United States
Department of
Agriculture

Forest Service

Northern Region

FOREST PLAN
MONITORING AND EVALUATION REPORT
Fiscal Year 2008
Bitterroot National Forest

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INTRODUCTION

Introduction

The Bitterroot National Forest continued its well-established monitoring program and research collaboration in 2008.

Wildfire occurrence and activity was much lower in 2008 than in previous years. Several important environmental documents and decisions were released in 2008, including the Trapper Bunkhouse Land Stewardship Project and the Haacke-Claremont Fuel Reduction Project. Numerous research projects occurred across the Forest which will yield valuable information.

The effects of the fires of 2000, 2003, 2006 and 2007 continue to influence and change the Bitterroot landscape. 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., FY2008). 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* Environme ntal 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	Lee McAlpine, 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	Kaye Olpin, Developed Recreation Program Manager
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
Watershed	Ed Snook, Marilyn Wildey, Hydrologists.
Wildlife	Dave Lockman, Dave Romero, North and South Zone Wildlife Biologists.

Approval: Julie K. King, 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, rutting, displacement, severely burned soil, surface erosion, and soil mass movement as described in Region 1 Supplement 2500-99-1.

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: 2008

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

INTRODUCTION:

The soil quality evaluations were conducted to determine the effects of management activities on soil productivity as required by the BNF Forest Plan and Region 1 Soil Quality Standards (R1 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 1 Supplement 2500-99-1) and Handbook (2509.18 WO Amendment 2509.18-91-1 and Region 1 Supplement 2509.18-2005-1). Part of the objective was to determine if the unit being monitored exceeds the R1 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 from management activities. 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.

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

EVALUATION – DETERMINE THE EFFECTS OF TIMBER SALE ACTIVITIES ON SOILS

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

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

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 conditions and effected environments during the planning process.

Table 2 - Existing Soil Condition Surveys

Project	Results
Lower West Fork Draft EIS	Existing soil conditions meet R1 SQS in all units except units 1 and 3. Soil rehabilitation activities will be completed in these units. Units are proposed for ground-based and skyline harvest. Soil rehabilitation will be implemented to trend site conditions in these units towards a net improvement in soil productivity. All units will meet R1 SQS following activities.
Trapper Bunkhouse Final EIS	Existing soil conditions meet R1 SQS. Units are proposed for ground-based and skyline harvest. Mitigations will be implemented and/or restrictions on harvest method will be prescribed to minimize soil disturbance from proposed thinning activities. Soil rehabilitation will be implemented in ground-based units to rehabilitate soils disturbed by ground-based equipment. All units will be within R1 SQS following activities.
Swift Creek Plantation	Existing soil conditions meet R1 SQS in all units except terraced units. Mitigations will be implemented and/or restrictions on harvest method will be prescribed to minimize soil disturbance from proposed thinning activities. Soil rehabilitation will be implemented in all units to improve soil conditions following vegetative treatments. All units will meet R1 SQS 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 R1 SQS. Rehabilitation projects are also often derived from these pre-activity surveys.

2. Bitterroot National Forest Post-Activity Soil Quality Monitoring Surveys (2008)

Post-activity soil quality monitoring was conducted to determine the effects of harvest activities on the soil resource. Seven harvest units were monitored from two different projects. The results of the 2008 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 (2008) - Percent New DSD post harvest activity.

Winter Ground-Based	Summer Ground-Based (includes Fall activities)	Summer Skyline
2 sites monitored	3 Sites monitored	2 sites monitored
6% New DSD	12.5 - 14% New DSD	3.5 - 4% New DSD

Winter ground-based created on average 6% new DSD while summer skyline yarding created approximately 3.5 to 4% new DSD. Summer ground-based, which includes fall activities, had significantly more impact at 12.5 to 14% new DSD. Details concerning the monitoring data in Table 3 are discussed in the following sections.

HAYES CREEK (Waddell Timber Sale)

Unit W1- Harvest Method: Summer Ground-Based

Background: The pre-activity soil assessment completed in 2005 found the unit had no pre-existing DSD. The unit is located on south facing slopes just above Waddell Creek. Mitigations recommended by the soil scientist in the Environmental Assessment (EA) included ground-based harvest in the winter to minimize soil impacts. Ground-based operations were completed in the fall of 2006; winter conditions for yarding were not met for soil protection.

Observations: Harvest in the unit did not follow the soil scientist's recommended mitigation for winter ground-based harvest because weather conditions did not produce snow or frozen ground in the unit. Operations were instead finished in the fall. DSD and compaction on main skid trails totals approximately 14% across the unit. Detrimental soil conditions also include many areas of bare soil with no revegetation and a high number of skid trails. Some of the detrimentally disturbed areas were rehabilitated by placing slash on disturbed portions of the skid trails but not all skid trails were rehabilitated or were able to retain slash because of slope.

Conclusion: The unit is within R1 SQS; however, implementation should include all planned mitigations to protect soil resources.

Unit W2- Harvest Method: Summer Ground-Based

Background: The pre-activity soil assessment completed in 2005 found the units had no pre-existing DSD. Mitigations recommended by the soil scientist in the Environmental Assessment (EA) included ground-based harvest in the winter to minimize soil impacts. Ground-based operations were completed in the fall of 2007; winter conditions for yarding were not met for soil protection

Observations: Harvest in the unit did not follow the soil scientist's recommended mitigation for winter ground-based harvest because weather conditions did not produce snow or frozen ground in the unit. Operations were instead finished in the fall. DSD and compaction on main skid trails totals approximately 13% across the unit. Detrimental soil conditions also include many areas of bare soil with no revegetation and a high number of skid trails. Some of the detrimentally disturbed areas were rehabilitated by placing slash on disturbed portions of the skid trails but not all skid trails were rehabilitated or were able to retain slash because of slope.

Conclusion: The unit is within R1 SQS; however, implementation should include all planned mitigations to protect soil resources.

Unit W3- Harvest Method: Winter Ground-Based

Background: The pre-activity soil assessment completed in 2005 found the unit had 0% DSD. Soils in the unit were characterized as poorly drained and highly sensitive to summer ground-based harvest. 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. Ground-based operations were completed in the winter of 2006.
Observations: Harvest in the unit followed the soil scientist's recommended mitigations for winter operations. DSD and compaction on main skid trails totals approximately 6% across the unit. The detrimentally disturbed areas were rehabilitated by placing slash on disturbed portions of the skid trails. Native vegetation remained intact and was not affected by winter yarding in most areas. No other detrimental soil conditions were noted off the main skid trail areas.

Conclusion: The unit is within R1 SQS.

Unit W4- Harvest Method: Winter Ground-Based

Background: The pre-activity soil assessment completed in 2005 found the unit had 15% DSD. Detrimental disturbance was observed as soil displacement on main skid trails. 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. Ground-based operations were completed in the fall of 2007.

Observations: Harvest in the unit was completed in the winter of 2006 and fall of 2007. Weather conditions did not allow for all harvesting to be completed in the winter as was recommended by the soil scientist. DSD and compaction on main skid trails totals approximately 6% across the unit. The detrimentally disturbed areas were rehabilitated by placing slash on disturbed portions of the skid trails. Overall, the unit had a good forest floor layer with high amounts of organic matter and compaction was mostly found in the deeper layers of the soil horizon.

Conclusion: The unit is within R1 SQS. Differences in pre-activity and post activity soil assessments are the result of forest floor recovery in locations where previously bare soils were present.

Gash Salvage Project

Unit 1- Harvest Method: Summer Ground-Based.

Background: The unit burned during the 2006 wildfire. The unit had moderate burn severity which did not fully consume the litter and organic soil horizons. The pre-activity soil assessment completed in 2006 found the unit had 5% DSD from past ground-based operations. Mitigations recommended by the soil scientist included utilizing historic skid trails in the ground-based units, operating only during dry soil conditions These mitigations along with other standard soil BMPs were written into the contract specifications. Ground-based and skyline operations were completed in the summer of 2008. Mulching would also be completed if mineral soils were exposed during ground-based operations. This mitigation was not included in the contract but would be completed after contract operations if necessary.

Observations: Harvest in the unit was completed in the summer of 2008. Soil displacement and compaction were noted along skid trails. DSD from recent ground-based yarding was noted at approximately 12.5% across the unit. Total DSD was 17.5% from both past and recent yarding activities. This amount of DSD exceeds the R1 SQS of 15%. Large areas in the unit had all organic matter removed, leaving exposed bare soil. Decompaction, slashing/mulching, along with fertilization and seeding will be completed to improve soil conditions and help native vegetation recover in these areas. These rehabilitation efforts will be completed in 2009/2010.

Conclusion: The unit is not within R1 SQS and will require follow up soil rehabilitation treatment to meet R1 SQS. Timber operations were changed during implementation to include more ground-based areas than what were initially planned and analyzed. The additional ground-base yarding led to increased soil disturbances across the unit.

Unit 2- Harvest Method: Summer Skyline

Background: The unit burned during the 2006 wildfire and had moderate burn severity effects on soils. The pre-activity soil assessment completed in 2006 found the unit had 8% DSD. Mitigations recommended by the soil scientist included using existing roads so as not to require any ground-based swing. Standard soil BMPs were written into the contract specifications. Skyline operations were completed in the summer of 2008.

Observations: Soil displacement was noted along the most heavily used portions of the main skyline corridors. DSD from recent skyline yarding was approximately 3.5% across the unit and was the result of displacement of organic and topsoil horizons on skyline corridors. Cumulative DSD was found to be approximately 11.5% due to past ground-based yarding (8% DSD).

Conclusion: The unit is within R1 SQS.

Unit 3- Harvest Method: Summer Skyline

Background: The unit burned during the 2006 wildfire which had moderate burn severity effects on soils. The pre-activity soil assessment completed in 2006 found the unit had 7% DSD from past yarding operations. Mitigations recommended by the soil scientist included reopening a closed road so as to not require any ground-based swing trails. Standard soil BMPs were written into the contract specifications. Skyline operations were completed in the summer of 2008.

Observations: Minor soil displacement was noted in skyline corridors. DSD from recent skyline operations was approximately 4%. DSD consists of displaced organic and topsoil horizons. Cumulative DSD was found to be approximately 11% due to past ground-based yarding (7% DSD).

Conclusion: The unit is within R1 SQS.

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

The following table (Table 4) is a summary of the 2008 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 Ground-Based	2	6%	6%
Summer Ground-based	3	13%	12.5-14%
Summer Skyline	2	3.75%	3.5-4%

The 2008 BNF monitoring has shown that:

- **Winter ground-based** yarding resulted in 6% DSD. This yarding method is effective at minimizing DSD when compared with summer ground-based operations;
- **Summer skyline** yarding results in minimal increases in DSD (3.5 - 4%); and
- **Summer ground-based yarding** cannot always be avoided because of uncontrollable weather conditions but should be avoided where possible due to the increase in new DSD (12.5 - 14%). If summer ground-based operations are prescribed, soil rehabilitation activities should be implemented to reduce compaction and also to minimize bare mineral soils by slashing or mulching. Seeding and fertilizing may be necessary if native vegetation is not likely to re-establish on the impacted sites.

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 2008.

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 actually 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.

The actual levels of harvest for all species are well below what was predicted in the Forest Plan. The Plan predicted that approximately 700.8 MMBF would be harvested over a 21 year period. Approximately 10%, or 70.14 MMBF, of this volume would be ponderosa pine. The actual 21-year harvest volume for ponderosa pine is 31.8 MMBF which is less than half of what was anticipated in the Forest Plan.

A growing percentage of harvested timber has no species noted. Some sawtimber (lumber) is included in this category but the majority is firewood, pulpwood and other non-saw products.

MONITORING RESULTS:

Table 5 – Species Mix Harvested in FY 2008, Cumulatively for the Past 5 Years, and from FY 1988 to 2008, Compared to the Forest Plan Desired Harvest Species Mix

	Forest Plan ASQ per year		Harvested 2008		Harvested 2004 to 2008 (5 years)		Harvested 1988 to 2008 (21 years)	
Species	Volume (MMBF)	Percent	Volume (MMBF)	Percent	Volume (MMBF)	Percent	Volume (MMBF)	Percent
Ponderosa Pine	3.34	10%	0.16	3%	2.12	8%	31.8	14%
Lodgepole pine	8.67	26%	0.06	1%	1.38	5%	35.7	15%
Douglas-fir	16.02	48%	1.67	35%	12.3	45%	79.5	34%
Engelmann spruce	1.67	5%	0	0%	0.14	1%	9.5	4%
Subalpine fir /Grand fir	3.34	10%	0	0%	0.65	2%	8.0	3%
Larch	0.33	1%	0	0%	0.07	0%	0.7	0%
Fuelwood/Dead/Pulp	0	0%	2.91	61%	10.64	39%	38.3	17%
Total	**33.37**	**100%**	**4.80**	**100%**	**27.3**	**100%**	**203.4**	**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: 2008

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, or reforestation 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/or approved by a Certified Silviculturist and updated as needed
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 three projects were evaluated in the field in 2008: 1) Middle East Fork Project units 15, 22, 23, 24, 26, 130 and 255; 2) Haacke-Claremont unit 5; 3) Swift Creek Plantation

A Forest monitoring team also reviewed the Painted Rocks Hazardous Fuel Reduction Project, units 1B and 3 and Gash Salvage Sale unit 1 and 2.

Review of these five projects indicates that silvicultural prescriptions are being completed for all projects although updates to prescriptions are not necessarily being completed. In some cases the appropriate changes were made but without documentation. Monitoring revealed a problem with how we implement stewardship contracting. In two instances a series of treatments were implemented that resulted in work that was not needed or was of low priority. It is critical for resource specialists involved in stewardship contracts to monitor work as it is accomplished and make changes, if needed, in a timely manner. Similarly, our stewardship contracts need to be designed to allow more flexibility to accommodate these changes as the need occurs.

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 and 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 2008.

MONITORING RESULTS:

Middle East Fork Hazardous Fuel Reduction Project: Spring Mink Units 15, 22, 23, 24, 26, 130, 255 (Harvest Units). Seven units were reviewed in the field post-harvest. Changes to the silvicultural prescription were required in almost every unit. In some cases the prescription was updated. In other instances, the FACTS database was updated to show a change in planned or accomplished activities without additional documentation in the prescription. The most common change was to eliminate reforestation although in some instances the fuel treatment was changed. In one case, the silvicultural prescription did not match what was required in the NEPA document. The silvicultural prescription for Unit 26 specified prescribed burning and the record of decision specified no burning.

Monitoring revealed that in some cases stewardship contracting resulted in work being accomplished that was not needed. On many of the Middle East Fork units a series of treatments were implemented via a stewardship contract. Logging was followed by slashing, understory tree thinning or construction of fire handline. In two instances the post-logging condition was different than what was anticipated and the work prescribed in the stewardship contract did not fit what was needed on the ground. In unit 13, the contractor was required to construct handline in preparation for prescribed burning. A decision was later made to hand pile and burn the slash in the unit instead. The handline that was constructed and paid for was not needed. Similarly, in units 23 and 24, the contractor thinned the understory after logging to allow for better growth of these trees. In actuality the post-harvest overstory was far too dense and thinning the understory would not accomplish what the silvicultural prescription intended. In both cases, work was accomplished that was not needed. A better solution would have been to provide flexibility in the stewardship contract to allow for differing conditions and changes in treatments and that treatment areas be reviewed by qualified personnel to ensure that the sequence of treatments is correct.

Haacke-Claremont Unit 5. This unit was reviewed pre-harvest. No problems were identified.

Swift Creek Plantation. This unit was reviewed pre-harvest. No problems were identified.

Gash Fire Salvage Units 1 and 2. No problems regarding the prescription were identified during the review. There was a question whether sufficient snags were left on site after logging but a snag count was not completed. This contract allowed snags to be felled for safety reasons and left on site for course woody material.

Painted Rocks Unit 1B and 3. No problems were noted for unit 3. On unit 1B, a monitoring group discussed whether imposed mitigations prevented the silvicultural prescription from meeting the fuels management objective. The prescription was primarily a noncommercial slashing/thinning treatment with a commercial salvage component on about 1/4 of the unit. Sizable no treatment areas designed to protect soils and sensitive plants in the commercial portion of the unit prevented us from treated a lot of the stand. As a result, the prescription did not fully meet the vegetation and fuel conditions that were desired in this stand.

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

Project	Planting	Spring Mink	Haacke-Claremont	Swift Creek Plantation	Gash Salvage	Painted Rocks	
Silvicultural prescription was completed and updated	**Y**	**P**	**Y**	**Y**	**Y**	**Y**	
Prescription was followed through all phases of implementation	**Y**	**Y**	**NA***	**NA***	**Y**	**Y**	
Prescription met the desired conditions	**Y**	**P**	**Y**	**Y**	**Y**	**Y**	

1/ NA = Not applicable or Not monitored; Y = fully met requirement; N = did not meet requirement; P = partially met requirement
*/ Since this was pre-implementation monitoring, it's too early to determine this item.

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 2008 (8 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 2008

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 2008	15,578
Acres surveyed where reforestation need was dropped	86,826
Planned planting	9,192
Natural regeneration certified as successful	32,110
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.

Eight 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.

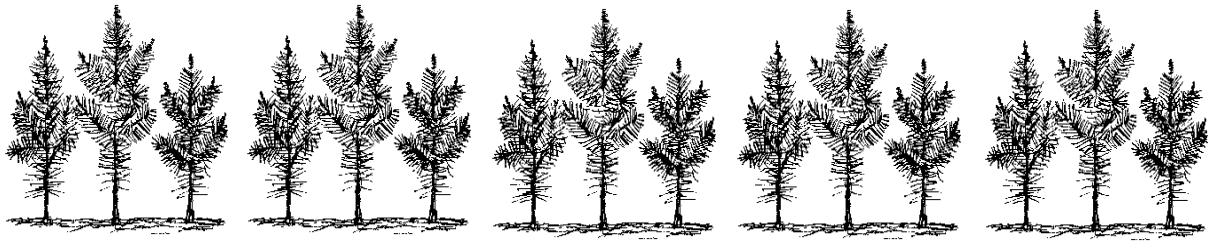
Of the total 307,000 acres burned in 2000, approximately 5% or 16,046 acres have been planted. Planting was accomplished on lower elevation lands where ponderosa pine was desired over Douglas-fir, and on many of the post-fire harvest units. Planting operations in the 2000 wildfire area will likely be 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 2008

VARIABILITY: Any deviation from regulations.

EVALUATION & MONITORING RESULTS:

No harvest openings in excess of 40 acres were proposed or created in 2008.

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.

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: 2008.

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:

Wildland Fire Situation

The Bitterroot Valley experienced a relatively mild 2008 fire season. Winter snow pack and spring run-off were average. Spring rains allowed for some prescribed fire. About the first week in June, spring rains ceased and fire indices began to climb and by mid-July, were at almost record highs. However, infrequent but wet thunderstorms started few fires during late July and this trend continued into September, when shorter days and longer nights prevented any starts from escaping initial attack.

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 2008 season, 1000 hr fuel moistures followed normal patterns, starting out high after winter snows. By late July, 1000 fuel moistures had their lowest point at about 10%. With wet thunderstorms, fuel moistures were moderated and with less than normal lightning, initial attack was successful. These conditions continued into September when fuel moistures again began increasing 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 2008, estimated ERC's fluctuated from 20-30 all spring, but started to climb sharply in mid-June to reach 65 by mid-July. Cooler than normal temperatures and wet thunderstorms kept ERC's from going any further up during most of August. Rains finally brought them back down in September.

The season's first fire was human-cause and recorded on April 17th, and the first lightning fire was recorded on June 30th. The last lightning fire occurred on August 15th and the last human-caused fire occurred on November 9th. No fires escaped initial attack and no incident management teams were needed during the summer. Seventeen lightning fires were managed for wildland fire use, burning a total of 8,087 acres. On average, the forest has about 139 fire starts annually. In 2008, the forest recorded 49 starts (Table 8).

Table 8 - Number of Fires by Year within Forest Protection Boundary and by Type of Fire

Type of Fire	1989	1990	1991	1992	1993	1994	1995	1996
Lightning	229	125	159	154	37	200	49	203
Human-caused	14	17	20	30	17	15	25	45
Total	243	142	179	184	54	215	74	248

Type of Fire	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Average
Lightning	71	112	137	249	50	76	96	90	126	74	94	33	118
Human-caused	28	9	32	28	23	23	5	17	19	28	14	16	21
Total	99	121	169	277	73	99	101	107	145	102	108	49	139

Table 9 - Number of Acres Burned By Year Within Forest Protection Boundary

Type of Fire	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Lightning	183	3,156	3,028	450	454	8,680	244	47,720	207	22826
Human-caused	549	3,166	1,889	161	11	777	375	432	33	3835
Total	732	6,322	4,917	611	465	9,457	619	48,152	240	26,661

Type of Fire	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Average
Lightning	2898	308,576	231	1241	11,595	1,529	44,994	7,174	50,500	8,092	26,191
Human-caused	316	11,559	5	242	1,374	37	12	8,886	450	2	1,706
Total	3,214	320,135	236	1,483	12,969	1,566	45,006	16,060	51,000	8,094	27,897

Table 10 - 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
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
2008 Acres	4	1	30	8094
Percent of MA	0	0	0.01	0.98
1989-2008 Average Annual Acres	**12,919**	**2,145**	**2,247**	**10,586**
1989-2008 Average Annual Percent of MA	**3.23**	**2.16**	**0.87**	**1.29**

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 and unroaded areas outside of wilderness; and FMU4 includes wilderness areas. As the Forest completes the latest Forest Plan revision, these areas will begin to have more significance in monitoring and Table 11 tracks acres burned in each FMU since 2003.

Table 11 – Acres Burned per FMU per Year

Fire Management Unit	2003	2004	2005	2006	2007	2008	Average
FMU1	1,210	98	1,723	8,828	492	4	2,059
FMU2	8,310	6	21	74	9,004	1	2,903
FMU3	2,350	165	6,129	3	20,082	4	4,789
FMU4	1,099	1,297	37,133	7,155	21,422	8,085	12,699
Total Acres	**12,969**	**1,566**	**45,006**	**16,059**	**51,000**	**8,094**	**22,449**

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 along 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 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 Table 12, 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.

In 2008, with several good burning opportunities in both the fall and spring, the Forest completed 700 acres of broadcast burning, 866 acres of hand piling, 222 acres of slashing, and 1,922 acres of pile burning. 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.

Table 12 - Prescribed Fire Program Acres Accomplished Per Year

	1992	1993	1994	1995	1996	1997	1998
Acres	2,000	2,000	2,100	2,000	2,005	5,234	5,700

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Average
Acres	5,100	2,982	755	349	2,191	5,171	2,100	2,090	7,814	3,710	3,135

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. In 2008, 50 landowners treated 408 acres of their private lands using $162,000 of grant money.

Insect and Disease Status as a Result of Management Activity, 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: 2008

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

EVALUATION:

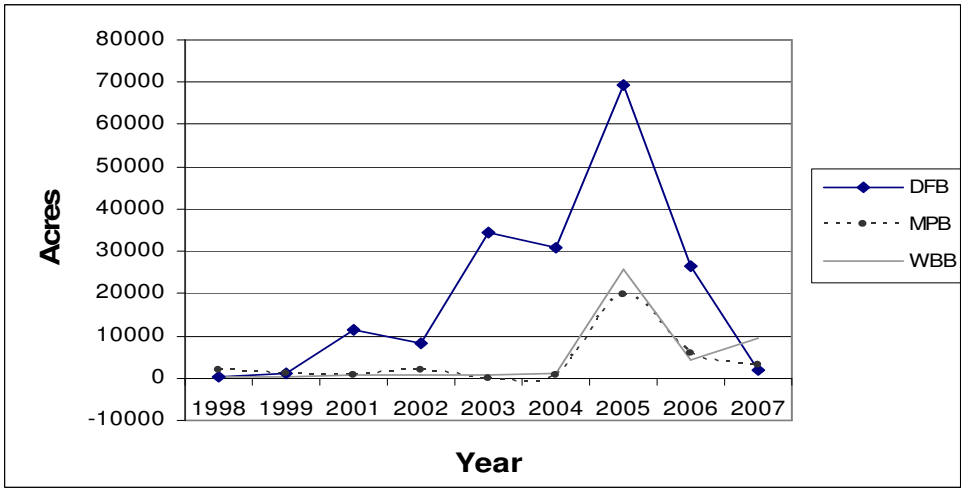
Bark Beetle Activity on the Forest is Declining. This trend continued in 2008. For Douglas-fir beetle, infested area on the Bitterroot was recorded at less than 1,000 acres, while ground surveys and observations on the Forest continued to show decidedly marked declines. A few areas on the south end of the Forest are still at higher than normal levels but other areas on the Forest are at or near endemic levels. The 2008 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.

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.

In 2008, MPB activity in lodgepole pine was the most often-encountered bark beetle-caused mortality on the Forest. Slightly more than 45,800 lodgepole pines were killed on 8,100 acres. MPB also killed about 3,300 5-needle pines on 1,400 acres; and 300 ponderosa pines on 360 acres. Western Balsam Beetle killed nearly 11,000 subalpine firs on 2,840 acres; and DFB-caused mortality was recorded on only 675 acres—where 2,000 DF had been killed. Other bark beetle-caused mortality was recorded at very low levels.

Figure 1 – 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 2008 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. There were a total of 13,206 acres of acres infested by Douglas-fir beetle, Mountain Pine Beetle, and Western Balsam Beetle in 2008.

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 13 summarizes the insect and disease information provided by the aerial detection flights conducted in the summer of 2008. Data are presented for the Bitterroot Reporting Area which includes the Bitterroot National Forest, private, and state-owned lands.

Table 13 - Insect and Disease Aerial Survey Summary For 2008

Pathogen	Bitterroot National Forest *		Private Land Bitterroot Area		State Land Bitterroot Area		TOTAL Bitterroot Reporting Area	
	Acres	Trees	Acres	Trees	Acres	Trees	Acres	Trees
Douglas-fir Beetle	604	1,687	40	125	31	121	675	1,933
Mountain Pine Beetle (PP)	297	200	22	82	39	29	358	311
Mountain Pine Beetle (LP)	8083	45647	15	72	21	125	8,119	45,844
Mountain Pine Beetle (WBP)	1384	3271					1,384	3,271

Engelmann Spruce beetle	2	2			2	6	4	8
West. Balsam Bark Beetle (SAF)	2838	10992	0	0			2,838	10,992
Pine Engraver Beetle (PP)					2	6	2	6
Spruce Budworm	659	0	515	0	14	0	1,188	0
Western Pine Beetle	11	11	10	10	3	3	24	24
TOTAL ACRES							**14,592**	**62,389**

* Montana outside of wilderness

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 three projects in 2008 - the Middle East Fork Fuel Reduction Project – Units 15, 22, 23, 24, 26, 130 and 255; Haacke-Claremont – Unit 5; and Swift Creek Plantation. No problems were found on any of these projects.

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 2008:

1. PSR Reviews and the National Christmas Tree, Bitterroot National Forest, October 2008
2. Insect and Disease Concerns in Swift Creek Plantations, Bitterroot National Forest, Sula Ranger District, August 2008.

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: 2008

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 14 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 14 - 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 15– 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 2001 to 2004
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 15 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 reexamined during Plan revision[1] (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.

Based on our knowledge of old growth habitat distribution on the Forest, we can conclude that old growth associated species are not threatened by current management practices or natural degradation of old growth habitats.

In 2008, a total of 2086 acres were surveyed for old growth. These surveys were completed in three different project areas. In the Willow-Gird project area, 536 acres were surveyed, in the Lower West Fork Project area, 1451 acres were surveyed and in the Hughes-Malloy project area, 99 acres were surveyed. The results of these surveys have not yet been finalized and will be reported on in 2009.

REFERENCE

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.

[1] Forest Supervisor letter, July 5, 2001, re: Post-Fire Forest Plan Review

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: 2008

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 17) 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 16 below summarizes the key invasive plant activities that occurred on the Forest in 2008.

Table 16 - Program highlights in 2008

Project	Description
1) Backcountry contract	Ongoing (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.
2) Participating Agreement between Ravalli County and Bitterroot Forest	The Forest continually contributes fund to the existing agreement(s) that implement 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 agreements included fire recovery special funding and regular appropriations.

3) Resource Advisory Committee (RAC)	On Going RAC project: 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 2006 - 2009 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 2006 - 2009 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	Ongoing 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 was the final year of the ongoing multi-year contract in which more than 1600 acres of knapweed and sulfur cinquefoil were treated in elk winter range and cross-boundary areas in the Skalkaho and East Fork drainages.
11) Roadside and ATV treatment	This was the final year of the ongoing multi-year contract in which numerous weed-vector roads were treated throughout the Forest and selected low relief grassland terrain compatible with ATV treatment for a wide variety of invasive plant species.
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 2007 Rombo Fire area.

15) Selway-Bitterroot Wilderness EIS	The four national forests involved in managing the SBW continued work on the SBW Invasive Plant Management EIS.
16) Revegetation	Reseeded cheatgrass treatment sites along Gibbons Pass.
17) TERRA Database	Ongoing entry of newly found weed sites 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.
18) Continental Divide Barrier Zone Project	Agencies located along and near the Continental Divide continued joint efforts 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 2 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 17 - 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
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 2008, the Forest used herbicides to treat and monitor approximately 10,635 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 325 new acres in 2008. 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.

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 2008 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 2008, the Forest aerially treated 1000 acres of spotted knapweed dominated grassland in the Skalkaho drainage on the Darby Ranger District and an additional 620 in the East Fork 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: Two new plants were found above the Chicken Creek infestation in the fall of 2008. In 2007 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. 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, trails 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 an increasing number 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 2008. 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 species 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 18 describes the biological control accomplishments for the 2008 season.

Table 18 - Biological Control Agent Releases

Agent (species)	Location	Target weed spp.	Number released
Cyphocleonus achates	Bitterroot NF	Spotted knapweed	15,350
Oberea species	Sleeping Child	Leafy spurge	500

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[2] 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

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

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 2008, over 1,000 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. Trails between the Elk City road and the Main Salmon River trail were also monitored for invasives. Only a few small infestations have been found and treated to date.

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: 2008

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 on the 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. The 2004 data showed a 91 percent 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.

The Forest participated in a Regional pilot study designed to determine fisher presence within 25 square mile grid cells in 2007 and 2008. The survey methodology is based on baited hair snares that are left in suitable fisher habitat for three weeks. Hairs collected from animals that attempt to reach the bait are then sent to the Genetics Lab at the Rocky Mountain Research Station facility on the University of Montana campus for identification. Marten hairs are also collected and identified during this process. In 2008, this survey methodology detected marten in five different locations on the North Zone (Middle Lost Horse Creek, Upper Lost Horse Creek, Lower Roaring Lion Creek, Roaring Lion Creek and Skalkaho Creek), as well as additional locations on the South Zone. In 2007, marten were detected from three locations on the North Zone (Burnt Fork, Daly Creek and Tin Cup Creek) and two locations on the South Zone (Soda Springs Creek and Mine Creek). These results indicate that marten are well distributed on the Forest, although they do not give us much information on abundance.

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 or 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, and 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. They are apparently not vulnerable in most of their range, but 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.

