United States
Department of
Agriculture

Forest Service

Northern Region

FOREST PLAN
MONITORING AND EVALUATION REPORT
Fiscal Year 2007
Bitterroot National Forest

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INTRODUCTION

Introduction

The Bitterroot National Forest continued its well-established monitoring program and research collaboration in 2007.

The effects of the fires of 2000, 2003, 2006 and 2007 continue to influence and change the Bitterroot landscape. A bark beetle epidemic, re-energized by drought and fire weakened trees, began to decline in severity in 2006 and continued to decline in 2007, but still caused some mortality. Streams and vegetation continue to adjust to the post-fire conditions with corresponding changes in fish and wildlife use, abundance and distribution. People's use and perceptions of the forest are influenced by these events, which in turn are affecting both local and national policies.

Forest Land and Resource Management Plans (Forest Plans) are intended to provide long-range management direction for each National Forest. Forest Plans provide guidance for balancing the physical, biological and social components of forest management in the form of goals, objectives, standards and guidelines. The Bitterroot Forest Plan was approved by the Regional Forester in September 1987.

As required by the Forest Plan, monitoring and evaluation provide a control system for Forest management. The results provide Forest line officers and employees, Regional and Washington offices, Congress and the public information on the progress and results of implementing the Bitterroot Forest Plan. Forest Plan monitoring involves gathering information and observing management activities to document their effects on people and the environment. There are three types of Forest Plan monitoring:

- **Implementation monitoring** is used to determine if goals, objectives, standards and management practices are implemented as detailed in the Forest Plan. In other words, did we do what the Forest Plan said we were going to do?
- **Effectiveness monitoring** is used to determine if management practices, as designed and executed, are effective in meeting Forest Plan standards, goals and objectives. Did the management practice do what we wanted it to do?
- **Validation monitoring** is used to determine whether the data, assumptions and coefficients used in the development of the Forest Plan are correct. Are the goals and objectives set by the Forest Plan valid?

Two other types of monitoring are presented for some resources. **Base line monitoring** establishes a basis for assessing change from current conditions, making comparison to future conditions possible. **Tracking** is useful as a way to report on the additional activities we are engaged in, such as numbers of wildfire ignitions and law enforcement incidents.

The Forest Plan monitoring requirements still provide the basic framework for the monitoring today. However, the actual monitoring techniques have evolved and improved over time to provide a more realistic, accurate and efficient monitoring package to evaluate the effects of management. Some of the newer techniques do not fit the original framework as well as older techniques, but the format has remained unchanged to provide some continuity until the upcoming Forest Plan revision. There will be changes in monitoring at that time and it will likely be more consistent and comprehensive throughout the Northern Region.

For each resource discussed in this report we present the objective of the monitoring, the data source, frequency, acceptable level of variability, evaluation and the results for the fiscal year (i.e., FY2007). The item number following most resource titles refers back to the Forest Plan monitoring item, found in Table IV-1 of the Plan (pages IV-6 through IV-9). The sections without item numbers are additional information we provide, but are not required Forest Plan monitoring.

The following is a partial glossary of acronyms found throughout this Monitoring Report:

- *BAR* Bitterroot Burned Area Recovery Project
- *BMP* Best Management Practices
- *BNF* Bitterroot National Forest
- *DEIS* Draft Environmental Impact Statement
- *EA* Environmental Assessment
- *EAWS* Ecosystem Analysis at the Watershed Scale
- *EIS* Environmental Impact Statement
- *ESA* Endangered Species Act
- *FP* Bitterroot National Forest's Forest Plan
- *FSM* Forest Service Manual
- *FWP* Montana Department of Fish, Wildlife and Parks
- *FWS* United States, Dept. of Interior, Fish and Wildlife Service
- *FY* Fiscal Year
- *GIS* Geographic Information System
- *HD* Hunting District
- *IRA* Integrated Resource Analysis
- *MA* Management Area
- *MBF* Thousand Board Feet
- *MMBF* Million Board Feet
- *NEPA* National Environmental Policy Act
- *NF* National Forest
- *NFMA* National Forest Management Act
- *RD* Ranger District
- *TMDL* Total Maximum Daily Load
- *TS* Timber Sale
- *USFWS* United States Department of Interior, Fish and Wildlife Service

Table 1 – List of Preparers

Resource	Name and Position
Administrative Appeals	Amy Veirs, Environmental Coordinator.
Fire Management	Rick Floch, Forest Fire Management Officer.
Fisheries	Rob Brassfield and Mike Jakober, North and South Zone Fisheries Biologists.
Insect and Disease Status	Sue Macmeeken, Silviculturist.
Law Enforcement	Jackie Clark, Law Enforcement Investigative Assistant.
Invasive Plants	Diane Bessler-Hackett, Rangeland Management Specialist; Gil Gale, Weeds and Range Program Leader.
Recreation	Sue Heald, Planning & Recreation Staff Officer
Research Needs	Amy Veirs, Environmental Coordinator
Riparian Condition	Rob Brassfield, Mike Jakober, North and South Zone Fisheries Biologists.
Roadless Areas	Sue Macmeeken, Silviculturist.
Road Construction and Mitigation	Jacob Pintok, Transportation Engineer.
Soils	Cole Mayn, Soil Scientist and Terry Carlson, Hydrologist.
Watershed	Ed Snook, Marilyn Wildey, Hydrologists.
Wildlife	Dave Lockman, Dave Romero, North and South Zone Wildlife Biologists.

Review: Dave Campbell, West Fork District Ranger; Ruth Wooding, Sula District Ranger

Approval: David T. Bull, Forest Supervisor

TERRESTRIAL ECOSYSTEMS

Management Effects on Soils
Item 31

OBJECTIVE: Determine the effects of timber sale activities on soil productivity. The effects monitored include: soil compaction, displacement and puddling and severe burns.

DATA SOURCE: Soil inventory and site inspection prior to and after treatments on activity units.

FREQUENCY: Annually, 25 percent of completed projects per year.

REPORTING PERIOD: 2007

VARIABILITY: More than 15 percent of the activity area detrimentally affected (total accumulation of detrimental compaction, displacement, puddling and severely burned soil).

INTRODUCTION:

Soil quality evaluations were conducted to determine the effects of management activities on soil productivity as required by the BNF Forest Plan and Region One Soil Quality Standards (SQS). To accomplish this task, soils were evaluated against definitions and guidelines provided in the BNF Forest Plan, as well as the Forest Service Manual (2550, Amendment No 2500-90-2 and Region One Supplement 2500-99-1) and Handbook (2509.18 WO Amendment 2509.18-91-1 and Region One Supplement 2509.18-2005-1). Part of the objective was to determine if the unit being monitored exceeds the Region One SQS of 15% aerial extent of Detrimental Soil Disturbance (DSD). It is important to consider the 15% as a trigger point at which more in-depth soil quality evaluations would be conducted and soil amelioration is considered to move toward a net improvement in soil quality.

There are 2 sets of factors to review when evaluating soil quality. The first set is a determination of DSD. By definition, DSD includes: (1) compaction in which the bulk density has increased by 15% above natural conditions; (2) rutting where wheel ruts are at least 2 inches deep in wet soils; (3) displacement with the removal of 1 inch or more of any surface horizon in a continuous area greater than 100 square feet; (4) severely burned soil; (5) surface erosion; and (6) any mass movement. The presence of these factors may indicate site impairment or soil productivity issues.

The second set of factors evaluated includes the site productivity indicators of: soil type, soil horizon thickness, the depth and type of duff and litter, the percent and type of ground-cover, native or non-native vegetation, root density and extension into the soil, soil-water interactions (infiltration rate, hydrophobicity) and stream channel conditions.

EVALUATION – DETERMINE THE EFFECTS OF TIMBER SALE ACTIVITIES ON SOILS[1]

This report provides an evaluation of Bitterroot National Forest projects including:

1. **Pre-Activity Soil Monitoring Surveys;**
2. **Post Activity Soil Monitoring Surveys;**

[1] Soil quality evaluations were conducted for this report on harvest units using the Northern Region Soil Disturbance Monitoring Protocol (March 2008).

1. Pre-Activity Soil Monitoring Surveys

Pre-activity soil monitoring was conducted to determine baseline soil conditions (

Table 2). The data are used to assess existing condition and effected environments during the planning process.

Table 2 - Existing Soil Condition Surveys

Project	Results
Lower West Fork Draft EIS	Existing soil conditions meet Region One SQS in all units except unit 1 and terraced units. Soil rehabilitation activities will be completed in these units. Surveys indicate that some portions of proposed treatment units contain existing DSD (< 15%) and are proposed for summer ground-based harvest. Mitigations will be designed and/or restrictions on harvest method will be prescribed to trend site conditions in these units towards a net improvement in soil productivity. All units should be well within Region One SQS (< 15%) following activities.
Tin Cup Salvage (within Trapper Bunkhouse EIS)	Existing soil conditions meet Region One SQS. The unit is proposed for ground-based and skyline harvest. Mitigations will be implemented and/or restrictions on harvest method will be prescribed to trend site conditions in these units towards a net improvement in soil productivity. All units will be well within Region One SQS (< 15%) following activities.
Haacke-Claremont EA	Existing soil conditions meet Region One SQS. Units are proposed for ground-based and skyline harvest. Minimal disturbance is expected in the units. Mitigations will be implemented and/or restrictions on harvest method will be prescribed to trend site conditions in these units towards a net improvement in soil productivity. All units will be well within Region One SQS (< 15%) following activities.
Weasel Salvage CE	Existing soil conditions meet Region One SQS. Units are proposed for skyline harvest. Minimal disturbance is expected in units. The majority of soil disturbances are anticipated to occur at landings. All units will be well within Region One SQS (< 15%) following activities.

These surveys provide the baseline data which help guide project designs. Soil resource protections including Soil and Water Conservation Practices (SWCPs), Montana BMPs and, in some cases, mitigations are prescribed to ensure soil resources are protected and maintained within the Region One SQS. Rehabilitation projects are also often derived from these pre-activity surveys.

2. Bitterroot National Forest Post-Activity Soil Quality Monitoring Surveys - 2007

Post-activity soil quality monitoring was conducted to determine the effects of harvest activities on the soil resource. Four harvest units were monitored from two different projects. In summary, all units monitored meet the Region One SQS. The results of the 2007 soil quality monitoring are displayed in Table 3. Note that the results indicate the amount of new or additional DSD created following an activity. These figures are independent of the existing soil quality conditions on the site.

Table 3 - BNF Soil Quality Monitoring (2007) - Percent DSD post harvest activity.

Winter Tractor	Summer Skyline
2 sites monitored	1 sites monitored
New DSD **4%**	New DSD **0 - 4%**

Winter tractor often had no detectable DSD to 4%. Skyline yarding had approximately 4% DSD. Details concerning the monitoring data in Table 3 are discussed in the following sections.

PAINTED ROCKS

Units 1a and 3 - Harvest Method: Winter Tractor

Background: The pre-activity soil assessment completed in 2005 found the unit had less than 5% DSD. Mitigations recommended by the soil scientist in the Environmental Assessment (EA) included ground based harvest in the winter to minimize soil impacts. This mitigation along with other standard soil BMPs were written into the contract specifications. Winter ground-based operations were completed in the winter of 2007.

Observations: Harvest in the unit followed the soil scientist's recommended mitigations for winter operations. Soil displacement was noted along the most heavily used portions of the main skid trails. Detrimental soil disturbance and compaction on main skid trails totals approximately 4% across the unit. This amount of detrimental soil disturbance is at the low end of the range predicted in the EA by the soil scientist. The detrimentally disturbed areas were rehabilitated by placing slash on disturbed portions of the skid trails, water barring and seeding prior to closing the sale. Minor areas of displaced soils (less than 10 ft^2) were noted; however, no other detrimental soil conditions were noted off of the main skid trail areas.

Conclusion: The units are within Region One SQS.

Unit 1b - Harvest Method: Summer Skyline

Background: The pre-activity soil assessment completed in 2005 found the unit had less than 5% DSD. Standard soil BMPs were written into the contract specifications. Skyline operations were completed in the fall of 2006.

Observations: Minor soil displacement was noted in skyline corridors; however these disturbances were not considered detrimental. Recontouring, slashing and seeding of the main skyline landing were completed by the contractor. The temporary swing road accessing the skyline landing was also recontoured, slashed and seeded. Erosion control measures were completed on the skyline corridors. These activities and cumulative effects are well within the Region One SQS.

Conclusion: Skyline harvest did not create new DSD in the unit. Cumulative DSD in the unit was not increased by harvest activities. The unit is within Region One SQS.

SPRING MINK

Unit 13 - Harvest Method: Summer Skyline

Background: The pre-activity soil assessment completed in 2004 found the unit had less than 5% DSD. Standard soil BMPs were written into the contract specifications. Skyline operations were completed in the summer of 2007.

Observations: Soil displacement was noted in skyline corridors; the majority of these disturbances were not considered detrimental. Erosion control measures were completed on the skyline corridors. Detrimental soil disturbance from displacement of organic and topsoil horizons on skyline corridors totals approximately 4% across the unit. Erosion control measures, including

waterbar installation and seeding, were completed on the skyline corridors. These activities and cumulative effects are well within the Region One SQS.

Conclusion: The unit is within Region One SQS.

3. SUMMARY: Bitterroot National Forest Post-Activity Soil Quality Monitoring Surveys

Table 4 is a summary of the 2007 post-activity soil quality surveys conducted on the BNF using the Northern Region Soil Disturbance Monitoring Protocol, March 2008.

Table 4 – Percent new DSD by harvest activity

Harvest Activity	# Sites Monitored	Avg. % New DSD	Data Range %
Winter Tractor	2	4%	4%
Summer Skyline	2	2%	0-4%

The 2007 BNF monitoring has shown that:

- **Winter tractor** is effective at minimizing detrimental soil disturbance, the DSD ranged from 0 to 4%;
- **Summer skyline** results in minimal increases in DSD (0 to 4%);

Careful administration of these sales minimized the potential disturbances to soil resources.

Lodgepole and Ponderosa Pine
Volume Item 12

OBJECTIVE: Track volume of ponderosa pine and lodgepole pine that is harvested.

DATA SOURCE: Annual Cut and Sold Report.

FREQUENCY: Annually.

REPORTING PERIOD: 1988 to 2007.

VARIABILITY: +/- 25 percent from predictions used in the Forest Plan over a five-year period.

EVALUATION:

One of the objectives in the Forest Plan is to achieve a species mix of offered volume that is nearly proportional to the mix currently growing on the Forest. This objective and supporting monitoring item were established because of a past concern for the possible over-cutting of ponderosa pine and the avoidance of lodgepole pine harvest.

Table 5 compares the desired species mix proposed for harvest in the Forest Plan with the species mix harvested. More Douglas-fir has been harvested than any other species. In recent years, the removal of beetle-killed Douglas-fir has been a priority across the Forest along with the removal of understory Douglas-fir (ladder fuels) from stands in the wildland urban interface. This trend is expected to continue into the future although salvage efforts in the bug-killed Douglas-fir are not expected to last much longer. In the past 5 years very little lodgepole pine has been harvested -only 9% of the total harvest compared to the estimated 26% estimated in the Forest Plan. It is anticipated that lodgepole pine stands will not be a priority for treatment in the near future since these stands are typically not high priority for fuel reduction. The percentage of ponderosa pine being harvested is declining compared to the overall 20-year average. A growing percentage of harvested timber has been recorded as firewood or dead timber with no species noted. This was true for several of the sales sold after the 2000 wildfires.

The actual levels of harvest for all species are well below what was predicted in the Forest Plan. The Plan predicted that approximately 667.4 MMBF would be harvested over a 20 year period. Approximately 10%, or 66.8 MMBF, of this volume would be ponderosa pine. The actual 20-year harvest volume for ponderosa pine is 31.6 MMBF which is less than half of what was anticipated in the Forest Plan.

MONITORING RESULTS:

Table 5 – Species Mix Harvested in FY 2007, Cumulatively for the Past 5 Years and from FY 1988 to 2007, Compared to the Forest Plan Desired Harvest Species Mix

Species	Forest Plan ASQ per year		Harvested 2007		Harvested 2003 to 2007 (5 years)		Harvested 1988 to 2007 (20 years)	
	Volume (MMBF)	Percent	Volume (MMBF)	Percent	Volume (MMBF)	Percent	Volume (MMBF)	Percent
Ponderosa Pine	3.34	10%	0.4	6%	2.6	8%	31.6	16%
Lodgepole pine	8.67	26%	3.2	3%	3.1	9%	35.6	18%
Douglas-fir	16.02	48%	0.2	51%	16.8	52%	77.8	39%
Engelmann spruce	1.67	5%	<1	<1%	0.1	<1	9.5	5%
Subalpine fir /Grand fir	3.34	10%	<1	1%	0.7	2%	8	4%
Larch	0.33	1%	0	0%	<1	<1	0.7	<1%
Fuelwood/Dead/Pulp	0	0%	2.4	39%	8.9	28%	35.4	18%
Total	**33.37**	**100%**	**6.3**	**100%**	**32.2**	**100%**	**198.6**	**100%**

Silvicultural and Fuel Prescriptions
Item 14

OBJECTIVE: To determine if site-specific silviculture and fuel prescriptions are being implemented and if the silvicultural prescription accomplishes stated objectives.

DATA SOURCE: Interdisciplinary team review pre- and post-activity.

FREQUENCY: Annually.

REPORTING PERIOD: 2007

VARIABILITY: Departure from management practice.

EVALUATION:

Forest Service Manual (FSM) Section 2470 requires that a silvicultural prescription be prepared and signed by a certified silviculturist on all vegetation management projects. Vegetation management projects include timber harvest, prescribed burning, mechanical noncommercial thinning and/or slashing, planting or species regeneration projects. The Forest's Environmental Management System (EMS) also requires ongoing evaluation and monitoring of compliance with the silvicultural handbook including review of pre-action, during implementation and post-action activities. Monitoring is designed to evaluate whether:

1. The silvicultural prescription was completed and updated as required
2. The prescription was followed through all phases of implementation and
3. The prescription met the desired conditions as defined in the NEPA document and silvicultural prescription.

The following six projects were evaluated in the field in 2007: 1) Frazier Fuel Reduction Project, unit 64E; 2) Kerlee Bert precommercial thinning units 83 and 84; 3) Teepee unit 6; 4) A planting unit in medicine & moonshine drainage; 5) Schoolpoint Hazardous Fuel Reduction Project, unit Alpha; 6) Painted Rocks Hazardous Fuel Reduction Project, units 1A, 1B, 3.

Review of these six projects indicate that silvicultural prescriptions are being completed and implemented as planned for most projects although some problems exist. In all cases, project implementation met or partially met the objectives outlined in the NEPA document and silvicultural prescription. In two out of the nine units reviewed, the prescription was only partially implemented and resulted in a condition that did not fully meet the desired outcome.

On projects involving timber harvest, the EMS Operational Control for Timber Harvest requires several items to be completed by a certified silviculturist to ensure that the direction in Forest Service Manual 2470 is met. These items include having a certified silviculturist 1) complete a diagnosis for stands proposed for action; 2) develop desired stand conditions; 3) complete or review the final silvicultural prescriptions for all areas included in a harvest project; 4) Prepare and discuss marking guides with the marking crew and/or presale forester; and 5) Review timber marking in the field during sale preparation. All EMS requirements were met in 2007.

MONITORING RESULTS:

Frazier Fuel Reduction Project Unit 64E. A post-harvest evaluation for this project was completed in 2006 and the results reported in the 2006 Forest Plan Monitoring and Evaluation Report. In 2007, the slash piles in unit 64E were burned. Fire spread from the piles and broadcast burned the majority of the unit and a portion of unit 31. Since this was not planned or anticipated, selection of this unit for monitoring was a deliberate choice to evaluate whether the accomplished burning was within parameters of the silvicultural prescription. The unit was evaluated by an interdisciplinary team consisting of a wildlife biologist, fuels management officer, soils scientist and certified silviculturist. Monitoring was completed by ocular estimates. It was the consensus of the team that the post-fire unit was within the acceptable limits described by the silvicultural prescription.

Kerlee Bert Precommercial Thinning Units 83 and 84. These stands are primarily ponderosa pine with a mix of Douglas-fir. Thinning was prescribed to reduce the risk of attack by mountain pine beetle in the ponderosa pine and to improve overall forest growth. The precommercial thinning treatment only partially met the objectives. The contract did not allow any trees greater than 7 inches in diameter to be cut, although the prescription specified that they could be cut. In both units, there were areas where thinning was needed but did not occur because of the size limit in cutting.

Teepee Blend Harvest Unit 6a, 6b: The prescription for this stand was a shelterwood-seedtree cut, retaining approximately 30 to 50 square feet of basal area. The stand was marked but was not yet harvested. Marking was reviewed by a silviculturist; as a result of the review, additional trees were designated for removal. The prescription called for leaving the largest and most vigorous trees, with a species preference of ponderosa pine and Engelmann spruce over any other species. An ocular approximation of basal area estimated that the marking left the stand at the lower end of the prescribed basal area. The largest and healthiest trees were left.

Moonshine and Medicine Planting (1 unit): Review of these units revealed that initial burned area prescriptions had been completed for proposed harvest units only. The Moonshine and Medicine units were never harvested. The prescriptions for these units (and other non-harvest units) were being completed as they were being planted, instead of prior to implementation. Implementation of planting-only prescriptions is almost identical to those developed for harvest and planting, therefore, no problems resulted on the ground. A generic prescription for planting units was completed as a result of this review.

Schoolpoint Hazardous Fuel Reduction Project (1 unit): Monitoring entailed a visual observation of a completed prescribed burn. A silvicultural prescription was written and the burn appeared to meet the parameters of the prescription.

Painted Rocks Hazardous Fuel Reduction Project Units 1A, 1B, 3: Monitoring was completed in three units to assess post harvest conditions and harvest operations in progress. Snags in unit 1A were short of the 4 to 12 per acre requirement. Other parameters of the prescription were met in all three units. Review of unit 1A by a wildlife biologist confirmed that snags were short of the prescribed number but that the 1 to 2 snags per acre left was sufficient given the extensive mortality within the area.

Table 6 – Synopsis of Monitoring for Silvicultural Prescriptions [1/]

Project	Frazier	Kerlee Bert PCT	Teepee Harvest	Planting	Schoolpoint	Painted Rocks
Silvicultural prescription was completed and updated	NA	Y	Y	P	Y	Y
Prescription was followed through all phases of implementation	P	N	Y	Y	Y	N
Prescription met the desired conditions	Y	P	Y	Y	Y	P

1/ NA = Not monitored; Y = fully met requirement; N = did not meet requirement; P = partially met requirement

Lands Adequately Restocked
Item 33

OBJECTIVE: To determine if lands are being adequately restocked and if the intent of the National Forest Management Act (NFMA) is being met.

DATA SOURCE: Forest Activity Tracking System (FACTS) database. FACTS replaces the Timber Stand Management Record System (TSMRS) which was used previous to 2005 to monitor this item. The Regional Regeneration Indices Report, also used in previous reports, is currently unavailable.

FREQUENCY: Annually.

REPORTING PERIOD: 5 years as required by Forest Plan although this report will cover the period from 2001 to 2007 (7 years)

VARIABILITY: +/- five percent over a five-year period.

EVALUATION AND MONITORING RESULTS:

The National Forest Management Act (NFMA) requires that "*all forested lands in the National Forest System be maintained in appropriate forest cover with species of trees, degree of stocking, rate of growth and conditions of stand designed to secure the maximum benefits of multiple use sustained yield management in accordance with land management plans*". It also states "*that timber will be harvested from National Forest System lands only where there is assurance that such lands can be adequately restocked within five years after harvest."*

The reforestation program on the Bitterroot National Forest is tied primarily to the wildfires of 2000 and includes an annual tree planting program as well as monitoring burned areas for the presence of natural regeneration. Areas that are planted or monitored for natural regeneration are certified when sufficient numbers of trees are present to meet management objectives as specified in a silvicultural prescription. After the fires of 2000, the Forest estimated that it would take a full decade to reforest the lands burned in the fires. Table 7 displays the status of reforestation seven years after the fires of 2000. Program highlights are included below.

The Forest is meeting the reforestation requirements set forth in the National Forest Management Act. Different strategies for reforestation are being applied depending on the desired tree species, degree of stocking and timeframe desired for tree regeneration. Areas where restoration of ponderosa pine is a goal have been, or will be, planted. Where timber management is an objective, reforestation activities are more intensive to ensure timely regeneration with sufficient numbers of trees for future wood products. In other areas, such as wilderness, where management objectives allow for more variable forest growth, stocking and species composition, monitoring is less intensive allowing for extended periods of regeneration.

Table 7 – Reforestation Needs and Accomplishments 2001 to 2007

Reforestation Need	Acres
Reforestation need identified in 2001	160,470
Additional reforestation needs identified from 2001 to 2007 (additional fire mortality, Gash Fire, land exchanges, Gold I Fire, etc.)	7,825
Planted 2001 to 2007	16,433
Acres surveyed where reforestation need was dropped	86,826
Planned planting	7,882
Natural regeneration certified as successful	27,110
Natural regeneration still being monitored	30,044

Reforestation strategies on burned lands vary by Management Area (MA) and direction provided in silvicultural prescriptions. The strategy in wilderness, semiprimitive and research natural areas (Management Areas 5, 6, 7, 8, 9) is to allow natural recovery without intensive monitoring. Reforestation will occur over time on its own. Within the roaded portion of the Forest (generally Management Areas 1, 2 and 3) a more intensive approach has been applied and burned lands are either planted or monitored closely for natural regeneration. Where access is limited, slopes excessively steep or extremely rocky or harsh, burned areas are left to recovery naturally. Whether the area is planted, monitored for natural regeneration, or designated natural recovery is included the FACTS database.

Seven years after the fire, natural regeneration of ponderosa pine remains scarce. Natural regeneration of Douglas-fir and lodgepole pine has been abundant in almost all areas where these species existed prior to 2000. In very few cases are there areas lacking natural regeneration. Where these occur, they will either be planted or left to recover naturally.

Of the total 307,000 acres burned in 2000, approximately 5% or 16,046 acres have been planted. Planting was accomplished on lower elevation lands where ponderosa pine was desired over Douglas-fir and on many of the post-fire harvest units. Planting operations in the 2000 wildfire area will likely be completed in 2009. An additional 387 acres has also been planted on timber sales that were sold prior to 2000. Approximately 5.7 million trees have been planted. Ponderosa pine has been the primary species planted, mixed with Douglas-fir, lodgepole pine and some Engelmann spruce. Overall, planting operations have successfully established trees. The Forest has replanted 605 acres since 2000, or approximately 4 percent of the total acres planted.

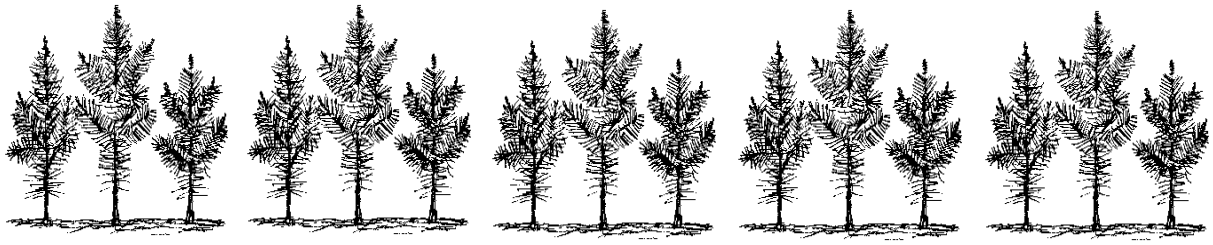
Aspen regeneration is abundant in many areas. This amount of regeneration was not anticipated and appears to be far in excess of the numbers and extent of aspen that existed before the fires. Aspen is commonly known to sprout from roots but is not known for its ability to regenerate prolifically from seed. Forest personnel have not monitored the aspen origin (seed versus sprout) but it appears that both seeding and sprouting has been prolific in the burned area.

Fire severity and the need for reforestation were greatly overestimated immediately after the fires of 2000. Field reviews and reassessment of these burned lands using newer aerial photography has resulted in the reforestation need being removed from almost 87,000 acres, which is over half of the acres initially estimated in need of reforestation in 2001. Reassessment of these lands has determined that there are sufficient trees to meet land management objectives without planting or further monitoring.

Salvage operations from the 2000 wildfires is nearly complete. The FACTS database indicates that approximately 11,435 acres of these harvest acres have been planted or are being monitored

for natural regeneration. Roughly one third of these acres are now certified as successfully regenerated with the remaining acres progressing towards certification.

As reported in previous years, Forest personnel are unable to keep up with the reporting requirements in the FACTS database. As a result, the database underestimates the progress made in reforestation.



Size Limit for Harvest Areas Item 35

OBJECTIVE: Evaluate maximum size limits for harvest areas to determine whether such size limits should be continued.

DATA SOURCE: Forest Service Activity Tracking System (FACTS) database, environmental analyses and timber sale folders.

FREQUENCY: Annually

REPORTING PERIOD: 1989 to 2007

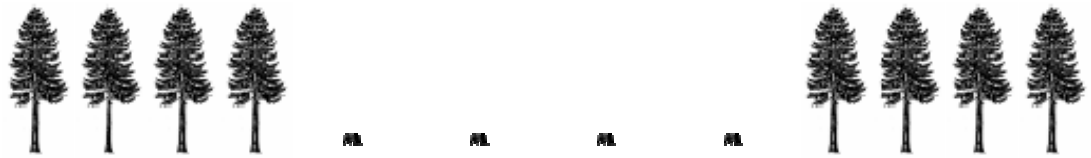
VARIABILITY: Any deviation from regulations.

EVALUATION & MONITORING RESULTS:

With some exceptions, the Forest Plan specifies that 40 acres is the maximum size for clearcuts and other even-aged harvest methods that create openings. Historical data show patch sizes within some landscapes to be naturally larger than 40 acres and recent fire activity on the Forest supports the concept that patch sizes can vary from an acre or less to over a thousand acres. Application of fire in conjunction with harvest treatments is part of the overall effort to move toward the historical condition of larger patch sizes on the landscape. While clearcuts do not entirely mimic these openings and events, we have proposed some regeneration harvests in the past that were larger than 40 acres, to approximate historical patch sizes. The Regional Forester approved openings over 40 acres in size for the Beaverwoods Timber Sale in 1995 and the Tolan Creek Timber Sale in 1993.

Since 2000, almost all openings created through timber harvesting on the Forest have been from salvage of dead and dying trees from the wildfires of 2000 or the Douglas-fir bark beetle epidemic. The National Forest Management Act (NFMA) contains a specific exception (219.27(d)(2)(iii)) that established size limits will not apply to areas harvested as a result of natural catastrophic conditions, such as fire, insect and disease attack, or windstorm." Many of the areas salvaged after the fires of 2000 and in subsequent projects where salvage of Douglas-fir bark beetle mortality occurred contained harvest areas in excess of 40 acres. No other harvest openings in excess of 40 acres were proposed or created in 2007.

Future planning efforts will likely continue to consider openings that approximate the historical, naturally occurring patch size. Where openings greater than 40 acres are proposed, outside of salvage treatments, approval from the Regional Forester will be requested prior to project approval.



Fire Management

OBJECTIVE: Track trends in wildland fire and fire management actions.

DATA SOURCE: Fire management records.

FREQUENCY: Annually.

REPORTING PERIOD: 2007.

VARIABILITY: Deviation from historic ranges of wildland fire and desired conditions.

EVALUATION:

As the Forest incorporates a more comprehensive ecosystem management type model into Forest Plan revision, two useful new concepts are emerging:

> ***Fire Regime*** – a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning. Five such fire regimes have been defined, based on fire frequency and fire intensity and there is a need to evaluate the Forest in terms of these five regimes.
>
> ***Fire Regime Condition Class*** – a classification of the amount of departure from the natural regime – possibly resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, canopy closure and fuel loadings. Three condition classes have been identified and there is also a need to evaluate the Forest, based on these three condition classes.

At present, fire regime condition class is being evaluated at the project level to determine the departure from natural regimes so that needed treatments can be identified and implemented as funding and conditions allow. While there has been no forest-wide determination, preliminary indications are that in general, lower elevation areas of ponderosa pine and Douglas-fir types have the most departure and are in greatest need of treatment, followed by mid-elevation mixed conifer types. Upper elevation lodgepole and sub-alpine fir types have the least departure from natural regimes.

MONITORING RESULTS:

As a result of the Federal Wildland Fire Management Policy and Program Review, fire managers have adopted new terminology to better describe fire use and resource management needs. In order to reduce confusion, the following definitions are being introduced:

> ***Wildland Fire*** - Any non-structure fire that occurs in the wildland. Three distinct types of wildland fire have been identified and include wildfire, wildland fire use and prescribed fire.
>
> ***Wildfire*** - An unwanted wildland fire.
>
> ***Wildland Fire Use*** – The application of the appropriate management response to naturally ignited wildland fires to accomplish specific resource management objectives outlined in fire management plans.
>
> ***Prescribed Fire -*** Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire burn plan must exist and the specific NEPA requirements must be met, prior to ignition.

Wildland Urban Interface (WUI) – the line, area or zone where structures and other human developments meet or intermingle with undeveloped wildland or vegetation fuels and is synonymous with the term “intermix.”

Appropriate Management Response (AMR) - Any specific action suitable to meet Fire Management Unit (FMU) objectives. Typically, the AMR ranges across a spectrum of tactical options (from monitoring to intensive management actions). The AMR is developed by using Fire Management Unit strategies and objectives identified in the Fire Management Plan.

Wildland Fire Situation

The Bitterroot Valley experienced an unusually severe fire season in 2007. Winter snow pack was below average, spring run-off was brief and early by about a month and below average spring rains abruptly terminated in mid-June. This allowed upper elevation fuels a much longer time to dry out before fire season normally occurs. These spring conditions provided good opportunities for prescribed fire activities, but once the spring rains ceased, fire severity rapidly increased, with record indices occurring through most of July and August. July was unseasonably hot, with record high temperatures on several different days. Green vegetation held most fires in check until fire-fighting resources could arrive; however, as these fuels dried out at the end of July, initial attack resources were only successful with considerable aviation help.

Two indices that are tracked each year to determine fire severity are 1000-hr fuel moisture content and the energy release component (ERC). The 1000-hr fuel moisture content represents the fuel moisture content in dead fuels in the 3- to 8-inch diameter class and can range from 1 to 40%. As large dead fuels dry, this number decreases and large fuel moistures below 10% signify the potential for high fire severity. In review of the 2007 season, 1000 hr fuel moistures were fairly low during the spring months due to unusually early spring run-off. By late July, 1000 fuel moistures had reached their lowest point at about 10%. These conditions continued into September and then began increasing again with fall rains. A late fall drying trend allowed for some fall burning accomplishment.

The energy release component (ERC) is used to provide a relative indication of drought conditions. It relates to the potential heat release per unit area in the flaming zone of a fire front and as live fuels cure and dead fuels dry, the ERC values get higher. As an example, conditions producing as ERC value of 24 represent a potential heat release twice that of conditions resulting in an ERC value of 12. For the Bitterroot Valley on the average for the past 25 years, only about 10% of the days during the summer experience an ERC above 45.

For 2007, estimated ERCs fluctuated from 20-30 all spring, but started to climb sharply in mid-June, reaching 55 by July 1. Record warm temperatures in July pushed the ERCs up to 70, where they stayed into August, slowly dropping off as the days grew shorter. Rains finally brought them back down in September.

The season’s first fire was human-cause and recorded on April 3rd and the first lightning fire was recorded on May 17th. The last lightning fire occurred on September 15th and the last human-caused fire occurred on October 26th. Two wildland fires escaped initial attack and were managed with incident management teams. Nineteen lightning fires were managed for wildland fire use, burning a total of 20,750 acres. On average, the forest has about 144 fire starts annually. In 2007, the forest recorded 108 starts: 94 lightning, 14 human caused (Figure 1).

Figure 1 - Number of Fires by Year within Forest Protection Boundary and by Type of Fire

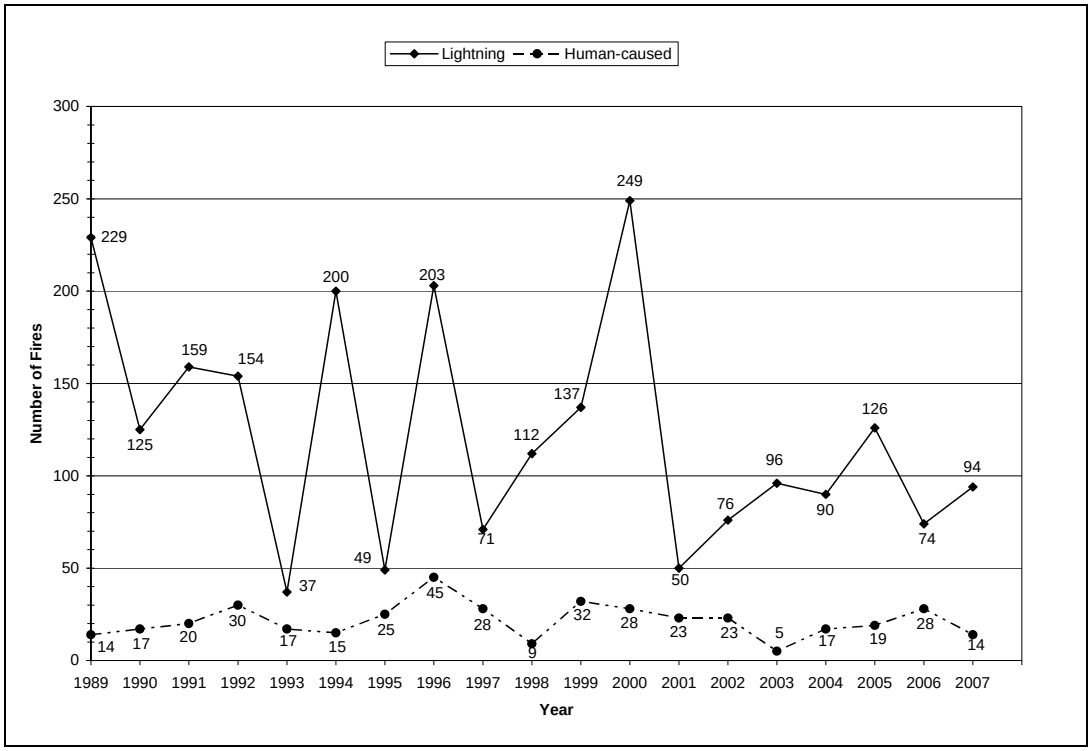


Table 8 - Number of Acres Burned By Year Within Forest Protection Boundary

Type of Fire	1989	1990	1991	1992	1993	1994	1995	1996	1997
Lightning	183	3156	3028	450	454	8680	244	47720	207
Human-caused	549	3166	1889	161	11	777	375	432	33
Total	732	6,322	4,917	611	465	9,457	619	48,152	240

Type of Fire	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Average
Lightning	22826	2898	308,576	231	1241	11,595	1,529	44,994	7,174	50,500	27,144
Human-caused	3835	316	11,559	5	242	1,374	37	12	8,886	450	1,795
Total	26,661	3,214	320,135	236	1,483	12,969	1,566	45,006	16,060	51000	28,939

Table 9 - Acres Burned By Management Area (MA)

Year Burned	MA 1, 2, 3a, 3b, 3c, 8b, 9, 10, 11a		MA 5 & 8a	MA 6 & 7
	Roaded	Inventoried Roadless		
Total MA Acres	**399,799**	**99,100**	**259,097**	**819,887**
1989 Acres	569	2	119	42
Percent of MA	0.14	0.00	0.05	0.01
1990 Acres	2,132	7	534	3,649
Percent of MA	0.53	0.01	0.21	0.45
1991 Acres	266	2,339	121	2,191
Percent of MA	0.07	2.36	0.05	0.27
1992 Acres	169	7	92	343

Year Burned	MA 1, 2, 3a, 3b, 3c, 8b, 9, 10, 11a		MA 5 & 8a	MA 6 & 7
	Roaded	Inventoried Roadless		
Percent of MA	0.04	0.01	0.04	0.04
1993 Acres	17	<1	<1	448
Percent of MA	0.00	0.00	0.00	0.05
1994 Acres	1,164	495	3,837	3,961
Percent of MA	0.29	0.50	1.48	0.48
1995 Acres	323	2	6	288
Percent of MA	0.08	0.00	0.00	0.04
1996 Acres	747	217	367	46,821
Percent of MA	0.19	0.22	0.14	5.71
1997 Acres	119	11	2	108
Percent of MA	0.03	0.01	0.00	0.01
1998 Acres	3,875	5	157	22,624
Percent of MA	0.97	0.01	0.06	2.76
1999 Acres	29	1,415	28	1,742
Percent of MA	0.01	1.43	0.01	0.21
2000 Acres	216,998	28,331	20,899	53,907
Percent of MA	54.28	28.59	8.07	6.57
2001 Acres	7	0	11	218
Percent of MA	0.00	0.00	0.00	0.03
2002 Acres	167	63	15	1238
Percent of MA	0.04	0.06	0.01	0.15
2003 Acres	10,155	6	2,350	458
Percent of MA	2.54	0.01	0.91	0.06
2004 Acres	106	2	160	1298
Percent of MA	0.03	<0.01	0.06	0.16
2005 Acres	3,147	2	6,129	35,728
Percent of MA	0.79	0.00	2.37	4.36
2006 Acres	8,834.24	0	69.8	7,155.78
Percent of MA	2.21	0.00	0.03	0.87
2007 Acres	9,558	10,000	10,006	21,436
Percent of MA	2.39	10.09	3.86	3.23
1989-2007 Average Annual Acres	**13,599**	**2,258**	**2,363**	**10,719**
1989-2007 Average Annual Percent of MA	**3.46**	**2.28**	**0.91**	**1.31**

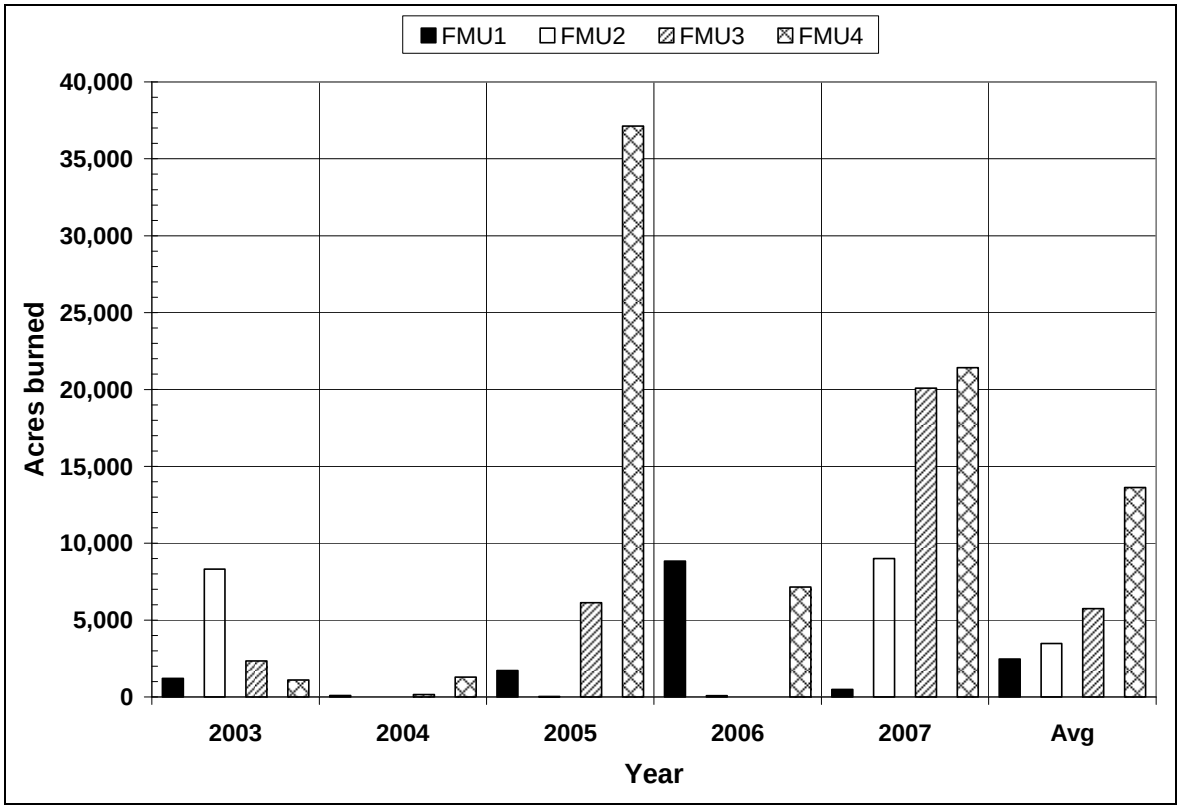
The Bitterroot NF Fire Management Plan identifies the following four Fire Management Units (FMUs): FMU1 includes the wildland urban interface areas; FMU2 includes the active roaded areas; FMU3 includes roadless[2] and unroaded[3] areas outside of wilderness; and FMU4 includes wilderness areas. As the Forest completes the latest Forest Plan revision, these areas will begin

[2] A national Forest area which (1) is larger than 5000 acres or, if smaller than 5000 acres, contiguous to a designated wilderness or primitive area; (2) contains no roads and (3) has been inventoried by the Forest Service for possible inclusion in the wilderness preservation system (Bitterroot Forest Plan).

[3] Any area, without the presence of a classified road, of a size and configuration sufficient to protect the inherent characteristics associated with its roadless condition (Roadless Area Conservation FEIS 2000).

to have more significance in monitoring and Figure 2 tracks acres burned in each FMU since 2003.

Figure 2 – Acres Burned per FMU per Year



Prescribed Fire

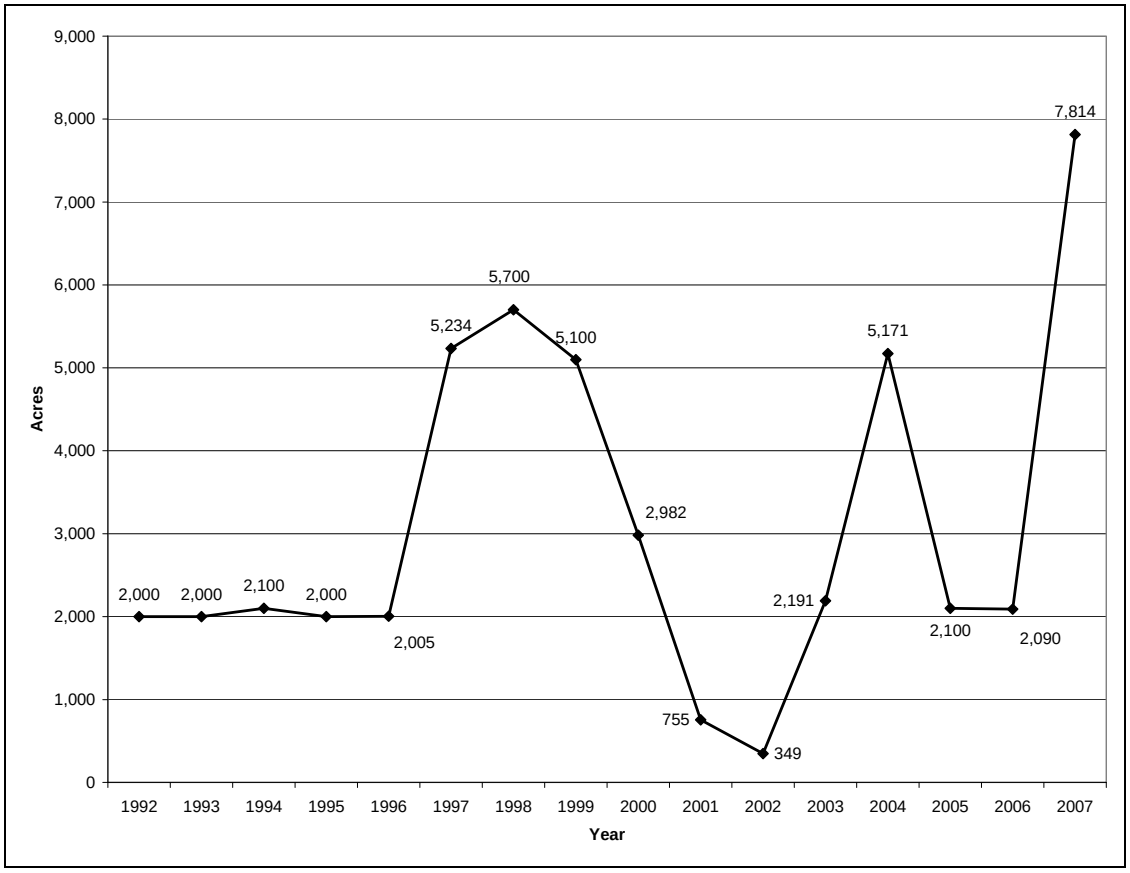
The Forest's prescribed fire management program plays an important role in sustaining ecosystems by reducing heavy fuel loadings, reducing fire risk to homes within the wildland urban interface of the Forest and by changing vegetation composition and structure to a condition that allows ecosystems to function within their historical range.

The warm, dry site ponderosa pine and Douglas-fir vegetation types characterize much of the interface area. Thickets of Douglas-fir in the understory have become established in many of these previously open stands; which puts them at risk for higher intensity wildfires. Under natural conditions, low intensity wildland fires frequently underburned these drier sites and maintained them in a more open condition. Forest managers will continue to reduce fuels in these priority areas and coordinate their efforts with Ravalli County, homeowners and research scientists.

As shown in Figure 3, acres treated with prescribed fire remained relatively steady from 1992 to 1996, but more than doubled from 1997 to 1999. Acres treated dropped slightly in 2000, in part due to dry fuel moistures and the extreme fire season. During the 2000 fire season, several planned out-year fuels projects were burned as a result of wildland fires and acres treated in 2001 and 2002 dropped to all time lows. With several good burning opportunities in both fall 2006 and spring 2007, the Forest completed 1,284 acres of broadcast burning, 2,191 acres of hand piling, 2,592 acres of slashing, 9 acres of lop/scatter, 937 leave tree protection and 801 acres of pile burning. A considerable amount of this work was done through contracting with an additional $900,000 of Regional end-of-year dollars. The majority of these acres were done in the WUI. The

Forest will continue to work to reestablish its prescribed fire program, but limits on funding may not allow it to reach its annual goal of approximately 10,000 acres.

Figure 3 - Prescribed Fire Program Acres Accomplished Per Year



Although fire in the ecosystem is a natural and revitalizing process, it does have other consequences. There may be hazy skies, temporary smoke pooling in the valley and some visible burn patches on the mountain slopes. However, prescribed burns can be timed to allow control of the prescribed burn length, smoke dispersal and fire intensity. In contrast, wildland fires often create more long-lasting smoke. The Forest has been monitoring air quality in relation to smoke from wildland fires and prescribed fires for several years. Results have been presented in the Air Resources section of previous years' monitoring reports.

Expanded Cooperative Efforts

As more people continue to build homes in forested settings in the Bitterroot Valley, the complexity of wildland fire suppression in these areas continues to increase. The Bitterroot National Forest, State and Private Forestry program is working cooperatively with the Bitter Root Resource Conservation and Development Area, Inc. (RC&D), State of Montana Department of Natural Resource Conservation and private landowners in the treatment of hazardous fuels on private lands and National Forest lands immediately adjacent to private lands. Bitterroot National Forest fire management personnel have been providing expertise to the RC&D community forester when working with the private landowners to improve understanding of fire risk in areas that need fuels treatment. They have also been assisting Rural Fire Departments in updating a Community Fire Plan that identifies priority areas for fuels treatment in conjunction with work being planned on adjacent public lands (http://www.bitterrootfireplan.org/).

The State and Private Forestry program provides grant monies and fuels treatment expertise to private landowners to assist them in reducing fire risk on their lands. This increases the chance of successfully suppressing a fire during initial attack and correspondingly reduces risks to lives, homes and property from a catastrophic large fire.

Insect and Disease Status as a Result of Management Activity and Mountain Pine Beetle Infestation Items 36 & 37

OBJECTIVE: To determine insect and disease status as a result of management activities. Monitor trends of mountain pine beetle infestations and respond if needed. Track whether the majority of harvest in lodgepole pine is done within stands with a moderate to high risk of attack by mountain pine beetle.

DATA SOURCE: Forest Pest Management aerial observations, Forest Health and Protection site trips & reports; field surveys, project monitoring and Forest Activity Tracking System (FACTS) database. Forest Health and Protection is a division of State and Private Forestry in the Forest Service with an office located in Missoula MT.

FREQUENCY: Annually

REPORTING PERIOD: 2007

VARIABILITY: Epidemic conditions following management activities or approaching the suitable timber base.

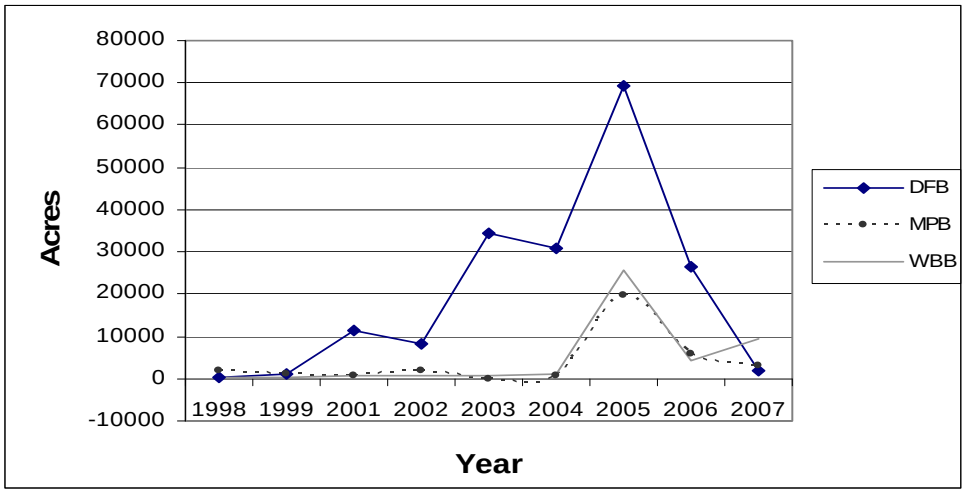
EVALUATION:

Bark Beetle Activity on the Forest is Declining. Although smoke conditions prevented a large portion of the Forest from being observed from the air, monitoring completed in 2007 clearly indicates that bark beetle infestations are declining. A few areas on the south end of the Forest are still at higher than normal levels but other areas on the Forest are at or near endemic levels. The 2007 aerial detection flight mapped 14,332 acres of bark beetle caused mortality on the Forest compared to the 114,400 acres mapped in 2005. Populations of bark beetles are not directly tied to management activities occurring on the Forest. They are the result of prolonged dry weather, decades of fire suppression, recent large fires and existing vegetation conditions. Since management activities within the planning period are not causing the bark beetle epidemic, we are within the Forest Plan variability threshold (Table 11).

The bark beetle of primary concern on the Bitterroot NF has been the Douglas-fir bark beetle (DFB). In western Montana, with the exception of Glacier National Park and Gallatin National Forest, the aerial detection flight showed a marked decline in the number of acres infested and the number of trees killed by Douglas-fir bark beetle (DFB). Declining populations may be the result of higher precipitation in 2005 and 2006 but is certainly tied to the fact that there are fewer host trees left remaining on the Forest. DFB populations have been high and/or at epidemic conditions for 13 years on the Bitterroot NF. Many areas on the Forest have few to no large diameter Douglas-fir trees left.

The Forest Plan requires monitoring of mountain pine beetle (MPB) activity since this beetle has historically caused widespread mortality of lodgepole pine throughout the western U.S. Recent outbreaks of MPB have occurred on adjacent Forests and still remain at higher than normal levels. Fortunately, extensive MPB associated mortality has not occurred on the Bitterroot. Mortality in whitebark pine caused by MBP continues to be the greatest concern on the Bitterroot since the distribution of this species is limited across the Forest.

Figure 4 – Acres Infested by Douglas-fir Beetle (DFB), Mountain Pine Beetle (MPB) and Western Balsam Beetle (WBB) Since 1998



Management Activities Affecting Insect Activity. Project monitoring in 2007 found relatively few insect and disease problems resulting from management activities. Ongoing activities that have the potential to cause insect or disease activities on the Forest include prescribed burning, timber harvest, precommercial thinning and slashing. Mitigation measures applied to these projects have been effective in preventing any noticeable spread of damaging insects or diseases. Incidental tree mortality was found on some of these projects but was well within the acceptable limits given the project objectives.

Stands at high risk for mountain pine beetle infestation are not being treated at this time. The emphasis of the timber sale program is to treat stands within the urban interface and to salvage dead timber where the opportunity exists. It is likely in the future the Forest will resume management activities in lodgepole pine areas.

MONITORING RESULTS:

Insect and Disease Aerial Survey: The primary data source for monitoring insect and disease conditions on the Forest is the aerial detection flight conducted annually by Forest Health and Protection. These flights provide general estimates, locations and trends of insect and disease activity on the Forest and are not meant to provide statistically accurate numbers of affected trees. Aerial flights detect dead and dying trees, which are usually the result of the previous year's insect, disease or fire activity. Table 10 summarizes the insect and disease information provided by the aerial detection flights conducted in the summer of 2007. Data are presented for the Bitterroot Reporting Area which includes the Bitterroot National Forest, private and state-owned lands. Only a portion of the Forest was flown and mapped in 2007. The Stevensville RD, the eastern side of Darby RD, a large part of Sula and West Fork Ranger Districts could not be monitored due to smoke conditions.

Table 10 - Insect and Disease Aerial Survey Summary For 2007

	Bitterroot National Forest*		Private Land Bitterroot Area		State Land Bitterroot Area		TOTAL† Bitterroot Reporting Area	
Pathogen	**Acres**	**Trees**	**Acres**	**Trees**	**Acres**	**Trees**	**Acres**	**Trees**
Douglas-fir Beetle	1,780	5,276	49	126	6	28	1,835	5,430
Mountain Pine Beetle (PP)	334	533	43	84	2	3	379	620
Mountain Pine Beetle (LP)	2491	2985	6	23			2,497	3,008
Mountain Pine Beetle (WBP)	180	156					180	156
West. Balsam Bark Beetle (SAF)	9547	15782			2	11	9,549	15,793
TOTAL ACRES	**14,332**	**24,732**	**98**	**233**	**10**	**42**	**14,440**	**25,007**

* *Montana outside of wilderness*
† *Numbers are approximate*

Project Monitoring:

The Forest Plan requires that silvicultural prescriptions utilize integrated pest management strategies and treatments that reduce long-term losses due to insects and diseases. Pest management strategies can be included in project design as an objective, direction (such as a tree cutting guide), or a mitigation measure. In most cases increasing tree vigor and reducing susceptibility to attack by insects and diseases is part of the criteria used to select which trees will stay and which will be removed. Examples of this include the control of mistletoe by selectively removing mistletoe-infected trees or thinning to reduce the susceptibility of forest stands to bark beetles. Mitigation measures are also routinely included in project design to prevent the spread of undesirable insects and diseases. In stands where ponderosa pine occurs the primary concern is bark beetles (mainly pine engravers and mountain pine beetle) and root disease. In Douglas-fir stands, Douglas-fir beetle, mistletoe and root disease are the primary concerns.

Overall, it appears that pest management strategies are working effectively to reduce long-term losses due to both insects and diseases. A list of commonly applied direction and mitigation was reported in the 2006 Forest Plan Monitoring Report. Monitoring was completed on two projects in 2007 - the Middle East Fork Fuel Reduction Project and past year's precommercial thinning units. As noted in Table 11, no problems were found on either of these projects. One problem was reported in 2007 on the Hayes Creek Fuel Reduction Project and is also noted in Table 11.

Table 11 – Effectiveness of prescribed treatments and mitigation measures monitored in FY 2007

Direction and/or Mitigation Measure	Insect or Disease of Concern	Applicable Projects [1/]	Purpose of Treatment or Mitigation	Effectiveness
Silvicultural prescription and marking guide	Mistletoe, DFB dead & dying, trees of poor vigor	Middle East Fork: Teepee Blend Stewardship Project unit 6	Improve overall stand health. Remove mistletoe infected trees that are the source for new infections	Very effective
Mitigation Measure: Restricted harvest operating season (July to December)	Pine engravers	precommercial thinning (PCT)	Operations scheduled in periods when pine engravers not seeking trees to infest	Very effective in PCT.
Lopping and scattering slash	Pine engravers	precommercial thinning (PCT)	To accelerate drying of the cambium making it unsuitable for pine engraver reproduction	
Mitigation Measure: Large landing piles	Pine engravers	Hayes Creek Fuel Reduction Project (one unit)	Large piles provide suitable habitat for pine engravers and prevent standing green trees from being attacked	Landing piles were left too long and became infested with pine engravers. Several surrounding trees were infested and died.

Insect and Disease Studies Being Completed on the Bitterroot NF:

Evaluating the Effectiveness of Thinning Treatments on DFB-Caused Tree Mortality
In 2005, Forest Health and Protection in cooperation with the Rocky Mountain Research Station, initiated a long-term thinning study in DF stands on the Helena, Lewis & Clark and Bitterroot NFs to evaluate the effectiveness of two thinning treatments on DFB populations and associated beetle-caused mortality. Replicated treatments consist of: (1) basal area reductions and (2) stand density index (SDI) treatments to maintain or approximate uneven-aged stands. Basal area reduction treatments will be included in ongoing projects on all three Forests; SDI treatments will be evaluated on the Helena and Lewis & Clark NFs only. Evaluations are in varying stages depending upon project status on each Forest. Pretreatment evaluations were conducted in 2006. Post-treatment evaluations were conducted in 2007 and will be done annually thereafter, if DFB are active in treatment units. If beetle activity is not found, monitoring will be conducted at 5-year intervals. This project is on-going.

