United States
Department of
Agriculture

Forest Service

Beaverhead-
Deerlodge
National Forest

FOREST PLAN MONITORING AND EVALUATION REPORT

Fiscal Year 2006

Cover Photo: West Fork Rock Creek, Pintler District, Janet Bean-Dochnahl, 2006

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Beaverhead–Deerlodge National Forest

Forest Plan Monitoring & Evaluation Report

Fiscal Year 2006

Introduction

This Annual Forest Plan Monitoring Report provides an account of management activities and conditions on the Beaverhead-Deerlodge National Forest (BDNF) for Fiscal Year 2006 (October 2005-September 2006). Twenty years have passed since the Beaverhead and Deerlodge National Forests implemented the existing Forest Plans (1986 and 1987 respectively). Monitoring and Evaluation Reports over the years accounted for both the implementation and the effectiveness of the Plans and provided the basis for revising long term management of the Forest. The Revised Forest Plan is scheduled to be distributed late in 2008. Monitoring direction for the Forest will change with the signing of that Record of Decision.

This final report under the old Plans is designed to link the monitoring items which annually track implementation of *objectives* and *standards* with items in the Revised Forest Plan. Five years from implementation, a Comprehensive Evaluation Report will answer monitoring questions related to effectiveness of the Revised Plan in reaching *goals*. We include a section called "Highlights" which shares information about relevant topics not required by any Plan monitoring item.

The table below provides a cross reference between the existing plans and the Revised Forest Plan (Draft at this printing) for monitoring items included in this report.

Table 1. Forest Plan Monitoring Items reported on in FY06

Monitoring Topic	Beaverhead Item	Deerlodge Item	Revised Plan Item
A. Forest Outputs and Accomplishments			
Watershed Assessments	-	-	3
Watershed Restoration	2-1	6-2	3
Noxious Weed Treatment	6-3	7-3	15
Timber sold/harvested	7-1,7-2	8-1	22
AUMs grazed	6-1	7-1b	22
Fuel Reduction	-	11-3,11-4	17
B. Insects and disease	9-1	11-1	16
C. Wildlife Management Indicator Species			
Elk	1-3	4-3	12
Goat	1-3	4-3	13(a)
Sagegrouse	1-6	-	-
Wolverine	-	-	13(c)
Mayfly	-	-	5
D. Riparian and Stream Function	2-3	6-1	4
E. BMP effectiveness	3-3	-	6,7
F. Invasive Species (Noxious Weeds)	-	7-3	15
G. Economic effects Budgets	10-3	14-1	22
Jobs and Income	11-1	14-1	22

Monitoring and Evaluation Highlights for FY06

Pygmy rabbit surveys - BDNF range and wildlife personnel surveyed potential pygmy rabbit habitat in the Fishtrap, Mudd Creek, Pintlar Creek, and Seymour grazing allotments on the Wise River Ranger District. Work was performed in January-February 2006 to better detect rabbit activity on snow cover. Three sites with a total of 7 burrow entrances were detected near the eastern boundary of the Mudd Creek allotment. These detections constitute the most northerly known sites in Beaverhead County. Additional dens for pygmy rabbits were mapped during a sagegrouse monitoring project in Henderson Pasture and Divide Pasture of Upper Big Sheep Creek and in East Terrell Pasture in Bloody Dick drainage of the Dillon District.

Black-backed woodpeckers in beetle outbreak areas – In 2006, both the Landbird Monitoring Program (LBMP), Northern Region of the USDA Forest Service, and the Avian Science Center, University of Montana, undertook surveys for presence of Black-backed Woodpeckers in beetle outbreak areas. The LBMP conducted an assessment of the landbird community in beetle infested areas on five National Forests in Region 1 with a focus on whether Black-backed Woodpeckers were found in recent beetle outbreak sites. Sixteen of the LBMP 428 survey points were on the Butte Ranger District of the BDNF. Surveys included both standard point counts and playback surveys using broadcast callers to locate Black-backed Woodpeckers. Only a few Black-backed Woodpeckers were detected in the beetle outbreak areas (all on the Nez Perce NF). Detection rates paled in comparison to a concurrent LBMP post-fire study. In a separate survey, the Avian Science Center project detected Black-backed woodpeckers on 63 of 888 points. Again, none of them were on the BDNF points (north and south of Butte). The 2006 Report for the project is available at http://avianscience.dbs.umt.edu.

Aquatic Habitat Improvement-

(1) Crockett Lake Western Boreal Toad Monitoring and Conservation *(Extracted from report of the same name on file at Madison Ranger District, Matt Bell, Chris Riley, Keif Storrar, and Lindsay Arthur, December 2006)*

> Within the past few decades, western boreal toad (*Bufo boreas boreas*; WBT) populations have experienced severe declines in Colorado, Wyoming, Utah, and New Mexico. Once thought to be the most common amphibian in western Montana (Maxell 2000), recent data suggests otherwise. In the late 1990's surveys have revealed the absence of toads in historic localities throughout western Montana, with occupation occurring in a very small portion of suitable habitat (Maxell 2000, Werner et al 2004). These findings have led to the designation of WBT as a species of special concern by the USFS Region 1 forester. On the Beaverhead-Deerlodge NF, WBT are distributed across the forest at low density. While lentic breeding for other amphibian species is relatively well distributed across the forest, only 7% of suitable breeding habitat is utilized by toads (Maxell 2000).

Crockett Lake is located in the Gravelly Mountains, approximately 12 miles SSE of Virginia City, Montana (T8S, R2W, S20, SWSW) and is home to a breeding population of WBT first documented in 2002. Since the monitoring of this population has begun (2003), several habitat enhancement projects have been implemented to increase the survival of early life stages.

Habitat Restoration

Mass desiccation of egg strings and larvae had been observed annually in primary breeding habitat along the southern shoreline of Crockett Lake from 2002 to 2004. This desiccation had been a result of receding water levels prior to, or shortly after the emergence of larvae from the egg strings. Log weirs were installed in 2004 at the outlet of Crockett Lake to raise surface water elevation and reduce the frequency of desiccation events, also improving water availability for livestock. Transects depicting pre-sill elevation of channel cross-section located at Weir 1 and Weir 2, and channel cross-section at Weir 3 after installation were measured. Since log weir installation, benefits to surface water include:

1) increase of 13" in surface elevation (see report on file at Madison District for photos and graphs)
2) perennial surface water with reduced fluctuation in elevation
3) no further occurrences of mass egg desiccation.

In 2006, a one-acre seasonal exclosure was installed to protect toads and their habitat from trampling. The exclosure is composed of temporary electric fence designed to protect one half of the lake and associated shoreline and uplands. The fence materials were donated by 1% For the Planet by way of the Madison River Foundation, and subsequently erected by District fisheries staff in late June. Over the course of the summer, the fence was 100% effective in excluding cattle, and based on observation, wildlife avoided the fence completely.

Also in 2006, at least one egg string was physically disrupted due to wind-driven wave action. To help prevent wind generated turbulence from affecting the breeding area in the future, logs have been placed between the breeding area and the main body of the lake. Vegetation in the breeding area will also aid in the prevention of desiccation. Natural vegetation helps to absorb turbulence and aids in anchoring the egg strings to keep them from washing ashore. The limitation or exclusion of livestock impacts in this area should help improve recovery of aquatic and terrestrial vegetation.

Crockett Lake in 2003 previous to log weir installation.


Crockett Lake Sept. 4, 2005, after log sill installation.
Note the greater surface water area.

Population Trends

The Crockett Lake population of WBT has been monitored since 2003 to assess abundance and metamorphic timing to track general population trends (Table 1). Data compiled is observational and is focused on abundance and temporal relationships of early life stages. Pre-restoration data are too sparse to use in comparative sense, but it will be useful to track the current and future population trend to evaluate inter-annual trend, and the efficacy of restoration/protection measures. A continuous record of summer time air and water temperature has been recorded at this site in 2005 and 2006, and its analysis is helpful in better

understanding breeding and metamorphic timing, in addition to possible changes in water temperatures that may result from habitat change.

Trends in the Crockett Lake WBT population show that egg strings are laid during the first two weeks of June at this elevation (8,100 ft.) and number from 3 to 8, with an average of about 5 to 6. Larvae begin to hatch out within 6-14 days after initial egg strings are laid. The maximum number of larvae observed appear to be in the range of 15,000 to 20,000 individuals (Figure 21, however in the 2003 season when 8 egg strings were counted, a maximum of 80,000 larvae were estimated. Numbers of larvae gradually decrease over the next two to three weeks, due to what appears to be predation by a variety of bird species, although in two years considerable predation by terrestrial garter snakes has been observed. Metamorphosis generally begins sometime during the last week of July and the first week of August. Terrestrial toadlets generally appear 10-21 days later, and can be observed along the shoreline into mid-September. It is during the period of late July into mid-September that toadlets are most vulnerable to livestock trampling mortality.

Table 2. Annual and seasonal describing population numbers and timing by life stage, *B. b. boreas*, Crockett Lake, 2003-2006. All water temperatures are mean daily, unless otherwise noted.

