HELENA NATIONAL FOREST

ANNUAL MONITORING REPORT

PREPARED FEBRUARY 2011

Fiscal Year 2008

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Reviewed By: _____ Date: 03/09/2011
NANCY PEAK
Deputy Forest Supervisor

Approved By: _____ Date: MARCH 9, 2011
KEVIN T. RIORDAN
Forest Supervisor

(this page intentionally left blank)

TABLE OF CONTENTS

INTRODUCTION **7**

FOREST PLAN MONITORING 7
SUMMARY 7

MONITORING ELEMENT REPORTS **18**

(A) RECREATION **18**

(A1) DEVELOPED RECREATION 18
(A2) DISPERSED RECREATION 22
(A3) ORV COMPLIANCE AND DAMAGE 25
(A4) MEASURE CHANGE IN STATUS OF ROADLESS ACRES 28
(B1) WILDERNESS 29

(C) WILDLIFE AND FISH **35**

(C1) UNGULATE DISTRIBUTION, MOVEMENT, POPULATION STRUCTURE AND DENSITY (ELKHORNS) 35
(C2) UNGULATE HABITAT EVALUATION (ELKHORNS) 40
(C3) EFFECTS OF LAND USE ACTIVITIES ON UNGULATE POPULATIONS (ELKHORNS) 48
(C4)ELK AND DEER HABITAT SUITABILITY, INDICATOR SPECIES 54
(C5) BIGHORN SHEEP HABITAT SUITABILITY, INDICATOR SPECIES 66
(C6) GRIZZLY BEAR HABITAT EFFECTIVENESS, INDICATOR SPECIES 68
(C7) OLD GROWTH HABITAT (INDICATOR SPECIES PILEATED AND HAIRY WOODPECKERS AND GOSHAWK) 72
(C8) MATURE CONIFER SUITABILITY, INDICATOR SPECIES 83
(C9) RIVER AND LAKE SYSTEM SUITABILITY, INDICATOR SPECIES (BALD EAGLE) 89
ADDITIONAL WILDLIFE MONITORING 91
(C10) POOLS FORMED BY INSTREAM DEBRIS, INDICATOR SPECIES 96
(C11) INTRA-GRAVEL SEDIMENT 98
(C12) STREAMSIDE COVER FOR FISH (RANGE PORTION) 100
(C12) STREAMSIDE COVER FOR FISH 114
(C13) AQUATIC INVERTEBRATE POPULATIONS 117

(D) RANGE/TIMBER, RANGE, RANGE/ROAD MAINTENANCE/TIMBER **119**

(D1.1) UTILIZATION OF FORAGE IN TRANSITORY RANGE 119
(D1.2) AVAILABLE FORAGE UTILIZED BY LIVESTOCK 120
(D2) ALLOTMENT MANAGEMENT PLANNING AND UPDATE 125
(D3) WEED INFESTATIONS 127
(D4.1) CONDITION AND TREND OF RANGE AND FORAGE AVAILABILITY 135
(D4.2) CONIFER/BRUSH ENCROACHMENT 144
(D5) PERMIT COMPLIANCE 146

(E) REGULATED VOLUME, TIMBER **150**

(E1) REGULATED VOLUME PREPARED FOR SALE 150
(E2) TIMBER ASSUMPTIONS 151
(E3) SILVICULTURAL ASSUMPTIONS AND PRACTICES 153
(E4) FIREWOOD REMOVAL 156

(E5) Size of openings 157
(E6) Regenerated yield projections 159
(E7) Reforestation practices and assumptions 160
(E8) Timber stand improvements and assumptions 162
(E9) Lands suitable for timber production 164

(F) SOIL AND WATER 166

(F1) Compliance with local, state, and Federal water quality standards 166
(F2) Soil and water improvement projects 176
(F3) Productivity changes in sensitive soils 177
(F4) Availability of adequate water to maintain management options, water rights. 193

(G)MINERALS 194

(G1) Forest Service Land Uses That May Affect Minerals Activities element will be available 194

(L1) FACILITIES 198

(L1) Roads 198
(L2) Road Management 201

(P) PROTECTION 203

(P1) Acres and volumes in insects and disease infestations 203
(P2) Air quality 205
(P3) Fuel treatment outputs 207
(P4) Wildfire acres 208
(P5) Cost of suppression, protection, organization, and net value change 211

(T) ECONOMICS, ADJACENT LANDS, RESOURCES, AND COMMUNITIES, AND ALL RESOURCES 213

(T1) Economics 213
(T2) Adjacent lands, resources, and communities Forest Plan Requirements: 215
(T3) All Resources – Emerging Issues or Changing Social Values 215
(T4) All Resources-Lands as not Meeting Physical or Biological Characteristics 221

PROGRAMS WITHOUT MONITORING REQUIREMENTS 223

HERITAGE RESOURCES 223

YOUTH FOREST MONITORING PROGRAM (YFMP) 225

Youth Forest Monitoring 225

LIST OF PREPARERS 229

Appendix A, Decision Flow Diagram……230

Introduction

The purpose of this document is to report progress and findings of Forest Plan monitoring, heritage monitoring and monitoring completed as part of the Youth Forest Monitoring Program. In addition, monitoring that is completed by various programs is summarized in this report.

Forest Plan Monitoring

The Regional Forester approved the Land and Resource Management Plan for the Helena National Forest on May 2, 1986. A requirement of the Helena National Forest Plan (FP) is to monitor and evaluate activities to determine how well the Plan is being implemented. If monitoring and evaluation find significant deviations, the Plan will be amended based on the findings.

All Forest Plan monitoring requirements are in the Forest Plan in Table IV-1 on pages IV/6 through IV/19. This Forest Plan (FP) Monitoring Report was compiled from information received from resource personnel and is arranged in order of the resource elements from Table IV-1 of the Forest Plan. An electronic copy of the Forest Plan can be found at: http://www.fs.fed.us/r1/helena/projects/plans/hnf-forestplan.pdf .

Summary

The Forest Plan lists 48 specific monitoring elements and two of those have more than one part; so a total of 50 monitoring elements are reported. Each element is addressed in detail in this document. The Forest has evaluated each of the monitoring elements and found that our management is within the variability defined in the Forest Plan for 36 of those elements.

This “Summary” section summarizes the 14 monitoring elements where the variability measures described in the Forest Plan are not being met. The summary of the various reasons that the Forest is outside the variability for any given element are presented here and each element is addressed in full detail under individual elements in the main report.

The Forest Plan Decision Flow Diagram, shown in Appendix A, provides a decision diagram to guide the evaluation of any element variation. Elements not within stated variability measure(s); A1, A2, C1, C4 (partial), C5, D2, D3, D5, E1, E7, E8, F3 (partial), P4, P5.

If the measured variability of an element exceeds the acceptable limits for the first time, the practice will continue but the validity of the varaibilty limits will be assessed the next fiscal year. Specific recommendations to meet the stated variability are made at the end of the individual elements in the main report for elements C4, D5 and F3.

If the measured variability of an element exceeds the acceptable limits and is a recurring variation, the element would ultimately require a change in management practices. If the recommended actions to meet the variability for these elements are undertaken, it is likely that the Forest would meet the intent of the Forest Plan.

- One element, D2 allotment management planning, has element variations for which management direction of a schedule oriented problem needs to be changed to address issues identified within the element.

- Ten elements, A1, A2, C1, C5, D3, E1, E7, E8, P4 and P5, have variations for which management practice, direction or scheduling is the issue and continuation would not result in serious consequences. According to the decision diagram, until a revision of the Forest Plan is initiated, or a change in the variability measure itself is made, the elements will continue to be outside of the variability measure.

MONITORING ELEMENTS OUTSIDE OF VARIABILITY

Element A1: Developed Recreation

Forest Plan Requirements:

The Forest Plan requires that use and condition of developed recreation facilities be monitored and reported annually.

Variability Measure:

Variability Measures:

Forest Plan Monitoring Requirements state that any 20% variation in visitor use between projected and actual should be documented. That task requires both projected baseline data (identified in the Forest Plan) and current recreation use information. Recreation use on National Forest lands is frequently measured by RVD's (Recreation Visitor Days). An RVD represents an aggregate total of 12 visitor hours, continuous or intermittent.

Assessment:

The 2003 total of 44,821 RVD's at Forest developed recreation sites is 39,879 less than the stated number of RVD's in 1981. Even with the addition of seven rental cabins as developed recreation sites, the amount of visitor use is much less than originally anticipated. The estimated visitor use (based on NVUM surveys) at developed recreation sites in fiscal year 2003 was only 39% of the Forest Plan projection.

Forest Staff believe recreation visitor use at developed sites has increased during the past 25 years. The basis for that belief is employee observation; national, regional and local recreation trends; and improved sampling methods. Based on results of the 2003 National Visitor Use Monitoring Project, it appears the recreation use figures identified in the 1986 Forest Plan (based on the best available data at the time) and/or the projected future growth estimates, were high. It is unknown how original use estimates were determined and as a result, any comparison with NVUM use figures is not appropriate.

NVUM data may not provide a fully accurate picture of RVD's on the Forest. It is based on a statistically valid sampling methodology and annual visitor use is influenced by weather, wildfire, economics and other factors. However, NVUM provides the most reliable recreation use information available today and is scheduled on a routine (5-year) basis. NVUM data collected during FY 2008 will likely revise use figures on the Helena National Forest. A comparison of the 2003 and 2008 data will provide a reliable analysis of the true variability of this element.

Actions in response to variability assessment:

Variability should no longer be based on the original projected use identified in the Forest Plan. Rather, future assessments should be compared to the 2003 and 2008 NVUM estimates. It would not be appropriate to initiate management actions based on a + or – 20% variation in NVUM estimates from any one year because visitor use is dependent upon factors such as: weather, fuel prices, and wildfire occurrences. In addition, funding constraints may require a further reduction in the opportunities provided for developed recreation on the Forest.

Element A2: Dispersed Recreation

Forest Plan Requirements:

The Forest Plan requires that Recreation Opportunity Spectrum (ROS) monitoring be completed and then reported on a five-year interval. National Forest recreation opportunities are managed according to a Recreation Opportunity Spectrum. Recreation activities are provided and managed in settings ranging from primitive (wilderness) to urban (highly developed).

Variability Measure:

Variability Measures:

Forest Plan Monitoring Requirements state that a 25% variation in the projected base by ROS type should be documented. The table above provides the projected summer ROS acreage by category (as identified in the Forest Plan) and the 2000 ROS acreage as identified for the Eastside Analysis Assessment.

Assessment:

Three of the four ROS classifications are currently within the range of variation as identified above. The semi-primitive non-motorized areas on the Forest are not within the 25% variation, according to the Eastside Assessment. 1986 ROS classifications were not entirely consistent with current ROS mapping classifications. To a large extent, that may account for the disparity between ROS acreage figures. Management activities impacting the semi-primitive non-motorized ROS category, such as the miles of road construction and changes in the status of Inventoried Roadless acres, were actually less than what was projected in the Forest Plan.

One primary criteria impacting ROS classifications on the Forest is the presence of motorized roads and trails. Travel plan decisions in the Clancy-Unionville and North Big Belt Mountains will impact the ROS acreage on the Forest. Although new ROS mapping efforts have not been initiated since those travel decisions, it is evident there will be an increase in the number of semi-primitive non-motorized acres. That increase may lift the ROS semi-primitive non-motorized category to the established 25% variation.

Actions in response to variability assessment:

Once Forest travel planning has been completed, new ROS inventories and maps should be developed to reflect the mix of available recreation opportunities. When the Forest Plan is revised, document the new ROS acreages and identify acceptable monitoring variations.

Element C1: Ungulate distribution, movement, population structure and density (Elkhorns)

Forest Plan Requirements:

Seasonal distribution, movement patterns, population structure and density of elk, mule deer, moose, and mountain goat populations are to be monitored to identify ungulate population segments and yearlong range of each segment in the Elkhorns. This monitoring element applies to Management Areas E1 – E4.

Variability Measure:

±10% from previous measurements

Assessment:

The post season count has decreased by 29% since 2007 and the spring count has increased by about 11%. Both the post-season and spring fawn: adult ratios have increased by 15% and 23% respectively. The buck: doe ratio has decreased by 39%.

The variation reflected in the changes between 2007 and 2008 does not meet the acceptable variation of ± 10% since mule deer counts have increased by greater than 10%.

Actions in response to variability assessment:

No actions are needed in response to the variability assessments for elk or mule deer because we are either within the acceptable variation (elk) or actions that would correct the variability (i.e. hunting permit structure) are not a land management oriented practice. The MFWP aerial survey report for deer indicates that minor over-winter mortality of fawns may have contributed to the increase in the overall count.

Element C4: Elk and Deer Habitat Suitability, Indicator Species

Forest Plan Requirements

Elk/mule deer habitat effectiveness (cover/forage, open road density, and livestock impacts on elk habitat potential) will be monitored to be able to respond to any unacceptable deviation from past measurements. This monitoring element is applicable to Management Areas L2, H1, H2, T2, T3, W1, W2, and E1 through E4.

Variability Measure Discussion

Many components of this monitoring element do not lend themselves to direct comparison with the variability measure identified in the Forest Plan in part because databases have been updated and/or data have been collected differently than in 2008. Where applicable, the variation relative to the Forest Plan measure is described; otherwise, variation is qualified.

Variability Measure

-±10% from previous measurements

Assessment (*Road Closure Effectiveness only component outside variability)*

Monitoring in the Wagner Atlanta project area in 2007 indicated that two out of the seven road closures were not effective (approximately 71% closure effectiveness). In 2008, eleven out of 17 road closures were not effective (35% closure effectiveness). The decrease in closure effectiveness is outside of the variability measurement.

Actions in Response to Variability Assessment

There are no actions needed at this time for all monitoring items with the exception of the Wagner Atlanta Road closure monitoring. Monitoring in 2008 indicates that several road closures aren't effective depending on the type of closure. Therefore, in order to meet Forest Plan standards in practice, additional closure methods may need to be identified and installed.

Element C5: Bighorn Sheep Habitat Suitability, Indicator Species

Forest Plan Requirements

Bighorn sheep habitat suitability will be monitored to be able to respond from any unacceptable deviation from past measurement. This monitoring element applies to Management Areas W1, P1, and P2.

Variability Measure Discussion

Variability Measure

-10% from previous measurements

Assessment

Bighorn Sheep Aerial Surveys:

The total number of bighorn sheep plummeted between 2007 and January 2008. It is well below the variability measure.

Actions in Response to Variability Assessment

Bighorn Sheep Aerial Surveys:

No actions are proposed at this time. MTFWP and the Helena National Forest will coordinate to determine what, if any, additional steps are needed to restore the bighorn sheep population in the Elkhorns.

Element D2: Allotment Management Planning and Update

Forest Plan Requirements:

Monitor allotment management planning and update.

Variability Measure:

Less than 4 plans updated annually (total averaged over the previous five year period), planned objectives are not being met.

Assessment:

An average of three allotment management plans were updated from 2004 through 2008. An average of two allotments have been updated annually over a ten year period. This variability measure is not being met.

Actions in response to variability assessment:

The Forest needs to increase the number of allotment management plans that are being updated annually to meet the requirements of this element. Four allotments are planned for 2009, completing these would result in the variability measure being met (four plans total, as averaged over a five years).

Element D3: Weed Infestations

Forest Plan Requirements:

Monitor weed infestations.

Variability Measure:

Noxious weeds increase distribution by 5%: other weedy species by 10%; infestations appear in previously unaffected areas (1986 Forest Plan).

Assessment:

Based on the 1987 weed EIS, inventories indicated 3,641 acres infested with noxious weeds. The preferred alternative identified 638 acres treated annually, which is 17.5% of the total infestation. This level of treatment was consistent with the Forest Plan. Noxious weed treatment activities under this schedule were greater than the projected annual rate of spread of 5 – 10% identified in the Forest Plan.

The most recent weed EIS efforts inventoried 22,668 and 198 miles of infested roadside for a total of approximately 23,000 acres. Simple statistical calculations comparing the 1987 and 2006 weed EIS inventoried acres computes an annual spread rate of 10.75% over the past 19 years. These calculations exceed the variability identified in the 1986 Forest Plan for this element.

Actions in response to variability assessment:

Noxious weed management efforts have been expanding since 1996 with peak years' centered around the fire restoration activities of 2001 – 2003. In 1997 an emphasis was placed on re-inventorying noxious weed infestations across the Forest in preparation of a new weed EIS. Inventories completed in 2000 indicated 22,668 acres and 198 miles of roads infested with noxious weeds. The rate of spread of these weeds is expected to expand 14 % per year (Asher 1998) and may increase due to large wildfires (recent and future). Restoration funding provided an increase in all facets of noxious weed management. Since 2003, restoration funding has been reducing and the Forest has strained to maintain the control efforts implemented in 2001 – 2003. Consequently, noxious weed infestations prior to 2001 and post 2003 have and will continue to spread at a greater rate than the annual rate of treatment on the Helena National Forest.

Project specific NEPA documents (timber and fuels) on the Forest routinely address weed treatments, expanding acres beyond the 1987 noxious weed and Forest plan thresholds in an effort to curtail weed spread. Funding was cyclic with minimal increases year to year, but based on inventoried acres the districts were unable to treat 15% (documented rate of spread based on research) of the total Forest acres.

Element D5: Permit Compliance

Forest Plan Requirements:

Permit Compliance

Variability Measure Discussion:

Variability Measure:

10% +/- Change from annual plan.

Assessment:

This resource element is outside the variability, thus has not been met for fiscal year 2008. At least one requirement within the annual plans was exceeded on 14 of the 77 active allotments. This represents 18% of the active allotments, or 24% of the measured allotments.

Actions in response to variability assessment:

In prior years, this element has been measured solely by whether or not an official noncompliance action against a permit was taken. This is the first year the results of all of the range elements have been brought forward into this element and used to measure D5 variability.

We are not able to be within the variability for this element. The Forest cannot perform field inspections and adequate documentation for all permit requirements on 90-100 percent of the allotments annually without an increase in staffing levels.

Element E1: Regulated volume prepared for sale

Forest Plan Requirements:

Volume prepared for sale.

Variability Measure:

A change (+/- 10%) in volume from the 5-year base harvest schedule. No more than 25% of the sales located outside of scheduled 10-year plan.

Assessment:

Annual harvest volume prepared for sale and 5 year base harvest schedule variability exceeds +/- 10% of the Forest Plan base harvest schedule.

Actions in response to variability assessment:

In review of the decision flow diagram in the HNF Forest Plan, the variability exceeds acceptable limits and is a reoccurring variation. Direct effect (management oriented) on the Helena's ability to adhere to a 10-year schedule is due to the recent large scale wildfires and a mountain pine beetle epidemic, the National emphasis on ecosystem management and fuels related programs and less emphasis on maximizing timber production on timbered lands, thus resulting in fewer acres treated with the sole emphasis of timber production.

The Forest Plan identified a 10 year harvest schedule and identified projects to be implemented between 1986 and 1996. Since 1997, the Forest has established a 5 year harvest schedule, however; projects on the Helena over the last 5 years have been primarily salvage projects and were not initially considered as a contribution to this 5 year timber sale schedule or the base harvest schedule. Policy has established that the ten-year sale program is an upper ceiling rather than a required output and therefore, this deviation does not require a Forest Plan adjustment at this time.

Element E7: Reforestation practices and assumptions

Forest Plan Requirements:

Monitor reforestation practices and assumptions

Variability Measure:

The Forest Plan projects 600 acres of tree planting per year with (1) acceptable variability of less than 75% of scheduled accomplishment in a five year period and (2) less than 50% accomplishment in any one year. Overall, there will be no more than plus or minus 10% in scheduled planting over a five year period.

Variability Measure Discussion:

Variability Measure:

The Forest Plan projects 600 acres of tree planting per year with (1) acceptable variability of less than 75% of scheduled accomplishment in a five year period and (2) less than 50% accomplishment in any one year. Overall, there will be no more than +/- 10% in scheduled planting over a five year period.

Assessment:

From 2004-2008, the Forest harvested an average of 473 acres/year, and 403 acres/year of planting (85%). While the Forest does not meet the variability requirement of planting at least 600 acres/year over the 5 year timeframe (from 2004 to 2008, the relative abundance of planting to harvest exceeds what was projected in the Forest Plan, although the level of acres is lower. This demonstrates the commitment of the Forest to meet the intent of this standard, which is to provide for adequate stocking within a reasonable timeframe following harvest. The planting during these timeframes generally occurred on salvage harvest areas that were completed 2003-2006. The Forest does meet 50% of the projection in a given monitoring year (for 2008, 52%). Most of the planting over this 5-year period was in response to the large wildfires and subsequent salvage activity that occurred in 2000 and 2003.

Accomplished planting is within 10% of planned planting over the 5 year monitoring timeframe. From 2004 to 2008, 100% of planned plantings were accomplished.

The tree planting program on the Forest is reflective of the timber sale program. The annual sale quantity is a ceiling, and the planting program is dependent on harvest to attain its ceiling. Harvest of active timber sales is sometimes delayed by market forces or natural events such as severe fire seasons and consequently the planting is delayed. Stands in fire salvage sales have been planted, but funding for reforestation of all burned lands is generally not available.

The Forest Plan projects 1,940 acres of harvest yearly and 600 acres of planting, thereby assuming that about 31% of harvest areas require planting with 69% being natural regeneration or no reforestation needed (intermediate harvest). According to the Forest Plan EIS, planting is scheduled for about ½ of the clearcut acres each year, and other regeneration systems such as shelterwood and seed-tree will generally naturally regenerate (II/74). From 2004-2008, the Forest harvested an average of 473 acres/year, and 403 acres/year of planting (85%). The relative abundance of planting to harvest exceeds what was projected in the Forest Plan, although the level of acres is lower. This demonstrates the commitment of the Forest to meet the intent of this standard, which is to provide for adequate stocking within a reasonable timeframe following harvest. The planting during these timeframes generally occurred on salvage harvest areas that were completed 2003-2006.

Actions in response to variability assessment:

Even though annual acres planted are below Forest Plan recommendation, the HNF is still meeting all NFMA requirements to establish regeneration within a 5 year time frame on all acres harvested. No additional action is needed.

Element E8: Timber stand improvements and assumptions

Forest Plan Requirements:

Monitor timber stand improvements and assumptions.

Variability Measure Discussion:

Variability Measure:

The Forest Plan projects 280 acres of pre-commercial thinning per year with (1) less than 75% accomplishment of scheduled TSI in 5 years, or (2) less than 50% accomplishment per year.

Assessment:

Since the Canada Lynx has been listed as a threatened species under the Endangered Species Act the timber stand improvement program within its habitat has been “on hold”, awaiting the thinning treatment recommendations from the Northern Region Lynx Conservation strategy. Most of the stands scheduled for pre-commercial thinning are encompassed by the habitat needs of this species. In addition, there has not been funding for TSI projects in recent years. A deviation of management practices is observed. The Conservation Strategy has been finalized (2008), and with this new firm direction several NEPA analyses are including precommercial thinning proposals.

Even considering the relative abundance of acres harvested, the Forest is not compliant with the TSI objective defined in the Plan due to the constraints associated with a listed species. The Forest is not compliant with the acceptable variability of less than 75% of scheduled accomplishment in a five year period. Annually the Forest has accomplished less than 50% of the thinning objective.

Actions in response to variability assessment:

No additional action is needed at this time. The ability to meet the intent of this element is not within control of the Forest. Future monitoring should show progress in this area.

Element F3: Productivity changes in sensitive soils

Forest Plan Requirements:

To insure that management practices do not adversely affect soil productivity, EA's, review of proposed activities, field examinations and laboratory testing are used to monitor 10-15 sites annually.

Variability Measure Discussion

Monitoring activities were split into three activity types: monitoring activity 1 evaluates results of timber harvest management actions; monitoring activity 2 assesses the outcome of fuels management and prescribed fire actions; monitoring activity 3 documents rangeland conditions associated with allotment management actions. Activity 3 will not be discussed in this summary section, as the variability was not exceeded.

Variability Measure Discussion For Activity 1:

Variability Measure:

When changes of baseline soil disturbance levels are detected based on Region 1 Soil Quality Standards.

Assessment:

The objectives of this field evaluation were to first, determine if management practices are in compliance with Region 1 (R1) Soil Quality Standards (SQS) and Helena National Forest Plan Standards. The Helena National Forest Plan requires activities to not exceed 20% detrimental soil disturbance from baseline soil conditions. The R1 SQS requires that activities not exceed 15% detrimental soil disturbance from baseline conditions. Through field data collection and report compilation, the Region 1 Soil Quality Standards were not adhered to for the Jim Town Timber Sale, Units 5 and 6.

Areas outside of the timber sale boundaries were characterized as Disturbance Class 1 as a result of relic impacts that existed prior to this timber sale. This level of disturbance is not assumed to be detrimental but shows signs of some level of past impact. This presence of relic disturbance has an affect on the final level of disturbance and cumulative impacts, though the extent cannot be quantified from this data.

Units 5 and 6 of the Jim Town Timber Sale exceed both the Region 1 guidelines and the Helena National Forest Plan guidelines for detrimental soil disturbance. The amount of direct impact resulting from the most recent activity is uncertain because of the cumulative effects of relic disturbance because no baseline data were collected. Regardless of the direct and indirect effects, mitigation is needed to align these units with a trend of improving physical conditions. It is worth noting that the effects anticipated from previous monitoring of winter harvest on the Helena National Forest should not exceed roughly 3% of the activity area.

Additionally, Unit 6 did not retain an adequate amount of coarse woody debris to provide for long term nutrient cycling and to aid in resisting surface erosion.

Actions in response to variability assessment

Any further activity in the project area should be deferred until soil conditions can be evaluated. For all future actions, soil information should be evaluated before implementation in a representative subset of activity units in any given project area. Existing condition data is generally collected prior to implementation of any activity on the Helena NF, this instance just further reinforces the need.

Mitigation measures will be coordinated with the Forect ecologist. Activity must be completed with an emphasis on protecting archeological sites and in compliance with Best Management Practices for reducing an invasion of noxious weeds. Unit 6 will need to have some additional slashing performed to increase the amount of coarse woody material remaining, especially if burning is to occur which will consume most of the material that is present now.

Variability Measure Discussion For Activity 2:

Variability Measure:

When changes of baseline levels of the soil's chemical and physical properties exceed 20% as determined by lab analysis.

Assessment:

Both data points inside Davis 9 are stable and do not present any erosion hazards. Point 1 having 25% bare ground may be of concern, but the time of year the data was collected may have been too early to see an "average" amount of vegetation for the growing season. It is unclear as to whether or not the high amount of bare ground resulted from the prescribed fire. Soil conditions observed in this unit are in compliance with the Helena National Forest Plan and Region 1 guidelines.

The amount of coarse woody debris remaining in the Bull Sweats Project Area, (1.43 tons/acre) is not sufficient for providing desirable quantities for soil productivity and soil protection in timbered sites and does not meet Region 1 guidelines. Physical soil conditions observed in this unit are in compliance with the Helena National Forest Plan.

All of the sites located within the Crow Creek Unit 3 project area are very open with only the occasional Douglas Fir tree encroaching, but being dominated by sagebrush, grasses and rock outcrops. None of the data points exhibited characteristics that should be alarming with regards to erosion hazards or threats resulting form severely burned soils. Soil conditions observed in this unit are in compliance with the Helena National Forest Plan and Region 1 guidelines.

The data points within the Crow Creek Unit 5 project area did not exhibit any recorded erosion or severely burned soils. None of these data points suggest any threat to erosion resulting from the prescribed fire. Soil conditions observed in this unit are in compliance with the Helena National Forest Plan and Region 1 guidelines.

The sagebrush and grass dominated vegetation surrounding the Crow Creek Unit 15 data points has not suggested any erosion hazards would result from the prescribed fire activity. No erosion or severely burned soils were recorded in any of the data points. Soil conditions observed in this unit are in compliance with the Helena National Forest Plan and Region 1 guidelines.

The only issue with any of the Deep Creek Units is regarding the validity of recorded coarse woody debris remaining in Unit 3D. Based on visual estimates, photo comparison to other units and professional judgment, the fuel loading in this unit appears to be sufficient to protect against soil erosion and provide for long term nutrient cycling. All of the units exhibited little to no recorded erosion or severely burned soils. Soil conditions observed in this unit are in compliance with the Helena National Forest Plan and Region 1 guidelines.

One of the major factors in not recording any extreme levels of erosion during the data collection of 2007 could be a result of the average (or less than average) amount of rain and snow that these sites

received. No high intensity rain or snow melt conditions were recorded in these areas last spring/summer which would most likely have an impact on the recently burned soils.

Actions in response to variability assessment and recommendations for Activity 2

The amount of coarse woody debris remaining in the Bull Sweats unit evaluated above does not meet the Regional Soil Quality Standards for the residual amounts of coarse woody debris for a forested site. This does not necessarily mean the remainder of the unit is not in compliance with standards and guidelines. Mitigation measures to increase the amount of coarse woody material may include revisiting the unit and slashing some of the remaining standing dead while maintaining compliance with snag retention for this habitat type.

All other units analyzed are in compliance with the Helena National Forest Plan and Region 1 Soil Quality Standards.

Element P4: Wildfire acres

Forest Plan Requirements:

Wildfire acres burned are to be monitored annually and reported every 5 years.

Variability Measure:

Variation of +/- 25% above projected average of annual wildfire burned acres.

Assessment:

The variability on average is within acceptable limits if you do not count the large fire year of 2007 being above the 25% projected average of wildfire burned acres, if the large fire year of 2007 is considered the variability is outside of the acceptable range.

Actions in response to variability assessment:

No change to monitoring element is necessary at this time. Large fires are heavily dependant on weather and drought patterns, large fires will continue to occur during periods of extended dry weather.

Element P5: Cost of suppression, protection, organization, and net value change

Forest Plan Requirements:

Monitor annually the cost of suppression, protection, organization, and net value change report every 5 years.

Variability Measure:

Variation of +/- 5% increase in real costs.

Assessment:

The Forest has increased its dedicated firefighting workforce considerably since the mid-80's. Congress is now funding wildfire suppression at higher levels than in past.

Actions in response to variability assessment:

Variability stated cannot be met annually as the true cost of suppression, protection and organization is beyond the control of the forest as an individual unit.

Monitoring Element Reports

(A) RECREATION

(A1) Developed Recreation

Forest Plan Requirements:

The Forest Plan requires that use and condition of developed recreation facilities be monitored and reported annually.

Intent:

The intent of that requirement includes: checking the accuracy of use-projections made during the Forest Planning process; monitoring closeness to capacities; and determining if developed facilities are maintained to existing capacity and standards.

Data Sources:

2003 National Visitor Use Monitoring Report; Forest Service Infrastructure & Deferred Maintenance Reporting System (Infra); Fee Compliance Figures; Capital Investment Program; Employee Observations; Road Counters; Trailhead Registers; Special Use Authorizations; Results and Information presented in previous Monitoring Reports.

The Recreation Information Management (RIM) system formerly utilized by the Forest Service to track visitor use was determined to be inaccurate and outdated. The agency now estimates visitor use every five years through implementation of the statistically valid National Visitor Use Monitoring Project.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

The second round of the National Visitor Use Monitoring Project (implemented on the Forest in fiscal year 2008) was developed to provide statistically valid use estimates. Through traffic counts (road & trail) and visitor exit surveys, recreation use information was obtained specific to the Helena National Forest.

Infra was designed to track facilities: their number, condition and associated costs. All recreation facilities are identified within the Developed Recreation database. At a minimum, condition surveys are accomplished every five years and the resulting information documented in Infra.

Fee compliance is accomplished primarily through implementation of a self-service pay system at designated fee sites. Forest employees routinely monitor fee collections during the summer months to obtain visitor use figures.

Registration boxes are installed and maintained at both the Alice Creek and Indian Meadows Trailheads. Forest employees monitor the registration boxes to note visitor use and comments.

Monitoring Activity:

Condition surveys were last completed at all developed recreation sites on the Helena Forest during 2004. Because condition surveys are not required again until 2009 (as per national protocol), only a few were initiated at recreation sites in 2008.

Monitoring visitor use at fee sites is accomplished primarily through the fee registration system. In addition, Forest employees with compliance responsibilities record use during the summer months at all

fee campgrounds. On occasion, forest employees document visitor use at non-fee developed sites. Accurate visitor use information is not obtained prior to Memorial Day or after Labor Day.

In 2006 the Forest initiated and completed a Recreation Facility Analysis (RFA) to identify a future program of work for developed sites. A proposed 5-Year Action Plan was developed to focus recreation emphasis on day use activities. The Action Plan was approved in 2008 by the Forest Supervisor and the Regional Office following a public comment period.

Rental Cabins are reserved and permits issued through the National Recreation Reservation System. Occupancy of the six rental cabins on the Helena Forest totaled 999 nights during 2008 for 2,074 individuals. That represents an increase of approximately 10% over the previous year. Receipts at the fee campgrounds on the Helena Ranger District totaled $12,500 during 2008 and reflect approximately 2,500 paid nights of camping. The decrease in campground revenues from the previous year result from the late opening of Cromwell Dixon Campground and the closure of the Park Lake Campground. Campground fees on the Lincoln Ranger District totaled $8,853 during 2008.

Coulter Campground was open to day use but closed to camping due to safety risks associated with the 2007 Meriwether Fire. A debris deflector that was installed in 2007 above the toilet remains in place to protect that facility. There was a minimal amount of overland water and debris flow in the campground.

Meriwether Picnic Site was open for public use throughout the 2008 season. The debris deflector installed above the picnic shelter in 2007 remains in place to protect that facility. Rain above Meriwether Canyon did result in two significant floods and debris flows. The extent of material (mud, gravel and boulders) that flowed into the picnic area was considerable. On at least two occasions the shelter filled with mud. Due to the debris deposits, the site looks rough and foot travel was difficult. Access to the lower toilet was limited by the creek channel and water flows. Toilets at the picnic site could not be pumped because the barge dock is blocked with sediment. Once erosion within Meriwether Canyon is reduced (within the next 2 to 4 years) the picnic site needs to be rehabbed.

Visitor use of the Park Lake Day Use Area was popular. Most public comments received supported the restriction on camping along the shoreline. New facilities that were installed in 2007 (17 picnic sites, two parking lots, one toilet and 9 fire rings) were frequently used during the summer months of 2008.

Visitor use information was collected during fiscal year 2008 through the National Visitor Use Monitoring Project (NVUM). That information has not yet been provided to the Forest.

Use of the Copper Creek campground on the Lincoln Ranger District remains down from the pre-2003 Snow Talon Fire. However, that use is gradually increasing as the vegetation in the campground increases. Campsites that retain large mature green trees along Copper Creek were the preferred sites and received the most use. Visitation is expected to increase in the future when construction of the Snowbank Lake diversion is completed and the lake is again full of water.

Aspen Grove campground received heavy weekend use, with most of the campsites occupied. Weekday use was sporadic with only 1/3 to ½ of the sites occupied. The amphitheater at the Aspen Grove campground received little use in 2008. The campground received a moderate amount of use throughout the hunting season.

Bug damage has increased significantly in most developed recreation sites. Trees are dying quickly and present a future risk to public safety. Next year and in subsequent years, the Forest will have to remove a greater percentage of hazard trees before the sites are open for public use. Cromwell Dixon

Campground on MacDonald Pass was closed for the entire summer season in 2008 due to the large number of dead and dying trees in the campground. Cromwell Dixon is the first developed site that will require the large scale removal of hazard trees. That work is scheduled for the winter of 2008/2009.

Data Analysis Methods:

The condition of developed recreation facilities is monitored through the Forest Service Infrastructure & Deferred Maintenance reporting system in I-Web. Over a five-year period, condition surveys are accomplished at all developed recreation facilities. The resulting information is entered into the Infra database and revised as changes occur within the sites. NVUM use estimates should be evaluated for notable changes from the previous survey. Documented changes may necessitate management changes at the recreation site such as: increased maintenance and/or identification of capital investment projects.

Monitoring Results:

The 1986 Helena Forest Plan stated that actual use of developed recreation sites in 1981 was 84,700 RVD's. Projected use at developed sites between 1996 and 2005 was estimated to be 114,100 RVD's. The Forest Plan indicated there were 15 developed recreation sites (campgrounds & picnic areas) on the Forest. Changes have occurred within the developed recreation program over the past 20 years such as: addition of rental cabins, larger RV and travel trailers, and increased use of trailheads.

Pikes Gulch Campground on the Helena Ranger District was abandoned during the 1990's. Two new developed sites were constructed at Gipsy Lake (campground and picnic area). Nine facilities were added to the developed recreation program as rental cabins (Cummings, Strawberry, Kading, Indian Flats, Rillway, Thompson, Bar Gulch, Eagle Guard, Moose Creek). Based on a lack of public use at Strawberry, the cabin was removed from the Rental Program. Cummings Cabin was once again open and available for public use in 2008 after minor repairs were completed.

The 2003 Visitor Use Monitoring Project provided a more accurate estimate of use at developed recreation sites on the Forest. NVUM use figures (identified below) also provide an average length of stay estimate for visitors on the Helena Forest.

Day Use Developed Sites: 44,000 visits
Average Length of Stay: 1.9 hours
Total hours at Day Use Sites = 83,600 hours
Total RVD's at Day Use Sites = 6,966

Overnight Use Developed Sites: 33,900 visits
Average Length of Stay: 13.4 hours
Total hours at Overnight Sites = 454,260 hours
Total RVD's at Overnight Sites – 37,855
Total RVD's at Forest Developed Sites = 44,821

Variability Measure Discussion:

Variability Measures:

Forest Plan Monitoring Requirements state that any 20% variation in visitor use between projected and actual should be documented. That task requires both projected baseline data (identified in the Forest Plan) and current recreation use information. Recreation use on National Forest lands is frequently measured by RVD's (Recreation Visitor Days). An RVD represents an aggregate total of 12 visitor hours, continuous or intermittent.

Assessment:

The 2003 total of 44,821 RVD's at Forest developed recreation sites is 39,879 less than the stated number of RVD's in 1981. Even with the addition of seven rental cabins as developed recreation sites, the amount of visitor use is much less than originally anticipated. The estimated visitor use (based on NVUM surveys) at developed recreation sites in fiscal year 2003 was only 39% of the Forest Plan projection.

Forest Staff believe recreation visitor use at developed sites has increased during the past 25 years. The basis for that belief is employee observation; national, regional and local recreation trends; and improved sampling methods. Based on results of the 2003 National Visitor Use Monitoring Project, it appears the recreation use figures identified in the 1986 Forest Plan (based on the best available data at the time) and/or the projected future growth estimates, were high. It is unknown how original use estimates were determined and as a result, any comparison with NVUM use figures is not appropriate.

NVUM data may not provide a fully accurate picture of RVD's on the Forest. It is based on a statistically valid sampling methodology and annual visitor use is influenced by weather, wildfire, economics and other factors. However, NVUM provides the most reliable recreation use information available today and is scheduled on a routine (5-year) basis. NVUM data collected during FY 2008 will likely revise use figures on the Helena National Forest. A comparison of the 2003 and 2008 data will provide a reliable analysis of the true variability of this element.

Actions in response to variability assessment:

Variability should no longer be based on the original projected use identified in the Forest Plan. Rather, future assessments should be compared to the 2003 and 2008 NVUM estimates. It would not be appropriate to initiate management actions based on a + or – 20% variation in NVUM estimates from any one year because visitor use is dependent upon factors such as: weather, fuel prices, and wildfire occurrences. In addition, funding constraints may require a further reduction in the opportunities provided for developed recreation on the Forest.

Recommended Efforts:

Condition surveys should continue to be accomplished at all developed sites on a five-year cycle. That information should be entered into the Infra database thereby updating deferred and annual maintenance needs. When specific site conditions change, those changes should be reflected in the Infra database.

The Helena Forest should continue to implement the National Visitor Use Monitoring Project as currently scheduled, every five years. Visitor use information obtained from the 2003 and 2008 surveys should be utilized as baseline data for future comparisons and projections.

As funding allows, the Forest should continue implementing the 5-Year Action Plan for developed recreation sites in fiscal year 2009 to reduce maintenance backlogs, improve visitor service and meet existing standards. Next year a fee system should be implemented for the Skidway and Gipsy Lake Campgrounds. In addition, toilets that were identified for decommissioning should be removed.

Monitor visitor use and demand at Copper Creek campground as vegetation returns within the Snow Talon fire area and water returns to Snowbank Lake.

Monitor the success of implementing user fees at Skidway and Gipsy Lake Campgrounds.

Monitor visitor use and demand for expanding the fall operating season at Aspen Grove campground.

(A2) Dispersed Recreation

Forest Plan Requirements:

The Forest Plan requires that Recreation Opportunity Spectrum (ROS) monitoring be completed and then reported on a five-year interval. National Forest recreation opportunities are managed according to a Recreation Opportunity Spectrum. Recreation activities are provided and managed in settings ranging from primitive (wilderness) to urban (highly developed).

Intent:

The intent of that requirement is to ensure maintenance and enhancement of a wide variety of recreation opportunities.

Data Sources:

GIS coverage of the ROS; 2003 NVUM; Employee Observations; Hunter Patrols; Public Input

Because the RIM system, formerly utilized by the Forest Service to track visitor use, was determined to be inaccurate and outdated, it is no longer utilized.

Recreation Opportunity Guides are no longer maintained by the Helena Forest. The Forest web-site now provides general information about a variety of recreation opportunities on the Forest.

The Recreation Opportunity Spectrum (ROS) provides an established framework for stratifying and defining classes of outdoor recreation environments, activities and experiences. ROS is not a land classification system but rather a management objective (a way to describe and provide a variety of recreation opportunities).

Current Efforts and Findings:

Documentation of Monitoring Methodology:

As Forest travel planning continues, the Forest seeks and documents public comment. That input is used to develop travel plan alternatives and evaluate effects. To a large extent, the type of use and season of use allowed on Forest roads and trails determines recreation activities.

Trail condition surveys are implemented as required or as needed. Condition surveys, public input, and employee observations help determine trail maintenance needs and priorities.

Monitoring Activity:

The primary management activity that continues to influence the Recreation Opportunity Spectrum is implementation of past travel plan decisions. Through those decisions motorized use is now allowed on designated routes only.

The Helena Ranger District issued several recreation event Special Use Permits that took place in the general forest area. The Elkhorn Ultra-Marathon, the “Don’t Fence Me In” fun run, Tri-Arabian Horse Ride, Montana State Folf Tournament and the York .38 Special mountain bike ride attracted several hundred people to the National Forest.

Monitoring of dispersed recreation sites was accomplished through condition survey assessments. Over a five-year period, condition surveys were completed for documented dispersed sites identified in the General Forest Areas (GFA’s). The resulting information was then entered into the Infra database.

Visitor use information obtained during fiscal year 2003, through the National Visitor Use Monitoring Project, provides our best estimate of dispersed recreation use. Although the recreation survey does not provide information for specific sites, it does estimate visitor use on all Helena Forest lands for a variety of recreation activities. Based on the recreation survey, the top five most popular activities on the Helena National Forest in 2003 were: viewing wildlife, hiking/walking, viewing natural features, relaxing, and driving for pleasure.

As a routine element of program management, proposed recreation actions and activities are evaluated in compliance with the National Environmental Policy Act. Specialist input is provided for all proposed projects to evaluate and document the potential impacts upon recreation opportunities and use.

Dispersed camping within the Copper Creek drainage increased during the hunting season. This increase was due to the closure of the Copper Creek Campground and as a result of the Aspen Grove Campground remaining open during the fall.

The Snow Talon Fire area continues to offer increased opportunities for winter snowmobile play areas in the Copper Creek area. The fire opened up areas for general off trail riding and new areas for high marking.

Again this year several trail projects were initiated and completed. Construction or reconstruction was accomplished on the following trails: Hellgate Ridge, Doolittle, Hunters Gulch Connection, and Thompson Gulch. All work was completed in compliance with the 2005 North Big Belts Travel Plan decision. During the past 20 years the Helena National Forest has accomplished three or more reconstruction projects annually. This effort greatly improved visitor access and opportunities and reduced the backlog of deferred maintenance needs.

The Crow Creek footbridge in Tizer Basin was replaced through the volunteer services of the Back Country Horsemen. This new bridge should provide safe pedestrian travel for many years.

The Mann Gulch Trail was reconstructed for the second time within the past few years. The trail and associated structures were damaged during the 2007 Meriwether Fire. While the trail provides good access for pedestrians, it is not recommended for stock. Due to the steep terrain and numerous switchbacks, this trail is subject to slides and needs to be maintained annually.

Data Analysis Methods:

Recreation use information obtained through the National Visitor Use Monitoring Project does not provide use figures for any one site on the Forest. However, the report does provide information indicating people use the Helena National Forest for a variety of dispersed recreation activities. Survey information, along with traffic counts, is a helpful tool for future recreation planning. Traffic counts, from survey exit locations on the Forest, provide a snapshot of recreation use occurring in a general area. Public comments provided during the surveys indicate an average or better satisfaction rating for recreation on the Forest. NVUM information will be used to evaluate future recreation opportunities on the Forest.

Monitoring Results:

ROS Category	Acres - as Projected in Forest Plan	25% Variation	Acres – as Identified in Eastside Assessment
Primitive	105,000	78,750 – 131,250	98,214

ROS Category	Acres - as Projected in Forest Plan	25% Variation	Acres – as Identified in Eastside Assessment
Semi-Primitive Non-Motorized	275,000	206,250 – 343,750	193,925
Semi-Primitive Motorized	188,000	141,000 – 235,000	168,578
Roaded Natural & Modified and Rural	408,000	306,000 – 510,000	503,157

Dispersed recreation activities continue to remain popular in the North Big Belts following implementation of the 2005 travel plan decision. Reconstruction of the Hellgate Ridge, Doolittle, Hunters Gulch Connector and Thompson Gulch trails will increased OHV activity in the North Big Belts and improve motorized opportunities.

Variability Measure Discussion:

Variability Measures:

Forest Plan Monitoring Requirements state that a 25% variation in the projected base by ROS type should be documented. The table above provides the projected summer ROS acreage by category (as identified in the Forest Plan) and the 2000 ROS acreage as identified for the Eastside Analysis Assessment.

Assessment:

Three of the four ROS classifications are currently within the range of variation as identified above. The semi-primitive non-motorized areas on the Forest are not within the 25% variation, according to the Eastside Assessment. 1986 ROS classifications were not entirely consistent with current ROS mapping classifications. To a large extent, that may account for the disparity between ROS acreage figures. Management activities impacting the semi-primitive non-motorized ROS category, such as the miles of road construction and changes in the status of Inventoried Roadless acres, were actually less than what was projected in the Forest Plan.

One primary criteria impacting ROS classifications on the Forest is the presence of motorized roads and trails. Travel plan decisions in the Clancy-Unionville and North Big Belt Mountains will impact the ROS acreage on the Forest. Although new ROS mapping efforts have not been initiated since those travel decisions, it is evident there will be an increase in the number of semi-primitive non-motorized acres. That increase may lift the ROS semi-primitive non-motorized category to the established 25% variation.

Actions in response to variability assessment:

Once Forest travel planning has been completed, new ROS inventories and maps should be developed to reflect the mix of available recreation opportunities. When the Forest Plan is revised, document the new ROS acreages and identify acceptable monitoring variations.

Recommended Efforts:

Dispersed recreation site information should be noted and revised in the Infra database as needed. This information is helpful in identifying resource concerns and work priorities. Utilize GFA (General Forest Areas) condition surveys to identify deferred maintenance needs and the annual program of work.

When travel planning has been completed on the Forest (scheduled for June 2011), review ROS maps to determine consistency with existing Forest Plan direction. At that time it would be appropriate to establish a new ROS baseline for the Forest.

Visitor use information (NVUM) was collected during fiscal years 2003 and 2008 to identify visitor use numbers and trends. The 2003 information is the most current and accurate recreation use information currently available on the Forest. The NVUM information collected in fiscal year 2008 is not yet available. Base future recreation plans, in part, on information obtained through the National Visitor Use Monitoring Project. Ensure recreation facilities and programs are managed in accordance with Recreation Opportunity Spectrum objectives. Note changes in percent of recreation activity participation after implementing the next National Visitor Use Monitoring survey scheduled for fiscal year 2013. The change in recreation activities may reflect a change in trends either locally or regionally.

The Forest should continue to emphasize implementation of the travel plan decisions. In doing so employees should monitor recreation activities to note changes and trends that may be occurring.

(A3) ORV compliance and damage

Forest Plan Requirements:

The Forest Plan requires that ORV (OHV) damage and compliance be documented.

Intent:

The intent of that requirement is to ensure travel plan updates are realistic, understandable, and enforceable. It also ensures that travel plans adequately protect the resources and meet assigned prescriptions of the Forest Plan.

Data Sources:

LEIMARS (incident reporting and case tracking system); Monitoring Reports; Employee Observations; Hunter Patrol Notes

Current Efforts and Findings:

Documentation of Monitoring Methodology:

All law enforcement incidents (warnings and violation notices) are documented annually. Through LEIMARS, each incident is recorded in reference to a specific 36 CFR (Code of Federal Regulations).

Field observations, trail conditions, OHV violations, and public comments regarding OHV use are documented at each Ranger District.

Monitoring Activity:

Field observations, trail conditions, OHV violations, and public comments regarding OHV use are documented at each Ranger District. In addition, OHV violations, warnings, and incidents are documented in the law enforcement database (LEIMARS).

Law enforcement statistics document OHV problems on the Helena Forest during fiscal year 2008. There were 9 Violation Notices issued for OHV related incidents in 2008 compared with 15 the previous year. There were 15 Incident/Warning Reports documented for OHV related incidents in 2008 compared with 60 the previous year. Specific rationale for the decline in OHV violations is uncertain.

In 2008 there were continued travel management violations on both the Townsend and Helena Ranger Districts. While recent travel plan implementation projects have reduced violations and damage, there are

still some problem areas remaining. Vehicles traveled behind the gate on the Cottonwood Gulch Road #4155 in February when that route was closed to motorized travel. The Forest received reports of OHV violations in the Cave Gulch area and there were two reported accidents. In addition, there was a motorcycle accident reported in Woodchute Gulch. The southern portions of the Elkhorn Mountains on the Townsend Ranger District continues to experience travel management violations in the spring as people are out hunting for shed antlers.

Anecdotal observations by Forest Service personnel on the Lincoln Ranger District suggest a general increase in OHV use during the spring, summer and fall that result in resource impacts. The National Visitor Use Monitoring Surveys were not conducted in areas of high OHV activity. The illegal use of ATV's was especially noted during the fall hunting season. The Keep Cool Lakes area is located within private and State land management areas which were closed to motorized travel, except over the snow vehicles in winter.

There were about 150 participants for a May ATV ride authorized on the Lincoln District. The event took place on roads and designated trails. District personnel are receiving increased demands for longer, 30 mile loop trails for ATVs and motorcycles.

Observations of snowmobile parking areas and snow ranger reports indicate an increase of use by snowmobiles from previous years due to average snow-packs. The Snow Talon Fire area has increased snowmobile opportunities.

Data Analysis Methods:

OHV compliance and damage are monitored and evaluated continuously based on public comment and employee observation. Past, current and future travel planning responds to both compliance problems and resource concerns.

Monitoring Results:

Existing OHV use does impact natural and cultural resources on the Forest, although the severity of damage is highly subjective and difficult to quantify. Resource impacts resulting from OHV use have diminished since July 1, 2001 when off-route motorized travel was prohibited based on a 3-State OHV Record of Decision. Although motorized travel is only allowed on existing routes, violations occur that result in property/resource damage and/or user conflicts. Continued off-route travel results from the growing popularity of OHV use and the reduced opportunities for OHV use on public lands. The reduction in OHV opportunities is directly related to an increase in motorized restrictions. Motorized sport riding does result in some limited impacts to designated Forest trails.

OHV problems that occurred in 2008 were similar to those occurring in the past. The primary OHV violation identified on the Helena Forest was: possessing or using a vehicle off National Forest System roads (36 CFR 261.56).

As evidenced by Forest employee observation, a growing problem on the Helena Forest is the illegal use of OHV's that occurs near subdivisions and other private land. The growing development and occupancy of private in-holdings suggest that this trend will continue. It is extremely difficult to monitor OHV use along National Forest boundaries where public and agency access is limited.

The primary method utilized to track OHV impacts has been law enforcement reports and employee monitoring.

A travel plan decision for the North Big Belts was signed on May 18, 2005. The associated environmental impact statement did address OHV impacts and provided rationale for changes and additional travel restrictions. The North Big Belts travel decision was made with the following intent:

To provide a variety of motorized and non-motorized routes for both public and administrative needs that will prevent or reduce potential unacceptable damage from roads and trails to the area's resources.

To develop travel maps and respective area signing that are clear and understandable.

To provide a travel plan that is enforceable.

4) To reduce long-term maintenance costs for the area's transportation system.
5) To improve watershed conditions associated with travel routes.

A South Belts Travel Plan Decision Notice and Finding of No Significant Impact were signed by Forest Supervisor Kevin Riordan on February 14, 2008. That decision designated open and closed motorized roads and trails during the period of May 15th through December 1st. Travel restrictions have now been identified for the entire Townsend Ranger District. In response to the 2005 Travel Management Rule, the required Motor Vehicle Use Map (MVUM) for the Townsend District was developed and published. The MVUM can be revised annually to reflect changes in motorized restrictions.

Variability Measure Discussion:

Variability Measures:

Forest Plan Monitoring requirements state there should be District or ID Team review to note unacceptable resource damage from OHV use or unenforceable situations.

Assessment:

Updated travel plan decisions and implementation of site specific Closure Orders do address critical OHV problems by restricting use. Completion of travel planning on the Forest will reduce OHV violations and the associated resource impacts. It should be noted that the revision of the Forest travel restrictions will not eliminate OHV violations. Because there is a growing demand for OHV travel and frustration on the part of OHV enthusiasts regarding the lack of opportunities, some recreationists may continue to violate travel restrictions.

Actions in response to variability assessment:

The implementation of new travel restrictions on the Forest will require an initial emphasis on compliance and monitoring. A Forest employee could be given responsibilities to track travel plan implementation: its progress and success. If social or resource conflicts develop following implementation of the new travel restrictions, additional management actions may be required.

Recommended Efforts:

In compliance with the 2005 National Forest Travel Management Rule, travel planning is scheduled for completion on the Forest by June 2011. Following travel plan revision, the Forest should develop and update (as needed) a Motor Vehicle Use Map (MVUM) to meet the Travel Management Rule. The Forest should emphasize implementation of new travel plan decisions with improved signing and increased field presence to ensure compliance.

An increased emphasis should be made by Forest employees to monitor, document and track OHV violations, user conflicts and resource damage. Forest Service law enforcement officers should continue to coordinate with district personnel to identify all OHV problems encountered.

Forest Service personnel should limit their OHV use in areas closed to motorized travel to that deemed absolutely necessary. The public has repeatedly stated the agency should abide by existing motorized restrictions. Agency employees should not be authorized to drive on roads closed to motorized use when other options are available. When off-route motorized travel is required by Forest employees, they should ensure the public is adequately informed and impacts are limited.

It is not necessary to ask a Forest ID Team to review and evaluate unacceptable resource damage resulting from OHV use. Individual resource specialists are capable of determining acceptable levels of motorized use based on both resource and social impacts. However, we do recommend the annual Monitoring Report continue to track OHV issues, compliance and damage.

Continue to implement Emergency Orders restricting motorized travel on specific roads or trails where resource impacts are deemed unacceptable.

Continue to seek and utilize public input during the travel planning process. Work closely with local user groups to identify acceptable alternatives to travel plan proposals.

There is increased demand for additional OHV opportunities on the Helena Forest. That results from increased sales of ATV's and new travel restrictions on the Helena and adjacent National Forests. The Forest should continue to consider additional OHV routes in the future based on public demands and resource concerns.

(A4) Measure Change in Status of Roadless Acres

Forest Plan Requirements:

The Forest Plan requires measuring the amount of change in the status of Inventoried Roadless acres.

Intent:

The intent of that requirement is to compare the acres and distribution of the Inventoried Roadless resource with that projected in the Forest Plan. Data sources could include the following: project plans, NEPA documents, watershed analysis, and transportation analysis.

Data Sources:

Resource project decisions, Travel Plan decisions.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Not applicable.

Monitoring Activities:

Forest projects that may affect Inventoried Roadless resources are evaluated in compliance with NEPA regulations.

Data Analysis Methods:

Summarization of data records from project or travel plan decisions.

Monitoring Results:

The Forest Plan projected considerably more road construction and timber harvest within the Inventoried Roadless lands than has occurred thus far.

Variability Measure Discussion:

Variability Measures:

Forest Plan Monitoring requirements state that a loss of more than 20,000 acres by 1991 requires analysis and review of the trend. Although the length of time required to monitor this element has terminated, the Forest will continue to track and monitor changes to Forest Inventoried Roadless resources.

Assessment:

The South Belts Travel decision enhanced roadless characteristics within two Inventoried Roadless (IRA) areas. In both the Camas Creek and Grassy Mountain IRAs, the number of road miles open to motorized travel was reduced. It should be noted this change does not affect established boundaries or the size of those IRAs.

Actions in response to variability assessment:

No actions are needed to respond to this element.

Recommended Efforts:

Continue to monitor changes to national policy and management direction for Inventoried Roadless Areas. Continue to track changes to and effects upon local Inventoried Roadless Areas through environmental analysis of project proposals.

(B1) Wilderness

Forest Plan Requirements:

The Forest Plan requires the following items are monitored annually: trail conditions, visitor encounters, range conditions, trend and actual use levels, and campsite impacts.

Intent:

The intent is to provide the public high levels of wilderness recreation experiences and maintain high quality wilderness resources.

Data Sources:

Hunter Patrol Reports; Trailhead registration (voluntary); Limits of Acceptable Change (LAC) for the Scapegoat; Anecdotal information from district personnel.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

During 2008 conditions were monitored and documented in the Scapegoat Wilderness (by Forest employees) in accordance with the Forest Plan, and Bob Marshall Great Bear Scapegoat Wilderness

Management Plan. Conditions within the Gates of the Mountains Wilderness were monitored by district trail crews, district recreation staff and the wilderness ranger.

Monitoring Activity:

NVUM survey information obtained in 2003 was insufficient to provide accurate use estimates for the Scapegoat and Gates of the Mountains Wilderness areas. There weren't enough visitor survey days assigned in NVUM for a statistically valid sample of wilderness use. Information from visitor surveys conducted in 2008 is not yet available. Informal observations by Forest Service employees indicate that visitor use within both wilderness areas has remained static.

Condition surveys for wilderness trails are completed as assigned (or as needed) and documented within the Infra database. The Helena Forest Plan monitoring requirement for measurement and frequency of Wilderness (B1) is annual, 25% of heavy use areas and trails.

During the summer/fall of 2007, a new recreation workforce was implemented on the Helena Forest. A seasonal wilderness ranger position was created to help manage and monitor both the Scapegoat and Gates of the Mountains Wilderness areas. In 2008 the wilderness ranger also assumed the duties of trail crew foreman on the Lincoln Ranger District.

Gates of the Mountains

The Gates of the Mountains wilderness experienced a major wildlife during the summer of 2007. The fire did impact many of the trails within the Gates of the Mountains Wilderness. In particular, segments of the following trails were significantly damaged: Big Log Gulch, Meriwether Canyon, Refrigerator Canyon and Willow Creek. These trails will all require an inspection and assessment of reconstruction needs. During 2008 campsite surveys were accomplished by the wilderness ranger in an attempt to meet the 10-Year Wilderness Challenge.

Scapegoat

Only a few highly impacted campsites were inventoried in 2008. However, pre-season and operating season inspections were completed on most outfitter camps.

Wilderness managers decided to concentrate monitoring efforts on heavily impacts sites and attempted to take more active management actions to improve conditions. Most areas identified as being heavily use are the same areas noted during previous monitoring periods. Approximately 70 miles of trail were monitored.

Volunteers and outfitters again accomplished a large portion of the trail work. The downfall was lightest it's been in the past five years which allowed an increase in trail clearing and maintenance. There are approximately 110 miles of system trail in the Scapegoat Wilderness administered by the Lincoln Ranger District.

The greatest level of visitor use in the Scapegoat Wilderness occurs during the early fall hunting season. However, the Continental Divide and Heart Lake areas continue to increase in popularity during the summer.

Data Analysis Methods:

Previously obtained condition surveys for trails within both the Scapegoat and Gates of The Mountains Wilderness indicate many trails are not fully maintained to Forest Service standards. The greatest level of

visitor use occurs within both wilderness areas during the fall big game hunting seasons; however, the Scapegoat Wilderness is also a popular destination during the summer.

Monitoring Results:

Trail conditions

Gates of the Mountains

As a result of the 2007 wildfire, several trails require reconstruction. Forest trail crews (with support from the Montana Conservation Corps and Back Country Horsemen) did accomplish a great deal of work in 2008. Most of the trails were cleared of downfall, 94 water-bars were installed, 1,500 feet of trail were relocated, and approximately 14,770 feet of existing trail was reconstructed. Even with the level of work completed, additional reconstruction and maintenance will be necessary in the future. Trails that need to be inspected next year for additional work include: Slip Gulch, Willow Creek, Meriwether Canyon and Refrigerator Canyon.

A contract was awarded and work accomplished to reconstruct the Mann Gulch Trail that was also damaged during the fire in 2007.

Scapegoat

The Helena National Forest monitoring requirement for measurement and frequency of Wilderness (B1) is annual, 25% of heavy use areas and trails. In the Scapegoat Wilderness, Opportunity Class IV trails are managed to accommodate heavy traffic and there are approximately 17 miles of trail in Opportunity Class IV.

Trail Conditions for the Scapegoat (Reference MA P-1 of HNF FP, BMWC Recreation Management Direction).

