

North Dakota Forest Health Highlights - 2006



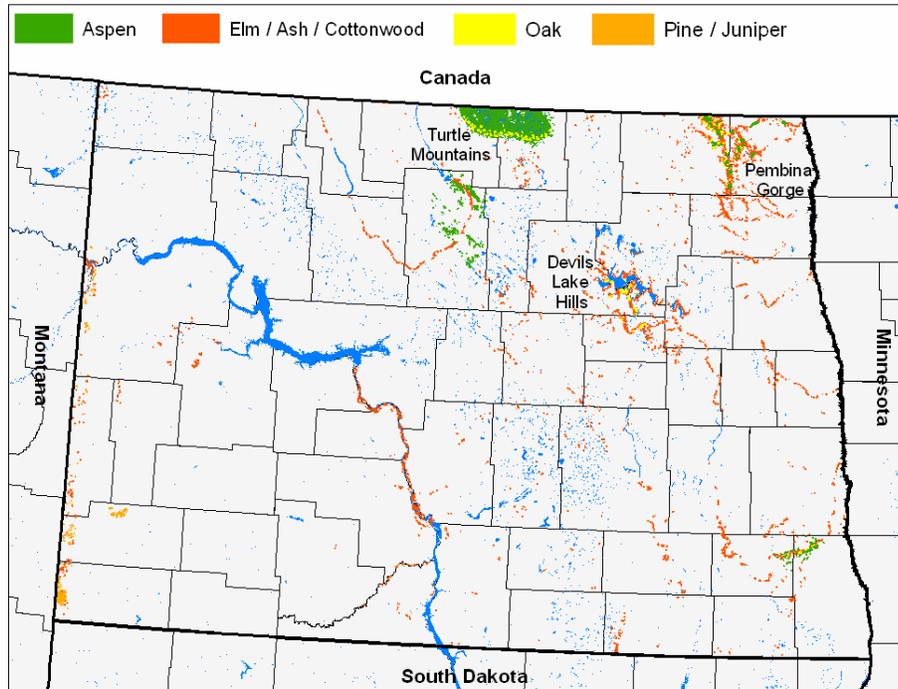
Wooded draws of western North Dakota

The Forest Resource

Native forests are a valuable resource in North Dakota. These forests provide wildlife habitat, provide recreational opportunities, stabilize river banks, filter water runoff from adjacent agricultural lands, provide wood products, serve as seed sources for conservation tree production, and increase the botanical diversity of the state. Native forests and woodlands represent approximately 1.5 percent of North Dakota's total land area (673,000 acres). Eastern deciduous forest types and western coniferous forest types can be found in North Dakota (figure 1).

Deciduous forests along riparian corridors represent the majority of North Dakota's forests. Dominant species within these bottomland forests include Green ash (*Fraxinus pennsylvannica*), Box elder (*Acer negundo*) and American elm (*Ulmus americana*). Stands of Aspen (*Populus tremuloides*) and Bur oak (*Quercus macrocarpa*) can be found in the Turtle Mountains, Pembina gorge, and Devils Lake hills. Forests of Western North Dakota are represented by Cottonwood (*Populus deltoides*) forests along rivers, wooded draws comprised of ash and elm, and pockets of Ponderosa pine (*Pinus ponderosa*) and Rocky mountain juniper (*Juniperus scopulorum*).

Figure 1. Distribution of Forest Types in North Dakota.



In addition to natural forests, conservation tree plantings such as farmstead plantings, shelterbelts, living snow fences, wildlife plantings, and others contribute substantial wooded acreage. Although many rural tree plantings occur in areas where the historical vegetation type was prairie, these resources are critical for the present needs of rural residents that live in the current agricultural landscape. These plantings control wind erosion, reduce water loss on agriculture lands, alter snow accumulations during winter months, and provide thermal cover for livestock and wildlife. Commonly used species of rural plantings include: Green Ash, Spruce (*Picea* spp), Ponderosa Pine, and Hybrid Poplar (*Populus* spp).