	2003	2004	2005	2006
Date first egg string observed	3 June	13 June [a]	18 June	10 June
Water temperature (°C) first egg string	-	-	8.3 [e]	7.9
Number of egg strings first day	1	2	1	4
Total number of egg strings	8 [b]	6 [c]	3	5
Date first amplexus observed	-	13 June	20 June	12 June
Water temperature (°C) first amplexus	-	-	15.6	11.1
Number of pairs first day	-	1	1	1
Total pairs observed	-	3	1	1
Date larvae first observed	17 June	26 June	1 July	16 June
Water temperature (°C) first larvae	-	22 [e]	15.7	9.6
Number of larvae first observed	<1,000	<1,000	3,000	<1,000
Total # of larvae observed at one time	80,000	15,000	20,000	14,000
Date of first observed metamorph	26 July	9 August	1 August [d]	25 July [d]
Water temperature (°C) first metamorph	-	-	16.8	18.8
Total # of metamorphs first observed	1,000	<100	10	1,000
Total # of metamorphs observed at one time	>5,000	200	20,000	4,000
Date of first fully terrestrial toadlet	19 August	25 August	11 August	8 August
Date of last metamorph			19 Sept.	15 Sept.

a- remains of individual eggs observed 19 May. Possibly other species (PSMA,AMTI)
b- includes 2 egg strings desiccated
c- includes 3 egg strings desiccated. Three late egg strings (north shore pre-July 7th)-two desiccated
d- legs observed only as very initial stages of development (14 July 2005; 19 July 2006)
e- instantaneous water temperature

Upon first inspection, year-to-year mean daily water temperatures do not appear to correlate well to dates of first observation of any particular life stage (Table 1). Since temperature is known to greatly influence growth and maturation over time, we decided to explore this relationship with a number of graphical analyses. When mean daily water temperature is plotted as a function of its respective date for the 2005 and 2006 datasets, a polynomial curve can be fitted to the points (Figure 2). This shows how Crockett Lake water temperatures in the early summer of 2006 were considerably warmer than the preceding year. Highlighting the date of initial observation of each particular life stage observed each year on the respective curve (recognizing that this is not the actual mean daily water temperature measured on that specific date), patterns result that show greater consistency in the year-to-year thermal momentum of Crockett Lake relative to the timing of the toad population's initial breeding, egg hatching, metamorphosis, and migration from aquatic to terrestrial environments. Egg laying very consistently occurs when the polynomial curve reaches 11°C, egg hatching initiates in the vicinity of 14-16 °C, metamorphosis occurs at about 17-19 °C, and as the lake begins to cool, terrestrial migration begins at about 14-15 °C. Years when early summer is cooler than normal tend to retard the timing of reproduction and larval growth, as expected. How this affects possible changes in exposure to a variety of mortality forces is not clear, but may be worth exploring. Continued monitoring of temperatures and life stage timing in future years will help to confirm and hopefully fine tune our understanding of these relationships.

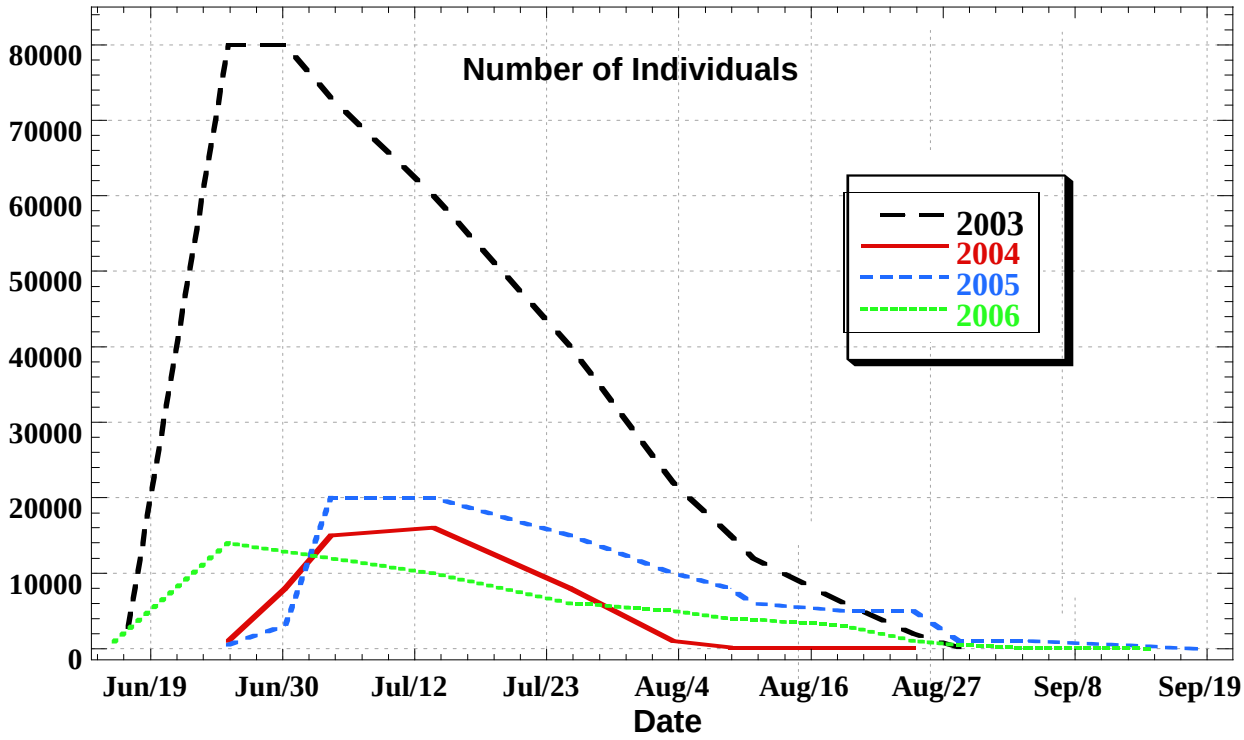

Figure 1. Visual estimates of number of WT from larvae to metamorph over the course of each summer, 2003-2006. Arrows depict date of first metamorph and dots depict first terrestrial toadlets.

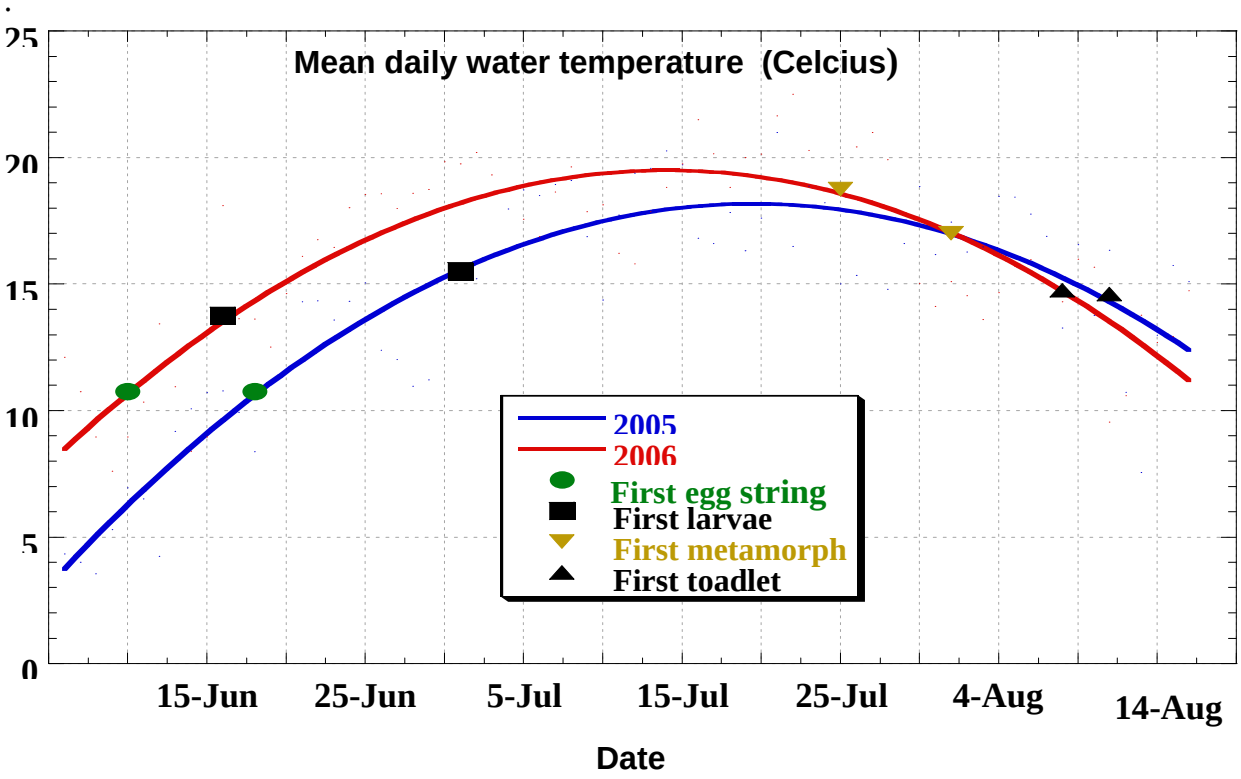

Figure 2. Plot of mean daily water temperature as a function of date, with fitted polynomial curves, Crockett Lake, MT, 2005 and 2006. Symbols plotted for each year reflect the date of first observance of each life stage, as it correlates to the respective curve.

Population Connectivity

During the summer of 2006 all lentic water bodies within a 4 km radius of Crockett Lake were identified and surveyed in order to locate other toad breeding sites that may function as a meta-population to Crockett Lake (Figure 4) . A total of 27 lentic sites were surveyed, 24 that were mapped on 1:24,000 scale topographic maps and 3 incidental sites. Of the 27 sites visited, WBT were observed at only one site, Romy Lake (4km west of Crockett Lake), where a sizeable breeding population was documented (>5,000 toadlets). This population is likely exchanging individuals with the Crockett Lake population (Bryce Maxell, Zoologist, Montana Natural Heritage Program, pers. comm.), however, a genetic analysis is needed for confirmation. As the only breeding population within reasonable migration distance to Crockett Lake, the Romy Lake population may be an important dynamic to the long term success of WBT at Crockett Lake for two reasons; 1) the exchange of genetic material, and 2) the source for individuals in the event of a catastrophic population decline. Potential migration corridors between Romy Lake and Crockett Lake should be considered important to both populations.

Recommendations for future monitoring:
Due to the almost complete absence of certain age classes (2nd year to pre-adult) a method of marking adult individuals (toe clipping, pit tagging) could be implemented to assess levels of adult/subadult recruitment. Overwintering habitat, i.e. rodent burrows, appear to be present in abundance throughout the surrounding landscape however the complete lack of intermediate age classes may indicate poor winter survival among juvenile toads. If it is found that the same adult individuals return annually to breed with little or no recruitment, without immigration, the long-term outlook for this population of WBT may be in question. This effort would require a period of intensive monitoring in early spring.

A genetic analysis of toad populations from both Romy Lake and Crockett Lake would be essential in assessing the level of genetic connectivity between these two sites. Tail clips from at least 50 larval toads at each site should be collected to ensure an inclusive sample size.

After metamorphosis, toadlets at Crockett Lake tend to congregate along the northwest shoreline. This thermoregulatory behavior runs counter to our exclusion efforts to protect the breeding area in the southwest corner. The cattle exclusion area should be translocated to the northwest portion of the lake sometime after larval emergence from egg strings but prior to terrestrial occupation. This adaptation in the exclusion strategy will protect WBT individuals during all stages of early development and will maximize the effort to reduce the risk of trampling mortality.

