United States
Department of
Agriculture

Forest Service

Beaverhead-
Deerlodge
National Forest

FOREST PLAN MONITORING AND EVALUATION REPORT

Fiscal Year 2005

Cover Photo: South Boulder River, Tobacco Roots, Janet Bean-Dochnahl.

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Forest Plan Monitoring & Evaluation Report
Fiscal Year 2005

Introduction

This Forest Plan Annual Monitoring Report provides an account of the management activities of the Beaverhead-Deerlodge National Forest (BDNF) for Fiscal Year 2005 (October 2004-September 2005). Monitoring and evaluation are tools the Beaverhead-Deerlodge National Forest uses to assess whether we are accomplishing the goals and objectives set forth in the Forest Plans. The results provide Forest line officers and employees, Regional and Washington offices, Congress, and the public with information on the progress and results of implementing the Forest Plans.

Over the 19 years since implementation of Forest Plans, evaluation of data has been leading us closer to initiating Forest Plan revision. In 2002, this Forest began the process of revising the two Plans and consolidating them into one Plan. An important step preparing for Revision was to review the findings from a dozen previous Forest Monitoring and Evaluation Reports along with other information to determine which parts of the plan are in greatest need of revision. We know much of our current Plans direction (goals, objectives, outputs and costs) and the related monitoring items will be changing soon with the revised Plan. This year's monitoring effort recognizes that fact. "Evaluation" refers to the detailed discussion provided in the draft Analysis of the Management Situation (2002).

Monitoring information for the BDNF is presented in two separate reports because we still follow two separate Forest Plans until Plan Revision is complete. At that point, late in 2007, we will have a single Forest Plan for the BDNF. Until then, monitoring requirements are unique (though sometimes overlapping) for the Beaverhead and Deerlodge portions of the Forest. For some monitoring items, data is collected for the entire Forest and cannot be broken out by unit. This is noted as Forestwide data, where that is the case. The Beaverhead Report is presented first, then the Deerlodge. A separate Table of Contents and Summary of the monitoring items by Forest is presented at the beginning of each Forest Report.

List of Preparers

Resource	Name and Position
Appeals and NEPA	Cindy Tencick, Appeals and Litigation Coordinator
Economics, Emerging Issues	Janet Bean-Dochnahl, Planner, Social Science
Facilities, Transportation	Craig Simonsen, Transportation Planner
Fire	Tammy Clark, Fire Management Officer
Fisheries	Jim Brammer, Fisheries Biologist
Heritage Resources	Mike Ryan, Archaeologist
Insect and Disease, Research	Robert Wooley, Forest Ecologist
Minerals	Dan Avery, Geologist
Noxious Weeds	Robert Wooley, Forest Ecologist
Old Growth	Art Rohrbacher, Wildlife Biologist
Range	Grant Godbolt, Range Management Specialist, Juanita Miller, Resource Assistant
Recreation	Patty Bates, Recreation/Lands/Eng Staff Officer
Research	Robert Wooley, Forest Ecologist
Riparian and Watersheds	Bryce Bohn, Dave Salo; Hydrologists
Roadless	Janet Bean-Dochnahl, Planner, Social Science
Soils	Dan Svoboda, Dave Ruppert, Karen Gallogly; Soil Scientists
Timber	Rick Henningsen, Timber Management Officer, Cathy Frey, Timber Resource Specialist
Wildlife	Art Rohrbacher, Wildlife Biologist
Wilderness	Jonathan Klein, Recreation Tech; John Ericson, Recreation Forester

COORDINATORS: Peri Suenram, Planning Staff Officer, Janet Bean-Dochnahl, Planner

WRITER/EDITOR: Sharon Sawyer, Program Analyst

APPROVAL: Bruce Ramsey, Forest Supervisor

BEAVERHEAD NATIONAL FOREST

Summary of Observations

Monitoring items are summarized in this table by item number, activity monitored, and the summary observation.

Table 1. Summary of Monitoring Items for Beaverhead Unit

Item Number	Title	Observation
1-1	Elk Population Trend	Virtually all State Elk Management Units (EMUs) on the Forest have reached or exceeded State population goals
1-2	Elk Winter Range Forage	Elk populations on the Forest are robust. Winter range is not limiting
1-3	Big Game Population Trend	Big game populations are very healthy and abundant on the Forest
1-4	Big Game Winter Range	Big game winter range conditions are still supporting very healthy populations
1-5	Habitat improvement	All habitat improvement targets met or exceeded. Wildlife habitat improvement in FY05 focused on the eradication of noxious weeds
1-6	Sage Grouse	The Forest continues to use the Connelly (2000) guidelines to manage for sage grouse where appropriate. Current knowledge continues to show the greatest challenges and opportunities for sage grouse conservation in southwest Montana are found on private, State and BLM lands
1-7	Trumpeter Swan	The Conklin Lake site remains consistently active
1-8	T&E Species	Existing listed species continue to be evaluated for all NEPA projects. Listed species continue to do well on the Forest
1-9	Cavity Nesting Habitat	The large snag component is well represented across the Forest. Mountain pine beetle outbreaks are increasing the total snag component on a daily basis
1-10	Habitat Effectiveness	Wildlife security, as measured by road density, is not an issue for the Beaverhead NF
1-11	Diversity of Plan Communities	Old growth inventory is well within the Plan requirements
2-1	Fisheries Habitat Improvement	We accomplished fisheries habitat improvement at a much higher level than estimated in the Forest Plan
2-2	Fisheries Indicator Species	Densities of westslope cutthroat trout measured in Browns Creek in 2005 are high, but because of the up and down nature of the populations in Browns Creek, a trend is not easily discernable. Substantial fluctuations in the densities of grayling

Item Number	Title	Observation
		in the upper Ruby River are beyond what is desired
2-3	Fisheries Riparian Habitat	Ten years of trend data on 59 streams randomly selected across the Forest were analyzed in 2005. Forty four percent of the 59 stream reaches improved in condition. They are in an upward trend
3-1	Sediment Production	No monitoring was conducted for this item in 2005 on the Beaverhead unit. Monitoring now focuses on tracking changes in stream condition (see Item 2-3)
3-2	Watershed Standards	No specific monitoring of timber sale standards was conducted in 2005. Monitoring now focuses on tracking changes in stream condition in grazing allotments
3-3	BMP effectiveness	No specific monitoring of timber sales was conducted in 2005
4-1	Soil Displacement/ Organic Residue	Field data collection for soil displacement and organic residue on timber sales was limited to the Deerlodge zone in FY05
5-1	Recreation Use	The most current survey data is from 2000, which was published in the FY03 Monitoring and Evaluation Report
5-2	Wilderness Compliance	The Lee Metcalf Wilderness was not managed to standard. We lack an education plan, zoning and limits of acceptable change standards, and reliable use data. The Anaconda Pintler Wilderness Area was managed to standard
5-3	Roadless Acres	No management activity took place in 2005 which would change roadless character
5-4	Facility Access	All projects comply with requirements for access for people with disabilities
5-5	Historic Preservation	All management actions were carried out in compliance with the Region 1 Heritage Program Programmatic Agreement
6-1	Forage Utilization	Total actual use by livestock was 132,643 AUMs, 70% of the capacity projected in the Forest Plan
6-2	Range Improvements	95% of the structural and 115% of non-structural improvement targets were met
6-3	Noxious Weeds	7,635 acres of noxious weeds were treated in 2005 under all funding sources
6-4	AMP Updates	No AMPs or AMP updates were completed in 2005, two projects were underway
6-5	AUM Outputs	132,643 AUMs were grazed, about 70% of the 1986 plan estimate
7-1	Timber Sold	A total of 5.5 MMBF was offered and 5.5 MMBF was sold in

Item Number	Title	Observation
		FY2005
7-2	Timber Harvested	Timber was sold from 414 acres, approximately 24 percent of acres projected in the Forest Plan
7-4	Silvicultural Treatments	No cultural practices were accomplished in FY 2005
7-5	Natural Regeneration	No even aged harvests requiring regeneration were scheduled over the last 6 years
7-6	Silvicultural Practices	Contrary to silvicultural assumptions, the FY2005 harvest was 100 percent uneven-aged and commercial thins
8-1	Roads	No new permanent (system) roads were constructed; 16.2 miles of existing roads were reconstructed on the Beaverhead-Deerlodge; 3.5 miles of system roads were obliterated
8-2	Road Restrictions	There are approximately 328 miles of National Forest System Roads closed year-round to standard highway vehicles, and 867 miles closed seasonally
8-3	Trail Management	The Beaverhead Forest Plan scheduled trail construction/reconstruction projects are completed. Accomplishment of this monitoring item is now measured by whether targets are met. Targets were met in FY05
8-4	Road Management	Full maintenance was accomplished on approximately 464 miles of road
8-5	Exterior Access	No exterior access roads were constructed or reconstructed in FY 2005
9-1	Insect and Disease Protection	Aerial surveys show that insect infestations grew from 102,867 acres in FY04 to 261,200 acres in FY05
10-1	Economic Assumptions	The actual costs of preparing, offering and selling timber have been notably higher than Forest Plan projected costs since as early as 1988
10-2	Economics—Timber Values	Plan predictions made prior to 1986 are no longer valid. Timber values are being reassessed during Forest Plan Revision
10-3	Budgets	Budget expenditures in FY05 were within 5% of Forest Plan projections when converted to 2005 dollars. The outlook for Forest Service budgets over the next 5 years is declining or stable
11-1	Local Economies	Forest Service contributions to jobs are up 6% from 2004 in the 8 county area affected directly by BDNF management. Forest Service activities can account for 1,624 jobs out of a pool of 45,836 jobs in the area

Item Number	Title	Observation
11-2	Impacts on Management	Other agencies and private landowners continue to affect BDNF management, particularly in the arena of threatened or endangered wildlife and species of concern, travel management and fire management
11-3	Emerging Issues	The Analysis of the Management Situation addresses those issues not resolved or adequately addressed by the Forest Plan
12-1	Land Allocations	The question of whether allocation of suitable lands made in 1986 continues to be appropriate is being reevaluated during the Forest Plan Revision process
12-8	FP Data Base	Forest Plan data bases were updated extensively for the analysis conducted for Forest Plan Revision
13-1	Appeals	Two projects were appealed in FY05. Appeals were withdrawn on one and the decision was affirmed by the Regional Office on the second

Wildlife

Item 1-1: Wildlife—Elk Population Trend

Activity: How are elk populations responding to the provided NF habitat capacity?

Unit of Measure: Number of elk

Reporting Period: 5 years

Variability which would initiate further evaluation: ± 10% deviation from projected capacity

Monitoring Results: Virtually all State Elk Management Units (EMUs) encompassing the Forest have reached or exceeded State population goals. The Beaverhead-Deerlodge National Forest (BDNF) is the most heavily hunted area in the State. Elk numbers for those hunting districts encompassed by the forest exceed 28,000 elk (2003 Montana Fish Wildlife and Parks (FWP) winter counts). Thirteen of the 29 hunting districts encompassed by the forest are open to non-quota cow elk hunting to reduce herd numbers.

Evaluation: The total elk population on the Beaverhead-Deerlodge NF virtually matches the total population objective, 28,000 versus approximately 30,000 in the State Elk Management Plan (2005). Distribution is uneven, however, with some hunting districts greatly exceeding objectives and other hunting districts below State objectives. Elk populations, however, are controlled by the FWP. In recognition of local increases in populations, the State has instituted either sex elk harvest in 2004, 2005, and for the upcoming 2006 season to reduce elk numbers. Thirteen of the 29 hunting districts wholly or partially within the forest are open to non-quota either-sex elk hunting.

Item 1-2: Wildlife—Elk Winter Forage

Activity: Is there adequate forage available to sustain the projected big game (elk) population?

Unit of Measure: acres

Reporting Period: 5 years

Variability which would initiate further evaluation: 10% of Allotment Management Plans (AMPs) do not meet Forest Plan standards for utilization of seasonal range; 10% decline in acres by condition or trend.

Monitoring Results: Neither range allotment monitoring nor the revised Montana State Elk Management Plan have documented winter range forage issues. The State plan in particular has not identified any hunting districts with concerns for winter range forage. The random sample allotments examined for the BDNF 2005 Range Review included the Brown's-Cherry C&H, Mussigbrod C&H, Standard Creek, Burnt Basin, and Simpson Creek allotments.

The reviews are generally focused on implementation of riparian standards, but implementation of upland and winter range utilization standards are also checked. The team review concluded that upland utilization standards are generally being met. *Source: FY2005 BDNF Range Review, October 28, 2005 Summary, R. Wooley, located in Project File.*

Evaluation: Allotment management is meeting utilization standards for seasonal range and forage is more than adequate for wintering elk. The revised State elk management plan (2005) has not identified winter range issues for national forest lands

Item 1-3: Wildlife—Big Game Population Trend

Activity: How do populations respond to National Forest habitat capacity?

Unit of Measure: Number of animals by species

Reporting Period: 5 years

Variability which would initiate further evaluation: ± 10% deviation from projected capacity.

Monitoring Results: No Forest-wide big game population monitoring is conducted by Forest Service personnel. Forest Service biologists coordinate with Montana Fish, Wildlife and Parks (FWP) forest-wide population objectives which are currently contained only in the revised Montana State Elk Management Plan (2005). There is no breakdown for numbers on Beaverhead-Deerlodge National Forest lands alone.

With the exception of whitetail deer which are found predominantly on bottom lands outside the forest, big game summer ranges are located on National Forest lands in southwest Montana. Current FWP big game population data are as follows across all ownerships for those hunting districts that overlay the BDNF:

Table 2. FWP Big Game Population Data

Big Game Animal	Population Estimate
Moose	stable/ population estimated at 1330
Elk	stable-increasing/ population estimated at 28074
Whitetail Deer	stable/ population estimated at 15669
Mule Deer	stable-increasing / population estimated at 27550
Mountain Goats	stable-increasing / population estimated at 2100
Big Horn Sheep	stable-increasing / population estimated at 758
Black Bears	stable / population estimated at 3089

Population data was extracted from the FWP web site monitoring data by hunting district (http://fwp.mt.gov/hunting/planahunt/).

Evaluation: Big game populations are very healthy on the Forest and in some instances (elk) are exceeding State objectives. Habitat is not limiting. FWP is instituting either-sex hunter harvest of elk to reduce numbers. Limited either-sex harvest of mule deer is also being instituted for some hunting units to control numbers. The State also provides multiple tags for both residents and non-residents to harvest doe whitetail deer.

Item 1-4: Wildlife—Big Game Winter Range

Activity: Are winter range conditions being maintained or improved?

Unit of Measure: Acres

Reporting Period: 5 years

Variability which would initiate further evaluation: ± 10% decline in acres by condition or trend in five-year period.

Monitoring Results: No Forest-wide monitoring by Forest Service has occurred. Some snowmobile issues have been identified in the Boulder River area on elk range. Moose displacement by snowmobiles has been identified in the West Fork Madison River drainage. As noted at item 1-2 and 1-3, upland forage utilization standards are retaining forage for big game and State monitoring indicates stable to upward trends.

Evaluation: There are no indications that current winter range conditions have declined more than 10% or are limiting populations of big game. Big game winter range conditions are still supporting very healthy populations. The Draft Revised Forest Plan proposes some additional snowmobile use restrictions heavily based on winter range protection from motorized disturbance. (See the Draft Revised Land and Resource Management Plan, DEIS, Alternative 5 winter non-motorized allocations in West Fork Madison and Boulder River, I-15 Corridor and Boulder River-Sheepshead Management Areas).

Item 1-5: Wildlife—Habitat Improvement

Activity: Were scheduled habitat improvement projects accomplished?

Unit of Measure: Acres (and Structures)

Reporting Period: 5 years

Variability which would initiate further evaluation: Less than 90% accomplished over 5-years.

Monitoring Results: All habitat improvement targets were met or exceeded. Wildlife habitat improvement in FY05 focused on the eradication of noxious weeds. Actual accomplishment (1637 acres) was 298% of the assigned target. The wildlife program achieved significant economies of scale by partnering with the range program in eradicating noxious weeds.

Evaluation: This monitoring item is outdated. Habitat improvement projects were scheduled in Appendix P of the 1986 Forest Plan for the years 1986-1990 only. As those projects were completed, new habitat improvement projects were scheduled based on targets and need. We have consistently met targets within budget constraints. No further evaluation is required.

Item 1-6: Wildlife—Sage Grouse

Activity: Indicator species for sagebrush dependent species

Unit of Measure: Number of animals

Reporting Period: 5 years

Variability which would initiate further evaluation: More than 10% decline in population in 5-year period.

Monitoring Results: We are involved in several efforts to learn more about sage-grouse on the Forest. A Challenge Cost Share (CCS) project with Montana State University is being completed in Big Sheep Creek basin. Over 25,000 acres of habitat are being inventoried and birds are being trapped and monitored. A CCS inventory with National Wildlife Federation in 2005 documented 12 sage grouse broods and 30 separate adults in the Gravelly and Big Hole landscapes. Besides the projects with MSU and National Wildlife Federation, we are an active party in the Dillon Sage-grouse Working Group and were active in developing the Statewide Sage-Grouse Management Plan. “Guidelines to Manage Sage-grouse Populations and Their Habitats”, Connelly, Schroeder, Sands and Braun, 2000, is being used in allotment plan revisions to meet sage-grouse needs. Forest specialists have modeled sage-grouse habitat using Connelly (2000) guidelines to determine possible extent of available habitat on the Forest. See the table below for results. There is still no documented breeding or nesting on BDNF lands.

Table 3. BDNF Sage Grouse Habitat

Sage Grouse Habitat	All Acres	BDNF Acres/%
Nesting	1,900,915	259,290/13.6%
Brood Rearing	298,810	76,460
Total	2,190,725	335,750/15.3

Evaluation: We do not have an accurate count of the number of sage-grouse on BDNF lands so cannot establish a trend over the last 5 years. However, based on the information developed over the last 10 years from FWP breeding survey data and the habitat model described above, we know BDNF lands are not used as leks, nesting areas or wintering grounds. These are the areas critical for population maintenance. Summer dispersal upslope onto the Forest has been

documented. Modeled grouse habitat for SW Montana shows the main challenges and opportunities for sage-grouse conservation occur on State, BLM, and private lands.

The Forest continues to use the Connelly (2000) guidelines to manage for sage grouse where appropriate. Current knowledge continues to show that the greatest challenges and opportunities for sage grouse conservation in southwest Montana are found on private, State and BLM lands.

Item 1-7: Wildlife—Trumpeter Swan

Activity: Indicator species for marshland dependent species

Unit of Measure: Number of active nests

Reporting Period: 5 years

Variability which would initiate further evaluation: More than 10% decline in numbers in 5-year period.

Monitoring Results: The single nest site at Conklin Lake on the Madison RD remains unchanged. The lake is an in-holding of private ownership in the SE portion of the Gravelly landscape. This nest area was active again in 2005. It is unknown if any cygnets were successfully fledged.

Evaluation: There is no known change in swan nesting on the Forest

Item 1-8: Wildlife—Threatened and Endangered Species

Activity: Bald eagle, peregrine falcon, gray wolf, grizzly bear

Unit of Measure: Acres of habitat: number of animals

Reporting Period: 5 years

Variability which would initiate further evaluation: Any measure of decline in habitat.

Monitoring Results:

Bald Eagle – 15 nests have been documented on the Forest. All nests are on or near the Madison RD in the Madison River drainage. Nesting appears to be annually consistent along the Madison River drainage. While there are incidental observations of birds on the Wisdom, Wise River, Pintler and Madison Districts, the latter encompasses all the known nesting on the Forest.

Peregrine Falcon - While peregrine falcon has been de-listed (August 1999), there are Peregrine falcons are known to nest on the south half of the Beaverhead-Deerlodge Forest near Hidden Lake in the Gravelly Range and in the nearby Centennial Valley. Fledgling production for 2005 is unknown.

Gray Wolf – Approximately 9 wolf packs totaling 60 wolves are active across the Forest. Both numbers of packs and numbers of animals have varied due to control efforts on those wolves that have preyed upon livestock. Gray wolves are identified as non-essential/experimental for all but a small portion of the Forest north of I-90. Packs are definitely increasing, particularly west of Dillon with notable wolf activity occurring in the Big Hole.

Grizzly Bear – The Gravelly landscape is now considered occupied by grizzly bears. This encompasses approximately 500,000 acres. The entire landscape is now subject to a special order prescribing food storage and sanitation requirements to minimize human/bear conflicts. Grizzly bears are expanding in the Greater Yellowstone Ecosystem which encompasses portions of the Forest. The Fish & Wildlife Service will soon propose de-listing of the bear. Bear sightings have

been documented in the southern portion of the landscape in the Fish Creek area, and further north in the Geyser Creek drainage. The Greater Yellowstone Grizzly Bear EIS is amending the forest plan to facilitate the de-listing of the bear.

Canada lynx – This species was on the Forest T&E list in 2005. The national lynx survey did not confirm occupancy for the BDNF. Lynx habitat mapping has been done for the entire Forest. The most recent Fish & Wildlife Service list (7/17/06) for the Forest no longer shows this species for the BDNF

Evaluation: There has not been any measured decline in habitat for bald eagle, peregrine falcon, gray wolf, grizzly bear or lynx. Wolves and grizzly bears in particular continue to show increases. No further evaluation is required.

Item 1-9: Wildlife—Cavity Nesting Habitat

Activity: Cavity nesting habitat management

Unit of Measure: Number of snags per acre

Reporting Period: 5 years

Variability which would initiate further evaluation: Snag level 10% below Forest Plan standards.

Monitoring Results: Improved FIA analysis shows slight changes in large snag densities by landscape. FIA monitoring shows widespread distribution of larger snags across the Forest. This snag inventory is considerably above the Beaverhead plan requirements of 1.0 – 2.5 snags per acre at the compartment scale (P.II-29 Beaverhead Plan 1986).

Table 4. Snag Density by Landscape

LANDSCAPE	SNAGS PER ACRE >10”DBH
Pioneer	**6.8**
Big Hole	**8.4**
Upper Rock Creek	**11.8**
Clark Fork – Flints	**4.3**
Upper Clark Fork	**2.2**
Boulder River	**4.4**
Jefferson River	**3.8**
Tobacco Roots	**8.9**
Gravelly	**8.7**
Madison	**10.6**
Lima Tendoy	**4.9**

Evaluation: Snag standards are exceeded forestwide at the landscape scale. FIA is the best statistical inventory tool currently available, although it still does not provide information at the compartment scale identified in the 1986 plan.

Item 1-10: Wildlife—Habitat Effectiveness

Activity: Security Cover/Road Closures

Unit of Measure: Effective cover percentage

Reporting Period: annual

Variability which would initiate further evaluation: Any change in projection below 70% effective cover.

Monitoring Results: This topic has not changed from the 2004 discussion.

Some of our Habitat Analysis Units (HAUs) fall below the 70% elk effective cover standard even before management activities like harvest or roading take place. The Beaverhead-Deerlodge Analysis of the Management Situation, 2002, identified several problems with the use of elk effective cover analysis as established in the 1986 Forest Plan. Habitat effectiveness was designed as a measure of elk summer range security.

State Elk Management Units were not compatible with the scale of management units (Habitat Analysis Units (HAU)) described in the Plan. Alternatives being considered for Forest Plan Revision address more effective and meaningful measures for elk security – they focus largely on road density. This monitoring item was designed to assure elk security which would lead to elk population stability. As noted in the narrative at item 1.1 all Elk Management Units that encompass portions of the Forest have reached or exceeded State objectives for herd population, hunter numbers, and hunter recreation days. This is with the existing road densities and road management objectives. The single most important factor in habitat effectiveness is open, motorized roads/trails. The 70% habitat effectiveness (HE) level HE elk equates to slightly less than 1.0 miles/sq mi of open motorized roads/trails.

Ten of the 29 hunting districts encompassing the forest exceed 1.0 mi/sq mi of open motorized roads/trails during the fall hunting season. This is the period when elk are subjected to the most disturbances. Only four hunting units exceed 1.5 mi/sq mi which equates to approximately 50% HE. This is the minimum HE recommended by Christensen et al (1993) where elk are one of the primary resource considerations.

Evaluation: Some of our Habitat Analysis Units fall below the 70% standard in their natural condition, before any management activity takes place. It was apparent soon after the original Forest Plan was signed that further evaluation of this item would be required. Recommendations for improving habitat effectiveness standards were made through the Five Year Review (1992) and the Analysis of the Management Situation (2002) and Alternatives in the Forest Plan Revision DEIS (2005). However, the intent of this monitoring item is to assure secure habitat for elk which would lead to elk population stability. Using current road density measurements and elk population levels as an indicator, that security is being provided. At the hunting district scale, there is little need for concern about adequate habitat effectiveness based on open motorized roads/trails. As discussed at items 1-1 & 1-3 elk populations are very robust across the Forest.

Item 1-11: Wildlife—Diversity of Plant Communities

Activity: Diversity of plant communities (old growth habitat acres) habitat for old growth dependent species (pine martin, goshawk)

Unit of Measure: Acres

Reporting Period: 5 years by District; 10 years Forest-wide

Variability which would initiate further evaluation: Anything less than Forest Plan standards.

Monitoring Results: Updated Forest Inventory Analysis (FIA) data indicates an old growth component well within the historic range of variation.

Table 5. Estimates of Probable Forestwide Old Growth by Dominance Type

Beaverhead-Deerlodge Dominance Group	Standard Error	90% Confidence Interval Lower Bound	Percent Old Growth	90% Confidence Interval Upper Bound
Douglas-fir, Ponderosa Pine, Limber Pine	**3.0**	**15.6**	**20.4**	**25.4**
Engelmann-Spruce Subalpine fir	**5.0**	**28.1**	**36.1**	**44.4**
Lodgepole pine	**2.0**	**13.7**	**17.0**	**20.4**
Whitebark Pine	**5.3**	**26.0**	**34.7**	**43.6**
Other	**5.6**	**18.6**	**27.6**	**36.9**

The distribution of old growth by landscape has yet to be revised to reflect the current percentages.

Evaluation: Old growth is not in short supply on the BDNF, levels exceed Forest Plan standards.

Fisheries

Item 2-1: Fisheries—Habitat Improvements

Activity: Were scheduled habitat improvement projects determined necessary and accomplished?

Unit of Measure: Acres, Miles

Reporting Period: Annual

Variability which would initiate further evaluation: Less than 90% accomplishment in 5 years.

Monitoring Results: The Forest Plan lists an average annual workload of 5 acres of fish habitat improvement per year. Actual targets assigned according to budget allocations from the Regional Office averaged 39.6 stream miles and 7.2 lake acres improved per year. Average accomplishments from FY2001 through 2005 were 37.4 stream miles and 7.8 lake acres improved for an average accomplishment of 94.4 and 108% respectively.

Fisheries improvements focused on federally listed and sensitive fish and amphibian species on the Forest. Projects included grayling restoration in the Upper Ruby River, expansion of westslope cutthroat trout populations; non-native fish removals to reduce competition with westslope cutthroat trout, bank stabilization, in-stream channel enhancement, removal of fish passage barriers, riparian protection, and enhancement and stabilization of a boreal toad breeding sites.

Completed projects were appropriately consistent with National Forest Service and Forest Plan direction. They were beneficial in promoting aquatic TES conservation and restoration in Southwestern Montana.

Evaluation: The rate of accomplishment was greater than 90%. No additional evaluation is necessary.

Item 2-2: Fisheries—Indicator Species

Activity: Indicator Species—westslope cutthroat trout (WCT) and fluvial arctic grayling

Unit of Measure: Number of fish

Reporting Period: 5 years

Variability which would initiate further evaluation: Measurable declines in populations.

Monitoring Results:

Westslope Cutthroat trout: A number of streams were inventoried in 2005 to determine cutthroat trout population characteristics. Sampling objectives focused primarily on genetic purity and not on population densities. Only inventories in Browns Creek, in the Horse Prairie Creek drainage, were sampled in a way that allowed comparison of fish densities, over time.

We commonly use two electrofishing procedures to quantify fish densities in a stream. A single electrofishing pass (commonly referred to as a 1-pass sample) allows biologists to compare densities by looking at "the number of fish caught per unit of effort". Effort is most often standardized to sampling distance. In Table 2-2 this is expressed as the number of cutthroat caught per 100 meters of stream. To estimate the *total* number of fish present, multiple electrofishing passes are made over the same stream reach and all fish are temporarily removed and held. The rate that fish are depleted from the reach allows an actual estimate to be made. Because the number of electrofishing passes made in Browns Creek were not the same between reaches or years, two types of results are used in the table. This was done to provide a comparison of WCT densities between 1997, 2002 and 2005.

Table 6. Comparison of Westslope Cutthroat Trout Densities in Browns Creek

Stream Segment	Cutthroat Density fish/100 meters 1997	Cutthroat Density fish/100 meter 2002	Cutthroat Density fish/100 meters 2005
Reach 1	**--**	**(8)**	**(23)**
Reach 2	**(41) 50** [a]	**17**[b]	**86** [b]
Reach 3	**(80)109** [b]	**(13)**	**(61) 90** [a]
Reach 4	**(38) 39** [b]	**(7)**	**(26) 38** [b]

a*-an estimate of the total number of cutthroat in 100 meters of stream was extrapolated from one pass electrofishing data to allow comparison with data from other years. Capture efficiency used to determine estimate was an average of those from Reaches 3 and/or4.*
b *the total number of cutthroat was determined from multiple electrofishing passes within the same stream reach.*

Three stream segments (reaches) in Browns Creek were electrofished in 1997. Another effort in 2002 resulted in 4 reaches being electrofished. In 2005 the same 4 reaches were re-sampled. There was substantial variation between years. Data from 2002 indicated a significant reduction in cutthroat densities from 1997, only to have them rebound substantially by 2005. Numbers in parentheses represent the cutthroat captured in one electrofishing pass in 100 meters of stream. Numbers without parentheses represent an estimate of all cutthroat present in 100 meters of stream.

Fluvial Arctic Grayling: Recovery of the Big Hole River grayling population has been a focus of management efforts for Montana Fish, Wildlife and Parks (MFWP) since the early 1990s. The Beaverhead-Deerlodge National Forest has been a partner in data collection and restoration efforts from the beginning. However, except for occasional forays by a few fish into a couple of tributary streams, the grayling in the Big Hole drainage are nearly all downstream of the Forest Boundary. The most significant role of the Beaverhead-Deerlodge Forest in recovery of Big Hole grayling is to ensure land management actions don't inhibit recovery objectives in the River. Declines in the Big Hole grayling population have occurred over the last 7 to10 years. They are primarily attributed to drought, low stream flows, high water temperatures and habitat limitations in the River. Trends in grayling numbers have not been attributed to current Forest management.

Kaya (1992a) identified the upper Ruby River as a potentially suitable stream for fluvial arctic grayling reintroduction, due to its size, low gradient and because it contained relatively low densities of non-native trout. In 1997 restoration efforts began by planting nearly 30,000 young-of-the-year grayling above Vigilante Guard Station. Since then, grayling of varying numbers and ages have been planted annually. Efforts to reestablish grayling are focused on the National Forest, so our land management has more potential to affect the population there, than in the Big Hole River.

Population monitoring data from the Ruby River shows substantial variation in grayling densities from year to year. In 1997 only 26 grayling were caught per mile and they averaged 2.7 inches in length (see the table below). This directly reflects the YOY plant earlier that year. In 1998, nearly 100,000 age 1+ grayling were planted (Table 2-2a), resulting in fairly high densities that fall. Densities remained relatively high in 1999, but dropped to very low levels in 2001 and 2002. This coincided with significant reductions in the number of grayling planted those years. Densities rebounded in the fall of 2003, and 2004 after about 33,000 and 29,000 age 1+ grayling were planted (Tables 2.2a and 2-2b). The 2005 plant was around half the number of fish introduced in 2004 and again, densities in the fall of 2005 reflected this.

The consistent trend between fall densities in the river and the number of grayling planted is attributed to poor over-winter survival of stocked fish and poor natural reproduction. As such, grayling densities in the upper River are dependent on the number of grayling planted that same year. The challenge in establishing a population in the Ruby River is tied closely with getting a base population established that will allow biologists to learn the primary factors limiting reproduction and over-winter survival. In 2003, MFWP began using remote site stream incubators (RSIs) in a number of tributary streams. Incubators allow eggs to develop and hatch in a natural environment. The fry then have the opportunity to imprint on a chosen stream, in hopes they will return to spawn after they reach maturity.

Table 7. Estimates of Arctic Grayling Abundance and Average Lengths

River Section	Year	Estimated # of Grayling / Mile	# of Grayling Caught / Mile	Ave. Length (inches)
Three Forks	1997	--	26	2.7
Three Forks	1998	408	275	9.8
Three Forks	1999	815	175	10.4
Three Forks	2000	--	98	8.2
Three Forks	2001	7	5	9.5
Three Forks	2002	14	12	10.9
Three Forks	2003	279	200	10.0
Three Forks	2004	--	--	--
Three Forks	2005	129	69	9.8
Vigilante	1997	--	--	--
Vigilante	1998	780*	106	10.0
Vigilante	1999	--	--	--
Vigilante	2000	541	136	8.5
Vigilante	2001	27	13	10.5
Vigilante	2002	3	1	11.6
Vigilante	2003	10.2	104	10.2
Vigilante	2004	--	274	10.2
Vigilante	2005	44	37	10.3

** Estimate is weak due to large standard deviation of 288*

Table 8. Numbers and Ages of Fluvial Arctic Grayling Planted in the Upper Ruby River

Fluvial Arctic Grayling	1997	1998	1999	2000	2001	2002	2003	2004	2005
# Fish Planted	29,808	98094	7339	10668	1177	650	33321	28808	14470
Age	<1	1+	1+	1+	1+	2+	1+	1+	1+

The 2003 RSIs unfortunately produced few fry. Spring runoff in the upper Ruby River peaked early and was nearly twice the intensity of average spring runoffs over the previous 64 years of record. Extreme flows and suspended sediment reduced the effectiveness of the RSIs in 2 ways. High water levels and current velocities dislodged incubators and many of the eggs were pre-

maturely spilled into the river during extreme conditions. High sediment loads, a natural byproduct of the geologic instability of the Gravelly Mountain range, also clogged the intakes of some incubators reducing flow through the incubators and covering eggs with fine sediment.

