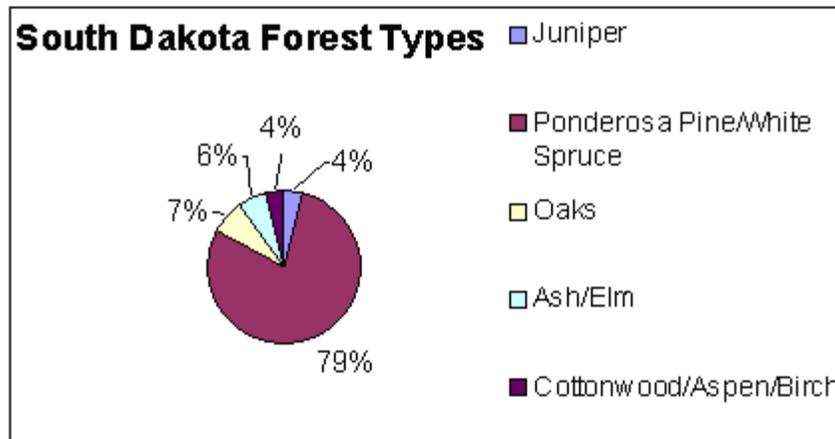


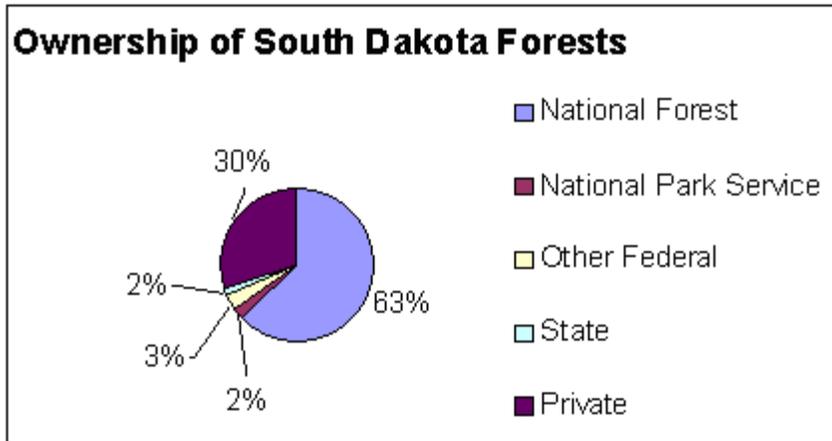
The Resource

South Dakota has basically two types of forested lands. Over 1.6 million acres of traditional conifer forests are found in the Black Hills and as native wooded draws throughout the western half of the state. The remaining forests are plains/prairie type forests of riparian hardwood forests and agro-forestry plantings. The plains/prairie forests exist along the tributaries and waterways of the Missouri and Minnesota Rivers. Some 200,000 acres of the plains forests are classified as non-forest land with narrow wooded strips of agro-forestry plantings with windbreaks, shelterbelts, and living snow fences.

The conifer forests are primarily located in western South Dakota in the Black Hills area, along the Belle Fourche-Grand Moreau River, and in the Pine Ridge and Rosebud Indian Reservations. Ponderosa pine dominates much of this sites comprising over 99% of the forested land. The Black Hills forests produce timber that support several local sawmills and are a large recreational destination of much of the country.