- Opportunity Class I – primary objective of maintenance is for resource protection. Monitored annually whenever workload permits.
- Opportunity Class II – primary objective of maintenance is for resource protection. Monitored annually whenever workload permits.
- Opportunity Class III – primary objective of maintenance is for resource protection, cleared to standard. Monitored annually.
- Opportunity Class IV – primary objective of maintenance is for resource protection. Managed to accommodate heavy traffic, cleared to standard to withstand heavy traffic. Monitored annually. HNF FP monitoring requirement for measurement and frequency of Wilderness (B1) is annual, 25% of heavy use areas and trails.

Visitor encounters

Gates of the Mountains

Because visitor use was traditionally limited, an appropriate number of trail encounters weren't established for the Gates of the Mountains Wilderness. Past employee observations confirm the number of encounters would generally meet established ROS criteria for semi-primitive areas (usually 6 - 15 encounters daily). The wilderness implementation plan for the Gates does recommend that baseline data be gathered to establish a useable carrying capacity.

Scapegoat

There is little or no evidence that visitor encounters exceed existing ROS standards for primitive and semi-primitive non-motorized areas. Visitor encounters were primarily documented during fall hunter patrols. Approximately 30 miles of patrol were completed in 5 days and resulted in 8 camp contacts and

10 trail contacts. Several warnings were issued for violations of the Food Storage Order. The probabilities of encounters and general level of encounters were within standard for all four Opportunity Classes in fiscal year 2008. The amount of person days and miles of patrol were less than occurred last year due to the increased duties and responsibilities of the wilderness ranger.

Visitor Encounters for the Scapegoat (Reference MA P-1 of HNF FP, BMWC Recreation Management Direction). As a minimum, trail and campsite encounters in Opportunity Classes III and IV will be monitored annually.

- Opportunity Class I – general level of encounters is very infrequent.
- Opportunity Class II – general level of encounters is low.
- Opportunity Class III – general level of encounters is moderate.
- Opportunity Class IV – general level of encounters is moderate to high.

Range Conditions

Gates of the Mountains

The Moors Mountain Grazing Allotment, which is grazed two of every three years (rest rotation system), is in generally good to excellent condition. The Moors Mountain allotment was utilized in 2008 by one permittee for a total of 21 days.

Scapegoat

The range condition in the Scapegoat Wilderness (pack and saddle stock only) is generally in good condition and does not exceed a moderately grazed appearance.

Trend and actual use levels

Gates of the Mountains

The wilderness implementation plan for the Gates does require monitoring use via ranger observations. It also states baseline data must be gathered to establish useable carrying capacity.

Scapegoat

Trend and actual use levels in the Scapegoat are best evaluated using the visitor encounters and campsite impacts measurements from the Limits of Acceptable Change/Opportunity Class guidelines.

Campsite impacts

Gates of the Mountains

The most popular campsites within the Gates of the Mountains are traditional hunting camps. Forest employees monitor those dispersed campsites, but not through a formal LAC process. Thus far, no single dispersed site within the Gates of the Mountains Wilderness requires camping restrictions.

Many of the camps that were inventoried in the early 1990's were no longer evident when the sites were re-inventoried in 2008.

Scapegoat

The information presented below in the 2007 monitoring report was field inspected in 2008 and conditions appear to remain unchanged. Campsite impacts/trends for the Scapegoat Wilderness are summarized below by geographic area:

Bighorn Lake, Valley of the Moon, CDT (Geo unit 5-1-1): General trend is a slight decrease in the number of sites and only one site with a heavy impact rating. Impacts at Big Horn Lake have improved from the four impacted sites to only two discernable sites.

Middle Fork, Upper Lander's Fork (Geo unit 5-2-1): The trend is a slight decrease in impacts since 2003 when outfitters and the public relocated to this area because other areas were closed due to fire. This drainage receives a lot of regular use and there are three moderate and one heavily impacted site in the upper Lander's; down two sites from 2004.

Mainline Trail, Twin Lakes (Geo unit 5-3-1): The trend is improving with static impacts. A decrease in the number of sites which occurred in the Twin Lakes area is a result of blow down. Several sites located near the Mainline Trail receive regular use and impacts tend to be static in those areas.

Mineral Creek (Geo unit 5-4-1): The trend is static. The main impacts are a cluster of sites on the East Fork in the lower end of the Mineral Creek drainage. The number of sites has decreased from 4 discernable sites to only two moderately impacted sites.

Meadow Lake, East Fork of Meadow Creek (Geo unit 5-5-1): The trend is a slight increase to static impacts. The peninsula/shoreline of Meadow Lake has four sites: one with light impact, two moderately impacted and one heavily impacted site. This area is currently out of standard with the opportunity class. The management plan for the area is to restrict livestock from the campsite (on a voluntary basis) using signs as the primary tool as well as campsite rehab. The East Fork has three out of the four sites with a moderate impact rating.

Alpine Parks, Arrastra and Dry Creeks (Geo unit 5-5-2): General trend is a slight increase in impacts. Fiscal year 2007 shows no decrease in moderately impacted sites (3) or highly impacted sites (1). Use is expected to continue at the present levels and impact trends to be static to increased.

Webb Lake, Parker Lake, Sourdough (Gea unit 5-6-1): General trend is static but there is a noted decrease in impacts and substantial recovery at the seven sites near Parker Lake.

Heart Lake, Landers Fork (Geo unit 5-7-1): The trend of impacts is static to increasing. There are seven moderate and two heavily impacted sites at Heart Lake. The peninsula shows recovery and was opened to camping in 2007 but remained closed to stock. The main campsites near the hitch rails were heavily impacted but opening the peninsula may relieve some pressure on them. With the high density of moderately and heavily impacted sites, this area is out of standard for opportunity class IV. Desired management in this area is personal on-site contacts.

Assessment:

The primary intent of the wilderness element within the Forest Plan Monitoring requirements is to achieve a high level of wilderness recreation experience and to maintain a high quality wilderness resource. Current management and use of both the Gates of the Mountains and Scapegoat Wilderness does meet that intent.

Recommended Efforts:

Trail condition surveys should be accomplished within the Scapegoat when assigned or as needed. The previous requirement for conducting trail condition surveys on a five-year interval has been revised. Condition survey information should be utilized to identify critical maintenance needs and develop a program of work.

Trails and campsites within the Gates of the Mountains should be evaluated and monitored during the 2009 field season to identify impacts from the Meriwether Fire. Trail segments that are identified with safety concerns or resource impacts should be scheduled for improvement as quickly as possible.

The majority of frequently used campsites in the Scapegoat and Gates of the Mountains Wilderness have been mapped and documented in the past. Annually, 20% of the wilderness campsites should be monitored to ensure resources are not degraded and impacts are deemed acceptable. Within the Bob Marshall Wilderness Complex (Scapegoat) managers made a decision to improve sites and reduce the amount of monitoring.

Every effort should be made to ensure both the Scapegoat and Gates of the Mountains Wilderness Areas are managed to meet the 10-Year Wilderness Challenge. An increased field presence has been identified as the main factor that would move the Scapegoat Wilderness closer to meeting the 10-Year Challenge.

At a minimum, identify and staff an adequate baseline workforce (both within the agency and through partnerships) for both the Scapegoat and Gates of the Mountains.

Other Monitoring Efforts:

In 2004 the USDA Forest Service developed a 10-Year Wilderness Stewardship Challenge to define successful wilderness stewardship. There are 10 elements associated with the Wilderness Challenge that are numerically rated from 0-10. A score of 10 is the highest possible for an individual element. A total score of 60 is needed for each wilderness to meet the minimum standard. The following 10 elements are rated to reflect the 2008 condition.

Element #1 – Wilderness covered by a fire plan that evaluates and considers the full range of management responses.
Scapegoat – score of 8
Gates of the Mountains – score of 3

Element #2 – Wilderness is successfully treated for noxious weeds/invasive plants.
Scapegoat – score of 5
Gates of the Mountains – score of 5

Element #3 – Monitoring of wilderness air quality values is conducted and a baseline is established for this wilderness.
Scapegoat – score of 6
Gates of the Mountains – score of 6

Element #4 – Priority actions identified in a wilderness education plans are implemented.
Scapegoat – score of 6
Gates of the Mountains – score of 4

Element #5 – This wilderness has adequate recreation standards, monitoring and management programs to monitor opportunities for solitude or primitive and unconfined recreation.
Scapegoat – score of 4
Gates of the Mountains – score of 6

Element #6 – Wilderness has a completed recreation site inventory.

Scapegoat – score of 10
Gates of the Mountains – score of 6

Element #7 – Outfitter and guide permits have operating plans which direct outfitters to model appropriate wilderness practices and incorporate appreciation for wilderness values in their interaction with clients.
Scapegoat – score of 6
Gates of the Mountains – score of 6

Element #8 – Wilderness has a minimum set of forest plan standards in place which monitor degradation of the wilderness resource.
Scapegoat – score of 6
Gates of the Mountains – score of 4

Element #9 – The priority information needs fro this wilderness have been addressed through field data collection, storage, and analysis.
Scapegoat – score of 8
Gates of the Mountains – score of 4

Element #10 – Baseline workforce in place.
Scapegoat – score of 6
Gates of the Mountains – score of 2

Total score for the Scapegoat is 65 which exceeds the Minimally Accepted standard. Total score for the Gates of the Mountains is 46 which is less than the Minimally Accepted standard.

(C) WILDLIFE AND FISH

(C1) Ungulate distribution, movement, population structure and density (Elkhorns)

Introduction

The analysis of this element is based on mule deer and elk aerial surveys in the Elkhorns conducted annually by Montana Department Fish, Wildlife, and Parks.

Forest Plan Requirements

"Seasonal distribution, movement patterns, population structure and density of elk, mule deer, moose, and mountain goat populations are to be monitored to identify ungulate population segments and yearlong range of each segment in the Elkhorns. This monitoring element applies to Management Areas E1 – E4."

Intent

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

Data Sources

Forest Plan suggested data sources include: ground and aerial observations; radio tracking; annual Elkhorn wildlife monitoring report. Data are derived from annual surveys conducted by Montana Department Fish, Wildlife, and Parks (MTFWP) personnel and from ground surveys conducted by Forest Service personnel. Data are filed at the Supervisor's Office and include:

- Elk aerial surveys in Hunting District 380 for winter 2008
- Mule deer aerial surveys in Hunting District 380 for winter and spring 2008

MTFWP is responsible for determining methods to measure populations. Currently, no radio-tracking is occurring. There is no Elkhorn wildlife monitoring report. Monitoring conducted in the Elkhorns is included in the Forest-wide annual monitoring reports rather than in a stand-alone document.

Surveys were not conducted for mountain goats or moose.

Current Efforts and Findings

Documentation of Monitoring Methodology

Aerial surveys are utilized by MTFWP personnel, annually, to develop trend data to determine if the population under consideration is within the population goals as described in species-specific management plans. Subsequently, these data are used to establish amount of type of hunting permits for the following year. See MTFWP Memos in project file for more details on methodology.

Monitoring Activity and Data Analysis Methods

Elk Aerial Surveys:

Aerial surveys were conducted on February 20th and 21th, 2008 for elk.

Mule Deer Aerial Surveys:

Aerial surveys were conducted on January 3rd, 2008 and April 2nd, 2008 for mule deer.

Monitoring Results

Elk Aerial Surveys:

A total of 2,101 elk were observed in 2008 which is an increase of 72 elk over last year's survey (N=2,029) (Tables 1 and 2. Data for 2007 are included for comparison). Conditions were favorable for survey efforts. Calves were classified from the air with an observed ratio of 24.7 calves: 100 cows. Calf ratios typically range from 35 to 45 calves per 100 cows. Lower than normal calf ratios have occurred from 2001 through 2008. The lower calf ratios are probably a result of continued drought, which affects the physical condition of the cows and their ability to carry a fetus to term or sustain a calf once born. Most herd units are relatively stable or have decreased somewhat in numbers of elk.

A total of 235 bulls were observed of which 58 were yearling bulls and 177 were bulls 2 1/2 years old or older. Overall, bull elk made up 15.9% of the total elk counted. The total number of bulls observed in 2008 represent the third highest number of bulls observed since comparable surveys were conducted beginning in 1983. The objective in the Elk Management Unit is to have 10% of the elk population comprised of antlered bulls.

Table 1. Summary of elk observations in Hunting District 380 for 2008

Herd Segment	Total	Cows	Calves	Yearling Bulls	Brow-tined Bulls	Total Bulls	Unclassified
South Crow	471	5	-	12	31	43	423
North Crow	499	321	96	23	59	82	0
Kimber	370	297	59	3	11	14	0
Sheep Creek	234	158	42	9	25	34	0
Prickly Pear	264	38	9	7	9	16	201
Elkhorn	6	3	-	0	3	3	0

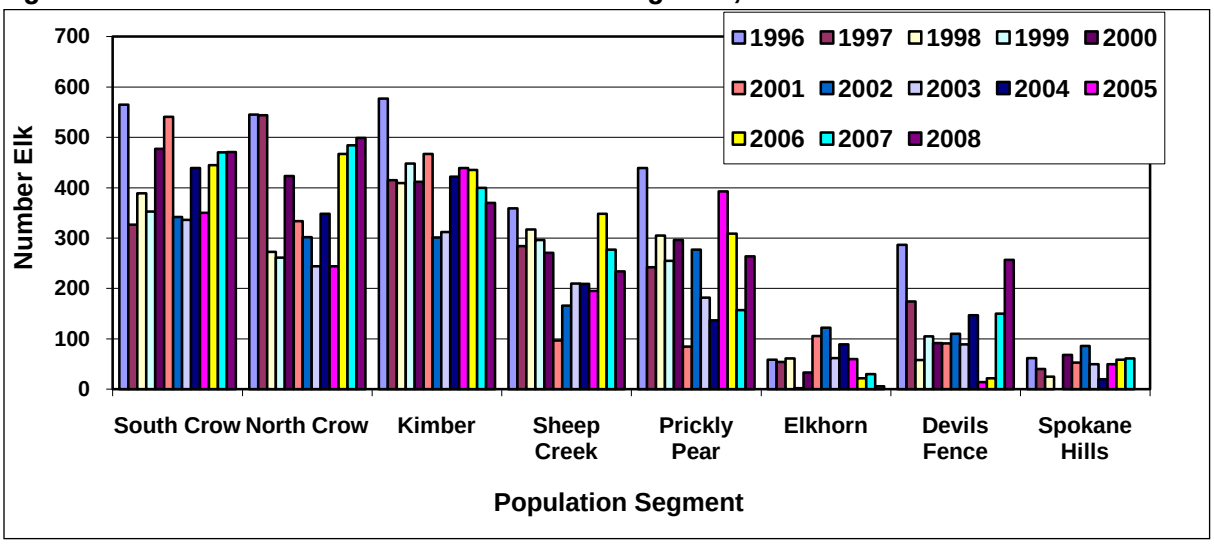
Devil's Fence	257	174	40	4	39	43	0
Spokane Hills	0	0	0	0	0	0	0
Total	2101	996	246	58	177	235	624

Table 2. Summary of elk observations in Hunting District 380 for 2007

Herd Segment	Total	Cows	Calves	Yearling Bulls	Brow-tined Bulls	Total Bulls	Unclassified
South Crow	470	335	84	23	28	51	0
North Crow	484	326	98	13	47	60	0
Kimber	400	288	77	11	24	35	0
Sheep Creek	277	222	45	7	3	10	0
Prickly Pear	157	84	29	10	1	11	33
Elkhorn	30	10	9	-	11	11	0
Devil's Fence	150	83	18	7	42	49	0
Spokane Hills	61	40	12	-	9	9	0
Total	2029	1388	372	71	165	236	33

Figure 1 summarizes the number of elk observed in each herd segment from 1996 – 2008.

Figure 1 Number of elk observed in each herd segment, 1996-2008.



Mule Deer Aerial Surveys

A total of 556 deer were observed during the winter aerial survey (Tables 3 and 4). Data for 2007 are included for comparison. This was a decrease of 230 deer over last year. Aerial surveys were also conducted during the spring of 2008 with a total of 514 deer observed, an increase of 51 over last year. This is well above the long term average of 305 deer (See data in project file).

Fawn production during the December survey was 24.7 fawns per 100 adults which was lower than the previous year (44.9 fawns per 100 adults) indicating that there was minor over-winter mortality of fawns. The buck: doe ratio of 18.8 bucks: 100 does was higher than the previous year.

Table 3. Summary of mule deer observations in Hunting District 380 for 2008

Year	Post-Season Total Deer	Fawns: 100 Adults (Post Season)	Spring Total Deer	Fawns:100 Adults (Spring Recruitment)	Bucks:100 Does
2008	556	28.3	514	26.5	11.5

Table 4. Summary of mule deer observations in Hunting District 380 for 2006/2007

Year	Post-Season Total Deer	Fawns: 100 Adults (Post Season)	Spring Total Deer	Fawns:100 Adults (Spring Recruitment)	Bucks:100 Does
2006/2007	786	24.7	463	21.6	18.8

Variability Measure Discussion

Variability Measure

±10% from previous measurements

Assessment

Elk Aerial Surveys

The total number of elk observed in 2008 increased by about 4% compared to 2007 and remains within the population objective of 1,700 to 2,300 observed elk. The cow elk and calf composition remains the same between 2007 and 2008 (24.7 fawns per 100 adults in 2007 and 2008). Bull elk made up approximately 236 of the total observed in 2007 compared with 235 in 2008, basically no change.

The variation (increase of 4%) in the total number observed between 2007 and 2008 is within the acceptable variation of ± 10%.

Mule Deer Aerial Surveys

The post season count has decreased by 29% since 2007 and the spring count has increased by about 11%. Both the post-season and spring fawn: adult ratios have increased by 15% and 23% respectively. The buck: doe ratio has decreased by 39%.

The variation reflected in the changes between 2007 and 2008 does not meet the acceptable variation of ± 10% since mule deer counts have increased by greater than 10%.

Actions in Response to Variability Assessment

No actions are needed in response to the variability assessments for elk or mule deer because we are either within the acceptable variation (elk) or actions that would correct the variability (i.e. hunting permit structure) are not a land management oriented practice. The MFWP aerial survey report for deer indicates that minor over-winter mortality of fawns may have contributed to the increase in the overall count.

Recommended Efforts

Continue to monitor to (1) document elk and deer use patterns as forests succumb to mountain pine beetle infestations, and (2) decipher how use patterns shift as regenerating forests in the Warm Springs Burn mature and close in.

Conclusions

The Helena National Forest relies on MTFWP for annual monitoring data as their methods are generally mountain range wide. Forest personnel supplement these efforts with on-the-ground data collection to determine habitat suitability and use. See additional monitoring elements for more information on habitat conditions. Based on MTFWP survey data conclusions – 2,101 observed elk that are within the population objective of 1,700-2,300 observed elk and 514 observed mule deer in the spring that are well above the long term average (305) – elk and mule deer in the Elkhorns appear to be viable relative to MTFWP objectives. The intent of the Forest Plan monitoring is to 'measure the effect of management activities on representative wildlife habitats with the objective of ensuring that viable populations of existing native and desirable non-native…animal species are maintained'. According to the Decision Flow Diagram (Figure IV-1, page IV/20 Forest Plan), if the variability is within acceptable limits then the Forest may continue management practices and re-evaluate during the next monitoring period. Since this is the case with elk, the Forest will continue to implement ongoing projects and continue planning additional habitat enhancement in the Elkhorns commiserate with Forest Plan standards. In the case of mule deer, the variability exceeds the acceptable limits. However, this year the high count appears to be related to causes not associated with management practices.

(C2) Ungulate habitat evaluation (Elkhorns)

Introduction

Habitat preferences for elk, mule deer, moose, and mountain goats vary by season of use and are generally measured accordingly. Habitat preferences for elk include (1) adequate hiding cover on summer range and low open road densities as reflected in a measure of habitat effectiveness; (2) security during the hunting season measured according to hiding cover/open road densities and large patch sizes greater than ½ mile from open roads; and (3) adequate thermal cover on winter range.

Mule deer habitat preferences are generally similar to those described for elk; however, mule deer will use smaller stands of hiding and thermal cover and also rely on shrubs for foraging as well as for hiding cover. Little is known about specific mule deer habitat use in the Elkhorns; however, the Limestone Hills in the southeast portion of the Elkhorns, primarily on BLM managed lands, are heavily used by mule deer in the winter based on radio telemetry data from 1982.

Moose are generally associated with riparian areas and early successional areas with adequate browse. Moose may be found throughout the Elkhorns; however, incidental sightings are concentrated in the western portion of the mountain range and in Tizer Basin. Because of their solitary nature coupled with a paucity of moist, early successional or riparian habitats, moose densities in the Elkhorns are low.

Mountain goats were native to major mountain ranges of western Montana but were absent from isolated ranges east of the Continental Divide. Sixteen mountain goats were introduced into the Elkhorns in the late 1950s and since that time have become established in suitable habitat across the Elkhorns. About 60 goats were estimated to once occupy the Elkhorns. Today, about 10 remain. Mountain goats use alpine and subalpine areas close to cliffs or rocky ledges on which they depend to escape predators and are considered intermediate browsers.

This monitoring element focuses on elk habitat preferences and assumes that discussions relative to elk are also applicable to mule deer. Habitat preferences for moose are assumed to be addressed in the discussion for *Element C12 Riparian.* Mountain goats are not abundant in the Elkhorns; reports, anecdotal and per MTFWP, indicate that approximately 10 goats remain in the Elkhorns. Reasons for their low numbers are unknown at this time. Therefore, they will not be included in this analysis for the time being.

Forest Plan Requirements

"Habitat will be evaluated on the basis of topographic and physiographic features, vegetation, and climate for elk, mule deer, moose, and goat to determine habitat preferences by species of wildlife. This monitoring element applies to Management Areas E1 – E4."

Intent

To determine preference by species of wildlife.

Data Sources

Forest Plan suggested data sources include: aerial photos, habitat type inventory, land type inventory, field transects, and the annual Elkhorn wildlife monitoring report. Specific data sources include the following for elk:

Elk summer habitat effectiveness is based on available hiding cover and open road densities. Hiding cover is based on R1-VMAP[1] and field data where available. The model used to identify hiding cover is

[1] R1-VMAP is described in more detail in the following documents on file in the Supervisor's Office:

(1) USDA Forest Service.2006. Region One Vegetation Classification, Mapping, Inventory, and Analysis Report: Region One Vegetation Council Classification Algorithms. Numbered report 05-01. Revised 2006.

described in the *Criteria for Wildlife Models Helena National Forest Version June 2009.* Road densities are derived from the Forest's INFRA roads database. Thermal cover is also based on R1-VMAP. Grassland condition is based on the Elkhorn Vegetation Study completed by the Ecosystem Research Group in 2006 and *The Role of Fire in the Elkhorn Mountains* (Barrett 2005) which was referenced as part of the Elkhorn Vegetation Study See the Project File for Barrett (2005) and the following website for the Elkhorn Vegetation Study: http://www.fs.fed.us/r1/helena/elkhorns/history/veg_study_phse2.shtml

Current Efforts and Findings

The Elkhorns are in the initial phases of an epidemic mountain pine beetle outbreak (MPB) that is changing the vegetative characteristics of ponderosa pine and lodgepole pine stands. Baseline vegetation will be established and tracked over time to identify changes in habitat conditions for big game species as a result of the MPB outbreak. Road densities are not expected to change since the Elkhorn Travel Plan has already been completed (1995). However, those data will also be reported as road densities may take on greater importance as cover is lost to tree mortality associated with the MPB. Grassland conditions are expected to change as a result of more frequent prescribed burning compared to the last several decades.

Documentation of Monitoring Methodology

Several data sources are used to describe and analyze habitat preferences and conditions for big game species in the Elkhorns. These are described below according to the habitat parameter in discussion.

Monitoring Activity and Data Analysis Methods

Cover data are derived from R1-VMAP vegetation data and are based on information in the Forest Plan. Stands with canopy cover of 40% or greater are considered hiding cover except where field data have been collected in which case those data are used to determine presence and extent of hiding cover. Field data are based on cover board estimates that measure the extent to which vegetation at each sample plot would 'hide 90% of an elk at 200 feet'. Stands with canopy cover greater than 60% are considered thermal cover.

Open road density calculations for summer and the hunting season are based on data located in the Forest's INFRA Road Database and the Montana Transportation Framework. Summer habitat effectiveness is based on the methodology described in Lyon (1983)[2]. Security habitat is based on the methodology described in Hillis et al (1991)[3]. Changes in foraging habitat are based on condition and extent of grasslands and are analyzed on a subsection of the Elkhorns in the study area of the Elkhorns Vegetation Study completed in 2006 and in the area described by Barrett (2005) in *The Role of Fire in the Elkhorn Mountains*.

Monitoring Results

The vegetation data available and analyzed for 2008 reflect a snapshot on a continuum between living, green forests with endemic levels of MPB and forests that are dying at an accelerated rate due to the epidemic levels of MPB. Elk habitat is described according to seasonal preferences and the respective condition of that habitat.

---

(2) USDA Forest Service. 2007e. Region One vegetation classification, mapping, inventory and analysis report. Numbered Report 06-04 v1.2.

[2] Lyon, L.J. 1983. Road density models describing habitat effectiveness for elk. Journal of Forestry 81(9): 592-595.

[3] Hillis, J.M., J.E. Thompson, J. Canfield, L.J. Lyon, C.L. Marcum, P.M. Dolan, and D.R. McCleery. 1991. Defining elk security; the Hillis paradigm. In *Proceedings of Elk Vulnerability Symposium.* Eds. Christensen, A.G., L.J. Lyon, and T.N. Lonner, Montana State University, Bozeman, MT.

SUMMER HABITAT

Hiding Cover and Summer Range

Several factors are used to analyze summer habitat effectiveness. These include consistency with Forest Plan Standard 3 (Forest Plan p. II/17) which requires a minimum of 35% hiding cover within each elk herd unit and the degree of habitat effectiveness as measured by summer time open road densities. This also includes a discussion of the condition of grasslands in the Elkhorns as a measure of forage habitat.

Table 5 summarizes the amount of hiding cover per elk herd unit in the Elkhorns. Hiding cover in all herd units except for Sheep Creek and Prickly Pear is based on canopy cover and therefore has a higher threshold to determine if Forest Plan consistency has been achieved. See table in Forest Plan (p. II/18). Because those herd units utilize canopy cover as a proxy for hiding cover, a minimum of 50% hiding cover in each herd unit is required to demonstrate consistency with this Standard. The availability of hiding cover in Prickly Pear and Sheep Creek is derived by cover board data; as such, a minimum of 35% hiding cover is required to meet the Standard. None of the herd units meets the hiding cover requirements regardless of how the data have been derived.

Table 5. Forest Plan Hiding Cover Analysis for Standard 3 by Elk Herd Unit

Elk Herd Unit (EHU)	Total EHU Acres	Acres of Hiding Cover	Percent Hiding Cover in EHU	Meets FP Standard 3?
Sheep Creek	43,848	6,265	0.11	No
Prickly Pear	31,051	8,009	0.11	No
North Crow	25,828	3,936	0.15	No
South Crow	32,586	7,238	0.22	No
Kimber	30,131	1,473	0.05	No
Devil's Fence	20,245	258	0.01	No

Summer Habitat Effectiveness

Habitat effectiveness is also an important measure of habitat quality on summer range and is based on open road densities. Lyon (1983) recommends a minimum of 50% habitat effectiveness within each herd unit (Figure 2). Table 6 summarizes habitat effectiveness by herd unit. All herd units comprise at least 50% habitat effectiveness.

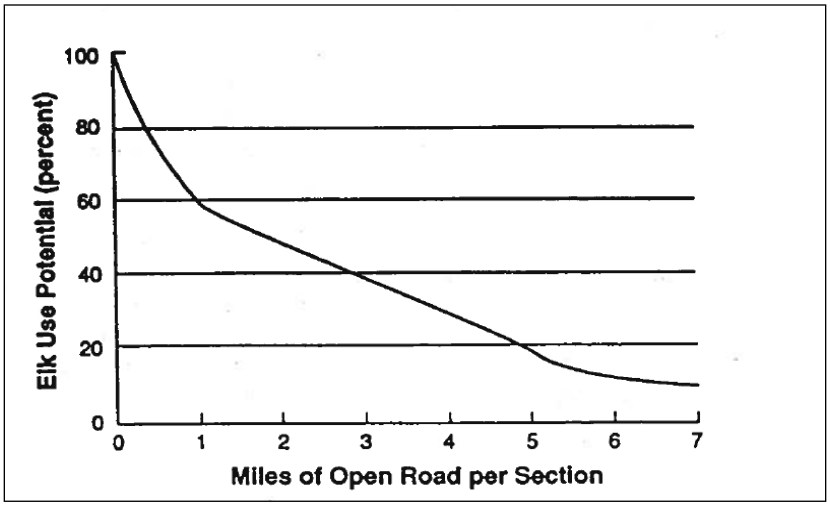


Figure 2 Summer Habitat Effectiveness Based on Open Road Densities

Table 6. Habitat Effectiveness by Elk Herd Unit

Elk Herd Unit (EHU)	Total EHU Acres	Square Miles EHU	Total Open Road Miles	Open Road Density	Habitat Effectiveness
Sheep Creek	43,848	69	81.0	1.2	0.58
Prickly Pear	31,051	49	42.6	0.9	0.61
North Crow	25,828	67	71.5	1.1	0.59
South Crow	32,586	51	45.0	0.9	0.61
Kimber	30,131	47	40.6	0.9	0.61
Devil's Fence	20,245	32	52.8	1.7	0.50

Forage Habitat

Elk forage on a variety of plants; however, in the Elkhorns grasses comprise a majority of their diet. The Ecosystem Research Group (ERG) as part of the Elkhorns Vegetation Study identified extent of conifer encroachment and its effects on rangeland habitat based in part on Barrett's *The Role of Fire in the Elkhorn Mountains*. According to ERG, approximately 2,924 acres of encroachment have occurred in the areas where Barrett's study overlaps the Vegetation Study Area, specifically in the Kimber and North Crow Herd Units. Barrett (2005) concludes that historically about 2,400 acres of grass and shrublands burned annually on the Townsend Ranger District portion of the Elkhorns. In contrast, post-1940 fire data suggest an average of 129 acres burned per year, including prescribed burning. This figure does not include the 1988 wildfire that burned about 50,000 acres.

Conifer encroachment into grasslands – and most likely sagebrush - has created patches of elk cover that may not have been historically present (Figure 3). The high frequency of fires in grasslands and sagebrush generally limited trees to scattered, small patches.

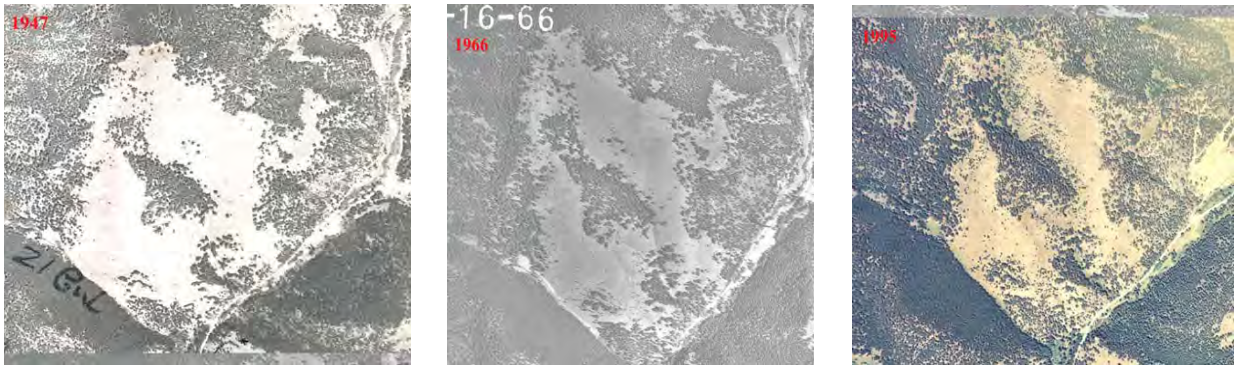


Figure 3 Aerial photo-comparison from 1947-1995 at the intersection of 21 Gulch and Elkhorn Creek

Security during hunting season

Elk security during the hunting season is measured according to Forest Plan Standard 4(a) and the Hillis paradigm which describes security as areas greater than 250 acres at least ½ mile from open roads. Hiding cover is preferable; however, the main feature is distance from roads.

Hiding Cover and Forest Plan Standard 4(a)

Table 7 summarizes the relationship of the amount of hiding cover per elk herd unit and open road densities during the hunting season (October 15- December 1) in the Elkhorns. As with the Summer Range discussion above, hiding cover in all herd units except for Sheep Creek and Prickly Pear is based on canopy cover and therefore has a higher threshold to determine if Forest Plan consistency has been achieved. See table in Forest Plan (p. II/18). Because those herd units utilize canopy cover as a proxy for hiding cover, the Montana Department of Fish, Wildlife, and Parks thresholds are used to determine if a respective herd unit is consistent with Forest Plan Standard 4(a). Hiding cover in Prickly Pear and Sheep Creek herd units is derived by cover board data; as such, the Forest Plan definition and threshold is used to determine Forest Plan consistency. None of the herd units meets the hiding cover requirements regardless of how the data have been derived.

Table 7. Forest Plan Hiding Cover Analysis for Standard 4(a) by Elk Herd Unit

Elk Herd Unit (EHU)	Total EHU Square Miles	Percent Hiding Cover in EHU	Total Open Road Miles	Open Road Density	Meets FP Standard 4(a)?
Sheep Creek	69	0.11	49.7	0.73	No
Prickly Pear	49	0.11	32.3	0.67	No
North Crow	67	0.15	55.6	0.83	No
South Crow	51	0.22	44.6	0.88	No

Table 7. Forest Plan Hiding Cover Analysis for Standard 4(a) by Elk Herd Unit					
Elk Herd Unit (EHU)	Total EHU Square Miles	Percent Hiding Cover in EHU	Total Open Road Miles	Open Road Density	Meets FP Standard 4(a)?
Kimber	47	0.05	32.5	0.69	No
Devil's Fence	32	0.01	34.2	1.08	No

Elk Security

Table 8 summarizes the percent of security habitat by elk herd unit based on Hillis et al (1991). Hillis et al. (1991) recommend that each herd unit (or other comparable boundary) comprise at least 30% secure habitat during the hunting season. All herd units except for Devil's fence are aligned with this threshold. Figure 4 illustrates the security habitat within each herd unit in the Elkhorns.

Table 8. Percent Elk Security by Elk Herd Unit		
Elk Herd Unit (EHU)	Percent Elk Security	Meets Hills et al. (1991) Recommendation
Sheep Creek	0.41	Yes
Prickly Pear	0.48	Yes
North Crow	0.42	Yes
South Crow	0.38	Yes
Kimber	0.51	Yes
Devil's Fence	0.04	No

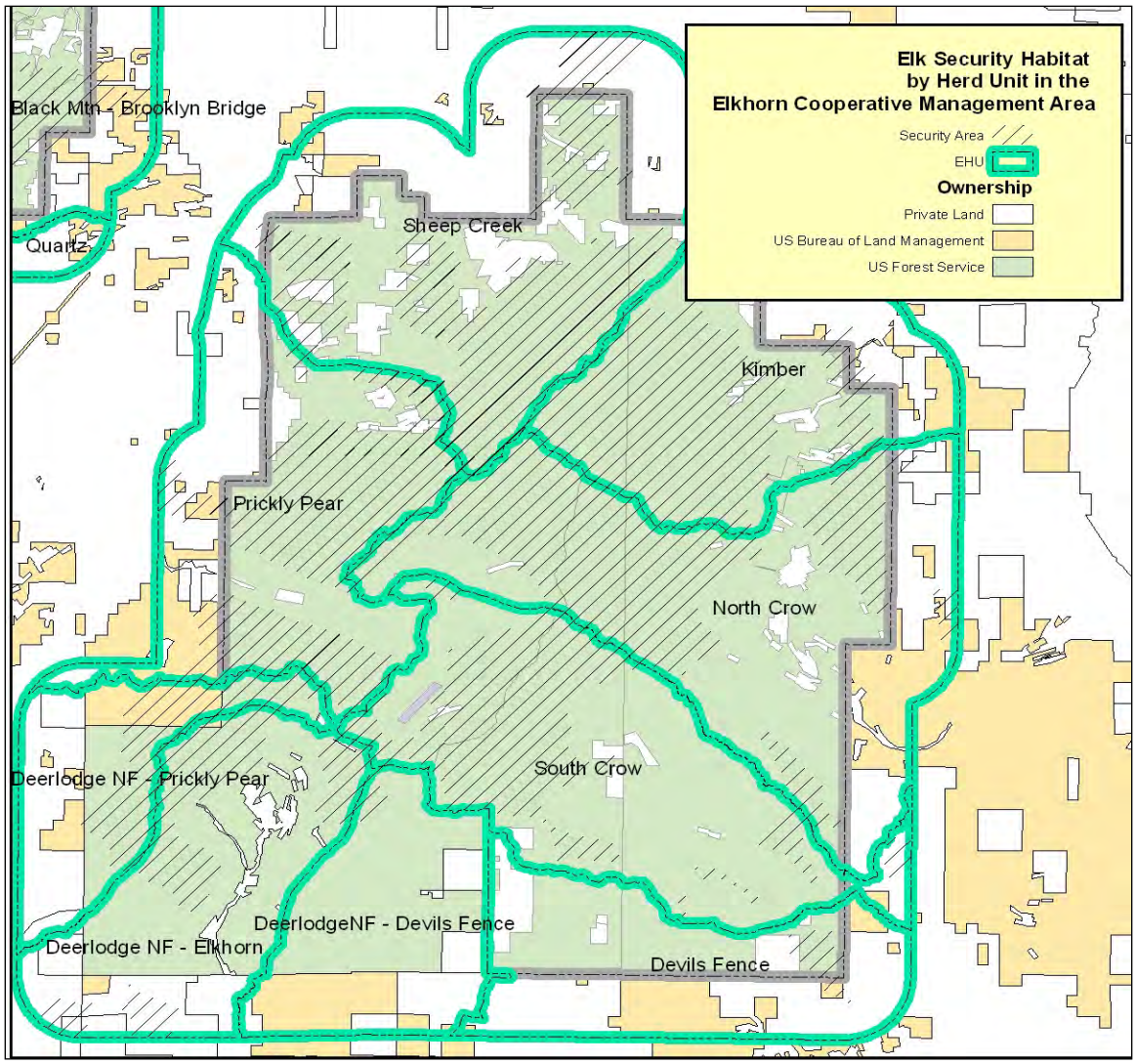


Figure 4 Elk Security Habitat by Elk Herd Unit

WINTER RANGE AND THERMAL COVER

Winter range is based on a combination of information from Montana Department of Fish, Wildlife, and Parks and the Helena National Forest data. Thermal cover is based on the Forest Plan definition[4] with the exception of canopy cover which includes anything ≥ 60%. Table 9 summarizes the percent of thermal cover on winter range by elk herd unit. None of the herd units meets the Forest Plan Standard of 25% thermal cover on winter range within each herd unit. Most of the winter range in the Elkhorns comprises lower elevation grasslands. Figure 5 identifies winter range by each herd unit in the Elkhorns.

Table 9. Forest Plan Thermal Cover Analysis for Standard 3 by Elk Herd Unit

Elk Herd Unit (EHU)	Total EHU Acres	Total Acres Winter Range	Total Acres Thermal Cover	Percent Thermal Cover	Meets FP Standard 3?
Sheep Creek	43,848	28,770	782	0.02	No
Prickly Pear	31,051	12,556	0	0	No
North Crow	25,828	29,059	91	0.003	No
South Crow	32,586	15,303	0	0	No
Kimber	30,131	15,493	74	0.005	No
Devil's Fence	20,245	15,778	0	0	No

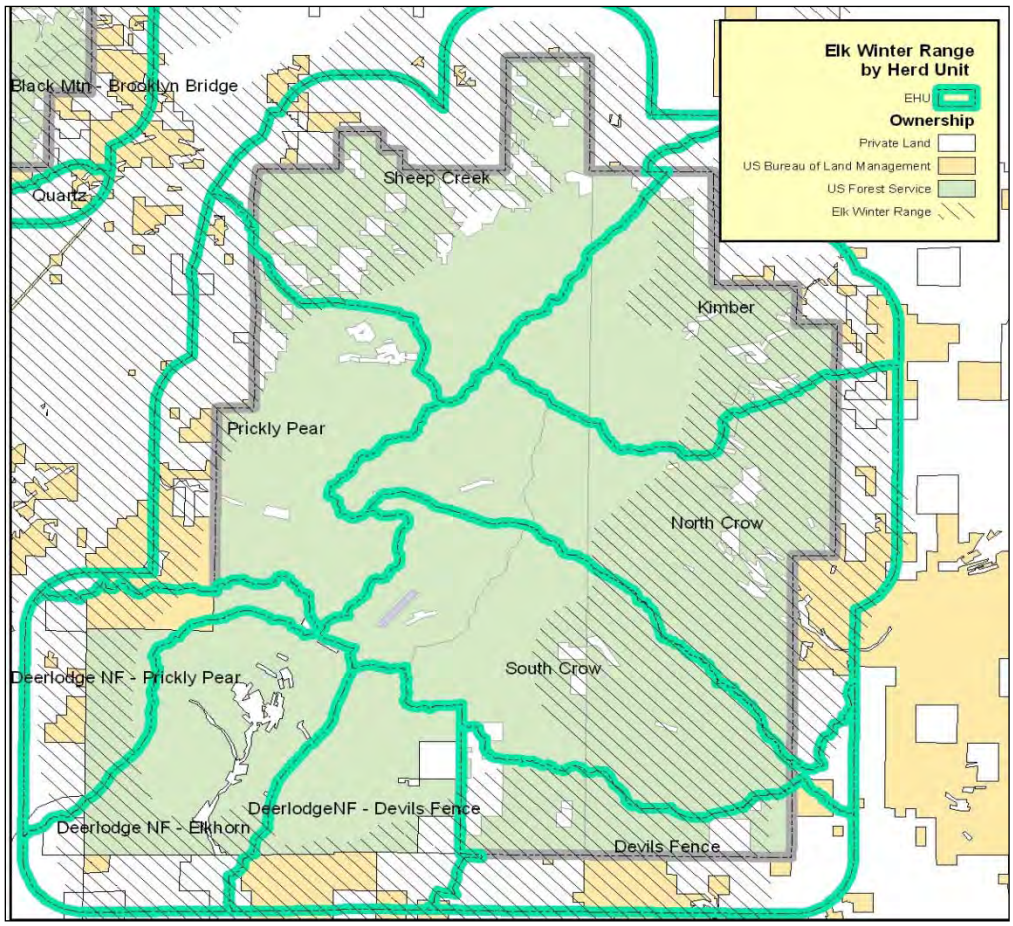


Figure 5 Elk Winter Range by Herd Unit in the Elkhorns

[4] Thermal cover is defined as cover used by animals to ameliorate effects of weather; a stand of coniferous trees 40 feet or more tall with an average crown closure of 70 percent or more, and having a minimum size of 15 acres.

Variability Measure Discussion

Vegetation conditions naturally change over time and in the absence of large scale disturbance, these changes are generally imperceptible in the short term (3-5 years). Currently, MPB infestations are increasing in the Elkhorns and will most likely result in large scale changes to forested stands. Therefore, in terms of hiding and thermal cover, data presented in this Monitoring Report will represent baseline data against which to measure changes associated with MPB infestations. Changes in grassland communities have been measured over the past several decades and are reflected in Barrett's (2005) study that was referenced during the preparation of the Elkhorns Vegetation Study by the Ecosystem Research Group. Although that study focused on the Kimber and North Crow herd units, it is generally representative of all grasslands in the Elkhorns. These data and analyses will be used to determine variability in grasslands, and hence foraging habitat for elk.

Variability Measure

±10% from previous measurements

Assessment

Elk generally avoid human disturbance and/or exhibit physiological stress when exposed to human activity regardless of season. In forested landscapes, open road density is used as an easily-measured variable to assess levels of human disturbance upon elk and is calculated as elk habitat effectiveness in the summer and as a measure of elk vulnerability during the hunting season. Habitat conditions, hiding and thermal cover and foraging habitat, are also used as indicators of elk habitat. The previous analysis indicates that Forest Plan Standards for thermal and hiding cover (Standard 3) and for hiding cover/open road densities (Standard 4[a]) are not attained for any of the elk herd units within the Elkhorns. Furthermore, grassland communities are currently experiencing conifer colonization which is reducing available elk forage habitat. Open road densities vary from low to moderate and in some instances provide some level of habitat effectiveness during the summer and in terms of elk security during the hunting season. Despite current conditions that generally are inconsistent with Forest Plan Standards, elk numbers are within Montana Department of Fish, Wildlife, and Parks objectives. So, despite the fact that Forest Plan standards for hiding cover and thermal cover have not been achieved in each respective elk herd unit, the Forest Plan intention of *"ensuring that viable populations of existing native species…are maintained*" is being met. Elk numbers have steadily increased since the crafting of the Forest Plan.

Actions in Response to Variability Assessment

Variability associated with this element is difficult to determine because the landscape in the Elkhorns has been naturally shifting for several decades regardless, or in spite of, any management activities. Very little timber management has occurred in the Elkhorns especially since the Forest Plan removed the Elkhorns from the timber base. Recently, prescribed fire has been used more frequently as a tool to improve grasslands and to reduce conifer colonization in some locations. These management-related changes are described in C-3. At this time there is no deviation of any management practice or specified goal in terms of elk habitat conditions.

Recommended Efforts

The following recommendations would provide data to assist in the analysis of elk habitat conditions in the Elkhorns:

- Continue monitoring changes in forested stands as the MPB outbreak runs its course in the Elkhorns
- Identify and map areas of conifer colonization in order to identify opportunities for grassland restoration
- Review current habitat conditions relative to elk distribution to determine if management actions are necessary to improve cover and forage conditions.

Conclusions

A discussion of elk habitat in the Elkhorns is not complete without a discussion of elk populations in the Elkhorns. Elk occurred across much of North America prior to European settlement. By the early 1800s, subsistence, market, and hide hunting almost eliminated elk east of the Mississippi River. By 1910, there were fewer than 50,000 elk in North America and virtually none in the Elkhorns. In 1939, 34 elk were transplanted from Yellowstone National Park into the Elkhorns. As a result of management, elk increased in the Elkhorns to the point where they now comprise an important part of the ecosystem and a focal hunted species.

In 1982, an Elkhorn Monitoring Program was initiated in order to collect information needed to understand the wildlife, habitat, and land use present in the Elkhorns in order to assure biologically sound management, maintain and enhance wildlife values, and promote public confidence and approval of the Wildlife Management Unit concept. Initially, the monitoring program included elk and mule deer and was intended to wrap up by the mid-1980s. At that time, however, the scope of the elk monitoring in the Elkhorns was expanded in order to gather information on bull ecology in order to evaluate the effects of different hunting regulations on bull survival and hunter attitudes. By 1991, the monitoring had concluded and data and management recommendations were summarized in the *Elkhorn Mountains 1991 Annual Report* (DeSimone and Vore 1992[5]). That report concluded, among other conclusions, that:

- Range condition on public land in the Elkhorns is generally good although some areas in the Elkhorns were in poor condition which may explain in part the displacement of elk from public lands in favor of private land.
- The Elkhorns elk herd is vulnerable to hunter harvest and displacement from public to private land.
- The Elkhorn's elk herd has increased since elk surveys began in the 1960s. Generally, the elk herd was stable during the 1960s and 1970s and exhibited a substantial increase during the 1980s. During the 1960s and 70s evidence indicates comparatively stable populations with high counts between 600 and 800 elk. During the 1980s (probably in response to reducing antlerless harvest) the herd more than doubled to approximately 2,000 by the close of the decade.

In 1989, the Elkhorn Integrated Resource Management Analysis (IRMA) was completed in order to establish the existing condition of the Elkhorn Mountains, among other goals. The IRMA concluded that: Generally, the cover/forage rations are near optimum on key winter/summer range and on key winter range. Key summer range is high in cover and low in forage whereas summer range has a 50/50 cover/forage split. Winter range is low in cover and high in forage with very low thermal cover and forested forage.

In 1993, the Elkhorns Landscape Analysis was completed in order to develop a long-term integrated program that characterized the existing condition of the Elkhorns in order to make recommendations for future management. The Landscape Analysis concluded that:

- Large portions of grassland prairies are permanently 'gone'.
- There is a loss of forage productivity in old growth habitats
- 30% of elk winter on private land
- There is the potential to lose large blocks of interior forest and 'security'.

The Elkhorn Wildlife Management Unit occurs within the Elkhorn Elk Management Unit (EMU) and comprises Hunting District (HD) 380 as defined in the state-wide Montana Elk Plan (MFWP 2004). **The** Montana Final Elk Management Plan January 2005[6] provides detailed information on the EMU relative to

[5] DeSimone, R. and J.Vore. 1992. Elkhorn Mountains 1991 Annual Report. Montana Department Fish, Wildlife, and Parks.
[6] Montana Department Fish, Wildlife, and Parks. 2005. Statewide elk plan for Montana.

goals, objectives, and management challenges. Excerpts are presented in Table 9. Note that 'current trend survey' in this table refers to the year the plan was in preparation.

Table 9. Elk populations and population objectives for the Elkhorn Elk Management Unit			
Elk Management Unit	**Hunting Districts**	**Elk Populations**	**Population Objectives**
Elkhorn	380	The number of elk has been relatively stable since 1992.	Maintain the number of elk observed during post-season aerial surveys within 15% of 2,000 elk (1,700-2,300).

Elk numbers have fluctuated in the Elkhorn EMU from 1996 through 2008 (See Figure 1). Hiding and thermal cover has been relatively stable for the past decade until recently. Currently, the mountain pine beetle outbreak in the Elkhorns is impacting forest structure. The extent to which the mountain pine beetle will impact thermal and hiding cover needs to be monitored as the MPB outbreak unfolds.

It becomes somewhat difficult to predict a causal relationship between elk numbers and habitat since elk numbers have fluctuated over the past few years while habitat conditions have remained relatively stable with the noteworthy exception of the 1988 Warm Springs Fire that burned about 50,000 acres. This is not to suggest that habitat conditions have no bearing on elk populations. Certainly, quality and distribution of cover and forage are key to healthy elk herds and the ability of the landscape to retain elk on public land. Rather, other variables are also at play that govern elk population numbers as indicated by DeSimone and Vore (1992) in their conclusion "*During the 1980s (probably in response to reducing antlerless harvest) the herd more than doubled to approximately 2,000 by the close of the decade*". So, despite the fact that Forest Plan standards for hiding cover and thermal cover have not been achieved in each respective elk herd unit, the Forest Plan intention of *"ensuring that viable populations of existing native species…are maintained*" is being met. Elk numbers have steadily increased since the crafting of the Forest Plan.

(C3) Effects of land use activities on ungulate populations (Elkhorns)

Introduction

Several land use activities occur annually in the Elkhorns and range from actions specifically designed to enhance ungulate habitat to those that are considered expected outputs according to the Forest Plan – e.g. livestock grazing, recreation, etc. This monitoring element focuses on these land use activities to determine if (1) management actions designed to improve quality and distribution of ungulate habitat are meeting objectives; and (2) other management actions are not negatively impacting ungulate habitat.

Forest Plan Requirements

"Past, present, and future land use activities and their effect on populations will be evaluated to determine responses to man imposed activities by various ungulate populations. This monitoring element applies to Management Areas E1 – E4."

Intent

Evaluate response to man imposed activities by various ungulate populations.

Data Sources

Field observations, aerial observations, radio-tracking, hunter check stations, field transects, annual Elkhorn wildlife monitoring report (Forest Plan suggested data sources). Specific information and data sources include the following and are on file at the Supervisor's Office:

- Elkhorn Travel Plan and Road Closure Effectiveness Monitoring Data

- Crow Creek Environmental Assessment and Updates and Monitoring Data
- Bighorn Sheep and Elk Winter Range Prescribed Burning Decision Memo and Monitoring Data
- Slim Sam Aspen Decision Memo and Monitoring Data
- Forest Service Activity Tracking System (FACTS) database

Current Efforts and Findings

Several efforts have been underway to improve wildlife habitat in the Elkhorns and include travel planning, prescribed fire, weed treatments, among others.

Documentation of Monitoring Methodology

Several data sources and methodologies are used to describe and analyze effects of land use activities on ungulate populations in the Elkhorns. These are described below according to the parameter in discussion.

Monitoring Activity and Data Analysis Methods

Road Closure Effectiveness Monitoring

The Elkhorn Travel Management Plan Environmental Assessment was completed in 1995. We utilized the subsequent travel plan map to monitor road closure effectiveness. Personnel surveyed a majority of roads in the Elkhorns during hunting season, a time period that generally results in increased traffic in the Elkhorns. Data were collected and analyzed to determine the effectiveness of different closure methods.

Crow Creek Vegetation and Bighorn Sheep/Elk Winter Range Habitat Monitoring

The Crow Creek Environmental Assessment was completed in 1994. As part of that decision, monitoring needed to occur to assure vegetation treatments met desired objectives to rehabilitate grasslands and conifer habitats. The Bighorn Sheep and Elk Winter Range Prescribed Burning Decision Memo was completed in 2000 which also included requisite monitoring. Data were collected according to FASTplot Data Collection Protocols – Version 3.1 (on file at the Supervisor's Office).

Slim Sam Aspen Restoration Monitoring

The Slim Sam Aspen Project Decision Memo was completed in 1999 and included monitoring requirements to establish baseline photo points and baseline fixed plots and follow-up monitoring post-treatment until treatment objectives have been met. The objectives of the Project were (1) to inventory and establish baseline information on all aspen stands in the Slim Sam basin; (2) to determine limiting factors relative to health and regeneration for each stand; (3) to prescribe treatment based on those limitations; and (4) to monitor the results, in terms of effectiveness and cost, of each treatment type. Items 1 -3 have been completed. This monitoring report discusses the results of item (4).

Synthesis of Management Activities

The FACTS database was utilized to identify past activities in the Elkhorns between 1994 and 2008. The beginning year of 1994 was chosen to include initial data collection associated with the Crow Creek Environmental Assessment, the earliest ongoing project. That information was then used to evaluate habitat conditions for ungulates. The Forest Service Activity Tracking System (FACTS) is a web-based application that is used to track and manage a Forest's activities at the field level. FACTS standardizes the automation of activity information nationwide, providing tools to plan, track, and upward report activity data. The application consists of an integrated set of forms, reports, and map products that supports entry, edit, and retrieval of activity information. FACTS also interfaces with several other national applications.

Monitoring Results

Road Closure Effectiveness Monitoring

The following areas were surveyed during the road closure effectiveness monitoring: (1) all of the mapped Forest roads in the northwest Elkhorns from the Warm Springs Road #226 and Middle Fork Warm Springs Road #4010; (2) all of the mapped Forest roads in the east Elkhorns from Staubach Creek Road #491 south to Johnny Gulch and Norris Gulch; and (3) a fraction of the roads on the Beaverhead-Deerlodge National Forest portion of the Elkhorns. Table 10 summarizes the monitoring results.

Table 10. Summary of Closure Effectiveness on the Helena and Beaverhead-Deerlodge National Forests				
Helena National Forest				
Type of Closure	**Number of Times Recent Use Detected based on Vehicle Tracks**	**Number of Times No Recent Use Detected**	**Total**	**Percent Driven**
Sign	4	2	6	0.67
Closed with Barrier	15	44	59	0.25
Closed, No Sign or Barrier	49	9	58	0.84
Total	68	55	123	0.55
Beaverhead-Deerlodge and Helena National Forest Combined				
Sign	4	4	8	0.50
Closed with Barrier	16	51	67	0.24
Closed, No Sign or Barrier	50	10	60	0.83
Total	70	65	135	0.52

Crow Creek Vegetation and Bighorn Sheep/Elk Winter Range Habitat Monitoring

Twenty-seven plots were monitored for the Crow Creek Vegetation Project and another 10 plots were monitored for the Bighorn Sheep Habitat/Elk Winter Range Habitat Project (Figure 6). Data will be summarized in future monitoring reports.

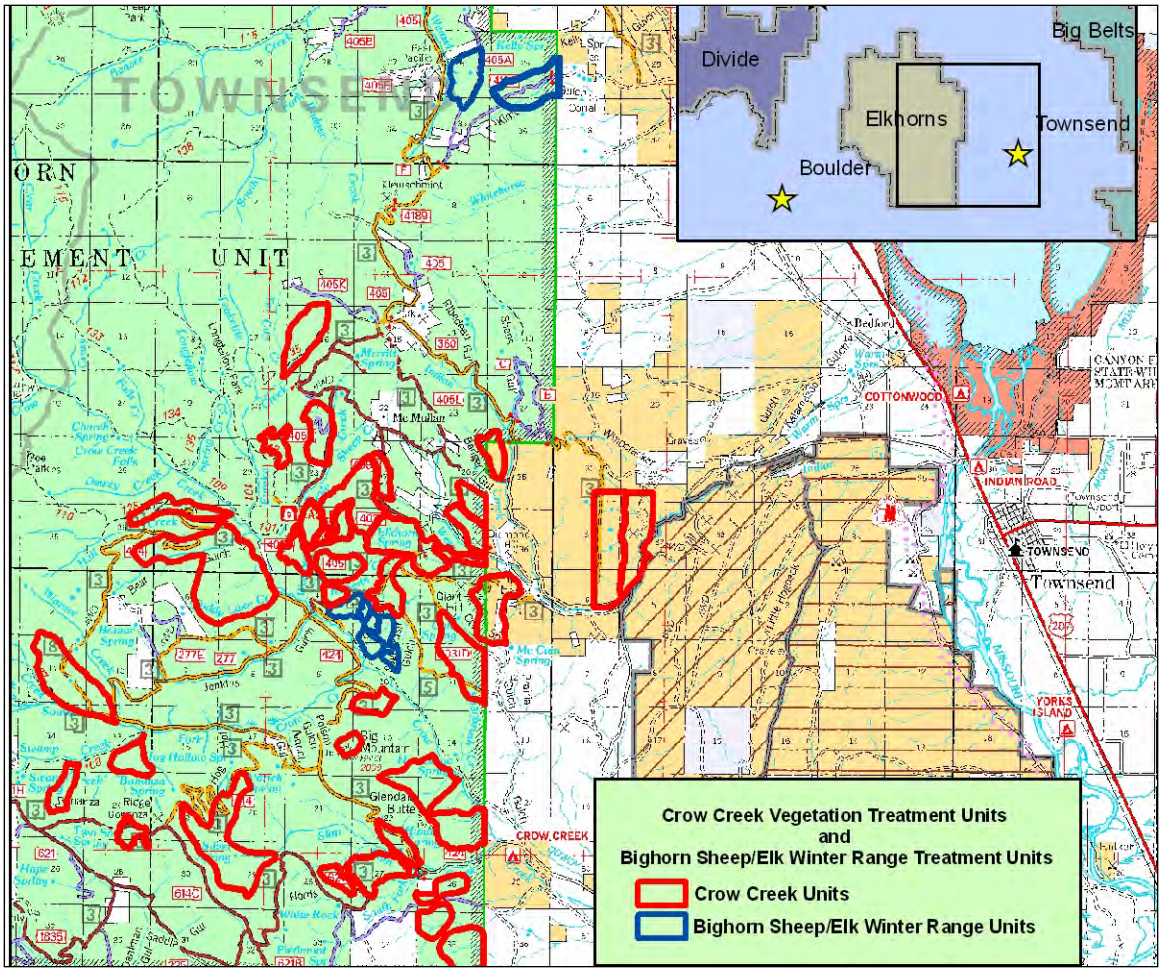


Figure 6 Crow Creek and Bighorn Sheep/Elk Winter Range Treatment Units

Slim Sam Aspen Restoration Monitoring

Twenty-one transects were monitored for the Slim Sam Aspen Project in 2008. Baseline data were collected in 1999; monitoring data were collected in 2002, 2003, 2005, and 2008 (Figures 7-9).

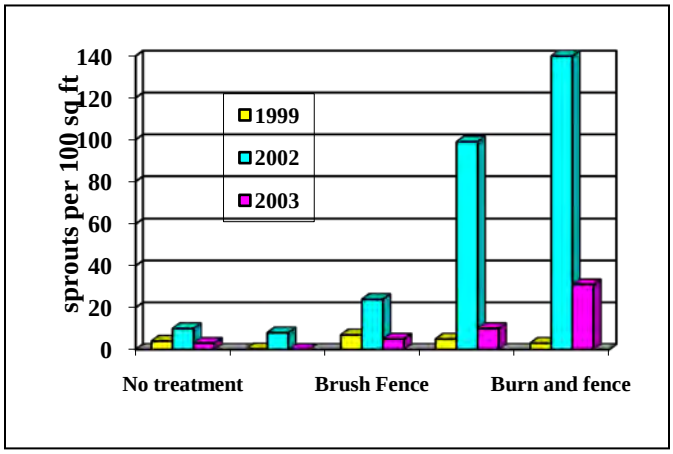


Figure 7

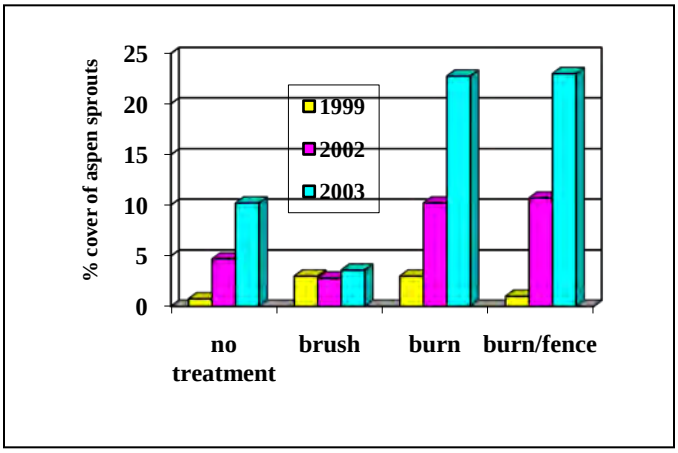


Figure 8

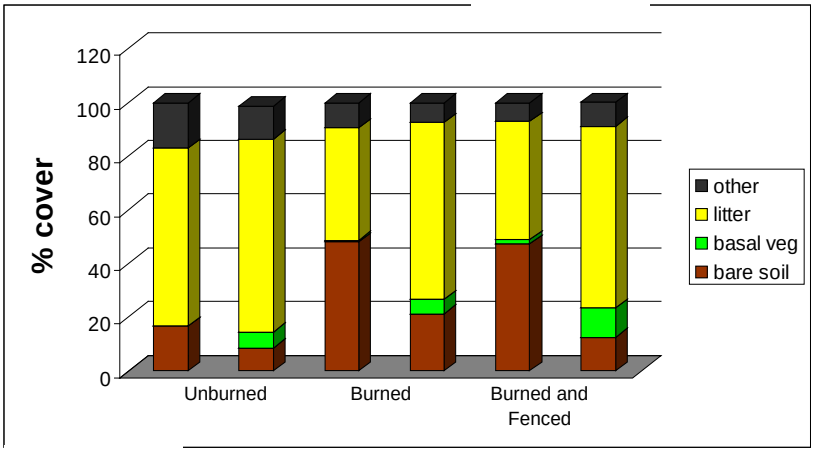


Figure 9

Synthesis of Management Activities

Activities that have modified vegetation are summarized in Table 11 and are associated with the aforementioned vegetation management projects (i.e. Crow Creek and Bighorn Sheep/Elk Winter Range prescribed burning and other miscellany). All of these activities were designed to improve wildlife habitat. Several hundred acres were treated more than once in order to accomplish treatment objectives. For example, acres that were thinned for hazardous fuels were also underburned.