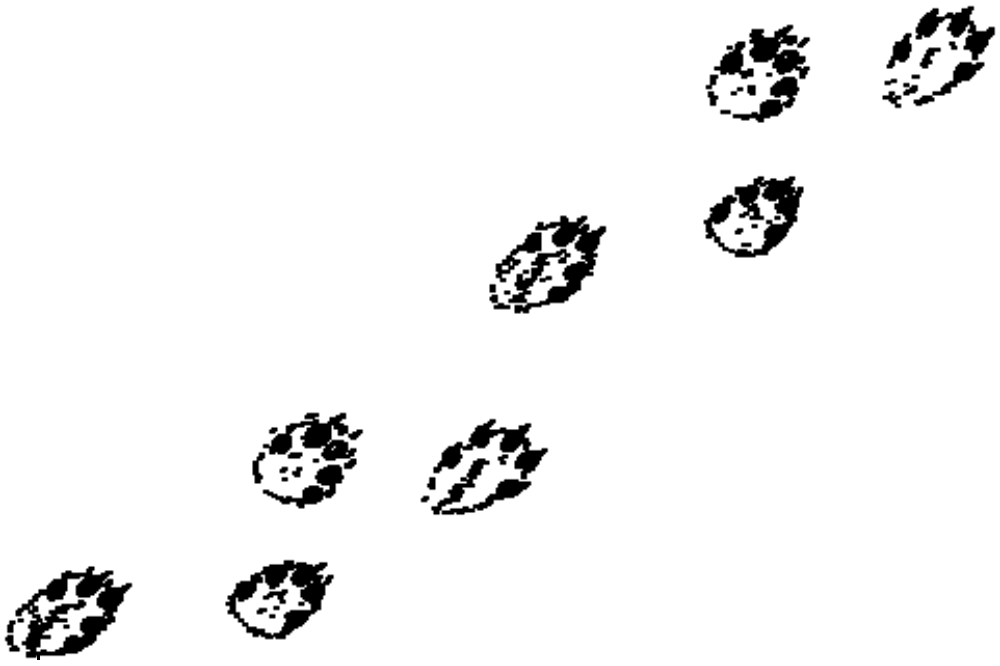
Foresman, K.R. and D.E. Pearson. 1998. Comparison of survey methods for the detection of forest carnivores. J. Wildl. Mgmt. 62:1217-1226.

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.

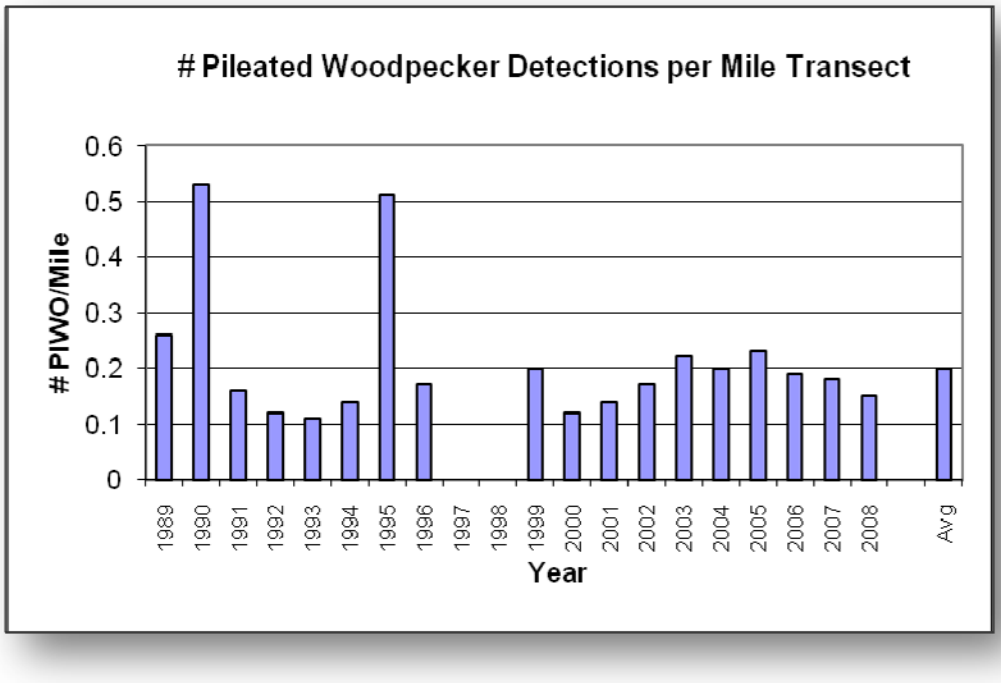
REPORTING PERIOD: 2008.

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 2008, we completed one survey on one route, two surveys on each of seven routes and three surveys on one route for a total of 18 transects. We recorded an average of 0.15 pileated woodpecker detections per mile of transect, slightly below the 2007 detection rate and well below the long-term average. This year's figure is about 25% below the long-term average of 0.20 detections per mile, and is 26% below the most recent 5-year average of 0.204 detections per mile. Further evaluation of these data follows.

Figure 2 - Results of Pileated Woodpecker Call Counts, 1989-2008



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 1678 miles of transects since 1988. We recorded an average of 0.20 calls or sightings per mile of transect over that period. The 2008 recording of an average 0.15 pileated woodpecker detections per mile of transect is about 25% below this long-term average and is about 26% below the most recent 5-year average.

Figure 2 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 each year since 2005.

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, by themselves, 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. 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: 2008.

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:

On February 27, 2008 the U.S. Fish and Wildlife Service (USFWS) published a rule designating the Northern Rocky Mountain population of the gray wolf as a Distinct Population Segment (DSP), and removing this DSP from the Federal list of Threatened and Endangered species (PF-WILD-131). This rule was scheduled to take effect on March 28, 2008 (*Ibid*). However, a number of plaintiffs petitioned the Montana District Court requesting an injunction to defer designation of the Northern Rocky Mountain DSP, and delisting of this DPS while the lawsuit was pending. On July 18, 2008, Judge Molloy ruled in favor of the plaintiffs and granted their request for an injunction. As a result, gray wolf populations throughout Montana, Idaho and Wyoming were returned to whatever status they had under the Endangered Species Act prior to the 2008 USFWS delisting.

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 seven new wolf packs in the Idaho portion of the CIEPA and four new wolf packs in the Montana portion of the CIEPA in 2008. However, eight previously documented packs in Idaho and four packs in Montana were dropped from the documented pack list due to inactivity or control, resulting in the net loss of one pack in Idaho and no change in the number of packs in Montana. Reproduction was confirmed in 54 packs within the CIEPA, 43 of which met the recovery standards for a breeding pair. These packs produced a minimum of 197 pups in 2008, a 9% decrease from the known pup production in 2007. 180 wolves were confirmed to have died in 2008 within the CIEPA, including at least 160 due to human-related causes. The total wolf population across the CIEPA at the end of 2008 was estimated at 914 wolves, a 10% increase over 2007 (USFWS et al. 2009).

Fourteen wolf packs were known or suspected to use portions of the Forest in 2007. One new wolf pack was documented using the Montana portion of the Forest in 2008, and the old Magruder pack which was dropped as a documented pack in 2007 appeared to be active again in 2008. However, two known Montana packs were eliminated through control actions following livestock depredations. As a result, at least 14 wolf packs were known or suspected to occur on portions of the Forest at the end of FY 2008.

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 2005, 2007 and 2008, but in Idaho in 2006. Four Brooks Creek wolves were eliminated following livestock depredations, and another was killed illegally, but at least three adults remained at the end of 2008.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 reinvigorated Magruder Pack appears to use the headwaters area of the Selway River, but lack of a radio collar in the pack makes territory boundaries uncertain. The Painted Rocks pack inhabits the West Fork of the Bitterroot River south of Painted Rocks Lake. The Sapphire pack inhabited the east side of the Sapphire Range in the Ross' Fork, West Fork and Middle Fork Rock Creek drainages, but apparently disbanded in 2008 and is no longer classified as a documented pack. 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 moved from the west side of the Sapphire Range between Skalkaho and Willow Creeks and usurped the Sapphire pack's territory in 2008, but was subsequently eliminated by control actions following livestock depredations. The Sula pack uses the "triangle" area west of Highway 93 between Sula and Lost Trail Pass. The 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 Trapper Peak pack uses the Bitterroot Mountains between Tin Cup Creek and Trapper Creek. The new Watchtower pack appears to use the drainages to the north of the Nez Perce Road in Montana, and probably adjacent areas in Idaho, but lack of a radio collar in the pack makes territory boundaries uncertain. 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. 2009).

Table 20 – Status of Known Wolf Packs on the Bitterroot National Forest as of 12/31/08

Pack Name	State	Known Adults	Known Pups	Known Total	Known Wolf Mortalities	Confirmed Depredations
Brooks Creek	MT	3	?	3	5	2 calves, 3 llamas
Divide Creek	MT	5	2	7		
East Fork Bitterroot	MT	3	0	3	1	
Hughes Creek	ID	2	5	7		
Indian Creek	ID	?	?	?		
Lake Como	MT	3	?	3		
Magruder	ID	?	?	?		
Painted Rocks	MT	5	4	9		
Selway	ID	?	?	?		
Sula	MT	?	?	5		
Trail Creek	MT	5	0	5	1	
Trapper Peak	MT	2	1	3		
Watchtower Creek	MT	2	?	2		
Welcome Creek	MT	3	3	6		
MINIMUM TOTALS		**33**	**15**	**53**	**7**	**5**

The territories of two other known Idaho packs (Owl Creek and Pettibone Creek) and one suspected Idaho pack (Roaring Lion) 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; and 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 FEIS 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 2008, 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. 2009. Rocky Mountain Wolf Recovery 2008 Annual Report. C.A. Sime and E.E. Bangs, eds. USFWS, Ecological Services, Helena, MT. Available online at: http://www.fws.gov/mountain-prairie/species/mammals/wolf/annualreports.htm

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: 2008.

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 FY2008.

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 1 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 3 new bald eagle territories in 2008, and new nests in two existing territories. There are now 17 known bald eagle nesting territories in the Bitterroot drainage. In 2008, 16 bald eagle nests were active in the spring. Eleven of these nests were successful, producing a total of at least 18 juvenile bald eagles (MFWP, 2008), for an average productivity of 1.125 fledglings per active nest. 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 and only 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 one young in 2008. Two nests in the Painted Rocks Lake territory (the second discovered in 2007) are on private land but are very close to the BNF boundary. The second Painted Rocks Lake nest fledged two juvenile eagles in 2008.

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 2008, there were about 490 identified bald eagle territories across Montana. 411 of these territories were monitored in 2008, and 344 of those were considered active. At least 247 of the active nests were successful, while 45 were unsuccessful and 52 had unknown outcomes. The nesting success rate for the 292 known fate active nests was 84.6%. The successful nests fledged a minimum of 428 young eagles, which gives a mean brood size of 1.73 fledglings per active nest. When extrapolated to the nests with unknown outcomes, this mean brood size results in an estimate of 503 eagles fledged from known active nests in Montana in 2008 (MFWP 2009). Comparing fledgling numbers between years may be difficult due to the variation in monitoring effort. However, the nesting success rate for known fate active nests and mean brood size should be comparable regardless of monitoring effort. The nesting success rate of known fate nests increased from 79.4% to 84.6% from 2007 to 2008, while the mean number of eaglets fledged per successful nest stayed about the same at 1.7.

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 dependent 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 however, 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), but 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:

The Avian Science Center at UM coordinated a four-year study of black-backed woodpecker occurrence within 17 fires that burned in 2003. These fires were scattered across western Montana, and included the Big Creek and Gold 1 fires on the BNF. The results confirmed that black-backed woodpeckers are more restricted to burned forest conditions than any other bird species for which there is sufficient data, at least in western Montana. Further, black-backed woodpeckers are relatively abundant only in high fire severity portions of burns. Intensive salvage harvest soon after a fire appears to have strong negative effects on black-backed woodpeckers, while light salvage appears to have little effect on the species. Finally, burned forests that were harvested fairly intensively (seed tree or shelterwood cuts) within a decade or two prior to the fires were much less suitable as postfire habitat for black-backed woodpeckers. Even forests that were harvested more selectively within a decade or two prior to fire were less likely to be occupied by black-backed woodpeckers. The species apparently prefers areas that were recently burned with high severity fire where snag densities are high (Hutto 2007).

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 BNF 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 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 may no longer be suitable, 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 Regionwide. 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.

WESTERN TOAD (aka BOREAL 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 western 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 western 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 western 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 western toads in 2008. 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 2008. The Gash Creek fire burned some areas upstream of Sweathouse 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:

The Forest participated in a Regional pilot study designed to determine fisher presence within 25 square mile grid cells in 2007 and 2008. The survey methodology is based on baited hair snares that are left in suitable fisher habitat for three weeks. Hairs collected from animals that attempt to reach the bait are then sent to the Genetics Lab at the Rocky Mountain Research Station facility on the University of Montana campus for identification. In 2008, this survey methodology identified fishers from two locations on the Forest, one in Trapper Creek and the other in Bear Creek. In 2007, one fisher was identified in the Burnt Fork drainage. A number of marten were also identified.

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 a 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). Fisher 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 2008, the Landbird Monitoring Program conducted a second round of surveys for flammulated owls in those Forests within Region 1 that support flammulated owl populations based on the 2005 surveys (see below). 24 transects were surveyed on the BNF, and many of them were surveyed twice. We detected flammulated owls on about 7.8% of the 245 calling points, on a total of 8 of the transects (Smucker et al. 2008). Most flammulated owl detections were on the southern half of the Forest, similar to the 2005 survey.

In 2005, the Landbird Monitoring Program initiated the first systematic Region-wide survey for flammulated owls. This survey 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 remained fairly consistent from 2000 to 2004, but seems to have declined somewhat since then. 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 2008 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/).

Regional surveys in 2005 and 2008 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 (Smucker et al. 2008, Cilimburg 2006). 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 1 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).

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 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 that protect riparian and aquatic habitats continue to provide appropriate protections for the northern leopard frog and its potential habitat if it still exists on the Forest.

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. There is no indication that the fires negatively affected peregrine occupancy or breeding success at these eyries. 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 2008 to determine productivity. They also inventoried a number of canyons that contain good habitat in an effort to find new eyries. We did not find any new eyries in 2008.

We currently know of 14 eyries in the Bitterroot drainage that have been active at least once since 1992. 11 of our eyries were occupied by peregrines in 2008, and produced at least 22 fledged peregrines. The number of fledged peregrines in 2008 set a new record for the Forest. We were unable to detect any fledglings at two of our eyries that had appeared active, although some may have been present. One former peregrine canyon was occupied by prairie falcons again in 2008. The BNF accounted for about 15% of the 74 known active territories and about 18% of the known production of 125 juvenile peregrines in Montana in 2008 (Sumner and Rodgers 2008). Peregrine productivity in Montana in 2008 was the second highest on record.

Table 21 summarizes known activity and productivity for each eyrie. The year in parenthesis following the territory name indicates when the territory was discovered.

Table 21 - 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
2008	Act, 2	Act, 4	Act, 1	Act, 4	Act, 2	Inact	Act, 3	Inact	Act, 2	Act, 0	Act, 2	PRFA	Act, 0	Act, 2

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 2007. 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 FWP biologist and a BNF biologist surveyed the same area for bats in August 2007, and detected a number of bat species. They did not detect any big-eared bats.

WOLVERINE

Wolverines are solitary animals that range extensively over a wide variety of habitats. Isolation from human presence and association with subalpine habitats characterize the general understanding of wolverine-habitat associations in the southern extent of the species' North American range (Copeland et al. 2007). Wolverine home ranges are very large, averaging approximately 150 square miles for females and 163 square miles for males in a study in northwest Montana (Hornocker and Hash 1981), and 142 square miles for females and 611 square miles for males in a study in central Idaho (Copeland 1996). 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.

Recent research indicates that wolverine distribution in the mountains of the western United States is closely tied to high-elevation areas containing alpine vegetation, alpine climatic conditions or relatively high probabilities of spring snow cover (Aubry et al. 2007). Copeland et al. (2007) found that wolverines in central Idaho favored high elevations throughout the year, and that the downward shift in elevation during the winter described by earlier investigators was relatively minor in their study area, and was restricted largely to males. They noted that carrion resulting from hunter wounding losses was an important forage resource for wolverines in the winter, but that wolverines utilized carrion found in mid-elevation forests and largely avoided big game winter ranges.

With few exceptions, known wolverine reproductive dens have been located in alpine, subalpine, taiga, or tundra habitats (Magoun and Copeland 1998 including extensive internal citations). In Idaho, wolverine dens occurred in snow-covered boulder talus in subalpine cirque basins located at high elevations, and consisted of long, complex snow tunnels leading under inaccessible boulder scree that provided a high degree of security (*Ibid*). A critical feature of wolverine denning habitat appears to be dependability of deep snow throughout the denning period (February through April). Almost all verified reproductive dens were under 1 to 5 meters of snow (*Ibid*). Female wolverines appear to be quite sensitive to human disturbance in the vicinity of natal and maternal dens, and may abandon dens and move their kits a considerable distance if they detect human presence in the area (Copeland 1996, Magoun and Copeland 1998). Outside of the denning season, wolverines do not appear to avoid people or roads and trails, and are sometimes found near trails and active campgrounds during summer (Copeland et al. 2007). They will also use unmaintained winter roads for travel (*Ibid*).

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 22 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 22 - Wolverine Sightings, Bitterroot National Forest

Year	District	Vicinity	# Wolverine	Observation Type
2006	Darby	Tamarack Lake	1	Sighting
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., K.S. McKelvey and J.P. Copeland. 2007. Distribution and broadscale habitat relations of the wolverine in the contiguous United States. Journal of Wildlife Management 71(7):2147-2158.

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.

Brewer, L.T., R. Bush, J.E. Canfield and A.R. Dohmen. 2007. Northern goshawk: Northern Region overview. [Unpublished report]. USDA Forest Service, Northern Region, Missoula, MT. 57 pp.

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 University

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 annotated 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.

Copeland, J. P. 1996. Biology of the wolverine in central Idaho. M.S. Thesis, University of Idaho. Moscow, ID. 152 pp. [0738]

Copeland, J.P., J.M. Peek, C.R. Groves, W.E. Melquist, K.S. MeKelvey, G.W. McDaniel, C.D. Long and C.W. Harris. 2007. Seasonal habitat associations of the wolverine in Central Idaho. Journal of Wildlife Management 71(7):2201-2212.

Dixon, R.D. and V.A. Saab. 2000. Black-backed 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 1, 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.

Hornocker, M. G., and H. S. Hash. 1981. Ecology of the wolverine in northwestern Montana. Canadian Journal of Zoology 59: 1286-1301. [0714]

Howie, R.R. 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.L. 2007. Understanding the influence of local and landscape conditions on the occurrence and abundance of black-backed woodpeckers in burned forest patches. Final Report – Joint Fire Science Program Project No. 04-2-1-106. University of Montana, Missoula, Montana. 17 pp. Available online at:
http://avianscience.dbs.umt.edu/projects/documents/finalreport2007_000.pdf

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.

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

Jones, J.L. 1991. Habitat use of fisher in north central 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

Magoun, A. J. and J. P. Copeland. 1998. Characteristics of wolverine reproductive den sites. Journal of Wildlife Management 62(4):1313-1320. [0724]

Maxell, B.A. 2004. Amphibian and aquatic reptile inventories conducted on and around the Bitterroot National Forest 2000-2003. Report to Region 1 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 and Rocky Mountain Forest and Range Experiment Station and Rocky Mountain Region GTR RM-253.

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

MFWP. 2009. 2008 Bald Eagle Nesting Season Summary. Unpublished report. Montana Dept. of Fish, Wildlife and Parks Region 2 Office. Missoula, Montana. 3 pp.

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 south central 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 vertebrates 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

Smucker, K., A. Cilimburg and M. Fylling. 2008. 2008 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

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, Wildlife 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: 2008.

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 2008, we have trapped and banded 3,464 birds, including 1,115 recently fledged young. We have had 2,088 recaptures, including multiple captures of some individuals. Since 1993 about 32 percent of the birds caught and banded have been young of the year. In 2008, about 19 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 68 species since 1993, including 32 species in 2008. The most common species captured at our two sites are common yellowthroat, Swainson's thrush, McGillivray's warbler, (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 144 raptors on this route in 2008, including 119 adults, 4 fledged immature birds and 21 nestlings that had not yet fledged. This is the highest number of raptors we've counted on this transect, and is well above the five-year average count (100 raptors).

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 1 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.

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).

In addition, in 2001 and again in 2003, crews from the Region 1 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 1, including 136 points in 29 stands on 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. Results indicated that many of our most common bird species, including several generalists that inhabit a wide range of forest types, are more abundant in, and possibly prefer old growth when it is available on the landscape. However, most of the birds that occur in old growth are also found in mature or younger forests, indicating that there is not a unique bird community restricted to old growth. The final report is available online at: http://avianscience.dbs.umt.edu/projects/documents/CompletedOldGrowthReport12_13.pdf.

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 152 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. More recently, both CBCs have documented the arrival and increase of populations of the Eurasian collared-dove, a Eurasian species that has rapidly colonized North America. These two CBCs are consistently within the top five CBCs in Montana in terms of bird species diversity. In FY 2008 the

Hamilton CBC tallied 6,931 individual birds and 73 species. The Stevensville CBC tallied 10,142 individual birds and 87 species.

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 again removed the northern goshawk from the Sensitive species list on July 17, 2007. Reviews of recent goshawk research (summarized in Samson 2005, Samson 2006, Brewer et al. 2007) 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 2008 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 17 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 15 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; nine 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 2008, 72 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 2008, 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. We did not discover any new goshawk nests in 208. Three previously known nests were active in the spring, but all three apparently failed. Still, we discovered three new goshawk nests, two of which were active. 2008 appeared to be a terrible year for goshawk productivity on the Forest. Three of the 48 known useable nests that we checked were active (6.25%), well below the Forest's average occupancy rate. All three active nests apparently failed, so average productivity was 0.0 young fledged per active nest, by far the worst productivity we've documented. 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. We assume that 2008 was a very poor year for prey, and that most goshawks did not attempt reproduction. An alternate explanation is that goshawks are using many nests that we have not discovered the past few years as our ability to survey territories has declined, and that we are simply failing to document reproduction that is actually occurring.

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, but we did not observe this in 2008. 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, red-tailed hawks using one goshawk nest and Cooper's hawks using two goshawk nests.

Table 23 summarizes the monitoring results for goshawks since 1998.

Table 23 – 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.
2008	0	3	0	All three active nests failed.

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

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.

Brewer, L.T., R. Bush, J.E. Canfield and A.R. Dohmen. 2007. Northern goshawk: Northern Region overview. [Unpublished report]. USDA Forest Service, Northern Region, Missoula, MT. 57 pp.

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]

Kowalski, S. 2006. Frequency of northern goshawk presence in the Northern Region: 2005 survey. Unpublished report. USDA Forest Service, Northern Region, Missoula, MT. 14 pp.

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

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: 2008

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 2008 (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.

Aquatic Monitoring of Carbaryl Application near Bass Creek (Charles Waters Campground; Stevensville Ranger District). Stoneflies have been reported to be particularly susceptible to carbaryl, an insecticide used at Charles Waters Campground as a short-term preventative measure against beetle attacks on large pine trees. The presence and density of stoneflies nymphs in Bass Creek was monitored to detect effects to aquatic invertebrates from spraying carbaryl on nearby pine trees. Stoneflies in Bass Creek were considered an indicator of potential effects to trout and other aquatic species. Two approaches were used: a before and after treatment approach, and a control versus treatment approach. Spraying did not appear to affect stoneflies numbers in the areas sampled.

During project planning, the expectation was that measurable quantities of the sprayed insecticide would be unlikely to drift beyond a few meters of the tree (based on an unpublished review of Haverty et al., 1983, and other articles). A 75-foot (22.9 m) distance between treatment (spraying) and stream was expected to keep the insecticide out of water. No-spray zones of 75 ft appear sufficient to protect the most sensitive aquatic insects (Fettig, et al. 2008). Because of the convenience of using the campground road as the near-steam project boundary, and because the stream was at low flow (not accessing its floodplain) the closest sprayed tree was 130 feet from Bass creek.

Indian Trees Campground (Sula Ranger District). Forest fisheries biologists monitored the Indian Trees campground during summer 2008. The purpose of the monitoring was to see if fish passage continued to be blocked in the four culverts under the campground loop road. An unnamed tributary to the West Fork of Camp Creek (the unnamed tributary is referred informally as "Indian Trees Creek") flows through the campground in two channels. The culverts were installed in 2001 when the loop road was paved and the campground was upgraded.

At the time of installation, the two channels of Indian Trees Creek carried roughly an equal amount of water. Since then, the north channel has become nearly dry at base flows, while the south channel transports all of the water. There was no change in the fish passage situation in 2008. All four culverts continued to be fish barriers, with the principle reason being that they were all undersized at installation. A large amount of gravel bedload passed through the two culverts on the south channel during high flows in May 2008; however, the bedload did not accumulate in the culvert barrels or otherwise improve the fish passage situation. The culverts are a low priority for replacement because of the small size of Indian Trees Creek and the small amount of suitable fish habitat that occurs upstream of the campground. A small population of westslope cutthroat trout is isolated in a 0.4 mile long segment of Indian Trees Creek upstream of the campground.

Spring Gulch Campground (Sula Ranger District). The Spring Gulch campground flooded in the latter part of May 2008 when runoff flows in the East Fork Bitterroot River exceeded flood stage for several days. Flood stage at the USGS Darby gage on the Bitterroot River is 7.5 feet; peak flows in 2008 reached 8.1 feet on May 20th, and remained above flood stage until May 22nd. The 2008 flood had a recurrence interval of about nine years. The flooding at the campground commenced on May 19th, and by May 20th, most of the campground was covered by more than six inches of water. The campground remained submerged for the next couple of weeks as the floodwaters gradually receded. The flood shifted the alignment of the large ponderosa pine in the East Fork at the upstream end of the campground. The tree was pushed downstream a short distance, and pivoted so that it was less perpendicular to the current. This change in alignment forced scouring flows around the east side of the rootball, which rapidly washed away a 40-foot section of Road 5727. On May 20th and 21st, the Forest road crew armored the eroded river bank with rip-rap, and constructed a temporary detour around the site by excavating a new road into the toe of the slope. Section 7 Endangered Species Act bull trout consultation for the emergency repair work was covered under the 2008 Biological Opinion of the Effects to Bull Trout and Bull Trout Critical Habitat from Road Management Activities on National Forest System and Bureau of Land Management Lands in Western Montana. The Opinion allows emergency road repairs to occur without having to conduct an individual consultation as long as certain protective mitigation measures are implemented during the repair work. In the case of the Road 5727 repair, the work was monitored by Forest fisheries biologists, and the mitigation measures were properly implemented.

Figure 3 – Washout of Road 5727 during high flows. May 20, 2008.

Figure 4 – Completed repair of Road 5727 washout site. September 2008**.**

Figure 5 - Flooding in the Spring Gulch Campground. May 20, 2008

Piquett Trailhead Rehabilitation Project (West Fork Ranger District). In 2007, a user-created road was obliterated in the Riparian Habitat Conservation Area (RHCA) at the Piquett Creek trailhead, and 16 large, beetle-killed fir trees were felled into the Piquett Creek and Britts Creek stream channels to increase woody hiding cover for bull trout and westslope cutthroat trout. The trailhead area was burned at mixed severity in August, 2007 (Rombo Fire). Forest fisheries biologists monitored the Piquett Trailhead Rehabilitation project during summer, 2008. The project was successfully achieving its objectives. Vehicles did not attempt to drive into the RHCA, and vegetation was satisfactorily growing on the obliterated user-created road. The large wood in Piquett and Britts creek was forming pools and creating complex hiding cover for fish.

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 2008. 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 2008, 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.

Lookout Creek Trail Bridge Replacement (West Fork Ranger District). In August 2008, Forest and Montana Conservation Corps (MCC) crews replaced the Whitecap Creek Trail #24 bridge over Lookout Creek. Lookout Creek is a major tributary to lower Whitecap Creek, which is tributary to the Selway River. Forest fisheries biologists monitored the replacement to ensure that the mitigation measures in the Section 7 bull trout and steelhead consultation were implemented. Monitoring indicated that all of the mitigation measures were implemented except for a couple of them dealing with using straw waddles and applying straw mulch on disturbed areas near the stream. Straw waddles and mulch were not needed at the work site because there was not much soil disturbance. Two dead cedar snags were cut to build the new bridge (the consultation analyzed the cutting of five snags). The two snags were cut closer to the stream (50 and 75 feet away) than the consultation analyzed (> 150 feet); however, the snags were carefully selected from a part of the RHCA where their removal would have a negligible impact on shade, and would be incapable of being recruited to the stream channel if they fell over. As a result, their removal had a negligible impact on shade and woody debris recruitment, which was consistent with the consultation effects. Sediment input caused by the project was indistinguishable, as were the areas where substrate was borrowed for the gabion baskets. The determination of effect for bull trout and steelhead was “not likely to adversely affect”. The effects of the bridge replacement were consistent with that determination.

Figure 6 - The new trail bridge over Lookout Creek, looking upstream. October, 2008

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, cut into firewood, or removed.
- 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 spring and autumn 2008, Forest fisheries biologists monitored the Kit Carson outfitter camp that is located in the RHCA along Deep Creek. The purpose of the monitoring was to ensure that the mitigation measures specified in a 2007 Section 7 Endangered Species Act consultation were properly applied. The key mitigation required the outfitter to fence off a small area in Deep Creek where stock access water. The fencing was properly implemented in 2008.

Angling by Selway River Float Outfitters (West Fork Ranger District). In 2008, 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 third 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, 2007, and 2008 angler surveys are compared in Figures 7-9.

Figure 7. - Percent of Trips Returning Their Data Sheets

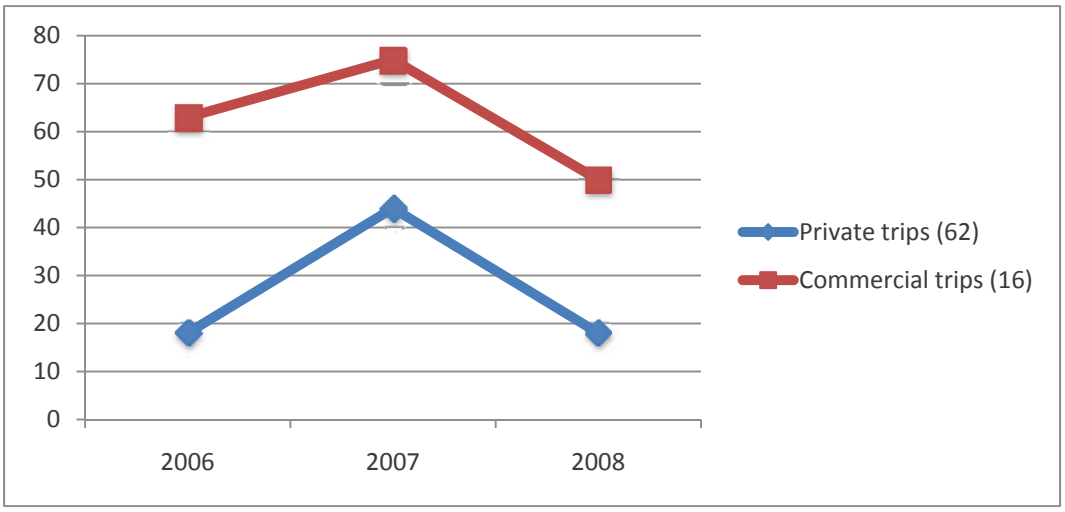


Figure 7 displays the percent of trips (commercial or private) that returned their data sheets. The results indicate that commercial trips returned a higher percentage of their data sheets than private trips in all three years. In 2008, high water caused an unusually large number of trip cancellations (24 private and 2 commercial). With high water, fewer trips fished, and it is suspected that many private trips that did not fish also did not bother to turn in their data sheets.

