

United States  
Department of  
Agriculture

Forest  
Service

Black Hills  
National  
Forest

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# BLACK HILLS NATIONAL FOREST



Weed treatment in the Jasper Fire area, summer 2002

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## 2002 MONITORING AND FIVE- YEAR EVALUATION REPORT

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# Black Hills Forest Plan

## Monitoring and Five-Year Evaluation Report

### Fiscal Year 2002

(October 2001 through September 2002)

### What This Document Is:

This is the annual monitoring and evaluation report for the Black Hills Land and Resource Management Plan (Forest Plan.). A revision of the Forest Plan was completed in June 1997. The first amendment to this Forest Plan was completed in May 2001. The 2002 Monitoring Report incorporates the Five-Year Evaluation of the Forest Plan required by the National Forest Management Act (36 CFR 219.10g - ...."The Forest Supervisor shall review the conditions on the land covered by the plan at least every 5 years to determine whether conditions or demands of the public have changed significantly.")

The basis for the annual monitoring report is in Chapter Four of the Forest Plan. This report does not discuss the entire inventory and monitoring that occurs in the Black Hills, but only that monitoring information related to the Forest Plan. More detailed studies may occur in association with individual projects that implement the Forest Plan. When relevant to Forestwide trends, information from these site-specific projects is incorporated into Forestwide monitoring.

The Black Hills Monitoring and Evaluation Report focuses on effectiveness monitoring, which focuses on whether or not the Forest is meeting or moving toward established objectives set forth in the 1997 Land and Resource Management Plan. Implementation monitoring or monitoring to insure standards and guidelines are implemented as directed in the Plan are a minor part of this monitoring report. The Washington Office (WO) appeal decision on the 1997 Land and Resource Management Plan directed the Forest to conduct more intensive monitoring than was originally in the 1997 plan.

The Forest has developed a "Monitoring Implementation Guide" to describe methods on how to implement the monitoring and evaluation requirements of the Revised Plan; see <http://www.fs.fed.us/r2/blackhills/projects/planning/2001Monitor/MonGuide.pdf>

Several different environmental factors are monitored each year; however, not every item is scheduled for evaluation and reporting on an annual basis. Chapter Four of the Forest Plan indicates how often each item is reported.

The implementation of the Forest Plan is discussed in the appendix of this report. The goals and objectives of the 1997 Revised Forest Plan are listed along with accomplishments in fiscal year 2002 (FY2002).

Supporting documentation for this report is located in the Supervisor's Office, Black Hills National Forest.

### Five-Year Evaluation Findings:

- The Forest has accomplished less than 25 percent of the prescribed burning objective in the Forest Plan over the last five years, but has exceeded the historic annual level of wildfire acreage.
- The Forest has offered 30 percent of the decade 1 sawtimber volume allowed by the 1997 Forest Plan. On an average annual basis, the Forest has offered 61 percent of general allowable sale quantity (ASQ) Objective 303 and zero percent of Objective 305, the Norbeck non-interchangeable component allowable sale quantity, over the first five years of the Forest Plan. POL (products other than logs) is

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included in the total program upon contract award or when contracts are modified.

- ◉ Mountain Pine beetle (MPB) infestations are continuing to spread along with those of other insects. The Forest's ability to manage for reduced insect risk is limited due to funding, the time it takes to set up a timber sale or other treatment project, legal considerations (NEPA process), and contract length. The situation is improving with increased funding, changes in legal and policy requirements, and industry cooperation.
- Specific riparian restoration has occurred on less than 20 acres. The acreage of riparian restoration will fall well short of the 500-acre objective at the current rate of implementation.
- The protocols for sensitive plants have been recently implemented, and it will be a number of years before a statistical statement for trend can be made. The number of years before a statistical trend statement can be made will vary by species. The trend may be difficult to establish and may not even be possible for some plant species because of species characteristics such as dormancy, etc.
- ◉ Fisheries nonstructural accomplishments (acres enhanced/restored) did not meet the objective in any year because of the high cost-per-acre of desired treatments, e.g. dredging, and the limited Fisheries Program funding. Fisheries structural accomplishments were reported in miles of streams enhanced/restored rather than as structures, so it was not possible to evaluate if this objective was met. However, the 27 miles of streams enhanced or restored in the past 5 years suggests significant accomplishment of the structural objective.
- ◉ The primary heritage program concern at this time is the protection of heritage sites during project implementation. Damage to sites and project delays have occurred. Project implementation needs to include review of project designs and mitigation measures.
- ◉ Wilderness trail counts in 2002 were approximately 35,994 recreation-visitor-days (RVD) of which the majority occurred on Harney Peak, Trail 9. The Forest Plan provides a guideline of an estimated carrying capacity of 32,100 RVDs of use for the entire wilderness. At this time, the trail counter data is not reliable enough to take management actions to limit use. Hell Canyon Ranger District has implemented two activities to improve the reliability of wilderness use estimates and assist in redirecting some use away from the wilderness. The National Visitor Use Monitoring effort occurring throughout the Black Hills National Forest in FY 2003 includes a wilderness use component.
- ◉ The Forest has acquired 15 percent of the Forest Plan right-of-way objective in the first 5 years of the 1997 Forest Plan.
- ◉ Net operating costs for Fiscal Year 2002 were \$31.4 million compared to \$3.7 million in 1998. Revenues totaling \$9.3 million in 2002, down from \$17.0 million in 1998, were affected by a decline in national timber market prices. Program costs totaled \$40.7 million in 2002 compared to \$20.7 million in 1998. Of the 2002 expenditures \$10 million was for fire suppression compared to less than \$1 million in 1998. In 2002, \$2.5 million was expended for fire restoration and rehabilitation resulting from the 2000 Jasper Fire.
- Both fire suppression and fire restoration and rehabilitation are unplanned expenses and are not annual budget items. Between 1998 and 2002, increases were seen in fire management, hazardous fuel reduction, timber management, environmental analysis, and Forest Planning. Fluctuation in programs such as fire management (\$14,000,000 in costs), changing market price for timber (a decline from \$17,000,000 in timber receipts in 1988 to \$9,000,000 in 2002), and the increased costs of environmental analysis and mitigation in project planning are a few of the factors causing increased net operating costs.
- ◉ Forest Plan objectives should use the same unit of measure (acres or miles) used for the annual accomplishment reporting. Either additional funding or a complete reprioritization of funding within the Wildlife, Fish, and Rare Plants Program is needed to accomplish the fisheries nonstructural objective because of the high cost per project. A reduction in Knutson-Vandenberg funds would likely result in a reduction of nonstructural wildlife accomplishments.
- ◉ Forestwide snag density goals are met, although distribution across watersheds is uncertain.

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Hardwood snag density objectives may need to be reviewed as to whether six snags per acre is a realistic objective. Snag monitoring methods may need to be revised or employed more vigorously in order to more precisely measure conditions. The complicated language regarding aspect, species composition, size class, and decay class are difficult to measure and track. Therefore, any future direction regarding desired snag conditions should attempt to simplify these measures while retaining the intent established under current objectives. Project-level snag measurements are not always conducted; instead, projects are designed to leave all snags (Standard 2304) and provide green tree replacements (Standard 2306).

- Recent large fires have changed the appearance of the existing scenic integrity beyond our control. An accounting of these changes from wildfires has not been tallied to date.

## Forest Plan Amendments:

The Black Hills National Forest has undertaken changes to the 1997 Revised Land and Resource Management Plan (Forest Plan). These changes, or amendments, are in response to direction from the Chief of the Forest Service in his October 1999 decision on various appeals of the Revised Plan and to the settlement agreement stemming from the Veteran Salvage Timber Sale lawsuit. These changes are being accomplished in two phases.

In late August 2000, the Forest Service signed an agreement with several groups settling a lawsuit filed in November 1999. The lawsuit challenged implementation of certain projects on the Forest. Because of the settlement agreement, changes must be made to certain timber sales under contract and certain sales not yet sold, which are covered in the scope of the agreement. The Forest is continuing to make these changes as required.

The Phase I Amendment was completed, and the Regional Forester issued the decision in May 2001. This amendment contains interim protections for a variety of wildlife and plant species and allows the Forest to proceed with some limited project decisions for the next two to five years. The Phase I Amendment decision was appealed but was upheld on review.

The Phase II Amendment process was officially initiated on November 28, 2001. Scoping comments were requested by January 28, 2002. The focus of this amendment is broader than that of Phase I and includes investigating strategies to address risks from fire, insects, and disease; reviewing protections for a variety of plant and animal species; determining appropriate timber harvest volumes; and evaluating and designating research natural areas as appropriate. This significant amendment is targeted for completion in 2004.

Visit the Black Hills National Forest website at [www.fs.fed.us/r2/blackhills](http://www.fs.fed.us/r2/blackhills) for ongoing information.

*/s/ Brad Exton (for)*

JOHN C. TWISS  
Forest Supervisor

*January 29, 2004*

Date

## **Monitoring Item 1: Air Quality**

**Objective 101: Maintain air quality standards in accordance with state implementation plans.**

### **Monitoring:**

The Black Hills National Forest continued to provide representation at the quarterly Pennington County Air Quality Board meetings during the year 2002.

The Forest experienced no violations of the Clean Air Act on the Black Hills National Forest for the period year 2002 nor were there any air quality complaints from individuals or other entities attributed to National Forest project activities (South Dakota - Administrative Rules - Article 34:10; Wyoming - Environmental Quality - Chapter 9.1).

Prescribed burning on the Black Hills National Forest, which includes forest residue pile burns, remains the single greatest potential air degradation activity. The Forest saw an increase to 1,433 acres in its prescribed burning activities in FY2002. Favorable burning opportunities in the fall of 2001 and spring of 2002 caused the acreage increase. The revised Forest Plan establishes an annual objective of 8,000 acres of this type of activity. The Forest is making every effort to increase the amount of fire restoration treatments. Increased emphasis here will likely result in reduction in the amount of other types of burning that occur, including wildfire and pile burning to dispose of forest residues.

The following mitigation actions are implemented on the Black Hills National Forest during prescribed burning activities to minimize air quality degradation:

Receptors such as subdivisions, roads, towns, and other air-quality sensitive areas are identified during the prescribed burning planning process.

Burning prescriptions are identified in the "prescribed burn plan" to ensure that the air quality standards are maintained in receptor areas.

Prior to implementation of an approved prescribed burn project, weather conditions (predicted and current), including smoke dispersal predictions, are assessed to insure smoke management criteria can be met.

Air quality is monitored on site and at receptor areas during burn implementation to insure that air quality remains within identified parameters.

The Black Hills region has no non-attainment areas identified at this time (EPA. 2003. Criteria Pollutant Area Summary Report. Green Book. URL: <http://www.epa.gov/air/oaqps/greenbk/anc12.html>. February 6). Rapid City, South Dakota remains the key area of concern in that it is close to being designated as a non-attainment area for PM-10, which is a pollutant often produced by smoke and dust. The concern for air quality in the Rapid City area has resulted in the Forest working jointly with the Rapid City Air Quality Office on guidelines for all National Forest burning activities. This 1995 guideline places restrictive measures for all forms of open burning planned on National Forest land in the Rapid City air shed. The Forest continues to work with the Pennington County Air Quality Office in mitigating all potential air-quality-impacting activities.

The State of South Dakota is currently developing a long range Air Quality Monitoring Database that will

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assimilate air-monitoring data, air-quality-influencing events, and weather data from 1990 to the present. The Forest assists the State by providing information on the occurrence of wildfires and prescribed fire activities on the Forest to keep the database current. In addition to activities on the National Forest, information from other area land management agencies including the Bureau of Land Management, Fish and Wildlife Service, Bureau of Indian Affairs, and State of South Dakota is entered in the database. Air monitoring data will come from the three area monitoring sites currently established at Rapid City, the Badlands, and Pine Ridge. Once established, this database will represent a comprehensive resource available to land management agencies in monitoring air-quality trends and in determining air-quality links with various resource management activities and/or weather phenomena.

### **Evaluation:**

The Black Hills National Forest management activities, primarily prescribed burning, have met state clean air standards over the last five years. The Forest has accomplished less than 25 percent of the prescribed burning objective in the Forest Plan over the last five years, but has exceeded the historic annual level of wildfire acreage.

## Monitoring Item 2: Soils Productivity and Revegetation

**Objective 104. Maintain or enhance watershed conditions to foster favorable soil relationships and water quality.**

### Monitoring:

Forest Plan standards call for 15 percent or less of any given land unit to be detrimentally compacted as part of meeting Objective 104. Soil compaction has been monitored for five years in various locations that have been grazed or where timber harvest has occurred.

### Evaluation:

None of the range monitoring sites exceeded Forest Plan standards for compaction.

Year	Site	Percent Compaction
2002	Baseline	.9
2002	Ditch Creek	9.6
2001	Sheep Flats	10
2001	Deerfield South	2
2000	Manganese Draw	5
2000	Bear Lodge Lytle Creek	6
1999	Negro	4
1999	Bear Lodge	3

Two timber sites exceeded Forest Plan standards the first year after harvest. The Baldman site was measured again one year later. Compaction had reduced significantly and met Forest Plan standards.

Pre-harvest data was collected for sites in 2001 and 2002, but the units were not harvested, so no data is reported.

Year	Site	Percent Compaction
2002	No Units Harvested that had monitoring sites	
2001	No Units Harvested that had monitoring sites	
2000	Duck	0
2000	Dumbuk	0
2000	Baldman	6 (17% recovery from 1999)
2000	Baldman Upper Flat	3

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Year	Site	Percent Compaction
1999	Baldman	23
1999	Hells Gate	0
1998	Mallo	20
1998	Roubaix	13
1998	South Fork	16

Monitoring results indicate that soils are not being detrimentally compacted due to grazing or timber harvest.

### Monitoring Item 3: Soils Revegetation

**Objective 104. Maintain or enhance watershed conditions to foster favorable soil relationships and water quality.**

#### Monitoring:

This monitoring item had been included in the Monitoring Implementation Guide (page 5) based on policy found in FSH 2509.18 – “Management activities will be conducted in such a way as to not exceed Soil Quality Standards. This emphasis is on protecting the soil resource before excessive damage occurs.”

The following sites were monitored for evidence of detrimental erosion (indicators include pedestalled rocks and plants, deposition of soil on the uphill side of rocks, plants and down debris, erosion pavement, and rills and gullies > one-inch deep), and effective ground cover. Definitions can be found in FSH 2509.18. Effective ground cover for sites with a low to moderate erosion class is 40 to 50 percent for the first year after disturbance and 60 to 70 percent for the second year. Standard 1109 and Guideline 1110 provide direction on rehabilitation and revegetation of roads and disturbed sites.

The Jasper Fire (August 2000) significantly affected the Dumbuk, Limestone, Lemming, Crawford, and Uncle timber sale units. Timber sale contracts were modified to include more burned areas, thus leaving some green trees in the unit. Conventional and whole tree harvest methods were used.

Because the majority of timber activities occurred in the Jasper Fire boundary in FY 2001 and to improve understanding of fire effects in the Black Hills, data was collected in the Jasper Fire area. In Dumbuk, Limestone, Lemming, Crawford, and Uncle Timber Sales, the units sampled were harvested in intensively burned areas. Ten 100-foot transects were sampled in each unit. Each transect was separated by 100 feet. A random starting point direction was used for each transect.

Effective ground cover was recorded at 10-foot intervals starting at the 5-foot mark along the transect. Photos were taken randomly.

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**Evaluation:**

**Percent Ground Cover Estimates.**

District	Timber Project/Sale	Cutting Unit	Percent Ground Cover
Hell Canyon	Crawford	A	32
Hell Canyon	Crawford	B	26
Mystic	Uncle	F	11
Mystic	Uncle	G	20
Hell Canyon	Dumbuk	C	30
Hell Canyon	Dumbuk	D	31
Mystic	Lemming	E	26
Mystic	Lemming	H	12
Hell Canyon	Limestone	I	16

Additional ground cover data was collected while collecting soil compaction data in May 2001 (see 2001 Soil Compaction Study Results). These units are located in the Jasper Fire area. Ten samples per transect were taken; each unit had 10 transects. Transects were designed to cover one soil type.

District	Timber Project Area	Data Collection Date	Site Type	Percent Ground Cover
Hell Canyon	Dumbuk II SW1/4 Sec. 12 & NW1/4 Sec. 13, T2S, R1E (Dumbuk)	05/15 through 16/01*	Proposed Timber Harvest	42
Mystic	Hell Canyon WQC Sec. 14, T2S, R2E (Lemming/Uncle)	05/09/01	Proposed Timber Harvest	0
Mystic	Gillette East Center of Sec.9, T2S, R2E (Uncle)	05/08/01	Proposed Timber Harvest	0
Hell Canyon	Gillette West Center of Sec.8, T2S, R2E (Dumbuk)	05/07/01	Proposed Timber Harvest	20

\*Before growing season following 9/2000 Jasper Fire.

**Jasper Fire -Crawford Timber Sale – Cutting Unit A**



Ground Cover shown 5 percent, Transect #7, October 2, 2001. Information provided an estimate of 32 percent ground cover for the transect.

**Jasper Fire - Dumbuk Timber Sale - Cutting Unit C**



Ground Cover shown 80 percent, Transect #3, October 3, 2001

The data collected along the 10 points provided an estimate of 30 percent ground cover for the transect.

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**Jasper Fire - Lemming Timber Sale - Cutting Unit E**



**Ground Cover shown 30 percent, Transect #2, October 11, 2001**

The data collected along the 10 points provided an estimate of 26 percent ground cover for the transect.

**Jasper Fire - Uncle Timber Sale - Cutting Unit G**



**Ground Cover shown 5 percent, Transect #9, October 11, 2001**

The data collected along the 10 points provided an estimate of 20 percent ground cover for the transect.

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**Jasper Fire - Limestone Timber Sale - Cutting Unit I**



**Ground Cover shown 70 percent, Transect #3, October 12, 2001**

The data collected along the 10 points provided an estimate of 16 percent ground cover for the transect.

**Additional Photos.**

**Jasper Fire - Uncle Timber Sale - Cutting Unit F**



**October 11, 2001**

Information provided an estimate of 11 percent ground cover for the transect.

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**Jasper Fire - Uncle Timber Sale - Cutting Unit G**



**October 11, 2001**

Information provided an estimate of 20 percent ground cover for the transect.

## Monitoring Item 4a: Watershed Assessment

**Objectives:**

102. Use a qualitative survey which emphasizes riparian condition, such as the Proper Functioning Condition methodology, to refine the preliminary watershed health assessments (FP-EIS:Appendix J) within the next planning period. This survey would focus first on Class III watersheds, and could be supplemented with additional quantitative methods, as needed, for the design of watershed improvements. Class I watersheds do not need to be surveyed unless information becomes available which suggests there was an error in classification.

213. Maintain or enhance existing riparian area biodiversity, physical structure and size.

**Monitoring:**

This report is due every 10 years. The next due date is 2007.

## Monitoring Item 4b: Riparian/Wetland Assessment

**Objectives:**

102. Use a qualitative survey which emphasizes riparian condition, such as the Proper Functioning Condition methodology, to refine the preliminary watershed health assessments (FP-EIS:Appendix J) within the next planning period. This survey would focus first on Class III watersheds, and could be supplemented with additional quantitative methods, as needed, for the design of watershed improvements. Class I watersheds do not need to be surveyed unless information becomes available which suggests there was an error in classification.

213. Maintain or enhance existing riparian area biodiversity, physical structure and size.

**Monitoring:**

The protocol for PFC Class II – III monitoring was not a repeatable system, so monitoring was not done.

A new repeatable protocol needs to be developed.

## Monitoring Item 4c1: Stream Health/Water Quality

### Objectives:

102. Use a qualitative survey which emphasizes riparian condition, such as the Proper Functioning Condition methodology, to refine the preliminary watershed health assessments (FP-EIS:Appendix J) within the next planning period. This survey would focus first on Class III watersheds, and could be supplemented with additional quantitative methods, as needed, for the design of watershed improvements. Class I watersheds do not need to be surveyed unless information becomes available which suggests there was an error in classification.

213. Maintain or enhance existing riparian area biodiversity, physical structure and size.

### Monitoring:

State standards are monitored by collecting grab samples at the 19 stations Forestwide. Some parameters are analyzed on site, some are analyzed in the Forest Soil and Water lab, and some are analyzed by private laboratory.

### Evaluation:

This monitoring item was dropped during the Forest Plan Phase I Amendment. Single grab samples do not provide Class A results. Monitoring Item 4C2 is being substituted for this item.

## Monitoring Item 4c2: Stream Health Range/Stream Habitat Integrity

### Objectives:

102. Use a qualitative survey which emphasizes riparian condition, such as the Proper Functioning Condition methodology, to refine the preliminary watershed health assessments (FP-EIS:Appendix J) within the next planning period. This survey would focus first on Class III watersheds, and could be supplemented with additional quantitative methods, as needed, for the design of watershed improvements. Class I watersheds do not need to be surveyed unless information becomes available which suggests there was an error in classification.

213. Maintain or enhance existing riparian area biodiversity, physical structure and size.

### Monitoring:

Up to 19 reference (sites) reaches scattered across the Forest will be measured and monitored. The selected sites best represent undisturbed stream conditions across the Forest. Once baseline data is collected, sites will be re-measured every five years.

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### **Evaluation:**

Two reference reaches have been established (Castle Creek and Whitelaw Creek). All baseline sites should be established within the next five years.

## **Monitoring Item 4d: Best Management Practices**

**Objective 104. Maintain or enhance watershed conditions to foster favorable soil relationships and water quality.**

### **Monitoring:**

Three timber sales were monitored for Best Management Practice (BMP) compliance in the 2000 and 2001 Monitoring Reports in cooperation with the States of Wyoming and South Dakota.

### **Evaluation:**

Results from the Wyoming and South Dakota 2000/2001 BMP Audits are shown in a table in the 2001 Monitoring Report. As defined in both states' Best Management Practices 2000/2001 Field Audit Reports, a perfect score of 1.00 would indicate that practices exceed BMP requirements and improve the resource. Scores of 0.70 and up indicate field practices are meeting the BMP requirements for that specific harvest activity, and scores of 0.60 and up indicate minor departures from the BMP requirements with temporary impacts to soil and water resources. The compliance scores for all three sales indicate that BMP objectives are being met.

## **Monitoring Item 5: Water Quantity**

**108. Manage for sustained or improved water flows.**

### **Monitoring:**

Evaluation of water yield and comparison with Forest Plan projections is the purpose of this monitoring item.

### **Evaluation:**

Data to perform the water yield calculations will not be available until completion of the Forest Plan Phase II Amendment. This monitoring item will be completed at that time.

## Monitoring Item 6: Riparian/Wetland and Riparian Habitat Restoration

### Objectives:

214. Restore riparian shrub communities across the Forest by 500 acres during the plan period on sites capable of supporting this community.
215. Implement riparian rehabilitation projects for at least three stream reaches during the plan period. Select reaches where the water table has receded and plant species composition has changed as a result of human activities. Coordinate planning and implementation with state game and fish agencies and downstream private landowners. Use the following in designing the projects:
  - a. Raise the water table to saturate historically inundated soils;
  - b. Convert drier-site vegetation to native wet-meadow species;
  - c. Reintroduce beaver into the drainage once suitable habitat is developed; and
  - d. Design management to maintain wet-meadow conditions.

### Monitoring:

District personnel, project files, and annual budget and accomplishment reports were queried to determine riparian/wetland restoration acreage. The placement of certified weed-free straw bales in drainage channels through MacIntosh Fen is restoring approximately 15 acres of the historic willow communities by reestablishing a higher water table and saturated soil conditions. Nonstructural habitat enhancements reported under Monitoring Item 7a for fisheries also provide riparian restoration/enhancement related to this objective. Approximately two miles of willow plantings have occurred along streams for an estimated three acres of riparian restoration.

### Evaluation:

Restoration efforts in MacIntosh Fen are trending riparian conditions towards Objective 215a-d. Other small-scale riparian/streamside riparian plantings on the Hell Canyon Ranger District have not yet changed upland soil saturation or allowed the reintroduction of beaver, but the long-term results are favorable. Less than 20 acres of specific riparian restoration has occurred. The acreage of riparian restoration will fall well short of the 500-acre objective at the current rate of implementation.

## Monitoring Item 7a: Vegetative Diversity and Species Composition

**Objectives:**

201. During the planning period conserve existing hardwood communities and restore historic hardwood communities by 10 percent over 1995 conditions on sites capable of supporting these communities.

205. Restore grassland (meadow and prairie) communities across the Forest by 10 percent over 1995 conditions. Determine the restoration potential on a site-specific basis based on landform and soils. 210. Implement at least one adaptive management project (fire simulation cut) in the next 10 years to simulate forest structural conditions following a stand-replacing fire (using primarily mechanical methods). Follow this treatment with low-intensity prescribed fire when ground fuels permit. Treatment size should be large enough to adequately monitor effects. Consult with the Rocky Mountain Station in project design and monitoring.

213. Maintain or enhance existing riparian area biodiversity, physical structure and size.

222. Complete the following habitat projects each year during the plan period:

	Nonstructural	Structural
Wildlife	1,000 acres	100 structures
Fish	50 acres	50 structures
Range	600 acres	30 structures

**Monitoring:**

Objective	Forest Plan Acres	1998 RMRIS Acres	1999 RMRIS Acres	2000 RMRIS Acres	2001 RMRIS Acres	2002 RMRIS Acres	Percentage Change from 1995
201. Hardwoods	59,734	59,661	63,286	61,641	63,098	63,045	5.5%
205. Grasslands	101,861	104,341	105,540	107,566	109,340	109,470	7.5%

Fisheries nonstructural accomplishments (acres enhanced/restored) did not meet the objective in any year because of the high cost per acre of desired treatments, e.g. dredging, and the limited Fisheries Program funding. Fisheries structural accomplishments were reported in miles of streams enhanced/restored rather than as structures, so it was not possible to evaluate if this objective was met. However, the 27 miles of streams enhanced or restored in the past 5 years suggests significant accomplishment of the structural objective.

Obj. 222	1998		1999		2000		2001		2002	
	Acres	Structure	Acres	Structure	Acres	Structure	Acres	Structure	Acres	Structure
Wildlife	7201	302	5855	N/A	2716	162	1761	N/A	3302	5
Fisheries	0	13.5 miles	0.5	1.5 miles	0	2 miles	3	9 miles	2	1 mile
Range	2348	56	822	37	298	35	522	17	N/A	26

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The range program completed additional non-structural habitat projects in 1998 and 1999. This data does not include noxious weed treatment (See Monitoring Item 19.). In 1998-2000, structural improvements in excess of the Forest Plan objectives were achieved.

### **Evaluation:**

#### **Objectives 201 and 205.**

Since 1995, the Forest increased the amount of hardwood and grassland communities, but neither meets the objectives established in the Forest Plan.

#### **Objective 210.**

For the first five-year period, the fire simulation cut has not been scheduled due to the Forest's recent large fires. Rocky Mountain Research Station (RMRS) and Colorado State University (CSU) are nominating a joint fire-science proposal on the Black Hills National Forest, which, if selected, will not be implemented until 2004.

#### **Objective 213.**

Numerous projects contribute to meeting this objective through Forest Plan standards and guidelines, but this objective is too general to quantify. It should be deleted from the Forest Plan.

#### **Objective 222.**

For the five-year period we averaged more than the Plan objective in both categories of habitat projects.

Forest Plan objectives should use the same unit of measure (acres or miles) used for the annual accomplishment reporting. Either additional funding or a complete reprioritization of funding within the Wildlife, Fish, and Rare Plants Program is needed to accomplish the fisheries nonstructural objective because of the high cost per project. A reduction in Knutson-Vandenberg funds would likely result in a reduction of nonstructural wildlife accomplishments.

## Monitoring Item 7b: Vegetative Diversity Structure

**Objectives:**

- 206. Maintain or establish a minimum of 20 percent of the forested area of a planning unit (diversity unit, watershed, and/or landtype association) to provide vertical diversity.
- 209. Manage at least 5 percent of a timber harvest project area for the grass/forb structural stage. Grass/forb openings should be 1 acre in size or larger. In accounting for openings, include those created by wildfire or other natural disturbance events. Also include grass/forb openings greater than 1 acre within low density stands.

**Monitoring:**

**Objective 206.**

Vertical diversity (1997 Black Hills Land and Resource Management Plan glossary): the diversity in an area that results from the complexity of the above-ground structure of the vegetation; has two or more layers; the more tiers of vegetation or the more diverse the species makeup or both, the higher the degree of vertical diversity (Thomas et al. 1979).