Elytroderma Needle Disease Thinning and Pruning Project
Initially reported in the 2004 Forest Plan Monitoring report, this project is in the Elk Bed area of the Darby RD. Elytroderma has been moderately severe for a number of years in this area. Twelve ponderosa pine stands were randomly assigned one of five treatments: thinning to 12x12 spacing, with and without pruning, thinning to 18x18 spacing, with and without pruning and control (no treatment). Annual monitoring began in 2006 and continued in 2007. See FHP Numbered Report 08-03 for establishment data and 2006 re-measurement data.
http://www.fs.fed.us/r1-r4/spf/fhp/publications/bynumber/R1Pub08_03_thin_PP_suppress_Elytroderma.pdf

REFERENCES:

Previous monitoring reports include reference material describing insect and disease conditions on the Forest. In addition, the following websites contain specific information on forest insect and disease problems described above and summarize conditions throughout the Northern Region: http://www.fs.fed.us/r6/nr/fid/wid.shtml **,** http://www.fs.fed.us/r1-r4/spf/fhp/conditions/entry1.html

The following Forest Health & Protection Reports were completed on the Bitterroot National Forest in 2007:
Charles Waters CG (Bass Creek Area), Stevensville, RD, Bitterroot National Forest, 6 July, 2007.

Prevention/Suppression/Restoration Project Reviews, Custer, Bitterroot and Gallatin National Forests, October 2-19, 2007.

Old Growth
Item 6

OBJECTIVE: Ensure that old growth is being inventoried through project planning. Determine compliance with old growth standards in the Forest Plan (acres by habitat type, land class and management area).

DATA SOURCE: Timber Stand Management Record System (TSMRS), aerial photography, FIA data and inventory.

FREQUENCY: 100 percent every three years.

REPORTING PERIOD: 2007

VARIABILITY: +/- 20 percent over three years.

EVALUATION:

The intent of old growth management in the Forest Plan (1987) is stated in the Forest-wide resource standard on page II-19, "The amount and distribution of old growth will be used to ensure sufficient habitat for the maintenance of viable populations of existing native and desirable vertebrate species, including two indicator species, the pine marten and pileated woodpecker." Each management area (MA) that contains land suitable for timber management has a standard for retention of old growth habitat. Old growth stands should generally be 40 acres or larger and distributed over the management area. MA 1 requires about three percent old growth retention, while MAs 2 and 3 require about eight percent. In MA 3b, the standard is to maintain 50 percent in fisheries areas and 25 percent in non-fisheries areas. The weighted average of Forest Plan Management Area standards was intended to maintain about 10 percent old growth habitat in suitable lands within management areas 1, 2, 3a, 3b and 3c.

The Plan sets no old growth retention standards for MAs 5 through 11. The Forest Plan allows for very little management that could impact the amount of old growth in those management areas. Natural processes such as growth, succession and disturbances including wind and wildfire will continue to regulate the amount of old growth habitat in management areas 5 through 11, as is intended by the Forest Plan.

We have been inventorying old growth habitat for each project based on Regional old growth definitions, the Old Growth Forest Types of the Northern Region (Green et al. 1992) and the Forest Plan standard. The Forest Plan expects old growth to be distributed by third-order drainage and management area. During the inventory, we collect data on vegetation habitat type groups for western Montana, minimum age, minimum number of trees per acre above a certain diameter, live basal area per acre, snags per acre larger than nine inches in diameter, dead or broken-topped trees, down woody material, percent decay and number of canopy layers. This information is compared with criteria in the Forest Plan and regional old growth definitions to determine old growth status.

The Forest's inventory of old growth was completed in 2004 and updated in 2006 for management areas 1, 2, 3a and 3c. About 17 percent of MAs 1, 2, 3a and 3c has old growth habitat characteristics. Total current old growth habitat exceeds Forest Plan Standards by a large margin for each management area. Old growth has apparently increased 2 percent between 2004 and 2006, which is within the Forest Plan variability and requires no further evaluation.

MONITORING RESULTS:

Table 12 shows a summary of the old growth inventory, which is complete for all Forest lands with a numerical old growth standard. In 2006, this information was updated to reflect field inventories for the Trapper Bunkhouse analysis area.

Table 12 - Old Growth Habitat Area and Distribution by Ranger District and Forest Plan Management Area for All Lands Outside Roadless and Wilderness Management Areas

District	Management Area[1]	Total MA Acres	Old Growth Habitat Area (acres)	Old Growth Habitat Area (percent)	Forest Plan Standard (percent)
Stevensville	1	16508	2962	18	3
Stevensville	2	9644	866	9	8
Stevensville	3a	30868	4861	16	8
Stevensville	3c	3425	1221	36	8
Stevensville Total		60445	9910	16	
Darby	1	64015	8790	14	3
Darby	2	39992	1805	5	8
Darby	3a	34931	3662	10	8
Darby	3c	8154	1247	15	8
Darby Total		147092	15504	11	
Sula	1	54547	8960	16	3
Sula	2	44884	6261	14	8
Sula	3a	26754	3943	15	8
Sula Total		126185	19164	15	
West Fork	1	72679	20357	28	3
West Fork	2	47135	10636	23	8
West Fork	3a	30033	7485	25	8
West Fork	3c	253	12	5	8
West Fork Total		150100	38490	26	
Forest Totals		**483822**	**83068**	**17**	

[1] Management Area 3b is a linear inclusion (riparian) in each of these Management Areas and has not been separated for display here. The Forest Plan intends that 50% of 3b fisheries riparian and 25% of the 3b non-fisheries riparian be old growth habitat.

[2] No MA 3c occurs on the Sula District.

Table 13 – Old Growth Habitat by Management Area

Forest Plan Management Area[1]	Forest Plan Minimum (%)	2004 Inventoried Old Growth as a % of MA	2006 Inventoried Old Growth as a % of MA	% Change from 2004 to 2006
1	3	19	20	+5
2	8	13	14	+8
3a	8	16	16	0
3c	8	23	21	-8
Total		**16.6**	**17**	**+2**

[1] *Management Area 3b is a linear inclusion (riparian) in each of these Management Areas and has not been separated for display here. The Forest Plan intends that 50% of 3b fisheries riparian and 25% of the 3b non-fisheries riparian be old growth.*

FINDINGS:

Total current old growth habitat exceeds Forest Plan standards by a large margin for each management area. Table 13 above implies that old growth increased between 2004 and 2006 in MAs 1 and 2, stayed the same in MA 3a and declined in MA 3c. Compared to our 2004 estimate, the Forest is within the Forest Plan variability across the combined management areas. No further evaluation is needed.

When the old growth information is compared between 2004 and 2006, it appears there has been some reduction in old growth amounts in Management Area 3c. The largest losses were on the Darby District. The apparent reduction reflects updated data in the Trapper Bunkhouse area. Upon field review, some stands previously classified as old growth were removed from that category due to observed stand conditions. However, as shown in the table, the Darby District still comfortably meets Forest Plan old growth standards in all management areas.

Old growth within Management Area 3c on the West Fork District is below standards; however this is a very small area (253 acres) near the District boundary and is inconsequential at the Forest scale. Even though old growth habitat standards are clearly met in Management Areas Forest-wide, the Forest Plan standards need to be carefully evaluated for each third order drainage where vegetation management projects are planned.

Post-2000 and 2003 fire old growth reviews and inventories indicate limited available drier, ponderosa pine dominated old growth habitats. The Forest has established policy to maintain or enhance these drier habitats until the issue can be re-examined during Plan revision[4] (also see discussions on flammulated owls in the "Sensitive Wildlife Species" section). The policy involves maintaining existing old growth where the dominant old growth species is ponderosa pine, western larch or Douglas-fir and designing management treatments to increase the longevity of these stands. Researchers consistently note that objectives for managing habitat for old growth associates (wildlife) should focus on maintaining a diversity of vegetation types and seral stage consistent with natural forest patterns; therefore, active management may be warranted to maintain old growth and habitat characteristics (Brewer et. al. 2008). The current Forest Plan allows for this management.

REFERENCE

Brewer, Lorraine, B. Erickson, B. Kennedy, C. Partyka, S. Slaughter and D. Wrobleski. Effects of Silvicultural Treatments on Old Growth Characteristics and Associated Wildlife Habitat.

Green, P., J. Joy, D. Sirucek, W. Hann, A. Zack and B. Naumann. 1992. Old-Growth types of the Northern Region. Unpublished Report. Northern Region, USDA Forest Service.

[4] Forest Supervisor letter, July 5, 2001, re: Post-Fire Forest eviewPlan R

Invasive Plants
Item 10

OBJECTIVE: Monitor infestations of leafy spurge, dalmatian toadflax, goatweed and knapweed.

DATA SOURCE: Inventory of infestations.

FREQUENCY: 100% every three years.

VARIABILITY: Increase in area infested.

REPORTING PERIOD: 2007

EVALUATION:

As in previous years, the Forest monitored for all known and suspected invasive plant species, not just the four species identified for monitoring in the Forest Plan.

Monitoring has shown a substantial increase in invasive plants species and area infested over the past two decades. This is considered an important topic in the current Forest Plan revision. Effectiveness of the Forest inventory, monitoring and treatment program has improved in recent years. Continued emphasis on inventory and mapping has led to a more accurate picture of the invasive plant situation on the Forest. Apparent changes in the inventory (Table 15) largely reflect updated information rather than actual changes in acreages infested.

The objective for invasive plant control on the Forest is a coordinated and effective Integrated Pest Management (IPM) program. Prevention of new invaders through education and awareness, quick eradication of new invaders and protection of weed-free areas remain high priorities. The Forest has expanded its invasive plant awareness, education and prevention efforts. The control components of the IPM approach include chemical, manual and biological measures which are used singly or in combination.

MONITORING RESULTS:

Implementation of the 2003 Forest Noxious Weed Treatment Record of Decision:

The Bitterroot National Forest invasive plant management program increased ten-fold in scope with the signing of the 2003 Forest Noxious Weed Treatment Project Record of Decision. The document identified new expanded objectives for the Forest and provided a road map for achieving those objectives over the next ten years. It emphasized application of the progressive principles of Integrated Pest Management. Table 14 below summarizes the key invasive plant activities that occurred on the Forest in 2007.

Table 14 - Program highlights in 2007

Project	Description
1) Backcountry contract	The Forest added to and fully funded the 4 year (2007-2010) backcountry treatment, mapping and monitoring project for new invaders and expanding established invaders on trails and remote areas including the FCRNR Wilderness, west side canyon trails and at-risk grassland sites.

Project	Description
2) Participating Agreement between Ravalli County and Bitterroot Forest	The Forest added funds to the existing 3 year agreement that implements an integrated invasives strategy including: cooperative treatment of high priority invasive plants across Forest / private land boundaries; biological control release and monitoring program with the Victor and Darby schools science departments; mapping of new invaders; and improving and delivering invasive weed education to groups in the county. The agreement included fire recovery special funding and regular appropriations.
3) Resource Advisory Committee (RAC)	The Ravalli County RAC recommended and the Forest Supervisor approved funding for: Phase 2 invaders: Rush skeletonweed, blueweed and common bugloss. Funding was provided for mapping and treatment.
4) Participating Agreement with the Wilderness Institute	On going 3 year agreement signed in 2006 with the WI for mapping, monitoring and hand pulling invasive plants in the Selway-Bitterroot and Anaconda-Pintler Wildernesses in conjunction with planned NEPA analysis and inventory needs. The program involves the use of volunteers through the WI and promotes education and training about invasive plants.
5) Participating Agreement with Montana Conservation Corps	On going 3-year agreement initiated in 2006 with the MCC that meshes with the Wilderness Institute agreement for mapping and treatment work in remote areas and trails on the Bitterroot Forest. The program also promotes education and training for the participants about invasive plants.
6) Participating Agreement with the Western Agricultural Research Center	This project increased funding, through a pre-existing agreement, to the WARC for the rearing and release of biological control insects on spotted knapweed.
7) Cooperative work with Salmon-Challis (S-C) National Forest	The Bitterroot and Salmon-Challis Forests are implementing a long term strategy for the FCRNR Wilderness to control invasive plants. Particular focus is on treatment and mapping of rush skeletonweed, a new invader on the BNF.
8) Rocky Mountain Elk Foundation Grant	On going project funded invasive plant treatment (both chemical and biocontrol) and monitoring work on about 250 acres of relatively weed-free critical elk winter range in the upper West Fork watershed. Work focused on mapping and treating pioneering infestations of knapweed and a small infestation of rush skeletonweed, a new invader. The purpose is to maintain the grasslands in the highest and most productive ecological condition possible.
9) General Invasive Plant Education and Training	a) Wilderness Rangers inspect and enforce weed-free feed/hay requirements in the backcountry throughout the field and hunting seasons. In addition, they inform users about best practices to prevent the increase and spread of invasive weeds. b) Invasive plant awareness and prevention was a major theme again in this year's conservation education program. The Forest continued to develop working relationships with groups like the Bitterroot Garden Club, county schools and Backcountry Horsemen. c) Forest specialists trained permanent and seasonal employees on each ranger district in the identification of new invaders and in the basic weed prevention measures outlined in the Region One supplement to the Forest Service Manual 2080 (R1 2000-2001-1).
10) Aerial Treatment	This ongoing multi-year contract treated about 1,800 acres of knapweed and sulfur cinquefoil in elk winter range and cross-boundary areas on the Sula Ranger District.
11) Roadside and ATV treatment	This ongoing multi-year contract treated numerous weed-vector roads throughout the Forest and selected low relief grassland terrain compatible with ATV treatment for a wide variety of invasive plant species.

Project	Description
12) Biocontrol Program	This program involves: releasing biological control insects for several target invasive plant species at priority sites; recording the GPS locations of the release sites; and pre / post release measurements of plant community features and insect establishment.
13) Post-treatment Plant Monitoring	Grassland plant trend plots were reread on Reimel and Sula Peak aerial treatments.
14) BAER program	Treatment and monitoring work was funded for the 2006 Gash Fire area.
15) Invasives Prevention	a) Weed prevention protocols for wash stations and general weed prevention best management practices were implemented on the Rombo and Tin Cup Fires.
16) Selway-Bitterroot Wilderness EIS	The four national forests involved in managing the SBW continued work on the SBW Invasive Plant Management EIS.
17) Revegetation	Contract and force account crews planted native species seed and containerized seedlings on almost 20 acres of grasslands that received aerial and roadside herbicide treatment. The objective was to boost the native plant recovery on these sites.
18) TERRA Database	During the winter of 2007, inventory for the previous field season was entered in the TERRA database. This database serves the important purpose of allowing the quick generation of maps by species and location of invasive weeds. With the depletion of post-fire recovery funding, it has become more important to correctly prioritize treatment and inventory work. The improved database allows the program manager to target work objectives and timing for maximum effect and efficiency.
19) Continental Divide Barrier Zone Project	Agencies located along and near the Continental Divide joined together to determine and stop spread of new invaders from one side of the Divide to the other.

Noxious Weed Inventory and Mapping

The species listed in Table 15 are listed as category 1, 2 and 3 noxious weed species in the State of Montana. Category 1 invasive plants are those that are currently established and generally widespread in many Montana counties. Category 2 invasive plants are recently introduced and rapidly spreading. Category 3 invasive plants have either not yet been detected in the State, or are found only in small, scattered, localized infestations.

Table 15 - Noxious Weed Infestation Information

Weed Species	Common Name	Category	FY 2007 Inventory (estimated acres)
Cardaria draba	white top	1	1
Centaurea diffusa	diffuse knapweed	1	1
Centaurea bierbersteinii *	spotted knapweed *	1	274,000*
Centaurea repens	Russian knapweed	1	0
Centaurea solstitialis	yellow starthistle	3	0.3
Chondrilla juncea	rush skeletonweed	2	73
Chrysanthemum leucanthemum *	oxeye daisy *	1	3000

Weed Species	Common Name	Category	FY 2007 Inventory (estimated acres)
Cirsium arvense	Canada thistle	1	632
Crupina vulgaris	common crupina	3	0
Cynoglossum officinale	houndstongue	1	1035
Echium vulgare	blueweed	2	2
Euphorbia esula	leafy spurge	1	48
Hypericum perforatum	St. Johnswort	1	1160
Linaria dalmatica	dalmatian toadflax	1	20
Potentilla recta *	sulfur cinquefoil *	1	689
Ranunculus acris	tall buttercup	2	300
Tanacetum vulgare	common tansy	2	300

**These species generally occur as a complex with spotted knapweed, sulfur cinquefoil and oxeye daisy.*

Control Efforts

In 2007, the Forest used herbicides to monitor and treat approximately 7,794 acres of invasive plants. All treatments complied with the environmental protection measures itemized in Table 14 of the 2003 Noxious Weed Treatment Project Record of Decision.

Approved biological control organisms were released on 85 new acres in 2007. These were all first year releases approved by the 2003 Noxious Weed Treatment Project ROD.

Whitetop: This species occurs in Ravalli County and has only been identified at one site on the forest.

Diffuse knapweed: This species was located during field surveys being conducted in the burned areas for sensitive plant populations in 2001. It is a small infestation (0.1 acre) in the Whiskey Gulch area, adjacent to private land. It is proposed for treatment in the Forest's Noxious Weed Treatment Project.

Dalmation toadflax: The largest infestation of this species occurs along the Sweeney Creek road. This site is being treated with picloram (Tordon®). Smaller infestations have been found on the West Fork District (along Painted Rocks Lake road).

Spotted knapweed: The majority of acres treated with herbicide in 2007 were for spotted knapweed. Picloram at a rate of one pint of herbicide per acre was used. Good containment results are apparent in areas including Reimel Ridge, Rye Creek Road, Magruder Corridor and Bass Creek due to the diligent efforts of District spray crews and roadside contractors. Spotted knapweed was treated under contract on 28 trails and consequently a reduction in occurrence and plant density is resulting from these spray efforts. Transline® is being used to treat spotted knapweed within administrative sites and recreational areas.

In early May of 2007, the Forest aerially treated 1800 acres of spotted knapweed dominated grassland in the Bunch Gulch and Shirley Mountain area of the Sula Ranger District. The project used two different chemicals in order to tailor the treatment to the target species and avoid collateral damage to non-target species.

Russian knapweed: No known infestations occur on the Forest.

Yellow starthistle: In 2001, a small, localized infestation of yellow starthistle was located in the Salmon River drainage (Idaho), within the boundaries of the Bitterroot National Forest. This infestation was promptly treated and mapped. Another, much smaller infestation was located along the Selway road, between Paradise and the Magruder crossing and was also treated and mapped. One plant was found in the latter location in 2004 and again treated but none has been found since.

Rush skeletonweed: One new infestation consisting of a couple of plants was found in the Coal Creek drainage just a couple of miles from the 2006 Deer/Chicken Creek infestation. Fall monitoring on both sites did not turn up any new plants. The site located at Fawn Ridge has received steady attention with chemical treatment since its discovery. The known site, treated in past years, is contained at 57 acres and appears to be diminishing in size. The Rush Skeletonweed polygons along the Dwyer/Smith trail were treated on the multi-year backcountry contract.

Oxeye daisy: This species is found mostly along roadsides and riparian areas. It typically occurs with spotted knapweed and sulfur cinquefoil. Treatments are ongoing.

Canada thistle: This species has been associated with timber sales and roadside areas. It is typically treated only when found with other weed species. The one-acre patch in Blue Joint Meadows continues to be monitored and treated when necessary.

Common crupina: There are no known infestations occurring on the Forest.

Houndstongue: Found along road sides, trail sides, timber sales and other disturbed areas. Treatments are included in chemical applications for spotted knapweed. This plant seems to be expanding.

Leafy spurge: In past years there were increasing numbers of new infestations; however, due to diligent spraying over the last few years, the number of plants at each site has greatly been reduced and no new infestations were found in 2007. The Little Sleeping Child Drainage supports several small infestations that have been receiving treatments—both chemical and biological. Eradication of this weed species continues to be the goal. Apthona beetles were found on the sites in 2003 and more releases were established in 2004.

St. Johnswort: Infestations occur along the Magruder Corridor and along many of the west side canyon trails. The largest infestation is in the Camas Creek area along the road sides. Beetles have been established. Efforts are aimed at keeping this species from becoming widely established in the Selway-Bitterroot Wilderness.

Sulfur cinquefoil: This species occurs in a complex with spotted knapweed and has been treated with picloram. Accurate acreages are hard to obtain because of intermingling with spotted knapweed populations. It has been found near roads and trails, as well as in areas far removed from roads or trails. It has potential to consume as many acres as are currently infested with spotted knapweed, as it has been found to be commonly associated with knapweed and in some instances has out-competed knapweed. Sulfur cinquefoil responds well to chemical applications, but because it is a prolific seed producer, seedlings rapidly reestablish in subsequent years.

Tall buttercup: All populations of this species were treated again this year. These treatments appear to be checking the spread of these populations.

Common tansy: This species has recently been listed as a category 1 noxious weed within the State of Montana. Many roadsides have been treated along with knapweed.

Cheatgrass: While not listed formally at this time as a noxious weed in Montana, a petition for listing was submitted during the winter of 2004-2005. Cheatgrass is an invasive specie of annual grass that has demonstrated the ability to form replacement monocultures on sites where effective herbicide (and in a few instances biocontrol) treatment has eliminated a former monoculture of spotted knapweed. This species has shown that, under certain conditions, it can derail the objective of reinstalling a vigorous native plant community.

Biological Control: A cooperative working relationship with the Montana State University Agricultural Experiment Station has contributed to the expansion and effectiveness of the biological control program as well as a multi-year contract. The target species for biological agent introduction are leafy spurge, Canada thistle and spotted knapweed. Table 16 describes the biological control accomplishments for the 2007 season.

Table 16 - Biological Control Agent Releases

Agent (species)	Location	Target weed spp.	Number released
Cyphocleonus achates	Bitterroot NF	Spotted knapweed	2,725

Monitoring of biological control releases is ongoing. Effectiveness and population survival are monitored on an annual basis, with the goal of looking at long-term survival. New releases are typically given two years to transition into new environments before monitoring is conducted. Good results are being seen on knapweed where biocontrols have been established in the valley bottoms for many years. Knapweed is difficult to find on many of these sites.

Invasive Plants in Wilderness

A basic weed-monitoring program (visual observations) has been in place for many years along trails and at campsites in the Selway-Bitterroot and Anaconda-Pintler Wilderness areas. Wilderness rangers have filled out weed location cards and/or have mapped weed locations. Recent observations are summarized below.

Anaconda-Pintler Wilderness: Invasive plants identified in the Anaconda-Pintler Wilderness include knapweed on the East Fork Trail near the trailhead and knapweed, Canada thistle and tall buttercup in the Kurtz Flat area and beyond Star Falls.

Selway-Bitterroot Wilderness: Invasive plants identified along trails leading directly into the Selway-Bitterroot include:

- Knapweed -present for many years along trail corridors, sometimes in isolated patches. Also present on south facing slopes some distance above the trail especially along the Kootenai, Bass and Big Creek drainages.
- Canada Thistle -found in small patches trailside.
- Tall Buttercup - found scattered in trace amounts on most trails on the west side of the Bitterroot Valley.
- Common Tansy-found in trace amounts along Bass Creek Trail growing in trailside clumps.
- Sulfur Cinquefoil- found in similar habitat to knapweed. It is not limited to the trailside, but tends to run up the hillside.
- Goatweed – found along Sweathouse Trail before the wilderness boundary and in an isolated 1/2 acre patch in the South Fork of Sweeney Creek.
- Oxeye Daisy -Scattered trailside plants.

Monitoring of efforts to spot spray knapweed along trails[5] indicates that the canopy coverage of knapweed has been reduced by over 90%. Non-target species do not appear to have been affected by spot treatments (dead or wilting plants not observed). Still present along trails that have been sprayed are Canada thistle and tall buttercup.

Members of the public have adopted certain wilderness trails for pulling weeds. Weed pulling has been quite successful where weeds occur in limited numbers and in specific areas. Overall, however, hand pulling has achieved only limited success.

All wilderness trailhead bulletin boards have a sign informing users of weed free feed regulations. Most Wilderness trailheads have noxious weed education posters.

Frank Church-River of No Return Wilderness: In 2007, over 800 acres of spotted knapweed and rush skeletonweed were monitored and treated in the Frank Church Wilderness. Treatment areas included the Upper Selway Trails, Fawn Ridge and the Prospect to Dywer Trails.

[5] Monitoring consisted of visual observations by a wilderness ranger.

Elk Habitat
Effectiveness Item 7

OBJECTIVES: Monitor and ensure compliance with Forest Plan standard for Elk Habitat Effectiveness.

DATA SOURCE: Travel plan, Timber Stand Management Record System (TSMRS) and inventory.

FREQUENCY: Annually.

REPORTING PERIOD: 2007.

VARIABILITY: Any deviation from Forest-wide objectives.

EVALUATION:

The Forest's monitoring reports through FY1992 contained data on Elk Habitat Effectiveness (EHE). Since then, we have collected data on each of the Integrated Resource Analysis areas as they are considered for project work. The evaluations have shown that EHE objectives can be met by closing roads to motorized vehicles during the season elk use the area.

When developed as a Forest Plan standard, EHE was a surrogate for hunting season security. In implementing the Forest Plan, we found the technique to be more valid for evaluating the capability of land to support elk in the absence of hunting. The 2003 and 2004 monitoring reports (Elk Security Sections) explained that the Hillis method (1991) is more appropriate for analyzing hunting season security. The Forest continues to calculate EHE for each project proposed under the current Forest Plan.

The fires of 2000 probably decreased EHE in some drainages by removing vegetation that had made some roads impassable, thus increasing open road densities. These roads were evaluated during the Post-Fire Assessment and many have been scheduled for decommissioning (permanently removed from the Forest road network) or storage (physically closed to all motorized travel). As the Forest continues travel management planning, the transportation system will be analyzed for its impact on elk habitat.

The Forest Plan Five Year Review (1994) contains an evaluation of the current approaches for assessing the condition of elk populations on the Bitterroot NF. We are using the information from the review as we revise the Forest Plan.

Site-specific Forest Plan amendments are sometimes needed when proposing projects that conflict with EHE objectives. Amendments will continue to be done, as needed on a project by project basis, to address the conflicting nature of the Forest Plan's fuels/fire protection goals, objectives and standards for the wildland urban interface and the overlapping winter range thermal cover standard defined on page 8 of the Forest Plan Record of Decision (1987). Elk Habitat Effectiveness objectives will be evaluated during Forest Plan Revision.

Elk Population in Relation to Habitat Changes Item 38

OBJECTIVE: Monitor population trends and determine relation to habitat changes.

DATA SOURCE: Montana Department of Fish, Wildlife and Parks (FWP).

FREQUENCY: 100 percent annually.

REPORTING PERIOD: 1997-2008

VARIABILITY: +/- five percent of most recent three-year average.

EVALUATION:

The change in elk population has exceeded an increase of five percent twice in the last ten years. Further evaluation indicated the increases are occurring in the proper areas according to the Montana Elk Management Plan. The 2005 Montana Elk Management Plan established population objectives by Hunting District as found in Table 17.

Table 17 – Elk Population Objectives by Hunting District

Hunting District	Elk Population Objectives
HD 240	750
HD 204-261	1320
HD 270	3000
HD 250	2000

The total objective for the Bitterroot elk herd is therefore 7,070 elk. FWP trend counts indicate population objectives have been met or exceeded in all Hunting Districts, except 240 and 250. The trend counts indicate a stabilizing elk herd, which in some hunting districts is lower than FWP and Forest Plan population objectives.

State Statute 87-1-323 states that viable elk, deer and antelope populations, based on habitat acreage, can be reduced as necessary. It reads as follows:

> (1) Based on the habitat acreage that is determined pursuant to 87-1-322, the commission shall determine the appropriate elk, deer and antelope numbers that can be viably sustained. The department shall consider the specific concerns of private landowners when determining sustainable numbers pursuant to this section.
>
> (2) Once the sustainable population numbers are determined as provided in subsection (1), the department shall implement, through existing wildlife management programs, necessary actions with the objective that the population of elk, deer and antelope remains at or below the sustainable population. The programs may include but are not limited to:
>
> (a) liberalized harvests;
>
> (b) game damage hunts;
>
> (c) landowner permits; or

(d) animal relocation.

(3)The department shall:

(a) manage with the objective that populations of elk, deer and antelope are at or below the sustainable population number by January 1, 2009; and

(b) evaluate the elk, deer and antelope populations on an annual basis and provide that information to the public.

The decrease (Table 18) in the 2006-2008 average population does not meet the Forest Plan variability standard. Forest personnel are working with a Fish Wildlife and Parks appointed Elk Management Working Group to implement hunting season regulations designed to achieve population objectives.

MONITORING RESULTS:

FWP personnel conduct annual aerial elk counts. The results of the aerial elk counts, done as consistently as possible from year to year, indicate a reliable trend in elk populations on early spring ranges in the Bitterroot Valley. The annual trend surveys began in the early 1950s and show a steady growth and stabilizing elk herd since that time in the Bitterroot Valley. The number of elk detected has doubled since the early 1980s. Table 18 displays three-year averages as required by the Forest Plan when monitoring elk populations to detect possible effects of habitat changes.

The trend count for this reporting period shows a ten percent decrease, or a negative five percent deviation for this reporting year. The decrease in population is, in large part, due to the liberalized hunting regulations for those hunting districts that exceeded population objectives. For the current reporting year, the cumulative elk population number is 7,021, with a spring count of 5,950. In hunting districts 270, 204 and 261, where greater harvest is encouraged through hunting regulations, the populations are only ten percent over the objective versus 20 percent over the objective the previous year (2007) in HD 270. HDs 204 and 261 were slightly less than one percent over the objective. The decrease in population for other areas, such as HD 250, can best be attributed to a few variables: the continued influence of which side of the boundary a local herd unit is on when counted and spring green-up timing, as stated in past reports by previous Montana Fish Wildlife & Parks Area Biologists. This season's lower elk numbers, particularly in HD 250, were also influenced by the reduced amount of flight time (about 50% less than normal), a new pilot and the use of various aerial observers versus previous years.

The Forest continues to work with Montana Fish Wildlife and Parks, the Bitterroot Elk Working Group and the MTFWP Area Biologist to meet the Montana Elk Management Plan and Forest Plan objectives. Appropriate measures are in place for the 2008 and 2009 hunting season, as a precautionary measure, based on this season's population numbers.

Table 18 - Elk Populations, Three-Year Running Average (Number of elk and percent change)

3-Year Period	'97-99	'98-00	'99-01*	'00-02*	'01-03*	'02-04	'03-05	'04-06	'05-07	'06-08
Average Elk Population	6090	6112	6143	6394	6795	6954	7555	7620	7760	7021
Percent Change	0	0	0	+4	+6	+2	+8	+1	+2	-10

** Assuming level trends in elk population for Hunting Districts 240 and 250, which were not surveyed in 2001*.

Pine Marten Population in Relation to Habitat Changes Item 39

OBJECTIVE: Monitor population trends and determine relation to habitat changes (36 CFR 219.19(a) (6)).

DATA SOURCE: Track surveys.

FREQUENCY: Three transects annually after the five-year average is established.

REPORTING PERIOD: 2007

VARIABILITY: +/- five percent of most recent five-year average.

EVALUATION:

The Bitterroot NF has been monitoring marten populations by searching transects for marten tracks since 1988. We surveyed nearly 750 miles of transects between 1988 and 1996. In that period, we saw an average of one marten track every 6.7 miles (6.7 miles per track). Variation among transects was high, ranging from four miles per track to 11 miles per track. It would appear that our population is much less dense than a Canadian population, where Thompson et al. (1989) found nearly three tracks per mile of transect surveyed. The 1988-1996 data established a base line population index with which to compare future information. This information is used for comparison instead of a strict "most recent five-year average" because it contains more robust data.

When compared to the base line data, more recent surveys have shown a dramatic decrease in the miles per marten track. This could reflect an increase in marten numbers, or could be indicative of sampling variables such as snow conditions during surveys. If populations are increasing, it is difficult to attribute this to a particular cause like habitat change, as this monitoring item intended. The most recent science and analysis indicate that pine marten are doing well on the Forest and we will continue to use monitoring and research results to evaluate this management indicator species.

MONITORING RESULTS:

Each Ranger District has established permanent pine marten monitoring routes. We established these transects in developed areas, areas to be developed and areas where no development is scheduled. We counted tracks that crossed transects to establish a base line population index for comparison with future track counts.

The Forest did not complete many marten monitoring transects between 1997 and 2003 because of other funding priorities. The few surveys completed during this period were either consistent with earlier surveys (Larry Creek) or found more marten tracks per mile (Willow Mountain) compared to previous surveys. We completed nine marten transects in FY 2004, but have not completed any since then due to other priorities and a lack of snow.

Table 19 - Marten Transects Conducted in 2004

Transect	Year	Miles	Tracks	No. of times surveyed	Miles/Track
Larry Creek	2004	12	40	2	0.3
Willow Mountain	2004	19	42	2	0.5
Lost Horse	2004	17	30	1	0.6

Skalkaho/Rye	2004	24.5	6	2	4.1
Meadow/Tolan	2004	17	3	1	5.7
Nez Perce Pass	2004	5.5	28	1	0.2
TOTAL		**95**	**149**		**0.6**

The average number of miles surveyed per marten track in 2004 (0.6 miles/track) was considerably lower than the average from 1988 to 1996 (6.7 miles/track). This means that we saw many more marten tracks in 2004 than in the 1988 to 1996 period. This year's data showed a 91% decrease in miles per marten track compared to the long-term average, which triggered further evaluation. The apparent decrease in effort required to find tracks could mean that marten numbers have increased dramatically, but could also be a result of other sampling or environmental variables. Results on the Larry Creek and Willow Mountain transects were the same in 2003 and 2004 (Larry Creek had 0.3 miles/track both years; Willow Mountain had 0.5 miles/track both years). Our evaluation only supported the difficulty of drawing conclusions given the number of variables that factor into survey results. Such variables include year-to-year population variability, weather differences between years and environmental changes caused by events such as wildfires or management activities.

Graduate students from the University of Montana have conducted two research projects related to marten on the Bitterroot NF in recent years. One evaluated the effectiveness of snow tracking, remote cameras and sooted track plates in detecting the presence of marten, fisher and wolverine in several large canyons (Foresman and Pearson 1995; Foresman and Pearson 1998). The other looked specifically at the effectiveness of sooted track plates in determining the presence of marten known to be in the area (Ivan 2000). Neither study was designed to determine marten population levels nor monitor changes in marten population levels; however, the researchers felt that the canyons they surveyed supported good numbers of marten (K. Foresman, pers. comm.).

Forest biologists have rated the suitability of the marten habitat across the Forest. Considering all the area rated, the Habitat Suitability Index for marten was calculated at 0.32. This index tells us that on average marten habitat on the Bitterroot Forest (at least the 190,000 acres rated for suitability) is about 1/3 as good as the best marten habitat. This implies that marten are likely to occur in low densities in suitable habitat throughout the Forest; however, marten populations are likely to be robust in the corridors of high quality habitat that exist along many of the larger streams draining the Bitterroot Mountains.

At a Forest wide scale it is estimated that we have approximately 393,400 more acres of marten habitat than is necessary to maintain a minimum viable population (Samson 2006). Another way to say this is that we have an estimated 2,374% of the habitat necessary to maintain a minimum viable population of marten on the Forest.

These findings are also consistent with the broader view offered by the Natural Heritage Program. The international network of Natural Heritage Programs employs a standardized ranking system to denote global (G — range-wide) and state (S) status. Species are assigned numeric ranks ranging from 1 (critically imperiled) to 5 (demonstrably secure), reflecting the relative degree to which they are "at-risk." The Montana Natural Heritage Program classifies the American marten as a G5 S4 species (MNHP, 2006). This means that at the global scale, marten are considered to be common, widespread, abundant and not vulnerable in most of their range. At the state scale marten are considered to be uncommon, but not rare and usually widespread. Marten are apparently not vulnerable in most of their range; however, there is possibly cause for long-term concern. University of Montana mammalogist Kerry Foresman classifies marten as common in Montana and shows that they occur throughout the western and southwestern parts of the state (Foresman 2001). FWP trapping records indicate that between 1996 and 2002 (the latest year

available), the average number of marten taken by trappers annually was 1,133 across Montana, 202 within FWP District 2 and 66 within Ravalli County.

No further evaluation is needed at this time, since all indications are that pine marten appear to be doing well on the Forest. Continued monitoring and research may eventually allow us to draw some clearer conclusions.

REFERENCES:

Foresman, K.R. 2001. The wild mammals of Montana. Special Publication No. 12, American Society of Mammalogists, Lawrence, KS. 278 p.

Foresman, K.R. and D.E. Pearson. 1995. Testing of proposed survey methods for the detection of wolverine, lynx, fisher and American marten in Bitterroot National Forest. Final Report for the Research Joint Venture Agreement INT-94918, USDA Forest Service, Intermountain Research Station, Missoula, MT.

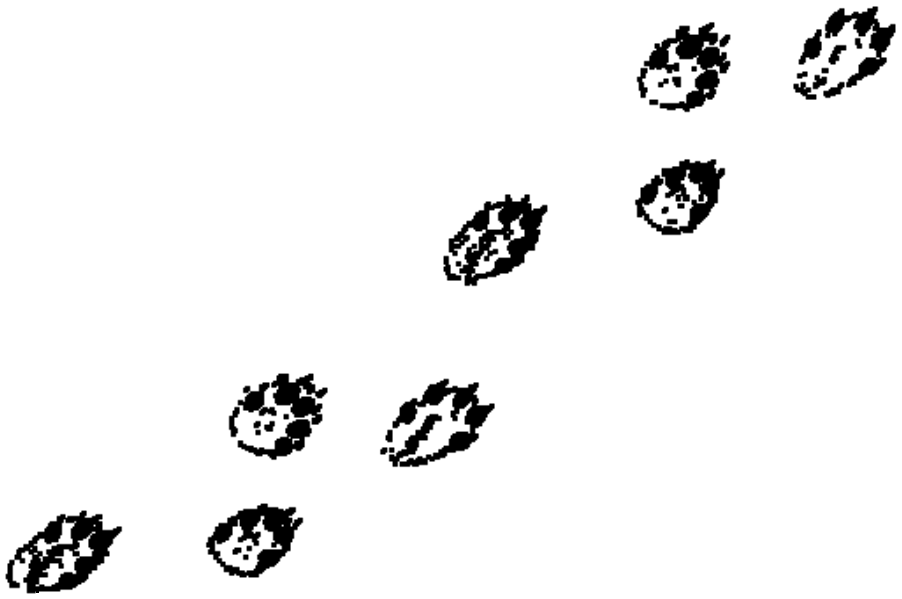
Foresman, K.R. and D.E. Pearson. 1998. Comparison of survey methods for the detection of forest carnivores. J. Wildl. Mgmt. 62:1217-1226.

Ivan, J. 2000. Effectiveness of carbon sooted aluminum track plates for detecting American marten.
M.S. Thesis. University of Montana, Missoula, Montana.

MNHP. Montana Natural Heritage Program database. 2006. Montana Natural Resource Information System. Montana State Library, Helena, MT. http://nhp.nris.state.mt.us/ [0467]

Thompson, I. D., I. J. Davidson, S. O'Donnell and F. Brazeau. 1989. Use of track transects to measure the relative occurrence of some boreal mammals in uncut forest and regeneration stands. Can. J. Zool. 67:1816-1823.

Zielinski, W. J. and H. B. Stauffer. 1996. Monitoring *Martes* populations in California: survey design and power analysis. Ecol. Applications 6(4):1254-1267



Pileated Woodpecker Population in Relation to Habitat Changes Item 40

OBJECTIVE: Monitor population trends in relation to habitat changes.

DATA SOURCE: Call transects.

FREQUENCY: Three transects annually after the five-year average is established.

REPORTING PERIOD: 2007.

VARIABILITY: +/- five percent of most recent five-year average.

MONITORING:

Most Forests in Montana and Idaho use the Northern Region's standardized technique for establishing and monitoring pileated woodpecker call routes. We established nine call routes on the Bitterroot National Forest (BNF) that are each monitored three times annually, if weather and budgets allow. In 1997 and 1998, we sampled no transects due to budget constraints. In FY 2007, we completed two surveys on each of six routes and three surveys on each of three routes for a total of 21 transects. We recorded an average of 0.18 pileated woodpecker detections per mile of transect, slightly below the 2006 detection rate and the long-term average. This year's figure is about 14% below the long-term average of 0.21 detections per mile and is 10% below the most recent 5-year average of 0.20 detections per mile. Further evaluation of these data follows.

EVALUATION:

Data from nine monitoring transects scattered over the Forest show high variability in pileated woodpecker detections among transects and between years. Although the scientific literature has validated the usefulness of the call route technique to monitor population trends, more transects may be needed to reduce variability and increase confidence in our data. Lack of funding has precluded establishment of more transects, but we do have some base line information. We have systematically run approximately 1506 miles of transects since 1988. We recorded an average of 0.21 calls or sightings per mile of transect over that period. The 2007 recording of an average 0.18 pileated woodpecker detections per mile of transect is about 14% below this long-term average and is 10% below the most recent 5-year average.

Figure 5 - Results of Pileated Woodpecker Call Counts, 1989-2007

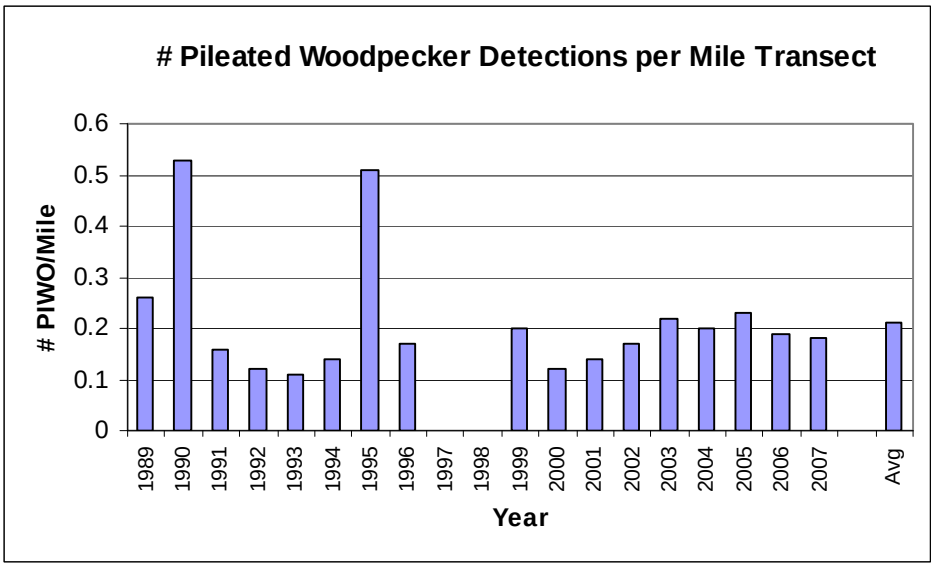


Figure 5 displays the number of pileated woodpecker calls or sightings detected per mile of transect monitored across the entire Forest by year. Ignoring the large spikes in pileated detections in 1990 and 1995, these data show that pileated detections declined somewhat in the early 1990s but increased from then until 2000, when they declined again. The spikes in 1990 and 1995 illustrate the variability inherent in these types of transects and may or may not indicate actual changes in population levels. The low number of detections per mile in 2000 could indicate that populations declined that year, but could also be a result of other factors. The number of detections per mile generally increased slightly each year from 2000 to 2005, despite the fact that several of the transects were burned extensively during the fires of 2000. Pileated woodpeckers are not normally associated with moderate to high-severity burned areas. Number of detections has declined slightly in both 2006 and 2007.

The number of detections can be influenced by local weather or stream conditions which can make hearing difficult, the period of time during the breeding season when transects are run which can influence the frequency of vocalizations and the ability of the observer to hear and correctly identify pileated calls. Changes in the number of detections over time may also indicate actual changes in the number of birds present, which could be a result of habitat change or a number of other factors such as weather. Cool, wet springs for example, drastically reduce the productivity of many bird species. The variability introduced by these factors makes it difficult to determine whether pileated woodpecker populations are changing on the Bitterroot National Forest and if so, why.

We know that habitat quality for this species declined in the late 1800s and early 1900s across the Forest as a result of extensive cutting of mature ponderosa pine habitats. Fire suppression has also reduced habitat quality since the 1930s. Nevertheless, a recent habitat assessment for the pileated woodpecker indicates adequate habitat exists and is well distributed on the Forest and across the Northern Region. Based on this assessment, the Bitterroot National Forest is estimated to contain sufficient suitable nesting habitat to support about 91 pairs of pileated woodpeckers and enough winter foraging habitat to sustain almost 800 pairs of this species (Samson 2005). This habitat is well-distributed across the BNF at lower to mid elevations. Habitat estimates for the BNF only include National Forest System lands and alone are estimated to provide 86% of the habitat necessary for a minimum viable population (Samson 2006). Additional nesting habitat for pileated woodpeckers is located on private lands in the Bitterroot valley in the mixed cottonwood and ponderosa pine forests along the Bitterroot River and many of its larger tributaries. These bottomland forests provide some of the most productive habitat for this species

and also serve to connect subpopulations in the surrounding mountains. The presence of large amounts of high quality habitat on private land indicates that the Bitterroot drainage is capable of supporting a much larger population of pileated woodpeckers than indicated by the Forest's estimates alone.

At the Regional scale, habitat modeling estimates that there is enough suitable nesting habitat to support about 2362 pairs of pileated woodpeckers and enough winter foraging habitat to sustain about 19,430 pairs of birds (Samson 2005). Again, this estimate does not include the high quality habitat located along the river and stream corridors on private land. Median dispersal distance for pileated woodpeckers is estimated to be about 150 miles, which indicates that pileated woodpeckers across the entire Region belong to a single, well connected population. The Forests neighboring the Bitterroot to the north and west show pileated woodpecker habitat in excess of the quantity modeled to maintain a minimum viable population on their Forests alone (Lolo - 165%, Clearwater -346% and Nez Perce -459%). Although no population estimates are available, the large amount of apparently suitable habitat well distributed across the Region combined with the interconnectedness of the population indicates that short-term viability of pileated woodpeckers across the Region is not an issue (Samson 2005).

These findings are also consistent with the broader view offered by the Natural Heritage Program. The international network of Natural Heritage Programs employs a standardized ranking system to denote global (G — range-wide) and state (S) status. Species are assigned numeric ranks ranging from 1 (critically imperiled) to 5 (demonstrably secure), reflecting the relative degree to which they are "at-risk." The pileated woodpecker is listed as G5 and S4 in Montana. G5 indicates that throughout its range, it is considered common, widespread and abundant although it may be rare in parts of its range. It is not vulnerable in most of its range. S4 indicates that in Montana, it is uncommon but not rare, although it may be rare in parts of its range and usually widespread. This statewide rating also indicates the specie is apparently not vulnerable in most of its range, but there is possible cause for long-term concern. The positive trends from Forest monitoring discussed above indicate both the pileated woodpecker and its habitat are doing well on this Forest.

Given the above evaluation of data since 1988, we conclude that current management on the Bitterroot National Forest is having little discernable negative impacts on the pileated woodpecker. Our evaluation of this year's detections being slightly below the five-year average indicates current management practices are appropriate. Suitable habitat appears to be well distributed across the Forest, river basin and Region. Most of the Forest's recent management activities in lower elevation forests emphasize restoration of mature ponderosa pine habitats, which should benefit pileated woodpeckers over time.

REFERENCES:

Samson, F. B. 2005 (amended March 6, 2006). Conservation assessment of the northern goshawk, blacked-backed woodpecker, flammulated owl and pileated woodpecker in the Northern Region, USDA Forest Service. Unpublished report on file, Northern Region, Missoula, Montana, USA.

Samson, F.B. 2006. Habitat estimates for maintaining viable populations of the northern goshawk, black-backed woodpecker, flammulated owl, pileated woodpecker, American marten and fisher. USDA Forest Service. Unpublished report on file, Northern Region, Missoula, Montana, USA.

Threatened and Endangered Wildlife Species

OBJECTIVE: Monitor threatened and endangered species populations and trends and initiate recovery as planned. Determine population and habitat relationships and recovery needs as specified by the Region and USDI Fish and Wildlife Service.

DATA SOURCE: Monitoring wolf recovery updates, off-forest environmental impact statements (e.g., Wolf Recovery Plan and Grizzly Bear Recovery Plan) and other data as available.

FREQUENCY: Annually.

REPORTING PERIOD: 2007.

VARIABILITY: Changes in trends that indicate recovery or further declines.

INTRODUCTION:

The USDI Fish and Wildlife Service (FWS) removed bald eagles from Federal listing as a Threatened species on August 8, 2007. Per Region One policy, the bald eagle was automatically added to Regional Forester's Sensitive Species List when it was removed from Federal listing. As a result, the summary of bald eagle monitoring efforts in 2007 was moved to the Sensitive Wildlife Species monitoring item.

FWS also removed Canada lynx and grizzly bear from the list of threatened or endangered wildlife species that may occur on the Bitterroot National Forest in 2006 and 2007, respectively. FWS still lists gray wolves as a non-essential, experimental population and yellow-billed cuckoo (western population) as a Candidate wildlife species that may occur on the Forest. The Bitterroot NF wolf population is considered proposed (see discussion below). FWS reintroduced gray wolves into the Frank Church-River of No Return Wilderness in 1995 and 1996 and those individuals and their descendents dispersed across northern Idaho and western Montana, including the Bitterroot NF. The grizzly bear has not been confirmed as occurring in the Bitterroot drainage since the 1950s, with one exception (see Grizzly Bear section). Lynx were proposed for listing under the Endangered Species Act in 1999. FWS listed them as threatened in 2000 and included them on the list of threatened and endangered wildlife species that may occur on the Forest until 2006. In an amendment to the 2005 Canada Lynx Conservation Agreement the Bitterroot National Forest has been classified as Unoccupied Lynx Habitat by the USFWS and the Forest Service. Lynx are no longer included on the FWS list of threatened and endangered species that may occur on the Forest. Peregrine falcons were delisted by FWS in August 1999 and are now classified as a sensitive species by the Regional Forester.

GRAY WOLF (Proposed) EVALUATION & MONITORING RESULTS:

The Bitterroot NF is within the boundaries of the Central Idaho Experimental Population Area (CIEPA) for gray wolves. The CIEPA includes all of Idaho south of I-90 and north of I-84 and I-86 and west of I-15 and all of western Montana south of I-90 and west of I-15. Any wolves within this area are treated as a proposed species under Section 10 (j) of the Endangered Species Act. Therefore, the Forest is only required to confer with the Fish and Wildlife Service if an action "is likely to jeopardize the continued existence" of the species. The availability of ungulate prey and isolation from human disturbance/mortality are the two most important factors in determining suitable wolf habitat.

Wolves continue to expand their range and numbers within the CIEPA and the Bitterroot National Forest. Wolf monitoring efforts conducted by the Montana Department of Fish, Wildlife and Parks, the Idaho Department of Fish and Game and the Nez Perce Tribe documented 15 new wolf packs in the Idaho portion of the CIEPA and eight new wolf packs in the Montana portion of the CIEPA in 2007; however, five previously documented packs in Idaho and two packs in Montana were dropped from the documented pack list due to inactivity or control, resulting in net gains of 10 packs in Idaho and six packs in Montana. Reproduction was confirmed in 70 packs within the CIEPA, 51 of which met the recovery standards for a breeding pair. These packs produced a minimum of 197 pups in 2007, a 9% increase over the known pup production in 2006. 110 wolves were confirmed to have died in 2007 within the CIEPA, including at least 100 due to human-related causes. The total wolf population across the CIEPA at the end of 2007 was estimated at 830 wolves, a 12% increase over 2006 (USFWS et al. 2008).

Eleven wolf packs were known to use portions of the Forest in 2006. Two new wolf packs and one existing Idaho pack were documented on the Forest during 2007, but the old Magruder pack is no longer considered to be a documented pack. The Indian Creek pack is an existing pack that should have been included as a pack using the Forest in 2006, but was missed. As a result, at least 14 wolf packs were known to occur on portions of the Forest at the end of FY 2007.

The Brooks Creek pack uses the Bitterroot Mountains between Bass Creek and Mill Creek, as well as the adjacent drainages in Idaho. This pack denned in Montana in both 2007 and 2005, but in Idaho in 2006. The Divide Creek pack uses the Sleeping Child and Rye Creek drainages in the Sapphire Mountains. The East Fork Bitterroot pack uses the southern end of the Sapphire Mountains to the northeast of Sula. The Hughes Creek pack occupies the Idaho portion of the Allan Mountain Roadless Area, but also uses the upper Hughes Creek drainage on the BNF. The Indian Creek pack appears to use the area around Paradise on the Selway River, but lack of a radio collar in the pack makes territory boundaries uncertain. The Lake Como pack appears to use the Bitterroot Mountains between Lake Como and Blodgett Creek, although the lack of a radio collar in the pack makes territory boundaries uncertain. The Painted Rocks pack inhabits portions of the West Fork of the Bitterroot River, but lack of a radio collar in the pack makes territory boundaries uncertain. The Sapphire pack inhabits the east side of the Sapphire Range in the Ross' Fork, West Fork and Middle Fork Rock Creek drainages, but sometimes crosses the Sapphire crest into the heads of the Sleeping Child and Skalkaho drainages. The Selway pack's territory includes the area roughly between Magruder and the vicinity of Elk City, Idaho on the Nez Perce NF. The Skalkaho pack's territory includes the west side of the Sapphire Range between Skalkaho and Willow Creeks. The Sula pack uses the "triangle" area west of Highway 93 between Sula and Lost Trail Pass. The new Trail Creek pack is believed to use the southwest part of the East Fork drainage including Tolan Creek, as well as the Trail Creek area on the Beaverhead-Deer Lodge NF. The new Trapper Peak pack uses the Bitterroot Mountains between Tin Cup Creek and Trapper Creek. This pack was believed to be the Lake Como pack in 2006, but telemetry locations showed that it is a new pack. The Welcome Creek pack uses the north end of the Sapphire Mountains from Ambrose Creek north to Miller Creek and over into the Rock Creek drainage on the Lolo NF.

Table 20 summarizes known information on the number of individuals in each pack, as well as the number of known wolf mortalities from any cause and the number of livestock or domestic animals confirmed killed by each pack (USFWS et al. 2008).

Table 20 – Status of Known Wolf Packs on the Bitterroot National Forest as of 12/31/07

Pack Name	State	Known Adults	Known Pups	Known Total	Known Wolf Mortalities	Confirmed Depredations
Brooks Creek	MT	3	4	7	3	3 calves
Divide Creek	MT	4	3	7		
East Fork Bitterroot	MT	3	1	4		
Hughes Creek	ID	9	2	11	1	
Indian Creek	ID	2	0	2	1	
Lake Como	MT	5	?	5		
Painted Rocks	MT	2	?	2		
Sapphire	MT	4	?	4	6	2 calves
Selway	ID	8	7	15		
Skalkaho	MT	4	5	9	1	1 calf
Sula	MT	7	3	10		
Trail Creek (new)	MT	3	3	6		
Trapper Peak (new)	MT	2	0	2	1	
Welcome Creek	MT	4	0	4		
MINIMUM TOTALS		**60**	**28**	**88**	**13**	**6**

The territories of two other Idaho packs (Owl Creek and Pettibone Creek) may include portions of the Forest, but territory boundaries for these packs are uncertain. The Forest receives numerous reports of wolf sightings outside the territories of the known packs each year and it is possible that other packs exist on the Forest. Transient wolves pass through the BNF on a regular basis.

GRIZZLY BEAR (Threatened) EVALUATION & MONITORING RESULTS:

Grizzlies are far-ranging animals that require protection from human caused mortality, but subsist in a wide variety of habitats depending primarily on food availability. Historical records indicate that grizzly bears were once abundant in the Bitterroot Mountains, but did not survive the intense pressure to eliminate them as threats to domestic sheep and cattle. The last known grizzly was hunted and killed in the area in 1956. Since that time, periodic sightings of grizzly bears have been reported in the Bitterroots, most of which were probably black bears. The only recent confirmed sighting of a grizzly bear in the Bitterroot drainage was an apparent transient bear that was seen two nights in a row on private land on Sunset Bench southeast of Stevensville in late September, 2002. This animal had apparently crossed the Sapphire Range from the Rock Creek drainage, where it was seen and photographed feeding on a moose gut pile the previous day. The bear disappeared after it was seen on Sunset Bench. The origin of this bear is uncertain; no other grizzly bears had been confirmed in either Rock Creek or the Sapphire Range for many years.

A mature male grizzly was shot by a black bear hunter in the North Fork Kelly Creek drainage in Idaho about 35 miles northwest of the northern edge of the BNF on September 3, 2007. This was the first confirmed grizzly bear in the Bitterroot Mountains in over 50 years. Testing confirmed that this bear was genetically tied to the small grizzly bear population in the Selkirk Mountains of northern Idaho, northeast Washington and southern British Columbia, indicating that it had traveled at least 140 miles to the North Fork Kelly Creek. It is unclear whether this bear was a wandering individual or if it is part of a previously unknown population that has become established in that area.

The Selway-Bitterroot ecosystem is one of six ecosystems in the continental U.S. outside of Alaska that are managed for grizzly bears. FWS studied the Bitterroot Grizzly Bear Evaluation Area to determine its habitat capability for grizzly bears. The evaluation determined the area was suitable for grizzly bears and it is now a grizzly bear recovery area. The FWS prepared an Environmental Impact Statement and issued a Record of Decision in November 2000 (USFWS 2000), which approved reintroduction of grizzlies into the Selway-Bitterroot ecosystem as a nonessential experimental population starting in 2002. Implementation of this decision is currently on indefinite hold due to political considerations.

LYNX (Threatened) EVALUATION & MONITORING RESULTS:

Lynx are uncommon and occur in low densities in even the best habitat. Lynx habitat in the Bitterroot National Forest has been identified through an interdisciplinary process with FWS to be generally areas exceeding 6,200' elevation which support vegetation types dominated by subalpine fir or spruce. Lynx do not use open or semi-open areas (Maj 1992). They use mature and over mature spruce and subalpine fir forests with deadfalls for denning. Foraging habitat typically is dense 20 to 30 year old sapling and pole-sized stands of lodgepole pine and other conifer species (Quinn and Parker 1987; Koehler and Brittell 1990; Thompson et al. 1989). Lynx are dependent on snowshoe hare (*Lepus americanus*) as their primary prey. Lynx abundance and density varies with the cyclic snowshoe hare population fluctuations and trapping pressure. In this area, snowshoe hares frequent dense stands of trees in early successional stages (Koehler and Brittell 1990). The shrubs and saplings provide food for the hares as well as cover from predators. Providing good hare habitat will benefit lynx (Quinn and Parker 1987).

The US Fish and Wildlife Service (FWS) no longer include lynx on its list of Threatened, Endangered and Candidate species that may occur on the BNF. In an amendment to the 2005 Canada Lynx Conservation Agreement (PF-WILD-061) the Bitterroot National Forest has been classified as Unoccupied Lynx Habitat by USFWS and the Forest Service.

The Record of Decision (ROD) (USDA Forest Service 2007a) for the Northern Rockies Lynx Management Direction (NRLMD) FEIS (USDA Forest Service 2007b) became effective July 16, 2007. The ROD amended the management direction in the selected alternative into all Forest Plans in the planning area, including the BNF Forest Plan. The NRLMD FEIS management direction incorporates the terms and conditions the US Fish and Wildlife Service (USFWS) issued in their Biological Opinion and Incidental Take Statement (USDI Fish and Wildlife Service 2007). Direction in the NRLMD ROD applies to mapped lynx habitat on National Forest System land presently occupied by lynx, as defined by the Amended Lynx Conservation Agreement between the Forest Service and USFWS.

In 2007, the Bitterroot NF analyzed project effects to lynx through Biological Assessments using the objectives, standards and guidelines contained in the Canada Lynx Conservation Assessment and Strategy (Ruediger et al. 2000).

Forest personnel identified a set of lynx tracks in the upper Larry Creek drainage in 2004 during a marten monitoring transect. A hunter reported seeing a lynx in the upper Lick Creek drainage in 2002. Montana Fish, Wildlife and Parks personnel sometimes find lynx tracks on or near the Forest while conducting their furbearer track surveys. Montana Department of Fish, Wildlife and Parks trapping records indicate one lynx was taken during the 1994-95 trapping season in Hunting District 270. This was the first lynx reported taken for several years.

The Forest was part of a pilot program to test the effectiveness of lynx monitoring using hair snare methodology in 1999, 2001 and again in 2002-3. The Forest established a grid of stations scented with a lynx attractant near the Continental Divide east of Lost Trail Pass. We checked hair snares at these stations on a regular basis and collected any hair samples found. Lab analysis of these samples identified hair from a number of different mammal species but none of the samples contained lynx hair.

REFERENCES:

Koehler, G.M. and J.D. Brittell. 1990. Managing spruce-fir habitat for lynx and snowshoe hares. J. of Forestry: 88(10) pp. 10-14.

Maj, M. 1992. Interim management recommendations, sensitive species. USDA Forest Service, Northern Region Office. Unpubl. report. 16 pp.

Montana Department of Fish, Wildlife and Parks. 2007. 2006 Bald Eagle Nesting Season Summary. Montana Department of Fish, Wildlife and Parks. Missoula, Montana. Unpubl. report.

Quinn, N.W.S. and G. Parker. 1987. Lynx. pp. 682-695 *in:* Wild furbearer management and conservation in North America, Novak, M., M. O. Baker and B. Malloch, eds. 1987. Ministry of Natural Resources, Ontario, Canada. 1150 pp.