Table 11. Vegetation Management Activities in the Elkhorn Mountains from 1994 through 2008

Activity	Acres Treated
Broadcast Burning	3,900
Thinning for Hazardous Fuels	727
Underburning	10,745

Variability Measure Discussion

Some of these data are intended to provide a baseline from which future variability can be measured (i.e. road closure effectiveness monitoring). Other monitoring data are assessed to determine the variability measure.

Variability Measure

±10% from previous measurements

Assessment

Road Closure Effectiveness Monitoring

The monitoring results indicate roads that are closed with barriers (e.g. gates, berms) are most effective at reducing unauthorized use whereas roads that are closed without a sign or barrier are the least effective. This year will serve as a baseline for outyear comparisons; therefore, there is no variability assessment.

Crow Creek Vegetation and Bighorn Sheep/Elk Winter Range Habitat Monitoring

The data collected for the Crow Creek and Bighorn Sheep/Elk Winter Range habitat improvements are in the process of analysis. Therefore, there is no variability assessment at this time.

Slim Sam Aspen Restoration Monitoring

The data are currently in the process of analysis to determine changes in aspen response across all data collection years. The data collected in 2005 and 2008 are currently being analyzed and will be summarized in a future monitoring report. Data summarized for 1999 through 2003 indicate the following:

- Sprout densities increased in 2002 in all treatment types (See Figure 6).
- Sprout densities in 2003 declined in all treatments, but stayed the highest in the fenced stands (See Figure 6).
- Sprouting increased dramatically in stands treated with fire (See Figure 7).
- Canopy cover of aspen sprouts increased over time in all treatments except for the aspen stands with brush fences (See Figure 7).
- Burning increases the amount of bare soil the first year (See Figure 8).

Synthesis of Management Activities

Prescribed burning and thinning of hazardous fuels has been implemented as a means to improve habitat for wildlife, particularly elk and bighorn sheep. As indicated in C1, in general elk have either remained stable or have been increasing in the Elkhorns over the past several years. Management activities have been designed to achieve both the objectives in the Forest Plan and those described in the 2005 Elk Management Plan. Specifically, these management activities are designed to provide adequate forage for elk and other wildlife primarily during the winter period. Bighorn sheep, on the other hand, have precipitously declined due to disease within the population.

As data are analyzed, the effectiveness of these vegetation projects will be assessed relative to distribution of wildlife in order to determine if objectives are being accomplished. At this time, there is no variability assessment.

Actions in Response to Variability Assessment

Since data are currently being analyzed, a variability assessment and any needed actions are not necessary at this time.

Recommended Efforts

The following monitoring items are recommended in order to more fully understand the effectiveness of habitat management in the Elkhorns and to meet monitoring requirements identified in the respective Decision Memos for those projects referenced above.

- Synthesize existing data to determine if project specific objectives have been achieved. If not, identify opportunities to reach desired conditions.
- Establish transects to monitor elk and bighorn sheep response to habitat improvements.

- Initiate big game monitoring designed to determine if mountain pine beetle outbreaks are affecting distribution of big game.
- Identify effects of conifer colonization into grass and shrublands and subsequent opportunities for management, if applicable.

Conclusions

In 1982, an Elkhorn Monitoring Program was initiated in order to collect information needed to understand the wildlife, habitat, and land use present in the Elkhorns in order to assure biologically sound management, maintain and enhance wildlife values, and promote public confidence and approval of the Wildlife Management Unit concept. Initially, the monitoring program included elk and mule deer and was intended to wrap up by the mid-1980s. At that time, however, the scope of the elk monitoring in the Elkhorns was expanded in order to gather information on bull ecology in order to evaluate the effects of different hunting regulations on bull survival and hunter attitudes. By 1991, the monitoring had concluded and data and management recommendations were summarized in the *Elkhorn Mountains 1991 Annual Report* (DeSimone and Vore 1992[7]). Relative to Element C3, that report concluded, among other conclusions, that:

- Range condition on public land in the Elkhorns is generally good although some areas in the Elkhorns were in poor condition which may explain in part the displacement of elk from public lands in favor of private land.
- Management in the Elkhorns has been designed to create habitat conditions that will encourage elk, and other big game, to remain on public land as much as possible in order to minimize impacts to private land and to retain a public resource on public land.

The goals for monitoring and evaluating the Forest Plan are to determine, among others, how well the Forest is meeting its planned goals and objectives. Goals and objectives in the Elkhorns are based on the respective management area and include optimizing elk winter range, mountain goat and elk summer habitat, as well as maintaining habitat for a variety of nongame species. The projects described above have been designed to promote habitat for a variety of species. While elk populations are stable or increasing, other big game species – mule deer and bighorn sheep – are declining both in the Elkhorns and statewide. These declines appear to be unrelated to factors governing land management such as fawn mortality in the case of mule deer and pneumonia in the case of bighorn sheep.

(C4)Elk and deer habitat suitability, indicator species

Forest Plan Requirements

Elk/mule deer habitat effectiveness (cover/forage, open road density, and livestock impacts on elk habitat potential) will be monitored to be able to respond to any unacceptable deviation from past measurements. This monitoring element is applicable to Management Areas L2, H1, H2, T2, T3, W1, W2, and E1 through E4.

Intent

To be able to respond to any unacceptable deviation from past measurement.

Data Sources

Project EAs, herd unit sampling, forage/browse transects (Forest Plan suggested data sources). Reports, data, and metadata are available at the Supervisor's Office. Specifically, the following data sources were used to address this element:

- Cover and forage data based on R1-VMAP vegetation data stored electronically at the Supervisor's Office

[7] DeSimone, R. and J.Vore. 1992. Elkhorn Mountains 1991 Annual Report. Montana Department Fish, Wildlife, and Parks.

- Open road densities generated from INFRA and ARCGIS coverages stored electronically at the Supervisor's Office.
- Road closure effectiveness data based on field surveys; forms are located in the Supervisor's Office.
- Aerial Surveys from Montana Department Fish, Wildlife, and Parks (MTFWP). Data are filed at the Supervisor's Office and include:
- Elk surveys in Hunting District (HD) 390, 391, and 392 for winter 2007
- Mule deer surveys in HD 392 for winter and spring 2007

Current Efforts and Findings

Several ongoing efforts contribute to our understanding of habitat effectiveness for elk and mule deer. We continue to utilize vegetation data from R1-VMAP. We discuss open road densities, the effectiveness of our road closures as well as a discussion of MTFWP aerial survey data for elk and mule deer.

Documentation of Monitoring Methodology

Several data sources and methodologies are used to describe and analyze effects of land use activities on ungulate populations in the Elkhorns. These are described below according to the parameter in discussion.

Monitoring Activity and Data Analysis Methods

Cover and Forage

Cover and forage data are derived from R1-VMAP vegetation data and are based on Forest Plan definitions for cover. Canopy cover of 40% or greater are considered cover; areas with 0-25% canopy cover is considered forage as well as non-forested areas which includes both shrub and grasslands. Cover/forage analyses are completed for the management areas pertinent to this element: L2, H1, H2, T2, T3, W1, W2, and E1 through E4. These management areas include wildlife considerations in the management goals which vary among management areas. See Forest Plan III/14 – 23, III/34 – 41, III/50 – 55, and III/81 – 92.

Open Road Densities

Open road densities were calculated to reflect changes mainly associated with implementation of travel planning efforts. However, the INFRA database has been updated since the *2007 Forest Plan Monitoring Report* to reflect not only travel planning efforts but also more accurate existing conditions based on field inventories. Therefore, some of the changes in road densities between 2007 and 2008 are based on field inventory and some are based on road closures associated with travel planning. The density analysis includes any road that is open all or for some portion of the year as well as for those roads only open during the hunting season.

Road Closure Effectiveness

Road closure effectiveness was monitored in the Wagner Atlanta Project Area. Closed roads were monitored on various dates during the hunting season to determine adequacy of closure. Type of closure was identified and whether the closure was effective in preventing motorized use (i.e. evidence of use). All roads identified for closure upon completion of the Wagner Atlanta Timber Sale were monitored. Field notes can be found in the project file.

Aerial Surveys

MTFWP personnel conducted aerial surveys in the Big Belts to estimate trend counts for elk and mule deer. Reports are on file at the Supervisor's Office that describe the monitoring activity in more detail.

Monitoring Results

Cover and Forage

Each of the management areas applicable to this monitoring element has management goals designed to promote wildlife values relative to the capabilities of the management area. For example, wildlife management standards for L2 require that adequate thermal and hiding cover be maintained adjacent to forage areas. Table 12 summarizes the relationship of forage and cover by management area and includes the respective wildlife management standard for each management area. Forage is provided by grass and shrub; these parameters are summarized individually since forage varies by the wildlife species of interest (i.e. elk generally graze on grass; deer generally browse on shrubs). Forage is also provided in those areas comprised of tree canopy between 10 and 25%. Cover is provided by forested stands with canopy cover greater than or equal to 40%. Forested stands with canopy cover between 25 and 40% may provide both forage and cover opportunities depending on the composition of the understory and the configuration of trees in the area (e.g. clumpy trees are more likely to provide cover).

Table 12. Forage and cover by Management Area						
Management Area	Forage			Transition	Cover	Management Area Standard
	Grass	Shrub	Tree Canopy 10-25%	Tree Canopy 25-40%		
EL1	25,551	1,155	8,390	13,422	5,967	Implement wildlife habitat improvement practices…to maintain and enhance the quality of winter range.
EL2	3,660	60	13,026	15,054	11,874	Implement wildlife habitat improvement practices to maintain and enhance mountain goat and summer elk habitat.
EL3	2,390	58	3,179	9,191	9,092	Implement wildlife habitat improvement practices…to maintain and enhance the quality of elk calving and summer habitat.
EL4	2,083	162	2,338	7,218	4,308	Implement wildlife habitat improvement practices…to maintain and enhance aspen and willow regeneration and other forested areas, for wildlife habitat.
H1	855	53	1,103	2,152	14,090	Maintain adequate thermal and hiding cover adjacent to forage areas.
H2	200	20	151	421	3,915	Maintain adequate thermal and hiding cover adjacent to forage areas.
L2	24,020	2,470	20,151	6,388	18,253	Maintain adequate thermal and hiding cover adjacent to forage areas.
T2	406	94	697	1,399	8,377	Maintain adequate thermal and hiding cover adjacent to forage areas.
T3	3,964	2,033	2,471	5,546	29,351	Maintain a minimum of 35 percent hiding cover for big game. Maintain thermal cover adjacent to forage areas.
W1	6,759	1,339	5,055	12,027	53,593	Maintain adequate thermal and hiding cover adjacent to forage areas.
W2	3,987	761	4,288	2,624	10,688	Most new roads and about 50% of existing roads will

						be closed, at least seasonally. Maintain adequate thermal and hiding cover adjacent to forage areas.

Open Road Densities:

Open road densities have been calculated for the eleven management areas specific to this monitoring element (Figure 10).

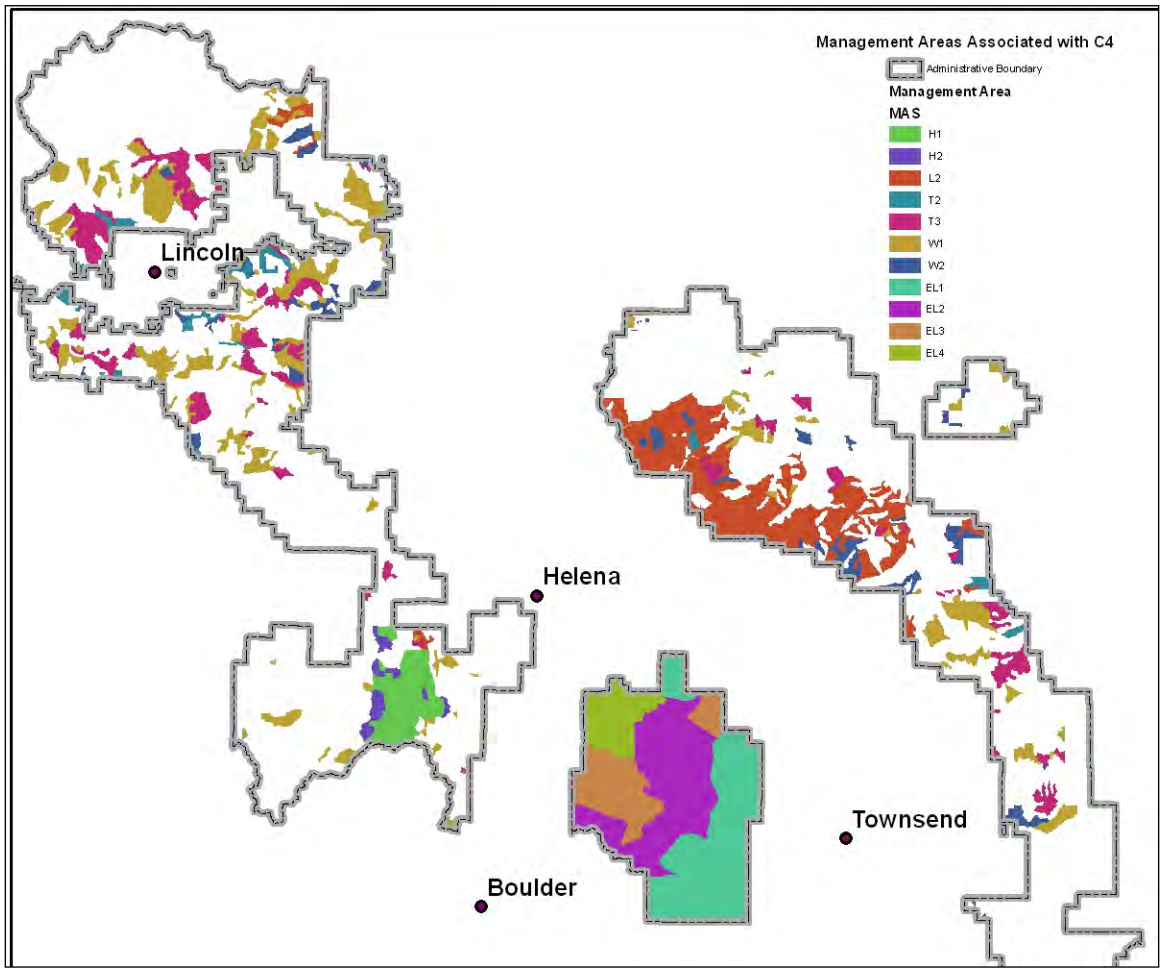


Figure 10 Management Areas associated with C4

Table 13 summarizes open road densities based on any and all roads open at any time during the year.

Table 13. Open Road Densities by Management Area for All Roads Open at Any Time During the Year				
Management Area	Acres	Square Miles	Open Road Miles	Open Road Density
EL1	55183	86	99	1.2
EL2	46435	72	1	Negligible

EL3	24496	38	27	0.7
EL4	16355	25	18	0.7
H1	18442	28	34	1.2
H2	4726	7	11	1.6
L2	71845	112	90	0.8
T2	10986	17	36	2.1
T3	43638	68	88	1.3
W1	79449	124	43	0.3
W2	22442	35	19	0.5

Table 14 summarizes open road densities during the hunting season. Open road densities that were calculated for the 2007 Monitoring Report are also shown in Table 14. It's important to note, however, that the methodology for calculating open road densities during the hunting season has changed between 2007 and 2008. In 2007, only roads that occurred on the National Forest were analyzed. In addition, only those roads that were labeled 'arterial', 'collector', or 'local' were included and of those the 'local' roads only received a weight of 25%. In 2008, the INFRA database was updated to more accurately reflect 'on the ground' conditions. As such, roads that previously had not been identified in the INFRA database but that actually existing on the ground were added to that database. So, the 2008 data better reflect what's present on the ground and we included all roads in the analysis.

Table 14. Open Road Densities by Management Area for Roads Open During Hunting Season

Management Area	Acres	Square Miles	Open Road Miles	Open Road Density	Open Road Density from 2007 Report
EL1	55183	86	93	1.1	0.7
EL2	46435	72	0.7	Negligible	Negligible
EL3	24496	38	27	0.7	0.3
EL4	16355	25	18	0.7	0.5
H1	18442	28	34	1.2	0.5
H2	4726	7	11	1.6	0.7
L2	71845	112	84	0.7	0.5
T2	10986	17	27	1.6	0.5
T3	43638	68	57	0.8	0.3
W1	79449	124	35	0.2	Negligible
W2	22442	35	19	0.5	0.2

Road Closure Effectiveness:

In 2008, 6 roads and their offshoots were monitored for closure effectiveness as part of the Wagner Atlanta Timber Sale. Recipe closures included re-contouring, debris placement, signs, and gates. Table 15 summarizes the monitoring results. Figure 11 illustrates the road closure off of Forest Road #4161, a road closed with a gate. The photo on the left was taken in 2007; the photo on the right in 2008.

Table 15. Summary of Closure Effectiveness in the Wagner Atlanta Timber Sale Area				
Type of Closure	**Number of Times Recent Use Detected based on Vehicle Tracks**	**Number of Times No Recent Use Detected**	**Total**	**Percent Driven**
Sign	1	0	1	1.0
Closed with Barrier	5	5	10	0.5
Closed, No Sign or Barrier	5	1	6	0.83
Total	11	6	17	0.65

Figure 11. Road closure effectiveness monitoring in 2007 (right) and 2008 off of Forest Road #4161. Closure method is a gate.

Aerial Surveys:

Elk **-** Overall, survey results indicate Hunting District (HD) 390 continues to show an upward trend in population. Hunting Districts 391 and 392 are within normal population parameters. Table 16 summarizes elk numbers by hunting district for 2008.

Table 16. Summary of elk observations in Hunting Districts 390, 391, and 392 for 2008							
Hunting District	Total	Cows	Calves	Yearling Bulls	Brow-tined Bulls	Total Bulls	Unclassified
390	1,618	1,152	220	107	139	246	
391	432	119	19	29	3	32	262
392	974	767	136	67	4	71	

Mule Deer **–** Surveys were conducted in HD 392 in January and April 2008. Table 17 summarizes the January (post-season) and April (spring counts) 2008.

Table 17. Summary of mule deer observations in HD 392, January and April 2008					
Year	Post-Season Total	Fawns: 100 Adults (Post-Season)	Spring Total	Fawns: 100 Adults (Spring Recruitment)	Bucks: 100 Does
2008	241	36.7	814	18.7	23.7

Variability Measure Discussion

Many components of this monitoring element do not lend themselves to direct comparison with the variability measure identified in the Forest Plan in part because databases have been updated and/or data have been collected differently than in 2008. Where applicable, the variation relative to the Forest Plan measure is described; otherwise, variation is qualified.

Variability Measure

-±10% from previous measurements

Assessment

Cover and Forage:

Table 18 synthesizes the data presented in Table 12 above in order to describe the cover/forage ration in each management area and to determine if management actions need to be adjusted or introduced. Forage acres comprise areas of grass, shrub, and tree canopy 10-25%; cover comprises areas with tree canopy greater than or equal to 40%. Because the 'transition area' – areas of tree canopy between 25 and 40% could provide either forage or cover they are not included in the cover/forage analysis. This does not imply that these areas are insignificant; rather, opportunities exist within these 'transition areas' to provide either forage or cover depending on the respective limiting factor.

The relationship of forage and cover depends primarily on big game seasonal habitat. For example, quality *and* quantity of forage is generally more important during the winter than the amount of cover and its proximity to forage. At other times of the year, the juxtaposition of forage and cover may be more important than each of those factors alone. Thomas and others (1979 p 109)[8] stated that "optimum elk habitat is the amount and arrangement of cover and forage areas that result in the maximum proper use of the maximum possible area". They recommended 40 percent cover to 60 percent forage. Leckenby (1984)[9] indicated that elk use of cover is greatest when it's within 200 yards of forage.

Table 18. Cover/Forage Ratios by Management Area

Management Area	Total Acres Forage	Total Acres Cover	Total Acres Forage and Cover	Cover/ Forage Ratio	Management Area Standard	Comment
EL1	35,096	5,967	41,063	15:85	Implement wildlife habitat improvement practices...to maintain and enhance the quality of winter range.	EL1 comprises more forage than cover; this is in keeping with research that indicates forage may be more important in winter than cover.
EL2	16,746	11,874	28,620	41:59	Implement wildlife habitat	Preferred summer habitat for elk includes quality forage,

[8] Thomas, J.W., H. Black, Jr., R.J. Scherzinger,and R.J. Pedersen. 1979. Deer and elk. In: Thomas, J.W., ed. Wildlife habitats in managed forests – the Blue Mountains of Oregon and Washington. Agric. Handb. 553. Washington, D.C. U.S. Department of Agriculture, pp. 104-127.

[9] Leckenby, D.A. 1984. Elk use and availability of cover and forage habitat components in the Blue Mountains, northeast Oregon 1976-1982. Wildl. Res. Rep. 14. Portland, OR: Oregon Department of fish and Wildlife, 40 pp.

Table 18. Cover/Forage Ratios by Management Area						
Management Area	Total Acres Forage	Total Acres Cover	Total Acres Forage and Cover	Cover/ Forage Ratio	Management Area Standard	Comment
					improvement practices to maintain and enhance mountain goat and summer elk habitat.	cover, and distance from human disturbance. Preferred habitat for mountain goats includes foraging areas in close proximity to escape habitat (e.g. cliffs). The cover/forage ration in EL2 is better suited to provide for a variety of habitat conditions needed by goats and elk during the summer.
EL3	5,627	9,092	14,719	61:39	Implement wildlife habitat improvement practices…to maintain and enhance the quality of elk calving and summer habitat.	The higher ratio of cover to forage in EL3 benefits elk during calving season and is generally beneficial during summer depending on forage availability, slope, aspect, and other considerations.
EL4	4,583	4,308	8,891	48:52	Implement wildlife habitat improvement practices…to maintain and enhance aspen and willow regeneration and other forested areas, for wildlife habitat.	EL4 is intended to be managed for a variety of forested and non-forested ecosystems. The cover to forage ratio is almost equal which indicates that a variety of habitat conditions may exist to support a diversity of wildlife species. However, the data in Table 12 indicate a higher proportion of grasses in this management area as compared to shrubs. An opportunity exists to improve the distribution of shrub species in this management area through a variety of techniques including prescribed fire and conifer colonization removal.
H1	2,011	14,090	16,101	88:12	Maintain adequate thermal and hiding cover adjacent to forage areas.	The cover/forage ratio in H1 indicates that the amount of available cover far outweighs available forage. However, further examination is necessary to determine the amount of forage that may be present in the understory of those areas identified as cover.

Table 18. Cover/Forage Ratios by Management Area						
Management Area	Total Acres Forage	Total Acres Cover	Total Acres Forage and Cover	Cover/ Forage Ratio	Management Area Standard	Comment
H2	371	3,915	4,286	91:9	Maintain adequate thermal and hiding cover adjacent to forage areas.	Same as above
L2	46,641	18,253	64,894	28:72	Maintain adequate thermal and hiding cover adjacent to forage areas.	L2 approaches the 40:60 ratio of cover to forage described by Thomas and others (1979) as optimum.
T2	1,197	8,377	9,574	87:13	Maintain adequate thermal and hiding cover adjacent to forage areas.	See H1
T3	8,468	29,351	37,819	77:23	Maintain a minimum of 35 percent hiding cover for big game. Maintain thermal cover adjacent to forage areas.	T3 cover/forage ratio is weighted towards cover ; however the juxtaposition of cover to forage has not been analyzed.
W1	12,386	53,593	65,979	81:19	Maintain adequate thermal and hiding cover adjacent to forage areas.	See H1
W2	9,036	10,688	19,724	54:46	Most new roads and about 50% of existing roads will be closed, at least seasonally. Maintain adequate thermal and hiding cover adjacent to forage areas.	Opportunities exist to increase the amount of forage available in W2.

At this time, there is no indication that ongoing management activities have resulted in a deviation from goals and objectives identified in the Forest Plan for each management area. Although there is variability among the management areas relative to cover and forage, this is more likely associated with natural landscape patterns than any management activity.

Open Road Densities:

Figure 12 illustrates the relationship between open road density and expected elk use in an area – otherwise known as habitat effectiveness. While this relationship is generally used to describe summer habitat effectiveness, it's useful in understanding overall habitat effectiveness. Lyon (1983)[10] recommends a minimum of 50% habitat effectiveness to maintain elk in a given area. General open road densities summarized in Table 13 range from negligible to 2.1 miles per square mile; most of which are greater than 50%. The higher open road densities (e.g. 2.1 miles per square mile) do not provide desired levels of habitat effectiveness according to Lyon's model.

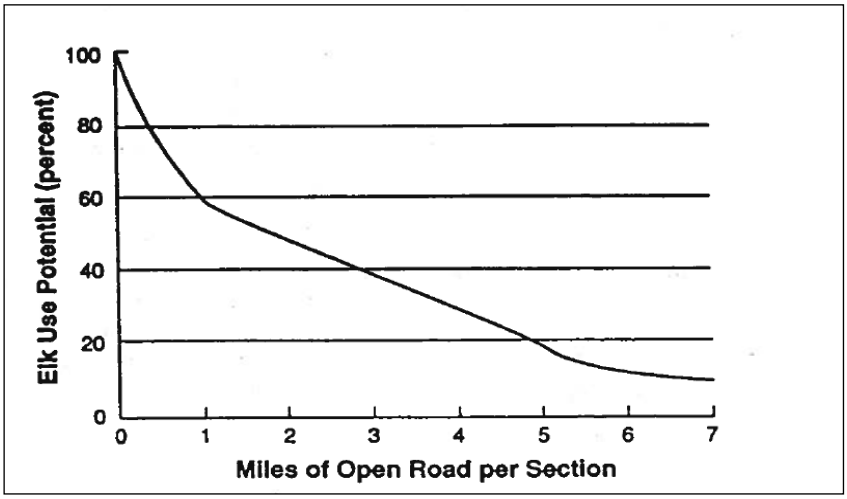


Figure 12 Summer Habitat Effectiveness Based on Open Road Densities

Open road densities are reduced during the hunting season in order to improve big game security during the hunting season. Open road densities during the hunting season (see Table 14) range from negligible to 1.6 miles per square mile and reflect a decrease from general open road densities (see Table 13). Since we are utilizing both an updated database and a more in depth methodology for this analysis, data are not comparable between years. Data described in this Monitoring Report will serve as baseline for out year comparisons. Therefore, there is no variability assessment.

Road Closure Effectiveness:

Monitoring in the Wagner Atlanta project area in 2007 indicated that two out of the seven road closures were not effective (approximately 71% closure effectiveness). In 2008, eleven out of 17 road closures were not effective (35% closure effectiveness). The decrease in closure effectiveness is outside of the variability measurement.

Aerial Surveys:

Elk – Elk totals in 2007 were 1,742, 509, and 1,241 for Hunting Districts (HD) 390, 391, and 392 respectively. Total number of elk in 2008 consisted of 1,618 in HD 390, 432 in HD 391, and 974 in HD 392. This reflects a decrease by about 7% in HD 390, 15% in HD 391, and 22% in HD 392. This monitoring element is designed to address changes in habitat not necessarily changes in numbers of animals. However, the changes in total number of elk observed between 2007 and 2008 in HD 390 reflect a <10% increase. The changes in HD 391 and HD 392 are greater than 10%. These changes are not related to a management oriented practice. Furthermore, overall, survey results indicate HD 390 continues to be above desired population objectives and HDs 391 and 392 are within normal population parameters. Therefore, the intent of this element is being achieved.

[10] Lyon, L.J. 1983. Road density models describing habitat effectiveness for elk. Journal of Forestry 81(9): 592-595.

Figure 13 (excerpted from Montana Fish, Wildlife and Parks annual survey results) illustrates trends in elk numbers from 1989 through 2008.

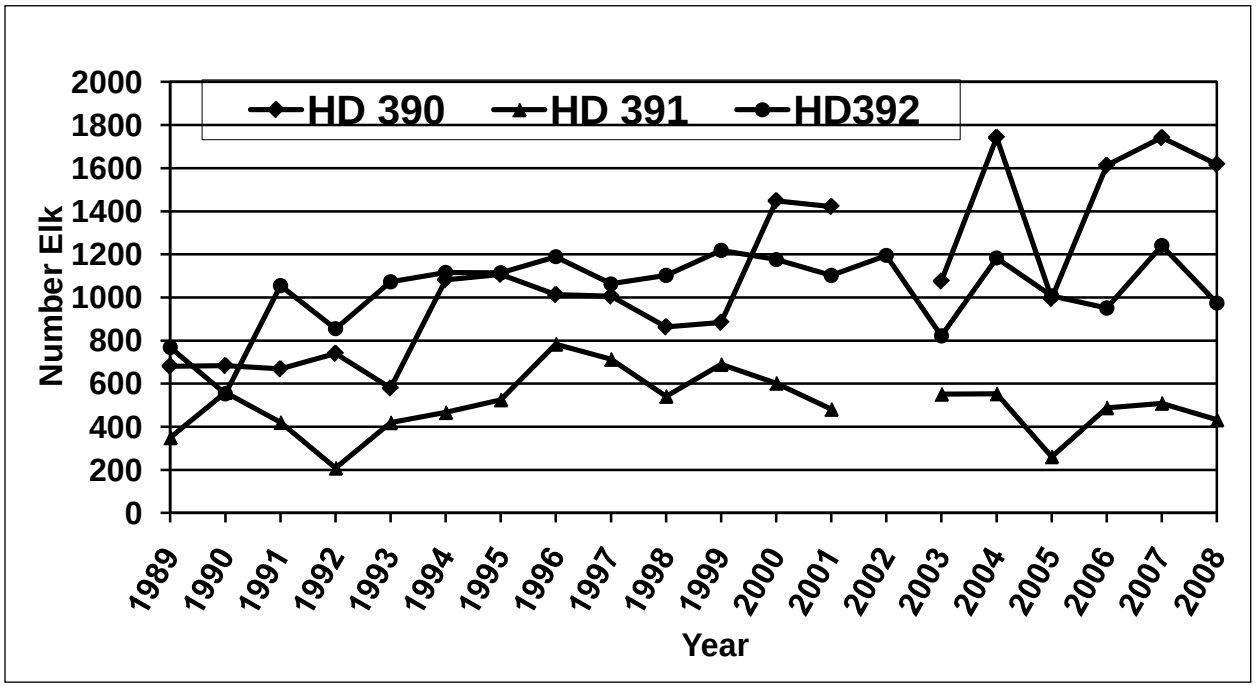


Figure 13. Population Trends in Hunting Districts 390, 391, and 392 from 1989-2008.

Mule Deer – The total number of mule deer counted in 2007 included 578 post-season and 647 spring survey. In 2008, there were approximately 241 deer post-season and 814 in the spring. Mule deer numbers decreased by about 60% in 2008 based on post-season counts and increased by about 21% based on spring recruitment counts. These changes are not related to a management oriented practice. This monitoring element is designed to address changes in habitat not necessarily changes in numbers of animals. Furthermore, the decrease in post season numbers is likely the result of significant fawn mortality during the winter and may also be related to ongoing drought conditions. Therefore the intent of this monitoring element is being achieved.

Actions in Response to Variability Assessment

There are no actions needed at this time for all monitoring items with the exception of the Wagner Atlanta Road closure monitoring. Monitoring in 2008 indicates that several road closures aren't effective depending on the type of closure. Therefore, in order to meet Forest Plan standards in practice, additional closure methods may need to be identified and installed.

Recommended Efforts

The following items are recommended in order to more fully understand the effectiveness of habitat management in the management areas associated with C4.

- Utilize existing radio-telemetry data on elk (particularly in the Elkhorns) to interpret use patterns relative to habitat availability.
- Continue to monitor road closure effectiveness according to required travel plan monitoring and to determine if Forest Plan standards are being implemented effectively.

Conclusions

One of the goals of the Forest Plan is to "maintain and improve the habitat over time to support big game and other wildlife species". In order to accomplish this goal, standards are in place as well as a monitoring plan to ensure that management activities accomplish Forest Plan goals. The intent of this monitoring element is to focus on those management areas that include a wildlife emphasis as part of the overall goals and objectives. Travel planning has been completed on portions of the Forest and monitoring has been ongoing in those areas to evaluate road closure effectiveness. Wildlife habitat enhancement projects have also been ongoing (see C3) to maintain and enhance big game habitat.

The effects of implementing the Forest Plan are generally occurring as predicted in the case of elk. The Forest Plan target population for elk is 6,400 by the year 2000 which has been achieved Forestwide. Table 19 summarizes the number of elk observed within all the HDs on the Forest. The total number of elk counted in 2008 exceeds 6,400. Note that many of the HDs extend off of the Forest. However, it's safe to assume that at least 6,400 of the 11,768 elk counted during 2008 occur on the Forest sometime during the year.

Table 19. Total Observed Elk by Hunting District 2008

HD215	HD281	HD293	HD335	HD339	HD343	HD380	HD390	HD391	HD392	HD446	TOTAL
1,365	726	*	667	822	810	2,101	1,618	432	974	2,253	11,768

*Data not collected in 2008.

(C5) Bighorn sheep habitat suitability, indicator species

Forest Plan Requirements

Bighorn sheep habitat suitability will be monitored to be able to respond from any unacceptable deviation from past measurement. This monitoring element applies to Management Areas W1, P1, and P2.

Intent

To be able to respond to any unacceptable deviation from past measurement.

Data Sources

Montana Department of Fish, Wildlife and Parks Region 4 aerial surveys (Forest Plan suggested data sources). Montana Department Fish, Wildlife, and Parks (MTFWP) personnel did not conduct bighorn sheep surveys in the 2008/2009 season due to precipitous declines in bighorn sheep populations. However, those data will be summarized here to serve as a baseline and reference for outyear survey data as they become available.

In previous years, monitoring specific to Management Areas W1, P1, and P2 was not conducted because MTFWP conducted annual surveys where bighorn sheep were present in order to determine if there is a need to regulate hunting. Therefore, surveys and data were limited to areas within which MTFWP conducted aerial surveys.

Sources of data for 2008 are derived from:

- 2007/2008 bighorn sheep surveys conducted by MTFWP

Current Efforts & Findings

Documentation of Monitoring Methodology

Aerial surveys have been utilized in the past by MTFWP personnel to develop trend data to determine if the population under consideration is within the population goals as described in species-specific management plans. See MTFWP Memos in project file for more details on methodology.

Monitoring Activity and Data Analysis Methods

Bighorn Sheep Aerial Surveys

Bighorn sheep aerial surveys were conducted on March 30th, 2007 and January 16th, 2008 by MTFWP.

Monitoring Results

Bighorn Sheep Aerial Surveys:

Bighorn sheep in the Elkhorns were originally from transplants which began in the winter of 1995/96, supplemented in 1996/97 and in 2000. A total of 75 sheep had been released at 2 different release sites. Radio collars and individually marked neckbands were placed on a total of 58 sheep. During the 2005 survey effort, approximately 6 marked animals were observed indicating they are phasing out of the population and most sheep observed are now Elkhorn Mountain "natives".

Surveys were conducted for bighorn sheep in Hunting District 380 on March 30, 2007. Since that survey, the bighorn sheep population in Hunting District 380 has precipitously declined due to a pneumonia epidemic. The 2007 survey indicated a total of 198 sheep; an aerial survey conducted on January 16, 2008 indicated that there were only 35 bighorn sheep. Therefore, those data derived from the 2007 survey will not be analyzed except as a contrast to those data collected in January 2008. Additional updates will be reported in subsequent Forest Plan Monitoring Reports.

Variability Measure Discussion

Variability Measure

-10% from previous measurements

Assessment

Bighorn Sheep Aerial Surveys:

The total number of bighorn sheep plummeted between 2007 and January 2008. It is well below the variability measure.

Actions in Response to Variability Assessment

Bighorn Sheep Aerial Surveys:

No actions are proposed at this time. MTFWP and the Helena National Forest will coordinate to determine what, if any, additional steps are needed to restore the bighorn sheep population in the Elkhorns.

Recommended Efforts

Continue to rely on MTFWP for primary field information on bighorn sheep population numbers and distribution. Coordinate with MTFWP for feasibility of bighorn sheep restoration. Follow up any reported observations (by aerial surveys or ground sightings) with field surveys to examine suitable habitat more critically and to detect any animals present.

Conclusions

The Forest Plan provided a population estimate of 210 bighorn sheep in 1980. Bighorn sheep increased for several years in part due to reintroductions into the Elkhorns. It's possible, although unlikely, that 210 sheep still occur across the Forest. However, MTFWP does not count bighorn sheep throughout the

Forest and only one sheep hunting district occurs on the Forest (380). Therefore, survey efforts have concentrated in that hunting district. Efforts such as additional augmentation would be necessary in order to approximate 1980 Forest Plan estimates.

(C6) Grizzly bear habitat effectiveness, indicator species

Forest Plan Requirements

Grizzly bear habitat effectiveness (habitat diversity, open road density) will be monitored to be able to respond to any unacceptable deviation from past measurement. This monitoring element is applicable for Management Areas P-1 and P-3 where they overlap with essential and occupied grizzly bear habitat (referred to as Management Situation (MS) 1 and 2 in the Forest Plan. See page II/19.). However, data are presented for those portions of the Forest for which data have been collected.

Intent

To be able to respond to any unacceptable deviation from past measurement.

Data Sources

Project EAs, grizzly habitat measurements (Forest Plan suggested). Specifically, the following data were used to compile this report:

- Moving window analysis filed at the Helena National Forest Offices.
- INFRA Roads Database
- Northern Divide Grizzly Bear Project at http://nrmsc.usgs.gov/research/NCDEbeardna.htm
- Grizzly Bear population trend monitoring at http://fwp.mt.gov/wildthings/tande/monitoring.html

Current Efforts and Findings

The Helena National Forest Plan provides open road density thresholds in the Northern Continental Divide Ecosystem (NCDE). Since the crafting of the plan, a moving windows analysis was developed to better depict impacts of roads on grizzly bear security and habitat effectiveness. We use both parameters to measure changes in grizzly bear habitat.

Documentation of Monitoring Methodology

The protocol paper "Moving Window Motorized Access Density Analysis & Security Core Area Analysis for Grizzly Bear" was utilized for the moving window analysis. Documentation of the methodology is on file in the Supervisor's Office. The Northern Grizzly Bear Project methodologies are described on their website.

In 2002, the U.S. Geologic Survey and others initiated research to estimate the grizzly bear population size in the NCDE. Subsequently, Montana Fish, Wildlife, and Parks (MTFWP) initiated a population trend survey to monitor the vital population parameters of grizzly bears by assessing the survival and reproductive rates, and population trend

Monitoring Activity and Data Analysis Methods

Road Densities

Road densities for the Helena National Forest Portion of the Northern Continental Divide Ecosystem (NCDE) are based on a moving windows analysis and area density analysis[11] and utilizes the INFRA

[11] U.S. Dept. of Agriculture (USDA), Forest Service. 2002. Protocol Paper – NCDE grizzly bear motorized access management and Flathead National Forest Amendment 19. 19 pp.

database to determine open and total road densities. Road densities have been updated due to database validation and updates.

Grizzly Bear DNA Study

The U.S. Geologic Survey in conjunction with the National Forests within the NCDE and other partners implemented a study to estimate the grizzly bear population size in the NCDE in 2002. Data were used to estimate the number of grizzly bears in the NCDE. Information on the study design is in the project file and at the website at http://www.nrmsc.usgs.gov/research/NCDEbeardna.htm.

Grizzly Bear Population Trend Monitoring

Since 2004, MTFWP has captured and monitored 73 female grizzly bears in the U.S. and Canada for Trend Monitoring. Sixteen new females were captured in 2008. Including management bears and bears captured for other research purposes, 79 individual bears were radio-monitored in 2008. Thirty-nine of these monitored bears were trend females. An additional 25 young of these females were monitored through visual observations. See the NCDE Grizzly Bear Monitoring annual report. [12]

Monitoring Results

Road Densities

The moving windows analysis and open road density calculations have been recalculated to reflect updates in the INFRA database. Table 20 summarizes open road densities relative to the Forest Plan Standard.

Table 20. Road Densities Per Forest Plan Standards

Subunit	Existing Condition (Standard = 0.55 mi/sq. mi)
Red Mountain subunit	0.36
Arrastra Mountain subunit	0.47
Alice Creek subunit	0.14

A moving window analysis was also completed for the NCDE. Table 21 summarizes the results of the moving window analysis.

Table 21. Percent Route Density and Core Security Areas in the Monture-Landers Fork BMU

Subunit	OMRD[1]	TMRD[2]	Core[3]
Alice Creek Subunit (<75% Forest Service management) (% of area meeting guideline)	9	23	72
Arrastra Mountain Subunit (% of area meeting guideline)	19	20	72
Red Mountain Subunit (% of area meeting guideline)	22	18	64

[1]Open motorized route density guideline: ≤19% of each subunit with >1.0 mile/mi^2; if <75% FS land management, then no net increase in >1.0 mile/mi^2 open motorized route density class due to FS actions.
[2]Total motorized route density guideline: ≤19% of each subunit with > 2.0 mile/mi^2; if <75% FS ownership, then no net increase in >2.0 mile/mi^2 open route density class due to FS actions.
[3]Core area (>2,500 contiguous acres, ≥0.3 mi. from motorized route, no roads or trails receive "high intensity use" (USDA 1990) and no motorized routes open during non-denning period) guideline: ≥68% of the subunit considered core area; if <75% FS ownership, then no net decrease in potential security core areas due to FS actions.

[12] Mace, R. and T. Chilton. 2009. Northern Continental Divide Ecosystem Grizzly Bear Monitoring Team Annual Report - 2008. Montana Fish, Wildlife & Parks, 490 N. Meridian Road, Kalispell, MT 59901. Unpublished data.

Grizzly Bear DNA Study:

Data collection and analysis the Northern Divide Grizzly Bear Project was completed in 2007. The study indicated that 765 grizzly bears make their home in the Northern Continental Divide Ecosystem, a 7.8 million acre area in northwest Montana stretching from north of Missoula, Montana, to the Canadian border.

Grizzly Bear Population Trend Monitoring

Figure 14 is excerpted from Mace and Chilton (2009) (*See footnote 12)* and reflects the area within which grizzly bear trend monitoring is occurring. Results indicate that monitored bears were well distributed throughout the NCDE and included multiple age classes. Based on the distribution of female home ranges, the Glacier National Park capture zone has been under-sampled to date, while the Swan/Mission zone has been over-sampled. Ten trend females have died since 2004, one of which occurred in 2008. Fourteen radio instrumented management females were monitored during the year with one mortality. Eleven known/probable and man-caused mortalities of grizzly bears in the NCDE occurred during 2008. Management removals accounted for 36% of these mortalities.

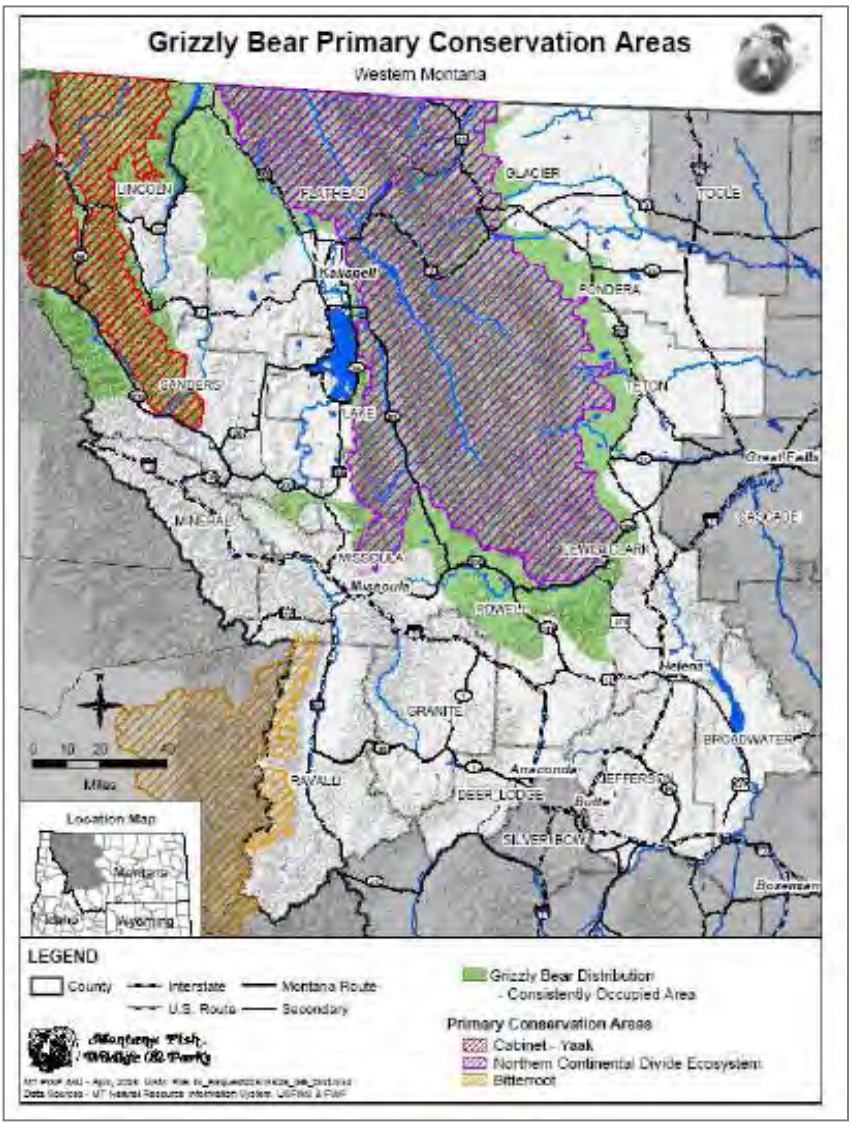


Figure 14

Variability Measure Discussion

Many components of this monitoring element do not lend themselves to direct comparison with the variability measure identified in the Forest Plan. Where applicable, the variation relative to the Forest Plan measure is described; otherwise, variation is qualified.

Variability Measure

--10% from previous measurements

Assessment

Road Density

The 2007 Monitoring Report reported an overall open road density in the occupied grizzly bear area of 0.34 miles per square mile (See Forest Plan p. D/3 for a map of occupied grizzly bear habitat). Since there are no changes in open road density from 2007 to 2008 that analysis is still applicable and summarized as follows:

An analysis conducted for the 1987 Monitoring Report indicated that at that time there were 58.6 miles of road in the NCDE excluding the Scapegoat Wilderness. This equated to an open road density of 0.40 miles/square mile. A habitat effectiveness estimate of 95% was also calculated based on methodologies described in the *Wildlife Documentation Helena National Forest 1983* located in the Supervisor's Office.

To determine if the variability measure had been exceeded, road construction and decommission data were compared with those calculated for the 1987 Monitoring Report. Open road densities in 2007 were 0.34 miles/square mile with a habitat effectiveness of approximately 96%. Based on this analysis, the change in variability that would initiate actions had not been reached. Since there have been no changes in 2008, this conclusion remains in effect.

Changes in the Forest's INFRA database did result in changes to moving window analyses. Table 21, above, indicates that the Alice Creek subunit meets access management standards for open motorized route density and core area. While it exceeds the total motorized route density standard by 1%, less than 75% of the landownership in the subunit is managed by the Helena National Forest (this includes recent land acquisitions). Therefore, the access standard is modified and stipulates no net increase in the percent of area with more than 2 miles of open motorized route per square mile resulting from Forest Service actions. Consequently, the Alice Creek subunit is in compliance with the NCDE Recovery Zone guidelines.

The Forest manages more than 75% of the land within the Arrastra Mountain and Red Mountain subunits. None of the subunits meet all three moving window criteria; although each subunit does meet at least one criterion.

Grizzly Bear DNA Study

The baseline data collected from the Northern Divide Grizzly Bear Project are aimed at helping federal, state, and tribal wildlife agencies in managing the northwest Montana grizzly population. It will assist the Montana Department of Fish, Wildlife, and Parks in conducting grizzly population trend studies and help the U.S. Fish and Wildlife Service with monitoring program efforts and recovery criteria. The monitoring element is intended to detect changes in habitat that would result in impacts to grizzly bears. Since the crafting of the Forest Plan, grizzly bear numbers have increased many fold in excess of the variability measure.

Grizzly Bear Population Trend Monitoring

Trend data are not yet available for this study.

Recommended Efforts

We recommend utilizing the Cumulative Effects Model (CEM) to determine changes in habitat effectiveness.

Conclusions

One of the Forest Plan's objectives included management that would emphasize meeting the recovery target of 18 grizzly bears in essential habitat. The Scapegoat Wilderness is considered essential habitat (See Forest Plan p. V/4). Today, this target has been exceeded; therefore, objectives set forth in the Forest Plan for grizzly bears have been achieved.

(C7) Old growth habitat (Indicator species Pileated and Hairy Woodpeckers and Goshawk)

Forest Plan Requirements

Old growth habitat (Indicator species pileated and hairy woodpeckers and goshawk) is to be monitored to be able to respond to any unacceptable deviation from past measurement. This monitoring element is applicable to Management Areas M1, H1, H2, R1, T1-T5, W1, W2, and E1-E4.

Intent

To be able to respond to any unacceptable deviation from past measurement.

Data Sources

Project EAs, habitat sampling by transects of species density, TSMRS (Forest Plan suggested data sources). Additional data for this monitoring element have been compiled from the following sources:

- FIA old growth data are derived from the Helena National Forest Summary Database
- Birds and Burns Surveys; maps and data are on file at the Supervisor's Office
- FIA snag density estimates on file in the Supervisor's Office
- Project Level Goshawk Surveys for 2008; maps and data are on file at the Supervisor's Office
- Goshawk Old Growth Surveys; maps and data are on file at the Supervisor's Office
- Clancy Unionville Vegetation Manipulation and Travel Management Project Appendix A
- Northern Region Landbird Monitoring Program Birds in Old Growth 2007
- Northern Region Landbird Monitoring Program observations for pileated and hairy woodpeckers on file at the Supervisor's Office and at the following website: http://avianscience.dbs.umt.edu/

Current Efforts and Findings

This element is designed to document monitoring efforts for old growth habitat and associated species and includes a reference to hairy woodpeckers. Hairy woodpeckers are snag-dependent indicators as identified in the Forest Plan (p. II/17). However, they will be included in this section since there is no separate monitoring element relevant to snag-dependent species.

Documentation of Monitoring Methodology

Several sources have been utilized and examined for use in this monitoring element. These include the following:

- Grid data are collected according to the methodology described at the following website: http://www.fs.fed.us/rm/ogden/data-collection/field-manuals.shtml.
- Grid snag and old growth density estimates are based on the methodologies described in Application of Forest Inventory and Analysis (FIA) Data to Estimate the Amount of Old Growth

Forest and Snag Density in the Northern Region of the National Forest System[13], on file in the Supervisor's Office. Additional information and methodologies/assumptions associated with these data are described in the following documents on file at the Supervisor's Office: *R1 Vegetation Council Classification Algorithms* (updated USDA 2006)[14], *R1 Grid Intensification using CSE Protocols – Field Procedures* (USDA 2007)[15], and *R1 Multi-level Vegetation Classification, Mapping, Inventory, and Analysis System* (USDA 2007)[16].

- Monitoring methodology for the Clancy Unionville Project bird monitoring is based on the *Northern Region Landbird Monitoring Point Count Protocol* (2007) and the general *Field Methods Protocol* (2004) which are located at the following website and on file at the Supervisor's Office: http://avianscience.dbs.umt.edu/documents/projects/habitat_relationship/ptct_protocol_2007.pdf

  http://avianscience.dbs.umt.edu/documents/projects/habitat_relationship/2004_LBMP_methods_000.pdf

- Project level goshawk surveys were conducted according to the Goshawk Field Inventory Methods Helena National Forest 2008 and the Northern Goshawk Inventory and Monitoring Technical Guide (USDA 2006).
- Goshawk old growth surveys were conducted in polygons that had been established as part of the Northern Region Landbird Monitoring Program Birds in Old Growth 2007 and were conducted according to the *Goshawk Field Inventory Methods Helena National Forest 2008* and the *Northern Goshawk Inventory and Monitoring Technical Guide* (USDA 2006)[17].
- Monitoring methodology for the Northern Region Landbird Monitoring Program is located at the following website and on file at the Supervisor's Office:

http://avianscience.dbs.umt.edu/documents/methods2007_OG.doc
http://avianscience.dbs.umt.edu/research_landbird_methodsmanual.htm

- Birds and Burns Research data are collected according to the *Birds and Burns Point Count Protocol* on file at the Supervisor's Office. See also http://www.rmrs.nau.edu/wildlife/birdsandburns/

Monitoring Activity and Data Analysis Methods

Old Growth

Intensified grid data stored in the Helena National Forest Summary Database were used to determine old growth estimates Forest-wide. The Forest has 636 plots that are measured periodically; of these 613 are forested. Old growth estimates are derived from the forested plots. Confidence intervals are also included in the statistical analysis.

---

[13] USDA Forest Service, Rocky Mountain Research Station. 2004. Application of Forest Inventory and Analysis (FIA) Data to Estimate the Amount of Old Growth Forest and Snag Density in the Northern Region of the National Forest System. Natural Resource Assessment, Ecology, and Management Science Research, Research Work Unit RMRS-4852; 2150 Centre Ave. Bldg. A., Fort Collins, CO 80526. 970-295-5945.

[14] USDA Forest Service. 2006. R1 Vegetation Council Classification Algorithms. USDA Forest Service, Region 1, Forest and Range Management, Missoula, MT. 11 pp.

[15] USDA Forest Service. 2007. Region 1 Grid Intensification using CSE Protocols, Field Procedures. Version 1.0. USDA Forest Service, Region 1, Forest and Range Management, Missoula, MT. 151 pp.

[16] USDA Forest Service. 2007. R1 Multi-level Vegetation Classification, Mapping, Inventory, and Analysis System. USDA Forest Service, Region 1, Forest and Range Management, Missoula, Montana.

[17] USDA Forest Service. 2006. Northern Goshawk Inventory and Monitoring Technical Guide. General Technical Report WO-71.

Snags

Intensified grid data are also used to estimate snags Forest-wide. Snags are categorized according to Forest Plan groupings: 7-12" dbh, 12-20" dbh, and >20" dbh. Confidence intervals are also included in the statistical analysis.

Clancy Unionville Vegetation Manipulation and Travel Management Project Bird Monitoring

The Clancy Unionville Project required that landbird monitoring take place in order to detect changes in the resident bird community associated with project implementation. Fifteen points were established within four different units that were proposed to be treated with prescribed fire (Figure 15). These data are included in this element due to pileated and hairy woodpecker detections.

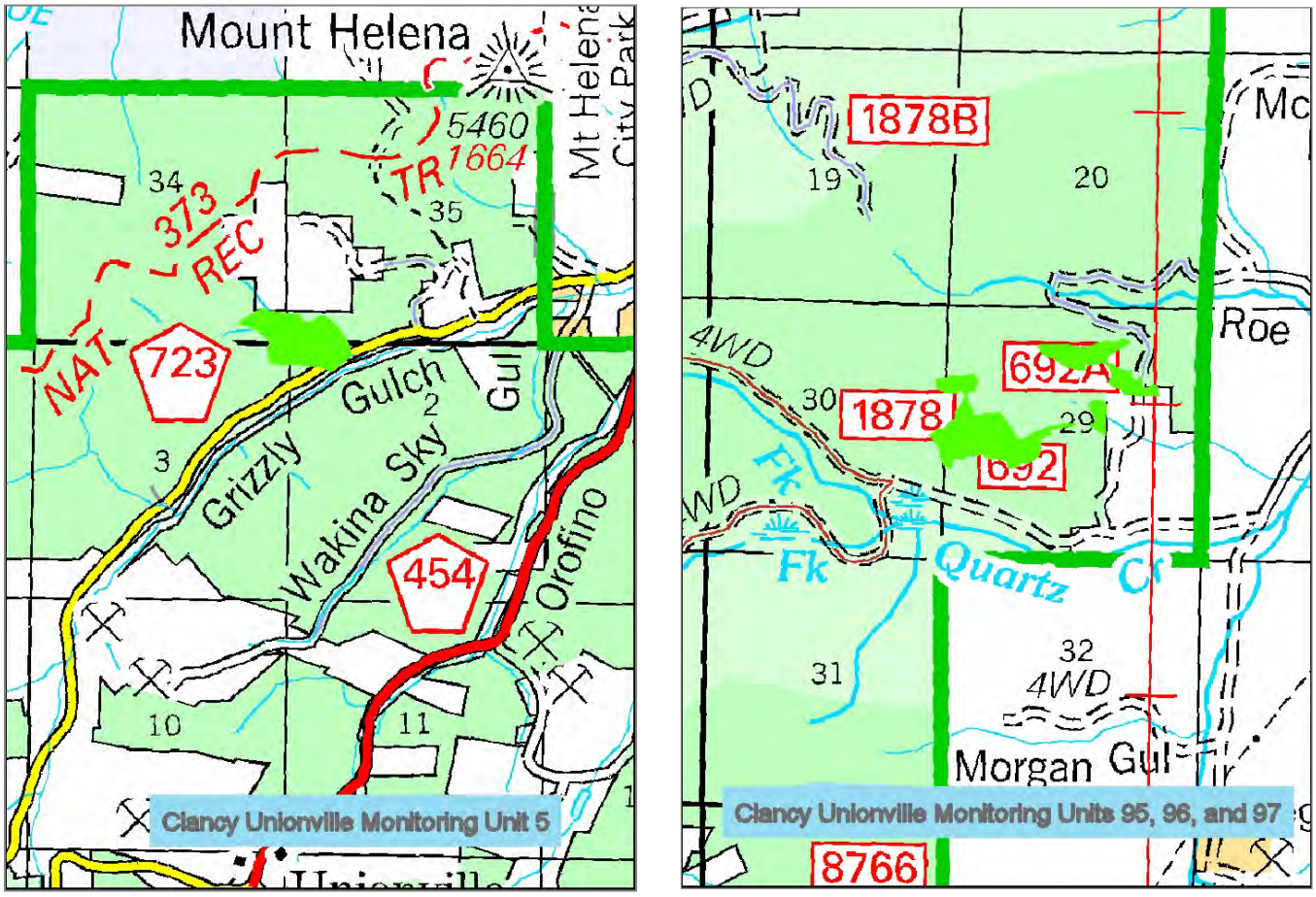


Figure 15. Clancy Unionville Project Bird Monitoring Units

Project-Level Goshawk Surveys

Goshawks were monitored in project areas summarized by landscape area in Table 22 utilizing Goshawk Field Inventory Methods Helena National Forest 2008 and the Northern Goshawk Inventory and Monitoring Technical Guide (USDA 2006).

Table 22. Project Level Goshawk Surveys		
Big Belts	Divide	Elkhorns
Cabin Gulch Vegetation	Telegraph Mountain Pine Beetle	Warm Springs Habitat

Table 22. Project Level Goshawk Surveys		
Big Belts	Divide	Elkhorns
Treatment Project	Salvage Project	Enhancement Project

Goshawk Old Growth Surveys

Goshawk surveys were conducted at old growth plots that were identified as part of the Northern Region Landbird Monitoring Program that focused on birds in old growth for 2007. We utilized the *Goshawk Field Inventory Methods Helena National Forest 2008* and the *Northern Goshawk Inventory and Monitoring Technical Guide* (USDA 2006).

Northern Region Landbird Monitoring Program – Birds in Old Growth and Observations for Pileated and Hairy Woodpeckers

Pileated and hairy woodpecker observations were collected as part of the 2007 Landbird Monitoring Program Birds in Old Growth surveys. Observations were also summarized for 1994 through 2006 as part of the FY06 Forest Plan Monitoring Report. These data were collected according to the Northern Region Landbird Monitoring Program Field Methods referenced under *Data Sources.* Data were not collected in 2008 for pileated or hairy woodpeckers so the information provided in the 2007 Monitoring Report are repeated in the 2008 Report.

Birds and Burns Research

This project is part of the Joint Fires Sciences Program investigating the effects of prescribed fire strategies to restore wildlife habitat in ponderosa pine forests of the interior west. The North Elkhorns is one of 9 study sites selected by the Rocky Mountain Research Station to conduct effectiveness monitoring for prescribed fire to quantify reductions in fuel, and evaluate effects of fuel reductions on habitat and populations of the avifauna (and small mammals in selected locations).