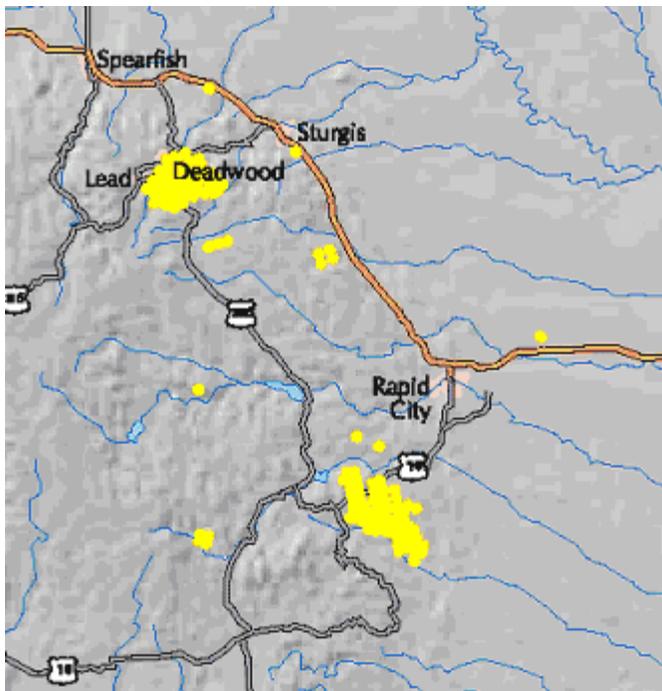
Deciduous and hardwood trees of ash, linden, hackberry, oak, elm, cottonwood and willow are found in the Riparian Forests. These occur throughout the state but are mostly concentrated in the east along the Missouri and Minnesota rivers. Over 1.3 million acres of the plains/prairie forests are agro-forestry plantings, natural wooded draws, and community forests. Agro-forestry plantings of shelterbelts, windbreaks, and living snow fences increase crop and livestock production, protect water quality, and preserve soils. These plantings are a mixture of hardwoods, pines, and junipers; sometimes these plantings become an agricultural problem when they encroach too far onto grazing lands of the prairie.





Special Issues

Wildfires - Three years of drought have promoted several large wildfires in South Dakota's Black Hills forests during 2000, 2001, and 2002. Over 370 wildfires occurred in South Dakota during 2002, and burned of 21, 810 acres of forest and range lands. In 2002, the Black Hills forests experienced two large complex of wildfires near the communities of Deadwood and Custer.



Largest Wildfires	Location	Dates Started - Ended	# of acres burned
Battle Creek	Custer area	Aug.16 - Aug.29	13,700
Grizzly Gulch	Deadwood area	June 29 - July 23	10,771

Adding to drought and wildfire problems in South Dakota, bark beetle outbreaks are destroying thousands of ponderosa pines causing an increase of hazardous fuels for potential fires.

Mountain pine beetle, *Dendroctonus ponderosae*, has caused extensive ponderosa pine mortality throughout the Black Hills of South Dakota over the last 3 years. Aerial surveys have detected a large and expanding mountain pine beetle infestation in the Beaver Park area of the Northern Black Hills. Ground surveys found 37 trees per acre killed. Continued studies of these outbreaks areas indicate that beetle populations are still increasing and will cause dramatic levels of future tree mortality.

As available host trees are killed in the Beaver Park area, then the large beetle populations expand to surrounding forest sites. The majority of the infestations are confined to national forest lands more private and state lands are now becoming infested. The Sturgis watershed area is hardest hit with by this beetle epidemic and logging is in progress to reduce the forest susceptibility to attack and remove infested trees. Thinning is also planned to increase tree vigor and health. These practices will also reduce the fire hazard further preserving water quality.

In 2002, mountain pine beetle has affected approximately 15,000 acres of private forestland in addition to forestland within the Black Hills National Forest. Private lands adjacent to the National Forest are beginning to suffer considerable mortality and forest landowners are thinning their lands to reduce susceptible host material.



Aerial view of ponderosa pine mortality caused by mountain pine beetle in Beaver Park area of the Black Hills National Forest in South Dakota. Notice that all of the red and much of the brown/gold colorings were once green pines until recent attacks by mountain pine beetle.

Pine engraver beetle, *Ips pini*, is another bark beetle causing significant amounts of ponderosa pine mortality in the Black Hills. Pine engraver beetle populations built up in storm damage and fire areas and increased exponentially around the Black Hills the last 3 years.

Many of the areas getting hit hardest by *Ips* in the Black Hills are in the wildland-urban interface. In 2002, the pine engraver beetle affected approximately 25,000 acres of private forest and urban lands. The population has been increasing in recent years due to the increase in suitable hosts, trees that have been injured or killed by fire and severe snow and hail storms.

This recent, unprecedented levels of *Ips* activity is a consequence of wildfires and weather events, such as hail and snow-breakage. *Ips* beetles bred in this weakened and damaged tree material. With a nearly unlimited supply of food, the *Ips* beetle populations increased significantly. Now that this food supply is becoming less suitable, *Ips* have exited it and are killing standing trees.