Ruediger, B., J. Claar, S. Gniadek, B. Holt, L. Lewis, S. Mighton, B. Naney, G. Patton, T. Rinaldi, J. Trick, A. Vandehey, F. Wahl, N. Warren, D. Wenger and A. Willianmson. 2000. Canada lynx conservation assessment and strategy. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management and USDI National Park Service. Forest Service Publication #R1-00-53, Missoula, MT. 142 pp.

Thompson, I.D., I.J. Davidson, S. O'Donnell and F. Brazeau. 1989. Use of track transects to measure the relative occurrence of some boreal mammals in uncut forest and regeneration stands. Can. J. Zool. 67:1816-1823.

USDA Forest Service. 2007a. Northern Rockies Lynx Management Direction Record of Decision. National Forests in Montana and parts of Idaho, Wyoming and Utah. U.S. Dept. of Agriculture, Forest Service, Northern Region Office, Missoula, MT. March 2007. 71pgs [0757]

USDA Forest Service. 2007b. Northern Rockies Lynx Management Direction FEIS Volume 1. National Forests in Montana and parts of Idaho, Wyoming and Utah. U.S. Dept. of Agriculture, Forest Service, Northern Region Office, Missoula, MT. March 2007. 587pgs [0755]

USDI Fish and Wildlife Service. 2007. Biological opinion on the effects of the Northern Rockies Lynx Amendment on the distinct population segment (DPS) of Canada lynx (*Lynx canadensis*) in the contiguous United States. Unpublished. Montana Field Office, Helena, Montana. 85 p. [0753]

USDI Fish and Wildlife Service. 2000. Grizzly bear recovery in the Bitterroot ecosystem: Final Environmental Impact Statement. Missoula, MT.

USDI Fish and Wildlife Service, Nez Perce Tribe, National Park Service, Montana Fish, Wildlife and Parks, Blackfeet Nation, Confederated Salish and Kootenai Tribes, Idaho Fish and Game and USDA Wildlife Services. 2008. Rocky Mountain Wolf Recovery 2007 Annual Report. C.A. Sime and E.E. Bangs, eds. USFWS, Ecological Services, Helena, MT. 275 pp. Available online at: http://www.fws.gov/mountain-prairie/species/mammals/wolf/

Sensitive Wildlife Species

OBJECTIVE: Monitor sensitive wildlife species habitat and populations to minimize impact until conservation strategies are prepared. Track populations and trends. Determine population and habitat relationships.

DATA SOURCE: Surveys and habitat mapping from project planning.

FREQUENCY: When a project area is analyzed.

REPORTING PERIOD: 2007.

VARIABILITY: Data that indicate downward trends in populations or habitat or stable, viable populations or habitat.

INTRODUCTION: Sensitive species are those animal species identified by the Regional Forester for which population viability is a concern, as evidenced by:

- ♦ Significant current or predicted downward trends in population numbers or density; and/or
- ♦ Significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

The regional list was updated in 2005 and the current sensitive wildlife species listed for the Bitterroot NF are black-backed woodpecker, boreal toad, Coeur d'Alene salamander, fisher, flammulated owl, northern bog lemming, northern leopard frog, peregrine falcon, western big-eared bat and wolverine. Northern goshawk was dropped from the list in 2007, while bald eagle was added.

The management goal for sensitive species is to maintain a viable population of a species throughout its range within the planning area (FSM 2670.5 19, 28). The planning area is the Bitterroot NF. The Forest provides special management emphasis to ensure sensitive species viability and to preclude trends toward endangerment that would result in the need for federal listing under the Endangered Species Act of 1973. On National Forest projects, our wildlife biologists complete biological evaluations to determine the effects each project will have on sensitive species.

The following is a description of the sensitive species' habitats and the monitoring and evaluation we did in FY2007.

BALD EAGLE

Bald eagles are usually associated with large rivers, lakes or the ocean coast where fish are readily available as a prey item. During the winter, they are sometimes found in more diverse locations that provide concentrations of other foods such as waterfowl or carrion.

Bald eagles have made a dramatic recovery in Montana and across the country since they were listed as Endangered in 1973. As a result of this recovery, USFWS downlisted bald eagles to Threatened in 1995 and removed them from Federal listing as a Threatened species in August 2007. Per Region One policy, the bald eagle was automatically added to the Regional Forester's Sensitive Species List when it was removed from Federal listing.

Monitoring:

Montana FWP personnel monitor bald eagle nests along the Bitterroot River from an airplane. This data is supplemented by observations from the ground for several nests. Observers

discovered 2 new bald eagle territories in 2007 and new nests in two existing territories. There are now 13 known bald eagle nesting territories in the Bitterroot drainage. In 2007, 13 bald eagle nests were active in the spring. Only 4 of these nests were checked for productivity during the summer, but these 4 nests fledged at least 7 juvenile bald eagles (MFWP, 2008), for an average productivity of 1.75 fledglings per active nest. Assuming this average productivity applied to the other 7 nests where actual productivity was not determined, total bald eagle productivity for the Bitterroot valley is estimated to be 19 young eagles in 2007. The presence of these nests indicates that the breeding population of bald eagles in the Bitterroot Valley has increased dramatically in the past five years.

We discovered the first known bald eagle nest on the Bitterroot NF near Lake Como in April 2003. This nest has been successful every year since then and fledged two young in 2007. A new territory and nest was discovered near Painted Rocks Lake in 2007. This nest was on private land but was very close to the BNF boundary. Nesting success was not determined for this nest in 2007.

The Bitterroot drainage also provides fall, winter and spring habitat for bald eagles. The Hamilton and Stevensville Christmas Bird Counts indicate that the number of bald eagles wintering in the Bitterroot Valley is large and stable or increasing. Wintering eagles can be found throughout the Bitterroot Valley, especially in areas near the Bitterroot River and in areas where road-killed deer are common. Wintering bald eagles usually leave the area in February and March for northern breeding grounds. Bald eagles use Painted Rocks Lake and the East and West Forks of the Bitterroot River during migrations.

Evaluation:

The breeding population of bald eagles in the Bitterroot valley has increased dramatically since the late 1990s, when the only known active nest was on the Lee Metcalf National Wildlife Refuge. Active bald eagle nests are now scattered along the entire length of the Bitterroot River. The valley's bald eagle population swells during the winter when migrants join the resident birds and the species is now a fairly common winter resident in the Bitterroot valley. The biggest threat to the local breeding population appears to be residential development on private lands along the Bitterroot River.

There were only 12 known nesting pairs of bald eagles in Montana in 1973. By 2007, there were about 447 identified bald eagle territories across Montana that contained at least 310 active nests. These nests fledged a minimum of 301 young eagles in 2007. Fledging success was not determined for some of these nests, but extrapolating nesting success from the nests where productivity was determined yields an estimate of about 418 young eagles fledged in 2007 across Montana (MFWP, 2008). This is less than the 366 active bald eagle nests monitored in Montana in 2006 that fledged a minimum of 504 juvenile eagles (MFWP, 2007), but some of this apparent decline was due to lack of productivity data caused by funding constraints that limited monitoring efforts in many areas.

In a broader context, the Montana Natural Heritage Program ranks the bald eagle as a G5 S3 species (MNHP, 2006). This means that across its range the species is considered common, widespread and abundant (although it may be rare in parts of its range). It is not vulnerable in most of its range. In Montana, the species is considered potentially at risk because of limited and potentially declining numbers, extent and /or habitat, even though it may be abundant in some areas.

BLACK-BACKED WOODPECKER

Black-backed woodpeckers' preference for recently burned forest has led to its listing as sensitive. Most research on black-backed woodpeckers indicates that they are dependant upon fires, particularly in the Northern Rockies (Hutto 1995, Caton 1996, Hitchcock 1996, Murphy and Lehnhausen 1998, Saab and Dudley 1998, Hejl and McFadzen 2000). Post-burn area studies in Oregon, Montana, Idaho and South Dakota consistently report that wood-boring beetles that occur in abundance (2 to 8 years) following a fire are an important food source for the woodpecker. Hutto (1995) stated the black-backed appears nearly restricted to post-burns and

Murphy and Lehnhausen (1998) postulated that local populations increase in number in post-burned areas and decrease in unburned areas. Preferred nesting habitat is characterized by high snag densities (Hejl and McFadzen, 2000).

Black-backed woodpeckers are also found in unburned forests and in areas of insect outbreaks (Marshall 1992, Bock and Lynch 1970, Apfelbaum and Haney 1981, Harris 1982, Goggan et al. 1988); however, they likely occur at lower densities and viability may not be maintained over time without sufficient post-fire habitat. For example, home ranges for black-backed woodpeckers in beetle-killed forests were estimated to be 1,000 acres, compared to an estimated territory size of 56 acres/pair in post fire habitat (Powell 2000). Some studies indicate that black-backed woodpeckers forage primarily on wood-borers, which may explain this difference in suitability between beetle outbreaks and post-fire habitat. Wood borers are much less abundant than bark beetles in areas of bark beetle outbreaks (Powell 2000). However, insect outbreak studies (without fire) suggest the species is attracted to other insects such as bark beetles when these insects provide an abundant prey base (summarized in Samson 2006). Arnett (et al. 1997a and 1997b) found similar densities of black-backed woodpeckers in mountain pine beetle killed areas, as in post-burns, further suggesting the species is not “restricted” to post-burns. Hoyt and Hannon (2002) noted that few studies have considered all habitats in proportion to availability nor considered the difficulty in comparing bird densities observed in open post-fire habitats versus bird densities observed in closed canopy and structurally complex, live forests.

Monitoring:

Forest personnel located six active black-backed woodpecker nests in 2004 as part of the preliminary stage of a University of Montana PhD study looking at the genetics of black-backed woodpeckers. All of these nests were located in areas that burned during 2003.

The Forest established several transects in 2002 to monitor the amount and duration of cavity nester use of forests burned at different intensities in 2000. We found a number of active cavity nests in forests that burned with moderate to severe severity, but few active cavity nests in forests that burned with low severity. We did not document any black-backed woodpecker nests on these transects in 2003 or 2004, but have not run these transects since then.

A research project conducted by scientists at the Rocky Mountain Research Station, Forestry Sciences Lab in Missoula looked at cavity nesting densities of nine species in the Ward Mountain fire (burned in 1994) and the Swet/Warrior Fire (burned in 1996). The Forest Service harvested portions of the Ward Mountain fire using a salvage prescription in 1995. The Swet/Warrior fire, located within the Selway-Bitterroot Wilderness, was not harvested. The researchers found nesting densities of black-backed woodpeckers were higher in the unharvested area than in the area that had been salvage logged (Hejl et al. 2000).

Evaluation:

It is apparent the Bitterroot National Forest (BNF) has and continues to provide sufficient and well distributed habitat to support the black-backed woodpecker. This conclusion is based on Forest monitoring and the following evaluation of other available information.

Habitat modeling based on Forest Inventory and Analysis data (FIA) estimates that the Bitterroot National Forest contains sufficient post-fire habitat to support between 2898 and 4490 pairs of BBWO (Samson, 2005). At a Forest-wide scale it is estimated that we have 373,615 acres of black backed woodpecker habitat over what is necessary to maintain a minimum viable population (Samson 2005). Another way to say this is that we have an estimated 1,371% of the habitat necessary to maintain a minimum viable population of black-backed woodpeckers on the Forest. Although the portion of this habitat that burned in 2000 is losing its suitability, fire records show continual recruitment of new post-burn habitat. This habitat is well-distributed across the BNF as a result of the widespread fires in 2000, 2003 and 2005 plus smaller amounts of fire in other years. Since 1989, the Bitterroot National Forest has averaged over 28,000 acres of new wildfires each year. Excluding the exceptionally large fires of 2000 from the average, the Forest still averaged over 10,000 acres of wildfire (new quality black-backed woodpecker habitat) each

year (see the fire section of this report for annual figures); this is in addition to the ongoing bark-beetle epidemic on the Forest (see item 37 – Insect and Disease status).

In broader context, the Montana Natural Heritage Program ranks the black-backed woodpecker as a G5 S2 species (MNHP, 2006). This means that across its range the species is considered common, widespread and abundant (although it may be rare in parts of its range). It is not vulnerable in most of its range. In Montana, the species is considered at risk because of very limited and potentially declining numbers, extent and /or habitat, making it vulnerable to extirpation in the state. The state ranking appears to not reflect the huge increases in the amount of burned habitat created by wildfires in Montana since 1999.

Hillis (2003) reported a 258% increase in habitat (post-fire) for the species in Region One from 2000 to 2003 and Samson (2006) reported that black-backed habitat (post-fire and insect outbreaks) has increased across the Northern Region in the last decade (from 278% on the Kootenai to over 300,000% on the Flathead). Samson (2006) also found that no gap between current post-burn or insect-infested (with no burn) areas occurs that would limit black-backed woodpeckers from interacting Region-wide. Information provided in Dixon and Saab (2000) suggests the species is increasing in numbers in the United States.

At this Regional scale, habitat modeling based on FIA data estimates that there is enough suitable post-fire habitat to support at least 3,719 to 6,405 pairs of black-backed woodpeckers (Samson, 2005). Areas of insect outbreaks offer additional potential habitat and black-backs have been documented using this habitat in Idaho and Oregon. Median dispersal distance for this species is estimated to be about 65 miles, although they are known to travel farther than this during irruptions. This dispersal distance indicates that black-backed woodpeckers across the entire Region belong to a single, well connected population. Although no population estimates are available, the large amount of suitable habitat well distributed across the Region combined with the interconnectedness of the population indicates that short-term viability of black-backed woodpeckers across the Region is not an issue (Samson, 2005).

Furthermore, a recent state-wide insect and disease condition report shows dramatic increases in tree mortality from 2002 to 2005 (USDA-FS 2005c). Across all Federal ownership in Montana, mountain pine beetle mortality was evident on about 172,050 acres of lodgepole pine and 17,434 acres of ponderosa pine in 2002. In 2005, the area affected by mountain pine beetle mortality increased to 577,481 acres of lodgepole pine and 25,244 acres of ponderosa pine (Ibid. at 48). Across the same area, Douglas-fir beetle mortality in Douglas-fir stands increased from about 60,112 acres in 2002 to about 168,798 acres in 2005. (Ibid. at 46). These areas containing trees recently killed by bark beetles are available as secondary habitat that could support lower numbers of black-backed woodpeckers than recently burned areas.

BOREAL TOAD (aka WESTERN TOAD)

This species is largely terrestrial, but can occur in a variety of habitats from valley bottoms to high elevations. These toads breed in shallow, muddy areas in lakes, ponds and slow streams. They may lay eggs and reproduce successfully in depressions seasonally filled with water, including wheel ruts on roads. The species seems to be widespread across the Bitterroot NF, although local population trends are unknown.

Monitoring and Evaluation:

There is no formal monitoring program for boreal toads in place on the Bitterroot NF at this time. Amphibian surveys indicate that they are well distributed across the Forest, but are uncommon to rare (Maxell 2004). Personnel from the Montana Natural Heritage Program performed amphibian and reptile surveys on the Bitterroot NF in 1995. They found boreal toads at a number of sites across the Forest and evidence of reproduction was apparent at several sites (Hendricks and Reichel 1996). An amphibian survey crew working under contract for the Regional Office surveyed many of the ponds and lakes on the Forest from 2000 to 2004 to document evidence of amphibian breeding. They only found evidence of boreal toad reproduction at about 3% of the

suitable sites surveyed, which is similar to the percentage they found throughout western Montana (Maxell 2004). The Forest did not have any projects within breeding habitats of boreal toads in 2007. This species has undergone severe population declines in many portions of its range, so the low reproductive success documented in western Montana is a concern.

COEUR D'ALENE SALAMANDER

This small terrestrial salamander is generally found below 5,000 feet in elevation in seeps, spray and splash zones of waterfalls, or cascades along streams and creeks. They use rock fissures or boulder piles covered by moss mats, remaining beneath the moss during the day. The salamanders hibernate from November to April. Removal of overstory vegetation, increases in water temperature, changes in water table and flow and physical disturbance of talus or rock habitat can affect Coeur d'Alene salamander populations. The southernmost record of this salamander in Montana is in the Chaffin Creek drainage on the east side of the Bitterroot Mountains.

Monitoring and Evaluation:

An amphibian survey crew working under contract for the Regional Office surveyed suitable habitat for this species at numerous sites on the Forest from 2001 to 2004. They found Coeur d'Alene salamanders at five new sites on the Forest: one in the Rock Creek drainage, one in the Little Rock Creek drainage, one in the Chaffin Creek drainage (Maxell 2004) and two along Lake Como (Maxell, pers. comm. 2004). Previous surveys by biologists from the Montana Natural Heritage Program in 1987 (Montana Natural Heritage Program 1987) and 1988 (Genter et al. 1988) only found Coeur d'Alene salamanders at Sweathouse Falls. Coeur d'Alene salamanders are very difficult to survey for and the new locations probably reflect improved survey techniques and increased effort rather than an increase in the species' abundance or distribution. Still, these new locations hint that Coeur d'Alene salamanders may be more widely distributed in the Bitterroot Mountains than previously thought. Forest Plan standards which protect riparian and aquatic habitats continue to provide appropriate protections for the Coeur d'Alene salamander and its habitat. There were not any project related impacts to Coeur d'Alene salamander habitat on the Forest in 2007. The Gash Creek fire burned some areas upstream of Swethouse Falls in 2006, potentially increasing sediment loads or affecting water flows or water chemistry at the falls.

FISHER

The home range of fishers varies in size from 4 to 32 square miles, wherein optimum habitat is thought to include mature, moist coniferous forest with a woody debris component, particularly in riparian/forest ecotones in low- to mid-elevation areas that do not accumulate large amounts of snow (Jones 1991, Heinemeyer 1993, Ruggiero et al. 1994). A review of fisher research suggests that the species uses a diversity of tree age and size class distributions at the patch or stand level that provide sufficient (generally greater than 40%) overhead cover (either tree or shrub).

Fishers use lower elevations than pine marten (i.e. are restricted to areas of lower snow accumulation compared with marten) and are better adapted to earlier successional stages of forests than marten (Banci 1989, Jones 1991); however, the studies conducted in this region have concluded that fishers use late successional forest more frequently than the early to mid-successional forests that result from timber harvest (Aubry and Houston 1992; Buck et al. 1994; Rosenberg and Raphael 1986). Similarly, fishers in the Rocky Mountain study preferred late-successional forests with complex physical structure, especially during the summer (Jones and Garton 1994). Fisher seem to avoid non-forest and pole/sapling stands and spend little time in ponderosa pine stands. They show a strong affinity for forested riparian habitats throughout the year (Jones 1991).

Documented den sites have occurred in cavities of live or dead trees in forested areas with some structural diversity (forb/shrub cover, downed wood, multiple forest canopy layers) that maintain a prey base of snowshoe hare, porcupine and a variety of small mammals (Ruggiero et al. 1994). Almost all known natal dens for fishers (where parturition occurs) and maternal dens (other dens where kits are raised) have been discovered in Eastern North America (Arthur 1987; Paragi 1990). Of these, the vast majority were located high in cavities in living or dead trees. This

strongly suggests that female fishers are highly selective of habitat for natal and maternal den sites. Information is available for only two natal dens (California, Buck et al. 1983; Montana, Roy 1991) and one maternal den (California, Schmidt et al. 1993, unpubl.) in the western United States. The den found in Montana was in a hollow log 11m long with a convoluted cavity averaging 30 cm in diameter. Female fishers will use 1-3 dens per litter. (Paragi 1990). Riparian stringers of late successional stage vegetation provide important connectors. Fishers use forested riparian areas extensively for foraging, resting and as travel corridors (Claar et al. 1999; Witmer 1998, p. 15).

Research and Monitoring:

Observers conducting pine marten track surveys found a set of fisher tracks in the Lost Horse Creek drainage in 2004. Dr. Kerry Foresman from the University of Montana detected fisher in the Big Creek and Bear Creek drainages during his study in the winter of 1994-1995. He feels most of the Bitterroot canyons support fisher populations. Two fishers were taken from the Bitterroot Mountains in 1994-95, one from Big Creek and one from Lost Horse Creek. These were the first taken for several years in the Bitterroot. According to Montana Fish, Wildlife and Parks trapping records, between three and five fisher have been trapped each year for the past eight years in the Bitterroot Valley. Current Montana Fish, Wildlife and Parks trapping records show a total of six fishers trapped with the most recent taken in 2003.

Evaluation:

Based on the above research, monitoring and the following evaluation of other available information, it appears suitable fisher habitat is well distributed within capable ecotypes across the Bitterroot National Forest and, although uncommon by nature, the species is using that habitat.

The Montana Natural Heritage Program ranks fisher as a G5 S3 species (MNHP, 2006). This means that across its range the species is considered common, widespread and abundant (although it may be rare in parts of its range). It is not vulnerable in most of its range. In Montana, the species is considered potentially at risk because of limited and potentially declining numbers, extent and /or habitat, even though it may be abundant in some areas.

Witmer (1998, p.14) states that the status of the fisher in the Western United States is poorly known but generally perceived as precarious and declining. Fisher populations in all the other states in the northern Rocky Mountains and Pacific Northwest are considered Imperiled, Critically Imperiled or Possibly Extirpated (MNHP, 2006). Fishers are apparently secure in their core range, which includes the boreal forest zone across Canada.

Fishers were apparently extirpated from Montana by 1930 and there are no records of their occurrence in the state from then until fishers from other areas were released at several sites in the early 1960s (Vinkey, 2003). The Bitterroot Mountains possess the most verified records of fisher in the state both before and after 1989 and appear to be the stronghold of fisher populations in Montana (Vinkey, 2003). This is largely due to a release of 39 fishers from British Columbia in the Idaho side of the Bitterroots in 1962, although genetic investigations indicate that some native fishers may have survived in the Selway-Bitterroot region (Vinkey, 2003). Twelve fishers from British Columbia were released at Moose Lake on the eastern edge of the Sapphire Mountains in 1962 and apparently became established in the Sapphires based on trapping records; however, there have been few verified records of fishers in the Sapphires since 1989 and researchers have been unable to verify the presence of a self-sustaining population in this area (Vinkey, 2003). University of Montana mammalogist Dr. Kerry Foresman considers the Sapphire Mountains to be generally too dry for fishers and has been unable to locate any on the east side of the Bitterroot Valley (Foresman, 2006).

At the Bitterroot National Forest-wide scale, a query of FIA data estimates that we have 95,134 acres of summer habitat and 286,142 acres of winter fisher habitat. This is 95% of the habitat necessary to maintain a minimum viable population of fisher (Samson 2006; Samson 2005). The adjacent Lolo National Forest and Clearwater National Forest have an estimated 149% and

358% of the habitat necessary to maintain a minimum viable population, respectively (Samson, 2005).

Given the large amount of suitable habitat on the Bitterroot National Forest and additional connected habitat on the adjacent Forests (indicated, in part, by the successful expansion and continued presence of re-introduced populations), short term viability of the fisher at this scale does not appear to be concern. For the fisher, managing the landscape within the natural range of composition, structure and frequency and extent of ecological drivers (fire, insects and wind) may be most effective for long-term fisher persistence (Samson 2006 p. 11).

FLAMMULATED OWL

Flammulated owls evolved in an ecosystem primarily shaped by frequent, low severity fires. Fire suppression has resulted in conversion of many pine forests to shade-tolerant fir forests with high tree densities in smaller diameter classes. Overall “fire suppression may be resulting in sub-optimal habitat for flammulated owls” (Linkhart 2001, page 168). These same stand conditions increase the potential for moderate or severe stand replacing fires. A Bitterroot National Forest assessment after the extensive fires of 2000 found that, “Of the 11 sensitive species on the Forest, flammulated owl habitat was the most severely affected” (USDA Forest Service, 2000).

Based on current literature, flammulated owls are dependent on mature to old growth ponderosa pine/Douglas-fir forests at lower elevations in the Rocky Mountains. These habitats correspond very closely to habitat type groups 1, 2 and 3 on the BNF. They are found in mature open park-like stands with some understory shrubs and small trees (McCallum 1994). In general, flammulated owls nest in relatively large trees in relatively open areas. They are not typically associated with burned areas or extensive beetle-killed trees, probably due to the lack of physical and biological components needed to support both the owls and the insects they prey on.

Composition of forests within favored areas where flammulated owls foraged repeatedly suggests the importance of old ponderosa pine or ponderosa pine and Douglas-fir in the foraging behavior of the owl. Old ponderosa pine forests (whether pure or mixed with other species) typically form open stands with well-developed grass or shrub understories, as long as frequent fires are allowed to limit invasion of shade-tolerant conifers. These understories support arthropods (insects for food) in a forest layer that is used extensively by fledged owlets and molting adults in late summer (Reynolds and Linkhart, 1992).

The associated prey for flammulated owls in the early spring are primarily noctuid (night flying) moths and in the summer crickets, grasshoppers, moths and beetles (McCallum, 1994). The openness of these stands also provides space for hawking flying insects between crowns and for hover-gleaning them from outer needle bunches (Reynolds and Linkhart 1987).

Reynolds and Linkhart (1992) reported that males sang from hidden positions next to tree trunks or in dense clumps of foliage and that ponderosa pine and Douglas-fir were the only species used as song trees. These trees had a mean age of 289 years. Security cover is provided by regenerating Douglas-fir thickets and large-diameter, veteran trees with heavy branching. These features are utilized by both foraging and roosting owls for cover from predators (van Woudenberg 1999, including extensive internal citations).

Ponderosa pine is an important habitat component of flammulated owls. Ponderosa pine was found by some researchers to be the preferred nest tree (McCallum 1994 IN van Woudenberg 1999). Wright (1996) found that flammulated owl occurrences were correlated with the number of ponderosa pine trees > 15” and live basal area (IN Samson 2005, p. 55).

Flammulated owls depend on woodpeckers to create nesting cavities, usually in large dead trees. Reynolds and Linkhart (1992) state that in reports where forests surrounding nests were described or photographed, all nests were in, or adjacent to, mature or old growth stands (Hanna 1941, Bull and Anderson 1978, Cannings et al. 1978, Hasenyager et al. 1979, Cannings 1982, Bloom 1983, Reynolds and Linkhart 1984, 1987, Fix 1986, Goggans 1985, Hayward 1986, Howie and Ritcey 1987, McCallum and Ghelback 1988); however, Hasenyager et al. (1979) and Bloom (1983) reported nests in forests that had been partially cut but contained large, residual trees and

Winter (1974) found the owl in second-growth forests, although they did not report nesting in this age-class (Reynolds and Linkhart 1987).

Flammulated owls appear to be tolerant of humans and are known to nest close to occupied areas (Hayward and Verner, 1994).

Monitoring:

In 2005, the Forest participated in the first-ever Region-wide survey for flammulated owls. This survey was part of the Region's Landbird Monitoring Program and was coordinated through the Avian Science Center at the University of Montana. The Region-wide survey indicated that flammulated owls occur on every National Forest (NF) in the Region with the exception of the Custer, Lewis and Clark and Gallatin NFs. The highest detection rates for flammulated owls were on the Nez Perce, Lolo, Helena and Bitterroot NFs. Locally, we surveyed 30 transects across the Forest, many of which had not been previously surveyed for this species. We detected flammulated owls on about 15% of the 279 calling points, on a total of 14 of the transects (Cilimburg 2006). Most flammulated owl detections were on the southern half of the Forest, similar to a mid-1990s study (Wright, 1996).

A graduate student from the University of Montana surveyed much of the suitable habitat on the Bitterroot NF for flammulated owls in 1994 and 1995 (Wright 1996). She found concentrations of this species in several locations on the Darby and Sula Districts. The Forest has continued to monitor some of the routes where Wright found owls in the mid-1990s. The number of flammulated owl detections on unburned transects has remained fairly consistent from 2000 to 2004. Owl numbers remained similar on unburned transects resurveyed in 2006. High and mixed severity fires burned through several of the areas known to support concentrations of flammulated owls on the Bitterroot NF in August 2000. We monitored several of the previously established transects through these areas in 2001 and detected about half the number of flammulated owls that were found before the fires. Flammulated owl detections on burned transects have continued to decline and we found very few owls in severely burned areas in 2004. Our 2006 surveys detected very few owls in burned areas except where some unburned patches of trees occurred. We will continue to monitor established transects to determine changes in owl use.

Evaluation:

The Montana Natural Heritage Program classifies the flammulated owl as a G4 S3B species (MNHP, 2006). This means that at the global scale, the species is considered to be uncommon but not rare (although it may be rare in parts of its range) and usually widespread. It is apparently not vulnerable in most of its range, but there is possibly cause for long-term concern. At the state scale, the breeding population is considered to be potentially at risk because of limited and potentially declining numbers, extent and/or habitat, even though it may be abundant in some areas.

The flammulated owl is perhaps the most common raptor of the montane pine forests of the western United States and Mexico (McCallum, 1994). The BNF is near the northeast edge of the known range of this species. As of 1998, flammulated owls were considered to have a widespread presence in Missoula and Ravalli counties, (Wright 1996 in Hart et al. 1998 and http://nhp.nris.state.mt.us/mbd/).

A standardized Regional survey effort in 2005 found that flammulated owls were well-distributed in suitable habitat west of the Continental Divide, but were rather restricted in distribution east of the Divide. On the BNF, flammulated owls were detected on 14 of the 30 completed transects and on 42 of the 281 sample points (Cilimburg, 2006). These surveys showed that flammulated owls are well-distributed in suitable habitat on the southern half of the Forest, which was heavily sampled. They were only detected on a few transects on the north half of the Forest, but this area was not heavily sampled. Wright (1996) found a similar distribution pattern for flammulated owls on the BNF during field work for her Master's thesis in 1994 and 1995. The Region One Wildlife Ecologist has looked at viability for this species and has determined that habitat is well distributed

and abundant for the flammulated owl in the Northern Region and that short-term viability of the species in the Northern Region is not an issue (Samson 2005).

The number of flammulated owl detections on the Bitterroot National Forest on unburned transects has remained fairly consistent from 2000 to 2006. In high and mixed severity fires that burned through areas known to support concentrations of flammulated owls in 2000, about half the number of flammulated owls were detected in 2001. Flammulated owl detections on burned transects have declined since then.

Bitterroot National Forest-wide, habitat modeling based on FIA data estimates that the Forest contains 11,144 acres of flammulated owl habitat more than what is estimated to be necessary to maintain a minimum viable population (Samson 2006; Samson 2005). Another way to say this is that we have an estimated 337% of the habitat necessary to maintain a minimum viable population of flammulated owls on the Forest.

Based on our evaluation of available research, monitoring and the above information, it appears flammulated owl habitat is adequately distributed within capable ecotypes across the Bitterroot National Forest and sufficient to support the species. The extensive fires of 2000 did disproportionately reduce the amount and distribution of flammulated owl habitat within the burned portion of the Forest and the literature indicates the successional trends resulting from fire suppression within the habitats used by the owl may be further reducing the quality of the remaining habitat. Therefore the Forest's policy since the 2000 fires has been to maintain these remaining habitats and, where appropriate, design management treatments that, increase the longevity of the habitat by reducing the risk of moderate-to-severe fires, reducing competition for water and nutrients and increasing stands' resistance to insect and diseases.

NORTHERN BOG LEMMING

Northern bog lemmings (*Synaptomys borealis*) prefer sphagnum bogs as primary habitat, but they also occur in wet meadows and mesic forest environments. Discovery of individuals on the Beaverhead NF, near its boundary with the Bitterroot NF, extended the known range of the species nearly 100 miles to the south. Populations in Canada are extensive, but bog lemmings are difficult to trap and little is known about their population status in the United States.

Monitoring and Evaluation:

The Regional Forester added the northern bog lemming to the Sensitive Species List for the Bitterroot NF in June of 1994. The Forest has not conducted systematic surveys for bog lemmings, but one was trapped in Meadow Creek in the East Fork of the Bitterroot River in June of 1992. Another was trapped along Big Creek in 1996. The Lost Trail Fen is probably suitable habitat, but we have not completed surveys there. None of the project analyses completed in FY2007 prescribed treatments in potential northern bog lemming habitat. Forest Plan standards which protect riparian and aquatic habitats continue to provide appropriate protections for the northern bog lemming and its habitat.

NORTHERN GOSHAWK

Northern goshawks (*Accipiter gentilis*) are large forest hawks usually associated with coniferous forests in our area. Studies in Oregon found that they tend to nest in mature to over mature forest stands with relatively dense crown closures and open understories and use a variety of habitats within a large foraging territory (Reynolds et al., 1982). Nest sites identified on the Bitterroot and Beaverhead-Deerlodge National Forests occur in a variety of stand structures, including stands that are somewhat younger and more open than those described in the literature. Goshawks typically build several nests within their territory and alternate use among these nests on an unpredictable basis. USFWS conducted a status review of the northern goshawk in the western United States in 1997-1998 in response to a petition to list the species. FWS has not proposed to list the species as Threatened or Endangered at this time. The Regional Forester added goshawks to the Sensitive Species List for the Bitterroot NF in March 1999 and subsequently removed goshawks from the Sensitive Species List in October 2004. Goshawks were added back to the Sensitive Species List in 2005.

The Regional Forester removed the northern goshawk from the Sensitive species list on July 17, 2007 (PF-WILD-070). Reviews of recent goshawk research (summarized in Samson 2005; Samson 2006; PF-WILD-073) and the Region's 2005 goshawk surveys (Kowalski 2006) demonstrate that (1) habitat exists to support reproductive individuals on each Forest; (2) habitat is well-distributed; and (3) individual goshawks can interact with one another across the Region. The Forest Service Manual (2670.5) states that Sensitive Species are those for which there is a significant current or predicted downward trend in population numbers/density and a similar downward trend in habitat capability that would reduce distribution of the species. Regional data collection and analysis demonstrates that neither condition exists; therefore, the species no longer meets the definition for "sensitive."

Monitoring:

The Bitterroot NF has monitored known northern goshawk nests on an intermittent basis since at least 1991. The Forest initiated a more systematic monitoring and nest search effort in the summer of 1998. As of September 2007 we have identified a total of 99 northern goshawk nests across the Bitterroot NF, in 36 different territories. Of the known nests, 57 have been active at least one year since we found them and 15 have been active more than one year. We know of several alternate nests within many territories. We have documented at least 161 juvenile goshawks fledged from these nests. Forest personnel have identified two additional territories that have been active at least one year since 1995 (courtship displays, active territorial defense, or newly-fledged young were seen). Although no actual nests have been located in these territories, Forest biologists have observed a total of five fledged juvenile goshawks within them.

We have documented the loss of 14 known goshawk nests since 1998 and five others have deteriorated to the point of being unusable. Two of the lost nests burned up during the fires of 2000; two were lost when the nest trees fell over; eight fell out of the nest tree due to unknown but natural causes and one was knocked out of the nest tree when a firewood cutter dropped a snag through the branches of the nest tree. As of October 2007, 80 of the 99 nests we have discovered are intact and usable, although some need a little maintenance by the birds.

The Forest could not fund the Accipiter survey contract in 2007, so monitoring consisted mostly of checking the status of previously known nests. We did not check all the known nests and were unable to spend much time searching for new nests in territories where none of the known nests were active, or in new areas. Still, we discovered three new goshawk nests, two of which were active. 2007 appeared to be a below average year for goshawk productivity on the Forest. Seven of the 63 known useable nests that we checked were active (11%), somewhat below the Forest's average occupancy rate. However, average productivity was 1.9 young fledged per active nest, well above the Forest's average productivity rate of 1.4 young fledged per active nest. These results are probably not cause for alarm, as goshawks are known to skip reproductive attempts or fledge fewer young in years where the prey base is limited, which is often dependent on weather.

In 2005, the Forest participated in the first-ever Region-wide standardized survey protocol for goshawks. Crews completed calling transects along grid lines through randomly located primary survey units (PSUs) on every Forest in the Region. The crew on the BNF did not record a single goshawk response over the course of the breeding season, although they did discover seven previously unknown goshawk nests. These results reinforce the theory that 2005 was a poor year for goshawk reproduction on the Forest, since non-breeding goshawks are unlikely to respond to recorded goshawk calls. Across the Region, surveyors detected goshawks on approximately 40% of the randomly selected PSUs. This indicates that goshawks are reasonably abundant and well-distributed across the Region.

Other raptors sometimes use goshawk nests. In 2007, one known goshawk nest was occupied by a red-tailed hawk, the first time we have seen this species using a goshawk nest on the Forest. In previous years we have documented great horned owls using three different goshawk nests (one nest two different years), great gray owls using one goshawk nest and Cooper's hawks using two goshawk nests.

Table 21 summarizes the monitoring results for goshawks since 1998.

Table 21 – Goshawk Monitoring Results Since 1998

Year	Newly Discovered Nests [2]	Active Nests (Total)	Number of Young Fledged	Remarks
1998 [1]	5	5	8	
1999 [1]	8	3	5	Several other territories appeared active based on the presence of adults, but known nests within the territories were inactive and we were unable to find active alternate nests.
2000 [1]	5	5	9	One of the active nests contained two young, but was destroyed by the Bear fire before the young could fledge.
2001 [1]	8	6	12	Also found two additional active goshawk territories where we could not locate any nests.
2002 [1]	9	7	16	One of the active nests contained two young, but the nest fell out of the tree before the young could fledge. We also discovered two additional active goshawk territories where we could not locate any nests. In addition to the nests occupied by goshawks, one of the known goshawk nests was occupied by a great horned owl.
2003 [1]	11	15	37	One known goshawk nest was occupied by a great gray owl and fledged four owls. Another known goshawk nest was occupied by a great horned owl.
2004 [1]	19	13	23	We found five new nests and two new territories. Two active goshawk nests failed.
2005 [1]	12	4	5	We found nine new nests and three new territories. One active goshawk nest apparently failed.
2006	7	10	16	One known goshawk nest was occupied by a great horned owl and another by a Cooper's hawk. We found seven new nests (five of which were active) and one new territory. Three active goshawk nests failed.
2007	3	6	13	One known goshawk nest was occupied by a red-tailed hawk. We found three new nests (two of which were active), all in existing territories. One active goshawk nest failed.

[1] All known nest sites were monitored.
[2] Some of these are alternate nests within known territories.

We sometimes find Cooper's hawk nests while searching for goshawk nests. The Cooper's hawk is a smaller *Accipiter* species that tends to nest in somewhat younger and denser forest stands than goshawks, but which sometimes use inactive goshawk nests. We did not monitor most of the known Cooper's hawk nests in 2007 due to time constraints. We did not find any new Cooper's hawk nests in 2007. Two previous nests were destroyed when the trees they were in snapped off. Three known Cooper's hawk nests were destroyed by the Gash Creek fire in 2006. Our monitoring results are summarized in **Table 22** below.

Table 22 – Coopers Hawk Nests Found While Surveying For Goshawks Since 1998

Year	Newly Discovered Nests[2]	Active Nests (Total)	Number of Young Fledged	Remarks
1998 [1]	1	1	2	
1999 [1]	0	2	5 or 6	
2000 [1]	1	2	6	The new nest and one of the nests active in 1999 were active and each fledged three young.
2001 [1]	2	2	5	One of the new nests was near a previously known nest. Only the newly found nests were active.
2002 [1]	3	2	6	None of the previously known nests were active. One of the new active nests and one new inactive

				nest were both near a previously known nest.
2003 [1]	4	5	14	One active nest was previously known. Two new nests were near previously known nests. Two new nests were in newly discovered territories.
2004 [1]	4	5	12	Three new nests were found in three newly discovered territories. One active Cooper's hawk nest failed.
2005 [1]	4	2	Unknown	No known nests active. 2 active nests discovered after young had fledged and left area.
2006	2	1	2	Found two new nests, one in a new territory and one in a known territory. One young fledged from new nest, plus another found in a known territory where the only known nest was not active.

[1] All known nest sites were monitored.
[2] Some of these are alternate nests within known territories.

In 2002, we noticed that one of our female Cooper's hawks was wearing a USFWS band. We attempted to capture this bird to get the band number, but were unsuccessful. The same female returned to the same territory in 2003 and rebuilt and successfully used a nest that had partially fallen out of the nest tree in 2002. We were able to capture this bird in 2003. We ran her band number through the USFWS database and discovered that she was at least two years old when she was banded during migration in September 1999 at a HawkWatch International raptor banding site in the Goshute Mountains in Nevada. It is very unusual to get a band return from a bird on its breeding territory that was banded during migration, so this information helped define migration routes for Cooper's hawks from our area. This female returned to the same territory again in 2004. She did not use any of the known nests in her territory in 2005.

We found two active sharp-shinned hawk nests in 2005. Both fledged four young. Sharp-shinned hawks are the smallest *Accipiter* species and tend to nest in somewhat younger and denser forest stands than Cooper's hawks. We will continue to monitor these nests in the future.

Evaluation:

It is apparent the Bitterroot National Forest has sufficient and well distributed habitat to support the northern goshawk and that the species is using that habitat. This conclusion is based on the following evaluation of the Forest monitoring data considered with other available information.

The Bitterroot National Forest is estimated to have sufficient suitable nesting habitat to support a minimum of 340 goshawk nests, which would provide nesting habitat for at least 57 to 170 goshawk pairs. Inventory and modeling also estimate that there is enough suitable post-fledging habitat to support a minimum of from 68 to 135 goshawk pairs and enough suitable foraging habitat to support a minimum of 87 goshawk pairs (Samson, 2005). Therefore, a conservative estimate is that the BNF contains enough suitable habitat to support all the life stages of at least 57 goshawk pairs. In other words, this habitat assessment indicates that we have 347,917 acres of goshawk habitat more than what is necessary to maintain a minimum viable population (Samson 2006; Samson 2005). Another way to say this is that we have an estimated 1,254% of the habitat necessary to maintain a minimum viable population of goshawks on the Forest. This habitat is well-distributed across the Bitterroot National Forest. These habitat estimates correlate well with the results of the Forest's active program of monitoring Accipiter nests described above.

For broader context, at the Regional scale (Forest Service Northern Region), habitat modeling based on Forest Inventory and Analysis data (FIA) estimates that there is enough suitable habitat to support at least 1,266 pairs of goshawks (Samson, 2005). Median dispersal distance for goshawks is estimated to be about 167 miles, which indicates that goshawks across the entire Region belong to a single, well connected population. Although no population estimates are available, the large amount of apparently suitable habitat well distributed across the Region combined with the interconnectedness of the population indicates that short-term viability of goshawks across the Region is not an issue (Samson, 2005).

Since goshawks and their habitat are well distributed across the Forest, are reasonably abundant given their large territory size and produce good numbers of fledglings, we are confident that the goshawk population across the Forest is doing well and that it contributes positively to the viability of goshawk populations in western Montana.

NORTHERN LEOPARD FROG

Northern leopard frogs inhabit lakes and ponds in non-forested areas that contain dense emergent vegetation such as cattails or sedges. They were formerly widespread in Montana, but they appear to have been extirpated from most of their historic range in western Montana (Hendricks and Reichel 1996). The Regional Forester added this species to the sensitive species list for the Bitterroot NF in March 1999, even though their known habitat requirements make it unlikely they ever occupied many sites on National Forest lands.

Monitoring and Evaluation:

Personnel from the Montana Natural Heritage Program performed amphibian and reptile surveys on the Bitterroot NF in 1995. They did not find any northern leopard frogs in the two valley bottom sites where they were reported in the 1960s (Hendricks and Reichel 1996). An amphibian survey crew working under contract for the Regional Office surveyed almost 200 still-water (lentic) habitats on the Bitterroot NF from 2000 to 2004. Most of these sites were not suitable habitat for leopard frogs and the crew did not find any evidence of leopard frogs in the Bitterroot drainage (Maxell 2004). One of the sites occupied by leopard frogs in the 1960s was filled in for a housing development in 2000 or 2001. It is likely that this species no longer occurs in the Bitterroot drainage, although no thorough survey of lentic habitats on private lands has been conducted (Maxell 2004).

Forest Plan standards which protect riparian and aquatic habitats continue to provide appropriate protections for the northern bog lemming and its potential habitat.

PEREGRINE FALCON (Delisted 1999)

Following their remarkable sustained population recovery across the country, USFWS removed peregrine falcons from the Endangered Species List in August 1999. They were added to the Regional Forester's Sensitive Species List in 2000.

Peregrine falcons occupy a wide variety of habitats, but need adequate cliff ledges or rock outcrops for nesting. Peregrines prefer dominant high open cliff faces. Habitat surveys for the Bitterroot NF identified suitable nesting sites along the west side of the valley on cliffs in or adjacent to the Selway-Bitterroot Wilderness. USFWS considers peregrines as a migratory species for this area.

The Forest, in partnership with The Peregrine Fund, the Liz Claiborne/Art Ortenberg Foundation and Patagonia, Inc., released (hacked) juvenile peregrine falcons in the Painted Rocks area in 1989, 1990 and 1991. In 1992 birds returned to the area, selecting lands along the river for nesting. We also hacked peregrine falcons in the Canyon Creek drainage in 1992 and in the Little Rock Creek drainage in 1993. We curtailed further hacking on the Bitterroot NF after wild adults harassed the recent fledglings at both these sites, indicating that nearby territories were already occupied. Since we now have a number of established breeding pairs, there is no need to continue reintroduction efforts. Known eyries on the Bitterroot NF are on tall, vertical cliff faces and most are within or near the Selway-Bitterroot Wilderness. The Blodgett fire burned near peregrine nest cliffs in Blodgett and Mill Creeks in August of 2000, but juveniles had left those nests at least a month earlier. We don't expect the fires to negatively affect peregrine occupancy or breeding success in the future. In fact, adult peregrines from territories near the 2000 fires appear to forage above the burned areas quite frequently.

Monitoring and Evaluation:

The Bitterroot NF participates in the statewide peregrine monitoring program coordinated by two peregrine experts under contract with Montana Department of Fish, Wildlife and Parks. Bitterroot NF personnel and/or volunteers from Bitterroot Audubon monitored all the known eyries on the

Forest in 2006 to determine productivity. They also inventoried a number of canyons that contain good habitat in an effort to find new eyries. We found one new eyrie in 2006.

We currently know of 14 eyries in the Bitterroot drainage that have been active at least once since 1992. 10 of our eyries were occupied by peregrines in 2006 and produced at least 21 fledged peregrines. This was about 14% of the known production of 147 juvenile peregrines in Montana in 2006 (Sumner and Rodgers 2006). One of our active eyries failed to produce any fledglings, apparently because a pair of golden eagles nested near the peregrine eyrie and drove the peregrines away. One other peregrine canyon was occupied by prairie falcons in 2006. Table 23 summarizes known activity and productivity for each eyrie. The year in parenthesis following the territory name indicates when the territory was discovered.

Table 23 - Peregrine Falcon Productivity on the Bitterroot National Forest

Year	Painted Rocks (1992)	Blodgett (1994)	Bear Creek (1996)	Kootenai (1998)	Tin Cup (1999)	Big Creek (2000)	Mill Creek (2000)	Sweeney (2001)	Sawtooth (2001)	N. Lost Horse (2001)	Boulder (2001)	One Horse (2005)	Trapper Peak (2006)	Fred Burr (2007)
1992	Act, ?													
1993	Act, ?													
1994	Unk.	Act, 2												
1995	Unk.	Act, 2												
1996	Act, 2	Act, 1	Act, 1											
1997	Unk.	Unk.	Unk.											
1998	Unk.	Act, 1	Act, 1	Act, 3										
1999	Act, 3	Unk.	Act, 3	Act, 3	Act, 0									
2000	Act, 2	Act, 3	Act, 1	Act, 2	Act, 4	Act, 1	Act, 1							
2001	Act, 1	Act, 2	Act, 2	Act, 2	Act, 3	Inact	Act, 0	Act, 2	Act, 2	Act, 2	Act, 2			
2002	Act, 1	Act, 3	Act, 3	Act, 2	Act, 1	Inact	Act, 3	Inact	Act, 0	Act, 2	Act, 2			
2003	Act, 0	Act, 2	Act, 2	Act, 2	Act, 3	Inact	Act, 0	Inact	Inact	Act, 3	Act, 1			
2004	Act, 3	Act, 2	Act, 1	Act, 1	Act, 0	Inact	Act, 4	Inact	Act, 0	Act, 1	Act, 0			
2005	Act, ?	Act, 0	Act, 2	Act, 3	Act, 3	Act, 0	Act, 1	Inact	Act, 3	Act, 2	Act, 1	Act, 0		
2006	Act, 2	Act, 3	Act, 2	Act, 2	Act, 3	Inact	Act, 2	Inact	Act, 0	Act, 3	Act, 2	PRFA	Act, 2	
2007	Act, 2	Act, 2	Act, 1	Act, 2	Act, 2	Inact	Act, 2	Inact	Act, 1	Act, 0	Act, 2	PRFA	Act, 0	Act, 0

Act, # = Active, number fledged Unk = Unknown or no survey conducted Inact = Inactive

WESTERN BIG-EARED BAT

The Bitterroot NF is within the range of the western big-eared bat (*Plecotus townsendii*). Hoffman et al. (1969) reported specimens collected northeast of Florence at the Curlew Mine, in Hamilton and at Lake Como. The bats used a wide variety of vegetation types, from juniper/pine to high elevation mixed conifer forests (Barbour and Davis 1969). Roosting, maternity and hibernating colonies use caves, abandoned mine tunnels and occasionally abandoned buildings. Females generally tend the young alone and are most often found associated with a maternity colony. Males are more solitary and may venture farther out into the forest to forage and occasionally roost in cavities or behind loose bark. Caves or mine tunnels are essential to western big-eared bat nursery colonies.

Monitoring and Evaluation:

The Forest did not propose any projects near suitable hibernacula or roost sites in 2006. Bat surveys using mist nets and audio bat detectors were conducted at several locations on the

southern end of the Forest in 2006. A number of bats were captured and identified, but none of them were big-eared bats. A MT FWP biologist did record the echolocation sounds of a big-eared bat near Woods Cabin on Lake Como in August 2006 during a public presentation about bats. The Forest did not monitor any known big-eared bat sites in FY2006.

WOLVERINE

Wolverines (*Gulo gulo*) are solitary animals that range broadly over a wide variety of habitats. Isolation from human impacts and a diverse prey base seem to be the most important habitat components. Within large roadless areas, wolverine use appears to be concentrated in medium density to scattered mature timber and in ecotonal areas around natural openings such as cliffs, slides, basins and meadows. There seems to be little use in stands of dense young timber or in openings such as clearcuts or wet meadows (Reel et al. 1989; Butts 1992).

Wolverine home ranges are very large, averaging approximately 150 square miles in Montana. Wolverines in Montana seem to display a distinct seasonal elevational movement pattern. In the summer, they move to higher elevations and inhabit forests dominated by subalpine fir. In the winter, low elevation riparian areas may be important (Reel et al. 1989; Butts 1992). Wolverines feed primarily on rodents and carrion, although they are opportunists and will also consume berries, insects, fish, birds and eggs when available. Ungulate carrion seems to be particularly important in the winter and wolverine movement to lower elevations during winter may be to take advantage of ungulate mortalities on winter ranges (Reel et al. 1989; Butts 1992).

Monitoring and Evaluation:

The Regional Forester added wolverines to the Sensitive Species List for the Bitterroot NF in June of 1994. We have not specifically monitored for wolverines on the Forest, but we do record incidental observations. Table 24 summarizes known wolverine sightings on the BNF since 1992. With approximately 73% of the Bitterroot National Forest in inventoried roadless areas or wilderness, it appears abundant wolverine habitat exists and is well distributed across the Forest. These sightings indicate that wolverines are present on the BNF and that they occur in a variety of locations across the Forest.

Table 24 - Wolverine Sightings, Bitterroot National Forest

Year	District	Vicinity	# Wolverine	Observation Type
2004	Stevensville	Willow Mountain	1	Tracks
2004	Stevensville	Bass Creek	1	Tracks
2004	Sula	Sign Creek	1	Sighting
2004	West Fork	Nez Perce Pass	1	Tracks
2003	Stevensville	Upper Mill Creek	1	Sighting
2001	Stevensville	Sharrott Creek	1	Tracks
2001	Darby	Sleeping Child Hot Springs	1	Sighting
2001	West Fork	West Fork Road	2	Sighting
1999	Darby	Lost Horse Creek	2	Sighting
1996	Sula	Mink Creek Saddle	1	Sighting
1995	Stevensville	Sweathouse Creek	1	Sighting
1995	Darby	Gird Point	1	Sighting
1992	Darby	Schumaker Campground	1	Sighting
1992	Darby	Coyote Meadows	1	Sighting

REFERENCES:

Apfelbaum, S. and A. Haney. 1981. Bird populations before and after wildfire in a Great Lakes pine forest. Condor 83:347-354.

Arnett, E.B., B. Altman and W.P. Erickson. 1997a. Relationships between salvage logging and forest avifauna in lodgepole pine forests of the central Oregon Pumice Zone. Unpubl. 1996 annual report to the Weyerhaeuser Co., Springfield, OR

Arnett, E.B., B. Altman and W.P. Erickson. 1997b. Effects of salvage logging on neotropical migratory landbirds in lodgepole pine forests of central Oregon: 1997 preliminary results. Unpubl. report to the Weyerhaeuser Co., Springfield, OR

Arthur, S.M. 1987. Ecology of fishers in south-central Maine. Orono, ME: University of Maine. Ph.D. dissertation. 112 pp

Aubry, K.B and D.B. Houston. 1992. Distribution and status of the fisher in Washington. Northwestern Naturalist 73: 69-79.

Banci, V. 1989. A fisher management strategy for British Columbia. Victoria, British Columbia: British Columbia Ministry of the Environment, Lands and Parks, Wildlife Branch. Wildlife Bulletin No. B-63

Barbour, R.W. and W.H. Davis. 1969. Bats of America. University of Kentucky Press, Lexington, KY. 286 pp.

Bloom, P.H. 1983. Notes on the distribution and biology of the flammulated owl. Western Birds 14:49-52.

Bock, C.E. and J.F. Lynch. 1970. Breeding bird populations of burned and unburned conifer forest in Sierra, NV. Condor 72:182-189.

Buck, S., Mullis, C., Mossman, A. 1983. Final report: Corral Bottom-Hayfork Bally fisher study. [Unpublished report]: U.S. Dept. of Agriculture. In cooperation with: Arcata, CA: Humboldt State Universtity

Buck, S., Mullis, C., Mossman, A. 1994. Habitat use by fishers in adjoining heavily and lightly harvested forest. Pp. 368-376 In: Buskirk, S.W., Harestad, A., Raphael, M., comps. Eds. Martens, sables and fishers: biology and conservation. Ithaca, NY: Cornell University Press.

Bull, E.L. and Anderson, R.G. 1978. Notes on flammulated owls in Northeastern Oregon. The Murrelet 59:26-27.

Butts, T. W. 1992. Wolverine (Gulo gulo) biology and management: a literature review and annotataed bibliography. USDA Forest Service Northern Region, Missoula, MT. 105 pp.

Cannings, R.J. 1982. A flammulated owl nests in a nest box. Murrelet 63:66-68.

Cannings, R.J., Cannings, S.R., Cannings, J.M., Sirk, G.P. 1978. Successful breeding of the flammulated owl in British Columbia. Murrelet 59:74-75.

Caton, EL. 1996. Effects of fire and salvage logging on the cavity-nesting bird community in NW Montana. Dissertation, University of MT, Missoula.

Cilimburg, A. 2006. 2005 flammulated owl surveys: final report. Avian Science Center, University of Montana. Missoula, MT Available on the Internet at http://avianscience.dbs.umt.edu/research_landbird_flam.htm

Claar, J.J., N. Anderson, D. Boud, M. Cherry, B. Conard, R. Hompesch, S. Miller, G. Olson, H. Ihsle Pac, J. Waller, T. Wittinger, H. Youmans. 1999. Carnivores. Pages 7.1-7.63 in Joslin, G. and H. Youmans, coordinators. Effects of recreation on Rocky Mountain Wildlife: A review for Montana. Committee on Effects of Recreation on Wildlife. Montana Chapter of the Wildlife Society.

Dixon, R.D. and V.A. Saab. 2000. Black-backied woodpecker (Picoides arcticus) In the birds of North America, No. 509 (A. Poole and F. Gill, eds). The Birds of North America, Inc. Philadelphia, PA.

Fix, D. 1986. Flammulated owls in the western Oregon Cascades. Oregon Birds 13:38-40. (0250)

Foresman, K. 2006, Personal communication. Professor of Biological Science, University of Montana, Missoula, Montana.

Genter, D. L., A. G. Wilson, Jr. and E. M. Simon. 1988. Supplementary report on the status of the Coeur d'Alene salamander (*Plethodon vandykei idahoensis*) in Montana. The Montana Natural Heritage Program,. Helena, MT. 39 pp.

Goggans, R., R. D. Dixon, L. C. Seminara 1988. Habitat use by Three-toed and Black-backed woodpeckers. Oregon Dept. Fish and Wildl. Nongame Rep. 87302

Goggons, R. 1986. Habitat use by flammulated owls in NE Oregon. Master's thesis, Oregon State University, Corvallis.

Hanna, W.C. 1941. Nesting of the flammulated screech owl in California. Condor 43:290-291

Harris, M. A. 1982. Habitat use among woodpeckers in forest burns. Master's thesis, Univ. of Montana, Missoula

Hasenyager, R.N., J.C. Pederson, A.W. Haggen.1979. Flammulated owl nesting in a squirrel box. Western Birds 10:224

Hayward, G.D. 1986. Activity patterns of a pair of nesting flammulated owls (Otus flammeolus) in Idaho. Northwest Science 60:141-144.

Hayward, G.D. 1989. Boreal owl habitat relationships: a report to Region One, U. S. Forest Service. Dept. of Fish and Wildlife Resources, College of Forestry, Wildlife and Range Sciences, University of Idaho, Moscow, ID. 30 pp.

Hayward, G.D. and J. Verner, tech. eds. 1994. Flammulated, boreal and great gray owls in the United States: a technical conservation assessment. Gen. Tech. Rpt. RM-253. Fort Collins, CO: U.S. Dept. of Agriculture, Forest Service, Rocky Mtn. Forest and Range Experiment Station. 214 p

Hayward, G.D., P.H. Hayward and E.O. Garton. 1987. Habitat requirements and distribution of the boreal owl in central Idaho. Annual progress report, Dept. of Fish and Wildlife Resources, College of Forestry, Wildlife and Range Sciences, University of Idaho, Moscow, ID. 16 pp.

Heinemeyer, K.S. 1993. Temporal dynamics in the movements, habitat use, activity and spacing of reintroduced fishers in northwestern Montana. M.S. Thesis, Univ. of Montana, Missoula, MT. 158 p

Hejl, S., M. McFadzen and T. Martin. 2000. Maintaining fire-associated bird species across forest landscapes in the northern Rockies. Report INT-99543-RJVA. Missoula, MT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Forest Sciences Lab. 20 pp.

Hendricks, P. and J.D. Reichel. 1996. Amphibian and reptile survey of the Bitterroot National Forest: 1995. Montana Natural History Program. Helena, MT. 95 pp.

Hillis, M., A. Jacobs and V. Wright. 2003. U.S. Forest Service Region One black-backed woodpecker assessment. Unpubl. Report, USDA Forest Service, Missoula, MT. 18 pp.

Hitchcock, S.M. 1996. Abundance and nesting success of cavity-nesting birds in unlogged and salvage-logged burned forest in northwestern Montana. M.S. Thesis, Univ. of Montana, Missoula, MT. 89 p.

Hoffman, R.S., D.L. Pattie and J.F. Bell. 1969. The distribution of some mammals in Montana. II. Bats. J. of Mammalogy 50(4):737-741.

Howie, RR and R Ritcey. 1987. Distribution, habitat selection and densities of flammulated owls in British Columbia. Pp. 249-254 in Biology and Conservation of Owls. USDA FS General Technical Report. RM-142, Fort Collins, CO.

Hoyt, J. S. and S. J. Hannon. 2002. Habitat associations of black-backed and three-toed woodpeckers in the boreal forest of Alberta. Canadian Journal of Forest Research 32:881-1888

Hutto, R. 1992. Ornithology professor, University of Montana. Personal communication with D. Lockman, 8/20/92.

Hutto, R.L. 1995. Composition of Bird Communities Following Stand-Replacement Fires in Northern Rocky Mountain (U.S.A.) Conifer Forests. Conservation Biology, V.9, No. 5, October, 1995. p 1041-1058.

Jones, J. L. and E. O. Garton. 1994. Selection of successional stages by fishers in northcentral Idaho. Pages 377–388 in S.W. Buskirk, A.S. Harestad, M.G. Raphael and R.A. Powell, editors. Martens, sables and fishers: biology and conservation. Comstock Publishing Associates, Cornell University Press, Ithaca, New York, USA.

Jones, J.L. 1991. Habitat use of fisher in northcentral Idaho. M.S. Thesis. University of Idaho, Moscow, ID. 147 pp.

Linkhart, B.D. 2001. Life history characteristics and habitat quality of Flammulated Owls in Colorado. PhD dissertation, University of Colorado, Boulder, Colorado. 206 pp

Marshall, D. B. 1992. Status of the black-backed woodpecker in Oregon and Washington. Portland, Or: Audubon Society of Portland

Maxell, B.A. 2004. Amphibian and aquatic reptile inventories conducted on and around the Bitterroot National Forest 2000-2003. Report to Region One Office of the U.S. Forest Service, Bitterroot National Forest, Montana Department of Fish, Wildlife and Parks and Biological Resources Division of the U.S. Geological Survey. Montana Cooperative Wildlife Research Unit and Wildlife Biology Program, University of Montana, Missoula, MT. 128 pp.

McCallum, D. A. 1994. Flammulated, Boreal and Great Gray Owls in the United States: A Technical Conservation Assessment. USDA Forest Forest and Rocky Mountain Forest and Range Experiment Station and Rocky Mountain Region GTR RM-253.

McCallum, D. Archibald and Frederick R. Gehlbach. 1988. Nest-Site Preferences of Flammulated Owls in Western New Mexico. 9 ppgs.

