural areas and especially in more urban settings. Due to the high percentage of ash in North Dakota communities, steps to mitigate risk associated with ash heart rot should be a priority in small cities and towns.

Abiotic

- Herbicide damage continues to be a commonly encountered 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 iron chlorosis. In recent years, and especially in the spring/early summer of 2011, moist, below-average soil temperatures have led to an increase in iron chlorosis incidence and severity.
- Cultural practices, such as improper planting, mulching, pruning, watering, fertilization practices, etc., mostly by private home owners, 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.

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