

Forest Health Highlights in South Dakota 2015



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Forest Resources

Coniferous forests make up more than three-fourths of the state's forest. These forests are situated primarily in the Black Hills, extending north into Harding County and east to Todd County. The dominant species is ponderosa pine. These forests contribute to the state's economy through a vibrant forest products industry, tourism, and agriculture, and provide valuable wildlife habitat. Two-thirds of the coniferous forests in the state are on federal land. The most serious threats to these forests are mountain pine beetles and fires.



Bottomland forests make up only 3 percent of the forested land in the state. These forests consist primarily of cottonwood, willow, green ash, and elm. The forests provide tremendous value in improving water quality and flood control. Approximately 70 percent of bottomland forests in South Dakota are privately owned. The biggest threat to riparian forests is the lack of regeneration of cottonwood trees. Other problems include banded elm bark beetles, Dutch elm disease, and poplar cankers.

Upland hardwood forests of oak, ash, aspen and elm, comprise approximately 20 percent of South Dakota forest land and are scattered primarily in the northeast and southeast corners of the state. Aspen, birch, ash, ironwood, and bur oak also occur in the Black Hills. The greatest threats to these forests are declining regeneration, disease, invasive species, and land-use changes. The most valuable assets of hardwood forests are the recreational opportunities and wildlife habitat they provide. About two-thirds of the upland hardwood forests are privately owned; the rest are mostly on federal lands.



Urban or community forests occupy approximately 103,000 acres in the state. There are a large number of species present within community forests with ash being the most common followed by elm, crabapples, and maple. Community forests provide energy conservation, improved water quality, and aesthetic appeal, among other values. Common threats include diseases, development, and weather events. There are two Tree Campus USA universities and 34 Tree City USA communities in South Dakota.

Windbreak forests cover about 200,000 acres across the state. Although not typically thought of as forest land, they serve many valuable functions. Windbreaks protect roads, fields, livestock, and structures from wind and snow, and help prevent soil erosion. They provide habitat for pheasants and other birds. Windbreaks face the same threats as other forests types. The most common species found in shelterbelts is green ash. With the looming threat of emerald ash borer, efforts are being taken to expand the diversity of plantings. There is no ownership data for windbreaks, although most are considered to be privately owned.



Insect Conditions

Ash and privet borer

Tylonotus bimaculatus

This insect was reported in declining green ash trees in several southeastern South Dakota counties in 2014. It has now been found in privet hedges in Sioux Falls and Yankton, SD. Ash and privet borer has been previously recorded in South Dakota though it is a relatively rare insect. The borer is typically found in mature or drought-stricken windbreak ash trees. The larvae pack their galleries with frass and these galleries may appear similar to those created by the emerald ash borer. The insect is not a serious problem in South Dakota but is a close “look-a-like” to the emerald ash borer.

Ash/lilac borer

Podosesia syringae

This is a common borer of stressed ash trees and there has been an increase in reports of this insect following the recent drought. Ash/lilac borer infestations rarely result in significant mortality, however there are Manchurian ash trees in Sioux Falls attacked by this insect and have since died. Manchurian ash is not considered as drought tolerant as green ash. It is being considered as a better ash to plant due to its tolerance to emerald ash borer infestations but its susceptibility to our native borer, and poor adaptation to dry climates, may limit its future use.

Elm sawfly

Cimbex americana

This insect periodically appears on American elms and willows in the eastern part of the state. This past summer reports came in from northeastern South Dakota of the larvae feeding along the margins of American elm and willow leaves. The defoliation of trees in the northeastern part of the state was severe with some laurel leaf willows completely defoliated by the insect.



Elm sawfly larvae; Dr. John Ball, August 12, 2015.

Emerald ash borer

Agrilus planipennis

Emerald ash borer has not yet been found in South Dakota but detection trapping in parks and campgrounds continues throughout the state. The only *Agrilus* caught in the traps to-date are the bronze birch borer, honeylocust borer, and the two-lined chestnut borer. Pest Detector workshops were held at three locations during the summer and were attended by 64 people, mostly Master Gardeners. Attendees were trained in the detection of this pest as well as thousand cankers disease. Master Gardeners had 28 reports of possible emerald ash borer infestations and these reports had follow up visits. All reported infested trees were colonized by the **redheaded** (*Neoclytus acuminatus*) and **banded ash borer** (*N. caprea*) and the only insects submitted as possible emerald ash borers were the **golden buprestid** (*Buprestis aurulenta*). There were also numerous reports of “swarms” of banded ash borer adults flying this spring. Most of these reports came from over-mature ash windbreaks.