**Black Hills National Forest Stand Structure**

	<b>Bearlodge</b>	<b>Hell Canyon</b>	<b>Mystic</b>	<b>Northern Hills</b>	<b>Total Forest</b>
<b>Percent Change 1995-2003</b>	<b>Percent Change</b>				
Predominately Single Story	-6%	-16%	-16%	-11%	-14%
Two-storied stand, clearly recognizable or manageable understory	1%	-13%	3%	-1%	-3%
Multistoried - more than two recognizable canopy levels	5%	29%	14%	11%	16%
Clumpy-stand broken up by rock, etc., into several different units	-1%	0%	0%	0%	0%

The data in the table above was compiled from current Forest Production Database and compared with the 1995 frozen database. The changes identified above are from both changes in vegetation and the addition of approximately 200,000 acres of stand structure information to the current Forest Production Database, as the information in that database is constantly being improved. In absolute numbers, single-storied stands have declined by 45,000 acres while multi-storied stands have increased by 174,000 acres. (See references forest\_stand\_structure.xls, mat\_stand\_struct\_forested\_comb\_1995.doc and mat\_stand\_struct\_forested\_comb\_2003.doc.)

Late-successional forests also provide diversity. See Monitoring Item 8 for information on late-successional forests.

**Evaluation:**

Vertical diversity has increased on the Forest over the last five years.

## Monitoring Item 8: Vegetative Diversity and Late-successional Stands

### Objectives:

207. Manage at least 5 percent of the forested land base for late succession.

- a. The late succession acreage should include acres in Management Area 3.7, the smaller scale stands identified in the Resource Information System (RIS) database, and other management areas that provide late succession conditions, such as Wilderness. Conserve the integrity of these late successional stands.
- b. Small scale late-succession stands other than Management Area 3.7 identified in the Forest Plan may, through project analysis and environmental documentation, be exchanged for other existing late succession. The stand to be considered for late succession management should be at least equal in quality and size. This exchange process should be limited to situations where there will be an improvement in forest late-succession conditions.

208. In addition to late succession described under Objective 207, provide smaller late-successional patches to meet specific resource elements (e.g., goshawk nesting areas, snag replacement clumps).

### Monitoring:

RMRIS02 Database	Total Acres
Late-successional management areas	38,652
Smaller tracts managed as late successional	29,881
Total acres managed late successional	68,533

The late-successional management areas reported above include 1.1A (Black Elk Wilderness Area) and 3.7 (Late-successional Forest Landscapes). The smaller tracts reported are classified as capable but not appropriate for timber production areas that are to be managed for old growth. Combined, they comprise over six percent of the total 1,107,366-acre forested land base. These lands are being managed to provide late-successional conditions, but a wide range of successional stages are currently represented. According to the Research Information System (RIS) database, 1,623 acres of structural stage 5 (SS5 – Old Growth) were present in 2002. Old growth and late-successional acreages may be underestimated because SS5 is not a calculated value; instead, it is subjectively determined by field observers. All other SSs are calculated from measured tree data; hence, they are more objective and more widely used. SS4C stands are characterized by large trees [ $>9$  inch diameter-breast-height (dbh)] and dense canopies ( $>70\%$ ), and as such, often exhibit late-successional qualities. The 2002 database showed 20,487 acres of SS4C within the managed late-successional areas.

There were approximately 2,730 acres of SS5 and 106,132 acres of SS4C outside of managed late-successional stands in 2002. These areas are included in Objective 208 and are comprised of other emphasis areas such as goshawk nest stands, wildlife thermal cover, and marten habitat.

(See AML, GIS coverage, and text files named late\_succ” at fsfiles/office/p2/deis/draft/05\_chap3/timber/suit)

### Evaluation:

The Forest exceeds the objective of managing five percent of the forested land base for late-successional stands. However, available data indicates less than five percent is exhibiting late-successional characteristics.

## Monitoring Item 9: Vegetative Diversity and Snag Retention

**Objective: 211. In Ponderosa pine forested portions of a watershed, maintain an average of 2 hard snags per acre on south facing slopes and 4 hard snags per acre on north facing slopes, well dispersed across the watershed through the rotation. Calculate as a per acre average for the watershed; some acres may have no snags while others may exceed the average. In other forest types maintain an average of 6 hard snags per acre, well dispersed across the watershed. (Revised Amendment 1.)**

### Monitoring:

Snag (standing dead tree) criteria are clarified in Forest Plan Standard 2301. Definitions are refined by timber type, snag height and diameter, aspect, and historic fire regime.

Snag densities were measured at two scales during this five-year reporting period: Forestwide and project-wide. The Interior West Forest Inventory and Analysis (FIA) document provides estimates at the Forest-scale. Project-level data were collected within vegetation planning units (e.g., timber sales). The project data are less comprehensive due to the small total sampling area, but they still provide valuable information on achieving Forest Plan snag objectives.

The FIA program conducted a forest resource inventory in 1999 using a nationally standardized mapped-plot design (DeBlander 2002). Although the data are now three years old, they are included in this annual Forest Plan monitoring report for the following reasons: (1) they are the most recent comprehensive attempt at monitoring snag density, (2) they became available in 2002 and therefore have never been published in any previous annual Forest Plan monitoring reports, and (3) they are appropriate for a five-year assessment.

The FIA estimated 2.7 snags per acre when considering all snags of all species at least 11.0 inches in diameter. Ponderosa pine and white spruce were the only species sampled with snags in the 19-inch and larger category; density of this size class was estimated as 0.3 per acre (11% of all snags). No further breakdown of the data is available (e.g., by species, decay category, aspect, or watershed). At this time, we can make the following statements about the “all snags/all species” average of 2.7 snags per acre: (1) it slightly exceeds the established objective for ponderosa pine on south-facing slopes, and (2) it is somewhat less than the objective for pine on north-facing slopes. We can also extrapolate that the average is more applicable to the ponderosa-pine snag objectives than objectives for any other forest type, because pine are by far the most common tree and vegetation type on the Forest (and provide the most snags).

Extensive tree mortality has occurred in the Black Hills since the FIA plots were measured in 1999, meaning there are more snags on the Forest than reported by FIA. Over 158,000 acres have experienced wildfire since then, and mountain pine beetle (MPB) killed approximately 830,000 trees. Prescribed burns have occurred across more than 5,100 acres since 1999 (see Monitoring Item 23) and have created additional snags. These events have increased snag densities. For example, monitoring and modeling within the Sheldon burn area (Hell Canyon RD) indicate that the current density of snags  $\geq 10$  inches diameter and  $\geq 25$  feet tall is 75.8 snags/acre. However, it must be recognized that these large mortality sources produce a clumped rather than even distribution of snags across a watershed (although the events are well distributed across the Forest), and that initial densities have been or could be reduced in some areas by salvage harvest. Regardless, these large-scale natural and management processes are very important in providing snags, and the result is additional snags added to the Forestwide  $\leq 7$  per acre averages not included in the 1999 data accomplishment of snag objectives than is likely to occur through silvicultural management alone.

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Project-level monitoring in 2002 supports the assertion that snags are not evenly distributed across watersheds. Snag monitoring in the Mercedes project area (Mystic RD) revealed that only two of six watersheds (7<sup>th</sup> level) exceeded two snags/acre. The remaining four watersheds, as well as the project average, had less than one snag/acre.

### **Evaluation:**

Forestwide snag density goals are met, although distribution across watersheds is uncertain. Hardwood snag density objectives may need to be reviewed as to whether six snags per acre is a realistic objective. Snag monitoring methods may need to be revised or employed more vigorously in order to more precisely measure conditions. The complicated language regarding aspect, species composition, size class, and decay class are difficult to measure and track. Therefore, any future direction regarding desired snag conditions should attempt to simplify these measures while retaining the intent established under current objectives. Project-level snag measurements are not always conducted; instead, projects are designed to leave all snags (Standard 2304) and provide green tree replacements (Standard 2306). Watersheds with large burns or moderate to heavy insect infestations almost certainly exceed snag objectives. Without these events, tree mortality rates will remain low, resulting in areas where minimum snag densities are only slowly achieved.

## **Monitoring Item 10: Vegetative Diversity and Thermal Cover**

**Objective 5.4-205. Provide thermal cover for elk, deer and winter turkey habitat on at least 20 percent of the forested portion of this management area.**

### **Monitoring:**

This objective applies to Management Area (MA) 5.4 Big Game Winter Range. This MA encompasses 394,393 acres of the Forest, but only about 361,000 acres of this are forested. Thermal cover is defined as stands with crown cover 70 percent or greater, and the tallest 40 trees in the stand must be 40 feet or taller. This equates roughly to structural stages 3C, 4C, and 5 (i.e., dense stands of trees >5 inches diameter and late-successional stands). Only 80 percent of structural stage 3C was included as described in the Forest Plan Final Environmental Impact Statement (FEIS) (Revised Forest Plan FEIS, 1996, Appendix B – 13).

Thermal cover is calculated through queries of the structural stages in the Research Information System (RIS) database. RIS is updated annually with new information obtained during timber planning efforts and wildfire assessments. Typically, lag times exist between when data is collected, when it is entered into the database, and when it is reported in the annual monitoring report. For example, the 2002 database does not reflect the Battle Creek, Grizzly Gulch, or Little Elk Fires of 2002. These fires burned approximately 2,150 acres of thermal cover in MA 5.4, and the acres are accounted for in the final entry in the table below. Since 2000, fires have destroyed 6,610 acres (1.7%) of thermal cover in MA 5.4. Insect outbreaks also affect stand condition and the quantity of thermal cover, but no adjustments were made for this source. See Monitoring Item 20 for information on insect conditions.

The amount of thermal cover in MA 5.4 was 6.5 percent in 1995. Although cover appeared to have increased

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to about 10 percent by 2000 (excepting fire acreage), in 2002 it declined to nearly the same level as existed in 1995. The current estimate reflects on-the-ground losses (e.g., due to fire and timber harvest) as well as “paper losses” that resulted from correcting errors in the RIS and Geographic Information System (GIS) databases. Almost half (1.9% or 7,628 acres) of the decline is explained through corrections to stand and/or MA boundaries. As mentioned above, another 1.7 percent was lost during fires. The cause of the remaining 0.3 percent loss (1183 acres) is unknown but is likely due to timber harvest in areas where a surplus of thermal cover (>20%) was identified in project-level analyses (i.e., at a smaller scale).

Management Area 5.4 Big Game Winter Range (394,393 Acres Total) <sup>1</sup>	Thermal Cover Acres	Thermal Cover Percentage
1995 RMRIS Database <sup>1</sup>	25,738	6.5%
2000 RMRIS Database - not adjusted for fires <sup>1</sup>	40,218	10.2%
2001 RMRIS Database – adjusted for fires <sup>1</sup>	35,824	9.1%
2002 RMRIS Database – not adjusted for fires	27,162	6.9%
2002 RMRIS Database -- adjusted for fires	25,012	6.3%

<sup>1</sup>Data as reported in 2001 Forest Plan Monitoring Report.

### Evaluation:

The data indicate the Forest is not meeting or trending toward the Plan’s objective of providing 20 percent thermal cover in MA 5.4. Approximately 79,000 acres of thermal cover would need to be present in order to meet the objective; current condition is less than one-third of this. This data does not include thermal dumps or inclusions that are not mapped within stands.

## Monitoring Item 11: Down/Dead Woody Material

**Objective 212:** In conifer forested portions of a planning unit, provide at least once during a rotation (approx. 100 yrs.) an average of 5-10 tons per acre of down, dead woody material at least 3” in diameter, provided there is no conflict with fire or pest management objectives. In the shelterwood silvicultural system, accomplish this through commercial and pre-commercial treatments. Provide this tonnage no later than the removal cut (overstory removal) or a combination of removal cut and pre-commercial thinning of the established stands (thinning to be accomplished within 10 years of the removal cut).

### Monitoring:

Down, dead woody material was monitored in three timber sales during 2001. These sales were planned under the 1983 Land and Resource Management Plan.

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### **Evaluation:**

Monitoring needs to be conducted on sales that were planned under this standard, contained in the 1997 Land and Resource Management Plan. There is currently no data to evaluate Objective 212.

## **Monitoring Item 12: Commodity Production and Growth Rate**

### **Monitoring:**

Timber growth is monitored and evaluated on a ten-year cycle and 2002 is year five of the 1997 Plan. The next report is due in 2007.

## **Monitoring Item 13: Regeneration**

**36 CFR 219.27(c)(3)** When trees are cut to achieve timber production objectives, the cuttings shall be made in such a way as to assure that the technology and knowledge exists to adequately restock the lands within 5 years after final harvest. Research and experience shall be the basis for determining whether the harvest and regeneration practices planned can be expected to result in adequate restocking. Adequate restocking means that the cut area will contain the minimum number, size, distribution, and species composition of regeneration as specified in regional silvicultural guides for each forest type. Five years after final harvest means 5 years after clearcutting, 5 years after final overstory removal in shelterwood cutting, 5 years after the seed tree removal cut in seed tree cutting, or 5 years after selection cutting.

### **Monitoring:**

Surveys for natural regeneration were done on 13,030 acres in fiscal year 2002. Out of the total acres surveyed, 6,287 acres were certified for regeneration. The remaining 6,743 acres will be surveyed in FY2004 to determine certification.

Surveys (third-year and fifth-year) are conducted before certification is established; certification may be established at any point in the three surveys that regeneration is verified.

The source of this data is from the FY2002 SILVA99 Report for the Black Hills National Forest.

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**Regeneration Survey Five-Year Summary:**

<b>Year</b>	<b>Acres Surveyed</b>	<b>Acres Certified</b>
1998	11,499	9,050
1999	21,352	8,700
2000	17,684	7,762
2001	15,641	13,236
2002	13,030	6,287

Over time, the acres certified will equal the acres surveyed.

Ponderosa-pine seed is produced almost every year, with abundant crops every two to five years (Boldt and Van Deusen 1974), although seed production on the Limestone Plateau and some portions of the Bearlodge Mountains has been sporadic in recent years. In areas with prolific seed production and favorable climate, natural regeneration of ponderosa pine can be quite successful. Frequent rain showers throughout the growing season, which lasts from early March to August, is the major climatic factor contributing to the prolific growth and establishment of ponderosa pine. (Reference: Ecology, Silviculture, & Management of Black Hills Ponderosa Pine by Shepperd & Battaglia RMRS-GTR-97, September 2002)

Silvicultural treatments use the recommended systems found in Black Hills silvicultural documents. Boldt 1974 and Shepperd 2002. The Forest does not remove the overstory in shelterwood silvicultural systems until the understory is established as result of seed cut.

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**Evaluation:**

Forest silvicultural systems (1996 FEIS, Standard 2408 pg. II-31) harvest timber on suitable timbered lands consisting of a preparation cut (for natural regeneration) and an overstory removal cut. The overstory removal is not done until the young trees below have been certified as meeting regional regeneration standards. NFMA regeneration requirements are being met. (Require regeneration be certified before the overstory removal is made.)

## Monitoring Item 14: Timber Production

**Objectives:**

**303. Offer the following allowable sale quantity (ASQ) of timber on suitable and available timberlands in the next decade:**

<b>Allowable Sale Quantity From Suitable Lands: (Decade Total)</b>	
Sawtimber	
Million Cubic Feet	181
(Million) Board Feet	838
Roundwood	
Million Cubic Feet	21
(Million) Board Feet	N/A
Total	
Million Cubic Feet	202
(Million) Board Feet	838

**304. On lands not identified as suitable and available for timber harvest, timber volume may be offered as a by-product of other vegetation management objectives. This volume would be offered in addition to the ASQ.**

**305. The ASQ in Objective 303 includes the following non-interchangeable component in the Norbeck Wildlife Preserve. This portion of the ASQ is not interchangeable with the volume outside the Preserve.**

<b>Allowable Sale Quantity From Suitable Lands In Norbeck Wildlife Preserve: (Decade Total)</b>	
Sawtimber	
Million Cubic Feet	5.4
(Million) Board Feet	27.0
Roundwood	
Million Cubic Feet	1.0
(Million) Board Feet	N/A
Total	
Million Cubic Feet	6.4
(Million) Board Feet	27.0

**The 10-year allowable sale quantity expressed on an average annual basis:**

Forest Plan	Million Cubic Feet (MMCF)	Hundred Cubic Feet (ccf)
Sawtimber	18.1	181,000
POL	2.1	21,000
Total ASQ	20.2	202,000

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**Monitoring:**

The allowable sale quantity (ASQ) in the Forest Plan is based on the total during the decade from FY 1997 through FY 2006. (Record of Decision, page ROD-35).

The ASQ is a maximum level of timber that may be sold during the first decade after plan approval. A ceiling on the level of timber that can be sold, the ASQ takes into account available funding, other multiple-use values, and compliance with standards and guidelines that provide environmental protection. ASQ is not an absolute yield that must be achieved (1997 Forest Plan FEIS, page II-36).

Harvest acreage over the decade is an estimated 255,000 acres or average 25,500 acres per year at full funding level. The Forest is producing approximately 55 percent of the planned average at the full funding level. The following table compares the total planned acres for 1998 through 2002 project decisions with the estimate for the decade as shown in the 1996 Final Environmental Impact Statement.

**Five-Year Summary:**

Estimated Decade Acres (From FEIS, Alternative G, page II-36, Full funding level)	Annual Harvest Acres (Signed Decisions)					
	Estimated FY1998-2007	FY1998	FY1999	FY2000	FY2001	FY2002
255,000	47,710	32,773	0	0	9,761	90,244

No activities were planned in FY2000 and FY2001. The October 1999 Chief's decision on appeals of the 1997 Revised Forest Plan determined that changes to Forest Plan direction for protection of species viability were needed before issuing further project decisions. The Black Hills National Forest Phase I Amendment to the 1997 Forest Plan per Interim Direction was signed May 18, 2001. The Black Hills National Forest Phase II Amendment to the 1997 Forest Plan is scheduled to be completed in 2004.

The following table compares total timber offered, sold, and cut, and acres harvested for FY1998 through FY2002. This table represents projects that are being implemented. The previous table represents **planned** projects, which may not be implemented for several years. It does not relate to the table below.

**1997 Forest Plan Objective 303 - ASQ 83.8 mmbf Average Per Year:**

Black Hills National Forest						
Year	Funded Target		Offer	Sold	Cut	Harvested
	<i>mmbf</i>	<i>ccf</i>	<i>mmbf</i>	<i>mmbf</i>	<i>mmbf</i>	<i>Acres</i>
1998	73.4	146,800	77.0	78.6	62.0	14,307
1999	70.8	141,600	82.7	73.5	73.0	14,238
2000	70.0	140,000	2.8	36.2	65.7	13,567
2001	69.0	138,000	36.5	38.2	75.4	12,442
2002	60.0	120,000	49.5	52.3	62.4	15,123

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Through 2002 timber has not been offered from Norbeck management areas.

In FY2002, the Beagle Timber Sale was modified to include fire salvage volume from the Battle Creek Fire area. The 2001 program included modification of existing sales and new sales from the Jasper Fire areas. FY2002 was short of target due to two sales damaged by the Battle Creek Fire.

Wildfires have affected sales under contract, timber available for sale, and flow of sales. The Forest is committed to offering up to 70 mmbf annually for future years as funding allows.

### **Evaluation:**

The Forest has offered 30 percent of the decade 1 sawtimber volume allowed by the 1997 Forest Plan. On an average annual basis, the Forest has offered 61 percent of general ASQ Objective 303 and zero percent of Objective 305, the Norbeck non-interchangeable component allowable sale quantity, over the first five years of the Forest Plan. POL is included in the total program upon contract award or when contracts are modified.

## Monitoring Item 15: Commodity Production and Forage Production

**Objective 301.** Produce on a sustained basis and make available up to 233 million pounds of forage for livestock and wildlife use each year (weather permitting). The location and amount of forage produced under the forest canopy will vary with the density of the overstory. This may necessitate changes in where and how both livestock and wildlife grazing takes place on a local basis over the rotation of a stand of timber.

- a. Livestock use will be up to 127 million pounds of forage per year or approximately 128,000 AUMs.
- b. Wildlife use will be up to 106 million pounds of forage per year or approximate population levels of 70,000 deer and 4,500 elk or other combinations that use the same amount of forage.

### Monitoring:

This report is due every 10 years. The next due date is 2007.

## Monitoring Item 16: Commodity Production and Rangeland Trend

### Objectives:

**301.** Produce on a sustained basis and make available up to 233 million pounds of forage for livestock and wildlife use each year (weather permitting). The location and amount of forage produced under the forest canopy will vary with the density of the overstory. This may necessitate changes in where and how both livestock and wildlife grazing takes place on a local basis over the rotation of a stand of timber.

- a. Livestock use will be up to 127 million pounds of forage per year or approximately 128,000 AUMs.
- b. Wildlife use will be up to 106 million pounds of forage per year or approximate population levels of 70,000 deer and 4,500 elk or other combinations that use the same amount of forage.

**302.** Maintain rangelands in satisfactory range condition.

### Monitoring:

This report is due every 10 years. The next report is due in 2007.

## Monitoring Item 17: Forage Utilization

### Objective 301.

Produce on a sustained basis and make available up to 233 million pounds of forage for livestock and wildlife use each year (weather permitting). The location and amount of forage produced under the forest canopy will vary with the density of the overstory. This may necessitate changes in where and how both livestock and wildlife grazing takes place on a local basis over the rotation of a stand of timber.

- a. Livestock use will be up to 127 million pounds of forage per year or approximately 128,000 AUMs.
- b. Wildlife use will be up to 106 million pounds of forage per year or approximate population levels of 70,000 deer and 4,500 elk or other combinations that use the same amount of forage.

### Monitoring:

The objective listed above relates to annual projected livestock forage use. The Phase I Amendment to the 1997 Land and Resource Management Plan changed Guidelines 2505 and 2506 to standards. These two standards relate to proper use or residual levels in riparian and upland forest rangeland settings.

Following direction in Standard 2506, districts continue to develop new Allotment Management Plans (AMPs) for allotments that have recently approved environmental assessments. The districts issue Annual Operating Instructions (AOIs) for each allotment on the Forest. Utilization or residual guidelines are included in the AMPs and/or AOIs.

In fiscal year 2002, actual grazing use on the Forest was 114,749 AUMs. This is approximately 89 percent of the annual projected Forest grazing capacity of 128,000 AUMs available for livestock utilization identified in the 1997 Forest Plan. Two reasons for not meeting projected Forest Plan AUMs were the loss of forage in allotments because of wildland fires that occurred in 2000 and 2001 and drought conditions. Phase I Amendment did not reduce the grazing capacity for livestock use.

Items Monitored	1998	1999	2000	2001	2002
Livestock AUMs Grazed	118,452	118,452	122,003	107,553	114,749
Livestock AUMs Permitted	118,452	119,570	122,003	116,707	125,073

Districts monitored and evaluated approximately 735,902 acres of range allotments to determine forage utilization. Following is a breakdown of acres and grazing allotments monitored by ranger district:

Items Monitored	Hell Canyon	Mystic	Northern Hills	Bearlodge
Acres Monitored and Evaluated for Livestock Forage Utilization	210,402	139,825	257,654	128,021
Grazing Allotments Evaluated	12	29	28	13

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Both Forest Service range staff and livestock permittees performed monitoring. The districts collected forage utilization data by ocular estimate, photos, and stubble height measurements on key areas throughout the allotments. Forage utilization on the allotments surveyed was within Forest Plan standards. The use on a few areas in some allotments did exceed proper allowable use guidelines; however these areas represent a small percentage of the overall utilization on the Forest. Monitoring training sessions have been conducted and more are planned. The “Wyoming Range Guide” (an update to the Black Hills range guide) is planned for use in future permittee training sessions.

### **Findings and conclusions relevant to the evaluation follow:**

1. Measured forage utilization exceeded proper allowable use guidelines on a small amount of areas within allotments surveyed. Forage utilization throughout all the allotments surveyed was within Forest Plan standards and allotment management objectives. Due to drought conditions, several allotments ran reduced use and/or ended early.
2. The Forest continues to promote more permittee assistance in monitoring grazing allotments with training sessions and using the Wyoming Range Guide and Black Hills Range Guide.

### **Evaluation:**

While forage availability and resultant use may vary annually depending on climatic conditions, wildland fires, non-use, and other resource reductions of AUMs, actual livestock forage use with the first five years of the plan is at 91 percent of Forest Plan objectives.

Deer and elk forage use is estimated based on population levels reported in Monitoring Item 26. The elk population is estimated to be at or near the goal (4,500). Deer populations for the last five years ranged in the low to mid 40,000s. Additional forage for wildlife use is being provided due to recent large fires on the Forest.

## Monitoring Item 18a: Plant Sensitive Species

**Objective 221: Conserve or enhance habitat for sensitive species and species of special interest (management indicator species) listed in Chapter Two.**

### Monitoring:

*Adiantum capillus-veneris* (southern maidenhair fern), *Epipactis gigantea* (stream orchid), *Sanguinaria canadensis* (bloodroot), *Salix serissima* (autumn willow), *Platanthera orbiculata* (large round-leaved orchid) and *Carex alopecoidea* (foxtail sedge) were monitored according to Monitoring Item 18a of the Black Hills National Forest Land and Resource Management Plan Monitoring and Implementation Guide, as revised for the 2002 Monitoring Season.

Remaining core sites of *Sanguinaria canadensis* were visited and baseline data collected, except site SACA13-8 that could not be relocated at the indicated map location.

Because 2002 was a drought year, additional large round-leaved orchid sites were visited per the monitoring plan. *Platanthera orbiculata* plants were present at each of the 13 sites visited.

At McIntosh Fen, 560 clumps of *Salix serissima* (autumn willow) were counted in 2002.

Sixteen new locations were found for *Carex alopecoidea* (foxtail sedge) during surveys in 2002, including discovery of most of the larger populations currently known. The only significant range extension was the finding of three sites in the Bearlodge Mountains.

No monitoring was required of *Equisetum scirpoides* (dwarf scouring rush), *Muhlenbergia glomerata* (marsh muhly), or *Scirpus cyperinus* (woolgrass) in 2002, as monitoring was performed in 2001.

Sensitive plant monitoring for 2002 followed the monitoring design updated during the Phase I Amendment to the Black Hills National Forest Environmental Analysis (Appendix F). Additional background information to the monitoring design is included in that appendix.

Monitoring data was gathered between early spring (late April) and early fall (late October) during optimal sensitive plant identification timeframes.

### Evaluation:

- The Forest started collecting qualitative monitoring information as described in the 1997 Black Hills National Forest Land and Resource Management Plan Monitoring and Implementation Guide in 1998 and 1999. Direction was received from the WO in October 1999 to raise the monitoring of sensitive plants to a quantitative level. Baseline data collection (baseline monitoring) to support the development process of quantitative monitoring protocols began in June of 2000.
- Baseline data collection for known locations of sensitive plants that continued to merit status on the Regional Forester's sensitive species list occurred in 2000 and 2001. Baseline data continues to be collected on new occurrences of sensitive plants that merit status on the list.
- Monitoring protocols available to the public with the Phase I Amendment decision (2001) were designed to detect changes that could affect the long-term persistence of the species on the Black Hills National Forest, to "trigger" action, and to provide trend information where possible in the long-

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term. Through annual consultation with the Rocky Mountain Research Station, the protocols were refined and supplemented for the 2002 monitoring season based on monitoring results and new occurrence information.

- Monitoring has been “triggering” action for conservation of the species such as through targeting weed treatment and promoting changes in recreational use,
- The protocols have been recently implemented, and it will be a number of years before a statistical statement for trend can be made. The number of years before a statistical trend statement can be made will vary by species. Trend may be difficult to establish and may not even be possible for some plant species because of species characteristics such as dormancy, etc.
- Plans are to continue to refine and supplement monitoring protocols through new information received on the species, new occurrence information, new monitoring information, and changes in the R2 sensitive species list. Plans are to continue to do this through annual consultation with the Rocky Mountain Research Station. This has been done for the 2003 monitoring season, and the revised protocols are available with this report and the 2003 Monitoring Guide at <http://www.fs.fed.us/r2/blackhills/projects/planning/2001Monitor/MonGuide.pdf>.

### **Viola selkirkii Pursh ex Goldie (Great Spurred Violet)**



Photo by Reed Crook 6/5/2002

Elk use, recreation (off-trail use, rock climbing), fire, and noxious weed invasion are the known or potential impacts or risks to *V. selkirkii*. With any of these risks, all population sites are not expected to be lost at any one time because fire wouldn't carry in many of the areas due to rock formations; elk use does not occur at every site; rock climbing does not occur at every site; and noxious weed invasion potential is not likely at many of the sites.

VISE2-2, (within Norbeck) is the largest site (out of 10 currently known sites) of *V. selkirkii* and is the population that has the potential for the largest combination of potential risks (elk use, fire, noxious weed proximity). Due to location of the site, it is likely that any moisture-induced decline (due to climatic change) would be detected first at this site. Because of these factors, monitoring of this site could serve as a “barometer” to indicate whether other sites should be monitored. The “trigger” to monitor additional *Viola selkirkii* sites if one or more of the four largest subpopulations (there are eight sub-populations at this site) at this site are lost is to look at two other sites of *V. selkirkii* in other drainages. The Forest has data for *V. selkirkii* during a wet climatic period. The question remains concerning whether these same sites have violets in drought years. Climatic events and fire trigger more monitoring.