Experience gained from 2003 helped biologists modify techniques and choose more suitable locations for RSIs the next 2 years. In 2004 and 2005, hatching success and the number of fry introduced into the Ruby drainage increased substantially. Biologists from MFWP and the Forest are working on improving conditions in tributaries to promote successful natural reproduction when imprinted grayling return to spawn. An ongoing agreement is facilitating a way for both agencies to share in the cost of reintroduction efforts.

Evaluation:

Westslope cutthroat trout: Because of the up and down nature of the westslope cutthroat population densities in Browns Creek, a trend is not easily discernable. The 2005 densities are substantially higher than those in 2002 and are very near those in 1997.

The decline evidenced in 2002 is not likely attributable to land management actions, because there has been little to no change over the monitoring period. It is more likely the cause of environmental stress. Because the population is isolated in the high elevation, headwaters of Browns Creek, there is little opportunity to escape and/or compensate for extreme environmental conditions that commonly occur. Drought and harsh winter conditions are likely responsible for poor reproductive success and high over-winter mortalities in certain years. Over-all, densities in 1997 and 2005 represent some of the highest observed on the Forest east of the Continental Divide. The low 2002 densities, however, are something to think about relative to other WCT populations. Browns Creek cutthroat, while being isolated, have 6 to 7 miles of suitable stream available. This is several times more than most of our cutthroat populations have. Environmental stresses on populations in more limited stream lengths may be having much more significant threats to their persistence than was observed here.

*Arctic grayling***:** Substantial fluctuations in the densities of grayling in the upper Ruby River are beyond desired levels.

The difficulties in reestablishing grayling in the Ruby River seem to be tied to low over-winter survival and limited reproductive success. The use of RSIs will hopefully produce young fish that can better cope with the environmental conditions that the drainage provides. Annual monitoring by FWP will determine progress toward reestablishment goals and we will continue sharing information and working jointly on projects to promote recovery in both the upper Ruby and Big Hole Rivers.

Riparian

Item 2-3: Riparian Habitat

Activity: What are management effects on the functioning of riparian areas?

Unit of Measure: Number of reaches in functioning, functioning at risk, and non-functioning conditions and their trends.

Reporting Period: 5 years

Variability which would indicate further evaluation: <85% of 50 reaches show an upward trend.

Monitoring Results: In 2005, the Forest hydrologist re-measured 59 stream reaches randomly selected across the Forest to determine if allowable use levels were effective in protecting streams from livestock grazing.

The data shows that on reaches previously found to be FUNCTIONING (F)- 7% improved, 26% got worse, and 67% stayed the same;

The data shows that on reaches previously found to be FUNCTIONING AT RISK (FAR) – 27% improved, 13% got worse, and 60% stayed the same;

The data shows that on reaches previously found to be NON-FUNCTIONING (NF) – 19% improved, 0% got worse, and 81% stayed the same.

The following Table compares the results in changing condition from previous measurements to 2005 measurements. Appendix A contains detailed data about each re-measured stream and the changes found in various parameters leading up to the determination of change in condition.

Table 9. 2005 BDNF Stream Morphology Measurements

District	Stream	Last Survey	Function (Previous)	Function 2005	Trend
Butte	Yankee Doodle	1999	NF	NF	No Change
Butte	Moose Down	1999	FAR	NF	Downward
Butte	Moose BLM	1999	FAR	FAR-	Downward
Butte	NF Divide 1	1997	FAR	FAR	No Change
Butte	NF Divide Down	1997	F-	F-	No Change
Dillon	Price Mid	2002	NF	NF	No Change
Dillon	Smith Creek	1994	NF	NF	No Change
Dillon	Kearns	1994	F	FAR	Downward
Dillon	Price3	2002	F	FAR	Downward
Dillon	Hunter 3	1994	FAR	F-	Upward
Dillon	ST Lou 1	1994	F-	F	Upward
Dillon	Bull Down	1999	F	F	No Change
Dillon	Hunter 1	1999	F	F	No Change
Dillon	Price Up	2002	F	F	No Change
Jefferson	Carmichael	1998	NF	NF	No Change
Jefferson	Park	1998	FAR	FAR	No Change
Jefferson	Saul Haggerty	1998	F	F-	Downward
Madison	Poison Up	1995	NF	NF	No Change
Madison	Poison Down	1995	NF	NF	No Change

District	Stream	Last Survey	Function (Previous)	Function 2005	Trend
Madison	Dry Fawn	1995	F	NF	Downward
Madison	Tepee 7	1992	FAR	FAR-	Downward
Madison	WF Madison 3	1992	NF	FAR	Upward
Madison	WF Madison 7	1992	NF	FAR	Upward
Madison	Davis Up	1995	FAR	FAR	No Change
Madison	Lazyman	1994	FAR	FAR	No Change
Madison	Romy	1995	FAR	FAR	No Change
Madison	SF Warm Springs	1995	FAR	FAR	No Change
Madison	Lewis	1995	F	F-	Downward
Madison	Buford Down	1992	NF	F	Upward
Madison	Company	1995	F	F	No Change
Madison	Elk 6	1995	F	F	No Change
Madison	Pocket	1995	F	F	No Change
Pintler	Upper MF Rock	1997	NF	NF+	Upward
Pintler	Copper	1997	FAR	FAR	No Change
Pintler	Copper Up	1997	FAR	FAR	No Change
Pintler	Sand Basin	1997	FAR	FAR	No Change
Wisdom	Dry	1998	NF	NF	No Change
Wisdom	Engle Main Up	2003	NF	NF	No Change
Wisdom	Ruby Up	2003	NF	NF	No Change
Wisdom	WF Ruby Dn	2003	NF	NF	No Change
Wisdom	Engle So Trib	2003	NF	FAR	Upward
Wisdom	Cow Trib Up	1998	FAR	FAR	No Change
Wisdom	Big Swamp Down	1998	FAR	F	Upward
Wisdom	Big Lake Down	1998	F-	F	Upward
Wisdom	Big Hole Dn	1998	F	F	No Change
Wisdom	Big hole Mid	1998	F	F	No Change
Wisdom	Big Hole Up	1998	F	F	No Change

District	Stream	Last Survey	Function (Previous)	Function 2005	Trend
Wisdom	Cow Trib Dn	2003	F	F	No Change
Wisdom	Engle No Trib	2003	F	F	No Change
Wisdom	Indian 3	2003	F	F	No Change
Wise River	Sawlog D2	1994	NF	NF	No Change
Wise River	Sheldon	1994	FAR	NF	Downward
Wise River	Happy	1994	F	FAR	Downward
Wise River	Mono Up	1994	F	F-	Downward
Wise River	Jacobson Dn	1991	NF	F	Upward
Wise River	Odell 1	1998	FAR	F	Upward
Wise River	Wyman 5	1998	FAR	F	Upward
Wise River	Mono Mid	1994	F	F	No Change
Wise River	Wyman 1	1998	F	F	No Change
Wise River	Wyman 2	1992	F	F	No Change

+ indicates Upward Trend
- indicates Downward Trend

Evaluation: Forty four percent of the 59 stream reaches improved in condition. They are in an upward trend. We are not meeting the evaluation criteria of 85% of measured reaches in upward trend. Forty-one percent remain static and fifteen percent are in worse condition - a downward trend. The Forest recognizes that consistent compliance with livestock grazing standards is essential if stream reaches are to show an upward trend in condition. The revised Beaverhead-Deerlodge Forest Plan is addressing this problem in high priority watersheds through additional standards designed to ensure that permittees meet grazing objectives consistently.

Watershed

Item 3-1: Sediment Production

Activity: What are the impacts of management activities on sediment production?

Unit of Measure: Tons per year

Reporting Period: Annual

Variability which would initiate further evaluation: Any increase that is in violation of Forest Plan Standards.

Monitoring Results: Operation of eight monitoring stations was discontinued after the 1993 season since the objectives of the monitoring effort were met. The data from the eight monitoring stations will be used in conjunction with data from other national forests on the east side of Region 1 to adjust coefficients in the WATSED model or to develop a correlation between

sediment in the water column and sediment in spawning gravels. All data are on file at the Forest Supervisor's office in Dillon.

Evaluation: The purpose of this monitoring item has already been accomplished. All data are on file at the Forest Supervisor's Office in Dillon. Monitoring efforts now focus on determining the status of streams with respect to their function. See Monitoring Item 2-3, Riparian.

Item 3-2: Watershed Standards

Activity: How accurate are assumptions that scheduled harvest can meet watershed standards?

Unit of Measure: Acres of timber harvest scheduled

Reporting Period: 5 years

Variability which would initiate further evaluation: ± 15% change in the amount that can be scheduled within Plan standards vs. planned timber harvest acres.

Monitoring Results: In 2005, no specific monitoring was conducted on any timber sales. The acres of timber harvest have dropped dramatically since the implementation of this plan. There is currently very little concern regarding whether timber harvest can occur and meet watershed standards.

Evaluation: The acres of timber harvest have dropped far below the 15% variation from Forest Plan projections described for this monitoring item. Faulty assumptions about how well scheduled harvest can meet watershed standards are but a small piece of this shortfall. Public pressure and new agreements (Short Term Strategy for WCT) have driven projects designed to generate no increase in sediment – which is much more stringent a criteria than Plan standards. A number of other issues (old growth, clearcutting, species viability, declining budgets) have also driven reductions. See more discussion about this monitoring item in the Analysis of the Management Situation, 2002.

Item 3-3: BMP Effectiveness

Activity: Are "Best Management Practices" (BMPs) effective?

Unit of Measure: projects

Reporting Period: Annual

Variability which would initiate further evaluation: Application of Best Management Practices (BMPs) found inadequate or ineffective.

Monitoring Results: Implementation monitoring for BMP's related to timber harvest was not conducted on the Forest in 2005. Monitoring efforts have been refocused on evaluating the effectiveness of grazing BMP's (also see Beaverhead monitoring item 2-3 and Deerlodge monitoring item 7-5).

The 2005 fall integrated Range Review reported that on the five allotments inspected, standards are generally being met in the uplands for utilization. Only one upland pasture exceeded utilization standards. Those same allotments showed one or more cases of exceeding riparian standards for stream-bank disturbance or riparian vegetation utilization. Streams with naturally well armored banks, or where functioning exclosures exist were within standards. (NOTE: the riparian review team doesn't generally look at the total length of stream accessible to cattle, but reports only on the section that is inspected. Standards allow up to 15% of the reach to be out of compliance before the pasture is considered out of compliance.) The report recommended that

standards be reconsidered for non-fish bearing streams or streams that dissipate into irrigation canals downstream, allowing more resources to be invested in important fish bearing streams or tributaries that pay larger dividends for the time and dollars invested. The Report also noted that use of the Grazing Permit Administration Guidelines continues to be an effective tool for documenting and generating needed changes on some grazing allotments.

Evaluation: Of the 5 grazing allotments inspected in the integrated range review, cases of exceeding grazing standards occurred. In most cases, the compliance problem was with riparian grazing standards. The Forest Annual Interdisciplinary Range Review is scheduled and designed to improve our ability to effectively implement riparian guidelines. Annual recommendations help District Range Specialists improve their monitoring skill and identify additional training needs. There have been no indications that BMP's are inadequate or ineffective. Range riparian grazing standards are proving effective where implemented consistently over time

Soils

Item 4-1: Soil Displacement/Organic Residue

Activity: What are the impacts of activities on soil displacement and organic residue?

Unit of Measure: Benchmark vs. sample soils

Data Source: Field data on timber sales

Reporting Period: 5 years

Variability which would initiate further evaluation: Forest Plan standards not met.

Monitoring Results: Field data collection for soil displacement and organic residue on timber sales was limited to the Deerlodge zone in FY05.

See Deerlodge Item 9-3 for an extensive report on how activities affected soil displacement and organic residue on the South Butte Timber Sale.

Recreation

Item 5-1: Recreation Use

Activity: How does actual dispersed/developed/wilderness use compare to projected use?

Unit of Measure: RVDs (Recreation Visitor Days)

Reporting Period: 5 years

Variability which would initiate further evaluation: ± 20% variation from projections over five years.

Monitoring Results: The National Visitor Use Monitoring (NVUM) survey was completed in 2000 and 2005. Because the 2005 results are not yet available, the most current available information is from 2000. These results were published in the FY03 Monitoring and Evaluation Report.

Evaluation: The FY03 Monitoring Report concluded that a comparison can't be made between NVUM surveyed visits and the Forest Plan projected visitor use days because they aren't comparable units. In addition, NVUM data is only available Forestwide and doesn't break out the

Deerlodge and Beaverhead units. Trends in visitor use, spending and satisfaction between 2000 and 2005 should be available late in 2006.

Item 5-2: Wilderness Use Compliance

Activity: Is actual wilderness use in compliance with wilderness management direction?

Unit of Measure: N/A

Reporting Period: 5 years

Variability which would initiate further evaluation: Noncompliance with wilderness management direction.

Monitoring Results:

The Lee Metcalf Wilderness (LMW) on the Madison Ranger District and the Anaconda Pintler Wilderness (APW) on the Wisdom and Wise River Ranger Districts are evaluated annually for compliance with Wilderness Plans. Wilderness management successes and deficiencies are addressed two ways: using the elements listed in the Chief's 10-Year Wilderness Stewardship Challenge, delineated below, and using the Infra-WILD database. The 10-Year Wilderness Stewardship Challenge provides a framework to consider and evaluate the effectiveness of management's ability to maintain a wilderness setting.

The 10-Year Wilderness Stewardship Challenge Criteria

1. Direction exists in the either the Forest Plan or a subsequent planning document that addresses the natural role of fire in Wilderness and considers the full range of management responses.

Lee Metcalf Wilderness Area - This element is fully met for the Lee Metcalf Wilderness (LMW). A fire assessment (plan) has been completed and approved for the Wilderness.

Anaconda Pintler Wilderness Area – The Fire Management Plan (FMP) for the APW was completed in 1979, with updates in 1993 and 2000. The 2005 Rating for Fire Plans: 10 / 10 points. Fire Management Plan (FMP) is implemented and evaluated for effectiveness and modifications are made as needed.

2. The Wilderness was successfully treated for non-native, invasive plants.

Lee Metcalf Wilderness Area - In 2005, this element was fully met by the Beaverhead-Deerlodge portion of the LMW. The Gallatin portion did not have a comprehensive weed plan. However, a weed plan was completed for the Gallatin NF in 2006, and the entire wilderness is now fully compliant.

Anaconda Pintler Wilderness Area – The Beaverhead-Deerlodge National Forest Noxious Weed Control Program Environmental Impact Statement (EIS) was completed in 2002. The APW has not yet achieved a full measure of compliance with all aspects of the EIS. The 2005 Rating for Non-native, Invasive plants: 6/10 points. Management actions taken in highest priority areas have been evaluated and determined to be successful.

3. Monitoring of Wilderness air quality values is conducted and a baseline established.

Lee Metcalf Wilderness Area - The LMW is fully in compliance with this element. Water quality (acid rain) studies have been ongoing for several years and continue.

Anaconda Pintler Wilderness Area – The APW is currently in full compliance with required air quality values. The 2005 rating for Air Quality Values: 10/10 points. Monitor

priority sensitive receptors for trends from baseline (in addition to IMPROVE visibility monitoring).

4. Priority actions identified in a Wilderness education plan are implemented.

Lee Metcalf Wilderness Area - Education actions are deficient for the LMW. In 2005, there was no education plan. (A draft education plan was submitted in 2006). There is no cohesive plan for education. Education efforts are somewhat random, not coordinated between administering units, and remain a generally low priority.

Anaconda Pintler Wilderness Area – Wilderness education plans are not yet in place for the APW. Additional coordination among the managing units is taking place, and personnel are currently working on developing and implementing an education plan as resources are available. The 2005 rating for Wilderness Education Plans: 4/10 points. Develop wilderness education plan, or if existing, review and make necessary modifications.

5. This Wilderness had adequate direction, monitoring, and management programs to protect opportunities for solitude or primitive and unconfined recreation.

Lee Metcalf Wilderness Area - The LMW is deficient in this category as well. The existing Wilderness Plan is dated (20 years old). Efforts to establish zoning and limits of acceptable change standards have been long neglected do to lack of funding and management direction.

Anaconda Pintler Wilderness Area – The APW plan provides direction to achieve the goals of protecting opportunities for solitude, but managing units have not yet fully achieved the desired goal. Adequate monitoring levels may be achieved with additional resources. Areas that show degradation are managed to reduce impacts and improve desired conditions. The 2005 rating for Opportunities for Solitude: 6/10 points. The Forest Plan contains the needed components to provide adequate direction on management of opportunities for solitude or a primitive and unconfined recreation specific to this wilderness. Conditions are monitored on the ground and evaluated for compliance with forest plan direction. If monitoring shows that unacceptable levels of degradation exist, appropriate management actions are taken. If conditions are stable or improving, no further actions are needed.

6. The Wilderness has completed a recreation site inventory.

Lee Metcalf Wilderness Area - There is an inventory of campsites for the Lee Metcalf, with an impact index for each site. These sites should have been resurveyed in 2005, but were not, due to financial considerations.

Anaconda Pintler Wilderness Area – With the help of volunteers (Wilderness Institute, University of Montana), a baseline campsite inventory and a baseline noxious weed inventory have been completed (Sula Ranger District, Bitterroot National Forest). Ongoing and updated information needs to be collected for a complete and current picture of the conditions on the ground. The 2005 rating for Recreation Site Inventory: 6/10 points. A recreation site inventory has been completed for this wilderness using the recreation site monitoring protocol which conforms to the national site monitoring protocol as a minimum.

7. Existing outfitter & guide operating plans for this Wilderness direct outfitters to model appropriate Wilderness practices and incorporate Wilderness values in their interactions with clients and others.

Lee Metcalf Wilderness Area - This element is fully successful.

Anaconda Pintler Wilderness Area – The APW plan gives specific guidelines for existing, renewed, and new Outfitter & Guide operations that may conduct operations in the

wilderness. Five year and annual operating plans that are issued with each authorization outline appropriate practices for each operation. The APW has not yet fully achieved the desired goal. The 2005 rating for Outfitter and Guides: 8/10 points. Monitoring is conducted on at least 25% of outfitter & guide permittees annually to evaluate if they are implementing appropriate wilderness practices and awareness of wilderness values in their operating plans. Any non-compliance issues are noted in the performance rating and discussed with the outfitter.

8. The Wilderness has adequate direction in the Forest Plan to prevent degradation of the Wilderness Resource.

Lee Metcalf Wilderness Area - To some extent this element is met, but as mentioned, the Wilderness Plan is dated and not specific enough to deal with today's management challenges. In 2005, an MOU was signed with the County Sheriff to authorize Search & Rescue operations in accordance with Wilderness rules and sensitivities.

Anaconda Pintler Wilderness Area – The APW has adequate direction, but has yet to fully achieve the desired goals. The 2005 rating for Adequate Plan Standards: 8/10 points. Conditions are monitored for changes to the resource according to the schedule described in the forest plan monitoring section.

9. The priority information needs for this Wilderness have been addressed through field data collection, storage, and analysis.

Lee Metcalf Wilderness Area - There is increased need for data collection, especially with regard to aquatics (information needed to proceed with a dialogue on the issue of stocking of non-native fish, for example). Information on use levels is not reliable. Stock grazing impacts should be studied.

Anaconda Pintler Wilderness Area – The APW has collected some field data, but detailed analysis has not been completed. Additional data collection and analysis needs to be done to provide useful input to decision makers for long-term management of the APW. The 2005 rating for Information Management: 2/10 points. Inventory and/or monitoring data are collected in the field to address priority management issues, according to methods prescribed in a documented data collection protocol.

10. The Wilderness has a baseline workforce.

Lee Metcalf Wilderness Area - Field presence in the wilderness is marginal, but we have been able to retain a wilderness ranger from June through October. Volunteers have provided exceptional education value over the past five years, but this cannot be counted on to continue.

Anaconda Pintler Wilderness Area – Field personnel have been funded as much as possible, but representatives on the ground in the APW have been sporadic across managing units. Coordination among managing units continues, and volunteers have been incorporated whenever possible. The 2005 rating for baseline workforce: 2/10 points. Unit meets 50% of the baseline workforce.

Infra-WILD Database Criteria - Infra-WILD database reporting criteria assigns points for those items "managed to standard". A wilderness area is considered "managed to standard" if it scores a minimum of 60 points.

Lee Metcalf Wilderness Area - In FY05 the Lee Metcalf scored 54 points. Deficiencies were due to a lack of education action plan, no invasive species plan, lack of adequate forest plan direction, and inadequate staffing.

Anaconda Pintler Wilderness Area – The APW achieved a score of 62 in 2005. Short and long term improvements need to be made in the following database elements: 2) Successfully treat non-native, invasive plants, 4) Priority actions identified in education plan, 5) Adequate direction, monitoring, and management programs to protect opportunities for solitude, 6) Completed a recreation site inventory, 7) Outfitter & Guide operating plans model appropriate practices, 8) Adequate direction in the Forest Plan to prevent degradation, 9) Information needs addressed, 10) Has an adequate baseline workforce.

Evaluation:

Lee Metcalf Wilderness Area - In 2005, the Lee Metcalf Wilderness, jointly managed by the Beaverhead-Deerlodge and Gallatin National Forests, was not managed to standard according to the Infra-WILD reporting database. Using the 10-Year Wilderness Stewardship Challenge criteria, 4 criteria were fully met, 3 items were marginally met, and 3 items were deficient. We expect to improve that score substantially in FY06 with the completion of an Education Action Plan and Noxious Weed Plan. Revision of the BDNF Forest Plan in FY07 will bring us even closer to a successful rating.

Anaconda Pintler Wilderness Area – The APW met the Infra-WILD standards for management in 2005 and scored 60 points using the 10-Year Wilderness Stewardship Challenge criteria, which is considered within compliance. Items to improve on are: develop and implement a Wilderness Education Plan, increase the presence of personnel in the field, and collection of timely information so appropriate management decisions can be made to protect the wilderness resource.

Item 5-3: Recreation—Roadless Acres

Activity: Are there actual changes in the inventoried roadless acres comparable with the changes predicted in Forest Planning?

Unit of Measure: Acres

Reporting Period: 5 years

Variability which would initiate further evaluation: Decrease in roadless acres 5% greater than predicted.

Monitoring Results: There was no reduction in acres of inventoried roadless area in 2005. A new inventory in 2004 (described in the FY04 Monitoring and Evaluation Report) shows an increase in roadless acres since 1983.

Evaluation: Development of roadless areas is far less than the Forest Plan predicted. Only 1% of the total acres projected for development of the Forest Plan were actually developed by the end of the first decade. National pressure to protect roadless lands in the National Forest System manifested as the Roadless Area Conservation Rules of 2001 and 2005. With this shift in public interest, the Forest Service has been managing roadless areas under and Interim Directive from the Chief of the Forest Service since 2000. This Directive has resulted in little or no activity taking place in inventoried roadless areas on the BDNF since 2000.

Item 5-4: Recreation—Facility Access

Activity: Are all newly constructed and reconstructed recreation facilities designed to be accessible to people with disabilities?

Unit of Measure: Projects

Reporting Period: 5 years

Variability which would initiate further evaluation: Greater than 25% of facilities constructed or reconstructed in a 5 year period do not provide access for people with disabilities.

Monitoring Results: Recreation facility construction and reconstruction projects were designed to be accessible to people with disabilities and to comply with Forest Service Outdoor Recreation Accessibility Guidelines (FSORAG).

Evaluation: All projects comply with requirements for access for people with disabilities. No further evaluation is needed.

Item 5-5: Recreation—Historic Preservation

Activity: Are management activities conducted in accordance with Section 106 of the National Historic Preservation Act?

Unit of Measure: Projects

Reporting Period: Annual

Variability which would initiate further evaluation: Any project found to be out of compliance.

Monitoring Results: All projects were carried out in compliance with Section 106 of the National Historic Preservation Act. The table below details by District those projects inspected for compliance.

Table 10. Section 106 Compliance Reviews Completed for FY05 Projects

DISTRICT	PROJECT NAME
Dillon	**Badger Pass Prescribed Burn**
Dillon	**Birch Creek CCC Amphitheater Fire Ring**
Dillon	**Vigilante Buried Cable**
Dillon	**Pioneer Mountains Endurance Ride**
Dillon	**Varicchio Paleontology Special Use Permit**
Dillon	**Sawtooth Lake Trail Bridge**
Dillon	**Grasshopper Campground SST**
Wise River	**Bear Gulch Fuels Reduction**
Wise River	**Canyon Creek Charcoal Kilns Restoration**
Wisdom	**North Steel Creek Fuels Reduction**
Wisdom	**South Side Burn**
Wisdom	**Clark's Return Trail Construction**
Wisdom	**Twin Lakes Division Fence**
Wisdom	**Cornell Ditch Repair**
Wisdom	**Battle Mountain Fuels Reduction #1**

DISTRICT	PROJECT NAME
Wisdom	**Sheep Creek Burned Area Restoration CMPA Replacement**
Wisdom	**Moose Horn Mine Notice of Intent**
Madison	**South Meadow Creek Lake Dam/Reservoir Special Use Permit**
Madison	**Oliffe Conservation Easement/Reese Land Purchase**
Madison	**Bear Creek Guard Station Bear Proof Container**
Madison	**Bogus Basin Fence and Pipeline**
Madison	**Aurora Creek Placer Plan of Operation**
Madison	**Glenora-Quartz Lode Plan of Operation**
Madison	**Gazelle Creek Westslope Cutthroat Habitat Restoration**
Madison	**Arasta Creek Westslope Cutthroat Habitat Restoration**
Madison	**Tepee Creek Westslope Cutthroat Habitat Restoration**
Madison	**West Fork Cabin Camp Pump House Construction**
Madison	**Pot Trail Rehabilitation**
Madison	**Wolverine Basin Trailhead Construction**
Madison	**Shovel Creek Hardened Livestock Crossings**
Madison	**Antone Guard Station Maintenance**
Madison	**Braxton Land Exchange**
Madison	**Johnny Ridge Fire Base Camp Survey**

Evaluation: The Heritage Program is within the variability parameters.

Range

Item 6-1: Forage Utilization

Activity: Are actual use levels and capacity similar?

Unit of Measure: Number of AUMs

Reporting Period: 5 years

Variability which would initiate further evaluation: ± 5% change from the projected AUM capacity.

Monitoring Results: Actual use by cattle in 2005 was 96,559 head months or 120,331 Animal Unit Months (AUMs). Actual use by sheep in 2005 was 36,098 head months or 10,826 AUMs. Actual use by horses for 2005 was 699 head months or 838 AUMs. Actual use by bison during 2005 was 648 head months or 648 AUMs. Total actual use by livestock was 132,643 AUMs.

Evaluation: Actual use is 70% of the capacity projected in the 1986 Forest Plan. In 1996, the Riparian Amendment (to the Forest Plan) added more stringent riparian forage utilization and stream bank compaction guidelines and estimated a greater decline in AUM capacity. The variability measure for this monitoring item was not adjusted accordingly. Compliance with forage utilization standards has resulted in the decline of actual AUMs grazed as projected by the Riparian Amendment FEIS.

Item 6-2: Range Improvements

Activity: Are the projects being accomplished as programmed?

Unit of Measure: Projects, acres

Reporting Period: 5 years

Variability which would initiate further evaluation: Less than 90% of scheduled projects accomplished over five years.

Monitoring Results: In FY05, range construction projects for the Beaverhead-Deerlodge National Forest included 1 mile of electric fence, 14.15 miles of barbed wire fence, 31 water developments, 7.7 miles of pipeline, and one well. Ninety five percent of the range structural improvement targets for 2005 were met. One hundred and fifteen percent of non-structural range improvement targets were met.

Evaluation: This monitoring item is outdated. The project schedule in Appendix B was only developed through 1991. These projects were either completed or became outdated. Projects are currently derived through AMP updates. Although 95% of the range structural improvement and 115% of the non-structural improvement targets were met, the funded level of construction is far behind what is needed to replace worn out structures and for new construction needed to implement existing approved Allotment Management Plans.

Item 6-3: Noxious Weeds

Activity: Are the program levels necessary to control weed infestations being identified and accomplished?

Unit of Measure: Acres

Reporting Period: 5 years

Variability which would initiate further evaluation: < 80% accomplished over five years.

Monitoring Results: On the combined Beaverhead-Deerlodge National Forest, 7,635 acres of noxious weeds were treated in 2005 under all funding sources including cost share. Wildlife habitat improvement funds paid for treatment on winter range and other critical wildlife areas. Range improvement funds paid for treatment along roadsides, trails and in grasslands. Cost share funding from the Sikes Act and Rocky Mountain Elk Foundation complimented other funding. Targets were exceeded.

Evaluation: The BDNF far exceeded noxious weed treatment acres scheduled in the Forest Plans. However, the 2002 Noxious Weed Record of Decision envisioned treating 16,000 acres per year. This level of treatment has not been reached during any of the years since 2002.

Item 6-4: AMP Updates

Activity: Are allotment management plans and updates being done as scheduled?

Unit of Measure: Number of plans

Reporting Period: 5 years

Variability which would initiate further evaluation: < 4 new plans or 13 updates a year.

Monitoring Results: The Forest did not complete any of the NEPA projects or decision processes initiated although the Madison Range AMPs on the Madison Ranger District and the Westside AMPs on the Dillon District were well under way. These Plans, originally scheduled for FY05, will be completed in FY06.

Evaluation: Fewer updates and plans are being completed than the Forest Plan envisioned. Beginning in FY03, the Forest began to lag behind the schedule outlined in the Beaverhead Settlement Agreement with the National Wildlife Federation. As most AMP decisions are tied up in appeals and occasionally one is tied up in litigation, planning will likely be continually behind.

Item 6-5: AUM Outputs

Activity: Are Forest Plan outputs (AUMs) consistent with Forest Plan projections?

Unit of Measure: AUMs

Reporting Period: 5 years

Variability which would initiate further evaluation: 10% less than projected carrying capacity.

Monitoring Results: Actual AUMs in 2005 were 132,643 or about 70% of the 1986 plan estimate.

Evaluation: Changed conditions, drought, ranch closures, the riparian amendment, transitory forage decline, and conifer encroachment onto shrublands and grasslands have all contributed to fewer AUM's than envisioned in the 1986 plan. These conditions are being addressed in the Forest Plan Revision process now underway.

Timber

Item 7-1: Timber—Timber Sold

Activity: Are Forest outputs (MCF, MBF, Acres) consistent with Forest Plan projections/yield assumptions/conversion ratios?

Unit of Measure: Acres, MMCF, MMBF

Reporting Period: 5 years

Variability which would initiate further evaluation: ±10% less than projected carrying capacity.

Monitoring Results: The Forest Plan projects an allowable sale quantity of 5.8 MMCF (17.3 MMBF) of timber to be harvested annually from 2700 acres for the first decade. The information presented in Table 7-1 below displays the timber sale program and harvest data for Fiscal Years 2001-2005, as well as the projected Forest Plan outputs.

Table 11. Timber Sale Program, Fiscal Years 2001-2005

	FOREST PLAN	2001	2002	2003	2004	2005	AVE 2001-2005
Volume Sold (MMBF[1]):							
Chargeable Volume							
Live	17.3	2.1	2.8	0.1	0.6	4.5	2.0
Dead	n/a	0.0	0.0	0.0	0.0	0.0	0.0
Chargeable Total	17.3	2.1	2.8	0.1	0.6	0.0	1.1
Non-chargeable Volume	n/a	2.9	2.4	0.8	0.8	1.0	1.6
Total Volume Sold	n/a	5.0	5.2	0.9	1.4	5.5	3.7
Volume Not Sold:[2]							
Chargeable Volume	n/a	0.0	0.1	0.4	0.0	0.0	0.1
Non-chargeable Volume	n/a	0.0	0.0	0.0	4.6	0.0	0.9
Total Volume Not Sold	n/a	0.0	0.1	0.4	4.6	0.0	1.0
Volume Harvested	17.3	4.2	5.8	4.2	2.5	3.6	4.1
Acres Harvested	2700	315	895	931	163	414	544

1 MMBF = million board feet

2 Not Sold due to lack of bids, litigation, or deficit with no request.

A total of 5.5 MMBF was offered and 5.5 MMBF was sold in FY2005. Of that amount, 5.5 MMBF was chargeable volume credited to the Allowable Sale Quantity. Harvest of some sort took place on 414 acres.

The five year average figures showed a total volume sold of 3.7 MMBF/year. Total chargeable volume sold was 2.0 MMBF/year, or about 12% of the average annual ASQ volume. The total volume harvested averaged 4.1 MMBF/year, which is about 24 percent of the Forest Plan projected level. Total acres harvested averaged 544 acres/year, approximately 20 percent of the Forest Plan level. The volume harvested has decreased over the past five year period due to a decrease in the volume under contract as less volume is sold.

The five year average timber volume per harvest acre is approximately 7.5 MBF/acre as compared to the Forest Plan projected yield of approximately 6.4 MBF/acre.

Evaluation: Over the last 5 years, only 24% of the volume projected by the Forest Plan has been harvested, far below the 10% change which triggers further evaluation. The problem with timber harvest projections was already becoming apparent one year after the Plan was approved (1987 Monitoring and Evaluation Report). The 5 Year Monitoring Review (1992) and Analysis of the Management Situation (2002) describe in detail the many reasons for this short fall. Alternatives being considered during Forest Plan Revision include constraining timber harvest projections with realistic budget projections and eliminating suitable timber base in those areas where conflicts prevented us from harvesting in the past, like inventoried roadless areas.

