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2010 Innovations Awards Application

Deadline: March 1, 2010

ID # (assigned by CSG): **10-MW-29SD**

Please provide the following information, adding space as necessary:

State: South Dakota

Assign Program Category (applicant): Natural Resources and Parks & Recreation (Use list at end of application)

1. Program Name: Custer State Park Mountain Pine Beetle Control Project
2. Administering Agency: South Dakota Department of Agriculture,
South Dakota Department of Game Fish and Parks and
South Dakota State University
3. Contact Person (Name and Title): Raymond Sowers, State Forester & Division Director, Resource Conservation
and Forestry, South Dakota Department of Agriculture
Doug Hofer, Parks Division Director, South Dakota Department of Game,
Fish and Parks.
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8. Web site Address: SD Department of Agriculture: <http://www.state.sd.us/doa/Forestry>;
SD Game, Fish and Parks: <http://www.sdgifp.info/parks/index.htm>
9. Please provide a two-sentence description of the program.

The mountain pine beetle epidemic threatens Custer State Park, the crown jewel of the state park system in South Dakota. In response to the threat, South Dakota Department of Agriculture, South Dakota Department of Game, Fish and Parks, and South Dakota State University jointly developed a detailed plan to aggressively manage the epidemic within the boundary of Custer State Park.

10. How long has this program been operational (month and year)? Note: the program must be between 9 months and 5 years old on March 1, 2010 to be considered.

The program began with baiting trees near existing infestations of mountain pine beetle in May of 2005 with the removal of 3,000 trees. Trees near existing infestations were baited with the pheromone *trans*-Verbenol to attract the beetles. Baited trees draw many times the normal numbers of beetles to an area, essentially “soaking up” a local beetle population. Baited trees are then felled, cut into 2-foot lengths and left on-site to dry out. The drying wood does not provide enough food, so most of the larvae die. The program was expanded in 2007-08 after it received a special appropriation totaling \$175,000 from the State Legislature in 2007-08 to create a 450 acre buffer along the border between Custer State Park and the adjacent Black Hills National Forest to slow the beetle’s spread into or out of the park. The border was thinned to density less than 60 basal area and linked natural barriers such as rock outcroppings and spruce stands. To date, almost \$1.7 million has been expended in this cooperative project.

11. Why was the program created? What problem[s] or issue[s] was it designed to address?

Custer State Parks is located in the Black Hills of South Dakota and is visited by more than 1.8 million people annually. These visitors contribute more than \$3.9 million in revenue yearly to the local economy. Since 1996, the mountain pine beetle has greatly affected the ponderosa pine forests of the Black Hills. The beetle is a native insect and is well adapted to the natural conditions of the Black Hills. The Black Hills experienced widespread epidemics in the 1890s, 1940s, 1970s and currently. One of the concerns with the loss of trees to mountain pine beetle is the loss of commercial value of the trees, resulting in increased costs to clean up infested areas because the lumber is of limited salvage value. An added concern is that dead trees could provide fuel for catastrophic fires which have historically followed mountain pine beetle epidemics. Such a fire in Custer State Park would be especially problematic because a severe fire in an inaccessible area such as the backcountry areas at Custer State Park can be very unsafe and expensive to contain. Also, forest regeneration in these burned areas can be slow and take up to 80 years or more to regenerate to its former condition.

The current mountain pine beetle infestation in the adjacent Black Elk Wilderness Area spilled over into small pockets in Custer State Park in 2001 and has expanded to include many stands in the prime recreation areas within the park. Field sampling conducted during the past four years has shown that the beetle populations were increasing at an exponential rate similar to other epidemics in the Black Hills.

In response to this growing problem, South Dakota Department of Agriculture and South Dakota Department of Game, Fish and Parks partnered to formulate a plan to aggressively manage the epidemic. This plan has proven successful in minimizing the mountain pine beetle’s impact on the park.

12. Describe the specific activities and operations of the program in chronological order.

- a. The program was initiated because the mountain pine beetle infestation in the Black Elk Wilderness Area spilled over into Custer State Park.
- b. Field sampling in Custer State Park from 2005 to present indicated that the mountain pine beetle populations were increasing at an exponential rate until 2008 and stabilized 2008-09.
- c. South Dakota Department of Agriculture and Department of Game, Fish and Parks came up with a detailed plan in May 2005 to aggressively manage the infestation within Custer State Park.
- d. Trees near existing infestations were baited to attract the beetles in 2005 and continued through 2009. Baited trees draw many times the normal numbers of beetles to an area, essentially “soaking up” a local beetle population. Other infested trees in the proximity were marked, felled, cut into 2-foot lengths and left on-site to dry out. The drying wood does not provide enough food, so most of the larvae die. Total trees treated:
2005: 3,000 trees
2006: 4,100 trees
2007: 11,900 trees
2008: 21,000 trees
2009: 22,000 trees