A total of 41 transects were established in 2003. These were systematically placed 200 m apart on the four study sites. These same transects were used in 2006 to search for woodpeckers and their nests. Each transect was visited at a minimum of one time. This included using a play-back device to increase the probability of encountering a woodpecker. Transects where woodpeckers were detected were repeatedly visited to locate woodpecker nests. The 2006 Final Report is on file in the Supervisor's Office. Data were not collected in 2007 or 2008; data collection resumed in 2009. Data from 2006 are reported here in order to serve as baseline for 2009 efforts.

Monitoring Results

Old Growth

The estimated percentage of old growth on all forested lands on the Helena National forest is 12.2% with a 90% confidence interval of 10% to 14.3%. These figures represent an increase over those reported in the 2007 Monitoring Report. In 2007, the estimated percentage of old growth Forest-wide was 10.9%. The increase is a reflection of the number of sample points available in 2008 rather than an actual increase in the amount of old growth Forest-wide. In 2007, estimates were based on the FIA base grid which comprises fewer data collection points than the Helena National Forest intensified grid. The FIA grid contains 138 forested plots whereas the Helena Forest intensified grid contains 613 forested plots.

Snags

Snag densities in 2008 have been analyzed according to Forest Plan categories: 7-12" dbh, 12-20" dbh, and >20" dbh. In previous years, snags were grouped as follows: 9" plus, 14" plus, and 21" plus. Therefore it's difficult to describe a direct comparison between snag levels in 2008 and snag levels prior

to 2008. However, general trends can be derived. Table 23 summarizes snag densities from 2006 through 2008.

Table 23. Forest-wide Snag Densities 2006-2008				
Forest-wide Snag Densities per Acre 2006				
Diameter at Breast Height (dbh)	Number of Forested Plots with Non-Null Values	**90% CI For Percent Old Growth** Lower Bound	Point Estimate	Upper Bound
9 inch plus	126	8.3	12.6	17.2
14-inch plus	126	0.7	1.1	1.8
21-inch plus	126	0.1	0.2	0.4
Forest-wide Snag Densities per Acre 2007				
Diameter at Breast Height (dbh)	Number of Forested Plots with Non-Null Values	**90% CI For Percent Old Growth** Lower Bound	Point Estimate	Upper Bound
9 inch plus	125	8.4	12.7	17.5
14-inch plus	125	0.6	1.1	1.8
21-inch plus	125	0.1	0.3	0.4
Forest-wide Snag Densities per Acre 2008				
Diameter at Breast Height (dbh)	Number of Forested Plots with Non-Null Values	**90% CI For Percent Old Growth** Lower Bound	Point Estimate	Upper Bound
7-12 inches	606	22.6	26.1	30
12-20 inches	606	5.4	6.5	7.7
20-inch plus	606	0.8	1.2	1.6

Clancy Unionville Vegetation Manipulation and Travel Management Project Bird Monitoring

A variety of bird species were detected in the four prescribed burn units that were monitored in the Project area. Table 24 summarizes the number and species of birds detected within the respective burn unit.

Table 24. Bird Species Detections and Abundance by Burn Unit				
Species	**Unit C5**	**Unit C95**	**Unit C96**	**Unit C97**
American Crow	1	1		
American Robin	2		1	6
Brown-headed Cowbird	2	7	1	
Cassin's Finch	1			
Chipping Sparrow	8	10	2	15
Clark's Nutcracker		7	1	5

Table 24. Bird Species Detections and Abundance by Burn Unit				
Species	**Unit C5**	**Unit C95**	**Unit C96**	**Unit C97**
Common Raven	1	5	1	8
Dusky Flycatcher	2	1	1	
Gray Jay	1	2		
Green-tailed Towhee	2			
Hairy Woodpecker	1	1		1
Hermit Thrush		1		2
House Finch	1			
MacGillivray's Warbler			1	
Mountain Bluebird		1		1
Mountain Chickadee	6	1		2
Mourning Dove	4			
Northern Flicker	1	4		
Pine Siskin	2	3		2
Pileated Woodpecker		2		1
Red-breasted Nuthatch	3	8	2	7
Ruby-crowned Kinglet	3	4	1	7
Red-naped Sapsucker			1	
Red-winged Blackbird				1
Spotted Towhee	2			
Swainson's Thrush				1
Townsend's Solitaire	2	4	1	3
Vesper Sparrow		3	2	4
Warbling Vireo	1			
White-breasted Nuthatch	2			
Western Tanager	2		1	1
Yellow-rumped Warbler	3	2	1	

Table 25 summarizes the cover types identified within each bird unit.

Table 25. Cover Types Found within each Burn Unit			
Unit C5	**Unit C95**	**Unit C96**	**Unit C97**
40202	30708	30708	30708
40303	31608		31608
41703	40302		40302

30708 – Grassland, Idaho fescue dominated, low structured, ungrazed
31608 – Grassland, unidentified dominate species, low structured, ungrazed
40202 – Ponderosa pine, mature
40302 – Douglas-fir, mature
40303 – Douglas-fir, young
41703 – Dry forest, young

Project-Level Goshawk Surveys

Cabin Gulch Vegetation Treatment Project

A new nest was located in 2007 in the Cabin Gulch Project area in the vicinity of the Middle Fork of Cabin Gulch. The nest stand and surrounding area was surveyed in 2008; goshawks were not located during that survey.

Telegraph Mountain Pine Beetle Salvage Project

Goshawk surveys were conducted at pre-determined points in three general locations in the Little Blackfoot area. No goshawks were detected.

Warm Springs Habitat Enhancement Project

Goshawk surveys were conducted at pre-determined points in the Warmsprings Project Area. Other portions of the project area were goshawks had previously been identified were also surveyed. One goshawk was detected; however, no nest was located.

Goshawk Old Growth Surveys

There were a total of 319 subpoints identified as part of the *Northern Region Landbird Monitoring Program – Birds in Old Growth* inventory effort for 2007. Of those, 91 (29%), were surveyed in 2008. Only one point had a goshawk observation.

Northern Region Landbird Monitoring Program – Birds in Old Growth and Observations for Pileated and Hairy Woodpeckers

Figure 16 illustrates the changes in pileated woodpecker observations from 1994 through 2007. Data collected in 2006 and 2007 are not comparable to those collected between 1994 and 2004. Different methodologies were utilized; the 2006 data are confined to the Big Belts whereas the earlier data are Forest-wide, and the 2007 data were confined to old growth stands Forest-wide.

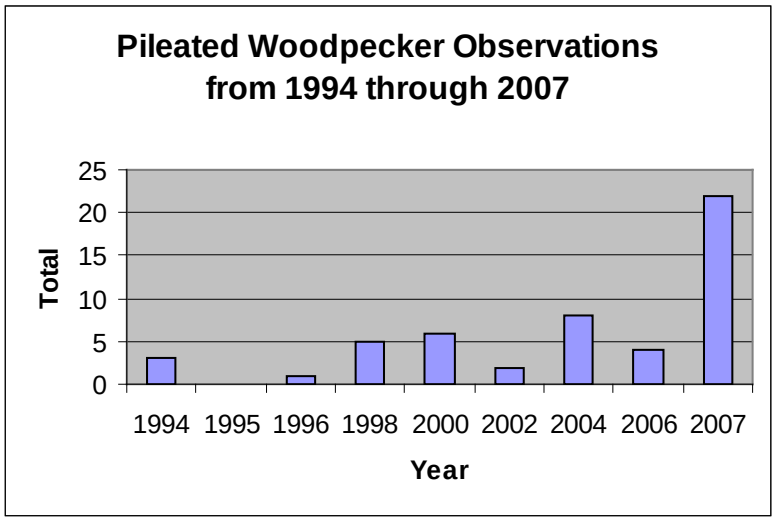


Figure 16 Pileated Woodpecker Observations 1994-2007

Pileated woodpeckers are not common on the Helena National Forest. Other portions of Region One, particularly west-side Forests, generally have between 5-10% occurrence rates compared to 1.5% on the Helena Forest. This is less than 10 individual observations per year for most years.

Figure 17 illustrates the changes in hairy woodpecker observations from 1994 through 2007. Data collected in 2006 and 2007 are not comparable to those collected between 1994 and 2004. Different methodologies were utilized; the 2006 data are confined to the Big Belts whereas the earlier data are Forest-wide, and the 2007 data are confined to old growth stands Forest-wide. Hairy woodpeckers tend to be more common than pileated woodpeckers although the data indicate only slight increases in observations. Regionally, the Helena National Forest

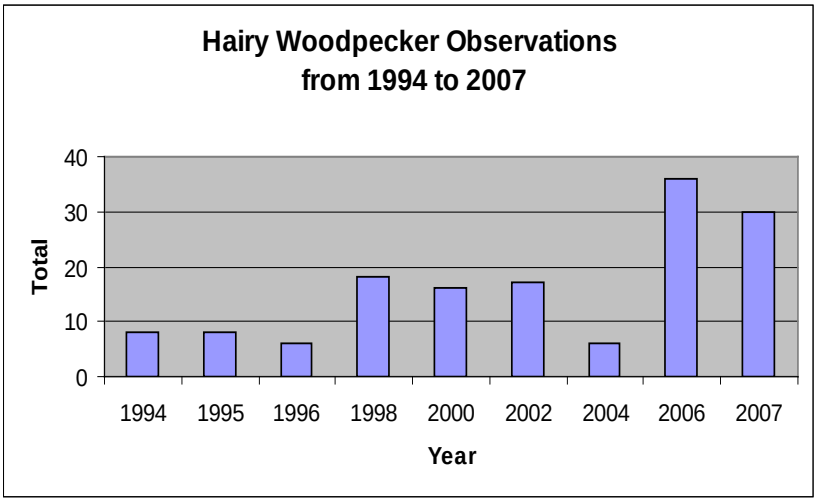


Figure 17 Hairy Woodpecker Observations 1994-2007

is about average in occurrence rates.

Birds and Burns Research

In 2006, 26 confirmed nests were located and monitored. Five additional territories were identified but either these nests failed early on in the breeding season or the female never laid eggs because subsequent monitoring did not yield any evidence of eggs or feeding young. Two of 26 confirmed nesting pairs continued with courtship behavior well into the month of July. The 2006 nest season ran exceptionally late with the last nest (Red-naped Sapsucker) fledging July 29, 2006. All nests in 2006 were woodpecker nests.

Variability Measure Discussion

Many components of this monitoring element do not lend themselves to direct comparison with the variability measure identified in the Forest Plan. Where applicable, the variation relative to the Forest Plan measure is described; otherwise, variation is qualified.

Variability Measure

-10% from previous measurements

Assessment

Old Growth

Old growth comprises about 12% of the forested stands on the Forest. This is roughly 111,600 acres. The Forest Plan requires that 5% of each 3rd order drainage be managed for old growth. This is roughly 46,500 acres Forest-wide. Current amounts of old growth exceed that required by the Forest Plan. Therefore, the variability measure has not been exceeded.

Snag Densities

The number of snags reported for 2006 and 2007 did not reflect any significant measurable difference (Figure 18). Snag densities for 2008, although not directly comparable to 2006 and 2007 due to different groupings between years, indicate that more snags are present Forest-wide (Figure 19). Since snags are clearly increasing Forest-wide, the variability measure has not been exceeded.

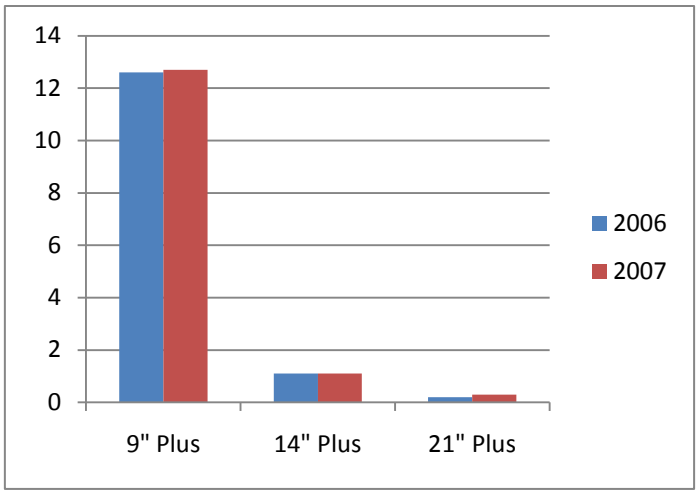


Figure 18. Snag Densities in 2006 and 2007

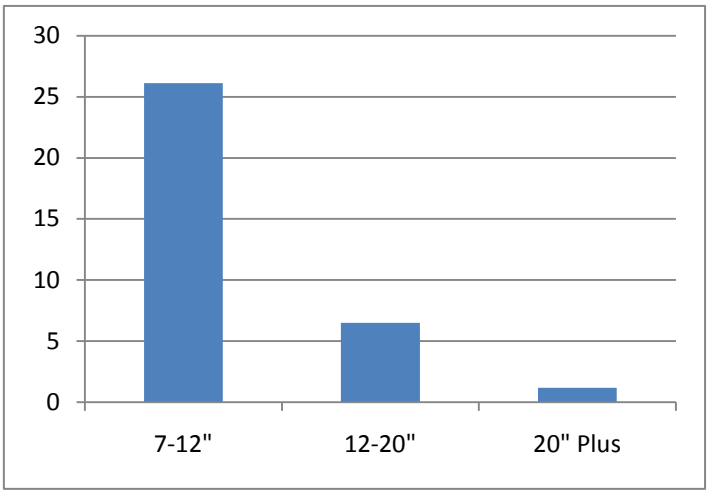


Figure 19. Snag Densities in 2008

Clancy Unionville Vegetation Manipulation and Travel Management Project Bird Monitoring

Hairy woodpeckers were detected within three of the four prescribed burn units while pileated woodpeckers were only detected within two of the units. In general, species diversity was high within three of the four units. These data will serve as baseline data for future monitoring efforts in this Project area.

Project-Level Goshawk Surveys

Data are not collected in a manner that would lead to an assessment of variability. Rather, they are collected in areas associated with existing or potential projects in order to develop a baseline from which management actions can be tailored to meet goshawk habitat needs.

Goshawk Old Growth Survey

We surveyed approximately 29% of those units identified as old growth for the purposes of the *Northern Region Landbird Monitoring Program – Birds in Old Growth* inventory efforts. The Forest Plan states that 20% of 'old growth habitat units' will be surveyed annually. Goshawk surveys in old growth resulted in only one observation. This could be due to several factors including timing of survey efforts and suitability of the overall area as goshawk habitat. Survey efforts are consistent with the measurement frequency identified in the Forest Plan.

Northern Region Landbird Monitoring Program – Birds in Old Growth and Observations for Pileated and Hairy Woodpeckers

The data for both the pileated and hairy woodpecker vary among data collection years mainly associated with different methodologies. These data are intended to identify long-term trends, not between year variations. The data from the *Northern Region Landbird Program – Birds in Old Growth* inventory indicate a significant increase in pileated woodpecker observations whereas hairy woodpecker observations were consistent with data collected in 2006. There is no variability assessment since data are not comparable among years due to different methodologies. However, we will continue to utilize these and other available data to refine baseline information and establish trends.

Birds and Burns Research

Nest success (percentage of nests that successfully fledged at least one young) in 2006 was 81 percent with 21 of 26 nests fledging at least one chick (Table 26). Parasites and predation were the most common cause of failure for nests in 2006. Of the nests that were successful (n = 21), the average number of chicks that fledged was 2.9 per nest in 2006. This was close to the 2005 average (2.6 chicks per nest) and the 2004 average (2.7 for 25 nests). Three hairy woodpecker nests were located and monitored and no pileated woodpecker nests were located.

Table 26. Number of Nests Monitored, and the Number that Successfully Fledged at Least One Young During the 2006 Field Season

		Unit				All units combined
		Maupin Control	Maupin Treatment	Strawberry Control	Strawberry Treatment	
Downy Woodpecker	Number of nests monitored	0	1	0	1	2
	Number of nests that successfully fledged young	0	1	0	1	2

Table 26. Number of Nests Monitored, and the Number that Successfully Fledged at Least One Young During the 2006 Field Season						
		Unit				All units combined
		Maupin Control	Maupin Treatment	Strawberry Control	Strawberry Treatment	
Hairy Woodpecker	Number of nests monitored	1	1	0	1	3
	Number of nests that successfully fledged young	1	1	0	1	3
Northern Flicker	Number of nests monitored	0	1	0	2	3
	Number of nests that successfully fledged young	0	0	0	2	2
Red-naped Sapsucker	Number of nests monitored	7	8	0	1	16
	Number of nests that successfully fledged young	6	5	0	1	12
Northern Three-toed Woodpecker	Number of nests monitored	0	2	1	0	2
	Number of nests that successfully fledged young	0	1	1	0	2
Totals	Number of nests monitored	8	12	1	5	26
	Number of nests that successfully fledged young	7	8	1	5	21

Actions in Response to Variability Assessment

There are no actions needed at this time.

Recommended Efforts

Old Growth

Old growth units can be defined based on the four landscapes on the Forest. As program funding and priorities allow, a percentage of each landscape would be monitored annually to determine variability.

Snag Densities

As program funding and priorities allow, we recommend implementation monitoring in project areas to determine if snag recommendations have been met.

Clancy Unionville Vegetation Manipulation and Travel Management Project Bird Monitoring

Project-Level Goshawk Surveys

Recommendations include: (1) Continue systematic survey of previously-occupied ranges and continue to investigate potential home ranges; (2) Employ intensive sampling where goshawks have previously been located and more extensive sampling in areas where they have not been found so far; (3) Carry out more extensive examination of goshawk territories burned over by the Meriwether fire and assess the potential for future occupancy; (4) Expand survey work to other areas of the Meriwether burn to determine potential for overall occupancy by goshawks and pileated woodpeckers and to develop an overview of how these species adapt to altered habitat conditions; and (5) Establish monitoring in areas impacted by mountain pine beetle.

Goshawk Old Growth Survey

We recommend that we continue to conduct goshawk surveys in areas identified in old growth as funding allows.

Northern Region Landbird Monitoring Program – Birds in Old Growth and Observations for Pileated and Hairy Woodpeckers

Region One is no longer conducting region-wide bird surveys through the landbird monitoring program. A new sampling strategy is being designed to dovetail with other bird monitoring efforts and will include monitoring in bird conservation areas (BCA). We recommend continued support of bird data collection.

Birds and Burns Research

We recommend that data continue to be collected in the Warm Springs Habitat Enhancement Project area to identify management implications associated with the study goals and to identify what, if any, impact the growing mountain pine beetle epidemic has on landbirds and cavity nesters. In fact, one of the Forest Plan goals is to "*determine, through monitoring, the relationship between wildlife populations, their habitat, and various land use activities in the Elkhorn Mountains that could be applied to benefit wildlife in other areas of the National Forest System lands"* (Forest Plan p. II/2)

Conclusions

The intent of this monitoring element is to "measure the effect of management activities on representative wildlife habitats with the objective of ensuring that viable populations of existing native…species are maintained" (Forest Plan p. II/17). Monitoring will allow us to determine if the Forest-wide goal – maintain and improve the habitat over time to support big game and other wildlife species (Forest Plan p. II/1) – is being achieved. The emphasis of the goals and objectives is habitat.

Specifically, this monitoring element focuses on pileated and hairy woodpeckers, and northern goshawks. Hairy woodpeckers have wide ecological amplitude in terms of nesting and foraging. They are not tied to old growth structural characteristics to the extent that pileated woodpeckers or northern goshawks may be. However, they are included in this element because at the time the Forest Plan was developed, hairy woodpeckers represented snag-dependent species on the Helena and Townsend Ranger Districts where pileated woodpeckers were rare or absent (Helena National Forest Plan EIS p. III/26).

Pileated woodpeckers were chosen as a management indicator species (MIS) because they were the largest primary excavator on the Helena National Forest – and still are. At the time of Forest Plan development, they were limited to the Lincoln District. Pileated woodpeckers were also chosen as an MIS species because they have the most restrictive requirements in terms of snag size of any cavity nester on the Forest. Therefore, pileated woodpeckers were expected to be a 'good old-growth indicator' because of their feeding requirements for large snags and down logs. The emphasis is on these structural components that tend to be more common in late-successional forests although certainly not limited to those sites.

The northern goshawk was chosen as an MIS species for old growth due to the diverse prey base and nesting habitat commonly found in late-successional forests. Dispersion of late-successional habitat throughout the Forest was considered important for goshawks although recent science has shown that goshawks also make use of a wide variety of habitats so long as a diverse prey base is present along with mature trees for nesting.

Old growth on the Helena Forest exceeds Forest Plan standards at this time. However, as the mountain pine beetle runs its course, old growth will decrease the extent to which is unknown. Snags are abundant in the smaller size classes with very few large snags present on the Forest. This is primarily due to a lack of large trees across the Forest. Snags will continue to be abundant as the mountain pine beetle expands; however, large snags will continue to be rare. For now, the habitat requirements for hairy and pileated woodpeckers and northern goshawks as prescribed by the Forest Plan are being met.

(C8) Mature conifer suitability, indicator species

Forest Plan Requirements

Mature conifer suitability is to be monitored to be able to respond to any unacceptable deviation from past measurement. This monitoring element is applicable to Management Areas T1-T5, W1, W2, and E1-E4.

Intent

To be able to respond to any unacceptable deviation from past measurements.

Data Sources

Project EAs, habitat sampling by transects of marten use, TSMRS (Forest Plan suggested data sources). Specifically, we used survey data collected as part of the Northern Region fisher surveys, the MTFWP furbearer survey route locations, and data collected by Wild Things Unlimited. We also utilized the Helena National Forest Summary Database for marten habitat estimates.

Current Efforts and Findings

FIA base grid data were used in previous monitoring reports to estimate marten habitat. The Helena Forest has intensified that grid; there are now 4x as many plots as there were in previous monitoring reports.

Documentation of Monitoring Methodology

Several sources have been utilized and examined for use in this monitoring element. These include the following:

- Grid data are collected according to the methodology described at the following website: http://www.fs.fed.us/rm/ogden/data-collection/field-manuals.shtml and are based on the methodologies described in *Application of Forest Inventory and Analysis (FIA) Data to Estimate the Amount of Old Growth Forest and Snag Density in the Northern Region of the National Forest System*, on file in the Supervisor's Office. Additional information and methodologies/assumptions associated with these data are described in the following documents on file at the Supervisor's Office: *R1 Vegetation Council Classification Algorithms* (updated USDA 2006) *R1 Grid Intensification using CSE Protocols – Field Procedures* (USDA 2007) and *R1 Multi-level Vegetation Classification, Mapping, Inventory, and Analysis System* (USDA 2007). See Element C7 for reference listings.

- Marten habitat was modeled according to Habitat Estimates for Maintaining Viable Populations of the Northern Goshawk, Black-backed Woodpecker, Flammulated Owl, Pileated Woodpecker, American Marten, and Fisher (Samson 2006)[18].
- Fisher surveys were conducted according to *U.S. Rocky Mountain Fisher Survey Protocol.* These survey efforts will also detect marten presence.
- Wild Things Unlimited utilized snow track transects.
- MTFWP utilized established furbearer survey route locations.

Monitoring Activity and Data Analysis Methods

FIA Data

Forest Inventory and Analysis (FIA) data were used to determine mature forest habitat acres Forest-wide as well as by landscape in order to determine distribution and abundance of marten habitat.

Fisher Hair Snare Surveys

Surveys were conducted according to the *U.S. Rocky Mountain Fisher Survey Protocol.* Twelve grid cells were surveyed for a total of 38,400 acres. Each grid cell is approximately 5 mi^2. Table 27 and Figure 20 identify the grid cells that were surveyed. Blackfoot Meadows and South Fork Crow Creek were not part of the original grid cells established through the *U.S. Rocky Mountain Fisher Survey Protocol* so they don't show up in Figure 20.

Table 27. Fisher Grid Cell-Box Number Surveyed by Area in 2008

Blackfoot Meadows	Lost Horse Creek	Beaver Creek LRD	Copper Creek	Willard Creek	Hall Creek	Arrastra	Poorman Creek	Ogden Mountain	Chessman	South Fork Crow Creek	Kading
BMDW-1	2682-1	2544-1	2545-1	2824-1	2847-1	2495-1	2591-1	2493-1	2757-1	SCROW-1	2633-1
BMDW-2	2682-2	2544-2	2545-2	2824-2	2847-2	2495-2	2591-2	2493-2	2757-2	SCROW-2	2633-2
	2682-3	2544-3	2545-3	2824-3	2847-3	2495-3	2591-3	2493-3	2757-3	SCROW-3	2633-3
	2682-4	2544-4	2545-4	2824-4	2847-4	2495-4	2591-4	2493-4	2757-4	SCROW-4	2633-4
										SCROW-5	
										SCROW-6	

[18] Samson, F. 2006. Habitat Estimates for Maintaining Viable Populations of the Northern Goshawk, Black-backed Woodpecker, Flammulated Owl, Pileated Woodpecker, American Marten, and Fisher. Table 3, p. 11.

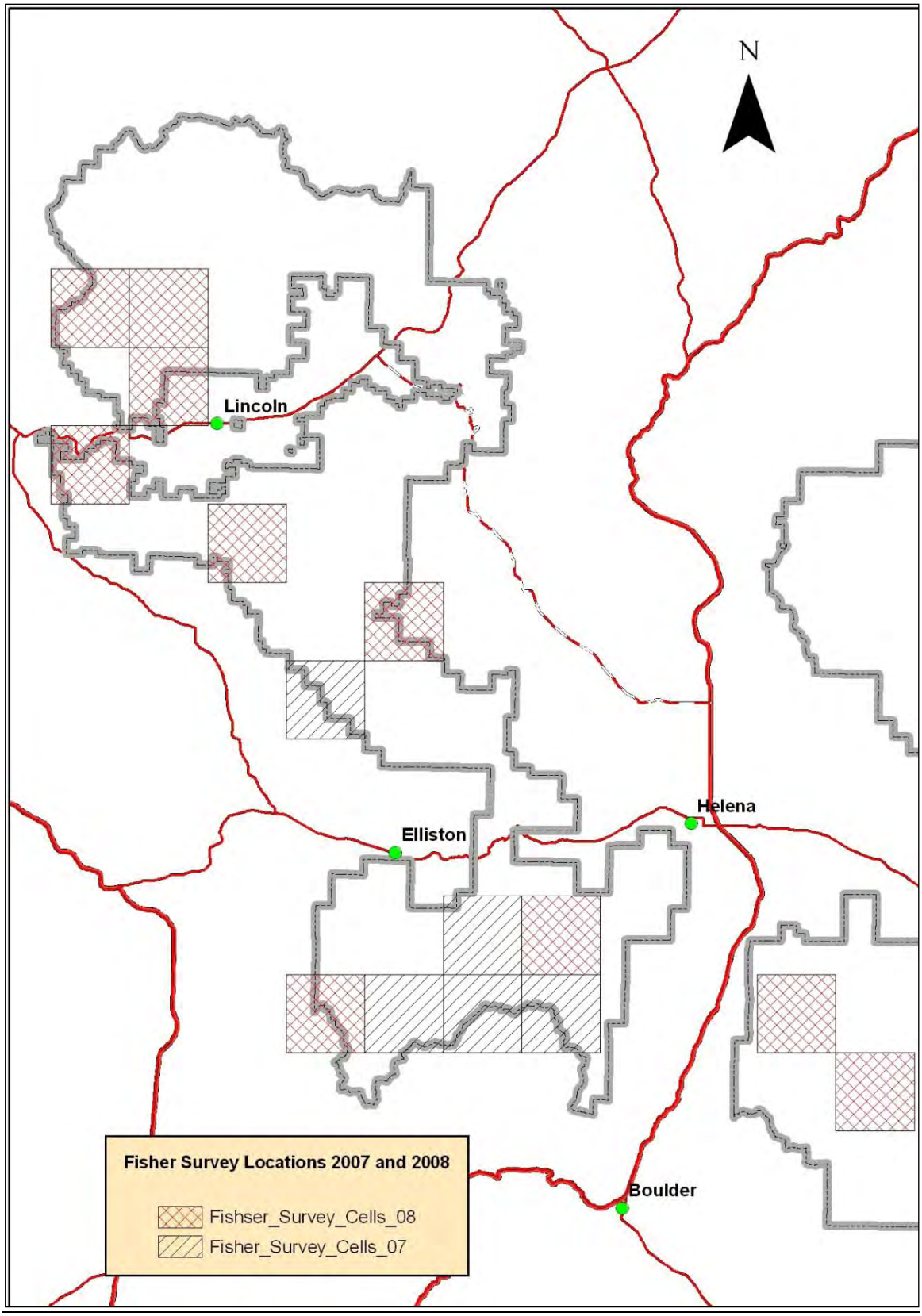


Figure 20 Fisher Survey Locations 2007 and 2008

Winter Track Surveys

Wild Things Unlimited personnel visited the MacDonald Pass Area between December 1, 2007 and March 23, 2008 to conduct snow track surveys in order to help document general carnivore use levels in the area. Several areas were surveyed: 1) the proposed Biathlon project; 2) MacDonald Pass vicinity; 3) the Telegraph-Minnehaha area, and 4) the Greenhorn Mountain vicinity. Along each survey route, detected species of carnivores were recorded, as well as specific locations of carnivore tracks (except for the very common coyote and weasel tracks). General levels of track abundance were also noted for prey species such as snowshoe hare, red squirrel, and grouse, and for ungulates such as deer, elk, and moose.

MTFWP conducted tracking surveys along pre-established routes in the Copper Creek area and in the Rimini/Little Blackfoot area. After the Snow Talon Fire in Lincoln in 2003, the Copper Creek survey route was replaced with Beaver Creek.

Monitoring Results

FIA Data

FIA data were used to estimate marten habitat across the Forest. Forest-wide, about 34.7% of forested stands were identified as marten habitat. This estimate has a lower confidence interval of 31.5 and an upper confidence interval of 37.8. Table 28 summarizes marten habitat estimates by landscape for 2007 and 2008.

Table 28. Estimates of Marten Habitat by Landscape 2008				
	Number of Forested Plots with Non-Null Values	90% CI For Percent Old Growth		
		Lower Bound	Point Estimate	Upper Bound
Blackfoot	224	24.4	29.5	34.4
Divide	143	32.5	39.2	46.1
Elkhorns	56	25.4	35.7	46.7
Big Belts	183	31.4	37.2	43
Estimates of Marten Habitat by Landscape 2007				
	Number of Forested Plots with Non-Null Values	90% CI For Percent Old Growth		
		Lower Bound	Point Estimate	Upper Bound
Blackfoot	46	17.4	25.7	34.1
Divide	33	26.3	37	47.9
Elkhorns	13	4.3	15.4	28.9
Big Belts	45	22.9	31.6	41.2

Fisher Hair Snare Surveys

Table 29 summarizes the results of the fisher hair snare surveys. Highlighted rows indicate areas where hair samples were retrieved. Fishes were detected at sites 2495-2 and 2591-2. Martens were detected at sites 2591-1, BMDW-2, and 2545-4.

Table 29. Fisher Grid Cell-Box Number Surveyed by Area in 2008

Blackfoot Meadows	Lost Horse Creek	Beaver Creek LRD	Copper Creek	Willard Creek	Hall Creek	Arrastra	Poorman Creek	Ogden Mountain	Chessman	South Fork Crow Creek	Kading
BMDW-1	2682-1	2544-1	2545-1	2824-1	2847-1	2495-1	2591-1	2493-1	2757-1	SCROW-1	2633-1
BMDW-2	2682-2	2544-2	2545-2	2824-2	2847-2	2495-2	2591-2	2493-2	2757-2	SCROW-2	2633-2
	2682-3	2544-3	2545-3	2824-3	2847-3	2495-3	2591-3	2493-3	2757-3	SCROW-3	2633-3
	2682-4	2544-4	2545-4	2824-4	2847-4	2495-4	2591-4	2493-4	2757-4	SCROW-4	2633-4
										SCROW-5	
										SCROW-6	

Winter Track Surveys

Tracks of several carnivore species were detected during the Wild Things Unlimited surveys, as well as tracks of several prey species and ungulate species. Wolverine and lynx tracks were detected as well as marten and hair and/or scat samples were used to verify these detections.

MTFWP detected lynx, wolverine, several other mustelids, as well as several other species. These data sheets are on file at the Supervisor's Office.

Variability Measure Discussion

Many components of this monitoring element do not lend themselves to direct comparison with the variability measure identified in the Forest Plan. Where applicable, the variation relative to the Forest Plan measure is described; otherwise, variation is qualified.

Variability Measure

-10% from previous measurements

Assessment

FIA Data

Intensified grid analysis indicates that marten habitat is abundant and well distributed. Estimates of marten habitat in 2008 are higher than those for 2007 since additional data points have been added. For example, the base FIA grid comprised 46 plots that met marten habitat model parameters while the intensified grid comprised 224 plots. So the increases in marten habitat estimates are based on a larger sample size. The estimates from 2007 were intended to represent baseline data; however, since the 2008 dataset is more robust, that will serve as baseline for outyear comparisons. Therefore, there will be no variability assessment. Assessments will be conducted in outyears as grid plots are updated and data become available for comparisons across years.

Fisher Hair Snare Surveys

Fisher hair snare surveys are designed to delineate the geographic range of fisher in the Rocky Mountains and to index the abundance of fisher in specific populations through the use of DNA. Implementation of the protocol will also result in the detection of martens. However, because marten and fisher habitat does not always overlap, marten detections, as they occur, may be less frequent than those for fisher since marten habitat is not a target of this survey. Therefore, the data that have been collected are not sufficient to conduct a variability assessment but rather to demonstrate presence in those areas where martens have been detected.

Winter Track Surveys

Both the Wild Things Unlimited track surveys and those conducted by MTFWP indicate that marten are present on the Helena National Forest. The Wild Things Unlimited surveys are designed to determine if certain species are present in survey areas as well as to determine if animals are moving back and forth across Highway 12. Their results indicate that the MacDonald Pass area may serve as an important wildlife travel corridor for rare and other species.

MTFWP surveys are designed to detect trends over time. Those data have not been analyzed at this time.

Actions in Response to Variability Assessment

There are no actions needed at this time.

Recommended Efforts

FIA Data

As program funding and priorities allow, marten habitat should be monitored utilizing intensified grid data and supplemented with presence/absence and habitat use surveys.

Fisher Hair Snare Surveys

Continue fisher hair snare surveys as a surrogate for marten surveys as long as the fisher effort continues regionally.

Winter Track Surveys

Conduct winter tracking surveys in areas not covered by MTFWP survey routes to verify presence of marten in suitable habitat areas (as well as wolverine, lynx, and fisher). Continue conducting marten track surveys in conjunction with lynx tracking surveys.

Conclusions

The intent of this monitoring element is to "measure the effect of management activities on representative wildlife habitats with the objective of ensuring that viable populations of existing native...species are maintained" (Forest Plan p. II/17). Monitoring will allow us to determine if the Forest-wide goal – maintain and improve the habitat over time to support big game and other wildlife species (Forest Plan p. II/1) – is being achieved. The emphasis of the goals and objectives is habitat.

Specifically, this monitoring element focuses on martens. Martens were chosen as a management indicator species (MIS) because they are associated with mesic mature and late-successional forests. Specifically, they require at least 30% canopy cover and generally avoid large openings. Consequently, they are sensitive to management actions. Furthermore, because they are predators they are good indicators of ecosystem health due to their position on the food chain.

According to the Forest Plan EIS, Appendix B (p. B/68), the old growth requirements of the Forest Plan are intended to provide the minimum management requirements for several species including martens. As previously mentioned in Element C7, old growth on the Helena Forest exceeds Forest Plan standards at this time (*See Element C7)*.

Snags are also a consideration for martens. Snags are abundant in the smaller size classes with very few large snags present on the Forest (*See Element C7)*. This is primarily due to a lack of large trees across the Forest. Snags will continue to be abundant as the mountain pine beetle expands; however, large snags will continue to be rare.

Habitat analyses and survey data indicate marten habitat is well distributed and occupied on the Forest. However, as the mountain pine beetle runs its course, old growth and mature habitat will decrease, the extent to which is unknown.

(C9) River and lake system suitability, indicator species (bald eagle)

Forest Plan Requirements

River and lake system suitability will be monitored using bald eagle nesting habitat as an indicator to be able to respond to any unacceptable deviation from past measurements. This monitoring element is applicable to Management Areas R1, W1, and P2.

Intent

To be able to respond to any unacceptable deviation from past measurements.

Data Sources

Project EAs, habitat surveys of nesting areas (Forest Plan suggested data sources). Specifically, the Montana Natural Heritage Program Database was utilized to identify bald eagle locations.

Current Efforts and Findings

On August 9, 2007 the bald eagle was removed for the endangered species list. It is now managed according to the Montana Bald Eagle Management Plan and is analyzed as a Forest Service sensitive species.

Documentation of Monitoring Methodology

Observations are based on information stored in the Montana Natural Heritage Program Database (Heritage Database). See: http://fieldguide.mt.gov/detail_ABNKC10010.aspx

Monitoring Activity and Data Analysis Methods

The presence of eagles, eagle nests, and potential nesting sites are noted during wildlife surveys by various wildlife personnel (ample riparian zones, along rivers, near lakes). These data are available at the Montana Natural Heritage Program and are on file at the Supervisor's Office.

Monitoring Results

Bald eagles have not specifically been surveyed in 2008 by Helena National Forest staff since they were delisted in August of 2007. However, several observations have been recorded in the Heritage Database and are summarized in Table 30by those counties within which the Forest occurs. Only those observations from reported from the time of delisting through 2008 are summarized.

Table 30. Summary of Bald Eagle Observations by County for 2007 and 2008 (Source: Montana Natural Heritage Database)

County	Observation Date	Number Reported
Broadwater	3/1/2008	2
	6/14/2008	1
Jefferson	12/10/2007	1
	3/1/2008	1
Lewis and Clark	12/15/2007	1
	3/1/2008	9
	4/12/2008	1
	6/14/2008	1
	10/2/2008	1
	11/28/2008	1
	3/1/2008	3
Meagher	3/1/2008	3

Figure 21 is excerpted from the Heritage Database and includes all bald eagle observations, not just 2007 and 2008.

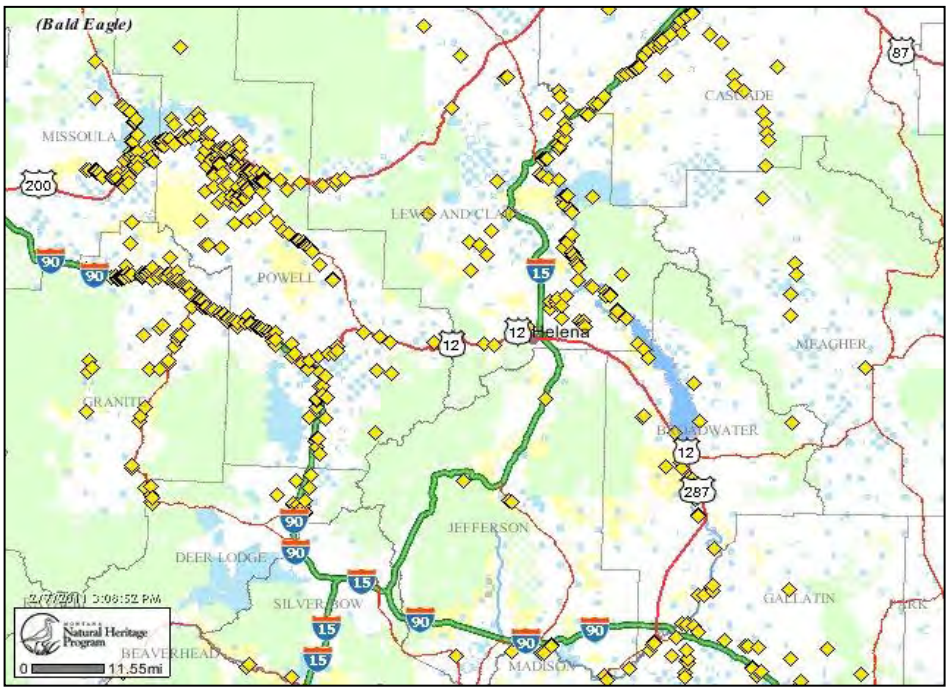


Figure 21. Bald Eagle Observations from the Montana Natural Heritage Program

Variability Measure Discussion

Variability Measure

Any loss of an eagle nest

Assessment

Data are unavailable at this time relative to nesting status of bald eagles.

Actions in Response to Variability Assessment

No actions are needed at this time.

Recommended Efforts

As program funding and priorities allow, continue to survey potential bald eagle habitat to identify nest locations.

Conclusions

Bald eagles were listed as a management indicator species because the Forest Service Handbook on Land and Resource Management Planning stated that listed species will be management indicator species. Since the crafting of the Forest Plan, bald eagles have been delisted. The Forest will continue to evaluate impacts of management activities on bald eagles and protect nesting and foraging habitat.

Additional Wildlife Monitoring

Additional wildlife monitoring has been conducted across the Forest that is not part of the Forest Plan Monitoring Requirements. These efforts are described below.

Forestwide Flammulated Owl Surveys

Monitoring Activity

Flammulated owls were surveyed, region-wide, in 2005 and again in 2008 in order to develop baseline data on the extent of flammulated owls regionally. Owls were surveyed as part of the Northern Region Landbird Program and according to the protocol located at the following website: http://avianscience.dbs.umt.edu/documents/2005_flammethods.pdf.

Analysis

Nineteen routes were surveyed in 2008 for a total of 138 points. Owls were recorded at 23 of the 138 points. Table 31 summarizes the sites that were visited and owl detections.

Table 31. Flammulated Owl Survey Sites and Associated Owl Detections

Site	Number of Visits	Number of Points	Number of Points with Owls	Total Number Owl Detections
Blacktail Slough	1	4	0	0
Cabin Gulch	2	7	0	0
Cement Gulch	1	5	0	0
Deep Creek	1	5	0	0
Elliston	2	6	0	0
Grassy Mountain	2	3	0	0
Greenhorn Belt	1	4	0	0
Keep Cool Lake	2	10	0	0
Mullen Pass	2	10	0	0
Ray Creek	1	6	0	0
Rimini	2	5	0	0
White's Gulch	1	4	0	0
Beartrap Gulch	1	7	2	4
Greenhorn Mountain	2	9	2	2
Ogden Mountain Road	2	12	2	2
Park Lake	1	10	6	6
Road 1163	2	11	2	2
Road 1830	2	10	8	13
Spring Gulch	1	10	1	1
TOTAL		**138**	**23**	**30**

Figure 22 illustrates the proportion of owls detected on each respective visit.

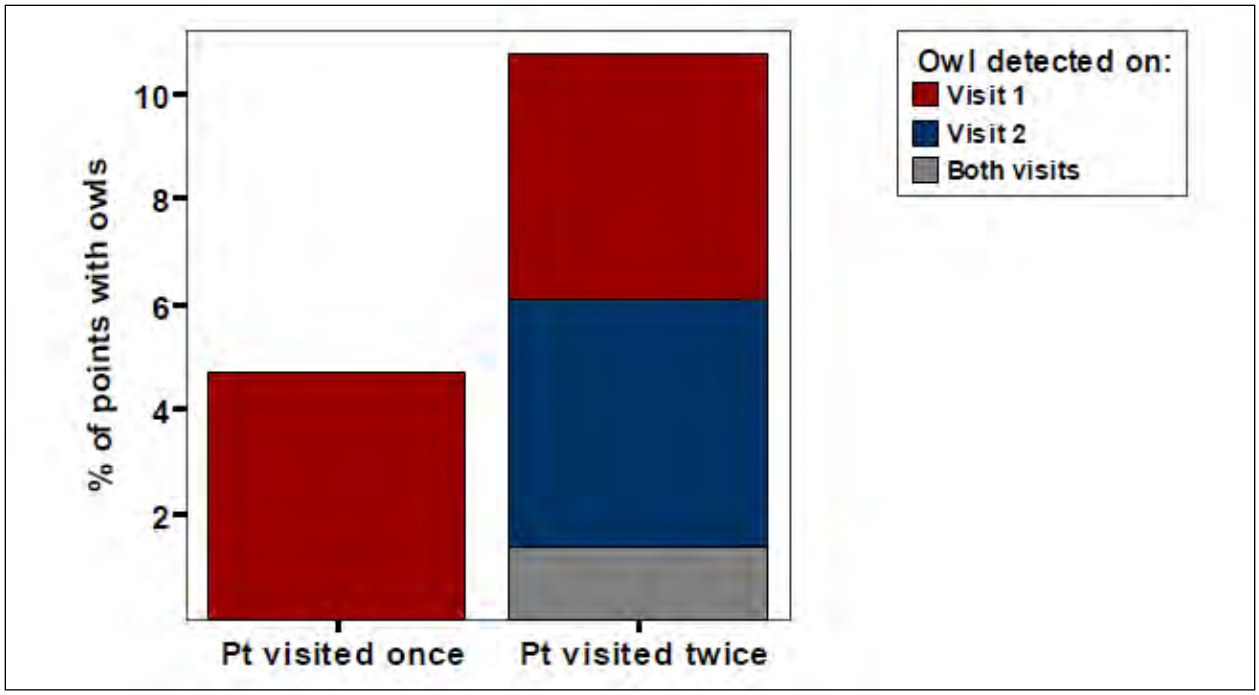


Figure 22. Percent of Points with Owl Detections

Variability Measure Discussion

Variability Measure

There is no variability measure since this is not a required Forest Plan monitoring element.

Assessment

Flammulated owls were detected on 17% of points. Most owls were detected on *either* the 1st visit or the 2nd visit, and owls were detected during both visits on only 1.4% of points. Interestingly, owl were detected at the same proportion of points (4.7%) visited once during the season as points that were visited twice, but in which the owl was detected on either the first or second visit.

Recommended Efforts

We recommend that flammulated owl surveys are continued along existing survey routes and that detections are followed up with nest searches in order to develop habitat relationships for flammulated owls on the Forest.

Citizen Science Flammulated Owl Surveys

Monitoring Activity

The flammulated owl is considered a sensitive species in Region 1 and a Montana Species of Concern. Because flammulated owls do not arrive on their breeding grounds until early to mid-May, they have been historically missed in nocturnal owl surveys. They also seldom vocalize except at night and are rarely seen.

During the summer of 2005 and again in 2008, the Avian Science Center assessed the breeding season distribution of flammulated owls across Region 1 as part of the Landbird Monitoring Program. In doing so, a workable protocol was developed with which to detect the presence of flammulated owls. Stemming from this work and with the support of MTFWP and the Helena National Forest, the protocol was taken to the next logical step – citizen science monitoring.

Flammulated owls were surveyed according to the Flammulated Owl Citizen Science Protocol – Helena Area.

Analysis

Eleven transects were surveyed in 2008 in the Helena area and flammulated owls were detected at 23 points on 3 of 11 transects (Table 32).

Table 32. Citizen Science Flammulated Owl Survey Sites and Associated Owl Detections

Site	Number of Visits	Owl Detected	Number of Points with Owls
Bridge Creek	1	No	0
Cabin Gulch	1	No	0
Dry Gulch	1	No	0
Magpie Creek	1	No	0
Park Lake	1	No	0
Strawberry Mountain	1	No	0
Mount Helena	1	Yes	3
Avalanche Gulch	2	No	0
Tenmile Creek	2	No	0
Priest Pass	3	Yes	2
Unionville	3	Yes	7
TOTAL		**3 Detections**	**23**

Variability Measure Discussion

Variability Measure

There is no variability measure since this is not a required Forest Plan monitoring element.

Assessment

Flammulated owls were detected on 27% of transects. Most of the owls were detected on the second visit. The weather conditions in 2008 were cold and wet and not conducive to owl detections.

Recommended Efforts

We recommend that the Citizen Science flammulated owl surveys are continued along existing survey routes and that detections are followed up with nest searches in order to develop habitat relationships for flammulated owls on the Forest.

Black-backed Woodpecker Surveys - Meriwether Fire

Monitoring Activity

The Meriwether Fire of 2007 burned more than 40,000 acres of which approximately 25,000 were in the Gates of the Mountain Wilderness. Black-backed woodpecker surveys were conducted in the burned area in 2008 by the Youth Forest Monitoring Program (YFMP) students. The methodology is described in “Designing Field Studies to Detect Habitat Change for Cavity-Nesting Birds” on file in the Supervisor’s Office.

Analysis

Eighteen sites were visited in the Meriwether area during June and July of 2008. Nine black-backed woodpeckers were detected and eight three-toed woodpeckers were detected.

Variability Measure Discussion

Variability Measure

There is no variability measure since this is not a required Forest Plan monitoring element.

Assessment

Most of the black-backed observations occurred in areas of high intensity fire. Only three woodpeckers were detected in low intensity areas. Black-backed woodpeckers in Montana are strongly tied to burned forests. The Meriwether surveys further strengthen this relationship and also indicate that black-backed woodpeckers colonize burned forests shortly following the fire disturbance.

Recommended Efforts

We recommend that the YFMP continues monitoring the Meriwether Fire until such time as black-backed woodpeckers are no longer detected (approximately 4- 6 years).

Bird Point Count Surveys in Sagebrush

Monitoring Activity

Bird point count surveys were conducted in the Grassy Mountain Project Area (formerly known as Hay Peggy) in 2008 in order to develop baseline data for landbirds in order to determine the effects of sagebrush management on landbird communities.

The monitoring methodology is based on the *Northern Region Landbird Monitoring Point Count Protocol* (2007) and the general *Field Methods Protocol* (2004) which are located at the following website and on file at the Supervisor's Office:

http://avianscience.dbs.umt.edu/documents/projects/habitat_relationship/ptct_protocol_2007.pdf

http://avianscience.dbs.umt.edu/documents/projects/habitat_relationship/2004_LBMP_methods_000.pdf

Analysis

Points were stratified into three 'cover' types: grassland (17 points), sagebrush (18 points), and 'mixed' which reflected a combination of cover types (4 points). Figure 23 illustrates the number of species detected by cover type.[19]

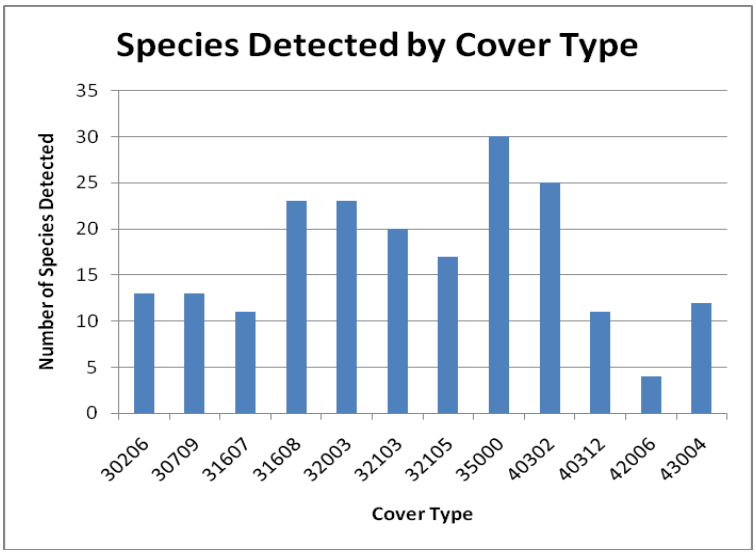


Figure 23

[19] See 'Cover Types' below.

Variability Measure Discussion

Variability Measure

There is no variability measure since this is not a required Forest Plan monitoring element.

Assessment

A majority of the species were detected in the 'conifer encroachment' cover type (35000). Several bird species were also detected in the mature, Douglas-fir cover type (40302).

Recommended Efforts

We recommend that at least one more year of pre-treatment data are collected followed by at least two years of post treatment data. We also recommend that these data are compared with the vegetation data that were collected at each of these points as part of a separate effort. Those data are more in depth and comprehensive and may allow for a more refined analysis of the relationship between birds detected and vegetative structure.

Cover Types

30206 – Grassland, blue grama dominant, medium structure, ungrazed.
30709 – Grassland, Idaho fescue dominant, low structured, ungrazed.
31607 – Grassland, unidentified dominant species, low structured, ungrazed.
31608 - Grassland, unidentified dominant species, low structured, ungrazed.
32003 – Sagebrush, big sagebrush dominant, medium structured, ungrazed.
32103 – Sagebrush, low sagebrush dominant, medium structured, ungrazed.
32105 – Sagebrush, low sagebrush dominant, low structured, ungrazed.
35000 – Conifer encroachment
40302 – Douglas-fir, mature
40312 – Douglas-fir, shelterwood cut.
42006 – Mixed conifer-deciduous forest.
43004 – Conifer, general.

(C10) Pools formed by instream debris, indicator species

Forest Plan Requirements:

Pools formed by instream debris are monitored by collecting field data from 10, 1000-foot sample sections above and within timber harvest areas twice every five years.

Intent

The intent is to insure that Helena Forest timber management practices do not decrease pools formed by woody debris. This element was originally developed to determine the effect of riparian timber harvest on instream pool habitat as the 1986 Forest Plan allowed for some removal of trees adjacent to streams.

Data Sources:

Review of Inland Native Fish Strategy (INFISH 1995) Buffers on the Snow Talon Salvage Sale. The Forest Plan refers to ten 1,000 foot sections above and within timer harvest areas. These sections have not been monitored as there is no harvest occurring within stream buffers.

Current Efforts and Findings:

Monitoring of this element has not occurred since 1992 as commercial harvest of trees that could become woody debris was not occurring. Following the Inland Native Fish Strategy (INFISH) being amended to

the Helena Forest Plan in 1995 (Amendment #14), implementation of INFISH, and implementation of the State Streamside management (SMZ) law, there has been no commercial action to remove streamside trees that could become instream pool habitat. Monitoring of this element in 2008 consisted of review of guidance that hazard tree removal at campgrounds and trailheads followed mitigation measures described in the programmatic biological assessment on Recreation Facility Maintenance (USDA Forest Service 2000a).

Monitoring methodology:

Review of hazard removal trees was assessed by ensuring district personnel were aware of guidance regarding removals described in the biological assessment referenced above.

Monitoring Activity:

Individual hazard tree removal within INFISH RHCAs occurred at campgrounds/road and trail crossings. Any hazard tree removal that occurs is required to meet the project description specified in the programmatic biological assessment on Recreation Facility Maintenance (USDA Forest Service 2000a) for which concurrence from the U.S. Fish and Wildlife Service (USDI 2000) was obtained.

Data Analysis Methods:

By ensuring the Infish buffers are being implemented, timber harvest and fuels reduction projects outside the buffers have low potential to affect woody debris recruitment. When removal of hazard trees for safety reasons occurs within buffers use of guidelines specified in the Programmatic Biological Assessment for Recreation Facility Maintenance (USDA Forest Service 2000a) ensures effects on woody debris recruitment are minimized.

Monitoring Results:

Removal of hazard trees at campgrounds and trailheads met guidance in the programmatic biological assessment (2000a). Removal of trees for firewood is occurring in violation of what is specified in firewood cutting permits. The magnitude of violation has been low in the past but has increased substantially in 2008 associated with tree mortality from insects and likely higher home heating prices. The magnitude of effect from illegal firewood cutting activities is likely to increase further as the pine beetle epidemic continues and demand for firewood increases.

Variability Measure Discussion:

Variability Measure:

A decrease in pools from present levels (90% confidence) or removal of large wood from within INFISH buffers for reasons other than safety.

Assessment:

The intent of the Forest Plan direction was met as no harvest of trees that could have become instream woody debris occurred from any commercial forest activities. However, the loss of trees that could become large woody debris has occurred along the Little Blackfoot River Corridor associated with illegal firewood cutting.

Actions in response to variability assessment:

Line officers and law enforcement were informed of firewood cutting violations

Recommended Efforts:

With regard to the illegal firewood cutting within 100 feet of the Little Blackfoot River, it is recommended that additional law enforcement efforts and signing be used to deter the activity.

As pointed out in the 2002-2006 monitoring reports, the recommendation is to rely on meeting the requirements in the Montana Streamside Management Law and the Inland Native Fish Strategy (INFISH) to ensure Forest management activities do not affect woody debris/pools on fishery streams. Project level monitoring on compliance with the SMZ Law and maintenance of INFISH buffers should ensure pool habitat is not affected by vegetation management activities.

(C11) Intra-gravel sediment

Forest Plan Requirements:

Substrate core samples are to be collected from spawning gravels to determine if the quality of spawning gravel is maintained. Nine samples from each of 30 sections are to be collected annually to determine statistical significance at the 90% confidence level.

Intent

Determine if the quality of spawning habitat is being decreased by Helena Forest management actions

Data Sources:

Sediment Samples from McNeil Core Sampling. Nine samples from each of thirty 1000 ft sample sections as referenced in the Forest Plan have been replaced with 15 samples as a means to assess existing conditions in drainages prior to conducting management activities.

Current Efforts and Findings:

Monitoring methodology:

Substrate fines by depth in spawning gravels that are less than ¼ inch in diameter are evaluated. Sampling is conducted using McNeil core sampler to collect stream substrates from likely spawning sites followed up with drying the samples, sieving the samples, and then weighing the samples by size class of substrate. The results are then used to determine the percentage of the sample by weight that is less than ¼ inch in diameter and to calculate a Fredle Index (Lotspeich and Everest 1981). Information is portrayed both as a function of percentage of fine sediment less than 6.4 mm and by the Fredle Index. The Fredle Index is a measure of pore size and porosity and may be a better measure of stream gravel quality for salmonid spawning and rearing than just fine sediments less than 6.4mm in diameter.

Monitoring Activity:

No monitoring was completed in 2008.

Data Analysis Methods:

No monitoring was completed in 2008.

Monitoring Results:

No monitoring was completed in 2008.

Variability Measure Discussion

Variability Measure:

Annual decrease in Fredle Index from present (90% confidence). Since cooperative work with the state assessed values based on fine sediments less than 6.4 mm in diameter a change in fine sediments less than 6.4 mm in diameter (90% confidence) is used for the 2007 data.

Assessment:

No monitoring was completed in 2008.

Actions in response to variability assessment:

The forest will continue with a strategy that substantial ground disturbing management actions proposed in various drainages will include actions that focus on reducing sediment production from existing levels or at least have no net increase in sediment delivery from existing levels. Although not a formalized strategy, this approach has been previously used as part of the Beaver Dry Timbersale, the Poorman Timber Sale, the Draft EIS on the Nevada/Dalton Project, Snow-Talon Salvage Sale, the Elliston Fuels Treatment Project, the upcoming Cabin Gulch Draft EIS, and upcoming evaluations for a Fuels treatment in the Hay Creek drainage. The approach is aimed at meeting or exceeding the Forest Plan Standard for General Watershed Guidance #4 (Helena Forest Plan pg II-35). For a stream like Hay Creek it is likely there will be efforts undertaken to reduce sediment delivery from existing levels.

Recommended Efforts:

Monitoring of sediment levels in salmonid spawning substrates should continue, but it is very difficult to show statistical significance in many streams as a function of management activities due to high natural variation of sediment levels in stream gravel substrates (as pointed out in the 2004 through 2006 Forest Plan Monitoring Report Element C-11). There should be continued emphasis to conduct additional follow-up efforts over the next several years to collect substrate sediment levels in streams where data was only collected in one year as well as continuing to collect sediment information from streams where a solid baseline of sediment information has been collected and we have conducted ground disturbing management activities. The sediment information provides quantitative data that helps assess whether there is a trend for any increase in sediment levels occurring in the various drainages where management activities have taken place. Additionally, in drainages where significant levels of fire have occurred with subsequent levels of sediment delivery during rainstorms, the sediment data can give some indication of how stream substrates recover over time.

Sediment sampling of stream substrates should also be continued for streams within drainages where new forest management activities are proposed so that current conditions can be assessed in relation to the broad overall average discussed in the data analysis methods section above.

Based on the cooperative efforts with the State in evaluating sediment levels throughout the Helena Forest (see data analysis methods section earlier) the Forest should consider using the 40% fine sediment level being considered by the State as the level for which a stream is considered impaired.

Sediment sampling of spawning gravels is a reasonable methodology for defining existing conditions in watersheds in relation to assessing the effects of management activities and/or natural events that have occurred. These efforts to determine existing sediment baseline conditions should continue. The baseline information collected can be used in comparison to the 40% level of fine sediment (the level at which a stream may end up being rated as impaired by the State of Montana) to help determine the magnitude of ground disturbing activities that are considered for a drainage. The trend data from information collected throughout the Forest since 1986 suggests that fisheries concerns related to the tendency for higher sediment levels to be present in drainages having high road densities are supportable and that efforts to decrease or at least assure no elevations from current sediment delivery levels are worthwhile and should be continued in the future.

(C12) Streamside Cover for Fish (Range Portion)

Forest Plan Requirements:

To assure management activities do not degrade the habitat of riparian dependent species, monitoring is conducted to assess streamside cover for fish, forage utilization, streambank trampling, plant and animal communities. Project environmental assessments, habitat transect sampling, allotment inspections, utilization studies, inspection of canopy and under story vegetation, watershed inventory and monitoring plans, and timber sale contracts are to be used as data sources. Annual inspections after livestock are removed and five transects per section are to be used to detect declines in habitat suitability.

Intent:

The intent of the requirement is to assure management activities do not degrade the habitat of riparian dependent species. 1. Shading for streams, 2. fish habitat, 3. song bird habitat, 4. forage and browse and 5. diversity

The Forest Plan included the following riparian standards for livestock grazing:

Continuous Grazing System

Dominant Vegetation	Early Pasture % Use	Late Pasture % Use
Grass / grasslike / forb Communities	40	20

Utilization for Deferred Rotation System

Dominant Vegetation	Early Pasture % Use	Late Pasture % Use
Grass / grasslike / forb Communities	50	35

Utilization for Rest Rotation System

Dominant Vegetation	Early Pasture % Use	Late Pasture % Use
Willow / grass / grasslike and Willow / forest Communities	60	40

- The "early" pasture is the pasture(s) used first and/or until approximately August 1. The "late" pasture is the pasture(s) used after this date.