Item 7-2: Timber—Timber Harvested

Activity: Is harvest accomplished as scheduled?

Unit of Measure: Acres, MBF

Reporting Period: 5 years

Variability which would initiate further evaluation: ± 20% change from the projected mix of lands and species.

Monitoring Results: Acres harvest by Management Area as projected in the Forest Plan is compared with FY2005 and average FY2000-FY2004 data in the Table below.

Table 12. Summary of Acres Harvested by Management Area.

	Forest Plan		FY2005		AVE. 2000-2004	
Management Area	ACRES	PERCENT OF TOTAL	ACRES	PERCENT OF TOTAL	ACRES	PERCENT OF TOTAL
1 MINMA	0	0	0	0	35	6
13 TMWET	0	0	0	0	17	3
16 TIMBR	1204	44	369	89	155	27
17 TMRNG	32	1	0	0	0	0
18 TMREC	143	5	0	0	0	0
19 TMLOW	54	2	0	0	2	<1
20 TWTDS	866	32	0	0	261	46
21 TMWLD	273	10	45	11	27	5
24 BGRNG	-	0	0	0	24	4
26 TMEKS	143	5	0	0	10	2
8 SPREC	0	0	0	0	1	<1
25 ELKSU	0	0	0	0	32	6
RIPRN	0	0	0	0	2	<1
TOTAL	2715	100	414	100	566	100

In FY 2005 chargeable volume was removed from 414 acres, approximately 24 percent of acres projected in the Forest Plan. For the five year average, chargeable volume was harvested from 544 acres annually. This is approximately 20 percent of projected acres harvested in the Forest Plan.

Evaluation: Volume and area harvested vary more than 20% from Forest Plan projections. Item 7-1 describes why. Management areas scheduled for harvest have also changed from projections. Since the wildfires of 2000, budgets and manpower have shifted from timber management to fuel reduction projects. These tend to take place outside of management areas with suitable timber

base. Alternatives being considered for Forest Plan revision include using timber harvest to a greater degree to meet other resource objectives like fuel reduction.

Item 7-4: Timber—Silvicultural Treatments

Activity: Are the Forest Plan projections accurate and is work accomplished as scheduled?

Unit of Measure: Acres

Reporting Period: 5 years

Variability which would initiate further evaluation: ± 20% change from projections over five years.

Monitoring Results: Timber stand improvement (TSI) includes precommercial thinning and stand improvement after selection harvests. Usually this occurs within the suitable timber base. Occasionally we treat acres outside the suitable base for reasons other than timber production, such as cleaning up an old selective post and pole harvest along a main road.

Reforestation includes both planting and natural regeneration from seeds left after harvest. Most natural tree regeneration occurs on harvest sites prepared by dozer piling, trampling, or other mechanical soil scarification.

The Table below shows the acreage of these activities predicted by Management Area in the Forest Plan, accomplished in 2005, and the average accomplishments from 2000 through 2004.

No cultural practices were accomplished in FY 2005. Timber Stand Improvement (TSI) was at 0 percent of Forest Plan average annual projections. Reforestation was at 0 percent of average annual projections.

Table 13. Acres of Cultural Practices in 2005 and 2001-2005

Cultural Practice	Acres Projected in the Forest Plan	Acres in 2005	Average Acres 2001-2005
Timber Stand Improvement	**620**	**0**	**20**
Reforestation (planting)	**2715**	**0**	**12**

Evaluation: The absence of TSI is due to the listing of Lynx as a Threatened and Endangered Species and reduction of TSI dollars to the Region. Reduced reforestation acres are due to lower than planned timber harvests, not from inadequate reforestation of harvested acres. Also, the Forest is harvesting more through commercial thinning than projected. These units do not require reforestation. The acres of suitable timber base that can realistically be managed for growth and yield in light of these issues is central to developing alternatives during Forest Plan Revision.

Item 7-5: Timber—Natural Regeneration

Activity: Is natural regeneration occurring as predicted and are harvested lands being reforested?

Unit of Measure: Acres

Reporting Period: 5 years

Variability which would initiate further evaluation: Less than 90% accomplishment of natural regeneration; 10% of harvested lands not adequately restocked in five years.

Monitoring Results: The Forest Plan projects 72 percent of harvested stands will be regenerated by natural means, 28 percent will be regenerated by planting. No stands have been harvested using even aged harvest systems between 2000 and 2005. Prior to 2000, 248 stands totaling 6043 acres were harvested using even aged regeneration methods. One hundred percent of those stands are adequately restocked either through planting or natural seeding. Ninety-seven percent of the total aces harvested during this time period were adequately stocked within 5 years.

Evaluation: Natural regeneration occurred at higher rates than predicted. No further evaluation is required.

Item 7-6: Timber—Silvicultural Practices

Activity: Is silvicultural guidance being followed?

Unit of Measure: Projects

Reporting Period: 5 years

Variability which would initiate further evaluation: Noncompliance with silvicultural guidance, questions regarding the validity of the silvicultural assumptions.

Monitoring Results: The Plan projects 100 percent of the harvest will be in even aged systems (clearcut, seed tree, and shelterwood). The FY2005 harvest was 100 percent uneven-aged and commercial thins.

The five year average shows less than 1 percent of the harvest being in the even-aged category and 99+ percent was selection and commercial thinning.

The following chart summarizes harvest method by year and compares it to predictions in the Forest Plan.

Table 14. Acres Harvested by Harvest Method.

Harvest Method	Forest Plan	FY2005	AVE 2000-2004
Clearcut/Seed Tree	2013	0	<1
Shelterwood	702	0	0
Selection/intermediate harvest	-	414	566
Salvage	-	0	0
Total	2715	414	567

Evaluation: Silvicultural guidance is being followed as required. However, Forest Plan assumptions that clearcutting would be the primary harvest method through the entire planning period are erroneous. In 1992, a policy decision was made to reduce the use of this practice nationwide and clearcut acres have steadily fallen. The shift to selective treatments from clearcutting has also reduced the volume per acre harvested. This issue is being reconsidered during Forest Plan Revision.

Facilities

Item 8-1: Facilities—Roads

Activity: Are the assumptions about local/collector road density, miles, standards, costs correct?

Unit of Measure:

Reporting Period: 5 years

Variability which would initiate further evaluation: ±10% in any one year; noncompliance with Forest Plan standards.

Monitoring Results: Table 15 displays Beaverhead-Deerlodge National Forest accomplishments in road construction and reconstruction over the past five years, as well as the projections from the individual Beaverhead and Deerlodge Forest Plans. (Note: Until 1998, the Beaverhead and Deerlodge National Forests reported road accomplishments separately. Due to the consolidation of the two Forests and subsequent changes in budgeting and reporting, the mileages shown are totals for the combined Beaverhead-Deerlodge National Forest. Thus, these numbers cannot be directly compared to the tables shown in Beaverhead Forest Monitoring and Evaluation reports for FY 1996 and earlier.)

Table 15. Road Construction and Reconstruction, Fiscal Years 2001-2005.

ACTIVITY	TOTAL FOREST PLAN MILES	2001 MILES	2002 MILES	2003 MILES	2004 MILES	2005 MILES	AVG 2001-2005
Construction	55.5	1.0	0.6	0.5	0	0	0.4
Reconstruction	16.2	2.6	5.1	5.4	21.9	16.2	10.2

The Forest Plan projects 29 miles of new road construction per year to provide for timber access, for an average of 1.7 miles per million board feet (MMBF) of timber offered. In actuality, less than one mile of specified road was constructed for timber sales during the entire five-year period (FY 2001-2005), which is less than one percent of the projected miles. Reconstruction averaged only sixty-three percent of the combined Forest Plan projected level during the same period. In FY 2005, no new permanent (system) roads were constructed on the Beaverhead-Deerlodge. The five-year average for road reconstruction is well short of the mileage projected in the Forest Plan, despite an increase in reconstruction over the last two years.

Road Decommissioning – As noted above, the Forest Service has shifted over the last decade and a half from a program of new road construction to reconstruction and decommissioning. While no monitoring is required of decommissioning efforts, we felt it would be of interest to the public and our managers to track those accomplishments.

A total of 3.5 miles of system roads were obliterated in FY 2005. This does not include obliteration of temporary roads constructed as part of a timber sale contract; these roads are obliterated before the purchaser's contract can be closed. The accomplishment in FY05 was considerably smaller than the 10.4 miles obliterated the previous year.

Evaluation: Actual road construction and reconstruction accomplishments are well below the Forest Plan projections. The trend of decreased road construction is occurring, at least in part, due to public opposition to the development of new specified roads; as a result, timber harvest units

are situated along existing roads or are accessed with temporary roads. Even temporary road construction is limited, however, with an estimated average of 0.5 mile/MMBF. These roads are all obliterated prior to completion of the timber purchaser's contract. The Forest Service's emphasis has shifted toward reconstruction and maintenance of the existing road system, and identifying the minimum transportation system necessary for meeting Forest management objectives. This issue is being reevaluated during Forest Plan Revision.

Item 8-2: Facilities—Road Restrictions

Activity: Are the assumptions about road management valid, especially those regarding closures and restrictions?

Unit of Measure: Miles

Reporting Period: 5 years

Variability which would initiate further evaluation: Noncompliance with Forest Plan.

Monitoring Results: According to the Forest Plan, "Most of the new roads constructed…will be restricted to motorized public access with the exception of snowmobile use. More will be closed in the fall than during the rest of the year to maintain elk security. Some will be closed yearlong." (Forest Plan, page II-11). Road or area closure methods will be determined through the plan implementation process and will be the methods determined to be most effective and cost-efficient given the Management Area objectives. Closure methods may include gates, signing, physical barriers, and obliteration of the entry portion of the road. New roads scheduled for closure will be so signed and/or gated when constructed.

Gates are the primary method of physically closing specified roads on the Forest, followed by signs only (no physical barrier), natural barriers, and man-made barriers. Many roads have been obliterated near the entry and/or have had right-of-way slash scattered on the road bed where long-term closures are planned. Approximately 3.5 miles of low standard roads were decommissioned this year. Table 16 shows the extent of road use restrictions on the Forest.

Table 16. Road Use Restrictions1, Fiscal Year 2005.

RESTRICTION PERIOD	RESTRICTED MILES
Yearlong	328
Seasonal	867

1 Table 16 displays restrictions applicable to standard highway vehicles. Many roads have different restrictions for other types of traffic, such as motorcycles, ATVs, and snowmobiles.

Evaluation: Assumptions about road closures and restrictions are still appropriate. No further evaluation is required.

Item 8-3: Facilities—Trail Management

Activity: Is the scheduled maintenance and reconstruction being accomplished as scheduled?

Unit of Measure: Miles

Reporting Period: 5 years

Variability which would initiate further evaluation: Less than 80% of schedule accomplished over five years.

Monitoring Results: 658 miles of trail were maintained and 32 miles of trail were improved in FY05 Forest-wide.

Evaluation: The Beaverhead Forest Plan scheduled trail construction/reconstruction projects are completed. Accomplishment of this monitoring item is now measured by whether targets are met. Targets were met in FY05.

Item 8-4: Facilities—Road Management

Activity: Is the scheduled maintenance and planned management occurring?

Unit of Measure: Miles

Reporting Period: 5 years

Variability which would initiate further evaluation: Less than 80% of schedule accomplished over five years.

Monitoring Results: Although the Forest Plan displays no annual target for maintenance, the Forest prepares an annual road maintenance schedule. Miles of road maintenance accomplished during FY 2005 are displayed in Table 17.

Table 17. Road Maintenance Accomplishments, Fiscal Year 2005.

	FOREST SERVICE	COOPERATOR	TOTAL
Miles of Road	433	31	464

Maintenance shown in Table 17 consisted of patrol blading and other routine road maintenance. Miles in the "Cooperator" column reflect patrol blading accomplished under cooperative agreements by County road crews on National Forest roads.

Scheduled maintenance activities depend on the availability of funds. The Beaverhead contains approximately 2572 miles of existing National Forest System Roads. We estimate that 20 to 30 percent of this mileage receives some maintenance in a typical year, but only about 10 to 15 percent is fully maintained to the desired standard and is consequently deteriorating.

A total of 3.5 miles of system road were decommissioned on the Forest in FY 2005.

Evaluation: The Forest Plan did not establish a baseline or target against which to measure accomplishment for this item. No further evaluation is required.

Item 8-5: Facilities—Exterior Access

Activity: Are access points being developed as scheduled?

Unit of Measure: Miles

Reporting Period: 5 years

Variability which would initiate further evaluation: N/A

Monitoring Results: This monitoring item is not required in Table VI-1 of the Forest Plan. The item was identified during a "needs assessment" as part of the monitoring process for 1988, and is included in this year's report for informational purposes only.

Public and administrative access to the Forest is difficult or unavailable in many areas due to intervening private landholdings. A list of potential access points is displayed in Appendix E of

the Forest Plan. A number of additional access points have been identified since the Forest Plan was implemented (see Monitoring Item 8-5 of the FY 1990 Forest Plan Monitoring and Evaluation Report for specific examples).

The Forest Plan estimates an average of 1.8 miles of exterior access road construction and 8.2 miles of reconstruction per year. Actual construction and reconstruction has been considerably less. During the five-year period from FY 2001-2005, only one major exterior access project was completed. During FY 2005, no new exterior access projects were initiated.

Evaluation: No further evaluation required. This is an informal addition to the Monitoring Plan.

Protection

Item 9-1: Protection—Insect and Disease Protection

Activity: Is the management direction adequate to deal with insect and disease problems?

Unit of Measure: Acres

Reporting Period: 5 years

Variability which would initiate further evaluation: 20% increase in rate of spread or volume loss compared to predicted mortality.

Monitoring Results: Insect and disease conditions are monitored by the Forest Health Protection branch of USDA Forest Service State and Private Forestry and the Montana Department of Natural Resources Forestry Division. The table below compares results of aerial surveys on the Beaverhead unit of the BDNF in FY04 and FY05. Acres of bark beetle activity more than doubled for some types of beetle. However, the big jump in infestations between 2004 and 2005 may be somewhat misleading. With ideal weather conditions for aerial flying in 2005, all potential infestations were flown for the first time since 2002.

Maps indicate infestations of particular concern in large and old growth Whitebark and Limber Pines, particularly in the Gravelly Range, and increasing fuel buildup in areas near residential development.

Table 18. Comparison of FY04 and FY05 Bark Beetle Infestations on the Beaverhead Unit

Insect	Acres infested to some degree in 2004	Acres infested to some degree in 2005
Douglas-fir beetle	4,766	23,500
Mountain Pine Beetle	40,926 (12,017 for lodgepole pine alone)	92,900
Western Pine Beetle	0	1800
Western Balsam bark beetle	21,175	82,000
Total	66,867	200,200

Source: USDA, FS, Region 1, Forest Health Protection Missoula Field Office, Bark Beetle Conditions-Northern Region, Ken Gibson 2005.

Data for the western spruce budworm was presented for the BDNF as a whole and can't be broken out for the Beaverhead Unit. Infestations are described as follows:

Table 19. Comparison of FY04 and FY05 Western Spruce Budworm Infestations on both Units B-D

Insect	Infested 2004	Infested 2005	Douglas-fir type on the BDNF affected
Western Spruce Budworm	37,000 acres	61,000 acres	10%

Source: USDA, FS, Region 1, Forest Health Protection Missoula Field Office, Bark Beetle Conditions-Northern Region, Ken Gibson 2005.

Direct control of insects during FY05 included treating 114 acres with MCH and 5 acres with Verbenone to disrupt mountain pine beetles on the Beaverhead Unit (USDA, USFS, 2005 Forest Service Activity Tracking System (FACTS)).

Evaluation: While mapped acres of insect infestations doubled between 2004 and 2005, some of this increase is attributable to better aerial survey weather in 2005.

Drought across the Rocky Mountain west and aging timber stands on the Forest are major contributors to the outbreaks. The majority of the forest types on the BDNF have advanced into mid or late seral conditions and associated size classes vulnerable to insects (Draft EIS, Beaverhead-Deerlodge Draft Revised Land and Resource Management Plan, 2005). Drought conditions have been pervasive since 2000 in the area. Ken Gibson (USDA USFS, Region 1, Forest Health Protection Missoula Field Office, *Bark Beetle Conditions-Northern Region, Insect and Disease Report,* 2005*)* reports that while western Montana and northern Idaho experienced normal or slightly higher amounts of precipitation in 2004 and 2005, long term drought effects are not easy to overcome. Somewhat improved moisture conditions resulted in decline for some insect species but mountain pine beetle and Douglas fir beetle continued to flourish. Intensity of infestations in white bark pine stands increased significantly.

Management activities such as timber harvest, prescribed fire or fuel reduction on the Beaverhead have been insignificant in altering the course of current bark beetle activity, as illustrated by research completed through the western U.S. (Ayers and Lombardo 2000, Volney and Fleming 2000). Many of the conditions leading to insect population increases are beyond land managers' capability to control and are, for the most part, natural occurrences within forested stands (Campbell et al 2004, Swetnam and Lynch 1993). Furniss and Renkin (2003) reviewed forest entomology in nearby Yellowstone National Park and state: "In Yellowstone National Park, forest insects such as bark beetles have existed with their tree hosts over epochs of time. Nonetheless, these insect species fluctuate in abundance and impact, regulated mainly by weather and availability of suitable tree hosts." McGregor and Cole (1985) state "the most important factors affecting survival of the beetle brood and the expansion of beetle populations to epidemic levels are climate, habitat type, size and age of trees, phloem thickness, moisture content of phloem, stand structure, and stand density."

Reducing tree sizes and stand density, mostly to trees smaller than 8" in diameter, has allowed treated stands to escape beetle activity in some areas of the Beaverhead during the current epidemic. However, this has been of limited scope and does not meet the need to maintain larger tree sizes on much of the landscape whether for old growth retention, large sawlog production, watershed protection, soil protection, or wildlife habitat objectives.

The 1986 Forest Plan objectives describe integrated pest management through vegetation treatments to create age class diversity as a way of controlling insects and disease, mountain pine beetle in particular. Clearcutting of lodgepole pine is highlighted. Clearcutting lodgepole pine has

declined on the Forest since a 1992 policy decision was made by the Forest Service to de-emphasize the use of this practice (BDNF, Analysis of the Management Situation, 2002). Clearcut acres have fallen steadily since. While the BDNF may not be able to elevate the scale of management activities like widespread lodgepole clearcuts to the degree infestations could be measurably reduced, we continue to employ integrated pest management techniques. Projects are designed to protect areas of development through fuel reduction or to protecting individual trees or small areas such as in campgrounds or administrative sites using direct controls like insecticides or disaggregating pheromones.

Economics

Item 10-1: Economics—Economic Assumptions

Activity: Verification of predicted costs vs. experienced costs.

Unit of Measure: Dollars

Reporting Period: 5 years

Variability which would initiate further evaluation: ±15% of predicted costs over five years.

Monitoring Results: The FY05 timber and salvage sale budget for both units of the Forest was $1,664,700. That budget went toward a target to offer 20.7 million board feet (MMBF) for sale. (That target was exceeded). The Beaverhead Forest Plan projects a timber budget of $1,094,106 in 2004 dollars to offer an average of 17.3 MMBF. That amounts to approximately $63/MBF projected compared to $80/MBF in real costs.

Evaluation: While the numbers above only offer a rough approximation of actual cost/MBF (volume prepared, offered and sold are all included in the budget) it has been clear that experienced costs of offering timber have been notably higher than Forest Plan projected costs since as early as 1988. As early as 1988, Monitoring and Evaluation Reports described actual timber sale preparation and administration costs higher than predicted for a number of reasons. Mitigation requirements for listed species (both wildlife and fish) continue to increase. Additional requirements evolve based on appeals and litigation. A shift from clearcuts to more intermediate harvests has also increased the cost per acre and cost per board foot.

Item 10-2: Economics—Timber Values

Activity: Verification of predicted values for timber.

Unit of Measure: Dollars

Reporting Period: 5 years

Variability which would initiate further evaluation: ±25% of prediction over five years.

Monitoring Results: In FY05, we received a total of $1,916,000 in NFTM to prepare and offer 20.2 mmbf of timber and also administer the volume under contract. In the salvage sale fund, we received authorization to spend $54,000 to prepare an additional 0.5 mmbf of timber. We do not have a tracking system for expenditures and revenues in place to meaningfully split out the costs for the Beaverhead and Deerlodge. TSPIRS data was dropped in 1998 and we don’t track those items any longer.

Evaluation: Plan predictions made prior to 1986 are no longer valid. Timber values are being reassessed during Forest Plan Revision.

Item 10-3: Economics—Budgets

Activity: Assess program budget vs. actual dollars received.

Unit of Measure: Dollars

Reporting Period: 5 years

Variability which would initiate further evaluation: ±15% of prediction by funding item over five years.

Monitoring Results: The following table displays actual expenditures in FY05 using current budget line items. Changes in budget code structure since the Plans were written make it difficult to compare individual programs over the years. This table indicates shifts in programs over the years. Both 1986 and 2005 budget information is for the Beaverhead-Deerlodge Forest combined. The 1986/87 Plans used 1978 projections so these were converted to 2005 dollars using a GDP deflator of 2.4936.

Table 20. Expenditures in Fiscal Year 2005 by Budget Line Item.

Budget Line Item	Description	1986/87 Projected Plan Budget ($000)	2005 Budget Expenditures ($000)
BDBD	Brush Disposal	366	890
CMFC	Facilities	591	1186
CWFS	Cooperative Work	73	99
CMRD	Road Construction & Maintenance	5722	1518
CMTL	Trail Construction & Maintenance	549	1198
CWKV	Knudtson/Vanderberg Fund	1326	205
HWHW	Hazardous Waste		1478
WFWF	Fire Protection/Preparedness		5304
NFCC	Hazardous Fuels		55
NFIM	Inventory and Monitoring	816	729
NFLM	Land Ownership	779	208
NFMG	Minerals and Geology	828	501
NFPN	Land Mgt Plans (Plan Revision)		975
NFRG	Grazing Management	1458	1241
NFRW	Recreation, Heritage, Wilderness	1546	1071
NFTM	Timber Sales Management	3082	1072

Budget Line Item	Description	1986/87 Projected Plan Budget ($000)	2005 Budget Expenditures ($000)
NFVW	Vegetation and Watershed	835	1194
NFWF	Wildlife and Fish	833	528
RBRB	Range Betterment	388	103
SSSS	Timber Salvage	49	593
WCWC	Computers, Fleet, Radios		1581
TRTR	Road and Trail Restoration		96
SPSP	Economic Action Programs		254
Admin	Administration	3260	525
	TOTAL	$22,975*	$21,702

Source: USFS, BDNF, Fund Status Report 10/25/05

Evaluation: Budget expenditures in FY05 were $21,702,000 compared to the budget of $22,975,000 projected by the Deerlodge and Beaverhead Forest Plans combined. This is within 5% the Plans projected budgets. Actual budget varies widely from predicted budget only if you look at individual budget line items. For example, road construction and maintenance budgets are ¼ of projected but new funding items like fire protection, hazardous fuels and hazardous waste appear. These budget changes are a reflection of changes in national priorities as well as Forest capabilities.

Adjacent Lands

Item 11-1: Adjacent Lands—Local Economies

Activity: How management of the National Forest affects the local economy, resource values, local uses, and lifestyles?

Unit of Measure: N/A

Reporting Period: 5 years

Variability which would initiate further evaluation: Unacceptable results or impacts according to ID team and/or Management Team review.

Monitoring Results: National Forest land nearby greatly enhances the quality of life for the people living in southwest Montana. The Forest is a source of natural resources, recreational opportunities and lifestyle settings for the residents of adjacent communities. Residents in local communities around the BDNF have maintained a high degree of interest in Forest management. This has been reflected in the level of participation in Forest Plan Revision. Work on revising the 1987 Deerlodge and 1986 Beaverhead Forest Plans began in earnest in FY03. The Draft Revised Land Management Plan and EIS were released in June 2005. BDNF staff met with the public in 160 different meetings from Island Park to Mammoth and Billings to Philipsburg. Over 1400 individual letters and over 9,000 signatures came on form letters or petitions before the formal comment period ended in October.

The economic value of activities and resource outputs from the BDNF (as a whole) were calculated for 2005 using an economic input output model called IMPLAN. IMPLAN was used to develop the direct and indirect effects of outputs, revenues, expenditures and Forest Service employment on the employment and labor income in the 8 counties affected most directly by the BDNF. Data on recreation visits were derived from a 2000 National Visitor Use Monitoring survey conducted on sites around the BDNF. We estimate a 1% growth of the numbers reported in the FY04 report. A 2nd NVUM survey was conducted in 2005 but data is too preliminary to use at this time (09/06).

Table 21. Value of Activities and Resources from the Beaverhead-Deerlodge National Forest in 2005

Resource Area	Output	Employment (Jobs related to FS activities)	Labor Income ($000 related to FS activities)
Recreation (visits)	599,940	363	8,393
Fish and Wildlife (visits)	478,355	383	9,160
Range (head months)	134,004	76	930
Timber (MMBF)	10.6	241	6,121
Payments to Counties ($000)	962	21	621
Forest Service Expenditures ($000)	21,702	540	16,750
TOTAL		1,624 jobs	$41,977,000

The Table shows that in 2005, the BDNF activity contributed approximately 1,624 jobs tied to $41,977,000 in labor income to the 8-county area economy. This amounts to 3.5% of the total employment of 45,836 and 3.3% of the area's labor income of $1,265,341,000. The Forests contribution to jobs is up 6% from last year, primarily due to an increase in timber harvested from 8.9 MMBF to 10.6 MMBF and a slight increase in budget. Contributions to the areas labor income is up 9% for the same reasons.

For a complete discussion of how management of the BDNF affects local uses and lifestyles, refer to Volume I of the Draft Revised Land and Resource Management Plan, "Social and Economic Impacts", June 2005.

Evaluation: The Forest Leadership Team has not identified unacceptable impacts.

Item 11-2: Adjacent Lands – Impacts on Management

Activity: What is the effect of other agencies or private landowners on National Forest Management?

Unit of Measure: N/A

Reporting Period: 5 years

Source: Analysis of other agency plans

Variability which would initiate further evaluation: Unacceptable impacts on proposed activities, Forest Plan goals and objectives, or Forest Plan targets.

Monitoring Results: Effects of other agencies or private landowners on National Forest management are tracked largely through the "cumulative effects" analysis in National Environmental Policy Act (NEPA) documents for various projects across the Forest.

Management of the BDNF is affected by a number of other agencies and private landowners in several arenas. The areas influenced the most in FY05 are described below:

Threatened and Endangered Wildlife and Species of Concern – Decisions by the US Fish and Wildlife Service on listed species (bull trout, grizzly bear, bald eagle, trumpeter swans, and lynx) add both management standards and reporting requirements. In FY05, Forest Plan Amendments for Grizzly Bear Habitat Conservation for the GYA National Forests (including the BDNF) were being developed to provide additional programmatic direction for grizzly bear habitat management. Also in FY05, the Northern Rockies Lynx Amendment was being drafted. This Amendment provides management guidelines for Canadian Lynx on National Forests and BLM lands in Wyoming Utah Montana Idaho. Information is available at their website (http://www.fs.fed.us/r1/planning/lynx.html).

Travel Management and Recreational Opportunities – decisions about travel by neighboring agencies (Dillon and Butte Field Offices of the BLM, Gallatin National Forest, and Yellowstone National Park) affect the balance of recreation opportunities our users expect from this Forest. Closures on other lands, whether private or public, can bring new users to this Forest. With new or increased use, user conflicts and resource conflicts can increase.

The Dillon BLM Field Office issued their Final Resource Management Plan (RMP) in 2005. The land use plan decisions described in their RMP are now final and are not subject to further administrative remedy. However, the route designations included in the RMP are implementation level decisions and were open for appeal until May 14, 2006. The BLM travel decisions are being reviewed in conjunction with proposed changes in the BDNF Plan Revision effort.

The Gallatin National Forest issued their Draft Travel Plan and DEIS in 2005. The Final Plan is not expected to be released until late in 2006.

Fire Management – Adjacent ownerships and inholdings of private property influence management options for fire suppression, wildland fire use, fuel treatments and prescribed fire.

The National Fire Plan and subsequent Healthy Forest Restoration Act of 2003 (HR 1904) expedites the preparation and implementation of hazardous fuels projects on all federal land and assists rural communities, States and landowners in restoring healthy forest conditions on state and private lands. Community assistance plans developed with counties and the State are identifying additional wildland/urban interface and opportunities for fuels treatments in urban interface areas adjacent to the Forest. A good example of collaboration and coordination between the BDNF, local landowners and county agencies is the Meadow Creek fuels reduction project on the Madison District. Meadow Creek was ranked as very high priority in a risk analysis contracted by Madison County (Madison County Strategic Wildland Fire Plan (2003)). A Forest Service fuels project proposed for this area opened the door for Madison County to compete for a National Fire Plan grant. The County used this money to develop a defensible space pilot project and flyer to distribute to homeowners. They continue to collaborate on the Meadow Creek fuels reduction project.

Evaluation: The Forest Leadership Team has not identified unacceptable impacts from other agencies or adjacent landowners.

Item 11-3: Adjacent Lands—Emerging Issues

Activity: Emerging issues and changing social values.

Unit of Measure: N/A

Reporting Period: 5 years

Variability which would initiate further evaluation: Issues not resolved or adequately addressed by the Forest Plan.

Monitoring Results: An Analysis of the Management Situation was released in December 2002 to address changes since the 1986 Plan was written, specifically to address those emerging or changing issues not adequately addressed by the Forest Plan. These are the key issues addressed by the various alternatives for a revised Forest Plan. Please refer to that document (available at http://www.fs.fes.us/r1/b-d/) for a comprehensive discussion of this monitoring item.

Evaluation: The Analysis of the Management Situation addresses those issues not resolved or adequately addressed by the Forest Plan.

Allocations

Item 12-1: Allocations—Land Allocations

Activity: Evaluate lands identified as not meeting physical or biological characteristics within assigned MA.

Unit of Measure: Acres

Reporting Period: 5 years

Variability which would initiate further evaluation: ±15% change in acres considered suitable for range or timber management.

Monitoring Results: The allocations made in the 1986 Beaverhead Forest Plan are being re-evaluated through the Forest Plan Revision process, currently underway.

Evaluation: This monitoring item is no longer relevant with changes being made in allocation of suitable lands for the Revised Forest Plan to be issued in FY07.

Item 12-8: Data Base—FP Data Base

Activity: Assess and update Forest Plan data base as needed.

Unit of Measure:

Reporting Period: Annual

Variability which would initiate further evaluation: Any deviation

Monitoring Results: Major updates to the Geographic Information System and corporate date bases have been made during the Forest Plan Revision effort.

Evaluation: Forest Plan data bases were updated extensively for the analysis conducted for Forest Plan Revision.

Appeals

Item 13-1: Appeals

Activity: 2005 Project/Activity Appeals. (Not a Forest Plan Monitoring Item).

Monitoring Results: In FY05, forty nine projects were under some level of environmental review and analysis on the BDNF. Nineteen project decisions were made and the appropriate documents signed. Two of those decisions were appealed. This list includes projects ready for implementation that were involved in appeals or litigation in FY05 (see the next Table 23 for the status of appeals in FY05). The source of the data is the "Schedule of Proposed Action, 07/01/05-09/30/05" for the Beaverhead-Deerlodge National Forest.

Table 22. Projects in Various Planning Stages in FY05

PROJECT NAME	DISTRICT	Stage of completion by the end of the fiscal year
Forest Plan Revision	Forest	DEIS issued 06/05, FEIS underway
CDNST - Fleecer to Seymour	Butte	Scoping Initiated
CDNST - Leadville	Butte	Scoping Initiated
CDNST – Nez Perce Gulch	Butte	Scoping Initiated
Cullen and Lowland Water Developments	Butte	DM underway
North Butte Land Exchange	Butte	EA underway
Whitetail Pipestone Travel Management	Butte	Environmental Impact Statement (EIS) underway
Betka Private Road Use Easement	Butte	DM underway
East Ridge Small Tract Acquisition	Butte	DM COMPLETED 8/08/05
Thompson Park Salvage Sale	Butte	EA underway
Uzlic Small Tracts Acquisition	Butte	DM COMPLETED 8/08/05
Bear Creek and Lemhi Pass AMPs	Dillon	EA underway
Grasshopper Fuels Management	Dillon	ROD COMPLETED 06/20/05
Henderson Gulch Water Developments	Dillon	Scoping Initiated
Robinson Private Road	Dillon	DM underway
Westside AMPs	Dillon	EA underway
OT Mining Amended Plan of Operation for Kit Carson/Dry	Jefferson	COMPLETED 8/04/06
Sheep Creek Stream Restoration	Jefferson	Scoping Initiated
Aurora Creek Placer Plan of Operation	Madison	DM COMPLETED 06/30/05
Cutthroat Trout Habitat Restoration –	Madison	DM COMPLETED 08/19/05

PROJECT NAME	DISTRICT	Stage of completion by the end of the fiscal year
East Gravelly Mountains		
Cutthroat Trout Habitat Restoration – West Gravelly Mountains	Madison	DM
Madison Range AMP updates	Madison	DM pending (11/05 completion)
Meadow Creek Fuels Reduction	Madison	DM Underway
Shovel Creek Hardened Crossings	Madison	Scoping Initiated for DM
Spruce Spring Special use Permit	Madison	DM COMPLETED 05/26/05
Warm Spring Trailhead Vault Toilet	Madison	DM COMPLETED 05/03/05
Abandoned Mine Closures	Pintler	COMPLETED 08/29/05
Antonioli Minerals Exploration	Pintler	DM underway
Barton Spring Commercial Thinning	Pintler	Scoping initiated for DM
Blackfoot Telephone Nonpareil Communications System	Pintler	DM COMPLETED 05/1905
Flint Creek Restoration Project	Pintler	EA COMPLETED 05/11/05
Georgetown Lake Hazardous Fuels Reduction	Pintler	DM underway
Gross Sapphire Exploration	Pintler	DM COMPLETED 04/28/05
Holsten Minerals Exploration	Pintler	Scoping initiated for DM
Maxville Hazardous Fuels Reduction	Pintler	Scoping initiated for DM
North Fork Rock Creek Culvert Removal	Pintler	DM COMPLETED 07/19/05
Piney Point Road Easements	Pintler	DM COMPLETED 08/22/05
Southern Cross Road Easements	Pintler	Scoping initiated for DM
Anderson Mountain Plan of Operations	Wisdom	DM COMPLETED 06/30/05
Big Swamp Creek Post and Pole	Wisdom	Scoping initiated
Chief Joseph Ski Area Cut Tree Retrieval	Wisdom	DM COMPLETED 08/25/05
CDNST – Berry to Goldstone	Wisdom	EA underway
CDNST – Gibbons Pass	Wisdom	Scoping initiated

PROJECT NAME	DISTRICT	Stage of completion by the end of the fiscal year
Lewis and Clark and Nez Perce National Historic Trail	Wisdom	EA COMPLETED SPRING 2005
Richardson Creek Plan of Operation	Wisdom	EA COMPLETED 05/20/2005
Rock Creek Plan of Operation	Wisdom	DM COMPLETED
Twin Lakes Division Fence	Wisdom	DM underway
Bear Gulch Hazardous Fuels Reduction	Wise River	DM underway
North Big Hole AMPs	Wise River	EA underway

Two projects were appealed in FY05 as shown in the table below.