Total trees treated 2005-09: 62,000

- e. Anti-aggregation baiting of limber pine began in May 2005. Limber pine is a preferred host to the mountain pine beetle. Limber pine is an extremely rare tree in South Dakota and this stand of limber pine has been given National Natural Landmark status by the National Park Service. In an effort to protect this rare stand, anti-aggregation pheromones that repel mountain pine beetles were placed on individual trees. This treatment has proven to be very effective with less than ten limber pines becoming infested due to their remote location. While this pheromone treatment has been effective on limber pine, it has not worked on ponderosa pine in the Black Hills.
- f. In 2006, the South Dakota Department of Agriculture began using aerial photography to chart the locations of infested trees. The aerial photography was done in late July or August so that the currently infested trees were very visible. The photography was digitized and used in ARC-GIS software to plan the on-the-ground marking of newly infested trees and to show elected officials and the general public the extent of the mountain pine beetle problem in an easily understood format.
- g. The State Legislature provided a special appropriation to establish a 450 acre buffer around the border of Custer State Park to slow the beetles' movement into or out of Custer State Park. This buffer was established during the winter of 2007-08.
- h. Commercial logging began in 2009 and will conclude in 2010. Commercial logging was implemented on 650 acres in the Sylvan Lake area where previous treatments were implemented to reduce stand density which reduces susceptibility to mountain pine beetle and wildfire risk. The remaining trees also benefit from increased light, water and nutrient uptake, making them less susceptible to future beetle attacks.
- i. Helicopter logging began in 2009 to remove infested trees that would have been difficult to remove otherwise. The goals of this program element were to remove infested trees on over 2,250 acres and to reduce stand density on about 100 acres that would have otherwise been inaccessible.
- j. Monitoring has been an important element of the plan since its inception and will continue when the current epidemic appears to be under control. Our current proactive approach to management will reduce the future risks of mountain pine beetle and provide a barrier for the continued spread of beetle populations. Ultimately, these management strategies will help ensure that Custer State Park remains a place of beauty and biodiversity in the Black Hills of South Dakota.

13. Why is the program a new and creative approach or method?

The combination of treatments used to combat mountain pine beetle infestations have never been used before in one project and makes this project unique from past efforts to control the mountain pine beetle in other states. Custer State Park is 71,000 acres in size and ranges from open prairie to ponderosa pine forests. The semi-mountainous topography within Custer State Park and the need to protect a relic stand of limber pine necessitated the need for a multiple strategy approach to adequately address the combat the spread of mountain pine beetle. In some locations, the more practical approach was to conduct spot baiting with pheromones and fell infested trees. To protect limber pine, anti-aggregation pheromones were the appropriate treatment. In other locations, the creation of a buffer between the adjacent Black Hills National Forest and Custer State Park to slow the spread of mountain pine beetle was the appropriate treatment. Finally, the use of commercial logging was used to thin forest stands to less than 60 basal area which decreases a stands susceptibility to future outbreaks.

Another aspect that makes the Custer State Park Mountain Pine Beetle Control Project unique is that the South Dakota Department of Agriculture has legislative responsibility to address forest insect and disease issues within South Dakota. South Dakota Department of Game, Fish and Parks has management authority over Custer State Park, which is the largest state park in South Dakota. South Dakota State University has the expertise in forest insect and disease issues. Likewise, each organization has various resources at its disposal to address some of the issues. However, to adequately address the entire issue, it is going to take all the expertise and resources of each of these entities to combat the mountain pine beetle spread into Custer State Park. Thus, the partnership between the three organizations was born in 2005.

14. What were the program's start-up costs? (Provide details about specific purchases for this program, staffing needs and other financial expenditures, as well as existing materials, technology and staff already in place.)

This project used existing personnel and equipment. Work priorities of existing personnel were redirected to accomplish the goals of the project.

15. What are the program's annual operational costs?

FY2005: \$36,282 (tree thinning)
\$10,000 (aerial flights to identify infestations)

FY2006: \$95,712 (tree thinning)
\$119,218 (baiting/tree felling)
\$10,000 (aerial flights to identify infestations)

FY2007: \$50,000 (tree thinning)
\$62,646 (baiting/tree felling)
\$10,000 (aerial flights to identify infestations)

FY2008: \$175,000 (tree thinning)
\$220,040 (baiting/tree felling)
\$10,000 (aerial flights to identify infestations)

FY2009: \$475,190 (baiting/tree felling)
\$10,000 (aerial flights to identify infestations)

FY2010: \$450,000 (baiting/tree felling)
\$10,000 (aerial flights to identify infestations)

FY2011: \$370,000 estimated (baiting/tree felling)
\$10,000 estimated (aerial flights to identify infestations)

FY2012: \$300,000 estimated (baiting/tree felling)
\$10,000 estimated (aerial flights to identify infestations)

Total cost spent FY2005-10: \$1,684,088

Total cost spent FY2005-10 plus 2011-12 estimates: \$2,374,088

16. How is the program funded?

Funds for the Custer State Park Mountain Pine Beetle Control Project were provided by Consolidated Payment Grant and the Forest Health Management Grant funds from the National Forest Service, state funds from the Department of Agriculture, Division of Resource Conservation and Forestry, state funds from the Department of Game, Fish and Parks, Parks Division and a special appropriation from the South Dakota State Legislature.