Sources
Maxell, B. A. 2000. Management of Montana's amphibians: a review of factors that may present a risk to population viability and accounts on the identification, distribution, taxonomy, habitat use, natural history, and status and conservation of individual species. Report to USFS Region 1, Order Number 43-0343-0-0224. University of Montana, Wildlife Biology Program. Missoula, Montana. 161 pp.

Maxell, B., Werner K.J., Hendricks, and P., Flath, D., 2004. Herpetology in Montana. Society for Northwestern Vertebrate Biology. 262 pp.

USDA, Forest Service, Beaverhead-Deerlodge National Forest, Madison Ranger District, 2006. "Crockett Lake Western Toad Monitoring and Conservation" Matt Bell, Chris Riley, Keif Storrar, and Lindsay Arthur. 11 pp.

(2) Soap Creek Barrier Culvert Replacement (*(Extracted from report of the same name on file at Madison Ranger District, Chris Riley 2006)*

Soap Creek, a tributary to the West Fork Madison River, is located in the Gravelly Mountain Range. During the 1990s a number of fisheries surveys were made in Soap Creek to establish the purity of westslope cutthroat trout (WCT) above and below two culvert barriers and a boulder cascade barrier to determine if the WCT

population was manageable as a pure population . See the MFISH webpage; http://maps2.nris.state.met.us/scripts/esrimap.dll?name=MFISH&Cmd+INST supported by Montana State Library Natural Resource Information Service.

Culvert FSR 8373 is located upstream of both a natural barrier and another culvert (FSR 209) that function as barriers to movement of rainbow trout into the reach occupied by relatively pure (>94%) WCT. Culvert FSR 8373 appeared to be restricting movement of all but the largest adult fish. WCT density upstream of the culvert was about 1/3 of that in the downstream population. The 48" culvert constricted flow by roughly 60%, resulting in a complete absence of substrate inside the culvert, a 6" outlet perch under low flow conditions, and a large scour pool below the outlet.

Photo 1. Soap Creek culvert (48" diameter CMP) with perched outlet previous to replacement.

A project to replace the culvert in 2006 was designed to remove the barrier to movement upstream and simulate the streambed to provide aquatic organism passage under all stream flow regimes. Pre-design work included determining the cross-sectional channel dimensions, low-flow water velocity, flood recurrence interval flows, longitudinal profile of the streambed, and Wolman pebble counts of the streambed material. The streambed was very stable. Large wood debris, while a factor in channel complexity and stability upstream was not an important component in the immediate vicinity.

Photo 2 below shows the successful replacement of the culvert with a buried arch pipe, simulating the natural streambed.

Photo 2. Soap Creek stream simulation culvert (14' x 10' buried arch pipe) after replacement.

West Face Project Integrated Review - In the fall of 2006 a team of 21 forest and district specialists, staff officers, and a district ranger reviewed the West Face Timber Sale and West Face Stewardship Project on the Wisdom District. The goal of the review was to compare requirements of the National Environmental Policy Act (NEPA), Environmental Assessment (EA) and Decision Notice (DN) with the two contracts and on-the-ground implementation. The group was divided into four teams to cover as many activities as possible on several treatment units. The review results are summarized below in table format, followed by conclusions and recommendations. The full report, titled "Post Harvest Monitoring Review and Report, West Face Timber Sale and Stewardship Project, October 2006", is available from the Dillon Supervisors Office, Planning Shop, 406 683-3857. Details on compliance with best management practices (BMPs) for soils and roads is also provided in section E of this report.

Y = mitigation fully met **M** = mitigation met with minor exceptions
P = mitigation partially met **N** = mitigation not met

Table 3. Results of West Face Integrated Review by Mitigation Item Specified in West Face DN

TEAM	NEPA Mitigation Items FIELD ACTIVITIES	Results
VEGETATION **WILDLIFE**	Noxious weed occurrence on roads, landings and yarding trails	M
	Revegetation of disturbed sites	M
	Snag density and distribution	P
	Goshawk nest buffer	Y
	Elk – unharvested zones in Units 6 and 7	Y

	Elk Habitat – retain 2/3 hiding cover, road closures	Y
SOILS/BMPs	Residual down woody debris (10-40 tons/ac)	P
	Skid trails mitigation	Y
	Obliteration of landings and roads	Y
	Final compaction levels and application of soil moisture limitations	Y
ROADS/BMPS WATER QUALITY	Timber cutting, yarding and hauling meet Appendix D	Y
	Visual monitoring to determine effectiveness of road activities listed in Appendix D3	Y
	Obliteration of all temporary roads	Y
VISUAL QUALITY RECREATION	Screening maintained between road and units Screening maintained between units and highway	P Y
STEWARDSHIP ACTIVITIES	Stewardship activities accomplished on the ground as prescribed. Activities tied to NEPA mitigation completed	Y Y

TEAM	**NEPA Mitigation Items** **CONTRACT OR PROJECT FILE REVIEW ITEMS**	**Results**
VEGETATION WILDLIFE	Documentation of silvicultural prescriptions in project file.	Y
	Additional road use restrictions were applied to protect big game if it was a harsh winter.	NA
SOILS/BMPS	Contract specifications state max. soil moisture by soil type or harvest unit. Soil scientist and sale administrator jointly assess at start of operations and following precipitation events.	Y
	Methods of harvest or haul were altered or treatments redesigned to stay within soil quality standards.	Y
ROADS/BMPS WATER QUALITY	Sale contract provisions insured repair or sediment sources on roads prior to hauling timber (Appendix D3)	Y
VISUAL QUALITY RECREATION	Timber harvest and log hauling were limited during the rifle hunting season	Y
	Winter logging and hauling were implemented in Units 5 and 17	Y
	If purchaser plowed FS roads, they plowed a parking area for snowmobiles.	Y
	Landscape Architect assisted in design and layout of Units 26, 30, 31, 32	M
STEWARDSHIP ACTIVITIES	Did contracting officer report of Land Management Activities match what was on the ground?	Y

Conclusion:

The twenty seven mitigation measures identified in the Decision Notice (DN) were reflected by contract requirements and implemented on the ground with three exceptions. While coarse woody debris met contract requirements in the units inspected, the contract did not match the DN requirement. Visual screening of roadside harvest was not provided on one of the nine units inspected.

Stewardship projects present many challenges to the Contracting Officer Representative, Sale administrator, and data tracking process in addition to their benefits. The number of land management activities that can be accomplished are tied to the bid value of the timber sold (not the appraised value) so in a list of 20 opportunities developed for the West Face Stewardship project only 10 could be completed. Stewardship projects are not all derived from the NEPA analysis tied directly to the project. Tracking NEPA authorization of projects will need to be part of stewardship project design.

New concerns surface as the Forest moves from traditional treatments to "ecosystem restoration" treatments.

- Timber marking procedures are developed to meet prescribed basal area. It is difficult to account for some mortality from burning to assure the basal area is met following *all* stand treatments.
- Forwarders might protect soils but they leave a higher fuel loading.
- Hog fuel remaining after commercial thinning is difficult or impossible to market from remote sites like these out of Wisdom.
- Aspen treatments present a new situation for interpreting forest wide standards like snag retention and clearcutting limitations.

Recommendations:

- Re-evaluate application of snag mitigation measures in aspen release treatments and in commercial thinning of Douglas-fir stands.
- Resolve conflicts between coarse woody debris requirements for soil, wildlife, and fuel loading concerns.
- Establish a process to assure stewardship contract activities reach the FACTS data steward.
- Consider visual effects of aspen release treatments along roads to the same degree as we consider conifer harvest.

NEPA Accomplishments - The Forest issued 1 Record of Decision (ROD), 31 Decision Memos (DM) and had 40 project analyses to meet the National Environmental Protection Act (NEPA) underway in FY06. Acronyms used in Table 4 include:

AMP	Allotment Management Plan
CDNST	Continental Divide National Scenic Trail
DEIS	Draft Environmental Impact Statement
DM	Decision Memo
EA	Environmental Assessment
FEIS	Final Environmental Impact Statement
GYA	Greater Yellowstone Area
POO	Plan of Operation
ROD	Record of Decision
SUP	Special Use Permit

Table 4. Projects in various planning stages in FY06

PROJECT NAME	DISTRICT	Stage of completion by the end of FY06
Grizzly Bear Amendment to Forest Plans	All GYA Forests	**ROD COMPLETED 04/18/06**
Beaverhead-Deerlodge Forest Plan Revision	Forest	DEIS issued 06/05, FEIS underway
Butterworth Private Road Use DM	Butte	Scoping Inititated 1/23/06
CDNST - Fleecer to Seymour	Butte	Scoping Initiated 06/03/05
CDNST - Leadville	Butte	Scoping Initiated 04/20/05
CDNST – Nez Perce Gulch	Butte	Scoping Initiated 09/05
Cullen and Lowland Water Develop.	Butte	Scoping Initiated 4/22/04
Elk Park Volunteer Fire Dept. Fun Run DM	Butte	Scoping Initiated 01/23/06
Herman Gulch Trail Reconstruction DM	**Butte**	**DM COMPLETED 6/23/06**
Mountain Top Assc Rd Use Permit DM	Butte	Scoping Initiated 01/23/06
Norton Creek Trail #95 Relocation DM	Butte	Scoping Initiated 04/06
O'Neil Road Use Permit DM	Butte	Scoping Initiated 01/23/06
Price Powder Salvage Sale DM	Butte	Scoping Initiated 03/17/06
Thompson Park Salvage Sale	Butte	EA *ON HOLD*
Bear Creek and Lemhi Pass AMPs	Dillon	EA underway
Birch Creek Fuels Management DM	Dillon	Scoping initiated 12/05
Estler-Deerhead trail maintenance	Dillon	Scoping initiated 08/15/06
Kitty Fuels Reduction DM	Dillon	Scoping Initiated 07/21/04
Lemhi Pass AMP Update DM	**Dillon**	**DM COMPLETED 09/22/06**
Painter Creek Fish Barrier DM	Dillon	Scoping Initiated 03/01/06
Westside AMPs	Dillon	EA underway, started 06/19/02
OT Mining Amended Plan of Operation for Kit Carson/Dry	**Jefferson**	**DM COMPLETE 6/28/06**
Boulder Road Access DM	**Jefferson**	**DM COMPLETE 05/04/06**
Gentor Resources, Inc Plan of Operations DM	**Jefferson**	**DM COMPLETE 06/20/06**
Hanninen Plan of Operations DM	**Jefferson**	**DM COPLETE 06/14/06**
Mammoth Special Use Road Permit	**Jefferson**	**DM COMPLETE 04/13/06**
Overland Cataract Trail System Relocation EA	Jefferson	Scoping 04/20/06
Sheep Creek Stream Restoration	**Jefferson**	**DM COMPLETE 04/21/06**
Toll Mountain Salvage DM	Jefferson	Scoping 09/30/05
Ward Land Exchange	Jefferson	Scoping 04/12/06
Whitetail Pipestone Travel Management	Jefferson	DEIS 04/07/06, FEIS underway
Eva MayAccess Roads SUP DM	Jefferson	Scoping initiated 08/01/06
Campground Concession Permit Renewal DM	**Madison**	**DM COMPLETED 04/28/06**
Cutthroat Trout Habitat Restoration – West Gravelly Mountains DM	Madison	Scoping initiated 12/16/04
Cow Fly Salvage DM	Madison	Scoping initiated 01/20/06