Figure 8. **-** Percent of Trips That Reported Fishing

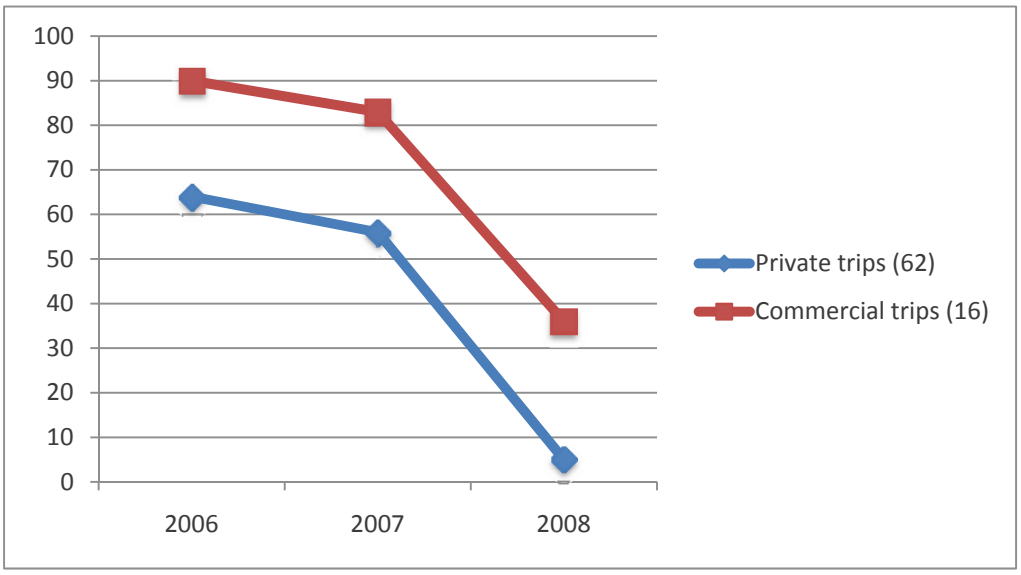


Figure 8 displays the percent of trips (commercial or private) that reported fishing. Trips that did not return their data sheets are assumed to have not fished, which may or may not be true. Commercial trips were more likely to fish than private trips in all years. Assuming an average of 11 people per private trip and 15 people per commercial trip, 2% (9 of 418) of the people on private trips, and 9% (18 of 210) of the people on commercial trips

fished in 2008. In 2007, a very low water year, the percentage of floaters who fished was higher (16% on private trips and 22% on commercial trips). In all years, the vast majority of the fishing occurred on the main stem Selway River, with minimal fishing in the tributaries. When tributary fishing occurred, it was usually associated with a commercial trip, and almost always occurred in the lower reaches of Moose or Bear creeks.

Figure 9. - Angler Hours

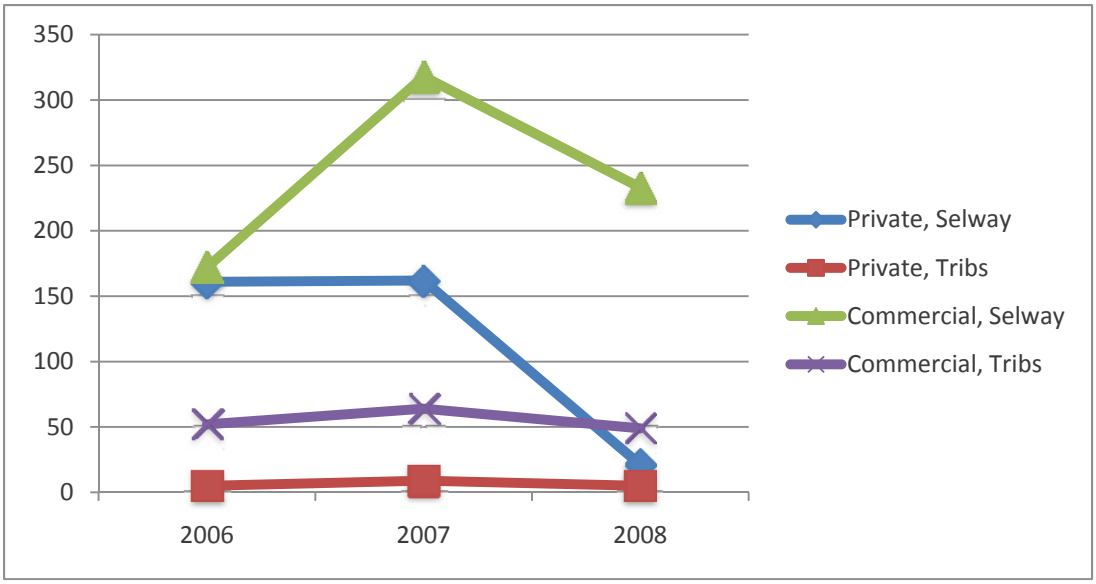


Figure 9 displays the total number of hours fished per season by type of trip (commercial or private) and water body (Selway River or tributaries). Commercial trips fished more than private trips in all years, especially in the tributaries of Moose and Bear creeks. Less fishing effort occurred on the Selway River in 2008 due to the high water, while tributary fishing effort in 2008 was similar to 2006 and 2007. The greater fishing effort by commercial trips in the tributaries of Moose and Bear creeks can be attributed to popular camping locations near the mouths of those streams, and the allocation of camp chores. Commercial trips provide employees to do the camp chores, thus giving customers more free time to fish near their camps.

Figure 10. - Number of Trout Caught

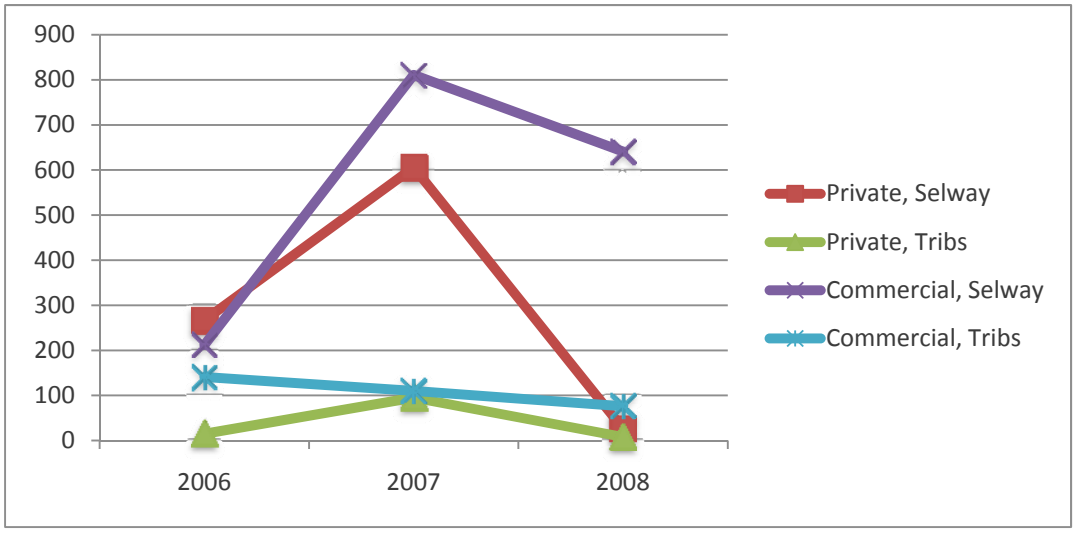


Figure 10 displays the total number of trout caught per season by type of trip (commercial or private) and water body (Selway River or tributaries). Commercial trips usually caught more trout than private trips, with the type of water year having a strong influence on the number of trout caught. The average annual number of trout caught in the Selway River during the 2006-08 float seasons was 854 (range 479-1417). In the tributaries, the average annual number of trout caught was 148 (range 84-205). The number of trout caught in the low water year of 2007 was roughly three times the number caught in the high water year of 2008. A few trips that fished intensively usually accounted for a high percentage of the total number of trout caught in that year.

The data sheet did not ask anglers to identify trout species, so unfortunately, information on species caught and sizes is lacking. We know that at least one bull trout was caught in 2007 when a private trip reported catching and releasing a 14-inch bull trout from the Selway River. Based on the mix of trout species that occur in the Selway River and its tributaries, the majority of the trout that were caught in 2006-08 were probably westslope cutthroat trout, juvenile steelhead or resident rainbow trout. However, because many anglers are unfamiliar with bull trout and cannot correctly identify them, we cannot rule out the possibility that other bull trout were caught and released. No fish were reportedly harvested in the Selway River or the tributaries by floaters in 2006-08.

Figure 11 - Number of Trout Caught Per Angler Hour

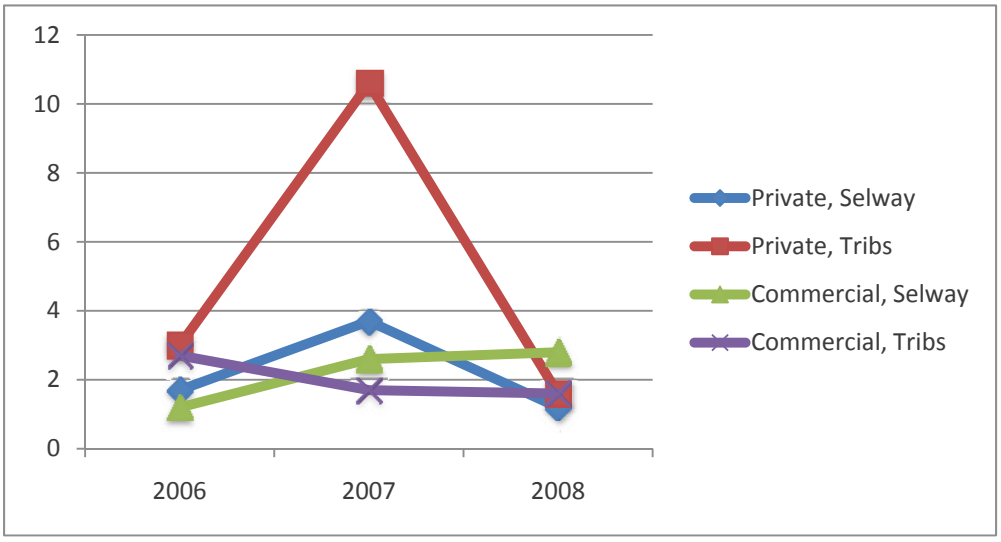


Figure 11 displays the number of trout caught per angler hour by type of trip (commercial or private) and water body (Selway River or tributaries). Regardless of water body or trip type, the catch per unit effort typically ranged between 1.5 to 3.5 trout caught per hour. The high catch per unit effort by private trips in the tributaries in 2007 was skewed by a trip of experienced anglers that fished intensively.

IDFG and the Bitterroot National Forest will repeat the float angler survey in 2009. IDFG has modified the data sheet for 2009 to provide more detailed information on species caught, sizes and locations. So far, the data collected in the 2006-08 float angler surveys has validated the Endangered Species Act effects determinations that were made by the Forest in 2000. In the 2000 Upper Selway Subbasin Biological Assessment, the Forest concluded that the Selway River float program was "not likely to adversely affect" threatened bull trout and steelhead populations and their habitat. The data collected so far has been consistent with those determinations.

Fire Management

Coffee Face Prescribed Burn (Darby Ranger District). The project is located on the north side of the Skalkaho highway from Brennan Gulch to the mouth of Daly Cr. Review was conducted on May 15 after the aerial ignition and during the hand ignition phase May 16 and 17, 2008. Very little of the project area has any potential to reach surface water. A few locations where it might have, such as springs and incised draws, were specifically reviewed. The Fisheries Biological Evaluation (BE) and Justification for use of Existing Programmatic Biological Assessments (BA) stated that "The treatments are planned for implementation in the spring when snow banks,

ridge lines, roads, cool/moist aspects, and drainage bottoms will be used as anchors and holding points for the burns. Fire line construction will be avoided if possible, but may be needed at some locations. Fuels will not be lit in riparian wetlands but fire would be allowed to back into them." These techniques were used and appeared to be effective at controlling burn extent and intensity in and near riparian areas. The majority of the area burned experienced low intensity fire. Very little fire-line was constructed; all of it was built by hand and was not located in riparian areas. Spring growth of vegetation occurred prior to intense rains, so the potential for erosion was negligible.

Rombo Wildfire (Sula and West Fork Ranger Districts). Forest fisheries biologists monitored post-fire riparian and stream channel conditions in the Piquett Creek watershed on numerous occasions in summer 2008 (post-fire year one). To the best of our knowledge, mudslides/debris torrents did not occur in 2008. The most vulnerable storm probably occurred on August 2, 2008. On that day, a large thunderstorm dropped a considerable amount of rain in a short period of time on the headwaters of Britts Creek, an area that was mostly burned at moderate-to-high severity. The storm quickly raised the water level in Britts Creek by 3-4 inches and caused very turbid "black water" to flow down the stream for about a day and a half. However, the stream channel did not blow out. When the water receded, fine black ash and silt was deposited in many places along stream banks and within the bankfull stream channel. That event did not noticeably color the water in lower Piquett Creek or the West Fork Bitterroot River. The effects of the Rombo Fire that were observed in 2008 were natural.

Mushroom picking (both commercial and personal use) occurred in the Rombo Fire area in summer 2008. Pickers accessed the fire at several places, with the most popular access points being the Piquett Creek trail, the Little Boulder Creek trail, the Warm Springs Creek trail, the Shook Mountain trail and some limited road access in the Slate and Rombo Creek watersheds. The vast majority of the burned area was only accessible by foot, which really limited the number of pickers and their impact on resources. Forest fisheries biologists monitored the mushroom picking that occurred via the Piquett, Little Boulder and Warm Springs Creek trails. With the exception of footprints in the ash and some logs that were cut out of the trails by pickers, there was no noticeable impact on riparian resources or the fishery. The vast majority of pickers did not camp overnight and there was no significant increase in dispersed campsite use in areas near the fire.

Forest fisheries biologists also monitored several of the rehabilitated dozer lines, hand lines and safety zones during summer 2008. These areas were not contributing sediment to streams, and erosion, if present, was not seen leaving the disturbed areas and moving towards streams. Grass cover was satisfactorily returning to the rehabilitated areas.

Facilities Management

Fish Screen at the Long Conner A Ditch (Darby Ranger District). The headgate and a short section of flume and ditch of the upper Long Conner Ditch at Chaffin Creek washed away in a flood in early November 2006. During the flood the stream at the point of diversion down-cut about eight feet and that made the diversion unusable without considerable alteration. The ditch owners proposed and the Forest authorized the POD to be moved upstream to get water into the ditch.

The owners of the ditch (a private party) agreed to install a fish screen to benefit the fisheries resource and expedite the consultation process with the USFWS. Field visits late in 2008 by forest personnel have noted that the fish screen to be placed in the *Long Conner A Ditch* has not been installed. The operating plan states: "A USFWS approved fish screen will be installed in the *Long Conner A Ditch* as soon as data gathering, materials availability, and weather conditions make installation of the fish screen possible, and not later than the termination date of August 1, 2008." The ditch has been operational for over a year. The fish screen was an integral piece of the project because of its benefit to the conservation of native fish in Chaffin Creek and needs to be completed and maintained. Bull trout continue to be present in Chaffin Creek near the point of diversion. Discussions between the FS and ditch owners are ongoing.

Other aspects of the ditch reconstruction project appear to have impacts to the stream near the amounts predicted in the project analysis. Sediment in the stream, from ditch and adjacent road reconstruction, has not been noticeable beyond the immediate period of construction. A primary reason for this is that the ditch, which is between the road and the stream, intercepts much of the run-off from disturbed sites. Large trees that were cut for reconstruction were left in the stream, as recommended, and provide habitat complexity.

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. These ditches were a concern to Forest fisheries biologists because they were unscreened and had the potential to entrain bull trout. 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 four 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 stream flow data that was collected was used to file a Forest Service instream flow claim in Chicken Creek for approximately four cfs. The claim does 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 fish-passable boulder weir structures. The rock diversion was replaced because it was impassable to fish at low flows. Monitoring of the boulder weir structures in 2008 indicates that they are functioning properly. The structures appear to be maintaining fish passage at all flows. In October 2008, a Forest Service fisheries research crew captured a 16-inch long adult bull trout about three miles upstream of the Hawkes diversion. That bull trout was a migratory fish from either the West Fork Bitterroot River or Painted Rocks Dam. It swam over the three boulder weir structures as it made its spawning migration into upper Chicken Creek.

Figure 12 - Hawkes diversion – upper boulder weir, just downstream of the Trollope-Hawkes irrigation ditch headgate. October 2008

Figure 13 - Hawkes diversion – middle boulder weir. October 2008

Figure 14 - Hawkes diversion – lower boulder weir. October 2008

A fish screen was installed on the Hawkes ditch in October, 2008. The screen is a passive design with ¼ inch diameter mesh. A screen with 1/8th inch mesh was tested, but deemed infeasible because it clogged too easily. The ¼ inch mesh screen meets the standards of the Biological Opinion.

Figure 15 - Fish screen installed on the headgate of the Trollope-Hawkes irrigation ditch. October 2008

The only action left to accomplish in TC2 is to install a fish screen on the Litchford ditch. At this time, it is unclear if the owner of the Litchford ditch is still interested in screening the ditch and obtained a Ditch Bill Easement. The ranch land irrigated by the Litchford ditch was subdivided in 2007.

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 Hawkes ditch was only recently screened (October, 2008), and the Litchford ditch has yet to be screened, so it is still too early to 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 (2006, 2007 and 2008) of that commitment. No bull trout have been found in the ditches in any years. The ditches were previously electro fished in 1999 and 2005. Table 24 and

Table 25 summarize the species, numbers, and sizes of fish captured in the Litchford and Hawkes ditches during the electro fishing surveys.

Table 24. **Litchford Ditch**

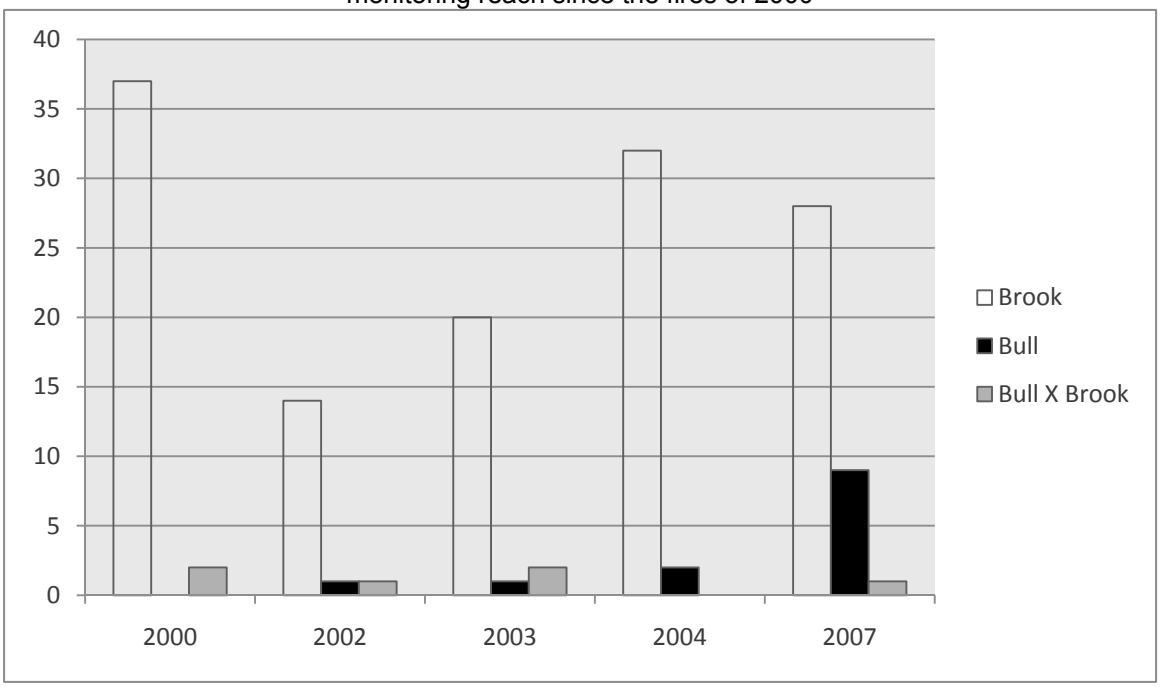
Date of survey	Length of survey	Fish species found	# of fish	Size range
August 23, 1999	20 m	Westslope cutthroat Brook trout	4 1	1-4” 4-5”
July 19 2005	100 m	Westslope cutthroat Brook trout	3 1	3-6” 1-2”
June 28 2006	100 m	Westslope cutthroat	7	2-5”
August 2 2007	100 m	Westslope cutthroat Brook trout	6 10	1-3” 1-3”
July 23 2008	100 m	Westslope cutthroat Brook trout Longnose sucker	9 2 2	3-5” 1-9” 4-5”

Table 25. 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”
July 23 2008	100 m	Westslope cutthroat Brook trout Longnose sucker	2 1 1	3-4” 2-3” 4-5”

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 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 16 - 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 three years (2006, 2007 and 2008) 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 26 summarizes the results of the redd surveys.

Table 26 - 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 *
October 3, 2008	0.7 miles	3	18 *

** = 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 two 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 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 throughout the 2007 and 2008 irrigation seasons, and with daily cleaning, functioned reasonably effectively. Forest fisheries biologists monitored the Twogood ditch screen on 11 different occasions during the 2008 irrigation season, which started on July 1st and ended on September 18th. The screen was maintained in good working condition during the 2008 irrigation season. There was more water in the East Fork during the 2008 irrigation season, and the summer was cooler and wetter as compared to 2007. As a result, the Twogood ditch was operated for fewer days in 2008 (80 days) than it was in 2007 (122 days).

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. In 2008, the ditch was electro fished on August 7 2008 and September 23 2008. No fish were found in the ditch in the August 7th survey. The headgate was closed for the season on September 18th, which caused the remaining water in the ditch to collect in several isolated, shallow pools. On September 23rd, 54 young-of-the-year westslope cutthroat trout (1 to 1.5 inches) and two juvenile westslope cutthroat trout (3 to 4-inches were rescued from an isolated pool of water directly below the headgate. The young-of-the-year fish probably got into the ditch by squeezing through the 0.25" mesh or slipping around the outsides of the screen sometime after the August 7th electro fishing survey. They were small enough to slip through the mesh or around the edges of the screen. The two juvenile cutthroat trout could have been present in the ditch during the August 7th electro fishing survey, but downstream of the sampling reach (i.e. we do not sample the entire ditch). In 2008, we found that the ¼ inch screen was effective in reducing the number of juvenile fish trapped in the ditch, but not young-of-the-year.

Table 27 summarizes the species, numbers and sizes of fish captured in the Twogood ditch during the electro fishing surveys

Table 27 - 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”
August 7, 2008	100 m	No fish found	0	
September 23, 2008	100 m	Westslope cutthroat	2 54	3-4” 1-1.5”

The lesson we have learned from our monitoring is that the 1/8th inch mesh screen will not work at this location due to clogging, but the ¼ inch mesh screen works reasonably well 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. This prediction has held true for the juvenile fish, but not for the young-of-the-year fish, which are small enough to slip through the ¼ inch mesh or around the edges of the screen. The number of juvenile fish entrained in the ditch was very low in both 2007 (1) and 2008 (2). In 2008, 54 young-of-the-year cutthroat trout were entrained in the ditch following closure of the headgate. Bull trout have yet to be seen or found in the ditch. We have also not found any fish pinned against the screen. Flows against the screen appear to be slow enough that impingement is not a significant risk.

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 TC3 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 and 2008 irrigation seasons, 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 six irrigation ditches. Bull trout are probably present in more ditches, but their densities are so low that their presence is difficult to detect.
    - ✓ Sopher ditch in lower Hughes Creek,
    - ✓ Two ditches that exit lower Nelson Creek,
    - ✓ Two ditches that exit lower Lost Horse Creek, and
    - ✓ Bass ditch of Bass Creek.
- Fish screens are expensive and high maintenance. 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 and 2008 suggests that on small ditches, passive screens can be effective, but they do require regular cleaning (e.g. daily on the Twogood ditch; weekly on the Ward Creek ditch).

Grazing

There are seven 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 seven 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)
7. Coal Creek jack-leg drift fence, constructed in 2007 (Coal Creek grazing allotment)

Each of these fences was monitored in 2008. The results are discussed in the following paragraphs.

Meadow Creek Exclosure Fence (Sula Ranger District). The Meadow Creek exclosure fence was 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 that total about 3850 linear feet of stream bank protection (roughly 1750 feet long + 1200 feet long + 900 feet long). The three exclosures are separated by two hardened cattle fords. 2008 was the 12th consecutive year that the exclosures were operational. 2008 was a successful season. No cows got inside the fences, and fisheries objectives were met. Since its construction in 1996, the Meadow Creek exclosure fence has been very effective. The riparian vegetation and stream banks inside the exclosures have recovered to near reference conditions.

Figure 17 - Conditions along Meadow Creek, prior to livestock exclosure. October 2004.

Figure 18 – Same spot, four years after livestock exclusion. October 2008**.**

Waugh Creek Exclosure Fence (Sula Ranger District). The Waugh Creek exclosure fence was 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. 2008 was the 10th consecutive year that the Waugh Creek exclosure fence was operational. The Waugh Gulch pasture did not receive scheduled grazing in 2008, and no cows got inside the exclosure fence. Trespass grazing, which has been a problem in past years, did not occur in 2008. The Waugh Creek stream channel inside the exclosure fence has narrowed and healed since 1998, which has produced much better fish habitat than what was present prior to fencing. In 2008, fisheries objectives were met inside the Waugh Creek exclosure fence.

Bugle Creek Exclosure Fence (Sula Ranger District). The Bugle Creek exclosure fence was constructed in 2000 as part of a fisheries improvement project. 2008 was the 8th consecutive year that the exclosure fence was

operational. The exclosure fence functioned effectively in 2008. No cows got inside the fence. The riparian vegetation and stream banks inside the fence have shown excellent recovery since 2000. The stream channel has narrowed and healed, and the willow seedlings that were planted along the stream banks in 2000 and 2001 are growing well. The fence has not shifted livestock 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 2008, 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. 2008 was the 8th consecutive year that the exclosure fence was operational. In June 2008, the Forest's south zone fisheries crew dismantled the dilapidated 1959 historic exclosure portion of the Reimel Creek exclosure fence, and replaced it with a 4-strand barbed wire fence that matches the rest of the exclosure. The project was funded by the Montana Fish, Wildlife and Park's Sikes program. The 1959 historic exclosure was burned in 2000, and had been falling down for years. It was a weak point that livestock often used to get inside the Reimel Creek riparian area. The new fence has eliminated that point of trespass.

The 2008 grazing season started out poorly, but improved as the season progressed. In July 2008, the permittee let cows onto the allotment, but did not fix all of the holes in the exclosure fence prior to letting them on. As a result, trespass cows were found along Reimel Creek on several occasions in July 2008. The District Ranger spoke to the permittee about the need to fix the fence and in late July 2008 the permittee hired a person to make the repairs. From that point on, riparian conditions improved.

End-of-season riparian conditions inside the Reimel Creek exclosure fence were inconclusive. In the upper third of the exclosure between Diggins and Wallace creeks, there was considerable trespass during the first half of the grazing season (before the fences got put up). End-of-season conditions in the upper meadow near Wallace Creek were poor and even slightly worse than 2007, which was a poor year throughout the exclosure.

Figure 19 - End-of-season conditions in the upper meadow below Wallace Creek. October 2007.

Figure 20 – End-of-season conditions in the upper meadow below Wallace Creek. October 2008.

In the middle third of the exclosure between Diggins Creek and the end of Road 73345, there was minimal livestock trespass, and riparian conditions were intact and essentially ungrazed. The lower meadow just upstream of the Road 727 crossing of Reimel Creek was ungrazed and in much better condition than at the end of the 2007 grazing season.

Figure 21 - End-of-season conditions in the lower meadow near the Road 727 crossing of Reimel Creek. October 2007.

Figure 22 – End-of-season conditions in the lower meadow near the Road 727 crossing of Reimel Creek. October 2008.

In the lower third of the exclosure between the Forest boundary and the end of Road 73345, trespass was light and incidental and riparian conditions were good. Overall, fisheries objectives were met in 2008 throughout most of the Reimel Creek exclosure – the exception being the upper third of the exclosure between Diggins and Wallace creeks.

The Reimel Creek exclosure fence has had mixed success since it was constructed in 2001. There have been good years with minimal livestock trespass (e.g. 2001 2002 2004, and 2006), and poor years with widespread riparian impacts (2003 2005, and 2007). 2008 was more like the good years than the poor years. Riparian conditions along Reimel Creek have substantially improved since the fence was constructed. The stream channel has narrowed, and numerous willow and alder shrubs have colonized the stream banks. 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. Most of the burned snags that were felled into Reimel Creek in May 2003 (BAR project) are providing decent hiding cover. 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. The Reimel Creek exclosure fence is the cornerstone that holds all of these riparian habitat improvements together.

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. 2008 was the 9th 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 2008, the goals were partially met. The fence was successful in keeping stock off of the stream banks, as it has in all years since construction. However, the restoration of the ponderosa pine/hawthorn riparian community on the stream banks 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 ponderosa pine survived. That pine is now about two feet tall. In another attempt to re-establish pine on the site, 67 ponderosa pine seedlings were planted inside the drift fence in May 2007. Only four of those pines were still alive in October 2008. The rest were killed by drought. 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 2008, 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. Another attempt will be made to plant hawthorn shrubs in autumn 2009. This time, five gallon containers will be planted instead of seedlings.

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. 2008 was the 4th consecutive year that the fence was operational. The fence was successful in 2008. There was essentially no sign of cows inside the drift fence, and riparian conditions inside the fence were intact. In 2008, fisheries objectives were met inside the fence.

Coal Creek Jack-Leg Drift Fence (West Fork Ranger District). In 2007, an 1100-foot long, post and rail jack-leg drift fence was constructed along the north side of Coal Creek. The purpose of the fence is to protect westslope cutthroat trout spawning habitat from livestock bank trampling. 2008 was the 2nd year that the Coal Creek drift fence was operational. The fence functioned effectively in 2008. There were no definitive signs of livestock presence inside the fence, and very little sign outside the fence. Grazing impacts, if they occurred at all, were negligible and probably caused by incidental wildlife use. The riparian vegetation and stream banks inside the drift fence looked good. In 2008, fisheries objectives were met inside the Coal Creek exclosure fence.

Meadow Tolan Grazing Allotment (Sula Ranger District). In October 2008, 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 10th consecutive year of post-grazing season monitoring (1999-2008). Results and trends are discussed in Item 17, Watershed Baseline Monitoring.

On August 22, 2008, Forest fisheries biologists initiated a bull trout redd trampling study in a two-mile long section of Meadow Creek where bull trout are known to spawn and rear. About half of the two mile section is accessible to livestock grazing from the Meadow Tolan grazing allotment; the other half is protected by riparian exclosure fences. The biologists built 40 artificial bull trout redds in the two-mile long section of Meadow Creek using clay pigeons. Each "redd" consisted of four clay pigeons placed in a square alignment (see photo), and then covered with gravel. The redds were built in habitats where bull trout were likely to spawn, such as the gravel tailouts of pools. The artificial redds were allowed to remain in the stream bottom of Meadow Creek from August 22nd until October 17th, which roughly correlates to the bull trout spawning period.