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Monitoring of this species needs to occur during the flowering period, which is typically May 10<sup>th</sup> to 30<sup>th</sup>.

### Monitoring Design:

On an annual basis, monitor presence/absence of the four largest sub-populations at VISE2-2. If one or more of the four largest sub-populations at "Violet Valley" are not present, document the reason (i.e., drought, elk, noxious weeds) if it can be determined. Select two other sites in other drainages to monitor presence/absence to determine if other populations are being affected in the same way.

*Viola selkirkii* site VISE2-2 was monitored on June 5, 2002. The four largest subpopulations were present.

No noxious weeds were found at this site.

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### *Adiantum capillus-veneris* L. (Southern Maidenhair Fern)



Photo by Reed Crook 6/28/2002

The Forest Service administers two ends of the only known *A. capillus-veneris* population located within the Black Hills. All except four acres within the middle of the population are owned or are under a conservation agreement with The Nature Conservancy (Whitney Preserve).

Recreation and noxious weeds are the currently identified potential risks to this species. *Cirsium arvense* (Canada thistle) is a state listed noxious weed, and *Elaeagnus angustifolia* (Russian olive) and *Tamarix* sp. (salt cedar) are non-native invasive species of concern. All invade the Cascade Creek Valley. *Lythrum salicaria* (purple loosestrife) is not known to occur within the Cascade Creek Valley or anywhere close by, but its aggressive nature if it were to invade creates the potential to impact riparian natives such as *Adiantum capillus-veneris*.

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Counting individual clumps as a form of quantitative monitoring is problematic as some areas are inaccessible or involve high risk of damage (steep slopes) to species by monitoring samplers and because *A. capillus-veneris* has rhizomatous growth.

Monitoring of *A. capillus-veneris* could occur anytime throughout the growing season.

### Monitoring Design:

1. Monitor presence/absence of patches along stream transects on an annual basis. If the number of patches decline by 10 percent or more, consult on a more rigorous design with the Rocky Mountain Research Station.

Cascade Springs was visited, and *Adiantum capillus-veneris* (southern maidenhair fern) was monitored on June 28, 2002. There were 52 clumps of *Adiantum capillus-veneris* counted in 2002; 49 clumps were counted in 2001. One clump found in 2001 was not relocated in 2002, but four additional clumps were located. There was no decline in the number of patches between 2001 and 2002.

Cascade Falls was also visited and *Adiantum capillus-veneris* (southern maidenhair fern) monitored on June 28, 2002. Seventeen clumps were counted in 2002; 18 clumps were counted in 2001. The site where clump number 8 was located is very dry and overgrown with poison ivy this year. Water is not flowing where clump number 11 was located. Clump number 9 in the washout was not found this year. An additional clump was found in a hole east of the lagoon in the flood washout area, and two additional clumps were found near clumps 4 and 5. Clumps 1 and 2 are nearly continuous with one another this year. The decline in number of clumps was less than 10 percent.

2. Recreation nick points -- Document number of nick points that actually extend into populations.

There are three nick points (unofficial trails created by visitor use that lead from designated trails and access Cascade Creek) at Cascade Springs that extend into *Adiantum capillus-veneris* populations. The major nick point south of the picnic shelter is starting to overgrow. It is still visible, but looks as if it is beginning to be re-vegetated, and visitor use into the fern occurrence appears to have ceased.

The second nick point is also starting to be overgrown, but an unofficial visitor-use trail has formed, paralleling the fence and leading to the cement platform below this nick point (along Cascade Creek) and small clumps of fern.

The third nick point, leading from the gazebo north to Cascade Creek, is still well developed and intensively used, and two small nick points are becoming visible off this main trail leading down to the creek. The main nick point ends at several small clumps of fern.

3. Monitor water levels at the site by installing piezometers along the creek. Monitor water levels on an annual basis.

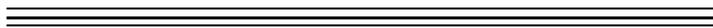
**Piezometers were not installed.**

4. Noxious weeds – Document any weeds and erosion patches.

*Cirsium arvense* (Canada thistle) is present at Cascade Springs. Three areas of particularly heavy infestations were marked on the map of the site (in monitoring files). *Cirsium arvense* control efforts consisted of manual pulling twice during the summer of 2002.

At Cascade Falls, *Cirsium arvense* (Canada thistle) is present.

*Lythrum salicaria* (Purple Loosestrife) was not found at Cascade Springs or at Cascade Falls.



**Epipactis gigantea Dougl. ex Hook. (Giant Helleborine)**



**Photo by Reed Crook 6/28/2002**

The only known occurrence of *E. gigantea* is located at the Cascade Springs portion of the Forest Service administered lands, on the Whitney Preserve (TNC), and on the private land but is not located at the Cascade Falls portion (Forest Service) where required habitat likely does not occur.

Recreation and noxious weeds are the current identified potential risks to this species. *Cirsium arvense* (Canada thistle) is a state-listed noxious weed. *Elaeagnus angustifolia* (Russian olive) and *Tamarix* sp. (salt cedar) are non-native invasive species of concern. All invade the Cascade Creek Valley. *Lythrum salicaria* (purple loosestrife) is not known to occur within the Cascade Creek Valley or anywhere close by, but its aggressive nature if it were to invade creates the potential to impact riparian natives such as *Epipactis gigantea*.

Counting individual patches as a form of quantitative monitoring is problematic as some areas are inaccessible or involve high risk of damage (steep slopes) to species by monitoring samplers.

Monitoring of *E. gigantea* needs to occur during the blooming period (June).

**Monitoring Design:**

1. Monitor presence/absence of patches along stream transects on an annual basis. If the number of patches decline by 10 percent or more, consult on a more rigorous design with the Rocky Mountain Research Station.

**Forty patches of *Epipactis gigantea* (steam orchid, giant helleborine) were counted on June 28, 2002, the same number as counted in 2001. Three patches found in 2001 were not located in 2002, but two entirely new patches were found in 2002, and one patch, found in 2000 but not found in 2001, was found again in 2002. Additional plants were found that link two previously separated patches, and one other patch has become two smaller patches. In summary, the number of patches counted in 2002 remained at 40.**

2. Recreation nick points - Document number of nick points that actually extend into populations.

There are three nick points (unofficial trails created by visitor use that lead from designated trails and access

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Cascade Creek) at Cascade Springs that extend into *Epipactis gigantea* populations. The major nick point south of the picnic shelter is starting to overgrow. The nick point is still visible, but re-vegetation has started. Travel into the orchid occurrence at the end of the first nick point appears to have ceased.

The second nick point is also starting to be overgrown, but a trail paralleling the fence leads to the cement platform below this nick point (along Cascade Creek) and into small patches of orchids.

The third nick point, leading from the gazebo north to Cascade Creek, is still well developed, and two small nick points are becoming visible off this main trail leading down to the creek. The main nick point ends at several small clumps of orchid.

3. Monitor water levels at the site by installing piezometers along the creek. Monitor water levels on an annual basis.

Piezometers were not installed.

4. Noxious weeds – Document any weeds and erosion patches.

*Cirsium arvense* (Canada thistle) is present at the site. Three areas of particularly dense infestations were marked on the map of the site (monitoring files). *Cirsium arvense* control efforts at Cascade Springs consisted of manual pulling twice during the summer of 2002.

*Lythrum salicaria* (Purple Loosestrife) was not present at Cascade Springs.



**Salix serissima (Bailey) Fern. (Autumn Willow)**



Photo by Reed Crook or Darcie Bacon 6/19/2001

At the time of monitoring design for 2002, the only known occurrence of *S. serissima* on lands administered

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by the Black Hills National Forest was located within the McIntosh Fen Botanical Area. A second site was located during the 2002 season, and details are included below. Noxious weeds were identified as posing the most concern for this species at the McIntosh Fen Botanical Area. *Cirsium arvense* (Canada thistle) currently occurs within the botanical area. *Lythrum salicaria* (purple loosestrife) is not known to occur at the site or anywhere close by but is very aggressive and has the potential to out-compete riparian natives, including *S. serissima*, if it invades the fen. A historically altered hydrologic regime (ditching while in private ownership, current lack of beaver activity) continues to put some level of stress on the willows at this site. An existing snowmobile trail crosses the botanical area but does not occur in the same specific area as *S. serissima*.

Monitoring of *S. serissima* needs to occur in June during the blooming period.

### Monitoring Design: (annual basis)

1. GPS new endpoints if site boundaries are expanded.

**There was no increase in the boundaries of site SASE2-A in 2002. Three GPS points (precise geographic locations determined by a satellite receiver) were collected to show that the *Salix serissima* (autumn willow) population had not expanded or contracted.**

2. Count individuals during the blooming period. If the number of individuals declines by more than 10 percent, consult on a more rigorous design with the Rocky Mountain Research Station.

**In 2002, 560 individuals were counted. In 2001, 453 plants were counted. This increase of over 100 plants in 2002 occurred primarily in the southern concentration of plants.**

3. Take annual measurements at both piezometers to note any changes in water level.

**The water level was 1.27' below the top of the pipe at the southern end, 1.03" below the level recorded in 2001 (2.3').**

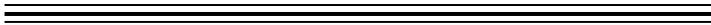
**The water level was 1.66' below the top of the pipe at the northern end, 0.09' below the level recorded in 2001 (1.75').**

4. Noxious weeds – document any weeds.

*Cirsium arvense* (Canada thistle) is present.

No *Lythrum salicaria* (purple loosestrife) was found at McIntosh Fen.

A second occurrence of *Salix serissima* (autumn willow) was located in an enclosure along Box Elder Creek on June 25, 2002 on the Northern Hills Ranger District. Thirteen plants were located: seven male, three female, and three non-reproductive plants. No GPS readings were made for this site in 2002, but baseline data was collected.



**Lycopodium complanatum L. (Trailing Clubmoss)**



Photo by Reed Crook 7/9/2002

Two (LYCO-1 and LYCO-2) known populations of *L. complanatum* are currently located on Forest Service administered lands in the Black Hills.

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Based on site visits to the known populations on Forest Service administered land, there are no apparent ongoing impacts to the species. Immediately adjacent private land has no obvious activities currently occurring, but it is not known how current use could change and affect the populations. An active placer mine is located close to LYCO-1, but there is no permit to operate at this time. The effect that fire or lack of fire has on this species is unknown. However, continuity of highly flammable, dense pine stands adjacent to population sites are of concern for this species. The steep slope on which LYCO-1 occurs does not appear accessible to cattle. There is a steep drop-off from the population down to an adjacent road. *Tanacetum vulgare* (tansy) is located roughly one-fourth mile downstream on a riparian floodplain but does not occur on the slope where the *L. complanatum* is located. Monitoring (human impact) of these sites may be the greatest risk. The monitoring design has been modified to keep site disturbance at a minimum.

*L. complanatum* is identifiable throughout the growing season and could be monitored from May until September.

### Monitoring Design:

1. Monitor LYCO-1 and 2 for presence/absence on an annual basis.

At site LYCO3-1 (Sand Creek), *Lycopodium complanatum* (trailing clubmoss) was present on 10/10/02.

*Lycopodium complanatum* (trailing clubmoss) was present at LYCO3-2 (Custer Crossing) when monitored on 07/09/02.

2. Install PVC pipe along the edge of LYCO-1 at the easiest visual observation point. The PVC pipe will act as a visual linear transect dividing the site into segments. If 10 percent from any one of the segments is missing, then the rest of the site will be examined. This allows monitoring of the site with minimal human impact. If the extent declines by 10 percent or more, consult on a more rigorous design with the Rocky Mountain Research Station.

**LYCO3-1 was divided into 4 linear quadrants using five pieces of PVC tubing oriented north to south. In the four quadrants oriented from east to west, the following coverage percentages were estimated: quadrant 1 to 50 percent; quadrant 2 to 75 percent; quadrant 3 to 75 percent; and quadrant 4 to 20 percent.**

**A third occurrence of *Lycopodium complanatum* (trailing clubmoss) was located on the Northern Hills Ranger District in August 2002, and basic information was collected (but not the baseline data).**

**A fourth occurrence of *Lycopodium complanatum* (trailing clubmoss) was located in the Grizzly Gulch Fire area late in the 2002 field season. No data was collected at the site in 2002.**



**Platanthera orbiculata (Pursh) Lindl. (Large Roundleaf Orchid)**



**Photo by Reed Crook 7/10/2002**

The currently known sites supporting *P. orbiculata* are clustered in three primary areas, each within a different geological type: (1) Bearlodge Mountains, (2) Northwestern Black Hills (contains the largest cluster of sites), and (3) Black Elk Wilderness.

A potential risk to this species is fire suppression, which has resulted in an increased density of ponderosa pine and spruce adjacent to *P. orbiculata* sites. The risk of catastrophic fire could have an intense impact on *P. orbiculata* population clusters.

Given the unpredictable nature of this species, its dependency on high soil moisture (it would not be unusual for all individuals from many of the sites to disappear during dry years), and the fact that all census data was collected in a wet year, the monitoring plan should include visiting 12 (9 in average years) sites during a dry year and counting the number of individuals present. Documenting presence/absence information on 12 sites during dry years will provide more information on the climatic association to this species and display whether or not appearance or disappearance of this plant is tied to moisture or to some other influence.

Monitoring of this plant should occur during the blooming period in late June to July. The plant is identifiable later in the season, and monitoring could take place in early August if the need arises.

**Monitoring Design:**

1. Annually monitor presence/absence of known site locations in Bearlodge proper: PLOR4-1, 2, and 3.

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*Platanthera orbiculata* was present at all three sites.

2. Annually monitor presence/absence in Black Elk Wilderness locations: PLOR4-23, 24, and 25.

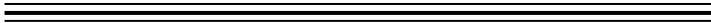
*Platanthera orbiculata* was present at all three sites.

3. Annually monitor presence/absence of three key monitoring population sites in the northwestern Black Hills: PLOR-6, -12, -19. If any of the key monitoring population sites are not present (refer to discussion above regarding climatic ties), document reason if it can be determined (i.e. drought, fire, noxious weeds).

*Platanthera orbiculata* was present at all three sites.

4. If drought occurs, three additional sites need monitoring: PLOR4-4, 21 and 22 (these sites were chosen for variation in geographic distribution). During the first drought year, count individuals at all 12 sites. During the second drought year and beyond, monitor all 12 sites for presence/absence. During the second non-drought year, count individuals at all 12 sites. After the second non-drought year, reassess the monitoring plan to determine future needs.

**FY2002 was a drought year. Four additional *Platanthera orbiculata* (large roundleaf orchid) sites were monitored: sites PLOR4-4, 13, 21, and 22. *Platanthera orbiculata* was present at all four sites.**



### **Equisetum scirpoides Michx. (Dwarf Scouring Rush)**

The recommendation is to remove this species from the R2 sensitive species list (14 of 24 sites had over 1,000 stems in 2000). Survey and baseline monitoring information has been gathered on 24 sites on Forest Service-administered land within the Black Hills, and there is documentation on 8 other sites. This species occurs on a variety of geological types, at different elevations, along drainages with varying aspects, and in different watersheds.

A primary risk identified for this species could be the invasion of *Lythrum salicaria* (purple loosestrife) into the sites located within riparian areas. *L. salicaria* (purple loosestrife) is not currently known to occur at any of the sites (site information last updated in 2001) or anywhere close by, but if it invades any of the areas, its aggressive nature creates the potential to impact *E. scirpoides*. Grazing does occur at some *E. scirpoides* sites, but direct or indirect impact to the plant is unknown as to whether it has a beneficial or harmful effect or both (due to depth of rhizomes, whether the disturbance may benefit establishment of the species, if the grazing is detrimental to riparian system in which the species occurs, etc.). However, data gathered provides good evidence that this species is persisting in high numbers on enough sites to make a good case for a high probability of persistence.

*E. scirpoides* is identifiable throughout the growing season, and monitoring could take place from the middle of May until early September.

#### **Monitoring Design:**

A presence/absence and estimate of aerial extent of three key populations will be used to monitor this plant species a minimum of once every five years. These three sites were chosen based on geographic distribution, large size, and the potential for disturbance. If *L. salicaria* (purple loosestrife) is documented to occur at any

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of the three locations, or the population is absent (i.e., due to flooding, drought, fire), then another of the known populations needs to be selected to serve as a key location for monitoring needs. *L. salicaria* (purple loosestrife) located at any key location will also serve as a “trigger” to check other known populations for this noxious weed.

Key monitoring locations of *E. scirpoides*:

1. EQSC-2 (Northern Hills Ranger District)
2. EQSC-10 (Castle Creek – Mystic Ranger District)
3. EQSC-26 (Fawn Creek – Bearlodge Ranger District)

No monitoring was required at any of the above sites in 2002 (monitoring occurred in 2001).



### *Sanguinaria canadensis* L. (Bloodroot)



Photo by Reed Crook 5/20/2002

*Sanguinaria canadensis* occurs in the northern/northeastern Black Hills and is the most abundant R2 sensitive species on the Forest. Species information suggests that bloodroot has characteristics that resist grazing impacts. Bloodroot is reported to be toxic to humans; therefore, it may be toxic to livestock. Trampling by livestock may damage the shallow, succulent rhizomes; however, the plants are typically in dense thickets and heavily wooded areas (some of which occur on steep slopes) that are less accessible to livestock use. The current assessment is that bloodroot is not in danger from grazing management based on a recent number of updated site records (22+), the numbers of individuals or clumps per site (ranging from five individuals or clumps to hundreds to thousands), and presence of many sites on vacant allotments. Currently not enough information about the individual sites exists to conclude that the differences in the relative sizes of the sites are attributed more to differences in grazing pressure than to differences in other attributes of the sites (i.e., drainage aspect, overstory cover, sites are adjacent to roads, etc.). Noxious weeds appear to be the most serious risk to *S. canadensis* both from the standpoint of invasion and from treatment. *Tanacetum vulgare* (*tansy*) and *Cirsium arvense* (Canada thistle) are present at some of the sites. Continuity of highly flammable, dense pine stands adjacent to population sites are also of concern for this species.

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### Monitoring Design:

1. Annually monitor presence/absence of the three key sites.

- SACA13-1 (704 – False Bottom site/Site # 99004, Northern Hills Ranger District)

- SACA13-2 (803 – Lost Gulch-main population)/Site #'s 99008 & 99007, Northern Hills Ranger District)

- SACA13-3 (807 – Runkle)/ Site #'s 94018 & 94011, Northern Hills Ranger District)

- SACA13-14 – added as key monitoring site in 2002

***Sanguinaria canadensis* was present at the above key monitoring sites.**

**Site SACA13-8 was not relocated in 2002. There is no known reason for the absence of *Sanguinaria canadensis* at this site.**

2. Gather baseline data on all additional core sites in 2002 that were not visited in 2001(SACA-4, 5, and 7 through 10).

**SACA13-14 was added as a fourth monitoring site during the spring of 2002. It was present on 05/14/02.**

**Baseline monitoring data for *Sanguinaria canadensis* was collected for core sites SACA13-4, SACA13-5, SACA13-7, SACA13-9, and SACA13-10.**

**Following further review of *Sanguinaria canadensis*, it was noted that none of the identified key monitoring sites included a paper birch/hazelnut vegetative community type, which is one of the three major types where bloodroot is found.**

3. GPS data will be collected at endpoints if the site is large (over one-half acre), and points will be collected if the site is less than one-half acre.

**Endpoints of all key and core sites except SACA13-8, which was not relocated, were documented with GPS locations during 2002.**

The Forest has taken a conservative approach for this species and monitoring. This approach involved the following: (1) designating a sufficient number of “core” populations that are protected from livestock grazing to result in a high probability of maintaining the species’ persistence in the Black Hills; (2) implementing quantitative monitoring to assess presence/absence of the populations; and (3) a periodic re-evaluation assessment, based on new data gathered from population sites. “Key/Core” populations, or those deemed critical to the maintenance of the *S. canadensis* meta-population, were chosen based on two criteria: their relative size and geographical distribution. Using the size criteria, the largest populations were designated as “key” sites (SACA-1, -2, and -3). Including the geographical distribution, seven additional sites were designated as “core sites” (SACA-4 thru -10). These sites are located within vacant allotments. Ten sites are designated as “key” and/or “core.” In a recent revision, a fourth monitoring site was added, resulting in 11 monitoring sites.

*S. canadensis* is identifiable most of the growing season. Monitoring is best accomplished during the blooming period (April and May) before emerging grasses and forbs and emerging leaves on shrubs and trees hide individual *S. canadensis*.

Site numbers are composed of a commonly used plant code (from the Natural Resources Conservation Service PLANTS database) followed by a number for the site (i.e., SACA13-14).

4. Noxious weeds – document any weeds.

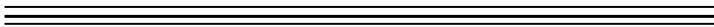
**At site SACA13-1, *Tanacetum vulgare* (tansy) was abundant through most of the site, with denser occurrences along the stream and FSR 195. *Hypericum perforatum* (St. John’s wort) is abundant in places along the stream. *Cynoglossum officinale* (hound’s tongue) is rare to occasional in the site.**

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At site SACA13-2, Spotted knapweed (*Centaurea maculosa*) occurred 1.1 mile northwest of the cabins (0.8 miles southeast of FSR 567.1). No other noxious weeds were found in the site.

At site SACA13-3, *Tanacetum vulgare* (tansy) is abundant around the margins of the population. *Cynoglossum officinale* (hound's tongue) is occasional in the site.



**Scirpus cyperinus (L.) Kunth (Woolgrass, Woolrush)**

This species will be re-evaluated as to whether it continues to merit status on the R2 sensitive species list. If it continues to merit status, monitoring will occur on identified “key” populations on a periodic basis. This monitoring will cease if further evaluation reveals that it no longer merits status on the R2 sensitive species list.

A primary risk identified for this species includes the potential for drainages in which it is located to be invaded by *Lythrum salicaria* (purple loosestrife). *L. salicaria* (purple loosestrife) is not known to occur at any of the sites or anywhere close by, but if it comes into any of the areas its aggressive nature creates the potential to impact *S. cyperinus*.

*S. cyperinus* is most identifiable August 15 to November 1. Monitoring needs to take place during this time frame.

**Monitoring Design:**

1. Monitor three key monitoring sites for presence/absence a minimum of once every five years.

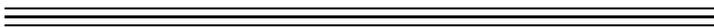
- SCCY-14 East end (area that contains 300+ clumps – Bearlodge Ranger District)
- SCCY-18 (Cook Lake Site - Bearlodge Ranger District)
- SCCY- 36 (Lucky Gulch – Bearlodge Ranger District)

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No monitoring was required at any of the above sites in 2002 (monitoring occurred in 2001).

2.5. If *L. salicaria* (purple loosestrife) is documented to occur in or adjacent to any of the key locations or if absence of a key location is documented, then a need exists to select another key population for monitoring purposes. *L. salicaria* (purple loosestrife) located at any key location will also serve as a “trigger” to check other known populations for this noxious weed.

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**Black Hills National Forest**

**Muhlenbergia glomerata (Willd.) Trin. (Marsh Muhly)**

A number of new sites of this species have been located. The majority of the newer sites are not located in riparian or boggy areas but on sites with a mesic moisture regime and on a variety of geological types. Therefore, *M. glomerata* has broader ecological amplitude in the Black Hills than previously thought. Because of the new information obtained on the species habitat preferences and the additional sites that have been located, this species will be re-evaluated as to whether it continues to merit status on the R2 sensitive species list. If it continues to merit status, the following monitoring design will be used.

A primary risk identified for this species could be the invasion of *Lythrum salicaria* (purple loosestrife) into the sites that are located within riparian areas. *L. salicaria* (purple loosestrife) is not currently known to occur at any of the sites (site information last updated in 2001) or anywhere close by, but if it invades any of the areas, its aggressive nature creates the potential to impact *M. glomerata*. More vigorous mats, or clumps, of this species were noted to occur in open areas that did not contain an overstory. Presence or absence or expansion and contraction of population sites are likely associated with climatic events.

Monitoring of *M. glomerata* needs to occur in August when it is the most identifiable.

**Monitoring Design:**

1. Monitor presence/absence of four key populations once every five years. These key sites were chosen based on geographic distribution and ecological amplitude. If one of the key populations is absent, document the reason for the absence if it can be determined (i.e., drought, flood, fire). Select another known or newly located site to serve as a key monitoring site.

- MUGL-9 (Corral Creek - Northern Hills Ranger District)
- MUGL-1 (McIntosh Fen - Mystic Ranger District)
- MUGL-4A (Planting Spring - Bearlodge Ranger District)
- MUGL-13 (Jasper Fire area, Mystic Ranger District)

**No monitoring was required at any of the above sites in 2002 (monitoring occurred in 2001).**

2. If *L. salicaria* (purple loosestrife) is documented to occur at any of the key locations during monitoring, and the persistence of that population is lost, then another key monitoring site needs to be selected. *L. salicaria* (purple loosestrife) located at any key monitoring site will also serve as a “trigger” to check other known populations for this noxious weed.



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**Carex alopecoidea Tuckerman (Foxtail Sedge)**



**Photo by Reed Crook or Cheryl Mayer 8/7/2002**

Based on recent confirmation (2000) of the identity of *Carex alopecoidea* and that it does occur on lands administered by the Black Hills National Forest, baseline data were gathered on this species in 2001. An estimate of linear extent, numbers of population patches, and other baseline data were gathered at 14 known sites. After consultation with the Rocky Mountain Research Station (January 2002), additional quick reconnaissance surveys were conducted in 2002 in similar habitat on the Bearlodge and Northern Hills Ranger Districts. This determined that more sites do exist and allowed additional data collection to be used in developing monitoring protocols.

**Monitoring Design:**

1. Conduct quick reconnaissance surveys for *C. alopecoidea* in similar habitat on the Bearlodge and Northern Hills Ranger Districts. If new sites are found, gather GPS data to pinpoint the location.

**Surveys for *Carex alopecoidea* (foxtail sedge) were conducted in a large number of drainages in the Northern Hills and Bearlodge Ranger Districts during 2002. Sixteen additional sites were located and GPS points and baseline monitoring data collected for each site.**

## Monitoring Item 18b-j: Animal Sensitive Species

**Objective 221: Conserve or enhance habitat for sensitive species and species of special interest (management indicator species) listed in Chapter Two.**

This section contains monitoring information and population trend assessments for all animal species on the Regional Forester's sensitive species list. Some of these species are also designated as management indicator species (MIS) in the Forest Plan. Forestwide habitat evaluations for these dual status species and all other MIS are provided in Monitoring Item 26.

### Monitoring:

#### 18b. Amphibians/Reptiles

The current Monitoring Implementation Guide specifies that population trend, occurrence data, and habitat information should be obtained for the northern leopard frog through site evaluations at 25 of 100 Forestwide index sites per year. The guide also outlines that incidental sighting records should be compiled for the tiger salamander, Black Hills red-bellied snake, and milk snake. Both tasks were accomplished in FY 2002.

Thirty leopard frog index sites were monitored on the Hell Canyon and Mystic Ranger Districts (see table below). The Hell Canyon Ranger District monitored 22 water sources, of which 10 were occupied by leopard frogs. Most observations were of adults ( $n \geq 60$ ), but reproduction was confirmed in three sites containing juveniles ( $n \geq 8$ ), and one site contained at least 100 tadpoles. The Mystic Ranger District monitored eight sites, but no leopard frogs were observed.

No extraordinary conditions were noted at any pond, but several ponds could benefit from mechanical sediment removal, fencing, changes in livestock management, or vegetation treatments.

Biologists on both districts observed tiger salamanders and/or non-target amphibian and reptile species during their leopard frog monitoring efforts. Larval and/or neotenic tiger salamanders were recorded at 12 sites. At least one pond with larval salamanders dried up before metamorphosis was complete. Non-target, non-sensitive species detected were western chorus frog, woodhouse toad, garter snake, and painted turtle. The two sites on the Hell Canyon Ranger District that were not occupied by target amphibians were occupied by non-target species, indicating that all Hell Canyon monitoring sites provided amphibian and/or reptile habitat. Four sites on the Mystic Ranger District supported predatory trout species; no amphibians or reptiles were observed at these sites.

**Number of Occupied Index Monitoring Sites**

Species	Total (N=30)	% Sites Occupied
Northern Leopard Frog	10	33%
Tiger Salamander	12	40%

There were several incidental sightings of non-aquatic reptiles in FY2002. There were 10 observations of Black Hills red-bellied snakes, which are nearly 3 times more than reported in 2001. This likely reflects an increased awareness and effort to report these observations. Four of these individuals were found dead on

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roads. There were no reports of milk snakes. There were four incidental observations of the non-target smooth green snake, one of which was dead on a road.

### Evaluation:

A total of 73 leopard frog index sites have been monitored since 2001. There had been no previous systematic sampling at most of these waters; therefore, the data are considered baseline and do not allow a trend assessment. However, current leopard frog distribution appears reasonably high; 60 percent (43/73) of all index sites were occupied by the species. The current monitoring protocols for amphibians and reptiles were established in 2001, and data has been collected and reported in accordance with it both field seasons since then.