Gall wasp

Callirhytis flavipes

Bur oak supports numerous gall species, but this one has become a serious threat to young bur oak trees. The gall wasp itself causes little injury to the host, instead the injury is due to the woodpeckers that feed on the twig gall form of the insect during the winter. Woodpeckers can shred most of the bark from the trunks of young (5 to 15-foot tall) trees. Since the bark is often removed completely around the trunk, the affected tree is either killed or suffers extensive dieback. There



Gall on bur oak caused by Gall wasp. Photo by Nicole Pyser, service forester, SDDA, August 31, 2015.

were areas of young oaks dying from the injury created by the woodpeckers searching for the larvae. The trees that are not killed by the woodpecker activity, often have the tops die back enough that the trees become misshaped. The injury can become so extensive that many producers are looking for another tree to plant in their windbreaks. However, it is common to see oak trees in a windbreak that are not affected by the gall or woodpeckers so there appears to be some resistance.

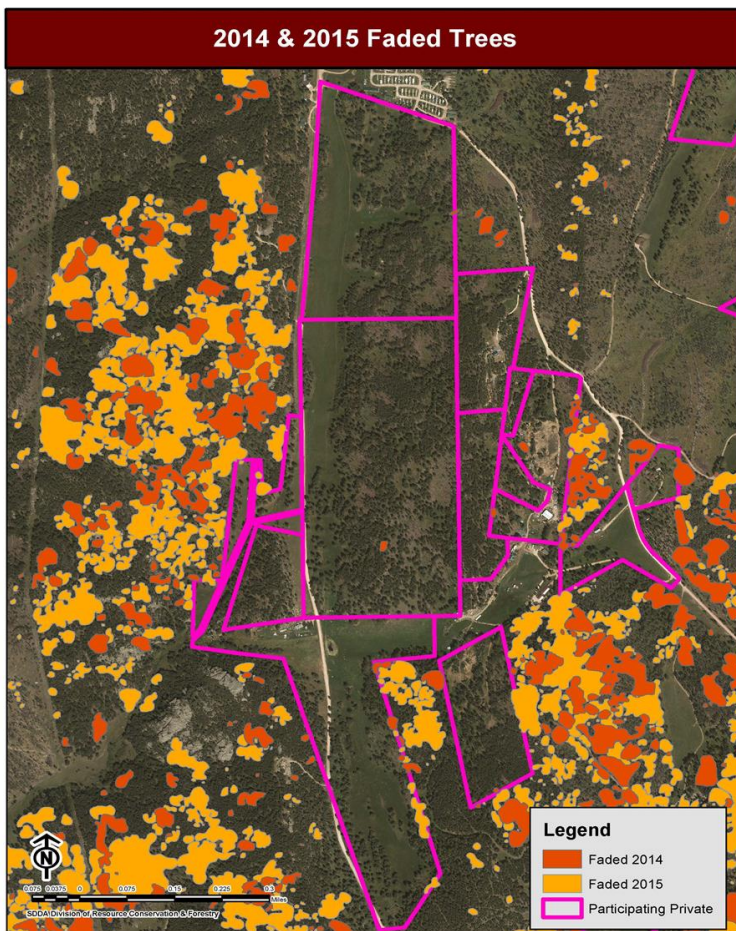
European elm flea weevil

Orchestes alni

We have had spotty reports of this insect for the past five years, but now it is common throughout the state. The defoliation is most common on Siberian elms and this insect appears to have replaced the elm leaf beetle that is rarely seen on elms now.

European elm scale
Gossyparia spuria

There were many reports this past spring of yellowing and falling elm leaves. The affected trees also developed very thin canopies by early June. These trees were also covered with sooty mold, a black powdery mold. Many of the elms had been treated for aphids in previous years with neonicotinoid insecticides and we may be seeing resistance to this group of insecticides by the elm scale.



Trees killed by MPB and subsequent fader analysis, surrounding private where infested trees have been treated. SDDA, RC&F file map.