Figure 23 - Artificial redd placed in Meadow Creek, before covering the clay pigeons with gravel. August, 2008

Twenty of the redds were placed inside of livestock exclosure fences, and 20 were placed outside of livestock exclosure fences. The purpose of this study was to estimate and compare the amount of trampling of bull trout redds that occurs outside of the exclosure fences (presumably by livestock) and inside the exclosure fences (presumably by big game). A redd was considered to be trampled if at least one of its clay pigeons was broken.

The artificial redds were measured and removed from the stream bottom on October 17, 2008. Only a few of the redds had been stepped on, and we saw no differences inside and outside the exclosure fences. Inside of the exclosure fences, two of the 20 redds (10%) contained clay pigeons that had been stepped on and broken. One

redd looked like it may have been stepped on by big game (possibly moose), the other by anglers or big game. Outside of the exclosure fences, the same percentage of redds (2 of 20, or 10%) contained clay pigeons that had been stepped on and broken. Livestock appeared to be the cause. This data provides with some baseline estimates of trampling levels, since we had no previous data. The study can be replicated in future grazing seasons to track tends. In should be noted that 2008 was probably the lightest grazing season that has occurred in the past decade. Therefore, the 2008 redd trampling results must be viewed in that context.

Waugh Gulch Grazing Allotment (Sula Ranger District). This allotment was rested in 2008, so there were no livestock in the area. Forest fisheries biologists used this opportunity to conduct a redd trampling study using clay pigeons in the West Fork of Camp Creek. The purpose of the study was to estimate of the amount of trampling of westslope cutthroat trout redds that occurs by big game in the West Fork of Camp Creek. The methods were the same as those described above for Meadow Creek, but the dates that the clay pigeons were deployed were different because the species of interest was the westslope cutthroat trout, which spawn in late May or June and emerge from the gravels in early August.

When the allotment is active, livestock graze the West Fork of Camp Creek pasture during the month of July. Westslope cutthroat trout redds are also present in the West Fork at that time, so there is potential for livestock to trample the redds. In this study, 20 artificial redds were built in the West Fork of Camp Creek on June 30, 2008. Ten of the redds were built between the Forest boundary and the Road 729 crossing; the other ten were built between the Road 729 crossing and the switchback where Road 8112 climbs out of the stream bottom. The redds were allowed to remain in the stream bottom from June 30th to July 30th, which approximates the time period that westslope cutthroat trout eggs incubate in the gravel, hatch into sac-fry, and the fry emerge from the gravel.

The artificial redds were measured and removed from the stream bottom on July 30, 2008. Three of the 20 redds (or 15%) had been stepped on by big game, which was a slightly higher percentage than we observed inside of the Meadow Creek exclosure fences. This data gives us an estimate of baseline "wildlife" trampling levels that can be compared to years when livestock use the allotment. Forest fisheries biologists plan on replicating this study again in 2009 when livestock are grazing the allotment.

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; one other 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.
- There is potential for livestock to trample bull trout redds in Meadow Creek (Meadow Tolan grazing allotment) and westslope cutthroat trout redds in the West Fork of Camp Creek (Waugh Gulch grazing allotment). Based on the results of the clay pigeon monitoring that we conducted in 2008, the percentage of redds trampled may be relatively low.

Weed Management

Forest fisheries biologists did not monitor weed management projects in 2008.

Timber Management

In 2008, Forest fisheries biologists monitored the following timber:

- Gash Salvage (ongoing)

- Spring Mink (completed in 2008, part of the Middle East Fork project)
- Kerlee Bert (ongoing, part of the Middle East Fork project)
- Lil' Lyman (completed in 2008)
- Painted Rocks West (completed in 2008)
- Burned Area Recovery (salvage portion completed in 2007, watershed portion ongoing)

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.

Gash Salvage Sale (Stevensville Ranger District). Forest fisheries biologists monitored the timber sale on March 9, April 16 and May 9, and twice in August 2008. The spring trips focused on road conditions, as spring break-up was occurring, and previous monitoring has shown that erosion from roads can be especially troublesome in the spring. The May 9th and August reviews included measuring widths of some of established RHCAs.

Our monitoring findings indicate:

Although intensive soil disturbance was observed along a primaryl yarding corridor within Unit 1 (disturbance was similar in size and intensity to a temporary road), there were no points where harvest-related fine sediments were observed traveling overland beyond the unit boundaries toward streams.

The width of the RHCA along the north boundary of Unit 2, that parallels a perennial non-fish-bearing stream (trib. of Gash Cr) for a distance of approximately 2100 ft, was designed to have a width of 150 ft. Eight width measurements were taken. Widths varied from much greater than 150 ft (at the east end of the RHCA to 132 ft (about 400 ft from the west end of the RHCA). It was estimated that the RHCA was too small (<150 ft) for a distance of about 200 ft. The number of trees that were cut within the 150 ft of the stream was not tallied, but the number is expected to small (less than 10). The amount of shade or large wood (the positive attributes of an RHCA) lost by the harvest of those dead trees, over a distance of 200 linear feet, is expected to be negligible. The RHCA width around Prince Gulch spring along Unit 2 was 120 ft, which exceeded the design width of 100 ft.

Although soil disturbance was observed in Unit 2 along skid trails, there were no points where harvest-related fine sediments traveled overland beyond the unit boundaries. The soils along the RHCA boundary were rocky and not prone to erode.

The flagged and painted RHCAs around two small wetlands in Unit 6 had not been harvested yet. These small wet areas would fit the description of "wetlands less than 1 ac" (INFISH 1995) and designed to have a 100ft RHCAs (according to the project Decision Memo). The RHCA of the upper wetland was 150 to more than 200 ft in width. The lower wetland had an RHCA that ranged from 93 to 117 ft. Of the six measurements taken only one was less than 106 ft. That one was east of the wetland and was 93 ft. This small incursion of 7 ft would have no effect on the wetland or water quality.

The northern boundary of Unit 6 is an RHCA along a stream that may be a very small perennial stream or an intermittent stream (rain before and on the day of this review made the determination difficult). This stream was not identified by the fisheries biologist during the planning stages, but was identified by the TSA during unit layout and was adequately marked to be protected. This stream is designed to have an RHCA of 100 to 150 ft. The RHCA narrowest point measured was 151 ft in width.

Limiting spring traffic (public access) on road 1325 was appropriate and effective as very little traffic related rutting occurred. The sale administration limited the effect of log haul to an imperceptible impact (there were no visible log truck caused ruts in the 1325 road because they either hauled early while the road was frozen, or postponed hauling, and no adverse effects to the RHCAs due to haul were observed.

A design feature was that temp roads and skid trails would not occur in RHCAs. So far this has not been an issue.

Spring Mink Timber Sale (Sula Ranger District). Forest fisheries biologists monitored the Spring Mink timber sale on October 23, 2008. The helicopter portions of units 12A, 13, 27, 51 and 130 were monitored. The sale was completed in October 2008 when the helicopter portions of these units were yarded.

Our monitoring findings indicate:

RHCAs: Only Unit 12A contained RHCAs, and they were properly marked. No harvest occurred inside the RHCAs, and there was no equipment entry. The helicopter portions of units 13, 27, 51 and 130 did not contain RHCAs.

Sediment entering RHCAs: No sediment was produced by the helicopter yarding. Soil disturbance was minimal due to the helicopter yarding.

Haul road conditions: The primary haul roads were Roads 725, 5757, and 13355 in the Meadow and Springer Creek drainages, Roads 717 and 311 in the Lyman and Guide Creek drainages, and Road 723 in the Jennings Camp Creek drainage. Roads 311, 723 and 725 have segments that closely parallel fish-bearing streams (Road 311 along Guide Creek for about 2.4 miles; Road 723 along Jennings Camp Creek for about 1.5 miles; Road 725 along Meadow Creek for about 5 miles). The Spring Mink hauling that occurred in 2008 happened in late summer and autumn when road conditions were dry. There was no indication of hauling-caused damage or increased sediment delivery to streams. Sale-associated road grading 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.

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 Guide Creek, 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. In Unit 13, a couple of wetland RHCAs have reduced function as a result of the skyline yarding that occurred inside their boundaries (i.e. this impact was discussed in the 2007 Forest Plan Monitoring Report). With the exception of the Unit 13 wetlands, the monitoring findings indicate that the effects of the Spring Mink timber sale were consistent with the predictions that were made in the Middle East Fork ROD and bull trout biological assessment.

Kerlee Bert Timber Sale (Sula Ranger District). In 2008, Forest fisheries biologists monitored the Kerlee Bert timber sale on January 14; February 5, 12, 19 and 26; March 7, 17 and 24; April 1 and14; May 8 and 15; June 5 and October 21 and 23. The following units were monitored: 10a, 10b, 17, 19, 21 and 121. Unit 10b was tractor yarded in the winter. Units 10a and 17 contained a mix of winter tractor yarding and summer skyline yarding. Units 19, 21 and 121 were skyline yarded in the autumn.

Our monitoring findings indicate:

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

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 723 and 5785 in the Jennings Camp and Colvert Creek drainages, and Roads 5758 and 725 in the Meadow Creek drainage. Road 723 closely parallels Jennings Camp Creek for about 1.5 miles; Road 725 closely parallels Meadow Creek for about two miles. The majority of the log haul on Road 723 occurred under good winter conditions in January-March, 2008. A low number of loads were hauled on Roads 5758 and 725 in the Meadow Creek drainage. The hauling in the Meadow Creek drainage occurred in October-November 2008 in dry conditions.

Throughout the haul, straw bale check dams were installed as mitigation on the outlets of all of the ditch relief culverts on the segment of Road 723 that parallels Jennings Camp Creek, and the segment of Road 725 that parallels Meadow Creek. Ten check dams were installed on Road 723; 20 check dams were installed on Road 725. The check dams were monitored and cleaned out in May 2008.

On Road 723, four of the 10 check dams trapped sediment and prevented it from entering Jennings Camp Creek. The total amount of sediment that was trapped was about 32 gallons. Nearly all of that was trapped by a single check dam. There were no indications of sediment escaping the check dams and directly entering Jennings Camp Creek.

On Road 725, only one of the 20 check dams trapped sediment, and that occurred in the inslope ditch leading into a ditch relief culvert. That check dam trapped about seven gallons of sediment and prevented it from entering the inlet of the ditch relief culvert. There were no indications of sediment exiting the outlets of the ditch relief culverts and entering Meadow Creek.

The straw bale check dams were effective in keeping sediment out of nearby streams, and should be used on other projects where winter hauling occurs along roads that closely parallel streams. The Kerlee Bert log haul was effectively managed by the sale administrators. Road erosion and sediment contributions to Jennings Camp and Meadow creeks were minimized to the greatest extent possible, given the poor locations of the haul roads. 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 2008. The mitigation to place trees in the East Fork for fish habitat adjacent to helicopter landing #17 was completed in July 2007.

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 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 2008, Forest fisheries biologists monitored the Lil' Lyman timber sale on Feb 5, Feb 12, Feb 26, Apr 15, Apr 25, May 20, Oct 21, Nov 6, and Dec 30. The following units were monitored: 6, 9c, 12, and 13. A portion of Unit 6 was winter tractor yarded in February 2008, the rest of the units were skyline yarded in October-December, 2008. All harvest and log hauling was completed by December 31, 2008.

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.

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. A light amount of hauling occurred in February 2008 under good winter conditions. Intermittent hauling also occurred in October-December 2008, mostly under snow-free conditions.

Throughout the haul, 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 21 check dams were installed. The check dams were monitored and cleaned out in May, 2008. Eight of the 21 check dams trapped some sediment and prevented it from entering Guide Creek. Thirteen of the 21 check dams did not receive any sediment. Essentially the same check dams that trapped sediment during the 2006-07 winter haul also did so in 2007-08. The total amount of sediment that was trapped in 2007-08 was about 33 gallons, which was slightly less than the 44 gallons trapped in 2006-07.

As with the first winter of Lil' Lyman TS hauling, the straw bale check dams were effective in keeping sediment out of Guide Creek, and should be used on other projects where winter hauling occurs along roads that closely parallel streams. The Lil' Lyman 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 2008. 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.

Painted Rocks West Timber Sale (West Fork Ranger District). In 2008, Forest fisheries biologists monitored the Painted Rocks West timber sale on January 3 and January 30. One winter tractor harvest unit (Unit 3) was monitored. The sale was completed in January 2008 when the tractor yarding in Unit 3 was finished.

Our monitoring findings indicate:

RHCAs: Unit 3 did not contain any RHCAs.

Sediment entering RHCAs: There was no sediment leaving the unit and moving towards streams.

Haul road conditions: The haul roads were Roads 5660 and 5662 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. Only a small number of loads were hauled during winter 2007-08, and the hauling occurred under ideal winter conditions. The haul roads maintained a solid snow and ice cover throughout the duration of the haul. There was no visible damage to the roads, no signs of erosion, and no sediment input to streams. The log haul was effectively managed by the sale administrator. The 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.

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 closed. The results for items #1 and #3 were reported in our 2007 Forest Plan Monitoring Report, and will not be reiterated in this report. We only report the results of item #2 in this report. Monitoring of item #2 will continue until all of the Burned Area Recovery culvert replacements, road decommissioning and road storage are completed.

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?

Yes. In 2008, 8.1 miles of road was decommissioned and 0.7 miles of road was placed in storage (Gilbert and Moonshine projects). Four fish culverts were replaced (Hart Creek, Road 311; Hart Creek, Road 73180; Mink Creek, Road 5753; and Castle Creek, Road 49). Monitoring of these projects indicates that BMPs were properly applied to minimize sediment production during and after construction. The work was well done, and sediment production was not excessive or beyond the bounds of the Burned Area Recovery FEIS effects analysis. So far, we have observed no problems with BMP application during culvert replacements or road decommissioning and storage activities. The total number of fish culverts that have been replaced or removed in the Burned Area Recovery project is now 22. These are listed below:

1. Daly Creek tributary 5.1 (removal), Road 5783. August 2001
2. Sand Creek, Road 362. July 2003
3. Magpie Creek, Road 362. July 2003
4. Took Creek, Road 362. July 2003
5. Took Creek, Road 1303. July 2003
6. Bugle Creek, Road 725. October 2003
7. Crazy Creek, Road 370-A. October 2003
8. West Fork Camp Creek, Road 729. October 2003
9. West Fork Camp, unnamed tributary 0.9, Road 8112. October 2003
10. West Fork Camp, unnamed tributary 1.0, Road 8112. October 2003
11. Railroad Creek, Road 75, August 2005
12. Hog Trough Creek, Road 75, August 2005
13. Weasel Creek, Road 75, August 2005

14. Rye Creek, unnamed tributary 12.3, Road 75, September 2005
15. Rye Creek, unnamed tributary 12.3, Road 5607, September 2005
16. North Rye Creek, Road 321, August 2006
17. Moose Creek (new bridge), Road 726, August 2007
18. Coal Creek, Road 5662, September 2007
19. Hart Creek, Road 311, September 2008
20. Hart Creek, Road 73180, September 2008
21. Mink Creek, Road 5753, September 2008
22. Castle Creek, Road 49, October 2008

One Burned Area Recovery fish culvert (East Piquett Creek, Road 731) is scheduled to be replaced in 2009. Two Burned Area Recovery fish culverts (Two Bear Creek, County Road 85D; Mine Creek, Road 5688) will be awarded a contract in fiscal year 2009, for replacement in 2010 or 2011. The Two Bear Creek culvert will be replaced with a new bridge. When these are completed, there will be two Burned Area Recovery fish culverts left to replace or remove:

1. North Rye Creek, Road 8111
2. Waugh Creek, Road 13334

Engineering designs have been completed for the North Rye Creek, Road 8111 and Waugh Creek, Road 13334 culverts, but both replacements are currently on hold because of the Forest's Travel Management EIS. Both culverts could possibly be removed pending the outcome of the Travel Management EIS.

Forest fisheries biologists decided to drop from consideration two Burned Area Recovery culverts in 2008: (1) the Road 75 culvert on Spring Gulch; and (2) the Road 5612 culvert on Rye Creek. The Spring Gulch culvert was dropped because the stream has dried up in recent summers. The Road 5612 culvert was dropped because since the 2001 mudslides, the existing culvert has been providing adequate fish passage at nearly all flow levels (culvert retains substrate and has minor constriction issues). Monitoring of the Road 5612 culvert will continue as the fish passage situation may change as the channel evolves.

Ten of the original 37 Burned Area Recovery culverts have been dropped from consideration. These are listed below, along with the rationale for dropping the culvert.

1. North Rye Creek, Road 321 (upper crossing, Section 31): Dropped in 2001 because the culvert was replaced by the BAER teams in October, 2000. A negligible amount of suitable fish habitat is present above this crossing.
2. North Rye Creek, unnamed tributary 4.3, Road 62435: Dropped in 2002 because the culvert is located on private land. The Forest Service has no jurisdiction.
3. Daly Creek, unnamed tributary 3.2, State Highway 38: Dropped in 2003 because the culvert is under the jurisdiction of the Montana Department of Transportation.
4. Bugle Creek, Road 73609: Dropped in 2003 because surveys indicate that no fish are present above or below the culvert, and suitable fish habitat is not present due to high gradients.
5. Elk Creek, Road 13860: Dropped in 2006 because surveys indicate that no fish are present above or below the culvert, and suitable habitat is not present due to high gradients.
6. Taylor Creek, County Road 104-A: Dropped in 2007 because the culvert is located on a county road that accesses numerous private homes, and a temporary bridge would have to be constructed to allow vehicle access during the replacement. This makes the cost of replacement prohibitively expensive considering the minimal amount of habitat it would open up upstream of the road crossing.
7. Mill Gulch, County Road 104-A: Dropped in 2007 for the same reason as Taylor Creek.
8. Malloy Gulch, County Road 104-A: Dropped in 2007 for the same reason as Taylor Creek.
9. Spring Gulch, Road 75: Dropped in 2008 due to the stream drying up at base flows.

10. Rye Creek, Road 5612: Dropped in 2008 due to the existing culvert providing adequate fish passage conditions at nearly all flow levels.

The Bitterroot Headwaters TMDL recommends that the Forest monitor any new culvert replacements to ensure that fish passage is being adequately maintained. In 2008, 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 streamflows increase in late autumn, 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.

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.

In 2008, Forest Service fisheries biologists monitored two Burned Area Recovery road decommissioning and storage projects on the Sula Ranger District. The results of this monitoring are summarized below:

Gilbert/Moonshine Road Decommissioning (completed in 2008): In 2008, the Forest decommissioned 8.1 miles and stored 0.7 miles of system road in the Gilbert Creek drainage. When all of the non-system spurs were added in, the actual mileage of decommissioning on the ground was about 11.7 miles. The road systems that were decommissioned and/or stored were the 7367x and 7368x systems. The treatment consisted of a mix of full and partial recontouring. About 2.4 miles of road were recontoured in the RHCAs of non-fish bearing perennial tributaries to Gilbert Creek. All of the recontoured stream crossings looked fine. Channel width/depth and entrenchment ratios matched the undisturbed channel above and below the road crossings. Bank angles/slopes were gentle and properly pulled back to allow for good revegetation. Bank dimensions matched the undisturbed conditions found above and below the road crossings. Sedimentation at the crossings was localized to the immediate area and was not excessive. It was within the bounds of the effects analysis in the Burned Area Recovery FEIS and bull trout biological assessment. The disturbed areas were properly seeded and covered with straw mulch and slash. Here and there, the operators also re-planted some small shrubs. In summary, BMPs were properly applied and Forest Plan and State water quality standards were met.

Medicine Tree Road 73213 Road Decommissioning (partially completed in 2006; finished in 2007): In 2008, Forest fisheries biologists monitored the Burned Area Recovery decommissioning of Road 73213 in the headwaters of the Medicine Tree Creek drainage. The southern portion of Road 73213 was recontoured in 2006. The 2007 treatment involved full recontouring of the junction with Road 5612 and at all of the stream crossings, and partial recontouring of the upland segments between the stream crossings. All of the stream crossings looked fine. Channel widths and bank dimensions matched undisturbed conditions above and below the road. At the main crossing of Medicine Tree Creek, the stream has downcut through about a foot of silt that had been deposited upstream of the undersized culvert that was removed. The vertical silt banks will continue to collapse, stabilize and vegetate over time. At all of the stream crossings, deposition of construction-generated sediment was restricted to the first 20-30 feet downstream of the road. Sedimentation was within the ranges of the effects analysis in the Burned Area Recovery FEIS. The portion of Road 73213 that was recontoured in 2006 had good

vegetative cover consisting of a mix of grass and knapweed with scattered shrubs. The portion of Road 73213 that was recontoured in 2007 was mostly bare in early June 2008, but grass shoots and small knapweed rosettes were starting to appear. Some livestock use (from the Medicine Tree grazing allotment) was evident on the recontoured prism, but it was limited. In summary, BMPs were properly applied and Forest Plan and State water quality standards were met.

Figure 24 – Typical stream crossing on the portion of Road 73213 recontoured in 2006. June 2008.

Figure 25 – Typical stream crossing on the portion of Road 73213 recontoured in 2007. June 2008.

Our key findings from item #2 monitoring are:

- BMPs have been properly applied during culvert replacement, road decommissioning, and road storage activities. The application of BMPs has been consistent with meeting State water quality standards.
- Sediment contributions during the culvert replacements have been within the bounds of the effects analysis in the Burned Area Recovery FEIS. Water quality has been protected to the extent possible given that short-term sediment inputs are unavoidable while replacing culverts.
- Sediment contributions from the road decommissioning and storage activities have been negligible, essentially having no effect on fish habitat. Most of the ground disturbance has occurred away from live water, and where streams have been affected, the streams are small and do not contain fish.
- The culvert replacement, road decommissioning and road storage activities have complied with the Forest Plan as amended by INFISH.

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: 2008.

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 may 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 TMDL goals, BMP compliance and substrate monitoring to judge effectiveness of these practices.

EVALUATION – Compliance with Federal and State Water Quality Standards

This water resource monitoring component documents how the Bitterroot National Forest is minimizing non-point source pollution through implementation of watershed restoration plans and Best Management Practices (BMPs). Items tracked are the implementation and effectiveness of the recent *Water Quality Restoration Plan and Total Maximum Daily Loads for the Bitterroot Headwaters Planning Area* ("Headwaters TMDL", MT DEQ 2006) and of BMPs for on-going timber harvest and road projects.

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.

The Bitterroot National Forest is not formally required to monitor stream conditions for the TMDL. However, East Fork Pebble counts will be performed annually, as budget allows, providing substrate trend information for both DEQ and the Forest. Other monitoring related to effectiveness of TMDL improvements would occur to document sediment reductions and completed watershed improvements to provide information that would support removal of streams from the State Impaired Waters (303(d)) List or the implementation of additional restoration efforts .

The Middle East Fork Hazardous Fuels Reduction Project is located wholly within the East Fork Bitterroot River watershed, and encompasses several streams listed in the Headwaters TMDL. The majority of this project was completed by the end of the 2008 field season, including its watershed restoration activities. FDR 73250 in Guide and Jennings Camp Creek watersheds was put into storage in 2008. With the exception of replacing three undersized culverts on Bertie Lord Creek, Tributary 3.5 to Bertie Lord and Mink Creek, all watershed mitigation for this fuels project has been completed. Ongoing mitigation, such as compliance with SMZ or RHCA regulations, would continue as the remaining vegetation management portions of the project are completed.

The Bitterroot Mainstem TMDL analysis 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 Bitterroot NF. 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.

IMPLEMENTATION MONITORING

Watershed Water Quality Restoration Plan

To support the Headwaters Water Quality Restoration Plan, as funding permits the Forest Service will locate and treat active sediment sources with the long-term goal of reducing the overall chronic sediment load and improving fish passage within the TMDL planning area. 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 2008 are listed below.

Table 28 – Watershed Projects in 2008 addressing Bitterroot Headwaters TMDL

Watershed/Projects - 2008	Treatment/area
Shrub Planting (various watersheds and culvert replacement or removal sites) – 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 (16 sites)
Blocking illegal OHV trails, spreading slash to aid in vegetative recovery, and posting signs	1 site
Decompaction, seeding, fertilizing and mulching of illegal OHV trails or access points in Trapper Creek drainage, West Fork Bitterroot River	8 sites
Repair of Meadow Creek Exclosure Fences (jointly completed with fisheries)	5 acres of streamside area protected
Storage (decompaction, recontour portions) of FDR 73250, Middle East Fork Mitigation	Recontour 800 feet adjacent to stream, recontour 3 crossings, seed and fertilize approximately one mile of road
Place straw bales along Meadow and Swift Creeks to protect water quality during hauling of Springer II TS. Project was never implemented due to recision of CE category used to analyze this project.	10 potential sediment contributing sites treated
Decommissioning of roads and skid trails in Gilbert drainages	55 acres
Installation of fish passage pipe on Mink Creek	1 site
Completion of Meadow Creek bridge installation, construction of new approach and obliteration of undersized culvert and existing approach	1 site
Installation of 2 fish passage culverts on Hart Creek	2 sites
Completion of Rombo BAER (burned area emergency response) road and crossing work	11 sites
Place gravel on crossings and install drain dips on FR 5715 and FR 8168	5 sites

In 2008, the Bitterroot National Forest worked with the Bitterroot Water Forum, a citizen-based non-profit watershed group, to secure funding to supplement National Forest funds for sediment reduction activities on forest roads identified in the TMDL as sediment contributors. The Water Forum contributed $5000 to purchase and place gravel on road crossings identified as sediment contributors in the Bitterroot Headwaters TMDL and in watershed affected by the Rombo Fire in 2008. This money was combined with other appropriated federal funds to accomplish sediment reduction work on FDR 5715 (Buck Creek) and 8168 (Ditch Creek) and included gravel crossings, installation of drain dips and shaping the road to reduce sediment and water runoff of water and road

sediment entering the streams. Research indicates that this type of work reduces sediment contribution to stream by up to 79% by reducing the flow length (runoff doesn't flow down the road for long distanced) and increasing the size of the particles on the road from sandy loam sized particles to gravel sized that are larger and less likely to be moved by storm runoff. The work was completed by the forest road crew during 2008.

Best Management Practices

The Bitterroot National Forest implemented numerous Best Management Practices to reduce road and activity-related sediment. 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 2008 improvements.** Projects implemented in 2008 to comply with BMP direction and reduce sediment sources, especially related to active forest management included:

- Tolan-Meadow Grazing Allotment - Maintained and repaired Meadow Creek exclosure fences to prevent livestock access to sensitive reaches of Meadow Creek.
- Middle East Fork Hazardous Fuels Reduction Project - Installed straw bale check dams in 10 locations along timber sale haul routes to protect streams from haul-related sediment. Sites included cross drain pipes or roadside ditches accessing streams on FDR 725 and 5764.
- Haacke-Claremont Timber Sale – Installed straw filters on 10 haul route sediment contribution sites.
- FR75 Rye Creek Road BMP upgrade – cross-drainage was improved with new and additional cross-drain culverts in preparation for gravel applications in 2009.

No Montana State BMP audits occurred on the Bitterroot National Forest in 2008. State audits occur every other year and although 2008 was an audit year, no projects on the Bitterroot were selected for audit.

As an EMS requirement, two timber sales-Gash and Painted Rocks West Timber Sales- were audited by Bitterroot NF interdisciplinary team for BMP and mitigation application and effectiveness. Because the audit included a variety of specialists, Rangers, and the implementation team, less time was spent on riparian issues than in previous years and other areas of project implementation was discussed. The findings of the audits related to riparian or watershed concerns are detailed below:

The Gash Fire Salvage timber sale on the Stevensville District did include activities in units adjacent to streams where buffers were in place. Monitoring surveys found that Unit 2 had a 200-300 foot length of buffer that was 130-140 feet in width instead of the required 150 feet. No sediment movement was observed in the stream buffer in any locations. Most of the skyline corridors in this sale were barely visible on the landscape. However one heavily used skid trail was wider than others and will require more rehabilitation than usual to restore.

The haul routes were well maintained. Drive-through dips prevented road runoff from traveling long distances and prevented erosion of the road surface. There was no evidence of sediment contributions at stream crossings.

A temporary road constructed in Unit 2 was shorter than what was analyzed. It will be obliterated and revegetated when vegetation management in this unit is completed.

Painted Rocks West, on the West Fork District was also monitored as part of EMS. . None of the units visited during the review had riparian issues. One point of discussion was the temporary road that accessed Unit 1B. The construction of this road required a large cut and although it was obliterated, the crust that formed on the soil has prevented adequate revegetation and allowed weeds to flourish. Discussion by the audit team centered on the trade-offs between limited timber harvest in this unit and the benefits gained from that harvest and the other resource effects from temporary road construction. Unit 2 was also reviewed. Activities in this unit resulted in no obvious adverse impacts. BMPs were applied as described in the timber sale contract.

The temporary road that was obliterated will require additional seeding and possible weed treatment. It is included on the project list for 2009.

The Bitterroot National Forest averages about 250 days per year of logging operations. In 2008, 7 different sales were overseen and monitored by timber sale administrators (TSAs) and various resource specialists. All timber sale operations were compliant with contractual BMPs, except those noted above. 2008 monitoring results suggests BMPs are being applied consistently on current timber sales on the Bitterroot and are effective in protecting water quality, although 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. The literally hundreds of correctly and successfully applied BMPs compare favorably with the exceptions where the BMP wasn't applied correctly or undesired effects occurred on the ground. These exceptions were small in size compared to the entire project areas and didn't cause long-term degradation of the watershed resource, but may have resulted in minor and temporary impacts. All of the 2008 BMP issues have been corrected or mitigations discussed to reduce their occurrence in future operating seasons.

EFFECTIVENESS MONITORING – Water Quality Restoration Plan Projects 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 analysis. 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 29 - The Bitterroot Headwaters TMDL Reference StreamThresholds for 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 30 displays 2008 survey results for the five sites located on the East Fork Bitterroot River.

Table 30 - Summary of Pebble Count Results, East Fork Bitterroot River, Years 2000-2008

Site Name	Range % fines <2mm	Range % fines <6mm	Comments about 2008 Data
East Fork at Indian Tree (Lowest Site on EF Bitterroot) C4	2-11%	5-14%	Particles sampled in 2008 were at the lower end of the range of those measured over the eight year sample period. Within the threshold in the TMDL.
East Fork at Spring Gulch, C4	3-11%	4-15%	Particle collected in 2008 were at the lower end of the range of those sampled over an eight year period. Within the threshold in the TMDL.
East Fork above Sula Bridge C4	6-15%	7-18%	Similar to previous surveys. Within the threshold in the TMDL.
East Fork below Mink Bridge B3	8-23%	9-23%	Similar to previous surveys. The % of fines less than 6 mm sampled at 21% is slightly over the threshold range identified in the TMDL.
East Fork below Meadow Bridge B3 (Upper most site)	7-15%	8-19%	Particles sampled in 2008 were at the lower end of the range of those measured over the eight year sample period. Values were within the threshold level for the TMDL.

Based upon monitoring conducted in 2008, 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. 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 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.

