South Dakota Department of Agriculture

July 2011

Mountain Pine Beetles in the Black Hills

Important Points:

- *Mountain Pine Beetle populations are still increasing in the Black Hills.*
- *CSP is being hit hard by MPB and continued action is needed.*
- *MPB in the unmanaged Black Elk Wilderness Area will continue to invade CSP and spread towards Mt. Rushmore National Memorial.*

Since 1996, mountain pine beetles have greatly affected the ponderosa pine forest of the Black Hills. The beetle is a native insect and well adapted to the natural conditions of the region. The Black Hills experienced widespread epidemics in the 1890s, 1940s, 1970s, and the present. Custer State Park has been seeing the effects of the current epidemic since 2004.

How the beetles kill a tree. The death of a pine tree by mountain pine beetle happens because the beetles girdle the tree through their tunneling which starves the tree. They also carry a blue stain fungus that colonizes the wood and slows the movement of water from the roots to the needles. This combined attack of beetle and fungus kills the tree within a year of the initial attack.

The concern with the loss of trees to mountain pine beetle. Once the commercial value of the trees is destroyed by the fungus and subsequent attacks by sawyer beetles, there is no economical way to remove infested trees.

An added concern is that leaving the dead trees builds up the amount of burnable material in the forest. Removing and/or treating these trees eliminates or shortens the time of increased fire risk. Trees removed lessen the fuel loading and trees treated hold moisture longer after initially drying and decompose faster since they have contact with the ground. Research shows that trees left standing start to fall within 5 years and create a "jackstraw" pile that extends over the

Mountain pine beetle trees treated in CSP.

"Jackstraw" area of untreated trees in wilderness.

SOUTH DAKOTA DEPARTMENT OF AGRICULTURE

CUSTER STATE PARK
BLACK HILLS · SOUTH DAKOTA

Pitch tubes caused by MPB attacks

bug killed area. This can create problems with fire suppression and increase risk to suppression crews.

A severe fire in an inaccessible area such as the backcountry of Custer State Park can be very unsafe and expensive to contain. Forest regeneration in these burned areas can be very slow and it may take 80 years or more for the stand to regenerate to its former condition.

The mountain pine beetle epidemic in Custer State Park has the potential to reduce income to the Park by reducing the commercial timber value of the forests and reducing visitation due to the loss of aesthetic value from hundreds of acres of standing dead trees. The mountain pine beetles and the subsequent fires could destroy much of the beauty of Custer State Park without continued treatment.

"New areas with expanding beetle populations and subsequent tree mortality include Bear Mountain, Custer Peak, the Deerfield area, and the Black Elk Wilderness area."

Epidemic Status in the Black Hills

The mountain pine beetle epidemic continues to grow and expand within the Black Hills National Forest. Areas with expanding beetle populations and subsequent tree mortality include Bear Mountain, Custer Peak, the Deerfield area, and the Black Elk Wilderness area. Pockets of beetle infestations are also more prevalent throughout the entire Black Hills. This indicates that the current beetle epidemic has not peaked and will continue to develop throughout the Black Hills, probably for at least another 5 years.

A forest health evaluation done by the USDA Forest Service in May of 2008 states that "the number of trees killed per acre found in parts of Norbeck/Black Elk Wilderness is extremely high." "There are large portions of wilderness that already have 100% mortality of the pine overstory, and this level of mortality is expected to continue in the near future." The evaluation also states that "the only effective long-range strategy to minimize beetle-caused mortality is controlling stand conditions through silvicultural means over large landscapes and monitoring for areas of beetle buildup." The infestation is moving east towards Mt. Rushmore National Memorial.

Forest health evaluations done in other parts of the Black Hills by the USDA Forest Service in December of 2008 also show "increasing numbers of current attacks." It is hard to estimate the extent of damage that will occur and how long it will continue. Management actions that increase tree vigor and reduce stand susceptibility to beetle attack through reducing basal area or stand diameter are very important.

Pitch tube attached to a piece of bark

Status of Mountain Pine Beetle in Custer State Park

Custer State Park is the crown jewel of the state park system in South Dakota. More than 1 million people visit the Park every year. They generate more than $2 million in revenue yearly, which greatly contributes to the local economy.

The mountain pine beetle infestation in the Black Elk Wilderness Area has spilled over into Custer State Park. The infestation, which began as small pockets in 2001, has expanded to include many stands in the Cathedral Spires and Sylvan Lake area – prime recreational areas. Field sampling has been done in Custer State Park for the four of the previous years to determine the population status. The data has shown that the beetle populations were increasing at an exponential rate, similar to the population build-up that occurred in the Beaver Park epidemic in the northern Black Hills.

In response to this growing population, the Division and the Park jointly came up with a detailed plan to aggressively manage the infestation. Harvesting infested trees and thinning to reduce stand susceptibility has been a proven means of slowing beetle populations **(from 2005-2008 1,860 acres have been thinned)**. In addition to these traditional actions, pheromones, synthetic forms of attractants naturally produced by beetles were used to draw beetles to specific trees. Baited trees draw many times the normal number of beetles, essentially "soaking up" a population. Infested trees are felled, cut into 2-foot lengths, and left on-site to dry out. The drying wood does not provide enough food for the larvae so most die. Pheromones are also being used to repel beetles from the rare limber pines present in Custer State Park.