MNHP. Montana Natural Heritage Program database. 2006. Montana Natural Resource Information System. Montana State Library, Helena, MT. http://nhp.nris.state.mt.us/

Montana Natural Heritage Program. 1987. Status report on the Coeur d'Alene salamander (*Plethodon idahoensis*) in Montana. The Montana Natural Heritage Program,. Helena, MT. 102 pp.

Murphy, EC and WA Lehnhausen. 1998. Density and foraging ecology of woodpeckers following a stand replacement fire. Journal of Wildlife Management 62: 1359-1372.

Paragi, T.F. 1990. Reproductive biology of female fishers in southcentral Maine. Orono, ME: University of Maine. 107 pp

Powell, HDW. 2000. The influence of prey density on post-fire habitat use of the black-backed woodpecker. Master's thesis, University of MT, Missoula.

Quinn, N.W.S. and G. Parker. 1987. Fisher chapter. *In:* Wild furbearer management and conservation in North America. Novak, M., M. O. Baker and B. Malloch, eds. 1987. Ministry of Natural Resources, Ontario, Canada. 1150 pp.

Reel, S., L. Schassberger and W. Ruediger. 1989. Caring for our natural community: Region One threatened, endangered and sensitive species program. USDA Forest Service, Northern Region. Missoula, MT. 309 pp.

Reynolds, R. T., E. C. Meslow and H. M. Wight. 1982. Nesting habitat of coexisting *Accipiter* in Oregon. J. Wildl. Manage. 46(1):124-138.

Reynolds, R.T. and B.D. Linkhart. 1984. Methods and materials for capturing and monitoring flammulated owls. Great Basin Naturalist 44: 49-51.

Reynolds, RT and BD Linkhart. 1992. Flammulated owls in ponderosa pine: evidence of preference for old growth. Pp. 166-169 in Old growth forests in the SW and Rocky Mt. regions: proceedings of a workshop. USDA FS General Technical Report. RM-213, Fort Collins, CO.

Reynolds, RT and BD Linkhart. 1987. The nesting biology of flammulated owls in Colorado. Pp. 239-248 in Biology and Conservation of Northern Forest Owls: proceedings of the symposium; 1987 February 3-7; Winnipeg, Manitoba. Gen. Tech. Rep. RM-142. USDA Forest Service, Fort Collins, CO.

Rosenberg, K.V. and R.G. Raphael. 1986. Effects of forest fragmentation on vertebreates in Douglas-fir forests. Pp. 263–272. in: Verner, J.; Morrison, M.L.; Ralph, C.J., eds. Wildlife 2000: Modeling habitat relationships of terrestrial vertebrates. Madison, WI: University of Wisconsin Press:

Roy, K.D. 1991. Ecology of reintroduced fishers in the Cabinet Mountains of northwest Montana. M. S. Thesis. University of Montana, Missoula, MT. 94 p.

Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, L.J. Lyon and W.J. Zielinski, Technical eds. 1994, September. The Scientific Basis for Conserving Forest Carnivores: American Marten, Fisher, Lynx and Wolverine, in the Western United States. USDA, Forest Service. Gen. Tech. Rep. RM-254.

Samson, F. B. 2005 (amended March 6, 2006). Conservation assessment of the northern goshawk, blacked-backed woodpecker, flammulated owl and pileated woodpecker in the Northern Region, USDA Forest Service. Unpublished report on file, Northern Region, Missoula, Montana, USA.

Samson, F.B. 2005. A Conservation Assessment for the Northern Goshawk, Black-Backed Woodpecker, Flammulated Owl and Pileated Woodpecker in the Northern Region, USDA Forest Service. Unpublished report on file, Northern Region, Missoula, MT

Sumner, J and R. Rodgers, R. 2006. 2006 Montana peregrine falcon survey. Montana Fish, Wildlife and Parks, Bozeman, MT. 51 pp.

USDA Forest Service. 2000b. Bitterroot Fires 2000, An Assessment of Post-fire Conditions With Recovery Recommendations. Bitterroot National Forest, Hamilton, MT. [0075]

USDA Forest Service. 2005c. Montana forest insect and disease conditions and program highlights. USDA Forest Service, Region One, Forest Health Protection Report 06-1, Missoula, MT

Van Woudenberg, Astrid M. 1999. Status of the flammulated owl in British Columbia. Ministry of Environment, Lands and Parks, Wildlfie Branch, Victoria BC. Wildlife Working Report No. WR-95.

Vinkey, R. S. 2003. An evaluation of fisher (*Martes pennanti*) introduction in Montana. M. S. Thesis, University of Montana, Missoula, Montana.97 pp.

Weydemeyer, W. and D. Weydemeyer. 1928. The woodpeckers of Lincoln County, MT. Condor 30:339-346.

Winter, J. 1974. The distribution of the flammulated owl in California. Western Birds 5(2): 25-44.

Witmer, Gary W.; Martin, Sandra K.; Sayler, Rodney D. 1998. Forest carnivore conservation and management in the interior Columbia basin: issues and environmental correlates. Gen. Tech. Rep. PNW-GTR-420. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 51 p. (Quigley, Thomas M., ed.; Interior Columbia Basin Ecosystem Management Project: scientific assessment).

Wright, V. 1996. Multi-scale analysis of flammulated owl habitat use: owl distribution, habitat management and conservation. M. S. Thesis. University of Montana, Missoula, MT. 91 pp.

Neotropical Migratory Birds

OBJECTIVE: Monitor neotropical migratory bird populations and trends. Determine population and habitat relationships. Cooperate with international program of monitoring.

DATA SOURCE: Survey routes established through several bird programs.

FREQUENCY: Annually.

REPORTING PERIOD: 2007.

VARIABILITY: Trends that indicate declines in populations.

EVALUATION & MONITORING RESULTS:

Neotropical migratory birds (NTMBs) breed here and winter in suitable habitats in western Mexico, Central America or South America. NTMBs have attracted national public attention due to well-documented population declines of many species in the eastern hardwood forests. These general declines have not been noted in forest-nesting species in western North America. In the west, seven species have shown declines, five of which are prairie grassland species. Although the Forest and others are actively monitoring birds in the Bitterroot Valley and Forest, we have found few trends and have only been able to draw limited conclusions about local populations at this time. The effort involves several separate but related programs, which are discussed below.

Monitoring Avian Productivity and Survivorship (MAPS) Program. In cooperation with a national network of MAPS stations coordinated by the Institute for Bird Populations at Point Reyes, CA, we mist-net, classify and band NTMBs and resident birds at two sites. We have monitored the Lick Creek site since 1993. We established the Lower Rock Creek site in 1994. When netted, the birds are identified, sexed, aged, weighed and measured before release. As a part of the national network, we hope to gain insight on the production of young and survivorship through the rigors of migration. Through 2007, we have trapped and banded 3,246 birds, including 904 recently fledged young. We have had 1,934 recaptures, including multiple captures of some individuals. Since 1993 about 27 percent of the birds caught and banded have been young of the year. In 2007, about 25 percent of the first time captured birds were young of the year. We have also captured over 200 birds that we released unbanded. We have captured individuals of 63 species since 1993, including 32 species in 2007. The most common species captured at our two sites are Swainson's thrush, McGillivray's warbler, common yellowthroat (all migratory species) and black-capped chickadee (a resident species).

Breeding Bird Surveys (BBS) Program. Volunteers and/or Forest staff currently run five BBS routes that are at least partially on the Forest. The routes are 24.5 miles long, with 50 stations where birds are identified primarily by their songs. The Breeding Bird Laboratory of the National Biological Survey, USDI Fish and Wildlife Service (FWS) sanctions the routes. The information on numbers and species of birds counted is entered in a national database in order to monitor trends of breeding birds. There are approximately 3,000 BBS routes in the U.S.

Moderate and high severity fire affected approximately 50% of the Skalkaho-Rye and Gibbons Pass BBS routes in 2000. The other three routes were unaffected by the fires. Since we have several years of pre-fire data from these routes, we have the opportunity to monitor changes in the bird communities caused by the fires over time.

Bitterroot Valley Raptor Survey. The Raptor Survey is an annual road survey from Florence to Hamilton that counts all raptors seen along the Eastside Highway. This is part of an effort coordinated by the Montana Department of Fish, Wildlife and Parks (FWP) native species

program to monitor trends in statewide raptor populations. We counted 102 raptors on this route in 2007. This is the third highest number we've counted on this transect and exceeds the five-year average count (95 raptors).

Research Note

In 2001 and 2002, the Forest provided logistical support and funding for a graduate student from the University of Montana who monitored the 13 transects that burned during 2000 as well as a similar number of unburned transects. She also conducted nest searches in several burned areas to determine which parts of the burns were most important to nesting birds. The study found that overall, seven species responded negatively and 16 species responded positively to fire. Further, seven species increased most dramatically at a single fire severity. She also found changes in abundance between one and two years after fire for most species that responded to fire. These findings underscore the importance of fire severity and time since fire and imply that both factors must be considered to understand the complexities of fire effects on bird communities. Her results suggest a need to manage for a range of fire severities because different bird species respond positively to different fire severities (Smucker, et al. 2005).

Forest-wide Point Counts. In 1994 we began a program to monitor breeding bird population trends along a network of transects across the Forest as part of the Region One Landbird Monitoring Program (LBMP). Each transect has ten stations where surveyors identify and record every bird seen or heard in 10 minutes. They also record vegetation data at each point. The points are permanently marked for relocation, so that over subsequent years population trends can be ascertained. This point count protocol is followed on all national forests in the Region. In 1994, LBMP crews established 42 transects and counted resident birds and NTMBs at 413 points on the Bitterroot NF. The crews monitored the transects and points again in 1995 and 1996, with only slight modification. Budget constraints dictated suspension of the point counts for the 1997 breeding season. Crews monitored a subset of the transects in 1998, 2000 and 2004. They collected additional vegetation data but no bird data at a subset of the points in 1999. Researchers have incorporated these data into the revised habitat relationship analysis, which provides information about specific habitats occupied across the Region. Data and results of the LBMP efforts are viewable on the University of Montana's Avian Science Center website at http://avianscience.dbs.umt.edu/research_landbird.

Moderate and high severity fire affected approximately 25% of the Forest's established point count transects in 2000. The other routes were unaffected by the fires. We have several years of pre-fire bird data from these routes as well as baseline vegetation data, so we now have the unique opportunity to detect changes in bird communities along these transects and correlate them with habitat changes caused by the fires. Please see the adjacent "Research Note" for a brief description and the findings from one initial study.

In addition, in 2001 and again in 2003, crews from the Region One Landbird Monitoring Program established a number of new point count transects on the Forest in burned and unburned ponderosa pine forest. These transects are intended to monitor the different bird communities that are associated with various combinations of burn intensities and/or mechanical treatments in dry forests.

In 2007, LBMP crews established point count locations in stands that were classified as dry forest old growth based on criteria in Green et al. (1992, errata 2005). Point counts were established in five National Forests across Region One, including the BNF. These point counts were intended to characterize the bird communities associated with xeric old growth forests and to determine whether that community was different from the birds associated with mature forests. At this time, a final report is still being written and results are not available.

Christmas Bird Counts. The Forest helps support Christmas Bird Counts (CBC) annually at Hamilton and Stevensville. These counts are part of a national effort to monitor broad-scale changes in the distribution and abundance of birds in the early winter. The CBC is coordinated by

the National Audubon Society and is the longest-running bird monitoring program in the world. Volunteer birders count birds on one day within count circles with radii of 7.5 miles centered on the Stevensville Ranger Station and the Hamilton airport. Both count circles include portions of the Forest. The Hamilton CBC started in 1988 and has a cumulative total of 118 species. The Stevensville CBC started in 1963 and has a cumulative total of 150 species. Among other findings, these CBCs document that the number of raptors wintering in the valley has increased dramatically since 1963. In addition, two species that we now think of as being very common winter residents (house finches and mourning doves) were rare or non-existent during the early years of the CBCs and have both become much more common here in the winter since the mid-1990s. These two CBCs are consistently within the top five CBCs in Montana in terms of bird species diversity. In FY 2007 the Hamilton CBC tallied 6,893 individual birds and 74 species. The Stevensville CBC tallied 11,794 individual birds and 86 species.

Green, P., Joy, J., Sirucek, Hann, W., Zack, A. and B. Naumann. 1992. Old-growth forest types on the Northern Region. R1 SES 4/92. USDA Forest Service, Northern Region, Missoula, MT. (errata corrected 2/05). [0132]

Smucker, K. M. 2003, R. L. Hutto and B. M. Steele. Changes in bird abundance after wildfire: importance of fire severity and time since fire. Ecological Applications 15(5): 1535-1549. Available on the internet at: http://avianscience.dbs.umt.edu/research_pub.

AQUATIC AND RIPARIAN ECOSYSTEMS

Riparian Area
Condition Item 22

OBJECTIVE: Ensure compliance with Forest Plan standards for fisheries, water and wildlife.

DATA SOURCE: Interdisciplinary team reviews and monitoring information from resource specialists.

FREQUENCY: One project per District per year.

REPORTING PERIOD: 2007.

VARIABILITY: Deviation from riparian area and fisheries objectives.

EVALUATION:

The Forest Plan's fish and wildlife goals are to provide habitat to support viable populations of native and desirable non-native wildlife and fish, provide for the recovery of threatened and endangered species and maintain riparian flora, fauna, water quality and recreation activities. This monitoring item discusses activities and monitoring associated with timber harvest, recreation, fire management, facilities management, grazing or other forest management activities in riparian areas, all of which can affect riparian function. We cover restoration of riparian areas in Item 19 and fisheries in Items 21 and 41.

Riparian monitoring in 2007 (as in past years) far exceeded this item's requirement of one project per District per year. Monitored activities include multiple projects related to developed recreation sites, outfitter and guide camps, fire management, facilities, grazing, weed management, timber management and activities related to implementation of the Burned Area Recovery decision. Project and activity specific key findings are presented below for each of these monitored activities. It is clear important lessons are being learned and applied. In almost all cases riparian and fisheries objectives are being met or exceeded. In those few cases where problems have been identified, root causes were usually attributable to human error or incorrectly applied practices had limited adverse effects on the riparian and fisheries resources. Most were either corrected upon detection or are scheduled to be remedied.

None of the monitored projects indicate inadequacies in the Forest Plan riparian area and fisheries objectives or protective standards.

MONITORING RESULTS:

Developed and Dispersed Recreation

Rehabilitation of Off-road Vehicle Damage to Arasta Creek (Stevensville Ranger District). A 200 ft section of a tributary to Threemile Creek was repeatedly driven through by 4WD vehicles. The illegal activity left deep wheel-ruts, which shifted the stream into unnatural channels. A small tractor with a backhoe and a 3-person crew filled ruts and put the stream back in the original channel location. The rocky access route, a non-system road, was water-barred and small boulders and woody debris were placed on the road to temporarily discourage use during rehabilitation. An emergency closure was issued for this 1/4–mile route. A visit to the site in the early fall revealed that the site grew lush herbaceous vegetation quickly as it is a moist environment and the stream was generally back in its original channel. We expect that there will be no noticeable increase in fine sediment in the fish-bearing portion of Threemile Creek, which is 1/4 mile downstream of this site. It should be noted that two off-road vehicle organizations contacted the district to volunteer their time and equipment to assist with rehabilitation.

Blodgett Campground and Trailhead Reconstruction (Stevensville Ranger District). In June 2007, a Forest fisheries biologist monitored the near-stream campsites that were decommissioned and planted with shrub seedlings and looked for erosion problems at the cut-slopes that were disturbed during reconstruction of the trailhead in 2003. Also in 2003, the trees that were cut for trailhead expansion were placed in the creek. The placement left bare trails where the logs were skidded by horses.

The planted seedlings were alive, but their growth remained slow because of the thick conifer overstory and soil compaction. Visitors used constructed trails and user-created trails that had previously riddled the area were much less common. A campground host onsite helped limit the impacts of campers. The constructed trails were starting to lose their definition, which may result in visitors making their own network of paths again.

The cut-slopes around the trailhead continue to be relatively well vegetated and not unduly erosive. The photo shows the vegetated nature of the slopes and the trailhead sign that alerts anglers to the potential presence of bull trout in the creek and explains how to differentiate them from brook trout. These educational posters were posted after bull trout were listed in 1998 and were replaced last summer at most trailheads.

Trails created during log placement in Blodgett Creek grew back well and a few of the logs scattered in the floodplain hid the old ford, which reduced its use and allowed plants to establish on most of it.

Figure 6 - Vegetation established on the 2003 construction area and the updated sign at Blodgett Trailhead

Figure 7 - The center of the photo was an old ford. This path was used to move logs into the stream in 2003. The use by visitors and the use during log placement caused this area to be relatively bare. Vegetation has re-established.

Blodgett Trail (Stevensville RD). This trail was evaluated while conducting the surveys of Blodgett Lake (see monitoring Item 21). Trails and dispersed campsites have the potential to cause erosion and affect streamside vegetation. The trail between the trailhead and Blodgett Lake, in the headwaters, parallels Blodgett Creek, but has very little impact on the creek. The Wilderness Ranger provided the historical perspective on the uses along the trail and relative conditions. Small areas that had been closed to camping had recovered. Other areas commonly used for camping were obviously disturbed, but were limited to a reasonable size and not eroding.

Figure 8 – This meadow near a popular campsite has narrow trails running through it, but the disturbance appeared to be mostly limited to small camping area (less than an acre) which impacted vegetation but was not eroded.

Daly Dispersed Campsite (Darby Ranger District). Each October, for the last several years, Forest fisheries biologists have counted bull trout redds along a section of Daly Creek near the Road 711 Bridge. Dispersed camping sites have been casually monitored while doing these redd counts. In 2007, it was observed that more than the usual amount of illegal firewood cutting occurred in one of the sites. A more thorough review of the area was conducted. Two-track roads were more scattered across the riparian landscape than previously known and included an old crossing over a perennial tributary (using logs laid in the crossing in corduroy fashion) that should probably be removed. Alternative dispersed camp sites that were away from the stream banks, accessible on open roads and usable during more times of the year could be developed near the junction of roads 5783 and 711.

Figure 9 - A very large tree, illegally cut for firewood, along the bank of Daly Creek results in a loss to the riparian ecosystem and the aesthetic quality of this remote site.

Spring Gulch Campground (Sula Ranger District). Forest fisheries biologists monitored the large ponderosa pine in the East Fork Bitterroot River at the upstream end of the Spring Gulch campground on several occasions in 2007. The tree did not move in 2007 and has not moved since it first fell in the river in June 2003. The tree traps floating chunks of ice during the winter and has accumulated a sizeable amount of small woody debris along its upstream side, but has yet to produce significant bank erosion, campground flooding, or noticeable downstream channel adjustments. The tree has formed an outstanding large pool that provides habitat for numerous fish, including overwintering habitat for bull trout. Because of the tree and its large pool, fish habitat in the East Fork adjacent to the Spring Gulch campground is in better condition than it was when the Bitterroot River Section 7 Watershed Baseline was written in 2000. Maintenance activities at the Spring Gulch campground in 2007 were consistent with our programmatic agreements with the U.S. Fish and Wildlife Service. Riparian conditions are on a stable trend and angling is the biggest campground-associated impact on the fishery.

Indian Trees Campground (Sula Ranger District). Forest fisheries biologists monitored this campground in summer 2007. As described in our 2006 report, the four culverts under the campground loop road are undersized and barriers to the upstream movement of fish in Indian Trees Creek. When they were originally installed in 2001, there was roughly equal flow of water in the two forks of Indian Trees Creek that flow through the campground. Over the past two years, nearly all of the flow has shifted into the south channel and the north channel was nearly dry in 2007. The four culverts are not meeting their objective of providing and maintaining fish passage. Given the Forest's lengthy backlog of other fish barrier culverts and the small size of Indian Trees Creek, replacement of the culverts is clearly a low priority at this time. Maintenance activities that occurred at the Indian Trees campground in 2007 were consistent with our programmatic agreements with the U.S. Fish and Wildlife Service. Campground activities appear to be having a negligible effect on the fishery. Riparian conditions are on a stable trend.

Piquett Trailhead Rehabilitation Project (West Fork Ranger District). In 2007, Forest fisheries biologists implemented a project to eliminate full size vehicle riparian impacts at the Piquett Creek trailhead. The project involved obliterating a user-created road (used by firewood cutters) in the Riparian Habitat Conservation Area (RHCA) at the Piquett Creek trailhead and felling 16 large, beetle-killed Douglas fir trees into the Piquett Creek and Britts Creek stream channels to increase woody hiding cover for bull trout and westslope cutthroat trout. The user-created road was made by firewood cutters to access a patch of beetle-killed Douglas fir trees in the RHCA along Piquett Creek. It was causing riparian soil damage and facilitating the illegal removal of trees for firewood in the Piquett and Britts Creek RHCAs. Like most user-created firewood roads, the system was steadily expanding in the RHCA as firewood cutters drove further and further to access beetle-killed trees. In April 2007, the Forest road crew obliterated the user-created road system, planted the disturbed areas with grass and placed boulders to keep vehicles from being able to drive off of Road 49 and down into the riparian area. The obliteration was successful in keeping vehicles out of the trailhead area during the remainder of 2007. The felled trees have formed complex pools and are providing excellent hiding cover for bull trout and westslope cutthroat trout.

Figure 10 - User-created road at the Piquett trailhead, before obliteration.

Figure 11 - User-created road at the Piquett trailhead, after obliteration

Figure 12 - Woody debris felling in Piquett Creek for fish habitat.

Sam Billings Campground (West Fork Ranger District). Forest fisheries biologists monitored this campground in summer 2007. The campground is located in RHCA surrounding Boulder Creek, a stream containing bull trout and westslope cutthroat trout. Maintenance activities at the campground in 2007 were consistent with our programmatic agreements with the U.S. Fish and Wildlife Service. Riparian conditions are on a stable trend and the biggest impact that campground users have on the fishery is angling.

Magruder Corridor Campgrounds (West Fork Ranger District). Fisheries biologists monitored road and campground maintenance, recreational activities and stock grazing at four of the five developed campgrounds in the Magruder corridor (Paradise, Indian Creek, Raven Creek and Deep Creek) during summer 2007. These four campgrounds are located within the RHCAs surrounding anadromous, fish-bearing streams (the Selway River, Deep Creek, Indian Creek and Whitecap Creek). We did not monitor conditions at the Observation Point campground due to its upland location, far from any streams. Our monitoring at the RHCA campgrounds detected no

new problems or significant impacts on aquatic resources. Conditions at the Indian Creek, Raven Creek and Deep Creek campgrounds are similar to those described and analyzed in the Upper Selway River Section 7 Biological Assessment (May 2000). Bank stability has improved at the Paradise campground since the Upper Selway River Section 7 Biological Assessment was written due to the protection offered by a riparian jack-leg fence constructed in 2000. In 2007, maintenance activities at the four RHCA campgrounds were consistent with our programmatic agreements with the U.S. Fish and Wildlife Service and National Marine Fisheries Service (also known as NOAA Fisheries). The maintenance activities had no effect on listed fish species.

Our key findings are:

- Most of the developed campgrounds and dispersed camping areas on the Forest are located in the RHCAs along fish-bearing streams.
- Many campground visitors fish; therefore, the location of the campgrounds in riparian areas increases fishing pressure on a local scale and probably results in some intentional and incidental mortality of westslope cutthroat trout, bull trout and juvenile steelhead (in Idaho). The most vulnerable fish are the larger adults. It is not unusual to observe fewer adult westslope cutthroat trout in the segments of streams that are located close to campgrounds.
- Management activities have been consistent with our programmatic agreements with the regulatory agencies (U.S. Fish and Wildlife Service and NOAA Fisheries).
- One of the most common management activities in campgrounds with the potential to impact the fishery is hazard tree removal. Hazard trees that can potentially land in the water and provide fish habitat are being felled into streams and left on site. The hazard trees that are too far away from the stream to land in the water are being evaluated by a fisheries biologist on a case-by-case basis. Depending on site conditions, the trees are sometimes felled and left on site, bucked into firewood, or removed.
- The dispersed campsites along Skalkaho and Daly creeks continue to be among the most heavily used and impacted dispersed sites on the Forest. Management attempts to reduce impacts to riparian areas at heavily used dispersed sites have had mixed success.
- User-created roads in riparian areas should be obliterated soon after their detection. If left alone, the road networks tend to expand rapidly and become much more difficult to eliminate.

Outfitter and Guide Camps

Kit Carson (West Fork Ranger District). In 2007, Forest fisheries biologists completed an informal Section 7 Endangered Species Act (ESA) consultation for the renewal of the Bill Mitchell Outfitters, Inc. outfitter and guide permit. The consultation focused on the effect of the Kit Carson base camp on riparian function and ESA listed fish species (bull trout and steelhead) and their habitat in Deep Creek. The Kit Carson camp is the main base camp and staging area for Bill Mitchell Outfitter's operations in Idaho. It consists of several wall tents, a gravel parking lot for about a dozen vehicles, a stock pasture and a stock watering ford in Deep Creek. These facilities are located on the south side of Deep Creek, about 50 feet from the edge of the stream. The potential effect of the stock watering ford on bull trout and steelhead spawning and rearing habitat in Deep Creek was the key issue in the consultation. Monitoring conducted by Forest fisheries biologists in Spring and Fall 2007 indicated that the stock watering area was appropriately fenced, which limits potential effects to bull trout and steelhead to insignificant levels. At the request of the U.S. Fish and Wildlife Service and National Marine Fisheries Service, two other mitigation measures were implemented: (1) bull trout identification posters were installed at the Kit Carson base camp to alert anglers; and (2) a provision was placed in the permit restricting firewood cutting to areas greater than 150 feet from Deep Creek. Forest fisheries biologists plan on monitoring the Kit Carson base camp in 2008 to ensure that the mitigation measures are being properly applied and followed.

Angling by Selway River Commercial Float Outfitters (West Fork Ranger District). In 2007, the Idaho Department of Fish and Game (IDFG) and the Bitterroot National Forest continued to collect angler use data from commercial and private floaters on the Selway River during the permitted float season (May 15 – July 31). This was the second year of the data collection effort (i.e. the first was in 2006). The Bitterroot National Forest provided the trip leader of each permitted launch with a data sheet developed by IDFG. Trip leaders were instructed to drop off the completed data sheet at the Fenn Ranger Station upon completion of their trip, or mail the data sheet directly to IDFG. Parties that did not fish were asked to indicate that on their data sheet and turn it in as well.

The results of the 2006 and 2007 angler surveys are compared in Tables 25-29.

Table 25 - Returned Data Sheets

	2006	2007
Private trips (62)	18% (11)	44% (27)
Commercial trips (16)	63% (10)	75% (12)

Private and commercial trips did a better job of returning their data sheets in 2007. One of the commercial outfitters did not return any of their data sheets, while the other three commercial outfitters returned all of their data sheets.

Table 26 - Fishing vs. Non-fishing Trips

	2006	2007
Private, no fishing	36% (4)	44% (12)
Private, fishing	64% (7)	56% (15)
Commercial, no fishing	10% (1)	17% (2)
Commercial, fishing	90% (9)	83% (10)

Commercial trips were more likely to fish than private trips, especially in the tributaries of Moose and Bear creeks. In 2007, the average number of people per private trip was 11 and the average number per commercial trip was 15. Using those numbers, approximately 16% (47 of 297) of the people on private trips reported fishing in 2007 and 22% (39 of 180) of the people on commercial trips.

12 trips reported fishing in the tributaries in 2007. Of those, 8 were commercial trips. In 2007, nearly all (11 of 12) of the reported fishing in the tributaries occurred in Moose Creek. One of the commercial trips also fished in Bear Creek. Moose and Bear creeks were the only tributaries where fishing was reported in 2007. In 2006, commercial trips fished Bear and Moose Creeks at relatively equal effort, while private trips reported a small amount of fishing in Running, Bear, Moose and “other” creeks.

Table 27 - Angler Hours

	Selway2006	Selway2007	Tribs 2006	Tribs 2007
Private trips	161	162	5	9
Commercial trips	172	318	52	64

Commercial trips spent more time fishing than private trips, especially in the tributaries of Moose and Bear Creeks. In 2006, private and commercial trips fished the Selway River with proportionally equal effort. In 2007, commercial trips fished about twice as many hours on the Selway River than private trips. If you subtract the angler hours from one outlier (one commercial trip accounted for 168 of the 318 hours, or 53% of the total), then private and commercial trips fishing the Selway River with proportionally equal effort in 2007. The greater fishing effort by commercial trips could be attributed to camping locations and allocations of camp chores. Commercial trips provide employees to do the camp chores, thus giving customers more free time to fish near their camps.

Table 28 - Number of Trout Caught

	Selway 2006	Selway 2007	Tribs 2006	Tribs 2007
Private trips	267	606	15	95
Commercial trips	212	811	141	110

In general, commercial trips caught more trout than private trips; however, one or two trips that contained expert anglers had a strong influence on the numbers. For example, in 2007, two commercial trips accounted for 72% (664 of 921) of all the trout caught by commercial trips and three private trips accounted for 58% (405 of 701) of all the trout caught by private trips. No fish were reported as harvested in 2006 and 2007 by any trip.

The data sheet did not ask anglers to identify trout species, so very little information on species caught is available. In 2007, one private trip reported catching and releasing a 14-inch long bull trout in the Selway River and noted on their data sheet that the majority of the 135 trout they caught were "rainbows". Another private trip reported that the 145 trout they caught were mostly westslope cutthroat trout less than 12 inches long. Based on the mix of trout species that occur in the Selway River and its larger tributaries, it is likely that the vast majority of the trout caught in 2006 and 2007 were westslope cutthroat trout, juvenile steelhead or resident rainbow trout.

Table 29 - Number of Trout Caught Per Angler Hour

	Selway 2006	Selway 2007	Tribs 2006	Tribs 2007
Private trips	1.7	3.7	3.0	10.6
Commercial trips	1.2	2.6	2.7	1.7

Commercial trips spent more hours fishing and tended to catch more trout than private trips; however, the private anglers caught more trout per hour than the commercial anglers in both the Selway River and the tributaries. Again, the numbers were influenced by one or two trips that fished intensively.

Two key pieces of data that are missing from this survey are estimates of angling use by private and commercial land-based outfitters and how much angling overlap occurs between land-based outfitters and floaters. This data would be helpful in determining potential issues of capacity and allocation relative to commercial activity. IDFG and the Bitterroot National Forest plan on repeating the float angler survey again in 2008.

Fire Management

Tin Cup and Rombo Wildfires (Darby, Sula and West Fork Ranger Districts). Forest fisheries biologists served as resource advisors and Burned Area Emergency Rehabilitation (BAER) team members on the 2007 Rombo and Tin Cup wildfires. ESA emergency consultation (for effects to bull trout from suppression activities) was not initiated on either fire due to the minimal amount and type of suppression activities that occurred in the RHCAs. The Tin Cup Fire generally burned outside of RHCAs, with the exception of several acres on the north side of Tin Cup Creek adjacent to Road 639-B and the upper ends of a few intermittent tributaries to Bunkhouse Creek. The fire did not burn down to the edge of Tin Cup or Bunkhouse creeks. The Rombo Fire burned 1.8 miles of fish-bearing stream, or about 26% of the available fish habitat in the Piquett Creek watershed, with lesser amounts of stream burned in the Warm Springs, Rombo and Little Boulder watersheds. The burn severity in the RHCAs was mostly low, with discontinuous patches of moderate severity. The majority of the RHCA acreage that was burned occurred along the non-fish bearing, upper reaches of Piquett Creek. Dozer lines (about 5 miles in the Tin Cup Fire and 8 miles in the Rombo Fire), hand lines and safety zones were constructed to suppress both fires. The dozer lines and safety zones avoided RHCAs and were recontoured and seeded in fall 2007. Several short segments of hand lines were constructed in RHCAs in both fires. The hand lines were recontoured and covered with slash following their use. Based on our monitoring of the vegetative recovery on the recontoured dozer lines following the 2000 fires, we expect the Tin Cup and Rombo dozer lines to be fully covered with grass by year 2 or 3 (2009 or 2010).

Hughes Malloy Prescribed Burn (West Fork Ranger District). On May 8 2007, the West Fork fire crew ignited (by helicopter) a 750-acre prescribed fire on the south-facing slopes in the lower Hughes Creek drainage. Malloy Gulch, a fish-bearing tributary to Hughes Creek, was located within the ignition perimeter, as were several intermittent tributaries to Hughes Creek. Hughes Creek formed the southern boundary of the burn unit. The burn prescription called for primarily a low severity fire with small patches (< 10% of the unit) of moderate/high severity. Ignition was not supposed to occur in RHCAs, but fire would be allowed to back into or cross RHCAs if it so desired. Forest fisheries biologists monitored the post-burn condition of the Malloy Gulch and Hughes Creek RHCAs about a week after ignition. The purpose of this monitoring was to see if helicopter ignition avoided the RHCAs and document the effect of the burn on riparian conditions. Helicopter ignition adequately avoided the RHCAs. There were only a few spots where fire backed down into the RHCAs and those burned "fingers" were spotty and discontinuous. Where fire backed into the RHCAs, it typically stopped about 100-150 feet from the edges of streams. Only in one spot did fire burn to the edge of Malloy Gulch and that was caused by a burned chunk of snag that rolled downhill and stopped along the edge of the stream. It burned about a 10 foot X 5 foot patch in the green riparian grass/shrubs and then went out. The fire spotted across the Hughes Creek Road about half a mile downstream of Crandall Creek. It burned about an acre of lodgepole flat along the outer 100 feet of the 300 foot RHCA at low severity and scorched the smaller trees. The inner 200 feet of the RHCA did not burn. Overall, it is estimated that < 5% of the RHCA acres in the unit were burned. The burn severity in the RHCAs was low and only a few of the smaller trees were killed or are likely to die from scorch. The Hughes Malloy burn had an insignificant effect on the fishery. Because of the low amount and severity of burn in the RHCAs, sediment contributions to fish habitat are unlikely to occur. The fire had negligible impacts on riparian vegetation. There was no fireline construction in the RHCAs. Our conclusion is that the mitigation measures in the Prescribed Fire Programmatic Biological Assessment for Bull Trout were properly applied and the fire had an insignificant effect on the fishery and riparian conditions.

Facilities Management

Fred Burr Reservoir (Stevensville Ranger District). Temperatures were monitored at and downstream of Fred Burr Reservoir. This was done following discussions with the Montana Department of Natural Resources and the Fred Burr Water Users Association. We continue to investigate how Fred Burr Reservoir affects bull trout in Fred Burr Creek both positively and negatively.

Besides being important because it has bull trout, Fred Burr Creek has been emphasized because it was listed as one of nine local bull trout populations within the Bitterroot River Core Area. A core area represents the closest approximation of a biologically functioning unit for bull trout. Recovery of bull trout emphasizes securing the existing distribution and increasing the abundance and connectivity of local populations within core areas.

Bull trout are very sensitive to water temperature. We found higher temperatures downstream of the reservoir in the summer, which was expected and had been noted in previous samplings of temperature. In 2006, the data also showed high daily variations in the temperature of stream water below the dam in the fall after there was no pool left in the reservoir. In 2007, we collected data to address the question of how far downstream did the reservoir effect stream temperatures. Was the temperature affect of the reservoir localized or extensive? We found that in late July through mid-August temperatures appeared to be affected by the reservoir for four miles (the length tested). From mid-August to mid-September the effect of the reservoir on temperature seemed to be less extensive, perhaps about one-half mile (to Hobo 5 but not as far as Hobo 4).

Figure 13 - Location of the temperature data recorders (called HOBOs) in Fred Burr Creek

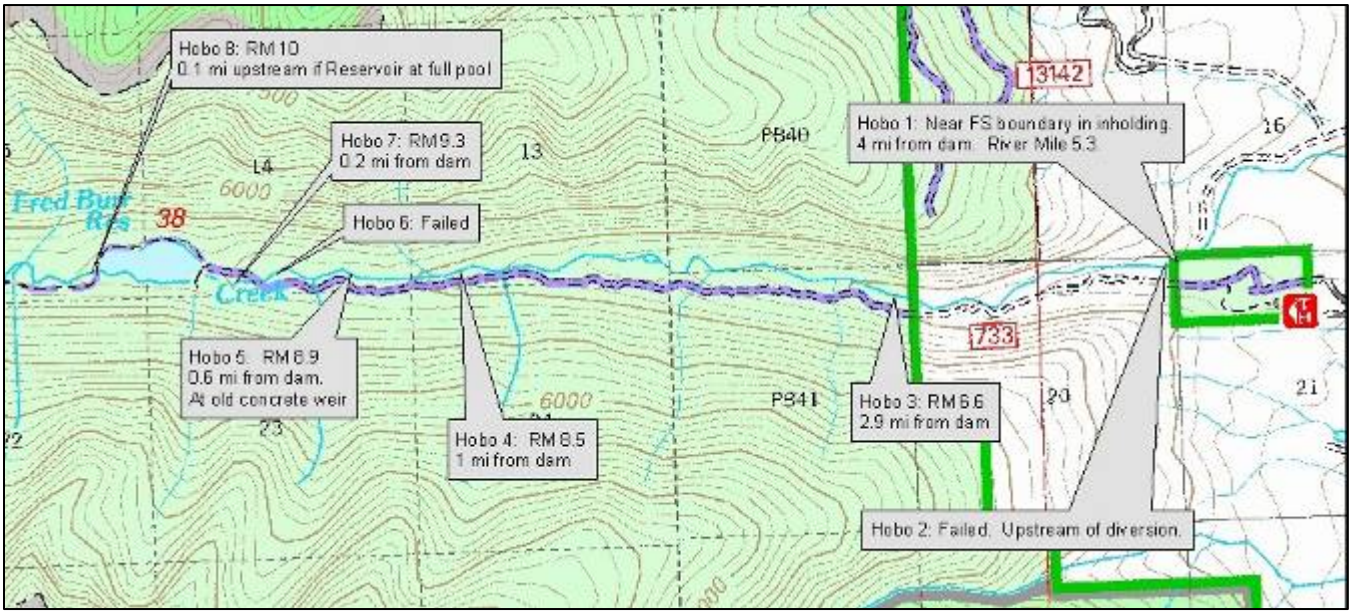
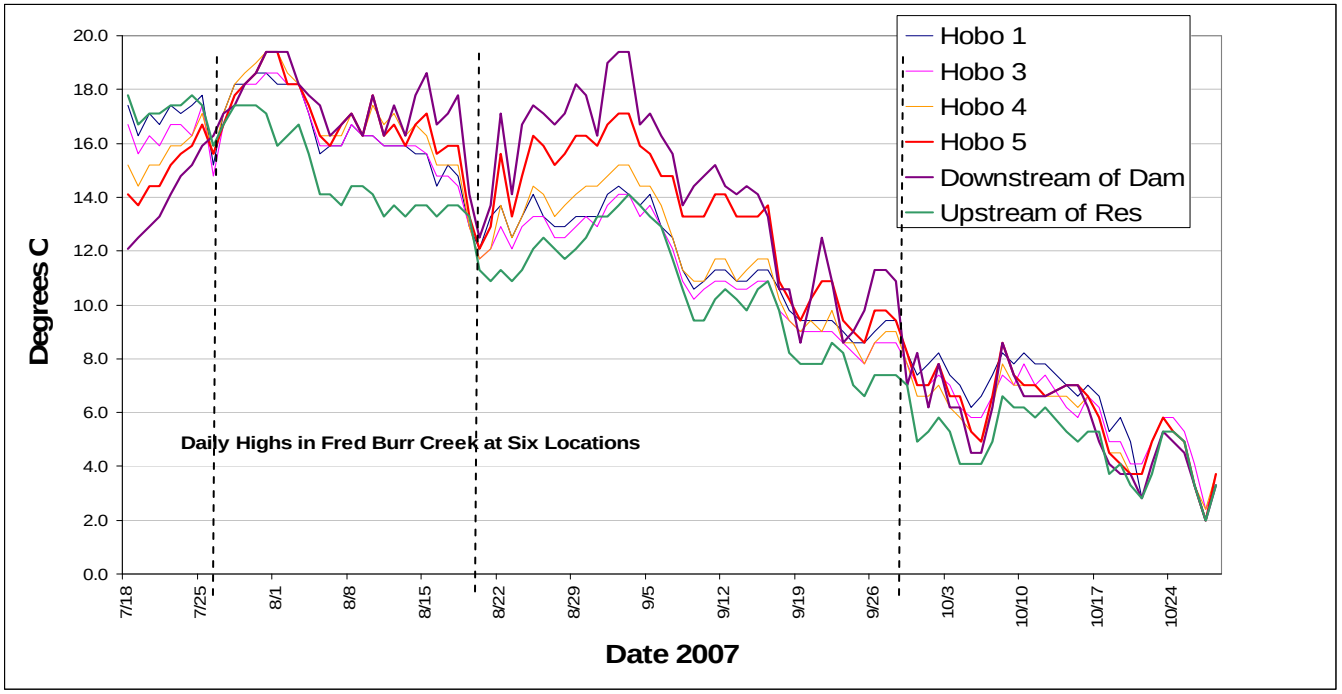


Figure 14 - Daily High Temperatures in Fred Burr Creek at Six Locations



Trollope-Litchford and Trollope-Hawkes Irrigation Ditches (West Fork Ranger District). The Trollope-Litchford and Trollope-Hawkes ditches exit the lower mile of Chicken Creek. The ditches are currently not screened and fish entrainment (i.e. fish enter, become trapped and eventually perish in the ditch) is a concern, particularly because juvenile bull trout are present in Chicken Creek at low densities. Forest fisheries biologists completed a formal Section 7 consultation on the ditches in 2006. Through the consultation process, the Forest and U.S. Fish and Wildlife

Service biologists agreed that the ditches are “likely to adversely affect” bull trout due to the potential for entrainment. The U.S. Fish and Wildlife Service issued a Biological Opinion in November 2006. The Biological Opinion contains several terms and conditions that mandate monitoring. These are listed below, along with our findings:

Term and Condition #1 (TC1). Monitor instream flows to determine minimum flow levels for the section of stream below the headgates to function as a migratory corridor

Forest fisheries biologists and hydrologists completed monitoring of TC1 in 2007 by conducting a wetted perimeter study on Chicken Creek. The data was submitted to the water rights coordinator (Tim Sullivan) in the USFS Regional Office in Missoula. The data will be used to file an instream flow claim for approximately four cfs on Chicken Creek. The claim will not have the legal authority to take water away from the Litchford and Hawkes ditches, but it will prohibit the development of any new ditch diversions on Forest Service land downstream of the Litchford and Hawkes ditches.

Term and Condition #2 (TC2): Implement the proposed action as described in the Biological Opinion.

Monitoring of TC2 is ongoing. In August 2007, the rock diversion for the Hawkes ditch was dismantled and replaced by three boulder weir structures that are expected to allow year-round fish movement past the structures. Forest fisheries biologists obtained $2262 (35% of the project cost) of partnership dollars from the U.S. Fish and Wildlife Service’s FRIMA program to help the water right holder pay for the project. Post-construction monitoring indicates that the boulder weirs were satisfactorily constructed. The boulder weirs will be monitored in 2008.

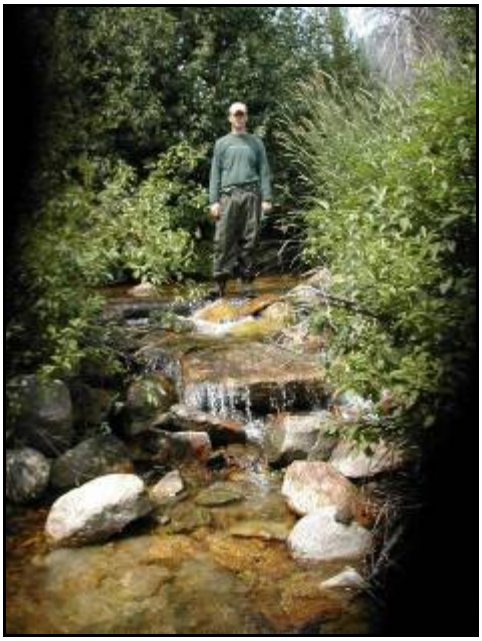


Figure 15 - Diversion for the Trollope-Hawkes irrigation ditch, before reconstruction.

Figure 16 - Diversion for the Trollope-Hawkes irrigation ditch, after reconstruction. This is the uppermost of three boulder weirs.

The water right holder for the Hawkes ditch is expected to install and maintain a fish screen on the Hawkes ditch headgate in 2008. After satisfactorily installing the fish screen, the Forest will issue the water right holder for the Hawkes ditch a Ditch Bill easement. So far, the water right holder for the Litchford ditch has taken no action to screen the Litchford ditch headgate. The ranch land irrigated by the Litchford ditch was subdivided in 2007 and at this time, it is unclear if the water right holder is still interested in screening the ditch and obtaining a Ditch Bill easement for the Litchford ditch.

Term and Condition #3 (TC3): Determine if the proposed mesh sizes are effective in reducing entrainment and impingement of juvenile fish. Determine if young-of-the-year bull trout are present in the ditches.

Monitoring of TC3 is ongoing. The Litchford and Hawkes ditches have not been screened yet, so we cannot answer any questions about the effectiveness of the mesh sizes. So far, the answer to the second part of TC3 has been no - bull trout have not been found in the ditches. The Forest made a commitment to electro fish the Litchford and Hawkes ditches annually for a period of five years, starting in 2006 and ending in 2010. The Forest has completed the first three years (2005 2006 and 2007) of that commitment. No bull trout have been found in the ditches. The ditches were previously electro fished in 1999. Tables 30 and 31 summarize the species, numbers and sizes of fish captured in the Litchford and Hawkes ditches during the electro fishing surveys.

Table 30 - Litchford Ditch

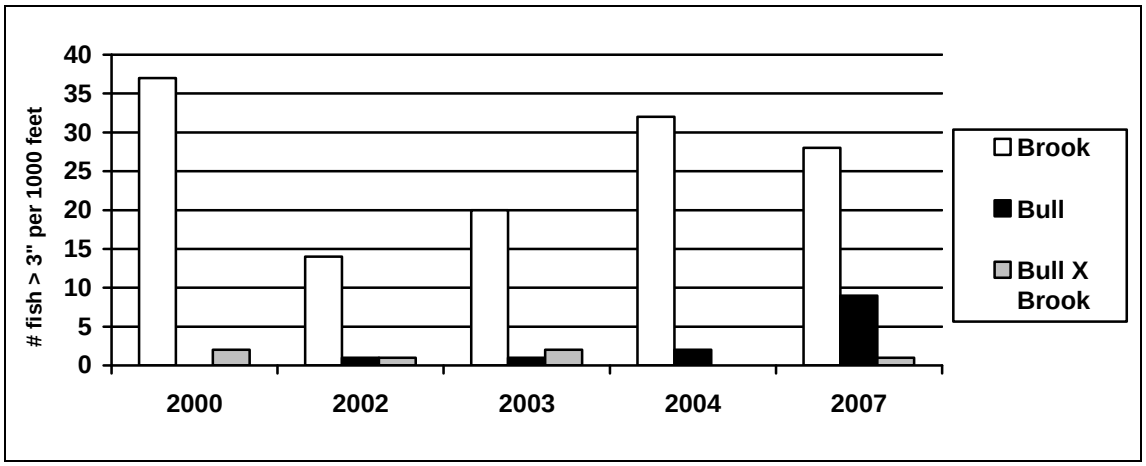
Date of survey	Length of survey	Fish species found	# of fish	Size range
August 23, 1999	20 m	Westslope cutthroat Brook trout	4 1	1-4” 4-5”
July 19 2005	100 m	Westslope cutthroat Brook trout	3 1	3-6” 1-2”
June 28 2006	100 m	Westslope cutthroat	7	2-5”
August 2 2007	100 m	Westslope cutthroat Brook trout	6 10	1-3” 1-3”

Table 31 - Hawkes Ditch

Date of survey	Length of survey	Fish species found	# of fish	Size range
August 23, 1999	77 m	Westslope cutthroat Brook trout Longnose sucker Slimy sculpin	1 3 1 2	2-3” 1-4” 4-5” 1-2”
July 19 2005	100 m	Westslope cutthroat Brook trout Rainbow trout Rainbow X westslope	13 1 3 3	2-9” 2-3” 3-5” 3-5”
June 28 2006	100 m	Westslope cutthroat Longnose sucker	7 2	3-5” 6-7”
August 2 2007	100 m	Westslope cutthroat Longnose sucker	7 5	3-9” 5-7”

To help answer TC3 and determine the trend of bull trout numbers in Chicken Creek, the Forest committed to electro fish the fish population monitoring reach in Chicken Creek two times between 2006 and 2010. The reach was electro fished in 2007, with the follow-up survey planned for 2009 or 2010. The reach was previously electro fished in 2000, 2002, 2003 and 2004 to monitor post-2000 fire recovery. In 2007, more bull trout were found than in previous surveys, although the numbers are still far too low to calculate a statistically valid population estimate. The number of brook trout has not changed much since the fires of 2000.

Figure 17 - Bull trout, brook trout and bull X brook hybrids captured in the Chicken Creek fish population monitoring reach since the fires of 2000



To help answer TC3 and determine the trend of bull trout spawning activity in Chicken Creek, the Forest made a commitment to establish and conduct a bull trout redd survey in Chicken Creek near the ditches for a period of five years, starting in 2006 and ending in 2010. The Forest has completed the first two years (2006 and 2007) of that commitment. The redd survey reach was initially established and surveyed in 2005. The survey data indicates that a few migratory bull trout still spawn in the lower end of Chicken Creek near the ditches, but not in any large numbers. The majority of redds we have observed have been small and probably most were made by brook trout. Table 32 summarizes the results of the redd surveys.

Table 32 - Bull Trout Redd Surveys in Chicken Creek

Date of survey	Length of survey	# migratory redds	# resident redds
October 24 2005	0.7 miles	1	12 *
October 13 2006	0.7 miles	5	10 *
October 10 2007	0.7 miles	2	14 *

** = We suspect that these are mostly brook trout redds, with possibly a few resident bull trout redds mixed in. Brook trout are more numerous than bull trout in Chicken Creek, so most of the smaller-sized redds were likely formed by brook trout.*

Term and Condition #5 (TC5): Notify the U.S. Fish and Wildlife Service if any dead, injured or sick bull trout are found, or if observing destruction of redds.

Monitoring of TC5 is ongoing. We have not observed any dead, injured or sick bull trout, or seen any destruction of redds during any of our activities.

Twogood Irrigation Ditch (Sula Ranger District). The Twogood ditch exits the north bank of the East Fork Bitterroot River about 500 feet downstream of Jennings Campground. Forest fisheries biologists completed a formal section 7 consultation on the Twogood ditch in 2006. Through the consultation process, the Forest and U.S. Fish and Wildlife Service biologists agreed that the Twogood ditch is "likely to adversely affect" bull trout due to the potential for entrainment. The U.S. Fish and Wildlife Service issued a Biological Opinion in August 2006. The Biological Opinion contains several terms and conditions that mandate monitoring. These are listed below, along with our findings:

Term and Condition #1 (TC1): Monitor the condition and use of the 1/8th or 1/4th inch mesh fish screen to determine its effectiveness in reducing entrainment of juvenile and young-of-the-year fish.

The water right holder owner installed a 1/8th inch mesh fish screen on the headgate of the Twogood ditch in early May 2007. The 1/8th inch mesh screen continually clogged with debris and was replaced with a ¼ inch mesh screen about a week later. The ¼ inch mesh screen was used for the remainder of the irrigation season and with daily cleaning, functioned effectively. Forest fisheries biologists monitored the Twogood ditch screen on 15 different occasions during the 2007 irrigation season, which started on May 1st and ended on August 30th. The screen was maintained in good working condition during the 2007 irrigation season.

The Twogood ditch was electro fished on July 13 and August 24 2005, prior to installation of the fish screen. No bull trout were found in either sample. The number of juvenile trout trapped in the ditch was considerably higher in late August than in mid July. In 2007, the Twogood ditch was electro fished on August 6 2007. No trout of any kind were found in the ditch and the only fish captured was a 2-inch long juvenile mountain whitefish. The data indicates that the ¼ inch mesh screen substantially reduced the number of juvenile and young-of-the-year fish trapped in the ditch. Table 33 summarizes the species, numbers and sizes of fish captured in the Twogood ditch during the electro fishing surveys

Table 33 - Fish captured in the Twogood Ditch

Date of survey	Length of survey	Fish species found	# of fish	Size range
July 13, 2005	100 m	Westslope cutthroat Mountain whitefish	1 3	3-4” 1-2”
August 24, 2005	100 m	Westslope cutthroat Brook trout	21 3	1-4” 4-7”
August 6, 2007	100 m	Mountain whitefish	1	2”

The lesson we learned from the 2007 monitoring is that the 1/8th inch mesh screen will not work at this location due to clogging, but the ¼ inch mesh screen will work with daily cleaning. The biological assessment for the Twogood ditch project predicted that the ¼ inch mesh screen would not stop all juvenile and young-of-the-year fish from entering the ditch, but it would substantially reduce the number of fish entrained in the ditch. The 2007 monitoring results appear to validate that prediction.

Term and Condition #3 (TC3): Notify the U.S. Fish and Wildlife Service if any dead, injured or sick bull trout are found, or if observing destruction of redds.

Monitoring of TC5 is ongoing. We have not observed any dead, injured or sick bull trout, or seen any destruction of redds during any of our activities.

Ward Creek Irrigation Ditch (West Fork Ranger District). This is a small ditch that exits Ward Creek on National Forest land about 0.5 miles upstream from the West Fork Highway. The West Fork Ranger District uses the ditch to water the horse pastures at Lone Pine. In 2006, Forest fisheries biologists observed small westslope cutthroat trout from Ward Creek trapped in the ditch and recommended that a fish screen be installed on the headgate. The West Fork Ranger District installed a passive screen (1/4 inch mesh) on the ditch headgate prior to the 2007 irrigation season. The screen was maintained throughout the 2007 irrigation season and functioned adequately with weekly cleaning.

Our key findings are:

- Very few of the irrigation ditches that exit the Forest are screened, but the Forest has been increasing its efforts in recent years to screen the ditches that have points of diversion on the Forest.
- The number of fish entrained in irrigation ditches across the Bitterroot River basin each Summer numbers in the thousands. In the Lost Horse Creek ditch system, a research study estimated that 9,000 fish were entrained in ditches in 2005 and 2006. In the Tin Cup Creek ditch system, the estimate was about 3,000 fish entrained. The most common species entrained was the westslope cutthroat trout.

- Bull trout have been found in five irrigation ditches (the Sopher ditch in lower Hughes Creek, two ditches that exit lower Nelson Creek and two ditches that exit lower Lost Horse Creek). Bull trout are probably present in more ditches, but their densities are so low that their presence is difficult to detect.
- Fish screens are expensive. For that reason, the type of screen installed needs to be carefully assessed on a case-by-case basis. It is clearly not practical to install an expensive, self-cleaning 3/32nd inch screen on every ditch that exits the Forest. Our monitoring from 2007 suggests that passive screens can be effective, but they do require regular cleaning (daily on the Twogood ditch; weekly on the Ward Creek ditch).

Grazing

There are six riparian exclosure fences or drift fences that are monitored on an annual basis by fisheries biologists and range specialists on the Sula and West Fork Ranger Districts. The six fences that are monitored are:

1. Meadow Creek exclosure fence, constructed in 1996 and extended in 2004 (Meadow Tolan grazing allotment)
2. Waugh Creek exclosure fence, constructed in 1998 and extended in 2004-05 (Waugh Gulch grazing allotment)
3. Bugle Creek exclosure fence, constructed in 2000 (Meadow Tolan grazing allotment)
4. Reimel Creek exclosure fence, constructed in 2001 (Camp Reimel grazing allotment)
5. Paradise Campground jack-leg fence, constructed in 2000 (no allotment is associated with this fence)
6. Meadow Creek jack-leg drift fence, constructed in 2005 (Meadow Tolan grazing allotment)

In 2007, a 7th riparian fence was constructed, which consists of a 1100-foot long, post and rail jack-leg drift fence along the north bank of Coal Creek (Coal Creek grazing allotment). Each of these fences was monitored in 2007. The results are discussed in the following paragraphs.

Meadow Creek Exclosure Fence (Sula Ranger District). The Meadow Creek exclosure fence was originally constructed in 1996 as part of the INFISH action plan. In 2004, the exclosure was extended downstream by another 1750 feet. There are now three separate exclosures (roughly 1750 feet long + 1200 feet long + 900 feet long) separated by two hardened cattle fords. 2007 was the 11th consecutive year that the exclosures were operational. 2007 was mostly a successful season. No cows got inside the lower and middle exclosures, but some type of animal snapped all three wires at the top end of the upper exclosure where it crosses Meadow Creek. This allowed a few cows to graze inside the upper exclosure for a few weeks near the end of the grazing season. Utilization inside the upper exclosure was light and scattered. Since 1996, the Meadow Creek exclosures have been effective. Livestock have only been able to get inside the exclosures two times in 11 years and both times utilization inside the exclosures was minimal. The riparian vegetation and stream banks inside the exclosures have recovered to near reference conditions. The two cattle fords on Meadow Creek primarily consist of gravel bedload and are functioning adequately at this time. The fords need to be watched in future years and hardened if bank erosion becomes excessive. In 2007, fisheries objectives were met inside the lower and middle exclosures and mostly met in the upper exclosure.

Waugh Creek Exclosure Fence (Sula Ranger District). The Waugh Creek exclosure fence was originally constructed in 1998 as part of the Camp Reimel EA. In 2005, the Forest completed a 700-foot long extension on the upstream end of the 1998 exclosure fence. The Waugh Creek exclosure fence now consists of a 700-foot long exclosure and a 1400-foot long exclosure separated by a cattle ford. 2007 was the 9th consecutive year that the Waugh Creek exclosure fence was operational. The Waugh Gulch pasture did not receive scheduled grazing in 2007 and no cows got inside the exclosure fence. Trespass grazing, which has been a problem in past years, did not occur in 2007. The Waugh Creek stream channel inside the exclosure fence has narrowed and healed since 1998. This resulted in much better fish habitat than occurred prior to fencing. In 2007, fisheries objectives were met inside the Waugh Creek exclosure fence.

Bugle Creek Exclosure Fence (Sula Ranger District). The Bugle Creek exclosure fence was originally constructed in 2000 as part of a fisheries improvement project. 2007 was the 8th consecutive year that the exclosure fence was operational. The exclosure fence functioned effectively in 2007 – no cows were able to get inside the exclosure fence during the grazing season. The riparian vegetation and stream banks inside the fence have shown excellent recovery since 2000. The channel has narrowed and healed. The willow seedlings planted by the Forest in 2000 and 2001 are growing. The fence has not shifted stream bank impacts to other unfenced areas and has not concentrated grazing impacts above or below the fence to any great degree. The hardened livestock ford at the upper end of the fence has been effective in reducing bank trampling where livestock cross Bugle Creek. In 2007, fisheries objectives were met inside the Bugle Creek exclosure fence.

Reimel Creek Exclosure Fence (Sula Ranger District). In 2001, a five-mile long livestock exclosure fence was constructed around the burned riparian area of Reimel Creek. The upper end of the exclosure fence is located just below the mouth of Wallace Creek; the lower end is located where Reimel Creek exits the Forest. 2007 was the 7th consecutive year that the exclosure fence was operational. In 2007, widespread trespass occurred throughout the exclosure and riparian conditions at the end of the grazing season were much poorer shape than they were in 2006. Poor fence maintenance by the permittee was the cause of the trespass and poor riparian conditions in 2007. Substantial sections of the fence that were damaged by blowdown in winter 2006-07 were never repaired prior to the start of the grazing season. This allowed cattle easy access to the riparian area throughout the 2007 grazing season. In 2007, fisheries objectives were not met inside the Reimel Creek exclosure fence.

Figure 18 - End-of-season conditions in the lower meadow near the Road 727 crossing of Reimel Creek. October 2006.

Figure 19 – End-of-season conditions in the lower meadow near the Road 727 crossing of Reimel Creek. October 2007.

The Reimel Creek exclosure fence has had mixed success since it was constructed in 2001. There have been some good years with minimal livestock trespass (e.g. 2001 2002 2004 and 2006) and some poor years with widespread riparian impacts (2003 2005 and 2007). Despite some livestock trespass, the trend in riparian conditions along Reimel Creek has clearly improved since the late 1990's. The stream channel has narrowed and damaged banks are healing with good undercut bank formation. Numerous willow and alder shrubs are colonizing the stream banks, with most being about waist-to-chest high. Many of the shrubs originated from 2000-2001 plantings. The fish habitat structures that were constructed in 1999 are providing good pools and hiding cover and harboring numerous fish. Most of the burned snags that were felled into Reimel

Creek in May 2003 (BAR project) are providing decent hiding cover and small pool formation. Hundreds of new snags have fallen into or across Reimel Creek in the past couple of years. The short sections of Road 727 that were relocated further away from Reimel Creek in 2001-02 and 2005 are stable and have been effective in reducing road impacts on the stream channel. Because of all of these improvements, it would be a shame to give up on the Reimel Creek exclosure fence and allow conditions to revert back to what they routinely were prior to 2001. It is very important for the watershed and fisheries resources that the Reimel Creek exclosure fence be successful.

