



South Dakota Forest Health Highlights 2011

Forest Resources



The coniferous forest makes up more than three-fourths of the state's forest. These forests are situated in the Black Hills, extending north into Harding County and east to Todd County. The dominant species is ponderosa pine. These pine stands contribute to the state's economy and provide valuable wildlife forage and cover. The most serious threats to these forests are insect and fires. Two-thirds of the coniferous forests in the state are on federal land.

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. The biggest threat to riparian forests is the lack of regeneration of cottonwood trees. Approximately 70 percent of bottomland forests in South Dakota are privately owned.



Urban or community tree lands occupy approximately 103,000 acres in the state. There is 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.

Shelterbelts and windbreaks 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 also provide habitat for pheasant and other birds. Shelterbelts face similar threats as other forests types though there is a pressing need for renovation. The most common species used as a shelterbelt tree is green ash, and 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.



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. In general, upland forests have declining regeneration and face threats of disease, invasive species, and land-use changes. Perhaps the most valuable asset of hardwood forests are the recreational opportunities they provide, including hunting, camping, and wildlife viewing. Approximately two-thirds of the upland hardwood forests are privately owned; the rest are predominantly federally owned.

Forest Health Issues

General Overview

The most common tree species from which samples were submitted or inspected during visits include ponderosa pine (23 percent). The remaining top five were green ash (16 percent), Colorado blue spruce (7 percent), eastern redcedar and Rocky Mountain juniper (6 percent) and American elm (3 percent). Other common species include white spruce, honeylocust, silver maple, and cottonwood. The number of calls generated by concern over mountain pine beetle is the primary reason for the high number of visits involving ponderosa pine. The calls regarding honeylocust, silver maple and cottonwood were generally related to the summer flooding.

The most common insect and mite problems are reflective of this species list. Problems associated with conifers generate the most calls with mountain pine beetle (18%), Diplodia tip blight or Dothestorma needle blight (10%), pine engraver beetle (5%). Zimmerman pine moth and red turpentine beetles were also frequently identified as stressors. Broadleaf tree problems were generally much fewer than reported in the past with diseases being more common concerns than insects. The most common disease question was related to Dutch elm disease and bacterial blight of lilac followed by common foliage diseases such as apple scab and ash rust.

Insect Conditions

Eastern ash bark beetles (*Hylesinus aculeatus*)

These bark beetles are secondary insects that hasten the decline of ash trees that are already stressed by drought or other causes. The state has experienced a widespread decline and mortality of black ash (*F. nigra*) and these insects are commonly associated with the dying trees.

Grasshoppers (*Melanoplus*) The high grasshopper populations in the western part of the state are also having an impact on trees and shrubs. Seedling trees are still being killed by the mid-season defoliation by grasshoppers in shelterbelts throughout western South Dakota.

Mountain pine beetle (*Dendroctonus ponderosae*)

The northern border of the Sylvan Lake Unit of Custer State Park has experiencing an epidemic that began shortly after an expanding population of mountain pine beetles was detected in Black Elk Wilderness Area in 2002. The Black Elk Wilderness Area bordering Custer State Park has experienced near 100 percent mortality by 2011. The beetle situation in the adjacent land in Custer State Park has resulted in much less pine mortality due to a multitude of 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 have occurred in the western portion of the main body of Custer State Park with an estimated 140,000 trees being infested during the past flight. The state is planning to take aggressive action to manage these stands in a similar manner to what has been done near Sylvan Lake.



Custer Peak mountain pine beetle epidemic.

The mountain pine beetle epidemic in the Black Hills that was concentrated originally on Federal land has now spread to private lands, primarily in the central Hills area though infestations are now becoming more common in the northern Hills as well. Landowners adjacent to Rapid City are also seeing mortality of their pines due to the beetle. The state, in cooperation with the local conservation districts, has been marking infested trees on private property at the request of landowners. There is also cost-share available to assist landowners in removal and treating the infested trees.



Marking a mountain pine beetle infested tree.

Limber pine is also a host to mountain pine beetle. There are some relic stands of this species in the Cathedral

Spires of Custer State Park. There has been concern that the expanding beetle population from the adjacent Wilderness Area might spread into these stands and eliminate the species from the area. The trees are already stressed by white pine blister rust and encroachment by white spruce and 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 less than 1 percent of the trees lost to colonization by mountain pine beetle, despite a high infestation of the beetles in the immediate vicinity.