17. Did this program require the passage of legislation, executive order or regulations? If YES, please indicate the citation number.

This program did not require the passage of new legislation but the program was necessary to comply with existing legislation. South Dakota Codified Law 38-22-16.2 makes property owners who allow the spread of mountain pine beetles from their land to adjacent private or public land responsible for remedying the problems caused by the infestation. Further, South Dakota Codified Law 41-20-12 requires the South Dakota Department of Agriculture to conserve and protect trees and forest on state-owned lands.

18. What equipment, technology and software are used to operate and administer this program?

This program relied heavily on the use of Global Positioning Systems (GPS) and Geographic Information Systems (GIS), primarily ARC-GIS software, to record and communicate the locations of baited sites and infested trees to be removed. ARC-GIS software recorded the location of past treatments to help with targeting treatments in subsequent years and to communicate the State's efforts to combat mountain pine beetle to elected officials and the general public. ARC-GIS also provided an effective tool to visually compare treated areas with adjacent untreated areas to show the effectiveness of the current treatment strategies.

The program used two types of synthetic pheromones in this project to increase the effectiveness of felling and the protection of limber pine. The pheromone *trans*- Verbenol was used to attract mountain pine beetles to already infested trees to “soak up” local beetle populations. The pheromone Verbenone was used to repel mountain pine beetle from limber pine.

19. To the best of your knowledge, did this program originate in your state? If YES, please indicate the innovator’s name, present address, telephone number and e-mail address.

The program originated in South Dakota. The innovator’s name is Raymond Sowers, State Forester, South Dakota Department of Agriculture, 523 E. Capitol Ave, Pierre, SD 57501. Phone number 605-773-3623. Email address: Ray.Sowers@state.sd.us

20. Are you aware of similar programs in other states? If YES, which ones and how does this program differ?

While other states in the western half of the US have issues with mountain pine beetle, South Dakota is the only one we are aware of which has formed a partnership such as ours to protect a unique resource like Custer State Park.

21. Has the program been fully implemented? If NO, what actions remain to be taken?

As of December 2009, the partners have implemented all practices in the plan to address the current infestation. Commercial logging will conclude in 2010 to reduce stand density, which will reduce susceptibility to mountain pine beetle and fire risk. Personnel of South Dakota Department of Agriculture, South Dakota Department of Game, Fish and Parks and South Dakota State University will continue to monitor Custer State Park for any new infestations and will undertake appropriate actions to limit further spread of mountain pine beetle.

22. Briefly evaluate (pro and con) the program’s effectiveness in addressing the defined problem[s] or issue[s]. Provide tangible examples.

To date, approximately 1,860 acres have been treated and 650 acres have been commercially thinned to reduce the spread of mountain pine beetles in Custer State Park. While the steps undertaken by the partnership between the two state agencies and South Dakota State University have been effective in slowing the spread of mountain pine beetle compared to adjacent federal forest lands, it has been a challenge to step up funding as quickly as needed. Fortunately, the two state agencies have been able to utilize various funding sources at their disposal to meet short-term needs to reduce the infestation.

While current efforts have been effective in slowing the spread in Custer State Park, mountain pine beetle populations in the adjacent lands under the control of the Black Hills National Forest will continue to pose a problem for Custer State Park. The current beetle populations in the adjacent Black Elk Wilderness Area and pockets in the Bear Mountain, Custer Peak and Deerfield areas indicate that the current beetle epidemic has not peaked and will continue to develop through the Black Hills for at least another five years. Further, even when the current epidemic has peaked, the remaining dead trees will pose potential fire danger for the adjacent lands, including Custer State Park.

23. How has the program grown and/or changed since its inception?

The program started in 2005 with approximately 3,000 trees treated and has grown to 22,000 trees treated in 2009. Other initiatives have been undertaken since and include the creation of 450 acres of thinned border, anti-aggregation baiting of the limber pines from 2005-2009 and the commercial logging from 2009-2010 to reduce stand density and fire risk on 650 acres in the Sylvan Lake Area.

24. What limitations or obstacles might other states expect to encounter if they attempt to adopt this program?

The primary limitation that states might face when implementing a similar program would be the initial coordination in formulating a plan. Fortunately in South Dakota, the state agencies and South Dakota State University have a long history of working together to promote forest health and stewardship within Custer State Park. Funding also has the potential to challenge similar efforts, but fortunately, the partners were able to take

advantage of several sources of funding available at the time. The largest challenge for the partners has been and will continue to be the threat of further infestations of mountain pine beetle and fire from the surrounding Black Hills National Forest. A continued proactive approach will continue to be needed to reduce the risk of further mountain pine beetle infestations that threaten the park from adjacent federal land.

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