The mountain pine beetle projects in Custer State Park include**:**

- **Spot Baiting 2001** A 230-acre baiting and thinning project successfully stopped several small infestations within the Park.
- **Spot baiting 2005-2011** Trees near existing infestations were baited and other infested trees were marked. Infested trees were felled and cut into 2-foot lengths and left to dry, killing most of the mountain pine beetle larvae that was inside them.
- **Total trees treated in CSP-**

  2005: 3,000

  2006: 4,100

  2007: 11,900

  2008: 21,000

  2009: 22,000

  2010: 13,087
- **Special appropriations buffer Winter of 2007-2008** 450 acres around the border of Custer State Park were thinned to slow bark beetle movement into or out of the Park. Part of those acres were piled for aesthetic or fire danger reasons. This was finished in 2008.
- **Anti-aggregation baiting of limber pine 2005-2011** A relic stand of limber pine in the Cathedral Spires has received National Natural Landmark status from the National Park Service. Limber pine is a preferred host to the mountain pine beetle and there is concern that South Dakota could lose this unique stand. Anti-aggregation pheromones that repel mountain

Division forester placing mountain pine beetle bait on a ponderosa pine and flagging the baited tree for identification in the Fall.

"In response to this growing population, the Division and the Park have come up with a detailed plan to aggressively manage the infestation."

MPB larvae

"Unchecked infestations on the surrounding Black Hills National Forest demand that control efforts be continued…"

pine beetles from limber pine were placed on individual trees. Less than ten limber pines have become infested with mountain pine beetles due to their remote location. *These pheromones do not work on ponderosa pine in the Black Hills.*

- **Commercial tree harvesting 2009-2011** The same areas where all of these projects have been taking place are being commercially logged to reduce stand density, which reduces susceptibility to mountain pine beetle and fire risk. Trees were baited in the areas to attract beetles within the park into a place where the infested trees could be removed during harvesting.
- **Helicopter 2009-2011** A helicopter logging crew was contracted to remove the infested trees that would have normally been treated on site in remote locations. The contract was extended in 2009 to harvest more trees in these locations to reduce stand densities on more acres.
- **Monitoring** Personnel will continue to monitor this area of Custer State Park for any new infestations.

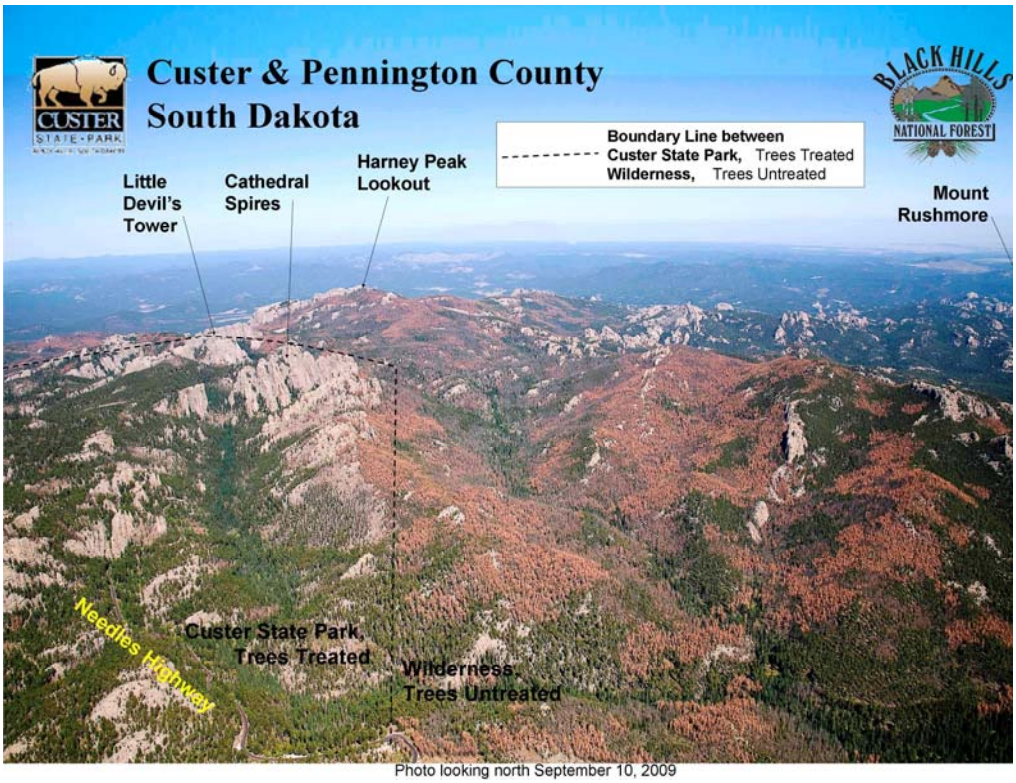

Photo looking north September 10, 2009

Future Needs

The mountain pine beetle problem is not yet completely eliminated in Custer State Park. Unchecked infestations on the surrounding Black Hills National Forest demand that control efforts be continued in the coming years. A continued proactive approach to management will reduce the risk of mountain pine beetle and provide a barrier for the continued spread of beetle populations. These management strategies will help to ensure that Custer State Park remains a place of beauty and biodiversity in the Black Hills of South Dakota.

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