Future monitoring efforts at leopard frog index sites should include presence/absence assessments for all three species of trout, as these non-native predators may significantly limit the abundance and distribution of aquatic amphibians (Pilliod and Peterson 2001).

The Monitoring Implementation Guide does not imply that abundance, distribution, or trends could or should be inferred from incidental observations of the other sensitive amphibians and reptiles. Therefore, no attempt to do so is made here.

### 18c. Bats

Two sensitive bat species occur on the Black Hills National Forest: Townsend's big-eared bat (*Corynorhinus townsendii*) and the fringe-tailed myotis (*Myotis thysanodes pahasapensis*). Both species are known to hibernate in caves and abandoned mines.

The Black Hills National Forest coordinates winter bat monitoring with Jewel Cave National Park and cave and mine surveys with the South Dakota Department of Game, Fish and Parks (SDGFP).

In FY 2002, the Hell Canyon Ranger District completed the third consecutive year of hibernation counts for bats at one cave (gated in 1995). No evidence of human disturbance was observed, and vegetation around the mouth of the cave is re-growing after the Jasper Fire of 2000. The cave contained 235 Townsend's big-eared bats. No fringed myotis were observed, but two non-target bat species were noted.

**Number of Townsend's big-eared bats observed at a gated cave on the Hell Canyon R.D.**

Species	Number Observed 12/09/1999 (FY2000)	Number Observed 01/20/2001 (FY2001)	Number Observed 12/29/2001 (FY 2002)
Townsend's big-eared bat	300	218	235

Bat inventories and/or monitoring occurred at five abandoned mines on the Mystic Ranger District. A newly identified (but abandoned) mine was discovered with a maternity roost of Townsend's bats. This is the first abandoned mine documented in the Black Hills to be used for this purpose. There are now four known Townsend's maternity roosts on the Black Hills National Forest (Tigner and Stukel 2003). Of the four other mines surveyed on the Mystic Ranger District, two contained Townsend's big-eared bats and one was used by fringe-tailed bats. Non-target bat species were observed at four of the five sites.

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### **Evaluation:**

Trend data for the hibernacula in the Jasper Fire area showed a 27 percent decrease in Townsend's bat use between FY 2000 and FY 2001. Nearly 20 percent of the decrease was recuperated in FY 2002 (See table above). Although the cause of the initial decline is not known, it could be due to the Jasper Fire of 2000. The fire occurred during summer before bats arrived for hibernation, but it did result in a loss of vegetation. Vegetation around the entrance of caves may regulate temperature and air fluctuations within the cave (Black Hills National Forest 2000). If vegetation removal is a significant source of the change, we could see further increases in bat use as vegetation recovers to pre-fire conditions. This cave should continue to be monitored in the future.

The discovery of a new maternity roost in a previously undocumented roost structure demonstrates the importance of continuing the Forest's inventory and monitoring program.

### **18d – Management Indicator and Region 2 Sensitive Birds**

In general, birds are relatively efficient to monitor because many species can be monitored together through a single effort. There are currently two methodologies being used in the Black Hills that provide a multiple species approach: the Rocky Mountain Bird Observatory Monitoring Program and Breeding Bird Survey routes. Data from these reports that are applicable to Black Hills Management Indicator Species (MIS) or Region 2 sensitive species are provided below under individual species headings. When these efforts do not adequately monitor a species (e.g., rare birds and birds of prey), a more specific protocol can be adopted.

#### **Rocky Mountain Bird Observatory Monitoring Program**

In 2001, the Forest began funding the Rocky Mountain Bird Observatory (RMBO) to monitor long-term trends of bird populations through point-count transect surveys (Panjabi 2001, Panjabi 2003). Ten habitats throughout the Forest are currently being monitored: white spruce, northern hills ponderosa pine, southern hills ponderosa pine, late-successional ponderosa pine, aspen, pine-juniper shrubland, mixed-grass prairie, montane riparian, foothill riparian, and burn area. Not all habitats will be monitored in all years, and adjustments may be necessary in habitat classifications and transect locations. The monitoring is designed to provide statistically rigorous population trend data on most regularly occurring breeding species in the Black Hills and informative status data on others.

In 2002, 3,402 point-count stations were sampled along 265 transects in all 10 habitats. A total of 126 potentially breeding bird species were detected. Because this is only the second year of a long-term monitoring effort, it is too soon for this technique to assess whether bird population sizes are changing. However, the Forest is obtaining valuable preliminary information on species-specific densities and habitat associations for many species.

#### **Breeding Bird Surveys**

Beginning in the 1960s, qualified volunteers and professional biologists have worked in partnership with the Forest Service to complete breeding bird survey (BBS) routes annually as part of a national program administered by the U.S. Geological Survey (USGS). Five routes were initially used in the Black Hills; now there are 15 routes. Large-scale results are available on the USGS web site (<http://www.mbr-pwrc.usgs.gov/bbs/bbs.html>). A cursory report specific to the Black Hills is prepared every two years, most recently in 2002. However, it should be understood that because the BBS protocol was designed mainly to detect trends over relatively large areas and long time-periods, care must be taken in interpreting trends over relatively small scales such as a five-year time-period in the Black Hills.

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### **Pygmy Nuthatch**

RMBO detected three pygmy nuthatches in 2001 and two in 2002. The observations occurred in northern ponderosa pine, late-successional pine, pine-juniper shrubland, and white spruce habitat strata. Although this monitoring is providing information on habitat association, the sample size is currently insufficient to determine density or trend. The species' rarity is confirmed through BBS efforts, as only one bird has been detected on Black Hills NF despite numerous annual surveys.

### **Evaluation:**

The pygmy nuthatch is currently considered both a Region 2 sensitive species and a Black Hills National Forest MIS. While the species' rarity may warrant sensitive status, it presents difficulties to being an effective MIS because the species is not abundant enough to detect meaningful population changes that have occurred because of management actions. Therefore, it is recommended that this species be omitted as an MIS in the Forest Plan Phase II Amendment.

### **Brown Creeper**

Results from the first two years of RMBO monitoring indicate the brown creeper occurs in low abundance throughout the Black Hills but is widely distributed primarily in mature coniferous habitats. In both 2001 and 2002, over 90 percent of all observations were made in mature or late-successional forest. Over 250 creepers have been observed since the point-count surveys began, with densities in the various coniferous habitat strata ranging from approximately 4 to 15 birds/km<sup>2</sup>.

### **Evaluation:**

Population trend data is not yet available for the brown creeper due to insufficient time since the RMBO monitoring program began. However, it is expected that this species will be effectively monitored (and trends detected) through the established point-count protocol.

Because preliminary data suggest there is a strong association between brown creeper and older forests, it is recommended that this species be retained as an MIS for late-successional habitats.

### **Lewis', Black-backed and Three-toed Woodpeckers**

The Forest has recently been very active in acquiring information specific to the Black Hills about sensitive woodpeckers. A conservation assessment has been completed, and three research projects have been initiated and/or completed. These efforts are in addition to the BBS and RMBO monitoring programs described above, which also provide information on these woodpeckers.

The most thorough monitoring effort applicable to all three sensitive woodpeckers was the RMBO program. Results from the first two years of surveys indicate that all three species are relatively uncommon, so density estimates cannot be calculated for all habitats in which the species occurred. Black-backed woodpeckers were the only species with more than 50 detections (N=147 birds). Black-backs were most abundant in burned areas and late-successional stands; densities in these habitats during 2002 were 6.9 birds/km<sup>2</sup> and 1.3 birds/km<sup>2</sup> respectively. Observations in burned areas increased nearly eight-fold between 2001 and 2002, indicating black-backs are colonizing the Jasper Fire area. Detections occurred in seven additional habitats, but the observations were too infrequent to allow density calculations. Nearly all detections occurred in ponderosa pine. In contrast, three-toed woodpeckers were usually found in or near white spruce stands, and white spruce was the only habitat with sufficient observations to permit density estimates (1.8 birds/km<sup>2</sup>). Lewis' woodpeckers were very uncommon in any habitat type. RMBO observed only seven individuals, and these detections were spread over four habitats and two years.

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The Forest has been working with the Rocky Mountain Research Station, the University of Wyoming, and the South Dakota School of Mines and Technology on three separate woodpecker studies. These studies are contributing to our knowledge of nesting and foraging ecology of Lewis', black-backed, and three-toed woodpeckers in the Black Hills.

The University of Wyoming study was completed in 2002 after two field seasons of data collection on black-backed and three-toed woodpeckers (Mohren 2002). The study evaluated densities of the two species across a variety of unburned habitat structural stages (HSS) and forest types.

According to Mohren (2002), overall density of black-backed woodpeckers across the entire Black Hills NF averaged approximately 0.25 birds/km<sup>2</sup> (1 bird/4 km<sup>2</sup>). The species showed greatest selection for areas with dense stands of mature ponderosa pine (HSS 4C), and avoided mature pine stands with more open canopies (HSS 4A and 4B). No black-backs were found in the spruce forest type. It is noteworthy that neither Mohren nor RMBO found substantial evidence of black-backs in spruce because the species has been associated with spruce in other regions of the United States (see Anderson 2002). This and other findings prompted Mohren (2002) to recommend changes to the ARC-HABCAP model.

Mohren (2002) estimated the density of three-toed woodpeckers across the Forest to be approximately 0.1 bird/km<sup>2</sup> (1 bird/10 km<sup>2</sup>). Three-toeds preferred areas where spruce, aspen, and/or ponderosa pine occurred in close proximity to each other. Habitat structural stage did not appear to be a major factor in site selection by three-toeds. These findings prompted Mohren (2002) to recommend changes to the Arc-HABCAP model.

In 2002, the Rocky Mountain Research Station began investigating the relationship between mountain pine beetle epidemics and woodpecker densities (Rumble 2002). Black-backed woodpeckers were the most common primary cavity nesting species (i.e., excavator) in outbreak areas. Black-back densities were up to 47 times higher within severely infested areas than in areas with low beetle occurrence. Preliminary results also indicated that cavity excavations were most common in trees attacked several years ago that had lost their needles and were broken off. Due to lack of funding, this project is not expected to continue in 2003.

In 2001, the South Dakota School of Mines and Technology began studying woodpeckers in the 2000 Jasper Fire area. The study was designed to quantify nesting habitat characteristics of woodpeckers and other cavity nesters, determine whether pre-burn forest structure is a good indicator of post-fire use by black-backed woodpeckers, and determine the influence of salvage logging on cavity nesters. The third objective could not be achieved because the area showed a lack of snags in salvaged areas. The study detected a noticeable increase in nesting black-backed woodpeckers between 2001 (n=0) and 2002 (n=11) (Vierling 2003). Sample sizes are very small, but preliminary data show that black-backed woodpeckers nested exclusively in ponderosa pine, and their nest trees had significantly more snags near them compared to random sites. No Lewis' or three-toed woodpeckers have been detected yet within the burn. The study will continue at least through 2003.

Black-backed woodpeckers were detected on two BBS routes in 2002, one of which was within a burned area. Lewis' woodpeckers were reported on one route that has had consistent sightings since 1993. No three-toeds were reported.

In addition to these focused research and monitoring efforts, there have been incidental reports of woodpeckers. Hell Canyon biologists reported three sightings of black-backed woodpeckers on their district in 2002. Two observations were within burned areas, and one was in a wind-throw area.

A conservation assessment of woodpeckers in the Black Hills was completed in 2002 (Anderson 2002). The purpose of the document was to compile biological information and ascertain important conservation issues. The document addresses all three sensitive species and four non-status woodpeckers. No field data were collected for this project.

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### **Evaluation:**

Although statistical trend data is not yet available for any woodpeckers, preliminary data suggest that recent fire and beetle events may lead to detectable positive trends for at least the black-backed woodpecker. Current abundance, age of event, and pre-fire vegetative conditions could all influence the magnitude and timing of trends.

### **Osprey**

Osprey were not known to nest in the Black Hills prior to 1990 (Tallman et al. 2002). Since then, five nests have been discovered, indicating an upward trend. In 2002, one nest was discovered by Hell Canyon Ranger District biologists. The nest fledged two young. No other nests were monitored in 2002.

### **Evaluation:**

The osprey population trend is increasing.

### **18e. Butterflies**

The Mystic Ranger District surveyed five sites for butterflies in 2002. In general, flowering plants (butterfly habitat) appeared to be more limited in 2002 than in recent years, perhaps due to drought. Regardless, approximately 20 species of butterflies were observed. This includes one sensitive species: the tawny crescent. The tawny crescent was observed at two sites. No regal fritillary butterflies were observed during these surveys or any previous butterfly surveys on the Mystic Ranger District. The Black Hills is at the periphery of the regal fritillary's range. Populations of this species may be difficult to assess and/or monitor.

Twenty-seven species of butterflies were identified during surveys on the Bearlodge Ranger District. A few individual crescents have yet to be identified to the species level; therefore, it is unknown if any tawny crescents were present. No regal fritillaries were collected.

### **Evaluation:**

Data is currently insufficient to determine butterfly population trends. However, the Forest is continuing to monitor butterflies.

### **18f. Management Indicator Species, Fish.**

See Monitoring Item 26.

### **18g. Marten**

Marten track plate box surveys were conducted in suitable habitat on three districts in FY2002. The Northern Hills Ranger District surveyed 11 sites, with marten evidence observed at 3 of them. The Mystic RD surveyed six plots, of which two contained marten tracks. Vegetation sampling was conducted in response to these detections in order to further our understanding of habitat use. Hell Canyon biologists surveyed two areas, but no tracks were found. Twenty-six percent of all plots surveyed revealed positive evidence of marten presence.

The Black Hills NF completed a conservation assessment for the marten in 2002 (Buskirk 2002). The purpose of the document was to compile biological information and ascertain important conservation issues. No field data were collected for this project.

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### Evaluation:

The marten monitoring program is in its infancy, and population trends cannot be ascertained at this time.

### 18h. Land Snails

In 2002, the Forest received the final report for a contract to inventory and/or monitor 357 sites for land snails (Frest and Johannes 2002). Many of the sites had been surveyed in the early to mid 1990s, and some were revisited in 1999 to help assess population changes. More than 100 new sites were inventoried for the first time. A total of 38 species were identified, including 12 that were previously undocumented in South Dakota. The surveys also provided information on two species with both Region 2 sensitive and MIS status: the Cooper's rocky mountain snail (*Oreohelix strigosa cooperi*) and Cockerell's striate disc (*Discus shimeki*). Cockerell's disc was found at a total of 18 sites. Cooper's snail was found at 102 sites, including 61 sites that contain a morph of *Oreohelix* that Frest and Johannes (2002) propose be split from the Cooper's snail into its own species. However, because this proposal has not been accepted through a peer review process and preliminary taxonomic research does not support splitting the species (report from T. Anderson, 12/2002), the Black Hills National Forest currently recognizes only the one species.

When comparing original survey data with that replicated in 1999, several noteworthy changes are revealed: (1) five sites appear to have lost the Cooper's snail; (2) one site gained Cooper's snail; (3) one site lost Cockerell's disc; and (4) one site gained Cockerell's disc. In addition, sites surveyed for the first time in 1999 show Cockerell's disc at 7 sites and Cooper's snail at 42 sites.

Ten of the sites surveyed by Frest and Johannes in either 1991, 1992, or 1999 were monitored by Mystic Ranger District personnel in 2001 or 2002. Five of the sites were within the Jasper Fire area, but none of these five sites originally contained either Cooper's snail or Cockerell's disc. No live specimens of the snail species originally present were observed at any of the Jasper Fire area sites, but additional monitoring is recommended to detect snails emerging from refugia. The remaining (unburned) five sites contained snail species assemblages similar to those originally reported by Frest and Johannes.

### Evaluation:

The Jasper Fire area appears to have had a negative impact on snails, as none of the five sites monitored before and after the fire contained live snails after the fire.

The Frest inventories constitute baseline population data for most of our snail sites. Long-term monitoring is required to determine accurate trends, as monitoring showed that sometimes snails were absent during the first round of surveys but present during the second round and vice-versa.

### 18i. Northern Goshawk

An attempt was made to monitor all known goshawk territories and nests in 2002. The objectives were to confirm occupancy and to evaluate nest presence and condition. Due to the large number of nests (>100) and inherent difficulties associated with trying to locate them, about half of all known nests were located. Over 95 percent of all known territories were monitored. Results are shown in the following table.

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<b>District</b>	<b>Territories Monitored</b>	<b>Territories Confirmed Occupancy</b>	<b>Percent Territories Occupied</b>	<b>New Territories Discovered</b>
Bearlodge	14	1	7%	1 Possible
Northern Hills	26	9	35%	0
Mystic	20	6	30%	0
Hell Canyon	24	4	17%	1
Total	84	20	24%	1-2

There were a few particularly noteworthy observations recorded during 2002 goshawk monitoring efforts:

- One known nest stand was burned in the Battle Creek Fire of 2002. The nest tree is still standing, but the nest and the tree’s needles were consumed in the fire. It is not known if the nest was occupied at the time of the fire, but an adult goshawk was seen near it beforehand. An adult goshawk was also seen within approximately one mile of the nest during the fire.
- Including this nest there are 10 known nests that have been affected by fire since 1998, which is approximately 7 percent of all nests known to the Forest. Most were lost in the Jasper Fire of 2000. In some cases, suitable unburned habitat and known alternate nests exists nearby and could be adopted for nesting with relatively minor changes in territory use. In at least one case, consumption was extensive and is assumed to have caused territory displacement or abandonment.
- At least four nests or nest trees were altered or destroyed by other natural events such as storms (ice/wind/snow) and insect infestations. The events had occurred over the past few years. Their effect on territory use is unknown.
- One goshawk territory with suspected human vandalism in 2001 was disturbed again in 2002. The active nest and commercial mothballs were found on the ground under the nest tree. The mothballs indicate human involvement, but their purpose at the site is unknown. The nest apparently fledged at least one young, as an adult and a juvenile were seen nearby. It is unknown if any birds were harmed by the disturbance. Forest Service biologists will continue to monitor this territory and work with law enforcement officials to prevent future disruption.
- Two nests previously used by goshawks were used by other raptor species in 2002 (great-horned owl and long-eared owl). An additional nest may have been used by a red-tailed hawk. These nests should be monitored in future years to determine if goshawks re-occupy them.

Goshawks have been monitored by Forest biologists for several years. Territory occupancy rates over the past five years are used to indicate population trend and are presented in the table below.

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Northern Goshawk	YEAR				
	1998	1999	2000	2001	2002
Number of Territories Monitored	0	12	42	46	84
Percent of Territories Occupied	N/A	58%	29%	20%	24%

Goshawk territory occupancy rates were variable over the five-year reporting period, making trend difficult to assess beyond the loss of territories to fire (burned nests were not included in occupancy calculations). Occupancy appears to have substantially declined after 1999 but annual differences in sample sizes may explain much of the change. Small sample sizes, such as that seen in 1999, are less likely to reflect accurate conditions than large sample sizes (e.g., >25). Also, monitoring may have been limited to suspected active or regularly active nests, causing the occupancy rate to appear higher. If one compares data between 2000 and 2002, the decline in occupancy is less obvious and appears relatively stable or slightly decreasing after burned nests are excluded.

Additional sightings of individual or paired goshawks occurred during the first two years of the RMBO monitoring program. Although this program may provide new information on goshawk occurrence, it is not expected to provide reliable density estimates. The Black Hills National Forest will likely rely on efforts that are more intensive, such as described above, to monitor goshawks.

### Evaluation:

Goshawk occupancy has fluctuated over the past few years, but appears relatively stable or slightly decreasing. Goshawk nesting activity (and territoriality/detect ability) is known to fluctuate annually and may be dependent on weather and other random or variable events. It is unknown how much these factors may have contributed to the fluctuating occupancy between 2000 and 2002, but it is likely that recent drought conditions played some role. Changes in goshawk habitat are displayed in Monitoring Item 26; please refer to that section for further evaluation of goshawk trends.

### 18j. Black-tailed Prairie Dog

To date, the Black Hills National Forest has not had a formal prairie dog monitoring program. However, due to the recent addition of the species to the R2 sensitive species list, an attempt was made in 2002 to identify all occupied habitat. Suitable prairie dog habitat on the Black Hills National Forest is restricted to non-rocky grassland soils on the Hell Canyon Ranger District. During the summer of 2002, Hell Canyon biologists visited all historically documented prairie dog colonies on National Forest System lands and recorded basic observations displayed in the table below.

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Colony Name	1992 Acres	2002 Acres	2002 Relative Prairie Dog Density (high, med, low) <sup>1</sup>	Comments
McKenna	5	7	Medium	Approximately another 40 acres located on adjacent private land
Edgemont	0	32	Low	New Colony
Breesne	2	40	Medium	
Long Mt.	90	141	Medium	
Shirttail	1	2	Medium	Approximately another 30 acres located on adjacent private land
Bennet	5	25	Unoccupied	Colony abandoned for unknown reasons

<sup>1</sup>Relative density estimate based on ocular field comparison with nearby colonies in western South Dakota (e.g., Wind Cave N.P., Badlands N.P.).

Two prairie dog colonies appear to have substantially increased in size since last observations were recorded in 1992 (i.e., Breesne and Long Mountain). Further expansion was deemed unlikely for McKenna and Shirttail due to topography and vegetation characteristics adjacent to the sites. These two colonies are located primarily on private land that is more open. Edgemont, Breesne, and Long Mountain have the potential to expand to a certain degree; most of the open grassy areas are already occupied, but there is suitable habitat nearby for some limited expansion. There was no obvious evidence to indicate why the Bennet colony was abandoned, but disease and poisoning have been implicated in other areas of the western U.S. Based on the condition of the burrows, it is estimated that the site has been unoccupied for two to three years.

**Evaluation:**

Two prairie dog colonies remained relatively stable in size between 1992 and 2002, two increased in size, one was newly discovered, and one was abandoned. These mixed data preclude along-term trend assessment but indicate the need for further monitoring efforts.

## Monitoring Item 19: Noxious Weeds

### Objectives:

- 230. Eradicate or limit spread (acres) of new introductions of non-native pests (insects, diseases, plants) to minimize ecosystem disruption.
- 231. Prevent new infestations and manage to reduce established infestations of noxious weeds. Treat 3,600 acres per year during the next ten years to limit noxious weed infestations.
- 232. Inform the public about noxious weed prevention, in coordination with local weed districts where they exist.

### Monitoring:

This monitoring item is an indicator for the change in weed infestation acreage over time and what efforts are being made to improve the situation. The objectives listed below relate to noxious weed species, treatment, and education.

#### Objective 230.

The Forest is aggressively working on this objective by identifying new locations of weeds; the sites are being aggressively treated and rechecked yearly. These species include new infestations of spotted knapweed (*Centaurea maculosa*), leafy spurge (*Euphorbia esula*), and St. Johnswort (*Hypericum perforatum*) in areas not found previously. Sulphur cinquefoil (*Potentilla recta L.*) and diffuse knapweed (*Centaurea diffusa Lam.*) were found in 2001 after the Jasper Fire with a population of around 10 to 15 plants per species. Yellow toadflax (*Linaria vulgaris L.*) and Dalmation toadflax (*Linaria dalmatica*) are also being found in some remote areas. The Battle Creek Fire area added to the task of treating additional weed infestations. New invasive weeds may appear throughout the treatment time frame. Saltcedar (*Tamarix ramosissima*) has been identified as a new invasive to South Dakota, and aggressive measures are being taken to control the spread. Specific location, treatment, and monitoring of many sites on the Forest are listed after the objective section.

#### Objective 231.

Weed treatment over the past 6 years has been above the Forest Plan treatment objective of 3,600 acres.

Year of Treatment	Acres Treated
1997	5,304
1998	4,409
1999	4,702
2000	5,172
2001	5,881
2002	7,515

Infestation acreage is difficult to measure, and our inventory methods and tracking are improving. The Weed Environmental Assessment signed in January 2003 has an estimate of approximately 82,000 acres. A portion

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of the increase in our acreage estimates is due to the spread of weeds, but much of this increase is because of improved inventory methods. Historical data is being compiled into the Terra database, and the estimated acreage of infestation by species will be updated. The Terra database is being built at the Rocky Mountain Regional Office, and the information is not yet available to the Forest. This information will reflect better inventory and additional infestations because of better tracking. Some of the new infestations are a result of large fires over the past three years. In addition to the treatments listed in the previous table, the Forest has worked on other efforts to prevent and reduce infestations:

- On June 25, 1999, the Black Hills National Forest Noxious Weed Free Forage Closure came into effect.
- In August 2001 during the Elk II Complex Fire, vehicles assigned to the fire were thoroughly washed before being demobilized to prevent non-native seeds from our local area being dispersed on highways and other states from where fire personnel came.
- In November 2001, aerial seeding of 3,550 acres on the Elk II Complex Fire was done in the high intensity burn areas to reduce and limit the spread of the existing infestations in the area. The intent was to provide a cover crop for competition to the non-natives in lands not yet infested. Lack of moisture during the summer of 2002 caused low germination during the summer. Some good rainfall in late August and September resulted in good germination and growth in scorched areas.
- In 2001, the National Forest System lands and state land around Ranch A were treated in conjunction with UW Extension Service and Crook County to minimize the spread to an adjacent subdivision.
- In the fall of 2002, the Battle Creek Fire area was aggressively treated to stem infestation spread after the fire. The Battle Creek Fire area will be closely observed and monitored as funds become available. Photos will be taken, and folders will be updated with the status of local and new noxious weed locations. Test plots will be established with Plateau and Transline.
- In 2002, some districts did extensive inventory and monitoring. Inventory/monitoring forms were made available to all employees and subsequently completed and turned in to the weed coordinator.
- Seeding of burn piles is a standard practice on the Forest.

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### Objective 232:

In the spring of 2000, the districts on the Forest, along with the Black Hills Resource Conservation and Development Weed Committee, surrounding weed and pest districts, and industry representatives held five workshops at different locations in western South Dakota. Each gave a presentation on how they were dealing with noxious weeds, treatments, and future plans. Educational material was also handed out.

In April 2001, Forest personal gave a “hands on” workshop involving noxious weed identification, recognizing the impacts of noxious weeds on the environment and noxious weed prevention measures. These concepts were also presented and participated in by students as part of the field day activities for the “Choices” program in April of 1998, 1999, and 2000. “Choices” is an environmental education program for seventh and eighth grade students in the Custer School District in Custer, South Dakota. The program is designed to give young adults exposure to the natural environment that surrounds them, to promote a better understanding and appreciation for the natural and cultural resources in forests, grasslands, caves, and aquatic ecosystems, and to show how sustainability of these resources depends upon the choices they make now and in the future.

In June of 1998, the Wyoming Weed Team was formed to develop the Wyoming Weed Management Strategic Plan. Strategies, goals, and objectives are being formed, and a final should be out in 2003. Members are from the University of Wyoming, Wyoming Department of Agriculture, weed and pest districts from Wyoming, Forest Service, National Parks, Wyoming Department of Transportation, Wyoming State Land

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Board, Bureau of Land Management, Wyoming Weed and Pest Council, and many others.

On July 30, 1999, a public monitoring workshop was held on the Hell Canyon Ranger District in the upper French Creek area. This area was heavily mined and still has some mining occurring today. The area was heavily infested with Leafy spurge along the creek banks and in large mining berms. The area was treated with Rodeo, an aquatic herbicide, in July 1998.

In the fall of 1999, the French Creek Watershed Weed Management area was formed. The group, formed by private landowners, includes Jewel Cave and Wind Cave National Monuments, Custer State Park, South Dakota Department of Game Fish and Parks, Nebraska and Black Hills National Forests, and Custer County Weed and Pest District. Applications for grants were submitted, and in 2001 and 2002 monies were given to private individuals in the French Creek watershed to treat noxious weeds. A 50/50 cost share grant was given to the Custer County Weed and Pest District to map weed infested areas in the watershed. A GPS unit was signed out from the district office to the county to help with the mapping in 2003.

The Forest provided a booth on noxious weed awareness at the Rapid City Stock Show in 1999 and 2000.

Each year, the South Dakota weed supervisors meet statewide and by district. At the statewide meeting in 2003, Forest personnel gave a presentation on efforts in the Jasper Fire area. At the state supervisors' meeting in 2003, Forest personnel gave a briefing on what the Forest Service had accomplished in 2002 and plans for 2003. In 2001, the Forest gave presentations at the Fall River and the Custer County public weed meeting.

District weed crews gave a presentation on the effects of fire on noxious weed populations at the Forest-sponsored Moon Walk for the public within the Jasper Fire area. General identification training was also given.

Over the last few years the Forest Service has provided Lawrence County with a map of treatment and biological releases and attended some of their meetings.

In the spring of each year, districts spend time training the weed spraying crews. This has included having the South Dakota Department of Agriculture give an overview on identification of noxious weeds that exist in South Dakota and the surrounding states. Industry representatives explain how spray units work and why calibration is extremely important.

In June of each year, the districts offer a weed identification training session during district orientation. This provides our new employees and other district personnel with information on the problems with invasive weeds and whom to notify when weeds are found on the district.

