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Testimony on “Impact of the Mountain Pine Beetle Epidemic in the Black Hills”
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Mountain pine beetles are native to the forests of western North America, including the Black Hills. Mountain pine beetles are one of the most destructive insects of the Black Hills because they often kill large numbers of pine trees during periodic outbreaks. Trees infested during the summer will remain green through the fall and winter; the next year, needles on the infested trees will turn straw-yellow to orange. Trees that have been dead for two years have hanging gray needles. After two years, trees killed by mountain pine beetle will drop their needles and only the dead tree trunks will remain until they rot and fall to the ground.

Life Cycle of a Mountain Pine Beetle

The mountain pine beetle (*Dendroctonus ponderosae*) is a small insect that lives most of its life in the inner bark of pine trees. The adult beetles are black to rusty brown and about 1/4 inch in length.

The beetle has one complete life-cycle each year. They fly from infested trees to a new “host” tree in late June or July. The female beetles seek out new green trees to attack. These trees are often mass-attacked. Once they have located a favorable new host, adult beetles will tunnel into the tree to mate and the female beetles will lay eggs along the sides of their tunnels. After the newly laid eggs hatch, the young beetle larvae will tunnel through the nutritious tissue found just beneath the bark and feed upon this tissue from August until May of the following spring. The new adult beetles will emerge from the dead host in mid-summer to seek a new living tree – beginning their life cycle again.

The beetles try to colonize trees in large numbers and overwhelm the natural defenses of a pine tree. Tunneling beneath the bark by the adult beetles and their larvae disrupts the movement of food, produced by the needles, to the roots. The adult beetles also carry a blue-stain fungus from tree to tree. This fungus stops the movement of water from the roots to the needles. The combination of these two factors results in the tree's death which insures that the young beetle larvae can mature into new adults.

Pine trees produce a resin, “pitch,” as a defense against beetle attacks. Normally, a healthy tree can “pitch-out” attacking beetles and prevent them from entering the tree. Healthy trees produce more pitch than stressed trees and trees with more growing space are usually healthier than trees growing in dense thickets. Pines that are stressed, either through drought or competition with surrounding trees may produce little or no pitch in response to a beetle attack. These trees are very vulnerable to successful attack by the mountain pine beetle.

Mountain pine beetle attacks are usually concentrated in dense stands of large trees, with yellow-bark trees the most vulnerable to attack. However, when beetle populations are high, they will attack trees as small as 3 inches in diameter.

Mountain pine beetles favor trees that are 8 to 9 inches in diameter or larger because the larger trees will allow the larvae to mature before the trees becomes unviable as a host. Infested trees that have been successfully attacked can be easily identified in mid to late summer by the pitch tubes on the trunks of each tree. There will also be red boring dust in bark crevices and on the ground around a successfully attacked tree.

Not all pitch tubes indicate successful attacks by mountain pine beetle. Beetles may be found trapped in the pitch excreted by an attacked tree. If the majority of beetle attacks are successfully 'pitched-out,' the attacked tree may survive.

Trees attacked by mountain pine beetle quickly degrade in quality. The blue-stain fungus introduced by the beetles when they attack a tree causes an unsightly blue to black stain in the wood of a tree. This stained wood is undesirable in traditional wood products. It is a general rule-of-thumb that beetle-killed trees must be harvested within one year of infestation before they become unusable for lumber products.

Other insects, such as sawyer beetles, which feed on dead trees, can reduce the interior of mountain pine beetle -attacked trees to a weakened "pulp" within a short time. This condition also reduces the viability of the attacked trees to be used for traditional lumber products. Therefore, it is imperative that any salvage operations to remove mountain pine beetle - killed trees must occur as soon as possible after infestation.

Historical Perspective

The mountain pine beetle is native to the forests of western North America. In fact, the first mountain pine beetle was identified and recorded in the Black Hills during the late 1800s. This beetle was called the "Black Hills Beetle". Later, similar beetles were found throughout the western United States and Canada and the beetle was officially renamed "mountain pine beetle." These bark beetles evolved in the western pine forests and primarily attack ponderosa, lodgepole, and limber pines.

Since recorded history, there have been periodic outbreaks on about a twenty-year cycle within the Black Hills; each of these outbreaks lasted from five to seven years. The first recorded outbreak of mountain pine beetles was in the 1890s around the town of Deadwood. In fact, the town received its name due to the numerous dead trees found throughout the area. The second recorded epidemic occurred just prior to the Second World War between 1933 and 1942; a third occurred between 1945 and 1957; and a fourth between 1963 and 1981. The current epidemic, which began in the late 1990s, continues to expand.