Paradise Campground Jack-Leg Drift Fence (West Fork Ranger District). The Paradise Campground jack-leg drift fence was constructed in 2000 as part of a fisheries improvement project. 2007 was the 8th consecutive year that the fence was operational. The fence consists of a 0.25-mile long wooden jack-leg drift fence that runs along the north bank of Whitecap Creek adjacent to the Paradise Campground in two segments (separated by a gap of intact riparian vegetation). The fence has two goals: (1) keep stock off of the stream banks; and (2) restore the native riparian community of ponderosa pine trees and hawthorn shrubs to the stream banks. In 2007, the fence was successful in keeping stock off of the stream banks (as it has in all years since construction), but restoration of the pine/hawthorn riparian community continued to be a failure. Numerous ponderosa pine and hawthorn seedlings were planted along the north bank of Whitecap Creek (inside the drift fence) in 2001-02, but only one 2-foot high pine was still alive and growing in Fall 2007. In another attempt to re-establish pine on the site, Forest silviculturists planted an additional 67 ponderosa pine seedlings inside the drift fence in May 2008. Monitoring in October 2007 indicated that survivorship of the pine seedlings was very poor. Only 5-10 seedlings appeared to be alive, with the majority apparently killed by the extreme drought and heat of Summer 2007. Due to the harshness of the growing site, it may be that the only way that pine will become re-established is if they are regularly watered during their initial Summer following planting. In 2007, fisheries objectives were partially met inside of the Paradise jack-leg fence. The stream banks were protected from stock grazing, but the restoration of the pine/hawthorn community continued to be a failure.

Meadow Creek Jack-Leg Drift Fence (Sula Ranger District). The Meadow Creek jack-leg drift fence was constructed in 2005 along a grazed, upper reach of Meadow Creek. The purpose of the fence is to reduce livestock bank trampling (Meadow Tolan grazing allotment) along a chronically trampled quarter mile-long section of upper Meadow Creek that contains bull trout and westslope cutthroat trout spawning and rearing habitat. 2007 was the 3rd consecutive year that the fence was operational. The fence was successful in 2007. There was essentially no sign of cows inside the drift fence and riparian conditions inside the fence were intact. Prior to the 2007 grazing season, we had considered felling a couple of snags at the downstream end of the fence to prevent cows from being able to walk upstream in Meadow Creek. However, upon further field review, this was not done. Monitoring in future years will indicate if it is needed. In 2007, fisheries objectives were met inside the fence.

Coal Creek Jack-Leg Drift Fence (West Fork Ranger District). In July 2007, the Forest fisheries crew constructed a 1100-foot long, post and rail jack-leg drift fence along the north side of Coal Creek. The funds needed to build the fence were awarded to the Forest from the Montana Fish, Wildlife and Parks Sikes Program. The purpose of the fence is to protect westslope cutthroat trout spawning habitat from livestock bank trampling. The lower end of the fence was connected to an existing exclosure fence on State land; the upper end tied into a jackpot of downed, beetle-killed fir trees. Livestock were provided watering access to Coal Creek in two locations. 2007 was the 1st year that the Coal Creek drift fence was operational and the fence had a successful initial year. Livestock use of the stream banks was much lower than usual and the areas that are typically trampled during the grazing season showed recovery in 2007. In 2007, fisheries objectives were met inside the Coal Creek exclosure fence.

Figure 20 - Typical view of the Coal Creek jack-leg drift fence that was constructed in July 2007.

Figure 21 - Livestock crossing of Coal Creek at the end of the 2006 grazing season, before construction of the drift fence.

Figure 22 - Same crossing at the end of the 2007 grazing season, after construction of the drift fence".

Meadow Tolan Grazing Allotment (Sula Ranger District). In October 2007, Forest fisheries, watershed and range specialists monitored bank trampling levels and channel cross-sections in the long-term monitoring reaches that were established in the 1997 Meadow Tolan/Bunch Gulch/Shirley Mountain Grazing Allotments EA. This was the 9th consecutive year of post-grazing season monitoring (1999-2007). Results and trends are discussed in Item 17, Watershed Baseline Monitoring.

Waugh Gulch Grazing Allotment (Sula Ranger District). This allotment was rested in 2007. With the exception of the Waugh Creek exclosure fence, no other monitoring was conducted by Forest fisheries biologists in this allotment in 2007.

Our key findings are:

- Riparian exclosure fences have proven to be a very effective tool for protecting riparian resources and the fishery within grazing allotments.

- Fenced riparian areas have shown that they respond quickly and positively to the absence of livestock grazing. Considerable recovery of the vegetation and stream banks occurs during the first year of livestock absence and by year 3 to 5, riparian recovery is generally excellent.
- If they are regularly maintained, the fences essentially have a 100% chance of achieving recovery goals.
- The most negative aspect to riparian exclosure fences is the annual maintenance commitment; another is the lack of visual "naturalness" on the landscape (most of the fences are made out of conventional steel post and barbed wire) and a generally low potential for disrupting big game movement.
- If maintained, exclosure fences are good, reliable solutions for restoring localized riparian grazing problem areas and fish habitat.

Weed Management

Forest fisheries biologists did not monitor weed management projects in 2007.

Timber Management

In 2007, Forest fisheries biologists monitored the following timber sales:

- Spring Mink (ongoing, part of the Middle East Fork project)
- Kerlee Bert (ongoing, part of the Middle East Fork project)
- Lil' Lyman (ongoing)
- Halford Seed Production Area (ongoing)
- Painted Rocks West (ongoing)
- Frazier Interface Stewardship (completed)
- Burned Area Recovery, Skalkaho salvage (completed)

The purpose of our monitoring was to: (1) verify protection of the RHCAs; (2) look for indications of sediment delivery to streams; (3) monitor log hauling conditions; (4) document the application and effectiveness of the fisheries mitigation measures; and (5) assess the effects analysis predictions made in project NEPA documents and biological assessments. The results of our monitoring were documented in individual unit logs for each visit, which are available upon request. The monitoring results for each of the sales are summarized below.

Spring Mink Timber Sale (Sula Ranger District). In 2007, Forest fisheries biologists monitored the Spring Mink timber sale on Jan 19, Jan 23, Feb 7, May 30, Jun 27, Jul 6, Aug 20, Oct 17 and Oct 31. The following units were monitored: 12A, 13 22 23 24 26R 27 29 29A, 37, 50, 51, 70, 130 236 and 255. The yarding consisted of about 55% helicopter and 45% skyline. All of the skyline yarding was completed in 2007. About 80% of the helicopter yarding was completed in 2007.

Our monitoring findings indicate:

RHCAs: In all of the units except for unit 13, the RHCAs were properly marked and no commercial harvest occurred in the RHCAs. In unit 13 (a skyline unit), there were three instances where RHCAs were either not marked, or trees were harvested from RHCAs. The first instance involved a small (20 feet X 15 feet) wetland within the interior of unit 13 that should have been buffered with a 100 foot RHCA, but was missed by the marking crew. The wetland was discovered by the sale administrator, but not until about 20 trees had been felled and yarded from the RHCA. The second instance was a safety issue involving another 100 foot RHCA that was located around a small wetland, just outside the northeast corner of unit 13 and uphill from Road 723. A dozen hazard trees in that wetland RHCA were overhanging Road 723 and those trees

were felled for safety reasons because of their potential to fall and injure people working on the road. Ten of the felled hazard trees were harvested because of their potential to roll downhill onto the road and injure workers. The project fisheries biologist looked at the hazard trees with the sale administrator prior to their felling and approved their felling and removal, if needed. Two of the hazard trees were directionally felled into the wetland RHCA and left on-site. The third instance involved a ponderosa pine tree that was harvested from about five feet inside the 100 foot wetland RHCA that runs along the bottom of unit 13. It was close to the boundary line, but clearly inside the RHCA.

Sediment entering RHCAs: No sediment was seen leaving the harvest units, crossing into RHCA boundaries, or moving towards streams.

Haul road conditions: The primary haul roads were Roads 5753 and 13302 in the Mink and Springer Creek drainages, Roads 725 and 5757 in the Meadow and Springer Creek drainages and Road 723 in the Jennings Camp Creek drainage. Roads 723 and 725 have segments that closely parallel fish-bearing streams (Road 723 along Jennings Camp Creek for about 1.5 miles; Road 725 along Meadow Creek for about 5 miles). The majority of the Spring Mink hauling that occurred in 2007 happened during the very dry Summer and early Fall months, particularly the bulk of the log truck traffic on the two road segments that closely parallel Jennings Camp Creek (Road 723) and Meadow Creek (Road 725). The log haul was satisfactorily managed by the sale administrator. Hauling impacts during the wet period that occurred in September 2007 were minimized. Winter hauling occurred on short segments of Roads 5753 and 13302 in the Mink and Springer Creek drainages. These roads contain few stream crossings and hauling occurred under good winter conditions with no significant erosion problems seen during spring break-up. In conclusion, erosion from haul road surfaces and sediment delivery to streams was insignificant in the Spring Mink timber sale in 2007. The sale-associated road maintenance (grading and snow plowing) was conducted in a manner consistent with the programmatic road maintenance biological assessment for bull trout and the mitigation measures in the Middle East Fork ROD.

Consistency with mitigation measures: The fisheries mitigation measures are listed on pages C-9 and C-10 in the Middle East Fork ROD. The mitigation measures were properly applied and met in all of the units and haul roads except for unit 13. In unit 13, the mitigation measure “RHCA boundaries will be designated on the ground in consultation with the fisheries biologist” was not met because of the failure to buffer the small interior wetland. The mitigation measure “commercial harvest will not occur in the RHCAs” was not met in two locations in unit 13: (1) the missed wetland described above and (2) the single ponderosa pine tree that was harvested from the RHCA along the bottom of unit 13. Finally, the harvest of ten felled hazard trees from the wetland RHCA in the northeast corner of unit 13 for safety reasons did not fully meet the mitigation measure “felled hazard trees will be left on-site in RHCAs”.

Effects analysis predictions: In the Middle East Fork FEIS and bull trout biological assessment, it was predicted that there would be no detectable increase in sediment contributions to fish habitat, no increases in water temperatures and no reductions in stream shade, woody debris recruitment and RHCA function. Based on the fact that no sediment was seen crossing into the RHCAs from the harvest units and no point source sediment inputs were observed along haul roads, it is very unlikely that a detectable sediment increase has occurred as a result of the Spring Mink timber sale. Water temperature monitoring with continuously-recording HOBO-TEMP thermographs failed to detect any discernable temperature increases in Jennings Camp Creek, Springer Creek and Mink Creek (see Item 21 and 41 for more details), as would be expected because there was no reduction of shade in the RHCAs bordering those streams and their tributaries. There was no commercial harvest of trees from any RHCAs capable of contributing large wood to fish habitat; therefore, the prediction that there would be reduction in woody debris recruitment was correct. The prediction that there would be no reduction in RHCA function was incorrect. The two wetlands in unit 13 will receive more solar radiation as a result of the felling and yarding that occurred in their RHCAs. This could dry the soils and result in reduced wetland area and function in the long-term. In conclusion, with the exception of the reduced RHCA function in the affected wetlands in unit 13, the monitoring findings suggest that the rest of the predictions made in the Middle East Fork ROD and bull trout biological assessment are valid.

Kerlee Bert Timber Sale (Sula Ranger District). In 2007, Forest fisheries biologists monitored the Kerlee Bert timber sale on Jul 30, Aug 31 and Dec 31. The sale started in August 2007, so only one unit (unit 17) was monitored in 2007. Unit 17 consisted of a mix of skyline and winter tractor yarding. Only the skyline yarding was monitored in 2007. The winter tractor portion of unit 17 was completed in February 2008 and will be reported in the 2008 monitoring report.

Our monitoring findings indicate:

RHCAs: In unit 17, no commercial harvest occurred in the RHCAs. The RHCAs were properly delineated with one exception – the RHCA boundary along a wetland on the north side of the unit was marked too narrow. The sale administrator adjusted the boundary to its proper width (100 feet) before harvest activities commenced.

Sediment entering RHCAs: No sediment was seen leaving unit 17, crossing into RHCA boundaries, or moving towards streams.

Haul road conditions: The primary haul roads were Roads 723, 5785 and 5786 in the Jennings Camp and Colvert Creek drainages. Road 723 closely parallels Jennings Camp Creek for about 1.5 miles. The log haul commenced on these roads in August 2007 and continued throughout winter 2007-08. However, the number of loads was small. Prior to the start of winter hauling conditions, straw bale check dams were installed as mitigation on the outlets of all of the ditch relief culverts on the portion of Road 723 that parallels Jennings Camp Creek. The log haul was satisfactorily managed by the sale administrator. Hauling impacts during the wet period that occurred in September 2007 were minimized and winter hauling was not allowed to commence until excellent conditions were present in December 2007. No significant erosion of the road surface or point sources of direct sediment delivery to streams was observed on the haul roads in 2007. In conclusion, erosion from haul road surfaces and sediment delivery to streams was insignificant in the Kerlee Bert timber sale in 2007. The sale-associated road maintenance (grading and snow plowing) was conducted in a manner consistent with the programmatic road maintenance biological assessment for bull trout and the mitigation measures in the Middle East Fork ROD.

Consistency with mitigation measures: The fisheries mitigation measures are listed on pages C-9 and C-10 in the Middle East Fork ROD. All of the mitigation measures were properly applied and met in 2007. The mitigation to place trees in the East Fork for fish habitat adjacent to helicopter landing #17 was completed on July 30 2007.

Figure 23 - Trees placed in the East Fork Bitterroot River for fish habitat adjacent to Kerlee Bert helicopter landing #17.

Effects analysis predictions: In the Middle East Fork FEIS and bull trout biological assessment, it was predicted that there would be no detectable increase in sediment contributions to fish habitat, no increases in water temperatures and no reductions in stream shade, woody debris recruitment and RHCA function. Based on the fact that no sediment was seen crossing into the RHCAs in unit 17 and no point source sediment inputs were observed along haul roads, it is very unlikely that a detectable sediment increase has occurred as a result of the Kerlee Bert timber sale. Water temperature monitoring with continuously-recording HOBO-TEMP thermographs failed to detect any discernable temperature increases in Jennings Camp Creek (see Item 21 and 41 for more details), as would be expected because there was no reduction of shade in its RHCAs or those of its tributaries. No harvest of trees occurred in RHCAs. As a result, the sale has had no effect on woody debris recruitment or RHCA function. In conclusion, the monitoring findings suggest that the predictions made in the Middle East Fork ROD and bull trout biological assessment are valid.

Lil' Lyman Timber Sale (Sula Ranger District). In 2007, Forest fisheries biologists monitored the Lil' Lyman timber sale on Feb 2, Feb 7, Feb 28, Mar 6, Mar 19, Apr 16, Apr 25, May 25 and Oct 17. The following units were monitored: 9a, 9d and 13. The yarding consisted of winter tractor.

Our monitoring findings indicate:

RHCAs: In all of the units, the RHCAs were properly marked and no commercial harvest occurred in the RHCAs.

Sediment entering RHCAs: No sediment was seen leaving the harvest units, crossing into RHCA boundaries, or moving towards streams. Short-term sediment inputs occurred when three fish barrier culverts were removed on the North Fork of Lyman Creek as part of the Road 13304 decommissioning. The amount and extent of sedimentation below the road crossings was consistent with the analysis in the Lil' Lyman biological assessment and evaluation.

Haul road conditions: The primary haul roads were Roads 311, 717 and 1398 in the Lyman and Guide Creek drainages. Road 311 closely parallels Guide Creek for 2.4 miles between the East Fork Highway and Guide Saddle. The majority of the hauling occurred in January-February 2007 under winter conditions. Prior to any winter hauling, straw bale check dams were installed as mitigation on the outlets of all of the ditch relief culverts on Road 311 between the East Fork Highway and Guide Saddle. A total of 20 check dams were installed. Seven of the 20 check dams trapped sediment and the total amount trapped was roughly 44 gallons. At two of the check dams that trapped sediment, about 16 gallons of sediment escaped around the edges of the straw bales. It was stopped by the riparian vegetation filter before it could enter Guide Creek. One of the check dams filled with sediment, which caused water to flow around the dam and trickle into Guide Creek. This was one of the few points of direct sediment to Guide Creek that we observed during the log haul. 13 of the 20 check dams did not receive any road sediment. Overall, the straw bale check dam mitigation was effective in minimizing sediment contributions and should be used on other projects where winter hauling occurs along roads that closely parallel streams. The Lil' Lyman winter log haul was effectively managed by the sale administrator. Road erosion and sediment contributions to Guide Creek were minimized to the greatest extent possible, given the poor location of the road. The sale-associated road maintenance (grading and snow plowing) was conducted in a manner consistent with the programmatic road maintenance biological assessment for bull trout and the mitigation measures in the Lil' Lyman Decision Memo.

Consistency with mitigation measures: The fisheries mitigation measures are listed in the Lil' Lyman Decision Memo. All of the fisheries mitigation measures were properly applied and met in 2007. The straw bale check dam mitigation was effective in minimizing sediment contributions to Guide Creek during winter hauling.

Effects analysis predictions: The fisheries biological assessment predicted that the Lil' Lyman timber sale would have a negligible effect on bull trout and their habitat in the East Fork Bitterroot River because of the miniscule quantities of sediment that could potentially enter the East Fork from Guide Creek. Based on our monitoring of the log haul along Guide Creek, it is obvious that any sediment that came off the haul road, escaped the check dams and managed to get routed

downstream into the East Fork and enter bull trout habitat was very small and immeasurable. This indicates that the predictions made for bull trout were valid.

The fisheries biological evaluation predicted that the Lil' Lyman timber sale would impact individual westslope cutthroat trout, but not on the scale needed to reduce viability or contribute to federal listing. The main impact was predicted to be localized and short-term reductions in the quality of spawning and rearing habitat in the North Fork of Lyman Creek caused by sedimentation from removing culverts on Road 13304. The harvest activities themselves were predicted to cause immeasurable sediment contributions to westslope cutthroat trout habitat in all streams. Because of the protection of the RHCAs from harvest, no changes to water temperatures or woody debris recruitment were predicted to occur. The monitoring findings suggest that these predictions were valid. The amount and extent of sedimentation below the road crossings was consistent with the effects analysis. Water temperature monitoring with continuously-recording HOBO-TEMP thermographs failed to detect any discernable temperature increases in the North Fork of Lyman Creek (see Item 21 and 41 for more details), as would be expected because there was no reduction of shade in its RHCAs or those of its tributaries. No harvest of trees occurred in RHCAs. As a result, there has been no effect on woody debris recruitment. It is expected that by 2009, most of the sediment deposition caused by the culvert removals will be flushed from the affected areas in the North Fork of Lyman Creek below the Road 13304 stream crossings.

Halford Seed Production Area Timber Sale (West Fork Ranger District). In 2007, Forest fisheries biologists monitored the Halford Seed Production Area timber sale on Jan 5, Feb 23, Mar 13 and Mar 26. The three units in the sale (units 8, 9 and 10) were monitored. The yarding consisted of a mix of skyline and winter tractor.

Our monitoring findings indicate:

RHCAs: Only unit 9 contains RHCAs. The RHCAs were properly marked and no commercial harvest occurred in the RHCAs.

Sediment entering RHCAs: No sediment was seen leaving unit 9, crossing into RHCA boundaries, or moving towards streams.

Haul road conditions: The haul roads were Roads 5633, 5633-A and 13487 in the Gemmell and Halford Creek drainages. The haul roads are upland roads that switchback across the slope and cross Gemmell Creek (a small stream that contains westslope cutthroat trout) twice and Halford Creek (an intermittent, non-fish bearing stream) three times. The Road 5633 system is steep and erosive. The most erosive portions were gravel surfaced in Summer 2007. The log hauling occurred during winter 2006-07. Because the units contain low volumes of timber, log truck traffic was light. Prior to the start of the winter haul, straw bale check dams were installed in the ditches that drain into the five stream crossings to trap road sediment and prevent it from entering streams. Post-haul monitoring following spring break-up indicated that the check dams were effective in trapping road sediment in the ditch system and preventing it from entering streams. Most of the check dams trapped at least some sediment in the road ditches. The only direct input occurred where a few shovel-fulls of sediment trickled around the ends of the check dam and entered an intermittent tributary to Gemmell Creek. Numerous rills exited the road shoulder in the steeper sections of Road 5633 that were located away from streams. In a few cases, sediment plumes were visible on the forest floor a couple dozen feet from the edge of the road. In all of those instances, the deposition occurred far enough away from streams to prevent inputs to water, with adequate vegetative filter between the sediment and the nearest stream. In conclusion, the Halford winter log haul was effectively managed by the sale administrator. The sale-associated road maintenance (grading and snow plowing) was conducted in a manner consistent with the programmatic road maintenance biological assessment for bull trout and the mitigation measures in the Halford Decision Memo.

Consistency with mitigation measures: The fisheries mitigation measures are listed in the Halford Decision Memo. All of the fisheries mitigation measures were properly applied and met. The

straw bale check dam mitigation was effective in minimizing sediment contributions at road stream crossings during winter hauling.

Effects analysis predictions: The fisheries biological assessment and evaluation predicted that the Halford timber sale would result in insignificant sediment inputs to streams and would maintain water temperatures, water quality, woody debris recruitment and fish habitat structure and complexity. No detectable changes would occur to bull trout or westslope cutthroat trout populations. Our monitoring of the log haul indicates that sediment input to Gemmell and Halford Creeks was insignificant. Because the RHCAs were protected from harvest, the other habitat elements were maintained. As a result, it is highly unlikely that any changes occurred to the westslope cutthroat trout population in Gemmell Creek, or the westslope cutthroat trout and bull trout populations downstream of the sale area in the Nez Perce Fork. This suggests that the effects predictions were valid.

Painted Rocks West Timber Sale (West Fork Ranger District). In 2007, Forest fisheries biologists monitored the Painted Rocks West timber sale on Jan 5, Feb 26 and Mar 26. The four units in the sale (units 1A, 1B 2 and 3) were monitored. The yarding consisted of a mix of skyline and winter tractor.

Our monitoring findings indicate:

RHCAs: Only unit 2 contains RHCAs. The RHCAs were properly marked and no commercial harvest occurred in the RHCAs.

Sediment entering RHCAs: No sediment was seen leaving unit 2, crossing into RHCA boundaries, or moving towards streams.

Haul road conditions: The haul roads were Roads 5660, 5662, 13852, 13853 and 13413 in the Coal Creek drainage. About 2.5 miles of Road 5660 are located in the valley bottom of Coal Creek, but for the most part, the road does not encroach on Coal Creek or its floodplain. Roads 5660 and 5662 contain a total of four stream crossings. The rest of the roads have no stream crossings. The log hauling occurred during winter 2006-07. Straw bale check dams were not used as mitigation because the stream crossings are relatively flat and the haul roads were determined to have a relatively low risk of contributing sediment to streams. Post-haul monitoring following spring break-up did not find indications of direct sediment input to streams. At three of the stream crossings, there was no indication of sediment leaving the road surface. At one stream crossing, an existing silt fence trapped about five gallons of road sediment and prevented it from entering a tributary to Coal Creek. The Painted Rocks West winter log haul was effectively managed by the sale administrator. The sale-associated road maintenance (grading and snow plowing) was conducted in a manner consistent with the programmatic road maintenance biological assessment for bull trout and the mitigation measures in the Painted Rocks West Decision Memo.

Consistency with mitigation measures: The fisheries mitigation measures are listed in the Painted Rocks West Decision Memo. All of the fisheries mitigation measures were properly applied and met.

Effects analysis predictions: The fisheries biological assessment and evaluation predicted that the Painted Rocks West timber sale would generate immeasurable sediment contributions to streams and would maintain water temperatures, water quality, woody debris recruitment and fish habitat structure and complexity. No detectable changes would occur to bull trout or westslope cutthroat trout populations. Our monitoring of the log haul failed to find indications of direct sediment input to Coal Creek. The impact of sediment from hauling appears to be consistent with the effects prediction (e.g. insignificant effect with no visible deposition in streams). Because the RHCAs were protected from harvest, the other habitat elements were maintained. Water temperature monitoring with continuously-recording HOBO-TEMP thermographs failed to detect any discernable temperature increases in Coal Creek (see Item 21 and 41 for more details), as would be expected because there was no reduction of shade in its RHCAs or those of its tributaries. As a result, it is highly unlikely that any changes occurred to the bull trout and westslope cutthroat trout populations in Coal Creek and the West Fork Bitterroot River. In

conclusion, the monitoring findings suggest that the predictions made in the fisheries biological assessment and evaluation were valid.

Frazier Interface Stewardship Project (West Fork Ranger District). The timber harvest portion of the Frazier Interface stewardship project was completed in 2006. The results of the timber harvest monitoring are documented in the 2006 Forest Plan Monitoring Report. In 2007, our monitoring consisted of measuring the effectiveness of the straw bale check dam mitigation that was applied along Road 363 during the 2006 log haul. Straw bale check dams were installed below the outlets of six ditch relief culverts on the 0.8 mile segment of Road 363 that closely parallels Pierce Creek. Three of the six check dams trapped a total of roughly 45 gallons of sediment. The other three check dams did not receive any sediment. There were no indications that sediment was able to escape the check dams and enter Pierce Creek. In conclusion, the check dams were effective in keeping road sediment out of Pierce Creek in 2006.

Burned Area Recovery Project (All Districts). There are three fisheries monitoring items in the Burned Area Recovery FEIS (Volume II, Appendix C, pages C-12 to C-16). Forest fisheries biologists started monitoring these items in February 2002 and they have been monitored and reported every year since. Monitoring of items #1 and #3 was completed in 2007 when the last of the Burned Area Recovery salvage sales (Skalkaho) closed. This is the last year that we will report items #1 and #3. Monitoring of item #2 will continue whenever Burned Area Recovery road decommissioning/storage is implemented or fish culverts are replaced. Item #2 will be reported in future monitoring reports as needed. The results of our 2007 Burned Area Recovery monitoring are summarized below.

FISHERIES MONITORING ITEM # 1

The objectives of item #1 are to:

- ensure that riparian habitat conservation area (RHCA) buffers are properly delineated and protected and no fuel reduction activities occur within RHCAs
- ensure that the Forest meets management obligations for threatened, endangered and sensitive fish species
- ensure that Burned Area activities comply with the Forest Plan as amended by the Inland Native Fish Strategy

In order to meet the objectives of Item #1, we focused our monitoring efforts to answer the following questions.

1. Were RHCA buffer widths properly delineated and of sufficient width?

Yes, in almost all cases. Nearly all of the RHCA buffers were properly delineated and marked in the Burned Area Recovery project. In 2007, the RHCAs in the Skalkaho salvage sale were properly delineated and painted.

2. Were the trees inside of the RHCAs protected from felling and harvest?

Yes, the vast majority of the time. There were a total of 14 instances (in the 122 salvage units that contained RHCAs) where purchasers erroneously felled and/or removed trees from RHCA buffers in the Burned Area Recovery project. In the 14 instances, a total of 162 trees were cut. The 162 trees affected a lineal buffer length of about 900 feet, which is < 0.1% of the total length of RHCA buffers in the salvage units. In the majority of the 14 cases, the cutting took place within the outer third of 150-200 foot wide RHCAs surrounding small intermittent streams and wetlands. This cutting had a negligible effect on aquatic resources because it either occurred in non-fish bearing areas, or occurred too far from stream channels to affect shade or woody debris recruitment. In 2007, there was no cutting of trees inside the RHCA buffers in the Skalkaho salvage sale. In conclusion, the expanded RHCA buffers that were used in the Burned Area Recovery project were very effective in preventing negative effects to aquatic resources.

3. Were the trees felled inside of the RHCA buffers left on site?

Only about half the time. Of the 162 trees that were cut inside of RHCAs in the Burned Area Recovery project, about half (78) were left on site. 84 of the trees were yarded, which violated the mitigation measures in the Record of Decision (ROD). The ROD states that trees cut in the RHCAs must be left on site.

Approximately 80 hazard trees were cut for flight path safety around the perimeters of ten RHCA helicopter landings in the Burned Area Recovery project. Most of the felled hazard trees were left on site. Removal by purchasers occurred in two cases in 2002 (Robbins Gulch landing #9 and the FSR 75/715 junction landing along Rye Creek), both of which violated the mitigation measure mentioned above. Illegal removal of the felled hazard trees by firewood cutters occurred at most of the RHCA landings.

In July 2004, 15 hazard snags were felled for safety reasons in the RHCA surrounding Laird Creek, just upstream from the Forest boundary. The snags were felled because they posed a risk of falling onto private property. The landowner was afraid that the snags could kill or injure his family or destroy his home. The hazard snags were felled into Laird Creek to provide fish habitat and left on site per the mitigations in the ROD. The snags have remained on site and are providing good habitat for fish.

4. Did the equipment or skyline corridor entries into the RHCAs comply with the Montana SMZ Law?

Yes. There were 12 instances in the Burned Area Recovery project where tractor skidders or skyline corridors entered RHCAs. All of the entries complied with the Montana Streamside Management Zone (SMZ) Law. Only one of the entries required a SMZ variance from the Montana Department of Natural Resources and Conservation (Elk Point I salvage sale in March 2002). In that instance, the SMZ variance was properly obtained and implemented. In summary, equipment entering RHCAs had no effect on the fishery and a negligible effect on RHCA function and aquatic resources. There was no entry of RHCAs in 2007.

5. Did we find evidence of sediment moving from the harvest units into the RHCA buffers?

No. 122 salvage units containing RHCAs were harvested in the Burned Area Recovery project. The RHCA boundaries on all of those units were walked by Forest fisheries biologists to look for signs of sediment moving from the harvested areas into the RHCAs. No evidence of sediment movement into the RHCAs was observed. 22 units were double-checked for sediment movement one and two years post-harvest and still, there was no evidence of sediment movement into the RHCAs. In 2007, there was no evidence of sediment movement into the RHCAs of the Skalkaho salvage sale units.

6. Did temporary roads cross or enter RHCAs?

No. Four, short (the longest was 250 feet in length) temporary roads were constructed and recontoured in the Burned Area Recovery project. None entered RHCAs. In 2007, there was no temporary road in the Skalkaho salvage sale.

7. Were new landings constructed in the RHCA buffers?

No. A total of nine landings (all helicopter) were used in RHCAs on Forest Service land in the Burned Area Recovery project. All were properly sited in existing clearings, per the mitigations in the ROD. In 2007, there were no RHCA landings in the Skalkaho salvage sale.

8. Did fuel storage and refueling occur in the RHCAs?

No. Fuel storage and refueling did not occur in RHCAs in the Burned Area Recovery project. Fuel storage and refueling usually occurred at the helicopter service landings and those were located outside of the RHCAs. Spill containment mitigations were properly applied at the service landings and no significant fuel spills occurred. In 2007, fuel storage and refueling did not occur in RHCAs in the Skalkaho salvage sale.

Item #1 Conclusions:

The key findings and lessons learned from monitoring item #1 are:

- RHCA buffers were properly delineated and marked in nearly all cases.
- Erroneous cutting and/or harvesting of trees from the RHCAs occurred infrequently. There were 14 instances where erroneous cutting in RHCAs occurred and that affected less than 0.1% of the total RHCA buffer length in the project area. In all but a few isolated cases, the purchasers did a good job of avoiding the RHCAs.
- The little cutting that occurred in the RHCAs had an insignificant effect on aquatic resources.
- There was no evidence of sediment moving into the RHCA buffers from adjacent salvage units.
- Temporary roads and RHCA helicopter landings had a negligible effect on aquatic resources. We attribute this to careful location, mitigation and rehabilitation.
- The mitigation that required purchasers to leave merchantable sized hazard trees lying on the ground on the floor of the RHCA helicopter landings was ineffective. Nearly all of those trees were removed by firewood cutters within a year or two.

FISHERIES MONITORING ITEM # 2

The objectives of item #2 are to:

- ensure that Best Management Practices (BMPs) are properly applied to minimize sediment production during the replacement of fish culverts and the decommissioning and storage of roads
- ensure that the Forest meets management obligations for threatened, endangered and sensitive fish species
- ensure that culvert replacement and watershed improvement activities comply with the Forest Plan as amended by INFISH
- ensure that state water quality standards are being met

In order to meet the objectives of Item #2, we focused our monitoring efforts to answer the following questions.

1. Were BMPs properly applied to minimize sediment production during the replacement of fish culverts and the decommissioning and storage of roads?

Two fish barrier culverts were replaced in 2007 and one culvert removal (Daly Creek tributary 5.1) that was erroneously omitted from previous reports was added to this list, bringing the total number of culvert replacements or removals in the Burned Area Recovery project to 18. These 18 culvert replacements or removals are listed in Table 34.

Table 34 – Burned Area Recovery Projects

Stream	Road	Date
Daly Creek tributary 51 (removal)	Road 5783	August 2001
Sand Creek	Road 362	July 2003
Magpie Creek	Road 362	July 2003
Took Creek	Road 362	July 2003
Took Creek	Road 1303	July 2003
Bugle Creek	Road 725	October 2003

Stream	Road	Date
Crazy Creek	Road 370-A	October 2003
West Fork Camp Creek	Road 729	October 2003
West Fork Camp unnamed tributary 09	Road 8112	October 2003
West Fork Camp unnamed tributary 10	Road 8112	October 2003
Railroad Creek	Road 75	August 2005
Hog Trough Creek	Road 75	August 2005
Weasel Creek	Road 75	August 2005
Rye Creek unnamed tributary 123	Road 75	September 2005
Rye Creek unnamed tributary 123	Road 75	September 2005
North Rye Creek	Road 321	August 2006
Moose Creek (new bridge)	Road 726	August 2007
Coal Creek	Road 5662	September 2007

Five Burned Area Recovery fish barrier culverts are under contract to be replaced in 2008 in 2009

In 2007, Forest fisheries biologists and engineers monitored the installation of the Moose Creek bridge and the replacement of the Road 5662 culvert on Coal Creek for BMP application and compliance At both sites, the BMPs were properly applied to minimize sediment production Burned Area Recovery road decommissioning and storage did not occur in 2007 So far in the Burned Area Recovery project, BMPs have been properly applied during the culvert replacements, road decommissioning and road storage projects

The Bitterroot Headwaters TMDL recommends that the Forest monitor any new culvert replacements to ensure that fish passage is being adequately maintained In 2007, Forest fisheries biologists monitored all of the Burned Area Recovery fish culvert replacements that have occurred so far All but three of the culverts are maintaining year-round fish passage The Magpie Creek, lower Took Creek (Road 362) and upper Took Creek (Road 1303) are maintaining fish passage for most of the year when stream flows are higher, but at base flows, they are not maintaining passage because the stream water is flowing subsurface through the culvert barrels and then re-appearing on the surface below the culvert outlets When stream flows increase in late Fall, adequate surface flows are present again in the culvert barrels and fish passage is maintained As more fines are deposited and seal the interstitial spaces in the coarser substrates, year-round surface flows are expected to occur throughout the culvert barrels, which would maintain year-round fish passage

Electro fishing surveys were conducted above and below a few of the Burned Area Recovery culvert replacements in 2007 to monitor the effectiveness of fish barrier removal The results of this monitoring is disclosed in the Item 21 and 41 chapter

2 Were Forest Plan and State water quality standards met during the replacement of fish culverts and the decommissioning and storage of roads?

Yes There are three Forest Plan standards (INFISH amendment) that pertain to culvert replacements and road decommissioning/storage projects INFISH standard RF-4 directs the Forest to size new culverts to pass the 100-year flood with associated debris and bedload This has been done All of the Burned Area Recovery fish culverts have been properly sized to pass the 100-year flood with debris and bedload INFISH standard RF-5 directs the Forest to provide and maintain fish passage at all road crossings This has been accomplished at all of the fish

culvert replacement sites The new fish culverts have been installed in a stream simulation manner to provide and maintain fish passage INFISH standard WR-1 directs the Forest to design and implement watershed restoration projects in a manner that promotes the long-term health of aquatic ecosystems This has been done The road decommissioning and storage projects have removed all of the culverts from the treated roads and at a minimum, recontoured the drainage features of the roads to their stable, natural slopes When completed, the decommissioned and stored roads are left in a natural condition that requires no further management action from the Forest Service They pose no threat to watershed health

The proper application of BMPs during culvert replacements and road decommissioning/storage projects is considered to be consistent with meeting State water quality standards The culvert replacements and road decommissioning/storage projects have not produced unexpected or unusually high sediment pulses At Coal Creek, the BMPs were properly applied and sediment contributions to the stream were within the amounts predicted in the Burned Area Recovery Final EIS A skiff of sediment deposition was observed in the low velocity areas 500 feet below the culvert Most of the deposition occurred within the first 350 feet below the culvert The same is true of the Moose Creek bridge, where sediment deposition was not visible > 300 feet below the old Road 726 culvert crossing

In 2007, Forest Service fisheries biologists monitored three Burned Area Recovery road decommissioning and storage projects that were completed in previous years The results of this monitoring are summarized below:

Laird/Gilbert road decommissioning (completed in 2003-04): These roads were decommissioned (recontoured) in 2003-04 In June 2007, Forest fisheries biologists monitored Road 13326 on the south side of Laird Creek and the Road 7365x system in the Gilbert Creek and lower Laird Creek drainage on the north side of Laird Creek No erosion or sediment problems were observed on any of the roads The majority of decommissioned segments were > 90% vegetated A few of the most rocky and sandy harsh sites were about 60% vegetated, but the bare spots were small and scattered In either case, dirt was not leaving the road prism The stream crossings were vegetated well enough that erosion and sediment contributions to streams were not detectable Shrub cover (mostly ninebark) was thick on the undisturbed forest floor along both edges of the recontoured road prisms, but did not seem to be invading the edges of the prisms too well, except in the wetter draws There were some small shrubs growing in the prism of Road 13326, but they are < 2 feet tall at this time The only trees that were growing on the recontoured roads were the planted ponderosa pine seedlings The seedlings are about one foot tall Most of the seedlings were alive on the south side of Laird Creek On the north side, it appeared that most had been killed by deer and elk browsing Numerous snags have fallen across the recontoured prisms All of the stream crossings were stable with good vegetative cover There was more knapweed and mullein growing on the recontoured road prisms than on the surrounding undisturbed forest floor There was no indication that ATVs had been driving on the prisms where ATV width treads were retained In summary, the recontoured roads have decent vegetative cover, but are still not at 100% The segments in the draws have close to 100% vegetative cover, but these comprise < 25% of the distance Planted grasses are the dominant cover type on the roads, even where weeds occur None of the roads pose an erosion or sediment contribution threat to streams

Figure 24 - Typical conditions on a decommissioned road on a northwest aspect in the Laird Creek drainage, four years after treatment

Road 13340 storage (completed in 2006): This road was placed in storage in 2006 The stream crossing where the culvert was removed on Indian Trees Creek looked good in 2007 There was no sign of sediment deposition at or downstream of the culvert removal site Fish passage is being maintained at the stream crossing Small shrubs were planted at the stream crossing in Fall 2006 and were alive and growing The planted grasses were growing on the ripped road prism, but grass height was low (1-2 inches high) due to the large amount of rock fragments in the soil There were no areas where significant erosion or sediment contributions to Indian Trees Creek were observed Leaving an ATV width tread on the road prism may have been unnecessary, as there was no indication of ATV use this Summer

Road 74160 storage (completed in 2006): This road was placed in storage in 2006 The stream crossings all looked fine At the main crossing of Coal Creek, sediment deposition was visible in the stream bottom in the immediate vicinity of the crossing, but did not extend below the crossing for more than a couple dozen feet None of the stream crossings are fish-bearing Small shrubs were planted at the stream crossings in Fall 2006 and were alive and growing In June 2007, about 20% of the ripped road surface was vegetated, primarily with planted grasses and a few small shrubs and lodgepole that were preserved during storage There were no areas where significant erosion or sediment contributions to Coal Creek were observed

Figure 25 - Recontoured Road 74160 crossing of Coal Creek, 10 months after culvert removal

Item #2 Conclusions:

The key findings and lessons learned from monitoring item #2 are:

- BMPs were properly applied during culvert replacement and road decommissioning activities
- The culvert replacements did not produce excessive sediment inputs to streams Water quality was protected to the extent possible given that short-term sediment inputs are unavoidable while replacing culverts
- The road decommissioning and storage produced negligible sediment inputs to streams Most of the ground disturbance did not occur near live water Decommissioned and stored roads pose a low risk of sediment input to streams

FISHERIES MONITORING ITEM # 3

The objectives of item #3 are to:

- ensure that Burned Area Recovery road maintenance and prescribed burning activities comply with the mitigation measures in the US Fish and Wildlife Service's programmatic biological assessments for bull trout
- ensure that the Forest meets management obligations for TES fish species
- ensure that Burned Area Recovery road maintenance and prescribed fire activities comply with the Forest Plan as amended by INFISH

In order to meet these objectives, we focused our monitoring efforts to answer the following questions

1 Did prescribed burning activities comply with the Forest Plan and the bull trout programmatic assessment?

Yes Slash pile burning and water drafting for dust abatement are the only prescribed fire activities that occurred in the Burned Area Recovery project Both were completed in a manner consistent with the Forest Plan and the prescribed fire programmatic biological assessment

2 Did road maintenance activities comply with the Forest Plan and the bull trout programmatic assessment?

Most of the time There were nine instances in the Burned Area Recovery project where road maintenance activities did not comply with the bull trout programmatic road maintenance

biological assessment Non-compliance generally involved purchaser graders sidecasting road material over the fill slope, either during grading or snow plowing In 2007, road maintenance activities associated with the Skalkaho salvage sale complied with the programmatic road maintenance biological assessment

Item #3 conclusions:

- Spring snowmelt run-off on ice-rutted encroached haul roads is much more of a threat to deliver sediment to streams than non-channelized overland sediment movement through RHCAs adjacent to salvage units Sediment produced by water running down ice-rutted roads can move from the road bed to a nearby stream quickly and in large quantities
- Ice rutting can be avoided, but it takes careful sale administration The key is to avoid driving large numbers of log trucks on ice-covered roads anytime when temperatures are above freezing The most vulnerable time period is late winter and early spring when nighttime temperatures are typically below freezing, but daytime temperatures rise into the 40's and 50's It is best to finish the bulk of the hauling before March arrives
- Once deep ice ruts form in the road surface, they cannot be erased by plowing They will have to melt off and that usually takes at least a week Chipping water bars into the frozen surface with a pulaski to divert the water running down the ruts is difficult and has limited effectiveness
- Drainage holes in the snow berm should be established during the first plowing job and maintained at regular intervals throughout the winter Waiting to punch the holes until after the snow berm has set up does not work The berm becomes rock hard and very difficult to move
- Along some roads, depending on topography and location relative to streams, an alternative to punching drainage holes in snow berms is to push the snow berm far enough off the road shoulder to allow the road bed to adequately drain during snowmelt On some roads, that can eliminate the need for most drainage holes The berm needs to be pushed far enough off the road shoulder on the first plowing and then maintained on each subsequent plowing In obvious drainage locations such as the outlets of drive-through dips and pronounced low spots in the road where pools of water form, drainage holes are still needed
- Along roads that closely encroach on streams, a combination of numerous drainage holes along with pushing the snow berm off the road shoulder has been effective in preventing erosion during spring break-up We have not observed sidecasted snow damming streams or diverting the stream channel into nearby road fills Encroached roads are predominantly located at low elevations on the Bitterroot National Forest These roads typically do not receive enough snow to cause sidecasting problems, with the possible exception of blocking the outlets of ditch relief pipes
- Outlets of the ditch relief culverts need to be kept free of snow blockage during plowing This means that they need to be marked with snow stakes before it starts to snow Once snow covers the outlets, they are difficult to find
- The items listed above typically require close and timely monitoring and attention by the timber sale administrator to achieve the desired results

Water and Sediment Yield
Monitoring Item 17

OBJECTIVES: Validate prediction models and monitor compliance with State and Federal water quality standards and BMPs.

DATA SOURCES: Flow and sediment sampling before and after project activities. Additional sources used: Water monitoring stations (water column monitoring of flow and sediment); Stream surveys (channel shape, composition, stability and productivity); precipitation and snow pack information; coordination with State Department of Environmental Quality (DEQ) relative to water quality standards, 303(d) listing and TMDL development; the State of Montana Department of Forestry for BMP compliance; and internal BMP audits.

FREQUENCY: Annually (six streams representing major geologic types).

REPORTING PERIOD: 2007.

VARIABILITY: Twenty percent variation from predicted sediment increases and changes in water quality.

EVALUATION - General

The 2001 and 2002 Forest Plan Monitoring and Evaluation Reports, Item 17, discuss the results of fourteen years of monitoring "streams representing major geologic types" as identified in the Forest Plan. In summary, results using the prescribed methodologies have been highly variable. While we continue to collect this data for other purposes, it has provided limited usefulness in directly addressing the objectives of this monitoring item. Findings suggesting high sediment load variability and a need for research-level sampling programs have been consistent with recent literature. Additional monitoring methods, along with ongoing evaluation of relevant scientific literature, are now being used to better address this monitoring item's objectives. Focus of this item was shifted to tracking progress towards meeting the Total Maximum Daily Load (TMDL) goals, BMP compliance and substrate monitoring to judge effectiveness of these practices.

EVALUATION – Compliance with Federal and State Water Quality Standards - Total Maximum Daily Load (TMDL) analysis

The 2006 Bitterroot Headwaters TMDL provided a landscape-scale assessment of water quality and human impacts in the area upstream of the East and West Fork Bitterroot River confluence. Much of this study area is on the Bitterroot National Forest and the TMDL included sediment-reduction guidance for the Forest's Road system.

In the 2006 Forest Plan Monitoring Report, it was stated that "Compliance monitoring (for the TMDL) included pebble counts for several East Fork Bitterroot River sites within the TMDL's scope." Review of Section 9, Monitoring Strategy, of the TMDL, page 251, finds that this is not accurate; no monitoring of this type is required of the Bitterroot National Forest in the TMDL. This monitoring would be conducted by the MTDEQ Implementation Team (IT). Other monitoring is described in Table 9-1 of the TMDL. However, the East Fork pebble counts will continue to be monitored and reported annually, as budget allows, providing substrate trend information for both DEQ and the Forest. Other monitoring related to effectiveness of TMDL improvements is planned to document sediment reductions, fish passage improvements and to provide information that would support removal of streams from TMDL or determine if additional restoration efforts are needed.

The Middle East Fork (MEF) Hazardous Fuels Reduction Project is located wholly within the East Fork Bitterroot River watershed and encompasses several streams listed in the Headwaters TMDL. A large percentage of the watershed mitigation and BMP work for this project was completed by the end of the 2007 field season. Only one road, FDR 73250 in Guide and Jennings Camp and three fish passage pipes have not yet been implemented as the MEF decision indicated. Ongoing mitigation, such as compliance with SMZ or RHCA's would continue if further timber harvest activities occur.

The Bitterroot Mainstem TMDL started in 2006 and will cover the remainder of the Bitterroot Basin from the West and East Forks of the Bitterroot River to the confluence with the Clark Fork River. Thirty-four streams are currently listed on the State of Montana's 2004 303(d) list in this reach. Please refer to the DEQ website (www.deq.state.mt.us/wqinfo/tmdl/index.asp), for information on those streams currently believed to require a TMDL analysis. Of the 34 streams listed, 18 are partially located within the BNF. Five of these 18 streams have been classified as not needing a TMDL because no pollutant-related impairment has been identified. Based on stream survey data, the Forest is recommending that three additional streams be removed from the list. The public is encouraged to become involved in the TMDL process by contacting the State of Montana DEQ.

MONITORING – TMDL goals

To comply with the Headwaters TMDL, as funding permits the Forest Service will locate and treat active sediment sources in TMDL target and other stream basins, with the long-term goal of reducing the overall chronic sediment load. This plan includes crossing improvements, road and crossing decommissioning, riparian area fencing and other applicable treatments to reduce connected disturbed areas. Sediment/erosion reduction projects accomplished in 2007 are listed below.

Table 35 – Watershed Projects in 2007 addressing Bitterroot Headwaters TMDL

Watershed/Projects - 2007	Treatment/area
Shrub Planting (various watersheds and site types) – Other sites not accounted for here were planted with shrubs in the Mainstem TMDL area and in the Selway watershed.	Stabilize soils with native shrubs (8 sites)
Blocking illegal OHV trails, spreading slash to aid in vegetative recovery and posting signs	3 sites
Decompaction, seeding, fertilizing and mulching of illegal OHV trail in Moose Creek drainage, East Fork Bitterroot River	1 trail
Construction of Coal Creek Drift Fence Fisheries Project (with assistance from watershed)	6 acres of streamside area protected
Storage (decompaction, recontour portions) of FDR 73259, 73260, 73261, Middle East Fork Mitigation	Remove 3 crossings, seed and fertilize entire length of roads, mulch crossings in October
Obliterate access to streamside skid trail, Middle East Fork Mitigation	Block and recontour lower and upper access points, seed, fertilize, mulch in October
Replace two fish barrier culverts in Moose Creek (upper East Fork) with fish-friendly bridge	2 sites
Coal Creek Aquatic Organism Passage Culvert, Upper West Fork	1 site

MONITORING – Best Management Practices

The Bitterroot National Forest implemented numerous Best Management Practices to reduce road and activity-related sediment. Projects listed in Table 36 were implemented in 2007 to comply with BMP direction and reduce sediment sources, especially related to active forest management. Funding for the projects was provided by watershed, National Fire Plan, stewardship and other program funds. See Item 19 for a more complete list of 2007 improvements.

Table 36 – 2007 Projects to comply with BMP direction and reduce sediment sources.

Installation of straw bale check dams in 52 locations along timber sale haul routes to protect streams from haul related sediment inputs. Cross drain pipes or roadside ditches accessing streams on FDR 5758, 723, 725, 5633, 74014	Seed eroding portions of roadside ditches in Tepee (FDR 5758) and Jennings Camp (FDR 723)	Construct Coal Creek Drift Fence to prevent livestock access to sensitive reach of Coal Creek.

No (State-initiated) BMP audits occurred on the Bitterroot National Forest in 2007. State audits occur every other year and the next audit year is 2008.

As an EMS requirement, three timber sales were audited by Bitterroot NF personnel for BMP application and effectiveness using established MT DNRC methodology. The audit focused on timber sale units with riparian areas, unique mitigation requirements and/or temporary roads. Two open (Hayes Creek Fuels, Spring Mink) and one closed (Frazier) sale were audited. The findings of the audits are detailed below:

1) All applicable BMPs were consistently applied to each sale. Common non-applicable BMPs included BMP 14.16, Meadow Protection During Harvest (no meadows included within harvest units), BMP 18.04 and 18.05, Fire Suppression related BMPs (not fire suppression activity) and those BMP related to only to new road construction as no new permanent roads were constructed. BMP 14.23, Reforestation requirement has been included in project design on the Middle East Fork project (Spring Mink Timber Sale) because insect related mortality resulted in several stands with insufficient stocking of the ecologically appropriate tree species. These areas will be planted after harvest and prescribed fire is completed.
2) Most applied BMPs were rated as 4/4 (Operation meets requirement of BMP, Adequate protection of Soil and Water Resources). Exceptions of lower scores are described in the next section, Problem Areas and Corrective Actions.
3) In the two open sales, not all erosion control had been completed at the time of the audit. This is not a BMP violation due to the fact that July and August are not good seasons to be seeding. This work was scheduled to be completed later in the season when weather was more amenable to seeding.
4) Highlights and successes of the audit:
    - Skid trails in the Frazier Sale Unit 64W that were a concern in the 2006 internal audit because of dry soils and lack of ground cover are on an improving trend. Grass seed was applied in fall 2006 and is growing and providing ground cover. Slash was spread over the trails as available. No rilling was observed on these skid trails during the 2007 field review.
    - Grading of FDR 723 along Jennings Camp was 98% successful in keeping side-cast material out of the stream. A short, two foot section did have some side cast on the flood plain near the stream. The remainder of the road maintenance did not result in side-cast material along or in Jennings Camp Creek. This maintenance was completed by the Forest Road Crew and is also listed in the

problem section.

- Prescribed fire did escape burn piles and burn about 5 acres of Unit 64E in Frazier. The fire was of moderate severity, mortality was limited to six inch diameter pine and needle cast from the burned trees is providing good ground cover. This area had very good native grass recovery and the escaped fire effects were likely beneficial rather than detrimental (greater area treated, added habitat diversity).
- Spring Mink, unit 13, was rated as 5/4 (Operation exceeds requirements of BMP/adequate protection of soil & water resources) for BMP VIII 1.a (Adequate SMZ width maintained), due to the use wider riparian buffers than the MT SMZ guidance calls for. INFISH RHCA widths used by the Forest surpass the MT SMZ widths in all cases.
- Review of Unit Logs, monitoring reports by Mike Jakober, fisheries biologist, found that RHCA's were marked correctly on the active sales, with one exception. Due to confusing marking, two trees were accidently cut in a marked wetland in Unit 29 of Spring Mink Timber Sale. These cut trees were left on site as woody materials, reported to the sale administrator, biologist and hydrologist. After reviewing, it was concluded that no negative effects to wetlands or RHCA's occurred.
- There was no visual evidence of road surface rilling on haul routes. Water from the roads wasn't channeled to roadside streams during storm events or during winter hauling.
- Straw bales were installed by contract and forest crews according to required mitigation prior to hauling. They were monitored throughout the season and replaced as needed before winter weather set in.
- Review of sale administrator notes finds that in Units 13 and 130 wetlands outside of the unit were excluded by marking on the ground but not identified on the sale area map (SAM). There was a modification of the SAM for Unit 13 to show these wetlands. The Fisheries Biologist was informed and made the determination that they were wetlands.
- The internal BMP audit of Waddell and Hayes Cr units of the Hayes Cr Fuels timber sale and service contract suggested full BMP compliance. All applicable BMPs were rated as 4 for application and 4 for effectiveness. A full review of the timber sale administrator's 2007 daily diaries revealed very good communications with the contractor and no contract or BMP violations.
- Wetlands adjacent to unit W3 (Waddell) were appropriately designated on the ground and in the SAM. No TS impacts were observed in the designated wetland.

5) Problem areas and corrective actions:

- *Problem:* In Spring Mink Sale, Unit 13, a skyline unit, skyline yarding resulted in gouging a trough in two different corridors. Disturbance on one site was substantial and although it was water barred after use, personnel felt there was still moderate to high risk that runoff could be channelized in this corridor and erosion could occur. *Corrective Action:* To remedy the situation, fisheries and soils coordinated with Job Corps Natural Resource students to recontour berms and slash these skyline corridors. This work was completed in fall 2007 before winter conditions set in. Because this was addressed in a timely manner (before the next runoff season), it was not considered a technical BMP violation. Pre-sale and timber sale administration personnel were notified of the situation.

- *Problem:* FDR 723 was subject to BMP upgrades that were completed in 2005 and included gravel surfacing. Road maintenance was conducted by the Forest road crew

on FDR 723 in the Jennings Camp watershed in October of 2007 to offset use by the Spring Mink Timber Sale. The majority of grading on FSR 723 was conducted according to BMP direction, however on a short, 2 foot section along Jennings Camp Creek, grading deposited a very small amount of road material (several shovelfulls) in the floodplain. This site is located along a narrow section of road that is often a problem area due to it's proximity to the stream.
Corrective Action: Before hauling operations began, the road was widened by incorporating part of the ditch into the travel surface to provide a safer route and also to move traffic and road surface disturbance away from the stream. Although this effort likely resulted in reduction of sediment generated by road use, it suggests the road location issues will not be fully resolved by this treatment. The situation was discussed with the road crew and road maintenance supervisor.

- *Problem:* Review of timber sale administrator notes reveals that within Unit 13, there was a wetland less than one acre not delineated or identified on the SAM. Trees within this wetland were cut before it was recognized as a wetland by the timber sale administrator or cutting crews. No equipment entered or went within 100 feet of the wetland. This was a violation of an INFISH conservation practice, although it resulted in minimal wetland impacts and no soil disturbance.
Corrective Action: Skyline corridors were located to protect the wetland during yarding and this BMP was implemented correctly.

- *Problem:* Also noted in sale administrator diaries is discussion of an unmapped wetland area less than one acre above the road where trees were cut and yarded because they were a hazard to skyline operations. No equipment entered this wetland. This was a violation of a mitigation (no harvest of wetland trees) that resulted in minimal wetland effect. Standard protocol would be to cut hazard trees but leave them on-site as large woody debris
Corrective Action: The situation was discussed with the TSA and pre-sale personnel, who have had a very good record of supporting the standard hazard tree protocol. The purchaser was charged standard prices for the trees.

EVALUATION – Compliance with State Best Management Practices

Best management practices (BMPs) are included in project design and timber sale contracts to protect water quality and soil productivity. Results suggest that BMPs associated with riparian area protection have been consistently implemented and are successfully preventing harvest unit sediment from reaching streams. Comparing results from this monitoring program with Bitterroot Headwaters TMDL findings suggests most water quality problems on the Forest continue to be associated with permanent, streamside, native surface collector roads built before BMPs or Forest Plans were developed, rather than with timber harvest or temporary roads from current projects.

2007 monitoring suggests BMPs are being applied consistently on current timber sales on the Bitterroot and are effective in protecting water quality, although several minor exceptions occurred as noted above. Monitoring provides the opportunity to discover problem areas and either repair them or look for prevention options for the future. Adaptive management discussions with timber sale personnel focused on improving wetland protection through better marking and inclusion on SAMs. The literally hundreds of correctly and successfully applied BMPs compare favorably with the three cases where the BMP wasn't applied correctly or undesired effects occurred on the ground. These cases were small in size compared to the entire project areas and didn't cause long-term degradation of the watershed resource, but did result in several minor and temporary impacts.

The Bitterroot National Forest averages about 250 days per year of logging operations. In 2007, 13 different sales were overseen and monitored by timber sale administrators (TSAs) and various

resource specialists. No departures from contract provisions were noted by internal audits and are described above. All of the 2007 BMP issues have been corrected or mitigations discussed to reduce their occurrence in future operating seasons.

MONITORING – Effectiveness of TMDL and BMP implementation

Five sites on the East Fork Bitterroot River, in the Bitterroot Headwaters TMDL planning area, were surveyed for substrate/sediment composition in 2007. These sites have been surveyed several times since 2000 to monitor changes in the river following the fires and also to provide data for the TMDL. Trend results continue to be variable. Pebble counts have inherent variability and may have limited use in determining sediment transport and deposition trends, especially in steeper, cobble-dominated rivers such as the East Fork Bitterroot (Archer et al. 2004; Roper et al. 2002). On the other hand, the information collected can be used to evaluate broad-scale river condition especially when used in context with other habitat parameters.

In the Headwaters TMDL analysis, water quality targets derived from reference or minimally managed streams were used to compare to listed streams.

Table 37 - The Bitterroot Headwaters TMDL Thresholds Identified in the East Fork Bitterroot River

Stream Type	Threshold for % fines < 2mm	Threshold for % fines < 6mm
C4	Mean 23%, Range 14-32%	Mean 33%, Range 17-49%
C3	Mean 13%, Range 6-20%	Mean 16%, Range 8-24%
B3	Mean 12%, Range 5-19%	Mean 16%, Range 7-25%

Table 38 - Summary of Pebble Count Results, East Fork Bitterroot River, Years 2000-2006

Site Name	Range % fines <2mm	Average % fines <2mm	Range % fines <6mm	Average % fines <6mm	Comments about 2006 Data
East Fork at Indian Tree (Lowest Site on EF Bitterroot) C4	2-11%	4.2%	5-14%	6.9%	Similar to previous surveys.
East Fork at Spring Gulch, C4	3-11%	7.2%	4-15%	9.0%	Similar to previous surveys.
East Fork above Sula Bridge C4	6-15%	9.7%	7-18%	11.7%	Similar to previous surveys.
East Fork below Mink Bridge B3	8-23%	12.8%	9-23%	14.7%	Similar to previous surveys.
East Fork below Meadow Bridge B3 (Upper most site)	7-15%	10.7%	8-19%	13%	Similar to previous surveys.

Based upon monitoring conducted in 2007, all locations on the East Fork, except the East Fork below the Mink Creek Bridge, have substrates suitable for their stream types as described in the TMDL. In 2007 several of the sites (East Fork at Spring Gulch, Sula Bridge and Meadow Bridge), mean particle sizes increased a very small amount, a millimeter or less) while at The Indian Tree and Mink Bridge sites they decreased very slightly. Below the Mink Bridge the percentage less than 2mm is slightly over reference at 12.8% (12% for reference stream type). East Fork River pebble count results continue to suggest that this stream reach has appropriate channel substrate and is not sediment-impaired. The current dominant influences of the 2000 fires and ongoing land management do not appear to be increasing fine sediment at these sites.

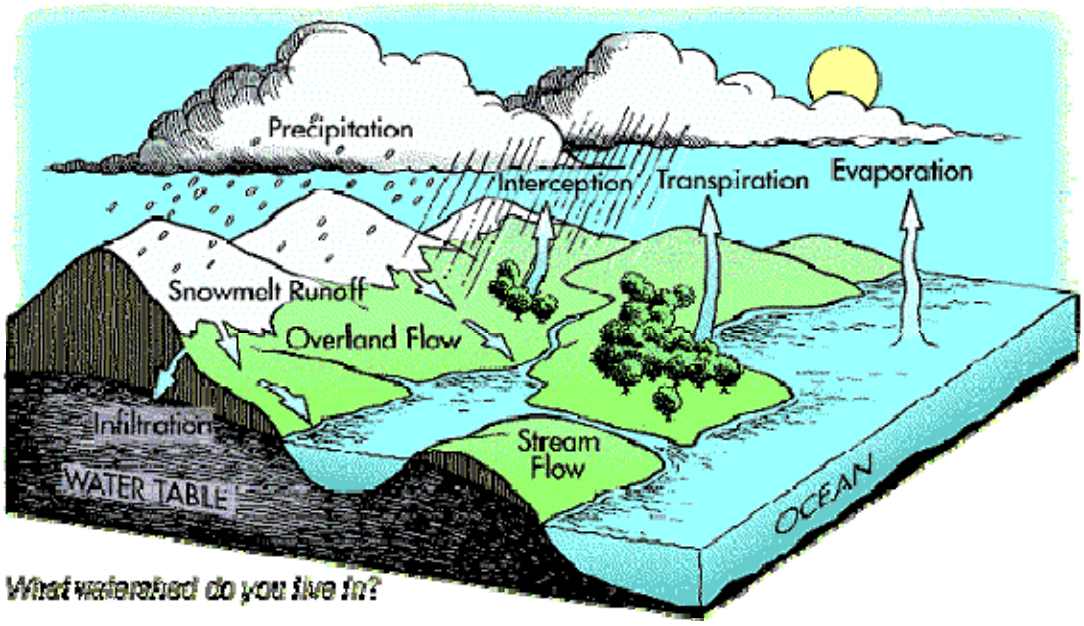
Monitoring will continue at these sites to provide trend information for the Forest and TMDL status as funding allows.