Educational material and display boards on noxious weeds and/or noxious weed identification and biological control booklets are available at each district office.

### **Evaluation:**

The Forest is exceeding the Forest Plan objective of treating 3,600 acres of noxious weeds per year but suspects noxious weeds are still spreading in spite of the increased treatment level. The Forest is obtaining better inventories to track noxious weed spread and believes some of the increased acreage is due to better inventories. The Forest has spent all of its efforts to treat noxious weeds and has not dealt with undesirable non-natives such as Smooth Brome and Kentucky Bluegrass that are not classified as noxious weeds but do tend to replace native grasses.

The Forest used a number of programs to educate people of the need to control noxious weeds. The Forest has established a weed-free program to limit the introduction of new noxious weed infestations.

## Monitoring Item 20a: Pine Beetle Susceptibility

### Objectives:

228. Within planning units (diversity unit, watershed and/or landscape association) where outbreaks of mountain pine beetle could threaten management objectives for ponderosa pine (especially where timber production is desired), maintain or reduce acreage of ponderosa pine stands that are in medium or high risk condition for infestation.
229. Using analyses of insect and disease populations, determine where suppression strategies are needed to meet management objectives and minimize value loss of tree vegetation affected by outbreaks of insect and disease pests.

### Monitoring:

Stands in the Black Hills can be hazard rated for mountain pine beetle (MPB). The most current and well-tested system is based on Schmid et al. 1994. In this system, each stand is rated based on average diameter and stand density. Stands that have an average diameter of less than 7.0 inches are rated as low hazard. Stands that have an average diameter of greater than 7.0 inches are then sorted based on density. All Forestwide stands were rated using data from the Resource Information System (RIS) database available in 2000 for this year's report. This data indicated there were 1,040,000 acres of susceptible type (ponderosa pine) on the Forest.

Hazard Rating	Density	Acres	Percent of Area
Low	< 80 BA	610,340	59%
Moderate	80-120 BA	333,320	32%
High	120 BA	96,340	9%

We estimate that this rating is skewed towards the low-hazard category based on the age of the rating and the age of the data available in the RIS system. Low basal areas caused most of the stands to be rated as low risk, a factor that can change significantly in 15 to 20 years. This is an increase in the moderate category and a decrease in the high category as compared to the 1995 database numbers.

A number of areas across the Forest are seeing stand-hazard decrease due to recent disturbances. These include the large fire areas over the last few years, such as Jasper, Rogers Shack, Battle Creek, Grizzly Gulch, and other fires. An area of concern with the recent fires is the expansion of pine engraver and wood borer populations in these areas and what effects they will have on surrounding areas. A study of beetle use of fire areas in the Black Hills is continuing. Areas killed by fire have lost the ability to support MPB populations. In addition, areas that have experienced heavy MPB mortality over the past few years, such as Beaver Park, may no longer have enough live host material to sustain MPB populations. However, beetles are spreading out from these areas and infesting nearby stands.

A number of current timber sales that have not been harvested now have more MPB infestations. These stands will be treated and develop a greater resistance to the beetles. Timber sales and other commercial contracts

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are the most financially efficient method of treating a landscape because the tree value supplements available funding.

### **Evaluation:**

MPB infestations are continuing to spread along with those of other insects. The Forest's ability to manage for reduced insect risk is limited due to funding, the time it takes to set up a timber sale or other treatment project, legal considerations (NEPA process), and contract length. The situation is improving with increased funding, changes in legal and policy requirements, and industry cooperation.

### **Objective 229:**

Evaluations have led to suppression projects being undertaken in the Northern Hills, campgrounds, and areas around Beaver Park. It is anticipated that suppression efforts will commence around the Deerfield area.

An aerial survey was conducted in August 2002 to estimate damage levels caused by bark beetles, MPB, and *Ips* on ponderosa pine.

A long-term study has been initiated to examine the flight periods and most effective lure chemistry of adult mountain pine beetle and pine engraver beetle.

On-the-ground surveys are being conducted to estimate the level of infestations and how they have changed over the past four years.

A study of beetle use of fire areas in the Black Hills is continuing.

## **Monitoring Item 20b: Pine Beetle Levels and Trends**

### **Monitoring:**

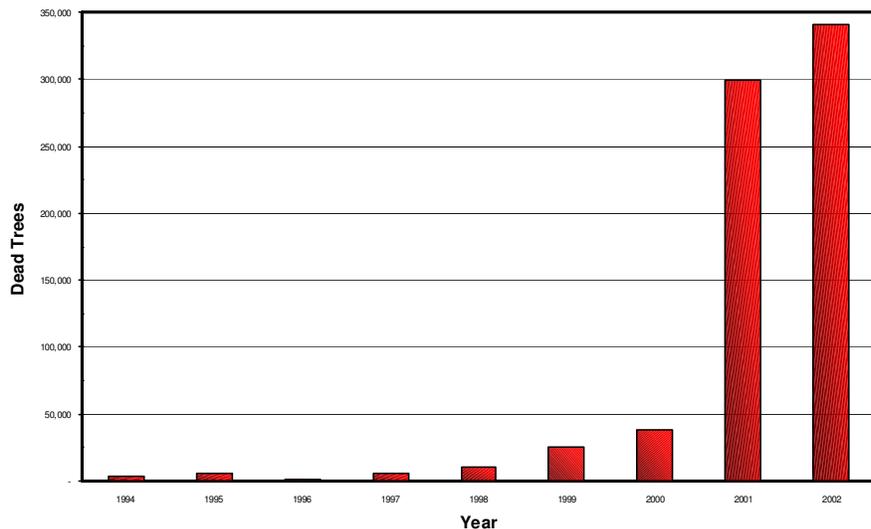
An aerial survey was conducted in August 2002 to estimate damage levels caused by bark beetles, mountain pine beetle (MPB), and *Ips* on ponderosa pine. The survey indicated that there were 340,398 trees killed by mountain pine beetle and 39,797 killed by *Ips* in the Black Hills, amounting to an estimate of almost 7 million cubic feet of volume lost. MPB mortality is starting to rival some of the historic levels from the twentieth century. The largest outbreak in the Black Hills occurred from about 1890 to 1908, with mortality estimated at close to one million trees killed per year at the peak of the outbreak. The next largest outbreak occurred in the 1970s with peak mortality numbers of around 600,000 trees killed in a single year. The predicted expansion of the beetle population projected for 2003 will approach these earlier outbreak estimates. Most of the tree mortality was scattered in small groups or as single trees. However, large areas of concentrated mortality were detected in Beaver Park, Vanocker Canyon, Kirk Hill, near Steamboat Rock, areas south and west of Bear Mountain, around the Ditch Creek area, areas west of Deerfield, Warren Peak, and the Boles Canyon area. Beaver Park alone accounted for about 115,000 of the total trees killed by mountain pine beetle.

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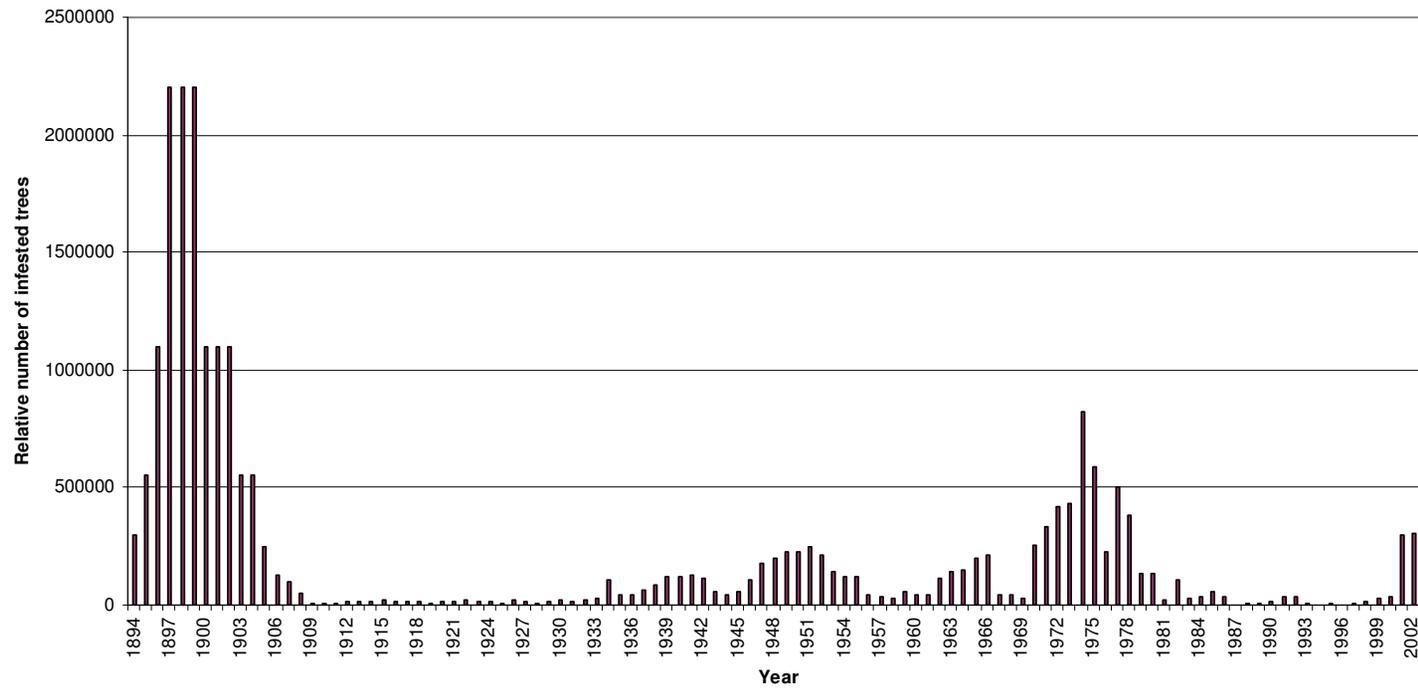
**Evaluation:**

When the mortality from mountain pine beetle and fires is added to the general background mortality from root disease and other sources, a considerable amount of mortality has occurred across the Forest over the past few years.

**Estimated mortality of ponderosa pine due to mountain pine beetle  
in the Black Hills of South Dakota and Wyoming  
from 1994 - 2002 based on aerial surveys**



Schematic MPB Infestations: Black Hills 1894-2003



## Monitoring Item 20c: Insect and Disease Evaluations

### Monitoring:

Biological evaluations of mountain pine beetle-caused mortality were conducted in the Beaver Park, Deerfield, and Nemo areas. These evaluations consisted of on-the-ground surveys to estimate the level of infestations and how they have changed over the past four years. Based on the ground surveys, beetle-caused mortality is increasing in all these areas. Beetle populations seem to be increasing at least at a two- to three-fold rate in these areas. The evaluations have led to suppression projects being undertaken in the Northern Hills, campgrounds, and areas around Beaver Park. It is anticipated that suppression efforts will commence around the Deerfield area.

A long-term study has been initiated to examine the flight periods and most effective lure chemistry of adult mountain pine beetle and pine engraver beetle. Baited funnel traps were checked weekly throughout much of 2002 to determine when the beetles began flying and when they stopped. This study will take several years to account for the year-to-year variation in flight periods caused by environmental factors. Other studies are looking at alternative control measures for mountain pine beetle; one involves the use of mountain pine beetle anti-aggregation pheromones and the other involves looking at effectiveness of different preventative sprays. The use of verbenone as an anti-aggregation pheromone of mountain pine beetle is unclear at this point. Two chemicals tested are effective at protecting trees from attack for one season, and one may be effective for two seasons. These insecticides are effective for treating individual trees in isolated areas but are not practical for widespread use. Some of these chemicals may not be available for forestry uses in the near future, so there is a continued need for further evaluation of suitable replacement chemicals.

**Mountain Pine beetle damage in Beaver Park, summer 2002**



### Other Insects and Diseases Of Interest:

#### Red Turpentine Beetle and Wood Borers.

Over the past few years, there has been a noticeable increase in activity of red turpentine beetle

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(*Dendroctonus valens*) and wood boring insects (beetles in the families Cerambycidae and Buprestidae). Neither of these groups of insects are typically considered tree killers; however, they can do damage to wood products.

Red turpentine beetle is generally found infesting heavily damaged or stressed trees and fresh cut stumps. They carry blue stain fungus, which will generally degrade wood quality. Since this beetle is rarely a tree killer, good long-term monitoring data has not been collected. However, the recent large population increases caused by trees damaged in wind and other weather events, fires, and other large areas of tree mortality have created conditions that cause this beetle to flourish. Increases in tree mortality in healthy trees have not been detected, but certainly some trees scorched in fires and later infested may have died prematurely. In 2003, we started looking at a series of different chemicals for use in pheromone traps for red turpentine beetle. The best mix of chemicals is unknown, and with improved technology, mass trapping may be one technique for controlling this insect in select areas.

Wood boring insects have also increased greatly across the Forest over the last few years. Their increased population also coincides with storm damage, fire damage, and mountain-pine-beetle caused mortality. Although these insects do not typically kill trees, they have attacked fire-scorched trees that still have green crown, which may be leading to more mortality in these areas than would be expected. Boring insects also play a large role in lumber quality. Since these insects actually bore into the wood of a tree as opposed to just living under the bark as do bark beetles, they cause serious degradation of lumber after they have attacked a tree. Over the past few years trees have died and become infested with borers so rapidly that in some cases, the trees did not hold lumber value for more than two to three months after they were killed. A series of traps and tests were started in 2003 to determine general numbers (populations) in some burned areas and to determine which species of borers are most common in the Black Hills.

### **Armillaria Root Disease:**

Armillaria root disease is common throughout the Black Hills on all tree species found here, conifers and hardwoods alike. Typically, it is not considered a killer of large trees; however, it does kill seedlings and saplings regularly. In larger trees, it acts more to reduce growth rates and stress the trees, which can make them more susceptible to bark-beetle attack. In the general forest, it can be found almost anywhere; however, it appears that there are root disease centers or places where it may be more of a problem. Known areas of greater Armillaria activity or root disease centers include the Bearlodge Mountains, Medicine Mountain, and generally, the Limestone Plateau. Armillaria is a concern in areas that have experienced fires as the large quantity of weakened trees may lead to an increase in these areas. Armillaria could kill some trees that may have otherwise survived. A series of plots were established in the Jasper Fire area to look at how Armillaria responds to wildland fire.

Overall, the above factors generally do not lead to large-scale tree mortality; however, conditions on the Forest over the past few years have led to rising populations and concerns. All of the above factors certainly do play a role in the forest. They are important in creating snags and providing other wildlife benefits such as being used as a food source. Continued high levels of mortality across the Forest will make these insects and diseases a continued common occurrence. Monitoring efforts will be continued as long as they persist at higher than normal levels.

### **Evaluation:**

Effective and economical pheromone or chemical treatments for widespread use on the Forest to reduce or eliminate pests have not been found. Some existing chemical methods that protect individual high-value trees may no longer be legal to use on the Forest in the future.

## Monitoring Item 21: Exotics

**Objective 230.** Eradicate or limit spread (acres) of new introductions of non-native pests (insects, diseases, plants) to minimize ecosystem disruption.

### Monitoring:

Detection surveys for the gypsy moth were continued at recreation and administrative sites on the Forest in 2002. No moths were caught in recreation sites on the National Forest; however, in 2000 moths were caught in surrounding private campgrounds near the National Forest. It is assumed that most of these are transient and there is no local population established at this time. See also Monitoring Item 19 noxious weeds.



Gypsy moth eggs



Gypsy moth larvae



Gypsy moth adult

### Evaluation:

Gypsy moth is not and has not been a problem on the Black Hills National Forest. The need for continued monitoring of this introduced pest is warranted.

## Monitoring Item 22: Fuel Loading Hazard

**Objective: 224. Reduce or otherwise treat fuels commensurate with risks (fire occurrence), hazard (fuel flammability), and land and resource values common to the area, using the criteria in Forestwide Standard 4110.**

### Monitoring:

The combination of all fuels influencing activities accounted for an estimated 176,000 tons of activities' slash being treated in accordance with Forest Plan required treatment standards.

All activities which generate fuels (reference Monitoring Item 23: FIRE - Fuel Treatment) require an assessment to determine appropriate fuel treatment as outlined by Land and Resource Management Plan (LRMP) Guideline 4110 (page II-55, LRMP). This assessment and prescribed treatment insure that on-site fuel hazards either remain at pretreatment levels or are reduced as necessary based on risk and/or values present.

Of the 26,288 acres of fuel reduction activities (see Chart - Monitoring Item 23), nearly 60 percent of it occurred in areas identified in the Black Hills National Forest Fire Protection Assessment (FPA) as having a high hazard index. Prescribed treatments in these areas reduced the hazard index to moderate or low levels. Less than five percent of fuel treatment activities occurred on areas of the Forest where the FPA rated existing fuel "hazards" low. Fuel treatment on the balance of the activity acres occurred on areas identified by the FPA as having a moderate hazard index. Prescribed treatment in these areas either reduced the hazard index or resulted in no change to the hazard index based on the fire "risk" or "values" present. Wildland fire burned 14,599 acres (1.2%) of the total Forest in 2002. Fuel hazard ratings were reduced in the burned area. Based on the combined effects of fuel treatment and wildland fire activity, an estimated 26,985 acres of the Forest moved from a high-hazard index to a moderate or lower-hazard fuel profile. In addition, an estimated 13,902 acres of the Forest moved from a moderate-to-low hazard fuel index. In any given year, untreated or unburned areas of the Forest that are currently rated as being in a moderate fuel-loading index will move into a high-hazard rating due to natural fuel deposition. However, the net decrease of high-hazard fuel acres on the Forest in 2001 is estimated at approximately 10,400 acres.

**High Hazard Acres**

LRMP Baseline (Decade 1)	LRMP Baseline (Decade 2)	1998	1999	2000	2001	2002
580,434	519,274	564,561	547,744	489,244	476,744	466,344

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**Evaluation:**

The Forest has reduced high fire-hazard acres from 580,434 acres to 466,334 acres, a 20 percent reduction in 5 years. The Forest is not meeting prescribed burning objectives because of limited days when the weather is favorable for maintaining control of the prescribed burn, smoke dispersal is acceptable, and due to wildland fire acreage.

<b>Accomplished (Acres)</b>	<b>FY1998</b>	<b>FY1999</b>	<b>FY2000</b>	<b>FY2001</b>	<b>FY2002</b>
Objective 227: Fuel Treatment Activities	26,455	28,029	28,475	25,598	26,288
Objective 223: Prescribed Fire Activities	1,633	1,830	2,600	900	1,433

**Monitoring Item 23: Fuel Treatment**

**Objectives:**

- 223. Use management ignited fires and prescribed natural fires to achieve desirable vegetative diversity and fuel profiles on 8,000 acres per year for the next decade. Use natural fire on a limited basis under specifically prescribed conditions.
- 224. Reduce or otherwise treat fuels commensurate with risks (fire occurrence), hazard (fuel flammability), and land and resource values common to the area, using the criteria in Forestwide Standard 4110.
- 227. Manage 28,900 acres of activity fuels and 4,000 acres of natural fuels each year during the next decade, consistent with the need to protect life, property and natural resources from the threat of wildfire. This acreage includes acres specified in Objective 223.

**Monitoring:**

The Forest accomplished fuel-treatment-related activities on a total of 26,288 acres of the National Forest in FY2002. Included in this work were activities as listed below:

<b>Fuel Treatments (Measured in Acres)</b>	<b>FY1998</b>	<b>FY1999</b>	<b>FY2000</b>	<b>FY2001</b>	<b>FY2002</b>
Pile Creation: Activity Fuels	1,454	595	1,056	879	1,233
Pile Burning: Natural Fuels	476	262	855	58	2,247
Activity Fuels	2,230	1,430	1,116	1,444	303
Prescribed Burning	1,633	1,830	2,600	1,073	1,433
Slash Removal	201	76	47	1,824	90
Urban Interface Thinning and Piling	28	111	560	3,718	15

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<b>Fuel Treatments (Measured in Acres)</b>	<b>FY1998</b>	<b>FY1999</b>	<b>FY2000</b>	<b>FY2001</b>	<b>FY2002</b>
Lop and Scatter (force account)	1,467	1,687	1,456	25	692
Pine Encroachment and Disposal	2,208	1,220	431	675	579
Pre-commercial Thinning and Associated Fuel Treatment	9,247	4,579	7,003	3,095	3,902
Aspen Regeneration	470	520	409	131	97
Purchaser Contribution - Lop and Scatter/Removal	7,041	6,027	12,967	12,515	15,697
Fuel Break Construction - associated with and included in the above acres	354	524	384	161	0

(See 2002 Forest Summary Silva Report as extracted from Rocky Mountain Resource Information System [RMRIS] database).

Much of the above acreage is associated with the Forest's active timber sale program.

**Evaluation:**

The Forest has accomplished the following:

- 84 percent of all activity fuel treatments projected in the 1997 Plan (28,900 acres/year).
- 47 percent of all management ignited fire fuel treatments projected in the 1997 Plan (8,000 acres/year).
- 62 percent of all management ignited fire natural fuel treatments projected in the 1997 Plan (4,000 acres/year).
- 33 percent of all management ignited fire activity fuel treatments projected in the 1997 Plan (4,000 acres/year).

## Monitoring Item 24a: Fire Suppression

**Objective 225. Manage wildfires using the appropriate suppression response (confine, contain or control) based on management area emphasis, existing values, risk of ignition and fuel hazards within a given area.**

### Monitoring:

The Black Hills National Forest experienced a significantly above-average fire occurrence year in 2002. There were 171 fires during the year of which 135 were lightning caused. The total number of fires was well above the Forest average of 139. The season saw a significant increase in the number of lightning fires (135), which exceeded the norm of 100. The number of human caused fires (36) was just below the norm of 38. The total acreage burned in 2002 exceeded the Forest average. Prior year drought conditions continued into 2002 and caused significant control problems during suppression activities. In all, 14,599 acres of the Forest burned in 2002. The largest fire was the Battle Creek Fire in August that burned over 10,000 acres of the Forest and cost over \$7 million to suppress. This fire destroyed three homes and threatened the town of Keystone and surrounding community. Other major fires included the Grizzly Gulch that threatened the towns of Lead and Deadwood and the Little Elk and Sheldon Fires.

The Forest completed a revision of its National Fire Management Analysis System (NFMAS) data in 1999. That revised analysis and associated fire modeling places projected annual losses at 3,253 acres with a suppression budget funded at the Most Efficient Funding Level (MEL). The suppression program for FY 2002 was funded at approximately 90 percent of the revised MEL budget level. Recorded losses (2002) were significantly above the norm and well above the NFMAS projections. However, based on the funding level, losses are considered within the statistical variation of historical fire records/data. All fire reports have been submitted and entered into the FIRESTAT Database at Kansas City.

### Evaluation:

All wildfires on the Black Hills National Forest were suppressed through appropriate suppression responses in accordance with management area emphasis, existing values, and fuel hazards within the incident area.

Confined: All                      Contained: All                      Controlled: All

## Monitoring Item 24b: Fire Prevention

Objective 226. Develop fuel management and protection strategies for intermixed landownerships in partnership with private, state and other federal agencies.

### Monitoring:

Indicators: Interagency involvement and or assessment of the following items:

- Status of fire management agreements with partner agencies;  
**All cooperator agreements and annual operating plans were reviewed and signed as required.**
- Involvement in interagency fire training exercises;  
**The Forest continues to play a lead role in interagency fire training by providing qualified instructors, financial support, and course coordination for much of the fire training offered in the Black Hills each year. The 10th annual Hardy Exercises was cancelled in 2002 due to the early onset of fire activity in the Region and country as a whole. The Forest and cooperator agencies responded to the unusually early fire season by sending personnel and resources to the extent that few people would have been around to take advantage of training exercises.**  
**Although some Cooperators elected to host separate Basic Fire School (S-190, 130 etc.) sessions in 2002, the Interagency community elected to host one large session at the Western Dakota Vocational Technical Institute located at Rapid City, SD. The Institute provided classrooms, student registration, and all administrative coordination of the training while various Federal, State and local cooperators provided instructors. The Institute has elected to be a partner in this annual fire training in the Black Hills, and we are looking to utilize their facility for other future training initiatives. They have also elected to offer course credits for the fire training as part of their school curriculum. This is proving to be a mutually beneficial arrangement.**
- Involvement in pre-suppression and prevention activities;  
**The Forest played a major role in organizing the joint fire management booth at the Annual Black Hills Stock Show in partnership with the South Dakota Interagency Fire Council (SDIFC). Prevention material and wildland fire information were displayed and made available at all other shows (i.e., Black Hills Sports Show) as well as at all office locations throughout the year.**
- Involvement in South Dakota Interagency Fire Council (SDIFC) meetings and activities;  
**The Forest is a member of the SDIFC and an ad hoc member of the Black Hills Fire Advisory Board (BHFAB). Both of these organizations provide interagency coordination of prevention, pre-suppression, and suppression activities in the Black Hills and surrounding areas. The Forest has representation at all meetings and participates in and provides representation to various committees and task groups of these two active organizations.**
- Effectiveness of the Custer Interagency Dispatch Center as assessed by fire management partners;  
**Activities at the Center this year included a flurry of filling early season resource orders to meet the National fire emergencies around the country. While not a record year for activity at the Center, workloads were at a level significantly above normal. Local geographic area activity represented a significant amount of the workload.**  
**The Center Manager received no complaints or dissatisfaction with activities at the Center in 2002.**  
**The Center is scheduled to move to a new location at the old Rapid City Regional Airport Terminal**

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**building in 2003. This building is currently being remodeled to accommodate the Center and staff by the spring of 2003.**

- Assessment of suppression support afforded partners through Incident Command System (ICS) process and as might be identified through post fire reviews, reports, or exit conferences; and
- All other information, which might cast light on the Forest's record of performance related to efficiency of operation in the fire management arena through interagency cooperation and prevention activities.

**The Forest completed reviews of various fire incidents during the course of the 2002 fire season in compliance with findings and abatement requirements of the Thirty-Mile incident.**

**Three South Dakota State Type III Incident Management Teams were assigned to incidents on the Forest in 2002 (Grizzly Gulch, Little Elk, and Battle Creek). The Forest and cooperators received very positive remarks from all three teams at the initial administrative briefing and at close out of each incident regarding initial management of the incidents and support of incoming teams after arrival.**

### **Evaluation:**

The Forest has extensively cooperated with private, state, and other federal agencies to develop joint fuel management and protection strategies for intermixed landownership in partnership with private, state, and other federal agencies.

## Monitoring Item 25: Threatened and Endangered Wildlife

Objective 220. Conserve or enhance habitat for federally listed threatened, endangered and proposed species.

### Monitoring:

#### Threatened and Endangered Species.

A threatened species, the bald eagle is present on the Forest during the late fall-winter. This monitoring item is designed to track winter bald eagle trends on the Forest. Bald eagle monitoring is to occur each year to develop a winter population database. The Monitoring Implementation Guide calls for district biologists to record bald eagle sightings throughout the winter during normal work activities.

Bald eagle sightings for the past five years are presented below by district, regardless of landownership. Observations of stationary bald eagles were generally associated with the birds feeding on animal carcasses along roads or perched in close proximity to a lake or stream. There are no known traditional winter roosts or nests in the Black Hills.

District	Number of Annual Bald Eagle Sightings				
	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002
Bearlodge	0	15	0	0	15
Hell Canyon	13	12	14	5	9
Mystic	17	51	24	22	51
Northern Hills	7	4	9	0	0
Total Forest	37	82	47	27	75

There was no monitoring of the endangered black-footed ferret, American burying beetle, whooping crane, and least tern or the proposed threatened mountain plover on the Forest due to the lack of historic records and/or lack of suitable habitat.

### Evaluation:

Incidental sightings of bald eagles establish presence but are not valuable for establishing trend because the survey effort is not standardized. Future monitoring efforts should adopt the national mid-winter bald eagle survey protocol coordinated by the U.S. Geological Survey.

## Monitoring Item 26: Habitat Capability Relationships, including Management Indicator Species (MIS) for Wildlife

### Objectives:

- 217. Maintain habitat for game and fish populations at the state objectives in effect in 1996.
- 218. Conserve or enhance habitat for resident and migratory non-game wildlife. Increase habitat capability for species when recommended in project level analysis.
- 219. Maintain or improve instream fisheries habitat. Cooperate with state agencies in aquatic ecosystem improvements to meet mutually agreed-upon objectives.
- 221. Conserve or enhance habitat for sensitive species and species of special interest (management indicator species) listed in Chapter Two.

Some of the Forest's Management Indicator Species (MIS) are also sensitive species. Therefore, additional data for many of the MIS can also be found in the various subsections of Monitoring Item 18.

### Monitoring:

#### Rocky Mountain Elk.

The Custer Expedition reported numerous elk sightings in the Black Hills during 1874. The subspecies present at that time was the Manitoban elk. By 1888, elk were extirpated from the Black Hills. Reintroduction of the larger Rocky Mountain subspecies was initiated in the early 1900s.