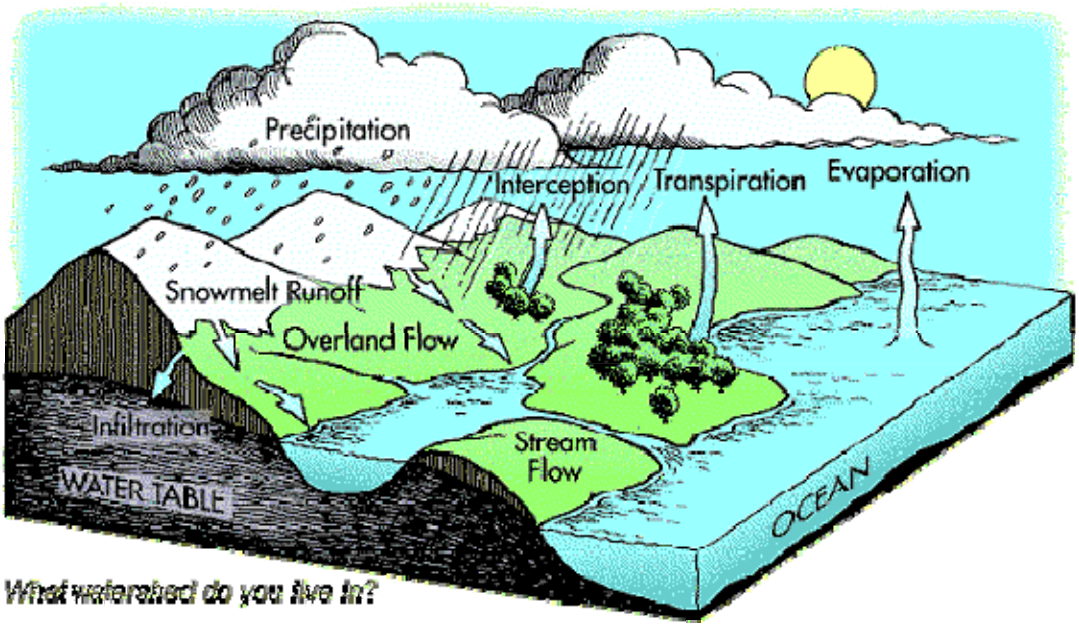
The BNF continues to participate in National and Regional efforts to evaluate stream survey protocols and the variability of data. A major player in this effort is the Forest Service Fish and Ecology Unit located in Logan, Utah (www.fs.fed.us/biology/fishecology/emp). These efforts will help the Forest 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.

MT DEQ 2006. Water Quality Restoration Plan and Total Maximum Daily Loads for the Bitterroot Headwaters Planning Area. Montana Department of Environmental Quality, Helena, MT. http://www.deq.state.mt.us/wqinfo/TMDL/finalReports.asp



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: 2008

VARIABILITY: Exceeding geomorphic threshold of concern.

EVALUATION:

Cumulative Effects Modeling

There were no timber sales with new permanent road construction implemented or proposed on the BNF during 2008. Instead, the proposed Lower West Fork timber sale, which has no new specified roads, was analyzed for potential cumulative watershed effects.

Updates and changes to the Lower West Fork proposal were modeled for cumulative watershed effects. This included changes in existing conditions and proposals that resulted from the 2007 Rombo Fire. Project design minimized proposed treatments that could exceed water yield or sediment guidelines. The Lower West Fork Draft EIS is scheduled for public review in 2009.

Cumulative Effects Monitoring

Cumulative Effects monitoring focused on watershed improvement accomplishment, effectiveness and future needs. Watershed condition inventories focused on potential for road-related sediment contribution. The few remaining roads identified for obliteration in the Burned Area Recovery Project were surveyed for treatment needs and are planned for treatment in 2009.

Roads in Ditch and Buck Creeks, identified as sediment impaired in the Bitterroot Headwaters TMDL, were reviewed and funded for crossing gravel placement and installation of drive through dips. Five sites were improved using funding from appropriated dollars and a $5400 grant from the Bitterroot Water Forum, a citizen-based non-profit watershed group. In the TMDL, 42 sites in these watersheds were identified as contributing sediment. Of these, 10 were estimated during the TMDL process to contribute sediment only to upland sites, 9 were estimated to contribute less than one ton/year, 6 sites between one and five tons/year, 8 sites between 5 and 10 tons/year and another 11 were estimated to contribute more than 10 tons/year to Ditch or Buck Creeks. Site review, by the Bitterroot Road Maintenance Supervisor when planning for the sediment reduction project (described above), found fewer sites than those identified in the TMDL contributing sediment and only five of those warranted treatment due to their location on a stream and level of contribution.

Other roads located in sediment impaired streams in the Bitterroot Headwaters TMDL were inventoried for treatment needs. Bugle Creek, a tributary to Meadow Creek and several tributaries to Hughes Creek were reviewed. In these watersheds the TMDL identified multiple sediment contributing crossings. These sites were visited on the ground and evaluated for treatment needs. As in Buck and Ditch Creeks, many sites identified in the TMDL as needing sediment reduction treatments were found to be not contributing or contributing in such small amounts that the cost of treatment would be far more expensive than the benefit gained from graveling or installation of a drive through dip. Those sites needing treatment were identified and will be included in an improvement project as funds are available.

In Laird and Gilbert Creeks, the TMDL inventory was completed prior to the implementation of several road obliteration projects that have occurred since 2001 as part of Burned Area Recovery. Since then, all of the roads identified as sediment contributing crossings have either been treated prior or were included in the Gilbert Road Decommissioning Project that was completed in 2009. An effectiveness monitoring effort for these treatments still needs to occur to address the success of the road obliteration projects.

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 maintenance in 2008 occurred on FDR 723 (Jennings Camp), 725 (Meadow Creek), 5758 (Tepee), and 311 (Guide) to protect these streams from potential sediment contributions from winter log haul operations.

MONITORING:

Existing Condition Surveys and Watershed Improvement Projects

Table 31 - Summary Table of Existing Condition Surveys and Watershed Improvement Projects

Activity	Units Accomplished	Location
Stream Reach Inventory	4.8 miles	PACFISH/INFISH stream monitoring Meadow Tolan Allotment (14 sites), Residual Pool Volume and Channel Stability Rating at 15 sites within the 2000 Burn Area, Channel Stability Ratings at an additional 8 sites in the Lower West Fork area.
Watershed Improvement Projects	97 acres watershed funding only, 121 acres mixed funding	Numerous sites – see narrative below.

Stream Reach Inventory

The PACFISH/INFISH Biological Opinion (PIBO) monitoring group sampled multiple stream reaches on the BNF during 2008 as part of their Effectiveness Monitoring Program for Streams and Riparian Areas within the Upper Columbia River Basin (www.fs.fed.us/biology/fishecology/index.html). In total, there are 33 sites located on the BNF monitored between 2001 and 2008. This project is also providing data on monitoring protocol repeatability and sensitivity to detect change. 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 218 acres in 2008. A limited amount of 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. Other work focused on improving drainage and reducing erosion from open roads. This work included installation of drive through dips, gravel of stream crossings or erodible sections of roads.

The following watershed improvement projects were completed in 2008:

- Darby RD Watershed Improvement Project: Trapper Bunkhouse Area. Reduce OHV access on areas not suitable for travel. Obliterate user-made unauthorized trail linking FR 62887 and FR 374A. Restrict access to full sized vehicles on FR 62882 and FR 62880 as identified in Forest Roads database. Obliterate non-system road adjacent to FR 62882 to prevent unauthorized access by full sized vehicles. Treatments included decompaction of soils, application of seed, fertilize and mulch, spreading of slash or dropping small trees to limit access.

- Plant native shrubs at 28 sites across the forest. Including such locations as culvert or bridge replacements, sections of recontoured road. Shrub species planted included woods rose, dogwood, alder, spirea.
- Mulching of stream crossings obliterated in Jennings Camp Creek as a result of the Middle East Fork watershed mitigation. Seeding and fertilizing occurred through stewardship contract and straw mulching was completed by forest personnel.
- Repair of Meadow Creek exclosure fences. Windstorms and aging fences necessitated replacement of several braces to ensure the exclosures would be effecting in restricting livestock access to sensitive reaches of Meadow Creek. Five sections of fence were repaired or improved.
- An unauthorized user-made OHV trail near Mink Creek was decompacted by hand, seeded, fertilized, mulched and slashed to the extent possible. Monitoring later in the field season found that this had not been effective in restricting access as several vehicles had driven over the site removing seed, mulch and slash. Fencing is planned for this location but will not be implemented until the slash piles are removed.
- Subsoiling (decompaction using specialty tools) occurred on 40 acres of historic skid trails in the Hays Creek Timber Sale area. These sites were identified as soil remediation treatment in the EA.
- Monitoring and maintenance drainage structures in the McClain Slide area to reduce the risk of further landslides.
- Seeding and fertilizing burn piles in the Laird Creek watershed and Frazier Draw TS to reduce bare soil, erosion, and weed spread.
- Fifty-five acres of decompaction, seeding, fertilizing and mulching on roads and skid trails in the Gilbert watershed. This project included roads identified in the Burned Area Recovery Project for obliteration or storage.
- Middle East Fork Mitigation on FDR 73250 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, and reduce sediment inputs.
- Decommission seven acres of roads in the Moonshine Decommissioning project.
- Ten acres of rangeland vegetation improvement.
- Invasive plant treatment and monitoring on ten acres.
- Ten acres of post-BAER invasive plant treatments and monitoring.
- Replacement of an undersized culvert on Mink Creek, FR 5753.
- Replacement of an undersized culvert with a bridge on Meadow Creek, FR 5758.
- Replacement of two undersized culverts on Hart Creek.
- BAER work on eleven acres in the Rombo fire area.
- Upgrades on six acres of FR 75 to reduce sediment contributions to streams.
- Five stream contributing sites on roads in the Ditch and Buck Creek drainages were graveled or had drainage improvements completed to reduce sediment contributions.

Figure 26 - Photo of a hill climb obliterated with Darby Watershed Improvement Project

Watershed Improvement Needs Inventory

Inventories were conducted on roads identified in the Bitterroot Headwaters TMDL as sediment contributing to determine contributing sites and needed treatments.

The remainder of the roads slated for obliteration in the Burned Area Recovery Project was reviewed to determine treatment needs. These are scheduled for treatment during the summer of 2009.

Project Monitoring

Monitoring highlights the past or on-going projects that were monitored for compliance, implementation and effectiveness during 2008. Individual monitoring reports are available from Forest hydrologists.

Table 32 - Summary of Project Monitoring

Activity	Item	Location and Findings
Completed Watershed Improvement (WI) projects inventoried for effectiveness and maintenance needs	Project Areas Visited	Meadow Tolan Site 10 (implemented October, 2005). Monitoring conducted in fall 2008 found that the project has improved stability within the project area. Meadow Creek Exclosure Fence (2004). Monitoring in 2008 found that the fence is effective in eliminating livestock access to Meadow Creek. Repair to damaged portions of the fence occurred. FR 73250, Middle East Fork watershed mitigation (2008). Road was put into storage in 2008. Implementation monitoring conducted about one month after completion found that the seeded grasses had germinated. Treatment included recontouring of stream crossings and section of road along stream, decompaction of another mile, with the remaining mile receiving no treatment due to limited funding and lack of sediment contribution on remainder of road. All sediment sources were treated. FDR 73691 (October, 2005). Monitoring in 2008 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.

		Waugh Gulch Aspen Exclosure (2001). Monitoring in 2008 found that the majority of aspen are approaching eight feet. Most are small diameter whip-like trees. Recommend the fence remain until aspen are large enough browsing by livestock or wildlife, still several years from now. FR 13302 Gate Installation (2007). This gate was installed to restrict off-road vehicle travel on non-system trail/road that provided access to a closed road system and increased use from OHV was causing trail surface degradation and increased sediment contributions to the Springer Creek. The gate is a combination of several salvaged gates and locking points didn't fit together correctly. Due to fire season and forest closures in 2007, use of a cutting torch to adjust gate openings wasn't possible. Although locked with a chain, the gate was not secure. Review in 2008 found the gate had not been repaired; this project is included on a project list for 2009. Indian Trees, Waugh Gulch Tributary Culvert Removal (2006). A plugged culvert was removed, stream banks recontoured, and road decompacted as part of a short road storage project. High spring flow runoff in 2008 resulted in bank erosion at the crossing site and encroached road fill with deposition at the tributary crossing on FR 729. Review of the site found that more material should have been removed and a wider channel constructed when the project was implemented. Additional work is not needed at this time as the area should stabilize without additional treatment. Monitoring will continue. Moose Creek OHV (2007). A steep unauthorized OHV trail linking FR 432 and FR 5770 was obliterated, seeded, fertilized and slashed. Additional restoration occurred at the shooting range near FR 432 where OHV's climbed short sections of hill and made a play area. Review in 2008 found that the obliteration of the steep trail was effective. In 2009 the area should be reviewed for possible re-seeding efforts. At the shooting range, restoration work was not effective due to OHV access. Since the affected area is small in size, with very low risk of sediment contributions, no additional work will occur. Middle East Fork roads FR 73259, 73260, 73261, (2007). Placed into storage using stewardship money are effective in restricting OHV use. Because of the lack of desirable vegetation growing on disturbed areas, these roads should be reseeded in 2009. Lost Trail Ski Area Expansion (1998). The expansion area was reviewed for compliance with mitigation in the FEIS. Log bridges spanning streams had been improved and met requirements of the FEIS. The litter around the lower terminal area was cleaned up and there was no litter found in other parts of the area monitored. The recently installed spring development that crosses the stream needs to be reviewed in 2009 for additional seeding if needed. Lost Trail (con't). Crossings to allow safe skier and equipment passage of streams have been re-done and are constructed according to the FEIS. An ATV trail on the west side of East Fork Camp, just beyond the stream crossing on FR 729, should be blocked and signed to prevent only limited permittee access as another route to the west is available and outside the RHCA. Revegetation has improved in some areas and is still slow in others. High elevation, short growing season and shallow soils limit revegetation recovery. The area around the lower chairs has much better litter control in 2008-it looked much cleaner than previous years. This area will continue to be monitored.

BMP, implementation, effectiveness, and validation monitoring	2 Projects Monitored	Forest EMS Audits were conducted in August 2008: Gash and Painted Rocks Timber Sale. Results described in Item 17. Straw bale sediment traps were also monitored and replaced as needed along the FR 725, FR 723 and FR 311. These were initially installed as watershed mitigation to protect streams from sediment that may be produced during log haul operations in the winter.
BAR Road Decommissioning Project Monitoring	0 site visited on the south zone	
Here 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. Each reach is 200 feet long, for a total of 400 feet of bank monitored each site. The complete report is available at the Supervisor's Office.

The overall impression for 2008 was that little livestock use occurred on the allotment. A wet spring occurred with rainfall and snowfall into mid-June. Good vegetation growth occurred and seed was produced throughout the allotment. At all monitoring sites, good residual vegetation was present and limited trampling occurred along stream banks.

Maintenance of the fences in the lower part of the meadow of Meadow Creek occurred in 2008. Areas damaged by the 2006 windstorm, as well as wear and tear, were repaired. Five braces and broken wires were replaced in June of 2008.

One of the monitoring sites reviewed annually in the Meadow Tolan Allotment was fenced in 2000. Since then, bank trampling has been eliminated from the sensitive "E" streamtype (narrow, meandering, relatively deep), stream width has narrowed and riparian vegetation improved.

Figure 27- Photo of Bugle Creek

The Upper Tolan Monitoring Site doesn't see much livestock use. This reach burned in 2000 and in 2006 the channel migrated to this location further to the west, abandoning the old channel due to a debris jam.

Figure 28 - Improved riparian zone in the Meadow-Tolan allotment

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: 2008.

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 2008 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, westslope cutthroat trout populations are stable on the Bitterroot National Forest, while bull trout populations have declined in some streams in recent years. 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 2008 and is discussed and **evaluated** in this section:

FISH HABITAT INVENTORIES:
Table 33 lists the fisheries habitat inventories that were conducted by Forest fisheries biologists in support of project planning and monitoring efforts in 2008. 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 33 - Fish Habitat Inventories Conducted in 2008

Stream	District	Inventory Length (mi.)	Inventory Method[3]
Carlton Creek	Stevensville	0.1	50m Overviews[2]
One Horse Creek	Stevensville	0.1	50m Overviews[2]
Sweeney Creek	Stevensville	0.1	50m Overviews[2]
Willow Creek	Stevensville	0.2	50m Overviews[2]
Willow Creek	Stevensville	0.6	I-walk
East Fork Bitterroot River (reach 7)	Sula	4.3	I-walk
Cameron Creek	Sula	0.7	I-walk
North Cameron Creek	Sula	0.7	I-walk
Hart Creek	Sula	0.8	I-walk
Lyman Creek tributary 1.8	Sula	0.6	I-walk
Guide Creek	Sula	1.0	I-walk
West Fork Bitterroot River (reach 8)	West Fork	5.0	I-walk
Nelson Creek	West Fork	0.5	I-walk
Nelson Creek	West Fork	0.3	50m Overviews[2]
Soda Springs Creek	West Fork	0.1	50m Overviews[2]
Little West Fork	West Fork	0.2	50m Overviews[2]
Sheephead Creek	West Fork	0.3	50m Overviews[2]
Watchtower Creek	West Fork	0.3	50m Overviews[2]
Total		15.9	

On the Stevensville and West Fork Districts, fish habitat was quantified at 50 meter sections in nine streams that were snorkeled in 2008. The surveys included parts of two ranger districts (Table 33), and the number of sections surveyed in each stream varied from 3 to 12 depending on the distribution of bull trout. Larger or scattered populations required more surveys than populations confined by barriers. Details are in *Bull Trout Presence in Nine Bitterroot National Forest Streams, Summer 2008.*

Fish habitat inventories using the I-walk methodology were conducted in portions of the East Fork Bitterroot River (reach 7) and West Fork Bitterroot River (reach 8) to monitor compliance with the pool and large woody debris (LWD) targets in the Bitterroot Headwaters TMDL. These reaches were initially inventoried in 2003 during the data collection phase of the TMDL. The Monitoring Strategy in the Headwaters TMDL recommends the reaches be re-surveyed at least once every five years, which was done in 2008.

In 2008, the East Fork monitoring reach (Reach 7, Cameron Creek to Tolan Creek) had 7 pools per mile and 19 LWD pieces per mile. The number of pools per mile was within the range of the TMDL target (4-9 pools per mile); the number of LWD pieces per mile was just below the TMDL target (> 20 pieces per mile). Essentially no change occurred between 2003 and 2008. Pools remained the same at 7 per mile; LWD increased very slightly from 17 to 19 pieces per mile.

In 2008, the West Fork monitoring reach (Reach 8, inlet of Painted Rocks Lake to Hughes Creek) had 15 pools

[3] 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.

[2] 50m Overviews: Habitat was quantified at sections that were snorkeled in 2008. Details are in *Bull Trout Presence in Nine Bitterroot National Forest Streams, Summer 2008.*

per mile and 30 LWD pieces per mile. The number of pools per mile was lower than the TMDL target (> 23 pools per mile); the number of LWD pieces per mile was higher than the TMDL target (> 20 pieces per mile. Pools remained essentially the same between 2003 (16 per mile) and 2008 (15 per mile), while LWD increased from 21 pieces per mile (2003) to 30 pieces per mile (2008).

On the Sula District, fish habitat inventories were conducted in Cameron, North Cameron, Hart, Lyman trib 1.8, and Guide creeks using the I-walk methodology. The purpose of the inventories was to collect baseline fish habitat data in support of a scheduled NEPA analysis for the East Fork and Sula Peak grazing allotments.
On the West Fork District, a fish habitat inventory was conducted in Nelson Creek using the I-walk methodology. The purpose of the inventory was to collect baseline fish habitat data in support of future NEPA analysis in the Nez Perce Fork drainage.

FISH POPULATION MONITORING:
The Forest Plan recommends monitoring fish populations in six streams annually to meet the Forest objectives. In 2008, fish populations were monitored in 20 streams at 21 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 are described in Clancy (1998). As displayed in Table 34, most of the reaches monitored in 2008 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, Wildlife and Parks (MFWP).

Table 34 summarizes the fish population estimates that were conducted on the Forest between 1989 and 2008. Years in which a population estimate was conducted in a monitoring reach are denoted with **X**.

Table 34 - Fish Population Estimates Conducted Between 1989 and 2008

Monitoring Site	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
Ambrose 8.4&8.6																				X
Andrews 0.5													X	X	X					
Bear 6.0			X																	
Beaver 0.3			X	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	X
Cameron 6.1					X						X								X	
Cameron 10.1		X									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					X
East Piquett 0.2																		X	X	X
Fred Burr 9.0										X										

Monitoring Site	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
Gilbert 0.1														X	X	X				
Gold 0.3		X	X					X												
Guide 0.1																	X	X	X	
Hart 2.8													X	X	X					X
Hughes 1.6										X	X									
Hughes 9.0								X			X									
Jennings Camp0.5																	X	X	X	
Johnson 0.7			X																	X
Kootenai 0.3										X										
Laird 1.4		X	X									X		X	X	X	X			
Laird 2.3												X		X	X	X	X			
Lavene 0.2																		X	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	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	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	X
Piquett 1.3		X	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				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																	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	X
Skalkaho 17.2												X								
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											

Monitoring Site	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
Sleep. Child 10.2	X	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	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 0.3					X								X	X	X				X	
Willow 12.1		X																		X
Woods 0.3			X																	
Woods 0.9								X	X				X	X	X					X

The following narratives summarize our most current knowledge of the fish populations in the monitoring reaches that were sampled in 2008.

- Ambrose 8.4 and 8.6. These two sections are located on private land, but are separated by a culvert in Forest Road #428, which is a partial fish barrier. With landowner permission, we sampled upstream and downstream of the culvert to determine if there was a difference in species or abundance. We also used different fin clips to detect movement through the culvert during the week between the "marking" electrofishing sample and the "recapture" electrofishing sample. Species were the same; only westslope cutthroat trout were caught. The densities were not substantially different; both sections had more than 100 cutthroat trout (between 3 and 7 inches in length) in the 1000 ft of stream sampled. During the week between marking and recapture one fish moved downstream through the culvert and none moved upstream.
- Beaver Creek 0.3 This reach is located near the mouth. It was sampled in 1984, 1991, 1992 and 2008. Numbers of westslope cutthroat trout and bull trout were similar between 2008 and the early 1990's. One brook trout was captured in the reach in 1984 and 2008.
- Burnt Fork 19.7 This reach starts at the Burnt Fork trailhead. It was sampled in 1995, 1996, 2000, 2006, 2007 and 2008. Compared to past population estimates, the populations of both westslope cutthroat and bull trout in 2007 and 2008 were lower in many size groups.
- Cameron Creek 10.1 This reach is located on State land above the Road 311 crossing. It was sampled in 1990, 1999, 2001-04, and 2008. Westslope cutthroat trout and brook trout are the only two fish species present in the reach. In 2008, westslope cutthroat trout numbers were similar to those that occurred before

the 2000 fires, while brook trout numbers continued to be considerably lower than those that occurred before the 2000 fires and in the first two years (2001-02) after the fires.

- East Fork Bitterroot River 31.4 This reach is located near the trailhead to the Anaconda Pintlar wilderness trail on the East Fork Bitterroot River. It has been sampled seven times between 1992 and 2008. In 2008, westslope cutthroat trout numbers were similar to past estimates. The number of larger cutthroat has been increasing since the early 1990's. In 2008, we were unable to capture enough bull trout to calculate a population estimate (we only captured two bull trout in 2008). In the past years, we captured between 10 and 33 bull trout.
- East Piquett Creek 0.2 This reach starts at the Forest boundary. It is located in the lower portion of the East Piquett watershed that was unburned by the 2007 Rombo Fire. The reach was established in 2006 to monitor the Lower West Fork project. It was sampled in 2006, 2007 and 2008. Westslope cutthroat trout and brook trout are common in the reach. One juvenile brown trout was captured in 2006 and 2008. The estimate for westslope cutthroat trout > 4 inches in the reach has ranged between 83 fish (2006), 73 fish (2007) and 70 fish (2008). The estimate for brook trout > 4 inches in the reach has ranged between 30 fish (2006), 22 fish (2007) and 11 fish (2008). High peak flows in June, 2008 caused significant bedload movement and channel/habitat changes in the reach.
- Hart Creek 2.8 This reach in located on State land above the Road 311 crossing. It was burned in 2000 at moderate severity. The reach was sampled in 2001-03 and 2008. Westslope cutthroat trout are the only fish species in the reach. In 2008, cutthroat numbers were similar to those observed in 2001-03.
- Johnson Creek 0.7 This reach is located above the private inholding. It was sampled in 1991 and 2008. Westslope cutthroat trout numbers in 2008 were higher than those observed in 1991. Bull trout numbers in 2008 were slightly higher than those observed in 1991. Two bull trout X brook trout hybrids were captured in 2008.
- Lavene Creek 0.2 This reach starts at the Forest boundary. The reach was established in 2006 to monitor the Lower West Fork project. It was sampled in 2006, 2007 and 2008. 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), 142 fish (2007) and 88 fish (2008). A large year-class of 3-4 inch cutthroat trout was present in 2008.
- Meadow Creek 5.6. This reach is located upstream of the Road 5759 bridge. It was sampled in 1989-91, 1994-96, 2000-04, 2007 and 2008. The westslope cutthroat trout population has decreased in recent years, but remains within the long-term range. Bull trout numbers were lower than average in 2008.
- Moose Creek 3.6. This reach is located near the Moose Creek trailhead. It was sampled in 1992-94, 2006, 2007 and 2008. In 2008, 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. It was sampled in 2006, 2007 and 2008. 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), 40 fish (2007) and 33 fish (2008).
- Piquett Creek 1.3 This reach starts upstream of the Forest boundary. It is located in the lower portion of the Piquett Creek watershed that was unburned by the 2007 Rombo Fire. The reach was sampled in 1990-91, 2001-03 and 2005-08, and will be used to monitor effects of the Lower West Fork project. Westslope cutthroat trout are common in the reach, and their numbers have remained stable over the last 18 years. Brook trout were once the dominant species in the reach, but have really declined since the 1990's. A steady decline has occurred throughout the decade of the 2000's, so much so that we were unable to capture enough brook trout to calculate statistically valid estimates in 2007 and 2008. A few bull trout and bull X brook hybrids are sometimes found in the reach. An incidental rainbow trout or brown trout has also been captured in the reach in some years. There was no detectable change in fish populations in the reach in 2008 as a result of the 2007 Rombo Fire.
- Reimel Creek 2.6 This reach starts at the Road 727 crossing. It was sampled in 1990-92, 2000-04 and 2008. Brook trout dominated this reach in the early 1990's, but have really declined since the 2000 fires. In 2008, the estimated number of brook trout > 4 inches was only 8 fish (e.g. numbers prior to 2001 typically exceeded 200 fish). Westslope cutthroat trout numbers have remained strong and stable since the 2000 fires. An incidental brown trout has been captured in the reach in some years, but none were found in 2008.

- Sheep Creek 0.2 This reach starts near the mouth. It was sampled in 1991 and 2008. Westslope cutthroat trout and bull trout are the only two species that have been found in the reach. Numbers of both species were similar in the 1991 and 2008 surveys.
- 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 2000-08 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. In 2001, post-fire mudslides killed most of the fish in the reach. The westslope cutthroat trout population recovered to its pre-mudslide level in 2004-05. In 2008, westslope cutthroat trout population numbers were within the long-term range, but bull trout numbers were below the long-term range. Brown trout are becoming more common in this reach.
- Warm Springs Creek 7.4. This reach is located near the Sheeps Head Creek confluence. It was sampled in 1992, 1994-95, 2006, 2007 and 2008. In 2006-08, westslope cutthroat trout population numbers were similar to past estimates, while the number of bull trout was significantly lower than past estimates.
- Willow Creek 12.1 This reach was sampled in 1991 and 2008. The westslope cutthroat trout population estimate was similar between the years. Bull trout, brook trout and hybrids of the two are also common in this reach.
- Woods Creek 0.9 This reach is located about a mile upstream from the mouth. It was sampled in 1996-97, 2001-03 and 2008. Westslope cutthroat trout are the most common species in the reach, and their numbers appear to be stable. Bull trout, brook trout and bull trout X brook trout hybrids are all present in the reach, with brook trout being somewhat more numerous than bull trout. In 2008, bull trout numbers were lower than those observed in previous surveys, while brook trout numbers were similar to previous surveys.

2008 Bull Trout Snorkel Survey

In 2008, the Forest received $15,000 from the USFS Region One Inventory and Monitoring Board to survey bull trout distribution. The survey was conducted in nine streams that had previous (but scanty) records of bull trout presence, and the surveys were generally 10-18 years old. The streams that were surveyed were Carlton, One Horse, Sweeney, and Willow creeks on the Stevensville Ranger District, and Nelson, Soda Springs, Little West Fork, Watchtower, and Sheephead creeks on the West Fork Ranger District. Snorkeling was the survey method used. The primary objectives of the study were to: (1) see if bull trout were still present in the areas they had been previously found; and (2) if present, determine how far upstream bull trout were distributed in each stream.

The previous surveys generally showed different bull trout distributions from what we found in 2008. Bull trout were not seen in four of the nine streams: Carlton, One Horse, Sweeney and Soda Springs creeks. Bull trout had previously been observed at low densities in these streams, with the exception of Carlton Creek where no bull trout had been previously seen. In Soda Springs Creek, electrofishing surveys conducted in 2004-06 found low numbers of bull trout downstream of our snorkel sections. A survey of Sweeney and One Horse creeks during different seasons and times of day would be useful to verify if bull trout are still present in those streams.

Known occupied bull trout habitat was extended upstream in the five streams where we observed bull trout in 2008 (Willow, Nelson, Little West Fork, Watchtower, and Sheephead creeks). It was expected that snorkeling in these seldom-surveyed streams would expand the known upstream extent of bull trout.

Brook trout were seen slightly further upstream in Sweeney and Nelson creeks than previous surveys indicated. Brook trout were present with bull trout in the lowermost sections of Nelson and Sheephead creeks.

This survey supports the Forest's previous statements regarding the extensive range of westslope cutthroat trout in streams across the Bitterroot National Forest. Westslope cutthroat were, by far, the most numerous and wide ranging fish observed in this survey.

A monitoring report titled "*Bull Trout Presence in Nine Bitterroot National Forest Streams, Summer 2008*" has been written for this study, and is available in electronic or hard copy format upon request from the Bitterroot National Forest Supervisor's Office. The report describes our survey results for each stream in detail.
In addition to the population estimates and snorkel surveys described above, numerous presence/absence electrofishing surveys were conducted across the Forest in 2008. These surveys were generally conducted to gather existing condition data for various Forest projects. 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.

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

- Westslope cutthroat trout populations across the Forest appear to be stable and strong in most streams.
- Bull trout populations have declined in several core area streams in recent years. The sharpest declines have occurred in the East Fork Bitterroot River and Warm Springs Creek. Both of these streams rely on migratory bull trout to maintain production and recruitment, and the number of migratory bull trout in the East Fork drainage has declined in our samples since 2000. Over the same time period, the resident bull trout populations in Skalkaho and Daly Creeks have remained stable with good numbers of all size classes. Water temperatures have been increasing in Forest streams since 1993 due to climatic warming. If temperatures continue to rise in future years, modeling predicts that bull trout distribution on the Forest will shrink, with the lowest elevations losing their bull trout first.
- Brook trout numbers have declined in several streams across the Forest since the early 1990's (e.g. Bertie Lord Creek, Laird Creek, North Rye Creek, Piquett Creek, Reimel Creek and West Fork Camp Creek). In some cases (Laird, North Rye, Reimel), this decline can be attributed to the 2000 fires. In others (Bertie Lord, Piquett, West Fork Camp), however, the reason for the decline is unclear. Westslope cutthroat trout numbers have generally increased in the streams where brook trout have declined.
- For the past couple of decades, Forest and FWP biologists have considered brook trout to be the biggest non-native fish threat to bull trout. In recent years, however, our thinking has changed somewhat. Brown trout have increased their numbers and distribution in several streams in recent years, and may pose more of a long-term threat to bull trout than brook trout do. Warmer water caused by climatic warming is expected to favor brown trout over bull trout. In many streams where they occur together with native trout, brook trout do not appear to be expanding their numbers or distribution.