The BNF continues to participate in National and Regional efforts to evaluate stream survey protocols and the variability of data. A major player in this effort is the Forest Service Fish and Ecology Unit located in Logan, Utah (www.fs.fed.us/biology/fishecology/emp). These efforts will help the Forest refine its monitoring strategy and choose monitoring protocols and techniques that will allow detection of system change related to management activities.

Citations:

Archer, E.K.; B.B. Roper; R.C. Henderson; N. Bouwes; S.C. Mellison; and J.L. Kershner. 2004. Testing Common Stream Sampling Methods for Broad-Scale, Long-Term Monitoring. Rocky Mountain Research Station, General Technical Report RMRS-GTR-122.

Roper, B.B.; J.L. Kershner; E.K. Archer; R.C. Henderson; and N. Bouwes, 2002. An Evaluation of Physical Stream Habitat Attributes used to Monitor Streams. Journal of the American Water Resources Association. 38(6):1637-1646.



Cumulative Watershed Effects
Monitoring Item 19

OBJECTIVE: Determine cumulative watershed effects and to promote management consistent with water quality goals.

DATA SOURCE: Monitoring of cumulative watershed effects is done indirectly through the evaluation of existing conditions for specific projects, TMDL-oriented monitoring and the effectiveness of the Forest watershed improvement program. Direct and indirect watershed effects are also measured directly through river stream reach monitoring. Cumulative watershed effects are estimated with WEPP (erosion) and ECA (water yield) model results produced during environmental analysis and verified with stream reach surveys and project monitoring.

FREQUENCY: One timber sale that includes road construction per District per year.

REPORTING PERIOD: 2007

VARIABILITY: Exceeding geomorphic threshold of concern.

EVALUATION:
There were no timber sales with new permanent road construction implemented or proposed on the BNF during 2007. Monitoring focused on watershed improvement accomplishment, effectiveness and future needs.

Cumulative watershed effects were modeled for the Lower West Fork, Haake-Claremont and Weasel Salvage Projects, although none have new permanent road construction proposals. Lower West Fork analysis is ongoing and final reports are due in 2008. Analysis suggests neither Haake-Claremont nor Weasel Salvage projects would exceed water yield or sediment guidelines in their respective watersheds.

Watershed condition inventories occurred on over 90,000 acres in 2007. They focused on the Lower West Fork, Haake-Claremont and Weasel project areas, all of which have ongoing analysis. Haake-Claremont and Weasel Projects are scheduled to be signed in 2008; Lower West Fork Draft EIS would be released for review in 2008.

Site condition monitoring was completed on 9 different projects in 2007. The results suggest watershed improvement projects are reducing sediment sources and contributing to improvements in watershed conditions.

Results of water yield modeling used in analysis (ECA and Bitterroot Water Yield Analysis Procedure) for the Lower West Fork Project suggest that proposed harvest levels would be below that thought to measurably increase water yields or affect channel conditions. Monitoring of 115 individual project harvest units suggests that modeled sediment yield increases are greater than what recent monitoring results have detected in the field.

Recent analysis and monitoring suggests that sediment from hauling on roads that are within sediment contributing distance from streams is the biggest risk to water quality. As in past years, silt traps/filters have been installed where needed to mitigate effects from winter hauling on stream channel condition. Sediment trap installation and maintenance in 2007 occurred on FDR 723 (Jennings Camp), 725 (Meadow Creek), 5758 (Tepee), 311 (Guide) and 5756 (above Springer area). Refer to Forest Plan Monitoring Report Item 22 for more detail.

Monitoring suggests system roads are contributing less stream sediment where best management practices (BMPs) have been applied. Road closures and obliterations also reduce

stream sediment input, as indicated by the monitoring described in Table 40.

In addition, the Forest continues to rehabilitate OHV trails where resource damage has been identified. Multiple sites in the Hart Bench area were treated in 2007.

MONITORING:

Existing Condition Surveys and Watershed Improvement Projects

Table 39 - Summary Table of Existing Condition Surveys and Watershed Improvement Projects

Activity	Units Accomplished	Location
Stream Reach Inventory	5.75 miles	PACFISH/INFISH stream monitoring Meadow Tolan Allotment (14 sites), Residual Pool Volume and Channel Stability Rating at 16 sites within the 2000 Burn Area,
Watershed Improvement Projects	82 acres watershed funding only, 46 acres mixed funding	Numerous sites – see narrative below.
Watershed Improvement Needs Inventory	94,087 acres	Lower West Fork Analysis Area Road system not inventoried in 2006 (11,100 acres and approximately 42 miles of road), Weasel Creek Salvage (28,970 acres, approximately 3 miles of road) and Haake-Claremont (54,017 acres, approximately 15 miles of road) were surveyed in 2007. None are signed decisions at this time and potential watershed improvements are not yet final.

Stream Reach Inventory

The PACFISH/INFISH Biological Opinion (PIBO) monitoring group sampled multiple stream reaches on the BNF during 2007 as part of their Effectiveness Monitoring Program for Streams and Riparian Areas within the Upper Columbia River Basin (www.fs.fed.us/biology/fishecology/emp). In total, there are 33 sites located on the BNF monitored between 2001 and 2007. This project is also providing data on monitoring protocol repeatability and sensitivity to detect change. In addition, the data are being used during the TMDL efforts the forest is participating in. As the program continues and additional data are collected at these sites, trends may be discernable.

Watershed Improvement Projects

Watershed improvement projects are implemented to reduce cumulative watershed effects. These projects totaled over 82 acres in 2007. Some of this work centered on prevention and reduction of soil impacts due to unauthorized user-created motorized trails. These illegal trails were decompacted (by hand or by machine), seeded, slashed and mulched to allow for vegetation recovery and stabilization. Another watershed focus was on reduction of sediment into streams from active surface erosion and/or mass failure associated with roadbeds no longer maintained for public travel. Roads storage/stabilization treatments included surface decompaction, waterbars, culvert removal, associated channel reshaping, seeding and mulching

The following watershed improvement projects were completed in 2007:

- FDR 5790, headwaters of Jennings Camp Creek. This project was identified during a 2006 State BMP audit as a road opened for a timber sale but not effectively closed

following use and a BMP violation. Illegal use of the road was resulting in rutting and sediment contributions to a headwater wetland area. This area was recontoured, decompacted, seeded, mulched and fertilized in fall of 2006 (FY2007).

- FDR 73258 and 73262 Decommissioning: This restoration project was identified in BAR 2002. The entrance to FDR 73258 was recontoured and a portion of the road decompacted. The remainder was left without treatment as 8" or more DBH ponderosa pine were growing on the road surface and there was no evidence of vehicle travel. The work at the entrance would effectively block future access. FDR 73262 was recontoured for the entire length as there was no vehicle access due to the alignment with FDR 723 and little vegetation recovery on the road surface. Both of these roads were seeded, mulched and fertilized.
- Straw bale sediment traps were installed on FDR 723 (Jennings Camp), 725 (Meadow Creek), 5758 (Tepee) as mitigation for haul-related sediment from Middle East Fork fuels projects. Maintenance occurred as needed due to livestock and wildlife disturbance. Sediment traps were also installed on FDR 311 (Guide) and 5756 (Swift/McCart Road), 5633 and 74014 (Halford and Gemmell) as mitigation for other projects.
- Shrubs were planted at 24 sites across the forest to help stabilize and de-compact soils. Most areas were adjacent to streams where culverts had been replaced or removed.
- Mulching occurred on two non-system roads that were obliterated in the Robbins Gulch drainage in FY2006. This work was completed in October of 2007.
- Obliteration of FDR 62586 and 62587 in North Rye Creek drainage using Bear TS Stewardship funds. This work was identified in the 2002 Burned Area Project.
- Sediment traps were installed on the Robbins Gulch Road, FDR 446 in November 2007 to trap sediment from the road travel-way resulting from a precipitation event in early November, 2006. Sediment traps were also installed on FDR 374, Trapper Creek following repairs to the road that were needed following the November storm event.
- A short section (300 feet) of the ditch on the Tepee Road was seeded as mitigation for the Middle East Fork project to reduce sediment contributions from ditch erosion. This will need monitoring in 2008 to determine effectiveness or need for additional treatment.
- Culvert sites on FDR 729 and 8112 in the West Fork of Camp Creek were reseeded due to sparse vegetation.
- Middle East Fork Mitigation on FDR 73259, 73260, 73261 and nearby skid trails was completed using stewardship money from the Kerlee Bert Timber Sale. These areas were decompacted, portions recontoured, seeded, mulched and fertilized to restrict access to motorized traffic, improve elk habitat effectiveness, reduce the risk of culvert failures and reduce sediment inputs.
- An exclosure fence on Coal Creek was completed with mostly fisheries funds to protect sensitive streambanks from livestock. Six acres of streamside area was protected.
- 28 burn piles in the Jennings Camp and Fern/Trap areas were rehabilitated using native grass seed and organic soil supplements.
- An illegal OHV trail connecting the Moose Creek Road (FDR 432) with FDR 5770 was decompacted, seeded and fertilized to facilitate recovery.
- Rocks were placed around the parking area at the Tin Cup Trailhead to confine vehicles to the established parking area.
- Five unauthorized OHV trails were blocked, signed and slashed by the OHV Ranger.
- A single bridge was installed on FDR 726 near the Moose Creek Campground replaced two undersized culverts on Moose Creek that historically did not pass large runoff events.

The new structure was designed to meet stringent aquatic organism passage requirements.

Watershed Improvement Needs Inventory

Additional work in the Lower West Fork area occurred to validate mapped stream/road crossings. This information will be used in analysis of the Lower West Fork project and will occur in 2008. Weasel Creek watershed was surveyed and a road storage project associated with a salvage proposal is currently being considered.

Project Monitoring

Table 40 - **Summary of Project Monitoring** highlights the past or on-going projects that were monitored for compliance, implementation and effectiveness during 2007. Individual monitoring reports are available from Forest hydrologists.

Table 40 - Summary of Project Monitoring

Activity	Item	Location and Findings
Completed Watershed Improvement (WI) projects inventoried for effectiveness and maintenance needs	Project Areas Visited	Reimel Cattle Guard and Road Relocation (implemented 2005). Field review found that vegetation recovery on disturbed soils is progressing well. In 2006 cheat grass was outcompeting the desired vegetation, while in 2007, the natives and annuals were more common. A windstorm resulted in many breaks in the riparian fence, as a result neither the fence nor the cattle guards were effective in keeping livestock out of the riparian area. This was brought to the attention of the range manager and conditions should improve in 2008. Review of two streamside road segments abandoned in 2001/2002 along the streams found that although vegetation was somewhat sparse, the soils were armored and not eroding or contributing sediment to Reimel Creek. The abandoned segments were replaced by sections of road further from the stream. Casual observers would not notice that these sections of road had been abandoned as they match the appearance of surrounding lands. Reimel Shrub Plantings (implemented 2006). Shrubs were planted along the stream bank adjacent to the 2005 road relocation site. Review in 2007 found no shrubs present although there was some vegetation growing. This site should be reviewed in 2008 to ensure that the existing vegetation is stabilizing the bank. The area could be replanted if shrubs are available. Meadow Tolan Site 10 (implemented October, 2005). Monitoring conducted in fall 2007 found that the project has improved stability within the project area but as expected, livestock still utilize the surrounding area. Meadow Creek Exclosure Fence (2004). Monitoring in 2007 found that the fence is effective in eliminating livestock access to Meadow Creek. A windstorm resulted in blowdown that damaged portions of this fence and upstream excloses in 2006. Maintenance is needed and is planned for 2008. The ford that was constructed in 2004 was also reviewed and is preventing further bank erosion. Seeding Effectiveness on FDR 723 and 725 (October, 2005). Monitoring finds that seed has germinated and road shoulders outside of graveled travel-way and ditches are green and fuzzy. Livestock does graze along this road but the grasses are expected to continue to grow and be effective in reducing erosion and trapping sediment. FDR 73691 (October, 2005). Monitoring in 2006 found that the first crossing is becoming more stable as grass cover improves; shrubs were planted in 2006 and are growing well. No additional slumping of road fill has occurred. Additional

Activity	Item	Location and Findings
		hand work proposed in 2007 has been postponed and continued monitoring will indicate future need should it arise. Waugh Gulch Aspen Exclosure (2001). Monitoring in 2007 found that the majority of aspen are approaching six feet. Recommend the fence remain until aspen are large enough browsing by livestock or wildlife, still several years from now. Vegetation recovery and shrub planting success on 4 Fish Culverts on Camp Creek and tributaries (2004). The bare areas were and reseeded in 2007.
BMP, implementation, effectiveness and validation monitoring	4 Projects Monitored	Forest Internal BMP Audits conducted in July 2006: Frazier, Spring Mink, Hayes timber sales. Results described in Item 17. Middle East Fork BMP Upgrades (mitigation). Results reviewed on the ground in October 2007. Gravel on the road surface and in the ditch is effective in preventing erosion of the road surface and the transport of sediment to Tepee Creek. Most of the ditch was graveled, which meets the intent of the mitigation in the Middle East Fork ROD to reduce sediment contributions. The lower 100 feet of the ditch was not seeded or gravelled because about 100 feet below the outlet of the last cross drain pipe, the entire stream is diverted into an irrigation ditch. Review of ditch condition in 2007 resulted in seed application along this ditch to stabilize and reduce erosion. Straw bale sediment traps were also installed in five sites along this road to reduce risk of sediment input from potential winter timber haul.
BAR Road Decommissioning Project Monitoring	1 site visited	Weird Tom Road Decommissioning (2006). Monitoring in 2007 found that recontouring was well done and revegetation efforts were effective. Stream crossings are stable and are not sediment sources just one year after implementation. Channel dimensions may still adjust with high flows.
Other Project Monitoring	1 allotment, 14 sites	Meadow Tolan Allotment Monitoring Sites (Bunch Gulch, Springer, Bugle Exclosure, Bugle Below Exclosure, Tributary to Meadow Site #6, Tributary to Meadow Site #10, Meadow Balsam Reach, Meadow Sagebrush Reach, Meadow Old Exclosure, Meadow 2004 Exclosure, Tolan, Swift, Lodgepole, Tributary to Meadow Site #13). See below for a monitoring summary.

Meadow Tolan AMP

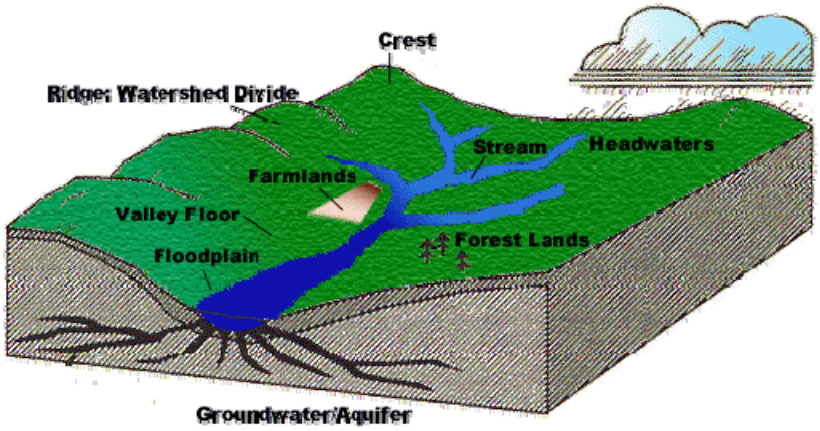
Monitoring of this allotment consists of measuring streambank trampling, tracking photo points and profiling the valley/stream cross-section at 14 established reaches. These reaches are each 200 feet long. A total of 400 feet of bank is monitored at each site. The complete report is available at the Supervisor's Office.

The overall impression was that dry conditions in 2007seemed to increase utilization and trampling along streambanks when compared to the previous year. Several sites (#6, 10 and 13, three un-named tributaries to Meadow Creek and #8, Swift Creek) saw more use this year but were still within recommended levels. Site #14, below the exclosure on Bugle Creek, had slightly higher utilization than recommended levels; should this continue additional mitigation may be needed. Site #3 (Meadow Creek above FDR 5759 bridge) had an increase in trampling and was above recommendations. The IDT met in the field to discuss this site and decided to construct a woody debris/slash fence to reduce livestock access and also to harden the watering area directly below the bridge to reduce bank erosion. Site 11 (Bunch Gulch) was rested in 2006 and 2007 but trespass livestock from another allotment in 2007 resulted in utilization above recommended

levels. The range manager has discussed the trespass with the cattle owner and attempted to solve the access problems.

Site #9 (North Fork Springer) was also above recommended utilization levels but not as high as previous years. Options for mitigation at this site are limited. Blocking off this area from livestock access would likely result in increased use along the fisheries portion of the stream and increase sediment contributions to Springer Creek. The IDT believes it to be more important to maintain fisheries habitat in Springer Creek by allowing livestock access in and through this wetland area.

Fences in the lower part of the meadow of Meadow Creek are in need of maintenance. Materials have been purchased and repairs are planned for 2008.



Validation of Aquatic Habitat Quality and Fish Population Assumptions Used to Predict Effects of Activities And Cutthroat Trout Population in Relation to Habitat Changes Items 21 and 41

OBJECTIVES: Monitor fish populations and trends. Determine fish population/habitat relationships. Determine indicators of aquatic habitat quality and effective monitoring methodologies. Monitor the population trends of management indicator species (westslope cutthroat trout) and determine the relation to habitat changes.

DATA SOURCE: Fish population census, habitat inventory and condition, channel structure, redd counts, radio-telemetry and streambank vegetation data. Data collected cooperatively with the Montana Department of Fish, Wildlife and Parks (MFWP).

FREQUENCY: Annually.

REPORTING PERIOD: 2007.

VARIABILITY: A decline in aquatic habitat quality and/or fish population for more than one year (Item 21); 10 percent difference from projected cutthroat trout yield (Item 41).

INTRODUCTION:
Forest monitoring of the fisheries and aquatic environment in 2007 again far exceeded the minimum requirements set in the 1987 Forest Plan. Research and analysis of fisheries and fish populations since the Forest Plan was signed have shown that the ten percent annual variability noted above is too narrow given the natural annual variation in fish populations. Based on our ongoing long-term monitoring, fish populations are either stable on the Bitterroot National Forest, or trends are inconclusive at this time. Habitat quality is either being maintained or improving. Individual measures and evaluations are discussed further in the following sections.
The current emphasis of the Bitterroot National Forest's fisheries monitoring program is to:

1. Monitor population densities and distributions of resident trout.
2. Determine viability trends of bull trout and westslope cutthroat trout populations on the Forest scale.
3. Validate fish/habitat relationships.
4. Locate the strongest bull trout populations and monitor their status.
5. Monitor compliance with Anadromous Fisheries (PACFISH) and Inland Native Fish (INFISH) requirements.

MONITORING RESULTS AND EVALUATION:
The following monitoring was accomplished in 2007 and is discussed and **evaluated** in this section:

- Fish Movement Monitoring (page 135)
- Culvert Inventories and Replacements (page 135)
- Project Level Monitoring of Fisheries/Watershed Improvement Projects (page 141)

FISH HABITAT INVENTORIES:

Table 41 lists the fisheries habitat inventories that were conducted by Forest fisheries biologists in support of project planning and monitoring efforts in 2007. The inventories supply information used at a variety of scales to address short-term and long-term aquatic issues on and off the Forest.

Table 41 - Fish Habitat Inventories Conducted in 2007

Stream	District	Inventory Length (mi.)	Inventory Method[6]
Sheephead Creek	West Fork	1.8	I-walk
Watchtower Creek	West Fork	3.4	I-walk
Little West Fork	West Fork	1.4	I-walk
Slate Creek	West Fork	1.6	I-walk
Rombo Creek	West Fork	1.1	I-walk
Ditch Creek	West Fork	0.2	I-walk
West Fork Bitterroot River (reach 2)	West Fork	3.9	I-walk
Weasel Creek	Darby	0.4	I-walk
Total		**13.8**	

On the West Fork District, fish habitat inventories were conducted using the I-walk methodology in seven streams in 2007. The Sheephead Creek, Watchtower Creek and the Little West Fork inventories were conducted to gather baseline habitat data for a future project analysis in the Nez Perce Fork drainage. The Slate Creek inventory was conducted to collect data used in the effects analysis for the Slate Creek campground project. The Rombo Creek inventory was conducted to fill a data gap following the 2007 Rombo Fire. The West Fork Bitterroot River and Ditch Creek inventories were repeated after a 5-year interval (i.e. they were initially inventoried in 2002) to monitor the pool and large woody debris targets in the Bitterroot Headwaters TMDL. In 2002 and 2007, the West Fork monitoring reach (Conner bridge to Trapper Creek) met its TMDL targets for pools (> 4 pools per mile) and large woody debris (> 20 pieces per mile). The number of pools in the West Fork monitoring reach stayed about the same between 2002 and 2007 and we counted a small increase in large woody debris. In 2002 and 2007, the Ditch Creek monitoring reach met its TMDL target for pools (> 39 pools per mile), but did not meet its TMDL target for large woody debris (> 50 pieces per mile). We counted more pools in the Ditch Creek monitoring reach in 2007 than 2002, but slightly less large woody debris.

FISH POPULATION MONITORING:

The Forest Plan recommends monitoring fish populations in six streams annually to meet the Forest objectives. In 2007, fish populations were monitored in 24 streams at 25 monitoring reaches.

At each monitoring reach, we have set a goal of monitoring trout populations for at least three years to serve as a baseline for future population studies. This “pulsed” monitoring technique is necessary for assessing long-term changes in fish populations (Bryant, 1995). Complete methods

[6] I-walk: A survey method that looks at pool quality, substrate composition, large wood and pools per mile to quantify fish habitat as described by INFISH.

are described in Clancy (1998). As displayed in Table 42, most of the reaches monitored in 2007 have been sampled for at least three years and many have been sampled between 5-10 years. Since 1989, the Forest has accomplished its fish population monitoring requirements cooperatively with biologists from Montana Fish, Wildife and Parks (MFWP).

Table 42 summarizes the fish population estimates that were conducted on the Forest between 1989 and 2007. Years in which a population estimate was conducted in a monitoring reach are denoted with **X**.

Table 42 - Fish Population Estimates Conducted Between 1989 and 2007

Monitoring Site	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07
Andrews 0.5													X	X	X				
Bear 6.0			X																
Beaver 0.3			X	X															
Bertie Lord 0.2		X	X								X		X	X	X	X	X	X	X
Big 6.5				X															
Blue Joint 5.9						X	X												
Boulder 2.0				X														X	
Bunkhouse 1.3																	X		
Burnt Fork 19.7						X		X				X						X	X
Cameron 6.1					X						X								X
Cameron 10.1		X									X		X	X	X	X			
Camp 2.3															X	X	X	X	X
Camp 3.2										X									
Camp 6.6									X										
Castle 0.1																		X	
Chaffin 3.1		X	X														X		X
Chicken 1.0												X	X	X	X	X			X
Coal 1.3		X												X	X	X	X		
Daly 0.7	X	X						X			X		X	X	X			X	X
Divide 0.1	X	X	X					X					X	X	X				
Doran 0.1					X														
EF Bitterroot 2.5										X		X	X		X	X	X	X	X
EF Bitterroot12.0		X					X		X			X	X	X	X	X	X	X	X
EF Bitterroot 19.1				X															
EF Bitterroot 25.6				X													X		
EF Bitterroot 28.4		X																	
EF Bitterroot 31.4				X		X				X		X	X	X	X				
East Piquett 0.2																		X	X
Fred Burr 9.0										X									
Gilbert 0.1														X	X	X			
Gold 0.3		X	X					X											
Guide 0.1																	X	X	X
Hart 2.8													X	X	X				
Hughes 1.6										X	X								
Hughes 9.0								X			X								
Jennings Camp0.5																	X	X	X
Johnson 0.7			X																
Kootenai 0.3										X									
Laird 1.4		X	X									X		X	X	X	X		

Monitoring Site	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07
Laird 2.3												X		X	X	X	X		
Lavene 0.2																		X	X
Lick 1.9		X	X	X			X		X		X		X		X		X		
Lick 2.1							X		X				X						
L. Blue Joint 1.4												X	X	X	X	X	X		
L. Sleep Child 4.2													X	X		X			
Little Tin Cup 1.3					X														
L. West Fork 1.3				X												X	X	X	
L. West Fork 3.1				X															
Martin 1.3			X	X	X	X			X		X		X	X	X				
Martin 7.5				X	X	X	X						X		X				
Maynard 0.1													X	X	X	X			
Meadow 5.2		X	X																
Meadow 5.6	X	X	X			X	X	X				X	X	X	X	X		X	X
Meadow 7.3	X	X	X										X	X	X				
Medicine Tree 1.5													X	X	X	X	X		
Mine 0.2										X	X		X	X	X				
Moose 1.4			X	X	X				X		X		X	X	X			X	
Moose 3.6				X	X	X												X	X
NF Sheephead 0.5					X														
North Rye 1.9	X	X	X					X	X			X	X	X	X	X	X	X	
Nez Perce 1.2												X	X						
Nez Perce 9.8				X								X	X	X	X				
Nez Perce 11.8				X															
Overwhich 2.0					X	X	X			X	X							X	
Overwhich 8.9					X														
Pierce 0.5																		X	X
Piquett 1.3		X	X										X	X	X		X	X	X
Praine 1.0							X					X	X	X	X	X			
Railroad 1.4				X															
Reimel 2.6		X	X	X								X	X	X	X	X			
Reimel 2.9		X	X	X															
Reimel 3.8		X	X	X								X	X	X	X				
Rye 6.6													X	X	X	X	X		
Rye 12.4	X	X	X					X	X			X	X	X	X	X	X	X	
Salt 0.2								X	X										
Sheep 0.2			X																
Sheephead 0.2																X	X	X	
Sheephead 2.5					X														
Skalkaho 0.4		X																	
Skalkaho 5.8								X											
Skalkaho 8.1	X																		
Skalkaho 12.5									X										
Skalkaho 13.1			X	X		X				X	X		X		X				
Skalkaho 16.8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Skalkaho												X							

Monitoring Site	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07
17.2																			
Skalkaho 20.6			X	X	X	X							X		X				
Slate 1.6			X	X	X						X		X	X	X				
Sleeping Child 1.9					X														
Sleeping Child 4.5									X										
Sleep. Child 10.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sleep. Child 14.5	X	X	X					X					X	X	X				
Sleep. Child 16.9	X	X	X																
Soda Springs 0.3																X	X	X	
Sweathouse 5.7			X																
Swift 0.7							X						X	X	X				
Tepee 0.9																	X	X	X
Threemile 2.6			X																
Threemile 3.9				X															
Threemile 6.3			X																
Threemile 8.3			X													X			
Threemile 10.0																X			
Threemile 12.6																		X	
Threemile 15.3								X		X			X						
Tin Cup 7.2				X															
Tolan 2.1		X	X										X	X	X			X	
Tolan 5.1	X	X	X					X	X				X	X	X	X			X
Tolan 7.3	X												X	X	X				
Trapper 1.7				X															
Trapper 3.5				X													X		
Two Bear 0.8			X										X	X	X	X			
Ward 0.7																		X	X
Warm Springs 3.5				X	X	X	X					X	X	X	X	X			
Warm Springs 5.6		X		X															
Warm Springs 7.4				X		X	X											X	X
Watchtower 0.1																X	X	X	
Watchtower 0.8				X															
Waugh 0.7		X	X										X	X	X	X	X		
WF Bitterroot 1.2							X		X	X				X					X
WF Bitterroot22.2										X									
WF Bitterroot34.0			X	X			X			X	X								
WF Bitterroot40.0			X										X	X	X				
WF Camp					X								X	X	X				

Monitoring Site	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07
0.3																			
Willow 12.1		X																	
Woods 0.3			X																
Woods 0.9								X	X				X	X	X				

The following narratives summarize our most current knowledge of the fish populations in the 25 monitoring reaches that were sampled in 2007.

- Bertie Lord Creek 0.2 This reach is located near the mouth of Bertie Lord Creek. It was sampled in 1990-91, 1999 and 2001-07. The reach is being used to monitor effects from the Middle East Fork timber sales. As of 2007, Middle East Fork timber harvest or log hauling has yet to occur in the Bertie Lord Creek watershed. Westslope cutthroat trout numbers have been declining in this reach since 2000. The estimated number of cutthroat > 4 inches in the reach was 45 (2005), 23 (2006) and 25 (2007), which is down considerably from the range of 104-115 cutthroat > 4 inches estimated in 1990-91 and 1999. Brook trout numbers were also very low in 2005 (2), 2006 (3) and 2007 (1). Brook trout have not increased in the reach since monitoring began in 1990. Bull trout are incidental and rare in the lower end of Bertie Lord Creek, with an individual showing up in the sample roughly every other year. The reach will be sampled again after the Middle East Fork timber harvest and log hauling is completed to assess possible effects to the cutthroat population.
- Burnt Fork 19.7 This reach starts at the Burnt Fork trailhead. It was sampled in 1995, 1996, 2000, 2006 and 2007. Compared to past population estimates, the populations of both westslope cutthroat and bull trout in 2006 and 2007 were lower in many size groups.
- Cameron Creek 6.1 Population estimates have been collected in 1993, 1999 and 2007. Brook trout are the predominant salmonid in this reach, with small populations of westslope cutthroat trout and longnose suckers. The brook trout population in 2007 appeared to be lower than in previous estimates.
- Camp Creek 2.3 This reach is located in the portion of Camp Creek upstream of the Sula Ranger Station that was reconstructed in 2002. It was sampled in 2003-07. The reach was also sampled in 1999 when Camp Creek was still located in the highway ditch. Due to widespread hybridization between westslope cutthroat trout and rainbow trout, the two species are combined in the population estimates. Cutthroat trout have recolonized the reconstructed channel in healthy numbers and the reconstructed channel provides better habitat for adult cutthroat trout than the highway ditch did. In 1999, there were 10 cutthroat > 9 inches in the highway ditch. In 2007, there were 51 cutthroat > 9 inches in the reconstructed reach. Due to the increased length of stream in the new channel, there has likely been a significant increase in the number of trout in the reach. Bull trout were rare in the reach prior to the reconstruction and have not been captured since. Brook trout are present in the reach in large enough numbers to calculate statistically valid estimates in some years, but not all. Rainbow trout and brown trout are incidental and uncommon in the reach.
- Chaffin Creek 3.1 This reach was sampled in 1990-91, 2005 and 2007. A November 2006 flood caused substantial bedload movement and abandonment of the historic channel throughout much of the reach. In 2007, a new channel was forming where the stream was flowing across the forest floor. Westslope cutthroat are the most numerous salmonid in this reach, both before and after the flood. The number of cutthroat has been stable to slightly declining since sampling began. In 2007, cutthroat numbers were surprisingly high considering the extent of channel changes that had recently occurred. Lesser numbers of brook trout and bull trout also inhabit this reach.
- Chicken Creek 1.0 This reach is located at the mouth of the Chicken Creek canyon. It was sampled for the first time in 2000, shortly after being severely burned by the fires of 2000. Additional sampling occurred in 2001-04 and 2007. Westslope cutthroat trout are abundant in the reach and have bounced back strong following the 2000 fires and 2001 mudslides. The

estimated number of cutthroat > 4 inches in the reach was 218 in 2007 (as compared to 37 in October 2000). Brook trout numbers in the 2002-07 post-fire and mudslide period have ranged between 24-37 fish > 4 inches, which is less than half the number present in October 2000. Bull trout and bull X brook hybrids are present in the reach at low numbers. There are also sizeable numbers of longnose suckers that spawn in the reach in mid summer.

- Daly Creek 0.7 This reach is located in the lower end of Daly Creek along the paved portion of the Skalkaho Highway. It was sampled in 1989-90, 1996, 1999, 2001-03, 2006 and 2007 The 2007 population estimates of bull trout and westslope cutthroat trout were within the range of past estimates.

- East Fork Bitterroot River 2.5 . This reach is located near the Trinity Ranch. It was sampled in 1998, 2000-01 and 2002-07. Due to high infection rates of whirling disease, the rainbow trout in this reach have declined. The 2007 estimate of rainbow trout is slightly higher than 2005 and 2006, but still well below past estimates. Brown trout population estimates are slightly higher than past counts.

- East Fork Bitterroot River 12.0 This reach is located in the river canyon near Maynard Creek. It was sampled in 1990, 1995, 1997 and 2000-07. The 2007 population estimate of rainbow trout was lower than historic levels. Whirling disease infection rates have generally been increasing in this reach and may be responsible for this decline. The brown trout population estimates are slightly higher than past counts. .

- East Piquett Creek 0.2 This reach starts at the Forest boundary. The reach was established in 2006 to monitor the Lower West Fork project. 2007 was the second year the reach was sampled. Westslope cutthroat trout and brook trout are common in the reach. One juvenile brown trout was captured in 2006, but none were found in 2007. The estimate for westslope cutthroat trout > 4 inches in the reach has ranged between 83 fish (2006) and 73 fish (2007). The estimate for brook trout > 4 inches in the reach has ranged between 30 fish (2006) and 22 fish (2007).

- Guide Creek 0.1 This reach starts at the Forest boundary. It was sampled for three consecutive years in 2005-07 to gather baseline population data to monitor effects of the Middle East Fork timber sales. As of 2007, Middle East Fork timber harvest or log hauling has yet to occur in the Guide Creek watershed. A limited amount of hauling from the Lil' Lyman timber sale occurred on Road 311 in February-March 2007 and January-February 2008. The Guide reach contains low numbers of small (3-6 inch) westslope cutthroat trout. The number of westslope cutthroat trout captured in the reach has been 25 (2005), 2 (2006) and 10 (2007). Guide Creek is a very small stream (2-3' base flow wetted width). Low flows, drought and time of year when sampling occurs affects the number of westslope cutthroat trout that are present in the reach. There tends to be more fish in the reach early in the summer when flows are higher than later in summer. The reach will be sampled again after the Middle East Fork timber harvest and log hauling is completed to assess possible effects to the cutthroat population.

- Jennings Camp Creek 0.5 This reach starts about 0.3 miles upstream of the Forest boundary. It was sampled for three consecutive years in 2005-07 to gather baseline population data to monitor effects of the Middle East Fork timber sales. Middle East Fork timber harvest or log hauling commenced in the Jennings Camp watershed in July 2007. Westslope cutthroat trout are the only fish that have been found in the reach and they are common. The estimated number of cutthroat > 4 inches in the reach was similar in 2005 (48), 2006 (47) and 2007 (52). The each will be sampled again in 2009 or 2010 (after the Middle East Fork timber harvest and log hauling is completed) to assess possible effects to the cutthroat population.

- Lavene Creek 0.2 This reach starts at the Forest boundary. The reach was established in 2006 to monitor the Lower West Fork project. 2007 was the second year the reach was sampled. Westslope cutthroat trout are the only fish that have been found in the reach and

they are common. The estimate for westslope cutthroat trout > 4 inches in the reach has ranged between 89 fish (2006) and 142 fish (2007).

- Meadow Creek 5.6 This reach is located upstream of the Road 5759 bridge. It was sampled in 1989-91, 1994-96, 2000-04 and 2007. The westslope cutthroat population has decreased in recent years, but remains within the long-term range. Bull trout numbers were lower than average in 2007.
- Moose Creek 3.6 This reach is located near the Moose Creek trailhead. It was sampled in 1992-94, 2006 and 2007. In 2007, the number of bull trout and westslope cutthroat trout was slightly below the long term range.
- Pierce Creek 0.5 This reach is located downstream of the Road #5629 crossing. The reach was established in 2006 to monitor the Lower West Fork project. 2007 was the second year the reach was sampled. Westslope cutthroat trout are the only fish that have been found in the reach and they are common. The estimate for westslope cutthroat trout > 4 inches in the reach has ranged between 36 fish (2006) and 40 fish (2007).
- Piquett Creek 1.3 This reach starts upstream of the Forest boundary. It was sampled in 1990-91, 2001-03 and 2005-07. The reach will be used to monitor the Lower West Fork project. Westslope cutthroat trout are common in the reach. Westslope cutthroat trout numbers have remained relatively stable over the last 17 years, while brook trout numbers have declined since the early 1990's. 2006 was the first year in which the estimated number of westslope cutthroat trout > 4 inches in length exceeded that of brook trout and the trend continued in 2007. A few bull trout and bull X brook hybrids are typically found in the reach, but never in large enough numbers to calculate a statistical estimate. Incidental rainbow trout and brown trout have also been captured in the reach in some years.
- Skalkaho Creek 16.8 This reach is located near the Railroad Creek confluence. It has been sampled every year since 1989. Bull trout and westslope cutthroat trout population numbers are similar to pre-2000 fire levels. The number of larger westslope cutthroat trout and bull trout increased between 2000-07 with the implementation of catch and release fishing regulations. Brook trout are incidental in this reach and bull trout appear to be hybridizing with brook trout.
- Sleeping Child Creek 10.2 This reach is located near the Sleeping Child Hot Springs. It has been sampled every year since 1989. The 2000 fires did not cause a noticeable kill of fish in this reach, but the 2001 mudslides killed most of the fish. By 2004 and 2005, westslope cutthroat, bull trout and brook trout populations recovered to within pre-fire ranges. The 2007 population of westslope cutthroat was within the long-term range.
- Tepee Creek 0.9 This reach starts at the Forest boundary. It was sampled for three consecutive years in 2005-07 to gather baseline population data to monitor the effects of the Middle East Fork timber sales. As of 2007, Middle East Fork timber harvest or log hauling has yet to occur in the Tepee Creek watershed. The reach contains low numbers of small (2-5 inch) westslope cutthroat trout. The number of westslope cutthroat trout captured in the reach has been 8 (2005), none (2006) and 10 (2007). Tepee Creek is a very small stream (2' base flow wetted width). Low flows, drought and time of year when sampling occurs affects the number of westslope cutthroat trout that are present in the reach. There tends to be more fish in the reach early in the summer when flows are higher than later in summer. The reach will be sampled again after the Middle East Fork timber harvest and log hauling is completed to assess possible effects to the cutthroat population.
- Tolan Creek 5.1 This reach is located in the middle portion of Tolan Creek. The reach was burned in 2000, but the fires did not cause noticeable declines in fish populations. The reach was sampled in 1989-91, 1996-97, 2001-04 and 2007. Westslope cutthroat trout are abundant in the reach. Their numbers have remained stable over the past 18 years. In 2007, the estimated number of cutthroat > 7 inches (69) was higher than any previous year and roughly 2-4 times higher than what was estimated in the 1990's. In 2007, the number of bull trout > 5 inches (55) was in the middle of the range of previous year's estimates, but we were

unable to capture enough smaller bull trout (3-5 inch) to obtain estimates for the younger age classes. This also occurred in 2004. Prior to 2004, we were always able to obtain estimates for 3-5 inch bull trout.

- Ward Creek 0.7 This reach is located downstream of the Road #373 crossing. The reach was established in 2006 to monitor the Lower West Fork project. 2007 was the second year the reach was sampled. Westslope cutthroat trout are the only fish that have been found in the reach and they are common. The estimate for westslope cutthroat trout > 4 inches in the reach has ranged between 101 fish (2006) and 119 fish (2007).
- Warm Springs Creek 7.4 This reach in located near the Sheeps Head Creek confluence. It was sampled in 1992, 1994-95, 2006 and 2007. In 2007, the westslope cutthroat trout population was similar to past estimates. The number of bull trout in 2006 and 2007 was significantly lower than past estimates.
- West Fork Bitterroot River 1.2 This reach was first sampled in 1986 and subsequently sampled in 1995,1997-98, 2002 and 2007. Since catch and release for cutthroat trout was initiated around 1991, the population of westslope cutthroat has increased and stabilized. In 2007, the rainbow trout population was lower than previous estimates. The brown trout population seems to be increasing over time.
- West Fork Camp Creek 0.3 This reach is located in the lower end of the West Fork of Camp Creek. It is periodically grazed by livestock in the Waugh Gulch grazing allotment. The reach was sampled in 1993, 2001-03 and 2007. Westslope cutthroat trout are common and their numbers since 2000 have generally been higher than 1993. Bull trout are incidental (0-3 fish captured per year) in the reach. Brook trout are uncommon, but more numerous than bull trout. Brook trout numbers are low and have not changed much since 1993.

These are the key findings of the Forest's fish population monitoring:

- Westslope cutthroat trout populations across the Forest appear to be stable and generally strong in most streams.
- The number of young bull trout in most of the core area populations (Burnt Fork, Meadow, Moose, Tolan and Warm Springs Creeks) was lower than past estimates in 2006 and 2007. Of particular note, the population of bull trout in the Warm Springs Creek 7.4 monitoring reach was significantly lower in recent years. The bull trout populations in the Skalkaho Creek 16.8 and Daly Creek 0.7 monitoring reaches were within their long-term ranges in 2007. We do not know if this was just a natural fluctuation in the populations, or the beginning stages of a longer-term decline. Water temperatures have been increasing in Forest streams since 1993 due to climatic warming and that could be a factor. We plan on re-sampling the core area streams again in 2008 to shed more light on this issue.
- In the East Fork Bitterroot River, the number of large migratory bull trout has declined in our samples since 2000, while brown trout have substantially increased. This is particularly true in the portion of river downstream of Sula. A graduate study through the University of Montana has been initiated to learn more about the East Fork bull trout population. Whirling disease infection rates are high in the rainbow trout population downstream of Sula, which has caused their numbers to decline. In monitoring reach East Fork 2.5 above Conner, the fish population has shifted from one dominated by rainbow trout to one dominated by brown trout.
- Only three stream reaches burned by the fires of 2000 were sampled in 2000 (i.e. Chicken Creek, Sleeping Child Creek and Tolan Creek). In those streams, westslope cutthroat trout and bull trout populations are similar to pre-fire levels. Brook trout are still well below their pre-fire levels in most of the burned streams. The exception is upper Rye Creek, where brook trout have expanded their population.

In addition to the population estimates described above, numerous presence/absence surveys were conducted across the Forest in 2007. These surveys were generally conducted to gather existing condition data for various Forest projects. Presence/absence surveys are usually conducted with single-passes of either electrofishing or snorkeling. Species presence/absence and relative abundance levels were entered into a Forest-wide database maintained by the Montana Department of Fish, Wildlife and Parks in Hamilton. Forest-wide presence/absence of bull trout and westslope cutthroat trout has also been mapped on GIS.

MOUNTAIN LAKE SURVEYS:

Forest fisheries biologists surveyed two mountain reservoirs in the Blodgett drainage (Blodgett Lake and High Lake) and one in Lost Horse Creek (Fish Lake). Smaller natural lakes existed prior to dam construction. These lakes are morphologically similar, sitting at the base of high glacially scoured granite cliffs. The lakes were deep: from 56 feet in Blodgett Lake, to 107 feet in High Lake. Written reports are available.

MFWP biologists surveyed one lake (Baker Lake) in the Baker Creek drainage. Baker Lake is 53 feet deep. Table 43 displays the biological and angling data summary.

Table 43 - Summary of biological and angling data.

Lake	Fish Present	Catch per Angler Hour	Most Recent Fish Stocking	Trout Life Stages Observed or Limiting Factors	Amphibians in or Near Lake (# observed)
Blodgett Lake	Cutthroat Trout	0.9 Fish/Angler Hr. (14 fish in 15 hrs.; Avg.size = 9"; Range 6 to 12")	1984 Cutthroat Trout	No fry observed, Juveniles present, Adults present No spawning habitat	0
High Lake	Rainbow Trout	5.0 Fish/Angler Hr. (25 fish in 5 hrs Avg. size = 10" Range 5 to 14")	1984 Rainbow Trout	Saw fingerlings, juveniles and adults. Abundant spawning habitat in inlet stream.	Spotted Frog Adult (2) on east shore, several others along inlet stream
Fish Lake	Rainbow Trout	0.3 Fish/Angler Hr. (6 fish in 15 hrs Avg. size = 9")	1980 Rainbow Trout	No fry observed, Juveniles present, Adults present spawning habitat	0
Baker Lake	Cutthroat Trout	1.0 Fish/Angler Hr. (sizes were up to 12")	1952 Cutthroat Trout	No fry observed, Juveniles present, Adults present No spawning habitat	0

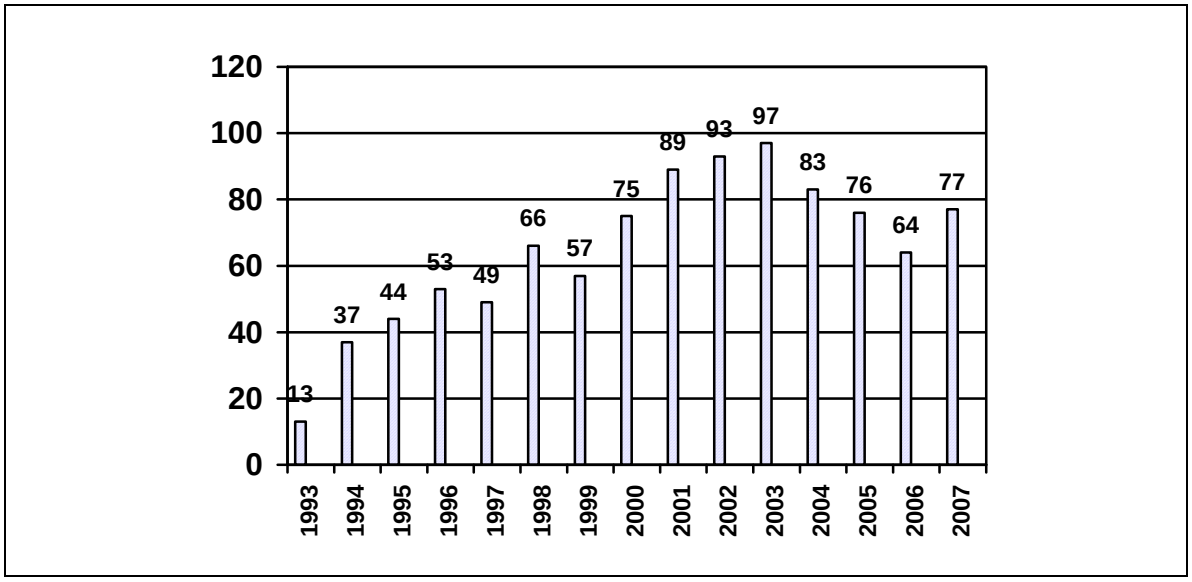
VIABILITY OF BULL TROUT AND WESTSLOPE CUTTHROAT TROUT POPULATIONS:
The Forest Plan defined a fish population viability concern as a decline in aquatic habitat quality and/or fish population for more than one year (Item 21) and a 10 percent difference from projected cutthroat trout yield (Item 41). Research and monitoring of fish populations over the past 18 years on the Forest has shown the Forest Plan viability stated above is too narrow given the natural variation that occurs in fish populations. We have learned that the only way to define the upper and lower bounds of the natural variation in fish populations is through numerous years of population monitoring.

The key findings from the fish population monitoring that has occurred across the Forest since 1989 are:

- Westslope cutthroat trout populations appear to be stable and relatively strong across the Forest. Populations do fluctuate naturally over time, but the monitoring data indicate a stable trend Forest-wide.
- Westslope cutthroat trout are easily the most abundant fish species on the Forest. They are present in nearly every fish-bearing stream and likely occupy greater than 90% of their historic habitat across the Forest.
- An estimated 63% of the westslope cutthroat populations that have been tested on the Forest are genetically unaltered. In general, hybridized populations are more prevalent in the westside canyon streams and the larger rivers (East Fork, West Fork and main stem Bitterroot), while genetically unaltered populations tend to occur on the eastside of the valley and in the headwaters on the south half of the Forest.
- Westslope cutthroat trout occur at reduced numbers in the Bitterroot River and the private reaches of tributaries on the valley floor. However, the population of migratory westslope cutthroat trout has been increasing in the Bitterroot River and the East and West Forks since the mid 1990's. The implementation of catch-and-release regulations has been a positive factor fueling the increase. The genetic make-up of the migratory westslope cutthroat trout populations in the rivers consists of a mix of some pure fish and some hybridized fish.
- The overall viability of westslope cutthroat trout in the Bitterroot River basin is considered to be "depressed", primarily because of the habitat fragmentation that occurs on private land between the Bitterroot River and its tributaries and the reduced numbers of migratory adult fish in the river. A key problem is the lack of year-round connectivity between the Bitterroot River and its spawning and rearing tributaries on the east and west sides of the valley. Considerable efforts and funds have been expended in recent years to screen irrigation ditches, eliminate fish passage barriers and secure instream flows in Skalkaho Creek, a key spawning and rearing tributary near Hamilton.
- Since 1989, the resident bull trout populations across the Forest have shown stable or inconclusive trends. The populations typically show some natural fluctuations from year to year. In 2006 and 2007, the number of young bull trout in most of the core area bull trout populations (Burnt Fork, Meadow, Moose, Tolan and Warm Springs Creeks) was lower than usual. We do not know if this was just a natural fluctuation in the populations, or the beginning stages of a longer-term decline. Water temperatures have been increasing in Forest streams since 1993 due to climatic warming and that could be a factor. We plan on re-sampling the core area streams again in 2008 to shed more light on this issue.
- In the East Fork Bitterroot River, the number of large migratory bull trout has declined in our samples since 2000, while brown trout have substantially increased. This is particularly true in the portion of river downstream of Sula. It is unclear whether a similar decline in large bull trout has occurred in the lower West Fork
- One stream where the monitoring data indicate that bull trout have declined or possibly been extirpated since the 2000 fires is upper Rye Creek. In contrast, bull trout population numbers have remained strong in the Skalkaho Creek drainage, despite research that shows there is little to no interchange of bull trout with the Bitterroot River.
- Connectivity between the rivers and spawning and rearing tributaries is a major problem for bull trout. The connectivity of westslope cutthroat trout populations in the Bitterroot River basin is better than that of bull trout populations, particularly in the main stem of the Bitterroot River and its tributaries. Westslope cutthroat trout have the distinct advantage of entering the spawning tributaries when flows are high and connectivity is at its annual best. Bull trout, by contrast, enter the spawning tributaries at low flows when water is being removed from the tributaries for summer irrigation. In the East and West Forks, connectivity for both species is considerably better than it is in the main stem of the Bitterroot River.

WATER TEMPERATURE MONITORING:
The Forest Plan does not contain water temperature monitoring requirements. Nevertheless, since 1993 the Bitterroot National Forest and the MFWP have cooperatively developed an extensive system of water temperature monitoring sites in streams across the Forest. The number of monitoring sites has grown considerably since monitoring began in 1993, as displayed in Figure 26.

Figure 26 - Number of Water Temperature Monitoring Sites on the Bitterroot National Forest



On the Forest, we have established an annual temperature monitoring period that starts on July 18th and ends on October 1st. This 76-day monitoring period usually captures the warmest part of the year and is the part of the year where water temperatures probably have their greatest influence on native salmonids.

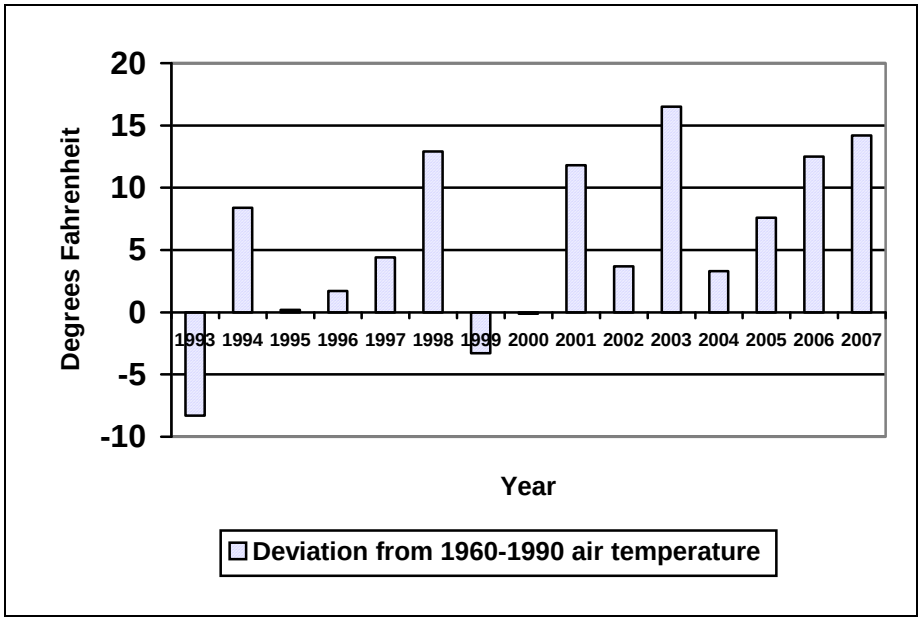
The unit of measure used to compare sites is the degree-day. Degree-days are calculated by summing the mean daily temperature that occurs at each site for every day between July 18th and October 1st (a 76-day monitoring period). For example, summing the 76 mean daily temperatures that occur at a given site between July 18th and October 1st gives you the total number of degree-days that were accumulated at that site. The higher the number of degree-days, the warmer the site. Degree-days are a useful variable because they standardize temperature data and allow comparisons between different years and different size streams.

There is a correlation between summer air temperatures and water temperatures and this affects the number of degree-days. For example, during hot summers like 2003, most of the monitoring sites on the Forest set their all time highs for degree-days. During cold summers like 1993, most of the sites set their all time lows. Because the weather causes a lot of the variation in the degree-days at a given site from year to year, the Forest has established a network of index monitoring sites to reduce some of that variability. Index sites are unburned reference sites that are monitored every year. They function as control sites. By comparing the degree-day trends in the burned and/or managed sites against the degree-day trends in the unburned and/or unmanaged index sites, we can reduce the variability caused by the weather and make some inferences about the influence of the fires and/or management activities on stream temperatures.

Figure 27 displays how the mean air temperatures for July, August and September have varied from the 30-year mean at the Stevensville Ranger Station weather station since 1993. The 30-

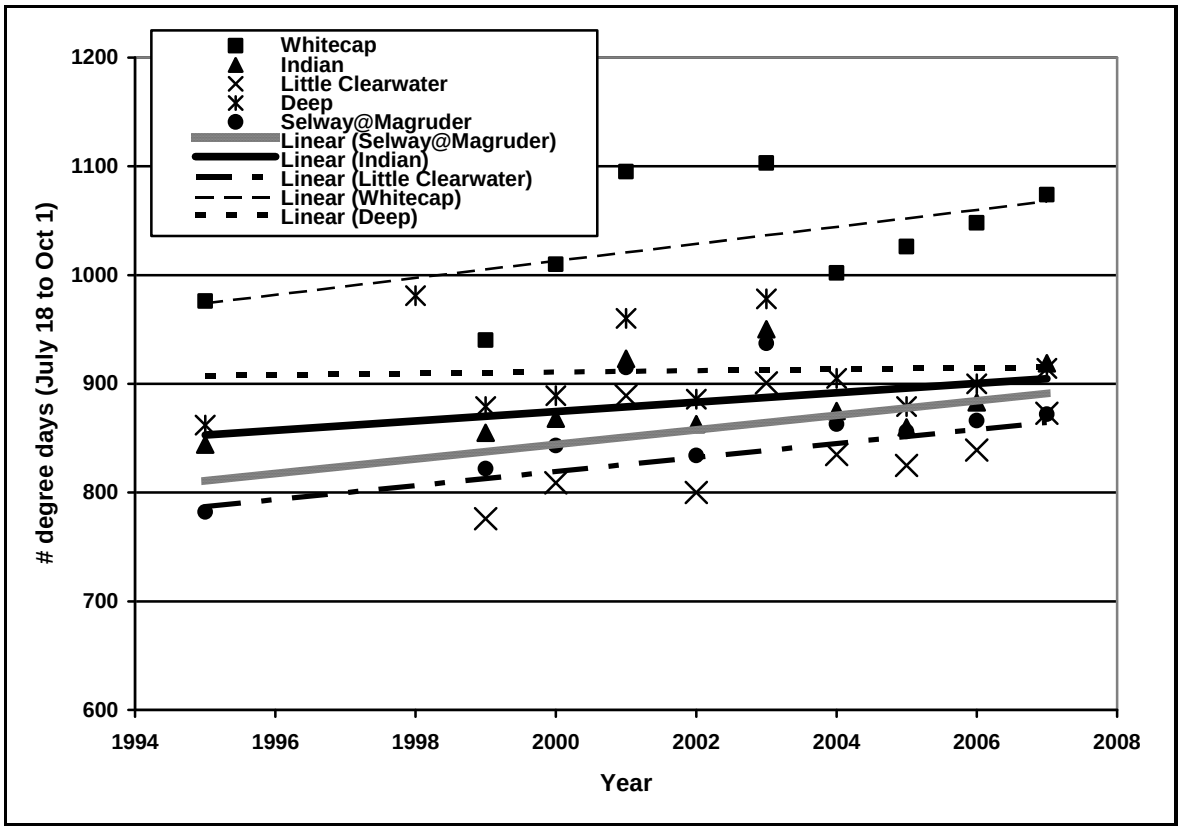
year period used for reference is 1960-1990. The mean air temperature for the 1960-1990 period is represented by the “0” horizontal line in the graph. Each bar represents the sum of the deviations from the 30-year mean air temperature for the months of July, August and September. The bars near the “0” line are the years where the July-September air temperatures were very close to the 30 year average. The bars above the “0” line are the years where the July-September air temperatures were warmer than average. The bars below the “0” line are the years where the July-September air temperatures were colder than average. Summer 2007 was the second warmest summer since we started monitoring water temperatures in 1993. The trend over the past 15 years indicates rising summer air temperatures on the Bitterroot National Forest.

Figure 27 - Deviations from the mean 30-year July-September air temperatures at the Stevensville Ranger Station Weather Station, 1993-2007



Between 2001 and 2005, our water temperature monitoring program focused on the streams burned by the 2000 fires. In 2006 and 2007, we still monitored a few of the severely burned streams, but our emphasis shifted more to project level, TMDL and index site monitoring. In our 2006 monitoring report, we showed that water temperatures have been increasing in the key bull trout streams on the Montana portion of the Forest over the past 15 years. Figure 28 shows that a similar increasing trend has also been occurred in the wilderness index streams on the Idaho portion of the Forest.

Figure 28 – Trend in degree days in wilderness index streams on the Idaho portion of the Bitterroot National Forest, 1995 to 2007



Middle East Fork Water Temperature Monitoring. Middle East Fork timber harvest occurred in the Mink, Springer and Jennings Camp Creek drainages in 2007. Harvest occurred in winter 2007 in the Mink Creek drainage, winter, summer and fall 2007 in the Springer Creek drainage and summer and fall 2007 in the Jennings Camp Creek drainage. The sale names were the Spring Mink and Kerlee Bert timber sales. In the Middle East Fork FEIS/ROD, a prediction was made that the timber harvest would maintain the existing water temperature regimes in streams (FEIS, pg 3.4-29). In order to assess the validity of that prediction, we monitored "before harvest" (monitored for four years, 2003-2006) and "after harvest" (2007) water temperatures in the three treatment streams (Mink, Springer and Jennings Camp Creeks) and in one nearby "control" stream (unnamed tributary 0.4 to Bertie Lord Creek) that has not had recent timber harvest in its watershed. Our control stream is an unnamed tributary to lower Bertie Lord Creek that is of similar size, discharge and channel type as Mink, Springer and Jennings Camp Creeks.
The monitoring results are summarized in Table 44. The data indicates that the degree day relationship between the treatment streams and the control stream remained essentially the same before and after the Middle East Fork timber harvest occurred. Changes of < 20 degree days in either the positive or negative direction are too small to distinguish any real change. Changes of that small of a magnitude are considered to be "background noise" and could be caused by several factors such as year-to-year variation in local weather at the monitoring site, or slight differences in thermograph accuracy (e.g. the thermographs we use have an accuracy range of +/- 0.74° C). The data supports the prediction that water temperature regimes would be maintained in the Middle East Fork streams. This finding is not surprising because timber harvest is not allowed in the RHCAs in the Middle East Fork project, which means that all of the stream shade is being maintained.

Table 44 - Middle East Fork Water Temperature Monitoring Results

Treatment Streams	Mean difference in degree days between the treatment streams and control stream, before harvest	Difference in degree days between the treatment streams and control stream in 2007, after harvest	Change in degree days after harvest
Mink Creek	+ 53 degree days	+ 43 degree days	10 degree days colder
Springer Creek	- 7 degree days	- 6 degree days	1 degree day warmer
Jennings Camp Creek	- 10 degree days	- 15 degree days	5 degree days colder

Lil' Lyman Water Temperature Monitoring. Lil' Lyman timber harvest occurred in the North Fork of Lyman Creek drainage in February and March 2007. Log hauling occurred during that same time period on Road 311 along Guide Creek in 2007. In the Lil' Lyman fisheries biological assessment, a prediction was made that there would be no water temperature increases in streams as a result of the timber harvest and log hauling. In order to assess the validity of that prediction, we monitored "before harvest" (2003-2006 in Guide Creek and 2003 in the North Fork of Lyman Creek) and "after harvest" (2007) water temperatures in the two treatment streams (North Fork of Lyman Creek and Guide Creek) and in one nearby "control" stream (unnamed tributary 0.4 to Bertie Lord Creek) that has not had recent timber harvest in its watershed. Our control stream is an unnamed tributary to lower Bertie Lord Creek that is of similar size, discharge and channel type as the North Fork of Lyman Creek and Guide Creek.