Special Issues

The mere presence or absence of pests within a forest does not determine the ‘health’ of the forest. The term ‘healthy forest’ is somewhat subjective and may take on many definitions based upon the social, ecological, economic, or cultural perspectives of people. The forests of North Dakota’s are generally resilient to damage imposed by biotic and abiotic pressures, however issues have emerged within recent decades that have warranted concerns. The factors that threaten the sustainability of the state’s native forests include:

- 1) Over-maturity coupled with disruption of natural disturbances essential to regenerate forests.
- 2) conversion of forest to non-forest
- 3) damage caused by non-native pests

Riparian Forest Health

Bottomland riparian forests consisting of American elm and Green ash in eastern North Dakota and Cottonwood forests along western rivers represent a large portion of North Dakota's native forests. Eastern bottomland forests have been severely impacted by Dutch elm disease (caused by *Ophiostoma ulmi* and *O. novo-ulmi*). This disease has eliminated many of the American elms that once comprised a large portion of this forest type and has shifted the species composition toward green ash and boxelder. This disease is of particular concern because of the American elm's status as the state tree. The decline of cottonwood forests along the Missouri River is largely attributed to the absence of regeneration and the gradual senescence of mature over story trees. Encroachment of non-native species such as Russian olive (*Elaeagnus angustifolia*), Buckthorn (*Rhammus* sp.) and brome grass (*Bromus* sp.) create additional management problems.

Aspen Health

Aspen forests of North Dakota are in a general state of poor health. Lack of fire disturbance and/or harvesting has resulted in older stands with minimal natural regeneration. The current condition of many stands are characterized by extensive stem decay caused by *Phellinus tremulae* and large stem mortality caused by Hypoxylon canker (*Hypoxylon mammatum*). In addition, defoliating insects contribute to the overall senescence of these forests. The declining aspen over story may succeed to hazel (*Corylus* spp.) shrub land in part due the absence of shade tolerant conifers in North Dakota. Fortunately, there have been recent opportunities for forestland owners to harvest aspen. The vigorous regeneration of aspen that follows harvesting is important for the long-term perpetuation of this unique forested resource.

Forest Insect, Diseases, and Weather-Related Events

Gypsy Moth - (non-native)

The North Dakota Forest Service, North Dakota Department of Agriculture, the US Forest Service and the USDA Animal Plant Health Inspection Service conduct annual statewide gypsy moth (*Lymantria dispar*) detection surveys. There were 419 and 365 gypsy moth detection traps placed in 2005 and 2006, respectively. These traps were distributed throughout the state to encompass major forest types at risk of gypsy moth introduction.

There were no gypsy moths caught in 2005 and 2006. The gypsy moth has been detected periodically in past years as single egg masses and larvae can be transported long distances on cars, recreational vehicles, nursery stock and other items. One gypsy moth was detected in 2003 and two additional gypsy moths were detected in 2004. Despite those isolated detections, there are no known established gypsy moth populations in North Dakota as of this date and trapping efforts will continue in the future and include new areas of potential risk.

Cottony Ash Psyllid - (non-native)

A non-native leaf-feeding insect known as the cottony ash psyllid (*Psyllopsis discrepans*) was detected in Fargo, Grand Forks, Minot, Hankinson, Dickinson, and Bismarck in 2005 and 2006. Black ash (*Fraxinus nigra*), Manchurian ash (*F. mandshurica*), and cultivated varieties/hybrids of the two are hosts to this insect. Insect feeding causes curling of leaves and defoliation under severe infestations. Such damage may incite tree decline, particularly on drought-stressed trees.

Decline of Black ash street trees have been observed in North Dakota communities during the past 5 to 10 years. Although, the psyllid appears to have caused substantial damage near Bismarck during 2005 and 2006, the insect was not observed during a Black ash street tree survey of Fargo in 2004 nor was it found in previous years. Consequently, the role of this new pest in the ash decline remains unclear. In addition to damage caused by the psyllid, stem cankers caused by *Cytospora* spp. (species unknown) and alcohol flux have contributed to the decline of these cultivars. Similarly, declining cultivars have shown symptoms consistent with those caused by ash yellows.