Updated Standards

The Forest Plan standards have been updated by riparian guidelines which were adopted by the Forest through a Forest Service Handbook 2209.21-98-1 Supplement. These standards are more specific than those of the Forest Plan. The intent of these guidelines is to maintain or move toward proper functioning condition and then to strive for and maintain the similarity level that best meets the integrated desired conditions. The values in the following tables are intended to promote recovery toward sustainable healthy, diverse and fully functional riparian systems or to maintain such conditions if in high similarity. Parameter values may be chosen to provide recovery within a specified timeframe, i.e. rapid recovery (5-15 years) or moderate recovery (15-30 years). The values for rapid recovery may be used for a particular stream if, for example, it is critical in meeting scenery value objectives , providing habitat for bull trout, westslope cutthroat trout, or meeting some other resource value. These guidelines are added to permit requirements as needed to meet the desired conditions for a given allotment.

Annual Riparian Zone Key Species Forage Utilization (percent by weight)									
Rapid Recovery					Moderate Recovery				
	Functionality/Similarity					Functionality/Similarity			
Resiliency	PFC/High	PFC/Mod	FAR/Mod	FAR/Low	Resiliency	PFC/High	PFC/Mod	FAR/Mod	FAR/Low
High	60/40	50/30	40/30	40/30	High	60/40	60/40	50/40	40/30
Moderate	50/30	40/30	40/20	40/20	Moderate	50/30	50/30	50/30	40/30
Low	40/20	30/20	20/20	20/20	Low	40/20	40/20	30/20	30/20
Key species to be monitored will be identified based on timing of use and/or palatability.									

Annual Flood Plain Soil Disturbance (percent)					
Rapid Recovery			Moderate Recovery		
	Functionality/Similarity			Functionality/Similarity	
Resiliency	FAR/Low	NF/Low	Resiliency	FAR/Low	NF/Low
High	20/15	15/10	High	30/20	20/15
Moderate	15/10	10/5	Moderate	25/15	15/10
Low	5	5	Low	10	10

New Information

In 1998 bull trout were listed as a threatened species. As a result of the Terms and Conditions of the U.S Fish and Wildlife Service 1998 Bull Trout Biological Opinion (USDI 1998 pages 98-99), monitoring is being conducted as directed by the Implementation and Monitoring Team using standardized protocol. The protocols are available in the project file.

There are 24 grazing allotments on the Helena which are in the Blackfoot or Little Blackfoot drainages. These allotments have the potential to have effects on bull trout, and are subject to the above protocols. Livestock grazing dates differ on various allotments to protect spawning bull trout and eggs when bull trout are present.

The HNF Riparian Guidelines (FSH 2209.21-98-1) were required to be applied to all westside allotments as part of the 1998 Bull Trout Level I Team Consultation Requirements. There are four eastside allotments that include streamswest of the Continental Divide and are in potential bull trout waters. The bull trout potential streams in those allotments also have these standards. The following table shows the standards that have been in place through AOI's (Ann) since 1998 on those allotments that have monitoring in place.

Allowable Use Standard On Herbaceous	**Allowable Use Standard on Sedges**	**Allowable Use Standard On Woody species**	**Stream Bank Disturbance**
35-40% 3-4 inch stubble ht	35-40% 6 inch stubble ht	40% use of total leaders	15-20%
35-40% 3-4 inch stubble ht	35-40% 6 inch stubble ht	40% use of total leaders	15-20%
35-50% depending on season of use		40% use of total leaders	

All standards addressed in the HNF Guidelines are variable, depending on stream condition, resiliency and recovery rate. When conditions warrant, more stringent HNF Guidelines would be applied. PIBO parameters are generally more stringent and apply to all bull trout allotments.

Allotment	FWS Status in Relation to Bull Trout	Monitoring in Place	Remarks
Alice Creek C&H (within bull trout recovery zone)	Not likely to adversely affect	Yes since 1999.	
Arrastra C&H	Not likely to adversely affect	No.	No fish habitat on Forest
Blossburg C&H	Adverse effect	Yes since 1999.	
Canyon Creek-Sandbar S&G	Not likely to adversely affect	Yes since 1999.	
Chimney Creek	Not likely to adversely affect	Yes since 1999.	
Clarks Canyon C&H	Not likely to adversely affect	Yes since 1999	
Dog Creek C&H	Not likely to adversely affect	Yes since 1999	
Drumlummon-Skelly C&H	Not likely to adversely affect	No	Only American Gulch
East Nevada C&H	Not likely to adversely affect	Yes since 1999	
Empire C&H	Not likely to adversely affect	No	Only Dog Creek
Hat Creek C&H	Adverse effect	Yes since 1999	
Horsefly S&G	Not likely to adversely affect	Yes since 1999	
Keep-Cool/Liverpool S&G	Not likely to adversely affect	Yes since 1999	
MacDonald Pass	Not likely to adversely affect	No	MacDonald Cr. & Rich Spur
Moose Creek C&H	Not likely to adversely affect	Yes since 1999	
Ophir-Hope C&H	Adverse effect	Yes since 1999	
Poorman-Willow C&H	Not likely to adversely affect	Yes since 1999	
Shingle-Mill C&H	Not likely to adversely affect	No.	
Slate Lake C&H	Not likely to adversely affect	Yes since 1999	
Spotted-Dog/Trout Creek C&H	Not likely to adversely affect	Yes since 1999	
Spring Gulch C&H	Adverse effect	Yes since 1999	
Stonewall C&H	Not likely to adversely affect	Yes since 1999	
Tenmile-Priest Pass C&H	Not likely to adversely affect	No	Only Mike Renig
West Nevada C&H	Not likely to adversely affect	Yes since 1999	

Data Sources:

Specific data sources recommended in the Forest Plan for this element include: Project EA's, habitat sampling by transects; allotment inspections; utilization studies; inspection of canopy and understory re-vegetation; watershed inventory and monitoring plan; timber sale contracts; information from 25, 1000 foot sections (these have been replaced as noted below).

From a fisheries perspective, the Cowfish Methodology (Lloyd 1985) was originally specified as a means to assess riparian conditions. This method has not been used since 1992 and beginning in 1998 the Helena Forest adopted methods that are more widely accepted. These newer methodologies/information bases used to assess riparian habitats include: 1) Implementation Monitoring Module Results from Interagency Implementation Team (IIT) Monitoring Protocol on grazing allotments west of the continental divide and 2) Bull trout Level 1 Team Monitoring Findings on four livestock allotments west of the continental divide. Additional data sources include biological assessments, biological evaluations, fishery effects analyses, general fishery reviews conducted on several ongoing allotments, proper functioning condition assessments, allotment utilization measurements, and riparian/migratory songbird assessments. These newer methodologies and evaluation approaches replace the transects and 1000 foot sections identified in the Forest Plan.

The Helena National Forest Riparian Inventory and Monitoring Strategy, 6/15/2009, outlines methods and responsibilities to determine whether the Forest is meeting Forest Plan standards for riparian areas. Two approaches are identified in the Strategy. Longterm monitoring using PIBO (Pacific Infish Biological Opinion) implementation protocol is identified as appropriate data collection to assess Forestwide grazing conditions to provide a broadscale determination as to whether Forest Plan intent is being met. Short term monitoring includes using the R1 Bank Alteration methodology as an appropriate protocol to use in determining annual impacts from livestock grazing. In addition, the PFC methodology (TR 1737-15) is applied provides a qualitative assessment of riparian areas based on quantitative science. These data will be used to address the intent of element C12. Specific monitoring is required as specified in the PIBO Biological Opinion for the BLossburg, Spring Gulch, Ophir-Hope and Hat Creek allotments.

Region 1 adopted a "Standardized Protocol for Measuring Bank Alteration on Grazing Allotments and Annual Grazing Use Indicators in Grazing Permit Administration" in 2006. The method, commonly referred to as the R1 Bank Alteration Method has been the methodology used by Forest since that time. It does not conflict with the methods of the HNF Riparian Guidelines.

Current Efforts and Findings*:*

Cowfish (Lloyd 1985) monitoring was discontinued in 1992. Presently monitoring of forage use and bank disturbance on allotments west of the continental divide is conducted as part of implementation monitoring for bull trout required by the U.S Fish and Wildlife Service biological opinion (USDI 1998 pgs 98-99) completed on Forest Plans in Washington, Oregon, Idaho and Montana. Additional bank disturbance monitoring is conducted on specified stream reaches to address adverse impacts to bull trout from livestock grazing on four allotments on the Helena Forest. The additional monitoring on these allotments is conducted as coordinated by the Bull Trout Level 1 Team and specified in the Terms and Conditions of the most recent Incidental Take Statement from re-initiation of the formal consultation for several livestock grazing allotments on the Helena Forest by the U. S. Fish and Wildlife Service (USDI 2002).

Documentation of Monitoring Methodology:

PIBO Effectiveness Monitoring: Eighty longterm monitoring sites have been identified as described in the Forest Riparian Strategy. The sampling will occur within the livestock allotments on low gradients across the Forest to assess riparian function using this methodology. In addition, the National PBIO monitoring team has established permanent plots on the Forest which will provide useful riparian information.

Proper Functioning Condition (PFC) Survey - The PFC methodology is documented in the project file (USDI/ USDA 1998). High priority allotments are assessed by field crews, using the PFC checklist. Photos and GPS points are established for each reach. After IDT review of the information, field visits will be made to reaches where additional information is needed. Riparian standards, appropriate to the PFC rating for each reach, are then established according to FSH 2209.1-98-1, except those allotments superseded by the Bull Trout Biological Opinion as described above

Biological Assessment - A standardized format for the assessment is used for proposed activities as agreed to by the Montana Bull Trout Level 1 Team. Stream reaches are visually inspected by professional fishery personnel with findings documented as part of the various "matrix" elements (USDI 1998) in the Biological Assessment. Documentation of the assessment and rationale for the effects analysis are detailed in specific assessments that are part of project files on individual grazing allotments as well as other actions that may have an effect on bull trout. One of the key components of the Biological Analysis is the watershed baseline. The watershed baselines establish overall condition for each of the 6th code hydrologic units in the Upper Clark Fork USDA (2000b) and Blackfoot (USDA 2000c) Bull Trout Section 7 Watersheds. These documents are also part of the project files.

Biological Evaluation - The biological evaluation only assesses effects to westslope cutthroat trout on the Helena Forest. This process is very similar to what is discussed above for biological assessments, except that east of the continental divide watershed baselines have not been completed to the level of detail as has been accomplished for streams west of the continental divide. Consequently the format for biological evaluations conducted east of the continental divide does not follow the format used west of the continental divide.

General Fishery Evaluation. For proposed activities a no effect checklist is used as a guide for evaluating risk to listed fish species (bull trout), sensitive fish species (westslope cutthroat trout), and other fish species present on the forest. Rationale for conclusions are included in documentation. This No Effect Checklist is used in place of an in-depth biological analysis or biological evaluation if no effects for an activity are projected. Review of ongoing activities that can affect riparian habitat related to fisheries is accomplished using walk through evaluations with notation documented in regard to effects or concern for possible effects to fishery resources.

Utilization Methodology

According to the Helena Forest Riparian Guidelines Handbook Supplement (R-1 FSH 2209.21-98-1) the following parameters are measured, as appropriate for the functioning condition class, resiliency and similarity of a given reach for all allotments, with the exception of stubble height. The bull trout allotments have a specific stubble height, as shown in the table entitled "2008 Riparian Monitoring—Bull Trout Allotments" which follows.

Key Species Utilization: This is the percent of total weight of key plant species utilized by ungulates while grazing the affected riparian area. Key species to be monitored will be identified based on timing of use and/or palatability. The height-weight method (determine percent reduction in height due to grazing and

convert to percent use in weight), ocular estimate (of herbage removed), or clipping and weighing (grazed and ungrazed plots) will be used to measure utilization (percent weight removal) of the key species.

Stubble Height: This is the height of standing grass or grass-lilke vegetation at the time of measurement within the floodplain. Two values area given, one for growing season use and the other for dormant season use. Stubble height is measured against the appropriate minimal stubble height along on e or more 100 foot line transects. Measurements are made at on foot intervals or are pace. A minimum of 25 points are measured. At least 50 percent of the measurements must meet or be taller than the required stubble height for compliance. Stubble height requirements may have to be adjusted on a site specific basis to account for the growth habit of the dominant grass or grass-like vegetation.

Woody Utilization: This is the utilization of the annual growth of woody species such as willows aspen, dogwood, etc., by livestock and wildlife within the riparian area. The production index method (count the number of twigs browsed vs. unbrowsed on pre-tagged individual shrubs) will be used to assess woody utilization. The twig length method (comparison of average leader growth of browsed and unbrowsed shrubs) may also be used when appropriate. Measurements will be made on a representative sample of plants less than 5 feet in height which are most affected by browsing.

Bank Disturbance: Bank disturbance refers to physical alteration of the bank by trampling. The actual feet of current year's bank soil disturbance associated with grazing will be measured along 100 foot transects on both sides of the stream. The frequency percentage (average number of feet disturbed or hits within 100 foot transects converted to percent) of disturbance will be used to assess compliance. Bank disturbance will be measured from the low water line to the top of the bank. Bank disturbance may be measured up to 18 inches back from the bank it could eventually lead to the entire section of bank falling in the stream during peak flows.

Floodplain Soil Disturbance: Floodplain soil disturbance refers to physical alteration of the floodplain by trampling. This parameter applies if there is no discernible streambank or there is a definable low terrace or series of low terraces. Both bank disturbance and floodplain soil disturbance may be measured on a representative reach if appropriate. This administrative monitoring parameter focuses on annual physical soil alteration directly due to ungulate hoof action. Soil disturbance will be measure in the floodplain and sensitive low terraces usually on both sides of the stream. The measurement procedure is identical to that used to assess bank disturbance. The frequency of disturbed soils will be assessed along 100 foot line transects. The frequency percentage will be used to assess compliance.

The follow chart (FSH 2209.21-98-1) shows the parameters most applicable to various reach ratings:

Rating	Key Species Forage Utilization	Floodplain Stubble Height	Woody Utilization	Bank Disturbance	Floodplain Soil Disturbance
Nonfunctional/low similarity		X		X	X
FAR/Low similarity	X	X		X	X
FAR/Moderate similarity	X	X	X	X	
PFC/Moderate or High Similarity	X		X		

Monitoring Activity:

Riparian survey using the Preliminary PFC (Proper Functioning Condition) method.

Portions of eleven grazing allotments had preliminary PFC survey information collected in 2008. A total of 21 miles of stream survey were completed. These surveys were completed by field crews, with the intent that Forest Staff convene in an interdisciplinary team and review the data and the photos. If additional information is needed by the team, more field data will be collected to make a final PFC determination. The following table shows a summary of the field crew preliminary PFC surveys Forestwide.

Stream Rating	Miles	Percent of Surveyed Miles	Meeting Forest Plan/FSH 2209.21-98-1
Functioning At Risk	5.1	24%	10% (2.1 miles) upward trend. Meeting 14% (3.0 miles) unknown trend. Unknown-likely not meeting
Non-functional	2.1	10%	Not meeting
Proper Functioning Condition	13.8	66%	Meeting
Total Miles	**21.0**		

*Assumption is that a stream that FAR with an upward trend is moving in the right direction to meet the intent of the Forest Plan.

**Assumption is that a stream that is FAR with no apparent trend is likely not moving in the right direction to meet the intent of the Forest Plan.

The above table shows that 76% of streams assessed (15.9 miles) are meeting the intent of Forest Plan element C12; 10% of the streams assessed (2.1 miles) are not meeting the intent. More information is needed on 14% of the streams (3.0 miles) to assess the trend. It is likely these streams are not meeting the intent of this element as the streams are functioning at risk with no apparent upward trend.

The following table shows a breakdown of the field crew PFC assessment by allotment:

ALLOTMENT NAME	PRELIMINARY FUNCTIONAL RATING	Stream Miles Surveyed	Miles/ Percent Grazeable Streams Surveyed*	Percent Functional Rating for the Allotment	Functioning in a condition to Meet Forest Plan/FSH 2209.21-98-1	Remarks
BIG BUFFALO	**PFC**	1.6		100%	Meeting	
BIG BUFFALO Total		**1.6**	**8/20%**			Need additional information
BROWNS GULCH	**FAR Total Trend:** **Not Apparent** **Upward**	 0.3 2.1		67% (13% of the FAR) (87% of the FAR)	 Likely not meeting Meeting	
	NF	0.1		3%	Not meeting	
	PFC	1.1		30%	Meeting	
BROWNS GULCH Total		**3.6**	**4/90%+**			No livestock grazing in this allotment since 2004.
CLANCY	**PFC**	2.2		100%	Meeting	
CLANCY Total		**2.2**	**18/12%**			New allotment management plan scheduled for 2009.
FROHNER	**FAR Trend:** **Not Apparent**	0.8		100% (100% of the FAR)	 Likely not meeting	
FROHNER Total		**0.8**	**8/20%**			Need additional data
LITTLE BUFFALO	**PFC**	2.1		100%	Meeting	
LITTLE BUFFALO Total		**2.1**	**14.5/14%**			Need additional data
MAUPIN	**FAR Trend:** **Not Apparent**	1.3 1.3		43% (100% of the FAR)	 Unknown	
	NF	0.3		3%	Not meeting	
	PFC	1.4		33%	Meeting	
MAUPIN Total		**3.0**	**3.5/90%+**			IDT review
QUARTZ CREEK ROWE GULCH	**FAR Trend:** **Not Apparent**	0.1 0.1		2% (100% of the FAR)	 Unknown	
	NF	0.1		2%	Not meeting	

	PFC	4.7		96%	Meeting	
QUARTZ CREEK ROWE GULCH Total		**5.0**	**11/45%**			Need additional data
RAY CREEK	**NF**	1.3		45%	Not meeting.	
	PFC	1.6		55%	Meeting	
RAY CREEK Total		**2.9**	**3.0/90%+**			New allotment management plan scheduled for 2009.
Grand Total		**21.0**				

*Miles of stream are taken from the nhd_streams layer. Allotments listed at 90%+, preliminary pfc surveys were intended to survey all live water grazed by livestock in the allotment.

Fishery Evaluations

No riparian fishery evaluations were completed in 2008.

Shading of Streams and Fish Habitat.

To evaluate this habitat parameter, stubble height and woody browse utilization are used . The following tables summarize 2008 evaluations.

Livestock Utilization Monitoring

Livestock forage utilization was measured on fifty-six streams, within thirty-eight allotments.

The following table shows riparian monitoring that was completed in 2008 using paced transects. Asterisk (*) indicates standards were exceeded when the monitoring occurred.

2008 Riparian Annual Use Monitoring—Non Bull Trout Allotments					
Allotment	**Riparian Area**	**% Utilization**	**% Browse**	**% Streambank Trampling**	**Remarks/ Action Taken**
Avalanche	Doolittle	10		20	
Big Buffalo	Buffalo Creek	35	<5	5	
	Corral Gulch	20	0	<5	
Cellar Ogilvie	Cellar Gulch	32	0	4	
Clancy	Clancy Creek	20	<5	10	
	Kady Gulch	25	<5	10	
Dahlman	Two Sam Spring	25			
Deep Creek	Carl Creek	36		57*	Exceeded. Take issue to 2009 permittee meeting and measure in 2009.
Dry Creek	Dry Creek	27			
Drumlummon	Skelly Gulch	30	5	10	
East West French	French Creek	60*	5	15	Exceeded. Take issue to 2009 permittee meeting and measure in 2009.
Grassy Mountain	Right Fork of Sulphur Bar	19		20	
Grouse Ridge	Bowman	20	<5	5	

2008 Riparian Annual Use Monitoring—Non Bull Trout Allotments					
Allotment	**Riparian Area**	**% Utilization**	**% Browse**	**% Streambank Trampling**	**Remarks/ Action Taken**
	Trout	30	<5	10	
Gurnett Creek	Duck Creek	10		20	unauthorized use
Indian Flats	Pikes Gulch	50	0	20*	Exceeded. Take issue to 2009 permittee meeting and measure in 2009.
	Indian Gulch	55*	0	15	Exceeded. Take issue to 2009 permittee meeting and measure in 2009.
Jim Ball	Pikes Gulch	60*	<5	30*	Exceeded. First offense notification given (see element D5).
Maupin	Maupin Creek	20	0	5	
	Willard Creek	25	<5	5	
Nelson Favorite York	Cottonwood Gulch	25	<5	5	
	Bull Run	30	0	10	
Quartz Rowe	South Fork Quartz	0	0	0	
Ray Creek	North Fork of Deep Creek	10		5	
Tarhead			5	18	
Whites Gulch	Miller Gulch	5		5	
	Whites Gulch	5	<5		

The following table shows the monitoring completed on the bull trout allotments:

2008 Riparian Annual Use Monitoring—Bull Trout Allotments					
Allotment	**Riparian Area/PIBO SITE ID**	**Stubble Height Standard* / Actual**	**% Browse**	**% Streambank Trampling**	**Remarks/ Action Taken**
Alice Creek	Upper	3”/4”	5%	3%	Met standards
	Middle	3”/5”	0%	5%	Met standards
	Lower	3”/10”	5%	0%	Met standards
Blossburg	Dog Creek	6”/7”	0	11%	Met standards
	Mullan**	Not recorded	Not recorded	Not recorded	No cows were in the Uncle George exclosure this year
	Meadow	6”/7”	10%	23%* (Isolated area—remainder 10-15%)	Exceeded.
Canyon Cr/Sandbar	Sandbar	3”/10”	5%	3%	Met standards

2008 Riparian Annual Use Monitoring—Bull Trout Allotments					
Allotment	**Riparian Area/PIBO SITE ID**	**Stubble Height Standard* / Actual**	**% Browse**	**% Streambank Trampling**	**Remarks/ Action Taken**
Clarks Canyon	East Portion	3”/8”	5%	15%	Met standards
Chimney Creek	Chimney	3”/5”	0%	5%	Met standards
	Rossin**	Not recorded	0%	Not recorded	Few cows used the area. Report stated that standards were met
Dog Creek	North Pasture**	Not recorded	Not recorded	Not recorded	Met standards
East Nevada	Nevada	3”/6”	0%	3%	Met standards
	Washington	3”/3”	Not recorded	3%	Met standards
	Jefferson**	Not recorded	5%	20%	Met standards
Hat Creek	Hat Creek	3”/4”	20%	20%	Met standards
	South Pasture	3”/7”	0	7%	Met standards
Horsefly	Black Diamond	3”/11”	5%	3%	Met standards
Keep Cool/ Liverpool	Keep Cool	3”/9”	Not recorded	Not recorded	Met standards
Moose Creek	Moose (rested)		0%		
	Wasson/2274	3”/5”	5%	10%	Met standards
	Wilson	3”/10”	Not recorded	3%	Met standards
Poorman/ Willow Creek	Willow Ck	3”/5”	10%	15%	Met standard
	Sauerkraut**		Not recorded	Not recorded	
Ophir Hope	North Fork Ophir Creek/2149	3”/8”	0%	3%	Met standards
	Lower Spring	3”/4”	10%	21%	Exceeded
Slate Lake	Elliston Creek/2154	6”/6”	10%	50%	Exceeded
	Slate Creek	6”/7”	5%	3%	Met standards
	Hurd Creek/2153		Not recorded	Not recorded	Not monitored in ‘08
Spotted Dog	Spotted Dog Creek/2152	3”/7”	0%	3%	Met standards
Spring Gulch	Upper Reach Spring		Not recorded	19%	Met standards
	Middle Reach Spring	3”/5”	5%	19%	Met standards
Stonewall	Beaver	3”/7”	0%	3%	Met standards
West Nevada	Madison/2278	3”/8”	0%	3%	
	Clear Creek	3”/4”	Not	NA	Met standards

2008 Riparian Annual Use Monitoring—Bull Trout Allotments					
Allotment	**Riparian Area/PIBO SITE ID**	**Stubble Height Standard* / Actual**	**% Browse**	**% Streambank Trampling**	**Remarks/ Action Taken**
			recorded		
	Deer Creek**	Not recorded	Not recorded	Not recorded	

**Forest monitoring, not a PIBO monitoring site

Data Analysis Methods:

Monitoring methods are aimed at determining if effects to fish habitat and other riparian dependent species have occurred. Measurement of forage stubble height can be used as a less costly measure to ensure bank disturbance levels are maintained to a specific standard rather than measuring bank disturbance directly. However, until relationships are better established it is currently assumed that measuring bank disturbance directly is a more accurate means of assessing effects to fisheries than stubble height of forage. Analysis, in regard to effects to fish habitat, is conducted in terms of whether greenline forage stubble height requirements were maintained and bank disturbance requirements were maintained. On allotments where general fishery reviews were completed, analysis is conducted in relation to the degree that streamside forage is maintained and the level of streambank disturbance present.

Livestock utilization , bank alteration, stubble height and woody utilization data were summarized from field observations and surveys.

Preliminary PFC assessments were conducted on 21.0 miles of stream. The data have been summarized and presented here. The intent of the surveys was to provide the Forest Interdisciplinary Team information to review and focus on areas that may need additional data collection.

Monitoring Results:

When all allotments on the Forest are combined, riparian monitoring shows that 87% of the allotments met permitted standards, while 13% did not.

Riparian monitoring conducted on non-bull trout allotments indicated that standards were met on 80% of the allotments, while standards exceeded on one or more stream reaches on 20%, or 4 of the 20 allotments, that were monitored. 26 streams were monitored; 21 met standards; 5 exceeded standards.

On the bull trout allotments, Biological Opinion monitoring conducted in 2008 indicated 83% of the allotments monitored met standards, while standards exceeded on one or more stream reaches on 17%, or 3 of the 18 allotments, that were monitored. Standards that were exceeded on three of the 32 streams in bull trout allotments that were measured.

Preliminary PFC assessments were accomplished on 21.0 acres. The preliminary investigations show that 76% of streams assessed (15.9 miles) are meeting the intent of Forest Plan element C12; 10% of the streams assessed (2.1 miles) are not meeting the intent. It is likely 14% of the streams (3.0 miles) are not meeting the intent of this element as the streams are functioning at risk with no apparent upward trend.

Variability Measure Discussion:

Variability Measure:

Decline in habitat suitability index (HSI) from present as measured by Cowfish Model (90% confidence) or a HSI of less than 0.6 as measured by Cowfish. Since Cowfish is no longer a monitoring tool, this variability measure is no longer pertinent.

As a substitute for Cowfish and HSI, residual forage stubble height is used along the greenline as a measurement tool on bull trout allotments. The stubble height must remain greater than 6 inches on 100% of the bull trout allotments to meet guidance. This requirement is aimed at maintaining adequate streamside shading and minimizing risk for bank disturbance to exceed 20% on sensitive stream channels. Stream bank disturbance levels are to be maintained at or below 20% on specified stream reaches west of the continental divide. Bank disturbance levels are set at this level by the Bull Trout level 1 Team on specified stream reaches to ensure that effects to fish habitat do not become significant.

Paced transects are used for both the stubble height and bank disturbance measurements on selected transects for portions of allotments where livestock grazing has potential to affect bull trout habitat. On other allotments without bull trout issues, assessments as to whether Helena Forest Riparian Guidelines (USDA 1998) are being met are used as a means of assessing whether the Forest-wide riparian standards outlined in the Helena Forest Plan (pgs II-35-36) are being met.

Helena Forest Riparian Guidelines (USDA 1998- in project file) are used as a means of maintaining shading and minimizing bank disturbance for the allotments east of the divide. In 2006, bank disturbance was the primary factor evaluated for the allotments evaluated by fisheries personnel and it was assessed visually in relation to the Helena Forest Riparian Guidelines (1998).

Assessment:

Since Cowfish (Lloyd 1985) is no longer used, the Cowfish HSI variability was not used in 2008. Findings from stubble height monitoring, bank disturbance monitoring, the various biological evaluations conducted during grazing allotment updates, and general fishery reviews on other livestock allotments indicate that fish habitat associated with riparian habitat condition and fish populations continue to be affected negatively to varying degrees on a number of grazing allotments across the Forest. Effects to fish habitat vary from minor to adverse and are documented, for the allotments reviewed, in project file memos, field notes, and correspondence.

In combining results from all allotments on the Forest, riparian monitoring shows that 87% of the allotments met permitted standards, while 13% did not.

Riparian monitoring conducted on non-bull trout allotments indicated that standards were met on 80% of the allotments, while standards exceeded on one or more stream reaches on 20%, or 4 of the 20 allotments, that were monitored. 26 streams were monitored; 21 met standards; 5 exceeded standards.

Findings on the non-bull trout allotments shows that Deep Creek, East-West French, Indian Flats and JimBall allotments exceeded standards in 2008. These exceedences will be discussed with grazing permittees and the Annual Operating Instructions for 2009 used to correct the exceedence.

On the bull trout allotments, Biological Opinion monitoring conducted in 2008 indicated 83% of the allotments monitored met standards, while standards exceeded on one or more stream reaches on 17%, or 3 of the 18 allotments, that were monitored. Forty-seven percent of the bull trout streams that were monitored met standards. Standards that were exceeded on three of the 32 streams in bull trout allotments that were measured.

Findings from the Implementation Grazing Monitoring and general fishery reviews for bull trout west of the continental divide indicates that although stubble height requirements are being met, bank disturbance levels on some stream reaches continue to be exceeded on three grazing allotments (Blossburg, Ophir/Hope, and Slate Lake) with likely adverse effects to fish habitat and fish populations on those allotments.

Preliminary PFC assessments were accomplished on 21.0 acres. The preliminary investigations show that 76% of streams assessed (15.9 miles) are meeting the intent of Forest Plan element C12; 10% of the streams assessed (2.1 miles) are not meeting the intent. It is likely 14% of the streams (3.0 miles) are not meeting the intent of this element as the streams are functioning at risk with no apparent upward trend.

Actions in response to variability assessment:

Recommendations to develop a Forest plan amendment to address effects of livestock were included in earlier fishery monitoring reports. In response the Forest developed riparian guidelines (USDA 1998) to utilize as a means to achieve the Riparian Standards in the Forest Plan. The Forest continues use of the new guidelines under Helena Forest handbook direction as a means to meet the riparian guidelines and Helena Forest Riparian Standards through direction provided to allotment permittees via grazing allotment annual operating plans and as an inherent component of new allotment management plans. If the Helena Forest Riparian Guidelines were to be implemented effectively, negative effects to riparian areas from livestock would be minimal and there would be little need for any amendment to the Forest Plan.

Specific action should be taken on the allotments identified above that exceeded standards in 2008. Allotments that were close to standards should continue to be monitored frequently to ensure compliance.

There is a need to move livestock out of pastures in a timely fashion so that the bank disturbance portion of the Helena Forest (1998) Riparian Guidelines is not exceeded on stream reaches highly susceptible to being damaged by livestock grazing. To ensure livestock are moved prior to bank disturbance levels being exceeded, additional review of riparian habitats is needed on many allotments.

Based on current information , the allotments most important to review from a fishery aspect and possible effects on bull or westslope cutthroat trout include Blossburg, Spring Gulch, Ophir/Hope, Clark Canyon, and Grassy Mountain allotments. Permittees need to be notified well in advance of any exceedance in bank disturbance levels so that they can move livestock in a timely fashion so that bank disturbance levels are not exceeded.

Recommended Efforts:

Areas that have adequate preliminary PFC information are appropriate for IDT review and line officer action, if appropriate. Where appropriate, standards from the Riparian Guidelines should be established and monitored.

To aid in applying the riparian quidelines and identify riparian conditions in grazed areas, the Forest should develop and implement a Riparian Inventory and Monitoring Strategy.

The collection of preliminary PFC information should be collected on all allotments, prioritizing those allotments that have exceeded standards in the past as well as those scheduled for allotment management plan updates.

Specific efforts to further reduce bank trampling should be undertaken on portions of Dog Creek (Blossburg Allotment, Spring Gulch (Spring Gulch Allotment), Hope Creek and Spring Gulch (Ophir/Hope Allotment), Skelly Gulch (Drumlummon Allotment), Clark Canyon Creek (Clark Canyon Allotment), , and portions of Hay Creek and selected tributaries (Grassy Mountain and Deep Creek Allotments). For the Fork of Duck Creek (Gurnett Allotment) continued exclusion of livestock is recommended for the reach critical to westslope cutthroat trout egg survival. Based on efforts in other locations of the forest, riparian fencing has proven to be very effective in reducing bank disturbance on the sites highly susceptible to being damaged by livestock and could be effectively used to protect stream reaches mentioned above.

The following efforts should continue: Bull Trout Level 1 monitoring requirements on livestock allotments having formal consultation, riparian condition surveys using the Proper Functioning Condition Concept, evaluation of fish habitats and populations through biological evaluations, biological assessments, general fishery reviews, and continued range utilization studies (Forest Plan Monitoring D-elements). From a fisheries perspective, continuation of monitoring to determine bank disturbance levels on the Blossburg, Spring Gulch, Ophir/Hope, and Hat Creek Allotments is an important element to continue as part of meeting the terms and conditions in the biological opinion from the Fish and Wildlife Service.

For streams east of the continental divide on the Helena National Forest, in the Upper Missouri, Boulder, Smith, and Dearborn 4th code hydrologic units, it would be useful to establish watershed baseline conditions using the same established protocol within each sixth code hydrologic unit as has been done for streams west of the continental divide. These baselines provide a comprehensive and standardized documentation of existing habitat conditions based on all past and ongoing activities and are very helpful in conducting cumulative effects analyses.

(C12) Streamside Cover for Fish

Riparian Landbird Assessment – Songbird Habitat – Wildlife Portion

Forest Plan Requirements:

To assure management activities do not degrade the habitat of riparian dependent species, monitoring is conducted to assess streamside cover for fish, forage utilization, streambank trampling, plant and animal communities.. Project EA's, habitat transect sampling, allotment inspections, utilization studies, inspection of canopy and understory vegetation, watershed inventory and monitoring plans, and timber sale contracts are to be used as data sources. Annual inspections after livestock are removed and five transects per section are to be used to detect declines in habitat suitability.

Intent

The intent of the requirement is to assure management activities do not degrade the habitat of riparian dependent species: 1. Shading for streams; 2. Fish habitat; 3. Song bird habitat; 4. Forage and browse; and 5. Diversity.

Data Sources

Specific data sources recommended in the Forest Plan for this element include: Project EA's, habitat sampling by transects; allotment inspections; utilization studies; inspection of canopy and understory re-vegetation; watershed inventory and monitoring plan; timber sale contracts; information from 25, 1000 foot sections. Additional data for this monitoring element have been compiled from the following sources: Landbird detections and habitat relationships on file at the Supervisor's Office.

Current Efforts and Findings

We conducted riparian bird point count surveys in order to establish relationships between riparian area conditions and bird species abundance and diversity in order to address Forest Plan Monitoring Item C-12 (USDA 1986, p. IV/9). Specifically, the purpose for the project is to collect data that allows managers to determine if management activities are degrading the habitat or riparian dependent species including songbird habitat.

Documentation and monitoring methodology

The monitoring methodology is based on the *Northern Region Landbird Monitoring Point Count Protocol* (2007) and the general *Field Methods Protocol* (2004) which are located at the following website and on file at the Supervisor's Office:

http://avianscience.dbs.umt.edu/documents/projects/habitat_relationship/ptct_protocol_2007.pdf
http://avianscience.dbs.umt.edu/documents/projects/habitat_relationship/2004_LBMP_methods_000.pdf

Monitoring Activity and Data Analysis Methods

Landbird observations were collected in 2008 as part of a broader effort aimed at characterizing riparian conditions across the Forest. These data were collected according to the Northern Region Landbird Monitoring Program Field Methods referenced under *Documentation and monitoring methodology.* Fifty points were surveyed across the Forest (Figure 1). Species, abundance, and vegetation cover type data were collected among other variables. The total number of species detected by cover type was analyzed in order to detect any habitat relationships.

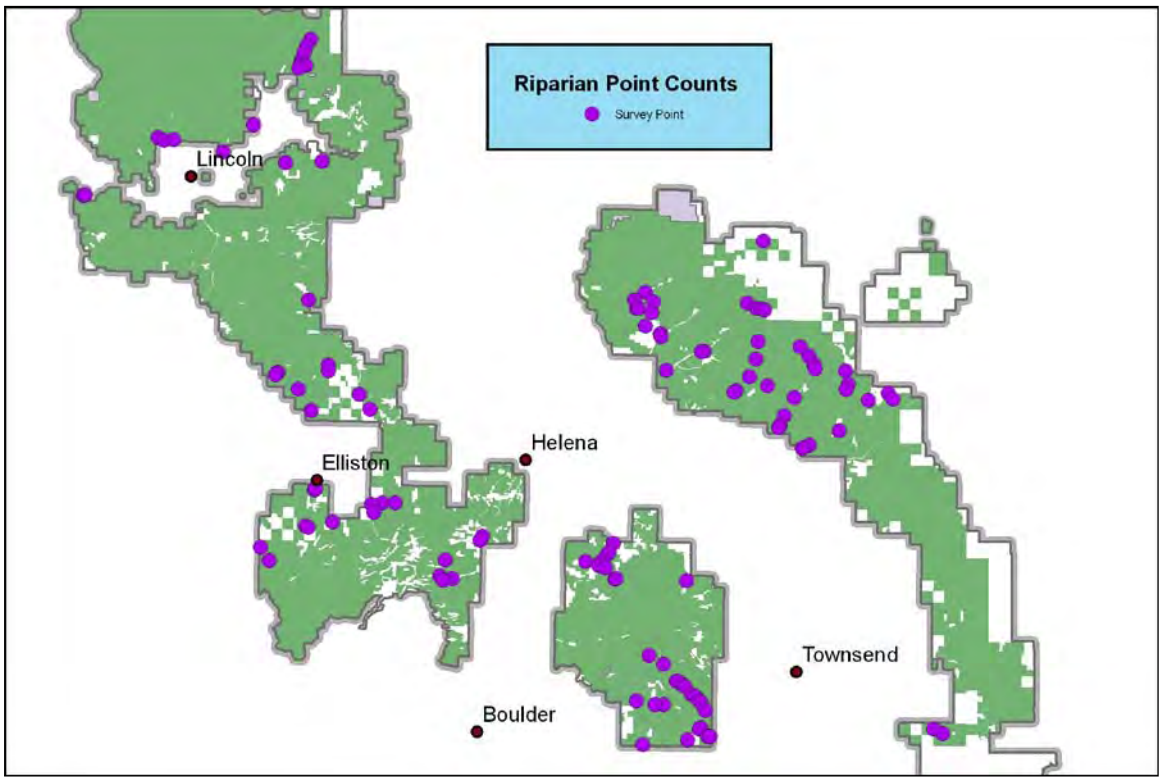


Figure 1

Monitoring Results

Figure 2 illustrates the number of different species detected by cover type[20].

[20] See Cover Type descriptions below.

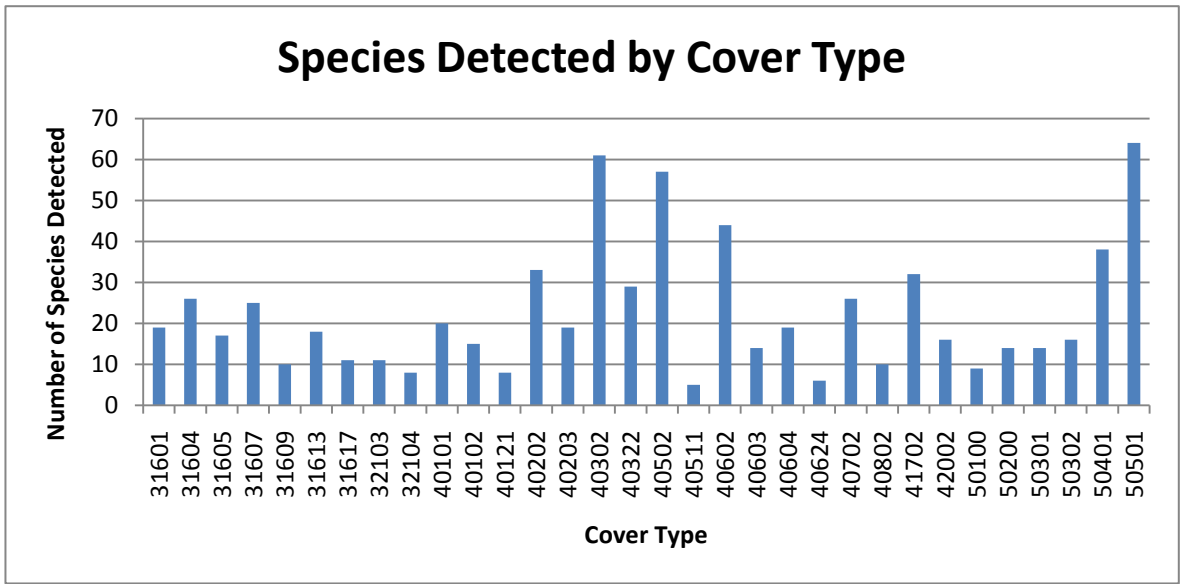


Figure 2

Variability Discussion

Variability Measure

Decline in habitat suitability index (HIS) from present as measured by Cowfish Model (90% confidence) or a HIS of less than 0.6 as measured by Cowfish. Since Cowfish is no longer a monitoring tool, this variability measure is no longer pertinent.

As a substitute for Cowfish and HSI, residual forage stubble height and streambank disturbance is being utilized as a variability measure by other resource areas (i.e. range and fish). The wildlife portion of this element will rely on that assessment for the 2008 analysis.

Assessment

Data indicate that a majority of the bird species were detected in the streamside riparian cover type (50501). Several bird species were also detected in the Douglas-fir, mature cover type (40302) and the mature, mixed conifer cover type (40502). There did not appear to be any distinction in the number of bird species detected in 'ungrazed' cover types versus 'grazed' cover types. This may be due to the fact that a majority of the allotments across the Forest met standards as discussed in the fish/range section of C12. Those data indicate that 87% of the allotments met permitted standards, while 13% did not.

More than 100 different bird species were detected for all points combined. The distribution of species by cover type demonstrates that a variety of cover types are important to ensure species diversity Forestwide.

Actions in response to variability assessment

At this time there are no actions needed since these data will serve as baseline for outyear comparisons.

Recommended Efforts

We recommend that we continue monitoring avifauna in riparian habitats to develop baseline data associated with Forest-wide streams and that areas are periodically remeasured to ensure that the diversity of bird species does not decline. We also recommend that these data are compared with the vegetation data that were collected at each of these points as part of a separate effort. Those data are more in depth and comprehensive and may allow for a more refined analysis of the relationship between birds detected and vegetative structure.

Cover Types

31601 – Grassland, unidentified dominant species, low structured, ungrazed
31604 – Grassland, unidentified dominant species, medium structured, ungrazed
31605 – Grassland, unidentified dominant species, medium structured, ungrazed
31607 - Grassland, unidentified dominant species, low structured, ungrazed
31613 – Grassland, unidentified dominant species, medium structured, grazed
31617 – Grassland, unidentified dominant species, low structured, grazed
32103 – Sagebrush, low sagebrush dominant, medium structured, ungrazed
32104 – Sagebrush, low sagebrush dominant, medium structured, ungrazed
40101 – Juniper woodland, old growth
40102 – Juniper woodland, mature
40121 – Juniper woodland, post-fire
40202 – Ponderosa pine, mature
40203 – Ponderosa pine, young
40302 – Douglas-fir, mature
40322 – Douglas-fir, post-fire
40502 – Mixed conifer, mature
40602 – Lodgepole pine, mature
40603 – Lodgepole pine, young
40604 – Lodgepole pine, thinned
40624 – Lodgepole pine, post-fire
40702 – Spruce, mature
42002 – Mixed conifer, mature
50100 - Marsh
50200 – Sedgeland, wet meadow, bog
50301 – Willow flats, no visible browse line
50302 – Willow flats, grazed by cattle
50401 – Cottonwood bottomland, no visible browse line
50501 – Streamside riparian, no visible browse line

(C13) Aquatic Invertebrate Populations

Forest Plan Requirements:

Aquatic invertebrate populations are to be evaluated by collecting samples across the forest on the same reaches where sediment sampling (Element C11) is conducted.

Intent:

The intent of this requirement is to assure that no impact is occurring to fish populations by using aquatic invertebrates as a surrogate measure for impacts to fish.

Monitoring Activity:

Single samples collected from a number of streams.

Data Analysis Methods:

Data is to be analyzed using the Biotic Condition Index or BCI (Winget and Mangum 1979 page 23). However, for 2006 an abbreviated method entailing calculation of a Diversity Index Value and Pollution Tolerance Index Value was used (see project file information for details on calculation of the Diversity Index Value and the Pollution Tolerance Index Value).

Monitoring Results:

Please see YFMP monitoring

Variability Measure Discussion:

Variability Measure:

Currently stated as annual decrease from present in Biotic Condition Index (90% confidence).

Assessment:

There is continued emphasis to utilize aquatic invertebrates by various federal and state agencies as well as universities as a means to assess effects to fish from a variety of factors. Aquatic invertebrate monitoring is certainly a tool that can be very useful for detecting effects to fisheries in certain circumstances (U.S. Environmental Protection Agency 1991, pgs 147-151). Examples include situations when there is likely risk of nutrient enrichment or influx of mine effluent into streams. Utility for detecting effects to fish due to sediment increases is low relative to cost; especially when the amounts of sediment delivered are likely to be relatively low (e-mail correspondence D. Perkinson 6/3//93, P.Cross 6/3/93, B Riggers, 6/3/93, B. Sanborn 6/3/93, B. May 6/3/93, 6/4/93, and email from L Walch 6/3/93 documenting conversation with Bob Bukantis from the Montana Water Quality Bureau). The low utility is due to high variability in sediment levels throughout streams on the forest (see discussion for element C-11 earlier) and variability in the invertebrate populations that is known to generally occur throughout the summer period. Statistical differences in the Biotic Condition Index are likely to be detected at the 90% confidence level as a function of sediment changes only when there are large changes in sediment levels. Use of the broader pollution tolerance index and diversity index values are even less likely to be able to detect subtle changes in aquatic invertebrates associated with minor changes in sediment delivery. In the scenario where sediment increases are likely to be low, but pervasive over time, it may be more cost effective to monitor sediment directly.

Actions in response to variability assessment:

No action needed as yet to calculated findings are not projected adequate to state whether change has occurred or not. See recommended efforts below for discussion in relation to aspects in the assessment section above.

Recommended Efforts:

Aquatic invertebrate population data are of limited utility for determining effects to fish from sediment related effects, except when sediment levels have increased greatly such as when intense rain events follow wildfire events or in low gradient streams where sediment has increased greatly from a management activity such as livestock grazing. Data is expensive to collect and analyze, and data analysis is unlikely to detect changes on projects where minor changes in sediment delivery occur. The probable inability to detect change is due to the variation in both the invertebrate populations year to year and even within a season as well as the variations in sediment levels that occur naturally in both managed and unmanaged watersheds. Aquatic invertebrate monitoring is useful in other instances where substantial changes in water quality (even when the change might be of short duration) are possible; including chemical pollution of some kind such as from mine effluent or nutrient enrichment or a drastic change in sediment levels due to habitat degradation.

Maintain this element as a monitoring tool for assessing the effects for new activities that have substantial potential to affect water chemistry through chemical pollution such as mine waste or nutrient enrichment. Using aquatic macro invertebrates is likely a useful tool to use to monitor for effects to fish on various livestock grazing allotments, but due to high cost it is likely more effective to assess effects of livestock grazing to fisheries through evaluation of grazing on streamside vegetation and streambank disturbance levels (see element C-12 above). The less intense monitoring of aquatic macroinvertebrates

currently conducted by the Helena Forest Youth Monitoring Group is a useful to continue as the findings are of some value for establishing a very broad baseline condition of aquatic invertebrates present in selected streams. Broad level baseline information is useful in describing biologic resources present in streams prior to conducting forest management activities.

Importantly, the forest plan requirement for the C-13 element should be restated such that it would require sampling in situations where either chemical changes from mine waste or nutrient enrichment are possible; not tied to sediment sampling sites associated with Monitoring Element C-11. Further, the variability factor that would stimulate action as currently cited in the Forest Plan C13 Monitoring Element should be restated to address site-specific conditions rather than inferring changes on a Forest wide basis. The changes could be done via an amendment or when forest plan revision occurs.

(D) RANGE/TIMBER, RANGE, RANGE/ROAD MAINTENANCE/TIMBER

(D1.1) Utilization of Forage in Transitory Range

Forest Plan Requirements:

Monitor utilization of forage in transitory range

Intent:

Determine correlation between level of forage utilization and mechanical damage to seedlings.

Data Sources:

Range inspections, forage utilization exams, regeneration surveys, FSVEG database information, and 22 transects.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Regeneration surveys are conducted according to FSM Sivicultural Practices 2409.17.

Monitoring Activity:

The Deep Creek, Grassy Mountain and Magpie allotments have had harvest from the Toston/Maudlow Fire Salvage, Cave Gulch Salvage within the last five years. Regeneration surveys have been conducted annually following harvest. The Snow Talon Fire Salvage did not occur within any grazing lands.

The following timber sales were monitored in the past five years on the Forest:

Allotment	Sale Area	Survey Year	Damage noted
Deep Creek Grassy Mtn.	Toston/Maudlow Fire Salvage	2002-2008 ongoing	None Reported
Magpie	Cave Gulch Fire Salvage	2002-2008 ongoing	None Reported
No allotments	Snow Talon Fire Salvage	2004-2008	None Reported

Data Analysis Methods:

The surveys are observational data. The data are summarized in the FACTS database.

Monitoring Results:

FACTS reports based on the regeneration surveys indicate that no damage caused by livestock occurred to seedlings for the past five years.

Variability Measure Discussion:

Variability Measure:

95% +/- correlation between the level of utilization and plantation failure.

Assessment:

Survey data indicate that no plantation failure occurred due to livestock damage. This element is within the variability identified in the Forest Plan.

Actions in response to variability assessment:

No action is needed.

Recommended Efforts:

Continue to monitor this element. It is important to understand what impact, if any, livestock are having on plantations.

(D1.2) Available Forage Utilized by Livestock

Forest Plan Requirements:

Monitor percent of available forage utilized by livestock

Intent:

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

Background

All active allotments across the forest are categorized and prioritized using A, B or C ranking system. The category an allotment is assigned to can change from year to year based on permittee compliance, allotment management plan (AMP) implementation or other factors such as unauthorized use. The designation is agreed to by the administering range specialist and line officer prior to the start of the grazing season. If ability to monitor all allotments is limited by workforce or workload capacity, field work is prioritized according to rank.

A allotments are generally allotments that are continually in non-compliance, have T&E species that require a higher level of monitoring, are in AMP implementation or have continual unauthorized use. A minimum mandatory documentation with a compliance form is required.

B allotments are generally allotments that have been in non-compliance in the past but have changed management and are meeting standards or allotments that are borderline with compliance issues. These will be administered to standard when A allotments have been taken care of. Allotment inspections will be documented in annual allotment diaries and may be summarized on a compliance form.

C allotments are generally allotments that have been in compliance, not stocked with livestock or don't have any major resource concerns, such as T&E species. These are generally not inspected unless all work is done on the A and B allotments.

Forage Utilization StandardsAllowable forage utilization by authorized livestock is based on one of three standards. The standards are tied to the year the allotment management plan was last updated, although utilization standards may always be modified in annual operating plans. Utilization standards are

summarized below and described here as based on either Forest Plan (fp), Range Anaylsis Handbook (hb) or Vegetation Stage (s).

FP: The Forest Plan identified utilization standards for riparian areas. These are listed in several of the permits that do not have current Allotment Management Plans and are used for upland monitoring as well as riparian. The early pasture is the pasture(s) used first and/or until approximately August 1. The late pasture is the pasture(s) used after this date.

- Continuous grazing system: early pasture 40% and late pasture 20%
- Deferred rotation system: early pasture 50% and late pasture 35%
- Rest rotation system: early pasture 60% and late pasture 40%

HB: The guides for allowable utilization of key species, by condition classes, are in the Range Analysis Handbook (R-1 FSH 2209.21 4/77 AMEND 21, pg. 633-1). The condition is assumed to be good and the type to be dry range.

- Continuous grazing system: 40 – 50%
- Deferred rotation system: early pasture 55% and late pasture 35%
- Rest rotation system: early pasture 65% and late pasture 40%

S: Allotment management plans that have been updated more recently have the following, more specific utilization standards by vegetation stage (formerly known as stage stand).

Vegetation Stage Allowable Utilization Levels, Upland Utilization

Herbaceous	Timing of Use (deferred)		Timing of Use (rest)			Timing of Use (continuous)
Vegetation	**Early**	**Mid**	**Early**	**Mid**	**Late**	**Yearlong**
Stage 1	50%	45%	60%	50%	40%	45%
Stage 2	45%	35%	50%	40%	30%	35%
Stage 3	35%	25%	35%	30%	25%	20%
Stage 4	0-5%	0-5%	0-5%	0-5%	0-5%	0-5%

Data Sources:

Range inspection records, utilization studies, range analysis.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Mapping Methodology

The Region One rangeland data collection system from the mid-80's through the early 90's was collectively called ECODATA. Cover/frequency, line intercept and plant composition protocols were used throughout the Forest during that time. ECODATA was replaced by the NRIS national database TERRA protocols which are very similar to ECODATA protocols. ECODATA legacy data has been "rolled over" into the TERRA system. The plot data were used to create the stand stage descriptions which are found in the project file. Stage 1 most closely resembles lightly grazed grasslands for a given habitat, while stage 4 is least like a lightly grazed grassland. The letter "I" signifies that a large amount of introduced grasses are present. Indicator plant species (plants such as rough fescue or Idaho fescue) and bare soil are key

indicators of stand stage. This is an ocular mapping method, and a form is filled out for the polygon that is being mapped.

Utilization Methodology

According to the Range Analysis Handbook (R-1 FSH 2209.21 4/77 AMEND 21, pg. 421-424-1) utilization can be monitored by ocular estimates, grazed plant, grazed loop methods and clipped-weight methods. The method used to determine utilization for 2008 were ocular estimate by percent, paced transects and measured.

Ocular –

The ocular estimate requires conscientious training and application. It is based on estimating the percent of use on a small sample plot. For training, clip a hoop to simulate grazing and retain clippings. Estimate percent removal and clip remainder of plot. Weigh both lots of herbage, determine percent removal and compare against estimates. Varying degrees of utilization can be recognized by a series of estimates and checks. Two paced transects should be located in one habitat type or site. Ten hoop plots at 1-chain intervals (can be shorter in smaller areas) per transects by pacing. Estimate percent removal per plot and record on form.

Paced –

Paced transects do not require much training. It is based on the relationship between the percent of the plants grazed and the percent used. This is a good method for bunchgrass ranges. This method is used on representative areas, with a 50 plant interval. Tally grazed and ungrazed plants at predetermined intervals along a transect. The length of the transect determines the intervals. To determine the percent, it is compared with various charts with specific bunchgrass species. This chart also helps determine the percent weight utilization.

Measured –

The Helena National Forest adopted the Monitoring for Success book in conjunction with the Range Analysis Handbook for measuring utilization and actual stubble height. Paced transects are used to measure both utilization and stubble height. For utilization, a maximum of a 50 pace transect is determined in a representative area of bunchgrasses. Percent of the plant that has been grazed is compared with diagrams of how bunchgrasses are typically grazed and the percent is recorded on a form. Once 50 paces are completed, the columns with the percent are added up and divided by the number of paces completed. This determines the total utilization of bunchgrasses in an area. This method can be isolated to specific bunchgrasses to help determine how livestock are grazing specific species. Stubble height is similar but is usually used on sod forming grass species. This method determines the amount of stubble left on site. This method is useful in riparian areas where a certain stubble height is necessary to meet riparian objectives for other dependent species.

Monitoring Activity:

Measurement of forage utilization on active grazing allotments in 2008 is summarized here. Specific monitoring activity, measurements and results by individual allotment are in the project file.

In 2008, 55 allotments, 71% of active allotments, were monitored and documented.

- Allotments measured of the 77 total active allotments
    - A allotments – 20 or 100% of A allotments
    - B allotments – 25 or 78% of B allotments
    - C allotments – 10 or 40% of C allotments

Data Analysis Methods:

Measurements were taken in the field using one of the methodologies described above. The results were then compiled by allotment. Annual overall utilization was determined by taking the end of grazing season utilization measurement in each pasture monitored and dividing it by the number of monitoring measurement. The average percent utilization was then calculated for the allotments measured annually and again of allotments measured during the last three year period.

An allotment was identified as exceeding standard based on the standard listed in the current annual operating plan for that allotment. Unless otherwise noted in an annual plan, an assumption was made that vegetation was in good to fair condition. The standards for continuous grazing are assumed to be early use in all allotments unless otherwise noted above. All continuous use allotments have an early turn on date and are grazed until the end of the season or allowable use is met. The annual operating plans can be found in the project file.

Monitoring Results:

Allotment Name	Rank	System	% Util. Early	% Util Late	% Util mid/ late	Average Util (%)	Year(s) Exceeded	Remarks / Action Taken
Spring Gulch (fp standard)	A	Cont.	65	60		63	08,06,04	exceeded, take issue to 2009 permittee mtg, measure in 09
Slate Lake (fp standard)	A	Defer. Rotate	60		30	45	08,04	exceeded, take issue to 2009 permittee mtg, measure in 09
Dog Creek (fp standard)	B	Defer. Rotate			70	70	08,04	exceeded, take issue to 2009 permittee mtg, measure in 09
Spotted Dog (fp standard)	B	Defer. Rotate	70		30	50	2008	exceeded, take issue to 2009 permittee mtg, measure in 09
East West French (s standard)	B	Defer. Rotate				55	2008	average utilization within standard in AMP but annual plan did not reflect. update 09 annual plan or amp.
Quartz Rowe (s standard)	B	Defer. Rotate			50	50	2008	exceeded, take issue to 2009 permittee mtg, measure in 09

- Allotments monitored of the 77 total – 55 or 71%
    - A allotments – 20 or 100% of 20 A allotments
    - B allotments – 25 or 78% of 32 B allotments
    - C allotments – 10 or 40% of 25 C allotments
- Average utilization over all allotments monitored this year – 34%
- Average utilization for the last three years over all allotments monitored those years – 34 %
- Allotments which have been monitored at least once in the last three years – 65 or 84%
- Number of allotments which have been monitored three years in the last five – 38 or 49%
- Average number of years an allotment is monitored – 3
- Allotments exceeding utilization standards in 2008 – 6 or 11% of allotments measured

    - A allotments – 2 or 10% (Slate Lake, Spring Gulch)
    - B allotments – 4 or 16% (Spotted Dog, Dog Creek, Quartz Creek, East West French)
- Allotments out of compliance three consecutive years – 0
- Allotments out of compliance three years within the last five – 2 or 2%
    - Spring Gulch and Gould allotments

Variability Measure Discussion:

Variability Measure:

+/- 10% variance from present over a sustained (3 yr) period.

Assessment:

Average utilization for the last three year period over all of the allotments monitored in those years:

- present – 34 % (71% of all allotments measured)
- 2008 – 34 % (85% of all allotments measured)
- 2007 – 33 % (74% of all allotments measured)
- 2006 – 35 % (63% of all allotments measured)

There is no variance from present over a sustained three year period (2006-2008). This element is within variability for 2008.

Actions in response to variability assessment:

No actions are necessary as the element is being monitored and is within the variability measure.

Recommended Efforts:

The variability measure for this element is difficult to interpret in a meaningful way. It appears that the comparison occurs between the current year's use and an average of the past three years. The intent of this element is clear; to measure forage utilization by livestock. A more meaningful variability assessment for this element would be to have an annual variability measure and a five year variability measure.

For the annual measure, we will be within variability if the following is true for the total of that years active grazing allotments:

- A allotments – 100% of allotments measured, 80% within standard
- B allotments – 80% of allotments measured, 80% within standard
- C allotments – 50% of allotments measured, 100% within standard

The allotment ranking would continue to be determined annually (prior to the grazing season) by the administering range specialist and line officer. The standards assessed would be those listed in the current annual operating plan, and the end of grazing measurements (by pasture or by season) would be used to assess whether or not measurements are within standard. Over a three year period, all B and C allotments are measured at least once.

For the five year measure, allotments that are out of compliance, i.e. exceed stated forage utilization standard, three out of the last five are outside the variability of this element. At least 80% of measured allotments would need to meet standards during the five year period to meet the variability.

The recommendation for any allotment outside the variability will be that an action will be taken to assess the allotment and determine what action is needed to bring the forage utilization into compliance with the appropriate standard.

(D2) Allotment Management Planning and Update

Forest Plan Requirements:

Monitor allotment management planning and update.

Intent:

Insure allotment management plan updates occur at 15 year intervals, that plan is being adhered to, management objectives are being met and improvements are maintained. This is a five year average assessment.

Data Sources:

FSRAMIS (range inspection reports). This database has been replaced by the INFRA database. Environmental documents, specialist reports and allotment inspections have been used in assessing this element.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

This element is an assessment of the number of allotment management plants updated, averaged over a five year period. The past ten years of allotment planning are shown for context. If there is not an entry for a particular year, there was no allotment planning completed that year.

Monitoring Activity:

Allotment management plan updates for the past ten years (1999-2008) were counted to assess this element.