Lobo Mesa Trail Reconstruction DM	Madison	Scoping initiated 07/20/06
Madison Range AMP updates	**Madison**	**DM COMPLETED 11/18/05**
Meadow Creek Fuels Reduction DM	Madison	Scoping 03/04/04
Ruby River Grayling Spawning Habitat Restoration DM	Madison	Scoping 08/10/06
Snowcrest III Trail Reconstruction DM	Madison	Scoping 07/20/06
Shovel Creek Hardened Crossings	**Madison**	**DM COMPLETED 10/27/05**
Wave Mine Dump Plan of Operations DM	Madison	Scoping 07/07/06
Barton Spring Commercial Thinning DM	Pintler	Scoping 06/05/06
East Fork Campground Modification	**Pintler**	**DM COMPLETED 09/07/06**
Georgetown Lake Hazardous Fuels Reduction	**Pintler**	**DM COMPLETED 03/31/06**
Holsten Minerals Exploration	Pintler	Scoping 05/12/05>
Maxville Hazardous Fuels Reduction	**Pintler**	**DM COMPLETED 02/22/06**
Maywood Ridge Communications Line Installation DM	Pintler	Scoping 03/07/06
Middle Fork Riparian Enhancement DM	Pintler	Scoping 06/08/06
Sand Basin Conifer Slashing/willow planting DM	Pintler	Est Scoping 09/06
Big M Outfitter Guide Renewal DM	**Pintler**	**DM COMPLETED 06/01/06**
Echo Lake Livestock Exclosure DM	**Pintler**	**DM COMPLETED 05/30/06**
Frank Antonioli Plan of Operation DM	**Pintler**	**DM COMPLETED 06/27/06**
GBP Spring Development Waterline DM	**Pintler**	**DM COMPLETED 06/09/06**
Ross Fork Trail Reconstruction DM	**Pintler**	**DM COMPLETED 06/01/06**
Royal Outfitters Guide Renewal DM	**Pintler**	**DM COMPLETED 06/01/06**
West Fork Willow Planting DM	**Pintler**	**DM COMPLETED 05/30/06**
Battle Mt Hazardous Fuels Red.	Wisdom	Est scoping 10/06
Big Swamp Creek Post and Pole	Wisdom	Scoping 08/29/05
CDNST – Berry to Goldstone	Wisdom	Scoping 03/03/04
Cont, Divide Outfitters Permit DM	**Wisdom**	**DM COMPLETED 08/28/06**
Twin Lakes Division Fence	**Wisdom**	**DM COMPLETED 01/03/06**
Wisdom Outfitter & Guide Renewal (2 DMs)	**Wisdom**	**DM COMPLETED 06/08/06 and 08/28/06**
Bear Gulch Hazardous Fuels Reduction	**Wise River**	**DM COMPLETED 03/15/06**
Gold Creek Trail Reconstruction. DM	Wise River	Scoping est. 03/06
Moose Creek Placer Mining POO DM	**Wise River**	**DM COMPLETED 08/01/06**
North Big Hole AMPs	Wise River	Scoping 02/18/04
Outfitter/Guide Special Use Permit (4 DMs)	**Wise River**	**3 DMs COMPLETED 07/18/06, 06/07/06, 09/06/06** 1 DM Scoping 04/13/06

Report by Monitoring Item

A. Forest Outputs and Accomplishments

Monitoring Question: Are Forest outputs meeting targets and plan predictions?

Performance Measure: Number of plans, acres of treatment, board feet sold, Animal Unit Months grazed, acres burned or treated.

Results: We have summarized accomplishment reporting required by a number of separate monitoring items to simplify tracking. The brief discussion compares FY06 accomplishments to the forest target, if there was one, and evaluates the trend.

Table 5. Monitoring Items in new and old Plans tied to Performance Measures

Performance Measures	Monitoring Item 1986 Beaverhead Plan	Monitoring Item 1987 Deerlodge Plan	Monitoring Item Draft Revised Beaverhead-Deerlodge Plan
Watershed Assessments	-	-	3
Watershed Restoration	2-1	6-2	3
Noxious Weed Treatment	6-6	7-3	15
Timber sold/harvested	7-1,7-2	8-1	22
AUMs grazed	6-1	7-1b	22
Fuel Reduction	-	11-3,11-4	17

Results: The following information was extracted from the Beaverhead-Deerlodge National Forest Final Accomplishment Certification Report, dated 11/20/06.

Watershed assessments

- The West Fork Rock Creek Watershed Assessment on the Pintlar District was completed in FY06. The document was published on the Forest website in January 2007. The Forest did not have a target for Watershed Assessment.
- Trend is up because no watershed assessments were completed in FY05.

Watershed Restoration

- Twenty one miles of stream habitat were enhanced, this was 236% of the Forest target.
- Trend is up from 14 miles accomplished in FY05.

Noxious weed treatment

- Acres of noxious weeds treated = 6,017 acres. This was 166% of the Forest target.
- Trend is down from 7,635 acres treated in FY05.

Timber Offered and Sold

1.90 MMBF Regular Program Contracts
0.15 MMBF Direct Sales.
0.54 MMBF Open contracts
4.60 MMBF Personal Use Post & Poles, Fuelwood Permits, Transplants

0.05 MMBF Sales Offered, but Not Sold

- **7.24 MMBF Total**

- Trend is down from 21.7 MMBF offered in FY05. That year only 10.6 mmbf were cut.

Livestock Grazing, Actual Use in 2006, in Animal Unit Months

Cattle 217,917
Horses 917
Sheep 7,627

- **TOTAL 226,461 AUM's**

- Trend in actual use is up from 185,601 AUMs in FY05 and 171,589 in FY04.

Fuel Reduction

- Acres of WUI high priority fuels treated = 2,195
- Acres non-WUI high priority hazardous. fuels treated =2,703

TOTAL = 4898

- This is 92% of the WUI target and 105% of the non-WUI target. The 2,703 acres includes 1,570 acres treated from other fund codes. Considering all acres, the Forest exceeded targets. Trend is slightly down from 5,273 acres accomplished in FY05, (3,081 acres in WUI).

Evaluation: The Forest met or exceeded FY06 annual targets for all performance measures. We accomplished more watershed assessments and more watershed restoration projects than in 2005, but fewer weeds were treated and fewer acres treated for hazardous fuels. Forest outputs for grazing were higher but less timber was offered for sale.

Table 6. Forest Accomplishments in FY06 compared to FY05

Forest Outputs and Accomplishments	FY05	FY06
Watershed Assessments (each)	0	2
Watershed Restoration (miles)	14 miles	21 miles
Noxious Weed Treatment (acres)	7,636	6,017
Timber offered or sold (MMBF)	21.7	7.24
Livestock grazing (AUMs)	185,601	226,461
Fuel Reduction (Acres treated)	5,273	4,898

B. Insects and Disease

Monitoring Question: Are levels of insect and disease increasing to damaging levels as a result of management activities.

Performance Measure: Changes in acres infested by landscape, % change on the Forest compared to the Region

Table 7. Insect and Disease Monitoring Items in new and old Plans

	1986 Beaverhead Plan	1987 Deerlodge Plan	Draft Revised Beaverhead-Deerlodge Plan
Monitoring Item	9-1	11-1	16

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 using aerial flights. Only a portion of the Forest was flown in 2006, compared to 2005 when ideal weather conditions resulted in a more complete survey. Portions were surveyed but as time moves on during insect epidemics, accurate assessments of annual infestations become less reliable because it is difficult to distinguish the year of infestation from the air by color and loss of needles. The significant change during 2006, reported by Gibson, included approximately 60,000 acres of increased mountain pine beetle activity on the Butte and Jefferson Ranger Districts. There were approximately 23,000 fewer infested acres on the Beaverhead unit than in 2005. Infestations by mountain pine beetle continued to increase while other beetle infestations dropped.

The Snowcrest Range had noticeable amounts of mountain pine beetle in both whitebark pine and lodgepole pine. Western spruce budworm defoliation was also noted in significant amounts in the Snowcrest Range.

In the Tobacco Root Range and Gravelly Range large numbers of Subalpine fir were noted killed by western balsam bark beetle. Mountain pine beetle also increased in the Gravelly range in whitebark and lodgepole pine stands.

Table 8. Bark Beetle Infestations on the BDNF 2004 - 2006 *

Insect	Acres infested to some degree in 2004	Acres infested to some degree in 2005	Acres infested to some degree in 2006
Douglas-fir beetle	9,866	43,900	11,100
Mountain Pine Beetle	120,017	274,900	334,030
Western Pine Beetle		1,800	None reported
Western Balsam bark beetle	24,975	88,300	54,700
Total	**154,792**	**408,900**	**399,830**

Source: USDA, FS, Region 1, Forest Health Protection Missoula Field Office, Ken Gibson, 2006

The trend in infestations on the BDNF follows regional trends. The "Montana Forest Health Highlights 2006" (USDA, FS, Region 1, Forest Health Protection, Missoula Field

Office, 2006) concludes that with some increase in precipitation in 2006, most bark beetle infestations are beginning to decline. Mountain Pine Beetle however, grew by 2%. On the BDNF, that growth was 21%. Spruce budworm, the primary defoliator in the region, grew by 250% in 2006. It grew by nearly that same amount on the BDNF.