Emerald Ash Borer (not in North Dakota)

The Emerald ash borer (*Agrilus planipennis*) poses a serious threat to North Dakota's native and planted ash resources. The North Dakota Forest Service and the North Dakota Department of Agriculture coordinated sentinel trap tree surveys of 5 North Dakota communities during 2005 where the risk of introduction is greatest. In addition to trap tree surveys, visual inspections were conducted at several parks and campgrounds throughout the state in 2006. No positive EAB detections were found during any surveys. Education and outreach efforts directed at city foresters, state agencies, decision makers and the general public have begun and will continue as an important component the state's preparation for this potential threat.

Cankerworms

Defoliation caused by spring cankerworm (*Paleacrita vernata*) and fall cankerworm (*Alsophila pometaria*) was observed in several locations of the state in 2006. Outbreaks of these species occur periodically in North Dakota however no outbreaks have been observed since the late 1990's. Damage was most severe along the Knife River and Spring Creek in Mercer County in 2006. Lower levels of defoliation caused by cankerworms were observed in several other counties as well. The increased number of reports in 2006 suggests that spring and fall cankerworm populations may be on the rise and damage to hosts may increase in the years to follow.

Cottony Maple Scale

Several communities experienced outbreak levels of the cottony maple scale (*Pulvinaria innumerabilis*). This pest is common within communities but often goes unnoticed. The scale population exploded in 2006. Scale infestations were observed on several tree species however damage was most severe on silver maple.

New fungus found on needles of spruce

In 2006, a new fungus was confirmed on spruce samples received by the NDSU plant diagnostic lab. Symptoms were consistent with those observed for *Rhizosphaera* needle cast however fruiting bodies and spore dimensions were not. The fungus was confirmed as *Stigmina lautii*. Following this confirmation, the fungus was found on Colorado blue spruce and white spruce in several locations of the state. Very little is known about the biology of *S. lautii* and it is not known whether the fungus is a pathogen, mycoparasite, or endophyte. Similarly, it is not known how long the fungus has been present within the state. Anecdotal evidence suggests that it has been present for several years and may have been misidentified as being *R. kalkhofii* based on symptoms observed in the field.

Dutch Elm Disease - (non-native)

Dutch elm disease (*O. ulmi* and *O. novo-ulmi*) continues to be the most damaging disease within community forests. Many communities have reported an increase in disease incidence in 2006 from the previous year. Larger cities conduct annual street surveys and implement pruning and sanitation to reduce the impacts of this disease. Unfortunately, smaller communities that do not possess the means to administer a forestry program continue to experience extensive losses from Dutch elm disease.

This disease has eliminated many of the American elms that once comprised a large portion of this forest type and has shifted the species composition toward green ash and boxelder. Dutch elm disease has now spread into the wooded draws of western North Dakota and is causing substantial damage.

Diplodia Shoot blight

Recently, shoot blight, caused by *Diplodia pinea* (syn. *Sphaeropsis sapinea*) has been confirmed in many ponderosa pine plantings throughout the state. Symptoms include shoot blight and twig dieback. The disease may incite stress and severe infections may kill trees over time. Trees of all ages are susceptible however older, cone-bearing trees appear to sustain the greatest amount of damage.

Diplodia shoot blight has been found periodically throughout North Dakota in past years however the incidence and severity of this disease has increased recently. This trend may be attributed to recent moisture trends that have favored infection and increased cone production on aging ponderosa pine.

Abiotic Factors

The prairie environment presents many unfavorable conditions for the health and survival of trees. Damage to many rural tree plantings is associated with unfavorable soil conditions such as high pH, poor drainage, and fluctuating water tables. Weather influences such as prolonged drought, unseasonable frosts, hail, and ice storms may cause damage as well. Other damaging factors include herbicide damage, wildlife damage, fire, and grazing. Such conditions of the prairie environment may predispose trees to secondary pests and exacerbate damage caused by others.

Very dry conditions were observed throughout North Dakota from mid-June until late August of 2006. Water deficiency stress may exacerbate damage caused by other pests, or if severe, may incite stress among trees. Trees most affected by the dry conditions

include, recently planted trees, seedlings and saplings, and drought intolerant species. In addition, water deficit may result in increased winter desiccation of conifers.

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