District	Allotment Name	NEPA Decision Date
1	Avalanche	28-Jan-00
1	Magpie	28-Jan-00
1	Whites Gulch	28-Jan-00
1	Tick Gulch	28-Jan-00
Total number of allotments updated in 2000: 4 allotments		
2	Austin	27-Sep-06 (withdrawn 2007)
1	Baldy	16-Feb-06
2	Big Buffalo	23-Jan-06
2	Empire	27-Sep-06 (withdrawn 2007)
2	Frohner	23-Jan-06
4	Gould Creek	26-Sep-06
2	Little Buffalo	23-Jan-06
2	Macdonald Pass	27-Sep-06 (withdrawn 2007)
2	Quartz Creek Rowe Gulch	23-Jan-06

District	Allotment Name	NEPA Decision Date
1	East Weston – Closed	14-Jul-06
1	Weston Spring – Closed	14-Jul-06
Total number of allotments updated in 2006: 6 allotments (Three withdrawn decisions not counted in total. Also, the two allotments closed are not counted in total, see rationale below.)		
1	North Fork	27-Sep-07
1	Six Mile	27-Sep-07
4	East Nevada	12-Sep-07
4	West Nevada	12-Sep-07
4	E Shingle Mill	28-Nov-06
Total number of allotments updated in 2007: 5 allotments		
4	Barlot-Rogers - Closed	10-Sep-08
4	Cadotte – Closed	10-Sep-08
4	South Fork Dearborn - Closed	10-Sep-08
2	Mount Helena – Closed	10-Sep-08
2	Telegraph - Closed	10-Sep-08
2	Cochran – Vacant (grass bank)	10-Sep-08
2	Jimtown – Vacant (grass bank)	10-Sep-08
1	Birch Creek - Closed	10-Sep-08
1	Duck Creek - Closed	10-Sep-08
1	North Baldy - Closed	10-Sep-08
1	Bear Cabin - Vacant	10-Sep-08
2	Austin	30-Sep-08
2	Empire	30-Sep-08
2	Macdonald Pass	30-Sep-08
Total number of allotments updated in 2008: 3 (The 11 allotments closed or vacant are not counted in total, see rationale below.)		

Data Analysis Methods:

These are observational data which have been summarized.

Monitoring Results:

Thirteen allotments were administratively closed or left vacant with no preferred applicant in the analysis period. These 13 are displayed in the table above; however, those are not counted as “updated” allotment management plans since livestock grazing is no longer a management objective or the land status is now private. Also, three decisions previously signed in 2006 were withdrawn in 2007. Another analysis was completed with a decision on these same allotments in 2008. So, over the past five year period (2004 – 2008) 14 allotment management plans were updated. A total of 20 allotments have been updated in the past ten year period (1999-2008).

Variability Measure Discussion:

Variability Measure:

If less than four plans are updated annually (total averaged over a five year period), then planned objectives are not being met.

Assessment:

An average of three allotment management plans were updated from 2004 through 2008. An average of two allotments have been updated annually over a ten year period. This variability measure is not being met.

Actions in response to variability assessment:

The Forest needs to increase the number of allotment management plans that are being updated annually to meet the requirements of this element. Four allotments are planned for 2009; completing these would result in the variability measure being met (four plans total, as averaged over the five year period).

Recommended Efforts:

Place emphasis on the environmental analysis required to complete allotment plan updates. Continue to monitor updated allotment management plan implementation. Conduct utilization studies and monitoring as required in the environmental documents. Ensure all future plan revisions include the principles of adaptive management so that issues can be addressed in a more timely fashion.

If the previous recommendation is not adopted, the forest should pursue a schedule to make needed updates to allotment management practices using administrative actions.

(D3) Weed Infestations

Forest Plan Requirements:

Monitor weed infestations.

Intent:

Monitor weed infestations, effectiveness of control measures activities responsible, implementation of IPM techniques.

Data Sources:

Sources include Allotment inspection records, reforestation exams, range analysis, mining projects, INFRA data base, CE projects, KV plans, and the Weed EIS.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Ocular estimates and previous year's data records are utilized in evaluating treatment effectiveness to plan and assess future treatment priorities (roads, campgrounds, trailheads).

A combination of ocular, photo points, population counts (sweeps), and nested rooted frequency (stem counts, canopy cover, and stem density) are utilized to monitor biological populations and effectiveness.

Research plots are designed to determine effectiveness of the treatments, or rate of invasive species spread by measuring percent cover, density and rooted frequency.

Risk analysis and modeling was conducted to provide data for the development of the Weed EIS and be utilized as a management tool for noxious weeds. This information is located in the Weed EIS project file and the weed monitoring files present at each district.

Monitoring Activities:

Monitoring / Mapping

Monitoring is considered a target accomplishment assigned by the Region and requires monitoring of 50% of the previous year's treated acres. The design of monitoring depends upon the level of funding. Monitoring information provides an overview of treatment effectiveness and provides insight for adaptive management.

Twenty-seven biological release sites and 3,627 herbicide acres were monitored in FY 08. Two water sampling sites were also selected adjacent to aerial spray units. Polar Organic Chemical Integrative Samplers were utilized to sample streams adjacent to spray units with the objective of estimating the exposure of aquatic organisms to the applied herbicides.

Monitoring objectives of biological control release are to:

- determine if the insects have become established at the release site;
- measure the general size of the bio-control agent population at one or two points in time;
- assess the spread of these insects away from the immediate release site;
- quantify the population of the target weed species at each release site to permit describing change over time;
- note site characteristics at each location to eventually permit correlating these characteristics with success or failure of insect population establishment; and
- establish permanent photo points at each release site to display changes in plant populations over time.

Table 1 – FY 08 Biological Monitoring

Site	Bio Agent	Target Species	Photo Points	Stem Counts	Ocular Assessments	Net Sweep
Coxey Gulch	Mecinus janthinus	DT	Yes		Yes	Reduction on plant size, vigor, and stems/acre
Hunters Gulch	Mecinus janthinus	DT	Yes	Yes	Yes	Establishment
Vermont Gulch	Urophora cardui	CT	Yes		Yes	Establishment/Increase populations
Vermont Gulch	Trichosirocalus horridus	MT	Yes		Yes	Establishment/Increase populations
Atlanta Creek	Apthona nigriscutus	LS	Yes		Yes	Establishment/Increase populations

Site	Bio Agent	Target Species	Photo Points	Stem Counts	Ocular Assessments	Net Sweep
Ohio Gulch	Cyphocleonus achates	SK			Yes	Establishment/Increase populations
Kentucky Gulch	Cyphocleonus achates	SK			Yes	Establishment/Increase populations
Grassy Mtn. Rd.	Ceutorhynchus hadroplantus	CT	Yes		Yes	Establishment/Increase populations
Hamilton Place	Apthona nigriscutus	LS	Yes		Yes	Feeding damage evident, Redistribution is ongoing
Grizzly Gulch	Apthona nigriscutus	LS	Yes		Yes	Feeding damage evident, Redistribution is ongoing
Walker Gulch	Apthona nigriscutus/flava	LS	Yes		Yes	Feeding damage evident, Redistribution is ongoing
Horse Pasture	Apthona nigriscutus/flava	LS	Yes		Yes	Feeding damage evident, Redistribution is ongoing
Horse Gulch	Apthona nigriscutus/flava	LS	Yes		Yes	Feeding damage evident, Redistribution is ongoing

The following steps are undertaken when evaluating biological release sites:

- determine if the insects have become established at the release site;
- measure the general size of the bio-control agent population at one or two points in time;
- assess the spread of these insects away from the immediate release site;
- quantify the population of the target weed species at each release site to permit describing change over time;
- note site characteristics at each location to eventually permit correlating these characteristics with success or failure of insect population establishment; and
- establish permanent photo points at each release site to display changes in plant populations over time.

Herbicide Effectiveness Monitoring

A total of 3,627 acres were monitored in 2008. On the Townsend district 194 acres were monitored, displaying upwards of 90% control on spotted knapweed, while other weed species such as toadflax and spurge displayed lower rates in the 80 percent control. The Helena district monitored 1,543 acres with spring efficacy of treatments revealing upper 70's to low 80's, while fall efficacy of treatments show higher levels of control (90's) on all target species. The Lincoln district monitored 1890 acres with excellent control (high 90 percent) on spotted knapweed. Much of the monitoring on the Lincoln district is associated with the aerial units treated in Moose Creek, Wasson and Wilson Creeks and in the Poorman drainage.

Table 2, below, displays the effectiveness of various herbicide treatments on the target species. Effectiveness monitoring provides significant information for future strategies and planning efforts.

Table 2 – FY 08 Herbicide Coverage, Effectiveness and Non-Target species Monitoring

Site	Target Species	Method/Observations
Trapper Mtn.	Knapweed, thistles, hounds-tongue	Seven aerial sites were monitored for coverage, efficacy and non target mortality of treatments with Picloram and Clopyralid. Coverage was extremely accurate and post effectiveness monitoring of an early July aerial contract indicates treatment is affecting target species in the 90% range, while non-target species display no immediate effects. Buffers were placed around live water and seeps at the time of application
Moose & Wasson Creek.	Knapweed, thistles, hounds-tongue	Nine aerial sites were monitored for coverage, efficacy and non-target mortality of treatments with Picloram and Clopyralid. Coverage was extremely accurate and post effectiveness monitoring of an early July aerial contract indicates treatment is affecting target species in the 90% range, while non-target species display no immediate effects. Buffers were placed around live water and seeps at the time of application
Deer Creek	Knapweed, thistles, hounds-tongue	Five aerial sites were monitored for coverage, efficacy and non-target mortality of treatments with Picloram and Clopyralid. Coverage was extremely accurate and post effectiveness monitoring of an early July aerial contract indicates treatment is affecting target species in the 90% range, while non-target species display no immediate effects. Buffers were placed around live water and seeps at the time of application
Poorman Creek	Knapweed, toadflax, St. Johnswort, thistles, hounds-tongue	Eight aerial sites were monitored for coverage, efficacy and non-target mortality of treatments with Picloram and Clopyralid. Coverage was extremely accurate and post effectiveness monitoring of an early July aerial contract indicates treatment is affecting target species in the 80% to 90% range, while non-target species display no immediate effects. Buffers were placed around live water and seeps at the time of application
Jimtown Prescribed Fire Units	Dalmatian toadflax, leafy spurge, knapweed.	Two ground contract treatment sites were monitored for coverage, efficacy and non-target mortality of treatments with Picloram. Coverage was thorough and post effectiveness monitoring of an August ground contract indicates treatment is affecting target species in the 90% range, while non-target species display no immediate effects.
Belts Mtn. Range	Spotted knapweed, Dalmatian toadflax, leafy spurge, common tansy, hounds-tongue, Canada thistle, musk thistle	Photo points established and ocular site condition noted. Treatment and effectiveness monitoring will continue to be monitored. Areas of infestations have continually grown. Level of treatment does not meet or exceed annual spread rate.
Divide Mtn. Range	Spotted knapweed, Dalmatian toadflax, leafy spurge, common tansy, hounds-tongue, Canada thistle, musk thistle, orange hawkweed (New Invader) and Oxeye Daisy	Photo points established and ocular site condition noted. Treatment and effectiveness will continue to be monitored. Areas of infestations have continually grown. Level of treatment doesn't meet or exceed annual spread rate.
Blackfoot Range	Spotted knapweed, Dalmatian toadflax, leafy spurge, common tansy, hounds-tongue, Canada thistle, musk thistle, orange hawkweed, and	Photo points established and ocular site condition noted. Treatment and effectiveness will continue to be monitored, determining treatment priorities for the coming years. Areas of infestations have continually grown. Level of treatment doesn't meet or exceed annual spread rate.

Site	Target Species	Method/Observations
	Oxeye Daisy	
Elkhorn, Belts, Divide, and Blackfoot road rights of way	Spotted knapweed, Dalmatian toadflax, leafy spurge, common tansy, hounds-tongue, Canada thistle, musk thistle, orange hawkweed, tall buttercup, oxeye daisy, henbane	Ocular observations are conducted to determine effectiveness and to plan/prioritize treatment areas for coming years is continuous. Effectiveness of treatments is high.
Alice Creek	Yellow toadflax, St. Johnswort, Spotted Knapweed, Houndstongue	Ocular observations were made to monitor infestation size and effectiveness of treatment. Infestation has remained stable over the past two years. No St. Johnswort plants were observed in the fall of 2006. This is one year after initial treatment. Houndstongue is beginning to spread to undisturbed sites.
Road right-of-ways, Ogden, Dalton, Copper Creek	Knapweed, Hounds-tongue, Yellow toadflax	Ocular observations to determine herbicide effectiveness and planning to prioritize treatment areas indicate reductions ranging from 55% – 78% in land treated. There is a direct correlation between levels of effectiveness and species treated.
Lincoln Trail heads & Campgrounds	Spotted knapweed	Ocular observations, Determine application needs and signing. Trail heads on the district have a low level of weed infestations and are remaining stable.
Aspen Grove Campground	Spotted knapweed	Ocular, general site condition and infestation size and canopy cover noted. Herbicide effectiveness has decreased the size of infestation by 50%.

Data Analysis Methods:

Simple statistics were performed on the data.

Monitoring Results:

Effectiveness monitoring indicates mixed success. The variability of success becomes grossly evident depending upon species and site characteristics. Effectiveness monitoring has increased now that monitoring is an integrated part of the overall accomplishments within the Region. Herbicide treatment on 20% of inventoried acres contained and controlled weed infestations from increasing across the Forest. Permanent herbicide monitoring plots established in 2001 have not been monitored for a few years now due to lack of manpower and funding levels.

Biological control was elevated significantly in 2001, releasing approximately 1 million insects each year until 2004. Insect populations have been recorded as having the physical capability to survive harsher climatic conditions on most of the release sites. Higher than expected survival rates appear to be reducing target weed species and rate of spread on some sites, while other sites are surviving but reduction in plant populations or density is not evident. On the successful insect release sites, photo points identify reductions in plant density and plant cover, and redistribution efforts are ongoing.

Polar Organic Chemical Integrative Samplers were utilized to sample streams adjacent to aerial spray units with the objective of estimating the exposure of aquatic organisms to the herbicides applied. Sampling sites were adjacent to aerial units with 300 foot buffers in place. Herbicides selected for the noxious weed treatments were picloram and clopyralid herbicides. The analysis was completed USGS Columbia Environmental Research Center in Columbia, Missouri. Clopyralid was detected above the quantitation limit, but well under the acceptable level of aquatic toxicity. Ironically, Imazapyr and Imazapic compounds were detected at levels greater than quantitation limit. These two chemicals have never been applied by Forest personnel nor, have the surrounding private landowners ever heard of these products.

Research

Only biological control research has been consistent and ongoing through Montana State University and the Regional Office. Missoula Fire Research Lab has indicated interest but Forest funding and research dollars have not been sufficient to plan and implement research ideas.

Variability Measure Discussion:

Variability Measure:

Noxious weeds increase distribution by 5%: other weedy species by 10%; infestations appear in previously unaffected areas (1986 Forest Plan).

Assessment:

Based on the 1987 weed EIS, inventories indicated 3,641 acres infested with noxious weeds. The preferred alternative identified 638 acres treated annually, which is 17.5% of the total infestation. This level of treatment was consistent with the Forest Plan. Noxious weed treatment activities under this schedule were greater than the projected annual rate of spread of 5 – 10% identified in the Forest Plan.

The most recent weed EIS efforts inventoried 22,668 and 198 miles of infested roadside for a total of approximately 23,000 acres. Simple statistical calculations comparing the 1987 and 2006 weed EIS inventoried acres computes an annual spread rate of 10.75% over the past 19 years. These calculations exceed the variability identified in the 1986 Forest Plan for this element.

Actions in response to variability assessment:

Significant expansion of the noxious weed program was a result of the 2000 fire season. Budgets gained significantly, rising to several million dollars each year, providing the foundation for halting weed expansion. A Noxious Weed EIS was completed in 2006 identifying the need for action and has authorized adaptive management including aerial treatment on lands inside and outside the grizzly bear recovery zone. Education, monitoring, research and implementation of an aggressive herbicide and biological control efforts from 2001 through 2005 have held noxious weeds in check. However, funding levels and tighter guidelines for utilizing supplemental dollars have reduced the level of accomplishments on the ground where weed reductions once were very effective, now allowing these sites to gain momentum and expand again.

Project specific NEPA documents (timber and fuels) on the Forest routinely address weed treatments, expanding acres beyond the 1987 noxious weed and Forest plan thresholds in an effort to curtail weed spread. Funding was cyclic with minimal increases year to year, but based on inventoried acres the districts were unable to treat 15% (documented rate of spread based on research) of the total Forest acres.

Noxious weed management efforts have been expanding since 1996 with peak years' centered around the fire restoration activities of 2001 – 2003. In 1997 an emphasis was placed on re-inventorying noxious weed infestations across the Forest in preparation of a new weed EIS. Inventories completed in 2000 indicated 22,668 acres and 198 miles of roads infested with noxious weeds. The rate of spread of these weeds is expected to expand 14 % per year (Asher 1998) and may increase due to large wildfires (recent and future). Restoration funding provided an increase in all facets of noxious weed management. Since 2003, restoration funding has been reducing and the Forest has strained to maintain the control efforts implemented in 2001 – 2003. Consequently, noxious weed infestations prior to 2001 and post 2003 have and will continue to spread at a greater rate than the annual rate of treatment on the Helena National Forest.

A risk analysis was completed for the Helena National Forest and found that an estimated 319,700 acres on the Forest are currently susceptible to weed invasion based on acres of rangeland and forested areas with less than 35 percent tree canopy coverage, not to mention over 132,000 acres have burned from wildfire since the year 2000.

Table 3—Total FY08 Helena National Forest Direct Weed Control (Acres)

Control Type	D1	D2	D4	Total
Herbicides (Acres)	534.5	789.1	2908.5	4233.1
Biological Agents (acres)	110	16	0	126
Pulling (Acres)	1	1	1	3
TOTAL	645.5	806.1	2909.5	4,364.1

Table 4-- FY 08 Herbicide Treatment By Fund Code (Acres)

Fund Code	D1	D2	D4	Total
CONT			411	411
CWKV-KV	31	2	164	197
NFVW – Weed Mgt.	504.5	581.3	704.5	1,790.3
NFWF			63.5	63.5
NFXN			488	488
PSRS		182		182
TOTAL	535.5	790.1	2907.5	4,364.1

Table 5 – FY 08 Herbicides Used

Herbicide	Registration #
2,4-D	228-145
	01381-00103
	71368-1
	34704-120
	5905-501
PICLORAM	62719-6
CLOPYRALID	62719-259
METSULFURON METHYL	352-439
CLOPYRALID/2,4-D	62719-48

Herbicide	Registration#
(CURTAIL)	
CHLORSULFURON	352-522
DIGLYCOLAMINE	100-884
GLYPHOSATE	42750-59

Targeted weed species: white top, musk thistle, diffuse knapweed, spotted knapweed, oxeye daisy, Canada thistle, houndstongue, leafy spurge, St. Johnswort, Dalmatian toadflax, yellow toadflax, sulfur cinquefoil, common tansy, tall buttercup, and orange hawkweed.

Manual Treatment

Pulling occurred on approximately 3 acres of weed infested areas on the Helena NF. This activity was focused on small infestations in backcountry areas, trailheads, ranger stations, campgrounds, grazing allotments, administrative sites and burned areas. Table 6 below provides details on this activity.

Table 6 – FY 08 Weed Pulling

Ranger District	Acres Pulled	Location/Target Weed
Townsend	1	Knapweed and other occasional plants pulled throughout the season in various locations to stop seed production when other control methods are not available.
Helena	1	Knapweed, and Dalmatian toadflax were pulled at various times in the Gates of Mountains Wilderness area, specifically at Meriweather and Coulter campgrounds to eliminate non-target mortality and recreation/public visitor herbicide concerns.
Lincoln	1	Knapweed, yellow toadflax, common tansey, and St. John'swort were pulled at various times on administrative sites, and riparian areas to eliminate non-target mortality and recreation/public visitor herbicide concerns. Aspen Campground and Moose Creek Trailhead.
TOTAL	3	

Weed Education

Weed education, awareness and prevention are a high priority on the forest. Basic weed awareness and identification training is provided and field identification handbooks and weed calendars are made available to employees. Weed education is an ongoing activity on the Helena NF and is not limited to formal presentations. Constant interaction occurs between the Helena NF weed staff and all functional areas and specialists. Districts are signing trailheads with weed awareness information, "Weed Free Feed Required" signs are posted on major forest access roads; recreation site bulletin boards and "Leave No Weeds" posters and other weed information brochures.

Table 7 – FY 08 Education Presentations

Date	Teacher	School	# of Presentations	# of participants
May 08	Jay Winfield, Phil Walsh, Jim Nelson	Dearborn WMA	2	30 +
May 08	Diane Johnson, Tracy Schilling, Jay Winfield, Phil Walsh, Jim Nelson, Wes Simpson, and Misty Hamilton	Winston WMA	2	20
June 08	Shawn Heinert	Patterson Prarie WMA	1	10
June 08	Phil Walsh, Jim Nelson, Jay Winfield	Dearborn WMA	1	18
June 08	Jay Winfield	Last Chance BCH	1	6

Recommended Efforts:

Pursue an aggressive approach in noxious weed management as identified under the 2006 Noxious Weed EIS and continue utilizing biological control and aerial treatments where appropriate and effective. Financial support from all functions is necessary for this to become a reality.

Plan, implement and monitor treatment of 6,000 plus acres annually to curtail the annual spread rate and meet the goals and objectives outlined in the 2006 weed EIS. Efforts must be strengthened together with increased funding to be consistent with this direction. The Helena National Forest Weed EIS is consistent with the new state wide weed management plan that is currently implemented by all counties across the state of Montana. Noxious weed management strategies include; control, contain, and eradication of new invaders. However, weed personnel staffing is less than adequate to meet the direction of the Weed EIS. Staffing needs must be considered with increased funding levels.

(D4.1) Condition and Trend of Range and Forage Availability

Forest Plan Requirements:

Monitor the condition and trend of range and forage availability.

Intent:

Identify long term changes in range condition and trend, recommend change in management strategies and/or stocking levels.

Data Sources:

INFRA database, allotment inspection records, transect data, photo plots, wildlife surveys, burn area monitoring, and environmental documents. FSRAMIS was identified as a data source in the Forest Plan. This database has been replaced with the INFRA database, so it is not available or appropriate as a data source.

Current Efforts and Findings:

The condition and trend of allotments evaluated in this portion of this element includes those AMPs that have been updated in the past 10 years (1999 through 2008). An assessment of ongoing annual monitoring is summarized as well. Annual monitoring is important to help identify long term trends of use, which determine condition and trend.

Documentation of Monitoring Methodology:

Rangeland condition and trend has been monitored through quantitative data collection with ECODATA, TERRA and FSVEG protocols, specifically cover/frequency and ocular plant composition methods, and qualitative stand stage mapping which is based on ECODATA inventory.

The Region 1 rangeland data collection system from the mid-80's through the early 90's was collectively called ECODATA. Cover/frequency, line intercept and plant composition protocols were used throughout the Forest during that time. ECODATA has been replaced by the NRIS national database TERRA protocols which are very similar to ECODATA protocols. ECODATA legacy data has been "rolled over" into the TERRA system.

The vegetation stage methodology is found in the project file. ECODATA plot data were used to create the vegetation stage descriptions which are found in the project file. Stage 1 most closely resembles lightly grazed grasslands for a given habitat, while stage 4 is least like a lightly grazed grassland. The letter "I" signifies that a large amount of introduced grasses are present. Indicator plant species (plants such as rough fescue or Idaho fescue) and bare soil are key indicators of vegetation stage. This is an ocular mapping method, and a form is filled out for the polygon that is being mapped.

Monitoring Activity:

Allotment management plan updates for the past ten years are shown in the following table. Actions that were identified in the plan updates are listed. If there is no entry for a year then there were no updates completed that year. Monitoring and actions taken since the plan update are summarized with the exception of riparian area monitoring which is displayed in the C12 element.

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
AVALANCHE	28-Jan-00	20% reduction in numbers and season of use Vegetation: key areas have been established Improvements: reconstruct 8 water development	Permit waived back to FS in 2008. Non-use since 2002, have been filling behind non-use with cattle from adjacent allotment. Improvements: 6 water developments have been reconstructed, 10 fences have been reconstructed because of fire in 2000. Average utilization was 35% which is within the allowable mean for deferred rest rotation grazing system (50-45%). Likely to not have deteriorated condition due to reduction and

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
			improvement construction.
MAGPIE	28-Jan-00	12% reduction in season of use Vegetation: key areas have been established Improvements: reconstruct 6 water development and 5 proposed new water developments and 1 fence to be reconstructed, 6 fences proposed new construction.	Improvements: 3 water developments have been reconstructed; all fences identified on AMP were reconstructed after the fire in 2000. In 2008, the average utilization was 10% which is within the allowable mean for deferred rest rotation grazing system (50-45%). Likely to not have deteriorated condition due to reduction and improvement construction.
WHITES GULCH	28-Jan-00	Stocking is the same but season of use may vary Vegetation: key areas have been established Improvements: reconstruct 9 water development	Improvements: 7 water developments have been reconstructed, 2 fences were reconstructed but not identified in the AMP for reconstruction. Riparian fence is planned for construction of 2009 to protect westslope cutthroat trout habitat. In 2008, the average upland utilization was 32% which is within the allowable mean for deferred rest rotation grazing system (50-45%). Likely to not have deteriorated condition due to improvement construction.
TICK GULCH	28-Jan-00	No active grazing	No decrease in allotment conditions
BIG BUFFALO	23-Jan-06	Big Buffalo, Little Buffalo and Frohner will be used together in a flexible/adaptive manner allowing for adjustments in dates and numbers and allowing for rest of Little Buffalo or Frohner in a given year Areas of concern to monitor were identified in the DM: Head of Colorado Gulch, S. Blackhall Meadows, Blackhall aspen stands Colorado Mtn south ridge, Corral Gulch Random soil sampling as part of	In 2008 the watershed project to rehab section of the meadows completed. Two areas of concern were monitored for use levels. In 2008, the average upland utilization was 33% which is within the allowable mean for deferred rest rotation grazing system (50-45%). It is unlikely that conditions on this allotment have deteriorated. AMP signed in 2008. Little Buffalo rested in 2008, Big Buffalo used in conjunction with Frohner.

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
		forest wide monitoring	
LITTLE BUFFALO	23-Jan-06	Big Buffalo, Little Buffalo and Frohner will be used together in a flexible/adaptive manner allowing for adjustments in dates and numbers and allowing for rest of Little Buffalo or Frohner in a given year. Areas of concern to be monitored were identified in the DM: Brooklyn Bridge, riparian stringers, Go Devil Creek, Travis/Big Buffalo junction Random soil sampling as part of Forest wide monitoring	New Plans will be implemented in the 2008 grazing season. Permittee has developed a new watering source in the Go Devil pasture, but continuing drought has severely limited water on this allotment. It is unlikely that conditions on this allotment have deteriorated. This allotment was rested in 2008.
FROHNER	23-Jan-06	Big Buffalo, Little Buffalo and Frohner will be used together in a flexible/adaptive manner allowing for adjustments in dates and numbers and allowing for rest of Little Buffalo or Frohner in a given year. Areas of concern to be monitored were identified in the DM: Little Corral Gulch riparian and uplands, Park Lake campground (recreation conflicts), sedge bogs and wetlands. Random soil sampling as part of Forest wide monitoring program	New plans will be implemented in the 2008 grazing season. This allotment was rested in 2007. In 2008, the average utilization was 33% which is below the allowable mean for season long grazing system (35%). It is unlikely that conditions on this allotment have deteriorated. AMP signed in 2008. Little Buffalo rested in 2008, Big Buffalo used in conjunction with Frohner.
QUARTZ CREEK/ROWE GULCH	23-Jan-06	New plans for this allotment include the ability to be able to use portions of adjacent allotments if necessary due to drought conditions or other resource concerns. Areas of concern to monitor are identified in the DM: unnamed drainage above Rye Field, Rowe Gulch riparian and upland, sedge bogs in the North Fork drainage, beaver influenced areas/wetlands Random soil sampling as part of Forest wide monitoring	AMP signed in 2008. The permittee recently relinquished the “off” numbers of the permit because the ranch has been subdivided and the “off’ lands fenced so that they are no longer accessible to the permittee’s cattle. Permittee has redeveloped an older water development above the Rye Field. In 2008, the average utilization was 50% which is at the allowable mean for deferred rest rotation grazing system (50-45%). It is unlikely that conditions on this allotment have deteriorated, despite being at utilization standards this

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
			grazing season. However if this continues conditions could decrease over time, so emphasize 2009 monitoring.
BALDY	16-Feb-06	Stocking is the same but season of use may vary Vegetation: key areas have been established Hydrology: establish long term cross sections in representative riparian areas Maintain existing improvements, no new ones planned.	Permit was waived to new permittee so implementation of AMP has not yet begun until new permittee is familiar with AMP and objectives. In 2008, an ocular estimation of utilization levels were well below the allowable mean for season long grazing system however they were not measured or recorded. It is unlikely that conditions on this allotment have deteriorated.
EAST WESTON	14-July-06	Combined with Weston Springs	None, land now in private ownership
WESTON SPRINGS	14-July-06	Closed due to land exchange	None, land now in private ownership
GOULD CREEK	26-Sep-06	Continue current management Vegetation: key areas have been established Hydrology: establish long term cross sections in representative riparian areas Maintain existing improvements, no new ones planned.	Implemented in 2007 to continue current management, continue annual inspections Likely no change in vegetative condition; livestock distribution and location throughout the grazing season improved in 2007 due to improvement maintenance. No data collected in 2008.
AUSTIN	27-Sep-06	Stocking is the same but season of use may vary Vegetation: key areas have been established Hydrology: establish long term cross sections in representative riparian areas	Decision was withdrawn in 2007.
EMPIRE	27-Sep-06	Stocking is the same but season of use may vary Vegetation: key areas have been established Hydrology: establish long term cross sections in representative riparian areas	Decision was withdrawn in 2007.
MACDONALD PASS	27-Sep-06	Stocking is the same but season of use may vary. Vegetation: key areas have been established Hydrology: establish long term	Decision was withdrawn in 2007.

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
		cross sections in representative riparian areas	
E. SHINGLE MILL	28-Nov-06	Continue current management Vegetation: key areas have been established Hydrology: establish long term cross sections in representative riparian areas Maintain existing improvements, no new ones planned.	Adaptive management will be applied to this allotment and implementation began in 2007. No change in vegetative or resource condition likely. Not monitored in 2008.
WEST NEVADA	12-Sep-07	Stocking and season of use will remain the same Vegetation: key areas have been established Hydrology: establish long term cross sections in representative riparian areas There are no new Improvements, just maintenance of existing improvements.	Adaptive management will be applied to this allotment so implementation has begun and will continue in 2008. In 2008, the average upland utilization was 25% which is within the allowable mean for season long grazing system (45%). It is unlikely that condition has deteriorated.
EAST NEVADA	12-Sep-07	Stocking and season of use will remain the same Vegetation: key areas have been established Hydrology: establish long term cross sections in representative riparian areas There are no new Improvements, just maintenance of existing improvements.	Adaptive management will be applied to this allotment so implementation has begun and will continue in 2008 In 2008, the average upland utilization was 33% which is within the allowable mean for season long grazing system (45%). No change in vegetative or resource condition.
NORTH FORK	27-Sep-07	Stocking is the same but season of use may vary Vegetation: key areas have been established Hydrology: establish long term cross sections in representative riparian areas Improvements planned but with	Adaptive management will be applied to this allotment so implementation has begun and will continue in 2008 In 2008, the average utilization was 13% which is within the allowable mean for deferred rest rotation grazing system (50-45%). It is unlikely that conditions on this allotment have deteriorated.

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
		separate decision.	
SIX MILE	27-Sep-07	Stocking is the same but season of use may vary Vegetation: key areas have been established No improvements planned as there is no water on FS land	Adaptive management will be applied to this allotment so implementation has begun and will continue in 2008 Not monitored in 2008 It is unlikely that conditions on this allotment have deteriorated.
BARLOT-ROGERS	10-Sep-08	Allotment was officially closed due to insufficient forage or watering sources available to livestock Any interior improvements need removed	none
CADOTTE	10-Sep-08	Allotment was officially closed due to insufficient forage or watering sources available to livestock Any interior improvements need removed	none
SOUTH FORK DEARBORN	10-Sep-08	Allotment was officially closed due to insufficient forage or watering sources available to livestock Any interior improvements need removed	None
MOUNT HELENA	10-Sep-08	Allotment was officially closed due to insufficient forage or watering sources available to livestock Any interior improvements need removed	None
TELEGRAPH	10-Sep-08	Allotment was officially closed due to insufficient forage or watering sources available to livestock Any interior improvements need removed	None
BIRCH CREEK	10-Sep-08	Allotment was officially closed due to insufficient forage or watering sources available to livestock Any interior improvements need	None

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
		removed	
DUCK CREEK	10-Sep-08	Allotment was officially closed due to insufficient forage or watering sources available to livestock Any interior improvements need removed	None
NORTH BALDY	10-Sep-08	Allotment was officially closed due to insufficient forage or watering sources available to livestock Any interior improvements need removed	None
BEAR CABIN	10-Sep-08	Allotment will remain vacant and portions might be combined with another allotment and the remainder closed at a later date	None
COCHRAN	10-Sep-08	Allotment will remain vacant and used as a grass bank for permittees on allotment affected by wildfire, prescribed burning or any other resource reason	None
JIMTOWN	10-Sep-08	Allotment will remain vacant and used as a grass bank for permittees on allotment affected by wildfire, prescribed burning or any other resource reason	None
AUSTIN	30-Sep-08	Stocking is the same but season of use may vary Vegetation: key areas have been established Hydrology: establish long term cross sections in representative riparian areas.	New plans to be implemented in 2009. In 2008, average utilization was 10% which is within the allowable mean for season long grazing system (45%). No change in vegetative or resource condition likely.
EMPIRE	30-Sep-08	Stocking is the same but season of use may vary Vegetation: key areas have been established Hydrology: establish long term cross sections in representative riparian areas.	New plans to be implemented in 2009. In 2008, the average utilization was 25% which is within the allowable mean for rest rotation grazing system (60-40%). No change in vegetative or resource condition likely.
MACDONALD PASS	30-Sep-08	Stocking is the same but season	New plans to be implemented in 2009.

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
		of use may vary Vegetation: key areas have been established Hydrology: establish long term cross sections in representative riparian areas Improvements planned but with separate decision.	In 2008, the average utilization was 32% which is within the allowable mean for deferred rest rotation grazing system (50-45%). An exclosure was constructed in the highway pasture to exclude cattle from a spring/willow complex. Established five transects to monitor willow communities in 2008. No change in vegetative or resource condition likely.

A private contractor was hired by the Elkhorn working group to map rangeland conditions in the Elkhorns, including the North Crow and Kimber Gulch allotments. The second phase of this work was completed in 2006. The study entitled "Elkhorns Vegetation Study, Phase 2" can be found in the project file. The results of the study showed that the allotment conditions in the North Crow and Kimber allotments are very good to excellent. Implementation of the results of the Elkhorns Vegetation Study will begin in 2009.

Data Analysis Methods:

Environmental analyses were completed in the last 10 years for all the allotments included in the condition and trend portion of this element. Ongoing monitoring was summarized to begin to assess the success of allotment management plan implementation through utilization measurements as an indication of the success of the plans. Annual monitoring is assessed to determine whether livestock utilization is appropriate.

Monitoring Results:

Thirty-one allotments which had updated allotment management plans in the past 10 years (1999-2008) were included in this analysis. Of those 31 allotments, 18 are currently active. The other 13 have been officially closed or combined with active allotments, remain vacant for to allow for emergency use if necessary during the allotment planning process, or, are no longer public lands. Of the 18 active allotments, none were likely to have deteriorated in condition, based on utilization, reductions and improvement construction as noted in the table above. None of the 13 close or vacant allotments were likely to have a decrease in condition either. However, one of the 18 active allotments was at the allowable use standard threshold in 2008 (Quartz). It is unlikely the condition of the vegetation will show a downward trend unless this utilization level continues for several years.

The 18 active allotments monitored in this element represent 24% of the allotments on the Forest. The 31 allotments represent 41% of the allotments on the Forest.

Variability Measure Discussion:

Variability Measure:

5% increase in acres with downward trend or a 5% decline in acres by condition class.

Assessment:

Of the 31 allotments presented here, none are likely to have deteriorated in condition, based on utilization, reductions and improvement construction as noted in the above table. One allotment has a

possibility of a decrease in condition, based on the fact the 2008 utilization measurements were at the allowable use limit; thus, one percent of the 77 active allotments possibly have a decline in acres by condition class. This is a representative sample of allotments across the Forest. It is likely that the Forest is within the variability of this element because the high utilization levels only occurred one year out of three with the exception of one allotment.

Condition and trend is a long term assessment. The above table shows various actions that were taken in the management update process. On those allotments where grazing reductions have occurred, it is reasonable to assume that condition and trend have improved as livestock grazing decreases with reduction in season or numbers. On allotments where grazing levels were maintained, actions such as developing new water sources, improved management techniques including herding and riparian fencing should result in improved conditions.

The next update to the plan where new inventory is collected is the true measure of this element. The information presented here can be used to indicate whether improvements can be expected from actions that have been taken but the true assessment can occur with the next analysis of the allotments that are shown in the above table.

Actions in response to variability assessment:

Continue annual utilization and permit compliance monitoring to ensure plans are being implemented appropriately. Plan and execute inventory updates on at least a 15 year interval. Ensure that baseline inventory is completed in order to have a comparison for trend.

Recommended Efforts:

Ensure that plans are updated and implemented on a scheduled basis. Ensure permit compliance through utilization monitoring.

(D4.2) Conifer/Brush Encroachment

Forest Plan Requirements:

Identify/determine encroachment by conifers/bush to grassland aspect.

Intent:

Conifer encroachment is managed through the use of prescribed fire, sometimes coupled with mechanical treatment. Burning that has occurred in the past 10 years is addressed for this portion of the element.

Data Sources:

INFRA database, allotment inspection records, transect data, photo plots, wildlife surveys, and burn area monitoring, environmental documents, FSVEG. FSRAMIS was identified as a data source in the Forest Plan. This database has been replaced with the INFRA database, so it is not available or appropriate as a data source.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Observational data, written records and FSVEG information were summarized for this element.

Data Analysis Methods:

Observational data have been summarized. No further analysis beyond summarization has been done.

Monitoring Activity:

No specific activities are accomplished at a Forest scale to determine changes for this element. A fire history study was completed on the east portion of the Elkhorns in 2005 (Barrett,) that indicated substantial losses of grassland aspect have occurred for the past 100 years. Visual comparisons between historic photos (1930's and 1940's) and 1990 aerial photos indicate that conifers have increased while grasslands have decreased on a project by project basis.

Conifer encroachment is treated on a project-by-project basis. The following table shows the acres that have been treated by Ranger District from 1996 to 2008.

Treatment Year	**Acres of Conifer Encroachment Treated**			
	Townsend	Helena	Lincoln	Total Forest
1997	448	548	500	1496
1998	1443	814	412	2669
1999	950	541	105	1596
2000	623	35	0	658
2001	95	276	1090	1461
2002	490	781	1161	2432
2003	184	513	700	1397
2004	3402	1329	798	5529
2005	866	55	0	921
2006	100	1651	2025	3776
2007	719	140	965	1824
2008	1062	688	0	1750
1999-2008	8491	6009	6844	21,344 acres

In addition to controlled burns, the Forest has experienced four large wildfires in the past ten years. The Cave Gulch fire burned over 40,000 acres in 2000; the Maudlow-Toston fire burned approximately 10,000 acres on National Forest land in 2000; the Snow-Talon fire burned over 40,000 acres in 2003. The Meriwether fire burned approximately 40,000 acres in 2007. The Cave Gulch and Meriwether fires in particular burned many acres of conifer encroachment. The other two fires burned relatively small acreages of conifer encroachment.

Monitoring Results:

21,344 acres of conifer encroachment have been removed in the past 10 years. Several thousand acres have likely been removed in wildfires.

Variability Measure Discussion:

Variability Measure:

5% decline in acres with a grass aspect. 5% less of grass/brush to a conifer overstory.

Assessment:

There is no baseline to compare this element to, so it is not possible to make a direct comparison. The following logic was used to discuss the element.

Using data from the Forest master vegetation geospatial database, there are approximately 104,500 acres of grassland/shrubland, or areas that are dominated by grassland/shrubland but have 5-10% tree cover on the Forest. [Grasslands are defined in the database as areas with less than 10% tree canopy cover, and does not include rock dominated areas. Grassland and shrubland are not differentiated in the database, so are grouped together in this discussion.] Not all of the grassland acres have active encroachment, but conversely not all acres of conifer are included in this figure. It is assumed that this approximately balances out, so the figure of 104,500 acres of grassland will be used for this discussion. 21,344 acres of conifer encroachment treatment, shown in the above table, equals 20% of the grasslands on the Forest. To use a "worst case scenario" by assuming that at least 50% of the acres treated were actual conifer encroachment rather than open grassland, approximately 10% of the conifer encroachment on the Forest was treated in the past ten years. With this set of assumptions, the variability of this element was met—there likely was less than a 5% decline in acres with a grass or sagebrush overstory.

Actions in response to variability assessment:

Continue to remove encroachment, where appropriate, to maintain or re-establish grassland and shrubland extent across the Forest.

Recommended Efforts:

The Forest should use the new VMAP product to identify areas of encroachment and establish a baseline for this element. One of the difficulties of this element is to define encroachment and what a grass aspect is. The level of encroachment, ie. the canopy cover of trees on encroached land may be a more appropriate measure of this concern. Once a baseline for encroachment is established, the ability to measure change in canopy cover on those areas be possible, and meaningful.

(D5) Permit Compliance

Forest Plan Requirements:

Permit Compliance

Intent:

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

Data Sources:

Grazing permits, allotment inspections and documented non compliance actions.

Current Efforts and Findings:

All of the active grazing allotments have a grazing permit issued to one or more permittees. The grazing permit authorizes livestock to use the area within an allotment. Each allotment then has a management plan which generally guides the grazing system in the allotment. Then, each allotment has an annual plan issued to all permittees to document specific requirements for that grazing season including, but not limited to utilization levels, structural improvement projects, and pasture rotation schedules.

Fifty-seven of the 77 active allotments (74%) have documented permit compliance checks. These permit compliance assessments were done by checking one or more of the following permit requirements; riparian and/or upland forage utilization, completion of improvement maintenance, range readiness, pasture rotation schedules, reports of unauthorized use, salt placement, adherence to any travel variances, and special improvement construction projects.

Documentation of Monitoring Methodology:

In a given year, most allotments (or a representative sample) are checked for range readiness prior to livestock being allowed to graze, especially if plant development is delayed, i.e. if we experience a cool, wet spring. In years of normal spring precipitation and plant development, only allotments at higher elevations are checked for range readiness.

All active allotments across the forest (77 in 2008) are categorized using A, B or C based on permittee compliance, AMP implementation or other factors such as unauthorized use. For "A" allotments (generally allotments that are continually in non-compliance, have T&E species that require a higher level of monitoring, AMP implementation or continual unauthorized use) a minimum mandatory documentation with Compliance Forms is required. "B" allotments (generally allotments that have been in non-compliance in the past but have changed management and are meeting standards or allotments that are borderline with compliance issues) will be administered to standard when "A" allotments have been taken care of. Allotment inspections will be documented in annual allotment diaries and may be summarized on Compliance Form. "C" allotments (generally allotments that have been in compliance, not stocked with livestock or don't have any major resource concerns, such as T&E species) will not be inspected unless all work is done on the A and B allotments. The project file has a list of the 2008 list of allotments, rankings and measurements.

The Forest Service Handbook, (FSH 2209.13 – Grazing Permit Administration, Chapter 10 – Term Grazing Permits) contains guidelines that are followed when issuing a permit, and list the procedures for dealing with non-compliance issues. Forest Plan Standards for allowable use for riparian and uplands are also used in conjunction with the Forest Service Handbook. These utilization standards are documented in detail in elements C12 (riparian) and D1.2 (forage).

Monitoring Activity and Data Analysis Methods:

The monitoring results from elements C12, D1.2, D2 and D4.1 are summarized. Documentation of other monitoring activities and official letters of non compliance are tallied.

Monitoring Results:

In 2008, there were formal letters of permit non compliance given to two permittees (two permits, four allotments). This represents five percent of the active allotments. An additional 10 (13%) allotments had an exceedence of one or both forage utilization standards (C12, D1.2). So, a total of 14 allotments had an issue of some sort with permit compliance. This represents 18% of the 77 active allotments or 24% of the measured allotments.

Allotment Name	**Compliance Issue**	**Action Taken**	**Remarks:**
Camas Creek	Cattle in all pastures at same time, new construction & maintenance of improvements	Sent letter identifying what needed to be done and the time frame in	If items in letter are not completed in the time frame specified for 2009, permittee

Allotment Name	Compliance Issue	Action Taken	Remarks:
	not completed for 2nd year, permittee made changes to number of livestock and season of use without authorization.	which to complete them	will receive a 25% suspension for a minimum of 2 years.
Grouse Ridge	Pasture rotation changed without authorization. C12 exceeded.	Phone contact followed by letter noting problems (followed appendix b of amp, item 4 first offense)	Permittee moved livestock to correct pasture within specified timeframe. Rank A for 2009. Same permittee for Grouse, Jim Ball and Nelson entries.
Jim Ball	Pasture rotation changed without authorization. C12 exceeded.	Phone contact followed by letter noting problems (followed appendix b of amp, item 4 first offense)	Permittee moved livestock to correct pasture within specified timeframe. Rank A for 2009.
Nelson Favorite York	Pasture rotation changed without authorization.	Phone contact followed by letter noting problems (followed appendix b of amp, item 4 first offense)	Permittee moved livestock to correct pasture within specified timeframe. Rank A for 2009.
Indian Flats	C12 exceeded.	Take issue to 2009 permittee meeting, consider A rank for 2009 and measure again in 2009.	
Deep Creek	C12 exceeded.	Take issue to 2009 permittee meeting, consider A rank for 2009 and measure again in 2009.	
East West French	C12 and D1.2 exceeded	Take issue to 2009 permittee meeting, A rank for 2009 and measure again in 2009.	
Slate Lake	C12 and D1.2 exceeded	Take issue to 2009 permittee meeting, consider A rank for 2009 and measure again in 2009.	
Dog Creek	D1.2 exceeded.	Take issue to 2009 permittee meeting, consider A rank for 2009 and measure again in 2009.	
Blossburg	C12 exceeded.	Take issue to 2009 permittee meeting, consider A rank for 2009 and measure again in 2009.	
Spotted Dog	D1.2 exceeded.	Take issue to 2009 permittee meeting, consider A rank for 2009 and measure again in 2009.	
Quartz Cr	D1.2 exceeded.	Take issue to 2009 permittee meeting, consider A rank for 2009	

Allotment Name	Compliance Issue	Action Taken	Remarks:
		and measure again in 2009.	
Ophir-Hope	C12 exceeded.	Take issue to 2009 permittee meeting, consider A rank for 2009 and measure again in 2009.	
Spring Gulch	D1.2 exceeded.	Take issue to 2009 permittee meeting, consider A rank for 2009 and measure again in 2009.	

Variability Measure Discussion:

Variability Measure:

10% +/- Change from annual plan.

Assessment:

This resource element is outside the variability, thus has not been met for fiscal year 2008. At least one requirement within the annual plans was exceeded on 14 of the 77 active allotments. This represents 18% of the active allotments, or 24% of the measured allotments.

Actions in response to variability assessment:

In prior years, this element has been measured solely by whether or not an official noncompliance action against a permit was taken. This is the first year the results of all of the range elements have been brought forward into this element and used to measure D5 variability.

We are not able to be within the variability for this element. The Forest cannot perform field inspections and adequate documentation for all permit requirements on 90-100 percent of the allotments annually without an increase in staffing levels.

Recommended Efforts:

Specific recommendations for the 10 allotments which had forage utilization standards exceeded are listed in the C12 and D1.2 elements. Three of the four non compliance issues were satisfactorily resolved by the end of the grazing season. Continue compliance checks on the allotments where standards were exceeded. Insure that permit actions are taken where warranted and that the permittees are appropriately involved.

It is likely this element will be a recurring variation; therefore, in fiscal year 2009 the range staff should make a recommendation to either modify the variability measure or modify management practices.

(E) REGULATED VOLUME, TIMBER

(E1) Regulated volume prepared for sale

Forest Plan Requirements:

Volume prepared for sale.

Intent:

The intent of this monitoring element is to insure that the base harvest schedule is followed and that the 10 year timber sale is adhered to.

Data Sources:

Data sources used to compile information for this element are the Region 1 Timber Sale Program Statistics, Fiscal Year Cut and Sold Report and the Periodic Timber Sale Accomplishment Report (PTSAR). The Forest Plan identified the 10-year sale program, quarterly cut and sold, and Form 2400-27. The data sources listed previously have replaced these sources, and are more appropriately used for this report.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Review and summarization of data from data sources described above.

Monitoring Activity:

Helena Forest timber sale program statistics data is input into the Timber Information Management (TIM) database, managed at the Forest Level and compiled at the Regional Office. Monitoring is accomplished through maintenance of the TIM database and the Periodic Timber Sale Accomplishment Report (PTSAR).

Data Analysis Methods:

No timber sales were offered during FY08. The lack of offered sales was due to on-going litigation on the Clancy-Unionville project as well as a shortage of signed NEPA decisions ready to implement. Additionally, due to the widespread outbreak of mountain pine beetle on the forest, much energy and time was spent in FY 08 planning and developing a forest-wide Bug Strategy (USDA, 2008) in response to the pine beetle epidemic. This forest wide Bug Strategy has provided a shift in the 5 year plan and the Forest will now prioritize vegetation project areas aligned with this strategy.

Monitoring Results:

Timber sale program statistics indicate that in FY08, the Helena National Forest offered 0.0 MMBF in commercial sawlog sales and sold 3.9 MMBF in personal use firewood and post and pole sales of an 11.4 MMBF financed program. The past 5-year average accomplishment for the Helena National Forest is 6.1MMBF of a 13.0MBF financed program.

Variability Measure Discussion:

Variability Measure:

Change (+/- 10%) in volume from 5-year base harvest schedule. No more than 25% of the sales located outside of scheduled 10-year plan.

Assessment:

Annual harvest volume prepared for sale and 5 year base harvest schedule variability exceeds +/- 10% of the Forest Plan base harvest schedule.

Actions in response to variability assessment:

In review of the decision flow diagram in the HNF Forest Plan, the variability exceeds acceptable limits and is a reoccurring variation. Direct effect (management oriented) on the Helena's ability to adhere to a 10-year schedule is due to the recent large scale wildfires and a mountain pine beetle epidemic, the National emphasis on ecosystem management and fuels related programs and less emphasis on maximizing timber production on timbered lands, thus resulting in fewer acres treated with the sole emphasis of timber production.

The Forest Plan identified a 10 year harvest schedule and identified projects to be implemented between 1986 and 1996. Since 1997, the Forest has established a 5 year harvest schedule, however; projects on the Helena over the last 5 years have been primarily salvage projects and were not initially considered as a contribution to this 5 year timber sale schedule or the base harvest schedule. Policy has established that the ten-year sale program is an upper ceiling rather than a required output and therefore, this deviation does not require a Forest Plan adjustment at this time.

Recommended Efforts:

Continue to maintain a 5-year timber sale schedule.

(E2) Timber assumptions

Forest Plan Requirements:

Timber assumptions: volume, productivity, condition class, slope, recovery, logging, acres harvested are validated and assumptions are correct in the Forest Plan.

Intent:

The intent of this monitoring element is to insure that: 1) board foot/cubic foot ratios are correct, 2) volume/acre yield is correct, 3) working groups accurately reflect productivity, 4) condition class assignments are correct, 5) scheduled logging systems (cable, tractor and helicopter) are used, and 6) schedule of acres harvested is correct.

Data Sources:

Sources of data include sale reviews, silvicultural prescriptions, environmental documents, cruise summaries and the Forest Activity Tracking System (FACTS). The Forest Plan lists TSMRS as a data source. This database has been replaced with National FACTS database, which is the appropriate data source to use for this element.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Review and summarization of data from all available data sources described above.

Monitoring Activity:

Item 1. Review cruise summaries and volume offered to determine board foot/cubic foot ratio and compare to projections in the Forest Plan, Item 2. Review cruise summaries and environmental documents and compare to projections in the Forest Plan to determine if volume/acre yield is correct.

Item 3. Review working groups to ensure they accurately reflect productivity. Item 4 is monitored through stand exams and age projections associated with the recent analyses. Item 5: Scheduled logging systems (tractor and cable systems) to determine whether they are in use in approximately the same ratio as projected. Item 6: Determine whether schedule of harvest is correct. All items are to be measured annually for one sale per district and reported every 5 years.

Data Analysis Methods:

A shift in emphasis as described in E1 has also resulted in a shift of budgets. This emphasis shift also indirectly influences volume prepared for sale. Implementation of salvage harvest and fuels reduction projects for example typically yields lower volume per acre and generally may extend stand rotation. Silvicultural prescriptions are designed to focus leaving trees individually and in clumps within and adjacent to harvest units for snag recruitment, structural diversity and regeneration with no plans in the near future to remove them.

Monitoring Results:

Item 1 and 2: The Forest Plan projects a board foot/cubic foot ratio of 3.1/1.0 and an average volume/acre of 7.75 MBF. In FY08 no timber sales were sold, therefore no board foot/cubic foot ratio is available for this year.

The past five year average on the Helena National Forest for board foot/cubic foot ratio is 2.07/1.0 and the average volume/acre harvested is 5.5 MBF. Volume and yield tables are correct.

Item 3: Forest Plan working groups continue to reflect forest productivity associated with forest habitat type groups.

Item 4: Condition Class assignments do accurately reflect forest tree size classes.

Item 5: The Forest Plan estimates that 93% of all harvesting will be accomplished with tractor systems and the remaining 7% with cable. No timber sales were offered in FY08.. Logging methods used over the last 5 years have been distributed between tractor (85%), cable (14%) and helicopter (1%). This variation is within Forest Plan Standards.

Item 6: The Forest Plan estimates that 1,940 acres of harvest annually wil be accomplished. In FY08, 124 acres of harvest occurred.

Variability Measure Discussion:

Variability Measure:

Sale reviews question validity of assumptions + or – 15 % of Forest averages.

Assessment:

Results of current board foot/cubic foot ratios indicate a lower ratio than originally predicted in the Forest Plan. This could be directly related to volume tables used in projections for the Plan and volume tables developed locally and used as part of the cruise program. Volume per acre projections in the Plan were primarily prioritizing regeneration harvest techniques and within the past 5 years the Helena has implemented primarily intermediate harvests and fire and beetle salvage which has resulted in a lower volume per acre than projected in the Plan.

Condition Class assignments are descriptions of existing conditions in timbered stands based on a classification system maintained in the TSMRS database and utilized in the Forest Plan. TSMRS is no

longer in use and its replacement, FACTS, does not include condition classes. Forest Plan condition classes are those found and defined in the FSH 2409.21e Timber Management Control Handbook. The classification assigns codes of 1-7 to timbered stands based on desirable stocking in relation to actual stocking as well as in terms of desirable tree species. Condition class is described briefly in appendix B of the Forest Plan EIS (B/13); the Forest Plan does not indicate the desirable abundance of condition classes nor assign guidelines. Instead, the classes are referenced as one of the criteria for assigning timber suitability and volume output estimates. Monitoring of this element would include verifying that the condition class assignment in TSMRS is appropriate based on site-specific analyses and prescriptions, thereby helping to validate the volume output assumptions developed for the Forest Plan. However, we do not track this element currently with respect to database information because the classification is no longer maintained. Instead, volume predictions and timber suitability are assessed through NEPA analyses, field exams, and prescriptions.

Although condition classes are not specifically monitored due to a change in classification schema used and database limitations, the intent of assessing condition class validity is to help assess timber suitability and volume predictions. This intent is met on the Forest through NEPA documentation, field exams, and detailed silvicultural prescriptions.

The Forest Plan EIS projects 1,940 acres of harvest per year and the harvest is monitored for a five-year period. In the past five years therefore the Forest Plan projected 9,700 acres of harvest. In the five-year period from 2004-2008, the Forest accomplished 2,363 acres (average 473/year or 24% of projection). Harvest projects completed on the ground from 2004 to 2008 included Cave Gulch Salvage, Maudlow-Toston Salvage, Poorman, Beaver-Dry, Lincoln Compound II, Grassy Bugs Salvage, Black Butte Salvage, Greyson Bugs Salvage, Snow Talon Fire Salvage, Moose Creek Cabin Hazard Trees, Trail Head Decks, Vigilante Decks, Strawberry Lookout, and Jimtown Fuels. In 2008, only 124 acres were harvested, all in the Jimtown Fuels project.

Just as the regulated volume prepared for sale is not a target, the projected acres harvested are not a target, but a ceiling. Deviations below Forest Plan projections are acceptable.This variation in harvested acres not within acceptable variability. This is a result of recent large scale wildfires and a mountain pine beetle epidemic, the National emphasis on ecosystem management and fuels related programs and less emphasis on maximizing timber production on timbered lands, thus resulting in fewer acres treated with the sole emphasis of timber production.

Actions in response to variability assessment:

No additional action is needed at this time for this element. The average annual harvest is addressed as a component of FP Element E3.

Recommended Efforts:

Continue to evaluate all items of this element at the project level using all available information.

(E3) Silvicultural assumptions and practices

Forest Plan Requirements:

Monitor silvicultural assumptions and practices.

Intent:

Insure that 1) uneven-aged as well as even-aged management is applied to elk winter and summer range, retention zones and riparian areas, 2) rotation age and culmination of mean annual increment

(CMAI) assumptions are correct, 3) silvicultural prescriptions follow management area standards, 4) silvicultural prescriptions precede all vegetative manipulation, and 5) silvicultural prescriptions achieve desired results.

Data Sources:

Silvicultural diagnoses, detailed prescriptions, NEPA documentation, FACTS database.

The Forest Plan lists TSMRS as a data source. This database has been replaced with National FACTS database, which is the appropriate data source to use for this element.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Review and summarization of data from all available data sources described above.

Monitoring Activity:

Ongoing review of all data sources listed was completed, including a review of the Forest's silviculture program. Silvicultural diagnoses and prescriptions provide information on appropriate silvicultural systems, silvicultural assumptions, and management area compliance. Post treatment monitoring, including evaluations by IDT members and the Regional Office, provide information on whether desired results were achieved. In 2008, implementation monitoring was done in Jimtown Fuels, Alice Creek prescribed burn (after action review) and the American Bar fuels reduction project (national review). Sale preparation was monitored in the Clancy Unionville project. All silvicultural prescriptions can be found in stand folders. Prescriptions were compared with assumptions in the Forest Plan.

Data Analysis Methods:

Silvicultural prescriptions are based on Forest Plan direction and management area standards during the design of the project; standards are discussed in every NEPA document as well as listed as part of each prescription (see examples in project file). During the silvicultural diagnoses phase of all projects, both uneven-aged and even-aged management are considered as treatment options; utilizing all information available the silviculturist determines the most appropriate method. Clearcutting was only used when it was the optimal method.

The management focus for harvest prescriptions during this monitoring period has been to increase stand resiliency and forest health, and salvage forests killed by fire and insects, rather than maximizing growth and yield. Due to priorities being placed on treating areas affected by fire and insect mortality, during this period there has not been an emphasis placed on regenerating green stands that have reached CMAI. However, site capability and rotation age are considerations in prescriptions and current projects meet the intent of this standard. Reforestation surveys help assess assumptions concerning site capability.

Comparisons of prescriptions and the Forest Plan show that the Forest is designing prescriptions with an attempt to mimic the effects that natural disturbances that would have had in specific ecosystems. For the most part, uneven-aged management is applied to warm and dry forests that were naturally thinned by fire, and even-aged management is applied to cool and moist forests that were naturally affected by historic stand replacement fires. Appendix H/1 of the Forest Plan specifies silvicultural practices by habitat type groups that include assumptions for rotation age, CMAI, harvest system, and reforestation requirements. Most of the areas harvested during this monitoring period fall in one of the Douglas fir habitat type groups, which generally indicate shelterwood systems and a rotation age from 120-150. While many of the harvest prescriptions for this monitoring year focused on salvage, these assumptions are correct and desired results are being achieved. Appendix M/1 of the Forest Plan provides guidance for all vegetation management practices occurring on the Helena National Forest including management

guidelines for habitat type groups. These practices and guidelines are being implemented where vegetative management is occurring. In review of recently completed harvest prescriptions, conclusions described are accurate.

Monitoring Results:

1) In 2008, 2,070 acres had silvicultural exams, diagnoses, and/or detailed prescriptions prepared for out-year projects.

2) In 2008 harvest was implemented in the Jimtown Fuels project. Uneven-aged management has generally been applied to warm and dry forests; the thinning in Jimtown is preparing this ponderosa pine site for uneven-aged management into the future. Even-aged management is often applied to higher elevation, cooler forests including areas used as summer range by elk. SMZ and retention zones have not been included in harvest activities for other resource considerations. These areas help provide snag habitat and reduce impacts to riparian ecosystems.

3) At this time, the Helena National Forest has found no indication that Forest Plan CMAI (culmination of mean annual increment) or rotation age needs to be adjusted. The Forest plan estimated rotation ages based on 95% of the CMAI (B/72).

4) Silvicultural prescriptions follow management area standards, as shown in NEPA documentation prepared during project planning. All prescriptions tier to the appropriate NEPA documentation which discusses how management area standards are met and applied.

5) Silvicultural prescriptions precede all vegetative manipulation, and are signed by a certified silviculturist. Silvicultural prescriptions for both harvest and prescribed fire are prepared during project analysis and implementation on the ground is consistently reviewed.

6) Silvicultural prescriptions are monitored during and after implementation to assess whether desired results were achieved so that adaptive management can be applied as is demonstrated in the documentation of field visits and reviews of harvest projects.

Variability Measure Discussion:

Variability Measure:

Silviculture program review questions the validity of silvicultural assumptions+ or – 15% of the Forest averages.