The Current Problem

Since the beginning of the current outbreak in the 1990s, mountain pine beetle numbers have been increasing at a steady rate. Today the beetles have infested over 30 percent of the entire Black Hills National Forest and have begun to impact state and private forest lands in large numbers.

The United States Forest Service has conducted forest pest aerial surveys of the Black Hills on an annual basis for decades. These surveys are useful in determining trends in forest pests and have been tracking the latest build-up of mountain pine beetles. The following is a summary of the data collected each year since 1996 – the beginning date for this latest outbreak:

1996 -	1,755 acres (mountain pine beetle Infested forest land, public & private)
1997 -	6,930 acres
1998 -	13,460 acres
1999 -	19,160 acres
2000 -	13,546 acres
2001 -	102,218 acres
2002 -	103,246 acres
2003 -	189,655 acres
2004 -	57,843 acres (survey conducted six weeks earlier than normal)
2005 -	19,464 acres (survey design was changed by USFS)
2006 -	40,022 acres
2007 -	25,387 acres
2008 -	22,424 acres
2009 -	44,100 acres

Recent trends indicate that the impact of mountain pine beetles on private forest lands will increase significantly over the next several years. Many areas will be hit hard and some private forest landowners will lose the majority of their trees. Heavy tree losses, increased fire danger, and damage to the aesthetic quality of our forests will have a negative economic impact on local communities and businesses. Industries that depend on forest resources will also be negatively impacted if the makeup of our forests is dramatically altered by mountain pine beetles and the devastating wildfires that accompany many of these outbreaks.

The Task

It has become increasingly apparent that federal, state, and local governments must intervene and actively control the spread of mountain pine beetles within the Black Hills. Our combined suppression efforts must be aimed at breaking the ever-increasing number of mountain pine beetle-infested trees that occur each summer. This task will not be easy. It will require the coordinated effort of all levels of government, as well as the cooperation and commitment of all forest landowners.

Since our combined efforts have not been enough to address the situation during the past ten years, a much higher level of commitment will be needed to stem the advancement of the current epidemic.

In many respects, a mountain pine beetle outbreak is similar to a large wildfire in its devastation. It is much slower than a wildfire in movement, but the end result is equally devastating to the landscape and has a similar long-term impact on the forest ecosystem. Therefore mountain pine beetle suppression efforts should be handled in the same manner as other natural disasters or emergency actions.

Federal & Non-Federal Lands

Of the forest lands within the Black Hills, 80 percent are under the control and administration of the Black Hills National Forest. Up until the summer of 2010, over 95 percent of mountain pine beetle infestations were located on lands administered by the Black Hills National Forest. Consequently, control of mountain pine beetle infestations on federal lands is the key to successful mountain pine beetle suppression. If the Black Hills National Forest is unable to aggressively attack and control mountain pine beetle infestations on federal lands, all other efforts on state and private forest lands will have limited success. However, the need to control mountain pine beetles on state and private forest lands cannot be ignored. Control efforts on these lands must be funded and supported as well as any effort on federal lands if our task is to be successful.

State & Private Lands

The need to address mountain pine beetle infestations on state and private forest lands is important and South Dakota has implemented a successful model for addressing mountain pine beetle. Non-federal lands comprise roughly 20 percent of the entire forest land within the Black Hills and comprise some of our most economically and socially important areas. These private holdings contain most of the real property and wealth of our local citizens. The overwhelming majority of the businesses and tourist establishments that drive the Black Hills' economy are located on state and private lands. Consequently, heavy mountain pine beetle infestations on state or private forest lands will have a major impact on our state's overall economy.

It is imperative that if federal funds are allocated to the control of mountain pine beetles in the Black Hills, an equal share should be allocated to suppression efforts on state and private forest lands. As a benchmark, 20 percent of any funding provided by Congress should be set aside for control efforts on non-federal forest lands. This would provide a fair and equitable means of ensuring that state and private forest lands are properly addressed in any allocations.

Current Situation on Private Lands

The South Dakota Department of Agriculture has been actively involved in mountain pine beetle control measures on state and private lands for decades. During the epidemic of the 1970s, the Division of Resource Conservation and Forestry (then known as the Division of Forestry) was instrumental in initiating an all-lands approach to coordinated mountain pine beetle suppression efforts on federal, state and local forest lands.