Table 23. Project Decisions Appealed in FY05.

Decision Under Appeal	Appellant(s)	Status
Grasshopper Fuels Mgt.	**Ecology Center, Alliance for the Wild Rockies**	**Appeal withdrawn by appellants**
Grasshopper Fuels Mgt.	**Native Ecosystems Council**	**Appeal withdrawn by appellants**
Sheep Creek Salvage	**Ecology Center, Friends of the Bitterroot, Alliance for the Wild Rockies**	**Decision affirmed, appellants requested relief denied**
Sheep Creek Salvage	**Native Ecosystems Council**	**Decision affirmed, appellants requested relief denied**

Evaluation: No evaluation is required by the Monitoring Plan.

DEERLODGE NATIONAL FOREST

Summary of Observations

Monitoring items are summarized in this table by item number, activity monitored, and the summary observation.

Table 24. Summary of Deerlodge Monitoring Item Observations

Item Number	Title	Observation
1-1	Actual Use and Consideration of Developed Recreation Facilities	The National Visitor Use Monitoring survey was completed in 2005, but results are not yet available.
1-2	Spectrum of Dispersed Recreation Opportunities and Uses	Project level analysis has determined the mix of VQOs has been maintained for projects completed in 2005.
1-3	ORV (Off Road Vehicles) Compliance and Damage	No travel plan updates were made in 2005.
1-4	Hunter Recreation	FWP monitoring shows all elk management units meeting or exceeding objectives for population, hunter numbers, and hunter recreation days.
1-5	Actual Condition of Significant Cultural Sites	We are within expected parameters for Section 106 compliance and deterring vandalism.
2-1	Change in the Roadless Resource	No activity took place in 2005 which would change roadless character (timber harvest, road construction, mining, etc).
3-1	Trail Conditions, Visitor Encounters, Range Trend and Conditions, and Campsite Impacts	The Anaconda Pintler Wilderness Area was managed to standard in 2005. With the ongoing development and implementation of a Wilderness Education Plan and an increased presence in the field, the damage to the wilderness resource may be reduced and desired future conditions achieved.
4-1	Elk, mule deer, moose and mountain goat populations	Big game populations are fundamentally robust and well distributed.
4-2	Elk, mule deer, moose and mountain goat habitat	No extraordinary management action appears to be required of State and Federal agencies.
4-3	Effect of land use activities on big game populations	Big game populations continue to remain healthy and wide spread across the Forest.
4-4	Indicator species – elk/mule deer- habitat effectiveness	Habitat security does not appear to be a crucial issue at the Forest scale. Forest Plan revision is addressing road densities with the objective of reducing roads to benefit wildlife.

Item Number	Title	Observation
4-5	Indicator species-bighorn sheep- habitat suitability	There are no habitat limitations for bighorn sheep at current population levels.
4-6	Indicator species for vegetation communities	The Forest reporting is based on the Northern Region Landbird Monitoring program and Montana Natural Heritage Program for data and trends related to indicators in a number of vegetative communities.
4-7	Old growth habitat	Old growth habitat is abundant on the BDNF. Existing habitat is more than sufficient for maintaining these species.
5-1	Cutthroat Trout	Density of WCT declined in Norton Creek with competition from Eastern Brook Trout. Pool density in the same stream increased. The number of pools declined in Copper Creek.
5-2	Intragravel Sediment and Fish Numbers	Sampling efforts have been shifted towards methodologies that measure surface fines' to provide data with the broadest potential benefit and the greatest potential for regional consistency. Trend data will be provided in future years.
5-3	Aquatic Invertebrate Populations	No aquatic invertebrate monitoring was done in FY05. Instead, water temperatures were monitored on five streams on the Pintler Ranger District Boulder, South Boulder, Wyman, Middle Fork Rock and Copper Creeks. Results were analyzed in comparison to the Riparian Management Objective for water temperature.
6-1	Streamside Cover	Not reported in FY05..
6-2	Riparian Rehabilitation	Monitoring of a 2003 stream fencing project indicates the initial stages of recovery are well on its way.
7-1a	Utilization of Forage in Transitory Range	No correlation was established between forage utilization and plantation failure.
7-1b	Percent of Available Forage Utilized by Livestock	Actual use was 82% of the capacity projected by the Deerlodge Forest Plan.
7-2	Allotment Management Planning and Update	No allotment updates were completed on the Deerlodge portion of the Forest in FY05.
7-3	Weed Infestations	The Forest far exceeded noxious weed treatment acres scheduled in the Forest Plans.
7-4	Range Condition and Trend	A new monitoring technique was implemented on a small scale on the Forest in 2006. We

Item Number	Title	Observation
		could not draw any trend conclusions for the Deerlodge based on the small sample in 2005.
7-5	Permit Compliance	In FY 2005, 68 out of 93 allotments were administered to standard. Of the 68 allotments inspected, 55 were in compliance and 13 (or 19%) were not.
8-1	Timber—Regulated Volume Prepared for Sale	Volume offered and/or sold does not exceed the ASQ over the 10 year period. No further evaluation is required.
8-2	Timber—Timber Assumptions: Volume, Condition, Class, Logging, Acres Harvested	Timber assumptions for board foot/cubic foot rations, volume/acre, condition class and logging system were acceptable. Acres harvested are only 33% of what was projected, this reflects in the volume harvested/year as well.
8-3	Timber—Silvicultural Assumptions and Practices	Silvicultural prescriptions and assumptions have been applied as required to timber stands. However, Forest Plan assumptions that clearcutting would be the primary harvest method in lodgepole pine, throughout the entire planning period are erroneous.
8-4	Timber—Size of Openings	The size of opening standard for even –aged management was met where it applied. No further evaluation is required.
8-5	Timber—Regenerated Yield Projections	Growth plot remeasurement was on schedule during the first decade of the Plan. Twelve plots (2001) have been remeasured since 1996.
8-6	Timber—Reforestation Practices and Assumptions	While the acres planted are far below Forest Plan projections, this is a reflection of reduced harvest, not lack of regeneration. No further evaluation is required.
8-7	Timber—Timber Stand Improvement Practices and Assumptions	Although TSI work is decreasing, we are still within 75% of the Forest Plan estimate over time.
8-8	Timber—Lands Suitable for Timber Production	There have not been measureable changes in the acreage of suitable lands over the last 10 years.
9-1	Compliance with local, State, and Federal Water Quality Standards	BMPs and mitigation measures were incorporated into Gird Creek and Low Sheep Thinning Timber Sales.
9-2	Riparian Rehabilitation	The Jack Creek tails removal was a major rehabilitation effort accomplished as well as 14

Item Number	Title	Observation
	Projects	miles of stream restoration and 10 acres of lake restoration.
9-3	Soil and Water—Productivity Changes in Sensitive Soils	Monitoring on the South Butte timber sale demonstrated where BMPs are applied, they are effective in minimizing detrimental soil disturbance.
9-4	Adequate Water Supply	All water right negotiations made during 2005 met policy objectives as stated in FSM 2541.02.
10-1	Mineral Activities	Sixty two Mineral Plans of Operation were administered to standard. Operators are applying mitigation measures to minimize adverse effects.
11-1	Acres and Volumes of Insect and Disease Infestations	Mountain pine beetle infestations have doubled in the past year due to drought conditions, warm winter temperatures and aging timber stands. Timber sales focus on salvage of insect mortality to reduce fuels or protect the public, thinning of vulnerable stands to improve tree vigor, or other forest health related needs.
11-2	Air Quality	State and Federal air quality standards were met.
11-3	Fuel Treatment Outputs	We accomplished 5,273 acres of fuel treatment across the Forest with a target of 2,989 acres. Fifty eight percent of the accomplishment was in wildland urban interface.
11-4	Wildfire Acres	In FY05, 326 aces burned on the Deerlodge unit of the Forest.
11-5	Cost of Suppression, Protection Organization and Net Value Change	The fire management program met targets associated with funding at 80% of the “Most Efficient Level”.
12-1	Local Roads in Place and Collector Roads Constructed	No new permanent (system) roads were constructed; 16.2 miles of existing roads were reconstructed on the Beaverhead-Deerlodge.
12-2	Road Management	Approximately 110 miles of National Forest System Roads are closed year-round to standard highway vehicles, and 695 miles closed seasonally.
13-1	Economics—Verification of Unit Cost Used in Plan Compared to On-The-Ground Cost	Costs of offering timber have been notably higher than Forest Plan projected costs since as early as 1994.

Item Number	Title	Observation
14-1	Adjacent Lands, Resources, Communities, and Agencies	Forest Service contributions to jobs are up 6% from 2004 in the 8 county area affected directly by BDNF management.
14-2	Adjacent Lands, Resources, Communities, and Agencies	Other agencies and private landowners continue to affect BDNF management in the arena of threatened or endangered wildlife and species of concern, travel management and fire management.
15-1	All Resources	The Analysis of the Management Situation addresses those issues not resolved or adequately addressed by the Forest Plan.
15-2	All Resources	Allocation of suitable lands is being reevaluated during the Forest Plan Revision process.
16-1	Research	The Forest participated in development of a riparian vegetation monitoring protocol to comply with the PacFish/Infish Biological Opinion (PIBO). An extensive inventory of sensitive plants was done in 2005, including all known Lemhi Penstemon, Alkali primrose, and Sapphire rockcress populations.

Recreation

Item 1-1: Recreation—Actual Use and Consideration of Developed Recreation Facilities

Activity: Check projection accuracy; monitor closeness of actual use to capacities; check if maintaining developed facilities to maintain existing capacity and standards.

Unit of Measure: MRVDs, PAOT

Reporting Period: Annual

Variability which would initiate further evaluation: ±20% difference between projected and actual use; capacity +10%; loss of 20% of developed facility capacity.

Monitoring Results: The National Visitor Use Monitoring (NVUM) survey was completed in 2000 and 2005. Because the 2005 results are not yet available, the most current available information is from 2000. These results were published in the FY03 Monitoring and Evaluation Report.

Evaluation: The FY03 Monitoring Report concluded a comparison can't be made between NVUM surveyed visits and the Forest Plan projected visitor use days because they aren't comparable units. In addition, NVUM data is only available Forestwide and doesn't break out the Deerlodge and Beaverhead units. Trends in visitor use, spending and satisfaction between 2000 and 2005 should be available late in 2006.

Item 1-2: Recreation—Spectrum of Dispersed Recreation Opportunities and Uses

Activity: Insure maintenance and enhancement of a wide variety of recreation opportunity settings and VQO mixes.

Unit of Measure: Acres

Reporting Period: Annual

Variability which would initiate further evaluation: ±10% of projected base by ROS preference type.

Monitoring Results: The current distribution of recreation opportunity spectrum classes was mapped in 2003 in conjunction with Forest Plan Revision efforts (see FY03 Monitoring and Evaluation Report).

Evaluation: ROS acres were calculated for Forest Plan Revision using a different land base than earlier monitoring reports, so a direct comparison of shifts in percent cannot be made. The DEIS discloses changes in classes from inception of the Forest Plan in 1987 to present. Project level analysis has determined that the mix of VQOs has been maintained for projects completed in 2005.

Item 1-3: Recreation—ORV (Off Road Vehicles) Compliance and Damage

Activity: Insure travel plan updates are realistic, understandable and enforceable; travel plan adequately protects the resources and meets assigned prescriptions of the Plan.

Unit of Measure: Varied

Reporting Period: Annual

Variability which would initiate further evaluation: ID Team or District review indicates unacceptable resource damage from ORV use, an unenforceable situation, or use conflicts with management goals for the Management Area.

Monitoring Results: Planning for the Whitetail-Pipestone area continued in 2005 but no travel plan updates took place to monitor or evaluate.

Evaluation: Changes in National direction will affect travel planning after 2005. The Forest Service issued new rules for designated routes and areas for motor vehicle use (36 CFR 212, 251, 261 and 295). In response to this, the Forest will be revising motorized travel management decisions beginning in 2007.

Item 1-4: Recreation—Hunter Recreation

Activity: Check the adequacy of cover and road closure combinations to provide season-long hunter opportunity.

Unit of Measure: % of bull elk harvested

Reporting Period: Annual

Variability which would initiate further evaluation: When bull elk harvest in any hunting district exceeds 40% during the first week of hunting season consistently (3 years in a row).

Monitoring Results: Montana Fish, Wildlife and Parks (FWP) most recent elk hunting and harvest report (2004) shows a 26.7% hunter success for Region 3. Virtually all of the FWP elk

management units encompassing the Forest have reached or exceeded their FWP population goals.

Evaluation: FWP monitoring shows all elk management units meeting or exceeding objectives for population, hunter numbers, and hunter recreation days.

Item 1-5: Recreation—Actual Condition of Significant Cultural Sites

Activity: Actual condition of significant cultural sites; monitor deterioration and/or vandalism to National Register eligible or listed sites.

Unit of Measure: Project

Reporting Period: Annual

Variability which would initiate further evaluation: Vandalism evident at 10% of sites; deterioration which threatens cultural integrity at any National Register eligible site; less than 100% of all projects in compliance with Section 106.

Monitoring Results: All projects were in compliance with Section 106. No reported vandalism to heritage sites occurred in 2005. Little program time is available for site stabilization or restoration so National Register eligible properties continue to deteriorate.

Evaluation: We are within expected parameters for Section 106 compliance and deterring vandalism. Due to a lack of broad scale archaeological inventory and lack of program capacity to complete archaeological/historic site stabilization and restoration projects we are falling behind in this monitoring element. We continue to complete stabilization/restoration projects as time and funding allow. (e.g. in 2005 we restored three National Register eligible charcoal kilns on Wise River District).

Roadless

Item 2-1: Roadless—Change in the Roadless Resource

Activity: Compare the acres and distribution of the roadless resource with that projected.

Unit of Measure: Acres

Reporting Period: Annual

Variability which would initiate further evaluation: Loss of 10% of roadless resources from Forest Plan projections.

Monitoring Results: There was no reduction in acres of inventoried roadless area in 2005. A new inventory in 2004 (described in the FY04 Monitoring and Evaluation Report) shows an increase in roadless acres since 1983.

Evaluation: Development of roadless areas is far less than the Forest Plan predicted. Only 1% of the total acres projected for development of the Forest Plan were actually developed by the end of the first decade. National pressure to protect roadless lands in the National Forest System manifested as the Roadless Area Conservation Rules of 2001 and 2005. With this shift in public interest, the Forest Service has been managing roadless areas under and Interim Directive from the Chief of the Forest Service since 2000. This directive resulted in little or no activity taking place in inventoried roadless areas on the BDNF since 2000.

Wilderness

Item 3-1: Wilderness—Trail Conditions, Visitor Encounters, Range Trend and Conditions, and Campsite Impacts

Activity: Achieve high level of wilderness recreation experience and maintain high quality wilderness resource.

Unit of Measure: Varied

Reporting Period: Annual

Variability which would initiate further evaluation: 10% deviation from management plans is acceptable, any ecosystem damage.

Monitoring Results: *Anaconda Pintler Wilderness Area* – See the Beaverhead Monitoring Item 5-2 for 2005 monitoring data.

Evaluation: Some damage has occurred around numerous lakes in the APW. Restrictions have been put in place to reduce the impacts from camping near the lakes by humans and stock. Compliance with these management actions has been relatively unsuccessful. Enforcement of these restrictions is sporadic due to limited numbers of personnel in the field to enforce, monitor, and educate wilderness visitors. Completion of the Wilderness Education Plan and implementing it at the local level should help to increase compliance and reduce impacts. Mandatory registration of visitors has also been implemented in the APW, but has also met with limited success. With increased education and increased field presence, registration of visitors should also improve.

Wildlife

Item 4-1: Wildlife—Seasonal Distribution, Movement Patterns, Population Structure and density of Elk, Mule Deer, Moose and Mountain Goat Populations.

Activity: Identify ungulate population segments and yearlong range of each segment in the Elkhorns.

Unit of Measure: Varied

Reporting Period: Annual

Variability which would initiate further evaluation: ±20% from previous measurements.

Monitoring Results: Approximately 50% of the Deerlodge hunting districts exceed population objectives in the State plan. Forest-wide populations basically meet the aggregate hunting districts objectives, but the distribution is uneven with some hunting districts slightly below the lower range of State objectives. Undergoing forest plan revision has lower road density objectives to improve habitat effectiveness and security.

State population monitoring shows stable moose populations. The subset of Item 1-3 for the Deerlodge NF totals approximately 320 animals. Populations appear to be stable.

Deerlodge mule deer populations also appear to be stable at approximately 7090 as a subset of item 1-3.

Mountain goats are stable at low levels. Distribution is disjunct across island mountain ranges.

Evaluation: Big game populations are fundamentally healthy and stable. Montana Fish, Wildlife and Parks have not identified Forest-wide concerns. The State permits limited either sex elk harvest to control populations.

Item 4-2: Wildlife—Habitat

Activity: Evaluate habitat on the basis of topographic and physiographic features, vegetation and climate for elk, mule deer, moose, and goat to determine preference by species of wildlife.

Unit of Measure: Varied

Reporting Period: Annual

Variability which would initiate further evaluation: ±20% from previous measurements.

Monitoring Results: Habitat conditions, as indicated by stable or increasing big game populations, do not appear to limit any of these species. Southwest Montana has undergone a recent drought cycle (5-6 years) that does not appear to have affected populations. While forested habitats are being altered by mountain pine beetle infestations, early seral stages that can provide increased forage will result from these natural disturbance processes. Mild winters have enabled big game populations to survive this high stress period in good condition. An extended severe winter is more likely to affect populations by increasing winter die-off.

Evaluation: Healthy big game populations are well distributed forestwide.

Item 4-3: Wildlife—Effects of Land Use Activities

Activity: Evaluate response to past, present, and future land use activities (includes livestock, grazing, timber harvest, fire, vehicle use, mining and hunting).by various ungulate populations and the effect on populations.

Unit of Measure: Varied

Reporting Period: Annual

Variability which would initiate further evaluation: ±20% from previous measurements.

Monitoring Results: No fundamental changes have occurred across the Forest since the previous report. OT Mining Company has been very actively core sampling for minerals on the Jefferson Ranger District. No mineral development has occurred yet as a result of that activity. Residential development of private lands bordering the Forest continues to occur. This is likely to increase conflicts with maintaining suitable winter range for big game.

Evaluation: As indicated in item 1-4, 4-1, and 4-2 the vitality of big game populations is not a concern as of this report.

Item 4-4: Wildlife—Indicator Species-Elk/Mule Deer Habitat Effectiveness

Activity: Evaluate effectiveness of elk and mule deer habitat (cover/forage, open road density, and livestock impacts on elk habitat potential) by elk security areas to be able to respond to any unacceptable deviation from past measurement.

Unit of Measure: Varied

Reporting Period: Bi-annual

Variability which would initiate further evaluation: -20% from previous measurements.

Monitoring Results: As noted in items 1-4, 4-1, 4-2, and 4-3, mule deer and elk populations are healthy across the forest. Hunting season secure habitat as measured by road density exceeds 40% in 9 of 12 hunting districts. The remaining 3 have 33% secure habitat.

Evaluation: Habitat security at the Forest scale appears adequate. Three individual hunting districts (213, 214, & 318) have greater management challenges due to higher road densities. The preferred alternative in the Draft Revised Forest Plan will reduce road densities from the current condition, improving security for elk.

Item 4-5: Wildlife—Indicator Species-Bighorn Sheep-Habitat Suitability

Activity: Evaluate bighorn sheep habitat suitability to be able to respond to any unacceptable deviation from past measurement.

Unit of Measure: Variable

Reporting Period: Annual

Variability which would initiate further evaluation: -20% from previous measurements.

Monitoring Results: Bighorn sheep are sparsely distributed on the Forest. Approximately 475 animals are found in three hunting districts on the Forest. No domestic sheep are grazed anywhere near wild populations, thereby reducing the likelihood of disease transmission.

Evaluation: The biggest potential threat to maintaining healthy bighorn is disease transmission from domestic sheep. There are no active sheep allotments on the Deerlodge NF.

Item 4-6: Wildlife—Indicator Species for Vegetative Communities

Activity: Evaluate the following communities to respond to any unacceptable deviation from past measurement:

Table 25. List of Indicator Species by Vegetative Community

Vegetation Community	Indicator Species
Lodgepole Pine	Hairy Woodpecker (Dendrocopus villosus)
Mountain Grassland	Mountain Vole (Microtus montanus)
Evergreen Shrub	Sage Thrasher (Oreoscopkes montanus)
Riparian: Shrub	Belted Kingfisher (Megaceryle alcyon, Willow Flycatcher (Empidonax traillii)
Riparian: Tree	Northern Water Shrew (Sorex palustris), Warbling Vireo (Vireo princeps)
Riparian: Wet Meadow	Western Jumping Mouse (Zapus princeps)
Riparian: Marshland	Blue-winged Teal (Anas discors)

Unit of Measure: Varied

Reporting Period: Annual

Variability which would initiate further evaluation: 20% from previous measurements.

Monitoring Results: The species listed above are monitored by the Northern Region of the Forest Service through an active bird monitoring program developed to support Forests across Montana and northern Idaho and through the Montana Natural Heritage Program. The Landbird monitoring program was initiated region wide to help biologists and managers better understand

habitat relationships of landbirds breeding in this region. The program helps Forests meet their legal mandates to monitor populations of "indicator" species in order to maintain viable populations of native vertebrates. The objectives, specifically, are to monitor the long term population and distribution trends, assess habitat relationships via permanent survey points, and conduct effectiveness monitoring of selected management practices. Results of 10 years of data are available at http://www.avianscience.org/research_landbird.htm.

The BDNF also uses data from the Montana Natural Heritage program, available at http://nhp.nris.mt.gov/nhip/birdmap.aspx and the North America Breeding Bird Survey, (Sauer, J. R., J. E. Hines, and J. Fallon. 2005. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2005. Version 6.2.2006. USGS Patuxent Wildlife Research Center, Laurel, MD),* available at http://www.mbr-pwrc.usgs.gov/bbs/bbs2005.html, to develop species distribution and trend information.

The 1987 Deerlodge Forest Plan did not provide a baseline against which to evaluate deviations in measurements for this monitoring item. So the evaluation of population trend will be based on the 10 years of Landbird data going back to 1996 when available, supplemented with trend data from the other two sources described above.

The evaluation of habitat will be based on trends from historic to 2003 and on management activity data from 2000 to 2005. A vegetation analysis completed in 2003 in preparation for forest plan revision provides a baseline against which to measure changes from historic to current conditions. Current vegetative cover and structure on the BDNF was obtained from the National Forest Inventory and Analysis (FIA) data set. The landscape dynamic simulation model SIMPPLLE (Chew, 2003) was used to estimate the historic range of possible vegetative patterns that may have occurred on BDNF landscapes over the past 400 years (DEIS, 2005). Separate viability analyses were done to look at riparian and sagebrush habitat using the Regional SILC3 vegetative cover map.

Hairy Woodpecker – Landbird monitoring plots on the BDNF resulted in the following detections of hairy woodpecker.

Table 26. Detections of hairy woodpecker on the BDNF by year

Hairy Woodpecker	1994	1995	1996	1998	2000	2002
Number of detections	12	8	1	1	5	21
Number of plots	636	801	507	301	301	625

The Landbird monitoring program also provides regional trends. Trends for hairy woodpecker in western Montana are displayed in the figure below. Detections vary between about .033 % and .058% of the plot counts.

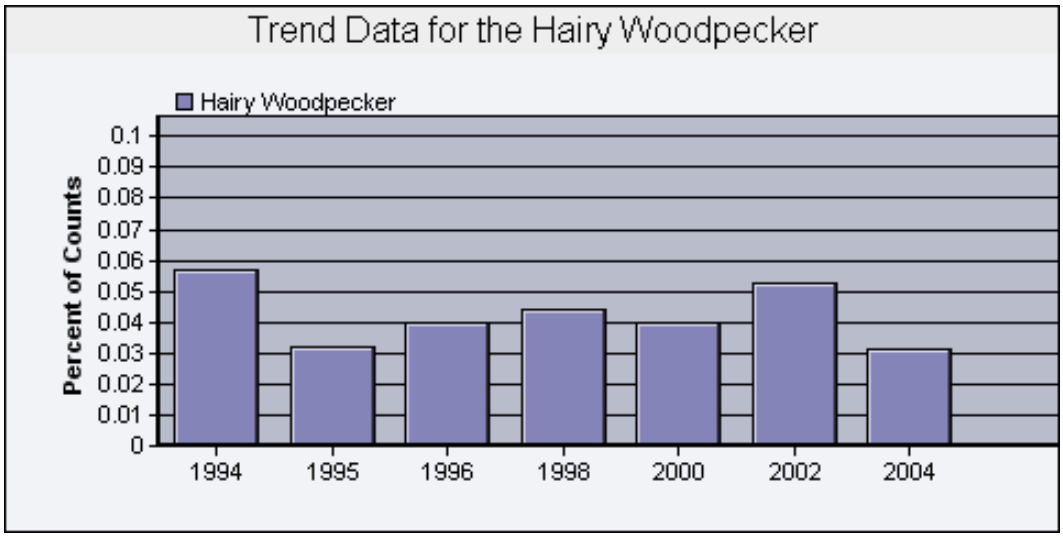


Figure 1. Trend for Hairy Woodpecker in western Montana, Northern Region Landbird Monitoring Program

The Montana Natural Heritage program data shows hairy woodpecker well distributed in southwest Montana. That data also shows a peak in detections in 2002 with some decline in reports in 2003-2005. The North American breeding bird survey reports positive trends in southwest Montana since 1996, ranging from 0.25% increase per year to more than 1.5% increase per year. Comparing the most recent data on the BDNF with the 1996 data, and the North American breeding bird reports, it appears that trends are up or stable and well within under the 20% change which would trigger further evaluation of this item.

Trends for hairy woodpecker *habitat* are also up. Lodgepole pine covers much more of the forest currently than historically, as indicated by the SIMPPLLE model (DEIS, 2005, pg. 75). In 2003, the BDNF had 1,300,000 acres of lodgepole pine, compared to a modeled historical range of 174,401 to 405,937 acres. The structure of those stands is older and more affected by insect and disease than historical models indicate, as well. Item 11-1 of this report indicates that mountain pine beetle infestations in lodgepole pine have doubled in the past year due to drought conditions, warm winter temperatures and aging timber stands. Some 182,000 acres on the Deerlodge unit have been affected by mountain pine beetle.

Management activities directed at lodgepole pine habitat have been on a small scale. Between 2000 and 2005, 1,409 of the 351,727 acres of lodgepole pine on the Deerlodge zone in were treated in projects targeting public safety around campgrounds, fuel reduction, and salvage of dead and dying trees (USFS, Timber Stand Management Reporting System (TSMRS)). That amounts to 4/10 of a percent. This is considerably less than the 20% change in measurements which would trigger further evaluation. Effects of management activities on hairy woodpecker are not evident from habitat monitoring information.

Mountain Vole – Montana Natural Heritage program show distribution of montane vole spotty across southwest Montana. Detections were recorded in 2003 and 2004 in the Big Hole (Wisdom) and Fleecer areas. There is not enough population data since 2000 to trigger a need for further evaluation.

Mountain grassland habitat for mountain voles is currently higher than the modeled historical coverage by grasslands (DEIS, 2005), 271,600 acres across the forest compared to the historical range of 258,400 to 271, 400 acres.

The BDNF does not engage in management actions which convert grasslands to other vegetation types, however, livestock grazing can affect the quality of grassland habitat for wildlife.. Monitoring of livestock grazing allotments demonstrates that application of more stringent riparian forage utilization and stream bank compaction guidelines has resulted in reduction of actual Animal Unit Months (AUMs) grazed and a reduction in upland grass utilization (USFS, BDNF, FY99 Report) which would be beneficial for the montane vole. Effects of management actions are not evident from grassland habitat monitoring information and would not trigger further evaluation.

Sage Thrasher – Montana Natural Heritage program shows distribution of sage thrasher scattered across sagebrush habitats in southwestern Montana, off National Forest. Sightings in 2002, 2003, 2004 and 2005 were in the area of the east Pioneers, Horse Prairie, Tendoy Mountains, and Grasshopper Valley. The North American Breeding Bird Survey shows slight downward trends since 1996 for sage thrasher in southwest Montana, decreasing from .25 to 1.5% per year, except in the Centennial Valley area where trends are up from .25 to 1.5% per year. Population trend data since 1996 does not exceed 20% to trigger further evaluation.

Sagebrush steppe habitat on the BDNF is limited. Well over 85% of the sagebrush cover in southwest Montana is off of Forest Service lands (BDNF Wildlife Habitat Viability Analysis, Query 6, 04/21/03). Most of the BDNF sagebrush acres are concentrated in the Jefferson and Pioneer landscapes. Current estimates (DEIS, 2005) show mountain shrublands currently occupy 84% of the lower range of modeled historic shrublands on the forest (186,600 acres compared to a historical range of 219,600 to 267,400 acres). Xeric shrublands occupy 58% of the lower range of modeled historic occurrence on the forest (22,200 acres compared to a range of 38,100 to 61,600 acres). The cause is attributed to conifer encroachment into shrublands, a result of fire suppression and lack of management rather any specific management activities.

The primary management activity which reduces sagebrush habitat is prescribed burning. The purpose can be to treat sagebrush/grasslands to restore grasslands, or to treat sagebrush/Douglas-fir colonization to reduce conifers in the short term and restore sagebrush in the long term. Between 2000 and 2005, 4,595 acres of sagebrush on the Deerlodge were burned or treated for ecosystem improvement (reduction of conifer invasion into brushlands) (USFS, TSMRS). The scale of management activities in sagebrush steppe habitat is within the 20% and does not trigger further evaluation. However, the Forest Plan Revision DEIS identifies loss of sagebrush/grassland cover as a result of fire suppression as an issue. Further evaluation is taking place and the Draft Plan proposes objectives to increase this habitat.

Belted Kingfisher – Landbird monitoring plots on the BDNF resulted in detections of belted kingfisher as shown below. The numbers have been small but stable since 1994. Regional trends were not estimated because detection is difficult and there is not enough data on these birds

Table 27. Detections of belted kingfisher on the BDNF by year

Belted Kingfisher	1994	1995	1996	1998	2000	2002
Number of detections	1	1	1	2	1	2
Number of plots	636	801	507	301	301	625

The Montana Heritage Program shows detections in the Big Hole, Beaverhead, Madison and Ruby/Jefferson River valleys and breeding documented on the forest. The North American

Breeding Bird Survey shows a mix of downward and upward trends in southwest Montana. The upward trend is in the Madison, Ruby and Jefferson valleys.

Small number of detections on the BDNF prevents a conclusion on whether population trends are within the 20% change to trigger evaluation, but trends in the North American Breeding Bird Survey would support an upward trend.

Riparian shrub habitat on the BDNF occurs in too small patches to be detected well in the vegetation satellite coverage (SILC3) or to be adequately sampled by FIA. Estimated coverage is 3 to 5% of the forest and shrinking (DEIS, 2005). The BDNF Forest Plan Monitoring and Evaluation Report on Riparian Health, 1999, concluded the shrub component of riparian communities is more limited than 50, 20 or even 10 years earlier. This is a result of browsing by moose and livestock, beaver trapping and conifer succession.

Management actions in riparian shrub habitat are generally limited to controlled livestock grazing. Heightened management of livestock grazing in riparian areas began on the Deerlodge in 1996 with the development of site-specific measures and guidelines for permit compliance. Compliance with these guidelines is resulting in improved riparian conditions as reported in the FY99 and FY04 Forest Monitoring Reports. While management actions have not resulted in the loss of 20% of the riparian shrub habitat which would trigger further evaluation, conifer succession into riparian deciduous shrub habitat was identified as a management concern in the Revised Forest Plan DEIS. Further evaluation is taking place, and an objective is proposed in the Draft Plan to reverse this trend.