MOUNTAIN LAKE SURVEYS:
On July 8 to 9, 2008, Fool Hen and Kneaves lakes were surveyed by Forest fish biologists. These lakes are located in the Sapphire Mountain Range, west of Corvallis, Montana, in the headwaters of Willow Creek, a tributary of the Bitterroot River. Both lakes sit at 7400 to 7500 ft in elevation. Gleason Lake is the only other lake in the drainage, and it was surveyed in 2006.

Aquatic life in these two lakes was strikingly different despite their close proximity to each other and physical similarities. Fool Hen Lake and its inlet and outlet contained numerous cutthroat trout and few amphibians, whereas Kneaves was alive with Columbia spotted frogs (*Rana luteiventris*), long-toed salamanders (*Ambystoma macrodactylum*), leaches, freshwater shrimp, diving beetles and other insects on and above the water surface.

Table 35 - Summary of biological and angling data collected during mountain lake surveys.

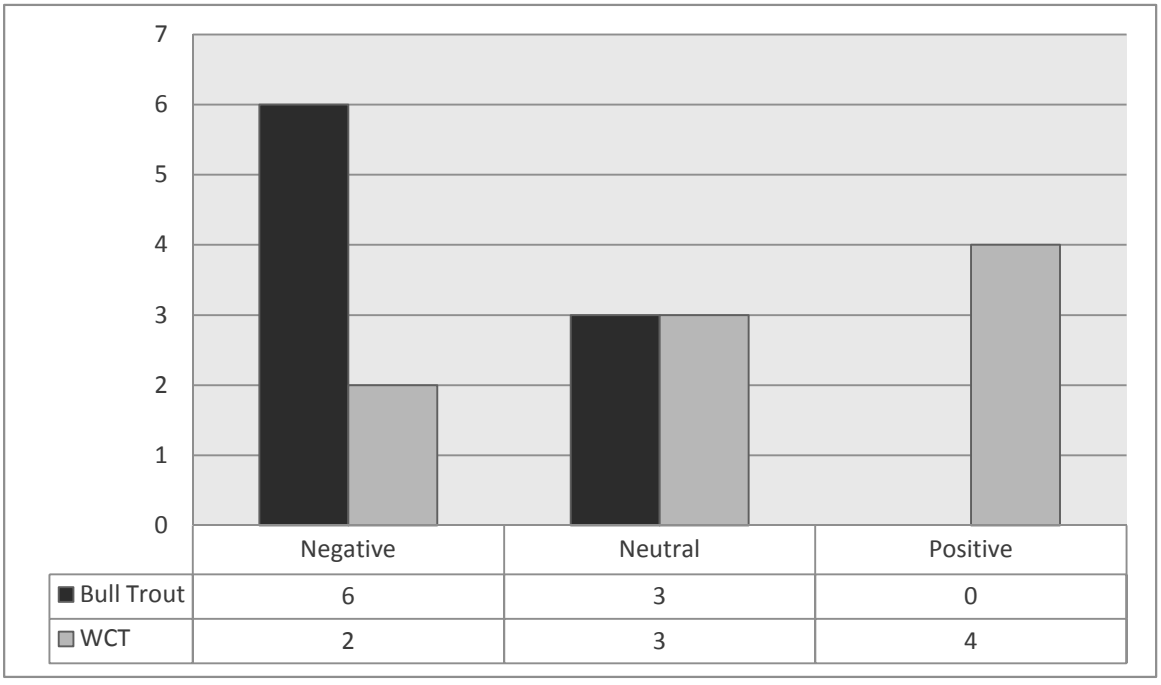
Lake	Fish Present	Catch per Angler Hour	Most Recent Fish Stocking	Trout Life Stages Observed or Limiting Factors	Amphibians in or Near Lake (# observed)
Fool Hen Lake	Cutthroat Trout	Catch per hour approx = 120 fish larger than 8 inches in 19 hrs (plus 4 fish between 4 & 8 inches)	1990 Cutthroat Trout	No fry observed, few juveniles present, Adults abundant, Spawning occurring during survey in 2 inlets & the outlet	None observed in the lake. 1 long-toed salamander found under rock near lake. Columbia spotted frogs in outlet stream.

Kneaves Lake	none	n/a	No Record of Stocking	n/a	Abundant Columbia spotted frogs & long-toed salamanders.

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 two decades 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.

In 2008, we sampled nine long-term fish population monitoring reaches where we capture enough bull trout and westslope cutthroat trout to calculate statistically-valid estimates for both species (Figure 1). Of the nine sites, bull trout numbers were down by more than 10% of the long-term average in six sites, and up in none. Westslope cutthroat trout numbers, on the other hand, were up by more than 10% of the long-term average in four sites, and down in only two sites. The data in Figure 29 affirms our belief that westslope cutthroat trout populations are stable and strong in most streams on the Forest, while bull trout populations are declining in some streams.

Figure 29 – Bull Trout and Westslope Cutthroat Trout Population Trends on the Bitterroot National Forest in 2008



Bull trout populations have declined in several core area streams on the Forest in recent years. The sharpest declines have occurred in Warm Springs Creek (Figure 30) and the East Fork Bitterroot River (Figure 31). Both of those populations rely on migratory bull trout to maintain production and recruitment, and the number of migratory bull trout in the East Fork drainage has declined since 2000. In 2008, the number of young bull trout in the Burnt Fork, Meadow Creek and Moose Creek was also lower than usual. The bull trout populations in Skalkaho and Daly Creeks remain stable with good numbers of all size classes. The bull trout population in Sleeping Child Creek is declining while brown trout numbers are increasing (Figure 32). Water temperatures have been increasing in Forest streams since 1993 due to climatic warming. If temperatures continue to rise in future years, modeling predicts that bull trout distribution on the Forest will shrink, with the lowest elevations losing their bull trout first. We plan on re-sampling the core area streams again in 2010 to shed more light on this issue.

Figure 30 – Population estimates for Bull Trout in the upper Warm Springs Creek monitoring reach. In 2008, not enough bull trout were captured to calculate an estimate.

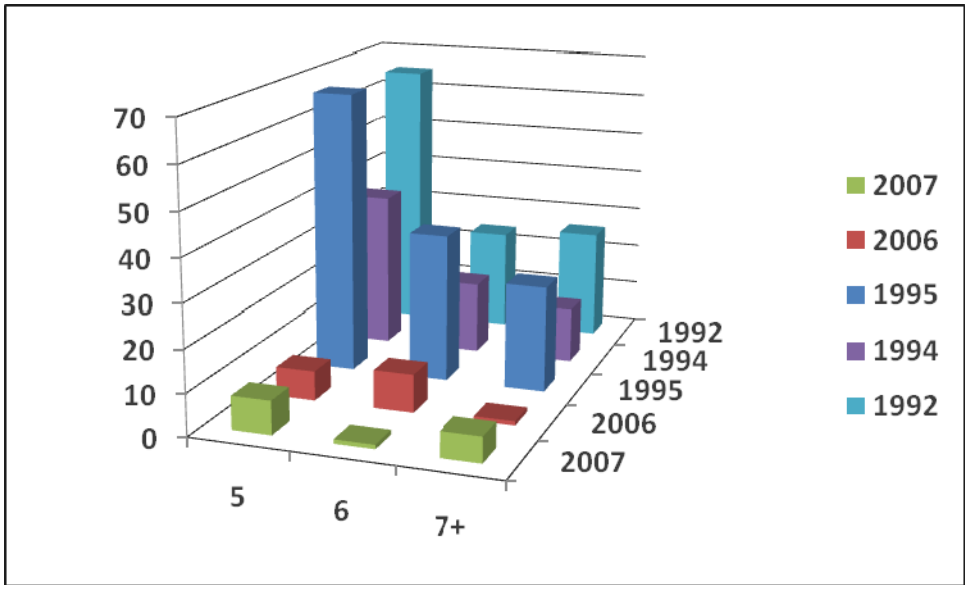


Figure 31– Number of Bull Trout < 12 inches (DV) and > 12 inches (DV > 12) captured in the East Fork Bitterroot River monitoring reach near Conner between 1998 and 2007

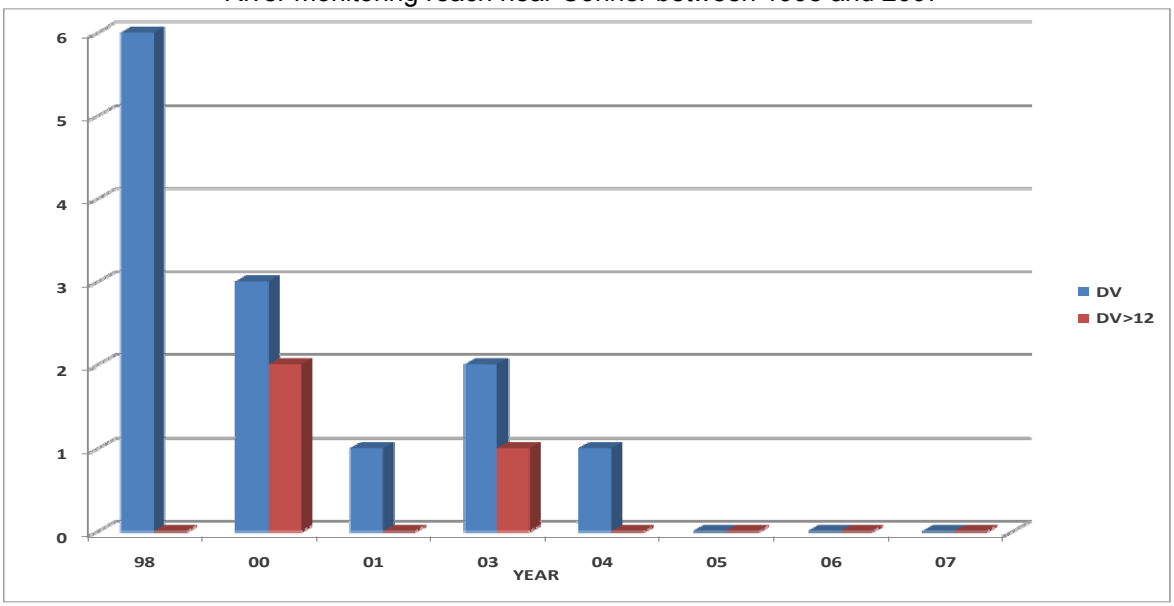
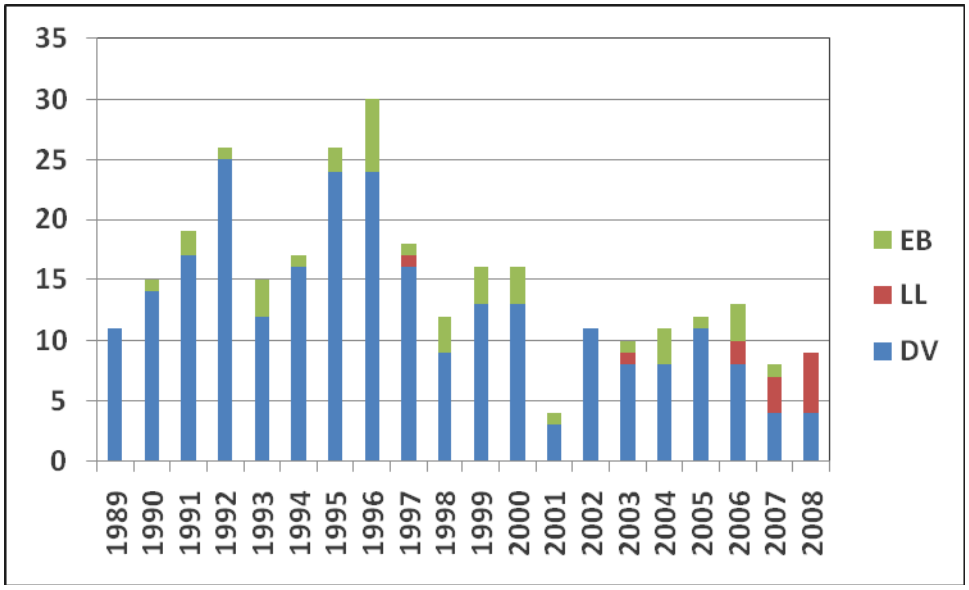


Figure 32– Number of Bull Trout (DV), Brook Trout (EB) and Brown Trout (LL) captured in the Sleeping Child Creek monitoring reach (near the hot springs) between 1989 and 2008



Westslope cutthroat trout populations are currently stable and 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.

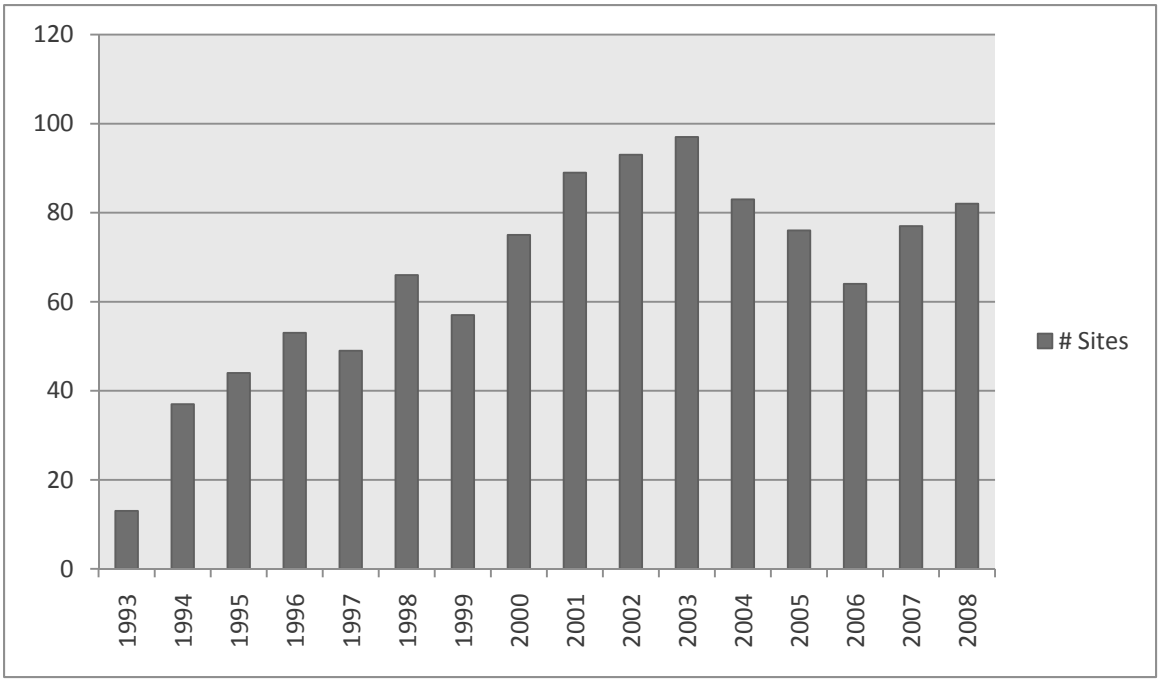
An estimated 63% of the westslope cutthroat populations that have been tested on the Forest are genetically unaltered. In general, hybridized populations are more prevalent in the Westside canyon streams and the larger rivers (East Fork, West Fork and main stem Bitterroot); while genetically unaltered 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.

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 33.

Figure 33- 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.

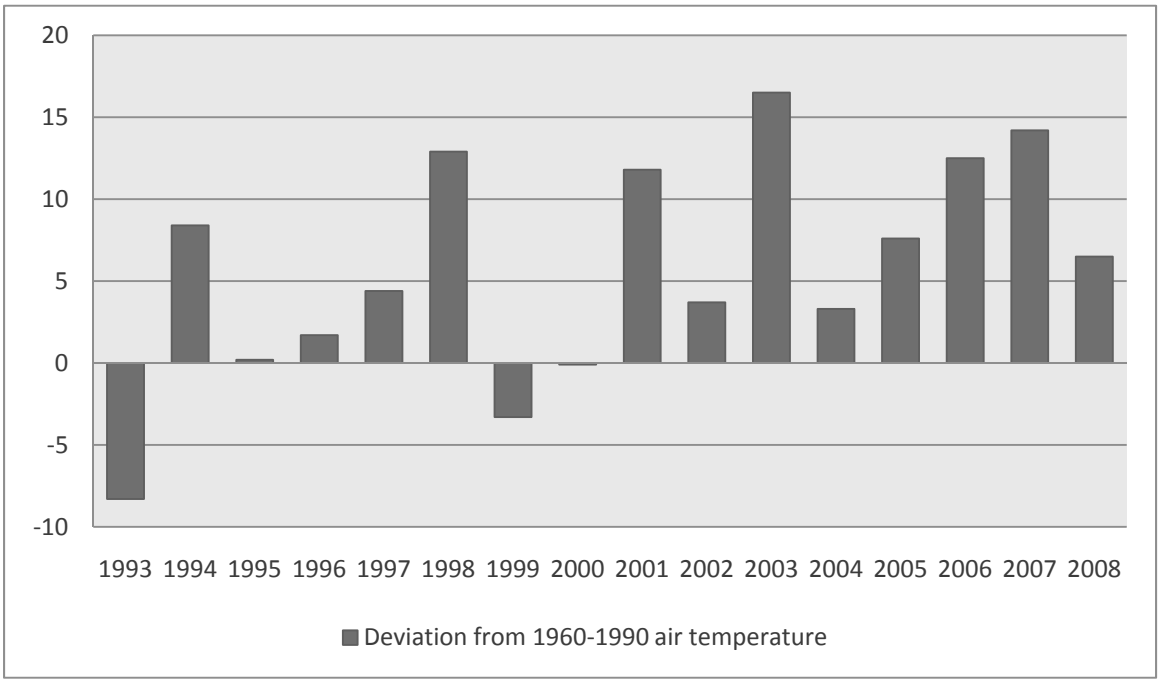
There is a correlation between summer air temperatures and water temperatures, and this affects the number of degree-days. For example, during hot summers like 2003, most of the monitoring sites on the Forest set their all time highs for degree-days. During cold summers like 1993, most of the sites set 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 34 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.

The trend in air temperatures over the past 16 years indicates that summers are getting warmer on the Bitterroot National Forest. Another trend that we have seen in some of the years since 2000 is that hot (100° F) temperatures have been arriving earlier in July, sometimes prior to the start of our July 18th monitoring period.

Figure 34 - Deviations from the mean 30-year July-September air temperatures at the Stevensville Ranger Station Weather Station, 1993-2008

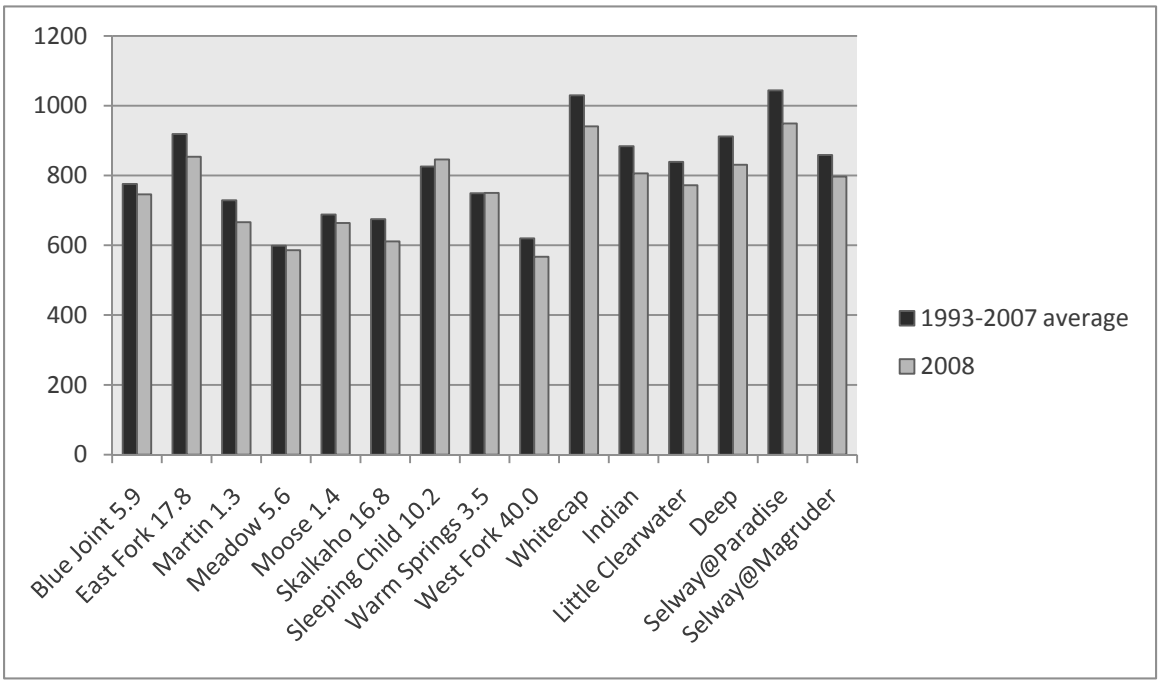


Summer 2008 was cooler than the past two hot summers, but still slightly warmer-than-average when compared to the 30 year average of mean air temperatures (Figure 34). Unlike 2006 and 2007, there were no lengthy periods of unusually hot weather, and the hottest days of the summer occurred on August 16-18th. The warmest consecutive 7-day period of stream temperatures usually occurs sometime during the last two weeks of July or the first week of August. That was true of the smaller streams in 2008. Most of the larger streams, however, experienced their warmest consecutive 7-days between August 12th and 20th.

Despite the air temperatures being slightly warmer-than-average, summer 2008 turned out to be the coldest water year that the Forest has experienced since 1993 or 1995. 42 of the 82 monitoring sites (51%) had their lowest degree day readings on record in 2008, including some notable index sites such as Skalkaho Creek 16.8 and the East Fork Bitterroot River 17.8 which have been monitored almost every summer since 1994. On the Idaho portion of the Forest, four of the six index sites recorded their lowest degree day readings on record in 2008.
In 2008, the emphasis of our water temperature monitoring consisted of a mix of index site monitoring, timber sale monitoring, TMDL monitoring, and post-fire monitoring (2000 fires and 2007 Rombo Fire). Our results are discussed below.

Index Site Temperature Monitoring.
Index sites are unburned reference sites that are monitored every year. They function as control sites, and allow us to sort out some of the year-to-year variability that occurs as a result of weather. In 2008, we monitored temperatures at 15 index sites. Nine of the sites were located on the Montana portion of the Forest; six of the sites were located on the Idaho portion of the Forest. The index sites have been monitored nearly every year since the early 1990's. In 2008, 13 of the 15 index sites recorded degree day readings that were lower than their 1993-2007 average (Figure 7). Four of the six sites in Idaho recorded their lowest degree day readings on record.

Figure 7 – Index site degree days in 2008 compared to their 1993-2007 average degree days



Project Level Temperature Monitoring

Middle East Fork Timber Sale. Middle East Fork timber harvest occurred in the Springer and Jennings Camp Creek drainages in 2007 and 2008. 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" (2008) water temperatures in two treatment streams (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 Springer and Jennings Camp Creeks. We did not monitor water temperatures in Mink Creek in 2008 because our 2007 monitoring data showed that the Spring Mink timber sale had no effect on water temperatures in that stream. The monitoring results are summarized in Table 36. For Springer Creek, the data indicates that the degree day relationship between Springer Creek and the control stream remained essentially the same before and after the Middle East Fork timber harvest occurred (Table 36). Changes of < 20 degree days 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). For Jennings Camp Creek, the data indicates that the degree day relationship between Jennings Camp Creek and the control stream differed before (2003-06) and after (2008) harvest. In 2003-06, Jennings Camp Creek averaged 32 degree days colder than the control stream. In 2008, however, the control stream was 14 degree days colder than Jennings Camp Creek (Table 36).

Table 36 Middle East Fork Water Temperature Monitoring Results

Treatment Streams	Mean difference in degree days between the treatment streams and the control stream in 2003-06, before harvest	Difference in degree days between the treatment streams and the control stream in 2008, after harvest	Conclusion
Springer Creek	7 degree days colder than the control site	11 degree days colder than the control site	The relationship between Springer Creek and the control stream remained essentially unchanged before and after harvest.
Jennings Camp Creek	32 degree days colder than the control site	14 degrees warmer than the control site	Jennings Camp Creek averaged 32 degree days colder than the control stream in 2003-06. However, in 2008 the relationship changed with the control stream being 14 degree days colder than Jennings Camp Creek.

At first glance, the data in Table 36 appears to suggest that timber harvest resulted in warmer water temperatures in Jennings Camp Creek. However, that seems unlikely because no harvest occurred in the Jennings Camp Creek RHCA (i.e. all of the shade in the riparian area was maintained), only a small portion of the watershed was harvested in the uplands, and Jennings Camp Creek still recorded its coldest temperatures on record in 2008. A closer look at the 2004-06 data indicates that degree days were less variable in Jennings Camp Creek than in the control stream in the years proceeding harvest (Table 37). This suggests that Jennings Camp Creek does not heat up or cool down as rapidly as the control stream, which could explain why Jennings Camp Creek did not cool down as much as the control stream in 2008, the coldest water year that the Forest has experienced since 1995. Forest fisheries biologists will monitor water temperatures in Jennings Camp Creek and the control stream again in summer, 2009 to further investigate this relationship.

Table 37 Pre-Harvest Degree Day Variability in Jennings Camp Creek and the Control Stream

	2004	2005	2006	Range of variability in 2004-06 degree days	2008
Control stream	712	661	689	51	633
Jennings Camp Creek	697	655	679	42	647

Lil' Lyman Timber Sale. Lil' Lyman timber harvest occurred in the North Fork of Lyman Creek drainage in 2007 and 2008. Intermittent log hauling occurred during that same time period on Road 311 along Guide Creek. 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 2001-2003 in the North Fork of Lyman Creek) and "after harvest" (2008) 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 38. The data indicates that both the North Fork of Lyman Creek and Guide Creek got colder in 2008 relative to the control site. For example, the North Fork of Lyman Creek was 21 degree days colder in 2008 (after timber harvest) relative to the control site than it was in 2001-03. The same pattern occurred in Guide Creek, which was 42 degree days colder in 2008 relative to the control site than it was in 2003-06. The most likely explanation for the colder temperatures we measured in the North Fork and Guide Creek in 2008 is that stream shade continues to recover after the 2000 fires, which is causing temperatures to gradually cool to their pre-fire levels. This was also observed in 2007. It is a natural feature of post-fire recovery that was not predicted in the fisheries biological assessment. Guide Creek, for example, recorded its coldest

temperatures on record in 2008. The data supports the NEPA prediction that measurable water temperature increases would not occur in the North Fork of Lyman Creek and Guide Creek as a result of the Lil' Lyman timber sale. Timber harvest was not allowed in the RHCAs in the Lil' Lyman timber sale, which means that all of the stream shade was maintained.

Table 38 Lil' Lyman Water Temperature Monitoring Results

Treatment Streams	Mean difference in degree days between the treatment streams and the control stream in 2001-06, before harvest	Difference in degree days between the treatment streams and the control stream in 2008, after harvest	Conclusion
North Fork of Lyman Creek	136 degree days warmer than the control site	115 degree days warmer than the control site	North Fork Lyman averaged 136 degree days warmer than the control stream in 2001-03. However, in 2008 the relationship changed with North Fork Lyman cooling by 21 more degree days than the control stream.
Guide Creek	3 degree days warmer than the control site	39 degree days colder than the control site	Guide Creek averaged 3 degree days warmer than the control stream in 2003-06. However, in 2008 the relationship changed with Guide Creek cooling by 39 more degree days than the control stream.

TMDL Temperature Monitoring. The Bitterroot Headwaters TMDL designated five water bodies as thermally impaired (East Fork Bitterroot River; West Fork Bitterroot River; Hughes Creek; Overwhich Creek; and the Nez Perce Fork). In the TMDL Monitoring Plan, a total of 12 sites were assigned for water temperature monitoring in those five streams, with specific water temperature targets for each site. Table 39 lists the thermally impaired water bodies, their specific monitoring sites and targets, and how 2008 temperatures compared to the targets.

Table 39 Bitterroot Headwaters TMDL Water Temperature Monitoring Results

Thermally Impaired Streams	TMDL Monitoring Sites	TMDL Target (warmest 7-day mean-maximum temp)	2008 Temperature (warmest 7-day mean-maximum temp)
East Fork Bitterroot River	River mile 0.5	< 15.0° C	20.1° C
	River mile 17.8	< 15.0° C	17.6° C
	River mile 31.4	< 12.0° C	15.3° C
West Fork Bitterroot River	River mile 1.2	< 15.0° C	19.7° C
	River mile 22.2	< 15.0° C	18.7° C
	River mile 40.0	< 12.0° C	10.8° C
Hughes Creek	Stream mile 1.4	< 15.0° C	17.0° C
	Stream mile 9.0	< 15.0° C	15.6° C
Overwhich Creek	Stream mile 2.0	< 15.0° C	18.2° C
	Stream mile 7.0	< 12.0° C	15.3° C
Nez Perce Fork	Stream mile 1.0	< 15.0° C	No data, thermograph lost
	Stream mile 11.0	< 12.0° C	13.9° C

Only one of the TMDL monitoring sites (West Fork Bitterroot River 40.0) met its target in 2008, despite it being the coldest water year in the Bitterroot River basin since 1993 or 1995. The Hughes Creek 9.0 site came close to meeting its target in 2008, but fell a few percentage points short. When the Headwaters TMDL was being written in 2004-05, there was considerable discussion between the Montana Department of Environmental Quality (DEQ) and our Forest fisheries biologists about the feasibility of the water temperature targets. Specifically, the Forest fisheries biologists felt that the 15° C target was not naturally attainable and thus infeasible for large stream systems such as the East Fork, West Fork, Hughes Creek, Overwhich Creek and the Nez Perce Fork. Forest fisheries biologists wanted an 18° C target for the middle and lower reaches of the East and West Forks, and a 17° C target for the lower reaches of Hughes, Overwhich and the Nez Perce Fork. At the upper sites, the

biologists wanted a target of 15° C because the monitoring data shows that temperatures in large, unmanaged streams on the Forest will naturally exceed 12° C in nearly all years. After much discussion, DEQ decided to adopt the INFISH Riparian Management Objective water temperature standards for the sake of consistency.

In 2008, four of the TMDL monitoring sites (East Fork 17.8; Hughes Creek 1.4; Hughes Creek 9.0; and Overwhich Creek 7.0) recorded their lowest degree day readings on record, yet none of them met their TMDL targets. Four other TMDL monitoring sites (West Fork 1.2; West Fork 22.2; West Fork 40.0; and Nez Perce Fork 11.0) came within a few degree days of recording their lowest readings on record. The monitoring data that the Forest has collected over the past 16 years strongly suggests that the TMDL water temperature targets were set too low, and will be not be attained in the majority of sites, even in the coldest years.