Table9. Western Spruce budworm Infestations on the BDNF 2004 - 2006

Insect	Acres infested in 2004	Acres infested in 2005	Acres infested in 2006
Western Spruce Budworm	37,000	61,000 10% of the Douglas-fir type	151,000 25% of the Douglas-fir type

Evaluation:

Natural events have had a strong impact on current levels of bark beetle infestation. Trees of several species, notably lodgepole pine and whitebark pine, grew into size classes that provide beetle breeding material while past drought and climatic conditions placed the trees at risk from moisture stress (USDA, USFS, Region 1, *Bark Beetle Conditions-Northern Region, Insect and Disease Report*, 2005). The epidemic has probably peaked in the Region and on the Beaverhead-Deerlodge NF (with 399,830 acres of beetle infestation reported in 2006 versus 408,900 in 2005) due to reduction of suitable breeding material (http//:www.fhm.fs.fed.us/fhh/fhh_07/mt_fhh_07.pdf). But if continued warm winters occur it will be expected to continue until either parasites and predators reduce the beetle populations, breeding material is exhausted, or cold winters return.

Management activities such as timber harvest, prescribed fire or fuel reduction on the BDNF have not been effective in altering the course of current bark beetle activity, as illustrated by research throughout 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 forest stands (Campbell et al 2004, Swetnam and Lynch, 1993). Furniss and Renkin (2003) reviewed forest entomology in nearby Yellowstone National Park and state "(i)n 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 BDNF during the current epidemic but 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. We continue to employ integrated pest management techniques on a project scale to protect areas of development through fuel reduction or protecting individual trees or small areas such as in campgrounds or administrative sites using direct controls like insecticides or disaggregating pheromones.

C. Wildlife Management Indicator Species

Elk

Monitoring Question: How are populations of elk changing?

Performance Measure: Population data for elk from Montana Fish Wildlife & Parks

Results: Data in the table below comes from the Montana Fish, Wildlife and Parks (FWP) website and State Elk Plan. No updates were made by FWP to the 2003 data in 2004 or 2005.

Table 10. Montana Fish Wildlife and Parks Elk Objectives compared to Population Estimates

BDNF Hunting Districts	2005 FWP State Elk Plan Objective ± 20%	FWP 2003 Population Estimates ± 10%	FWP 2006 Population Estimates ± 10%
210	2500	1043	952
211	600	679	485
212	850	1100	1074
213	650	401	689
214	200	309	270
215	1000	736	1144
216	325 %	457	288
300	700-900%	615	1137
302	550-700	399	736
311	2700	2096	3100
318	500	366	383
319	1100 Max	1515	936
320 333	1000 for both	1130 549	942 470
321	None stated approx 1000 migrate to Idaho	No winter elk	No winter elk
323 324 327 330 Total	7000 for entire Gravelly EMU	3119 3114 No winter elk 1830 (8063)	2682 2500 No winter elk 1132 (6314)
328	550-700	574	650
329	900 Max	582	683
331	1400 Max	1250	896
332	900 Max	506	600
340 350 370	1600 combined for all	219 602 330 (1151)	557 268 192 (1017)
341	600 Max	669	494
360	2200	4555	1914
362	2500	1159	3629
TOTAL	30,575	28,074	28,803 stable

Evaluation: While some hunting districts have shown up and down fluctuations since the State's 2003 counts, the elk population forest-wide meets State elk plan objectives within the 10% margin of error for population estimates.

Mountain Goat

Monitoring Question: Are management activities effectively protecting high elevation winter habitats for mountain goats?

Performance Measure: Population data for goats from Montana Fish Wildlife & Parks and number of snowmobile entries into non-motorized high elevation units protected for goats.

Results - (1986 Beaverhead Plan Monitoring Item 1-3, 1987 Deerlodge Plan Monitoring Item 4-3, Draft Revised Beaverhead-Deerlodge Plan Draft Monitoring Item 13)

Data in the table below comes from the Montana Fish, Wildlife and Parks (FWP) website. No updates were made by FWP to the 2003 data in 2004 or 2005. Non-motorized allocations described in the Revised Plan were not monitored prior to 2007.

Table 11. Montana Fish Wildlife and Parks Mountain Goat Population Estimates

BDNF Mountain Goat Hunting Districts	FWP 2003 Population Estimates + 10% all ownerships	FWP 2006 Population Estimates + 10% all ownerships
212	66 stable	45
222	25	25
223	44	40
312	150	150
320	100	100
321	75	75
322	60	60
324	**300** same herd as 324,325, 326,327, 328,362	**300** same herd as 324,325, 326,327, 328,362
325	"	'
326	"	'
327	"	'
328	"	'
331	80	80
340	No Data	No Data
Total	2100 stable - increasing	2075 stable

Evaluation: While some hunting districts have shown up and down fluctuations since the State's 2003 counts, the population forest-wide is generally stable.

Once the Revised Forest Plan is implemented, this item will also report on any winter disturbance of non-motorized high elevation allocations designed to protect mountain goats.

Wolverine

Monitoring Question: Are management activities effectively protecting high elevation winter habitats for wolverines? (Revised Beaverhead-Deerlodge Plan Draft Monitoring Item 13, no item in 1986/87 Plans)

Performance Measure: Population data for wolverine from Montana Fish Wildlife & Parks and other partners. Presence or absence of wolverines in high elevation habitats, number of snowmobile entries into non-motorized high elevation units protected for wolverines.

Results Wolverine Surveys – BDNF and Rocky Mountain Station biologists surveyed 445 km (226 miles) across 1152 sq.km. (284,664 acres) on the southern portions of the Dillon RD during February and March of 2006. Previously unsurveyed portions of the Bitterroot Range, Tendoy Mountains, and Beaverhead mountains were traversed in this effort. Four (4) new wolverine detections resulted from the survey. While wolverines occur at low densities, this effort coupled with previous work by Rocky Mountain Station in the Pioneer Mountains and Flint Range, and by Inman et al (Wildlife Conservation Society) in the Centennial Range, Madison Range, and the Gravelly Range indicate wolverines are widespread across the Forest.

Inman reports that between 2001 and 2005 they had trapped 26 wolverines (15 female, 11 male) in their Madison and Teton study areas. The Madison study area includes the Madison, Gravelly and Centennial mountain ranges. They documented 5 wolverine deaths in that same time period and an additional death of a young male legally harvested in the Madison study area in FY06. Inman conducted recreation surveys in the Madison study area this fiscal year, including parking area surveys and trail counters. Radio-instrumented females were monitored to locate den sites. As of the reporting date March 15, none of the 4 adult females had denned. This is 3 weeks later than previously documented birth dates. Aerial surveys and ground searches were also initiated to detect possible den sites of unmarked females.

Evaluation: The forest now has confirmed detections of wolverine in the Bitterrrot Range, Tendoy Mountains, Beaverhead Mountains, Pioneer Mountains, Flint Range, Centennial Range, Madison Range, and the Gravelly Range. This data will provide a baseline for future monitoring.

Once the Revised Forest Plan is implemented, this item will also report on any winter disturbance of non-motorized high elevation allocations designed to protect wolverines.

Sagegrouse

Monitoring Question: How are populations of sagegrouse changing? (1986 Beaverhead Plan Monitoring Item 1-6, no item in Draft Revised Plan).

Performance Measure: Number of animals

Results: Sage-grouse field surveys were conducted by the National Wildlife Federation under a challenge cost share agreement in the Big Hole, Upper Big Sheep Creek, and Gravelly Range areas. Approximately 94 miles of transects were run by NWF personnel and volunteers using bird dogs to detect grouse. One hundred and thirty one birds were counted. Notes were also made when pygmy rabbit dens, located in similar habitat, were observed.

- No birds detected on 4 allotments in the Big Hole area.
- 62 birds detected at Henderson Pasture in Upper Big Sheep Creek. Pygmy rabbit dens noted and mapped.
- 37 birds detected at Divide Pasture in Upper Big Sheep Creek. Pygmy rabbit dens mapped at East Terrell Pasture in Bloody Dick drainage
- 4 birds detected at Odd Ball pasture
- 3 birds detected at Black Canyon-north pasture.
- 17 birds detected at Elk Lake west area in the south Gravelly Range.
- 8 birds detected at Long Creek near the Divide Forest Service cabin.

Evaluation: One hundred and thirty one birds were counted in 2006 surveys compared to the 12 broods and 30 separate adults counted in 2005. While 335,750 acres of sage grouse habitat have been modeled and mapped on the Forest using Connelly (2000) guidelines, there are still no known leks, nesting areas or wintering grounds. These are the areas critical for population maintenance. Modeled sage-grouse habitat for southwest Montana show 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.

D. Riparian Stream Function

Monitoring Question: Are stream and riparian conditions improving?

Performance Measure: Percent of stream channels functioning or in upward trend.

Table 12. Stream Function Monitoring Item for Old and New Plans

	1986 Beaverhead Plan	1987 Deerlodge Plan	Draft Revised Beaverhead-Deerlodge Plan
Monitoring Item	2-4	6-1	4

Results: Five stream reaches on the Wisdom Ranger District of the Beaverhead-Deerlodge National Forest were sampled for both hydrology and riparian vegetation. Plots were originally established to measure change in hydrology and have been repeatedly measured over time. The last hydrology measurements were taken during the summer 2005 field season, while baseline riparian vegetation data was collected from these stream reaches during the summer 2006 field season. Seven additional plots were visited in 2006 for vegetation data collection, where hydrology data was lacking for the 2005 field season. The objectives of this report are to present a summary of hydrology and riparian vegetation results, as well as provide a narrative interpretation of these results.

Table 13. Summary Condition and Trend of Five Stream sites on the Wisdom District

Stream Name	Hydrologic Condition, Trend	Vegetative Condition
Engelbaugh	Not Functioning, Stable	Functioning
Upper Big Hole	Functioning (Reference Reach)	Functioning
Big Lake Creek	Functioning, Upward	Functioning
Cow Creek	Functioning at Risk, Upward	Functioning
Big Swamp Creek	Functioning, Stable	Functioning

Allotment: Saginaw
Hydrologic Unit Code: Englebaugh Creek, EngleMain UP

Physical Function
B4 stream type in 1988, 2003 and 2005
Site not moving toward the E4 stream type that should be on this site. Discrepancy between current and reference physical conditions in terms of entrenchment and w/d ratio makes the reach non-functioning.
Entrenchment has remained essentially the same (1.7 to 1.6)
Width -depth ratio has more than doubled (10 to 22.7).
W50 remained essentially the same (5.3 to 4.3), which is still twice the reference condition (2.4).
Substrate: percent fines < 6 mm closely match reference condition. (25% vs. 22%).