In 2005, the Division of Resource Conservation and Forestry (Division), in cooperation with Custer State Park, began an aggressive campaign to control mountain pine beetle infestations in the Sylvan Lake area. This area of Custer State Park is immediately adjacent to the Black Elk Wilderness Area. The Wilderness Area began to build large pockets of mountain pine beetles at the same time as large pockets started to develop in Custer State Park. The National Forest did very little to control the beetle populations in the wilderness area while the state aggressively controlled beetle infestations within the park. Today more than 90 percent of the trees within the Black Elk Wilderness Area are dead, while Custer State Park still has a viable forest ecosystem. Our efforts in Custer State Park show that aggressive action is effective.

South Dakota pioneered many of the control measures that are now recommended for Mount Rushmore National Monument and other areas of the Black Hills. These control measures have also been implemented on private forest lands.

In the early years of this outbreak, infestations on private forest lands were isolated and the Division worked with individual landowners on a case-by-case basis to address them. In the summer of 2010, mountain pine beetle infestations on private forest lands exploded; that year alone, the Division surveyed 24,329 acres and marked 54,294 infested trees. This represents an eleven-fold increase over the area infested in 2009.

Prior experience suggests that each infested tree left untreated will yield eight new infested trees the next season. Based on the 2010 increases, the current epidemic is growing faster than the average expansion rate. A bar-graph showing the infested acreage and the number of marked trees on private lands by year accompanies this paper and illustrates the huge increase in activity that occurred last summer.

We have been concerned about the current mountain pine beetle epidemic for the past decade and have acted aggressively to control mountain pine beetle on state owned lands. Still, with 90 to 95 percent of the infested trees located on federal lands under the administration of the Black Hills National Forest, our efforts have been unable to address the larger problem. The dramatic increase in mountain pine beetle-infested acres witnessed last year was due primarily to new infestations on properties adjacent to U.S. Forest Service lands.

Even though the mountain pine beetle problem has been largely a federal one, public concern over the damage caused by beetles is growing. South Dakotans are beginning

to look to all governmental agencies (federal, state, and local governments) for answers and assistance.

Future Predictions

Because of the life cycle of mountain pine beetle, it is difficult to predict how many trees will be infected each year. The most current aerial mapping data (summer 2010) indicates that there were 44,100 acres with mountain pine beetle infestations within the Black Hills. An analysis of that data indicated approximately 42,000 acres were located on federal lands and 2,060 on non-federal lands.

Last fall and winter, the South Dakota Department of Agriculture provided assistance to 514 private landowners, surveyed 24,329 acres, and marked 54,294 infested trees. This is significantly more acreage than the aerial survey indicated which was expected and not unusual. The survey plots out the acreage of trees that are currently dying as a result of mountain pine beetle attacks; however, these trees were infected the previous year. The trees infected the summer of 2010 will not show signs of dying until the summer of 2011.

The Division of Resource Conservation and Forestry estimates that the number of infested trees could be two to eight times greater than the numbers encountered last year. With this estimate, roughly 124,000 to 496,000 trees will be infested with MP on private lands by the end of summer 2011.

Since 95 percent of the mountain pine beetle infestation is located on federal lands and 80 percent of the forest land is in federal ownership, we can assume that a proportionate increase will occur on federal lands. Therefore, the Black Hills National Forest could yield between 620,000 and 2,480,000 newly infested trees in 2011. This is a staggering figure that, while an estimate, should frame the mountain pine beetle predicament.

Conclusions

In conclusion, the federal government should effectively and actively manage the mountain pine beetle outbreaks in the Black Hills National Forest and especially in areas bordering private lands. Few tactics may be effective to remedy the situation within the Black Elk Wilderness Area, but the Forest Service can make a difference within the Norbeck Wildlife Preserve. This area should be a top priority with proactive mountain pine beetle treatments being implemented immediately to stem the wave of beetles moving into that area from the Black Elk Wilderness.



Custer & Pennington County South Dakota



Little Devil's Tower

Cathedral Spires

Harney Peak Lookout

Boundary Line between
Custer State Park, Trees Treated
Wilderness, Trees Untreated

Mount Rushmore

Needles Highway

Custer State Park, Trees Treated

Wilderness, Trees Untreated

Photo looking north September 10, 2009

Area Surveyed and Number of Infested Trees Marked on Private Forest Lands by State Crews