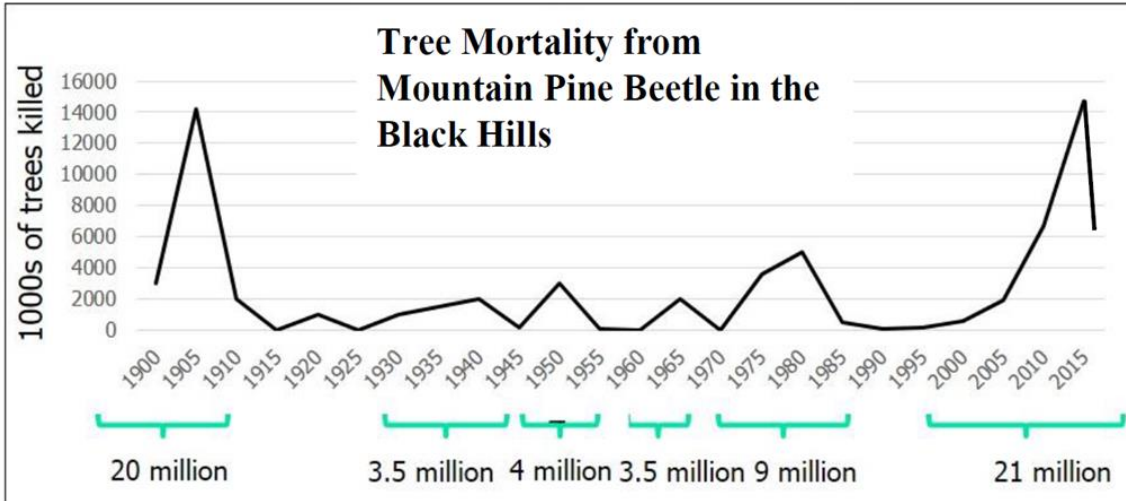
Mountain pine beetle
Dendroctonus ponderosae

The Forest Service land surrounding the border of the Sylvan Lake Unit of Custer State Park has been experiencing an epidemic since 2002, particularly within the Black Elk Wilderness Area. The Black Elk Wilderness Area bordering Custer State Park had experienced near 100 percent mortality by 2012. Custer State Park has seen lower pine mortality due to a multitude of management tactics such as thinning stands to reduce susceptibility and sanitation measures including removal of infested trees to cutting the infested trees into short sections and leaving in place. Almost 4,700 trees were infested in the Park from the 2015 flight. This is a significant reduction from the previous year. The infested trees are either harvested or the boles are cut into short sections (2 feet) and left in place, a solar treatment commonly referred to as “cutting and chunking.” The dominant treatment of infested

pinus conducted by landowners and the county crews was cutting and chunking between October 1 and March 1.

There is a relic stand of limber pine in Custer State Park that was being crowded by an overstory of white spruce. Blister rust and the additional stress of beetle attacks, even unsuccessful ones, could result in significant tree mortality. The overstory spruce were removed and many of the ponderosa pines have died from colonization by the mountain pine beetle/bluestain fungus. Anti-aggregation pheromone, verbenone, has been used as part of the management of this relic stand of trees. The efforts have been very successful with minimal losses of the limber pines, despite the loss of almost all the ponderosa pine in the immediate vicinity. However, during the 2014 flight, several trees became infested with the mountain pine beetle and bluestain fungus. The mountain pine beetle attacks rarely extended beyond the creation of the egg gallery but bluestain

often occurred throughout the tree and the host tree died. In 2015 and 2016 we are preventatively spraying all the mature limber pines that can be reached with an insecticide to reduce the chance of mortality.



Graph showing trend of tree mortality from MPB in the Black Hills since 1900. Courtesy of Dr. John Ball.

Red turpentine beetle

Dendroctonus valens

Populations of red turpentine beetle have appeared to increase recently. The number of infested trees may not be increasing as much as being reported however, as infested trees are probably being identified more often due to the intensive inspections for mountain pine beetle. We are also seeing an increase in turpentine beetles in stands where chipping was done in early spring and in areas with new home construction.



Red turpentine beetle attacks at the base of a MPB infested tree. Photo by Marcus Warnke, September 13, 2014.