The Black Hills elk population has been increasing over the past five years. It is currently estimated by the South Dakota Department of Game, Fish and Parks to be 4,190 animals. Current population estimates are not yet available from the Wyoming Game and Fish Department. Forest Plan Objective 217 supports habitat management for 3,850 elk in South Dakota and 500 in Wyoming (1996 FEIS page 349), which were the population objectives established by the respective state wildlife agencies in 1996. The State of South Dakota has acknowledged that elk numbers are higher than desired in some areas of the Black Hills and has responded by increasing license sales and extending hunting seasons. Nearly 1,000 elk were harvested from the Black Hills in the 2002 hunting year, compared with less than 550 in 1998.

Elk	Year				
	1998	1999	2000	2001	2002
Population Estimate <sup>1</sup>	2,735-3,000	3,440	3,895	4,155	4,190

<sup>1</sup> Estimate applies to Black Hills N.F. land only, and excludes data from Custer State Park, Wind Cave National Park, and private lands.

The HABCAP model was used to compare Forestwide habitat capability values from 1997 with data from 2002. Summer habitat values increased from 66 to 69 percent, and winter values increased from 62 to 63 percent. This indicates that elk habitat has slightly improved or remained stable over the last five years.

The Forest is involved in a cooperative elk study being conducted by the Rocky Mountain Research Station. Other partners include the South Dakota Department of Game, Fish and Parks and the Rocky Mountain Elk

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Foundation. A principal objective of the study is to validate the habitat relationship model, which will yield better predictive information on the effects of habitat change on elk use and numbers. Fieldwork was scheduled through 2002, but a final report is not yet available.

### Evaluation:

Increases were observed in both elk population and habitat capability (albeit slight) over the past five years. The Forest has surpassed Objective 217 in South Dakota by providing enough habitat for a nine percent population increase over state objectives. Increased habitat capability values indicate the Forest has also met Objective 221.

### Monitoring:

#### White-tailed and Mule Deer.

Forest Plan Objective 217 supports habitat management for 60,000 deer in South Dakota, which matches the state's population objective. Wyoming did not set specific Black Hills population objectives (1996 FEIS page 343). White-tailed population estimates increased 16 percent between 1998 and 2002. Mule deer estimates have fluctuated more often but are currently 10 percent lower than they were in 1998. Combined, the deer have never reached the state's objective and are currently 14,000 animals (23%) under objective. According to South Dakota Department of Game, Fish and Parks harvest reports, nearly twice as many deer licenses were available in 1997 than in 2002. Regardless, deer are very common in the Black Hills and are commonly seen in towns and along roadways.

Deer	Year				
	1998	1999	2000	2001	2002
White-tailed Deer Population Estimate	30,000	28,000	29,000	30,000	35,000
Mule Deer Population Estimate	12,000	13,000	12,000	10,000	11,000

The HABCAP model was used to compare Forestwide deer habitat capability values from 1997 with data from 2002. Summer white-tailed deer habitat values increased from 54 to 61 percent, and winter values decreased slightly from 59 to 58 percent. Both summer and winter values increased for mule deer (73 to 77 percent, and 63 to 65 percent, respectively). Indicating that summer habitat has increased and winter habitat has remained stable ( $\pm 2\%$ ) for both species over the past five years.

### Evaluation:

Deer populations have been relatively stable over the last five years, although they have fallen short of state deer objectives by 23 percent. Habitat capability values have increased or remained relatively stable for both deer species during both major seasons. Assuming that the HABCAP model reasonably portrays habitat conditions, monitoring data suggests population growth is not currently being limited by habitat and that the Forest is meeting Objectives 217 and 221.

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### Monitoring:

#### Turkey.

Forest Plan Objective 217 supports habitat management for 20,000 to 30,000 turkey in South Dakota. Wyoming did not set specific Black Hills population objectives (1996 FEIS, page 340). Wild turkeys were historically known to occur in South Dakota until about 1920 (SDGF&P Wildlife Survey Manual, 1998-2003). Small transplants began in 1948 and continued through 1951. By the fall of 1952, it was estimated that the Black Hills turkey population had increased to 1,000 birds. The species reached its peak of approximately 10,000 to 15,000 birds in the early 1960s and again in the late 1980s. Until the mid-1990s, populations were reduced substantially (approximately 3,000 birds) due to weather conditions affecting reproduction. Since 1995, turkey populations have been increasing. They are currently at an all-time high. The population size in 2002 was estimated to be more than twice as large as it was in 1998.

Turkey	Year				
	1998	1999	2000	2001	2002
Population estimate	9,000	15,000	16,000	17,000	18,500

The HABCAP model was used to compare Forestwide turkey habitat capability values from 1997 with data from 2002. Summer habitat capability increased slightly from 64 to 66 percent, and winter values remained constant at 64 percent.

### Evaluation:

Turkey populations are increasing in the Black Hills. The Forest is nearing the lower end (within 8%) of the population objective for turkey in South Dakota. Habitat capability values have remained fairly stable (0 to 2% change), indicating that habitat is not likely a limiting factor in population growth. Both population and habitat trend data suggest the Forest is meeting Objectives 217 and 221.

### Monitoring:

#### Mountain Goats.

Mountain goats are not native to the Black Hills. Six goats were introduced in Custer State Park in 1924 from Rocky Mountain Park in Alberta, Canada (*Wyoming Wildlife*, August 1940). The current population on the Forest descends from not more than three individuals that escaped shortly after their arrival at Custer State Park. An estimated 25 goats existed on Harney Peak in 1940.

According to the SDGFP 2002 County Wildlife Assessments (Game Report No. 2003-11), mountain goat populations have been stable in the Black Hills over the past five years. The State's population objective is unknown.

Mountain Goat	Year				
	1998	1998	1999	2000	2002
Population estimate	168	163	163	163	168

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A HABCAP model has not been developed for mountain goat habitat capability. Therefore, the Forest currently has no objective data or analysis system to evaluate habitat trends. However, because mountain goats in the Black Hills are associated with cliffs in the Black Elk Wilderness and Norbeck Wildlife Preserve, and relatively few management practices occur in these areas, it is likely that habitat has remained relatively stable.

### **Evaluation:**

The Mountain Goat population is stable. Habitat trends are unknown. Unknown state population objectives and unknown habitat trend make it impossible to evaluate achievement of Objectives 217 and 221.

### **Monitoring:**

#### **Mountain Lion.**

Mountain lions are currently being studied in a joint research project funded by the South Dakota Department of Game, Fish and Parks (SDGFP) and South Dakota State University. This study, begun in 1998 and continuing through 2003, is attempting to analyze the territory size and estimate current population size and structure of mountain lions in the Black Hills. This information is needed to establish baseline information from which future population estimates can be compared. The research currently indicates that approximately 48 to 72 mountain lions reside in suitable habitat in the Black Hills (Frescke, unpubl. data in SDGFP 2003). Mountain lion sightings (adults and kittens) have increased over the past five years and are most common in the southern counties (i.e., Custer and Fall River). The SDGFP believes that the mountain lion population has increased since the animal was classified as a state threatened species in 1978. In 2003, a bill was passed in the state legislature to change the state status from threatened to big game. This will allow the SDGFP more management flexibility while maintaining protection from illegal taking.

A HABCAP model has not been developed for mountain lion habitat capability. However, models do exist for white-tailed deer, mule deer, and elk, which are major prey species of lion. HABCAP results for those species indicate stable to increasing habitat capabilities.

### **Evaluation:**

The mountain lion population is stable to upward. Direct habitat capability trends are unknown, but prey habitat has been stable to increasing. It appears that the Forest has been consistent with Objectives 217 and 221.

### **Monitoring:**

#### **Townsend's Big-eared Bat and Fringe-tailed Myotis.**

There is no HABCAP model for either MIS bat species to evaluate habitat capabilities or trends. However, over the past five years, the Forest has installed gates at two caves to protect sensitive bats from human disturbance. See Monitoring Item 18c for population information.

### **Evaluation:**

The decreasing population trend and unknown habitat trend make it uncertain whether the Forest is meeting Objective 221 for the Townsend's big-eared bat. Lack of both population and habitat trends render it uncertain whether the Forest is meeting Objective 221 for the fringe-tailed myotis. However, the Forest's recent efforts to protect roosts with gates demonstrates a conscious effort to conserve habitat for both species.

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### **Monitoring:**

#### **Pygmy Nuthatch.**

The HABCAP model was used to compare Forestwide pygmy nuthatch habitat capability values from 1997 with data from 2002. Summer capability value decreased slightly from 49 to 47 percent, and winter value remained steady at 49 percent. See Monitoring Item 18d for population information.

### **Evaluation:**

The two percent decline in pygmy nuthatch summer habitat capability, if statistically significant, suggests habitat is slightly decreasing or is stable. It is uncertain if the Forest is meeting Objective 221.

### **Monitoring:**

#### **Brown Creeper.**

The HABCAP model was used to compare Forestwide brown creeper habitat capability values from 1997 with data from 2002. Yearlong habitat capability decreased slightly from 28 to 27 percent. See Monitoring Item 18.d. for population data.

### **Evaluation:**

The one percent decline in brown creeper habitat capability, if statistically significant, suggests brown creeper habitat is stable or very slightly decreasing. It is uncertain whether the Forest is meeting Objective 221. This species and its habitat should continue to be monitored in the future.

### **Monitoring:**

#### **Black-backed and Three-toed Woodpeckers.**

Observations in recent burns and areas with beetle outbreaks suggest that black-backed woodpeckers are likely increasing. (See Monitoring Item 18d for more information). It is estimated that over 170,000 acres burned between 1998 and 2002, and nearly 200,000 acres were infested with mountain pine beetles or pine engravers by 2003 (see Accelerated Watershed / Vegetation Restoration Plan – 10 Year Strategy). Although not all of this has created suitable habitat for woodpeckers, a large portion of it has, especially for the ponderosa pine-associated black-backed woodpecker.

The HABCAP model was used to compare Forestwide black-backed and three-toed woodpecker habitat capability values from 1997 with data from 2002. Values for yearlong black-backed habitat capability remained stable at 50 percent. The model does not consider either burned areas or areas with high beetle densities. Values for yearlong three-toed woodpeckers decreased very slightly from 33 to 32 percent. The HABCAP models may not be very reflective of true habitat capabilities for either of these species. See Monitoring Item 18d for HABCAP changes recommended by Mohren (2002); these recommendations have not yet been incorporated. Furthermore, the models do not reflect the high value of burns or beetle-killed areas.

### **Evaluation:**

Observations within recent burns and beetle outbreak areas suggest that the black-backed woodpecker is increasing. HABCAP modeling suggests habitat is relatively stable for both species, but there are recognized flaws in those models. It is highly likely that the Forest is meeting Objective 221 for at least the black-backed woodpecker based solely on the amount of new burned and beetle-killed habitat that has become available in the last five years.

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### **Monitoring:**

#### **Osprey.**

There is no HABCAP model to evaluate osprey habitat capability. However, the critical component of osprey habitat is fish-bearing waters, and there has been no change in this for many years. No major impoundments have been created or destroyed, and there have been no substantial changes in the State's fish stocking program that would affect the osprey. See Monitoring Item 18d for population information.

### **Evaluation:**

The increasing population trend and stable habitat trend indicate the Forest is meeting Objective 221.

### **Monitoring:**

#### **Northern Goshawk.**

Several habitat alterations have occurred over the past five years. It is estimated that over 170,000 acres burned between 1998 and 2002, and nearly 200,000 acres were infested with mountain pine beetles or pine engravers by 2003 (see Accelerated Watershed / Vegetation Restoration Plan – 10 Year Strategy). An additional unquantified amount of habitat has been altered by storms. Monitoring has shown a direct negative effect of these events on nesting habitat (see Monitoring Item 18i), but there could be positive effects to foraging habitat.

Habitat alteration from management practices such as timber harvests were observed within or near several nest stands. In some cases, nesting habitat was noted as suitable after harvest. In at least one instance, harvest is thought to have reduced habitat suitability within the nest stand. All of these harvests were designed prior to adoption of the Phase I Amendment.

The HABCAP model was used to compare Forestwide goshawk habitat capability values from 1997 with data from 2002. Summer habitat value increased slightly from 54 to 55 percent, and winter values remained stable at 54 percent. The model may not be sensitive enough to reflect all meaningful changes, as it appears to be unaffected by the large fires, insect and weather events that have occurred over the past few years. See Monitoring Item 18i for more information about these events, and for population information

### **Evaluation:**

The HABCAP model shows goshawk habitat to be relatively stable over the five-year reporting period. However, observed natural events and management activities have caused some reduction in nesting habitat. The management activities occurred prior to implementation of the Phase I Amendment. The short-term habitat trend appears to be stable to slightly decreasing. This is the same trend as observed with the goshawk population. Continued monitoring is needed to determine long-term trends and accomplishment of Objective 221.

### **Monitoring:**

#### **Bald Eagle.**

The HABCAP model was used to compare Forestwide bald eagle habitat capability values from 1997 with data from 2002. Winter capability value increased slightly from eight to nine percent. See Monitoring Item 25 for population data.

### **Evaluation:**

The one percent increase in bald eagle habitat capability, if statistically significant, indicates bald eagle habitat is slightly increasing or is stable. However, due to a lack of population trend, it is uncertain whether

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the Forest is meeting Objective 221.

**Monitoring:**

**Marten.**

The HABCAP model was used to compare Forestwide marten habitat capability values from 1997 with data from 2002. The yearlong capability value remained stable at one percent. See Monitoring Item 18g for population data.

**Evaluation:**

The stable marten habitat trend indicates the Forest is meeting Objective 221.

**Monitoring:**

**Cooper's Rocky Mountain Snail and Cockerell's Striate Disc.**

There are no HABCAP models to evaluate snail habitat capability or determine habitat trend. No known occupied sites for either species were lost in the Jasper, Battle Creek, or Grizzly Gulch Fire areas. See Monitoring Item 18h for population information.

**Evaluation:**

It is uncertain whether the Forest is meeting Objective 221.

**Monitoring:**

**Regal Fritillary.**

There is no HABCAP model to evaluate butterfly habitat capability or determine habitat trend. See Monitoring Item 18e for population information.

**Evaluation:**

It is uncertain whether the Forest is meeting Objective 221.

**Monitoring:**

**Aquatic MIS.**

The Forest Plan Phase I Amendment, signed May 18, 2001, identified five fish as MIS: (1) brook trout; (2) brown trout; (3) finescale dace; (4) lake chub; and (5) mountain sucker. Not all sites or all MIS fish species have been sampled since their designation as MIS. Current monitoring relies on state protocols and efforts. Population data are summarized in the following table. Shaded columns in the table show the years that MIS status has been designated. The population estimate is the number of fish in a 100-meter stream site. Data prior to the date of MIS designation is included when available. Final SDGFP data for 2001 and 2002 is not yet available.

Sampling Site	Species*/Size	Population Estimate		
		1998	1999	2000
Bear Butte Creek Site #14	MTS	~	3	168
Bear Butte Creek Site #15	MTS	~		123

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Sampling Site	Species*/Size	Population Estimate		
		1998	1999	2000
East Spearfish Creek Site #1	BNT <200mm	384	~	~
	BNT >200mm	87	~	~
East Spearfish Creek Site #2	BNT <200mm	115	~	~
	BNT >200mm	30	~	~
East Spearfish Creek Site #3	BNT <200mm	210	~	~
	BNT >200mm	34	~	~
Iron Creek South Site #2	BKT <200mm	318	~	~
	BKT >200mm	3	~	~
Little Spearfish Creek Site #2	BKT <200mm	91	~	~
	BKT >200mm	2		
	BNT <200mm	28	~	~
	BNT >200mm	6		
Rapid Creek Site #3	BNT <200mm	~	144	51
	BNT >200mm	~	31	23

\*BKT = brook trout, BNT = brown trout, MTS = mountain sucker

**Evaluation:**

Given the recent designation of brook trout, brown trout, finescale dace, and mountain sucker as MIS, it is not possible to ascertain population trend given the limited amount of data. Reference reach sites are being established to monitor stream parameters over time (see Monitoring Item 4c2), but no habitat trend is currently available. The conservation assessment for lake chub, finescale dace, and mountain sucker (Isaak et al. 2003) provides population and habitat trend information in a historical context.

Projects to benefit fisheries and aquatic ecosystems have been implemented on the Forest, contingent on funding and other priorities, to meet Objectives 217, 219, and 221. Monitoring Item 7a provides a summary of habitat enhancement projects. Other land treatments are done in compliance with the Forest Plan, which includes the implementation of standards and guidelines, BMPs, and Regional Watershed Conservation Practices to conserve and enhance aquatic and riparian resources per Objectives 217, 219, and 221.

**Monitoring:**

**Lake Chub.**

Lake chub are only known to occur in Deerfield Reservoir. The number of lake chub collected and catch per unit effort (CPUE) based on SDGFP gill net sampling since 1998 is shown below. Deerfield Reservoir was not monitored in 2001. Final SDGFP data is not available for 2002. Deerfield Reservoir is mesotrophic (Piroutek 1991), meaning the production of plankton is intermediate so some organic sediment is accumulating and some loss of oxygen occurs in the deeper water. The water is moderately clear. Mesotrophic lakes usually have some scattered weed beds and within these beds the weeds are usually sparse.

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Gill net sampling	Year				
	1998	1999	2000	2001	2002
Number Caught	155	55	11	N/A	N/A
CPUE	38.8	13.8	2.8		

**Evaluation:**

Population trend for the lake chub was downward from 1998 through 2000 based on the number caught and CPUE, but no trend can be stated for 2001 and 2002. The recent introduction of the non-native rock bass and an increasing population of the native white sucker are likely to cause an indirect decline in habitat condition for lake chub. Habitat trend is stable. Piroutek (1991) reported the trophic status of Deerfield Reservoir was comparable to conditions in 1980, suggesting that the reservoir's trophic status has not deteriorated. Sabtan (1988 cited in Piroutek 1991) estimated a 0.3 percent loss in reservoir volume due to sedimentation.

## Monitoring Item 27: Scenic Integrity

**Objectives:**

- 401. Review all existing projects and areas that do not meet the adopted Scenic Integrity Objective (SIO) specified for each management area, and set priorities for rehabilitation.
- 402. Provide natural appearing landscapes with diverse scenery and enhance opportunities to enjoy attractive settings. Maintain the following:

Scenic Integrity Objectives (Thousands of Acres)	
Very High	11
High	151
Moderate	524
Low	552
Very Low	4

**Monitoring:**

In the summer of 2000, a wildfire spread through the western portion of the Black Hills of South Dakota. The fire, named the Jasper Fire, spread over approximately 85,000 acres. The fire burned along approximately nine miles of U.S. Highway 16, to the east and west of Jewel Cave National Monument. Approximately three miles of this section of highway, in National Forest System lands, is a two-lane road with no shoulders. The intensity of the fire was such that it killed the majority of the trees right along this portion of the highway. As a narrow, older, two-lane road, clearing of vegetation is generally from the top of cut to the toe of fill. In conjunction with the South Dakota Department of Transportation, the fire-killed trees that could fall and hit the highway were identified as a recurring safety hazard to the public along this section of highway. A Categorical Exclusion (CE) with a Decision Memo was prepared. Activities were limited to within 66 feet of the highway – those areas where there was a direct threat to the public.

The following direction for scenery management applies to this project area:

“Manage travel corridors for federal, state, and county roads – meet a SIO of High.” LRMP, Forestwide Goal 420, page I-26.

“A HIGH scenic integrity refers to landscapes where the valued landscape character “appears” intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident.” Landscape Aesthetics, chapter 2, page 4.

“Where the SIO criterion is High or Moderate, meet the criterion within one full growing season after completion of a project.” LRMP, Forest Plan Guideline 5606, page II-72.

“Integrate the protection of aesthetic values with all resource planning.” LRMP, Forest Plan Guideline 5608, page II-72.

“Highest priority for protection of scenic quality are those areas of heavy public use, such as...major roads...” LRMP, Forest Plan Guideline 5609, page II-72.

“Within the immediate foreground of primary travel ways/use areas, manage tree stands to enhance the scenic quality and recreational qualities. Manage for a variety of scenic conditions...” LRMP, Forest Plan Guideline 5610, page II-72.

“Use the following priorities for rehabilitating areas that do not meet scenic integrity objectives:

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**Relative importance of the area and the amount of deviation from the scenic integrity objectives. "Foreground" (1/4 mile viewing distance) of high public use areas has the highest priority...." LRMP, Forest Plan Guideline 5603, page II-72.**

**Findings:**



**An example of fire-killed vegetation after the Jasper Fire prior to the hazard tree removal.**



**One year after project completion and activity clean up, treatment areas are covered with grasses and other plants. These photos are indicative of management that occurred along the Highway. (Note: Untreated fire-killed hazard trees, on the right side of the road, are not on National Forest System lands.)**

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### Evaluation:

The hazard tree removal was carefully done, keeping soil disturbance to a minimum. Equipment did not leave cuts or fills that would leave long-term evidence of management in this area. When trees were removed, stump heights were kept to the minimum resulting in the new grasses and plants easily covering them and screening/reducing their visibility. Non-merchantable material (trees, tops, and limbs) was all removed from the site, leaving no evidence of the volume of material that was removed.

The treated area has a natural appearing condition, but the lack of edge treatment (along the boundary of the treated/untreated areas) parallel to the edge of the road – such as “feathering” the density or undulation the edge – makes the management appear obvious. The potential effect of a lack of edge treatment was identified in the specialist report:

“This will create a strong, short-term contrast between cut areas and uncut areas. The contrast will last approximately five to ten years, depending upon the fall down rate of the smaller fire-killed trees. The diameter of the fire-killed trees as well as the amount of snow, wind, and moisture the area receives, will determine how quickly the dead trees on the surrounding slopes fall.” (Highway 16 - Jasper Fire area – hazard tree removal – Scenery Management Report)

As there was an excellent job of slash clean up, the project could have easily met the assigned SIO of High as soon as ground cover was established, had the edge been treated.

Currently, a MODERATE SIO level has been achieved.

Overall, the hazard tree removal and clean up was highly successful, an exceptional effort, as the residue (tops and limbs) and the tree boles were removed to reduce the hazard to the traveling public on National Forest lands along the highway.

### 1997 to 2002 Effectiveness Monitoring:

This is the fifth year since the 1997 Land and Resource Management Plan for the Black Hills National Forest has been in place. This portion of the report is a review of the previous five years of implementation and the cumulative effects.

During the past five years, the following projects and their SIO were reviewed:

Year	Project	Scenic Integrity Objective
1998	(No Monitoring Was Accomplished For Scenery Management)	N/A
1999	Horse Thief Day Use Area - Recreation Construction	Moderate SIO
1999	Breezy Point Picnic Area - Recreation Construction	Moderate SIO
2000	Jasper Fire Dozer Line Rehabilitation	High, Moderate, & Low SIO
2000	Bearlodge Road Closure & Rehabilitation	Moderate & Low SIO
2001	Storm Damage Cleanup – Hwy 16A	High SIO
2001	Storm Damage Cleanup – Sheridan Lake Road	High SIO
2002	Hazard Tree Removal – Hwy 16	High SIO

### Scenic integrity definitions are as follows:

**HIGH:** scenic integrity refers to landscapes where the valued landscape character “appears” intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident. (Landscape

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Aesthetics, pgs. 2-4)

- MODERATE** scenic integrity refers to landscapes where the valued landscape character “appears slightly altered.” Noticeable deviations must remain visually subordinate to the landscape character being viewed. (Landscape Aesthetics, pgs. 2-4)
- LOW** scenic integrity refers to landscapes where the valued landscape character “appears moderately altered.” Deviations begin to dominate the valued landscape character being viewed, but they borrow valued attributes such as size, shape, edge effect, and pattern of natural openings, vegetative type changes or architectural styles outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed but compatible or complementary to the character within. (Landscape Aesthetics, pgs. 2-4)

A SIO is a goal to achieve a desired integrity level after completion of management activities.

**Findings.**

**FY 1999.**

Both recreation sites were designed and constructed to be fully accessible. Facilities include the following: rest rooms, parking, trails, overlooks, picnic areas, and a fishing platform. The SIO for both Recreation Sites (Development Level 3) is MODERATE. (Forest Plan Guideline 5210)

**FY 2000.**

	<b>Scenic Integrity Objective</b>	<b>Scenic Integrity Achieved</b>	<b>Development Level</b>
Jasper Fire Area Dozer Line Rehab	Low/Moderate	High	NA
Bearlodge Ranger District Road Closure and Rehab	Low/Moderate	Moderate	1

**FY 2001.**

Along both highway sites, prior to the spring storms, the project sites met the HIGH SIO for the area. The storm lowered the existing scenic integrity to LOW. Once the management activity was completed (slash piles burned, burn bay vegetation re-established), the natural appearing condition was restored and achieved a HIGH level of scenic integrity.

**FY 2002: See report above.**

	<b>Scenic Integrity Objective</b>	<b>Scenic Integrity Achieved</b>	<b>Development Level</b>
Highway 16 Hazare Tree Removal	High	Moderate	4

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### Evaluation:

Monitoring shows six out of seven management activities studied (86%) met the SIO for their area. The limiting factors that have affected the ability to meet the assigned SIO for an area include the following: weather that can limit slash pile burning to complete a project in a timely manner and other management requirements that constrain the size of the area to receive treatment.

When projects are constrained to small or narrow areas during vegetation treatments, a tradeoff often exists between reducing the amount of treatment and creating natural edge effects or maximizing the treatment and creating an un-natural appearing edge. Expanding the treatment area to create a natural appearing edge or to remove/reduce undesirable effects of a natural event can move the required environmental documentation process from a Categorical Exclusion to an Environmental Assessment. In the case of a small project, this can add significant time and cost to the project, resulting in the project no longer being feasible to accomplish.

Meeting the SIO assigned in an area will continue to require careful planning and tradeoffs will continue to exist that provide challenges in meeting the Land and Resource Management Plan standards and guidelines.

**402. Provide natural appearing landscapes with diverse scenery and enhance opportunities to enjoy attractive settings. Maintain the following:**

Scenic Integrity Objectives (Thousands of Acres)	
Very High	11
High	151
Moderate	524
Low	552
Very Low	4

Management activities have been implemented across the Forest. Those portions we have monitored do not show a change in acres of existing scenic integrity from that shown in the table above. However, large wildfires have occurred in various locations across the Forest. These fires have changed the appearance of the existing scenic integrity beyond our control. An accounting of these changes from wildfires has not been tallied to date.

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## Monitoring Item 28: Heritage Resources

### Objectives:

- 403. Improve the management of heritage resources and integrate them with recreation and education while providing for compliance with all applicable laws and regulations.
  - a. Increase numbers and types of heritage resource interpretive sites and opportunities. Provide five projects per year during the plan period.
  - b. Conduct six heritage resource stabilization and rehabilitation projects per year during the plan period.
  - c. Nominate eligible sites (approximately five per year in the plan period) to the National Register of Historic places.
  - d. Inventory 50,000 acres each year in the plan period for heritage resource sites.
- 404. Conduct three research projects each year to support heritage resource management.
- 405. Manage all heritage sites listed in the National Register of Historic Places in consultation with the State Historical Preservation Officer (SHPO) and the President's Advisory Council on Historic Preservation (ACHP).
- 406. Provide opportunities for the public to participate in heritage management activities, including the monitoring, excavation, and protection of archeological sites.

### Monitoring:

#### Introduction.

Heritage monitoring efforts are used to measure the level of success in meeting management goals and objectives for heritage resources. The level of success can be measured each year and, more importantly, over a five-year period. For this report, the results of monitoring over a five-year period will be reviewed as a measure of movement toward heritage resource management goals and objectives.

Direction for management of heritage resources is provided in Goal 4 of the Forest Plan: "Heritage resources will be protected and interpreted so that visitors can better understand their environment and how heritage resources fit into the context of multiple use management" (Forest Plan, pp-1-23). Heritage objectives are listed above.

#### FY-2002 Monitoring Accomplishments.

Monitoring items for heritage resources measure two areas of emphasis for the program. Monitoring Items 1 through 4 reflect our responsibility to comply with Federal law and regulation for the protection of heritage resources under Section 106 of the National Historic Preservation Act (NHPA) (See Table 1.) The relatively large numbers exhibited in Monitoring Items 1 through 4 are in themselves a reflection of the large number of undertakings conducted on the Black Hills National Forest each year and funded through the primary purpose philosophy by other resource programs. Completion of heritage compliance protocols is required before project implementation. Monitoring Items 5 through 7 reflect the agency's responsibility to preserve and interpret heritage resources for public benefit under Section 110 of the NHPA. These program activities are funded directly by heritage program funds as the primary purpose function. The relatively low numbers exhibited in Monitoring Items 5 through 7 indicate a lack of adequate funding to meet proposed accomplishments in the Section 110 portion of the heritage resource program.