Assessment:

Current silvicultural prescriptions involve both timber harvest and prescribed fire. In 2008 harvest prescriptions being implemented included Jimtown Fuels. Fuels prescriptions being implemented include Clancy Unionville, Deep Creek, Alice Creek, and Poorman. During the 5-year planning timeframe, additional sales reflected include Greyson Bugs, Snowtalon Salvage, Poorman, Beaver Dry, Lincoln Compound II, Black Butte Salvage, Cave Gulch Fire Salvage, Maudlow-Toston fire salvage, Grassy Bugs Salvage, Strawberry Lookout, and Moose Creek Cabin. Assumptions in the Forest plan are continually assessed for validity when compared to silvicultural prescriptions and post-treatment monitoring. For this monitoring period, the Forest is within the variability standard of + or – 15% of the Forest averages as described in the silviculture and timber assumptions in the Forest Plan.

Actions in response to variability assessment:

No additional action is needed, for this monitoring period. The Forest is within the variability standard of + or – 15% of the Forest averages as described in the silviculture and timber assumptions in the Forest Plan.

Recommended Efforts:

Continue the involvement of silvicultural staff and prescriptions in any project that involves vegetative manipulation, including fuel reduction, prescribed burning, range, and wildlife vegetation manipulation

projects. Prescriptions should continue to incorporate management area direction, rotation age, and CMAI during their development. Continue close silvicultural involvement in implementation and monitoring of completed projects, including silvicultural reviews of timber sale preparation and administration. Monitor prescriptions for accomplishment of desired results by completing thorough post-treatment examinations.

(E4) Firewood removal

Forest Plan Requirements:

Firewood removal

Intent:

The intent of this requirement is to insure that potential firewood from timber sales and road building is made available to the general public before slash disposal.

Data Sources:

Post sale reviews.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Review timber sale areas after harvest activities are completed for availability of firewood for the public.

Monitoring Activity:

Forest personnel visit on-going and closed sale areas to view/evaluate firewood opportunities and monitor how the public is utilizing the firewood.

Data Analysis Methods:

Firewood is being offered to the public from slash piles in ongoing timber sales on the Forest. Current firewood opportunities are promoted by Forest personnel in the Snow Talon Fire Salvage, Greyson Bugs Salvage, Grassy Bugs Salvage, Maudlow Toston Salvage and Cave Gulch Salvage timber sales.

Monitoring Results:

Firewood has been made available from 100% of timber sales on the Helena National Forest. Press releases have been made in local newspapers to advise the Public of firewood gathering opportunities.

The recent large fires of 2000 and the ongoing mountain pine beetle epidemic on the Forest have increased availability of standing dead trees for firewood within all of these fire areas. There were no commercial firewood sales in FY 2008. Additionally, in FY 2008 the Forest expanded its firewood program to provide special permits to interested adjacent private landowners to allow them to remove green infested trees (marked by FS personnel) as personal use firewood within 100’ of the FS boundary bordering their property.

Variability Measure Discussion:

Variability Measure:

Annually firewood will be made available from 75% of all timber sales.

Assessment:

The Forest is within compliance with the variability measure for firewood management.

Actions in response to variability assessment:

No additional action is needed.

Recommended Efforts:

Continue proactive firewood management opportunities.

(E5) Size of openings

Forest Plan Requirements:

Monitor size of openings.

Intent:

The intent of this requirement is to insure that forest management practices comply with the environmental analysis which insures that openings conform to Forest Plan standards.

Data Sources:

NEPA documentation, FACTS database, implementation, and post-harvest monitoring documentation from Silviculturist and IDT, silvicultural prescriptions.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Review and summarization of data from all available data sources described above.

Monitoring Activity:

Environmental documents and implementation are monitored by the Forest Silviculturist to insure that opening sizes conform to standards and final implementation acres are recorded in FACTS (query in project file). NEPA documentation was reviewed for sales and compared with accomplishments in FACTS to assess opening size and whether the process for requesting large openings was necessary and/or followed. In some cases post-harvest monitoring was performed by the IDT and/or Silviculturist; these documents are provided in the project file. Silvicultural prescriptions are reviewed to ensure appropriateness of openings and checked for consistency with the NEPA planning.

The Forest Plan specifies that openings will normally be 40 acres or less, and if this size is exceeded, a 60-day public review and Regional Forester approval is needed. The Timber Management, Silvicultural Practices Handbook (FSM 2470) provides further detail by specifying some exceptions. One such exception states that where natural catastrophic events such as fire or insect and disease attacks have occurred, 40 acres may be exceeded without the public review and Regional Forester approval provided the public is notified and the environmental analysis supports the decision. Other exceptions provide for openings up to 60 acres without public review and Regional Forester approval, including cases where these openings reduce disturbances to other resources, occur in dwarf mistletoe or root rot areas, or best provide for visual quality objectives.

Data Analysis Methods:

Several projects, such as Greyson, Snowtalon, and Jimtown, have recently had ID team and/or silviculturist reviews (project file). In these projects, implementation unit size was similar to the size analyzed in NEPA documents. Prescriptions and FACTS show that harvest accomplished is consistent with NEPA planning, and during this monitoring period no openings were created that required Regional Forester approval. No documentation shows unacceptable results of ID team or administrative review results with respect to opening size. Rationale for the increase in size relates to treatment areas "fitting the landscape" which results in reduced visual effect, decreased fragmentation and reduced long-term disturbance (as fewer entries are needed to manage vegetation). This is considered for all projects in the planning phase.

Monitoring Results:

Regional Forester approval was granted for openings greater than 40 acres in Clancy Unionville, which was planned during the 5-year period but not implemented. Several other projects that were implemented in the monitoring period (2004-2008) had opening sizes over 40 acres (Maudlow-Toston, Cave Gulch, Snow Talon; 18 units total with a variety of prescriptions – see FACTS query in project file from 2007 monitoring report). All of these projects occurred in wildfire areas, and fit into the exception above not requiring the 60-day public review and Regional Forester Approval. However, the Forest did scope with the public and provide requests to the Regional Office for this activity. Intermediate harvest such as shelterwood preparation, commercial thinning, or liberation harvest do not constitute openings. There are no notations in post-harvest monitoring documentation indicating that the results of harvest were not consistent with planned unit design. Clearcutting is only used when it is the optimal method, as documented in the NEPA decision and detailed silvicultural prescriptions.

Variability Measure Discussion:

Variability Measure:

Unacceptable results of an ID team or administrative review.

Assessment:

The Forest is within stated variability for this element.

Regional Forester approval is obtained where openings exceed 40 acres and the rationale for the larger openings is disclosed in the environmental document. Regional Forester approval is not required for projects where natural catastrophic events such as fire, windstorms, insects and disease have occurred provided the public is notified in advance and the environmental analysis supports the decision.

Actions in response to variability assessment:

Within stated variability, no additional action is needed.

Recommended Efforts:

Continue compliance with the requirements of the Helena Forest Plan with regard to opening size.

Continue to treat forest landscapes at the scale of the environment.

(E6) Regenerated yield projections

Forest Plan Requirements:

Regenerated yield projections.

Intent:

Insure that regenerated yield projections are correct.

Data Sources:

Permanent plot records, FACTS database, silvicultural prescriptions

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Review and summarization of data from all available data sources described above.

Monitoring Activity:

The FACTS database was queried for plot installation or plot measurement activity. In addition, the database was checked for stocking survey results as a surrogate for permanent plot data. Prescriptions are written and reforestation measures prescribed considering yield projections.

Data Analysis Methods:

Thirty-three permanent growth plots have been establish across the Forest, 19 since 1986. For consistency in data collection across the Region, the Regional Office took responsibility of establishment and re-measurements of the permanent growth plots. At this time they evaluated and stratified all plots across the Region for similarities in habitat type and treatment. The RO determined it was no longer feasible or necessary to re-measure all plots on every Forest. Consequently, similar habitat types and treatment types were deleted from the measurement program. The plots have been established and monitoring has been ongoing although the Region has not been able to visit the stands as frequently as originally intended.

Based on stocking surveys, the Forest is generally successful in meeting reforestation goals as prescribed using our current knowledge of growth and yield. Where regeneration is unsuccessful, prescriptions are adjusted and adaptive management used.

Monitoring Results:

No permanent growth plots were established or measured in 2008. While stocking surveys cannot be used as data to compare with growth and yield projections, they do provide general results of stocking success in regenerating stands. Since the fires of 2000, over 17,000 acres have had stocking surveys. In 2008, 3,559 acres were surveyed; of this, about 11% (385 acres) were found to be failing according to prescribed regeneration requirements. 314 acres were also planted that year and 882 acres of natural regeneration was certified. Most failures are occurring on harsh, burned sites with little or no seed source present.

Variability Measure Discussion:

Variability Measure:

Within 5 years, less than 50% accomplishment of scheduled permanent plots. During the first decade (of the Plan) 60 permanent plots were to be established.

Assessment:

The procedure for analyzing growth and yield modeling has changed regionally. Regenerated yield projections are monitored and adjusted at the regional level based on Regional data derived from the permanent growth plot results. Due to the fact that the Region is not currently measuring permanent plots, we cannot report specific comparisons or adjust growth and yield models. Per the Forest Plan variability measure, more than 50% of the assigned plots have been established. We are currently past the first decade since the Plan. The Forest is using the best information available to meet the intent of this monitoring item (ensuring sustainable forest production) through careful prescription writing and post-harvest surveys. Stocking surveys help assess the success of regeneration and the appropriateness of harvest prescriptions. We are meeting the intent of this element.

Actions in response to variability assessment:

Within stated variability, no additional action is needed.

Recommended Efforts:

Continue to work with the Regional Office with growth and yield monitoring; continue to monitor regeneration and apply observations to future silvicultural prescriptions.

(E7) Reforestation practices and assumptions

Forest Plan Requirements:

Monitor reforestation practices and assumptions

Intent:

Silvicultural prescriptions, reforestation records, post sale administrative review and FACTS are monitored to insure that 1) regeneration is obtained within 5 years after final harvest cut, and 2) scheduled planting is accomplished.

Data Sources:

FACTS database, silvicultural prescriptions, post sale administrative review, stocking surveys, stake row surveys, post-harvest monitoring and exams. The Forest Plan lists TSMRS as a data source. This database has been replaced with National FACTS database, which is the appropriate data source to use for this element.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Review and summarization of data from all available data sources described above.

Monitoring Activity:

The FACTS database was queried to show areas in need of regeneration, reforestation status and results of stocking surveys, and planned versus accomplished planting (project file). Prescriptions are reviewed in conjunction with surveys to assess validity of assumptions and success of regeneration. Stake rows are performed on limited areas and are mainly used to assess the performance of nursery stock; however, they also provide some information in general terms of monitoring reforestation success.

Data Analysis Methods:

We use exam information to compare with desired/targeted reforestation conditions and to track reforestation as well as harvest accomplishments. This information is compiled and available in FACTS.

The Regional Office conducted an annual review of reforestation indices from TSMRS in the past; however, this review was not accomplished in recent years due to the transition to FACTS.

Planting usually occurs in the first three years after completion of harvest. In 2008, 314 acres were planted in recently harvested or previously managed areas that burned in recent wildfires (52% of the projected 600 acres/year). Over the 5 year planning timeframe from 2004 through 2008, 2,015 acres were planted averaging 403 acres per year or 67% of the projected acres in the Forest Plan.

When plantings are not accomplished, it is due to lack of funding, lack of available seed, harvest units not being completed, or unexpected amounts of natural seedlings found in pre-planting surveys. The sites are evaluated and re-scheduled for planting or natural regeneration and surveys. In general sites that are regenerating due to wildfire are programmed for natural regeneration over longer timeframes. The only green harvest sales with outstanding planting needs are Wagner-Atlanta (about 25 acres) and Poorman (about 80 acres); these plantings are scheduled for 2010 with KV funds.

Monitoring Results:

All silvicultural prescriptions specify whether a harvest unit requires regeneration; if so, the method of natural or artificial regeneration is prescribed based on the most cost effective way of meeting sustainability goals. Stands treated with regeneration harvest are measured with systematic stocking surveys 1, 3, and 5 years after site preparation or planting to monitor reforestation. In the event of a natural regeneration failure, planting is scheduled. In addition to harvest units, stands regenerated after wildfire are also monitored (with emphasis placed on timber management areas) to ensure re-stocking; failures in these areas are also scheduled for planting as funding allows. The FACTS database contains information on scheduled natural regeneration and planting, reforestation status, and accomplishments.

For 2008, stands planted in 2004 were reviewed. 443 acres were planted; 67% are certified as stocked and 27% are progressing. No stands are listed as failing. These results showing that many stands are still progressing after 5 years are indicative of sites where seedlings are successful but take a few years to grow to prescription specifications. Many of the sites planted during this period were harsh, burned over areas. Planting which has occurred after 2004 is not expected to be certified as of this monitoring report. All stands still progressing are scheduled for the appropriate stocking surveys.

Planting has been accomplished as recommended in silvicultural prescriptions and post harvest monitoring exams (see project file). Planned activities in prescriptions and changes as a result of surveys are entered into FACTS each season. According the FACTS, from 2004 to 2008, 100% of the planned plantings were accomplished.

Variability Measure Discussion:

Variability Measure:

The Forest Plan projects 600 acres of tree planting per year with (1) acceptable variability of less than 75% of scheduled accomplishment in a five year period and (2) less than 50% accomplishment in any one year. Overall, there will be no more than +/- 10% in scheduled planting over a five year period.

Assessment:

From 2004-2008, the Forest harvested an average of 473 acres/year, and 403 acres/year of planting (85%). While the Forest does not meet the variability requirement of planting at least 600 acres/year over the 5 year timeframe (from 2004 to 2008, the relative abundance of planting to harvest exceeds what was projected in the Forest Plan, although the level of acres is lower. This demonstrates the commitment of the Forest to meet the intent of this standard, which is to provide for adequate stocking within a reasonable timeframe following harvest. The planting during these timeframes generally occurred on salvage harvest areas that were completed 2003-2006. The Forest does meet 50% of the

projection in a given monitoring year (for 2008, 52%). Most of the planting over this 5-year period was in response to the large wildfires and subsequent salvage activity that occurred in 2000 and 2003.

Accomplished planting is within 10% of planned planting over the 5 year monitoring timeframe. From 2004 to 2008, 100% of planned plantings were accomplished.

The tree planting program on the Forest is reflective of the timber sale program. The annual sale quantity is a ceiling, and the planting program is dependent on harvest to attain its ceiling. Harvest of active timber sales is sometimes delayed by market forces or natural events such as severe fire seasons and consequently the planting is delayed. Stands in fire salvage sales have been planted, but funding for reforestation of all burned lands is generally not available.

The Forest Plan projects 1,940 acres of harvest yearly and 600 acres of planting, thereby assuming that about 31% of harvest areas require planting with 69% being natural regeneration or no reforestation needed (intermediate harvest). According to the Forest Plan EIS, planting is scheduled for about ½ of the clearcut acres each year, and other regeneration systems such as shelterwood and seed-tree will generally naturally regenerate (II/74). From 2004-2008, the Forest harvested an average of 473 acres/year, and 403 acres/year of planting (85%). The relative abundance of planting to harvest exceeds what was projected in the Forest Plan, although the level of acres is lower. This demonstrates the commitment of the Forest to meet the intent of this standard, which is to provide for adequate stocking within a reasonable timeframe following harvest. The planting during these timeframes generally occurred on salvage harvest areas that were completed 2003-2006.

Actions in response to variability assessment:

Even though annual acres planted are below Forest Plan recommendation, the HNF is still meeting all NFMA requirements to establish regeneration within a 5 year time frame on all acres harvested. No additional action is needed.

Recommended Efforts:

Continue implementation of recommendations from silvicultural prescriptions and reforestation exams to reforest stands to meet the 5-year regeneration time frame. Plant trees to meet reforestation requirements, as needed.

(E8) Timber stand improvements and assumptions

Forest Plan Requirements:

Monitor timber stand improvements and assumptions.

Intent:

Insure scheduled TSI projects are accomplished.

Data Sources:

FACTS database, silvicultural prescriptions and accomplishment reports.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Summarization and review of data from all available data sources described above.

Monitoring Activity:

Reports were queried from FACTS for planned and accomplished TSI activities (see project file). Prescriptions, where available and appropriate, were assessed.

Data Analysis Methods:

In the 5-year reporting timeframe, (2004-2008) the Forest did not accomplish any pre-commercial thinning. Many non-commercial projects have occurred on the Forest in the form of fuels slashing and fuels treatments, which in some cases accomplish similar objectives but often do not occur in past harvest units and are not focused on timber production. Like planting, TSI projects are dependent on the accomplishment of harvest activities, funding, and the types of prescriptions used although the timeframe from initial harvest to the pre-commercial thinning is much longer. Unlike planting, TSI projects are dependent upon the quantity and type of harvest units that occurred farther in the past and therefore are more subject to changing management policies and funding.

The projected 280 acres of pre-commercial thinning annually reflects 14% of the annual projected timber harvest acres (1,940). If the same percentage were applied to the average annual harvest acres during this 5-year monitoring period (2004-2008, average 473 acres/year) the relative TSI target would be about 66 acres to meet the intent, if not the value, of the Forest Plan element. This relative target has not been met.

Even though the TSI program is currently generally unfunded, the FACTS database has kept records of stands with a diagnosed TSI need. This need is 1,259 acres as of 2008 Most of this planned thinning lies within areas currently mapped as potential lynx habitat, or is not covered by a current NEPA analysis.

Monitoring Results:

No thinning was done in 2008 due to a lack of funding, changing management policies concerning lynx habitat, and a lack of current signed NEPA decisions that include precommercial thinning. In the FACTS database about 1259 acres are planned in accordance with silvicultural prescriptions, and additions are expected in the next few years.

Variability Measure Discussion:

Variability Measure:

The Forest Plan projects 280 acres of pre-commercial thinning per year with (1) less than 75% accomplishment of scheduled TSI in 5 years, or (2) less than 50% accomplishment per year.

Assessment:

Since the Canada Lynx has been listed as a threatened species under the Endangered Species Act the timber stand improvement program within its habitat has been “on hold”, awaiting the thinning treatment recommendations from the Northern Region Lynx Conservation strategy. Most of the stands scheduled for pre-commercial thinning are encompassed by the habitat needs of this species. In addition, there has not been funding for TSI projects in recent years. A deviation of management practices is observed. The Conservation Strategy has been finalized (2008), and with this new firm direction several NEPA analyses are including precommercial thinning proposals.

Even considering the relative abundance of acres harvested, the Forest is not compliant with the TSI objective defined in the Plan due to the constraints associated with a listed species. The Forest is not compliant with the acceptable variability of less than 75% of scheduled accomplishment in a five year period. Annually the Forest has accomplished less than 50% of the thinning objective.

Actions in response to variability assessment:

No additional action is needed at this time. The ability to meet the intent of this element is not within control of the Forest. Future monitoring should show progress in this area.

Recommended Efforts:

The lynx amendment for Northern Region has been finalized, which assesses the appropriateness of pre-commercial thinning projects in accordance with direction. A database review of pre-commercial thinning opportunities has been conducted to implement thinning in areas of greatest need. Several upcoming projects include aggressive precommercial thinning proposals. Continue to consider and prescribe pre-commercial thinning as appropriate in silvicultural prescriptions.

(E9) Lands suitable for timber production

Forest Plan Requirements:

Lands suitable for timber production.

Intent:

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

Data Sources:

Data sources include environmental analyses; stand exams, project plans, and timber planning process.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Review and summarization of data from all available data sources described above.

Monitoring Activity:

Evaluate the accuracy of suitable timberlands classification using the timber planning process, stand exams and environmental analyses. Suitability is considered during the preparation of site-specific silvicultural prescriptions. Post-fire assessments and stocking surveys are used to assess the re-stockability of lands currently in the suitable base that have not been recently harvested; this process is ongoing for the large fires of 2000 and 2003. Finally, stocking surveys, administrative reviews, and other post-harvest monitoring of harvest areas are used to determine if timber suitability assumptions in terms of re-stocking have been met. In cases where failures have occurred or re-stocking cannot be achieved the need to remove the area from the suitable timber base is assessed. Review Forest Plan amendments, specifically, Amendment #'s 5, 8, 9 and 18, and environmental documents to insure consistency with land suitability as described in the Forest Plan.

Data Analysis Methods:

The suitability stage I analysis was used to evaluate lands classified as suitable and unsuitable on the Helena National Forest. The 5-step analysis includes: analysis of lands capable of producing at least 20 CF per acre per year, available for timber production, review of technology available to produce timber without irreversible resource damage and limitations on reforestation. Site-specific Forest Plan amendments to modify suitability have been completed for 4 environmental analyses since 1986 (238 acres added to suitable, 100 acres removed). None have occurred in this planning timeframe. Field exams have been conducted extensively to determine the regeneration ability of both suitable and non-

suitable timber lands in recently burned lands (since 2000). At the completion of this exercise and following the development of prescriptions, the need for an additional amendment to remove or add areas to the suitable base will be assessed, specifically for burned areas where natural recovery is the best silvicultural practice and for failures from historic sales where re-stocking cannot be assured.

Harvest in non-suitable management areas is well documented and analyzed in NEPA documents and silvicultural prescriptions and have been found to meet all Forest Plan objectives and guidance relative to harvest on non-suitable lands. The need for Forest Plan amendments for projects is assessed during the NEPA planning phase and no such amendments have been proposed or accomplished during this monitoring period.

Monitoring Results:

No silvicultural harvest prescriptions were prepared in 2008 which included site specific recommendations to change suitable timber lands. During the 5 year monitoring period 2004-2008, 497 acres of unsuitable lands were harvested, primarily fire salvage-related. In all areas, re-stocking was assured and harvest was used to achieve other resource objectives; these objectives are articulated in NEPA and silvicultural prescriptions.

After the fires of 2001 and 2003, stocking surveys have been done in suitable timber ground in untreated areas as well as harvested and/or planted ones to ensure compliance with NFMA to provide for adequate tree stocking. As of field season 2008, the results of these surveys have determined that due to the difficulty in re-stocking (primarily site harshness), 856 acres of suitable lands are prescribed for “natural recovery”. Natural recovery is a reforestation option that allows long-term natural stocking, and the stand is not expected to produce a timber product for at least the next rotation. The inability to assure re-stocking is a critical element of land suitability; therefore, these lands should not be considered in the suitable base. Exams in fire areas are ongoing and there is potential to add to these natural recovery areas in lands currently designated as suitable. Examinations for all stands can be found in the stand folders. Additional assessments of suitability will likely be needed in mountain pine beetle-killed areas in the next few years. It may be appropriate to amend the Forest Plan management area for these sites at the completion of surveys.

FACTS was also queried to show stands listed as reforestation failures. 385 acres were listed as failing in 2008. Most failing stands are located in fire areas; all areas where harvest occurred recently or in the past are scheduled for planting. The remaining acres of failures are from older, historic sales or in unmanaged lands. A reforestation strategy is in place for these failures; some may be candidates to be removed from the suitable timber base due to the inability to assure stocking.

Variability Measure Discussion:

Variability Measure:

+/- 5% change in acreage of suitable lands.

Assessment:

The Forest is within variability measures for this element for the monitoring period 2008, and for the overall 5 year period since 2004. Lands specified as suitable in the Forest Plan total 251.6 thousand acres; A review of the amendments for the Forest Plan was completed. Amendments 5, 8, 9, and 18 contained changes to existing Forest Plan management allocations. These amendments have decreased this allocation by 100 acres, and increased it by 238 for a net increase of 138 acres. This represents less than 1% of the total allocation. No other changes have occurred during this monitoring period, meeting the variability standard of + or – 5% change in acreage.

Assessments of failures and natural recovery stands since the fires of 2000 thus far indicate less than 1000 acres potentially in need of allocation changes; this is within variability.

Actions in response to variability assessment:

Within stated variability, no additional action is needed. Suitability should continue to be assessed at the stand level during the prescription development, taking into account new information on climate change and drought trends.

It may be appropriate in the near future to pursue an additional amendment to account for the suitability change on the lands prescribed for natural recovery following fires and mountain pine beetle. As it currently stands, the 856 acres prescribed for natural recovery represent less than ½% of a change to the suitable base.

Recommended Efforts:

Continue to evaluate land suitability at the project level as well as assessing wildfire and insect-killed areas and past regeneration failures, and recommend Forest Plan amendments as necessary.

(F) SOIL AND WATER

(F1) Compliance with local, state, and Federal water quality standards

Forest Plan Requirements:

Monitor for compliance with local, state and Federal water quality standards. Ten percent of timber sales or other projects that create soil disturbance must be monitored annually. Flow measurements and measurement of selected water quality parameters (24 stations) will be made throughout the Forest. Activities identified as not meeting water quality standards, or as leading to long-term watershed degradation, would initiate action (i.e. modify the activity so that it will meet water quality standards).

Intent

To ensure compliance with local, state, and Federal water quality statutes.

Data Sources:

Over the past three decades, data have been collected at 41 water quality monitoring sites on the Helena National Forest (HNF) to monitor the majority of HNF timber sales and other major projects. The number of years during which data were collected at each site has varied based on project needs. In addition to HNF data collection, other data collection efforts on the Forest have included various TMDL inventory and monitoring programs, the HNF Youth Forest Monitoring Program, PIBO inventory and monitoring, and monitoring done by other governmental agencies (e.g. MT DEQ, US EPA).

Current Efforts and Findings:

Monitoring methodology:

Suspended sediment samples were collected daily using ISCO automatic water samplers, and periodically using DH-48 hand samplers following standard procedures (Edwards & Glysson, 1999). Bedload samples were obtained using a Helley-Smith bedload sampler following standard procedures (Edwards & Glysson, 1999). Suspended sediment and bedload samples were processed in the Helena National Forest Water Quality Lab using standard filtration methods (Guy, 1969). Flow measurements were recorded using Price AA, Pygmy, and Swoffer flow meters following standard USGS methods (Buchanan & Somers, 1969).

Stream stage was obtained by visual observation of staff gauges (graduated to 1/100 foot) and by recording capacitance-rod water-level sensors. At Copper Creek and Deep Creek, rating curves were developed using measurements at a range of flows following standard USGS methods (Kennedy, 1984). Streams monitored for pesticide contamination from aerial weed spraying involved use of a Polar Organic Chemical Integrative Sampler (POCIS). Details on this device are described in Alvarez et al. (2007). Youth Forest Monitoring protocols are outlined in the Youth Forest Monitoring Program Report for 2008.

Monitoring Activity:

Water quality monitoring sites on the Helena National Forest where data were collected in 2008 are listed in Table 1. Sites are either Helena National Forest (HNF) watershed monitoring sites or Youth Forest Monitoring Program (YFMP) monitoring sites. HNF sites are generally monitored every year over the period of record, and YFMP sites are generally monitored every three years. Stage and stream flow at the HNF sites were generally measured with a flowmeter several times during the peak flow season, and a recording water-level sensor collected daily data.

Among water resource issues, HNF management activities are most likely to influence the delivery to and transport of sediment in streams through ground disturbance, roads, and water yield through vegetation removal. Additional water resource impacts resulting from HNF management activities could include chemical contamination of surface water during and after aerial weed spraying operations. Aerial spraying on the HNF occurred in the Chicken, Deer, Moose, Wasson, and Sauerkraut Creek watersheds in 2008. Sediment flux and water yield were monitored directly at HNF sites.

Table 1. Water quality monitoring sites where data were collected in 2008. Data at YFMP sites are collected once per year.

Site	Sampling period	Parameter	Years sampled
Deep Creek (HNF)	Mar-Sep	Q*, TSS*, BL, WT	1991-94, 2001-08
Sulphur Bar Creek (HNF)	Mar-Jul	Q, TSS, BL, WT	1991-93, 2002-08
Cabin Creek (HNF)	Apr-Aug	Q, TSS, BL, WT	1978-93, 2006-08
Copper Creek (HNF)	Apr-Sep	Q*, TSS*, BL, WT	2004-08
Baggs Creek (YFMP)		MI	2008
Beartrap Creek (YFMP)		WT, pH, DO, SC, XS, PC, SI, SL	2007, 2008
Blackhall Meadows (YFMP)		WT, pH, DO, SC, MI, XS, SI, SL	2007, 2008
Dry Cottonwood Creek, N. Fork(YFMP)		WT, pH, DO, SC, MI, XS, PC, SI, SL	2008
Dry Cottonwood Creek, S. Fork(YFMP)		WT, pH, DO, SC, MI, XS, PC, SI, SL	2008
Magpie Creek (YFMP)		WT, pH, SC, MI, XS, PC, SI, SL	2001-08
Meriwether Creek (YFMP)		WT, pH, DO, SC, MI, XS, PC, SI, SL	2008
Middle Fork (YFMP)		WT, pH, DO, SC, MI, XS, PC, SI, SL	2008
Nevada Creek (YFMP)		WT, pH, DO, SC, MI, XS, PC, SI, SL	2004, 2008
Orofino Creek (YFMP)		MI, XS, PC, SI, SL	2008
Park Creek (YFMP)		WT, pH, DO, SC, MI, XS, PC, SI, SL	2008
Perkins Creek (YFMP)		MI, XS, PC, SI, SL	2008

Pikes Gulch (YFMP)		WT, pH, DO, SC, MI, XS, PC, SI, SL	2002, 2005, 2008
Roberts (YFMP)		WT, pH, DO, SC, MI, XS, PC, SI, SL	1999, 2002, 2005, 2008
Sheps Gulch (YFMP)		WT, pH, DO, SC, MI, XS, PC, SI, SL	1999, 2000, 2002, 2004, 2005, 2008
Slim Sam Creek (YFMP)		WT, pH, DO, SC, MI, XS, PC, SI, SL	1999, 2000, 2002-2006, 2008
Stonewall Creek (YFMP)		WT, pH, DO, SC, MI, XS, PC, SI, SL	2007, 2008
Web Lake (YFMP)		WT, pH, DO, SC, MI, XS, PC, SI, SL	2008
Weston (YFMP)		WT, pH, DO, SC, MI, XS, PC, SI, SL	1999, 2002, 2005, 2008
Willow Creek (YFMP)		WT, pH, DO, SC, MI, XS, PC, SI, SL	2008

Parameters: Q-discharge (Q*-hourly data), TSS-total suspended sediment (TSS*-daily data), BL-bedload, WT-water temperature, pH-pH, DO-dissolved oxygen, SC-conductivity, MI-macro-invertebrates, XS-channel cross section, PC-pebble count, SI-sinuosity, SL-slope

The HNF Forest Plan requires water quality monitoring at the project level in order to ensure that management activities are complying with state and federal water quality standards. Montana state law, which supersedes the Clean Water Act, defines stream water-quality standards in terms of attainment of beneficial uses, rather than in strictly quantitative terms. The 2008 monitoring sites related to past or ongoing HNF projects are on Cabin, Deep, and Copper Creeks—all classified by the state as B-1 streams (ARM 17.30.610). Beneficial uses of B-1 streams are “drinking, culinary, and food processing purposes, after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply” (ARM 17.30.623(1)). The beneficial use most likely to be affected by HNF projects is fish habitat, given its sensitivity to heightened sediment levels.

Monitoring related to the Toston/Maudlow fire (2000) and salvage sale (2002-05), along with the Deep Creek Hazardous Fuels Reduction project (2007) continued at the site on Deep Creek. At the Copper Creek water quality site, water quality was monitored for the Snow Talon salvage sale and road decommissioning (2005-08). Monitoring at the Cabin Gulch water quality site continued in 2008 in anticipation of the Cabin Gulch project, which is currently in the planning stage. The 2008 Youth Forest Monitoring program monitored twenty-two different streams on the forest. Twelve of the twenty-two sites were evaluated for the first time in 2008; thus, for these sites, no trend data are available.

Analysis:

Analysis methods generally consisted of comparing data collected at HNF and YFMP monitoring sites in 2008 with data from the same sites collected in previous years. Parameters measured at HNF sites are discharge, total suspended sediment (TSS), bedload, and water temperature. All of these parameters are influenced by climatic conditions with high inter-annual variability (e.g. snowpack, air temperature, precipitation events). Thus, direct comparisons among years are generally of limited value in determining the effects of management activities. To make meaningful inter-annual comparisons, sediment data were normalized by flow volume, and flow characteristics (e.g. peak flow and number of days of high flow) were evaluated. Measured bedload was generally a small fraction of measured suspended load and so was not included in this discussion.

In order to estimate total annual water and sediment yield at the two sites with daily records (Copper and Deep Creeks), mean annual hydrographs were developed using the existing spring-summer-fall data,

and synthesizing winter flow data. Missing days in each year's daily record were filled using the mean annual hydrograph. Constant sediment concentrations of 8 mg/l (Deep Creek) and 6 mg/l (Copper Creek) were applied for each day without a measurement. Details of this analysis are on file at the HNF Supervisor's Office.

Analysis methods used by the Youth Forest Monitoring program are outlined in the YFMP annual report, available at the HNF Supervisor's Office.

Variability Discussion:

Variability Measure:

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

Monitoring Results and Discussion:

Deep Creek Prescribed Fire; Maudlow-Toston Fire, Salvage Sale

The Maudlow-Toston fire and salvage sale were monitored at the Deep Creek-Pasture and the Sulphur Bar Creek monitoring sites. Daily total suspended solids (TSS) and hourly stream discharge data at Deep Creek (Pasture Site) from 2008 are shown in Figure 1. The daily TSS measured during the spring and summer in Deep Creek was slightly above the seven year average for this location (Table 2)—this is likely due to the small number of samples taken due to equipment problems. Most samples were taken in the general timeframe of large runoff events, and thus showed relatively high sediment concentrations.

The reduction in sediment loads follows a general downward trend since 2002 that suggests a gradual recovery from the Maudlow-Toston fire of 2000. For example, 2002 was a hydrologically similar year to 2007 at this site—average measured flow, peak flow, number of high-flow events, and annual water yield were nearly identical (Table 3). Over the same sampling period, the average daily suspended load was 83% less in 2007 than in 2002, and the estimated annual suspended load was 81% less. During 2008, suspended sediment levels were higher than in 2007, but estimated to be lower on an annual basis than in 2002-06. Prescribed fires during the summer of 2008 had the potential to expose soils to erosion and transport to stream channels, but monitoring at these sites did not reveal any signs of erosion (see Soils report). The increase over 2007 corresponded to higher and longer-duration peak flows, which may have increased streambank erosion over rates in the previous few years. Streambank erosion on the Forest may have been exacerbated by bank trampling by cattle. Although this was not specifically monitored in the Deep Creek drainage, 2008 riparian fencing projects (Carl, Cedar Bar, Sulphur Bar Creeks) should reduce these impacts. The conditions causing higher peak flow (larger snowpack, rain events) could also have caused increased erosion from roads. Another possible source of sediment to Deep Creek during spring runoff in 2008 was extensive timber harvest on private land in Russell Fork Deep Creek in 2007-08, although this was not evaluated in the field.

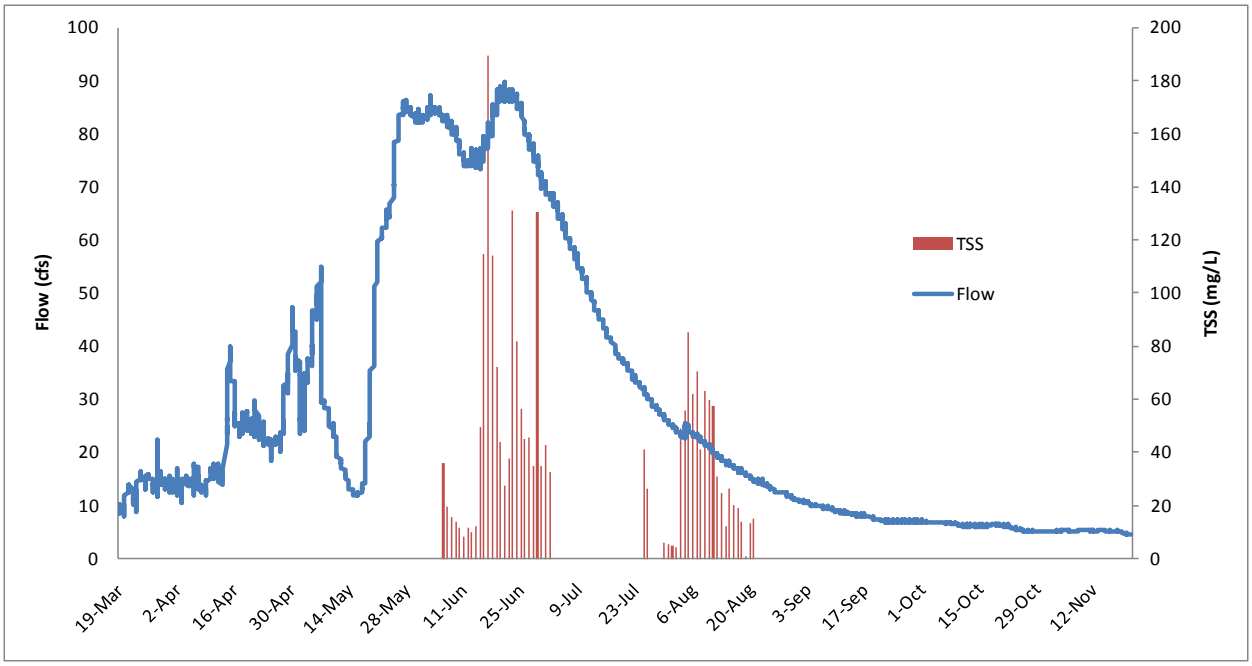


Figure 1. Measured total suspended solids (TSS) and flow volume for Deep Creek (Pasture Site) in 2008. Gaps in the TSS chart indicate that no samples were collected on those dates.

Work on the Maudlow-Toston salvage sale started during the summer of 2002 and was completed in September 2005. The data records suggest that in-stream sediment variability during and after the project were a function primarily of meteorological/hydrologic events, rather than ground-disturbing activities. The high sediment loads in 2003 can be directly tied to a high peak flow event. Ground disturbance related to the salvage operations, in addition to the effects of the Maudlow-Toston fire, probably contributed to the sediment flux to streams in this and other years in the record. However, it is difficult to separate these effects, and it is unlikely that the project contributed significantly to sediment loads in 2003 or in any year in the record. Although sediment data were limited due to equipment problems, sediment concentrations measured in 2008 may constitute an impairment of beneficial uses in Deep Creek—specifically, the salmonid fishery beneficial use. However, the only major project occurring on the Forest in the previous year (a series of prescribed fires) was shown to have no sediment delivery to a stream channel. Roads and cattle trampling of streambanks are management activities that were not quantified, and likely contribute to sediment loads in Deep Creek. Although these activities have not changed substantially since the TMDL monitoring efforts found that Forest streams contribute relatively little to sediment levels in Deep Creek, additional monitoring would help to clarify their impacts.

Table 2. Sediment data from daily measurements, Deep Creek-Pasture Site. Suspended load (tons/day) is the product of daily discharge, daily average TSS, and a unit conversion factor.

Year	Days measured	Ave. meas. daily TSS (mg/l)	Ave. daily normalized TSS** (mg/l/cfs)	Ave. meas. daily susp. load (ton/day)	Ave. daily susp. load* (ton/day)	Total ann. susp. load* (tons)
2002	112	52.7	1.22	7.2	2.6	950
2003	111	79.3	1.35	24.9	7.7	2810
2004	167	20.3	0.52	3.6	1.7	620

2005	92	40.3	0.90	5.9	1.7	620
2006	112	27.5	0.48	4.9	1.7	620
2007	112	9.0	0.28	1.0	0.5	180
2008	52	42.9	1.02	6.6	1.2	438
Average	110	38.9	0.83	7.7	2.4	892

*Average daily and total suspended load for the entire water year were calculated with the measured data and estimated values for the dates where no data were collected. **Average daily normalized TSS is the average value of measured daily TSS divided by daily discharge.

Table 3. Stream flow data from hourly stage measurements, Deep Creek (Pasture Site).

Year	Days measured	Average measured discharge* (cfs)	Peak discharge (cfs)	Days Q>80 cfs	Measured water yield (AF)	Est. annual water yield** (AF)
2002	122	31	80	0	7,503	12,310
2003	111	46	248	11	10,326	15,685
2004	167	34	189	5	11,457	14,784
2005	182	31	84	7	11,134	15,559
2006	169	38	98	12	12,738	16,665
2007	163	31	84	1	10,102	13,902
2008	247	30	96	34	14,478	15,994
Average	166	34	126	10	11,105	14,986

*Average measured discharge is calculated using measured stage and established stage-discharge relationship. **Estimated annual water yield was calculated using measured data, along with estimates from the mean annual hydrograph developed for this station for the dates not measured.

Snow-Talon Fire and Salvage Sale, Road Obliteration

Effects from the Snow-Talon fire and salvage sale were monitored at the Copper Creek monitoring site. Daily total suspended solids (TSS) and hourly stream discharge data at Copper Creek from 2008 are shown in Figure 2. Flow-normalized TSS values from 2008 were lower than in previous years (Table 4). Although the Copper Creek flow regime in 2008 was similar to 2006-07 (higher peak, longer duration high flows, higher annual yield) in contrast to 2004-05, sediment levels were lower (Table 5, Figure 2). This could suggest that the drainage is continuing to recover from the effects of the fire. Although data gaps during runoff may have led to a low estimate of annual load due to the methodology used to predict load on unmeasured days, normalized values indicate that the lower sediment load is realistic.

Table 4. Sediment data from daily measurements, Copper Creek. Suspended load (tons/day) is the product of daily discharge, daily average TSS, and a unit conversion factor.

Year	Days measured	Ave. meas. daily TSS (mg/l)	Ave. daily normalized TSS** (mg/l/cfs)	Ave. meas. daily susp. load (ton/day)	Ave. daily susp. load* (ton/day)	Total ann. susp. load* (tons)
2004	115	15.4	0.42	2.2	1.1	402

2005	106	14.5	0.25	3.0	1.2	438
2006	96	40.0	0.39	6.2	1.9	1387
2007	64	20.5	0.22	6.3	1.4	511
2008	74	12.7	0.16	4.0	0.9	329
Average	91	20.6	0.29	4.3	1.2	423

*Average daily and total suspended load for the entire water year were calculated with the measured data and estimated values for the dates where no data were collected. **Average daily normalized TSS is the average value of measured daily TSS divided by daily discharge.

Table 5. Stream flow data from hourly stage measurements, Copper Creek.

Year	Days measured	Average measured discharge* (cfs)	Peak discharge (cfs)	Days Q>120 cfs	Measured water yield (AF)	Est. annual water yield** (AF)
2004	115	55	161	3	12,636	14,632
2005	182	43	132	3	15,526	19,891
2006	183	59	222	30	21,301	24,882
2007	132	80	187	37	20,848	25,433
2008	101	95	194	33	20,943	25,583
Average	143	66	179	21	18,251	22,084

*Average measured discharge is calculated using measured stage and established stage-discharge relationship. **Estimated annual water yield was calculated using measured data, along with estimates from the mean annual hydrograph developed for this station for the dates not measured.

Given the high variability in streamflow over the past five years, it is difficult to conclude whether the Snow-Talon salvage sale (2005-07) and road decommissioning (2008) had any impact on sediment levels. Harvest activities most likely had no effect on in-stream sediment levels, given that operations were restricted to winter months. In any case, increased sediment would be difficult to separate out from the effects of the Snow-Talon fire of 2003.

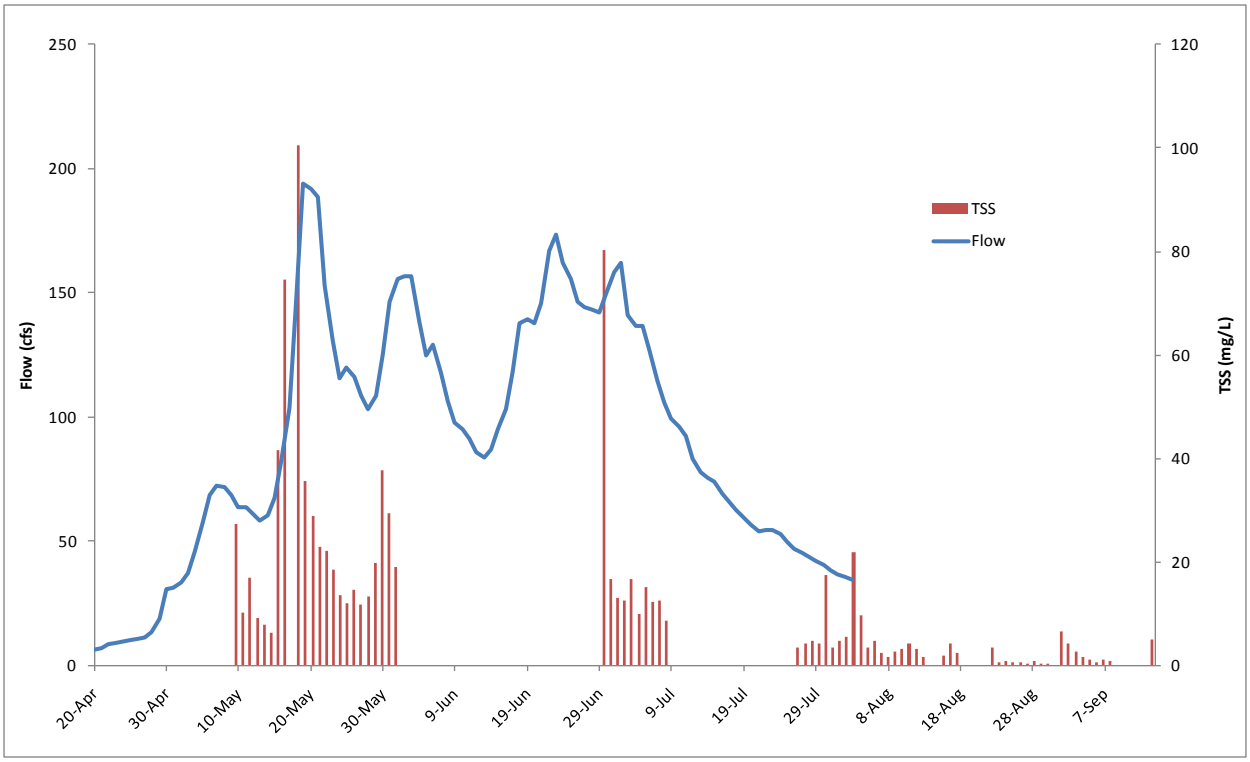


Figure 2. Measured total suspended solids (TSS) and flow volume for Copper Creek in 2008. Gaps in the TSS chart indicate that no samples were collected on those dates.

Cabin Gulch

Cabin Gulch was monitored from 1981-93 and again in 2006-08. Data are presented in this report not as an assessment of ongoing projects, but to provide background information in anticipation of the proposed Cabin Gulch project, which is still in preparation at the time of writing. Sediment levels in Cabin Creek have fluctuated considerably over the period of record, based in part on flow variability. Normalized TSS measurements show that per-unit sediment levels were heightened in the late 1980s to early 1990s (Figure 3), perhaps in response to management activities occurring in the basin in this period. Monitoring will continue at this site in FY2009.

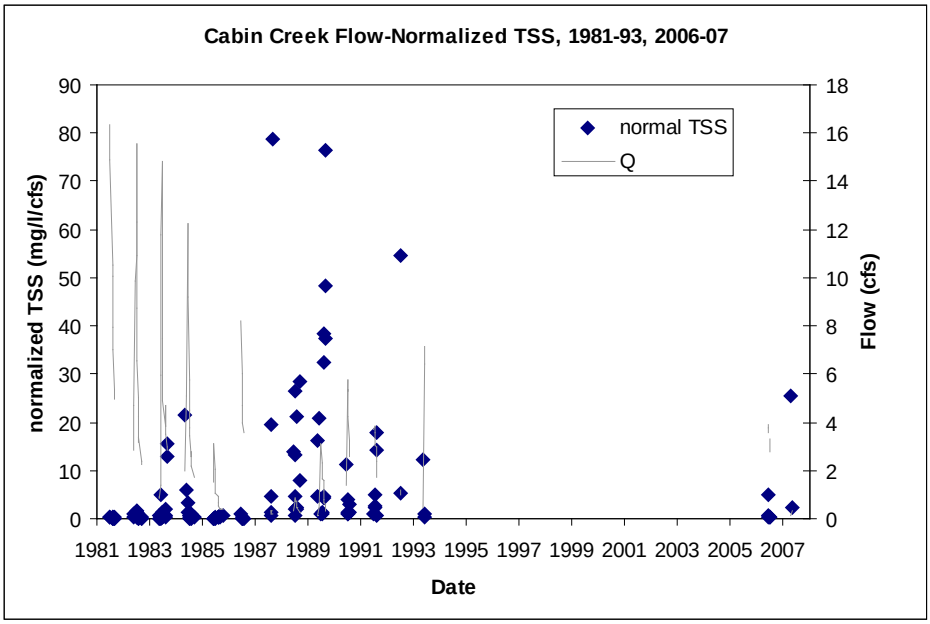


Figure 3. Flow-normalized measured total suspended solids (TSS) and flow volume for Cabin Creek.

Aerial Weed Spraying

In 2008, the HNF issued a contract for aerial application of herbicides to weed infested areas of Deer and Chicken Creek watersheds in the Nevada Creek drainage, and Moose, Wasson, and Sauerkraut Creek watersheds in the Blackfoot River drainage. Areas were treated with Clopyralid. Stream water quality was monitored before, during, and after spraying in Deer and Chicken Creeks using POCIS samplers supported by the USGS (Alvarez, 2007). This sampler is installed in the stream prior to spraying and remains in the stream for roughly one month after spraying. Results indicate the total amount of chemical absorbed by the sampler media over the time period it was installed in the stream. Estimated average water concentrations sampled in both streams ranged from 3.4 to 4.3 µg/L (ppb). These levels are well below thresholds that could affect fish or human health (USDA-FS, 2006).

Burned Area Emergency Response (BAER)

The Meriwether Fire of 2007 burned over 40,000 acres in the North Big Belt Mountains— mostly in the Gates of the Mountains wilderness area. Following the fire, no hillslope stabilization work was done despite the generally high burn severity and steep terrain, because such activity within a designated wilderness is prohibited. In 2008, precipitation monitoring stations were established in the Meriwether Gulch drainage in anticipation of post-fire flooding. At least three large floods occurred in the drainage during 2008. The floods were triggered by relatively modest precipitation events, and carried large volumes of sediment from the upper basin to the mouth of the gulch. The magnitude of these flood events was estimated using the *slope-area* and the *critical depth* methods, and rough correlations were made to the precipitation records from the rain gauges in the basin. A full report on this analysis was completed, and is filed at the HNF Supervisor's Office.

Youth Forest Monitoring Program

The 2008 Youth Forest Monitoring Report outlines conclusions drawn from their monitoring efforts. In this program, data are collected once during the summer; thus, only general conclusions can be drawn from these sites.

The site at Magpie Creek has been monitored from 2001-08. Measured parameters have remained relatively stable in the years since the Cave Gulch fire of 2000. The parameter showing the most change over this period of time is silt/clay particles (<.062mm) which have decreased considerably since 2005. This indicator suggests that this site has gradually improved in the years following the Cave Gulch fire.

Sites on Pikes Gulch, Sheps Gulch, Slim Sam, Stonewall and Weston Creeks also remained relatively stable for the measured parameters. Twelve of the twenty-two sites were evaluated for the first time in 2008, and so no trend data is available. Details of the YFMP analysis are in the YFMP annual report filed at the HNF Supervisor's Office.

Assessment:

Based on analysis of streams downstream of the Snow-Talon and Maudlow-Toston salvage sales and several grazing allotments, and downstream from aerial herbicide application, the Forest was within compliance with the variability measure for compliance with local, state and Federal water quality standards. The stream monitoring site at Deep Creek potentially showed an impairment to the salmonid fishery during early-summer runoff in 2008, based on suspended sediment concentration. However, the best available science is inconclusive in this area. Furthermore, the drainage above this monitoring site includes a large area of private land with recent, extensive management activity. More rigorous monitoring should be directed at this basin in order to clarify the role of ongoing National Forest management activities on sediment levels in Deep Creek.

Actions in response to variability assessment:

The 2008 field data appear to be within the range of acceptable variability.

Recommended Efforts:

Continue monitoring at Deep Creek-Pasture and Copper Creek as baseline water quality sites

Establish two additional baseline water quality sites on major streams on the Forest

Continue monitoring in Cabin Gulch and initiate a station in North Fork Deep Creek to provide pre-project data in anticipation of the Cabin Gulch project

Initiate data collection in additional streams on the Forest in anticipation of other planned projects

Monitor streams potentially affected by 2009 aerial weed spraying

Monitor effectiveness of BMPs recommended in hydrologist reports for FY 2009 projects

Continue BAER/post-fire monitoring efforts

Continue to support Youth Forest Monitoring Program monitoring efforts

(F2) Soil and water improvement projects

Forest Plan Requirements:

Soil and water improvement projects

Intent

To eliminate backlog of soil and water restoration acres by year 2000.

Data Sources:

Project EAs and accomplishment reports. Soil and water improvement projects are monitored through accomplishment reports to eliminate backlog of soil and water restoration acres.

Current Efforts and Findings:

Monitoring Methodology:

Monitoring methodology included inspections by COR and CO to assess whether projects were proceeding according to contract. Visits were also made by the Forest Hydrologist to document progress on the projects.

Monitoring Activity:

Two watershed improvement projects were monitored in 2008: North Belts Travel Plan road decommissioning and riparian fencing in the Deep Creek Watershed. Snow-Talon road decommissioning accomplished in late 2008 will be evaluated for effectiveness in 2010.

Analysis:

Both watershed restoration projects were completed as planned.

Variability Discussion:

Variability Measure:

Variability which would initiate action: < 80% accomplishment of target in five-year period.

Monitoring Results:

The HNF Watershed Program has been within 5% of its watershed target for all six-year periods. In FY2008, watershed targets accomplished included 69 acres of road decommissioning in the North Belts travel planning area, and 16 acres of riparian exclosures in the Deep Creek watershed.

The projected Watershed Improvement Schedule listed in the Forest Plan (Appendix T) is separate from the annual watershed target. The watershed improvement schedule is mainly a list of road improvement projects, and Watershed Program funds cannot be spent on system road improvements. The watershed targets that are assigned to the forest are not associated with these road improvements. Information on road improvement work in FY2008 can be found in the Engineering section of the Forest Plan Monitoring Report. Most of the abandoned mine restoration listed in the watershed improvement schedule has been accomplished. Information on abandoned mine restoration can be found in the Minerals/Geology section of the Forest Plan Monitoring Report.

Assessment:

The Forest is in compliance with the variability measure for Soil and Water improvement projects.

Actions in response to variability assessment:

Within variability; no action required.

Recommended Efforts:

Continue to monitor project areas in 2009 to assess whether closures were effective, and whether vegetation is recovering. Establish baseline monitoring for planned FY2009 projects.

(F3) Productivity changes in sensitive soils

Forest Plan Requirements:

To insure that management practices do not adversely affect soil productivity, EA's, review of proposed activities, field examinations and laboratory testing are used to monitor 10-15 sites annually.

Intent:

To insure that management practices do not adversely affect soil productivity.

Data Sources:

EA's, review of proposed activities, field examinations and laboratory testing.

New Information

Regional Soil Quality Standards were developed in 1999 (FSM 2500 R-1 Supplement No. 2500-99-1 to meet the direction in NFMA (1976) and other legal mandates. Soil quality is maintained when erosion, compaction, displacement, rutting, burning, and loss of organic matter are maintained within defined soil quality standards. Regional Soil Quality standards have determined that more than 15% detrimental soil disturbance would result in a loss of soil productivity. Regional Soil Quality standards provide benchmark values that indicate change or impairment of soil quality based on available research and Regional experience (Page-Dumroese et al. In Review). These standards replace the original, more lenient, Forest Plan standards for detrimental soil disturbance.

The major objective of soil quality monitoring is to ensure that ecologically sustainable soil management practices are being applied. The monitoring methods outlined in FSM 2500-99-1 promote the use of the sampling techniques described therein. Those methods are used to meet the intent of this element.

Current Efforts and Findings:

Annual Report Available:

A separate report is available in the project file for each of the three monitoring activities conducted in FY08.

- Monitoring activity 1 evaluates results of timber harvest management actions
- Monitoring activity 2 assesses the outcome of fuels management and prescribed fire actions
- Monitoring activity 3 documents rangeland conditions associated with allotment management actions.

Monitoring Activity 1 (Timber Harvest)

Forest soil science personnel conducted field assessments of soil conditions in one Timber Sale Area harvested within the past year. Areas sampled included a total of two harvest units in Jim Town Timber Sale Area, Units 5 and 6. Both units were winter logged and whole tree yarded to the landing and slash was hauled back and scattered throughout the unit to provide woody material to meet nutrient cycling recommendations for retention of coarse woody debris.

Information derived from "Soil Survey of Helena National Forest Area, Montana" (USDA Forest Service and Natural Resources Conservation Service 2001) shows Units 5 and 6 are both mapped inside and outside the sampled timber sale units as landtype 29B with a surface texture of a very gravelly loam.

Documentation of Monitoring Methodology for Activity 1

A comparison of measured disturbance results between the Northern Region Soil Disturbance Monitoring Protocol (NRSD) March 2008 edition transect sampling design and a grid sampling design was conducted on Unit 5. The grid sample design was conducted on Unit 6. Field soil conditions were judged using the NRSD Monitoring Protocol (March 2008 ed.) for 4 qualitative disturbance classes. Both sample designs utilized the same disturbance class rating system and visual indicators.

The visual indicators for determining disturbance were exactly as the NRSD Monitoring Protocol suggested; for each data point forest floor depth, top soil displacement, depth of rutting, burn severity, depth of platy structure, depth of compaction, presence/absence of live plants, fine/coarse woody material, rocks, and bare soil along with the disturbance class rating were recorded onto a hardcopy data sheet. Based on the results from the above mentioned criteria, one of four qualitative disturbance class ratings was assigned to each data point. At one point within each disturbance class rating, soil bulk density was measured using the standard core sample method (Blake and Hartge 1986) in triplicate. Likewise, at one point within each disturbance class rating, soil infiltration rates were recorded using the single ring infiltrometer method (Bouwer 1986) in triplicate. Finally, the amount of fuel load remaining within each unit was documented as per standard FireMon protocol. Refer to Tables 1 & 2 for additional information pertaining to the above mentioned data sets.

When “detrimental” soil impacts affect more than 20% of an activity area (i.e. a timber harvest unit), the amount of area affected by detrimental soil impacts exceed the Forest Plan (1986) measure of soil variability. FSM 2500 (USDA Forest Service 1999) Region 1 Soil Quality Standards provides more recent guidelines for measuring soil variability: “At least 85% of an activity area must have soil that is in satisfactory condition.” Stated another way, detrimental soil disturbance should be limited to affect no more than 15% of an activity area (USDA Forest Service 1999).

Bulk density values were compared against growth limiting bulk densities as influenced by soil texture as outlined by Daddow and Warrington, 1983. The landtype where monitoring occurred typically had a loam textured surface. Based on the above-mentioned reference the growth limiting bulk density for a loam soil is 1.50 g/cm^3 to 1.60 g/cm^3.

Average infiltration rates obtained on similar upland sites on the Little Belt Mountains (30 sites were evaluated) were used as a comparison data set. Infiltration rates averaged 8.6 liters per 32.5-minute test (the median value was 6.3 liters per 32.5 minutes), and ranged from 0.5 to 26.5 liters per 32.5 minutes on similar upland sites (30 sites were evaluated) in the Little Belt Mountains (USDA Forest Service 2002).

Maintaining soil productivity over the long term generally requires the presence of soil organic material, especially coarse woody debris (CWD). CWD is defined as downed material with a diameter greater than 3 inches. Brown et al (2003) recommends CWD levels of 5 to 10 tons per acre to maintain acceptable risks of fire hazard and fire severity while providing desirable quantities for soil productivity and soil protection in timbered sites.

Monitoring Results for Activity 1

Table 1. Display of the percent of disturbance for each unit by class.

	Transect Method				Grid Method			
Point Data	Unit 5	Percent of Total	Unit 6	Percent of Total	Unit 5	Percent of Total	Unit 6	Percent of Total*
Total Points	77		not performed		192		305	
Disturbance Class 0	11	14%			2	1%	20	7%
Disturbance Class 1	62	81%			96	50%	194	64%
Disturbance Class 2	4	5%			75	39%	81	27%
Disturbance Class 3	0	0%			19	10%	10	4%
Total Detrimental Disturbance Percent	5%		-		49%		31%	

*detrimental disturbance is the sum of Disturbance Classes 1 & 2.

Table 2. Display of average values for infiltration, bulk density and CWD.

	Unit 5		Unit 6	
	Average Infiltration (L/min)	Average Bulk Density (g/cm^3)	Average Infiltration (L/min)	Average Bulk Density (g/cm^3)
Disturbance Class 0	-	-	-	-
Disturbance Class 1	1.7	1.5	2.9	1.60
Disturbance Class 2	3.1	1.57	3.2	1.77
Disturbance Class 3	2.5	1.67	.2	1.58
CWD (tons/acre)	7.62		1.66/3.68*	

* Two Fuel Load measurements were performed in Unit 6

Variability Measure Discussion For Activity 1:

Variability Measure:

When changes of baseline soil disturbance levels are detected based on Region 1 Soil Quality Standards.

Assessment:

The objectives of this field evaluation were to first, determine if management practices are in compliance with Region 1 (R1) Soil Quality Standards (SQS) and Helena National Forest Plan Standards. The Helena National Forest Plan requires activities to not exceed 20% detrimental soil disturbance from baseline soil conditions. The R1 SQS requires that activities not exceed 15% detrimental soil disturbance from baseline conditions. Through field data collection and report compilation, the Region 1 Soil Quality Standards were not adhered to for the Jim Town Timber Sale, Units 5 and 6.