The monitoring results are summarized in Table 45. The data indicates that both the North Fork of Lyman Creek and Guide Creek got slightly colder in 2007 relative to the control site. For example, the North Fork of Lyman Creek was 24 degree days colder in 2007 (following the onset of timber harvest) relative to the control site than it was in 2003. A similar pattern occurred in Guide Creek, which was 36 degree days colder in 2007 relative to the control site than it averaged in 2003-06. The most likely explanation for the cooler temperatures we measured in the North Fork and Guide Creek in 2007 is that recovery of stream shade is occurring after the 2000 fires, which is causing stream temperatures to gradually cool and return to their pre-fire levels. This cooling trend is a natural feature that was not predicted in the fisheries biological assessment; however, the data does support the prediction that water temperature increases did not occur in the North Fork of Lyman Creek and Guide Creek in 2007. Timber harvest is not allowed in the RHCAs in the Lil' Lyman timber sale, which means that all of the stream shade is being maintained.

Table 45 - Lil' Lyman Water Temperature Monitoring Results

Treatment Streams	Mean difference in degree days between the treatment streams and control stream, before harvest	Difference in degree days between the treatment streams and control stream in 2007, after harvest	Change in degree days after timber harvest
North Fork of Lyman Creek	+ 129 degree days	+ 105 degree days	24 degree days colder
Guide Creek	+ 3 degree days	- 33 degree days	36 degree days colder

Painted Rocks West Water Temperature Monitoring. Painted Rocks West timber harvest commenced in the Coal Creek drainage in September 2006 and continued through March 2007. In the Painted Rocks West fisheries biological assessment and evaluation, a prediction was made that there would be no water temperature increase in Coal Creek as a result of the timber harvest. In order to assess the validity of that prediction, we monitored "before harvest" (monitored for five years, 2001-2005) and "after harvest" (2007) water temperatures in Coal Creek (i.e. the treatment stream) and Little Blue Joint Creek, a neighboring "control" stream. Little Blue Joint Creek was severely burned in 2000, but timber harvest has not occurred upstream of

the water temperature monitoring site. Little Blue Joint Creek is of similar size, discharge and channel type as Coal Creek.

The monitoring results are summarized in Table 46. The data indicates that the degree day relationship between Coal Creek and Little Blue Joint Creek remained essentially the same before and after the Painted Rocks West timber harvest occurred. As explained previously, changes of < 20 degree days in either the positive or negative direction are considered to be "background noise" and too small to distinguish any real change. The data supports the prediction that water temperatures did not increase in Coal Creek as a result of the Painted Rocks West timber harvest. This finding was expected because only one harvest unit (unit 2) contained an RHCA and no harvest of trees occurred in that RHCA.

Table 46 - Painted Rocks West Water Temperature Monitoring Results

Treatment Streams	Mean difference in degree days between Coal Creek (treatment) and Little Blue Joint Creek (control), before harvest	Difference in degree days between Coal Creek (treatment) and Little Blue Joint Creek (control) in 2007, after harvest	Change in degree days after timber harvest
Coal Creek	+ 129 degree days	+ 109 degree days	20 degree days colder

These are the key findings of the Forest's water temperature monitoring:

- Since monitoring commenced in 1995, stream temperatures have been increasing in the wilderness index streams on the Idaho portion of the Forest. Degree days have increased by 50 to 100 units in most of the Idaho index streams. This roughly correlates to about a 1º C increase in the mean daily water temperature.
- Since monitoring commenced in 1993, stream temperatures have also been increasing in the key bull trout streams on the Montana portion of the Forest. Seven-day mean-maximum temperatures increased by about 1.5º C between 1993 and 2007. Degree days increased by about 80-100 units between 1993 and 2007, which is a similar increase as the Idaho index streams.
- The number of young bull trout in most of the core area bull trout populations (Burnt Fork, Meadow, Moose, Tolan and Warm Springs Creeks) was lower than usual in 2006 and 2007. Increasing water temperatures could be a cause, but we cannot pinpoint that as the reason at this time. Additional sampling in future years is needed to determine trends. Optimum bull trout growth occurs at about 13º C. Bull trout tend to be absent or rare in streams which have maximum temperatures > 15º C for extended periods of time.
- If water temperatures continue to increase in future years, bull trout distribution is expected to shrink across the Forest, with the populations at the lowest elevations disappearing first.

BULL TROUT REDD SURVEYS:
Starting in 1994, Forest and MFWP fisheries biologists have cooperatively conducted annual bull trout redd surveys in three streams: (1) Meadow Creek on the Sula District; (2) Deer Creek on the West Fork District; and (3) Daly Creek on the Darby District. With the exception of a few missed years, redd counts have been conducted in these reaches every year since 1994. In 2000, in response to a bull trout radio telemetry project, a fourth bull trout redd survey reach was added in the upper East Fork Bitterroot River in the Anaconda-Pintler Wilderness Area. In 2005, a fifth bull trout redd survey reach was added in Chicken Creek on the West Fork Ranger District in response to a U.S. Fish and Wildlife consultation.

Meadow Creek Redd Survey (Sula Ranger District). The "Meadow reach" is a two-mile long section of Meadow Creek that the Forest has monitored each fall for bull trout redds since 1994. In October 2007, MFWP biologists counted only one bull trout redd in the Meadow reach. This

matched the low that was recorded back in 1998. The number of redds counted in the Meadow reach during 1994-2007 has ranged between 1 and 21.

Despite low redd counts, mark-recapture population estimates indicate that bull trout are common in Meadow Creek. Over the years, there has not been a correlation between the number of bull trout redds and the number of bull trout captured in the mark-recapture estimates. Redd counts have fluctuated at low numbers, while the number of bull trout captured at long-term population monitoring sites indicates that numbers are stable and the species is common. One reason for the lack of correlation may be that most of the bull trout in Meadow Creek are resident fish and resident bull trout redds cannot be reliably counted because they are too small and cryptic. Other possible reasons are that the bull trout are not spawning in the types of habitat or sections of stream that we think they should be, or we are unable to identify their redds. In summary, our data suggest that at least for now, redd counts are not a reliable way to detect resident bull trout trends in Meadow Creek. Despite doubts about reliability, Forest fisheries biologists will continue to survey redds in Meadow Creek in 2008. There are two reasons for this: (1) it complies with direction in the Headwaters TMDL and (2) if migratory bull trout ever do make a strong comeback in the East Fork drainage, Meadow Creek is likely to be a key spawning tributary and we should be able to document increased spawning use because redds produced by migratory bull trout are easier to count.

Upper East Fork Bitterroot River Redd Survey (Sula Ranger District). This reach was established by MFWP biologists in 2000 in response to several radio-tagged bull trout moving in this reach to spawn from the lower East Fork. In October 2000, MFWP biologists surveyed the section of the upper East Fork between Moss and Clifford Creeks. Five migratory bull trout redds were counted between Moss and Cub Creeks, but none between Cub and Clifford Creeks. In October 2001, the reach was shortened to include just the section between Moss and Cub Creeks. Two migratory bull trout redds were counted in 2001. In 2002-03 and 2005-06, one migratory bull trout redd was counted each year. In 2004 and 2007, no definite redds were found. MFWP biologists plan on continuing to survey redds in the Upper East Fork in 2008.

Deer Creek Redd Survey (West Fork Ranger District). The Forest has conducted a bull trout redd survey in the lower 1.3 miles of Deer Creek since 1994. In October 2007, MFWP biologists counted four redds in Deer Creek, which was considerably lower than 2006 (16), but about average for the period 1994-2005 (range 0 to 8 redds). Bull trout and brook trout are both present in Deer Creek. Because we are unable to accurately distinguish between the redds of the two species, we have reported the total number redds counted. We currently do not have fish population data to correlate with the redd surveys in Deer Creek. Forest and/or MFWP fisheries biologists plan on continuing to survey redds in Deer Creek in 2008.

Figure 29 – Resident Bull Trout Redd

Chicken Creek Redd Survey (West Fork Ranger District). This reach was established by Forest fisheries biologists in 2005 in response to a consultation with the U.S. Fish and Wildlife Service. The reach was surveyed for the first time in October 2005 and 13 redds were counted. MFWP biologists counted 15

redds in October 2006 and 16 redds in October 2007. Bull trout and brook trout are both present in Chicken Creek, with brook trout being the more common species. Because we are unable to accurately distinguish between the redds of the two species, we have reported the total number redds counted, with the assumption that most were probably made by brook trout. In August 2007, the low-flow passage barrier at the Trollope-Hawkes ditch diversion was eliminated. This opened up access to about four miles of spawning and rearing habitat above the diversion for migratory bull trout from the West Fork Bitterroot River. Forest and/or MFWP fisheries biologists plan on continuing to survey redds in Chicken Creek in 2008. The U.S. Fish and Wildlife Service directed the Forest to annually survey redds in Chicken Creek from 2006 until 2010. After the 2010 survey, the Forest and U.S. Fish and Wildlife Service will re-assess the need to continue the Chicken Creek redd survey.

Daly Creek Redd Survey (Darby Ranger District). The Forest has conducted a bull trout redd survey in a 1.2 mile long reach of Daly Creek since 1994. The 1.2 mile-long reach is located near the Road 711 bridge crossing. Thirty-four redds were observed in 2007, which is a similar number as 2005-06. All of the redds appeared to be made by resident bull trout. Considering the variability over the sampling period, 34 redds could be said to be about average. In recent history, the drainage above the surveyed section has been relatively unaltered by fire, roads or other obvious human activities. There were no readily observable changes in the habitat quality of the surveyed section. Forest fisheries biologists plan on continuing to survey redds in Daly Creek in 2008.

Figure 30 - Annual Bull Trout Redd Counts, 1994 to 2007

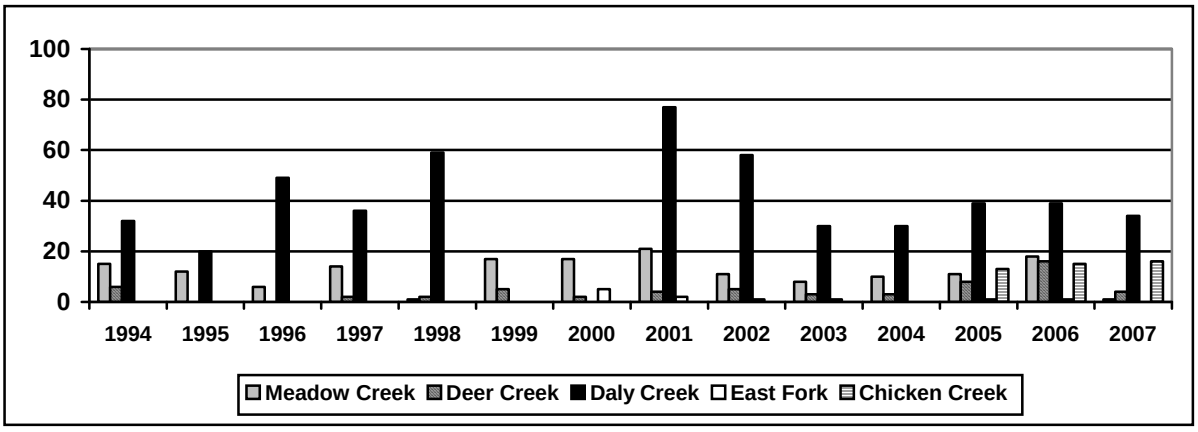


Table 47 – Annual Bull Trout Redd Counts, 1994 to 2007

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Meadow Creek (D3)	15	12	6	14	1	17	17	21	11	8	10	11	18	1
East Fork (D3)	ND	ND	ND	ND	ND	ND	5	2	1	1	0	1	1	0
Deer Creek (D4)	6	0	0	2	2	5	2	4	5	3	3	8	16	4
Chicken Creek (D4)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13	15	16
Daly Creek	32	20	49	36	59	ND	ND	77	58	30	30	39	39	34

(D2)														

ND = No data, not surveyed

These are the key findings of the Forest's monitoring of bull trout redds:

- The data indicates that redd counts have not been reliable indices of bull trout population trends. There could be several reasons for this: (1) we are looking in the wrong places (i.e. what we think is good spawning habitat is not what most of the bull trout are using for spawning); (2) we are looking in the right places but cannot reliably identify the redds that are present; or (3) there just are not many migratory bull trout redds and what redds are present are very widely scattered and not concentrated in any one reach.
- Redd counts are best used as an index of population trend after the key, concentrated spawning areas have been identified. Without knowing where the key spawning areas are, redd counts have very limited utility. That is the situation on most of the Forest now.
- How can the redd count methodology be improved? Biologists need to find out if concentrated spawning areas are being used by migratory bull trout and if they are, pinpoint their locations. The best way to do that is by following the movements of migratory bull trout spawners by radio telemetry. In 2008, a University of Montana graduate research project will track the spawning movements and locations of adult migratory bull trout from the East Fork Bitterroot River. A similar radio telemetry project was conducted in the East Fork by MFWP biologists in 2000, but the fires interfered with the project right at the critical time when the radio-tagged bull trout were entering their spawning tributaries. As a result, we were unable to discover the most important information concerning the location of key spawning areas. Hopefully, the 2008 project will reveal those locations.
- Future radio telemetry projects are needed to locate the key spawning areas for migratory bull trout in the upper West Fork drainage above Painted Rocks Dam. Trapping data collected by researchers working in Slate Creek in 2003 indicate that migratory bull trout in Painted Rocks Reservoir may be more common than was originally believed, but little is known about where those bull trout spawn.

FISH MOVEMENT MONITORING:

In spring 2007, MFWP biologists implanted radio transmitters in 12 adult rainbow trout in the lower West Fork Bitterroot River near Conner. The purpose of the study was to track the spawning movements of adult rainbow trout in order to identify where they spawn. Of the 12 fish, only two were known to enter tributaries to the river (e.g. the lower ends of Trapper and Watchtower Creeks). Most of the rainbow trout remained in the main stem of the West Fork until tracking ended in June. If these fish spawned, we suspect that it probably occurred in the main stem of the river. One fish entered the lower end of Watchtower Creek, which is a tributary to the Nez Perce Fork. If there is some spawning by rainbow trout in the Nez Perce drainage, it could be a source of hybridization between rainbow and westslope cutthroat trout.

WESTERN PEARLSHELL MUSSEL SURVEYS:

The western pearlshell mussel is western Montana's only native mussel. This species is widespread in the northwest US, but appears to be declining, in terms of area occupied and number of sites and individuals. Populations with several age classes, which would indicate a healthy population, are even less common.

We surveyed for western pearlshell mussels at 38 sites on 26 different streams or rivers. This equaled 3.5 miles of intensively-searched miles of stream. Because the mussels are typically found in lower gradient streams we generally started near the Forest Service boundary of a particular stream and worked our way upstream. These mussels were found at five of the 38 sites and because we have searched nearly all the best habitats, mussels are unlikely to be found at many other sites on the Forest.

Trout and other fish are hosts to the mussel during the parasitic larval portion of their life cycle. Movement of host fish can transport mussel larvae, benefiting the long-term survival of the native mussel.

CULVERT INVENTORIES AND REPLACEMENTS:
The Forest Plan as amended by INFISH and PACFISH directs the Forest to "provide and maintain fish passage at all road crossings on existing and potential fish-bearing streams" (INFISH/PACFISH standard RF-5). In order to meet this standard, Forest fisheries biologists and engineers have focused much of their attention in recent years on the identification and elimination of fish passage barriers at culverts.

Culvert Inventories: During the 2003 field season, the majority (> 80%) of the fish-bearing culverts on the Bitterroot National Forest were surveyed with the Fish Crossing protocol to assess whether or not they function as a passage barrier to trout. The FishXing model predictions were checked and validated by Forest fisheries biologists. Nearly of the fish-bearing culverts that were not surveyed in 2003 were visited by Forest biologists in 2004-07.

During the 2007 field season, 43 fish-bearing culverts on five Forest highways were surveyed with the Fish Crossing protocol. The highways surveyed included: (1) U.S. Highway 93 between Darby and Lost Trail Pass; (2) the East Fork Highway; (3) the West Fork Highway; (4) the Skalkaho Highway; and (5) the paved portion of the Nez Perce Road. The results indicate that 58% of the highway culverts are an upstream barrier to juvenile trout during some time of the year, 21% are potential barriers and 21% provide year-round passage. The results for adult trout were similar, with 51% of the culverts identified as barriers, 28% as potential barriers and 21% providing year-round passage.

Table 48 summarizes our most current knowledge of fish culvert passage status on the Forest. The numbers in the table differ from past reports because they are adjusted as new information becomes available, or as barriers are eliminated through replacement or removal. The numbers in the table are close to the actual condition on the ground and future adjustments will be minor.

Table 48 – Fish Passage Barriers at Culverts

Location	# of fish-bearing culverts	# known or suspected to be passage barriers	# unknown – not seen or surveyed	# likely to be offering suitable fish passage conditions
Sula and W. Fork R.D.	116	87 (75%)	1 (1%)	28 (24%)
Stevensville and Darby R.D.	46	33 (72%)	2 (4%)	11 (24%)
Montana DNRC land	6	1 (17%)	0	5 (83%)

Since the 2000 fires, the elimination of fish passage barriers at culverts has been a focus of the Forest fisheries and engineering programs. Since then, 54 culverts have been replaced or removed to improve fish passage on Bitterroot National Forest and adjacent state and private lands. The Bitterroot National Forest is responsible for the bulk (45 of the 53) of these culvert replacements and removals. The rest have occurred on Sula State Forest lands (5 culverts), along U.S. Highway 93 (3 culverts, Sula North/South reconstruction phase), or along the West Fork Highway (1 culvert, Slate Creek).
In 2007, the Forest replaced one fish barrier culvert with a new bridge (Moose Creek, Road 726), replaced two barrier culverts with fish passable stream simulation culverts (Cathouse Creek, Road 1126 and Coal Creek, Road 5662) and removed one barrier culvert (Scimitar Creek, non-system road) (See Table 49).

Figure 31 - Road 726 culvert on Moose Creek, before removal. August 2007

Figure 32 – Same crossing, after culvert removal and installation of a new bridge. September 2007

Figure 33 – The new bridge on Moose Creek. September 2007

Implementation Monitoring of Culvert Replacements: Bitterroot Headwaters TMDL recommends that the Forest monitor any new culvert replacements to ensure that fish passage is being adequately maintained. Table 49 lists the fish passage culvert replacements and removals that have occurred since 2000 and summarizes their current fish passage status based on our most recent monitoring visits. The current fish passage status of each culvert was classified as "fully functioning", "partially functioning" or "not functioning". These categories are defined as:

- *Fully functioning* = native material is stable and present throughout the culvert barrel; there are no prohibitive vertical drops on the inlet or outlet; all sizes and species of fish can pass through the culvert at high and low flows
- *Partially functioning* = since replacement, some of the native material has been flushed from the barrel and now less than half of the barrel is either bare or contains reduced amounts of substrate material; there are no prohibitive vertical drops on the inlet or outlet; most adult fish

can still pass through the culvert at high and low flows, but passage of juvenile fish is probably restricted at the higher flows due to prohibitive water velocities inside of the barrel; culverts that also provide good fish passage at high flows but their flows go subsurface at low flows were also placed in this category

- *Not functioning* = since replacement, all or most of the native material has been scoured from the barrel; prohibitive vertical drops may have developed on the inlet or outlet (in some cases they haven't, but the barrel is still bare); the majority of adult and juvenile fish probably cannot pass through the culvert at high or low flows

Table 49 – Status of culverts replaced or removed to eliminate fish passage barriers, 2000 to present

District[7]	Stream	Road	Year replaced or removed?	Fully functioning	Partially functioning	Not functioning
D4	Little Blue Joint Creek	5658	Replaced, 2000		X	
D4	Sheep Creek	6223	Replaced, 2001		X	
D4	Washout Creek	6223	Replaced, 2001	X		
D4	Two Creek	732	Replaced, 2001		X	
D4	Trout Creek	Tr #674	Removed, 2001	X		
D4	Nelson Creek	468	Replaced, 2002	X		
D4	Gemmell Creek	468	Replaced, 2002	X		
D4	Sentimental Creek	13482	Replaced, 2003	X		
D4	Sand Creek	362	Replaced, 2003 (BAR)	X		
D4	Magpie Creek	362	Replaced, 2003 (BAR)		X	
D4	Took Creek	362	Replaced, 2003 (BAR)		X	
D4	Took Creek	1303	Replaced, 2003 (BAR)		X	
D4	Gabe Creek	468	New bridge, 2004	X		
D4	Scimitar Creek	Non-syst	Removed, 2007	X		
D4	Coal Creek	5662	Replaced, 2007 (BAR)	X		
D3	Gilbert Creek	370	Replaced, 2000	X		
D3	Laird Creek	370	Replaced, 2000		X	
D3	Laird Creek	5615	Replaced, 2000	X		
D3	Reimel Creek	727	Replaced, 2000	X		
D3	Needle Creek	724	Replaced, 2001		X	
D3	Cameron Creek	311	Replaced, 2001	X		
D3	Bugle Creek	725	Replaced, 2003 (BAR)	X		
D3	Crazy Creek	370-A	Replaced, 2003 (BAR)	X		
D3	West Fork Camp Creek	729	Replaced, 2003 (BAR)	X		
D3	West Fork Camp, trib 0.9	8112	Replaced, 2003 (BAR)	X		
D3	West Fork Camp, trib 1.0	8112	Replaced, 2003 (BAR)	X		
D3	Diggins Creek	727	Replaced, 2003	X		
D3	Springer Creek	Non-syst	Removed, 2006	X		
D3	West Fork Camp, trib 0.1	13340	Removed, 2006	X		
D3	Lyman Creek, trib 1.8	13304	Removed, 2006	X		
D3	Lyman Creek, trib 1.8	13304	Removed, 2006	X		
D3	Moose Creek	726	New bridge, 2007 (BAR)	X		
D2	North Rye Creek, trib 2.1	321	Replaced, 2000		X	
D2	Rye Creek, trib 9.1 (lower)	311	Replaced, 2001	X		
D2	Rye Creek, trib 9.1	311	Replaced, 2001	X		

D2 – Darby District, D3 – Sula District, D4 – West Fork District, DNRC – Montana Department of Natural Resources, MDOT – Montana Department of Transportation, FHA – Federal Highway Administration

District[7]	Stream	Road	Year replaced or removed?	Fully functioning	Partially functioning	Not functioning
	(upper)					
D2	Gird Creek	1365	Replaced, 2001	X		
D2	Railroad Creek	75	Replaced, 2005 (BAR)	X		
D2	Hog Trough Creek	75	Replaced, 2005 (BAR)	X		
D2	Weasel Creek	75	Replaced, 2005 (BAR)	X		
D2	Rye Creek, trib 12.3	75	Replaced, 2005 (BAR)	X		
D2	Rye Creek, trib 12.3	5607	Replaced, 2005 (BAR)	X		
D2	Cathouse Creek	Non-syst	Removed, 2006	X		
D2	Cathouse Creek	Non-syst	Removed, 2006	X		
D2	North Rye Creek	321	Replaced, 2006 (BAR)	X		
D2	Cathouse Creek	1126	Replaced, 2007	X		
DNRC	North Cameron Creek	1397	Replaced, 2000	X		
DNRC	North Cameron Creek	73160	Replaced, 2000	X		
DNRC	Lyman Creek	DNRC	Replaced, 2000	Unknown		
DNRC	Praine Creek	DNRC	Replaced, 2001	X		
DNRC	Andrews Creek	DNRC	Replaced, 2007	X		
MDOT	Warm Springs Creek	Hwy 93	Replaced, 2002		X	
MDOT	Andrews Creek	Hwy 93	Replaced, 2002		X	
MDOT	Praine Creek	Hwy 93	Replaced, 2002		X	
FHA	Slate Creek	WF Hwy	Replaced, 2003	X		

D2 – Darby District, D3 – Sula District, D4 – West Fork District, DNRC – Montana Department of Natural Resources, MDOT – Montana Department of Transportation, FHA – Federal Highway Administration

Effectiveness Monitoring of Culvert Replacements: In 2007, electro fishing surveys were conducted upstream of two Burned Area Recovery culverts that were replaced on two unnamed tributaries to the West Fork of Camp Creek. The two tributaries are West Fork Camp tributary 0.9 and West Fork Camp tributary 1.0. Fish passable culverts were installed at the mouths of the two tributaries in October 2003. The purpose of the electro fishing surveys was to monitor the effectiveness of the fish passable culverts – has the number of fish upstream of the culverts increased since the barrier culverts were removed? In tributary 0.9, the answer is clearly yes. In 1993, only five small westslope cutthroat trout were found in the first 100 meters of stream above the culvert. In 2007, 40 westslope cutthroat trout were found in the same section of stream. In tributary 1.0, the answer appears to be no. In September 2003 (before culvert replacement) and in July 2007 (after culvert replacement), approximately the same number (26-29) of westslope cutthroat trout were found in the first 100 meters of stream above the culvert. The results of our monitoring indicate that the old culvert that was replaced on tributary 0.9 was clearly a barrier to nearly all fish, while the old culvert that was replaced on tributary 1.0 (although not meeting stream simulation standards) was probably passable to most fish.

In 2007, electro fishing monitoring sections were also established above and below the culvert replacement site on Coal Creek, Road 5662. The Road 5662 culvert was clearly a barrier to upstream fish movement due to a high vertical drop on its outlet. In August 2007, before replacement occurred, we found 82 westslope cutthroat trout and 2 brook trout > 3 inches in length in the 500 feet of Coal Creek directly below the Road 5662 culvert. In the first 500 feet of Coal Creek above the Road 5662, we found 38 westslope cutthroat trout and 1 brook trout > 3 inches. Although fish were present above the Road 5662 culvert and the species mix (i.e. westslope cutthroat trout and brook trout) was the same as below the culvert, the habitat above the culvert was very nice and appeared to be underutilized by fish. We plan on re-sampling the sections above and below the Road 5662 culvert in 2008 to see how fish numbers and species composition have responded to elimination of the barrier.

NEPA Backlog: There are currently 33 fish barrier culvert replacements or removals on the Forest that have NEPA analysis completed and are awaiting implementation. Six of the 33 are contracted to be replaced in 2008 or 2009 (designated with ** in the table). The majority of the culverts have survey and design completed. The Forest is pursuing opportunities to fund these backlog culverts as opportunities arise, but it is a slow process. Table 50 lists the fish barrier culvert replacements or removals that have NEPA analysis completed, but have not been implemented.

Table 50 – Backlog of fish barrier culverts with completed NEPA analysis

Stream	Road #	NEPA Document and Date of Decision
Two Bear Creek	County 85-D	Burned Area Recovery FEIS/ROD, 2001
North Rye Creek	Road 8111	Burned Area Recovery FEIS/ROD, 2001
Spring Gulch	Road 75	Burned Area Recovery FEIS/ROD, 2001
Rye Creek	Road 5612	Burned Area Recovery FEIS/ROD, 2001
Waugh Creek	Road 13334	Burned Area Recovery FEIS/ROD, 2001
Hart Creek **	Road 311	Burned Area Recovery FEIS/ROD, 2001
Hart Creek **	Road 73180	Burned Area Recovery FEIS/ROD, 2001
Mink Creek **	Road 5753	Burned Area Recovery FEIS/ROD, 2001
East Piquett Creek **	Road 731	Burned Area Recovery FEIS/ROD, 2001
Castle Creek **	Road 49	Burned Area Recovery FEIS/ROD, 2001
Elk Creek	Road 13860	Burned Area Recovery FEIS/ROD, 2001
Malloy Gulch	County 104-D	Burned Area Recovery FEIS/ROD, 2001
Mill Gulch	County 104-D	Burned Area Recovery FEIS/ROD, 2001
Taylor Creek	County 104-D	Burned Area Recovery FEIS/ROD, 2001
Mine Creek	Road 5688	Burned Area Recovery FEIS/ROD, 2001
Pete Creek (Idaho)	Road 468	Sentimental, Gabe and Pete Creek Culvert Replacements EA/DN, 2003
Baker Creek, north channel	Road 5629	Frazier Interface EA/DN, 2003
Baker Creek, south channel	Road 5629	Frazier Interface EA/DN, 2003
Pierce Creek	Road 5629	Frazier Interface EA/DN, 2003
Pierce Creek	Road 13466	Frazier Interface EA/DN, 2003
Pierce Creek	Road 363	Frazier Interface EA/DN, 2003
Warm Springs Creek	Road 370	Warm Springs and Meadow Creek Culvert Replacements EA/DN, 2005
Meadow Creek **	Road 5758	Warm Springs and Meadow Creek Culvert Replacements EA/DN, 2005
Meadow Creek	Road 725	Warm Springs and Meadow Creek Culvert Replacements EA/DN, 2005
Threemile Creek	Road 640	Threemile Bridge and Culvert EA, 2005
Bertie Lord Creek	Road 5786	Middle East Fork FEIS/ROD, 2006
Bertie Lord Creek, trib 3.5	Road 5786	Middle East Fork FEIS/ROD, 2006
Springer Creek	FDR 13302	Middle East Fork FEIS/ROD, 2006
Scimitar Creek (Idaho)	Road 468	Deep Creek Culverts DM, 2007
Schumaker Creek (Idaho)	Road 468	Deep Creek Culverts DM, 2007
Halfway Creek (Idaho)	Road 468	Deep Creek Culverts DM, 2007
South Fork Chaffin Creek	Road 374-A	Trapper Bunkhouse FEIS/ROD, 2008
South Fork Chaffin Creek	Road 374	Trapper Bunkhouse FEIS/ROD, 2008

The key findings of our culvert monitoring are:

- The majority of the replacements have been successful at eliminating fish passage barriers, at least for the present time.
- Success depends on meeting five criteria: (1) the culvert is sized large enough to capture the bankfull width of the stream channel; (2) native material is present and stable throughout the culvert barrel; (3) there are no prohibitive drops on the culvert inlet and outlet; (4) the approach and exit grades of the stream channel near the culvert approximate the natural grade of the channel, with no formation of headcut barriers above and below the culvert; and

(5) adequate surface flow (depth and volume) is maintained through the barrel at all discharges. When those five criteria are met, fish passage will be provided and maintained for all sizes and species of fish.

- Where culverts have been ineffective or only partially effective, the main reasons have been: (1) undersizing the diameter of the culvert (this pinches down the channel and increases water velocities inside of the culvert, which flushes the substrate out of the barrel); (2) not installing the culvert deep enough into the streambed (this contributes to the flushing of substrate and the formation of vertical drops on the inlet and/or outlet); (3) not matching the grade of the culvert with the grade of the stream channel (this can cause the formation of headcut barriers); or (4) water flowing subsurface through the barrel at base flows (this is caused by not mixing enough fines into the substrate that is placed inside the barrel).
- An important lesson we have learned is that an appropriate amount of fines must be mixed into the substrate that is placed inside the barrel. Otherwise, the water will flow subsurface through the barrel at base flows, forming an impassable seasonal barrier. This appears to be more of a problem on small streams than on large streams.
- Obtaining sufficient funding for survey, design and contract award is a major bottleneck to replacing fish barrier culverts on the Forest.

Forest fisheries biologists intend to continue to monitor the completed culvert replacements in future years to ensure that adequate fish passage conditions are being provided and maintained (INFISH/PACFISH standard RF-5).

PROJECT LEVEL MONITORING OF FISHERIES/WATERSHED IMPROVEMENT PROJECTS: Burned Area Recovery FEIS Fisheries Projects (All Ranger Districts). The Burned Area Recovery FEIS/ROD authorized three types of fisheries improvement work. These were:

1. The replacement and/or removal of 37 fish barrier culverts.
2. The placement of large woody debris in 16 miles of small streams (Rye Creek, North Rye Creek and unnamed tributaries, Reimel Creek, Jennings Camp Creek and Taylor Creek).
3. Riparian conifer planting (primarily spruce seedlings) in 4.5 miles of severely burned spruce bottom along Little Blue Joint Creek and Cow Creek.

The fish culvert portion of the Burned Area Recovery project is ongoing. Eighteen of the Burned Area Recovery culverts have been replaced (17) or removed (1) so far and five are under contract for replacement in 2008 or 2009. Eight of the 37 culverts have been dropped from treatment for the following reasons:

- Additional surveys revealed that no fish were present near or above the culvert = 2 culverts
- Culvert was replaced by Fires 2000 Burned Area Emergency Rehabilitation = 1 culvert
- Culvert is the responsibility of the Montana Department of Transportation = 1 culvert
- Culvert is the responsibility of Ravalli County = 3 culverts
- Culvert is located on private land = 1 culvert

That leaves six culverts left to replace. Those are:

1. Rye Creek, Road 5612
2. North Rye Creek, Road 8111
3. Spring Gulch (trib to Rye Creek), Road 75
4. Two Bear Creek, County 85-D
5. Waugh Creek, Road 13334
6. Mine Creek, Road 5688

The Burned Area Recovery culvert replacements are well behind the schedule that was intended when the ROD was signed in 2001 (e.g. 20 were supposed to be completed by the end of 2003). This delay is the result of the majority of the Forest's fire restoration funds being taken away to address firefighting needs elsewhere. The Forest continues to chip away at the replacements as funding becomes available. Nearly all of the culverts that have been replaced are meeting the goal of stream simulation.

Figure 34 - Road 5662 culvert barrier on Coal Creek. August 2007	**Figure 35** – Same crossing, after installation of a fish passable culvert. October 2007
	

Item 2a of the Burned Area Recovery Fish-Water-Soils Full Scale Monitoring Plan directed the Forest to monitor three of the Burned Area Recovery fish culvert replacements over a four year period, starting in 2004 and ending in 2007. Monitoring of item 2a was completed in the fall of 2007. Three culverts were selected for monitoring: (1) Bugle Creek, Road 725; (2) West Fork Camp Creek, Road 729; and (3) Magpie Creek, Road 362. The culverts were correctly sized to pass the 100-year flood and installed in a stream-simulation manner. The Bugle and West Fork Camp culverts successfully maintained year-round fish passage throughout the monitoring period. The Magpie culvert only maintained fish passage at the higher stream flows due to the loss of surface flows inside the culvert barrel at low stream flow conditions. A monitoring report for item 2a has been written. The report contains the monitoring photo-point photographs and is available at the Bitterroot National Forest Supervisor's Office.

The large woody debris placement portion of the Burned Area Recovery project was completed in 2004. The placement occurred either by hand or chainsaw felling. The woody debris additions have increased hiding cover for westslope cutthroat trout in Rye, North Rye, Reimel, Jennings Camp and Taylor creeks, which was the main objective of the project. The wood has also caused pool scour, but has not resulted in significant accumulations of spawning gravel. Movement of the wood has been insignificant.

Item 2b of the Burned Area Recovery Fish-Water-Soils Full Scale Monitoring Plan directed the Forest to monitor the changes in fish habitat caused by the directional felling of 100 burned trees into the Rye Creek stream channel. The type of monitoring was photo-points. The trees were felled into Rye Creek in December 2002. Photo points were established in April 2003 and re-visited by Forest fisheries biologists in April 2004 (1-year after felling), April 2005 (3-years after

felling) and April 2007 (5-years after felling). Monitoring of item 2b was completed in 2007. The projects goals were to increase fish hiding cover, trap sediments and improve spawning and rearing habitat. The goals to increase hiding cover and improve rearing habitat were accomplished. The goals to trap sediments and improve spawning habitat were not accomplished. A monitoring report for item 2b has been written. The report contains the monitoring photo-point photographs and is available at the Bitterroot National Forest Supervisor's Office.

The riparian conifer planting portion of the Burned Area Recovery project was completed in 2004. Item 2c of the Burned Area Recovery Fish-Water-Soils Full Scale Monitoring Plan directs the Forest to monitor the success of the planted seedlings with photo-points and stocking surveys. This monitoring is ongoing. It will be completed in Little Blue Joint Creek in 2008 and Cow Creek in 2009. When the monitoring of item 2c is completed, a report will be written and made available to the public in a future Forest Plan Monitoring Report.

The Forest annually sends a Burned Area Recovery Fish Monitoring Report and Terms and Condition letter to the U.S. Fish and Wildlife Service which documents our progress in meeting the terms and conditions in the Burned Area Recovery Biological Opinion. The Burned Area Recovery Fish Monitoring Report and the 2007 Terms and Condition letter are available at the Bitterroot National Forest Supervisor's Office.

Springer Creek Culvert Removal (Sula Ranger District). In 2006, the Forest road crew removed a fish barrier culvert on a non-system road crossing of Springer Creek, which is a small tributary to the East Fork Bitterroot River. Springer Creek provides a couple of miles of spawning and rearing habitat for westslope cutthroat trout. Forest fisheries biologists monitored the culvert removal site in 2007. Fish passage was successfully restored, with no barriers to fish movement present at the crossing. The dimensions of the recontoured stream banks at the crossing matched those of the natural channel above and below the crossing. The crossing was stable and beginning to revegetate.

Kerlee Bert Large Woody Debris Structure (Sula Ranger District). In July 2007, a large woody debris structure was constructed in the East Fork Bitterroot River adjacent to Kerlee Bert helicopter landing #17. The project was Item #005 in the Kerlee Bert Stewardship contract. Six whole trees with rootballs attached were placed in the East Fork in a jack-strawed configuration to provide fish habitat and create pool scour. The work was conducted by a purchaser excavator and directed by Forest fisheries biologists. The trees were obtained from clearing the access road into helicopter landing #17, which was located on the north side of the East Fork Highway. The structure was constructed to meet a mitigation measure in the Middle East Fork FEIS/Record of Decision. After construction, the structure was monitored at both low and high flows. The trees did not move or drift and the structure was providing good hiding cover and scour at both flows.

Figure 36 - Kerlee Bert woody debris structure at low flows, East Fork Bitterroot River.	**Figure 37 –** Kerlee Bert woody debris structure at high flows, East Fork Bitterroot River
	

Gabe Creek Bridge Installation and Snake Creek Bridge Replacement Projects (West Fork Ranger District). In August 2004, the Forest installed two new bridges over tributaries to the Selway River (Snake Creek) and Deep Creek (Gabe Creek). At Gabe Creek, the Forest removed a fish passage culvert and replaced it with a new bridge. At Snake Creek, the Forest replaced a 1948-era bridge with a new bridge. Forest fisheries biologists monitored both bridges in 2007. At both bridges, fish passage is being maintained and channel conditions are fine. Effects on the fishery were consistent with the project Biological Assessments.

Scimitar Creek Culvert Removal (West Fork Ranger District). In 2007, the Forest road crew removed a fish barrier culvert on a non-system road crossing of Scimitar Creek, which is a small tributary to Deep Creek in the Selway River drainage. Scimitar Creek provides about half a mile of spawning and rearing habitat for westslope cutthroat trout. Forest fisheries biologists monitored the crossing after removal of the culvert. Fish passage was successfully restored, with no barriers to fish movement present at the crossing. The dimensions of the recontoured stream banks at the crossing matched those of the natural channel above and below the crossing. The crossing appeared to be stable and was beginning to revegetate.

Chicken Creek Meander Reconstruction Project (West Fork Ranger District). In November 2004, about two hundred feet of unstable, braided channel in lower Chicken Creek were reconstructed into a single thread meandering channel. The goal of the project was to create a stable, channel that would alleviate flooding risk to the nearby Alta Meadows Ranch. The flooding was caused by large quantities of bedload transported into the area in 2001 and 2002 from severely burned areas upstream. An attempt was made to control the flooding with sand bags in 2002, but that attempt subsequently failed. Forest fisheries biologists visited the reconstructed meander on several occasions in 2007. The meander is stable, looks natural and is functioning successfully. The determination for bull trout in the project biological assessment was “not likely to adversely affect (NLAA)”. Our monitoring indicates that project effects were consistent with the NLAA determination. There is no need to annually monitor the Chicken Creek Meander Reconstruction project in the future.

Pierce Creek Woody Debris Addition (West Fork Ranger District). In June 2006, Forest fisheries biologists implemented a project to improve westslope cutthroat trout habitat in Pierce Creek, a small tributary to the lower West Fork Bitterroot River. The project had two objectives: (1) increase woody hiding cover for cutthroat; and (2) reduce sediment contributions from a nearby encroached road (Road 363). A total of 88 single woody pieces (8-10 inches in diameter; 6-8 feet

in length) and 51 rootballs were placed (by a hand crew) throughout one mile of Pierce Creek. At the same time, a dozen straw bale check dams were installed below sediment contributing points along Road 363. Forest fisheries biologists monitored the Pierce Creek project in 2007. The wood that was placed in the stream was forming small pools and providing good hiding cover. It has improved habitat complexity for the small westslope cutthroat trout that live in Pierce Creek. Movement of the wood was negligible, as was bank scour and erosion. The straw bale check dams trapped about 45 gallons of road sand in 2006-07 and prevented it from entering Pierce Creek. For a small stream like Pierce Creek, adding wood by hand is an effective, low cost way to improve fish habitat.

Hughes Creek Reclamation Project (West Fork Ranger District) – In 1998, a mine reclamation project was implemented in the Hughes Creek valley bottom. The project was located along the portion of Hughes Creek between the confluence of Mine Creek and the Forest boundary upstream of Mine Creek. A quarter mile of Hughes Creek was reconstructed back into its historic meander pattern (the stream had been unnaturally straightened by mine tailings). The floodplain and terraces were also reconstructed and planted with grass, shrubs and conifer seedlings. Supplemental plantings of willow and lodgepole pine were completed between 2000 and 2002. Nearly a decade has passed since the reclamation work was completed. Forest fisheries biologists monitored the Hughes Creek reclamation project in 2007. The stream channel is stable and is providing good fish habitat. Willow cover still is not continuous along the banks, but is slowly filling in along the bare sections of stream bank and gradually improving. It is thicker than it was in 2005. The lodgepole pines that were planted on the floodplain and terraces are 2-4 feet high, but coverage is spotty. The most pressing concern at the site is the near monoculture of knapweed on the floodplain, which is suppressing the recovery of grasses and forbs.

PEOPLE

Emerging Issues and Changing Social Values Toward Forest Activities Item 27

OBJECTIVE: To identify emerging issues and changing social values toward Forest activities.

DATA SOURCE: Personal contacts, letters, meetings and other public comments, social assessments, surveys.

FREQUENCY: 100 percent annually.

REPORTING PERIOD: 1987 through 2007.

VARIABILITY: Any change in the major planning issues.

EVALUATION & MONITORING RESULTS:

In January 2004, an Analysis of the Management Situation (AMS) was prepared for the Forest. This document summarized the public uses and condition of the land as well as identified what should be changed in the 1987 Forest Plan. The needed changes became the basis for our Forest Plan revision process. Findings from previous Forest Plan reviews were incorporated into the 2004 AMS.

Fire, Fuels and People: In August 2000, President Clinton directed the Secretaries of Agriculture and the Interior to develop a response to severe wildland fires, reduce fire impacts on rural communities and ensure sufficient firefighting capacity in the future. Congress in turn mandated implementation of the resulting National Fire Plan through its appropriation actions and written direction. The National Fire Plan addresses conditions that have evolved over many decades and cannot be reversed in a single year. It is a long-term commitment based on cooperation and communication among federal agencies, states, local governments, tribes and interested publics. The federal wildland fire management agencies worked in close consultation with states, governors and interested partners to prepare a 10-Year Comprehensive Strategy for implementation of the National Fire Plan. More information on the National Fire Plan can be found at the internet site http://www.fireplan.gov/

President Bush proposed the Healthy Forests Initiative in August 2002 and directed federal agencies to develop several administrative and legislative tools to restore these ecosystems to healthy, natural conditions and assist in executing core components of the National Fire Plan. These tools will also move forward the Implementation Plan for the 10-year Comprehensive Strategy.

On December 3, 2003, President Bush signed the Healthy Forests Restoration Act of 2003. The Healthy Forests Restoration Act of 2003 (P.L. 108-148) contains a variety of provisions to expedite hazardous fuel reduction and forest restoration projects on specific types of Federal land that are at risk of wildland fire or insect and disease epidemics.

On a more local and site-specific basis, the Bitterroot fires and their effects on the communities continued to dominate local public discussions and interest in management of the Bitterroot National Forest. Many of these effects and community/National Forest issues have been documented in *Bitterroot Fires 2000, An Overview,* in the technical report *Bitterroot Fires 2000*, as well as in the Bitterroot National Forest Burned Area Recovery FEIS and ROD (2001).

Research Note

Researchers from the University of Montana and Aldo Leopold Wilderness Research Institute conducted a social survey in the spring of 2004 to measure local public trust in the U.S. Forest Service and the Bitterroot National Forest. During a landscape-scale fuel reduction and forest restoration project, they will continue to monitor trust levels.

The issue of reducing fuels, particularly within the wildland-urban interface has been an overriding public focus since the 2000 fires. The Bitter Root Resource Conservation and Development Area, Inc. facilitated the development of a Community-Based Wildland Fire Risk Mitigation Plan, or "Community Fire Plan" for Ravalli County (http://www.bitterrootfireplan.org/). Diverse groups of Valley residents met repeatedly during the winter of 2002-2003 to prioritize potential actions to address the most pressing issues that affect the Valley's ability to reduce the risks associated with wildland fires. The strategy is a cooperative effort of volunteer fire chiefs, county officials, conservationists, community-based non-profit organizations, realtors, tourism and timber industry leaders, federal and state land managers, business people and interested residents. The resulting Community Fire Plan reflects consensus among those who participated in its development and among those who, by signing, support the approaches outlined within. The protection of private homes and property in the interface will continue to be an important social and ecological consideration in Plan revision.

Fire fighter fatalities such as those that occurred on the South Canyon Fire (1994) Thirty Mile Fire (2001) and the Esperanza Fire (2006) as well as a Bitterroot National Forest fire fighter fatality in 2001 have stimulated an increased emphasis on fire fighter safety, accountability and liability in recent years.

The increasing costs of fighting wildfires reached a critical point in 2006 when a record $1.5 billion was spent on fire suppression nationally. Fire suppression costs are consuming an increasing percentage of the agency's budget making it more difficult to finance other land management programs. This issue is receiving attention at both the state and national levels and will likely result in changes in how fires are managed.

Wilderness Dams: There are 16 privately owned dams within the Selway-Bitterroot Wilderness (SBW). All of the dams were built prior to wilderness designation and six were built prior to reservation of the national forest. While many of the issues surrounding management of these easements and special use authorizations are not new, several factors have increased the focus and controversy in recent years.

In managing the Selway-Bitterroot Wilderness dams, Forest Service line officers have dual and sometimes competing, responsibilities. They are required to protect the wilderness character while also ensuring, from a regulatory standpoint, that these dams are maintained in a safe condition. Dam owners, on the other hand, have certain rights and responsibilities for access, operation and maintenance of their facilities. Limits of line officer discretion and the reasonableness of conditions placed on access, operations and reconstruction are constantly debated both internally and externally. As a result, consistent, predictable and timely decisions are difficult to achieve.

Strategic Forest Plans: The Bitterroot Forest began revising its land and resource management plan in 2003. In 2005, a new planning rule was published which provided direction for a more streamlined, strategic land management plan. The new planning rule instituted an important paradigm shift in the way plans are developed. The Forest began using the new rule to guide its revision of the Land Management Plan. In May 2006, a Proposed Land Management Plan for the Bitterroot Forest was distributed for public comment. The 2005 Planning Rule was enjoined in March 2007, halting plan revision efforts on the Bitterroot National Forest. A new rule has since been issued, the 2008 Planning Rule and will guide the plan revision process once it is underway again.

Bitterroot Forest Restoration Committee formation: In 2007, multiple representatives of conservation groups, motorized users, outfitters, loggers, mill operators, state government and the Forest Service assemble and, facilitated by the National Forest Foundation, created the Montana Forest Restoration Committee. All agreed that restoring Montana's forests was a goal worth pursuing. They developed principles to guide restoration activities in Montana and assessed process and implementation steps needed to assure application of the principles on the ground. The initial focus was on Forest Service restoration projects. They concluded that early, enhanced engagement of diverse community interests in the selection, design and monitoring of restoration projects would result in broader public support for such efforts and help get more work

accomplished on the ground. The formation of Forest-level Restoration Committees for this purpose was recommended. The Bitterroot Forest Restoration Committee was formed and is working with the Forest Service on an ecosystem-level assessment that will provide the foundation for future Forest management activities.

Law Enforcement Efforts on the Bitterroot National Forest

OBJECTIVE: To monitor law enforcement problems and trends.

DATA SOURCE: Law enforcement management and records system (LEIMARS).

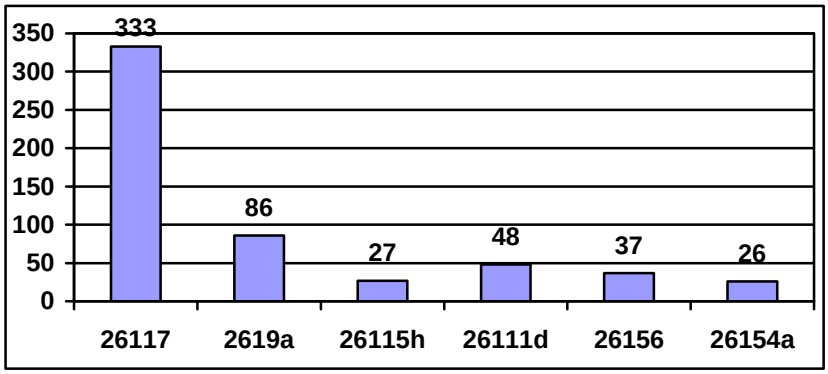
FREQUENCY: Annually.

REPORTING PERIOD: 2007

EVALUATION AND MONITORING RESULTS:

There were 908 recorded law enforcement incidents on the Bitterroot NF in 2007. Law Enforcement Officers wrote 290 warning notices, 511 incident reports and 105 violation notices. Many of the incidents occurred with no identifiable witnesses or too little information for a complete investigation. Figure 38 lists the most common incidents reported in 2007.

Figure 38 - 2007 Most Common Incidents on Bitterroot NF



- **26117** - Failing to pay any fee.
- **2619a** - Damaging any natural feature or other property of the United States.
- **26115h** - Use of a vehicle off-road in a manner which damages or unreasonably disturbs the land, wildlife, or vegetative resources.
- **26111d** - Failing to dispose of all garbage.
- **26156** - When provided by an order, to possessing or using a vehicle off National Forest System roads.
- **26154a** - Using any type of vehicle prohibited by an order.

Failure to pay a recreation fee is the most common incident with 224 warning notices and 31 incident reports written and 78 violation notices. Damage to resources by vehicle use off roads and dumping on the forest continue to be major law enforcement problems. Use of vehicles off road has created new trails and caused erosion in some areas, which the Forest addresses as soon as possible. For additional information, see Items 17, 19 and 28. Garbage dumps on the forest make some areas unsightly and are expensive to clean up. Additionally, they have the potential to cause soil and water pollution.

Condition of Developed Recreation Sites Item 2

OBJECTIVE: Evaluate the need for increasing or decreasing developed facilities (Forest Plan, p. II-4). Assure compliance with Forest Plan direction in the maintenance of facilities (Forest Plan, p. III-69).

DATA SOURCE: Meaningful Measures standards.

FREQUENCY: Annually.

REPORTING PERIOD: 2007

VARIABILITY: Failure to eliminate, replace, or repair 50 percent of MC 2 (facility condition is substandard) and MC 5 (facility condition needs betterment); and 25 percent of MC 3 (facility condition needs heavy maintenance) and MC 4 (facility condition needs replacement).

EVALUATION:

The recreation facilities analysis conducted in FY2006 (described below) has addressed the objectives for this monitoring item. As a result of this analysis managers concluded that the Forest should increase the number of cabin rentals by three within the next five years. Buildings to be added to the rental system are the Lost Horse Cabin, Magruder Office and Boulder Lookout. We also determined that we should not close any existing sites, but should reduce facilities at some, improve services at others and make operational changes in order to maintain facilities to national standards.

Maintenance needs have gone unmet for many years at some sites, leaving an inventory of deferred maintenance estimated at over one million dollars. We are outside the monitoring variability on the maintenance issue and the recreation facilities analysis constitutes our evaluation of that situation.

MONITORING RESULTS:

Recreation Facilities Analysis

In FY2006 the Forest completed a strategic evaluation of our developed recreation facilities. This process involved updating information regarding condition of facilities, operating costs and costs associated with bringing many deficient sites up to national standards (deferred maintenance). Based on this updated information, the estimated deferred maintenance costs for the Bitterroot N.F. are over one million dollars. We then described the unique recreation opportunities that the Bitterroot N.F. offers and used a variety of survey and use information to understand how the public uses the Forest and what they value. The Proposed Program of Work, a 5-year plan to bring developed recreation sites up to national standards within expected budgets, is the outcome of that process. This document, along with other information about the analysis, is available for public comment and review on the Forest's website at http://www.fs.fed.us/r1/bitterroot/recreation/rs_fmp/rsfmp.shtml. The Proposed Program of Work describes the vision for the Bitterroot N.F. developed recreation program, with specific actions proposed for developed recreation sites.

The recreation facilities analysis basically fulfilled the objective of this monitoring item to "evaluate the need for increasing or decreasing developed facilities" and also addressed the maintenance backlog concern. The proposed program of work is intended to provide developed sites that

consistently meet management standards, reduce the maintenance backlog and allow recreation visitors to enjoy the unique opportunities on the Bitterroot N.F.

The Proposed Program of Work recommends the actions related to our 80 developed recreation sites over the next five years, found in Table 51.

Table 51 - Proposed Program of Work

Action	Number of Sites
No changes proposed	7 sites
Change in season of operation	33 sites
New site fees (3 cabin rentals, 3 existing campgrounds)	6 sites
Increase of existing fees (8 cabin rentals, 13 campgrounds & group sites, 5 sites associated with Lake Como)	26 sites
Increase or improvement in services	12 sites
Removal of facilities or operation as dispersed sites	16 sites
Seek partners to help operate sites	10 sites

We know that conditions and needs will change frequently, so managers will review and update the analysis and this list of actions regularly.

In 2007, we started a recreation CIP project to upgrade trailheads (Chaffin, Trapper, Baker, Overwhich and Haley Chute Boat Launch) all projects approved in the RFA. No fees were changed in 2007. Partners were acquired for projects on Slate Creek Campground (RAC and Boy scouts), Spring Gulch accessible trail (RAC, Summit Independent living, Ravalli County People First) and East Fork Guard Station picnic shelter projects (RAC) planned for FY2008.

Off-Highway Vehicle Effects on Lands Item 28

OBJECTIVE: Monitor OHV effects on land.

DATA SOURCE: Site inspection and interdisciplinary team reviews.

FREQUENCY: Twenty-five percent of high use areas and trails annually.

REPORTING PERIOD: 2007

VARIABILITY: Irreversible ecosystem damage, user conflicts, displacement of wildlife and public safety.

EVALUATION:
In areas where motorized recreation use is recognized by the Forest Plan as compatible with other resource values and where trail systems have been designed to accommodate the use, unacceptable resource impacts are generally not occurring. Where developed trail systems have been created to avoid problem areas, users are mostly staying on the trails. When indicators of obvious trail maintenance are present, monitoring is showing trail visitors respond by being more careful in their use of the area. The highly visible presence of an OHV ranger has enabled the Forest to educate OHV users and offset, to some degree, the impacts of increasing OHV use.

Generally, where the terrain and vegetation do not provide opportunities to ride OHVs off the road or trail system, there is little overall damage from OHV use. However, in areas of the Forest where travel off roads is easier, impacts to sensitive vegetation and soils do occur. To date, we have not found any of this damage to be irreversible. Rehabilitation efforts are generally successful in terms of restoring the physical and vegetative resources, but are less successful in preventing future damage to restored areas. The Bitterroot NF is using travel restrictions and other methods of reducing resource impacts (signs, barriers and public education) to address this problem. The illegal use of vehicles on closed roads continues to be a problem. Many of these roads are gated, but each year gates are vandalized in an effort to gain access to closed roads.

Conflicts between motorized and non-motorized users of the Forest occur every fall during the big game hunting season. In areas of the Forest where both motorized and non-motorized use is allowed, users who expect a non-motorized experience are dismayed to find motorized use. User conflicts are increasing as OHV use increases and as technological advances allow OHVs to access areas that historically have only been accessible by foot or horseback.

The Forest has identified a need, through many discussions with the public, to provide well-designed loop routes for OHV use, using old roads where possible. Without designed routes available, motorized users will find their own opportunities in places that may be inappropriate and more likely to cause resource damage. With use focused on routes designed and designated for OHV use, our monitoring has shown less likelihood of resource damage and user conflict. We have determined that the travel management planning process is the best way to delineate a manageable system of routes for motorized uses while providing non-motorized opportunities as well. The Forest has mapped out a timeline to complete travel planning, with production of a motorized vehicle use map by December 2009.

MONITORING RESULTS:

It is difficult to directly monitor OHV use and the impacts resulting from inappropriate or illegal use. This monitoring requires motion sensitive cameras and/or enough on-the-ground personnel to cover thousands of acres throughout a six-month season. Because of these difficulties, there is no "numerically based" monitoring system in place for OHV effects.

However, Forest personnel do watch for, take note of and address OHV resource damage, illegal use and user conflicts. These are recorded each year via trail condition surveys, law enforcement records, site-specific project planning inventories and other resource monitoring reports and notes. OHV effects are also considered either directly or indirectly in these other Forest monitoring and evaluation items: Monitoring Items numbered 3, 7, 10, 17, 19, 21, 22, 24, 27, 28, 29, 38, 39, 40, 41 and additional monitoring headings Threatened and Endangered Wildlife Species, Sensitive Wildlife Species, Neotropical Migratory Birds and Law Enforcement on the Bitterroot Forest. In an effort to compile this knowledge, we have developed a list of areas that are currently being used by OHVs and where we have found some form of resource damage (see Table 52). This is not an all-inclusive inventory.

Impacts that have been noted may include: deep ruts, trail widening around wet areas, stream crossings that contribute sediment, trees cut down, signs torn down, or user conflicts. While noteworthy for monitoring use and for scheduling management actions and maintenance, damage was generally such that it seldom required immediate or emergency action. Existing trails that are hardened and open for OHV use are not included. We are tracking this information to establish a more complete record of OHV effects. In addition to the areas noted, some damage is occurring where OHVs cut switchbacks on system roads.

It should be clarified that the Forest's "inventory" of user created routes, mentioned in the FY 2004 Monitoring Report, likely does not reflect all the routes that existed on the ground in 2001, as was intended. Nevertheless, the map has proven useful as one piece of information that helps us determine when a new, illegal route appears so that we can close it.

In 2007, the Forest again monitored the effectiveness of gate closures. All the gates associated with winter/spring seasonal closures were monitored once in the spring and 75% were found to be effectively closed, compared with 82% in 2006. The percent of gates inspected that lacked travel management signs were down slightly from 2006, to 12%. In order to establish meaningful numbers and trends on closure effectiveness, monitoring needs to be continued and expanded to include year-round closures.

Table 52 displays areas of OHV resource damage that were identified in the 2006 Monitoring Report. Continued monitoring throughout 2006 and 2007 has shown improvement in all but a few areas. Illegal use in Larry Creek/Big Creek, Robbins Gulch, Brennan and Coffee Gulch off Gird Creek Road, the Butterfly mine rehab area and Coal Creek has declined as a result of increased OHV presence and education. Illegal use has also declined adjacent to legal routes listed in the table and impacts are healing.

Table 52 – Areas of Noted OHV Resource Damage by District

District	Areas of Noted Damage
Stevensville	Glen Lake Trailhead; Larry Creek/Big Creek – reduced use in 2006; Sawmill Creek; Sweeney Creek; Smith Creek; Cow Creek; the Willow Creek drainage, specifically Beartrap Creek and Eastman Creek; McCalla Creek; the area between trail #44 and Burnt Fork Lake; Fulkerson Gulch; Sharrott Creek; Cleveland Mountain, Sawmill Saddle
Darby	Robbins Gulch; Sawdust Gulch; Chaffin Creek at intersection of Trapper-Chaffin Road; Bunkhouse Road; Brennan Gulch and Coffee Gulch off Gird Point Road; Lost Horse/Lick Creek area - reduced use in 2006; Hart Bench; Weasel Creek; Crooked Creek; Lost Horse Observation Point Road; Butterfly mine rehab area; Skalkaho Daly dispersed campsites

District	Areas of Noted Damage
Sula	East Fork out of Martin Creek Campground; Reynolds Creek Road; Shook Mountain; Meadow Creek has heavy use over to Mink Creek; Ambrose
West Fork	Capri Lake Trail (100 yards); Meadow Gulch; Spruce Creek; Hughes Creek; Coal Creek; Flat; Mink Creek

Education and Law Enforcement

Since 2002, the Bitterroot NF has received state grant funding for a seasonal OHV Ranger. Each year the OHV ranger focuses on educating OHV users through field contacts, posting signs so that users know where they can legally ride and works regularly with the local OHV dealers, Western Montana Trail Riders Association and Ravalli County Off-Road Users Association. In 2007, one full-time & one part-time seasonal OHV Ranger again provided this critical field presence.

Signing areas and trails for appropriate uses and closures has been an important focus for several years. Many signs are damaged or removed through vandalism, so it is a constant battle to keep areas posted. In 2007, the OHV ranger replaced about 25 vandalized signs and installed about 25 new signs, primarily in Burnt Fork, Chain of Lakes, Johnson Creek, Andrews Creek and Sleeping Child.

In 2005 the OHV ranger filed 220 incident reports, seven warning notices and two violation notices related to illegal OHV use. For 2006 the OHV ranger recorded 124 incidents and issued one warning notice. In 2007, a new OHV ranger filed 13 incident reports, no warning or violation notices.

A new Forest Visitor Map with information on which roads and trails are open to specific vehicle types was made available to the public in 2006.

The Forest has mapped out a timeline to comply with the Travel Management Rule, with production of a Motorized Vehicle Use Map consistent with that rule planned in December 2009.