Willow Flycatcher – This species is not included in the Landbird reports. Montana Natural Heritage Program shows willow flycatcher well distributed in riparian shrub habitat across southwest Montana on and off the National Forest. Sightings in the five years since 2000 were numerous, highest in 2001.The North American Breeding Bird Survey combines their trend analysis of willow flycatcher with the alder fly catcher. The trend for the combined species is down from 1996. It is unknown whether that trend applies to both bird populations.

See the discussion of riparian shrub habitat for belted kingfisher.

Northern Water Shrew – The northern water shrew has not been confirmed on the Forest. Montana Natural Heritage Program has little data for the water shrew since the 1970s. No trend data is available. No further evaluation has been triggered.

Riparian tree habitat on the BDNF occurs in too small patches to be detected well in the vegetation satellite coverage (SILC3) or to be adequately sampled by FIA. Estimated coverage by riparian spruce type is about 2,600 acres based on SILC3 data (Wildlife habitat viability analysis Query 2, 2003). While riparian tree habitat for northern water shrew is limited on the BDNF, it is growing. The Forest Monitoring and Evaluation Report FY99 and the Forest Plan DEIS (2005) conclude that conifer succession (spruce and lodgepole) is increasing riparian tree habitat at the expense of important riparian deciduous shrublands.

Standards and guidelines for streamside management zones and riparian conservation areas generally limit management actions in this habitat. Effects of management activities reducing riparian tree habitat are not evident from monitoring information. No further evaluation is triggered. However, the Revised Forest Plan DEIS identifies this issues, evaluates it further, and the Draft Plan proposes objectives to reverse this trend.

Warbling Vireo – Landbird monitoring plots on the BDNF resulted in the following detections of warbling vireo. This species is ubiquitous across the forest. Montana Natural Heritage Program confirms the widespread distribution of warbling vireo with large numbers of sightings in southwest Montana.

Table 28. Detections of warbling vireo on the BDNF by year

Warbling Vireo	1994	1995	1996	1998	2000	2002
Number of detections	203	190	134	17	5	21
Number of plots	636	801	507	301	301	625

The Landbird monitoring program provides regional trend data as well as forest data. Trends for warbling vireo in western Montana are displayed in Figure 2. They appear to be slightly upward for the zone considered.

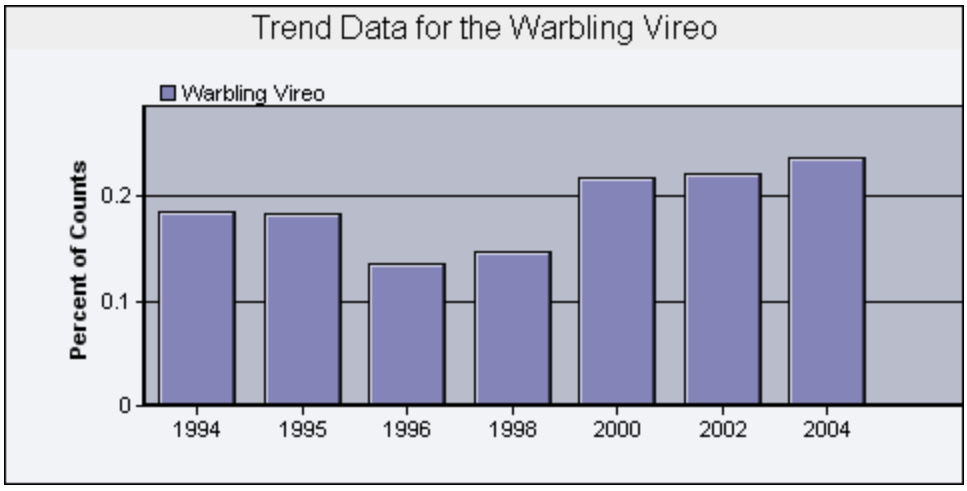


Figure 2. Trend for warbling vireo in western Montana, Northern Region Landbird Monitoring Program

The North American Breeding Bird Survey shows a mix of trends in the BDNF area since 1996, upward on most of the forest, downward on the northwest corner of the forest. Trend data for populations does not trigger further evaluation for this species.
See the discussion of riparian tree habitat above for the northern water shrew.

Standards and guidelines for streamside management zones and riparian conservation areas generally limit management actions in this habitat. Effects of management activities reducing riparian tree habitat are not evident from monitoring information. No further evaluation has been triggered. However, the Forest Monitoring and Evaluation Report FY99 and the Forest Plan DEIS (2005) conclude that conifer succession (spruce and lodgepole) is increasing riparian tree habitat at the expense of important riparian deciduous shrublands. This situation is evaluated in the DEIS and as a result, the Draft Revised Forest Plan proposes objectives to reverse this trend.

Western Jumping Mouse – Montana Natural Heritage Program has little data for the western jumping mouse since the 1970s. No sightings were attributed to the BDNF since the 1987 Deerlodge NF Plan was written. No trend data is available. No further evaluation is triggered by population data.

About 55,000 acres of the BDNF are classified as streamside riparian zones, but bog, swamp or wet meadow habitat for western jumping mouse on the BDNF is only estimated at 3,000 acres (BDNF Wildlife Viability Analysis, Query 3, 2003).

Management activities are not scheduled in wet meadows. Livestock grazing may take place in wet meadows on some allotments during the dry season. Heightened management of livestock grazing in riparian areas began on the Deerlodge in 1996 with the development of site-specific measures and guidelines for permit compliance. Compliance with these guidelines is resulting in improved riparian conditions as reported in the FY99 and FY04 Forest Monitoring Reports. No further evaluation is triggered by changes in habitat coverage.

Blue-winged Teal – Montana Natural Heritage Program shows a scattered distribution of blue-winged teal in southwest Montana. Since 2000, this species was sighted in the Madison and Big Hole valleys. The North American Breeding Bird Survey shows an upward trend for populations in southwest Montana, growing from .25% to 1.5 % and more per year. No further evaluation is triggered by population trend data.

The best habitat for blue-winged teal is located in valley bottoms off the forest. Marshlands are uncommon on the BDNF. Riparian classification estimates bog, swamp or wet meadow habitat (which would include marshlands) cover 3,000 acres on the forest (BDNF Wildlife Viability Analysis, Query 3, 2003). The BDNF has not scheduled management activities in the type of marshlands suitable for blue-winged teal. Effects of management actions on marshlands are not evident from monitoring information although extended drought conditions may be reducing their extent. No further evaluation is triggered by changes in marshland habitat.

Summary Evaluation: Population trends in southwest Montana are up for hairy woodpecker, warbling vireo and blue-winged teal. Population trends are mixed for belted kingfisher and slightly down for sage thrasher, except in the Centennial Valley. None of these changes are of the magnitude to trigger further evaluation. Population trends are unknown for mountain vole, willow flycatcher, northern water shrew and western jumping mouse.

Deleterious effects of scheduled management actions on habitat coverage, condition or trend has not surfaced in forest-wide or project monitoring for any of these habitats of concern. Acres of habitat change caused by scheduled management actions have been well within the 20% which would trigger further evaluation.

However, the absence of fire as an agent of change and the absence of management activities on the landscape has influenced several of these communities, as described in the Revised Land and Resource Management Plan DEIS: lodgepole pine, mountain grasslands and shrublands, and riparian shrublands. Extended drought across the region has also had some effect. Insect populations have greatly increased (USDA, 2005) and drought has undoubtedly influenced the extent of and plant species composition within riparian zones. These situations are evaluated in the DEIS and the Draft Forest Plan proposes objectives to remedy downward trends in habitat coverage for these communities.

Ongoing management of livestock grazing is the activity with the most potential to affect riparian or upland habitats of concern. Heightened management of livestock grazing in riparian areas began on the Deerlodge in 1996 with the development of site-specific measures and guidelines for permit compliance. Monitoring of livestock grazing allotments demonstrates that compliance with more stringent riparian forage utilization and stream bank compaction guidelines results in improved riparian conditions, reduction of actual Animal Unit Months (AUMs) grazed and a reduction in upland grass utilization (USFS, BDNF, FY99 and FY04 Reports) which would be beneficial for species relying on both riparian and upland habitats.

None of the species addressed here appear on the State of Montana species of concern list for the Forest Service or on the Regional Foresters species of concern list. Sage thrasher does appear on the Montana State list for BLM lands.

Item 4-7: Wildlife—Old Growth Habitat

Activity: Evaluate the following communities to respond to any unacceptable deviation from past measurement.

Old Growth Habitat:	Goshawk (Acipitor Gentilus) Northern 3-toed Woodpecker (Picoides tridactylus)
Pintler District Douglas-fir:	Piliated Woodpecker (Oryocopus Pileatus)

Unit of Measure: Varied

Reporting Period: Annual

Variability which would initiate further evaluation: -20% from previous measurements.

Monitoring Results: See Table 5, Beaverhead item 1-11 in the previous section for data on old growth coverage across the Forest. All landscapes across the Forest contain large amounts of old growth habitat. While FIA does not produce data at the compartment scale, it is evident that current old growth dramatically exceeds plan standards at the forest scale.

The Conservation Assessment of the Northern Goshawk, Black-backed Woodpecker, Flammulated Owl, and Pileated Woodpecker in the Northern Region, USDA Forest Service (Samson 2005**)** "shows that short-term viability is not an issue in Region 1 for the northern goshawk, black-backed woodpecker, flammulated owl or pileated woodpecker. Viable populations in the short-term for these species will be maintained as there is no scientific evidence that the species are decreasing in number, there have been substantial increases in the extent and connectivity of forested habitat since European settlement, the level of timber harvest of the forested landscape in the Northern Region has been insignificant, and well-distributed and abundant habitat exists on today's landscape for these species.

In Habitat Estimates for Maintaining Viable Populations of the Northern Goshawk, Black-backed Woodpecker, Flammulated Owl, Pileated Woodpecker, American Marten, and Fisher (2006) Samson further demonstrates that the regional critical habitat thresholds for these species are 47 square miles and 149 square miles respectively. The Beaverhead-Deerlodge alone contains 1540 and 72 square miles respectively. This habitat represents 33 times the regional habitat needs for goshawk and almost ½ the regional needs for the pileated woodpecker.

Evaluation: Based on existing habitat there are no rational concerns for maintaining goshawks or pileated woodpeckers on the BDNF.

Fisheries

Item 5-1: Fish—Cutthroat Trout

Activity: Evaluate pools formed by instream debris and fish numbers to insure that our management practices do not decrease instream cover or fish numbers.

Unit of Measure: Number of pools formed by instream debris: Fish density.

Reporting Period: Annual

Variability which would initiate further evaluation: Decrease in pools by 10% and statistically significant reduction in fish densities (90% confidence).

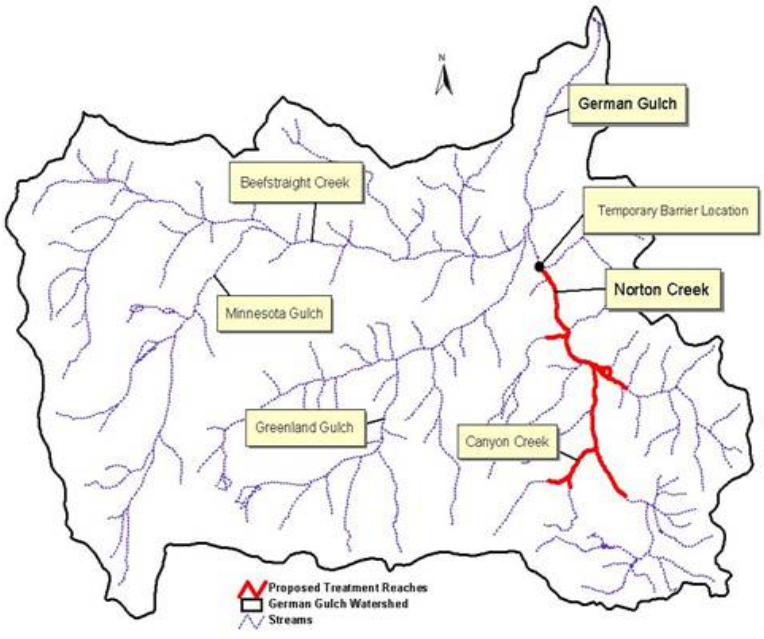
Monitoring: Habitat conditions in three segments of two streams were remeasured, after their original surveys in the 1990s. One on Norton creek in the German Creek Drainage, and 2 on Copper Creek in the Middle Fork of Rock Creek drainage.

Norton Creek: The original inventory in Norton Creek in 1999, found 16 pools per mile formed by large woody debris. When we re-inventoried the same reach, there were 7.6 pools per mile formed by large woody debris, along with 16 pools formed by beaver.

Fish densities have been monitored in Norton Creek since the late 1990s. This stream helps sustain a valuable population of westslope cutthroat trout (WCT) in the German Gulch drainage. Unfortunately, our data showed eastern brook trout (EBT) displacing cutthroat. In 1997 biologists observed a ratio of 1:1 EBT to WCT in Norton Creek. Brook trout dominance increased to 3:1 by 2002. Concern for the cutthroat population prompted biologists to evaluate conservation options immediately available. In 2003, Montana Fish, Wildlife, and Parks and the Forest Service, in partnership with George Grant Trout Unlimited, began a project designed to suppress brook trout. An environmental assessment was completed, and public response was generally supportive.

The area provides no ideal sites for a barrier. However, one was installed in the best available site near the mouth of Norton Creek, in 2003. The intent was to inhibit EBT returning to stream segments after removal. The barrier is a 4x8 metal plate with a 30 inch drop onto a splash pad, which eliminates the plunge pool fish use for jumping. The design was simple and costs were minimal. While not thoroughly documented, data suggest cutthroat trout, and some brook trout, are able to pass above the barrier during high spring flows. Since the barrier doesn't fully prevent brook trout passing, removal has been most effective prior to brook trout spawning in the fall.

From 2003 to 2005 biologists conducted single electrofishing pass removals of EBT in all stream segments with adequate habitat to support a fishery. To conduct this project work involves 3 to 5 crews of 2 or 3 people. In 2005 about 21 worker-days were used to do the electrofishing removals. In 2003 and 2004, it took 30% more effort because increased sampling and fish working time was necessary to deal with the high numbers of brook trout.



Proposed treatment reaches for brook trout removal in Norton Creek drainage.

Figure 3. Proposed Treatment Reaches

In 2003 an average of 94 brook trout were captured in each of 44 electrofishing sections. The average number of capture cutthroat trout was 7. In 2004, the average number of brook trout captured per section, was slightly lower at 90. The number of Eastern brook trout, longer than 75 mm or 3 inches, fell substantially from 63 to 27, reflecting a significant reduction in adult and sub-adult brook trout. In 2005, the average number of captured brook trout, per section, was 40.

Westslope cutthroat trout populations appear to be responding to the reduced brook trout populations in Norton Creek as shown in graphs below. Cutthroat, longer than 3", have nearly doubled since 2003. Young-of-the-year (YOY) increased by a factor of 10 from 2003 to 2005. Cutthroat trout response to brook trout removal varies among sections sampled depending on electrofishing efficiency and other factors, but the data shows increased WCT representation.

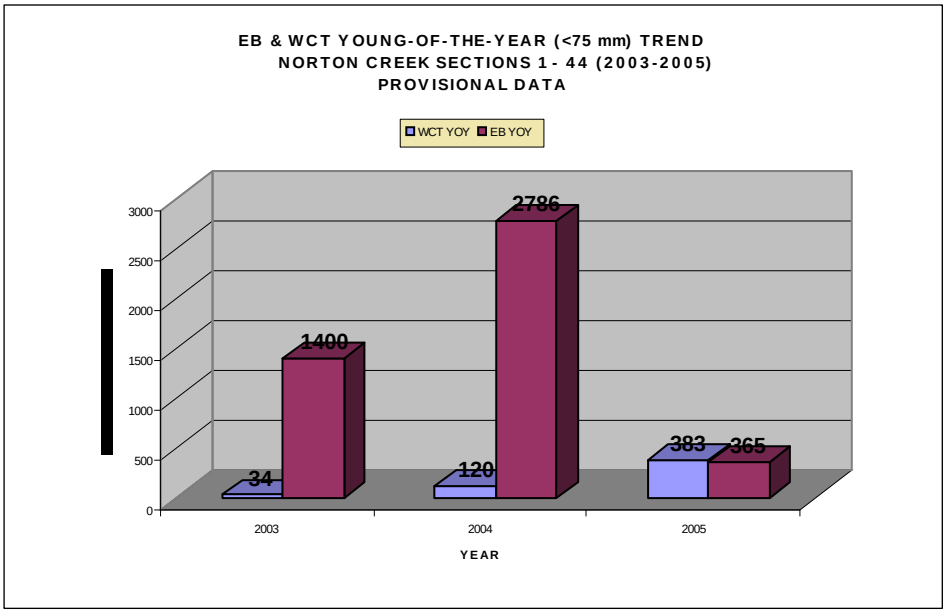


Figure 4. EB & WCT Young-of-the-Year Trend Norton Creek Sections

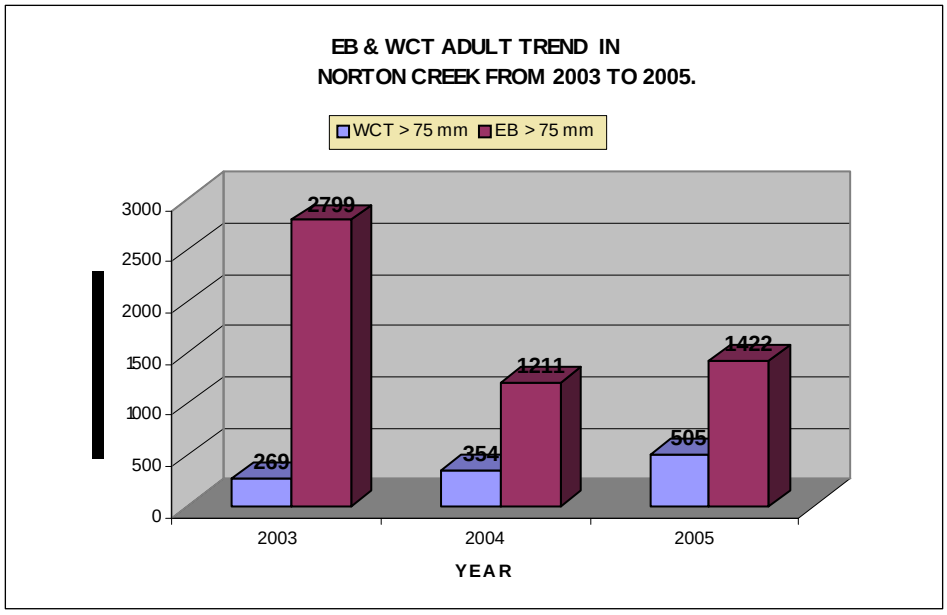


Figure 5. EB & WCT Adult Trend in Norton Creek

Copper Creek: Two stream reaches on Copper Creek were inventoried to compare against habitat data collected in 1995 and 1996. In reach #1, pool densities from large wood decreased from 20 to 13.7 per mile. Upstream in reach #2, the pools from large wood decreased from 9.8 to 8.5.

Fish population densities were collected within habitat reach #2 to compare to 1995 data. The comparison is not necessarily conclusive because our recent sampling was 500 meters upstream from the 1995 inventory site. Fifty-one fish were captured over 100 meters of stream in 1995, versus 14 in 2005.

Evaluation:

Norton Creek: Habitat inventories indicated a decline in pools formed by large wood between 1999 and 2005. Overall, pools may have increased based on the abundance of beaver ponds. The westslope cutthroat population in Norton Creek declined substantially between 1997 and 2003 until a brook trout removal project was initiated.

Natural fluctuations in woody debris are the probably cause for the reduction in pools formed by large wood, because there have been no management changes or new activities which would initiate a decline. Over-all there were no declines in pools caused by woody debris (not just large wood), because of the increase in beaver dams. Decreases in the Norton Creek westslope cutthroat trout population were not likely associated with changes in pools. It seems more plausible that environmental conditions associated with drought have allowed increased invasion of non-native brook trout. This was resulting in rapid displacement of cutthroat between 1997 and 2002 and the population's viability appeared threatened. Since the EBT removals, the number of WCT adults has increased 87% since the project began in 2003. Cutthroats less than 3 inches (young of the year) have responded dramatically and are over 10 times more abundant increasing from 34 to 383. Increased survival of young cutthroat trout is a common response to brook trout removal projects, and similar results have been documented in other Montana streams.

From a statewide perspective, biologists don't have time to conduct many projects like this. After three years recovery is incomplete and sustaining the population with electrofishing treatments requires an annual workload. As more removal projects are attempted, biologists and managers can address the feasibility of long-term commitment to individual projects. Norton Creek has taught us when 20 to 30 man-days are expended over 2 or 3 years we can promote a positive response in cutthroat in 3 to 4 miles of stream. The use of toxicants to remove brook trout can produce more efficient results and is often more permanent, but the public sometimes has concerns about the use of toxicants.

Copper Creek: There was a 32% decline in the number of pools formed by large wood in reach 1 of Copper Creek over a 10 year period. There was a 12% decline in reach 2. Fish population monitoring suggests there is also a decline in fish numbers within habitat reach #2.

The cause for a decline in pools formed by large wood is not fully understood. Copper Creek is primarily dominated by willows in the riparian areas. Because of this the role that large wood plays in pool formation is naturally limited. Fire wood cutting is occurring next to the stream in some localized areas and may be limiting the natural recruitment of wood into the stream, but this is more prevalent in reach #2 where the decline is less dramatic. Because there has been no management in the drainage that would substantially influence the recruitment of large wood into the stream, it seems the variation observed is likely related to natural environmental cycles.

Electrofishing data suggest a decline in fish densities has occurred in Copper Creek. This may be associated with a decrease in habitat complexity, resulting from a willow die-off. The loss of a vigorous riparian shrub community has caused a fair amount of bank instability, loss of lateral

cover and a decline in pool quality. Two non-Forest Service ecologists believe the die-off was due to disease and not management actions.

Item 5-2: Fish—Intragravel Sediment and Fish Numbers

Activity: Insure that our management practices do not degrade spawning and rearing habitat for cutthroat trout, validate sediment response model.

Unit of Measure: Percent of material less than ¼" diameter in the substrate.

Reporting Period: Annual

Variability which would initiate further evaluation: Increase in the fines (less than 6.3 mm diameter) to a depth of 8 inches (80% confidence). 10% reduction in fish numbers attributable to sediment increase.

Monitoring Results: No stream substrate measurements were taken in 2005.

Evaluation: Forest has abandoned stream substrate sampling in favor of measuring surface fines and broader stream function parameters. This is largely in response to a broader array of public concerns surrounding aquatic systems (rather than simply fish), ecological function (stream and riparian) and a national emphasis to standardize stream inventory methods. Intra-gravel fine sediment monitoring (prescribed by the Forest Plan) is done most effectively with McNeil core samples. Core sampling was designed to specifically address the level of fine sediments beneath the substrate so conditions can be related to the survival of trout eggs and fry. Collecting core samples, however, is labor intensive and post collection analysis is specialized and relatively expensive.

Many Forests are now predominantly monitoring fine sediments deposited on the surface of stream bottoms. The benefits include: 1) the data is more easily collected and so is often repeated at multiple sites within the same stream. Thus it is representative of longer reaches of stream, and less prone to questions about whether a single sample site accurately represents conditions. 2) Surface fines are monitored by hydrologists in many streams so the number of streams used for reference is often larger; and 3). The data seems to allow an effective evaluation of changes in stream function attributes, such as effective transport of the existing sediment load over time.

If fine sediment deposition is a problem, it is generally apparent in the amount of sediment deposited on the surface of the stream bottom. However, we have not been able to establish a consistent correlation between surface fines and those beneath the surface. Thus, relating surface fines data to core sample data can't be effectively done. Because funding and time have limited our ability to collect data both ways, we've shifted our sampling efforts toward methodologies that measure surface fines' to provide data with the broadest potential benefit and the greatest potential for regional consistency. When multiple years of data are available, we will again be able to determine trend.

Item 5-3: Fish—Aquatic Invertebrate Populations

Activity: Where fish populations are monitored, assist in the analysis of causative mechanisms responsible for fish population fluctuation. Where fish populations are not monitored, provide an index of relative changes in the biological health of the stream community affected by land management treatments.

Unit of Measure: Varied

Reporting Period: Annual

Variability which would initiate further evaluation: Significant alteration of the aquatic invertebrate community structure.

Monitoring Results: No aquatic invertebrate monitoring was done in FY05. Instead, a considerable effort was made to monitor water temperatures in streams as an index of healthy fish habitat. Temperatures were monitored on five streams on the Pintler Ranger District (Boulder, South Boulder, Wyman, Middle Fork Rock and Copper Creeks) between 1995 and 2005. Results were analyzed in comparison to Forest Plan objectives, more specifically, the Riparian Management Objective for water temperature.

More than any other aquatic attribute, stream temperatures have the greatest potential to dictate the distribution and health of native trout populations. At the most basic biological level, they either promote long-term survival, growth and reproductive success; or they don't. In recognition of this, the Inland Native Fish Strategy (INFISH), amended the Deerlodge Forest Plan in 1995, adding a Riparian Management Objective (RMO) for water temperature. It states there should be "No measurable increase in maximum water temperature (7-day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period). Maximum water temperatures below 15°C (59°F) within adult holding habitat and below 9°C (48°F) within spawning and rearing habitat.

Wording for the RMO is cumbersome and slightly confusing. To help clarify: Maximum temperature is defined as the "highest 7-day moving average of daily maximum temperatures". Further clarifying, then: 1) the maximum temperature shall not increase; and 2) the maximum temperature shall be below 59°F in adult holding habitat and below 48°F in spawning and rearing habitats.

To answer whether an action has/will increase the maximum temperature is dependent on defining a baseline from existing data to compare against. If we look at 11 years of temperature data from Boulder Creek (Figure 4) it becomes apparent that defining a baseline is challenging. The "lowest" maximum temperature occurred in 1997 and was13.7 °C (56.7°F). The highest maximum temperature was 17.2 °C (63°F) in 1998. The difference in maximum temperatures between these two consecutive years was 3.5 °C (6.3 °F). Figure 5 shows a temperature pattern in South Boulder Creek that is similar to Boulder Creek and most other streams. This is not surprising, since we know summer air temperatures and the amount of solar radiation (indirectly related to amount of time there is cloud cover) influence stream temperatures and can be substantially different from year to year.

The table below displays the range of maximum temperatures for 5 streams monitored. Copper Creek shows the smallest difference between highest and lowes temperatures at 1.4°C (2.5°F).

Table 29. Summary of Differences in Maximum Temperatures for 5 Streams on the Forest from 1995 to 2005.

Stream	Years of Data	Lowest Max Temp. (°C)	Highest Max. Temp. (°C)	Range of Max. Temps(°C)
Boulder Creek	11	13.7	17.2	3.5
So. Boulder Creek	8	13.5	16.4	2.9
Wyman Creek	10	14.2	16.7	2.5
Copper Creek	6	15.2	16.6	1.4
MF Rock Creek	7	11.6	14.1	2.5

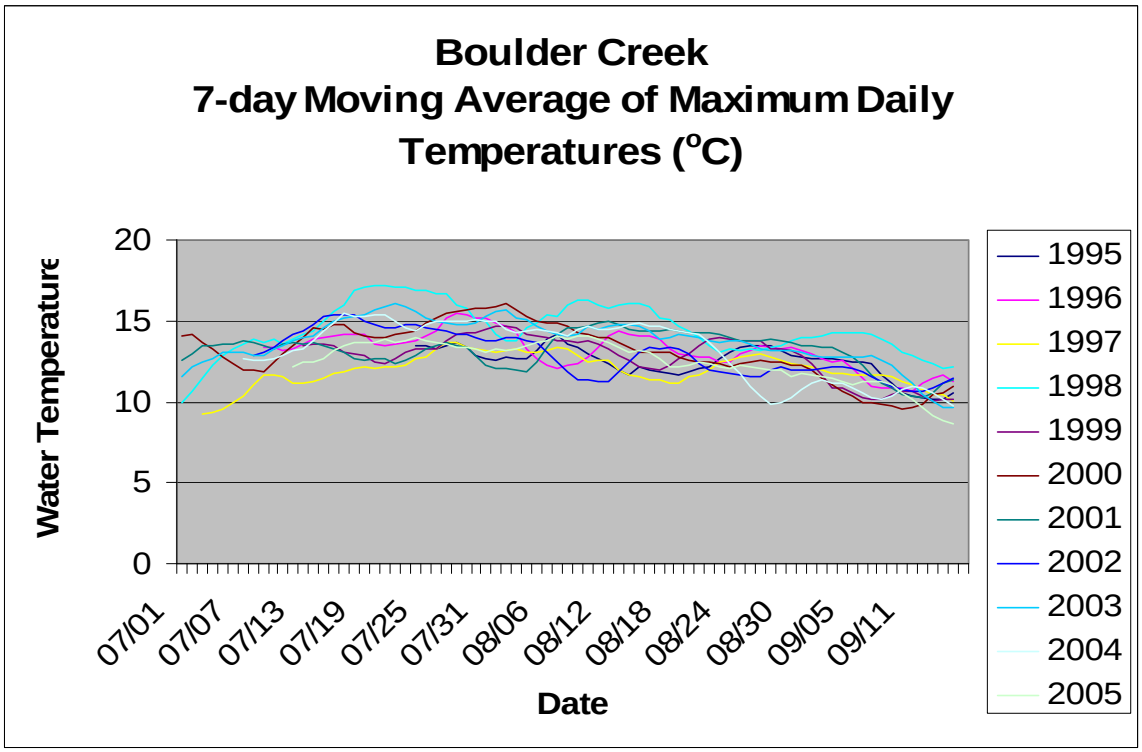


Figure 6. Water Temperature Data for Boulder Creek over 11 Years

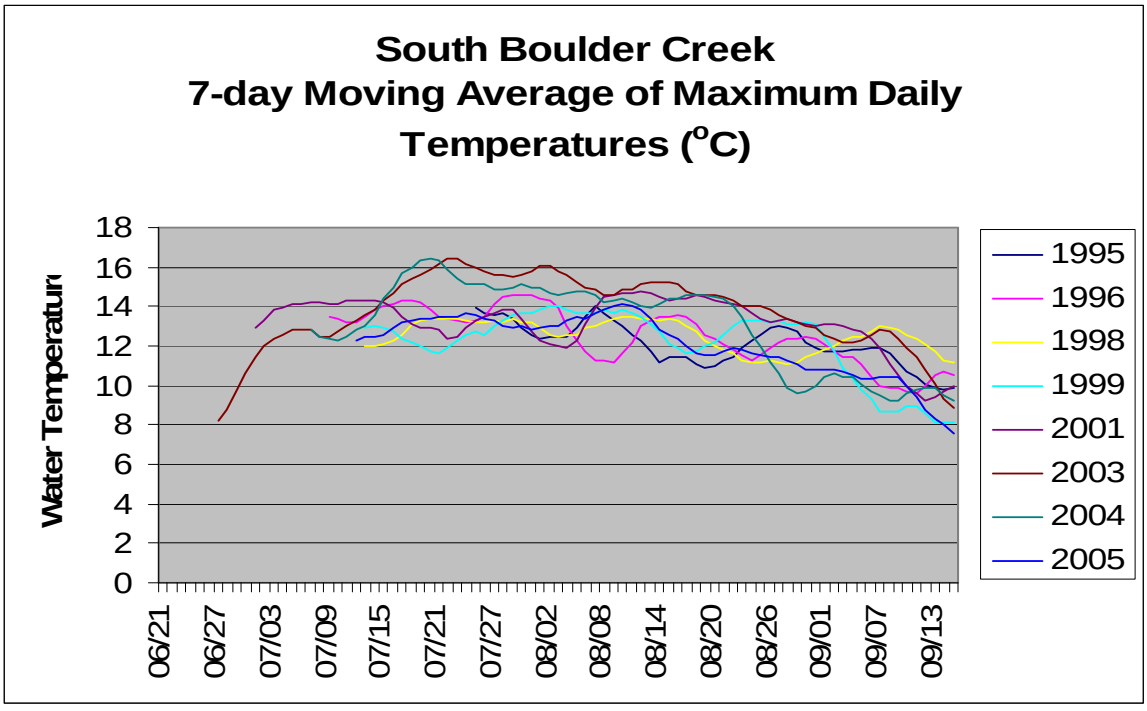


Figure 7. Water Temperature Data for South Boulder Creek for 8 Years

These streams represent some of the most comprehensive temperature monitoring data we have on the Forest. One could argue convincingly, that even with multiple years of data, there is risk in assigning a baseline maximum temperature we can compare against. Realistically, when most timber sales or other project are proposed, there is a window of 1 to 2 field seasons to collect

data. A single year's data collected in Boulder Creek in 2005 would have been misleading. The maximum temperature in 2005 trailed only 1997 as the coolest in the preceding 10 years at 14.1 °C (57.4°F). Based on the 11 years of data we have, there is a 55% likelihood that climatic conditions next year will result in a maximum temperature over 15°C. Post project monitoring could easily lead to the erroneous conclusion that the project threw temperatures outside the RMO and resulted in negative impacts to the fishery.

The opportunity to make assumptions about streams with limited data, based on trends in other streams was briefly evaluated. Yearly rankings of maximum temperatures by stream (Table 27) show there are consistencies between certain streams. In 2002, South Boulder and Wyman Creeks had their highest maximum temperatures and Boulder Creek had its 2nd highest maximum temperature. Unfortunately, no 2002 data were collected from Copper Creek and the Middle Fork of Rock Creek. Similarly, climatic conditions in 1998 resulted in the highest maximum temperatures for Boulder and Copper Creeks and the 2nd highest temperatures for Middle Fork of Rock Creek. However, 1998 temperatures in Wyman Creek were the 2nd coolest recorded in 10 years. (Table 27) This suggests some streams will commonly experience higher maximum temperatures in the same year. But this is not true for all streams and we must use caution when making assumptions with limited information.