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**Table 1. Heritage Monitoring Accomplishments.**

<b>Monitoring Items</b>	<b>FY1998</b>	<b>FY1999</b>	<b>FY2000</b>	<b>FY2001</b>	<b>FY2002</b>
1. Heritage resources compliance process completed prior to signing of environmental decision document (comply with NEPA, NHPA, and Chiefs Direction).	229 Projects	59 Projects	107 Projects	51 projects	124 projects
2. Avoidance or mitigation requirements effectively implemented prior to, during, and after project (comply with NHPA/NEPA).	32 mitigation or avoidance projects were monitored.	26 mitigation or avoidance projects were monitored.	41 mitigation or avoidance projects were monitored.	189 mitigation or avoidance projects were monitored.	51 mitigation or avoidance projects were monitored.
3. Inventories conducted to comply with the Archaeological Resource Protection Act, as amended 1988.	76 projects covering 93,873 acres were completed.	225 projects covering 78,938 acres were completed.	127 projects covering 28,686 acres were completed.	137 projects covering 41,713 acres were completed.	92 projects covering 78,891 acres were completed.
4. Protection of heritage resources listed in, or eligible for listing on the National Register of Historic Places. May or may not be associated with project specific activities (comply with NHPA).	106 sites were monitored.	97 sites were monitored.	143 sites were monitored.	248 sites were monitored.	36 sites were monitored.
5. Number of heritage resource interpretive sites provided (including sites, signs, roadside pullouts, brochures, public participation opportunities, sponsorship of heritage activities, etc.).	2 public outreach projects, and 1 interpretive program were provided.	25 interpretive programs were provided.	27 interpretive programs were provided.	34 interpretive programs were provided.	21 interpretive programs were provided.
6. Number of heritage resource stabilization and rehabilitation projects conducted (comply with NHPA).	1 project was conducted.	2 projects were conducted.	5 projects were conducted.	2 projects were conducted	2 projects were conducted
7. Increase in heritage resources listed on the National Register of Historic Places (comply with NHPA).	0 sites were nominated to or listed on the NRHP.	0 sites were nominated to or listed on the NRHP.	0 sites were nominated to or listed on the NRHP.	0 sites were nominated to or listed on the NRHP.	0 sites were nominated to or listed on the NRHP.

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### **Evaluation:**

#### **403. Improve the management of heritage resources and integrate them with recreation and education while providing for compliance with all applicable laws and regulations.**

403.a. Over five interpretive opportunities per year have been provided during the five-year monitoring period. Many of the opportunities have involved off-site interpretive programs such as school programs, interpretive pamphlets, public tours, moonwalks, and presentation of research papers at professional conferences. The Forest objective is being met, and in some cases, exceeded by utilizing off-site activities and programs.

403.b. Two stabilization and rehabilitation projects have been initiated during the first five years of the planning period. Both projects, the Gorman and Curran cabin restoration projects, were initiated in 2002 and completed in June of 2003. Both projects were implemented as Passport In Time programs. Both projects were initiated and completed in consultation with the South Dakota State Historic Preservation Office. An increase in heritage program funding will be needed to meet the Forest objective of six projects per year over the planning period.

403.c. No sites have been nominated to the National Register over this five-year monitoring period. An increase in heritage program funding will be needed to meet the Forest objective of five nominations per year over the planning period.

403.d. During the five-year period, an average of 65,000 acres has been inventoried each year. This trend is expected to continue over the next five years of the planning period.

#### **404. Conduct three research projects each year to support heritage resource management.**

Over the past five years, an average of one research project has been conducted or sponsored through cost-share agreements each year. Research projects completed include the Williams Spring and Rock shelter archaeological research projects, which were conducted under cost-share agreements with the University of Wyoming. The Williams Spring Geomorphology study was conducted under a cost share agreement with geologist John Albanese. The Flagpole Fire Effects study was conducted under a cost-share agreement with the South Dakota State Historic Preservation Office. The Hell Canyon Traditional Cultural property survey was conducted under contract with members of the Cheyenne River Sioux Tribe. The Black Hills Rock Art Overview was produced under contract to the National Park Service.

In order to meet the Forest objective of three research projects per year, an increase in heritage program funding is needed. The Forest is currently meeting this objective at a minimum level. Research opportunities can be increased if management of funding for cost-share partnerships can be administered at the Forest level.

#### **405. Manage all heritage sites listed in the National Register of Historic Places in consultation with the State Historic Preservation Officer (SHPO) and the President's Advisory Council on Historic Preservation (ACHP).**

The Forest maintains a strong relationship with the South Dakota and Wyoming SHPOs and the Advisory Council on Historic Preservation on listed and eligible properties. The heritage program is meeting this objective.

#### **406. Provide opportunities for the public to participate in heritage management activities, including the monitoring, excavation, and protection of archaeological sites.**

Through the Passport in Time program the public has participated in excavation and restoration projects each year. Over the five-year period six passport in time projects have been completed,

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including two historic restoration and four archaeological excavation projects. In 2001, the Forest conducted a children's archaeological field school in collaboration with the Adams Museum in Deadwood, South Dakota. During the week long project youth learned how to excavate and record a historic mine site. The data obtained during the project was used to evaluate the historic significance of the site and to develop required management recommendations.

A site stewardship program that will allow public participation in site protection and monitoring is being developed for implementation in FY2003. The heritage program is meeting this objective.

### Summary of Monitoring Results and Program Concerns

Over the first five years of the planning period, the Forest exhibits a strong and improving record of considering affects to heritage resources during the project planning and public involvement phases for a number of program areas. The primary heritage program concern at this time is the protection of heritage sites during project implementation. In the past two years, the Forest has consulted with the SHPO and ACHP concerning adverse effects to sites during project implementation. Examples include but are not limited to redesign of timber harvest units, use and/or construction of temporary roads, road maintenance activities, modification and maintenance of historic structures, and maintenance conducted under special use permit for power-line or buried cable replacement. In many cases, specific site avoidance or mitigation measures formally agreed to by the Forest, SHPO, and ACHP have not been implemented on the ground. In other cases, the SHOs and ACHP have not been afforded the opportunity to comment on potential adverse effects proposed under project designs or implemented under a variety of maintenance activities. As a result, damage to sites and project delays have occurred. Project implementation needs to include review of project designs and mitigation measures.

### Review of Heritage Monitoring Protocols and Accomplishments

Monitoring activities have been accomplished through programmatic agreements and project level Section 106 compliance inventories. During the first five years of the planning period, no planning dollars have been allotted to the heritage program at the district level to conduct post-project monitoring activities; and there has not been funding to compile and analyze field-monitoring data. For the past three years, the Forest has made a concerted effort to construct heritage site and project layers in the GIS environment. Efforts to populate the associated INFRA heritage module with data has also progressed. It is anticipated that INFREA and GIS efforts will be near completion in the fall of 2003. Completion of this effort will result in accurate monitoring data, increased efficiency in responding to compliance needs, and critical information for developing long term management objectives. Adequate funding will be needed to "clean" and maintain the heritage GIS (Geographic Information Spatial) layers and heritage INFRA database so that field-monitoring data can be entered, critically analyzed, and compiled for upward reporting.

Accomplished	FY1998	FY1999	FY2000	FY2001	FY2002
Obj 403a. Heritage Sites Interpreted	1	25	27	34	21
Obj 403c. Eligible Sites Nominated	0	0	0	0	0
Obj 403d. Heritage Inventory (Acres)	93,873	78,938	28,686	41,713	78,891

## **Monitoring Item 29: Wilderness Ecosystem Condition, Use, and Trends**

### **Objectives:**

- 1.1A-401. Actively restore Wilderness ecosystems damaged by humans to the degree feasible. Identify the processes needed to access, restore, or mitigate human-induced change.**
- 1.1A-405. Permit visitor freedom in Wilderness to the maximum extent feasible while recognizing that restrictions may be necessary to protect the quality of the wilderness experience. Take responsive actions quickly to protect the wilderness resource.**

The Black Elk Wilderness was established on December 22, 1980, with the enabling legislation Public Law (PL) 96-560, "To Designate Certain National Forest System Lands in the States of Colorado, South Dakota, Missouri, South Carolina, and Louisiana for the Inclusion in the National Wilderness Preservation System, and for Other Purposes." In 2002, through negotiations and the eventual passage of the Black Hills Fire Prevention Agreement, P.L. 107-206, Sec. 706 was signed into law on August 2, 2002, and 3,600 acres were added to the existing 9,831 acres originally established. The Black Elk Wilderness now consists of 13,431 acres and is located in Custer and Pennington counties of South Dakota, Black Hills National Forest.

Forage utilization by stock is negligible within the Black Elk Wilderness. There are no horse or cattle allotments within the wilderness, with the only stock use being day use by horseback riders. There are no suitable overnight horse campsites within the Black Elk. Most users bring their own feed and provide this at the trailhead horse campgrounds or other locations outside of the wilderness. Overnight use by hikers seldom occurs and there are no occurrences of concentrated overnight sites where soil and water impacts. Most use is day use with the resource impacts occurring on the trails from both foot and horse traffic.

According to trail monitoring counts within the Black Elk Wilderness, 60 percent of the use occurs on two trails between Memorial Day and Labor Day. These are the two main trails to the historic lookout at Harney Peak, one from Sylvan Lake and the other from Willow Creek. Most hikers entering at these portals are unaware of the wilderness concept and do not know anything about the National Wilderness Preservation System. This situation provides an excellent opportunity to introduce folks to the wilderness idea and Forest Service stewardship of this special area. To further this objective and to gain insight into the wilderness user, a wilderness self-registration effort was implemented in the fall of 2002. It is hoped current users will use this information to adapt their use and reduce adverse impacts to the wilderness resource so that an enduring resource of wilderness is provided for future generations.

A two-year sensitive plant and animal survey was completed in 2001. Four sensitive plants and six vertebrate species were inventoried within the Black Elk Wilderness.

### **Wilderness Resource:**

Forest Plan Guideline 1.1A-5103 estimates a carrying capacity of a 32,100-recreation visitor-day (RVD) level before management activities might be needed to protect the wilderness resource. In 2002, it was estimated using trail count data that 35,994 visitor days of use occurred in the Black Elk Wilderness. Initial steps to address this issue have involved implementation of a mandatory self-registration system. The objectives of the self-registration effort are to educate the wilderness user and inform them of the special restrictions that are in place and to provide information to the wilderness manager on how to efficiently and economically manage the use so that further restrictions are not necessary or are a last resort. There is also an effort to ensure the trail counter estimates of use are accurate before further management options are explored to address the use issue. In other congressionally-designated wildernesses where use has exceeded Forest Plan standards, a registration system has demonstrated positive results in making the wilderness visitor aware of

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the limitations of the wilderness resource and the steps that the visitor can take to insure his use provides for an enduring wilderness resource for future generations. (Personal communication, Craig Cope, Cloud Peak Wilderness Manager, Bighorn National Forest, August 2002)

The Black Elk Wilderness Education plan was completed and implementation began in 2001. Wilderness ethics, values, and Leave No Trace (LNT) techniques are presented during the programs conducted at campgrounds, schools, and organizations in communities throughout the Black Hills. The Hell Canyon Ranger District has also made a concerted effort through information and education efforts to redirect some trail use away from the Black Elk Wilderness. Due to the legislation and the 3,606-acre addition, the new exterior wilderness boundary has been posted along trails. Signs include advisories of incompatible uses such as mountain bikes. Larger portal signs have been relocated from interior boundary to new exterior boundaries. Some old interior boundary signs have been pulled on the west side.

Black Elk Wilderness		
Year	Visitors	Visitor-Days
1998	53,098	28,300
1999	73,000	36,500
2000	64,325	32,163
2001	61,727	30,864
2002		35,994
Annual Trend		>6.8%

### Evaluation:

Trail counts in 2002 indicated that approximately 35,994 recreation-visitor-days (RVD) of use occurred. The Forest Plan provides a guideline (1.1A-5103) of an estimated carrying capacity of 32,100 RVDs of use for the entire wilderness. The majority of trail use accounting for the 35,994 RVDs occurred on the heaviest used trail to Harney Peak, Trail 9, originating at Sylvan Lake and Willow Creek trailheads.

At this time, the trail counter data is not reliable enough to take management actions to limit use. Management activities by the Hell Canyon Ranger District include implementation of a special order covering wilderness uses and implementation of a self-registration system to improve the reliability of wilderness use estimates and assist in redirecting some use away from the wilderness where possible. The National Visitor Use Monitoring effort occurring throughout the Black Hills National Forest in FY 2003 includes a wilderness use component.

## Monitoring Item 30: Recreation Opportunities

**Objectives:**

407. Provide the following Recreation Opportunity Spectrum (ROS):

Recreation Opportunity Spectrum (ROS) (Thousands of Acres)	
Primitive	11
Semi-Primitive Non-Motorized	18
Semi-Primitive Motorized	12
Roaded Natural	1107
Roaded Natural Non-Motorized	95
Rural	1

408. Manage recreation use to stay within the capacity for the ROS class:

ROS Class	Capacity Range Recreation Visitor Days (RVDs/Acre)		
	Low	Moderate	High
Primitive	0.25	0.5	0.75
Semi-Primitive Non-Motorized	1.00	2.0	3.00
Semi-Primitive Motorized	1.50	3.0	4.50
Roaded Natural Non-Motorized	1.50	3.0	4.50
Roaded Natural	3.00	6.0	9.00
Rural	<<<< Design Capacity >>>>		

(See glossary for ROS capacity classes)

**Monitoring:**

**Recreation Activity: Recreation Opportunities across the Forest.**

The 1997 Forest Plan identified objectives for capacities of the ROS classes expressed in recreation visitor days (RVD's). No monitoring data or techniques to determine this data is available to determine the degree to which the Forest is meeting this objective.

**Evaluation:**

Recreation opportunity spectrum capacity objectives by ROS class has not been monitored, and it is doubtful of the practicality of accurate periodic monitoring of this condition.

General anecdotal evidence of how well the Forest is meeting these objectives may possibly be evident through monitoring of developed recreation use, dispersed recreation activities, and trail counter data from wilderness use.

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Activity Outputs	Units	1998	1999	2000	2001	2002
Developed Recreation	Recreation Visitor Days	342,600	339,600	331,600	326,600	321,100
Downhill Skiing	Recreation Visitor Days	4,500	4,000	*	*	*
Dispersed Recreation	Recreation Visitor Days	2,814,200	2,886,800	2,820,200	2,789,200	2,908,100
Off-road Vehicle Use	Recreation Visitor Days	74,400	75,900	77,000	73,400	80,900
Wilderness Use	Recreation Visitor Days	28,300	36,500	32,200	30,900	35,994

\* Terry Peak Ski area transferred from Forest to private land in an exchange.

### Monitoring:

#### Developed Recreation Discussion.

The backlog of deferred maintenance needs for our developed sites continues to be a major concern related to meeting Forest Plan standards for maintaining developed recreation sites. Operation and maintenance funding from appropriated dollars has been historically insufficient to meet the needs. The Forest makes use of service partners wherever possible, such as our campground concessionaire. Forestwide, our fee sites are paying for their day-to-day operation through the concession permit. Special use fees paid to the Forest from the concessionaire are re-invested into our developed sites through the Granger-Thye fee offset program. In 2002, this fee system enabled the Forest to re-invest approximately \$50,000 in permit fees back into our developed sites. The Black Hills National Forest Visitor Center overlooking scenic Pactola Lake and satellite visitor information stations at our district offices provided significant developed and dispersed recreation starting points for the visiting public.

### Evaluation:

The success of the Forest's developed recreation management program could be considered an indication that the Forest is meeting Forest Plan objectives in providing urban and roaded natural recreation opportunities within the capacity objective.

### Monitoring:

#### Dispersed Recreation Discussion.

With the Mickelson and Centennial Trails, snowmobiling, cross-country skiing, ATV and ORV routes, an established network of Forest roads and hiking trails, the Peter Norbeck Scenic Byway, a multitude of fishing opportunities at national forest lakes, and some of the best elk and deer hunting in South Dakota and Wyoming, the Black Hills National Forest continues to be a leader in providing dispersed recreation opportunities.

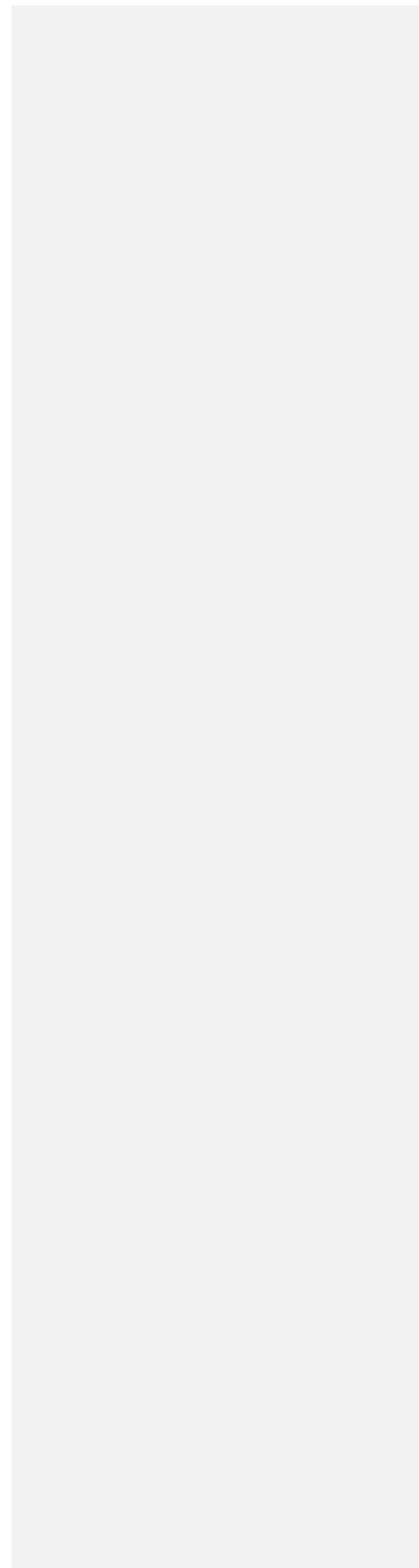
The Black Hills National Forest is well roaded. There are over 6,000 miles of federal, state, county and Forest Service roads serving 1.3 million acres of National Forest land. Because of this situation, there are limited opportunities for non-motorized or unroaded kinds of recreation experiences.

There are three official inventoried roadless areas on the Forest as established in the 1997 Revision to the Black Hills National Forest Land and Resource Management Plan. The Beaver Park roadless area on the Northern Hills Ranger District in South Dakota and the Sand Creek and Inyan Kara roadless areas on the Bearlodge Ranger District in Wyoming.

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**Evaluation:**

The dispersed recreation opportunities discussed here provide background information that the Forest is providing a wide range of ROS classes but with emphasis on roaded recreation opportunities, both roaded natural and/or semi-primitive motorized. How the Forest is doing in meeting the overall Forest Plan ROS objectives cannot be determined using the monitoring data currently gathered.



## Monitoring Item 31: Recreation Use, Trends, and Demographics

**Objectives:**

- 413. Provide interpretation, information and environmental education as an important part of outdoor recreation. Use "Tread Lightly", "Leave No Trace" and other techniques.
- 417. Coordinate trail development with the State Comprehensive Outdoor Recreation Plan (SCORP). Develop trail facilities in cooperation with other agencies and partners.
- 419. Provide for the annual designation and management of 350 miles of snowmobile trail by the States of Wyoming and South Dakota. Annual changes to the trail system should be limited.
- 422. Provide the following off-road travel opportunities:

Category	Percentage Of Forest
All Motorized Travel Allowed Yearlong	59.1%
Seasonal Restrictions Apply	22.8%
Seasonal Restrictions - No Off-road Travel	3.2%
Backcountry Motorized Recreation on Designated Trails	1.0%
Only OHV Travel Prohibited	11.4%
Motorized Travel Prohibited Except Snowmobiles	1.2%
All Motorized Travel Prohibited	1.3%

**Monitoring:**

**Objective 413.**

The Forest's interpretation, information, and environmental education efforts are monitored through the number of products offered. Recreation funding (NFRW) provided a target of 18 interpretation and environmental education products to standard, which was met and reported in the Forest's annual Management Attainment Report (MAR). These products included an aggressive interpretive sign program with interpretive panels placed at major portals to the Forest. In 2002 interpretive panels were constructed on Hwy 244, on the west side of Mount Rushmore; the southern end of the Iron Mountain Road, Highway 16A, as one enters the Forest from Custer State Park; along Highway 385 as one enters the Forest from Wind Cave National Park; and Highway 89 as one enters the Forest coming from the south. In addition, interpretive panels related to the Jasper Fire were placed along Highway 16, just west of Jewel Cave National Monument.

The Forest provided support to the Wyoming and South Dakota Project Learning Tree (PLT) programs through two grants totaling \$4,000. A \$25,000 grant was provided to the Journey Museum along with staff support to construct the Black Hills Forest exhibit in partnership with Custer State Park, South Dakota Society of American Foresters, and others. The Moon Walk program, offered by the Mystic Ranger District, presented six programs monthly during the spring, summer, and fall across the Forest with participation by all districts. The Pactola Visitor Center, located along Highway 385, was open seven days a week from the middle of May to the end of September. The Visitor Center provided information, education, and interpretation exhibits, including "Tread Lightly" messages and literature, on the Forest and its environment to over 67,000 visitors. The Center is managed by the Mystic Ranger District with funding for its operation provided entirely by recreation program funds.

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Wilderness education programs, which incorporate “Leave No Trace” messages, were presented at the Horsethief Lake campground by the Hell Canyon Ranger District on eight high use weekends during the summer. In addition, each district presented several programs to area schools and interest groups.

### **Evaluation:**

Through its Visitor Center, Moon Walks, wilderness education, and interpretive portal signs, along with other information and education efforts, the Forest continues to fully meet and exceed this Forest Plan objective. The Forest’s partnership with the Black Hills Parks and Forest Association also provided staffing assistance at the Visitor Center publications and interpretive products at Forest outlets and supplemental funding for interpretive exhibits at the Visitor Center.

### **Monitoring:**

#### **Objective 417**

The Forest continued its funding support for construction projects associated with the Mickelson Trail facilities, including trailhead work at the Mystic town-site and Dumont trailheads. Total Forest funding for the South Dakota Department of Game, Fish, and Parks managed Mickelson Trail (old Burlington railroad route) over the past ten years has exceeded one million dollars. The Forest continued work on preparing surveys for issuance of an easement for the route where it crosses National Forest System lands. The Forest continued its share of management of the Centennial Trail, a designated National Recreation Trail (NRT) that is jointly managed by Custer State Park, Black Hills National Forest, Bureau of Land Management, and National Park Service. Trail work included annual trail maintenance and trail reconstruction efforts on the portions of the trail located on National Forest System lands.

### **Evaluation:**

The Forest is meeting this Forest Plan objective through its cooperative management of the Mickelson Trail and the Centennial Trail, along with its input to the South Dakota State Comprehensive Outdoor Recreation Plan (SCORP).

### **Monitoring:**

#### **Objective 419**

The Forest continued its participation in Memorandum of Understanding (MOU) with the Wyoming and South Dakota Snowmobile Trail programs with snowmobile trails located, signed, managed, and groomed on the Bearlodge Ranger District by the State of Wyoming and on the Northern Hills, Mystic, and Hell Canyon Ranger Districts in South Dakota. The Forest issued its annual winter travel management special order, which provides for snowmobile and cross-country ski trails on the Forest.

### **Evaluation:**

This Forest Plan objective is being met through the Forest’s fulfillment of its responsibilities outlined in its MOUs with the Wyoming and South Dakota snowmobile programs.

### **Monitoring:**

#### **Objective 422**

Monitoring and evaluation of this Forest Plan objective is provided for under Monitoring Item 33 Access – Off-Road Vehicle Access.

## Monitoring Item 32: Access and Road Mileage

**Objectives:**

309. Provide the following changes to the National Forest System roads in support of long-term sustainable production of commodities.

Road Construction	280 miles/decade
Road Reconstruction	870 miles/decade
Road Obliteration	140 miles/decade
Two-track Obliteration	270 miles/decade

420. Manage travel corridors for federal, state and county roads.

- a. Meet a scenic integrity objective of high.
- b. Provide recreation facilities, trailheads, trail crossings and other road corridor components to meet demand.
- c. Include opportunities for pedestrians and bicycle ways.
- d. Use cooperative opportunities for development of outdoor facilities, such as provided for in the Intermodal Surface Transportation Efficiency Act (ISTEA) as an integral part of corridor planning.

421. Provide the following road system:

Roads (By End of the First Decade)		
Suitable for Public Use		4700 miles
Passenger Car	1200 miles	
High Clearance Vehicles	3500 miles	
Roads Closed To Vehicles		500 miles
TOTAL		5200 miles

**Monitoring:**

**Objective 309 and 421:**

The following is the status of the National Forest System (NFS) roads in FY2002:

	1996 FEIS Miles	FY98 Miles	FY99 Miles	FY00 Miles	FY01 Miles	FY02 Miles
NFS maintenance levels 1,2,3,4,5	5,204 <sup>1</sup>	5,219	5,271.0	5,281.1	5,385.1	5,397.1
NFS miles constructed	NA	13.3	21.2	1.6	2.1	7.0
NFS miles reconstructed	NA	102.0	178.1	53.6	21.3	75.7
NFS miles under Forest Service jurisdiction	4,651 <sup>2</sup>	4,655.0	4,696.0	4,706.0	4,800.0	4,812.0
NFS miles under local government jurisdiction	553 <sup>2</sup>	564.0	575.0	575.1	585.1	585.1
NFS miles obliterated	NA	0.0	27.3	18.3	19.9	0

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	<b>1996 FEIS Miles</b>	<b>FY98 Miles</b>	<b>FY99 Miles</b>	<b>FY00 Miles</b>	<b>FY01 Miles</b>	<b>FY02 Miles</b>
NFS miles open year long, seasonally for low clearance vehicles	653 <sup>2</sup>	687.0	689.0	734.0	741.0	718.0
NFS miles open year long, seasonally which are accessible to high clearance vehicles only	3,510 <sup>2</sup>	3,274.0	3,280.0	3,236.0	3261.0	3,258.0

1 –1996 FEIS, pg. II-61

2 –1996 FEIS pg. III-426

	<b>1997 Revised Forest Plan (miles/decade)</b>	<b>Accomplished FY1998 (miles)</b>	<b>Accomplished FY1999 (miles)</b>	<b>Accomplished FY2000 (miles)</b>	<b>Accomplished FY2001 (miles)</b>	<b>Accomplished FY2002 (miles)</b>	<b>Accomplished FY1998- FY2002 (miles)</b>
Road Construction	280	13.3	21.2	1.6	2.1	7.0	45.2
Road Reconstruction	870	102.0	178.1	53.6	21.3	75.7	430.7
Road Obliteration	140	~	27.3	18.3	19.9	0	65.5
Two-track Obliteration	270	24.8	34.0	23.5	32.7	6.0	121.0

**Evaluation:**

**Objectives 309 & 421.**

<b>Forest Plan Activities (Miles)</b>	<b>Percent Compliance FY1998 – FY2002</b>
Road Construction	16%
Road Reconstruction	49%
Road Obliteration	47%
Two-track Obliteration	45%
Suitable for Public Use	97%
Passenger Car	109%
High Clearance Vehicles	93%
Roads Closed To Vehicles	190%

**Monitoring:**

**Objective 420.**

The Forest Plan objective of maintaining a high SIO along federal, state, and county roads was achieved through landscape analysis and input to the Spearfish Canyon Corridor Plan and continued coordination and cooperation with other agencies and organizations, especially South Dakota Department of Transportation

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(DOT), with responsibility for management of other portions of the Peter Norbeck National Scenic Byway.

Projects initiated in 2002 involving new upgrades and additions to recreation facilities included an accessible boardwalk and bridge trail at the Horsethief Lake day use area along the Peter Norbeck National Scenic Byway. Also opportunities for scenic vistas and hazard tree removal were reviewed and planned with the input of the South Dakota DOT. Two scenic views of Mount Rushmore from historic tunnels along Highway 16A, the Iron Mountain Road, were reopened along with re-establishment of overnight camping at Grizzly Creek campground.

The Forest landscape architect provided scenic integrity input to meet scenic management objectives on timber analysis project areas including Slez, Fossil, Fanny, Canyon-Nest, Lakes, Prairie, Peak, Research-Rockford, and Hanna planning efforts. In addition, scenic integrity objectives were integrated into the Battle Creek Rapid Assessment on the Mystic Ranger District.

Opportunities for pedestrians and bicycle ways were provided through continued cooperation with the South Dakota Department of Game, Fish, and Parks in the management of the Mickelson Trail, which is closed to motorized use (except for a short section between Pilot Knob and Boxelder TH on the Northern Hills Ranger District). Annual trail maintenance dollars are distributed to the districts with emphasis on maintaining two miles of accessible trails on the Mystic and Northern Hills Ranger Districts.