Ongoing Prevention and Restoration

Johnson Creek, one of three unauthorized trails closed in 2004, was monitored in 2007 and found to still be effective. In 2006, we physically closed unauthorized OHV trails at the following locations:

- Lake Como Overlook
- Hart Bench
- Forest Road 1319 (3 trails)
- Gird Trail
- Buck Creek
- East Piquett
- Gold Creek
- Reimel/Coffee Gulch
- Moonshine
- Coal Creek

Inspections in 2007 showed this work was successful in Hart Bench and Moonshine. There was also increased compliance in Coal Creek. Use is still occurring in Gold Creek, Gird and Coffee Gulch and monitoring continues in all of these areas.

In 2006, a portion of the Bitterroot/Rock Creek Divide Trail #313 was closed to motorized use to protect heritage values in this area until travel management planning can be completed. A site visit in August 2007 revealed no use is occurring.

Monitoring of Past Rehabilitation:

The Forest issued an order in January 2003 closing the Lake Como lake shore (below the high water mark) to off-road motorized travel. This closure was implemented to reduce impacts from

OHVs on sensitive sites when the reservoir level drops below full pool. Monitoring shows the closure has been followed for the most part, with some illegal full size use in early spring.

Minor rehabilitation was completed on several sites during 2005, including Sawmill Creek, Reynolds Creek gate, Hart Bench and Lost Horse and in 2006 on three sites in the Brennan Gulch area. All show continued improvement.

The Forest also rehabilitated damage from “mud-bogging” at Dam Creek Lake, Railroad Creek and Forest Road 720 in 2006. Site visits in 2007 showed that Dam Creek Lake & Railroad Creek rehabilitation was effective and no new mud-bogging had occurred. In addition, the OHV ranger is monitoring God’s Little Acre, another area of mud-bogging.

Recreation Site and Trail Use Effects on Land Item 29

OBJECTIVE: Identify areas that are proceeding toward irreversible ecosystem damage.

DATA SOURCE: Site and trail inspection and interdisciplinary team review.

FREQUENCY: Annually (25 percent of high use areas and trails).

REPORTING PERIOD: 2007

VARIABILITY: Irreversible ecosystem damage.

EVALUATION:

We did not identify any irreversible ecosystem damage attributable to recreation site and trail use in 2007.

MONITORING RESULTS:

Condition surveys were completed on the following trails: Eakin Ridge 006 and 313.6 (Frogpond basin to AP). In addition walk-throughs were completed on Chain of Lakes system, Overwhich system, East Fork Trail and all Wilderness trails on the west side of the Bitterroot Valley.

Table 53 displays recreation sites where condition surveys were conducted in 2007.

Table 53 – Areas receiving Condition Surveys in 2007.

Ranger District	Recreation Site
Stevensville	Gash Creek Trailhead
	Palisade Mountain trailhead
	Sheafman Trailhead
	Sweathouse trailhead
	Sweeney trailhead
	Bass Fishing access Hwy 93
Darby	Bear Creek Trailhead(lost horse)
	Chaffin Creek Trailhead
	Lost Horse Observation Point
	Skalkaho snow park
	South Lost Horse Trailhead
	Trapper Peak Observation Point
Sula	Gibbons Pass
	Indian Trees Campground
	Nee-Mee-Poo Trailhead
	Spring Gulch Campground
West Fork	Appleberry Boat launch
	Baker Lake Trailhead
	Fales Flat Group Campground
	Haly Chute Boat launch
	Indian Creek Campground
	Paradise Campground
	Paradise Flat/White Cap Creek Trailhead
	Trapper peak Trailhead
	Alta Pine

A national recreation visitor use survey was completed in 2007. Results will be available fall of 2008 at http://www.fs.fed.us/recreation/programs/nvum or by contacting the Bitterroot NF Supervisor's Office.

Roadless Areas
Item 3

OBJECTIVES: Track the contribution of timber from roadless areas as projected by the Forest Plan. Monitor the change in the roadless inventory from project implementation.

DATA SOURCE: Roadless inventory and project documentation.

FREQUENCY: Annually.

REPORTING PERIOD: 1988 to 2007.

VARIABILITY: Change in roadless base different from projections in Appendix C of the Forest Plan EIS.

EVALUATION:

In FY2007, the Bitterroot NF did not harvest or construct roads in any roadless area on the Forest.

Between 1988 and 2007, the Forest has harvested 9.0 MMBF from roadless areas. This is less than 15 percent of the Forest Plan scheduled volume planned to come from roadless areas during the nineteen-year time period (Forest Plan Record of Decision, p. 6). Most of the volume was harvested from the Rock Creek fire salvage located in the Selway-Bitterroot Roadless Area.

Almost half of the roadless area component of the Forest Plan allowable sale quantity (ASQ) involves Montana Wilderness Study Act areas that are not available for harvest without legislative action. Combining this with the difficulty of entering other roadless areas that are available, it is clear that the Forest will not approach the roadless component of the ASQ (Forest Plan Record of Decision, p. 6).

Activities in roadless areas between 1988 and 2007 have not reduced the roadless inventory because no roads were constructed in connection with these projects. Timber harvest activity can be consistent with the natural integrity of the area and is usually not an irreversible loss of the roadless resource. Through NEPA scoping over the last few years, the public raised an issue regarding portions of the Forest that do not have roads (i.e., "unroaded") but were not included in the roadless inventory completed for the Forest Plan. "Unroaded" as well as inventoried roadless areas are often analyzed in NEPA documents for site-specific projects. The Middle East Fork Hazardous Fuel Reduction EIS, completed in 2007, contained such an analysis.

Nationally, roadless areas have been a subject of public debate, concern and litigation for over 30 years. These National Forest System lands have remained unroaded for a variety of reasons--inaccessibility, rugged terrain or environmental sensitivity. Extensive controversy continues over management of these areas, including lawsuits, appeals, letters and Congressional hearings. There is a strong need to come to agreement on the future management and protection of these lands.

MONITORING RESULTS:

Below is a discussion of the planned and completed activities in inventoried roadless areas on the Bitterroot NF from 1988 to 2007.

Table 54 displays the acres of actual roading or harvesting once it has occurred on the ground.

Table 54 - Roadless Area (MA 1, 2, 3a, 3b and 3c) Access and Harvest 1988 To 2007

Roadless Area & No.	Total Roadless Acres	Forest Plan MA 1-3c Acres (roaded emphasis)	Acres Planned for Development in Decade 1	Actual Acres Affected by Roads, 1988-2007	Actual Acres Affected by Harvest, 1988-2007	Change in Inventoried Roadless Acres
Allan Mountain (01946)	102,300	18,700	1,600	0	214	0
Blue Joint (01941)	65,400	16,700	6,200	0	0	0
Lolo Creek (01805)	587	0	0	0	0	0
Needle Creek (01066)	1,100	1,100	0	0	0	0
North Big Hole (01001)	3,700	700	0	0	0	0
Sapphire (01421)	44,100	15,800	1,100	0	0	0
Selway-Bitterroot (01067)	115,100	18,700	3,000	0	1,677	0
Sleeping Child (X1074)	21,400	9,200	2,100	0	192	0
Stony Mountain (01808)	43,700	10,700	2,700	0	265	0
Swift Creek (01065)	700	700	0	0	0	0
Tolan Creek (X1070)	7,100	7,100	3,300	0	0	0
TOTAL	**405,187** [1/]	**99,400** [2/]	**20,000**	**0**	**2,348** [3/]	**0**

[1/] 25.7% of Bitterroot NF lands.
[2/] 24.5% of roadless acres.
[3/] 11.7% of acres planned in Decade 1.

Activities in the Allan Mountain Roadless Area (01946)

The Buck-Little Boulder Timber Sale was designed to restore the ponderosa pine type through improvement cuts followed by underburning. Two units of this sale fell entirely within the roadless area and approximately one-half of a third unit was also in the roadless area. Three units were helicopter logged in the summer and fall of 1996. The inventoried roadless boundaries remained the same.

Activities in the Blue Joint Roadless Area (01941)

In the fall of 1992, Pegasus Gold Corporation performed exploration work on a block of mining claims in the Blue Joint Roadless Area. This was a core drilling operation using portable equipment they flew to the project site. Pegasus Gold Corporation drilled three holes and then shut the project down for hunting season. This project did not change the roadless character of the Blue Joint Roadless Area.

Activities in the Selway-Bitterroot Roadless Area (01067)

For the period 1988 through 1991 the only activity affecting this roadless area was the Rock Creek fire salvage. This was reported in the 1989-1990 Monitoring and Evaluation Report. In 1992, the St. Joseph's Timber Sale was sold. Approximately 20 acres of the sale was in the roadless area. The area was harvested using shelterwood silvicultural systems with over-the-snow tractor skidding. This roadless area harvest was reported in 1994. The harvest did not

require any new system roads. The 1996 Ward Mountain Timber Sale was a fire salvage sale located entirely within this roadless area. All 137 acres of the sale were logged by helicopter.

The Stevensville Southwest Decision Notice was signed in 1994. This project planned to harvest 385 acres in the roadless area using a helicopter and ground-based skidding. The project had no new road construction planned. The Stevensville SW Timber Sale was advertised in 1995, but received no bids. The Forest has no further plans to pursue harvesting in the roadless portions of this timber sale.

The 1996 Stevensville West Central Decision Notice included 22 acres of group selection harvest in the roadless area. No roads were planned to be built into the roadless area and the logging was to be done by helicopter. This activity was determined to not preclude the area's consideration as part of the National Wilderness Preservation System. These 22 acres were not included in the Stevensville West Central Timber Sale due to the economic considerations of harvesting small groups with a helicopter. The Forest has no further plans to pursue harvesting in the roadless portions of this timber sale.

The roadless inventory acreage remains the same for the Selway-Bitterroot Roadless Area.

Activities in the Sleeping Child Roadless Area (X1074)

The White Stallion Timber Sale was sold to Darby Lumber Company in 1993. Approximately 67 acres were harvested in the roadless area.

The Decision Notice for the Bear Project on the Darby Ranger District was signed in 1994 and planned to harvest 113 acres within this roadless area. The Bear Timber Sale sold in FY1998 and logging began on these two units. The fires of 2000 burned a portion of these units and logging was not completed until 2004. The harvest prescription for these units required the removal of dead and dying trees with some areas to be regenerated leaving a sparse overstory. The final units appear as a mosaic of burned areas, areas with a sparse overstory and more forested areas where limited harvesting occurred. No new or temporary roads were built. The final harvest acreage was 125 acres.

The roadless boundaries remain the same for the Sleeping Child Roadless Area.

Activities in the Stony Mountain Roadless Area (01808)

The Gird Point MA5 Heli-Salvage Timber Sale was sold in 1994. Two units totaling 265 acres fell within the roadless area. These units were harvested by helicopter in 1995. The inventoried boundaries remain the same.

Road Construction, Mitigation and Maintenance Item 24

OBJECTIVE: To determine if Forest Plan Soil and Water Conservation Practices and State of Montana Best Management Practices are being implemented in project management activities.

DATA SOURCE: Road construction and timber sale contracts, post-sale ID team review, force account crew work accomplishments and INFRA database records.

FREQUENCY: One sale per district per year.

REPORTING PERIOD: 2007.

VARIABILITY: Deviation from Best Management Practices Standards.

EVALUATION:

The Bitterroot National Forest (BNF) uses Best Management Practices (BMPs) as a mechanism to help us achieve water quality standards. The Forest incorporates BMPs as mitigation in all projects that may impact soil and water resources. In recent years new road construction has become a very minor part of the National Forest program of work, while maintenance, reconstruction, hydrological stabilization and road obliteration have become more prominent.

For several years prior to 1999, this monitoring item was not reported as a separate item; however, the Forest has continued to conduct interdisciplinary team reviews of projects on a yearly basis. We have reported these reviews; including road impacts to soil and water, in the yearly monitoring report (see Items 19, 21, 22 and 31 in this and previous reports). However, what has not been covered in the other reports is the overall status of roads on the Forest and our ongoing road maintenance, reconstruction and decommissioning. These are the subjects we will cover in this monitoring item for FY 2007.

MONITORING RESULTS:

Road Reconstruction

The Bitterroot National Forest has been reconstructing roads each year to reduce sedimentation, meet best management practices (BMPs) and to assure the standard of the roads meet traffic and safety needs.

In FY 2007, the Bitterroot National Forest did not have sufficient funding to contract road reconstruction or BMP upgrade work. The 1.8 miles of road improvement, along with the aquatic organism passage (AOP) project, were accomplished with Forest personnel.

NFSR 91 Mile Post 37.0 to Mile Post 38.4 for a total of 1.4 miles

AOP projects account for 0.10 miles of road improvement per project, there were four accomplished in 2007, the are as follows, Coal Creek, Cathouse Creek, Moose Creek and Scimitar Creek. Funding of these projects was a combination of 2006 and 2007 fiscal dollars. Scimitar Creek being the only project completed on FY 2007 funds.

Road Storage and Obliteration

The Bitterroot National Forest has been hydrologically stabilizing future needed roads and obliterating unneeded system and non-system roads in an effort to reduce sedimentation and to restore areas to pre-road conditions (Figure 1). Much of the work associated with road storage and obliteration in 2007 was identified in the Burned Area Record of Decision (ROD) and Middle East Fork Hazardous Fuels Reduction Project. In addition to work identified in various projects,

the Forest has also been obliterating non-system, unauthorized roads that are within the scope of other ongoing projects.

In FY 2007 the Bitterroot National Forest completed 1.9 miles of hydrological stabilization of roads accomplished through the Watershed program of work.

Figure 39 - Picture of Moose Creek taken from the road prism looking downstream prior to bridge installation. The culvert was a fish barrier and was removed after completion of the new bridge and relocation of the existing road prism.

Figure 40 - Picture of Moose Creek Bridge, taken from old road prism location looking downstream.

Road Maintenance

The Bitterroot National Forest's road crew maintained a total of 442.9 miles of road, the breakdown of road miles per maintenance level (ML) is as follows:

Maintenance Level	Number of Miles
ML 1	14.0
ML 2	89.9
ML 3	313.3
ML 4	7.1
ML 5	18.6

Yearly routine maintenance items completed in FY 2007 may include spot gravelling, removing large rocks from road surfaces, culvert maintenance and repair, road surface grading and bridge maintenance.

In addition to road maintenance, the road crew assisted with watershed and recreation projects in 2007. Scimitar Creek Culvert removal and obliteration of a user created OHV trail near Springer Memorial were accomplished by the road crew with Watershed funding. Recreation program work accomplished by the road crew included improvement of the Chaffin Creek and Overwhich Trailheads and installation of handicap features at Alta Campground, Fales Flat Campground, Rombo Campground and Sam Billings Campground.

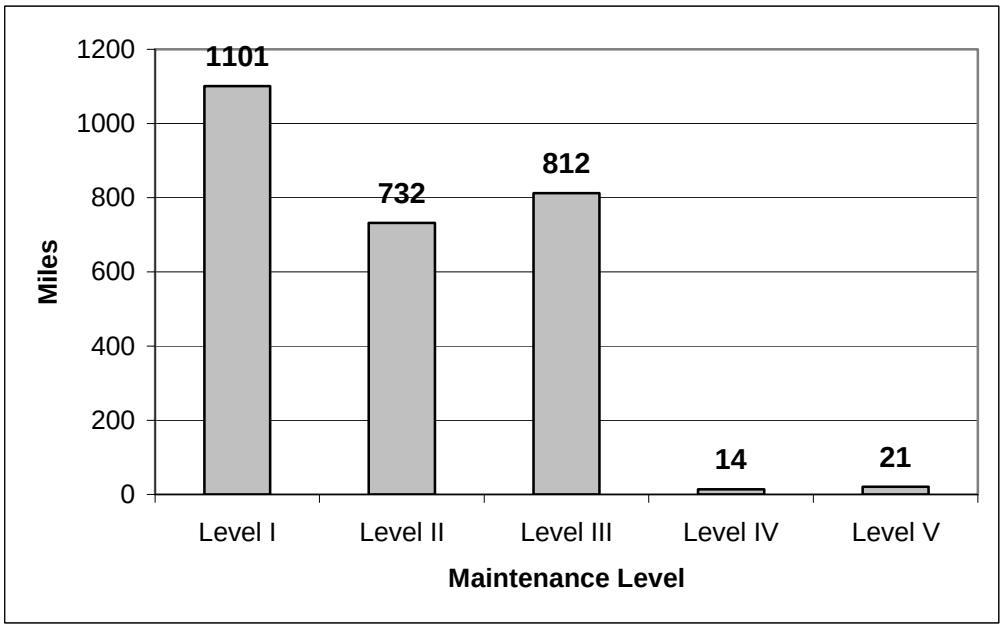
Road Maintenance Status

Existing roads are maintained and managed based on access needs, volume and types of traffic and the impacts the roads have on other resources. There are five levels of maintenance. They are as follow:[8]

Level I	Not maintained for public use. These are only maintained to preserve the road template. There are 1101 miles of Level I roads on the Forest; these roads are closed yearlong to full size motorized vehicle traffic.
Level II	Managed for high clearance vehicles, maintenance mainly focused on erosion control. There are 811 miles of Level II.
Level III	Native and gravel surface, low traffic volumes, maintained for template preservation and some user comfort. These roads are managed for use by standard highway vehicles. There are 812 miles of Level III.
Level IV	Higher traffic volumes, gravel surfaced arterial roads, maintenance at a higher standard. There are 14 miles of Level IV.
Level V	High traffic volumes, paved arterial roads. There are 21 miles of Level V roads.

[8] Please note that minor variations from year to year reflect on-the-ground changes as well as adjustments and corrections to the INFRA database.

Figure 41 - Miles of road at each maintenance level.



The Forest Service has special authorities under the Forest Road and Trail Act to trade road maintenance equally with the counties where it is more efficient for the Forest Service to maintain some county roads and for the county to maintain some Forest Service roads. Under the most recent agreement with Ravalli County, the county will perform normal spring maintenance and grading on all or portions of the following Forest Service roads: Mill Creek, Blodgett Creek, Warm Springs-Laird, North Kootenai, Rye Creek and Lost Horse. The Bitterroot NF will perform normal spring maintenance and grading on portions of the following county roads: Three Mile, Willow-St. Clair, Bitterroot-Big Hole, Hughes Creek, Fred Burr and Pierce Creek. We will do joint maintenance on Nez Perce Road.

Timber Suitability
Item 34

OBJECTIVE: Examine lands identified as not suited for timber production at least every ten years to determine if they have become suitable. If they are determined to be suitable, such lands are returned to the timber base.

DATA SOURCE: Stand exams, land typing and timber sale reports.

FREQUENCY: Ongoing

REPORTING PERIOD: 1988 to 2007

VARIABILITY: +/- five percent over a five-year period.

EVALUATION & MONITORING RESULTS:

Ground verification of lands suitable for timber production, as identified in the Forest Plan, has been ongoing with project planning. We are finding that site-specific mapping shows some lands identified as unsuitable in the Forest Plan are actually suitable and vice versa. Most projects are identifying more unsuitable land than was identified in the Forest Plan; however the changes have not been significant.

Land classification to determine whether land is suitable or not suitable for timber production is being updated in the Forest Plan revision using new vegetation and soils data sets and geographic information system mapping tools. This classification process is in progress and is expected to result in changes to the acres classified as not suited for timber production.

Part of the ongoing reforestation program has been to evaluate lands burned by the fires of 2000 to determine whether they are suitable for reforestation and timber production. Many stands classified as suitable have now been changed to non-suitable. These sites have been primarily on steep, dry, south to southwest facing slopes, with rocky soils. A map of stands evaluated on the south end of the Forest was compared to the recent mapping done as part of the Forest Plan revision. The maps are similar which helps affirm the work being completed in the revision process. Our work indicates that unsuitable sites are on a variety of habitat types with the majority of them on forest-grassland vegetation types and many of them on the Douglas-fir/ninebark habitat type. This reaffirms the importance of field verification of Forest-wide mapping. It is the combination of several factors together (habitat type, landform, soils, slope and aspect) that determine whether a site should be managed for timber production.

Previous monitoring indicated that the Douglas-fir/ninebark habitat type, which was considered unsuitable in the Forest Plan, should actually be classified as suitable. Some higher elevation habitat types were designated as having inadequate information in the Forest Plan. The consensus now is that one of the types, subalpine fir/woodrush (except the menziesia phase), should be classified as unsuitable. The draft suitability maps being used in Forest Plan revision have accounted for these adjustments, although, as noted above, in some cases these habitat types may be classified differently depending on other factors.

As we apply ecosystem management principles, we are finding the Forest Plan has limited our ability to reduce stocking levels or otherwise manage forest vegetation to meet resource objectives on some unsuitable lands. Managers need this option so fire can be restored as a natural process and vegetation can be returned to more sustainable conditions on these landscapes. Prior to 2007, site-specific amendments to the Forest Plan allowing vegetation treatment on unsuitable lands have been made for the Buck-Little Boulder and Beaver Woods Timber Sales on the West Fork Ranger District, the Warm Springs Project and Middle East Fork

Fuel reduction project on the Sula Ranger District. No NEPA projects completed in 2007 proposed harvesting on unsuitable lands.

The individual and cumulative nature of these timber suitability amendments will have an almost imperceptible effect on achieving the overall Forest Plan goals, objectives and desired conditions forest-wide. The total harvest treatments within unsuitable lands amount to only 1170 acres of the total forest acres (0.07%) since the Forest Plan was signed in 1988.

Timber Volume and Area Offered and Sold
Item 11

OBJECTIVE: Track timber harvest as a contribution to the local economy and as projected by the Forest Plan.

DATA SOURCE: Bitterroot NF Timber Information Management (TIM) database and Timber Sale Reports.

FREQUENCY: Annually.

REPORTING PERIOD: 1988 to 2007

VARIABILITY: +/- 20 percent difference from Forest Plan annually and +/- ten percent over a five-year period.

EVALUATION:

The 1987 Forest Plan projected a planned annual timber sale quantity (allowable sale quantity, or ASQ) of 33.37 million board feet (MMBF). The Plan predicted that this volume would be harvested each year from approximately 3,647 acres in Management Areas (MAs) 1, 2, 3a, 3b and 3c. Actual harvest volumes and acres cut would vary by year but the intent of the Forest Plan was to offer and award approximately 333.7 MMBF per decade after the Plan was signed.

Since 1988, annual harvest levels have been well below the ASQ predicted in the Plan. In 2007, the Forest offered and sold 37% of the planned annual ASQ and 53% of the planned annual harvest acres. Since 1988, the Forest has sold roughly 27% of the timber volume and 53% of the planned harvest acres predicted to be offered in the twenty year period since the Forest Plan was approved. More acres were sold in Management area 3a than anticipated in the Forest Plan. This is most likely due to the emphasis on treating stands in the urban interface and many of these acres are in MA 3a.

As shown in Figure 42 below, actual volume harvested has been less than what was offered and sold during the last twenty years. This is particularly true of sales sold since 2000, where the rapid deterioration of burned and bug-killed timber prevented all sold timber from being harvested.

In the past 20 years, approximately 85% of the total volume offered was sold. The Lost Buck timber sale was advertised in 2007 and no bids were received. This sale will be reoffered in 2008.

The annual, 5-year and 20-year harvest levels are outside the desired variability, as specified in the Forest Plan. In 20 years, 2002 was the only year the Forest met or exceeded the annual ASQ. Almost all National Forests have experienced similar declines. This is a national issue tied to changing social values, listing of new threatened and endangered species, declining budgets and many other factors. When the Forest Plan Revision is finalized, we will update the predictions of timber outputs to reflect the current social and regulatory environment.

MONITORING RESULTS:

Figure 42 - Timber Volume Sold and Harvested, Fiscal Years 1988 to 2007 (20 years) Compared to Forest Plan Predicted Program [1/]

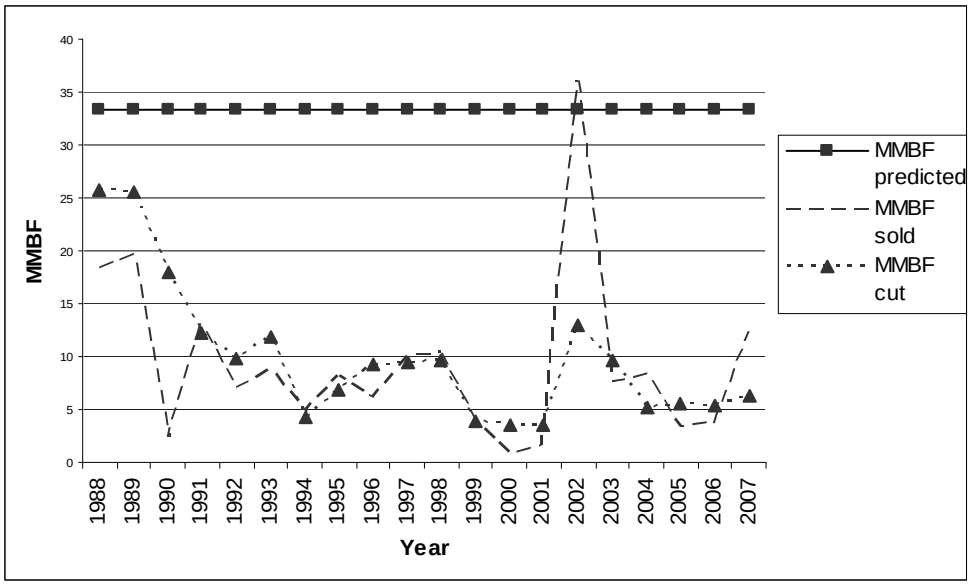


Table 55 – Timber Acres and Volume Sold By Management Area, Fiscal Year 2007 Compared to Forest Plan Predicted Annual Program

Forest Plan, p.III-80		Sold		
MA	Acres	Volume (MMBF)	Acres	Volume (MMBF)
1	1,528	14.57	0	0
2	1,439	12.01	1127	7.53
3a	283	3.05	1033	4.85
3b	385	3.62	0	0
3c	12	0.12	0	0
Total	3,647	33.37	**2160**	**12.38**

Table 56 - Timber Acres and Volume Sold By Management Area, Fiscal Years 1988 to 2007 (20 years) Compared to Forest Plan Predicted Program [1/]

Forest Plan, p. III-80			Sold			
					% of Forest Plan	
MA	Acres	Volume (MMBF)	Acres	Volume (MMBF)	Acres/Volume	
1	30,560	291.4	17,821	84.0	58%	29%
2	28,780	240.2	13,186	64.0	46%	27%
3a	5,660	61.0	7,222	33.0	128%	54%
3b	7,700	72.4	206	0.5	27%	<1%
3c	240	2.4	199	0.7	83%	29%
Total	72,940	667.4	38,634	182.2	53%	27%

Timber Volume Offered by Logging System and Harvest Method Item 13

OBJECTIVE: Track timber harvest as a contribution to the local economy and as projected by the Forest Plan. Validate Forest Plan assumptions on projected volumes by logging system and harvest method.

DATA SOURCE: Bitterroot NF Sale Tracking and Reporting System (STARS) Database and Timber Sale Reports

FREQUENCY: Every three years.

REPORTING PERIOD: 1988 to 2007.

VARIABILITY: Volume and acres offered by logging system are within +/- 20 percent of Forest Plan.

EVALUATION:

The Forest Plan requires that logging systems and harvest methods be prescribed for each project based on site-specific conditions. The logging methods are indicative of the land types associated with each sale. Therefore, timber volume offered by logging system and harvest method is likely to vary greatly from that anticipated in the programmatic Forest Plan. The monitoring results show that this is the case.

In the past 20 years, the most common method of logging has been to use tractors. This was anticipated in the Forest Plan since the majority of acres managed for timber are on gentle terrain. In recent years, cut-to-length and forwarding equipment has been used in lieu of tractors because this equipment results in less soil disturbance and less damage to residual standing trees. The extensive use of helicopter logging systems, in lieu of either ground-based or skyline/cable systems, was not anticipated in the Forest Plan. Helicopter logging has been required on approximately 28 percent of the acres offered for sale since 1988 compared to the Forest Plan estimate of 12 percent. Acres and volume removed via permit (firewood, poles, etc) are categorized as manual logging systems and were not included as part of the forest plan projections.

The Forest Plan expected that over 80% of the acres harvested would be regeneration harvests (clearcut, shelterwood and seedtree harvest methods). Instead, over the last twenty years, over half the acres harvested have been salvage removal of dead and dying trees. This has occurred either as selected trees from a forested area or (like many of the stands after the 2000 wildfires) the removal of almost all commercial trees from areas completely burned. Outside of salvage areas, about one quarter of the harvested stands have been regeneration harvests and approximately 18 percent selection cuts. Since 2000, almost all non-salvage harvest has been thinning (selection harvest) to improve stand vigor or remove smaller trees (ladder fuels). With the current emphasis on fuel reduction projects, the amount of selection cutting is expected to increase. Selection harvesting often provides the best alternative for addressing a variety of resource concerns and objectives including maintaining visual quality, protecting watershed and soil resources, providing enhanced wildlife habitat, reducing fuels and improving forest health.

MONITORING RESULTS:

Table 57 - Timber Offered by Logging System [1/]

	FY 2007		FY 1988 to 2007 [2/] (20 years)	
	Acres Offered	Volume Offered (MMBF)	Acres Offered	Volume Offered (MMBF)
Tractor	101	0.66	15,120	75.5
Skyline	789	5.95	7,085	46.6
Cable	0	0	3,633	14.0
Manual	255	1.85	6,353	24.6
Aerial	1015	3.92	12,681	53.3
Totals	**2160**	**12.38**	**44,872**	**214.0**

[1/] Tractor - tracked or rubber-tired equipment is used to skid logs or trees over the ground. This category also includes cut-to-length and log forwarding equipment. Skyline / Cable - logs or trees are skidded to a road by cables. Manual - methods used to remove primarily small merchantable products and fuel wood. Some horse logging is included in this category. Aerial - logs are removed from harvest units by helicopters; this method does not require roads in the immediate area and does not disturb the soil.
[2/] Minor corrections made to previous years harvest method acres & volume

Figure 43 – Comparison between Logging Methods Predicted in the Forest Plan and Actual Logging Systems (1988 – 2007)

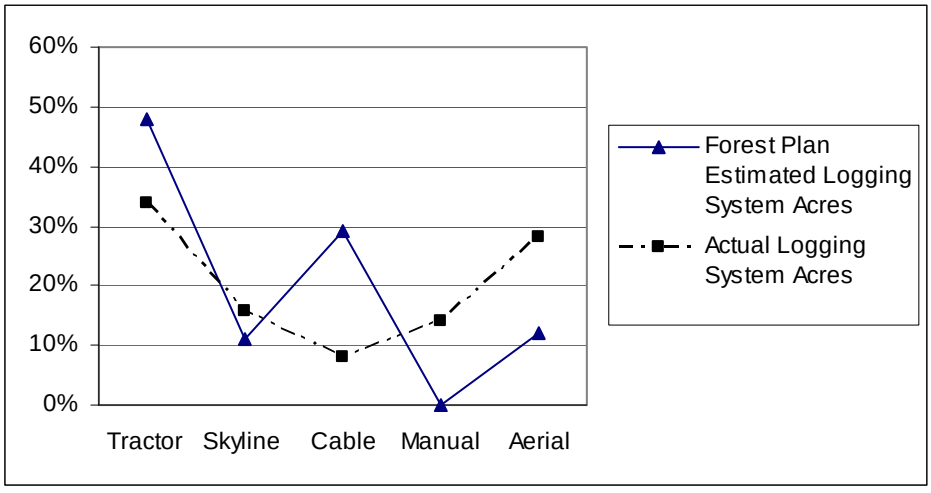
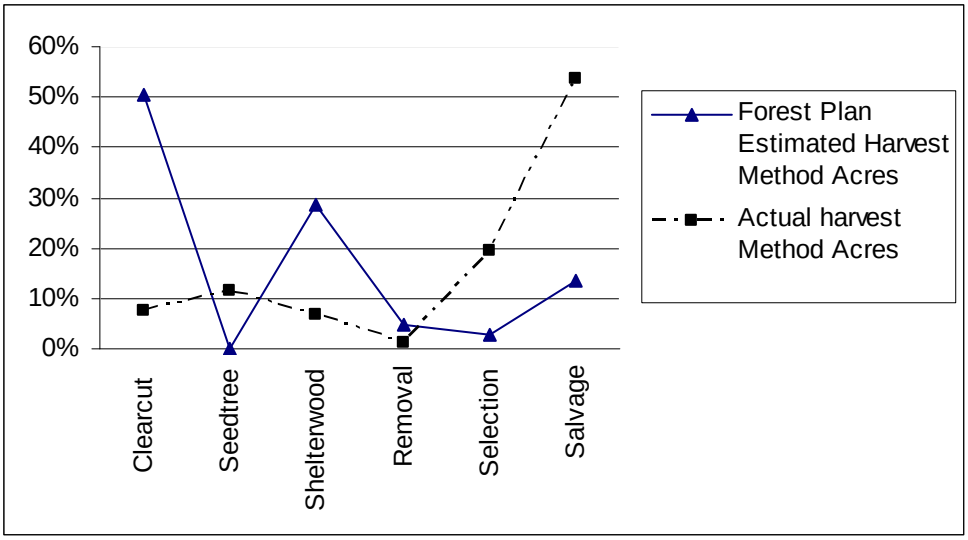


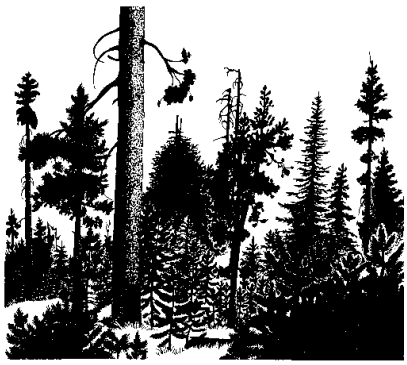
Table 58 - Timber Offered by Harvest Method

	FY 2007		FY 1988 to 2007 [1/] (20 years)	
	Acres Offered	Volume Offered (MMBF)	Acres Offered	Volume Offered (MMBF)
Clearcut[2]	0	0	3,330	36.6
Seedtree[2]	165	1.52	5,221	16.7
Shelterwood	270	2.32	2990	16.5
Removal[3]	0	0	538	4.2
Selection	938	3.89	8,648	36
Salvage	787	4.65	24,146	104
Totals	**2,160**	**12.38**	**44,873**	**214**

[1/] Minor corrections made to previous years harvest method acres and volume
[2/] Seed tree and clearcutting were combined in the Forest Plan. Clearcut percents include seed tree.
[3/] Seed tree and shelterwood final removal harvests.

Figure 44 – Comparison between Harvest Methods Predicted in the Forest Plan and Actual Harvest Methods (1988 – 2007)





Livestock Effects and Grazing Permit Revision
Status Item 30

OBJECTIVE: To report on allotment monitoring and progress of allotment management plan (AMP) revisions.

DATA SOURCE: Technical review of condition and trends, forage production, transitory range and other parameters as needed.

FREQUENCY: Ten percent of allotments annually.

REPORTING PERIOD: 2007.

VARIABILITY: +/- ten percent change in the carrying capacity

EVALUATION:

Although transitory range increases temporarily with fires, these are not calculated in any allotment's permanent carrying capacity. Therefore this does not affect the Forest Plan variability thresholds noted above. In 2007, the Forest completed and signed a NEPA decision to close three vacant allotments and leave another three open to be used as reserve grazing allotments when needed. The quantity of monitoring in 2007 exceeded minimum Forest Plan annual requirements.

MONITORING RESULTS:

2007 Actual Use

Nineteen of the 22 grazing allotments hold active permits. Of these, seven allotments were rested in the 2007 grazing season. Twelve permittees grazed a total of 3,821 Animal Unit Months (AUMs)

Land Area Grazed

Cattle grazing is authorized on approximately 11 percent of the land area of the Bitterroot NF.

Transitory Forage Status from Large Fires

The loss of tree canopy in the moderate and high severity burned areas from large fires in recent years combined with harvest of burned timber from salvage sale units did not lead to an increase in permitted grazing animals. The Forest no longer includes transitory forage in the calculation of the carrying capacity of an allotment. The transitory forage produced by the opened canopy of a burned timber habitat type is classified as secondary or supplemental rather than part of the primary permanent forage base. The amount of transitory forage does not change the allowable stocking rate of an allotment (the number of animals and the duration of grazing) in most cases. Natural plant succession eventually returns these areas to a forested cover type and phases out any flush of palatable forage plant growth.

New transitory feeding areas may change established livestock foraging patterns. The amount of grazing that occurs in these areas is dependent on the forage production and palatability, distance to water, natural barriers, elevation, steepness of slope, noxious weed invasion and availability of other forage. Many of the sites that experienced fire since 2000 and that are accessible by permitted livestock are not producing palatable herbaceous forage species. For example, pinegrass (Calamagrostis rubescens), an unpalatable grass that livestock generally avoid, dominates many acres of Douglas-fir habitat types. As tree roots and boles weaken from

fire effects, the resulting downfall increasingly prevents livestock movement through burned areas.

Allotment Compliance Results Summary

Forest rangeland specialists inspected 13 active allotments during the 2007 grazing season. The Forest uses these inspections to determine range readiness, permit compliance and utilization levels, as well as to collect data for the AMP revision process. In addition, range specialists inspect allotments to determine if they are in compliance with Forest Plan standards. These standards vary by management area, but generally require that forage use by livestock not exceed 50% on elk summer range or 35% on elk winter range. Rangeland monitoring work continues to focus strongly on grazing impacts to riparian condition. Specialists also employ supplemental streambank alteration standards prescribed for some drainages to address fisheries concerns.

Seven allotments were rested in 2007. Of the 12 allotments monitored, half of them had riparian areas that were grazed beyond forest plan standards. This was a dry, hot summer which caused grasses to cure out sooner and cattle to move to the creek bottom areas earlier than average.

Ambrose Creek Allotment: One riparian site within the allotment was grazed to 75% use with heavy trampling. Other sites within the allotment were grazed within standards.

Andrews, Warm Springs, Waugh Allotments*:* These three allotments run in conjunction with each other as pastures were rested in 2007.

Bunch Gulch and Shirley Mountain Allotments: The permittee rested these allotments this year; however a neighboring permittee did not check fences before turn on and, consequently, his cattle ended up on the allotment and grazed several areas beyond standards.

Camp Reimel Allotment: Grazed within standards, however riparian fences were not repaired before turn on.

Gold Creek Allotment: This allotment was rested in 2007.

Harlan Gulch: Grazing met riparian standards in Roan Gulch; however the permittee will need to continue diligent attention to removing cattle in order to successfully comply with standards in riparian areas. One area near a roadside trough exceeded standards. Discussions with the permittee emphasized riparian standards and Forest Service expectations for compliance with those standards.

Main Sleeping Child Allotment: This allotment was closed in 2007.

Meadow Creek Allotment: Annual riparian monitoring continued in Meadow Creek and results are reported in Item 19. Cages established in 2004 were clipped and monitored with only half the sites meeting standards.

Piquett Allotment: In 2003, this allotment received its tenth and final year of rest directed by the 1993 AMP. The allotment was used temporarily in 2001 to rest another severely burned allotment. It has not been grazed since. A Categorical Exclusion was completed on this allotment to keep it as a reserve allotment for other allotments needing rest.

Skalkaho Allotment: Coffee Gulch met riparian standards in 2007 with the five head reduction implemented in 2006. However Brennan Gulch exceeded standards. Cattle were moved straight from Brennan to the Gird Creek Pasture. The uplands appear to be in good condition. Weeds were treated along the roadsides as were known patches of leafy spurge.

Sula Peak and East Fork Allotments: Sula Peak was rested in 2007. East Fork was grazed; however, the fences had not been repaired, so cattle spent much of their time in the Shirley Mountain and Bunch Gulch drainages, exceeding standards in these areas.

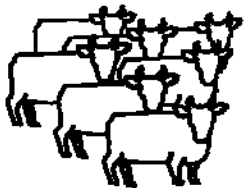
Trapper Peak Allotment: Forage use in the Waddell pasture did not meet standards but the remainder of the allotment did. Cattle were grazed in Waddell until mid-summer and then moved

to the Lost Horse Pasture as in the previous year. This prevented cattle from wondering in the Lake Como area late in the season.

Allotment Management NEPA and Plan Revision Status:

Public scoping was initiated for the **Waugh Gulch and Andrews Allotment Management Plan** revisions in 2002. An interdisciplinary team was formed and a large portion of the analysis document was developed. A NEPA decision is expected in 2008. The proposed action is to combine the allotments to increase efficiency of management, reduce stocking levels and institute a more progressive management approach that incorporates principles of rest/deferment.

The Forest completed a Categorical Exclusion on six grazing allotments, closing Main Sleeping Child, Rye Creek and the Claremont Haacke Grazing Allotments. Piquett Creek, Little Sleeping Child and Bertie Lord Grazing Allotments were left open to be used as reserve allotments when another allotment needs to be rested.



ADMINISTRATION

Administrative Appeals of Project Decisions

OBJECTIVES: Evaluate and disclose number and types of administrative appeals affecting Forest Plan implementation.

DATA SOURCE: Planning databases, Regional appeal records, project records.

FREQUENCY: As interest and data warrant.

REPORTING PERIOD: FY1991 - FY2007

INTRODUCTION:

Debate over forest management has increased interest in the rate and type of administrative appeals of Forest Service project decisions and the effects the Forest Service administrative appeal process has on Forest Plan implementation.

The Northern Region has maintained good records on the type, number, name and disposition of appeals since the mid-1980s. These data alone provide useful, but limited, information. Additional data collected by the Bitterroot National Forest is reasonably complete and reliable from FY1998 to the present and provides information on how many decisions were not appealed and some additional insight into the types of decisions most likely to be appealed.

The monitoring results provided below are not meant to be a comprehensive study on the subject and the information is clearly limited by both the type and amount of information available. The reader is advised not to draw conclusions beyond the face value of the data and keep the following in mind;

- In the broadest use, “decisions” include almost any project, activity or action taken by the Forest Service.
- Not all decisions are subject to the National Environmental Policy Act (NEPA) and of those that are, the most routine do not require formal documentation (e.g. mowing a lawn, painting a building).
- Not all decisions are subject to the notice, comment and appeal laws and regulations (35 CFR 215, 217, 218, 251). Except for the Regional data presented below, only decisions subject to notice, comment and appeal under the Appeal Reform Act (36 CFR 215) and those subject to the pre-decision objection process of the Healthy Forest Restoration Act (36 CFR 218) are tracked here. Also, the appeal regulations themselves, as well as the types of activities subject to appeal, have changed over the years.
- Any grouping of this data, as done here, can easily lead to oversimplified conclusions. The types of activities and projects proposed by the Forest and the choices made by groups and individuals to appeal those decisions, occur within a complex social, economic and political environment. Only a few of those factors are discernable in the available data. For example, every project and activity has unique benefits and effects, which likely influence who appeals the decision. Similarly, the grouping by “type of activity” combines small projects with large ones and remote activities with those adjacent to private land or communities, both factors which might influence people’s decisions to appeal, but which can’t be distinguished here.

MONITORING RESULTS (36 CFR §215 and prior 36 CFR §217):

In fiscal year 2007, eight Bitterroot National Forest project decisions were subject to the notice, comment and appeal regulations at 36 CFR 215. These are listed in Table 59. Of the eight decisions subject to appeal, two were appealed. One of the decisions was affirmed by the Appeal Deciding Officer (Gash Fire Salvage) and the appellant withdrew the appeal on the other decision (Guide 311 Rx Burn).

Table 59 – Appeal of 2007 project decisions subject to 36 CFR 215 requirements

Decision Name	Type	Appealed?
Cinnamon Bear Pine Restoration	Fuels Reduction	N
Gash Fire Salvage and Reforestation Project	Vegetation Treatment	Y
Guide 311 Rx Burn	Vegetation Treatment	Y
Hughes Malloy Underburn	Fuels Reduction	N
Jennings Non-Commercial Thinning Project	Vegetation Treatment	N
Larry Bass Burn	Fuels Reduction	N
Mill Lake Dam Access for Embankment Stability	Special Uses	N
Weasel Underburn	Vegetation Treatment	N

Northern Region Appeal Records for the Bitterroot National Forest, FY 1991 through FY 2007

During this seventeen-year period, 235 separate administrative appeals were filed challenging 54 individual project decisions.[9] Of those 54 decisions that were appealed, ten decisions were either withdrawn or reversed. The remaining 44 decisions were either affirmed after administrative review or the appellants withdrew their appeal.

Bitterroot National Forest Appeal Records, FY 1998 through FY 2006

From fiscal year 1998 through 2007 (ten years), the Bitterroot National Forest issued 48 decisions that were subject to appeal (Table 60). Thirty-eight separate appeals were filed on sixteen of those decisions. Of the sixteen decisions that were appealed, thirteen were affirmed after administrative review or the appellants withdrew their appeal, one was reversed and the Forest withdrew the two remaining decisions. Of the eleven broad categories describing the types of project decisions made in this period, the appealed decisions fell into seven categories (Table 61). Within those seven categories, 48 percent of the project decisions were appealed (16 of 33).

Further refinement of the data shows that of the 38 total appeals received during the ten year period, sixteen (42%) were appeals of decisions which included commercial timber harvest as a project activity (Table 62). The appeal rate of timber harvest related decisions averaged 69%. Conversely, the appeal rate on non-timber related decisions averaged 21%.

Twenty-four groups and ten individuals were party to the 37 appeals filed in this time period (Table 63). It is not uncommon for more than one group or individual to be party to a single appeal or to have more than one appeal on a single decision.

[9] Includes project and activity appeals under both 36 CFR §217 and 36 CFR §215 and changing regulations.

Table 60 – All BNF Project Decisions Subject to Appeal[10] and the Number of Appeals, FY 1998 through 2007

Fiscal Year	Decisions Subject to Appeal (#)	Decisions Appealed (#)	Individual Appeals (#, some decisions had more than one)
1998	5	1	1
1999	6	4	11
2000	5	0	0
2001	7	2	2
2002	2	0[11]	0[11]
2003	4	2	2
2004	2	1	16
2005	3	1	1
2006	6	3	3
2007	8	2	2
Total	48	16 (33%)	38

Table 61 – General Category of BNF Decisions and Appeals[10], FY 1998 through 2007

General Category of BNF Decisions Subject to Appeal (1998-2006)	Decisions Subject to Appeal (#)	Decisions Appealed (#)	Appeal Rate (%)	Individual Appeals (#, some decisions had more than one)
Administrative Site	1	0	0%	0
Ecosystem Management	2	0	0%	0
Forest Plan Amendment (Wilderness Direction)	2	1	50%	16
Fuels Reduction	7	3	43%	3
Range Management	2	1	50%	1
Recreation / Wilderness	1	0	0%	0
Road Management	4	1	25%	1
Special Uses	6	1	17%	1
Vegetative Treatment	15	7	47%	13
Fish Habitat or Watershed Improvement	5	0	0%	0
Weed Management	3	2	67%	2
Total:	48	16	33%	38

Table 62 - BNF Decisions Subject to Appeal[10] Which Included Timber Harvest as an Activity, FY 1998 through 2007

Fiscal Year	Decisions Subject to Appeal (with a timber sale component, #)	Decisions Appealed (#)	Individual appeals (#, some decisions had more than one)
1998	1	0	0
1999	3	3	10

[10] Only decisions subject to appeal under 36 CFR §215 are included as these are the most prevalent and have been the focus of most data requests. The Forest Service has three other administrative review processes as well. These are defined at 36 CFR §217, 36 CFR §218 and 36 CFR §251.

[11] This does not include the Burned Area Recovery project decision, which was not subject to appeal, yet received three appeals and two lawsuits. The appeals were dismissed without administrative review.

2000	3	0	0
2001	1	1	1
2002	0	0[11]	0[11]
2003	1	1	1
2004	0	0	0
2005	0	0	0
2006	3	3	3
2007	1	1	1
Total	13	9 (69%)	16

Table 63 – Project Appellants[10], FY 1998 through FY 2006[12]

Appellant	# of Appeals Party To
WildWest Institute[13]	9
Alliance for the Wild Rockies	7
Friends of the Bitterroot	6
Floyd E. Wood	5
Friends of the Clearwater	3
Wilderness Watch	3
American Wildlands	2
Action Whitewater Adventures	1
Aggipah River Trips	1
Aircraft Owners and Pilots Association	1
Bernie Kosolo	1
Bill Worf	1
Californians for Western Wilderness	1
Carlotta Grandstaff	1
Columbia Seaplane Pilots Association	1
Idaho Aviation Association, Inc.	1
Idaho Outfitters and Guides Association	1
Jennifer Callahan	1
John Lehrman	1
John Swanson	1
Kirby Erickson	1
Larry Campbell	1
National Organization for Rivers	1
Northwest Rafters Association	1
Paul Stanton	1
River Runners for Wilderness	1
State of Idaho, Dept of Transportation, Division of Aeronautics	1
Valley Co. Board of County Commissioners	1
West Fork Citizens Committee	1
Western Whitewater Association	1
Whitewater Expeditions	1
Wild Wilderness	1

[12] Six additional groups were also party to appeals filed on the Burned Area Recovery project decision in FY2002, but these appeals were dismissed without review as this project was not subject to administrative appeal.

[13] WildWest Institute formed in 2006 from a merger of the Ecology Center (previously listed here) and the Native Forest Network (previously not an appellant).

Research Needs
Item 44

OBJECTIVE: To identify research needed to accomplish national forest management activities.

DATA SOURCE: Interdisciplinary and management team review of activities.

FREQUENCY: Every two years.

REPORTING PERIOD: 2007

VARIABILITY: Inability to accomplish Plan goals and objectives with existing research.

EVALUATION AND MONITORING RESULTS:

The Bitterroot NF continues coordination with research through the Bitterroot Ecosystem Management Research Project (BEMRP), which provides a forum for communication between managers and scientists. Participants in BEMRP include the Bitterroot National Forest, USFS Northern Region Office, five science programs of the Rocky Mountain Research Station (RMRS) and University of Montana. This research and other research funded through other sources are providing information that will be useful as we revise the Bitterroot Forest Plan and continue to manage National Forest lands using results of current research. The Bitterroot Ecosystem Management Research Project's website is http://www.fs.fed.us/rm/ecopartner.

The fires of 2000 highlighted the need for new or additional research and fires since then have provided additional opportunities. A number of research and monitoring efforts occurred on the Bitterroot National Forest to help answer fire-related management questions. These included:

- **Effectiveness of Burned Area Emergency Rehabilitation (BAER) treatments for controlling erosion, retaining soil moisture and reducing peak flow.** There were three studies, conducted by RMRS, looking at the effects and effectiveness of straw wattles, silt fences and contour-felled logs. These studies concluded in 2004 and along with other studies have changed the recommendations for how post-fire treatments are applied.
- **Interactions of noxious weeds and fire, particularly at low elevations; weed invasion due to fire-suppression, BAER treatments and burned area restoration treatments.** A researcher from RMRS studied weeds in three of the large fire areas from the 2000 fires. The study also measured vegetative response to weed control efforts as they occurred. The researcher added another study looking at cheatgrass invasion on burned sites. Another researcher from RMRS also looked at weed invasion on plots throughout the burned area as part of long-term monitoring of vegetation recovery after the fires.
- **Effects of fires and burned area restoration on fish, birds and other wildlife.** A researcher from the University of Montana revisited bird transects set up several years before the 2000 fires and studied bird population response for three years after the fires. Montana Fish, Wildlife and Parks, the RMRS and the Bitterroot National Forest monitored fish and fish habitat recovery post-fire, including previous fires. RMRS and Aldo Leopold Wilderness Research Institute studied effects of prescribed and wildland fires on amphibians. Other studies looked at the effects of burned area recovery treatments on birds, plants and small mammals, although many of these studies took place on more recent fires on other forests.
- **Vegetation recovery post-fire and after burned area restoration treatments.** A researcher from RMRS is looking at long-term (15 years) vegetation response post-fire and post-treatment. He revisited his sites in 2005. Also, one hundred photo points set up by the Forest immediately post-fire were re-photographed in 2002 and 2003 and will be re-taken

periodically to provide a visual documentation of vegetation response, with the next set scheduled for 2008. RMRS remeasured the Forest Inventory and Analysis (FIA) plots done shortly prior to the fire to record immediate post-fire plant and fuel-load responses. These plots are long-term plots. A researcher at the University of Montana monitored vegetation response for use in a Montana Ecosystem Management Learning Center Site within the burned area.

- **Effects of pre-burn forest structure on fire severity.** From 2001 to 2003, researchers from the RMRS studied how age, structure and previous forest management affected fire severity in the 2000 fires.
- **Effects of fire on soils.** A researcher from RMRS focused on soil infiltration changes due to wildfire.
- **Preventing residential fire disasters.** A researcher from the RMRS looked at houses and landscaping and how they contributed to survivability of structures during fires. Researchers from the U.S. Geological Survey and the University of Montana studied the debris flows from the storms of 2001. Another study modeled building trends in the wildland-urban interface. BEMRP and the Bitterroot National Forest are working on a large-scale fuel reduction and forest restoration project that will reduce threats to homes, private property and forest resources while studying the effects of the treatments on various resources including vegetation and weeds and soil compaction and productivity.
- **Developing standard methods for collecting and moving data during fires.** Researchers at RMRS are exploring this.
- **Developing modeling tools to better understand trade-offs among natural fires, prescribed fires, mechanical treatments and no treatments.** Researchers at the RMRS and the University of Montana continue to work on modeling.

The Bitterroot National Forest has a long history as a research site. In particular, there is significant, long-term research on ecosystem management in riparian, grassland and forest habitats. New research needs are also arising as we delve further into ecosystem management and attempt to use the information gleaned from recent research. Areas ripe for further investigation and some ongoing research efforts designed to help answer these questions include:

- **Historical conditions in riparian areas, the processes that operate in natural riparian systems and how they have been affected by people**. A RMRS study is looking at the historical role of fire in maintaining riparian areas. In 2003 and 2004, they visited actively burning areas to monitor stream conditions immediately before, during and after wildfire. We expect to learn results of the final analysis of data in 2007.
- **Applications of ecosystem management principles to larger land areas, such as landscapes.** Modeling efforts by RMRS are allowing researchers and land managers to take a landscape-level view of management actions. Integrated modeling efforts allow managers to look at the long-term effects of actions or of inaction. BEMRP is involved in a landscape-scale study that will recommend optimum thinning and prescribed fire treatments near the wildland-urban interface on the Bitterroot front.
- **Effects of fuel reduction and forest restoration treatments on physical and chemical soil properties.** BEMRP and RMRS are planning a study to measure the effects of fire and mechanical fuel treatments on soils and how changes in soil physical and chemical properties affect organic matter decomposition.
- **Disturbance regimes (particularly fire) in low, middle and high elevation forests.** Researchers from RMRS, University of Montana, University of Idaho and University of Arizona are looking at the historical roles fire and other disturbances have played and still play in all of these forests, from the low elevation, dry ponderosa pine forests to the high

elevation whitebark pine forests. This includes looking at the effects of long-term fire exclusion.

- **The response of trees, forests and wildlife to ecosystem management and fuel reduction treatments.** Researchers from RMRS and the University of Montana are studying how different treatments affect the survival and growth rates of individual trees, condition of the understory, populations of wildlife such as birds, weed colonization and expansion and amounts of fuels that can affect future fire severity. Some of these studies are long-term, providing the forest and the public with additional data as each year goes by.
- **Improving communication of research results among scientists, managers and the public.** One study from the RMRS and the University of Montana looked at ways to improve communication among environmental education groups in the Bitterroot Valley. As part of the BEMRP landscape project, the Aldo Leopold Wilderness Research Institute is studying if and how the Bitterroot National Forest and BEMRP build trust for a large forest management project. A baseline method of measuring and monitoring trust in agency decisions in fuel and fire management was developed. A baseline measure was obtained. In addition, in-depth understanding of the meanings people attach to the Bitterroot Landscape has been achieved and it is hypothesized that those who took this opportunity to provide information to the Forest Service will exhibit higher levels of confidence in fuel and fire management.
- **Population information, habitat needs and resource management impacts on management indicator species, sensitive species and other species of concern.** Researchers from RMRS, University of Montana and University of Idaho, Owl Research Institute and the Bitterroot National Forest are currently studying lynx, snowshoe hares, wolverines, black-backed woodpeckers, boreal owls, spotted frogs, boreal toads, tailed frogs, migratory birds, northern goshawks, bull trout and cutthroat trout on the Bitterroot National Forest.
- **Evaluating Vegetative Response of Ponderosa Pine, Douglas-fir, Associated Understory Species and Noxious Weeds to Fuel Reduction Treatments.** Researchers collected pre-treatment data on a small portion of the Trapper Bunkhouse Land Stewardship Project. This study, spread over approximately 250 acres, is designed to evaluate treatments addressing forest fuels and forest health which are important issues of vegetation management on public forests. Little is known about specifics of short- and long-term vegetation changes in low elevation ponderosa pine stands containing a large component of Douglas-fir understory and overstory, much of which forms extensive ladder fuels. This study is part of a replicated design of silvicultural treatments being developed to scientifically and statistically test differences in treatment effects.
- **Long-term Effects of Thinning and Broadcast Burning on Spotted Knapweed Invasion and Understory Vegetation.** BEMRP's oldest study site is the Lick Creek Demonstration/Research Forest, which underwent thinning and understory burning treatments in 1993 and 1994. Throughout the years since, scientists have returned to Lick Creek to collect data related to the original objectives and to capitalize on previous work to answer other questions. In FY 07, a study was set up to examine how ecosystem management treatments affect weed invasion and how this may alter wildlife habitat. We re-measured understory vegetation at the same locations using the same methods as employed in the original study. This will allow us to evaluate how thinning and burning treatments have affected weed invasion over a 15-year time period.

Forest Plan Amendments

OBJECTIVE: Track formal changes to the Forest Plan.

DATA SOURCE: Amendments.

FREQUENCY: Annually.

REPORTING PERIOD: 1987 to 2007.

VARIABILITY: Repeated amendments for the same reason may indicate a need to adjust the Plan.

EVALUATION:

The Bitterroot National Forest and Northern Region decisions amended the Forest Plan twenty-seven times between 1987 and 2007. Four of the amendments (numbers 11, 13, 14 and 25) were required to allow timber harvest on unsuitable lands for the purpose of restoring historic forest structures and reducing fuels. Current direction does not allow harvest on unsuitable lands, yet harvest is an important tool needed to sustain some forest communities in some areas. This indicates a need to look again at Forest Plan standards, guidelines, goals and objectives related to unsuitable lands.

Three amendments have allowed site-specific exceptions to the elk habitat effectiveness standard. Monitoring shows that Forest Plan big game objectives continue to be met or exceeded, confirming the amendments have been appropriate and non-significant. See the monitoring section on Elk Habitat Effectiveness (Item 7) for further discussion of this standard.

MONITORING RESULTS:

Table 64 lists all the amendments to the Forest Plan and the nature of each decision.

Table 64 - Forest Plan Amendments 1987 Through 2007

Year	Amendment Number	Nature of Decision
1989	1	Changed a Management Area boundary.
1990	2	Changed a standard to allow new temporary outfitter camps in MA 11a along the Magruder Road.
1990	3	Allowed a temporary entry into MA 5 to salvage trees killed by Gird Point Fire.
1991	4	Changed a management objective for timber. Dealt with splitting ASQ within and outside inventoried roadless areas.
1991	5	Changed the schedule for reducing obtrusive outfitter caches and removing plumbing fixtures from Frank Church-River of No Return Wilderness.
1991	6	Identified Running Creek as eligible for the Wild & Scenic River system.
1992	7	Incorporated revised management direction for the Selway-Bitterroot Wilderness.
1992	8	Amended the Forest Plan standard for issuing new outfitter and guide permits.
1992	9	Allowed a boat launch facility to be built in a riparian zone.
1992	10	Allowed a fishing pier and trail to be built in a riparian zone.
1994	11	Allowed timber harvest on unsuitable lands in the Buck-Little Boulder Timber Sale.

Year	Amendment Number	Nature of Decision
1994	12	Refined the vegetation management direction for the Selway-Bitterroot Wilderness.
1995	12.5	Inland Native Fish Strategy (INFISH); provides interim direction to protect habitat and populations of resident native fish.[14]
1995	13	Allowed timber harvest on 174 acres of unsuitable lands in the Beaver Woods Vegetation Management Project area.
1996	14	Allowed timber harvest on unsuitable lands in the Warm Springs Project area.
1997	15	Allowed disposal of winter range via land exchange for specific sites in MA 8a.
1997	16	Allowed two third-order drainages on the Sula District to be managed at Elk Habitat Effectiveness values less than the 50% standard.
1997	17	Changed management area boundaries in MA 3a, 5 and 10 to allow for expansion of Lost Trail Ski Area. Changed the visual quality objective for the ski area from retention to modification.
1998	18	Established the Salmon Mountain Research Natural Area
2000	19	Updated wilderness direction for the Anaconda Pintler Wilderness
2001	20	Restricts, yearlong, wheeled cross-country travel where it was not already restricted (with several exceptions) and directs the Forest to complete site-specific planning on priority areas.
2001	21	Established the East Fork Bitterroot River Research Natural Area
2001	22	Site-specific amendment for the Burned Area Recovery Project. Refined snag, coarse woody debris and elk habitat effectiveness and thermal cover standards.
2002	23	Site-specific amendment for the Slate Hughes Watershed Restoration and Travel Management project. Allowed five third-order drainages on the West Fork District to be managed at Elk Habitat Effectiveness values less than the 50% standard.
2004	24	Replaces the 1985 Frank Church-River of No Return Wilderness Management Plan with a 2003 version. The 2003 version combines management direction in three different documents into one management plan.
2006	25	Site-specific amendment for the Middle East Fork Hazardous Fuel Reduction project. Refined snag, coarse woody debris, thermal cover and unsuitable land standards.
2007	26	Incorporate management direction in the Land Management Plan that conserves and promotes recovery of Canada lynx.

[14] INFISH, intended as interim direction, was not listed in this table prior to the 2001 monitoring report.