Other Insects, Diseases, and Damaging Agents of Forest Health Concern in the South Dakota

Gypsy moth -
Lymantria dispar

In 2002, insect larvae nor pupa were found on trees in South Dakota, nor has any defoliation in the state been attributed to this insect. There have been a few moths caught in traps that

<i>(Non-native)</i>	were placed around the state.
Cedar bark beetle - <i>Phloeosinus dentatus</i>	The cedar bark beetle has been associated with the decline and branch mortality of Eastern redcedar on approximately 200 acres of windbreak and urban plantings. The population is on the increase, most likely due to the extended drought that is reducing host vitality and defenses. The loss of cedars is a concern in windbreaks as there are relatively few evergreens that tolerate the growing conditions in the northern Great Plains.
Red turpentine beetle <i>Dendroctonus valens</i>	Populations of red turpentine beetle have increased dramatically due to large fires. Many of the heavily fire scorched trees were infested. At this time, there has been little movement from fire scorched trees out into green trees.
Ash/lilac borer <i>Fraxinus pennsylvanica</i>	These phloem/wood-boring insects have caused loss of green ash in shelterbelt plantings on private lands.
Root disease - <i>Armillaria ostoyae</i>	This root disease is extensively present throughout the Black Hills with large centers of the fungus occurring in the northern portions of the Hills. The fungus occasionally kills healthy, mature ponderosa pines and white spruces, but is most often found killing seedlings and saplings in these forests. Armillaria root disease may weaken larger trees and make them more susceptible to bark beetle attacks when insect populations are low.
Sphaeropsis (Diplodia) blight - <i>Sphaeropsis sapinea</i>	In 2002, there were trees on about 400 acres of forestland, urban land and agroforestry land that had serious infections of diplodia tip blight. The disease is common throughout South Dakota, particularly on Austrian pine but there has been an increase in the incidence of the disease in the Black Hills due to spring hail storms.
Western gall rust - <i>Endocronartium harknessii</i>	Widely distributed in the Black Hills area contributing to the death of small ponderosa pine trees. The disease also can be found on the limbs of larger trees but normally not a severe problem. Widely distributed in the Black Hills and contributing to the death of small ponderosa pine trees. The disease also can be found on the limbs of larger trees but normally not a severe problem.
White pine blister rust - <i>Cronartium ribicola (Non-native)</i>	This disease is causing decline to the few remaining stands of limber pine in the central areas of the Black Hills. Mortality of these trees was not observed, but these trees are more susceptible to bark beetle attack due to this disease.
Pinewood nematode - <i>Bursaphelenchus xylophilus</i>	While the nematode has been extracted from ponderosa pines near Fort Meade, the disease pine wilt has appeared in windbreaks of Scotch pine and Austrian pine in southern South Dakota. In 2002, however, we have identified approximately 10 acres of trees in several windbreaks that have died from the disease. We are completing a survey of plantings to determine the extent of the disease in the state.
Dutch elm disease, <i>Ceratocystis ulmi (Non-native)</i>	In 2002, Dutch elm disease has been increasing in a number of South Dakota communities that still have significant elm populations. Losses in the last two years have been three to four times higher than that experienced in previous years, about a total of 100 acres of street and park trees across the state. Due to the inability of communities to conduct prompt removals of the infected trees there will be an increase in root-graft infections for 2003.
Hackberry decline	Approximately 200 acres of hackberry in urban and agro-forestry plantings have been affected by hackberry decline in 2002. There has been relatively little loss in the native stands of hackberry across the state. The gradual loss of hackberry street trees, windbreaks and ornamental trees will result in a loss of diversity as there are few substitutes for this tree.

Drought

Colorado spruce, cottonwood, green ash, and ponderosa pine were all affected by drought in 2002. There are approximately 200,000 acres of windbreaks in South Dakota that were affected by the drought during 2002. While some of the western portions of the state began experiencing drought in 2001, this condition became almost statewide by 2002. In addition to agro-forestry plantings, urban forests were also impacted by the drought conditions. The increased environmental stress has resulted in an increase in successful colonization by borers such as ash bark beetles (*Hylesinus* spp), cottonwood borer (*Plectrodera scalator*) and Zimmerman pine moth (*Dioryctria* spp).

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