Table 30. Yearly Rankings (from warmest to coolest) of Maximum Temperatures for 5 Streams on the Forest from 1995 to 2005.

Stream	Ranking by Year										
	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05
Boulder Creek	9	5	11	1	8	3	7	6	2	4	10
South Boulder Creek	8	4	--	7	6	--	3	--	1	2	5
Wyman Creek	8	6		9	4	7	5	2	1	3	10
Copper Creek	--	5	6	1	4	3	2	--	--	--	--
MF Rock Creek	7	4	6	2	1	5	3	--	--	--	--

Annual consistency in meeting the temperature threshold of 59°F (15°C) prescribed in the RMO is cursorily presented in Table 28. Only in the Middle Fork of Rock Creek did maximum temperatures remain below 59°F, every year temperatures were monitored. Boulder Creek had maximum temperatures above what the RMO prescribes in 5 of the11 years data was taken. South Boulder Creek exceeded the RMO in 2 of the 8 years monitored. Wyman Creek exceeded it 5 of 10 years and Copper Creek exceeded it each of the 6 years temperatures were monitored.

Table 31. The Number of Times 5 Streams on the Pintler District Exceeded the INFISH RMO Maximum Temperature Threshold

Stream	Number of Times Exceeding 59°F										
	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05
Boulder Creek	0	5	0	25	0	9	0	0	9	5	0
South Boulder Creek	0	0	--	0	0	--	0	--	24	11	0
Wyman Creek	0	2	--	0	12	0	0	15	20	17	0
Copper Creek	--	2	2	37	3	10	25	--	--	--	--
MF Rock Creek	0	0	0	0	0	0	0	--	--	--	--

In actuality, Boulder Creek exceeded the maximum temperature prescribed by the RMO 53 times in its' warmest years. South Boulder, Wyman and Copper Creeks did the same 35, 66, and 79 times respectively (Table 29). The data seems to suggest the thermal regime is less than ideal and there may be little or no room for management in those drainages, without putting the fishery at risk.

Table 32. The Number of Times the Maximum Temperature Exceeded the 59°F threshold

Stream	Number of Times for each Max Temperature			
	59.1 - 59.9°F	60.0 - 60.9°F	61.1 - 61.9°F	62.1 - 62.9°F
Boulder Creek	22	19	2	10
South Boulder Creek	13	15	7	0
Wyman Creek	33	23	9	1
Copper Creek	35	30	11	3
MF Rock Creek	0	0	0	0

A closer look is important in understanding the complexities of dealing with temperature data. There is a natural tendency to presume harmful effects occur whenever an established threshold is exceeded. A review of some of the literature suggests this RMO was established to maintain optimal thermal conditions for most salmonids in the Northwest. When we look at information specific westslope cutthroat and bull trout, the guidance is fair in meeting their needs, but physiological needs are complex and the environments they prefer are seldom easily described.

For example, Dwyer and Kramer (1975) found the scope of activity for westslope cutthroat trout was greatest at a temperature of 15°C (59°F) when compared to higher and lower temperatures evaluated in 5°C increments. All factors being equal, a greater scope for activity translates into

greater resistance to fatigue and a higher probability of survival, when the limiting factor is oxygen. Interestingly, they found the scope for activity was higher at 20°C (68°F) than it was at 10°C (50°F), although the difference between the two was not substantial. This suggests that temperatures around 59°F may be most beneficial. The curves presented in the paper also imply that temperatures one or two degrees above 59°F are not substantially different, with regard to harm or benefit, than those a couple of degrees below.

Interestingly, in laboratory conditions, bull trout exhibited maximum growth when water temperatures were constant at 60.8°F (16°C), and food was unlimited and also when food was at 2/3 of the ration level that produced satiation. When food availability was reduced to 1/3 of the ration level that produced satiation, optimal temperature for growth dropped to between 46.4 and 53.6°F (8-12°C) (McCullough et al. 2001). One would presume, that during summer months when temperatures tend to be the hottest, food should not be limiting in most streams. If this is so, then bull trout were not necessarily harmed by the maximum temperatures shown in Table 7 above, which exceeded 59°F. As a matter of fact, 190 of 233 times the threshold was exceeded, maximum temperatures were only at 59.9°F or below. This is virtually the precise temperature McCullough et al. (2001) said promoted maximum growth. Twenty-nine of the remaining 43 times maximum temperatures were only 60.0 to 60.9°F. Also of importance in that study is that, maximum growth occurred at “constant” temperatures of 60.8°F. Average daily temperatures - for those periods when the maximum temperatures exceeded the RMO, were still below 59°F.

The RMO also sets a maximum temperature threshold of 48°F in spawning and rearing habitats. The intent of this objective is admirable, but the Forest’s ability to meet it in most places has little to do with management. In laboratory studies, temperatures from 42.8 to 50°F (6-10°C) tended to be the optimum range of temperatures for producing high survival to hatching and emergence in pacific salmon, steelhead and coastal cutthroat trout(McCullough et. al. 2001). Optimal incubation of bull trout eggs occurs at constant temperatures that are substantially coder (35.6-42.8°F (2-6°C)), with highest incubation success at 39.2°F (4°C) (McCullough et. al. 2001). Bull trout are a native char and require a narrow range of temperatures to rear and reproduce that may be colder than optimal for other trout species.

When managing for migratory populations the distinction between adult holding and spawning and rearing habitats may be straight forward. Bull trout often migrate to spawning areas and then leave to over-winter somewhere else. This is not so with resident cutthroat populations (and some bull trout populations) on the Forest. Adults live year-round in the same reaches of stream that are used for spawning. If we are not consistently meeting the 59°F threshold then, we are obviously failing to keep maximum temperatures below 48°F. In these situations, the question for biologists to answer is whether it is better to lean toward temperatures that promote better incubation and emergence success or better growth. This undoubtedly will vary by population.

When considering this objective with regard to bull trout reproduction, one must remember they are fall spawners and their eggs incubate over winter when water temperatures are naturally colder. Because of this, streams naturally tend toward the colder temperatures that benefit reproductive success at the appropriate time. It has also been demonstrated in several streams in Montana that bull trout choose to spawn in reaches where temperatures are more constant and often significantly controlled by springs. This undoubtedly is to their benefit, based on their physiologic requirements. It is appropriate then, for bull trout, to compare stream temperatures to the RMO only in very precise locations used for spawning and only at the appropriate period of spawning and incubation (September through March).

The RMO sets the same temperature threshold for spawning and rearing habitats. However, based on the McCullough et al. (2001) study, it is also questionable whether water temperatures at or below 48°F would be desirable fry and juvenile bull trout. Once emergence has occurred,

temperatures that promote faster growth would likely be of greater benefit. In certain situations where spawning and hatching occur in relatively focused reaches influenced by springs, fry probably need only travel a short distance to reap the benefit of two different temperature regimes.

Evaluation: The importance of stream temperature in supporting healthy fisheries is not refuted. This RMO was undoubtedly written to highlight the importance of natural temperature regimes that native fisheries evolved within; and with the intent to discourage actions that cause harmful change from natural conditions. Unfortunately, defining broadly desired thermal conditions in a way that : 1) appropriately protects targeted resources; 2) can be consistently applied; and 3) seldom extends beyond the original intent of the protection, to unnecessarily restrict land management options; is very difficult.

It seems the intent of the RMO might best be described as: 1) Protect native fisheries by providing for optimal temperatures where natural conditions allow; and 2) Provide for as near to optimal temperatures as possible where natural conditions don't allow. If this is truly the intent, analysis of projects might better be served through a generally stated objective which guides the Forest to promote temperature regimes that are optimal for desired fisheries. The thresholds in the current RMO seem to set the stage for meeting or not meeting Forest Plan direction, without an understanding that failure to meet the RMO may not necessarily be harmful.

The RMO, because it is presented as a simple threshold, may not lend itself well to considering the complex spatial variability that naturally occurs in streams, or the adaptations that have occurred to enable varied life histories, the different requirements between species or the changing physiological needs of different life stages.

Riparian

Item 6-1: Riparian (All Resources)—Streamside Cover

Activity: Evaluate streamside cover for fish; willow communities; forage utilization and stream bank trampling. Assure management activities do not degrade the habitat of riparian dependent species.

Unit of Measure: Percent overhead cover and percent stream bank stability

Reporting Period: Annual

Variability which would initiate further evaluation: + or – 15% variance in itilization; in range condition and trend, +-20% variance in stream bank cover and composition; moiré than 10% of the stream bank showing damage.

Monitoring Results: Not reported in FY05. See Beaverhead item 2-3 for a Forestwide report on fisheries riparian habitat conditions and trends.

Item 6-2: Riparian (All Resources)—Riparian Rehabilitation

Activity: Monitor riparian recovery of areas that received rehabilitation treatments.

Unit of Measure: Projects.

Reporting Period: Annual

Variability which would initiate further evaluation: Less than 90% success in recovery to a good or excellent condition within 5 years after treatment commences.

Monitoring Results: Approximately 1/3 mile of Norton Gulch was excluded from use by livestock in 2003 through construction of a barb-wire fence. A stream survey monitoring site exists within the exclosure, with the initial measurement made in 1998. A qualitative assessment of vegetation response was made in 2005. The initial stages of vegetative recovery are evident.

Evaluation: Only two years have elapsed since the fence was installed so it is too early to declare the project a success. In five to ten years, a re-measurement of stream channel dimensions, patterns and profile will determine changes in stream channel function. This will determine the ultimate success of the treatment, which generally takes more than five years of recovery. The qualitative vegetation assessment indicates that the initial stages of recovery are well on its way

Range

Item 7-1a: Utilization of Forage in Transitory Range

Activity: Determine correlation between level of forage utilization and damage to tree seedlings.

Unit of Measure: % seedling damage.

Reporting Period: 1, 3, 5 years after reforestation, as per established schedule 100% of exams in allotments and areas requiring reforestation.

Variability which would initiate further evaluation: 95% + correlation between levels of forage utilization and plantation failure.

Monitoring Results: A total of 1,270 acres of seedlings were monitored in 2005. Of those, 3 acres showed cattle damage. Source of data: USFS, Forest Activities Tracking System (FACTS), Bruce Schuelke.

Evaluation: No correlation was established between forage utilization and plantation failure.

Item 7-1b: Percent of Available Forage Utilized by Livestock

Activity: Determine actual use by livestock and if utilization constraints of Forest Plan are met.

Unit of Measure: Percent of available forage utilized by livestock

Reporting Period: 5 years, 100% of inspections records and utilization studies

Variability which would initiate further evaluation: ± 10% variance over a sustained (3 yr.) period.

Monitoring Results: Actual use by cattle on Deerlodge allotments in 2005 was 40,765 head months of cattle or 52,958 animal unit months (Source: USFS, INFRA data base, actual use by District).

Evaluation: Actual use was 82% of the capacity projected by the Deerlodge Forest Plan. Loss of transitory forage and conifer encroachment are additional contributing factors as is application of riparian standards required for protection of bull trout.

Item 7-2: Allotment Management Planning and Update

Activity: Insure update at 15 year intervals; plan is being adhered to, management objectives are being met, improvements are being maintained.

Unit of Measure: Number of Plans updated.

Reporting Period: Annual

Variability which would initiate further evaluation: Less than 4 plans updated annually, planned objectives are not being met.

Monitoring Results: No allotment updates were completed on the Deerlodge portion of the Forest in FY05.

Evaluation: The Deerlodge Forest Plan projected 4 allotment plans would be updated annually. None were completed in 2005. All planning resources have been directed towards the Beaverhead Lawsuit Settlement Agreement which targets allotment plan completion on the Beaverhead Unit of the Forest. We anticipate new allotment planning efforts will begin in FY06 on the Deerlodge portion of the Forest.

Item 7-3: Weed Infestations

Activity: Monitor weed infestation, effectiveness of control measures, activities responsible, implementation of IPM techniques.

Unit of Measure: Acres

Reporting Period: Annual

Variability which would initiate further evaluation: Noxious weeds increase distribution by 5%; other weedy species by 10%; infestations appear in previously unaffected areas.

Monitoring Results: The Deerlodge Forest Plan scheduled 1575 acres of treatment per year. On the Beaverhead-Deerlodge Forest as a whole, 7635 acres of noxious weeds were treated in 2004.

Evaluation: Noxious weeds have greatly increased in distribution since 1987. The Forest far exceeded noxious weed treatment acres scheduled in the Forest Plans. In an effort to deal with expanded weed problems, the 2002 Noxious Weed decision updated the Forest Plan treatment authority, envisioning treatment of 16,000 acres per year with the assistance of aerial treatment. This level of treatment has not been reached during any of the years since it was implemented.

Item 7-4: Range Condition and Trend

Activity: Identify decline in range condition and condition and trends, recommend changes in management strategies or stocking levels. Determine any shift away from grass aspects due to conifer or shrub encroachment.

Unit of Measure: Acres

Reporting Period: Annual

Variability which would initiate further evaluation: 5% increase in acres with downward trend or 5% decline in acres by condition class; 5% decline in acres with a grass aspect; 5% conversion of grass/brush to a conifer overstory.

Monitoring Results: The Forest Ecologist and Fisheries Biologists worked with the Northern Region Office and Northwest Research Experiment Station to develop riparian and range trend monitoring protocols in 2005. The PIBO (PacFish/Infish Biological Opinion) riparian vegetation monitoring technique was incorporated into the BDNF Range Monitoring Handbook and three riparian sites were monitored to test the method. The method appears to give useful information that can be used to provide some quantitative information to support a state and transition narrative along with photographic points.

Evaluation: We could not draw any trend conclusions for the Deerlodge based on the small sample in 2005 but results combined with 2006 monitoring trials will tell us if the PIBO vegetation monitoring technique will serve the need for a systematic long term trend monitoring system.

Item 7-5: Permit Compliance

Activity: Insure livestock use complies with range readiness, proper utilization and permit requirements.

Unit of Measure: Varied

Reporting Period: Annual

Variability which would initiate further evaluation: ±10% change from annual plan.

Monitoring Results: In FY 2005, 68 out of 93 allotments were administered to standard (Source of data: USFS INFRA data base). "Administered to standard" means that the inspection was thorough enough to determine if the utilization standards were met and annual instructions were followed. Administration requirements were met on 20% more allotments in FY05 than the two years previously. Of the 68 allotments inspected, 55 were in compliance and 13 or 19% did not meet standards.

In addition to the annual monitoring results recorded in the INFRA data base by District Range Specialists, an Interdisciplinary review of randomly selected range allotments is conducted each fall. The 2005 fall Range Review reported that on the five allotments inspected, standards are generally being met in the uplands for utilization. Only one upland pasture exceeded utilization standards. Those same allotments showed one or more cases of exceeding riparian standards for stream-bank disturbance or riparian vegetation utilization. Streams with naturally well armored banks, or where functioning exclosures exist were within standards. (NOTE: the riparian review team doesn't generally look at the total length of stream accessible to cattle, but reports only on the section that is inspected. Standards allow up to 15% of the reach to be out of compliance before the pasture is considered out of compliance.) The report recommended that standards be reconsidered for non-fish bearing streams or streams that dissipate into irrigation canals downstream, allowing more resources to be invested in important fish bearing streams or tributaries that pay larger dividends for the time and dollars invested. The Report also noted that use of the Grazing Permit Administration Guidelines continues to be an effective tool for documenting and generating needed changes on some grazing allotments.

Evaluation: Of the 68 allotments inspected, 19% did not meet standards. In most cases, the compliance problem was with riparian grazing standards. Other permit requirements like range readiness, upland utilization, winter range utilization, and pasture rotation are seldom problems. It is difficult to say if riparian utilization non-compliance exceeds the 10% variance from annual plans when taken into account with all the other requirements.

The Forest Annual Interdisciplinary Range Review is scheduled and designed to improve our ability to effectively implement riparian guidelines. Annual recommendations help District Range Specialists improve their monitoring skill and identify additional training needs.

Timber

Item 8-1: Timber—Regulated Volume Prepared for Sale

Activity: Insure that the volume offered and/or sold does not exceed ASQ for the 10-year period.

Unit of Measure: MMBF

Reporting Period: Annual

Variability which would initiate further evaluation: Cumulative value for Plan period is 10% over the cumulative average annual Allowable Sale Quantity (ASQ).

Monitoring Results: The following tables display the timber sale program and harvest data for Fiscal Years 1988-2005 as well as the projected Forest Plan outputs for this monitoring item.

Table 33. Timber Sale Program (Million Board Feet)

Year	Volume Sold	Volume Offered but not sold	Volume Appealed	Volume Sold From Previous Years Sales	Total
1988	19.6	0.3	0	0	19.9
1989	22.1	1.0	0	(4.6)	26.7
1990	5.5	3.9	0	(7.9)	17.3
1991	3.3	3.0	0	(4.2)	10.5
1992	3.6	6.9	0	(4.6)	15.1
1993	3.0	0	0	(6.9)	9.9
1994	6.3	0	0	(4.2)	10.5
1995	4.1	6.4	0	0	10.5
1996	2.6	7.8	0	(6.4)	16.8
1997	7.4	6.1	0	(13.2)	19.3
1998	8.8	1.3	0	(6.0)	16.1
1999	1.8	0	4.5	(1.2)	7.5
2000	2.9	0	0	0	2.9
2001	2.4	0	2.0	(0.2)	4.6
2002	2.9	0	1.6	0	4.5
2003	2.6	0	0	0.3	2.9
2004	4.8	0	0	3.2	8.0
2005	17.9	0	0	3.2	21.1
A/Y	6.8	2.0	0.5	5.8	12.5

The summary shown above consists of chargeable live and dead volume that actually has been sold. Timber volume under appeal and volume in timber sales offered for sale but not sold in the program year are shown in the year when actually sold.

Table 34. ASQ Sold (Million Board Feet)

Description	Allowable Sale Quantity (ASQ)
1988	18.5
1989	21.1
1990	11.4
1991	6.3
1992	3.6
1993	9.9
1994	10.5
1995	10.5
1996	9.0
1997	7.4
1998	8.8
1999	1.8
2000	2.9
2001	2.4
2002	2.9
2003	2.6
2004	4.8
2005	17.9
Yearly Average	8.5
Forest Plan	23.0

The seventeen-year average shows a total annual volume sold of 8.5 MMBF/year. This is 37% of the Forest Plan ASQ of 23.0 MMBF. These figures do not include an additional 6.2 MMBF that was sold to RY as part of the RY/Lost Creek Land Exchange (1997-2001).

Table 35. Timber Under Contract and Volume & Acres Harvested

Description	Volume Under Contract (MMBF)[1, 2]	Acres Harvested[3]	Sawlog Volume Harvested (MMBF)[1]	Convertible Products Harvested (MMBF)[1]	Total Volume Harvested (MMBF) [1]
1988	21.5	3428	21.8	1.4	23.2
1989	24.7	3567	30.0	1.1	31.1

Description	Volume Under Contract (MMBF)[1, 2]	Acres Harvested[3]	Sawlog Volume Harvested (MMBF)[1]	Convertible Products Harvested (MMBF)[1]	Total Volume Harvested (MMBF) [1]
1990	13.2	2765	22.3	1.3	23.6
1991	13.5	763	5.1	0.8	5.9
1992	10.0	638	9.9	1.4	11.3
1993	12.3	486	6.0	1.3	7.3
1994	15.3	676	6.0	2.0	8.0
1995	9.7	858	6.9	0.7	7.6
1996	14.2	532	2.7	1.9	4.6
1997	Not available	603	2.0	0.5	2.7
1998	19.8	583	6.5	1.2	7.7
1999	11.1	694	4.2	1.2	5.4
2000	11.3	827	6.0	1.3	7.3
2001	17.4	409	2.8	2.6	5.4
2002	5.6	905	8.8	1.2	10.0
2003	3.9	574	7.4	1.4	8.8
2004	8.6	374	2.1	2.2	
2005		506	4.6	2.4	7.0
A/Y		1038	8.6	1.4	10.0

(1) MMBF is million board feet
(2) Data for "Volume Under Contract for 1988 and 1989 has been adjusted to include estimates for Per Acre Material (PAM). This was derived from the automated timber sales accounting system report listing uncut quantities remaining by contract at the end of the FY (September 30).
(3) Does not include personal firewood volume.

Total volume harvested averaged 10.2 MMBF/year, which is 44 percent of the Forest Plan projected level of 23.0 MMBF. Volume harvested is not directly proportional to volume sold, but is influenced by variables such as the type of harvest method, the length of time of the timber sale contract, the demand for timber, and sawmill harvest schedules. Volume harvested has been decreasing over the eighteen year time period due to the decrease in the amount of timber being offered and sold.

Table 36. Commercial and Personal Use Firewood Removal

Description	Personal Use Firewood Permits Sold	Personal Use Firewood Sold (MMBF)
1988	910	2.0
1989	1262	2.7
1990	905	1.8
1991	206	1.2
1992	1058	1.4
1993	1021	1.3
1994	845	1.1
1995	857	1.2
1996	891	1.2
1997	Not available	Not available
1998	Not available	Not available
1999	905	1.2
2000	760	1.0
2001	1095	1.4
2002	902	1.2
2003	1045	1.4
2004	1077	2.2
2005	1227	1.8
Average per year	935	1.5

While personal use firewood was not identified as a specific component of this monitoring item in the Forest Plan, firewood volume is now considered part of the ASQ, Demand for firewood had leveled off in the late 1990's, but has picked up again with the increased insect killed trees. In FY 88 and FY 89, a personal use firewood permit was $2.50 per cord with a minimum of 4 cords. From FY 90 through FY 96, personal use firewood was $5.00 per cord with a minimum of 2 cords. Firewood increased to $6.00 per cord in FY97 and has remained at that price through FY2005. It is expected that firewood demand will probably continue at or near the current level of FY2005, which showed an increase in the number of permits sold, due to the higher cost of energy needs for winter heating.

Evaluation: Volume offered and/or sold does not exceed the ASQ over the 10 year period. No further evaluation is required.

Item 8-2: Timber—Timber Assumptions: Volume, Condition, Class, Logging, Acres Harvested

Activity: Insure that: 1) board foot/cubic foot ratios are correct 2) volume/acre yield is correct 3) condition class assignments are correct 4) scheduled logging system (cable and tractor) are used 5) scheduled of acres harvested is correct.

Unit of Measure: MMBF, acres, acres harvested

Reporting Period: Annual

Variability which would initiate further evaluation: ±15% of Forest Plan average projections.

Monitoring Results: 1. Board foot/cubic foot ratios: Cubic foot timber yield tables were used in the computer model "FORPLAN" to calculate Forest Plan timber volumes. Yield tables determine the volume of wood in individual trees by its diameter and height. Board foot/cubic foot ratios are necessary to convert cubic foot timber volumes into board foot volumes. With the possibility of all measurement going to cubic feet, board foot/ cubic foot ratio would become informational only.

2. Volume/acre yield: The volume actually harvested averaged 9.3 MBF/acre and is 35% higher than the Forest Plan anticipated at avolume of 6.9 MBF/acre. This may be due to the fact that personal use firewood is now included in the volumes harvested. Top wood above the merchantable sawlog specifications and post and pole size lodgepole pine are also included in volume removed. Also, stands selected for harvest during this reporting period have better than average volumes for the Forest.

3. Condition class assignments: Condition class assignments have been reviewed at each annual sale review and adjusted to ground truthed conditions, to date there has not been a significant change.

4. Scheduled logging systems: The Forest Plan scheduled no cable logging during the first period. During this reporting period, the majority of the harvest has been with conventional tractor yarding systems. Other systems used have been skyline, helicopter and horse.

5. Schedule of acres harvested:

Table 37. Harvest Volume by Harvest Method

	Volume Harvested/year	Acres Harvested/year	% Clearcut	% Shelterwood	% Select	Interim
Forest Plan	23 MMBF	3331	61	12	T	27
FY 88-05	10.2 MMBF	1038	40	12	2	46

The acres harvested are influenced by the timber volume per acre and the silviculture treatment method. Total acres harvested averaged 1,038 acres/year. The actual acres harvested is 31% of the estimated Forest Plan projection of 3331 acres at the 23.0 MMBF Forest Plan ASQ level

Evaluation: Timber assumptions for board foot/cubic foot rations, volume/acre, condition class and logging system were acceptable. Assumptions for acres harvested and treatment methods however were erroneous. Acres harvested are only 33% of what was projected, this reflects in the volume harvested/year as well. Problems with assumptions are discussed at length in the AMS (2002) and are being addressed through Forest Plan Revision.

Item 8-3: Timber—Silvicultural Assumptions and Practices

Activity: Insure that: 1) Uneven-aged as well as even-aged management is applied to elk winter range and riparian areas 2) rotation age and CMAI assumptions are correct 3) silvicultural prescriptions follow Management Area standards and guidelines 4) silvicultural prescriptions precede all vegetative manipulation 5) silvicultural prescriptions are practical and achieve desired results.

Unit of Measure: Varied within prescriptions

Reporting Period: Annual

Variability which would initiate further evaluation: Silviculture program review questions validity of assumptions. ±15% of Forest averages.

Monitoring Results: 1. Uneven as well as even-aged management is applied to elk winter range and riparian areas: Uneven-aged management is considered when prescribing treatment in these areas for timber sales.

2. Rotation age and culmination of mean annual increment (CMAI): Based on information contained in the timber sale prescriptions and field observations, stands are within the current rotation age and CMAI assumptions.

3. Silvicultural prescriptions follow management standards and guidelines: All silvicultural prescriptions and NEPA documents reviewed on the annual timber sale reviews follow management standards and guidelines.

4. Silvicultural prescriptions precede all vegetative manipulation: All stands within timber sales receive silvicultural prescriptions. Silvicultural prescriptions are sometimes lacking for vegetative manipulation projects that involve prescribed burning where very few trees are involved.

5. Silvicultural Prescriptions are practical and achieve desired results: Prescriptions reviewed both before and after implementation have been practical and have been within the range of desired results.

Evaluation: Silvicultural prescriptions and assumptions have been applied as required to timber stands. However, Forest Plan assumptions that clearcutting would be the primary harvest method in lodgepole pine, throughout the entire planning period are erroneous. In 1992 a policy decision was made by the Chief of the Forest Service to reduce the use of clearcutting and clearcut acres have steadily fallen.

Item 8-4: Timber—Size of Openings

Activity: Insure openings conform with standards and guidelines and to determine whether the maximum limits (40 acres) for harvest areas should be considered.

Unit of Measure: Acres

Reporting Period: Annual

Variability which would initiate further evaluation: Unacceptable results of an interdisciplinary (ID) team or administration review.

Monitoring Results: The current standard limits timber openings created by even aged management to 40 acres unless larger openings are warranted. Creating openings greater than 40 acres in size requires Regional Forester approval. Forest managers have requested and been granted variance from the regional standard on the size of openings for several ecosystem

management projects, even though these projects are not usually considered “even-aged management”. The size of the variance has depended on the ecosystem goals but generally ha been between 40 to 200 acres in size.

Evaluation: The size of opening standard for even –aged management was met where it applied. No further evaluation is required.

Item 8-5: Timber—Regenerated Yield Projections

Activity: Insure that regenerated yield projections are correct (by measurement of permanent growth plots and field sampling.

Unit of Measure: Plot

Reporting Period: 5 years

Variability which would initiate further evaluation: <50% accomplishment of scheduled permanent plots.

Monitoring Results: No growth plots were remeasured in 2005. Seventy five of the growth plots established since 1979 were remeasured during the 1988-2004 period.

Evaluation: Growth plot remeasurement was on schedule during the first decade of the Plan. Twelve plots (2001) have been remeasured since 1996. Our data shows that regenerated yield projections were acceptable. No further evaluation is required.

Item 8-6: Timber—Reforestation Practices and Assumptions

Activity: Insure that: 1) regeneration is obtained within 5 years after final harvest cut 2) scheduled planting is accomplished.

Unit of Measure: Acres

Reporting Period: Annual

Variability which would initiate further evaluation: Less than 75% accomplishment of scheduled planting in 5 years, less than 50% accomplishment per year. Greater than 10% increase in scheduled planting over 5 year period.

Monitoring Results:

Table 38. Acres of Site Preparation and Reforestation

Year	Acres of Site Preparation for Natural| Regeneration (tb 12)	Panted acres (tb 9, 10)
1988	403	341
1989	1580	53
1990	1150	211
1991	458	155
1992	153	313
1993	557	149
1994	250	228

Year	Acres of Site Preparation for Natural| Regeneration (tb 12)	Panted acres (tb 9, 10)
1995	428	296
1996	213	412
1997	134	135
1998	461	107
1999	215	116
2000	201	0
2001	241	142
2002	258	160
2003	374	84
2004	302	127
2005	361	296
Average Per Year	454	185
Forest Plan	2117	374

The assumption in the Forest Plan is that 10% of the acres harvested as a regeneration cut will need to be planted. A review of reforestation records between 1976 and 1998 indicate that this assumption is correct with 90% of the acres harvested during that period regenerated naturally. In most cases, natural regeneration actually results in overstocked stands.

The Forest Plan estimated that 73% of the 3331 acres harvested at the Forest Plan ASQ level of 23.0 MMBF would be by some type of regeneration cut (clearcut, shelterwood, or selection). Of the acres harvested during the 18-year reporting period, 52% received some type of regeneration cut. Ranger Districts have scheduled for planting areas that are expected to be slow in regeneration naturally. Planting targets are being met. The Forest Plan anticipated that an average of 374 acres would be planted. At the reduced rate of harvest from Forest Plan ASQ levels it is estimated that approximately a minimum of 159 acres would need to be planted each year to meet the 5-year restocking requirement. Actual planting for the 18-year period between 1988 and 2005 has averaged 185 acres.

Evaluation: The intent of this monitoring item was to ensure harvest units were regenerated within 5 years where reforestation did not take place naturally. While the acres planted are far below Forest Plan projections, this is a reflection of reduced harvest, not lack of regeneration. No further evaluation is required.

Item 8-7: Timber—Timber Stand Improvement Practices and Assumptions

Activity: Insure that scheduled TSI projects are accomplished.

Unit of Measure: Acres

Reporting Period: Annual

Variability which would initiate further evaluation: Less than 75% accomplishment of scheduled TSI in 5 years, or less than 50% accomplishment per year.

Monitoring Results:

Table 39. Timber Stand Improvement by Acre by Year

DESCRIPTION	SILVICULTURAL EXAMS (Thousand Acres-TB 8)	THINNING (TSI) ACRES (TB 14)
1988	29.5	179
1989	28.4	325
1990	46.5	272
1991	55.5	234
1992	8.0	339
1993	10.4	188
1994	10.6	282
1995	12.6	213
1996	10.7	196
1997	5.7	250
1998	<0.1	503
1999	<0.1	169
2000	0.1	15
2001	<0.1	225
2002	<0.1	218
2003	0.1	142
2004	0	0
2005	0	0
TOTAL	218.4	3867
Annual Average	12.1	215
Forest Plan	60.0	300

The amount of acres requiring thinning each year depends on the degree of overstocking of areas harvested or burned over about 20 years ago. Silvicultural stand exams helps identify stands needing treatment. Approximately 12,100 acres receive stand exams each year. The average 215 acres thinned each year is 72% of the Forest Plan estimate.

Evaluation: Although TSI work is decreasing, we are still within 75% of the Forest Plan estimate over time. No further evaluation is required at this time.

Item 8-8: Timber—Lands Suitable for Timber Production

Activity: Evaluate the accuracy of suitable timberlands classification in the Forest Plan; periodically reexamine lands identified as not suited for timber production to determine if they have become suitable and could be returned to timber production.

Unit of Measure: Acres

Reporting Period: Annual

Variability which would initiate further evaluation: ±5% change in acreage of suitable lands.

Monitoring Results: The Forest Plan classifies 406,800 as suitable for timber production. The evaluation of land suitability for tentatively suitable lands and the further division of these lands into suitable forest land available for timber harvest is ongoing through landscape analysis, project analysis, and timber stand examinations.

This data is entered into the Timber Stand Management Record System (TSMRS) to provide information for forest analysis.

The timber stand examination process and NEPA analysis on Suitable forest land provides an updating process for timber inventory, and as timber stands are examined we are better able to evaluate the status of the tentatively suitable lands.

During the last eighteen years (1988-2005) 218,400 acres of stand exam have been completed, averaging 12,100 acres per year.

Evaluation: There have not been measureable changes in the acreage of suitable lands over the last 10 years. A Forest-wide reanalysis of tentatively suitable timber land was conducted in FY04 as part of Forest Plan Revision. Suitable timber acres will be re-allocated in the revised Plan.

Soil and Water

Item 9-1: Soil and Water—Compliance with local, State, and Federal Water Quality Standards

Activity: Monitor to insure compliance with local, State, and Federal water quality statutes**.**

Unit of Measure: Varied

Reporting Period: Annual

Variability which would initiate further evaluation: Activities not meeting water quality standards or which would lead to long-term watershed degradation.

Monitoring Results: A Timber Sale Administration, Sale Preparation and Log Accountability Review was conducted on the Beaverhead-Deerlodge NF on August 8-11, 2005. The team reviewed the Gird Creek and Low Sheep Thinning Timber Sales. The Commendations section in the report included a discussion on BMPs as well as NEPA and NFMA compliance. It gave a positive assessment of temporary and system roads in terms of adequate drainage and maintenance. It also reported that BMPs and mitigation were incorporated into both sales, and the decisions made were consistent with the Deerlodge Forest Plan. It did note in the Sale Preparation section that a BMP tracking process from planning through sale administration would help ensure that mitigation and design features were implemented.

Evaluation: While this does not constitute a formal BMP review, it does appear that BMPs were followed and no further evaluation is warranted.

Item 9-2: Soil and Water—Riparian Rehabilitation Projects

Activity: To eliminate backlog of riparian rehabilitation acres by year 2000.