Biological Condition
Greenline:
Water sedge *(Carex aquatilis)* community type, high stability and late successional status.
Grazed with few seed heads observed.
Willow *(Salix)* species present, but grazed and no regeneration.
Bank trampling and crossing.
Cross Section:
Vegetation cured at time of data collection.
Noxious weeds and weedy species observed.
High graminoid diversity, but low cover in general.

Synthesis
The site is located in an area of high livestock use, as evidenced by a trail running parallel to the creek and Sheila Ridge, the crossing within the plot, a cluster of shade trees along the livestock trail, and close proximity to the pasture division fence. However, this site does not necessarily represent the physical and biological characteristics of the up and downstream channel or pasture.

Although greenline vegetation is represented by functionally desirable species, their heavily grazed status (low stubble height) in comparison to other species observed off the greenline compromises these species ability to regenerate in the future the site and provide for long-term stream stability. The discrepancy between the existing and potential stream channel conditions can be attributed to a crossing in the plot and trailing in and along the stream. It is unlikely livestock preference for this area will change in the near future to allow for recovery to potential.

Recommendations
Recognize this location is favored by livestock during hot summer months and encourage their movement from the area. Attention from the permittee will be required to prevent exceeding standards in this area. We recommend relocating this monitoring site to a location more representative of the pasture as a whole.

Allotment: Pioneer
Hydrologic Unit Codes: Upper Big Hole River, BigHole MID

Physical Function
This reach was considered a reference in 1998. Measurements in 2005 were virtually identical, and the reach is still in reference condition.

Biological Condition
Greenline:
Water sedge (*Carex aquatilis)* community type, high stability and late successional status.

Drummonds willow *(Salix drummondianna)* co-dominant.
Willow (*Salix)* species present, but grazed and no regeneration.
Some bank trampling, crossing just upstream.

Cross Section:

Diverse, no-noxious weeds.
High vegetative (54%) and litter (44%) ground cover.

Synthesis

The hydrology cumulative width curve in 2005 shows an extension at the top of the curve, indicating a small percent of the stream was wider. This is likely due to the inclusion of a livestock crossing near what appears to be a hunters camp. This is a small portion of the reach and does not yet affect overall function.

Riparian vegetation was robust, diverse, and provided high cover for the greenline and cross section. Greenline was dominated by desirable species and many seed heads were observed during data collection. Point bar in the plot was colonized by sedge (*Carex)* and willow (*Salix)* species, which were represented by a variety of age classes throughout the plot. Some bank sheering was evident in the plot.

Recommendations

Current grazing regime is compatible with desired future conditions for hydrology and riparian vegetation in this location. Continue to monitor livestock impacts to bank integrity, plant diversity, and plant regeneration. Manage for current standards.

Allotment: Dry Creek
Hydrologic Unit Codes: Big Lake Creek, BigLakeDN

Physical Function

The 2005 data shows that the measured reach has remained the same in terms of the cross section, and has improved in terms of overall stream width and substrate composition. The reach is functioning at this time.

Biological Condition

Greenline:
Willow *(Salix)* and birch *(Alnus)* species along greenline represented by one, mature age class, no regeneration.
Water sedge (*Carex aquatilis)* colonizing greenline, but grazed and trampled.

Cross Section:
Low vegetative cover (4%), high litter cover (77%), high bare ground (17%), and lot of exposed roots (3%).
Heavily grazed and weedy.

Synthesis
The physical characteristics of this stream have improved since 1998, when it was characterized as functioning with a downward trend. The well armored stream banks and bottom tend to degrade and improve at a slower rate than other stream types, characteristics that occur at this site and contribute to its resiliency. Continued grazing may not drastically alter the physical characteristics of this reach, but continued willow and birch browsing may inhibit age class diversity and impact physical (e.g., temperature) and chemical (e.g. type of organic matter input) properties of the stream in the future.

Recommendations
When cows are in pasture, monitor frequently for livestock impacts to riparian ecotone and bank and stubble height standards. Encourage permittee to monitor this site for excessive livestock use.

Allotment: Ruby Creek
Hydrologic Unit Codes: SW Cow Creek Tributary, CowTribUP

Physical Function
2005 data shows an improvement at the cross section, with the channel becoming less entrenched (1.5 to 2.6), and w/d ratio becoming smaller (9.5 to 6.9). However, overall reach width has become wider as shown by the cumulative distribution curve. There are no channel stability data for comparison over the time span. Fine sediment increased form 30% to 68%. This reach remains functioning-at-risk.

Biological Condition
Greenline:
Water sedge (*Carex aquatilis)* community type (high stability and late successional status),
Beaked sedge (*C. utriculata)* co-dominant and colonizing disturbed areas at aquatic-terrestrial interface.
Greenline vegetation was lush and healthy.
Bank trampling and crossing throughout the plot.

Cross Section:
Water sedge (*Carex aquatilis)* community type (high stability and late successional status), Tufted hairgrass (*Deschampsia caespitosa)* co-dominant.
Good vegetative (39%) and litter (58%), with some bare ground (3%).
Willow species present, but no regeneration.
Low species diversity.
No noxious weeds observed.

Synthesis
This site supports desirable vegetation and high greenline cover. Stream widening is attributed to cattle crossing and trailing in the stream and along the stream bank.

Although bank damage is present within the plot, species present are capable of successional advancement that can facilitate improved hydrologic function of this reach.

Recommendations
Limiting the amount of time livestock spend in the riparian area will favor a healthy, vigorous plant community that will enhance bank stability and contribute to the long-term sustainability of this reach.

Allotment: Twin Lakes
Hydrologic Unit Codes: Big Swamp Creek, BigSwampDN

Physical Function
The 2005 data show much the same condition as the 1998 data. There is little change in entrenchment (2.6 to 2.7) or w/d ratio (14.9 to 13.8). Both the cumulative width curve and the substrate curve are virtually the same for both years. The overall width is still wider than reference conditions, but both Channel Stability and BEHI indicate stable conditions and the substrate curve approximates reference conditions. This reach is likely functioning at this time.

Biological Condition
Greenline:
Engleman spruce/horsetail (*Picea engelmannii/Equisetum arvense)* community type with moderate stability and late successional status.
Greenline supported vigorous & diverse plant community that included three willow species.
Moose crossing in the plot.

Cross Section:
Engleman spruce/horsetail/ Drummond willow (*Picea engelmannii/Equisetum arvense /Salix drumondianna)* community type with moderate stability and late successional status
Good vegetative (39%) and litter (58%), with some bare ground (3%).
Salix species present and regenerating.
Lots of large, downed wood.
No noxious weeds observed.

Synthesis
Large rocks observed within the macro plot provided armoring and contribute to stream resiliency. Since this plot is located within an Engelman spruce (*P. engelmannii)* stringer forest, retention of shade tolerant herbaceous species on the greenline is desirable for wildlife forage and species diversity. Maintaining willow (*Salix*) species within this plot is desirable in the future for the ecosystem functions this group of species provides.

Recommendations

Evidence of livestock disturbance to stream morphology and riparian vegetation was largely absent from this location. This location should be monitored in the future for livestock impacts, as the pasture fence and cattle guard proximity to the plot may result in future damage. However, intensive data collection may not be necessary to monitor this site.

Other Plots

To establish a baseline data set, vegetation data was collected from greenline and stream cross sections of seven plots established for long term hydrology monitoring (Table 15). See *Long Term Range/Riparian Vegetation Trend Monitoring* reports for more information regarding these sites.

Table 14. Sites sampled in 2006 for baseline riparian vegetation data where previous year hydrology data was lacking.

Allotment (*Pasture*)	Stream (*Site*)	Hydro	Vegetation	
Monument Cattle & Horse Range (*Miner*)	Miner Creek (*Miner*)	1998	great	GL: CAAQ/CACA/SAGE XS: CAAQ/CAUT/CACA/SAGE
Ruby Creek (*Lower Ruby*)	BigMoosehorn Crk *(BigMoosehornDN & newMID)*	1998 2003	good	GL: CACA/CAUT XS: CACA/CHAN
Mussigbrod (*Mussigbrod*)	Mussigbrod Crk *(MussigbrodUPnew)*	new site	good	GL: CACA/CAAQ/CAUT XS: CACA/CAAQ
Saginaw (Unit #4)	Little Indian Crk *(GovTribDN)*	1998 2003	good	GL: CAAQ/CAUT/DECA XS: CAAQ/DECA/POPR
Saginaw (Unit #2)	E Fork Englebaugh Crk *(EngleMainDN)*	1998 2003	great	GL: AGEX/CAAQ/SAGE/SETR XS: AGEX/CAAQ/PICO
Pioneer (Pioneer)	Berry Crk *(BerryDN)*	1998	great	GL: CAAQ XS: CACA/CAUT/PICO

Evaluation: In 2006, Forest specialists re-evaluated the Forest stream monitoring program to integrate baseline riparian vegetation data with the hydrology data. Over 800 stream survey plots were established on the Beaverhead-Deerlodge National Forest in the 1990s to measure characteristics of stream morphology, evaluate stream function at the time of data collection, and monitor changes in stream hydrology over time. Stream sample sites were selected based on presence of land use disturbance (e.g. grazing, mining) rather than a statistically based sample design. The objective was to monitor the effects of grazing, particularly in areas of low gradient streams most vulnerable to livestock grazing impacts, not to determine stream conditions forestwide.

Several problems are associated with the current stream monitoring program. Budget and staffing limits the capacity to monitor 800 permanent sites. Some of the plots are poorly located, not representative of the stream reach or subwatershed. Other sites are difficult to find and require a large time commitment (hours) to locate. Permanent plot markers in the field are necessary to insure data is collected at the same location as previous surveys and to ensure time during the short field season is spent efficiently.

The new program re-designs stream sampling to provide statistically sound forestwide integrated stream information (hydrology and vegetation) and retain a representative sample of the permanent transects to carry forward two decades of monitoring data.
The potential to revisit and monitor stream characteristics will be increased by reducing the number of hydrology plots from approximately 800 to approximately 200. This will also facilitate gaining familiarity with plot locations and permanently marking and describing the location of these plots.

