

# South Dakota 2013 Forest Health Highlights

## South Dakota's Forest



**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 though aspen, birch, ash, ironwood, and bur oak occur in the Black Hills. The greatest threats to these forests are declining regeneration, disease, invasive species, and land-use changes. The most valuable asset of hardwood forests are the recreational opportunities 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.

# South Dakota Forest Insect and Disease Highlights

## Forest Insects

### Cedar bark beetles

*Phloeosinus spp.*

These bark beetles are secondary insects that hasten the decline of junipers that are already stressed. The predisposing stress for this outbreak was the 2011-2012 drought. The combination of the drought and colonization by this insect has resulted in the loss of juniper (cedar) windbreaks in the south central part of the state.

### 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 is the bronze birch borer. Pest Detector workshops were held during the summer and more than 78 people, mostly Master Gardeners, were trained in the detection of this pest as well as thousand cankers disease. Master Gardeners reported, and we followed up on, 16 reports of possible emerald ash borer infestations. All reports from trees were identified as the banded ash borer (*Neoclytus caprea*) and the only insects submitted as possible emerald ash borers were the golden buprestid (*Buprestis aurulenta*).

### Mountain pine beetle

*Dendroctonus ponderosae*

The Forest Service land surrounding the border of the Sylvan Lake Unit of Custer State Park has experienced a mountain pine beetle epidemic since 2002, particularly within the Black Elk Wilderness Area. The Black Elk Wilderness Area bordering Custer State Park has 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. While the epidemic has been held in check in the Sylvan Lake Unit of Custer State Park, there have been a number of spot infestations that occurred in the western portion of the main body of Custer State Park

with an estimated 30,000 trees being infested during the past flight (2013). This is a reduction from the previous year (2012) when 35,000 infested trees were found and (2011) when more than 120,000 infested trees were detected in Custer State Park. The infested trees have either been harvested or the boles were cut into short sections (2 feet) and left in place, a solar treatment commonly referred to as “cutting and chunking.”



Ponderosa pine infested with mountain pine beetles.

Photo courtesy of Dr. John Ball

The dominant treatment of infested pines conducted by landowners and the county crews was cutting and chunking between October 1 and March 1. Our study found that if infested trees were cut during this time period and at this length or shorter the beetle mortality was about 75% compared to standing infested trees and infested pockets did not expand afterwards (Ball and Taecker. 2013. Survival of Mountain Pine Beetle in Unpeeled Logs. West. J. Appl. Forestry 28: 154-157). Cutting later in the season or in longer lengths did not achieve the same mortality (Ball, Allen and Amborn. 2013. Cutting infested pines into unpeeled section: a population-reduction tactic for managing mountain pine beetle in the Black Hills. Poster session. Western Forest Insect Work Conference. Penticton, BC.)

There is a relic stand of limber pine in Custer State Park that have been crowded by an overstory of white spruce and infected by blister rust. The additional stress of beetle attacks, even unsuccessful ones, could result in significant tree mortality. 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 the loss of about 3 percent of the trees infested by mountain pine beetle, despite a high losses of ponderosa pine in the immediate vicinity. While no controls were in place to determine the effectiveness of verbenone on limber pines, the only limber pines killed by mountain pine beetle were the five that were not treated with verbenone (4) or were isolated trees (1). The remaining trees have been treated with verbenone. The ponderosa pines in these same stands have suffered about 90 percent mortality from mountain pine beetle

**Pine engraver beetles**  
*Ips pini* and *I. calligraphus*

Pine engraver beetle populations that had been very low during the past several years increased dramatically beginning in 2012 and are resulting in ponderosa pine mortality in the Black Hills, primarily in the southern counties of Fall River and Custer. The population has also increased in the Pine Ridge country of Shannon County. Pine engraver beetles are typically found in dying trees, as well as slash piles, but the populations are expanding and are now becoming a significant cause of tree mortality. The population had increased in the early 2000s due to an increase in susceptible host material as a result of wildfires and weather events, such as hail and snow-breakage that resulted in a tremendous buildup of dead, weakened and damaged tree material. The population is increasing again perhaps due to the number of trees killed by the mountain pine beetle and the aftermath of the 2011-2012 drought. Another factor is the increase in the use of chipping slash following thinning operations. We have seen an increase in pine mortality in stands where the fresh slash has been chipped in early spring. We may see a high population and subsequent tree mortality due to the number of pines with snapped tops following the October snow storm.