Unit of Measure: Acres

Reporting Period: Annual

Variability which would initiate further evaluation: <50% accomplishment of target in 5 year period.

Monitoring Results: Since 1997, targets have been set for the Forest as a whole, both the Beaverhead and Deerlodge units. The Forest's FY05 target for stream restoration was 10 miles. Fourteen miles of improvement were accomplished:

Table 40. Stream Restoration Targets

Name	District	Description
Doolittle Exclosure	Wisdom	26 acres protected on a 303(d) stream with westslope cutthroat trout
West Fork Madison River Exclosure	Madison	275 acres of high value riparian zone protected along a 303(d) stream
Shovel Creek Cattle Crossing	Madison	3 stream crossings hardened on a tributary to a 303(d) stream, supported by electric fence
Butte Cattle Exclosures	Butte	10 acres of high value riparian zone on westslope cutthroat streams protected
Crockett Lake	Madison	[1]Lake restoration was accomplished
Narrows Creek Pond Willow Planting	Madison	[1]Lake restoration was accomplished
Ruby River Pond Beaver Feeding	Madison	[1]Lake restoration was accomplished
Mud Lake	Pintler	[1]Lake restoration was accomplished

[1]*Lake restoration was accomplished on all 10 acres targeted.*

Additional stream restoration projects used different funding and were not included in target accomplishments. The Jack Creek Mine Waste Removal, a major rehabilitation project in the Basin Creek watershed (Boulder River Sub-Basin), was accomplished under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Ten acres of restoration were completed. This project routed tainted water from an abandoned mine downstream of an important fish-bearing tributary of Jack Creek and allows Westslope Cutthroat Trout from previously isolated populations to mix. The project removed mill tailings in the Jack Creek floodplain, providing a clean growing medium for vegetation.

The Jack Creek Mine Waste Removal and rerouting of water appear to be successful. Observations indicate ditch construction, stream channel reconstruction, mill tailings removal, and revegetation are adequate. The only possible exception is leakage from the ditch. Water quality samples were submitted (lab results pending) to determine whether leakage from the rerouting ditch at a point below the fish bearing streams is affecting Jack Creek. If water quality is not adequate in the target stream, then attempts to completely seal the ditch will commence.

The Americorps provided labor in restoring a meadow section of the South Fork Divide Creek above the South Fork Reservoir (Butte RD). The meadow and associated stream reach historically attracted cattle for forage, water and shade. A crossing on one segment of the stream received heavy impacts. The restoration work included construction of an armored crossing, construction of fence, which directs cattle to the constructed crossing, and placement of trees and limbs along the stream banks to create protective barriers. Four acres of restoration were accomplished by falling conifers in a nearby aspen stand to promote growth, and using grass seed and fertilizer to revegetate a bare slope.

Evaluation: While this monitoring item is now outdated (2000 has come and gone) we continue to report on riparian rehabilitation accomplishments. Targets for stream restoration were exceeded in FY05.

Item 9-3: Soil and Water—Productivity Changes in Sensitive Soils

Intent: Insure that management practices do not adversely affect soil productivity.

Resources to be monitored: productivity changes in sensitive soils.

Data Sources: Environmental Assessments and review of proposed activities, Field examinations and laboratory testing.

Frequency of Measure: Annual

Reporting Period: 5 years

Precision: High

Reliability: Moderate

Variability which would initiate further evaluation: When changes of baseline levels of the soil's chemical and physical properties exceed 20% as determined by lab analysis.

Monitoring Results: Forest Soil Scientists, Dan Svoboda (M.S. Forest Soils), Karen Gallogly (B.S. Range-Forest Management), and Dave Ruppert (M.S. Soil Science) conducted extensive monitoring on the South Butte Timber Sale, the sale and contract which implemented most of the Basin Creek Hazardous Fuels Reduction Project beginning in 2005. Their monitoring is documented in full in "Soil Scientist Specialist Report, Basin Creek Hazardous Fuels Reduction Project – Soil Productivity, Best Management Practices Monitoring, Compliance with Regional Soil Quality Standards, Forest Plan Soil Monitoring Item 9-3, September 8, 2006, available on the web at http://www.fs.fed.us/r1/b-d/projects/index-basin-cr.shtml.

A. Background

Basin Creek Hazardous Fuels Reduction project (Basin Creek Project) is located eight miles south of Butte, Montana. A Record of Decision authorizing treatments for the area was signed by Forest Supervisor, Thomas Reilly on June 7, 2004. The selected alternative (Alternative 3) proposed total treatment on 2,602 acres of the 14,320 acre project area. The ROD authorized a total of 2,268 acres of mechanical treatment and 334 acres of burning. The South Butte Salvage timber sale, based on the Basin Creek decision, was awarded on August 1, 2005 with some harvest conducted from early September to late November 2005, prior to court injunction. Based on field layout, the total acres treated in all treatment units is now 1,574 acres. Under the current operating plan filed by the purchaser, all acres will be tractor harvested with ground-based yarding systems to be used on 1,025 acres and helicopter yarding on 549 acres.

In the Basin Creek project, soil and water resources are protected during land disturbing activities by use of site-specific Soil and Water Conservation Practices (described in FEIS Appendix D),

specific mitigation and monitoring adopted as part of the decision (see FEIS at 2.9-2.10) and other design features of the project. Soil and Water Conservation Practices are commonly known as Best Management Practices (BMPs) and were adopted from the Soil and Water Conservation Practices Handbook [FSH 2509.22, R1/R4 Amendment No.1, page 1]. The mitigation and monitoring requirements (including BMPs) identified by the Interdisciplinary Team are implemented by incorporation in to the Timber Sale Contract and its provisions and through a signed Letter of Agreement by the purchaser to comply with Regional Soil Quality Standards. Regional Soil Quality Standards (SQS) provide the criteria for and definition of detrimental soil disturbance as well as organic matter guidelines.

The specific monitoring and mitigation items relating to soils identified in the FEIS and adopted as part of the ROD are as follows:

1. Use of appropriate BMPs and applicable timber sale contract provisions during road maintenance, snow plowing and forest product yarding/piling will keep detrimental soil disturbance including erosion, compaction and displacement within soil quality standards. For greater detail see the Soil and Water Conservation Best Management Practices (FSH 2509.22) listed in Appendix D.

2. When possible treat areas over snow or frozen ground to minimize ground disturbance my mechanized equipment.

3. Operate ground-based equipment when soils are dry. Where non-winter harvest operations are used, soil moisture will be assessed during harvest operations to determine periods when equipment operations should be halted. Assessments will be made following major precipitation events.

4. Designate main skid trails and recommend laying down treetops and limbs on these trails to protect the soil during skidding operations.

5. While logging is being conducted, break skid trails every 200 feet with slope breaks, waterbars or large woody debris to reduce buildup of overland flow in the skid trail.

6. Install water bars on designated skid trails at the completion of the project to minimize water erosion.

7. Place logs and debris on the skid trail surfaces following completion of the project to discourage off-road use.

8. Apply tilling or ripping on main skid trails in areas of detrimental soil compaction to maintain soil quality standards and fix existing problems.

9. Decommission temporary roads by tilling (subsoil) or re-contouring, seeding with native or desired species and spreading available slash over the road surface.

10. Retain a minimum of 10 tons per acre of large woody debris for organic matter recycling in units outside of the intermix community.

In addition to these required mitigation and monitoring items, the design of the timber sale requires that all or portions of 23 units be helicopter yarded; which eliminates ground-based yarding equipment from the unit. Also, in terms of monitoring item #4 above (designate main skid trails), the South Butte contract explicitly requires such designation (contract provision C.4#) and the contract requires 100’ spacing of the skid trails (contract provision C6.4#). This provision of 100’ spacing of skid trails would amount to a maximum of approximately 10% of an average 40 acre unit being disturbed by tractor skidding operations on the main skid trails (assuming a 10’ wide skid trail). Further, not all of these acres would necessarily be detrimentally disturbed as BMP monitoring has shown that normal machinery operated on moist soils would increase soil

bulk density after 15 passes considerably less than a 15% increase that would cause detrimental disturbance. The disturbance would be expected to be even less on frozen or dry soils. (See discussion below in the BMP Effectiveness sections of this report and the FY2004 Monitoring Report at 9-3.)

B. Implementation of contract provisions

Examination of all Timber Sale Inspection Reports (a total of 64 reports) prepared during the approximately 14- week period from September 3, 2005 to December 13, 2005, show references to the implementation of specific contract provisions and practices to minimize erosion and detrimental soil disturbances and compliance with Regional Soil Quality Standards. These reports document administrative, preventive, and corrective practices were continuously implemented, monitored, and adjusted during sale administration. The timber sale inspection reports are summarized in Appendix C of the Report by Svoboda, et.al, 2006 in the project file or on the web. Appendix C displays the practices and contract provisions for the seven units treated within the South Butte Salvage Sale and records the on-the-ground review of soil scientists during project operation and interaction of Forest Service timber sale administrators with the purchaser and equipment operators to assure the design of the project and the BMPs are carried out to ensure compliance with soil quality standards is achieved and site productivity is maintained. Specifically, they show, in addition to the implementation of other mitigation measures, the implementation of 100' skid trail spacing, the placing of slash, and operation on frozen ground to minimize soil compaction and detrimental disturbance.

C. BMP Effectiveness

Monitoring was conducted on the seven units of the South Butte Salvage Sale for which harvest had been completed prior to the District Court issuing a stay of activities November 22, 2005. Of the total sale acreage, approximately 158 acres have been treated to date. All treatments occurring so far have been ground based tractor operations. Five units have had harvest substantially completed with two more units where harvest is 75% completed. Due to the injunction all activities have been halted in the units.

However, in order to assess the effectiveness of BMPs on the units harvested the Forest Service undertook scientifically accepted soil quality monitoring (Howe, 2002) to evaluate Treatment Units during a two week period in late July 2006. The monitoring was conducted to determine levels of detrimental soil disturbance including detrimental soil compaction, rutting, displacement, and surface erosion. Percentage ground cover and tons of coarse woody debris per acre were also measured. In addition, soil chemical and physical analysis was conducted by an accredited soils testing laboratory to determine soil particle size distribution, organic matter content, cation exchange capacity, and pH.

1. Detrimental Soil Disturbance on Harvested Activity Areas

Units 14, 24, 59, 65, 66, 68, and 70 of the South Butte Salvage Sale were logged or partially logged during September through November, 2005. These units were all tractor logged and include landings or portions of landings within the units. Unit 68 is one acre and was operationally included into Unit 66. Trees in Unit 66 have been felled but not skidded and logs and tops made it impractical to sample so it was omitted from monitoring. Soil monitoring will comence in Unit 66/68 when logging operations can be resumed.

Monitoring took place in Units 14, 24, 59, 65, and 70 to determine effectiveness of practices and provisions implemented during sale administration were effective means to achieve Soil Quality Standards. The methodology, listed on the following page, was used to monitor soil disturbance, ground cover and coarse woody debris:

- Random GIS plot locations were generated by computer for each unit (activity area). Forty random plots were generated in each unit to get relatively evenly distributed plot locations. Each area of a unit was thus represented and each had an equivalent chance of being selected for sampling – including skid trails, landings and any temporary road that might have been located in the unit. Each random plot has an assigned unique number as well as a GIS location.
- Depending on unit size, at least two one-hundred foot transects were placed in each unit. Plot numbers were chosen randomly. The GIS plot location is the origin (start) of the transect. The direction of the transect line was determined by random numbers.
- Ground cover (litter, rock, lichen/moss/cryptogamic crust, vegetation, wood) was determined (point intercept method) at one-foot intervals along the transect (100 points per transect).
- The Howes Classification for new soil disturbance, classes 0-5 (Howes 2000), were also determined at five-foot intervals resulting in 20 points per transect.
- Soil penetrometer readings were also taken at five-foot intervals at the soil surface in Units 14 and 65, and also at 15cm depth in Units 24, 59, and 70 using a proving-ring penetrometer. Samples were taken at both near-surface and at approximately 12-15cm.
- Soil bulk density samples were taken in all units, usually two per transect at disturbed and undisturbed locations. Bulk density measurements were taken in part to confirm or calibrate visual indicators and observations of detrimental compaction made when using the Howes classification for assessing soil disturbance. A hammer core with three-inch diameter cores was used for sampling. Cores were sealed in plastic bags for transport to the lab.
- The other conditions that factor into detrimental soil disturbance - rutting, displacement, surface erosion and soil mass movement – were also analyzed and evaluated in determining the Howes Classification. (Severely burned soil is also a consideration, however, none of the units have been impacted by high intensity burns.)
- Field soil moisture was taken at each transect, usually at two locations.
- Observation of platy or massive structure was noted at each bulk density sampling location and at each 15cm-depth penetrometer reading.
- Large woody debris (equal or greater than three inches diameter) was recorded by size class utilizing the same transect location, but on a sixty-foot transect length, consistent with Browns (1974) method for determining woody debris.
- Photos were taken in each unit at most transects looking down the transect tape and overview shots were taken in each unit from several plot locations.

Additionally, soil samples were collected in representative disturbed and undisturbed locations in Units 14, 24, and 65 for laboratory chemical and physical analyses. These samples and the results of their analysis are discussed below in section D - Changes in baseline levels of sensitive soils chemical and physical properties.

The table on the next page displays the percentage post-harvest detrimental soil disturbance for the five activity areas monitored within the South Butte Salvage Sale. Field data collection sheets, bulk density measurements, and the calculations showing percentage detrimental soil disturbance by activity area are included in the background material supporting this analysis.

In addition, the FEIS disclosed the amount of existing detrimental soil disturbance in the project area and the methodology used to determine that amount. Prior to harvest activities, the Forest Service conducted field testing using the Howes (2000) field protocol and sampled soils from approximately 62% of the project activity units. Based on this field investigation, the Forest Service concluded existing soil disturbance in the project area was "non-detectable to slight." Table 41 identifies the percentage of existing detrimental soil disturbance where that data is available. We also have pre-harvest data on Units 22, 25, 44, 56, 64, and 75, not shown here.

Table 41. Detrimental Soil Disturbance by Harvested Activity Area

Unit	Total Acres	Yarding Method	Number of Total Transect Points	Number of Transect Points Found to Have Detrimental Disturbance	Percent Detrimental Disturbance by Activity Area
14	47	Tractor	140	19	14
24	15	Tractor	60	6	10
59	21	Tractor	80	10	12
65	37	Tractor	140	25	18
70	3	Tractor	40	8	20

All of the units were tractor logged. Units 14, 24, and 59 comply with the Regional Soil Quality Standard to limit detrimental soil disturbance to no more than 15 percent of an activity area. Detrimental soil disturbance in Unit 65 exceeds the standard by three percent and detrimental soil disturbance in Unit 70 exceeds the standard by five percent. **These findings are prior to completion of all required mitigation measures.** Work will be completed in the units 65 and 70 to comply with contract requirements and to meet soil quality mitigation requirements #8 and #9 of the FEIS if/when the Court allows it following whatever decision is made.

Of the detrimental soil impacts, detrimental soil displacement was the most common disturbance observed during field monitoring. It was found on 54 points of the 68 detrimental points (out of a total 460 points) in the five units. Two of the points showing displacement also showed signs of minor erosion. Detrimental displacement is displacement that results in the loss of 1 or one more inches (depth) of any surface soil horizon, usually the A horizon, from a continuous area greater than 100 square feet. Displaced soil can be back-bladed and smoothed with the harvesting equipment so the A horizon is restored to its original position. For the harvest units in the South Butte sale, this is easily accomplished as displaced soil is within the skid trail corridor and has not been moved from its location adjacent to its original position. There was no surface erosion and no soil mass movement identified as detrimental. There was only one observation of rutting.

The following summarizes the monitoring results for each harvested unit.

Unit 14: The areal extent of detrimental soil disturbance from both compaction and displacement is 13.6 percent in Unit 14. The unit or activity area is 47 acres. 4.3 percent of the total disturbance is from detrimental soil compaction, 7.9 percent of the total disturbance is from detrimental soil displacement, and 1.4 percent is from a combination of both detrimental compaction and displacement. Operations during dry soil conditions and designation of main skid trails (Soil Mitigation Measures, FEIS pg. 2.9) were especially effective in limiting the amount of detrimental soil disturbances to comply with Regional Soil Quality Standards. Documentation of operations during dry soil conditions was noted for two timber sale inspections, each completed on November 5, 2005. Both Forest Soil Scientists were on the site that day and agreed soil

moisture conditions were suitable for felling and skidding operations. One incidence of a deviation from approved skidding patterns was identified on November 2, 2005, however, the equipment operator was promptly notified that strict adherence to approved skidding patterns was required at all times as agreed to by the purchaser. Placing slash on skid trails (FEIS page 2.9) is a very effective practice for preventing soil erosion and was also noted on the inspection reports. The average percentage effective ground cover for seven transects measured in this unit is 87 percent. WEPP modeling to determine project specific requirements for effective ground cover predicts that 70 percent cover provides protective rainfall interception to prevent water erosion. Unit 14 complies with Regional Soil Quality Standards for limiting detrimental soil disturbance to less than 15 percent of the defined activity area.

Unit 24: The areal extent of detrimental soil disturbance within this unit is 10 percent. The unit is 15 acres. 8.3 percent of the total disturbance is from detrimental soil compaction and 1.7 percent is from a combination of detrimental soil compaction and displacement. Operations during dry soil conditions and designation of main skid trails (Soil Mitigation Measures, FEIS pg. 2.9) were especially effective in limiting the amount of detrimental soil disturbances to comply with Regional Soil Quality Standards. Documentation of operations during dry soil conditions was noted on November 3, 2005 during a routine timber sale inspection. Several notations by the Timber Sale Administrator (TSA) documented the success of approved skid trail spacing to limit the areal extent of detrimental disturbances. These were observations were made on November 15, 2005, November 17, 2005, and November 21, 2005. The TSA also noted one incidence of soil displacement on November 17, 2005; however, the displaced topsoil was back-bladed to correct the condition. The operator did a good job of correcting the condition which was noted on a subsequent inspection on December 12, 2005. Slash placement on skid trails as described above is an effective means of preventing erosion. The average percentage effective ground cover for three transects measured in this unit is 93 percent. This level of ground cover is more than adequate to protect the soil from water erosion. Unit 24 complies with Regional Soil Quality Standards for limiting detrimental soil disturbance to less than 15 percent of the defined activity area.

Unit 59: The areal extent of detrimental soil disturbance within this unit is 12 percent. The unit is 21 acres. 7.5 percent of the total disturbance is from detrimental soil displacement and 5.0 percent is from a combination of both detrimental compaction and displacement. This unit was combined operationally with Unit 24 so the weather conditions and operator expertise were the same for both units. Again, soil moisture conditions and skid trail spacing were effective practices used to limit the amount of detrimental disturbance and were noted on the timber sale inspection reports on November 15, 2005, November 17, 2005, and November 21, 2005. Slash placement was also used in this unit and the average percentage ground cover for five transects is 90 percent. Unit 59 complies with Regional Soil Quality Standards for limiting detrimental soil disturbance to less than 15 percent of the defined activity area.

Unit 65: The areal extent of detrimental soil disturbance from both compaction and displacement is 17.8 percent in Unit 65. The unit or activity area is 37 acres. 2.1 percent of the total disturbance is from detrimental soil compaction, 15 percent of the total disturbance is from detrimental soil displacement, and 0.7 percent is from a combination of both detrimental compaction and displacement. This unit was the first location harvested when operations began in October 2005. From the timber sale inspection reports it is apparent the operator was turning the skidder on the slope rather than backing down the same skidder path creating an unacceptable level of displacement at that location. Additional work, specifically more back-blading to smooth out displaced soil will be necessary at such time work can be resumed. With the completion of the work, the unit will comply with the soil quality standards. The average percentage effective

ground cover for seven transects measured in this unit is 83 percent. This level of ground cover is more than adequate to protect the soil from water erosion.

Unit 70: The areal extent of detrimental soil disturbance is 20 percent in Unit 70. No detrimental compaction was observed or measured in this unit, which is 3 acres. The small size of this unit is part of the reason for high percentage of displacement. One single skid trail occupies a greater percentage of the unit when compared to larger units increasing the percentage of disturbance. One notation (November 1, 2005) on the timber sale inspection report addresses the situation and states "some soil displacement remaining. Purchaser's representative says these areas will be smoothed when slash is placed on skid trails." This condition will be corrected at such time operations can be resumed. With the completion of the work, the unit will comply with the soil quality standards. Due to the small size of the unit, only a very small area would have to be corrected (approximately, 0.2-acre of back-blading and smoothing) to restore the unit to a condition that complies with the Regional Standard of <15% detrimental soil disturbance. However, mitigation will be applied to ameliorate all soil displacement. The average percentage effective ground cover for two transects measured in this unit is 90 percent. This level of ground cover is more than adequate to protect the soil from water erosion.

2. Coarse Woody Debris and Ground Cover

As indicated in the FEIS, coarse woody debris (also referred to as large woody debris) is limited within the treatment units (FEIS at page 3.216, 3.229). This is validated by the recent soil monitoring which indicates that coarse woody debris averages from less than 1 ton to 3.9 tons per acre for the five units sampled. This range is adequate for areas within 200 feet of private property boundaries (FEIS 2.5) but does not comply with the 10-15 tons per acre required for the project. The South Butte Timber Sale contract specifies whole-tree yarding. Large limbs and cull wood that would comprise the coarse woody debris for distribution across the treatment units is piled at the landings since logging operations have been suspended. As such, presently none of the five units complies with the coarse woody debris requirement of retaining 10-15 tons of material greater than 3 inches left on-site to maintain soil productivity. At such time as operations can be resumed, coarse woody debris would be distributed across the units at 10-15 tons per acre and monitored for compliance with this requirement. Our on-the-ground review indicates that there is sufficient coarse woody debris to meet this ROD mitigation requirement. Meeting this requirement will be an important improvement for soils in the project area from the current existing condition.

The "Effects Summary" section of the FEIS at 3.229 also states: "The other parameters in the SQS that are of concern in this proposal are displacement, compaction, erosion, sedimentation, and burning. Currently, soils are not compacted over threshold limits compared to undisturbed, similar areas and sites generally do not approach threshold values (see proving-ring penetrometer data in the project file). While the existing condition is poorer than most similar sites (soil/landform/habitat type/community type combination) in respect to woody debris and litter layer, the surface soil is stable." (FEIS 3.229). This report shows that harvest has been conducted, utilizing BMPs, such that deterimental soil disturbance will be minimized and will be less than 15% and woody debris requirements will be met.

In addition to coarse woody debris monitoring, percentage ground cover within activity areas was also measured. Ground cover consists of vegetation, fine organic matter, coarse woody material and rock fragments larger than three-fourths inches in diameter in contact with the soil surface. Minimum amounts of properly distributed ground cover necessary to protect the soil from erosion are a function of soil properties, slope gradient and length, and precipitation and must be determined locally. In forest conditions, surface runoff and soil erosion are generally low because of the surface litter cover (Elliot, W., Page-Dumroese, D.; Robichaud, P.R. 1999.) The Water

Erosion Prediction Project (WEPP) model is shown to be a useful tool in predicting the erosion impacts of different levels of vegetation removal at harvest, and different levels of compaction. Id. WEPP modeling was used to determine minimum amounts of ground cover necessary to protect soils from erosion within the South Butte Salvage Sale. Project specific parameters for soil texture, slope and preciptation were used as model inputs. The WEPP modeling shows that at 70% ground cover soil erosion is almost nil for the South Butte harvest units. All plot (transects) measured within the five harvested units of the South Butte Salvage Sale had over 70 percent protective ground cover in the form of litter, rock, lichen/moss/crytogamic crust, vegetation and wood. Average ground cover for the five units all exceeded 80 percent and ranged from 83 percent to 93 percent. The monitoring shows that ground cover is more than sufficient to provide protective cover from soil erosion to maintain soil productivity.

D. Changes in baseline levels of sensitive soils chemical and physical properties

Monitoring Item 9-3 applies to soil productivity changes in sensitive soils. Whether soils are sensitive can only be determined based on site-specific knowledge of the particular soil types located in the area. Based on 3 soil scientists (D. Ruppert, D. Svoboda, K. Gallogly) site-specific knowledge of the soils in the Basin Creek project area, it is their professional opinion as soil scientists that the soils in the Basin Creek area are not sensitive in the context of the planned activities. Existing condition assessment and post-harvest monitoring of ground cover and erosion substantiate this conclusion (Svoboda, et. al. 2006).

Although soils within the analysis area were not identified as “sensitive soils,” laboratory analysis was conducted to confirm this hypothesis. Three soil samples were taken – one from unit 14 and two from unit 65 for laboratory chemical analysis to address soil monitoring requirement 9-3 in the Deerlodge Forest Plan. These samples were compared to the physical and chemical properties of reference soils. Samples were chosen to represent the variability observed during the existing condition surveys and during the post-logging monitoring of five activity area units. This includes the range of soil texture, color, and organic matter content.

The soil from Unit 65, Transect 3, Plot 25, is identified as sample B06071133001. A review of the laboratory results indicates this sample correlates with a sample from the Deerlodge soil inventory identified as 092V91W005, map unit 207a, Galena Gulch, a loamy skeletal, mixed, Lamellic Eutrocryept. This sample would be a minor component of soil map unit 207a (Ruppert, personal com.). Examination of the laboratory data indicates that the two are reasonably similar in terms of particle size class and other physical characteristics. The sample from the project area however has high soil organic matter content. The reference soil and the collected sample are relatively similar and there is not a 20% difference in properties that would cause a detrimental decline in soil productivity.

A second sample from Unit 65, Transect 4, Plot 22, identified as sample B06071133004, is more typical since it is dominant in several units mapped within the Basin Creek project area. A soil previously sampled and used for the Deerlodge soil survey, 070601R3, a loamy-skeletal, mixed Typic Cryochrept is used as a reference for comparison. A review of the laboratory data indicates that both these soils are typical physically and chemically and both would be expected to have similar productivity.

The last soil sampled from Unit 14, B06071133005, is similar to the above soil B06071133004, physically and chemically. Therefore the same previously sampled soil 070601R3, can be used for comparison. Again, a review of the laboratory results indicates that both of these soils are physically and chemically similar in both the surface and subsurface and would be expected to have similar productivity.

All three of the samples were taken where there had been harvest activities. However, two of the Basin soils sampled had no apparent disturbance; a litter layer was present and there were no signs of surface erosion. The other B0607113005 was recently disturbed at the surface (litter displacement) by a mechanical feller/buncher or skidder in Unit 14. A direct comparison of the disturbed soil and its close match, B060711300, from Unit 65 indicates that the two are not more than 20% different relative to cation exchange capacity, based mostly on inherent variability, and appear otherwise similar physically and chemically.

Soil chemical and physical analysis was conducted by an accredited soils testing laboratory to determine soil particle size distribution, organic matter content, cation exchange capacity, and pH. The laboratory analysis shows that there is not more than 20 percent change in soil chemical and physical properties between reference samples and samples collected from project area, nor between undisturbed soil within an activity area and soil that has been impacted by management activity. There was not a change in soil chemical and physical properties of more than 20 percent.

E. Evaluation

This project proposal is an attempt to achieve desired conditions that protect soil productivity in the long-term. The proposed project is to remove large volumes of fuel that could burn with an intensity that will threaten long-term soil productivity and hydrologic stability in the project area. Fire scenarios discussed in the FEIS show detrimental soil quality impacts expected to occur in areas of severe burning with effects predicted from erosion and the fire models that are expected to be long- term.

Both field examinations and laboratory analysis were conducted to show that the project is consistent with the intent of Forest Plan monitoring item 9-3, even though site-specific knowledge demonstrates that the soils in the Basin Creek area are not sensitive in the context of the planned activities and the Forest Plan.

Laboratory analysis shows that there is not more than 20 percent change in soil chemical and physical properties between reference samples and samples collected from project area, nor between undisturbed soil within an activity area and soil that has been impacted by management activity. This confirms the line of reasoning established by the project soil scientist that monitoring item 9-3 did not apply to soils in the project area. Project area soils were not considered sensitive and there was not a change in soil chemical and physical properties of more than 20 percent.

Field monitoring conducted on the South Butte Salvage sale demonstrates that conservation practices and timber sale contract provisions are an effective means of achieving Regional Soil Quality Standards to maintain site productivity as required by the National Forest Management Act.

- Detrimental soil disturbance requirements were met on three of the five units monitored. They were exceeded by three and five percent, respectively, on two units **prior to completion of all required mitigation measures**. Review affirmed that these units will meet standards with completion of the work. There was no surface erosion and no soil mass movement identified as detrimental and only one observation of rutting.
- The field review confirms there is sufficient coarse woody debris to meet the 10-15 tons per acre ROD mitigation requirement.
- Average ground cover exceeded 80 percent, which based on the Water Erosion Prediction Project model is more than sufficient to provide protective cover from soil erosion to maintain soil productivity.

The soil impacts and conclusions in the Basin Creek FEIS are confirmed.

The Forest Service's analysis of the impacts of the project on soil productivity within the five harvest units of the South Butte sale shows that the analysis presented in the Basin Creek Hazardous Fuels Reduction Project is valid and the determination that "By design under this proposal, detrimental soil disturbance in all units would be at or below 15 percent, which is the maximum level allowed by soil quality standards from all causes" is supported. The soil quality standards have been incorporated into the project contract and practices designed to achieve these standards have been implemented and monitored.

Further, the Forest Service has confirmed soil chemical and physical properties have not changed more than 20 percent due to project impacts. Ground cover is adequate to minimize erosion and provide adequate protection to maintain site productivity. In addition, at such time as operations can be resumed, soil mitigation measures will be completed and coarse woody debris requirements will be met in all units as specified in Basin Creek Hazardous Fuels Reduction Project.

Item 9-4: Soil and Water—Adequate Water Supply

Activity: Insure availability of adequate water to maintain mgt. options, water rights and maintain existing water rights and update WURR file.

Unit of Measure: N/A

Reporting Period: Annual

Variability which would initiate further evaluation: Any change which would require acquisition of additional water rights.

Monitoring Results: The WURR file is no longer used, replaced by WUT (Water Uses Tracking). No entries were made into WUT during 2005. Forest involvement with water rights occurred as needed with the RO Water Team.

Evaluation: No water right cases or management options that required further evaluation were noted in 2005.

Minerals

Item 10-1: Mineral Activities

Activity: Monitor Forest Service allocations that may have an effect on minerals activities; mineral activities that have an effect on surface resources.

Intent: Check that recommended stipulations are adequate to protect resources but not severely restrictive on mineral activity.

Unit of Measure: EAs, operating plans, prospecting permits, lease applications review by ID Team

Reporting Period: 5 years

Variability which would initiate further evaluation: Departure from approved operating plan or violation of assigned stipulations. Unacceptable review of lease application by ID Team.

Monitoring Results: The Deerlodge unit administered all 62 Plans of Operations underway in FY05 to standard. "Administered to standard" in this case means permittees operated within their approved plan which includes any mitigating measures developed to minimize adverse effects.

Evaluation: Operating plans in compliance 100%. Monitoring item 10-1 was initially designed to monitor leasing applications also. Leasing applies to oil and gas. No oil and gas leasing decision made on the Deerlodge unit at this point, rendering this monitoring item is moot.

Protection

Item 11-1: Protection—Acres and Volumes of Insect and Disease Infestations

Activity: Insure that harvest emphasizes removal of high risk for mountain pine beetle attack. Maintain inventory of high risk stands of insect and disease infestations.

Unit of Measure: Acres, MBF

Reporting Period: Annual

Variability which would initiate further evaluation: Unacceptable results of an ID team review or if less than 70% of timber volume in programmed from high risk mountain pine beetle stands.

Monitoring Results:

Insect and disease conditions were monitored by the Forest Health Protection branch of USDA Forest Service State and Private Forestry and the Montana Department of Natural Resources Forestry Division. Insect infestations grew from 116,900 acres in FY04 to 208,700 in FY05. However, the big jump in infestations between 2004 and 2005 may be somewhat misleading. With ideal weather conditions for aerial flying in 2005, all potential infestations were flown for the first time since 2002.

Maps indicate infestations of particular concern in large and old growth Whitebark and Limber Pines and increasing fuel buildup in areas near residential development.

Table 42. Comparison of FY04 & FY05 Bark Beetle Infestations, Deerlodge Unit

Insect	Acres infested to some degree in 2004	Acres infested to some degree in 2005
Douglas-fir beetle	5100	20,400
Mountain Pine Beetle	108,000	182,000
Western Pine Beetle		
Western Balsam bark beetle	3800	6300
Total	116,900	208,700

Source: USDA, FS, Region 1, Forest Health Protection Missoula Field Office, Bark Beetle Conditions-Northern Region, Ken Gibson 2005.

Data for the western spruce budworm was presented for the BDNF as a whole and can't be broken out for the Deerlodge Unit. Infestations are described in the table on the following page.

Table 43. Comparison of FY04 and FY05 Western Spruce Budworm Infestations on Both Units of the B-D

Insect	Acres infested in 2004	Acres infested in 2005	Percent of Douglas-fir type on the BDNF affected
Western Spruce Budworm	37,000	61,000	10%

Source: USDA, FS, Region 1, Forest Health Protection Missoula Field Office, Bark Beetle Conditions-Northern Region, Ken Gibson 2005.

Direct control of insects was implemented on 22 acres, treating with MCH, and 12 acres treating with Verbenone to disrupt mountain pine beetles. Carbaryl was used to treat 193 acres in high risk campgrounds to protect high value trees on the Deerlodge Unit (USDA, USFS, 2005 Forest Service Activity Tracking System (FACTS).