Rombo Fire Temperature Monitoring. The 2007 Rombo Fire burned about 40% of the fish-bearing riparian areas in the Piquett Creek drainage. In 2008, water temperatures were monitored in Piquett, East Piquett, Castle and Britts creeks to discern any effects from the Rombo fire. The monitoring sites were located near the mouths of Castle and Britts creeks, and where Piquett and East Piquett creeks exit Forest Service land. An abundance of pre-fire data was collected at these sites during the years 2002-06, and we used that data for comparison.

We were unable to distinguish any fire-related temperature effects in Piquett and East Piquett creeks where those streams exit Forest Service land. There were no distinguishable increases in the daily maximum temperatures or in the size of the range of diurnal fluctuations in either stream. In Castle Creek, there were no distinguishable increases in daily maximum temperatures, but there was a larger diurnal fluctuation between the daytime highs and nighttime lows, which indicates some relatively minor fire-related effect. In Britts Creek, the daily maximum temperature increased by about 2.5º C over the 2002-06 average, and the diurnal fluctuation between daytime highs and nighttime lows was much larger than pre-fire conditions. The 2008 data confirms that significant warming and alteration of the daily temperature regime has occurred in Britts Creek as a result of the Rombo fire. This response was expected because most of the headwaters of Britts Creek were burned at moderate or high severity.

Fires 2000 Temperature Monitoring. Water temperatures were monitored in 19 sites affected by the 2000 fires. Some of the sites had overlapping reasons for monitoring, such as TMDL or index sites that were also affected by the 2000 fires. In 2008, 16 of the 19 burned sites (84%) recorded their lowest degree day readings since before the 2000 fires. The recovery of temperatures following the 2000 fires has been most evident in the small burned streams (e.g. Cameron, Guide, Gilbert, Hart, Jennings Camp, Lyman, North Cameron) where the return of shade from shrub cover has been extensive. It is more difficult to detect recovery in the larger burned streams (e.g. Meadow, Overwhich, Sleeping Child, Warm Springs) because other factors may have a greater influence on their temperature regimes than simply shade. We never have been able to detect much difference between pre and post-fire temperatures in the middle and lower reaches of the East Fork Bitterroot River. The exception is the upper monitoring site (milepost 31.4) near the Anaconda-Pintlar trailhead, where temperatures have been noticeably warmer since the 2000 fires.

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.
- Were the colder water temperatures that occurred in 2008 an anomaly or the beginning of a trend? The future will tell.
- The decline of bull trout that we have observed in some streams since 2006 may be related to stream temperature warming. The most vulnerable stream reaches are at the lower elevations where the lower limit of bull trout distribution currently exists.
- If water temperatures continue to increase in future years, bull trout distribution will shrink across the Forest, with the populations at the lowest elevations disappearing first. The most conservative climate models suggest warming in the range of 1.6º C over the next 50 years, which could result in suitable bull trout habitat

being reduced by 30-40% on the Forest. Some of the more liberal models suggest warming in the range of 6º C over the next 50 years, which could eliminate suitable bull trout habitat from all but the highest elevations.

- The 2007 Rombo Fire caused significant warming and alterations of the daily temperature regime alterations in Britts Creek. In the other fish-bearing streams that were burned in the Piquett Creek watershed, the Rombo Fire either had no distinguishable effect on water temperatures (Piquett and East Piquett creeks at the Forest boundary), or minimal effect (Castle Creek).
- Recovery of temperatures following the 2000 fires is furthest along in the small burned streams (e.g. Cameron, Guide, Gilbert, Hart, Jennings Camp, Lyman, North Cameron) where the return of shade from shrub cover has been extensive. Recovery is less evident in the larger burned streams where shade cover is less extensive.

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-Pintlar 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 autumn for bull trout redds since 1994. In October 2008, Forest fisheries biologists counted six bull trout redds in the Meadow reach. This was on the lower end of the range (1 to 21 redds) counted between 1994 and 2007. Over the years, there has not been a correlation between the number of redds counted and the number of juvenile bull trout captured in electrofishing mark/recapture estimates. Redd counts have fluctuated at low numbers, while juvenile bull trout have remained generally common. Either we cannot reliably count bull trout redds in Meadow Creek (i.e. most of the bull trout may be resident fish whose small redds are difficult to see), or the bull trout are spawning in areas where we are not looking for them.

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. Due to the lack of redds found in previous years, MFWP biologists did not survey this reach 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 2008, MFWP biologists counted five redds in Deer Creek, which was about average for the period between 1994 and 2007 (range 0 to 16 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 a fish population estimate in Deer Creek to compare with the redd count data. An estimate may be made in 2009.

Figure 35 – Resident Bull Trout Redd in Deer Creek

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. The number of redds counted has been 13 (2005), 15 (2006), 16 (2007), and 21 (2008). 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 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. In October 2008, a Forest Service fisheries research crew captured a 16-inch long adult bull trout about three miles upstream of the Trollope-Hawkes ditch diversion. That bull trout was a migratory fish from either the West Fork Bitterroot River or Painted Rocks Dam. It swam over the reconstructed diversion weirs as it made its spawning migration into upper Chicken Creek. Forest fisheries biologists will conduct the Chicken Creek redd survey in 2009 and 2010, which will fulfill its monitoring requirement with the U.S. Fish and Wildlife Service. After the 2010 survey, the U.S. Fish and Wildlife Service will decide whether there is a need to continue counting redds in Chicken Creek.

Daly Creek Redd Survey (Darby Ranger District). The Forest has conducted a bull trout redd survey in a 1-mile long reach of Daly Creek since 1994. Thirty-one redds were observed in 2008, which is a similar to 2003 through 2007. The redds were the size of those typically made by resident bull trout. 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 2009.

Figure 36 - Annual Bull Trout Redd Counts, 1994 to 2008

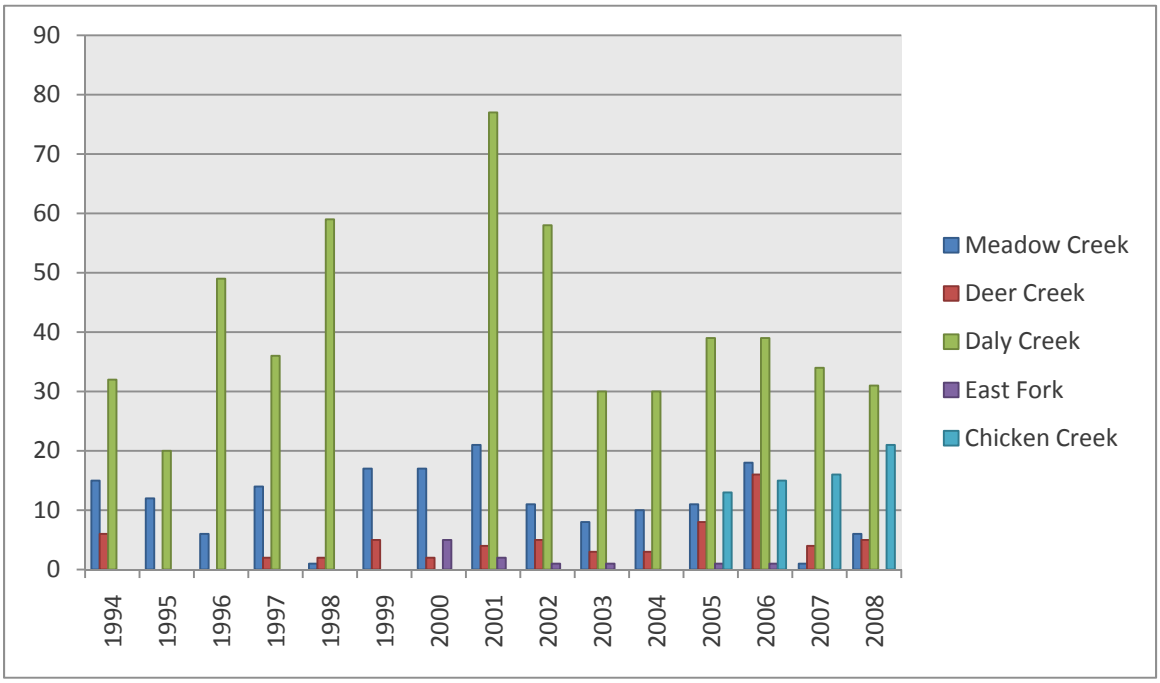


Table 40 – Annual Bull Trout Redd Counts, 1994 to 2008

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Meadow Creek (D3)	15	12	6	14	1	17	17	21	11	8	10	11	18	1	6
East Fork (D3)	ND	ND	ND	ND	ND	ND	5	2	1	1	0	1	1	0	ND
Deer Creek (D4)	6	0	0	2	2	5	2	4	5	3	3	8	16	4	5
Chicken Creek (D4)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13	15	16	21

Daly Creek (D2)	32	20	49	36	59	ND	ND	77	58	30	30	39	39	34	31

ND = No data, not surveyed

These are the key findings of the Forest's monitoring of bull trout redds:

- Redd counts have not been a reliable index of bull trout population trends on the Bitterroot National Forest. Either we are: (1) looking in the wrong places (e.g. what we think is good spawning habitat is not what most of the bull trout are using for spawning); (2) looking in the right places but cannot reliably identify the redds that are present (e.g. most of the redds are small resident redds that are difficult to see); or (3) there are just very few migratory redds, and the redds that are present are widely scattered. Forest and MFWP biologists are reasonably certain that the poor correlation that occurs between redd counts and the electrofishing data is caused by a combination of (2) and (3).
- Redd counts are best used as an index of population trend after key spawning areas have been identified. Without knowing where the key spawning areas are, redd counts have very limited utility. In 2008, Leslie Nyce, a University of Montana graduate student, used radio-telemetry to identify that the East Fork Bitterroot River and its larger tributaries (Orphan and Clifford creeks) in the Anaconda-Pintlar Wilderness Area are a key spawning area for migratory bull trout. Unfortunately, the number of migratory bull trout in the East Fork appears to have declined to such low numbers that it is questionable whether doing more redd surveys would provide any additional information in monitoring population trends. Since 2000, MFWP biologists already had an established redd survey reach (the Upper East Fork redd survey, discussed above) located in the vicinity where the radio-tagged bull trout went. However, the number of redds counted between 2000 and 2007 was very low.
- Radio telemetry could be used to determine where the bull trout in Painted Rocks Lake go to spawn. 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.

BULL TROUT MOVEMENT AND GENETIC RESEARCH:

Leslie Nyce, a graduate student at the University of Montana and MFWP biologist, started a research project in 2008 investigating the movement and population genetic structure of the bull trout population in the East Fork Bitterroot River drainage. Leslie's activities in 2008 included capturing and surgically implanting radio transmitters in fluvial bull trout adults from the East Fork Bitterroot River, tracking their spawning movements, and collecting non-lethal fin samples for genetic analysis from bull trout in the East Fork and some of its spawning tributaries. Six fluvial bull trout were implanted with radio transmitters in March/April, 2008. The bull trout were collected between Blind Draw and Tolan Creek. Four of the six fish were tracked to spawning tributaries in the upper East Fork drainage — Martin Creek, Orphan Creek, Clifford Creek, and an undetermined site in the upper East Fork in the vicinity of Clifford and Carmine Creeks.

A total of 262 fin samples were collected from bull trout ranging in size 50.8-609.6 mm. 206 of the fin samples were collected from seven spawning tributaries and one section of the upper East Fork in the Anaconda-Pintlar Wilderness Area; the other 56 fin samples were collected from bull trout (mostly juveniles) in the main stem East Fork between Conner and Meadow Creek. There are 17 tributaries to the East Fork that are known to contain bull trout. Fin samples were collected from seven of those 17 tributaries in 2008; summer 2009 will involve collecting fin samples from the remaining 10 tributaries.

Determining the genetic population structure will involve investigating genetic differences within tributary bull trout populations and genetic variation among tributary bull trout populations. Studies in other areas have found relatively little genetic variation within bull trout populations but substantial divergence among populations, the same is expected for the East Fork. If such genetic structure exists, it will be possible to assign bull trout from the main stem East Fork to the tributaries where they originated, helping to determine where fluvial bull trout come from. This information would be very useful in identifying key spawning areas for fluvial bull trout.

It is important to determine the genetic population structure of bull trout in the East Fork because the findings can help determine the best conservation and management actions. For example, if all of the bull trout populations in the East Fork drainage are genetically identical, they can be managed as one population. However, if the bull

trout populations are genetically distinct, they need to be managed as individual populations. This information will help direct the most efficient ways to allocate money for bull trout conservation and management in the East Fork Bitterroot River drainage.

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 41 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 41 – 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.	110	78 (71%)	0 (0%)	32 (29%)
Stevensville and Darby R.D.	45	33 (73%)	3 (7%)	9 (20%)
Montana DNRC land	6	1 (17%)	1 (17%)	4 (66%)

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, 59 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 (50 of the 59) 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 2008, the Forest replaced one fish barrier culvert with a new bridge (Meadow Creek, Road 5758), and replaced four barrier culverts with fish passable stream simulation culverts (Hart Creek, Road 311; Hart Creek, Road 73180; Mink Creek, Road 5753; and Castle Creek, Road 49) (See Table 41).

Figure 37 - Road 5758 culvert on Meadow Creek, before removal. May 2008

Figure 38 – Same crossing, after culvert removal and installation of a new bridge. August 2008.

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 42 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 or 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 42 – Status of culverts replaced or removed to eliminate fish passage barriers, 2000 to present

District[4]	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		

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, BAR – Burned Area Recovery Project

District[4]	Stream	Road	Year replaced or removed?	Fully functioning	Partially functioning	Not functioning
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
D4	Castle Creek	49	Replaced, 2008 (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	West Fork Camp, trib 0.1	729-B	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		
D3	Meadow Creek	5758	New bridge, 2008	X		
D3	Hart Creek	311	Replaced, 2008	X		
D3	Hart Creek	73180	Replaced, 2008	X		
D3	Mink Creek	5753	Replaced, 2008	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 (upper)	311	Replaced, 2001	X		
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, trib 0.9	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 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 re-sampled the electrofishing sections above and below the Road 5662 culvert in July, 2008. Sometime during the high runoff flows of May/June 2008, one of the grade control structures about 20 feet upstream of the culvert inlet failed, which triggered a chain reaction that caused the next downstream grade control structure at the culvert inlet to fail, and a considerable amount of substrate to get scoured out of the upper half of the culvert barrel. After this event, fish could no longer swim upstream past the road crossing, which confounded our results. Higher flows in 2008 also reduced electrofishing efficiency, which further confounded our results. As a result, we found fewer fish above and below the road crossing in 2008. Below the culvert, we found 36 westslope cutthroat trout and 4 brook trout > 3 inches in 2008 (as compared to 83 westslope and 2 brook trout in 2007). Above the culvert, we found 28 westslope cutthroat trout > 3 inches and no brook trout in 2008 (as compared to 38 westslope and 1 brook trout in 2007). The grade control structures may be repaired in 2009 or 2010 (which would re-establish fish passage) provided that adequate funding is available to do the work.

NEPA Backlog: There are currently 25 fish barrier culvert replacements or removals on the Forest that have NEPA analysis completed. Of those, two are scheduled to be implemented in 2009 (designated with ** in Table 43), and four will be contracted in 2009 (designated with # in Table 43). About half of the culverts listed in Table 11 have survey and design completed. The Forest is pursuing opportunities to fund these backlog culverts as opportunities arise, but it is a slow process. Culverts that have NEPA completed but the Forest have dropped from consideration for various reasons are not listed in Table 43.

Table 43 lists the fish barrier culvert replacements or removals that have NEPA analysis completed, but have not been implemented.

Table 43 – 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
Waugh Creek	Road 13334	Burned Area Recovery FEIS/ROD, 2001
East Piquett Creek **	Road 731	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 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
Spoon Creek	Road 13225	Trapper Bunkhouse FEIS/ROD, 2008
North Fork Willow Creek **	Road 13131	NF Willow Creek Culvert Replacements For Fish Passage DM, 2008

Stream	Road #	NEPA Document and Date of Decision
North Fork Willow Creek	Road 969-A	NF Willow Creek Culvert Replacements For Fish Passage DM, 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 is more likely to occur on small streams than 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. Twenty-two of the Burned Area Recovery culverts have been replaced (21) or removed (1), and one culvert (East Piquett Creek, Road 731) is scheduled for replacement in 2009. Two more culverts (Two Bear Creek, County 85-D and Mine Creek, Road 5688) will be awarded contracts in 2009, with replacement to occur in 2010 or 2011.
That leaves 12 culverts unaccounted for. Of those, ten culverts were dropped from treatment for the following reasons:

- Additional surveys revealed that no fish were present near or above the culvert (Bugle Creek, Road 73609; Elk Creek, Road 13860)
- Culvert was replaced by Fires 2000 Burned Area Emergency Rehabilitation (North Rye Creek, Road 321 crossing in section 31)
- Culvert is the responsibility of the Montana Department of Transportation (Daly Creek tributary 3.2, Skalkaho Highway)

- Culvert is the responsibility of Ravalli County (Malloy Gulch, Mill Gulch, and Taylor Creek, County 104-D)
- Culvert is located on private land (North Rye Creek tributary 4.3, Road 62435) and barrier should be retained to protect cutthroat trout from brook trout from entering higher in the drainage.
- Culvert is located on a stream that dries up in summer (Spring Gulch, Road 75).
- Culvert is providing adequate fish passage at nearly all flow levels (since the 2001 mudslides, the culvert has retained substrate with minor constriction issues). Monitoring will continue as the fish passage situation could change as the channel evolves (Rye Creek, Road 5612).

When the dropped culverts are subtracted, there are only two culverts left to replace. Those are:

1. North Rye Creek, Road 8111
2. Waugh Creek, Road 13334

Engineering designs have also been completed for the North Rye Creek, Road 8111 and Waugh Creek, Road 13334 culverts, but both replacements are currently on hold because the status of their respective roads could be changed by the Forest's Travel Management EIS. One or both of the culverts could possibly be removed instead of replaced pending the outcome of the Travel Management EIS.

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 post-fire restoration funds being taken away to address firefighting needs elsewhere in the nation. The Forest is continuing to chip away at the replacements as funding becomes available. Four of the Burned Area Recovery culverts were replaced in 2008. They are shown in the following photos.

Figure **39** - Road 311 culvert replacement on Hart Creek. September 2008

Figure 40 – Road 73180 culvert replacement on Hart Creek. September 2008

Figure 41 - Road 5753 culvert replacement on Mink Creek. September 2008	**Figure 42 –** Road 49 culvert replacement on Castle Creek. October 2008
	

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 2007. A monitoring report for item 2a has been written, and is available in electronic or hard copy format upon request from 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. 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 trees were felled into Rye Creek in 2002. Photo points were established in 2003, and re-visited by Forest fisheries biologists in 2004 (1-year after felling), 2005 (3-years after felling), and 2007 (5-years after felling). Monitoring of item 2b was completed in 2007. A monitoring report for item 2b has been written, and is available in electronic or hard copy format upon request from 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. Monitoring of item 2c will be completed in 2009. A draft monitoring report for item 2c has been written, and is available in electronic or hard copy format upon request from the Bitterroot National Forest Supervisor's Office.

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 2008 Burned Area Recovery Fish Monitoring Report and the Terms and Condition letter are available in electronic or hard copy format upon request from 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 2008. 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 vegetation was satisfactorily returning to the site. Forest fisheries biologists will monitor the Springer Creek culvert removal site in 2009. If conditions are fine, annual monitoring of the Springer Creek culvert removal project will no longer occur.

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. The structure was stable in 2007, but the trees were washed downstream in late May, 2008 when river flows exceeded bankfull stage for several days. The trees were widely scattered and eventually ended up being recruited to other debris jams further downstream. At bankfull stage, river flows were simply too powerful for the structure to withstand. This project will not be monitored in future years.

Moose Creek Bridge Installation (Sula Ranger District). In August 2007, the Forest removed an undersized fish barrier culvert on the Road 726 crossing of Moose Creek, and replaced it with a new bridge. Forest fisheries biologists monitored the bridge in 2008. The stream channel adjusted in a beneficial manner to the removal of the undersized culvert by scouring away the large gravel bar that had been deposited above the culvert inlet. The stream channel coming into and leaving the bridge now consists of a stable, low gradient riffle of natural width and grade. There are no unnatural drops in gradient above or below the bridge. The stream channel handled the high runoff flows in May/June 2008 without incident. Without the undersized culvert at the Road 726 crossing, there was no risk of flooding or road failure, which is another benefit to the new bridge because the undersized culvert had a history of overtopping during high runoff years. Revegetation of the recontoured portion of Road 726 is progressing nicely. Most of the shrub seedlings that were planted in autumn, 2007 are alive and growing Fish passage is being maintained. Effects to the fishery were consistent with the predictions made in the Burned Area Recovery FEIS and bull trout biological assessment. Forest fisheries biologists will monitor the Moose Creek bridge in 2009.

Figure 43 – Looking downstream from the Road 726 bridge over Moose Creek, immediately after removal of the undersized culvert. August 2007	**Figure 44 –** Looking downstream from the Road 726 bridge over Moose Creek, one year after culvert removal. September 2008
	

Lil' Lyman Road Decommissioning (Sula Ranger District). In 2006, a timber sale contractor recontoured much of Road 13304 in the Lyman Creek drainage. Three fish barrier culverts on an unnamed tributary to Lyman Creek (Lyman tributary 1.8) were removed during the project. Forest fisheries biologists monitored the restored Road 13304 stream crossings in 2008. All of the crossings are maintaining year-round fish passage. The upper crossing on tributary 1.8 is wider than the natural channel and has some braiding due to the deposition of a couple of small gravel bars. The other two crossings are narrow, single thread channels that match the natural channel widths above and below their respective crossings. Most of the shrub seedlings that were planted in autumn, 2006 are alive and growing. Grass growth on the recontoured road segments has been strong. The grass was about knee to waist high in summer 2008, and pretty thick. The recontoured road segments are

starting to blend in with the surrounding hillslopes. Knapweed is common on the recontoured segments, but its density is less than what occurs on the surrounding undisturbed hillslopes. Livestock bank impacts at the restored stream crossings were moderate this year. The crossings are vulnerable to livestock trampling because of a lack of woody obstacles. Forest fisheries biologists plan on remedying this situation in 2009 by covering the crossings with jack-strawed woody debris and allowing one hardened livestock ford at each road crossing. Forest fisheries biologists will monitor the Lil' Lyman road decommissioning project in 2009.

Figure 45 – Upper Road 13304 crossing on Lyman tributary 1.8. This crossing is wider than the natural channel dimension. July 2008.

Figure 46 – Lower Road 13304 crossing on Lyman tributary 1.8. This crossing matches the natural channel dimension. July 2008.

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 culvert removal site in 2008. Fish passage is being maintained. The stream channel has downcut and widened out some since removal, and the substrate at the crossing consists mostly of cobble. Channel width and dimensions at the crossing match the natural channel. Most of the shrub seedlings that were planted in autumn, 2007 are alive and growing. Forest fisheries biologists will monitor the Scimitar Creek culvert removal project in 2009.

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 2008. The wood that was placed in Pierce Creek has formed small pools and is providing good hiding cover for the small westslope cutthroat trout that reside in the stream. It has successfully met objective #1. There has been no significant movement of the wood or associated bank erosion. For a small stream like Pierce Creek, adding wood by hand is an effective and low-cost way to improve fish habitat. The straw bale check dams have successfully met objective #2. The check dams trapped about 45 gallons of road sand in 2006-07 and prevented it from entering Pierce Creek. In 2007-08, the check dams trapped about 25 gallons of road sand and prevented it from entering Pierce Creek. The Pierce Creek woody debris project is not scheduled for monitoring in 2009. Forest fisheries biologists may periodically monitor the project in future years as opportunities or needs dictate; however, it will not be monitored annually.

Taylor Creek Woody Debris Addition (West Fork Ranger District). In June 2004, Forest fisheries biologists placed (by hand) 20 pieces of large wood in the lower half mile of Taylor Creek to improve woody hiding cover for westslope cutthroat trout. Forest fisheries biologists monitored the Taylor Creek project in 2008. During the high

runoff flows of May/June 2008, the first 300 feet of the channelized reach of Taylor Creek above the Hughes Creek Road filled with gravel bedload, which caused Taylor Creek to abandon its channelized reach and move back into its historic stream channel to the east. A couple of the pieces of large wood closest to the Hughes Creek Road got covered with gravel bedload, the rest were located upstream of the affected area and are functioning effectively. The placement of the wood did not cause the bedload deposition, or cause Taylor Creek to abandon its channelized reach. The wood is functioning as planned and providing good woody hiding cover for the small westslope cutthroat trout that reside in Taylor Creek. The Taylor Creek woody debris project is not scheduled for monitoring in 2009. Forest fisheries biologists may periodically monitor the project in future years as opportunities or needs dictate; however, it will not be monitored annually.

Trout Creek Culvert Removal Site (West Fork Ranger District). In 2001, a fish barrier culvert on Trout Creek (a tributary to Overwhich Creek) was blasted out of its road bed with dynamite. Forest fisheries biologists monitored the road crossing in 2008. The high runoff flows of May/June 2008 caused major channel widening, bank erosion and instability, and sediment input at the site of the former culvert. The high flows undercut the toes of the stream banks, causing them to slump and fall into the stream, and leaving behind raw, vertical banks that are now 8-12' high and very unstable. Additional bank slumping and sediment input will occur during future high flow events until the unstable banks come to a stable angle of repose and begin to revegetate. The erosion that occurred in 2008 caused bedload deposition and channel braiding throughout the segment of Trout Creek between the road crossing and Overwhich Creek. That reach is now unstable and will experience lots of changes over the next few years. The lesson learned from the Trout Creek project is that dynamite can successfully remove a fish barrier culvert in a remote location, but it cannot pull the stream banks back far enough, or at a gentle enough grade, to prevent large scale channel widening and bank slumping at high runoff flows. Forest fisheries biologists will monitor the Trout Creek project in 2009

Figure **47** – The Trout Creek culvert blasting site during its first runoff period. June 2002.	**Figure 48 –** The same site three years later at low flows. September, 2005**.**
	

Figure 49 - **The** same site in July 2008, following substantial erosion and bank failure during the high runoff flows of May/June, 2008.

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 2008.

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).

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,

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.

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.

Travel Planning: Over the past few decades, the availability and capability of OHVs has increased tremendously. More Americans are enjoying access and recreational opportunities on their national forests and grasslands, in keeping with the Forest Service's multiple use mandate. However, the increase in OHV use also affects soil, water, wildlife habitat, and other recreational visitors. Today unmanaged recreation, including impacts from off-highway vehicles, represents one of four key threats facing the nation's forests and grasslands.

In 2005, the Forest Service published a new rule for providing motor vehicle access to national forests and grasslands.

Highlights of the Rule

- The rule requires each national forest or ranger district to designate those roads, trails, and areas open to motor vehicles.
- Designation will include class of vehicle and, if appropriate, time of year for motor vehicle use. A given route, for example, could be designated for use by motorcycles, ATVs or street-legal vehicles.
- Once designation is complete, the rule will prohibit motor vehicle use off the designated system or inconsistent with the designations.
- Designation decisions will be made locally, with public input and in coordination with state, local, and tribal governments.
- Designations will be shown on a motor vehicle use map. Use inconsistent with the designations will be prohibited.

The Bitterroot National Forest began its Travel Planning process in late 2007. More than 10,000 public comments were received on the starting point document that was released to the public. The Forest is currently working on reviewing and cataloguing comments into key points and concerns. Once this is complete, the Forest will continue to work with the public in developing alternatives and drafting an Environmental Impact Statement.

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: 2008

EVALUATION AND MONITORING RESULTS:

There were 545 recorded law enforcement incidents on the Bitterroot NF in 2008. Law Enforcement Officers wrote 214 warning notices, 207 incident reports and 124 violation notices. Many of the incidents occurred with no identifiable witnesses or too little information for a complete investigation. The chart below lists the most common incidents reported in 2008.

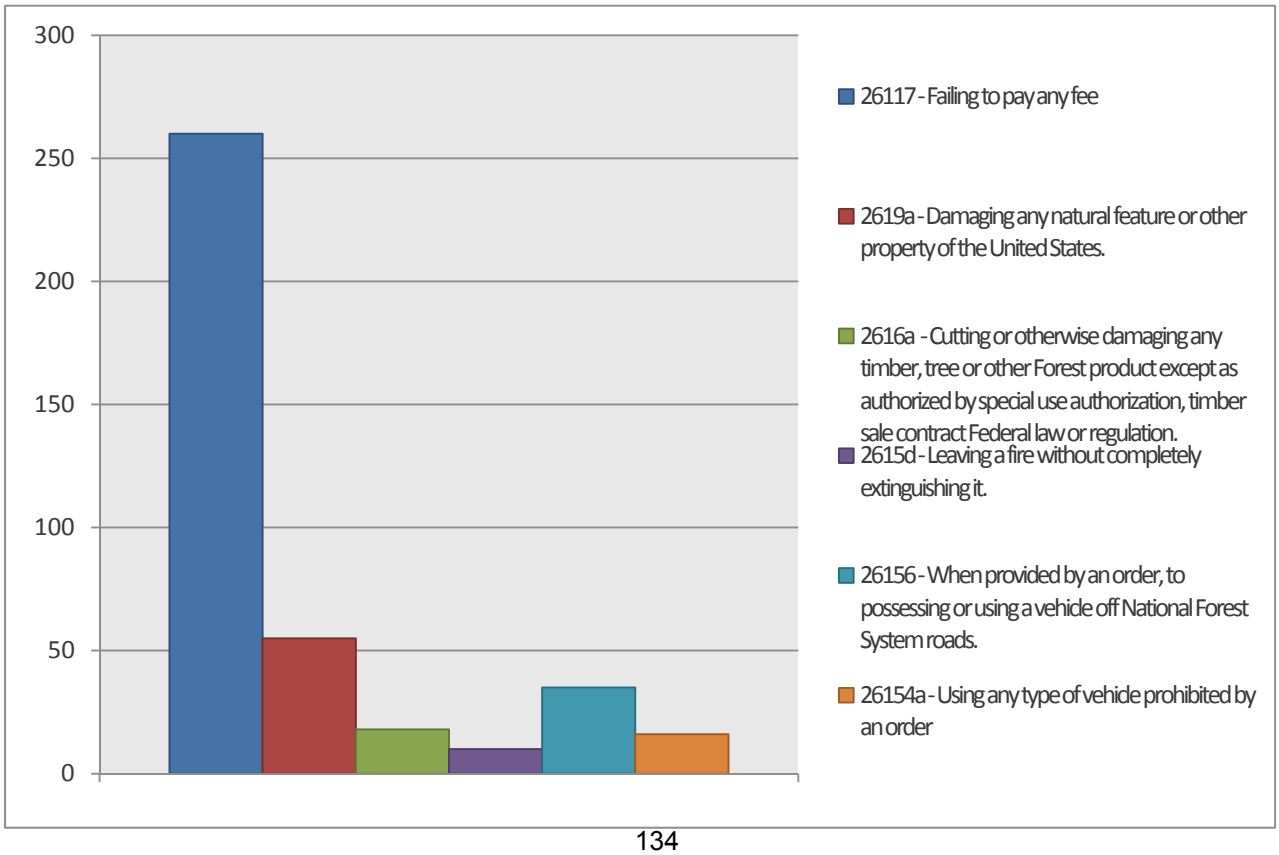
Failure to pay a recreation fee is the most common incident with 168 warning notices, 5 incident reports and 87 violation notices written.