Pine engraver beetle (*Ips pini*) Pine engraver beetle populations that were very low during the past several years are beginning to increase and are causing some ponderosa pine mortality in the Black Hills. Pine engraver beetles are typically found in dead and dying trees, as well as slash piles, but the populations are expanding and are now becoming a major 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 has resulted in a tremendous build up 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.

Pine sawflies (*Neodiprion fulviceps*) There has been increased defoliation of pine stands in the southern Hills during the past five years due to this insect. A few stands have experienced defoliation for the last three years and some tree mortality is occurring. However, the defoliation has been generally light, though persistent, over much of the area.

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.



Mountain pine beetle pupae and sawyer beetle larva in a standing green infested ponderosa pine tree.

Sawyer beetles (*Monochamus scutellatus*) Sawyer beetle populations have increased in the past year or two in mountain pine beetle infested trees. Previously, the sawyer beetles were not typically found in mountain pine beetle killed trees until a season or two later. Now it is common to find sawyer beetle larvae in “green” infested trees, often within weeks of the trees being colonized by mountain pine beetle.

Zimmerman pine moths (*Dioryctria*) 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. The injury is also being confused with mountain pine beetle attacks on some of the infested trees in the Rapid City area.

Disease Conditions

Ash rust (*Puccinia sparganiodes*) This rust disease was reported throughout much of the eastern half of the state and while it was not as severe as was reported in 2008, there was still many ash trees that were partially defoliated by the disease during early summer.

Bacterial blight (*Pseudomonas syringae*) Bacterial blight was reported on Amur maples and Japanese tree lilac trees in community plantings and lilacs in shelterbelts throughout eastern South Dakota. The initial symptoms of the disease included brown to black, water-soaked spots on the leaves that result in misshapen leaves. The terminals on the shoots also turn a black, droop over and die symptoms that mimic fireblight. There were numerous windbreak plantings in which the entire row of white-flowering lilacs were affected.

Diplodia tip blight (*Diplodia pinea* (*Sphaeropsis pinea*)) The disease is commonly reported throughout the state on Austrian and ponderosa pines in shelterbelts and community plantings. While the disease typically results in stunted and dying shoot tips, it has more recently been associated with branch dieback in infected trees. The disease also appeared on many of the ponderosa pine trees along the highway between Hill City and Rapid City. This outbreak along the highway was associated with a hailstorm that occurred the previous summer. The mechanical injury from the hail serves as an additional stress that allows *Diplodia* infected trees to express symptoms.

Dothistroma needle blight (*Dothistroma septospora*) This disease was been reported in ponderosa pine shelterbelts in many areas of the state in 2011. The symptoms generally occurred in the fall of 2010 and by the spring of 2011 infected trees were found that significant needle loss. This has become an increasingly common disease over the past several years. However the symptoms of this disease is often confused with those associated with other diseases and disorders, thus

Dothistroma is not as common as assumed by many landowners.

Pine wilt nematode (*Bursaphelenchus xylophilus*) Rapidly declining Austrian and Scotch pine in the southwestern portion of the state have been found colonized by this nematode. Many shelterbelt and community plantings of these species have disappeared during the past decade due to pine wilt disease. Now the disease is appearing in Mugo pines in this same region of the state. Pine wilt disease is also occurring in more Scots and Austrian pines in the southeastern part of the state.

Western gall rust (*Endocronartium harknessii*) This disease occurs primarily in the Black Hills and is a contributing factor to the death of small ponderosa pine trees. The disease also can be found on the limbs of larger trees but generally is not a severe problem.

White pine blister rust (*Cronartium ribicola*) This disease was discovered in some of the relic stands of limber pine in the Cathedral Spires area of Custer State Park in the early 2000s. The canker is now present in some of the stems of these trees and some mortality has occurred in recent years. Trees are being pruned to reduce the spread of the infection.

Forest Health Conditions with Other Damaging Agents

Flooding

There was significant season-long summer flooding along the Missouri River during 2011. The communities of Dakota Dunes, Fort Pierre and Pierre have been particularly impacted by the flooding with the loss of many conifers and fruit trees by the end of the summer. Many mature trees, most commonly cottonwoods and elms, were uprooted during the flooding. Ash, boxelder and cottonwoods appear the least affected by the flood, with bur oaks, hackberries and silver maples that were standing in flood waters during the summer exhibiting dieback and premature coloration last fall. We may still see significant mortality from the 2011 flood next year.



Missouri River flooding in Pierre, SD

For Forest Health Assistance and further information on Forest Health in South Dakota, please refer to the contacts and websites listed below.



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