During the summer of 2006, the Forest riparian ecologist began gathering base line riparian vegetation data to compliment the large amount of data on stream hydrology. Most of these sites have been repeatedly sampled for hydrology data without base line riparian vegetation data. The vegetation sampling in 2006 showed that on five sites with previous years hydrologic data (2005), riparian vegetation conditions were “functioning” regardless of stream channel conditions. Stream function on these 5 plots varied from non-functioning to functioning at risk to functioning. On seven other plots established for long term stream monitoring where current hydrologic condition was not available, vegetation condition was either good or great.

E. Best Management Practices Effectiveness

Monitoring Question: Are soil and water conservation practices (Best Management Practices or BMPs) being implemented during project work and are they resulting in protection of water quality and beneficial uses?

Performance Measure: BMPs implemented and percent rated effective

Results: An interdisciplinary team reviewed the completed West Face Timber Sale and Stewardship Project on the Wisdom District to see:

- Were mitigation measures and monitoring requirements identified in the environmental analysis implemented on the ground?
- Was mitigation effective at accomplishing the intended land management objective?

The team reviewed each mitigation measure identified in the Decision Notice. The detailed evaluation of BMPs for soil, road, and water quality follow.

1. Down woody debris maintained through timber sale contract provisions

Units 6, 35 and 37 were evaluated. The Decision Notice required a minimum of 10 tons per acre, particularly larger than 6" diameter, maintained through timber sale contract provisions designed with involvement from the Forest Soil Scientist. The Forest Plan requires 10-15 tons of down woody debris, some material 6" and larger. However, the timber sale contract requirement C6.406 (site condition) requires only 0 to 3 tons of woody material to be left evenly distributed on each acre where harvesting has occurred , for units 6, 35 and 37. Contract requirement C6.7 (hazard reduction and site preparation) requires machine piling of all slash concentration exceeding 3 tons/acre in units 6, 35 and 37.

Examining coarse woody debris in Unit 35 (Photo: L.Magnuson)

Three units were inspected. Values in the table below are based on one coarse woody debris transect (Brown 1974) in each unit at a representative location.

Table 15. Coarse Woody Debris in tons

Unit	3 " diameter	4" diameter	6" diameter	TOTAL
6		1	2.8	3.8
35	1.4	2.8	7.8	12
37	.7	1.2	2.8	4.7

Evaluation: Timber sale contract provisions (0-3 tons/acre) were not designed to maintain the coarse woody debris level required in the NEPA document (10 tons/acre) or by Forest Plan standards (10-15 tons/acre). Regardless of the contract requirements, Unit 35 has coarse woody debris that meets Forest Plan requirements and Graham, et al 1994. Unit 6 and 37 do not.

Followup: Need to resolve the conflict between desired fuel loading and down woody debris for soil productivity.

2. Skid trails and road location

The Decision Notice required all skid trails be designated. Skid trails would be broken every 50 feet with slope breaks, waterbars or large woody debris. The Forest soil scientist would review temporary road locations.

All skid trails were designated. Unit 6 was winter logged with very little surface disturbance, skid trail or otherwise, so the other skid trail requirements were not necessary. Skid trails observed in units 35 and 37 were not steep enough to require application of waterbars or debris mitigation.

The objective of the mitigation was to prevent detrimental disturbance. We define this using soil quality standards, assuring that 85% of the unit (activity area) has soil without detrimental disturbance. To determine if this objective was met, Howe's method was used to classify 20 plots along a 100 foot traverse in units 35 and 37, 1 traverse in each unit. (Unit 6 was so lightly impacted no plots were taken – it was rated as 100% soil without detrimental disturbance). Twenty percent of the plots read in each unit were rated as having detrimental disturbance (see plot sheets in project file for reference). Half of the detrimental plots in both units were only marginally detrimental (Howe's class 3). Most detrimental soil disturbance was for displacement on areas greater than 100 square feet. Sampling intensity was light (only 20 plots in each unit) which is not enough plots to determine a reliable confidence interval. By observation, we consider the soil quality standards to be essentially met. Very shallow, intermittent rill and sheet erosion was observed on skid trails. Soil movement from the skid trails was very low because of logging debris and undisturbed patches. Soil erosion was not noted within units other than skid trails. We do not recommend any further mitigation or soil restoration work, as this would likely be ineffective and may cause more detrimental disturbance.

Evaluation: The mitigation requirement was applied where necessary. Skid trails were designated. Other mitigation actions were not required. The mitigation requirement was met.

The purpose of the mitigation was to prevent detrimental rutting and compaction. No rutting was observed. While plots showed some detrimental disturbance, sampling was light and visual observation did not support this conclusion. Soil movement from the skid trails was low. No sediment delivery to drainage ways was noted from any skid trails because of the low delivery ratios and distance to drainage ways. Soil compaction does not appear to be a problem in these units (see details in item 3 below).Therefore, the required mitigation effectively met land management objectives.

3. Soil moisture and soil compaction levels

The Decision Notice required that timber harvest and log hauling periods meet contract specifications for soil moisture/soil compaction. The maximum soil moisture for skidding equipment operation by soil type or harvest unit would be stated. Forest Soil Scientist and Timber Sale Administrator will jointly assess at the start of operations and following precipitation events. The timber sale contract reflects the DN in provision C6.316 which prohibits logging activity if the soil moisture exceeds 12% unless ground is frozen or covered by 24' of snow.

Contract inspection notes and the project file document consultation with soil scientists on several occasions during project implementation when soil moisture conditions approached the 12% limit for logging. Contract inspection notes record soil moisture sampling by the timber sale administrator and/or soil scientist on five occasions between 7/03 and 9/04. In addition, a report in the files documents extensive sampling of Unit 37 by a soil scientist in September 2004 to determine soil moisture content. The moisture content ranged from 6.7 to 13% with 3 of 4 samples between 12 and 13% in the surface 4 inches. The subsoil was still dry. In addition, penetrometer readings (pounds per square inch) were takin on 13 plots on four sites. Detrimental soil disturbance in those cutting units was less than 10 percent. The soil scientist presented four alternatives for the operators to prevent exceeding soil quality standards.

The Soils BMP Team inspected Units 6, 35, and 37. Unit 6 was winter logged and observable disturbance was non-existent. Howe's method was used to classify 20 plots along a 100 foot traverse in units 35 and 37, 1 traverse in each unit, see notes above. Observations of the surface 15 to 20 centimeters showed no platy or massive structure. So it is unlikely that compaction greater than 15% occurred. Since there was no visual evidence of compaction, no samples were removed.

Evaluation: The mitigation requirement was met. Soil scientists and timber sale administrators sampled soil moisture after precipitation events.

The objective of the mitigation was to prevent detrimental rutting and compaction. No rutting was observed. No visual or measured evidence of compaction was apparent. The required mitigation effectively met land management objectives.

4. Unexpected or severe effects.

The Decision Notice requires we alter methods or redesign to keep effects within soil quality standards. No unexpected or severe effects were noted in the units visited.

Evaluation: No effects were noted so effectiveness cannot be evaluated.

5. Landings

Three landings were inspected to see if soil quality standards were met. A landing in Unit 37 had not been properly cleaned up. A lot of logging debris was left scattered over the surface. No detrimental soil disturbance was noted. Two landings in Unit 6 were observed where slash had been piled and burned. They were burned in the fall with frozen ground, six inches of snow, and the piles were wet. Litter remnants, some of it charred, were left where the slash piles burned. These remnants indicate that extreme heating did not occur on the soil surface. Vegetation is coming back and the team thought that in a few years they will be completely re-vegetated and restored.

Evaluation: The landings observed appear to be in satisfactory condition for this stage of recovery and are expected to be fully restored in the near future. The required mitigation effectively met land management objectives.

6. Repairs and mitigation to existing road-related sediment sources on the Doolittle Road system.

This mitigation item required that known sediment sources be identified and repaired before allowing roads to be used for timber haul and stated sale contract provisions would be used to insure this mitigation feature was met. However, the work was done using Capital Investment Project (CIP) dollars BEFORE the sale was offered. So it wasn't necessary to include it in the timber sale contract. Section C5.12 of contract did not reflect this as work was done using CIP funds before sale was offered. (The road work in Doolittle and Steel Creek was described in the reasonably foreseeable future actions (II-11) and the cumulative effects section for water quality and fisheries (IV-35)).

Evaluation: The North Fork (FR 2422) and Main Doolittle (FR 2421) roads were inspected. The effectiveness of sediment reduction measures was rated "very good".

The NEPA mitigation requirement for road repair was met on all segments of the roads inspected and the mitigation was effective at meeting the land management objective (reducing sediment sources).

Follow-up: Effectiveness/Validation monitoring such as re-measuring sediment core samples would help define support of beneficial uses (cold-water fisheries).

7. Application of Best Management Practices (BMPs) to insure compliance with State water quality standards and streamside management zone rules during timber harvest, yarding, and hauling.

We inspected most harvest units. Contract requirements BT6.6 and CT6.6 clauses apply. No observable soil erosion or sediment delivery was noted. The units the team inspected met BMP's, this was likely representative of the sale as a whole.

Evaluation: The mitigation requirement was met on the units inspected. The BMPs which applied to cutting, yarding and hauling were effective at preventing observable soil erosion or sediment delivery.

8. Stream Survey Re-measures on 18 sites at 5 year intervals

No data available for 2006.

Evaluation: While 5 years has passed since the Decision Notice was signed, the project activity continued until 2005. Compliance with this NEPA mitigation is ongoing.

9. Design of harvest units to prevent sediment

Most units were inspected. Only Unit 17 contained a Streamside Management Zone (SMZ), but it wasn't observed by this team. The vegetation/wildlife team inspected this SMZ unit and did not report sediment issues (see item 8 under vegetation and wildlife). The unit was winter logged over snow, mitigating potential sediment concerns.

All other units were located far from SMZ's, meaning that sediment delivery was precluded due to transport distances required for sediment delivery. Of the 28 units initially analyzed in the EA, 4 were dropped due to riparian concerns or logging concerns, 12 were logged in winter, and 11 were logged in summer.

Evaluation: This mitigation requirement was met as a whole on the units inspected, no need for future in-stream monitoring for the effects of timber harvest was identified. The required mitigation effectively prevented sediment contributions to streams.