Damage to resources by vehicle use off roads and dumping on the forest continue to be the major law enforcement problems. Use of vehicles off road has created new trails and caused erosion in some areas.

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.

Figure 50 shows the most common law enforcement incidents on the Bitterroot National Forest in 2008.

Figure 50 - Most Common Incidents on the Bitterroot National Forest



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: 2008

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 (Table 44) recommends the following actions related to our 80 developed recreation sites over the next five years:

Table 44 – 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 Cute 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.

In 2008, day use fees at Lake Como were increased to $5.00. Recreation Site Improvement (RSI) projects included Woods Cabin Window repair, purchase materials for the East Fork Guard Station and the Lake Como Boat Launch reconstruction project. Forest Capital Improvement Projects (CIP) included improvements at Overwhich, West Fork Boat Launch and Baker Lake Trailheads. RAC projects accomplished in 2008 included Slate Creek Campground and purchase of materials for East Fork Guard Station. The Spring Gulch RAC project was postponed in 2008.

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: 2008

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 45). 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 was 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 45 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 45 – 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
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

In 2008, an OHV ranger along with forest personnel monitored resource damage and the effectiveness of gate closures. All gates associated with winter/spring seasonal closures were monitored once in the spring and 80% were found to be effectively closed. The percentage of gates inspected that lacked travel management signs were down slightly from 2007. Monitoring of gate structures will need to be continued on a yearly basis to assess the effectiveness of closures.

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)
- Moonshine
- East Piquett
- Gold Creek
- Reimel/Coffee Gulch
- Gird Trail
- Buck Creek
- Coal Creek

2007 inspections showed that this work was successful in Hart Bench and Moonshine and there was increased compliance in Coal Creek. Use is still occurring in Gold Creek, Gird and Coffee Gulch and monitoring continues on all 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 and an August 2007 site visit showed no use occurring.

In 2008, education and law enforcement was successful with increased public contacts. The forest was successful in obtaining grant funding for the OHV ranger. The forest continued to sign areas and trails for appropriate uses and closures. Vandalism continued to be problematic. Preservation and restoration activities are ongoing in the Hart Bench, Dam Lake, Butterfly, Gird and Lick Creek areas. Meadow Creek is starting to receive more use and patrols were increased to monitor use.

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.

In 2008, it appears that the rehabilitation of the mud-bogging areas at Dam Creek Lake, Railroad Creek and Forest Road 720 is still effective. Monitoring activities are ongoing in the Hart Bench, Dam Lake, Butterfly, Gird and Lick Creek areas. Meadow Creek is starting to receive more use; in 2008, patrols were increased to monitor use. Additional public contacts by the OHV ranger are positive.

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: 2008

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 46 displays recreation sites where condition surveys were conducted in 2007.

Table 46 – 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 are available at http://www.fs.fed.us/recreation/programs/nvum or by contacting the Bitterroot NF Supervisor's Office.

In 2008, the National Visitor Use Monitoring Report (NVUM) was made available to the public. Results are available at http://www.fs.fed.us/recreation/programs/nvum. Trails condition surveys were conducted on Wilderness trails, Lake Como Trail and Bass Creek Nature Trail.

Table 47 - Areas surveyed for NVUM

Ranger District	Recreation Site
Stevensville	Blodgett Campground
	Kootenai Creek Trailhead
	Larry Bass Group Site
Darby	Lost Horse Cabin
	Black Bear Campground
	Woods Cabin
Sula	Warm Springs Campground
	East Fork Guard Station
West Fork	Slate Creek Campground
	Magruder Corridor

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 2008.

VARIABILITY: Change in roadless base different from projections in Appendix C of the Forest Plan EIS.

EVALUATION:

In FY2008 the Bitterroot NF did not harvest or construct roads in any roadless area on the Forest.

Between 1988 and 2008, 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 2008 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 2008, 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 2008.

Table 48 displays the acres of actual roading or harvesting once it has occurred on the ground.

Table 48 - Roadless Area (MA 1, 2, 3a, 3b, and 3c) Access and Harvest 1988 To 2008

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, 1988-2008	Actual Acres Affected by Harvest, 1988-2008	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

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, 1988-2008	Actual Acres Affected by Harvest, 1988-2008	Change in Inventoried Roadless Acres
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: 2008.

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 2008.

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 2008, the Bitterroot National Forest started culvert installations and drainage improvement on 6.57 miles of Skalkaho Rye Road, NFSR 75. Work began at the junction of NFSR 75 and the junction of North Rye Creek Road NFSR 321 and proceeded up the Rye Creek drainage on NFSR 75.

Aquatic Organism Passage (AOP) projects account for 0.10 miles of road improvement per project, there were four accomplished in 2008, they are as follows, Hart Creek (2), Castle Creek and Mink Creek. Funding of these projects was a combination of 2007 and 2008 fiscal dollars. The Hart Creek installation were accomplished with 2007 funding while East Piquett, Castle, and Mink Creek were accomplished with 2008 funding. East Piquett Creek culvert replacement was funded in FY 2008, and scheduled for construction in FY 2009. These culverts were identified for replacement in the Burned Area Restoration (BAR) EIS, 2001. For a complete list of BAR fish barrier culverts that have been replaced see Item 22 - Riparian Area Condition.

In addition to the AOP culvert installations the Bitterroot National Forest also removed a fish barrier culvert on Meadow Creek and replaced with a bridge. The new bridge spans Meadow Creek on the Kerlee Downing Road NFSR 5758, near its junction with Meadow Creek Road NFSR 725. Meadow Creek Bridge was accomplished with 2007 funding.

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 51Error! Reference source not found. and Figure 52**).**

Much of the work associated with road storage and obliteration in 2008 was identified in the Burned Area Record of Decision (ROD). 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 2008 the Gilbert Moonshine Decommissioning project obliterated 12.88 miles of road prism in the Gilbert Creek and Moonshine drainages.

Figure 51 - Picture of Road 13304 station 147+40 prior to recontour

Figure 52 - Picture of road 13304 station 147+40 taken a year after full recontour.

Road Maintenance

The Bitterroot National Forest's road crew maintained a total of 330.3 miles of road, the breakdown of road miles per maintenance level (ML) is as follows:

Maintenance Level	Number of Miles
ML 1	0.0
ML 2	55.5
ML 3	249.4
ML 4	6.7
ML 5	18.7

Yearly routine maintenance items completed in FY 2008 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 2008. These projects include: Lake Como boat launch access road and riprap, Job Corp boat launch, Slate Creek Campground rehab, Baker Lake Trailhead and road reconditioning, and Trapper Creek Trailhead.

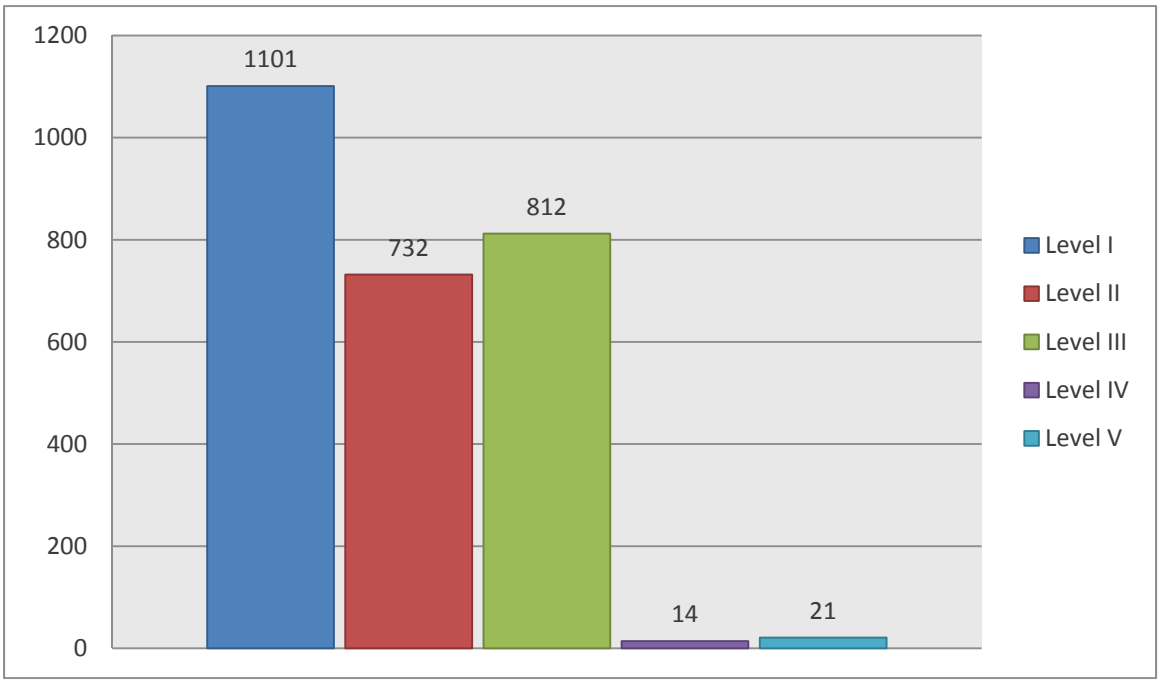
Road Maintenance Status

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:[5]

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.

[5] 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 53 - 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 2008

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 2008, 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 2008 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 2008

VARIABILITY: +/- 20 percent difference from Forest Plan annually and +/- ten percent over a five-year period.

EVALUATION:

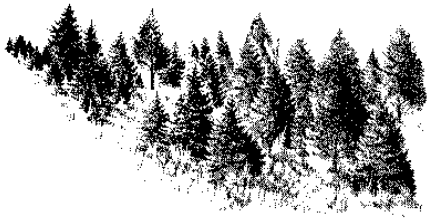
The 1987 Forest Plan projected a planned annual timber sale quantity (allowable sale quantity, or ASQ) of 33.37 million board feet (MMBF). The Plan predicted that this volume would be harvested each year from approximately 3,647 acres in Management Areas (MAs) 1, 2, 3a, 3b and 3c. Actual harvest volumes 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 2008, the Forest offered and sold 38% of the planned annual ASQ and 50% 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-one year period since the Forest Plan was approved. More acres were sold in Management area 3a than anticipated in the Forest Plan. This is not unexpected since treating stands in the urban interface is a priority and many of these acres are in MA 3a.

As shown in Figure 54**,** 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 21 years approximately 86% of the total volume offered was sold. All sales advertised in 2008 were awarded. Lost Buck Timber Sale which was advertised in 2007 with no bids received was sold as part of the Teepee Blend Timber Sale.

The annual, 5-year and 21-year harvest levels are outside the desired variability, as specified in the Forest Plan. In 21 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:

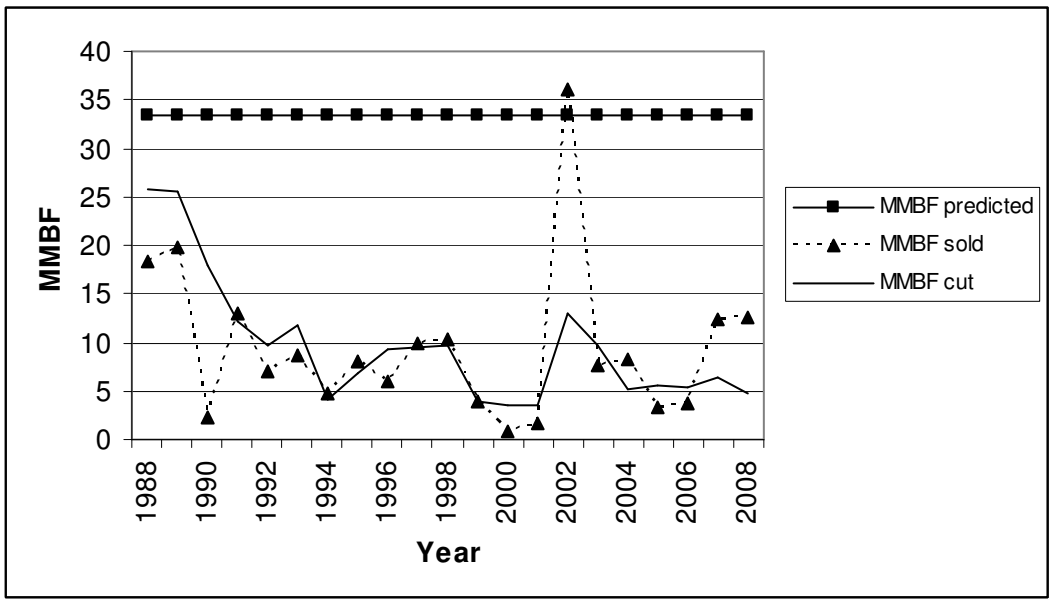
Table 49 – Timber Acres and Volume Sold By Management Area, Fiscal Year 2008 Compared to Forest Plan Predicted Annual Program

Forest Plan, p. III-80			Sold FY2008	
MA	Acres	Volume (MMBF)	Acres	Volume (MMBF)
1	1,528	14.57	227	1.16
2	1,439	12.01	594	5.08
3a	283	3.05	1046	5.95
3b	385	3.62	13	0.44
3c	12	0.12	0	0.00
Total	**3,647**	**33.37**	**1880**	**12.63**

Table 50 - Timber Acres and Volume Sold By Management Area, Fiscal Years 1988 to 2008 (21 years) Compared to Forest Plan Predicted Program

Forest Plan, p. III-80			Sold 1988 - 2008			
					% of Forest Plan	
MA	Acres	Volume (MMBF)	Acres	Volume (MMBF)	Acres/Volume	
1	30,560	291.4	18048	85.2	58%	29%
2	28,780	240.2	13780	69.1	45%	27%
3a	5,660	61	8268	38.6	126%	54%
3b	7,700	72.4	219	1.3	4%	1%
3c	240	2.4	199	0.7	83%	29%
Total	**72,940**	**667.4**	**40,514**	**194.9**	**53%**	**27%**

Figure 54 - Timber Volume Sold and Harvested, Fiscal Years 1988 to 2008 (21 years) Compared to Forest Plan Predicted Program [1/]



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 21 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 51 - Timber Offered by Logging System [1/]

	FY 2008		FY 1988 to 2007 (21 years)	
	Acres Offered	Volume Offered (MMBF)	Acres Offered	Volume Offered (MMBF)
Tractor	174	3.34	15,294	78.8
Skyline	880	5.04	7,965	51.6
Cable	0	0	3,633	14.0
Manual[1]	72	1.26	6,425	25.9
Aerial	754	2.99	13,435	56.3
Totals	**1880**	**12.63**	**46,752**	**226.6**

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.

Figure 55 – Comparison between Logging Methods Predicted in the Forest Plan and Actual Logging Systems (1988 – 2008)

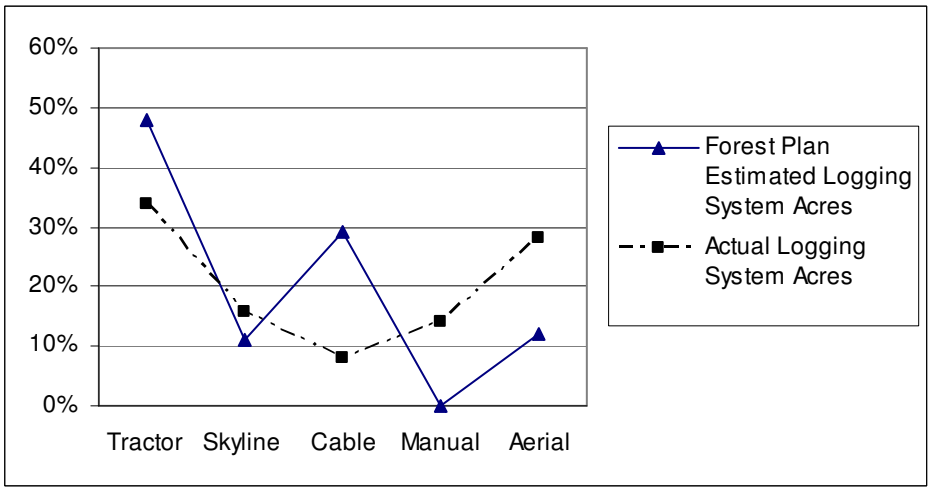


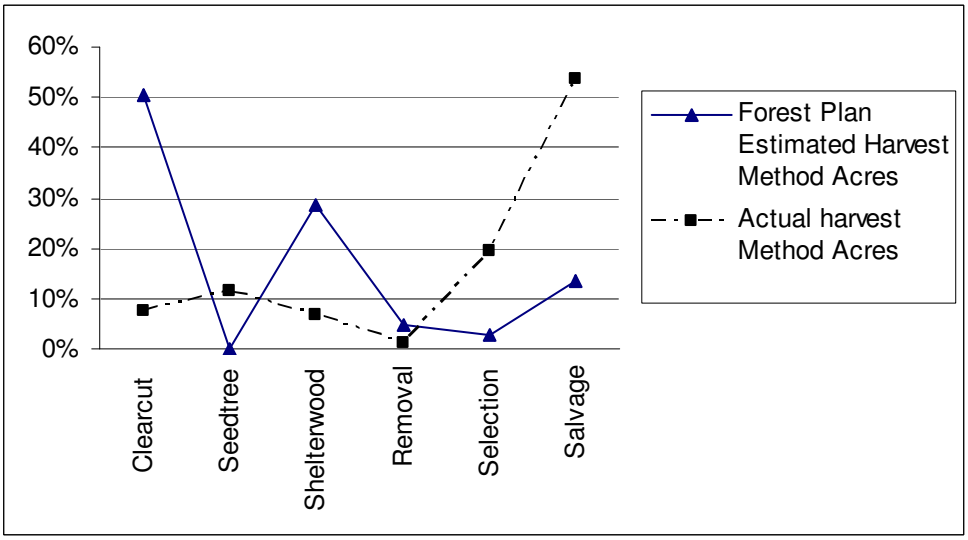
Table 52 - Timber Offered by Harvest Method

	FY 2008		FY 1988 to 2008 (21 years)	
	Acres Offered	Volume Offered (MMBF)	Acres Offered	Volume Offered (MMBF)
Clearcut[1]	0	0	3,330	36.6
Seedtree[2]	12	0.11	5,233	16.81
Shelterwood	220	1.40	3,210	17.9
Removal[3]	0	0	538	4.20
Selection	988	5.74	9,636	41.74
Salvage	660	5.38	24,806	109.38
Totals	**1880**	**12.63**	**46,753**	**226.63**

1/ Seed tree and clearcutting were combined in the Forest Plan. Clearcut percents include seed tree.

2/ Seed tree and shelterwood final removal harvests.

Figure 56 – Comparison between Harvest Methods Predicted in the Forest Plan and Actual Harvest Methods (1988 – 2008)



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: 2008.

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 2008, 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 2008 exceeded minimum Forest Plan annual requirements.

MONITORING RESULTS:

2008 Actual Use

Nineteen of the 22 grazing allotments hold active permits. Of these active allotments, nine were rested in the 2008 grazing season. Nine permittees grazed a total of 2,482 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 2008 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 stream bank alteration standards prescribed for some drainages to address fisheries concerns.

Nine allotments were rested in 2008. Of the 13 allotments monitored, including several rested ones, all met forest plan standards. The spring of 2008 was wet and cool with snow pack into summer in some areas. Summer temperatures were average resulting in good grass growth and adequate moisture throughout the season.

Ambrose Creek Allotment: This allotment was rested in 2008.

Andrews, Warm Springs, Waugh Allotments*:* These three allotments run in conjunction with each other as pastures and were rested in 2008.

Bass Creek Allotment: This allotment was grazed within standards in 2008

Bertie Lord, Little Sleeping Child and Piquett Creek Allotments: These allotments are inactive and left open as reserve allotments to be used when another allotment needs rest.

Bunch Gulch and Shirley Mountain Allotments: The allotments were grazed for approximately 3 weeks during the month of July.

Camp Reimel Allotment: Grazed within standards.

Coal Creek Allotment: This allotment was rested in 2008.

Gold Creek Allotment: This allotment was rested in 2008.

Harlan Gulch: Grazing standards were met.

Meadow Creek Allotment: Due to wolf activity in the area, the permittee chose to rest the allotment.

Medicine Tree Allotment: This allotment was grazed within standards in 2008.

North Sleeping Child Allotment: This allotment was grazed within standards in 2008

Skalkaho Allotment: Coffee Gulch met riparian standards in 2008 with the five head reduction implemented in 2006. However Brennan Gulch was used heavily. Weed treatments the previous year provided good grass in the drainage. 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: Both allotments were rested in 2008.

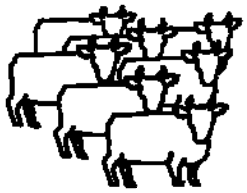
Sweathouse/Gash Allotment: This allotment was grazed within standards in 2008

Trapper Peak Allotment: The allotment met standards in 2008. 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 was signed in February 2009. The decision combined 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 Coal Creek allotment in 2008 which allowed grazing to continue under current practices.



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 - FY2008

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 2008, eight Bitterroot National Forest project decisions were subject to the notice, comment, and appeal regulations at 36 CFR 215. These are listed in Table 53. Of the eight decisions subject to appeal, none were appealed.

Table 53 – Appeal of 2008 project decisions subject to 36 CFR 215 requirements

Decision Name	Type	Appealed?
Haacke-Claremont Fuel Reduction Project	Fuels management; Forest products	N
Hotsprings Fuels Reduction Project	Fuels management	N
North Zone TSI	Vegetation management	N
Slate Creek Campground Restoration	Recreation management	N
Springer II Hazardous Fuels Reduction	Fuels management	N
Supplemental EIS Frank Church-River of No Return Wilderness Noxious Weed Treatment	Vegetation management (other than forest products)	N
Trapper Bunkhouse Land Stewardship Project	Research; Watershed management; Fuels management; Vegetation management (other than forest products; Forest products; Wildlife, Fish, Rare plants	N
Weasel Salvage and Underburning Project	Fuels management; Forest products	N

Northern Region Appeal Records for the Bitterroot National Forest, FY 1991 through FY 2008

During this seventeen-year period, 235 separate administrative appeals were filed challenging 54 individual project decisions.[6] 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 2008

From fiscal year 1998 through 2008 (eleven years), the Bitterroot National Forest issued 56 decisions that were subject to appeal (**Table 54**). 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 55). Within those seven categories, 29 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 eleven year period, sixteen (42%) were appeals of decisions which included commercial timber harvest as a project activity (Table 56). The appeal rate of timber harvest related decisions averaged 56%. Conversely, the appeal rate on non-timber related decisions averaged 29%.

Twenty-four groups and ten individuals were party to the 38 appeals filed in this time period (Table 57). 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.

Table 54 – All BNF Project Decisions Subject to Appeal[7] and the Number of Appeals, FY 1998 through 2008

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[8]	0[8]

[6] Includes project and activity appeals under both 36 CFR §217 and 36 CFR §215 and changing regulations.
[7] 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.
[8] 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.

Fiscal Year	Decisions Subject to Appeal (#)	Decisions Appealed (#)	Individual Appeals (#, some decisions had more than one)
2003	4	2	2
2004	2	1	16
2005	3	1	1
2006	6	3	3
2007	8	2	2
2008	8	0	0
Total	56	16 (29%)	38

Table 55 – General Category of BNF Decisions and Appeals[7], FY 1998 through 2008

General Category of BNF Decisions Subject to Appeal (1998-2008)	Decisions Subject to Appeal (#)	Decisions Appealed (#)	Appeal Rate (%)	Individual Appeals (#, some decisions had more than one)
Administrative Site	1	0	0%	0
Ecosystem Management	3	0	0%	0
Forest Plan Amendment (Wilderness Direction)	2	1	50%	16
Fuels Reduction	9	3	33%	2
Range Management	2	1	50%	1
Recreation / Wilderness	2	0	0%	0
Road Management	4	1	25%	1
Special Uses	6	1	17%	1
Vegetative Treatment	18	7	39%	13
Fish Habitat or Watershed Improvement	5	0	0%	0
Weed Management	4	2	50%	2
Total:	56	16	29%	36

Table 56 - BNF Decisions Subject to Appeal[7] Which Included Timber Harvest as an Activity, FY 1998 through 2008

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
2000	3	0	0
2001	1	1	1
2002	0	0[8]	0[8]
2003	1	1	1
2004	0	0	0
2005	0	0	0
2006	3	3	3
2007	1	1	1
2008	3	0	0
Total	16	9 (56%)	16

Table 57 – Project Appellants[7], FY 1998 through FY 2008[9]

Appellant	# of Appeals Party To
WildWest Institute[10] 8	
Alliance for the Wild Rockies	7
Friends of the Bitterroot	6
Floyd E. Wood	4
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

MONITORING RESULTS (36 CFR §218 – Healthy Forest Restoration Act (HFRA) objection process):

In 2003 Congress passed the Healthy Forest Restoration Act. For authorized projects, this act established a pre-decisional "objection" process instead of the post-decisional appeal process described above. The Forest had one project reviewed under this process in fiscal year 2007. Based on our limited experience with this new administrative review process, we feel it provides a more constructive approach to public participation than afforded by the more common post-decisional appeal process.

In September 2005, the Bitterroot National Forest issued the final environmental impact statement for the Middle East Fork Hazardous Fuel Reduction project, the Forest's first HFRA proposal. This began the thirty day pre-decision "objection" period. Twenty objections were submitted by individuals and groups.

Five of the objections were set aside, as the objectors were ineligible because they had not provided written comments to the Forest during the draft environmental impact review period.

The remaining fifteen objections were reviewed in detail. In each case the Reviewing Officer concluded the project and environmental analysis were consistent with legal requirements. The Forest Supervisor made his decision for this project on March 29, 2006. Because objections are received prior to the decision, the Forest Supervisor was able to address some of the objectors' concerns in the decision.

In 2008, the Forest signed eight decisions, none of which were appealed.

[9] 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.
[10] 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: 2008

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. Table 58 outlines research occurring on the Forest in 2008.

Table 58 - Research conducted on the Bitterroot National Forest in 2008**.**

Type of Research	Summary
Fire Incident Command Fire Filming	This project consists of researching and filming the operations of incident management teams located on the West Fork Ranger District of the Bitterroot National Forest during the summer of 2008.
Determining the prevalence of relapsing fever agent *Borrelia hermsii*	This project hopes to determine the prevalence of the relapsing fever agent *Borrelia hermsii* in western Montana, determine the abundance of ticks in nesting sites and the prevalence of *B. hermsii* in the ticks. Ticks will be collected from nest sites and cataloged. Bacterial DNA will be harvested from the ticks to determine if the ticks are infected. The project will also map the distribution of *Ornithodoros hermsii*, and relapsing fever spirochetes *B. hermsii* on the Bitterroot National Forest
Development of a decision support system for management of invasive weeds	Researchers propose to develop a system for decision management on invasive weeds that offers the optimization of resource allocation in deciding among treatment alternatives by incorporating species specific spread dynamics. Modeling with MAGIS will provide the optimal solution on which species to treat, how to treat, and where to treat based on desired objectives and predetermined constraints, as well as the ability to compare alternative scenarios with differing objectives and/or constraints. Spatial data of weed locations will be utilized from forest GIS or county section-based data. Spread rates of individual invasive plants will be determined using the INVADERS database.
Whitebark Pine Beetle Resistance	Research on the use of sapwood moisture to identify mountain pine beetle-resistant whitebark pine trees and improve the efficacy of verbenone in the protection of the whitebark pine from the mountain pine beetle.
Measurement of culturally modified trees	The overall objective of this study is to non-invasively evaluate culturally modified trees at two locations in the Bitterroot National forest, the Fales Flats site and the Hughes creek site. Through exterior measurement of CMTs' scars and dendrochronological analysis of nearby trees we can develop of a history an age and structure analysis of the forest stands and by extrapolation, the CMTs. The specific aims are to i) identify and describe CMT's and analyze their spatial pattern at each site, ii) register size and

Type of Research	Summary
	other specific features of individual CMT's and iii) analyze forest structure and age-distribution of forest stands with CMT's
Study of changes in snow water equivalent at SNOTEL sites	Research includes the installation of snowmelt lysimeters around SNOTEL stations to measure changes in snow water equivalent and compare them to measurements recorded by the SNOTEL.
Columbia Spotted Frogs and Radio tracking Garter Snakes	Research includes a long-term demographic study of the Columbia spotted frogs (*Rana luteiventris*) in the Little Rock Creek basin in the Bitterroot Mountains. The primary aim of this demographic research is to better assess and predict what factors drive variability in amphibian populations. This project is also monitoring garter snake presence in relation to frog and tadpole presence across the basin. It includes observing garter snake behavior around frog ponds (both terrestrial and common garter snakes), and documenting garter snake presence in the basin.
Genetic research on *Boechera stricta* and *B. holdboellii*	Research studying analysis for physiology and genetics of Boechera. The species of interest (*Boechera stricta* and *B. holdboellii*) are short lived, non-weedy perennials. The research site will include a monitoring station that is one post and six solid moisture probes. It will take up approx. 1/10 acre and will be the area where seedlings will we transplanted into small holes without disturbing the surrounding vegetation.
Measurement of natural magnetic field variations	Research will include utilizing small scientific recorders to monitor the Earth's natural magnetic field variations over time. Overall purpose is to gain understanding of deep Earth geological processes through their influence on its natural magnetic fields. Typical depths of interest are 10's of miles and there is no direct commercial applicability. Public benefits include improved understanding of Earth's mountain-building processes, and the training of students in scientific methods.
Reconstruction of Historic Vegetation Conditions	The objective of this study is to determine from tree ring records how tree establishment at forest ecotone boundaries has varied with climate, over the past few hundred years. There are two main objectives: understanding patterns of establishment at upper and lower treeline across the western US and the climate conditions associated with current and past establishment. Protected places provide the best opportunities for this research as land use has had less impact on the results we might obtain than in comparable areas outside of protected areas. In the case of lower treeline, this is less clearly advantageous, but we can account for impacts of grazing and other land uses at lower treeline. Upper treeline sites fitting sampling criteria are rare**.**
• **Monitoring of grassland vegetation plots**	Research includes locating grassland transect sites initially set up in the 1970s, photographing each site and re-reading Daubenmire frames on each site following Montana FWP vegetation monitoring techniques. For each transect, a data form will be developed that will include the hunting district, transect name, date and name of investigator, location by Section (to the nearest ¼ section), Township and Range, GPS coordinates (UTMs), a narrative description of how to locate the site, what marks the site (steel fence post, etc.), the direction the transect is read, what side of the tape measure frames are placed, slope, aspect, habitat type, dominant plant species, and general comments (pertinent changes in habitat observed over the past 36 years of visiting these sites, weeds, erosion, livestock grazing, forest succession, erosion, etc.). In addition to the digital photo, a map of each site with the GPS location and coordinates will be prepared.

Forest Plan Amendments

OBJECTIVE: Track formal changes to the Forest Plan.

DATA SOURCE: Amendments.

FREQUENCY: Annually.

REPORTING PERIOD: 1987 to 2008.

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-eight times between 1987 and 2008. 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.

Four 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 59 lists all the amendments to the Forest Plan and the nature of each decision.

Table 59 - 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.
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.[11]
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.
2008	27	Site-specific amendment for the Trapper Bunkhouse Land Stewardship Project. Refined snag, coarse woody debris and thermal cover.

[11] INFISH, intended as interim direction, was not listed in this table prior to the 2001 monitoring report.

2008	28	Site-specific amendment for the Haacke-Claremont Project. Allowed portions of third-order drainages within the project area to be managed at Elk Habitat Effectiveness values less than the 50% standard and refined coarse woody material standard.