Spotted wing drosophila

Drosophila suzukii

This insect has been found infesting a number of small fruits across the state. The most common hosts are fall-bearing raspberries but drosophilas have been collected from Tartarian honeysuckle and elderberry fruit. While the insect can be found throughout the state, the infestations are still spotty with some small fruit orchards heavily infested while others, only a mile or two away, having no problems.

Disease Conditions

Ash rust

Puccinia sporganioides

This foliage disease is appearing on many ash trees across the state. The petioles of infected leaves become distorted with bright yellow to orange pustules making the disease very noticeable to tree owners. The disease can result in some mid-summer defoliation of ash but rarely harms the trees. The last year that the disease resulted in shoot dieback was 2008.

Bur oak blight

Tubakia iowensis

This disease was first noticed on bur oaks in southern Minnesota, Iowa and eastern Nebraska back in the 1990s where it was associated with declining trees. The disease was detected in bur oaks along woody draws in Minnehaha County this past summer. The trees were found in several draws, but not all trees within a particular draw were affected.



Bur oak blight (BOB); Photo by Dr. John Ball, September 2, 2015.



Ponderosa pine with symptoms of Diplodia tip blight. Photo by Nicole Pyser, service forester, SDDA, July 31, 2015.

Diplodia tip blight

Diplodia pinea (*Diplodia pinea*)

The disease was commonly reported throughout the state on Austrian and ponderosa pines in shelterbelts and community plantings. The primary impact is in the southern half of the state where there are many over-mature trees that are on sites affected by the long-term drought in the early 2010s. The species primarily affected has been Austrian pine in the eastern half of the state. The disease has also become very prevalent in ponderosa pines through the communities along the eastern side of the Black Hills.

Dutch elm disease

Ophiostoma novi-ulmi

Reports of the disease were widespread in eastern South Dakota during 2015 with many communities suffering significant losses of their remaining American elm populations. The losses were often twice what normally occur in a year. Most of the mortality occurred earlier in the growing season than is typically observed. American elm still is one of the most common street trees in the state, comprising more than 5% of the population.

Pine wilt nematode

Bursaphelenchus xylophilus

Rapidly declining Austrian and Scotch pine in the southern region of the state have been found infected by this nematode. Reports of the disease increased in 2015 with most of the affected trees occurring in the southeastern counties that border Nebraska.

Mature Austrian and Scotch pines were the species most impacted by this disease but these are also the most common exotic pine planted in the region. Pine wilt disease has eliminated many Scotch pine windbreaks in the southern half of the state and this species is no longer recommended for planting south of US Hwy 14.

White pine blister rust

Cronartium ribicola

This disease was discovered in the relic stands of limber pine in the Cathedral Spires area of Custer State Park in the early 2000s. A survey of the limber pines in the park revealed no new infections in 2015. Pruning has been performed in past years to manage the spread of the disease.



American elm with Dutch elm disease in Rapid City. Photo by Marcus Warnke, July 29, 2015.

Forest Health Conditions with Other Damaging Agents

Freeze-damaged trees

Many trees in the state were already leafing out during the mid-May late frost that occurred throughout the state. This exposure to sub-freezing temperature, in the teens for many locations, resulted in wilted foliage or foliage that turns brown or black along the margins. Affected trees began dropping their freeze-damaged leaves within a few weeks. The trees that were just leafing out at the time of the frost, the hackberries and honeylocusts, were most affected as the newly expanding foliage was sensitive to the freezing temperatures. Many of the affected honeylocust put out very few new leaves and suffered significant dieback. Trees that had completely leafed out earlier than the frost, the crabapple, lindens and silver maples, suffered little damage as their older foliage was more tolerant of cold. The trees that were least affected by the cold were those that had not yet leafed out in mid-May such as bur oak.



Frost damage & seed thinning on autumn blaze maple. Photo by Dr. John Ball, June 3, 2015.

Voles

There was a tremendous amount of vole damage this past winter on junipers in ornamental plantings, young windbreaks and in native understory common junipers in the Black Hills. While their "runways" are common in lawns, voles are not usually a problem with woody plants unless they are short on food. However, this year many of the common junipers in the Black Hills along with creeping and savin junipers in ornamental plantings showed patches of dead foliage due to the stems being girdled by voles. Seedling junipers in windbreak plantings, regardless of species, were also affected with some losses as high as 75%.

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