10. Monitoring of road mitigation practices listed in Appendix D3 the first spring following implementation.

This applies to Clara-Arnold (FS 2454) Road, Steel Creek (FS 90) Road, Steel-Fox (FS 2420) Road and is not a field review item. We need to review the Project file to see if specialist reports exist for this monitoring effort.

We reviewed portions of the Steel Creek and Steel-Fox roads to see if road mitigation practices are still in place and effective. In 2006, road restoration activities rate "very good" at effectively reducing sediment. No need for further road work was identified.

Evaluation: In 2006, road restoration activities continue to perform as designed, effectively reducing sediment.

11. Closure of temporary and selected non-system roads

Contract requirements BT6.62 and CT6.603 apply.

Various closed roads throughout the sale area were inspected. In all cases, closures were in place with waterbars installed.

Evaluation: The mitigation requirement was met on the roads inspected and the required mitigation effectively met the land management objective.

SUMMARY EVALUATION: Of the eleven Best Management Practices identified for the West Face timber sale and stewardship project, only the coarse woody debris retention did not meet the Decision Notice or Forest Plan requirements. Of the three units inspected, only one of the three met the DN requirement of 10-15 tons per acre. Followup action on this item is scheduled by the Forest Leadership Team.

F. Invasive Species

Monitoring Question: Are management actions preventing or controlling new and existing infestations of weeds?

Performance Measure: Change in acres of known noxious weed infestations. Number of new species and extent.

Data is collected annually on the number of acres treated as required by the 1986 and 1987 Plans. That information is presented in Table 17 below.

Table16. Noxious Weeds treated on the BDNF, by Fiscal Year

Fiscal Year	**2003**	**2004**	**2005**	**2006**
Acres Treated	3,600	8,004	7,635	6,017

Actual infested acres are monitored annually by Ranger District weed supervisors and range ecologists. Data was available in 2006 from the Dillon and Madison Ranger Districts, as indicated in Table 17 below. By 2008, the noxious weed data will be available for all Ranger Districts.

Table 17. Noxious Weed Infestations on Two Ranger Districts, by Species

	Madison Ranger District		**Dillon Ranger District**	
Species	**Acres**	**# sites**	**Acres**	**# Sites**
Black Henbane	74	19	7	14
Bull thistle	127	75	6	7
Candadian Thistle	1046	336	84	76
Common Mullein	145	13		
Common Tansy	60	16		
Dalmation Toadflax	10.5	3		
Diffuse Knapweed	14	3		
Field Scabiosa	204	27		
Houndstongue	2054	494	40	47
Leafy Spurge	2	5	1	1
Musk Thistle	1005	180	31	32
Oxeye Daisy	.3	2		
Russian Knapweed	14	1		
Spotted Knapweed	1811	375		
St. Johnswort	1	1	76	110
Sulphur cinquefoil	.2	3	1	2
Whitetop (Hoary Cress)	0		2	2
Yellow Toadflax	89	20		
TOTALS	**6,656**		**249**	

Evaluation:
A baseline on actual infestation by District must be established before any trend can be determined. That baseline is only available for two Districts as of this report.

G. Economic Effects

Monitoring Question: What is the status and trend of goods and services provided from the Forest?

Performance Measure: Quantities of goods and services produced from the Forest measured by animal unit months, board feet of timber, visitor use numbers, oil and gas leases, Forest Service expenditures, and county payments.

Table 18. Forest Outputs Monitoring Items from Old and New Plans

	1986 Beaverhead Plan	1987 Deerlodge Plan	Draft Revised Beaverhead-Deerlodge Plan
Monitoring Item	10-3 11-1	14-1	22

Results: Total budget spent (including unplanned events like fire suppression and one-time costs like fire restoration and land purchase) changed from $20,912,000 in FY04 to $27,856,000 in FY05, to $20,377,000 in FY06. Planned costs dropped from $21 million in FY05 to $17 million in FY06.

Both budget and timber outputs were notably higher in FY05 than FY06. This shows up as a higher estimated impact on jobs and income in FY05 and a drop again in FY06, more comparable to FY03 and FY04. The third table provides the distribution of jobs throughout the 8-county area influenced by BDNF management, as a context for changes in jobs and income displayed in the tables that follow. Employment attributable to BDNF forest management was 3.5% of the 45,836 jobs available in the 8-county area. In FY06 employment attributable to the BDNF dropped to 3.35%.

Table 19. Beaverhead-Deerlodge Actual 2006 Budget Expenditures by Budget Line Item

Budget Line Item	DESCRIPTION	2006 Budget Expenditures ($000)
BDBD	Brush Disposal	25
CMFC	Facilities	585
CWFS	Cooperative Work	30
CMRD	Rd Construction and Mtce	966
CMTL	Trail Construction & Mtce	1,006
CWKV	Knudtson/Vanderberg Fund	489
WFPR	Fire Protection/Preparedness	2,741
WFHF	Hazardous Fuels	597
NFIM	Inventory and Monitoring	93
NFLM	Land Ownership	237
NFMG	Minerals and Geology	858
NFN3	Fire restoration	89
NFPN	Land Mgt Plans (Plan Revision)	439

NFRG	Grazing Management	826
NFRW	Recreation, Heritage, Wilderness	1,210
NFTM	Timber Sales Management	1,568
NFVW	Vegetation and Watershed	801
NFWF	Wildlife and Fish	592
RBRB	Range Betterment	112
SSSS	Timber Salvage	11
TRTR	Road and Trail Restoration	83
SPSP	Economic Action Programs	49
NFEX	Grants/Agreements/coop	217
WFEX	Grants/Agreements/coop	826
FDFD	Fee Demo	207
WFSU	Unplanned Wildfire Suppression	2,759
Admin	Administration	2,703
	TOTAL	$20,377

**Source of data: Unit Status of Funds Report, 10/11/06*)

Table 20. Employment by Program by Year (Average Annual, Decade 1)

	Total Number of Jobs Contributed			
Resource	FY03	FY04	FY05	FY06
Recreation	356	359	363	363
Wildlife and Fish	375	379	383	383
Grazing	96	92	105	121
Timber	287	155	241	165
Minerals	0	0	0	0
Payments to States/Counties	20	20	21	21
Forest Service Expenditures	497	522	564	480
Total Forest Management	1,630	1,528	1,676	1,533
Percent Change from FY03	---	-6.3%	2.8%	-6.0%

Table 21. Labor Income by Program by Year (Average Annual, Decade 1; $1,000)

	Thousands of dollars			
Resource	FY03t	FY04	FY05	FY06
Recreation	$8,227.6	$8,309.9	$8,393.0	$8,393.0
Wildlife and Fish	$8,980.4	$9,070.0	$9,160.7	$9,160.7
Grazing	$1,176.4	$1,140.4	$1,288.3	$1,505.7
Timber	$7,276.2	$3,926.8	$6,121.3	$4,180.9
Minerals	$0.0	$0.0	$0.0	$0.0
Payments to States/Counties	$599.2	$607.1	$621.0	$626.9
Forest Service Expenditures	$12,794.9	$15,342.0	$21,500.5	$15,727.9
Total Forest Management	$39,054.7	$38,396.2	$47,084.8	$39,595.0
Percent Change from FY03	---	-1.7%	20.6%	1.4%

Table 22. Role of Forest Service-Related Contributions to the Area Economy in Base year 2003

	Employment (jobs)		Labor Income ($ Thousands)	
Industry	Area Totals	FS-Related	Area Totals	FS-Related

Agriculture	3,485	223	$43,548.1	$4,106.9
Mining	771	23	$50,428.0	$20.6
Utilities	612	4	$65,701.3	$397.4
Construction	2,737	16	$79,833.8	$485.3
Manufacturing	1,430	86	$52,713.9	$2,619.2
Wholesale Trade	775	60	$26,140.4	$2,081.7
Transportation & Warehousing	939	24	$35,105.0	$875.3
Retail Trade	4,765	129	$107,269.1	$3,117.4
Information	683	8	$42,808.2	$424.2
Finance & Insurance	1,113	14	$33,651.5	$406.1
Real Estate & Rental & Leasing	1,145	36	$30,876.0	$888.9
Prof, Scientific, & Tech Services	2,994	34	$92,049.6	$900.5
Mngt of Companies	243	4	$10,981.0	$157.9
Admin, Waste Mngt & Rem Serv	1,315	17	$23,707.6	$285.3
Educational Services	300	6	$3,150.3	$57.9
Health Care & Social Assistance	5,049	59	$139,443.8	$1,695.5
Arts, Entertainment, and Rec	1,147	56	$17,193.8	$942.5
Accommodation & Food Services	4,570	305	$51,202.0	$3,657.3
Other Services	4,019	52	$51,283.1	$666.1
Government	7,744	472	$308,255.3	$15,140.5
Total	45,836	1,627	$1,265,341.8	$38,926.5
Percent of Total	100.0%	3.5%	100.0%	3.1%

Evaluation: Forest Service expenditures (budget) and the amount of timber sold declined between 2005 and 2006, resulting in a drop in labor income and employment contributions to local economies back to 2003 and 2004 levels. The Forest Service continues to contribute approximately $39,500,000 or 3.2% of the area labor income. This figure has been fairly stable the last 5 years.

List of Preparers

Resource	Name and Position
Forest Outputs and Accomplishments	Janet Bean-Dochnahl, Planner, Social Science Laurie Russell, Budget and Finance Officer
Facilities, Transportation	Craig Simonsen, Transportation Planner
Fire	Tammy Clark, Fire Management Officer
Insect and Disease, Research	Robert Wooley, Forest Ecologist
Minerals	Dan Avery, Geologist
Noxious Weeds	Chris Collett, Madison Ranger District, Reyer Rens, Dillon Ranger District
Range	Grant Godbolt, Range Management Specialist, Juanita Miller, Resource Assistant
Recreation	Patty Bates, Recreation/Lands/Eng Staff Officer
Riparian and Watersheds	Bryce Bohn, Hydrologist, Carly Gibson, Ecologist
Soils	Dave Ruppert, Soil Scientists
Timber	Cathy Frey, Timber Resource Specialist
Wildlife	Art Rohrbacher, Wildlife Biologist

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

WRITER/EDITOR: Sharon Sawyer, Program Analyst

APPROVAL: Bruce Ramsey, Forest Supervisor