The Forest annually submits project proposals to the SD DOT for funding through the ISTEA (Intermodal Surface Transportation Efficiency Act) program. Current projects in 2002 included work on the accessible fishing boardwalk at Horsethief Lake and restoration of the Peter Norbeck Monument located at the Norbeck Overlook and picnic ground. Both of these projects are located along the Peter Norbeck National Scenic Byway.

### **Evaluation:**

#### **Objectives 420.**

Through its active National Byway management efforts, participation in the ISTEA funding programs, and scenic management specialist input on timber analysis project areas, the Forest continues to meet this Forest Plan at a high level of compliance.

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**Monitoring Item 33: Access and Off-Road Vehicle Access**

Objective 422. Provide the following off-road travel opportunities:

Category	Percentage Of Forest
All Motorized Travel Allowed Yearlong	59.1%
Seasonal Restrictions Apply	22.8%
Seasonal Restrictions - No Off-road Travel	3.2%
Backcountry Motorized Recreation on Designated Trails	1.0%
Only OHV Travel Prohibited	11.4%
Motorized Travel Prohibited Except Snowmobiles	1.2%
All Motorized Travel Prohibited	1.3%

**Monitoring:**

Category	Percentage Of Forest	
	1997	2002
All Motorized Travel Allowed Yearlong	59.1	73.6
Seasonal Restrictions Apply	22.8	3.2
Seasonal Restrictions - No Off-road Travel	3.2	Unavailable
Backcountry Motorized Recreation on Designated Trails	1.0	Unavailable
Only OHV Travel Prohibited	11.4	Unavailable
Motorized Travel Prohibited Except Snowmobiles	1.2	Unavailable
All Motorized Travel Prohibited	1.3	1.0

**Evaluation:**

The Forest is working towards updating the GIS database so that accurate data runs can be conducted to determine the progress made on meeting the objectives for each of these travel management categories. A travel-management mapping effort to determine and display accurate information for public use began in 2002 and is expected to be completed sometime in 2004. Accurate acreage reporting and determination of effective area closures, which have accompanying special orders available for enforcement, will result from this mapping effort.

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**Monitoring Item 34: Access and Trail Opportunities**

Objectives.

416. Maintain and construct trails as displayed in the following table:

Non-motorized Trails (1996)	293 miles
Motorized Trails (1996)	14 miles
Non-motorized Trail Construction	204 miles
Motorized Trail Construction or Conversion from Road to Motorized Trail	15 miles
Total Forest Trail System	526 miles
Reconstruction	100 miles

417. Coordinate trail development with the State Comprehensive Outdoor Recreation Plan (SCORP). Develop trail facilities in cooperation with other agencies and partners.

418. Enhance the trail system to disperse use away from the Black Elk Wilderness.

419. Provide for the annual designation and management of 350 miles of snowmobile trail by the States of Wyoming and South Dakota. Annual changes to the trail system should be limited.

**Monitoring:**

**Objective 416.**

<b>1997 Revised Forest Plan</b>		<b>FY1998</b>	<b>FY1999</b>	<b>FY2000</b>	<b>FY2001</b>	<b>FY2002</b>
<i>Non-motorized Trails (1996)</i>	<i>293 miles</i>	<i>411.1<sup>3</sup></i>	<i>296.0<sup>3</sup></i>	<i>307.9</i>	<i>318.6</i>	<i>318.6</i>
<i>Motorized Trails (1996)</i>	<i>14 miles</i>	<i>24.6</i>	<i>24.6<sup>3</sup></i>	<i>14.2</i>	<i>14.2</i>	<i>14.2</i>
<i>Non-motorized Trail Construction</i>	<i>204 miles<sup>1</sup></i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.0</i>
<i>Motorized Trail Construction or Conversion from Road to Motorized Trail</i>	<i>15 miles<sup>1</sup></i>	<i>0.00<sup>3</sup></i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.0</i>
<i>Total Forest Trail System</i>	<i>526 miles<sup>2</sup></i>	<i>435.7</i>	<i>320.6<sup>3</sup></i>	<i>322.1</i>	<i>332.8</i>	<i>332.8</i>
<i>Reconstruction</i>	<i>100 miles<sup>1</sup></i>	<i>70.1<sup>3</sup></i>	<i>2.70</i>	<i>12.6</i>	<i>18.0</i>	<i>4.2</i>

<sup>1</sup>Per decade

<sup>2</sup>Total Miles at End of Decade

<sup>3</sup>Inventoried miles at end of FY1998 and FY1999. FY1999 reflects Mickelson Trail operation and maintenance being transferred to the State of South Dakota (115.1 miles).

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**Evaluation:**

**Objective 416.**

<b>Forest Plan Objective</b>	<b>Percent Compliance FY1998 – FY2002</b>
Non-motorized Trails	109%
Motorized Trails	100%
Non-motorized Trail Construction	0%
Motorized Trail Construction or Conversion from Road to Motorized Trail	0%
<b>Total Forest Trail System</b>	<b>79%</b>
Reconstruction	107.6%

**Monitoring:**

**Objective 417.**

See Monitoring Item 31.

**Monitoring:**

**Objective 418.**

Attempts to disperse use away from the Black Elk Wilderness involved trail improvements to the Centennial Trail, a National Recreation Trail; the Hell Canyon Trail, which was impacted from the Jasper Fire; and continued cooperation and funding of improvements, including trailheads, for the Mickelson Trail under the MOU with the South Dakota Department of Game, Fish, and Parks.

**Evaluation:**

**Objective 418.**

Trail improvements such as those identified above enhance our trail system's appeal to a wide variety of trail users looking for a variety of non-motorized experiences. It is doubtful in practical application that trail improvements outside of the Black Elk Wilderness will have any significant effect on dispersing use away from the wilderness trail system.

**Monitoring:**

**Objective 419.**

See Monitoring Item 31.

**Black Hills National Forest**

**Monitoring Item 35: Access and Right-Of-Way Acquisition**

Objective 503. Acquire approximately 25 rights-of-way each year to improve Forest access.

**Monitoring:**

Type	FY1998			FY1999		
	Cases	Miles	Acres	Cases	Miles	Acres
Acquired	6	1.4	11.04	8	1.09	10.55
FLPMA*	~	~	~	~	~	~
Forest Road Easements Conveyed	2	1.48	11.87	3	.095	4.07
Private Road Easements Conveyed	5	1.21	7.99	7	.8067	6.5
FRTA** Easements <sup>1</sup>	2	13.45	244.8	0	0	0

Type	FY2000			FY2001		
	Cases	Miles	Acres	Cases	Miles	Acres
Acquired	8	1.73	13.15	12	6.2	24.6
FLPMA*	~	~	~	~	~	~
Forest Road Easements Conveyed	3	1.10	4.7	4	3.5	14.1
Private Road Easements Conveyed	7	.95	4.9	3	6.7	26.7
FRTA** Easements <sup>1</sup>	0	0	0	0	0	0

Type	FY2002		
	Cases	Miles	Acres
Acquired	3	4.2	10.6
FLPMA*	~	~	~
Forest Road Easements Conveyed	1	.09	.69
Private Road Easements Conveyed	17	6.06	25.8
FRTA** Easements <sup>1</sup>	0	0	0

\*FLPMA - Forest Land Policy Management Act

\*\*FRTA - Forest Road and Trail Act

<sup>1</sup>Previously under special use permit that was converted to easements in 1998.

**Evaluation:**

The Forest has acquired 15 percent of the Forest Plan right-of-way objective in the first five years of the 1997 Forest Plan.

## Monitoring Item 36: Land Adjustment

**Objectives:**

- 501. Conduct approximately 500 to 1000 acres of land exchange each year over the decade, such as through purchase, exchange or donation, whenever lands meet land-adjustment criteria in Guidelines 8101 through 8104.
- 502. Provide timely response to landowner requests for access across the National Forest.
- 504. Actively seek local government and tribal government input and support for those exchanges that substantially change the balance of federal and private lands.
- 505. Work with conservation groups, state agencies and others to develop and implement cost-effective land and resource protection measures such as conservation easements, etc.

**Monitoring:**

**Land Acquired Through Acquisition.**

	FY1998	FY1999	FY2000	FY2001	FY2002
Land Adjustment Completed	Acres	Acres	Acres	Acres	Acres
Land Acquired through Purchase	~	~	~	~	259
Land Acquired through Exchange	414	479	526	170	330
Land Acquired through Donation	105	-0-	0	0	0
Total Acquired	519	479	526	170	589
Less:	~	~	~	~	~
Land Conveyed Out	255	498	575	89	176
Net Change:	+264	-19	-49	+81	+413

**Land Being Acquired Through Acquisition.**

~	FY1998	FY1999	FY2000	FY2001	FY2002
Land Adjustment Being Processed	Acres	Acres	Acres	Acres	Acres
Land Acquired through Purchase					1156
Land Acquiring through Exchange	479	894	683	617	473
Land Acquiring through Donation	0	-0-	80	80	80
Total Acquiring	479	894	763	697	1709
Less:	~	~	~	~	~
Land Conveying Out	498	723	606	641	504
Net Change:	-21	+171	+157	+56	+1205

## **Black Hills National Forest**

### **Evaluation:**

The Forest has continued to foster communication with several conservation groups and state agencies with the objective of completing land adjustment exchanges and/or conservation easements for everyone's benefit. The Forest is a member of the Black Hills Conservation Initiative, which is a partnership of private landowners, communities, state and federal agencies, and other conservation groups, to protect wildlife habitat and open space. The Forest has stressed land exchanges over conservation easements as the means to benefit the public. These exchanges can be time consuming (sometimes as long as three to five years), but the outcome of a more efficient and manageable land pattern is worth the time and effort expended on these efforts.

Landowner requests for access across the National Forest are acted on as quickly as possible. The Forest has also been given the authority to sign the permits authorizing this use. Previously, the permits needed to be signed by the Regional Office. This change will be a benefit to the public because requests can be acted on more quickly.

The Forest actively seeks input and support from local and tribal governments with respect to land exchanges. The local and tribal governments are notified early in the exchange process and asked if they have any concerns or recommendations regarding the exchange proposal. Any concerns or recommendations related are considered and evaluated throughout the exchange process. The governments are again notified during the NEPA phase of the project and again at the time of a decision being made.

**Black Hills National Forest**

**Monitoring Item 37: Economic Efficiency**

**Objectives:**

**601. Strive to reduce net costs of both market and non-market programs.**

**602. Maintain the ability to respond to budget reductions by keeping overhead and fixed costs, including salaries, at less than 70 percent of the Forest budget.**

**Monitoring:**

**Objective 601.**

		FY98	FY99	FY00	FY2001	FY2002
FUND CODE	FUND	DOLLARS	DOLLARS	DOLLARS	DOLLARS	DOLLARS
	RECREATION, WILDERNESS AND HERITAGE RESOURCES	~	~	~	~	~
	OPERATIONS	~	~	~	~	~
NFRM	Recreation Management	835,000	584,000	630,900	See NFRW	See NFRW
NFWM	Wilderness Management	79,000	28,000	23,700	See NFRW	See NFRW
NFHR	Heritage Resources	75,000	67,000	43,400	See NFRW	See NFRW
NFRW	Recreation/Heritage/Wilderness	*	*	*	908,600	894,800
	INVESTMENTS	~	~	~	~	~
CNRF	Recreation Construction	-0-	145,000	See PAFC	See CMFC	See CMFC
CNTR	Trail Construction	222,000	107,000	See PATC	See CMTL	See CMTL
PATC	Trail Construction	*	*	211,700	See CMTL	See CMTL
CMTL	Trail Capital Improvements & Mtce.	*	*	*	308,100	251,700
	WILDLIFE AND FISH	~	~	~	~	~
	OPERATIONS	~	~	~	~	~
NFWL	Wildlife	197,000	138,000	88,700	See NFWF	See NFWF
NFIF	Inland Fish	62,000	50,000	54,600	See NFWF	See NFWF
NFTE	Threatened, Endangered and Sensitive Species	28,000	48,000	32,700	See NFWF	See NFWF
NFWF	Wildlife & Fisheries Habitat Mgmt.	*	*	*	304,800	237,000
	RANGE	~	~	~	~	~

**Black Hills National Forest**

		<b>FY98</b>	<b>FY99</b>	<b>FY00</b>	<b>FY2001</b>	<b>FY2002</b>
<b>FUND CODE</b>	<b>FUND</b>	<b>DOLLARS</b>	<b>DOLLARS</b>	<b>DOLLARS</b>	<b>DOLLARS</b>	<b>DOLLARS</b>
	OPERATIONS	~	~	~	~	~
NFRG	Livestock Grazing Management	317,000	457,000	307,800	405,400	387,700
NFRV	Noxious Weeds	247,000	276,000	441,900	See NFVW	See NFVW
RBRB	Range Betterment	52,000	68,000	48,300	51,400	42,300
NFN3	Rehabilitation & Restoration	*	*	*	4,940,300	1,189,600
	TIMBER	~	~	~	~	~
	OPERATIONS	~	~	~	~	~
NFTM	Timber Management – Forest Products	4,933,000	5,109,000	3,900,400	4,921,000	7,539,100
NFFV	Forest Land Vegetation Management	467,000	140,000	100,800	See NFVW	See NFVW
	INVESTMENTS	~	~	~	~	~
CNTM	Timber Road Construction/Reconstruction	655,000	See CNRD	See PARD	See CMRD	See CMRD
	SALVAGE	~	~	~	~	~
SSSS	Timber Salvage	349,000	950,000	597,400	801,100	1,368,000
	WATER, SOIL, AND AIR	~	~	~	~	~
	OPERATIONS	~	~	~	~	~
NFSO	Watersheds	76,000	68,000	34,600	See NFVW	See NFVW
NFSI	Soil Improvement	132,000	154,000	53,600	See NFVW	See NFVW
NFVW	Vegetation & Watershed Mgmt.	*	*	*	1,361,000	835,100
TRTR	Ten Percent Road and Trail Fund	458,000	1,010,000	476,800	357,100	57,800
	MINERALS	~	~	~	~	~
	OPERATIONS	~	~	~	~	~
NFMG	Minerals	206,000	192,000	161,200	432,600	324,200
	INFRASTRUCTURE	~	~	~	~	~
	OPERATIONS	~	~	~	~	~
NFFA	Facilities Maintenance	239,000	189,000	See PAMF	See CMFC	See CMFC
PAMF	Facilities Maintenance	*	*	489,000	See CMFC	See CMFC
QMQM	Quarters Maintenance	32,000	61,000	16,900	4,900	14,800

**Black Hills National Forest**

		<b>FY98</b>	<b>FY99</b>	<b>FY00</b>	<b>FY2001</b>	<b>FY2002</b>
<b>FUND CODE</b>	<b>FUND</b>	<b>DOLLARS</b>	<b>DOLLARS</b>	<b>DOLLARS</b>	<b>DOLLARS</b>	<b>DOLLARS</b>
NFRD	Roads Maintenance	843,000	See CNRM	See PAMR	See CMRD	See CMRD
CNRM	Roads Maintenance	*	902,000	See PAMR	See CMRD	See CMRD
PAMR	Roads Maintenance	*	*	896,300	See CMRD	See CMRD
HTER	Flood Repair	66,000	1,000	-0-	-0-	-0-
HWHW	Hazardous Waste Management (Nemo)	380,000	-0-	20,000	58,600	16,400
NFRN	Facilities Maintenance - REC	*	240,000	See PAMF	See CMFC	See CMFC
DMDM	Deferred Maintenance (Title VIII)	*	*	*	349,900	See CMII
CMII	Deferred Maintenance	*	*	*	*	685,000
NFTR	Trail Maintenance	*	63,000	See PAMT	See CMTL	See CMTL
PAMT	Trail Maintenance	*	*	66,100	See CMTL	See CMTL
	<b>INVESTMENTS</b>	~	~	~	~	~
CNFA	Facility Construction	-0-	10,000	See PAFC	See CMFC	See CMFC
PAFC	Facility Construction	*	*	1,233,700	See CMFC	See CMFC
CNGP	Road Construction	105,000	See CNRD	See PARD	See CMRD	See CMRD
CMFC	Facilities Capital Improvements & Mtce.	*	*	*	1,260,400	648,800
CNRN	Road Construction	6,000	See CNRD	See PARD	See CMRD	See CMRD
CNRD	Road Reconstruction/Construction	*	1,068,000	See PARD	See CMRD	See CMRD
PARD	Road Construction	*	*	1,045,700	See CMRD	See CMRD
CMRD	Roads Capital Improvements & Mtce.	*	*	*	2,300,300	2,452,700
	<b>REAL ESTATE, PLANNING, AND LAW ENFORCEMENT</b>	~	~	~	~	~
	<b>OPERATIONS</b>	~	~	~	~	~
NFLP	Land Management Planning	240,000	115,000	See NFPN	See NFPN	See NFPN
NFPN	Land Management Planning	*	*	289,200	987,200	1,488,700
NFIM	Inventory and Monitoring	70,000	254,000	1,436,500	1,481,600	996,900
NFMP	Inventory & Monitoring (Title VIII)	*	*	*	66,600	*
NFLE	Law Enforcement	95,000	71,000	52,700	91,000	86,100
NFLA	Real Estate Management	322,000	312,000	384,600	See NFLM	See NFLM

**Black Hills National Forest**

		<b>FY98</b>	<b>FY99</b>	<b>FY00</b>	<b>FY2001</b>	<b>FY2002</b>
<b>FUND CODE</b>	<b>FUND</b>	<b>DOLLARS</b>	<b>DOLLARS</b>	<b>DOLLARS</b>	<b>DOLLARS</b>	<b>DOLLARS</b>
NFL	Landline Location	202,000	174,000	283,800	See NFLM	See NFLM
NFLM	Landownership Mgmt.	*	*	*	724,900	617,600
LALW	Land Acquisition, Land and Water	32,000	16,000	36,500	15,200	52,400
LAAQ	Land Acquisition	*	*	*	5,200	42,200
SPEP	Economic Action Program (Community Assistance)	34,000	30,000	See SPEA	See SPEA	See SPEA
SPEA	Economic Action Program (Community Assistance)	*	*	30,000	45,000	10,000
SPS6	Economic Action, Tribal YCC, Rural Community Assist.	*	*	*	20,100	40,000
SPS7	Economic Action, Fire Protection & Pilot	*	*	*	166,000	-0-
	GENERAL ADMINISTRATION	~	~	~	~	~
	OPERATIONS	~	~	~	~	~
NFGA	General Administration	1,287,000	1,498,000	981,600	*	*
	TRUST FUNDS	~	~	~	~	~
CWKV	Knutson-Vandenberg	3,320,000	2,591,000	2,678,400	1,837,400	1,509,500
RTRT	Reforestation	164,000	109,000	-0-	9,600	37,000
CWFS	Other Coop Work	603,000	432,000	298,300	131,100	130,900
NFNF	NFS-Protection and Management Reimbursements	211,000	408,000	461,800	249,500	359,200
HTAE	Federal Highway Administration Expense	7,000	13,000	12,000	10,400	7,000
NWBM1	Water System Improvements	*	82,000	*	*	*
PEPE	Timber Roads Purchaser Elective	*	371,000	37,100	55,700	273,300
SPFH	Forest Health Management, Federal Land	26,000	133,000	7,200	240,200	291,600
NFSD NFSA	Senior Community Service Employment Program	41,000	136,000	131,800	143,600	131,400
	FIRE MANAGEMENT	~	~	~	~	~
BDBD	Brush Disposal	170,000	228,000	227,200	216,100	203,700
WFPR	Fire Pre-suppression	1,676,000	2,174,000	2,738,500	3,769,500	3,478,200
WFHF	Hazardous Fuel Reduction (Title II)	362,000	451,000	810,300	952,800	2,536,900
WFW2	Hazardous Fuels Reduction (Title IV)	*	*	*	2,398,900	*

**Black Hills National Forest**

		<b>FY98</b>	<b>FY99</b>	<b>FY00</b>	<b>FY2001</b>	<b>FY2002</b>
<b>FUND CODE</b>	<b>FUND</b>	<b>DOLLARS</b>	<b>DOLLARS</b>	<b>DOLLARS</b>	<b>DOLLARS</b>	<b>DOLLARS</b>
WFW3	Rehabilitation & Restoration	*	*	*	*	1,381,000
WFSU	Emergency Suppression and Rehabilitation	812,000	941,000	6,639,600	6,663,800	10,042,400
	<b>TOTAL</b>	<b>\$20,735,000</b>	<b>\$22,664,000</b>	<b>\$28,515,300</b>	<b>\$39,046,900</b>	<b>\$40,661,000</b>

\*New or discontinued fund codes

**Receipts:**

Gross receipts before payments to counties:

	<b>FY1998</b>	<b>FY1999</b>	<b>FY2000</b>	<b>FY2001</b>	<b>FY 2002</b>
<b>DESCRIPTION</b>	<b>DOLLARS</b>	<b>DOLLARS</b>	<b>DOLLARS</b>	<b>DOLLARS</b>	<b>DOLLARS</b>
Timber	16,680,806	15,064,311	13,893,300	6,516,500	8,966,500
Grazing	117,983	117,186	118,300	106,300	116,300
Recreation - Special Uses (recreation residences)	74,499	80,198	133,900	108,200	118,200
Recreation - User Fees (admissions, outfitter guide permits)	31,213	15,546	21,500	20,400	21,400
Utility Special Use Permits	73,400	39,493	38,800	39,600	39,900
Minerals	7,294	6,304	6,800	12,500	16,000
Special Uses other than Recreation, Utilities, and Minerals	40,587	55,581	44,700	42,800	40,900
<b>TOTAL</b>	<b>\$17,025,782</b>	<b>\$15,378,619</b>	<b>\$14,257,300</b>	<b>\$6,846,300</b>	<b>9,319,200</b>

**Black Hills National Forest**

**Evaluation:**

**Objective 601.**

Program	Net Operating Costs				
	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002
	Dollars	Dollars	Dollars	Dollars	Dollars
Recreation, Wilderness & Heritage Resources Operations	-\$769,301	-\$488,182	-\$459,100	-\$697,600	-\$674,400
Recreation, Wilderness & Heritage Resources Investments	-\$222,000	-\$252,000	-\$211,700	-\$308,100	-\$251,700
Wildlife & Fish Operations	-\$287,000	-\$236,000	-\$176,000	-\$304,800	-\$237,000
Range Operations	-\$251,017	-\$407,814	-\$237,800	-\$5,290,800	-\$1,503,300
Timber Operations	\$10,276,806	\$8,865,311	\$9,294,700	\$794,400	\$59,400
Water, Soil, & Air Operations	-\$913,000	-\$1,508,000	-\$1,006,900	-\$1,718,100	-\$892,900
Minerals	-\$206,000	-\$192,000	-\$161,200	-\$432,600	-\$324,200
Infrastructure	-\$1,671,000	-\$2,534,000	-\$3,767,700	-\$3,974,100	-\$3,817,700
Planning	-\$240,000	-\$115,000	-\$289,200	-\$987,200	-\$1,488,700
Inventory & Monitoring	-\$70,000	-\$254,000	-\$1,436,500	-\$1,548,200	-\$996,900
Law Enforcement	-\$95,000	-\$71,000	-\$52,700	-\$91,000	-\$86,100
Real Estate	-\$556,000	-\$502,000	-\$704,900	-\$745,300	-\$712,200
Economic Action Programs	-\$34,000	-\$30,000	-\$30,000	-\$231,100	-\$50,000
General Administration	-\$1,287,000	-\$1,498,000	-\$981,600	\$0	\$0
Trust Funds	-\$4,372,000	-\$4,275,000	-\$3,626,600	-\$2,677,500	-\$2,739,900
Fire Management	-\$3,020,000	-\$3,794,000	-\$10,415,600	-\$14,001,100	-\$17,642,200
<b>TOTAL</b>	<b>-\$3,716,512</b>	<b>-\$7,291,685</b>	<b>-\$14,262,800</b>	<b>-\$32,213,100</b>	<b>-\$31,357,800</b>

## Black Hills National Forest

Net operating costs for Fiscal Year 2002 were \$31.4 million compared to \$3.7 million in 1998. Revenues totaling \$9.3 million in 2002, down from \$17.0 million in 1998, were affected by a decline in national timber market prices. Program costs totaled \$40.7 million in 2002 compared to \$20.7 million in 1998. In 2002, \$10 million of the expenditures were for fire suppression, compared to less than \$1 million in 1998. In 2002, \$2.5 million was expended for fire restoration and rehabilitation resulting from the 2000 Jasper Fire.

Both fire suppression and fire restoration and rehabilitation are unplanned expenses and are not annual budget items. Between 1998 and 2002, increases were seen in fire management, hazardous fuel reduction, timber management, environmental analysis, and Forest Planning. Fluctuation in programs such as fire management (\$14,000,000 in costs), changing market price for timber (a decline from \$17,000,000 in timber receipts in 1988 to \$9,000,000 in 2002), and the increased costs of environmental analysis and mitigation in project planning are a few of the factors causing increased net operating costs.

The terminology for this monitoring item (net costs) is confusing given that the timber program generates net income. A change to another unit of measure is recommended.

### Monitoring:

#### Objective 602.

Overhead and Fixed Cost As A Percent of Total Costs

	FY1998	FY1999	FY2000	FY2001	FY2002
Percentage	62%	74%	67%	56%	68%

### Evaluation:

The Forest has maintained its fixed cost to less than 70 percent of total expenditures in four of the last five years and is meeting the Forest Plan objective.

## **Update of Research Needs**

The following research needs were identified in FY2002.

1. Northern Goshawk
  - population dynamics
  - seasonal movements
  - habitat use
  - home range size
2. Distribution and abundance of sensitive snail species
3. Evaluation of mountain pine beetle epidemics as habitat for cavity nesting birds
4. Wildlife use of snags on managed ponderosa pine forests
5. Expand geographic scope of ongoing marten study in the North Zone
6. Efficient multi-species monitoring protocols

## List of Preparers

<b>Item #</b>	<b>Monitoring Item</b>	<b>Preparers</b>
Introduction	What This Document Is	Jeffrey Ulrich
	Five Year Evaluation Findings	Jeffrey Ulrich
	Forest Plan Amendments	Edward Fischer
1	Air Quality	Dean Berger
2	Soils: Productivity and Revegetation	Monte Williams
3	Soils: Revegetation	Monte Williams
4a	Watershed Assessment	Monte Williams
4b	Riparian – Wetland Assessment	Monte Williams
4c1	Stream Health – Water Quality	Monte Williams
4c2	Stream Health Range – Stream Habitat Integrity	Monte Williams
4d	Best Management Practices	Monte Williams
5	Water Quantity	Monte Williams
6	Riparian/Wetland: Riparian Habitat Restoration	Monte Williams
7a	Vegetative Diversity – Species Composition	Craig Beckner; Steve Hirtzel
7b	Vegetative Diversity Structure	Blaine Cook
8	Vegetative Diversity – Late-succession	Cara Staab
9	Vegetative Diversity - Snag Retention	Cara Staab
10	Vegetative Diversity - Thermal Cover	Cara Staab and Ron Calvird
11	Down/Dead Woody Material	Cara Staab
12	Commodity Production – Growth Rate	Craig Beckner and Blaine Cook
13	Regeneration	Blaine Cook
14	Timber Production	Blaine Cook
15	Commodity Production - Forage Production	Craig Beckner
16	Commodity Production – Rangeland Trend	Craig Beckner
17	Forage Utilization	Craig Beckner
18a	Sensitive Species: Plants	Deanna Reyher and Reed Crook
18b-j	Sensitive Species: Animals	Cara Staab
19	Noxious Weeds	Craig Beckner
20a	Pine Beetle Susceptibility	Blaine Cook and Kurt Allen
20b	Pine Beetle Levels and Trends	Blaine Cook and Kurt Allen

**Black Hills National Forest**

<b>Item #</b>	<b>Monitoring Item</b>	<b>Preparers</b>
20c	Insect and Disease Evaluations	Blaine Cook and Kurt Allen
21	Exotics	Blaine Cook and Kurt Allen
22	Fuel Loading Hazard	Dean Berger
23	Fuel Treatment	Dean Berger
24a	Fire Suppression	Dean Berger
24b	Fire Prevention	Dean Berger
25	Wildlife – Threatened and Endangered	Cara Staab
26	Wildlife – Habitat Capability and MIS	Cara Staab and Steve Hirtzel
27	Scenic Integrity	Steve Keegan
28	Heritage Resources	Dave McKee
29	Wilderness Ecosystem Condition, Use and Trends	Rick Hudson
30	Recreation Opportunities	Rick Hudson
31	Recreation Use, Trends and Demographics	Rick Hudson
32	Access: Road Mileage	Craig Kjar
33	Access: Off Road Vehicle Access	Rick Hudson
34	Access: Trail Opportunities	Craig Kjar
35	Access: Right-of-Way Acquisition	Glenn Kostelecky
36	Real Estate: Land Adjustment	Glenn Kostelecky
37	Economic Efficiency - Cost	Jeffrey Ulrich

## Black Hills National Forest

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