FY05 timber sale administration projects on the Deerlodge Unit are described in the table below. The purpose of the sales included salvage of dead trees to protect public safety, reduce fuel loading or offer wood products; thinning to reduce the potential for bark beetle infestations, producing post and pole products, or forest health restoration; and offering of sawlogs and roundwood off of suitable timber lands.

Table 44. Timber sales administered on the Forest

Timber Sale Name	District	Type of Sale
South Rocky Beaver	Jefferson	Salvage/thin,-reduce bark beetle
Boulder River Campground	Jefferson	Salvage/thin-public safety, reduce bark beetle
Delmoe Campground	Jefferson	Salvage/thin-public safety
Fish Creek	Jefferson	Forest health restoration and offer products
South Butte (inc. Basin Watershed)	Butte	Salvage-reduce fuel loading
Highway 2, Roosevelt Drive	Butte	Salvage (helicopter)-public safety, reduce fuel loading
Sunday Gulch Insect Salvage	Butte	Salvage & offer product
Low Sheep Campground area	Butte	Salvage/thin- public safety (20 acres) rest thinning to reduce mountain pine beetle
Gird Creek	Pintler	Offer LP and DF product
Boulder Wyman #25	Pintler	Roundwood with small sawlog component
Boulder Wyman Post and Pole	Pintler	Roundwood with small sawlog component

Evaluation: An annual inventory of high risk stands of insect and disease infestations continues to be maintained on the Forest through the USDA, FS, Region 1, Forest Health Protection Missoula Field Office.

The Deerlodge unit timber harvest program targets high risk mountain pine beetle stands or stands that already show high mortality from the pine beetle. The largest project underway in FY05 was the South Butte or “Basin Creek Watershed” project, first initiated in 2002. This

project was initiated to address the large number of lodgepole pine killed by mountain pine beetle in the Basin Creek and Thompson Park areas of the Butte Ranger District. The Basin Creek Record of Decision proposed to salvage the dead wood and treat areas where human developments or municipal watersheds were threatened by dense, dry fuels. Logging began in Basin Creek in the fall of 2005 but was halted by litigation with only four units completed. Sixteen million board feet of timber are still tied up in court a year later. The fuel reduction project in Thompson Park was tied to the Basin Creek analysis and is also on hold pending the outcome of litigation.

Item 11-2: Protection—Air Quality

Activity: Prescribed fire meets air quality standards of State and Federal guidelines.

Unit of Measure: Numbers of prescribed fires

Reporting Period: Annual

Variability which would initiate further evaluation: 10% beyond standards and guides.

Monitoring Results: All prescribed burning must meet State and Federal air quality guidelines or burning is not carried out. Individual prescribed fires are registered with the State and burning air advisories are checked daily during the burning season. All prescribed fire have met State and Federal air quality standards. No intrusions are known to exist.

Evaluation: This monitoring item pertains to operation of projects. With monitoring by the State based on registering individual prescribed fires and issuance of air advisories insures that State and Federal standards are not exceeded. Given the process, this is no longer a valid monitoring item.

Item 11-3: Protection—Fuel Treatment Outputs

Activity: Achieve Forest Plan fuel treatment target reports.

Unit of Measure: Acres

Reporting Period: Annual

Variability which would initiate further evaluation: -5% to +25% of programmed targets.

Monitoring Results: The fuels target for FY05 was met. This includes Brush Disposal, Hazardous Fuels, and FN other. The data base of record (NFPORS) indicates a target of 2,989 acres (1840 acres of that in wildland urban interface) for both units of the BDNF. A total of 5,273 acres were accomplished (3,081 acres of 58% of that in wildland urban interface). In general though, fuel treatments have decreased somewhat from past years. The five year average for the whole Forest is 6,730 acres. The primary emphasis over the last 3 years for treatment has been wildland urban interface. Historically, fuel accomplishments were associated with rangeland improvement or wildlife.

Evaluation: We are not meeting the expectations of this monitoring item, which was to treat 5400 acres of fuel a year, 445 of which would be fuels created by logging. Only a small portion of fuel treatment in the last 5 years has been logging slash. Since the big wildfire year of 2000 and the resulting National Fire Plan, emphasis is on treatments in wildland urban interface, use of mechanical treatments, and treating fire regimes and condition classes at risk. The acres tied to this monitoring item are no longer relevant to the Forest fuel treatment program and program targets. The Forest Plan revision effort is taking a new look at alternatives for using fuel treatment to achieve desired conditions.

Item 11-4: Protection—Wildfire Acres

Activity: Assume wildfire acres as within projected annual burned acres.

Unit of Measure: Acres

Reporting Period: Annual

Variability which would initiate further evaluation: +50% above projected average annual wildfire burned acres.

Monitoring Results: On the Deerlodge portion of the forest, 325.7 acres burned in FY05. This is more than the identified annual expected acres burned of 224.

Evaluation: The acres burned in FY05 were very close to 50% above the average projected burned acres. Given forest health issues, increase in stand densities, more fire regimes at risk, fires have increased in size, intensity and severity across the Rocky Mountain west. The projected acres burned is unrealistic in light of these changes.

Item 11-5: Protection—Cost of Suppression, Protection Organization and Net Value Change

Activity: Keep fire management program cost effective.

Unit of Measure: Varied

Reporting Period: Annual

Variability which would initiate further evaluation: ±5% increase in real costs.

Monitoring Results: Fire suppression budgets and organizational costs are only tracked for the combined Beaverhead and Deerlodge zones now. The fire management program for FY05 was funded at approximately 80% of the Most Efficient Level (MEL) as identified by the national fire funding data base (NFMAS). The Forest met or exceeded the targets associated with that level of funding.

Evaluation: Real costs are tracked using the NFMAS funding tool. The Forest met cost effective goals based on NFMAS. However, limitations on funding on a national and regional basis have for the most part made NFMAS obsolete as a tool for measuring efficiency and providing funding. A new process is being implemented to measure efficiency and budget options. Fire Program Analysis (FPA) is expected to be fully operational in sometime in the future.

Facilities

Item 12-1: Facilities—Local Roads in Place and Collector Roads Constructed

Activity: Insure that assumptions are valid concerning: 1) local/collector road density 2) local/collector road standards.

Unit of Measure: Miles

Reporting Period: 5 years

Variability which would initiate further evaluation: ±20% of predicted miles of road.

Monitoring Results: Table 40 displays Beaverhead-Deerlodge National Forest accomplishments in road construction and reconstruction over the past five years, as well as the projections from

the individual Deerlodge and Beaverhead Forest Plans. (Note: Until 1998, the Deerlodge and Beaverhead National Forests reported road accomplishments separately. Due to the consolidation of the two Forests and subsequent changes in budgeting and reporting, the mileages shown are totals for the combined Beaverhead-Deerlodge National Forest. Thus, these numbers cannot be directly compared to the tables shown in Deerlodge Forest Monitoring and Evaluation reports for FY 1996 and earlier.)

Table 45. Road Construction and Reconstruction, Fiscal Years 2001-2005.

ACTIVITY	TOTAL FOREST PLAN MILES	2001 MILES	2002 MILES	2003 MILES	2004 MILES	2005 MILES	AVG 2001-2005
Construction	55.5	1.0	0.6	0.5	0	0	0.4
Reconstruction	16.2	2.6	5.1	5.4	21.9	16.2	10.2

The Deerlodge Forest Plan projects new construction at 24.7 miles per year. Actual construction on the combined Beaverhead-Deerlodge National Forest averaged only 0.4 mile annually over the past five years, less than one percent of the projected mileage. Reconstruction averaged sixty-three percent of the combined Forest Plan projected level during the same period. In FY 2005, no new permanent (system) roads were constructed on the Beaverhead-Deerlodge. The five-year average for road reconstruction is well short of the mileage projected in the Forest Plan, despite an increase in reconstruction over the last two years.

Evaluation: Actual road construction and reconstruction accomplishments are well below the Forest Plan projections. The trend of decreased road construction is occurring, at least in part, due to public opposition to the development of new specified roads; as a result, timber harvest units are situated along existing roads or are accessed with temporary roads. Even temporary road construction is limited, however, with an estimated average of 0.5 mile/MMBF. The Forest Service's emphasis has shifted toward reconstruction and maintenance of the existing road system, and identifying the minimum transportation system necessary for meeting Forest management objectives. This issue is being reevaluated during Forest Plan Revision.

Item 12-2: Facilities—Road Management

Activity: Insure that assumptions are valid concerning local/collector road 1) yearlong closures 2) seasonal closures.

Unit of Measure: Miles

Reporting Period: 5 years

Variability which would initiate further evaluation: ±30% of miles of predicted road closed either seasonally or yearlong.

Monitoring Results: Gates are the primary method of physically closing specified roads on the Forest, followed by signs only (no physical barrier), natural barriers, and man made barriers. Table 41 shows the extent of road use restrictions on the Forest.

Table 46. Road Use Restrictions1, Fiscal Year 2004.

RESTRICTION PERIOD	RESTRICTED MILES
Yearlong	110
Seasonal	695

Table 41 displays restriction applicable to standard highway vehicles. Many roads have different restrictions for other types of traffic, such as motorcycles, ATVs and snowmobiles.

Vehicular traffic is managed to provide public access on roads for resource use and recreation, to reduce maintenance costs, to minimize sedimentation into streams, to keep disturbance of wildlife at acceptable levels, and to carry out the goals, objectives, standards and guidelines as defined in the forest plan. Roads have been permanently closed and seasonally restricted to meet the above objectives. Approximately thirty-eight percent of National Forest System roads on the BDNF have some type of restriction.

Evaluation: The Forest Plan did not establish a baseline or target against which to measure accomplishment for this item. No further evaluation is required.

Economics

Item 13-1: Economics—Verification of Unit Cost Used in Plan Compared to On-The-Ground Cost

Activity: Acquire accurate cost data.

Unit of Measure: Dollars/Acre

Reporting Period: Annual

Variability which would initiate further evaluation: In general, ±25% however, very large cost items such as road constructions and logging cost would have a smaller degree of acceptable variability, i.e., ±10%.

Monitoring Results: The FY05 timber and salvage sale budget for both units of the Forest was $1,664,700. That budget went toward a target to offer 20.7 million board feet (MMBF) for sale. The Deerlodge Forest Plan projects a timber budget of $1,131,000 in 2004 dollars for the planning and preparation of timber and salvage sales to offer an average of 23 MBF. That amounts to approximately $49/MBF projected compared to $80/MBF in real costs.

Evaluation: While the numbers above only offer a rough approximation of actual cost/MBF (volume prepared, offered and sold are all included in the budget) it has been clear that experienced costs of offering timber have been notably higher than Forest Plan projected costs since as early as 1994. The 1994 Five Year Monitoring and Evaluation Report showed costs used to develop the Forest Plan are lower than experienced costs by more than the 25% variability allowed.

Adjacent Lands

Item 14-1: Adjacent Lands, Resources, Communities, and Agencies

Activity: Effect of National Forest management on land, resources, and communities adjacent to the National Forest. Determine effects of Forest Plan on other ownership, resources, and communities.

Unit of Measure: Varied

Reporting Period: Annual

Variability which would initiate further evaluation: Unacceptable results of an ID Team Review.

Monitoring Results: National Forest land nearby greatly enhances the quality of life for the people living in southwest Montana. The Forest is a source of natural resources, recreational opportunities and lifestyle settings for the residents of adjacent communities. Residents in local communities around the BDNF have maintained a high degree of interest in Forest management. This has been reflected in the level of participation in Forest Plan Revision. Work on revising the 1987 Deerlodge and 1986 Beaverhead Forest Plans began in earnest in FY03. The Draft Revised Land Management Plan and EIS were released in June 2005. BDNF staff met with the public in 160 different meetings from Island Park to Mammoth and Billings to Philipsburg. Over 1400 individual letters and over 9,000 signatures came on form letters or petitions before the formal comment period ended in October.

The economic value of activities and resource outputs from the BDNF (as a whole) were calculated for 2005 using an economic input output model called IMPLAN. IMPLAN was used to develop the direct and indirect effects of outputs, revenues, expenditures and Forest Service employment on the employment and labor income in the 8 counties affected most directly by the BDNF. Data on recreation visits were derived from a 2000 National Visitor Use Monitoring survey conducted on sites around the BDNF. We estimate a 1% growth of the numbers reported in the FY04 report. A 2nd NVUM survey was conducted in 2005 but data is too preliminary to use at this time (09/06).

Table 47. Value of Activities and Resources from the Beaverhead-Deerlodge National Forest in 2005

Resource Area	Output	Employment (Jobs related to FS activities)	Labor Income ($000 related to FS activities)
Recreation (visits)	599,940	363	8393
Fish and Wildlife (visits)	478,355	383	9160
Range (head months)	134,004	76	930
Timber (MMBF)	10.6	241	6121
Payments to Counties ($000)	962	21	621
Forest Service Expenditures ($000)	21,702	540	16,750
TOTAL		1,624 jobs	$41,977,000

Table 47 shows that in 2005, the BDNF activity contributed approximately 1,624 jobs tied to $41,977,000 in labor income to the 8-county area economy. This amounts to 3.5% of the total employment of 45,836 and 3.3% of the area's labor income of $1,265,341,000. The Forests contribution to jobs is up 6% from last year, primarily due to an increase in timber harvested from 8.9 MMBF to 10.6 MMBF and a slight increase in budget. Contributions to the areas labor income is up 9% for the same reasons.

For a complete discussion of how management of the BDNF affects local uses and lifestyles, refer to Volume I of the Draft Revised Land and Resource Management Plan, "Social and Economic Impacts", June 2005.

Evaluation: The Forest Leadership Team has not identified unacceptable impacts.

Item 14-2: Adjacent Lands, Resources, Communities, and Agencies

Activity: Effect of management on adjacent lands and effects of other Government agencies (State, Federal, Local) activities on the National Forest. Determine effects of management of other ownership on Forest Plan.

Unit of Measure: Varied

Reporting Period: Annual

Variability which would initiate further evaluation: Unacceptable results of an ID Team Review.

Monitoring Results: Management of the BDNF is affected by a number of other agencies and private landowners in several arenas. The areas influenced the most in FY05 are described below:

Threatened and Endangered Wildlife and Species of Concern – Decisions by the US Fish and Wildlife Service on listed species (bull trout, grizzly bear, bald eagle, trumpeter swans, and lynx) add both management standards and reporting requirements. In FY05, Forest Plan Amendments for Grizzly Bear Habitat Conservation for the GYA National Forests (including the BDNF) were being developed to provide additional programmatic direction for grizzly bear habitat management. Also in FY05, the Northern Rockies Lynx Amendment was being drafted. This Amendment provides management guidelines for Canadian Lynx on National Forests and BLM lands in Wyoming Utah Montana Idaho. Information is available at their website (http://www.fs.fed.us/r1/planning/lynx.html).

Travel Management and Recreational Opportunities – decisions about travel by neighboring agencies (Dillon and Butte Field Offices of the BLM, Gallatin National Forest, and Yellowstone National Park) affect the balance of recreation opportunities our users expect from this Forest. Closures on other lands, whether private or public, can bring new users to this Forest. With new or increased use, user conflicts and resource conflicts can increase.

The Dillon BLM Field Office issued their Final Resource Management Plan (RMP) in 2005. The land use plan decisions described in their RMP are now final and are not subject to further administrative remedy. However, the route designations included in the RMP are implementation level decisions and were open for appeal until May 14, 2006. The BLM travel decisions are being reviewed in conjunction with proposed changes in the BDNF Plan Revision effort.

The Gallatin National Forest issued their Draft Travel Plan and DEIS in 2005. The Final Plan is not expected to be released until late in 2006.

Fire Management – Adjacent ownerships and inholdings of private property influence management options for fire suppression, wildland fire use, fuel treatments and prescribed fire.

The National Fire Plan and subsequent Healthy Forest Restoration Act of 2003 (HR 1904) expedites the preparation and implementation of hazardous fuels projects on all federal land and assists rural communities, States and landowners in restoring healthy forest conditions on state and private lands. Community assistance plans developed with counties and the State are identifying additional wildland/urban interface and opportunities for fuels treatments in urban interface areas adjacent to the Forest. A good example of collaboration and coordination between the BDNF, local landowners and county agencies is the Meadow Creek fuels reduction project on the Madison District. Meadow Creek was ranked as very high priority in a risk analysis contracted by Madison County (Madison County Strategic Wildland Fire Plan (2003)). A Forest Service fuels project proposed for this area opened the door for Madison County to compete for a National Fire Plan grant. The County used this money to develop a defensible space pilot project and flyer to distribute to homeowners. They continue to collaborate on the Meadow Creek fuels reduction project.

Evaluation: The Forest Leadership Team has not identified unacceptable impacts from other agencies or adjacent landowners.

All Resources

Item 15-1: All Resources

Activity: Effect of emerging issues or changing social values. Keep publics informed; raise FS awareness to public concerns.

Unit of Measure: N/A

Reporting Period: Annual

Variability which would initiate further evaluation: If issues cannot be dealt with under the Forest Plan.

Monitoring Results: Residents in local communities around the BDNF have maintained a high degree of interest in Forest management. This has been reflected in the level of participation in Forest Plan Revision, beginning with feedback to the Analysis of the Management Situation (AMS) which was released in December 2002. The AMS was written, specifically to address those emerging or changing issues not adequately addressed by the 1987 Forest Plan. The public has been actively involved since 2002 and continued to be after Draft Revised Land Management Plan and EIS were released in June 2005. BDNF staff met with the public in 160 different meetings from Island Park to Mammoth and Billings to Philipsburg. Over 1400 individual letters and over 9,000 signatures came on form letters or petitions before the formal comment period ended in October.

Please refer to the AMS document (available at http://www.fs.fes.us/r1/b-d/) for a comprehensive discussion of the issues to be dealt with through Revision.

Evaluation: The Analysis of the Management Situation addresses those issues not resolved or adequately addressed by the 1986 and 1987 Beaverhead and Deerlodge Forest Plans respectively. The public has been actively involved in the revision process for the Beaverhead-Deerlodge Forest Plan.

Item 15-2: All Resources

Activity: Evaluate lands identified as not meeting physical or biological characteristics used in initial allocation. Verify allocations in the Forest Plan.

Unit of Measure: Acres

Reporting Period: Annual

Variability which would initiate further evaluation: All changes will be evaluated annually.

Monitoring Results: The allocations made in the 1987 Deerlodge Forest Plan are being re-evaluated through the Forest Plan Revision process, currently underway.

Evaluation: This monitoring item is no longer relevant because of changes made in allocation of suitable lands in the Revised Forest Plan that should be completed in FY08.

Research

Item 16-1: Research

Activity: Determine needed research for National Forest Management. Identify research needs.

Unit of Measure: N/A

Reporting Period: Annual

Variability which would initiate further evaluation: Lack of reliable data to base predictions on.

Monitoring Results:

RIPARIAN AND RANGE MONITORING PROTOCOLS

The Forest Ecologist and Fisheries Biologists worked with the Northern Region Office and Northwest Research Experiment Station to develop riparian and range trend monitoring protocols in 2005. The PIBO (PacFish/Infish Biological Opinion) riparian vegetation monitoring technique was incorporated into the BDNF Range Monitoring Handbook and three riparian sites were monitored to test the method. The method appears to give useful information that can be used to provide some quantitative information to support a state and transition narrative along with photographic points.

This monitoring technique was implemented on a small scale on the Forest in 2006.

SENSITIVE PLANT RESEARCH:

Sensitive plants were monitored on the B-D in 2005 including an extensive inventory of all known Lemhi Penstemon, Alkali primrose, and Sapphire rockcress populations.

Arabis fecunda (Sapphire Rockcress) Brassicaceae

Global Rank: G2
Date observed: June 3 & 7, 2005
Observers: R. Wooley, Forest Ecologist/Botanist; C. Gibson SCEP Ecologist

Three populations of *A. fecunda* were visited on June 3, 2005 on the Wise River Ranger District of the Beaverhead-Deerlodge National Forest (Table 1). Located upslope from the Canyon Creek Charcoal Kilns 24 reproductive *A. fecunda* individuals were detected on metamorphosed limestone openings of the dominant *Cercocarpus ledifolius* and *Artemisia tridentata* var. *vaseyana* overstory. This population was in flower, setting seed, and appeared healthy. Wildlife trampling, human disturbance associated with nearby Charcoal Kilns, and conifer encroachment are potential threats to this population.

A vigorous population of 400+ *A. fecunda* reproductive individuals was observed near Vipond Park directly upslope from the Charcoal Kiln population. The site consisted of a pebbly metamorphosed limestone and more herbaceous species in comparison to the Charcoal Kiln population. Associate species include *Artemisia tridentata* var. *vaseyana, Poa secunda, Sedum sp.,* and *Phlox muscoides.* Southeast of this large population a previously undocumented population of 400+ *A. fecunda* reproductive individuals was observed amongst the same associate species and at a similar elevation. Both of these large populations were in flower, setting seed, and appeared healthy. Invasive species were not observed during this visit, however conifer encroachment is a potential threat to these high elevation populations.

On June 7, 2005 one large population of several thousand *A. fecunda* was examined on the slopes of Lime Gulch north of Birch Creek, Dillon Ranger District. Occupied habitat included openings in *Cercocarpus ledifolius*/*Juniperous scopulorum*/*Pinus flexilus* dominated slopes; *Artemisia tridentata* var. *vaseyana/Poa secunda/Pseudoroegneria spicata* meadows; edges of pebbly openings dominated by matting perennials*;* and dry creek bottoms. Similar to populations visited on the Wise River Ranger District, this population was in flower, setting seed, and appeared healthy. No invasive species were observed, however heavy Mule Deer and Elk grazing of *Cercocarpus ledifolius* was evident. Density of individuals varied throughout the site from sparse to abundant.

Table 44. *Arabis fecunda* Population Locations.

Population	Town/Range/Sec	Elevation (ft)
Charcoal Kiln	T2S R10W Sec 8	6330
Vipond Park #1	T2S R10W Sec 5	7370
Vipond Park #2	T2S R10W Sec 7	7350
Lime Gulch	T5S R10W Sec 14, 15	6200-6390

The abundance and health observed for all three *A. fecunda* populations visited is hypothesized to be attributed to amount and timing of precipitation, as well as mild winter temperatures. May and June precipitation are higher this spring than the previous few years, which may provide favorable site conditions for growth, flowering, and seed set of this sensitive plant. Similarly all four populations of *A. fecunda* visited in June 2005 occurred with *Lesquerella pulchella*, which was also in full bloom and setting siliques

Astragalus scaphoides (Bitterroot Milkvetch) Fabaceae

Global Rank G3
Date observed: July 11, 2004
Observers: R. Wooley, Carly Gibson

A population of *Astragalus scaphoides* was examined in the Reservoir Creek Drainage just inside the B-D Forest boundary. This population was discovered in 2004. Plants were occupying a larger area than observed in 2004, and appeared to be flowering in abundance. However, browsing most likely by mule deer or antelope was more prevalent than in 2004**.**

Saxifraga tempestiva Saxifragaceae

Global Rank: G2
Note: Unable to monitor this year due to time constraints.

Lesquerella paysonii (Payson's Bladderpod)

Global Rank: G2
Date observed: June 10 & 11, 2005
Observers: J. Joy, Former Forest Botanist; K. Sweet, Pintler RD Sensitive Plant Coordinator; C. Gibson SCEP Ecologist

One population of *Lesquerella paysonii* was visited on June 10 and 11, 2005 on the Pintler Ranger District of the Beaverhead-Deerlodge National Forest. Located at lower elevations of the West Fork Buttes Botanical Special Interest Area several hundred reproductive *L. paysonii* individuals were detected on sparsely vegetated slopes, a few individuals were also observed in forested areas. This population was in flower, setting seed, and appeared healthy. Associate species included *Phlox longifolia, Phlox kelseyi* var. *missoulensis, Isomopsis spicata* ssp. *orchideacea, Arabis* spp., *Erigeron compositus, Oxytropus* spp., *Castilleja* spp., *Festuca idahoensis,* and *Artemisia tridentata* var. *vaseyana*. In July 2004 an encroaching population of *Centaurea biebersteinii* (spotted knapweed; formerly *C. maculosa*) was treated with Clopyralid throughout the West Fork Butte SIA. Although some *Centaurea biebersteinii* were observed during the June 2005 visit, reduction in density and distribution of this invasive was evident throughout the SIA. This treatment had little or no effect on native species, as many remnant inflorescences of *Centaurea biebersteinii* were observed with native species emerging from the area formerly occupied by rosettes of this invasive. This included *L. paysonii* and *Phlox kelseyi* var. *missoulensis* individuals and may be attributed to the warm and wet spring. The area *Centaurea biebersteinii* and *Bromus tectorum* (cheatgrass) invasion, human disturbance associated with nearby Highway 38, and erosion are potential threats to this population.

Primula alcalina (Idaho Primrose) Primulaceae

Global Rank: G2
Date observed June 21, 2005
Observers: R. Wooley, Forest Ecologist/Botanist; C. Gibson SCEP Ecologist

One population of *Primula alcalina* was visited on June 21, 2005 on the Dillon Ranger District of the BDNF. Located in a hummock wetland surrounded by willows in the Cabin Creek area, several hundred (1500+) individuals were observed on the top and sides of hummocks. This population was in flower and appeared healthy. Wild ungulate and cattle grazing in the wet meadows likely maintain habitat for this population. Associate species included *Juncus balticus, Deschampsia caespitosa, Thalictrum alpina,* and *Potentilla fruticisa.*

Primula incana (Mealy primrose) Primulaceae.

Global Rank:G5
Date observed: June 21, 2005
Observers: R. Wooley Forest Botanist Ecologist, Carly Gibson SCEP Ecologist

Observed 30 *Primula incana* in bloom in the Cabin Creek Area on B-D Lands. The population is located on hummocks along Cabin Creek Cabin Creek and is on site where *P. alcalina* boomed earlier. Thus *P. incana* and *P. alcalina* are occupying the same site with different flowering periods.

Phlox kelseyi var missoulensis (Missoula Phlox) Polemoniaceae

Global Rank: G2
Date observed: June 10 & 11, 2005
Observers: J. Joy, Former Forest Botanist; K. Sweet, Pintler RD Sensitive Plant Coordinator; C. Gibson SCEP Ecologist

One population of *P. kelseyi* var. missoulensis was visited on June 10 and 11, 2005 on the Pintler Ranger District of the Beaverhead-Deerlodge National Forest. Located at lower and mid-

elevations of the West Fork Buttes Botanical Special Interest Area several thousand reproductive *P. kelseyi* var. missoulensis individuals were detected on sparsely vegetated slopes, sage lands, and forested areas. This population was in flower, setting seed, and appeared healthy. Associate species included *Phlox longifolia, Isomopsis spicata* ssp. *orchideacea, Arabis* spp., *Erigeron compositus, Oxytropus* spp., *Castilleja* spp., *Festuca idahoensis,* and *Artemisia tridentata* var. *vaseyana*. In July 2004 an encroaching population of *Centaurea biebersteinii* (spotted knapweed; formerly *C. maculosa*) was treated with Clopyralid throughout the West Fork Butte SIA. Although some *Centaurea biebersteinii* were observed during the June 2005 visit, reduction in density and distribution of this invasive was evident throughout the SIA. This treatment had little or no effect on native species, as many remnant inflorescences of *Centaurea biebersteinii* were observed with native species emerging from the area formerly occupied by rosettes of this invasive. This included *L. paysonii* and *Phlox kelseyi* var. missoulensis individuals and may be attributed to the warm and wet spring. The area *Centaurea biebersteinii* and *Bromus tectorum* (cheatgrass) invasion, human disturbance associated with nearby Highway 38, and erosion are potential threats to this population.

Botrychium paradoxum Ophioglossaceae

Global Rank: G2
Note: Unable to monitor this year due to time constraints.

Penstemon lemhiensis (Lemhi Penstemon) Scrophulariaceae

Global Rank: G3
Date observed: May and July, 2005
Observers: R. Wooley, Forest Ecologist/Botanist; C. Gibson SCEP Ecologist

East Pioneer Mountain populations of *Penstemon lemhiensis* were surveyed by Bob Wooley and Carly Gibson from late May through mid July as part of a multi-agency effort to update records for all *P. lemhiensis* populations in southwest Montana east of the Bitterroot National Forest (Table 2). A total of 23 populations were surveyed, some of which are newly recorded populations. The USDA Threaten, Endangered and Sensitive Plants Element Occurrence Field Guide and NRIS forms were used to document current conditions, location, and habitat for population surveys. Hard copies of these forms are on file at the BDNF Supervisor's office and will be entered in the NRIS TES application.

Most populations were in flower during site visits. *P. lemhiensis* individuals were easily identified and counted. In comparison to past records, large populations seem healthy and support higher number of individuals than in the past. Populations of moderate size are stable, maintaining the same number of individuals as reflected previous records or increasing/decreasing only slightly. Due to road construction on the Pioneer Scenic Byway above (NW) Grasshopper Creek, EO#79 was not surveyed and may be extirpated as a result of road expansion. Similarly, the roadside Big Hole Pass population (EO#66) was not found and appears to have been extirpated by road maintenance and expansion associated with Highway 278 in 2000. A few small populations were not located (EO#84, EO#17, and EO#11) and may have simply been overlooked during field visits this season. Populations in the Argenta/French Creek area of the Dillon Ranger District are threatened by non-native species invasion and mining disturbance. However, this area also supports one of the largest populations known to occur on the Forest (EO#9). Vipond Park, Bader Pass North, and Reservoir Creek Road are three additional large populations and appear healthy and robust. The only confirmed pollination event was witnessed during the Reservoir Creek population survey, where Bob Wooley observed a *Pseudomasarias vespoidea* visiting a *P. lemhiensis* flower. Element occurrence records have information pertaining to habitat, non-native species, associate species, and location of populations observed during the summer 2005 field season.

Table 49. Number of *Penstemon lemhiensis* individuals surveyed in 2005.

Site Name	Ranger District	Number of Individuals Observed
Black Mtn Rd N	Dillon (Private)	17
French Creek	Dillon	600+
Quartz Hill Gulch	Wise River	26
Vipond N	Wise River	0 (potential misidentification)
Rattlesnake Creek	Dillon	37
Black Mtn Rd S	Dillon	92
Ermont Gulch	Dillon (BLM)	82
Trapper Creek W	Wise River	15
Brownie Lake	Wise River	0 (potential misidentification)
Kerns Creek	Dillon	153
Badger Pass N	Dillon	700+
Grasshopper/Gravel Pit	Dillon (Private)	37
Grasshopper/Elk View	Dillon (Private/State)	1
Canyon Crk/Vipond S	Wise River	500+
HWY 278 mile 37	Wisdom (Private/State)	43
Trapper Creek E	Wise River	19
Big Hole Pass	Wisdom (Private/State)	0 (extirpated by road construction)
Pioneer Byway	Dillon	Not surveyed due to road construction.
Thief Creek	Dillon	50+
Sugarloaf	Dillon	0 (revisit recommended)
Reservoir Creek	Dillon	250+
New (HWY 278 mile 27 &28)	Wisdom (Private/State)	82
New (Clark Crk/Ma Barnes)	Dillon (State/BLM)	36
Toomey Creek-	Wise River	43
East Fork Fish Trap	Wisdom	0
Swamp Creek	Wisdom	0
Minor Creek	Wisdom	12
Selway Creek	Wisdom	14

Site Name	Ranger District	Number of Individuals Observed
Francis Creek	Wisdom	0
Steele Cr	Wisdom	3
Steele Creek	Wisdom	18
Big Hole B.F.	Wisdom	0
TOTAL	ALL	2750+

A survey crew counted an additional 1539 lemhi penstemons on BLM and Forest Service lands. National Park Service staff counted 600 plants at Big Hole Battlefield. The total number of Lemhi penstemons, counted in 2005, is estimated at 4889+ within its range on the BLM and BDNF.

The population structure for Lemhi Penstemon in 2005 is compared to the structure reported in 1997 in the Conservation Strategy for Lemhi penstemon.

Table 50. Comparative Number of Individuals in a Lemhi Penstemon Population

	Populations ranked by the number of individuals present				
YEAR	A (100+)	B (50-100)	C (30-50)	D (<30)	Total
1997	4	4	6	8	22
2005	5	4	5	11	25

Antennaria densifolia (Dense-leaved Antennaria) Asteraceae

Global Rank: G3
Observed August 16, 2005
Observers: Robert L. Wooley and Carly Gibson

The single know population of Antenaria densifolia in the lower forty eight states was examined and photographed at the Goat Flats RNA in the Anaconda Pintler Wilderness. This population is disjunct from other know populations in Northern Canada. The plants appeared healthy and had flowering stalks. Clumps of the *Antennaria* were mixed with other alpine tundra species most notably *Dryas octopetala* and *Cassiope mertensiana* near the rim of steep rocky precipices.

Suassurea weberi. (Weber's Sawort)Asteraceae

Global Rank: G3
Observed: August 16, 2005
Observer's: Robert Wooley and Carly Gibson

The population of Weber's sawwort was observed at the Goat Flat RNA. About 30 plants were observed, most past bloom. One plant was still in bloom where it was sheltered under a rock ledge. The population appeared unchanged from its last observation in 2003.

Evaluation: The BDNF is conducting detailed sensitive plant surveys to build a reliable data set for sensitive plants. This data will support research needs described in the FY04 report. The sensitive plants Lemhi penstemon and Sapphire rockcress were doing well in most locations. Adequate rains in May and June appear to have allowed these species to set abundant flowering stalks in many known locations in 2005. Although the number of individuals of Lemhi penstemon increased the population structure remained about constant from the last complete inventory in

1997. Work on developing a range wide conservation strategy for Lemhi penstemon continued in 2005.

The Forest collaborated with the Northern Region Office and the Northwest Experiment Station in development of a riparian vegetation monitoring protocol to comply with the PacFish/Infish Biological Opinion (PIBO). The methodology was incorporated into the Range Monitoring Handbook.

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