Pine engraver beetle galleries.  
 SDDA RCF file photo

**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 that were chipped in the early spring.

**Spruce needleminer**  
*Taniva albolineana*

There have been increased reports of the needleminer infesting Colorado spruce in windbreak and community planting in the eastern half of the state. This insect can cause severe defoliation in heavily



Spruce needleminer damage.  
 Photo courtesy of Dr. John Ball

infested trees, and in combination with drought injury, can result in tree mortality. During 2013 reports of dead or dying Colorado spruce, between 10 and 30 years old were common and while drought was the predisposing stress, the needleminer may have played an important role as a inciting factor in the mortality.

**Zimmerman pine moths**  
*Dioryctria spp*

Zimmerman pine moth continues to be a problem in windbreaks and ornamental plantings across South Dakota. Austrian pine is the primary species affected, though ponderosa pine windbreaks are also experiencing significant branch injury.

## Forest Diseases

### Dutch elm disease

*Ophiostoma novi-ulmi*

Reports of Dutch elm disease were widespread in eastern South Dakota during 2013 with many communities suffering high losses. Typically a community that has a significant elm population, more than 10% of its street trees, has annual losses of less than 1% of its trees to Dutch elm disease. The losses were often three to four times higher than normal during 2013 and this loss has severely reduced the elm street tree population. However, American elm still is one of the most common community trees in the state, comprising more than 8% of the street tree population.

### Diplodia tip blight

*Diplodia pinea* (*Sphaeropsis pinea*)

The disease was commonly reported throughout the state on Austrian and ponderosa pines in shelterbelts and community plantings. While the disease has been present in many declining trees, the underlying problem appears to be that the trees are mature and were stressed by the drought that occurred from 2011 to 2012.



Diplodia Tip Blight

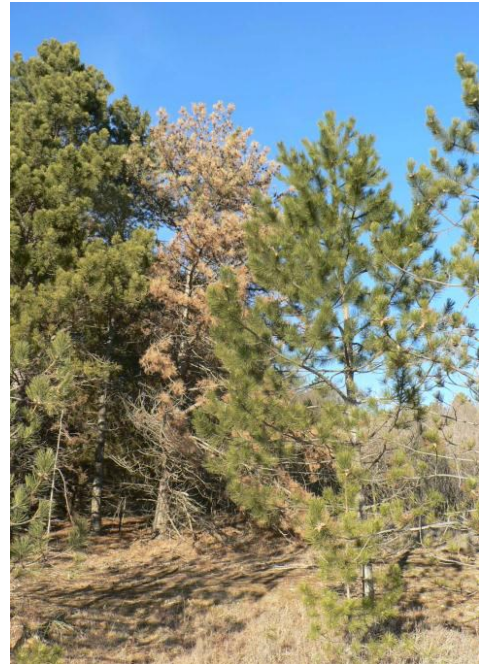
Photo courtesy of Dr. John Ball

### Pine wilt nematode

*Bursaphelenchus xylophilus*

Rapidly declining Austrian and Scotch pine in the southern region of the state (south of I-90) have been found infected by this nematode. Reports of

the disease increased in 2013 with most of the affected trees occurring in the southeastern counties that border Nebraska. Mature Austrian pines were the species most impacted by this disease but this is the most common exotic pine planted in the area.



Pine wilt nematode

Photo courtesy of Dr. John Ball

### White pine blister rust

*Cronartium ribicola*

White pine blister rust 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 only one new infection in 2013. Pruning has been performed in past years to manage the spread of the disease. Pruning infested tissue has generally been necessary for only a single small branch, less than 0.5 cm, on a limber pine.

## Forest Health Conditions with Other Damaging Agents

### Spring Ice Storm

An April ice storm in southeastern South Dakota resulted in the loss or severe damage to thousands of trees in Sioux Falls and the surrounding communities. More than 5,000 trees were removed due to the loss of more than half their can-



opy and another 50,000 or more required pruning. The city of Sioux Falls spent more than \$9 million in storm clean-up. The majority of the trees lost were mature ash and silver maples between 30 and 80 years old. Younger trees suffered less damage and trees that have coarse branching, such as oaks, also survived the storm with little injury.

### Fall Snow Storm

An early October snow storm blanketed much of western South Dakota. Since most of the trees were still in leaf, snow loading was very high and this additional weight caused tree and limb breakage. This storm resulted in the loss of many trees, regardless of species or age.



Spring Ice Storm, Sioux Falls, SD  
Photo courtesy of Dr. John Ball

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