Areas outside of the timber sale boundaries were characterized as Disturbance Class 1 as a result of relic impacts that existed prior to this timber sale. This level of disturbance is not assumed to be detrimental but shows signs of some level of past impact. This presence of relic disturbance has an affect on the final level of disturbance and cumulative impacts, though the extent cannot be quantified from this data.

Units 5 and 6 of the Jim Town Timber Sale exceed both the Region 1 guidelines and the Helena National Forest Plan guidelines for detrimental soil disturbance. The amount of direct impact resulting from the most recent activity is uncertain because of the cumulative effects of relic disturbance because no baseline data were collected. Regardless of the direct and indirect effects, mitigation is needed to align these units with a trend of improving physical conditions. It is worth noting that the effects anticipated from previous monitoring of winter harvest on the Helena National Forest should not exceed roughly 3% of the activity area.

Additionally, Unit 6 did not retain an adequate amount of coarse woody debris to provide for long term nutrient cycling and to aid in resisting surface erosion.

Actions in response to variability assessment

Any further activity in the project area should be deferred until soil conditions can be evaluated. For all future actions, soil information should be evaluated before implementation in a representative subset of activity units in any given project area. Existing condition data is generally collected prior to implementation of any activity on the Helena NF, this instance just further reinforces the need.

Mitigation measures will be coordinated with the Forect ecologist. Activity must be completed with an emphasis on protecting archeological sites and in compliance with Best Management Practices for reducing an invasion of noxious weeds. Unit 6 will need to have some additional slashing performed to increase the amount of coarse woody material remaining, especially if burning is to occur which will consume most of the material that is present now.

Monitoring Activity 2 (Fuels Management)

Documentation for Monitoring Methodology for Activity 2

Forest soil science personnel conducted field assessments of soil conditions in four Fuels Management Areas; Davis 9, Bull Sweats, Crow Creek and Deep Creek project areas. For information regarding soil surface texture for each landtype within monitoring units refer to Table 3. Table 4 displays the number of data points per unit within each project area, when the unit was burned, the date monitoring was performed and the acres within each burn boundary.

The Davis 9 project was burned in the fall of 2007. Data Points 0 & 1 both fell on the edge of an open park transitioning into a Lodgepole stand with the occasional Juniper.

The Bull Sweats vegetation manipulation project was comprised of an individual tree and group selection with implementation scheduled for early 1996. Harvest was then followed by under burning in May of 2006. The canopy was dominated by Ponderosa Pine.

All of the Units within the Crow Creek controlled burn area were ignited in April of 2007. The ground cover primarily consisted of sagebrush grasslands with encroaching Douglas Fir in a few units.

All three units in the Deep Creek project area were burned in the fall of 2007. Dominating the ground cover were Douglas Fir trees with grasses repopulating some of the area.

Table 3. Display of surface texture per landtype at each Plot Number

Project Name	Unit Designation	Plot Number	Landtype	Surface Texture
Davis 9		Plot 0	49A	Loam
		Plot 1	49B	Channery to Very Channery Loam with surface loess influenced by volcanic ash
Bull Sweats	Harvest 1	Plot 1	100	Gravelly Silt Loam to Extremely Gravelly Sandy Loam
Crow Creek	Unit 3	Plot 9 Plot 16 Plot 18 Plot 22	37	Cobbly Loam
	Unit 5	Plot 13 Plot 14 Plot 16	37	Cobbly Loam
	Unit 15	Plot 20 Plot 23 Plot 34	37	Cobbly Loam
Deep Creek	Unit 3A		390	Gravelly to Very Gravelly Loam
	Unit 3C		49	Cobbly Loam to Silt Loam
	Unit 3D		39	Very Channery Sandy Loam

Information derived from "Soil Survey of Helena National Forest Area, Montana" (USDA Forest Service and Natural Resources Conservation Service 2001)

Soil Best Management Practices (BMP's) were provided by Sue Farley, Forest Soil Scientist on the Helena National Forest on February 2, 2004 for the Deep Creek prescribed burn project and are available in the CE for the Deep Creek Project.

Table 4. Project Name, Units within the Project, Plot Number, Acres and Dates Burned and Monitored.

Project Name	Unit Designation	Plot Number	Acres	Date Burned	Date Monitored
Davis 9		Plot 0	677	Fall 2007	06/16/2008
		Plot 1		Fall 2007	06/16/2008
Bull Sweats	Harvest 1	Plot 1	60	May 2006	05/30/2008

Crow Creek	Unit 3	Plot 9	276	Fall of 1996 & 04/12/2007	08/18/2008
		Plot 16		Fall of 1996 & 04/12/2007	07/09/2008
		Plot 18		Fall of 1996 & 04/12/2007	07/10/2008
		Plot 22		Fall of 1996 & 04/12/2007	07/09/2008
	Unit 5	Plot 13	110	Fall of 1996 & 04/12/2007	07/15/2008
		Plot 14		Fall of 1996 & 04/12/2007	07/15/2008
		Point 16		Fall of 1996 & 04/12/2007	07/14/2008
	Unit 15	Plot 20	267	April/2007	07/14/2008
		Plot 23		April/2007	07/10/2008
		Plot 34		April/2007	07/10/2008
Deep Creek	Unit 3A		63	10/1/2007	06/18/2008
	Unit 3C		87	10/1/2007	06/19/2008
	Unit 3D		53	10/1/2007	06/19/2008

Prior to entering the fields, roughly 20 potential plot centers were placed inside each unit on a grid. Potential plot centers were then randomly selected in the office prior to reaching the field and are referred to as randomly selected plot centers. Point spacing of randomly selected plot centers varied and was dependent upon the size of the unit. The number of randomly selected plot centers visited within each unit was determined by the size of the unit, type of tree canopy and the variability of fire severity within the unit.

At each randomly selected plot center, a total of 100 data points (unless otherwise noted) were evaluated along 7 transects, with each transect being 75 feet in length. The 7 transects were oriented in a pre-defined hexagonal pattern. Transects occur along the six sides of the hexagon plus one transect starting at the plot center. Transects were directionally laid out according to the standard FIREMON sampling protocol (2005). At each of the 100 data points, both qualitative and quantitative data were recorded.

In the field, a qualitative assessment of visual indicators evaluating severe soil burning and erosion (e.g. sheet, rill and gully erosion, and mass wasting) were documented. For the quantitative assessment, bare ground versus soil cover was recorded at each data point Hydraulic conductivity of the soil surface was measured using the mini-disk infiltrometer method for determining soil water repellency (Robichaud 2004). Two different generations of mini-disk infiltrometers were used by field crews. Occasionally, a few of the data points fell on top of rocks, therefore that point was skipped which results in less than 100 data points collected. The amount of surface organic material (e.g. fuel load) was evaluated along all of the 7 transects of the randomly selected plot using the standard FIREMON sampling protocol (2005).

In the office, visual data (e.g. indicators for severe soil burning and erosion) and soil cover data were compiled and tallied in an Excel spreadsheet (Table 6).

Data collected with each generation of instrument was separated when entered into Excel, and then further divided by burned and unburned status (Table 7). Hydraulic conductivity data was also compiled in an Excel spreadsheet and analyzed for average values and standard deviation. Each infiltration measurement provided two pieces of data—the time for the first bubble to rise in the infiltrometer and the volume of water that infiltrates the soil during the one minute test. The time for the first bubble to rise is a measurement of the time needed for the first "drop" of water to leave the infiltrometer and pass into the soil which is the surface infiltration rate. In project file is a spreadsheet displaying the average number of seconds to the first bubble for each monitoring point is calculated for both generations of mini-disk infiltrometers and divided into burned and unburned categories.

The amounts of surface organic material were entered into the FIREMON database which generates a report displaying the amount of tons per acre of material totaled for all transects (Table 9).

The average surface infiltration rates, the number of seconds to the first bubble and the difference between those quantities are used only as one level of comparison for evaluating site conditions. There are no baseline value recommendations for standard surface infiltration rates on these (or similar) soils. The values obtained from these tests can be tied into water repellency classes as outlined in Table 9. Soil water repellency is evaluated in relative terms. Most researchers and land managers compare the water repellency of one site to another and/or the change in soil water repellency due to forest fire, rehabilitation treatments, as well as the change over time (Robichaud 2004). This assumption was applied to conditions resulting from prescribed fire and those units evaluated in this report. The most limiting value, either surface infiltration rate or time to the first bubble was used to determine the repellency class based on parameters from Table 6.

The mini-disk infiltration test is not a definitive measure of soil water repellency. However, it can be an effective field technique to quickly assess the spatial distribution of water repellent soils as well as the relative level of water repellency at each test site (Robichaud 2004).

Maintaining soil productivity over the long term generally requires the presence of soil organic material, especially coarse woody debris (CWD). CWD is defined as downed material with a diameter greater than 3 inches. Brown et al (2003) recommends CWD levels of 5 to 10 tons per acre to maintain acceptable risks of fire hazard and fire severity while providing desirable quantities for soil productivity and soil protection in timbered sites. No recommendations backed by study were found for Sage Brush dominated sites.

Not all of the units were forested sites. As outlined above in the Introduction of Monitoring Activity 2 section; vegetation type and cover varied for all of the units and sometimes varied between points.

Table 5. Water repellency classes defined for results of mini-disk infiltrometer test

Water Repellency Class	Volume (mL) of water to infiltrate during 1 min	Time (sec) for first bubble to rise
None	7 or more	0 to 2
Low	>4 to <7	3 to 4
Moderate	>2 to 4	5 to 9
High	0 to 2	>10 or no bubble

table from Assessing Post Fire Soil Water Repellency, Draft (Robichaud)

Monitoring Results for Activity 2

There was no identified trend in the data with regards to one type of mini-disk consistently reading higher or lower surface infiltration rates or seconds to the first bubble.

The burn pattern across all units was a mosaic; however no large pockets of severe burn were located. Sample points evaluated represent burn conditions across that specific unit. Specifically, this generalization was verified by David Marr, Soil Scientist, for all plots with in the Davis 9, Bull Sweats and Deep Creek units in addition to Crow Creek Unit 3. The remaining Crow Creek Units burned homogenously according to the District AFMO, David Nunn. Likewise, the data points with the Crow Creek Units were representative of the burned conditions for the entire unit.

Table 6. Visual data and soil cover data for soil monitoring plots within all Fuel Treatment Projects.

VISUAL DATA:	Severely Burned	Sheet Erosion	Rill Erosion	Gully Erosion	Mass Movement	% of Total Disturb.	Bare Ground	Soil Cover
Davis 9, Point 0	0	0	6%	0	0	6%	9%	91%
Davis 9, Point 1	1%	0	0	0	0	1%	25%	75%
Bull Sweats, Point 1	0	0	7%	0	0	7%	3%	97%
Crow Creek, Unit 3, Point 9	0	0	0	0	0	0	17%	83%
Crow Creek, Unit 3, Point 16	0	0	1%	0	0	1%	13%	87%
Crow Creek, Unit 3, Point 18	0	0	0	0	0	0	4%	96%
Crow Creek, Unit 3, Point 22	0	0	11%	0	0	11%	19%	81%
Crow Creek, Unit 5, Point 13	0	0	0	0	0	0	6%	94%
Crow Creek, Unit 5, Point 14	0	0	0	0	0	0	19%	81%

Crow Creek, Unit 5, Point 16	0	0	0	0	0	0	14%	86%
Crow Creek, Unit 15, Point 20	0	0	0	0	0	0	6%	94%
Crow Creek, Unit 15, Point 23	0	0	0	0	0	0	10%	90%
Crow Creek, Unit 15, Point 34	0	0	0	0	0	0	4%	96%
Deep Creek, Unit 3A	4%	0	2%	0	0	4%*	1%	99%
Deep Creek, Unit 3C	3%	0	0	0	0	3%	3%	97%
Deep Creek, Unit 3D	0	0	0	0	0	0	1%	99%

*Total disturbance is 4% because two of the points exhibited both severe burn and rill erosion.

Table 7. Average surface infiltration data for both burned and unburned sample points on soil monitoring plots within all Fuel Treatment Projects.

	Number of Samples Burned/ UnBurned (B/UB)	**Average** Surface Soil Hydraulic Conductivity (mL/min) **new mini-disk BURNED**	**ST DEV**	**Average** Surface Soil Hydraulic Conductivity (mL/min) **new mini-disk UN-BURNED**	**ST DEV**	**Average** Surface Soil Hydraulic Conductivity (mL/min) – **old mini-disk BURNED**	**ST DEV**	**Average** Surface Soil Hydraulic Conductivity (mL/min) – **old mini-disk UN-BURNED**	**ST DEV**
Davis 9, Point 0	45/55					5.00	2.25	4.75	1.69
Davis 9, Point 1	**New:** 8/42 **Old:** 4/46	5.25 (3.25)	7.05 (2.25)	4.17	2.18	6.00	1.41	6.61	2.79
Bull Sweats, Point 1	**New:** 62/8 **Old:** 51/8	1.89	1.23	2.25	0.71	2.92	1.62	4.25	1.39
Crow Creek, Unit 3, Point 9	42/55	7.52	4.29	7.58	4.14				
Crow Creek, Unit 3, Point 16	37/63					6.19	3.49	6.38	2.86
Crow Creek, Unit 3, Point 18	98	4.00	3.46	4.94	4.81				
Crow Creek, Unit 3, Point 22	70/28	5.61	4.21	6.43	2.85				
Crow Creek, Unit 5, Point 13	49/51	5.67	4.43	6.57	4.72				
Crow Creek, Unit 5, Point 14	27/73	6.89	4.59	9.51	4.60				
Crow Creek, Unit 5, Point 16	28/72	7.21	4.81	7.36	4.19				
Crow Creek, Unit 15, Point 20	46/52					6.37	4.29	6.92	2.80
Crow Creek, Unit 15, Point 23	**New:** 3/14 **Old:**28/45	6.77	8.01	7.79	7.04	5.57	3.72	7.44	4.13
Crow Creek, Unit 15,Point 34	47/50					5.28	4.29	5.58	3.96
Deep Creek Unit 3A	**New:** 9/36 **Old:** 11/44	2.78 (2.00)	2.33 (0)	1.94	0.71	1.82	1.08	2.98	1.8
Deep Creek Unit 3C	4/96					5.00	3.22	6.59	2.77
Deep Creek Unit 3D	12/43	2.17	1.19	2.47	1.12				

*values in parenthesis are results with outlier values replaced with the next highest value in the data set explained above.

Table 8. Water repellency class for burned and unburned sites with each generation of mini-disk.

	Number of Samples Burned/ UnBurned (B/UB)	**Water Repellency Class - New Infiltrometers BURNED**	**Water Repellency Class - New Infiltrometeres UNBURNED**	**Water Repellency Class - Old Infiltrometers BURNED**	**Water Repellency Class - Old Infiltrometers UNBURNED**
Davis 9, Point 0	45/55	-	-	NONE	NONE
Davis 9, Point 1	**New:** 8/42 **Old:** 4/46	HIGH (MODERATE)	MODERATE	LOW	LOW
Bull Sweats, Point 1	**New:** 62/8 **Old:** 51/8	HIGH	MODERATE	MODERATE	LOW
Crow Creek, Unit 3, Point 9	42/55	LOW	LOW	-	-
Crow Creek, Unit 3, Point 16	37/63	-	-	LOW	LOW
Crow Creek, Unit 3, Point 18	98	HIGH	HIGH	-	-
Crow Creek, Unit 3, Point 22	70/28	MODERATE	LOW	-	-
Crow Creek, Unit 5, Point 13	49/51	HIGH	MODERATE	-	-
Crow Creek, Unit 5, Point 14	27/73	LOW	NONE	-	-
Crow Creek, Unit 5, Point 16	28/72	MODERATE	MODERATE	-	-
Crow Creek, Unit 15, Point 20	46/52	-	-	MODERATE	LOW
Crow Creek, Unit 15, Point 23	**New:** 3/14 **Old:**28/45	HIGH	HIGH	MODERATE	LOW
Crow Creek, Unit 15,Point 34	47/50	-	-	MODERATE	MODERATE
Deep Creek Unit 3A	**New:** 9/36 **Old:** 11/44	MODERATE (HIGH)	HIGH	HIGH	MODERATE
Deep Creek Unit 3C	4/96	-	-	HIGH	LOW
Deep Creek Unit 3D	12/43	MODERATE	MODERATE	-	-

* values in parenthesis are results with outlier values replaced with the next highest value in the data set.

Table 9. Fuel load data showing tons per acre of surface organic material, by size class, within all Fuel Treatment Projects.

FUEL LOAD DATA	< 0.25 in.	0.25 - 1 in.	1 - 3 in.	> 3 in.*	Total (Ton/ac)
Davis 9, Point 0	.1	.59	.43	0	1.1
Davis 9, Point 1	.04	.31	.28	5.62	6.3
Bull Sweats, Point 1	.05	1.09	1.45	1.43	4.0
Crow Creek, Unit 3, Point 9	.01	.07	.2	0	.28
Crow Creek, Unit 3, Point 16	.12	.13	0	0	.25
Crow Creek, Unit 3, Point 18	.04	.13	.14	0	.31
Crow Creek, Unit 3, Point 22	.05	.32	.72	.2	1.3

Crow Creek, Unit 5, Point 13	.13	1.06	.97	0	2.16
Crow Creek, Unit 5, Point 14	.06	.22	0	0	.28
Crow Creek, Unit 5, Point 16	.08	.27	0	0	.35
Crow Creek, Unit 15, Point 20	.16	.61	.98	.51	2.26
Crow Creek, Unit 15, Point 23	.05	.67	.28	0	1.0
Crow Creek, Unit 15, Point 34	.07	.97	.14	0	1.18
Deep Creek, Unit 3A	.48	2.97	1.7	2.19	7.3
Deep Creek, Unit 3C	.33	2.32	2.54	.91	6.6
Deep Creek, Unit 3D	.05	.11	.46	1.84	2.4

*the values in this column reflect the coarse woody debris amounts

Variability Measure Discussion For Activity 2:

Variability Measure:

When changes of baseline levels of the soil's chemical and physical properties exceed 20% as determined by lab analysis.

Assessment:

Both data points inside Davis 9 are stable and do not present any erosion hazards. Point 1 having 25% bare ground may be of concern, but the time of year the data was collected may have been too early to see an "average" amount of vegetation for the growing season. It is unclear as to whether or not the high amount of bare ground resulted from the prescribed fire. Soil conditions observed in this unit are in compliance with the Helena National Forest Plan and Region 1 guidelines.

The amount of coarse woody debris remaining in the Bull Sweats Project Area, (1.43 tons/acre) is not sufficient for providing desirable quantities for soil productivity and soil protection in timbered sites and does not meet Region 1 guidelines. Physical soil conditions observed in this unit are in compliance with the Helena National Forest Plan.

All of the sites located within the Crow Creek Unit 3 project area are very open with only the occasional Douglas Fir tree encroaching, but being dominated by sagebrush, grasses and rock outcrops. None of the data points exhibited characteristics that should be alarming with regards to erosion hazards or threats resulting form severely burned soils. Soil conditions observed in this unit are in compliance with the Helena National Forest Plan and Region 1 guidelines.

The data points within the Crow Creek Unit 5 project area did not exhibit any recorded erosion or severely burned soils. None of these data points suggest any threat to erosion resulting from the prescribed fire. Soil conditions observed in this unit are in compliance with the Helena National Forest Plan and Region 1 guidelines.

The sagebrush and grass dominated vegetation surrounding the Crow Creek Unit 15 data points has not suggested any erosion hazards would result from the prescribed fire activity. No erosion or severely burned soils were recorded in any of the data points. Soil conditions observed in this unit are in compliance with the Helena National Forest Plan and Region 1 guidelines.

The only issue with any of the Deep Creek Units is regarding the validity of recorded coarse woody debris remaining in Unit 3D. Based on visual estimates, photo comparison to other units and professional judgment, the fuel loading in this unit appears to be sufficient to protect against soil erosion and provide for long term nutrient cycling. All of the units exhibited little to no recorded erosion or severely burned soils. Soil conditions observed in this unit are in compliance with the Helena National Forest Plan and Region 1 guidelines.

One of the major factors in not recording any extreme levels of erosion during the data collection of 2007 could be a result of the average (or less than average) amount of rain and snow that these sites received. No high intensity rain or snow melt conditions were recorded in these areas last spring/summer which would most likely have an impact on the recently burned soils.

Actions in response to variability assessment and recommendations for Activity 2

The amount of coarse woody debris remaining in the Bull Sweats unit evaluated above does not meet the Regional Soil Quality Standards for the residual amounts of coarse woody debris for a forested site. This does not necessarily mean the remainder of the unit is not in compliance with standards and guidelines. Mitigation measures to increase the amount of coarse woody material may include revisiting the unit and slashing some of the remaining standing dead while maintaining compliance with snag retention for this habitat type.

All other units analyzed are in compliance with the Helena National Forest Plan and Region 1 Soil Quality Standards.

Monitoring Activity 3 (Rangeland Conditions)

Documentation of Monitoring Methodology for Activity 3

Forest soil science personnel conducted field assessments of soil conditions in two active range allotments. Areas sampled included the Deep Creek Allotment and the Dry Creek Allotment. Monitoring on allotments occurred approximately half way through the permitted grazing season.

The Deep Creek Allotment is comprised of the following 13 landtypes: 14A, 15, 34, 39, 39A, 39C, 49, 49A, 94, 100, 110, 390 and 391. The Dry Creek Allotment is comprised of the following 10 landtypes: 14A, 29C, 39, 39A, 39B, 39C, 49, 94, 390 and 391.

Primary grazing lands in the Deep Creek Allotment fall upon landtypes; 39A, 39C, 49A, 110 & 391 While transitory grazing lands are comprised of landtypes 14A, 15, 34, 39, 49, 94, 100, 390.

In the Dry Creek Allotment, landtypes 29C, 39A, 39B, 39C & 391 typically comprise the areas of primary grazing sites. Likewise, landtypes 14A, 39, 49, 94 & 390 are generally comprised of transient grazing sites.

Table 10. Table showing allotment name, transect site ID, allotment acres & landtype.

Allotment Name	Allotment Acres	Landtypes where monitoring occurred	Surface Texture
Deep Creek	12,217	49A	Loam

Dry Creek	5,810	39C	Loam

*soil information obtained from "Soil Survey of Helena National Forest Area, Montana" (USDA Forest Service and Natural Resources Conservation Service 2001).

Sample areas where transects occurred, were determined from discussions with Tracy Schilling, Range Management Specialist on the Townsend District of the Helena National Forest. Sample areas were identified based on areas of primary and transitory rangelands of grazing animals within the allotment. Primary rangelands were selected for our monitoring sites and are assumed to be representative of conditions throughout the allotment.

Multiple indicators of soil health were evaluated at 20 sample points across one transect of varying length (or varying spacing of points). Spacing of the points was dependent upon the size of the primary grazing area to be evaluated. The larger the area the longer the distance between sample points. The direction of transects were randomly oriented. When transects changed direction, typically 90 or 45 degrees when the transect's path led into a timbered site.

Conditions were assessed at each of the 20 sample points based on characteristics of a 6 inch diameter circle at the toe of the data collector's boot when the desired distance was reached. The following soil indicators were evaluated at each of the 20 sample points:

- Depth and abundance of very fine and fine size plant roots (measured by digging into the ground using a shovel);
- Depth and color of the "A1" soil horizon (i.e. topsoil) was recorded (measured by digging into the soil surface using a shovel);
- Presence and type of soil cover (ocular estimate);
- Evidence of compaction, such as platy or massive soil structure (ocular estimate)

In addition to the indicators evaluated for each of the 20 sample points along the randomly oriented transect, two other types of soil data were collected at 3 out of the 20 sample points. These 3 data points were randomly selected from a bag containing the numbers 1 thru 20 before entering the allotment. The following is an outline of additional data collected at these points:

- Triplicate soil bulk density core samples were collected for the A1 horizon (i.e. topsoil) using the standard core sample method (Blake and Hartge 1986)
- Triplicate tests of soil infiltration rate were performed using the single ring infiltrometer method (Bouwer 1986)

For the Deep Creek Allotment, transect number 08DM008, point data was collected on July 25, 2008. Bulk density and infiltration data were gathered on August 19, 2008. Site conditions were dry for both days of monitoring.

For the Dry Creek Allotment, transect number 08DM012, bulk density and point data were collected on July 2, 2008 and infiltration was measured on July 15, 2008. Site conditions were moist when point data and bulk density samples were collected. The site was dry when infiltration rates were measured.

Point data was analyzed after being entered into an Excel spreadsheet to determine average depths and the percent of points with live plants on the surface (refer to Table 11).

Infiltration data was also entered into Excel spreadsheets to calculate the amount of water the average amount of infiltration (refer to Tables 12 & 13).

In the lab, bulk density samples were weighted and then left to air dry. Once the samples were dry (the length of dry time depended on the moisture content), the samples were reweighed to determine the dry weight from which the bulk density was calculated since we know the exact size of the cylinder the weight came from (refer to Tables 12 & 13).

There are no well-defined benchmark values for determining changes in soil condition associated with past or ongoing livestock grazing in this allotment. Therefore, conclusions regarding how past livestock grazing may have affected current soil conditions will be based on professional interpretation of soil monitoring data collected during the field season of 2008. This is consistent with recommendations by the National Research Council regarding rangeland monitoring: “evaluation of what constitutes a healthy, at risk, or unhealthy distribution of plants, bare areas, rooting depths, and growth periods will depend primarily on informed judgments” (National Research Council 1994, page 120). The indicators used in this analysis are; infiltration rates, bulk density values, percent ground cover, depth of very fine and fine roots, percent of the A Horizon filled with roots, top soil color and the structure of the top soil.

For comparison purposes, similar upland range sites (30 sites were evaluated) in the Little Belt Mountains, infiltration rates averaged 8.6 liters per 32.5-minute test (the median value was 6.3 liters per 32.5 minutes), and ranged from 0.5 to 26.5 liters per 32.5 minutes (USDA Forest Service 2002).

Bulk density standards were compared against recommendations from Daddow and Warrington 1983. Daddow and Warrington’s findings are based upon the root growth being limited from an increase in bulk density broken down by texture. The landtypes where monitoring occurred all typically have a loam textured surface. Based on the above-mentioned reference the growth limiting bulk density for a loam soil is 1.50 g/cm^3 to 1.60 g/cm^3.

Monitoring Results for Activity 3

Table 11. Table displaying the average data values collected across the 20 sample points.

Allotment Name	Dry Creek	Deep Creek
Monitoring Site	08DM012	08DM008
Top Soil Color	Black to Dark Grayish Brown	Very Dark Brown to Brown
Soil Structure	65% GRANULAR 35% PLATY	GRANULAR
Avg. depth to vf/f root decrease (in)	12.1	8.1
Avg. depth of A Horizon (in)	15.8	10.3

% of A Horizon filled w/roots	77%	81%
# of pts w/live surface cover	100%	100%
Sample Point Spacing (ft)	95	65

Table 12. Infiltration and Bulk Density values for the Deep Creek Allotment

Deep Creek	Average Infiltration (L/min)	Average Bulk Density (g/cm^3)
Point 6	4.0	1.14
Point 7	3.7	1.43
Point 11	3.5	1.20

Table 13. Infiltration and Bulk Density values for the Dry Creek Allotment

Dry Creek	Average Infiltration (L/min)	Average Bulk Density (g/cm^3)
Point 9	15	.95
Point 11	18.5	.97
Point 15	15.2	.97

Variability Measure Discussion For Activity 3:

Variability Measure:

The objectives of this field evaluation were to first, determine if timber harvest practices are in compliance with Region 1 (R1) Soil Quality Standards (SQS) and Helena National Forest Plan Standards. The Helena National Forest Plan requires activities to not exceed 20% detrimental soil disturbance from baseline soil conditions. The R1 SQS requires that activities not exceed 15% detrimental soil disturbance from baseline conditions.

Assessment:

Deep Creek Allotment

Site conditions on the allotment previously identified as the primary upland range locations appear to have no detrimental impacts. No evidence of soil erosion by water or wind was observed, vegetated ground cover was adequate to prohibit any off site transport of surface materials. Likewise, there was no indication of deposition of material from other sources onto the site. The A-horizon is present and appears to be stable and fairly uniform across the unit.

The measured soil infiltration rates are lower than the comparison values. Based on the soil's ability to absorb and retain water, it is uncertain as to whether or not this site's infiltrations rate is adequate to support a healthy rangeland condition. The bulk density values for all sample points for both transects are below the recommended threshold for growth limiting values. The soil bulk densities are adequate to

allow plant root penetration and growth. When all measured and observed parameters are taken into consideration, conditions do not appear to be unproductive.

Even with the relatively low infiltration rates, the low occurrence of invasive weed species, acceptable ranges in bulk densities, granular structure, adequate rooting depth, significant A-horizon presence and continuous live vegetative cover all indicate a healthy and productive range site.

Dry Creek Allotment

Site conditions on the allotment previously identified as the primary upland range location appear to have no detrimental impacts. No evidence of soil erosion by water or wind was observed, vegetated ground cover was adequate to prohibit any off site transport of surface materials. Likewise, there was no indication of deposition of material from other sources onto the site. The A-horizon is present and appears to be stable and fairly uniform across the unit.

The measured soil infiltration rates are higher than when compared to similar sites. The soil's ability to absorb and retain water is considered adequate to support healthy rangeland conditions. Especially when taken into account with the other information collected.

The bulk density values for all sample points for both transects are well below the recommended threshold for growth limiting values. The soil bulk densities are adequate to allow plant root penetration and growth. This is a very productive site, which explains why the sites with platy structure have not adversely effected the vegetation.

The low occurrence of invasive weed species, acceptable ranges in bulk densities, high infiltration rates, granular structure, adequate rooting depth, significant A-horizon presence and continuous live vegetative cover all indicate a healthy and productive range site.

Actions in response for variability assessment and recommendations for Activity 3

There are no recommendations of mitigating any existing conditions for either Deep Creek or Dry Creek Range Allotments based on the data presented above. Both allotments are within acceptable limits of disturbance as outlined by the Helena National Forest Plan and Region 1 Soil Quality Standards.

(F4) Availability of adequate water to maintain management options, water rights.

Forest Plan Requirements:

Ensure availability of adequate water to maintain management options, water rights

Intent

Maintain existing water rights and update Water Uses Requirements and Rights File

Data Sources:

Project EA's, AMP's AMO accomplishment reports, water uses and rights files are used to monitor availability of adequate water to maintain management options and water rights.

Current Efforts and Findings:

Monitoring Activity:

A transfer of water right from Beartrap Creek to Snowbank Lake was pursued and obtained.

Analysis:

Due to a failure to file a statement of claim during adjudication, the Forest lost the water right for the Snowbank Lake water diversion. A possible water rights transfer or new water right was investigated for this site in 2005. A contract was let to submit an Application to Change a Water Right in 2006. This application was submitted to DNRC in March 2007. After modifying the terms of the Change request in conjunction with Montana FWP, the final application was submitted to DNRC in October 2007. The Change Authorization was approved in January 2008.

Variability Discussion:

Variability Measure:

Variability which would initiate action – Any change which would require acquisition of additional water rights

Monitoring Results:

The State is currently in a statewide adjudication and all water rights are reviewed as part of each basin's temporary preliminary decree or preliminary decree. Individual projects are reviewed as to whether additional water rights need to be acquired.

Assessment:

A Change Authorization was pursued and obtained (in FY2008) for a water right to be transferred from Beartrap Creek to Snowbank Lake.

Actions in response to variability assessment:

None.

Recommended Efforts:

Continue to monitor water rights adjudication in watersheds on the Forest in FY 2009.

(G)MINERALS

(G1) Forest Service Land Uses That May Affect Minerals Activities element will be available

Forest Plan Requirements:

Forest Service Land Uses that may have an effect on minerals activities: minerals activities that may have an effect on surface resources

Intent:

Check that recommended stipulations are adequate to protect resources but not severely restrictive. Conversely, to check that resources are not severely restrictive on mineral activities.

Data Sources:

Data sources include minerals NEPA documents, project files and project field inspections on three ranger districts. Ten reviews are to be completed annually.

Current Efforts and Findings:

Hard Rock Mineral Activities:

This monitoring item was developed during a period of high mineral activity, particularly exploration drilling for low grade gold deposits. The State of Montana passed a law prohibiting cyanide in new heap leach gold operations. Since 2000 there has been only one exploration drilling project for a low grade gold deposit at Miller Mountain in the Big Belts. That project was completed and most of the bond released in the Fall of 2005. The project owner ceased activities and reclaimed his drill sites and roads due to a lack of a potential buyer. There were no new proposals in 2006.

Small scale placer prospecting activities account for the bulk of the hard rock minerals projects on the forest during the period 2007-8, along with a few underground lode activities. The forest administers between 50-75 of these projects per year with 6-10 new or amended projects annually as well a similar number that are reclaimed and closed. These projects have been approved with Categorical Exclusions and are generally as such a small scale (less than ½ acre per project on average) that other FS land uses do not affect the project permitting and scope. The consistency in applications and projects suggests that stipulations are not severely restrictive, however, regulatory changes that lead to larger bond amounts are not usually well received by the miners and can result in the scaling back or redesign of a project proposal. Regulatory changes related to Bull Trout listing in drainages west of the Continental Divide have increased project mitigations and Plan of Operations processing timelines for small scale placer projects. Some miners have found these mitigations to be severely restrictive, particularly with respect to available periods for operations.

A small handful of underground lode operations remain active at low levels, including the Bigler mine and White Hope mine. All of the mines have gold as their primary prospective product.

In 2005 and 2008, the Helena forest signed decisions that completed travel planning on the Townsend Ranger District. The result of these decisions has been closure of some miles of formerly open roads. Road closures curtail the ability for reconnaissance type mineral exploration but generally do not significantly increase the regulatory burden on Plan of Operation proposals. Some miners see road closures as helpful for preventing vandalism at their project sites.

Leasable Mineral Activities:

The Helena Forest completed its Forest-wide Leasing EIS in 1998 and the Record of Decision was upheld in 1999. Since that time, the Helena Forest has leased about 100,000 acres. Most of the lease requests were in 1999. Several lease requests occurred in the fall of 2007 in the southern Big Belts. All lease requests have been processed, with the exception of 6 parcels in Inventoried Roadless areas in the south Big Belts. Of the acres processed, not all of the acres submitted to BLM for sale have been purchased. A seismic proposal was received and processed in 2002 but the project was not conducted. All of the leases that were sold from this request were protested at the time of sale. Protests were related to discrepancies in Forest Plan described big game and elk winter ranges and the Leasing EIS, as well as to recent modifications in mapping these ranges being considered by Montana FWP.

In 1986, the Helena Forest had 287, 514 acres leased. In 1996, the Helena Forest had suspended a handful of leases and could not issue new leases until completion of its forestwide leasing EIS. The leasing EIS was completed in 1998. The Helena Forest is expected to receive additional lease applications in the future and is also expecting to be able to review and submit them to BLM in a timely fashion.

In the winter of 2005, a deep exploration well was initiated near Flesher Pass seeking natural gas in Mississippian carbonates underlying the Lewis Overthrust. This wildcat well was drilled from private land to private minerals that is surrounded by federal land. While the drilling was ongoing, the company submitted a second APD to the BLM for the same site with the intent of drilling to federal minerals. That

proposal was dropped in July 2005 as the initial well was unsuccessful. A review of the stipulations attached to the NFS surface did not appear to negatively impact the company's plans, nor was it identified as the reason for canceling the APD for the second well.

With the recent focus on renewable energy resources, there has been an upsurge in geothermal interest nationwide. Portions of the Helena National Forest are prospectively geothermal resources areas. There have been no lease requests or applications for exploration for geothermal activity on the Helena National Forest.

Mineral Materials

Nearly all of the mineral materials activities on the Helena Forest are either free – use permits or in-service road material pits. Free use permit requests have increased from about 6-8 per year before 2000 to about 15 per year. The increase appears to be related to residential housing growth in the Helena area. Residential project builders are usually seeking material quantities of about 1 ton or less each. The Forest may soon need to look at developing common use areas and charging small fees for material extraction in order to prevent undue small disturbances across the forest.

Geologic Resources

Identification and interpretation of unique geologic resources appears to be an area of increasing public interest. The Helena Forest has unique cave resources, overthrust geology, hard rock minerals, post fire debris flows, high elevation wet meadows, a historic hard rock millsite, fossils and semiprecious minerals. The future of study and interpretation of these sites is their interrelatedness to other resources such as wildlife, vegetation and watersheds, as well as cultural history.

Abandoned Mines

The Helena Forest has nearly 150 identified abandoned or inactive hard rock mine sites. Documented impacts from some of these sites includes water quality impairment, loss of vegetation growth, and metals bearing sediments that are harmful to human health and aquatics. Since 1995, the Forest has reclaimed 21 sites ranging from <0.1 acre to over 10 acres in an effort to reduce metals contamination to headwaters streams. The Forest currently has 2 mine waste repositories on NFS lands to maintain and monitor and is a cooperator at the Luttrell Regional Repository which has wastes from over 10 Forest Service mine sites and numerous EPA lead mine sites in it. Mine wastes from the Little Blackfoot watershed were disposed in the Luttrell Pit in 2006.

The Mike Horse dam, located in the Upper Blackfoot watershed on NFS lands was evaluated for stability in 2005. The dam was found to be in a deteriorating condition. The Forest is working within the CERCLA framework and responsible parties to resolve the long term issue of this dam. A draft EE/CA was prepared and released for public and agency comment in the fall of 2006. A cleanup decision was rendered in summer of 2007. The decision included the removal of the dam and placement of the impounded tailings in an onsite repository.

Numerous hazardous mine openings have been inventoried on the Helena National Forest and new openings continue to be discovered. The Forest is actively closing or rendering safe 10-15 sites per year. There were 18 mine closures in 2008, mostly in the area south of Helena which is a priority due to the high level of recreation use.

Documentation of monitoring methodology:

Monitoring protocols include project review by Forest Geologist of 5-10 projects with District Minerals Administrators annually through informal discussions during various stages of project NEPA and permitting. Emails and project file meeting notes between the minerals administrator and the ranger, miner or Forest geologist are generally the documentation that is used.

Monitoring Activity:

Monitoring activity includes discussions by Forest Geologist with mineral administrator and district rangers, as well as individual operators.

Data Analysis Methods:

Review CE's and project file documentation. Discuss projects with mineral administrators.

Monitoring Results:

The consistency in new applications and projects suggests that stipulations are not severely restrictive, however, regulatory changes that lead to larger bond amounts are not usually well received by the miners and can result in the scaling back or redesign of a project proposal. Regulatory changes related to Bull Trout listing in drainages west of the Continental Divide have increased project mitigations and Plan of Operations processing timelines for small scale placer projects. Some miners have found these mitigations to be severely restrictive, particularly with respect to available periods for operations.

Variability Measure Discussion:

Variability Measure:

1. Departure from approved operating plan or violation of assigned stipulations.
2. Unnacceptable review of lease application by ID Team
3. Unacceptable restrictions on mineral development

Assessment:

1. Variability item #1 – a small percentage of hard rock mineral projects invariably result in a departure by the miner from what was approved and bonded. Usually this is a result of miscommunication or lack of cooperation on the part of the miner. The resulting resources impacts, overall, are minor as these projects are localized in nature and relatively infrequent. The Forest is within the variability for this measure.
2. Variability item #2 – does not apply as the Forest completed its leasing analysis and ROD in 1998 which resulted in identification Forest Wide of areas available to lease and areas unavailable to lease.
3. Variability item #3 – Only two low potential areas have been eliminated from leasable mineral activities as a result of forest service restrictions. These areas include the Tenmile Municipal Watershed and the Elkhorn Wildlife Management Unit. These areas have a low potential for leasable (hydrocarbon) minerals due to their bedrock geology. Other factors, such as a Montana statewide ban on new cyanide projects, and global metal markets are more influential to mineral development, than resources restrictions. Travel plans and the resulting closures of roads have the potential to negatively impact initial exploration activities in areas of mineral interest and closed roads. No unacceptable restrictions have occurred.

Actions in response to variability assessment:

Travel plans need to specifically identify mineral resources exploration and development activities as a viable use of closed roads and areas, as part of approved Plans of Operation.

Recommended Efforts:

Describe any recommendations to accomplish the actions needed, or if no action is needed, to continue the current level of compliance with the monitoring element.

(L1) FACILITIES

(L1) Roads

Forest Plan Requirements:

Local roads in place and collector roads constructed.

Intent:

Insure that assumptions are valid concerning: 1. Local/collector road density 2. Local/collector road standards.

Data Sources:

INFRA Travel Routes inventory, accomplishment reports, EA's, transportation plans, and final construction reports. TIS inventory has been replaced by the FS intranet database program, INFRA (I-Web).

Current Efforts and Findings:

Currently, no new roads are being constructed without prior Roads Analysis and NEPA decisions.

Documentation of Monitoring Methodology:

New Road Construction is required to meet requirements of the Forest Service Manual and Best Management Practices (BMPs).

Monitoring Activity:

Any new road construction would be subjected to following the Forest Plan and NEPA.

Data Analysis Methods:

Methods to analyze newly constructed roads would be by a Final Inspection Report which would be filed in the Project folder and then entered into INFRA.

This newly constructed road would also continue to be monitored as per L2 requirements.

Monitoring Results:

Resource Element L1 monitors the miles of local roads in place and the miles of collector roads constructed on an annual basis. The Forest Plan stated that there were 1607 miles of system roads on the HNF in 1980 (the base year for the Forest Plan) and predicted that 22 miles of road (9 miles of collectors and 13 miles of locals) would be built each year. This would increase the total system miles to 2520 after five decades (or about year 2035). The attached table shows the miles of road in the system (now called the Transportation Atlas) by year since 1986. The table also shows the miles of road constructed each year. Where there are blanks in the table there is no information available. For two years, 2001 and 2002 the data is incorrect. There was an error in the database that caused many roads to be double counted. Data for those two years should not be considered.

Helena National Forest Road Information

Year	Miles in System	Miles Closed Yearlong	Miles of Collector Constructed	Miles of Local Road Constructed	Forest Plan Projections, Miles	Forest Plan Projected Collectors & Locals, Mi. to be Constructed Each Yr.
1986	1607	207	6	15.2		
1987			6.5	16		
1988			4.8	12		
1989			3.2	8.1		
1990			2.6	6.5		
1991			2.2	5.3		
1992	1680	325	3.3	8.2	1761	+22
1993	1680	325	1	3	1783	+22
1994	1940	568	0.5	0.9	1805	+22
1995	1990	570			1827	+22
1996	1887				1849	+22
1997	1776	335	0	0	1871	+22
1998	1899	339	0	0	1893	+22
1999	1837	334	0	2	1915	+22
2000	1954	297	0	0	1937	+22
2001	(1)	(1)	0	0	1959	+22
2002	(1)	(1)	0	0	1981	+22
2003	2847	888	0	0	2003	+22
2004	2832	888	0	0	2025	+22
2005 (2)	2829	888	0	0.3 (3)	2047	+22
2006 (2)	2831	893	0	0	2069	+22
2007 (2)	2854	967	0	0.5 (4)	2091	+22
2008 (2)	3070	1117	0	0	2113	+22

(1) For two years (2001 and 2002) the data is incorrect. There was an error in the database that caused many roads to be double counted. Data for those two years should not be considered.

(2) These number varies slightly from the 2004 number due to actual on the ground surveys and therefore the adjustment of the mileage.

(3) The 0.3 miles of road constructed was at MacDonald Pass to access a trailhead.

(4) The 0.5 miles constructed was at the Cave Gulch and Never Sweat Trailheads.

The Forest Plan assumed the total system miles should have been 1761 in 1992, 1871 in 1997, and 2,025 in 2004. The actual numbers were 1680 in 1992 (a 5% variance from the predicted), 1776 in 1997 (a 5% variance) and 2832 in 2004 (a 40% variance). The total miles in the system stayed within the plus or minus 20% tolerance until 2003. The reason for exceeding the variance in 2003 and 2004 is that the definition of a road in the Forest Plan differs from the definition used today as a result of the National Forest Service policy change with the new National Roads Policy adopted in 2001. The Forest Plan assumed that the 1607 miles of road inventoried in 1980 comprised all of the roads on National Forest land that were being used by vehicles. Low standard, low traffic “Jeep trails”/ roads, were not considered part of the system at that time. As per the 2001 Road Policy, all vehicle travel-ways including these low

standard routes are considered system roads. Over the years many of these routes were added to the system, while others were decommissioned (obliterated). Partially to implement the new National Road Policy and partially to prepare for forest-wide travel planning the Forest began an effort in 2001 to inventory all of the existing roads on the Forest. In 2001 and 2002 the roads database incorrectly double counted many of these new roads that were added to the system. That is why the values for those years are incorrect.

In 2005 an adjustment was made to the mileage due to on the ground condition surveys. Not all roads are surveyed every year and so adjustments will probably continue as other roads are surveyed.

The Forest Plan predicted that the Forest would build 9 miles of new collector roads and 13 miles of local roads each year between 1986 and 2035. The table above shows that since the plan as been adopted there hasn't been a year when that many miles of road were built. In 1986 and 1987 the total miles of road constructed came close to that prediction (well within the variance of 20%), but beginning in 1988 the miles of road construction was outside the 20% variance from the predicted 22 miles per year. The annual miles of road construction fell sharply in the early 1990's and, since 1995, very few new roads have been constructed on the Forest. The predicted miles of new road construction assumed the Forest would be building roads in inventoried roadless areas to access timber stands. After the mid-1990's no roads have been built in inventoried roadless areas due to changes in national policy and public support. Road construction outside inventoried roadless areas has almost completely stopped, with timber harvest using existing roads, temporary roads or logging systems (helicopter) that don't require closely spaced roads.

Variability Measure Discussion:

Variability Measure:

Variation of +/- 20% of predicted miles of road will initiate action.

Assessment:

The actual number of road miles is under the projected amount using the Forest Plan definition. However, under the 2001 Road Policy definition, the Forest is well within the variability limits.

Actions in response to variability assessment:

No action is needed since the Forest is within the variability as defined by the 2001 Road Policy.

Recommended Efforts:

With the virtual elimination of road construction to support the timber program, measuring the miles of collector road constructed is no longer a meaningful monitoring element. The total miles in the system is a valid element and one that is done annually when the forest prepares the Road Accomplishment Report (RAR). The RAR also annually tracks the miles of road by maintenance level, miles reconstructed, miles receiving maintenance, and miles decommissioned. All of these are valid monitoring elements and should be included in the revised Forest Plan. In addition to the items covered by the RAR another new monitoring element that should be considered during Forest Plan revision would be the miles of road open to dual use.

(L2) Road Management

Forest Plan Requirements:

Monitor road management.

Intent:

Insure that assumptions are valid concerning:

1) Collector roads.
   a. yearlong closures
   b. seasonal closures
2) Local roads
   a. yearlong closures
   b. seasonal closures

Data Sources:

INFRA Data base.

Actual road condition surveys to record lengths, condition and needed improvements.

Travel Routes Inventory maintenance plans and travel plans are used to insure that assumptions are valid concerning yearlong closures, and seasonal closures of collector and local roads. TIS data base has been replaced by INFRA data base. Travel Management plans are subjected to the NEPA process.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Random sampling on forest roads is occurring yearly for required Annual and Deferred Maintenance needs, and the INFRA data base is updated.

Monitoring Activity:

Qualified road/engineering personnel perform monitoring activity. This is a process in which personnel go out to the field and to the randomly selected specified road. A complete road condition survey is completed. This is usually when road lengths, maintenance levels, and closure restrictions are reviewed.

Data Analysis Methods:

Analysis of the data is checked against approved Travel Plans on record.

Monitoring Results:

Resource Element L2 monitors the miles of road closed to vehicle use either seasonally or year long. The variability that would cause action is plus or minus 30% of the predicted road miles. The Forest Plan stated that of the 1607 miles of road in the system 207 were closed either year long or seasonally. The plan predicted that the miles closed would increase to 327 by the end of the first decade and to 870 miles by the end of the fifth decade. There is no way to measure the miles of road closed seasonally on an annual basis, however the miles with year round closures by year since 1992 is known. In 1997, at the end of the first decade of the Forest Plan, there were 335 miles closed year long. This is only a 2% variance from the predicted number of closures. In 2007 there were 967 miles closed year long, which is slightly above what the plan predicted would be closed by 2035.

Of the total system miles of road in 2008, 2,854 miles, 1,125 miles are open yearlong. This means there are 1,729 miles with either yearlong or seasonal closures. As noted above there are 967 miles closed yearlong, leaving 762 miles with seasonal closures. The Forest Plan predicted that there would be about 1530 miles of road open yearlong by 2008. The decrease in miles open yearlong has come about as a mitigation measure for many projects taken on over the last twenty years. In most of the timber sales since 1986 wildlife mitigation has called for closing some existing roads in the area either seasonally or yearlong. Recent travel management decisions have also closed more roads either seasonally or yearlong to protect resources such as wildlife habitat, watershed health and non-motorized recreation.

The miles of yearlong closures are somewhat close to the miles for both seasonal and year long closures predicted by the plan and the seasonal closures have generally exceeded the miles closed each year since 1986. These additional miles of closures have come through travel plan decisions that either were attached to a timber sale or were stand alone decisions. Since the Forest Plan was written there has been an unanticipated surge in motorized recreation on the Helena NF. To control that increased use, seasonal or year long closures have been placed on more roads than had been predicted.

From year 2000 data to the 2007 data (since 2001 and 2002 are unusable due to errors) 900 miles were added to the database that were not recorded in previous years due to implementation of the National Roads Policy in 2001. Prior thought to why these roads were not counted could have been due to assuming these roads were not generally passable by a standard vehicle. They were rough unusable 4 wheel drive “Jeep” roads, and not considered to be used much, if at all. The National Roads Policy changed that and they were added to the Forest Inventory. Once these roads were accounted for, many roads were decommissioned and/or obliterated, thus the changed number in miles of roads closed year long, as well as the increase of miles in the system.

Year	Forest Plan Assumption (miles)	Actual
2000	1937	1954
Correction	+893	+893
2003	2830 (under 2001 definition)	2847

The Forest Plan assumed in year 2000 that there would be 1,937 miles of road in the system and the Actual number of miles was 1,954 miles and 297 miles closed yearlong. Once a correction was made to add the miles of previous, unaccounted for miles of road, the actual miles of road in the system in 2003 was 2,847 miles; an increase of 893 miles. Had that been added to the Forest Plan projection that would have kept the forest within a 1% variance between the two scenarios. However, it was not.

Also worth noting, is the difference in Roads Closed Yearlong, which changed from 297 miles in year 2000 to 888 miles in 2003. Year 2000 shows that 15% of the roads were closed year long while 2003 shows 31% of the roads closed year long, 31% in year 2005, 32% in year 2006, 34% in 2007, 36% in 2008.

The reason the number and percentage amount has risen so drastically on miles of roads closed, is due to the 2001 Roads Policy correction and closure of these “Jeep Trails”.

Variability Measure Discussion:

Variability Measure:

Variation of +/- 30% of miles of predicted roads closed either seasonally or yearlong will initiate action.

Assessment:

Assuming the miles of road open yearlong in 2008 cumulatively represents the situation in the years between 1986 and 2008, we are very close to the variability limits and no action is needed, as further variations will continue to fluctuate as Road Condition surveys continue into the future.

Actions in response to variability assessment:

As other travel management plans are created, monitoring in reference to the Forest Plan and NEPA decisions will be required.

Recommended Efforts:

No Action is needed to continue the current level of compliance with this monitoring element.

The Road Accomplishment Report (RAR) annually tracks the miles of road by maintenance level, miles reconstructed, miles receiving maintenance, and miles decommissioned. All of these are valid monitoring elements and should be included in the revised Forest Plan. In addition to the items covered by the RAR, another new monitoring element that should be considered during Forest Plan revision would be the miles of road open to dual use.

(P) PROTECTION

(P1) Acres and volumes in insects and disease infestations

Forest Plan Requirements:

Monitor acres and volumes of insect and disease infestations.

Intent:

Assure harvest emphasizes removal of high risk trees for mountain pine beetle attack, and to keep an inventory of acres of high risk stands for insect and disease infestations.

Data Sources:

NEPA documentation, R1 Forest Health Protection trip reports and Aerial Detection Surveys and accompanying Condition Reports; silvicultural prescriptions, survival and silvicultural exams, ground surveys, past sale reviews, and FACTS database. The Forest Plan lists TSMRS as a data source. This database has been replaced with National FACTS database, which is the appropriate data source to use for this element.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Review and summarization of data from all available data sources described above.

Monitoring Activity:

Areas at high risk of insect and disease infestations are monitored and evaluated for harvest opportunity. Data sources include, silvicultural prescriptions, survival and silvicultural exams, ground surveys, past sale reviews, FACTS, and review of annual FHP aerial detection surveys and Condition Reports. Project plans and implementation are monitored for changing insect conditions and effectiveness of treatments.

Data Analysis Methods:

Trends of increasing insect and disease activity across the Forest have continued during this monitoring period and can be expected to continue. As a result, most treatments either proposed or implemented contain a strong focus on salvage of dead and dying trees as well as increasing resiliency of residual stands to insects and disease. All project prescriptions also include designs or mitigations to prevent the introduction or spread of insects or disease; these measures include proper slash treatment and removal of infested individuals. In 2008 in particular, a large Forest-wide assessment was undertaken to examine the effects of the ongoing mountain pine beetle epidemic and propose a 5-year schedule of vegetation projects to address it. This assessment is in the project file.

Monitoring Results:

Most insects and diseases continued to increase across the Forest in 2008, and during the 5-year monitoring periods since 2004. The Douglas-fir beetle was on the rise during the first part of the period, declined in 2006 and 2007, but is rising again in localized areas that are stressed from the western spruce budworm. In these areas risk to Douglas-fir beetle (DFB) remains high and new outbreaks are possible especially following defoliation and fire activity. According to the 2008 Bark Beetle Conditions Report (Gibson 2009, project file), 5,200 acres on the HNF are infested with DFB. Mountain pine beetle (MPB) is in epidemic proportions, increasing in severity and distribution across the Forest. The bulk of this infestation is in lodgepole pine, but ponderosa pine and whitebark pine are affected as well. According to Gibson (2009), 360,200 acres are infested with MPB; this represents nearly 40% of the HNF land base. Pine engraver is credited with infesting an additional 10,000 acres; however it is likely associated with MPB. Western spruce budworm defoliation also continues to increase. This insect has caused notable mortality in the Flesher Pass area in particular. It is present on 200,000 acres as of the 2008 Aerial Detection Flight (Gibson 2008). A prominent disease on the Forest continues to be white pine blister rust, which continues to cause significant mortality in whitebark pine and is often present, coincident with mountain pine beetle. The Aerial Detection Flight in 2008, as summarized by Gibson (2009) measured trees killed in 2007 and mortality estimates do not include trees killed during 2008.

Several NEPA documents were written during this period that focused on areas at high risk to infestation; also, some projects implemented were focused on insects. In 2008 the planning process was continued for the following projects responding in part to current and potential infestations: Cabin Gulch (EIS), Hay Peggy (EIS), Elliston Face Fuels (CE), and Clancy Unionville (EIS). Projects that have been implemented since 2004 include Jimtown Fuels (2007), Greyson Bugs (2006), Snow Talon (2006), Grassy Bugs (2004), and Lincoln Compound (2004). Additionally, susceptible high-value recreation sites and administrative sites have been protected from bark beetles with pheromones and/or carbaryl treatments during the evaluation period (roughly 400 acres per year).

Additionally, several large vegetation projects based on the 2008 insect assessment are being developed for the NEPA analysis pipeline. All of these upcoming projects include design features to remove infested trees and lower resultant stand susceptibility to not only the mountain pine beetle, but other insects as well (Roadside Hazard Trees, Warmsprings, South Hills, Telegraph, Stonedry). Additional projects are programmed after these first areas, including Tenmile, Dalton, East Stemple, South Hills, and York/Nelson.

Silvicultural review of Clancy Unionville burning prescriptions resulted in delaying burning until after the mountain pine beetle epidemic, to avoid increasing the mortality in desirable ponderosa pine. Brief visual observations in the Jimtown project indicated that the thinning has lessened stand susceptibility and continuing mountain pine beetle mortality is much less than the surrounding landscape.

Variability Measure Discussion:

Variability Measure:

ID team reviews result in an unacceptable review **or** if less than 70% of timber volume is programmed from high risk to mountain pine beetle stands. Introduction or spread of insect or disease.

Assessment:

The Forest is within the variability for this element. The Forest continues to consider all opportunities to manage stands with current insect infestations as well as those areas at high risk to mountain pine beetle. Specifically, mountain pine beetle outbreaks have been targeted in the Greyson salvage sale, Jimtown Fuels, and Grassy Bugs projects; and in planning for Elliston Face, Cabin Gulch, Roadside Hazard Trees, Warmsprings, Telegraph, South Hills, and Stonedry projects. No negative IDT reviews have occurred in any treatments with respect to insects and disease.

The Forest is proactive in monitoring insect and disease activity, and considers opportunities to treat for mountain pine beetle in conjunction with all projects is meeting the intent of the standard. The deviation from this standard earlier during this monitoring period (prior to 2008) is due to the large scale wildfires and subsequent salvage harvest activities. Almost all of the planned and ongoing projects as of the end of FY2008 include a focus on stands at high risk for mountain pine beetle.

Insect and disease activity across the forest is extensive at this time. Planning activities are underway to respond to the current mountain pine beetle epidemic. While it is not possible to stop a mountain pine beetle outbreak of the scale currently faced, projects are being developed and programmed to respond and treat infected stands across the forest. Management activity is responsive to natural conditions such as prolonged drought and large scale disturbances such as fire. Proactive control measures have been implemented including the application of anti aggregative pheromones and participation in a regional selective breeding program to develop whitebark pine seedlings resistant to white pine blister rust.

Actions in response to variability assessment:

Within stated variability, no additional action is needed.

Recommended Efforts:

Continue with a proactive and aggressive forest health effort. Follow through with the multitude of opportunities to treat areas currently experiencing mortality associated with the Mountain Pine beetle and areas at high risk to mountain pine beetle.

(P2) Air quality

Forest Plan Requirements:

Annually monitor air quality.

Intent:

Assure prescribed fire meets state and Federal air quality standards.

Data Sources:

The State DEQ also operates Particulate Matter (PM) samplers in Helena and Great Falls

Current Efforts and Findings:

Prescribed burning is done when conditions are favorable for minimizing smoke impacts. This occurs either through reducing total emissions produced and/or burning during meteorological conditions that disperse smoke. Burning is conducted according to a prescribed burning plan prepared specifically for each burn. The prescriptions address burning conditions and smoke dispersal.

During spring and summer, this translates into finding the optimum combination of fuel moistures, fuel arrangements and meteorology to minimize downwind impacts. During the fall (September - November) this also means burning according to the restrictions and advice of the Monitoring Unit of the Montana/North Idaho State Airshed Group that currently monitor our burning program.

The purpose of the Monitoring Unit is to regulate fall prescribed burning by members of the Montana/North Idaho State Airshed Group, monitor on-going prescribed burning to ascertain and encourage compliance, and to record and document information pertinent to prescribed burning that leads to improved future operations and better understanding of smoke accumulation problems and cures.

Documentation of Monitoring Methodology:

The program coordinator of the Monitoring Unit works with the National Weather Service to review programs and establish starting dates for ventilation analyses and dispersion forecasts by NWS fire-weather forecasters. The Monitoring Unit considers existing air quality conditions and other local data in each airshed in determining the need for burning restrictions. The expected amount of residual smoke from previous days' burning is evaluated along with meteorological information, NWS forecasts and associated data and PIBAL balloon run data. The State DEQ also operates Particulate Matter (PM) samplers in Helena and Great Falls. This data is used to help determine the need for restrictions.

Monitoring Activity:

The State DEQ also operates Particulate Matter (PM) samplers in Helena and Great Falls.

Data Analysis Methods:

N/A

Monitoring Results:

No violations notices were received to indicate that standards had been exceeded. This information is summarized annually by state DEQ. Measurements are in compliance as determined by DEQ.

Variability Measure Discussion:

Variation of +/- 10% beyond standards and guides will initiate action

Variability Measure:

+/- 10% beyond standards and guides.

Assessment:

Variability is within acceptable limits.

Actions in response to variability assessment:

No change necessary.

Recommended Efforts:

Continue current management direction.

(P3) Fuel treatment outputs

Forest Plan Requirements:

Monitor fuel treatment outputs.

Intent:

Assure balanced fuel treatment reports.

Data Sources:

National Fire Plan Operating Reporting System (NFPORS).

Current Efforts and Findings:

Fuel treatment outputs have in the past been tied closely to timber harvest fuel treatments. Fuel treatment methods continue to change over time and acres treated within harvest areas have declined. Congress is currently funding natural fuels treatment (treatments not associated with timber harvest) at a higher level than has been set in the past.

Documentation of Monitoring Methodology:

The National Fire Plan Operating Reporting System (NFPORS) is currently used to track fuels accomplishment acres. Data gathered from previous monitoring reports was used to determine trends.

Monitoring Activity:

National Fire Plan Operating Reporting System (NFPORS) report for fuels accomplishments in FY06.

Data Analysis Methods:

N/A

Monitoring Results:

A total of 7,675 acres of natural fuels were treated in FY08.

Variability Measure Discussion:

Variation of +/- 25% of programmed targets will initiate action.

Variability Measure:

+/- 25% of programmed targets. Forest was actually at 100% of assigned FY08 Target.

Assessment:

Variability is within acceptable limits.

Actions in response to variability assessment:

No change is necessary.

Recommended Efforts:

Shift emphasis of monitoring to natural fuel treatment areas. For clarification due to reorganization, the Forest Fire Management Officer should be identified as responsible for monitoring and reporting findings.

(P4) Wildfire acres

Forest Plan Requirements:

Wildfire acres burned are to be monitored annually and reported every 5 years.

Intent:

Assume wildfire acres are within projected annual burned acres and determine the adequacy of the fire management organization.

Data Sources:

FIRESTAT database

Current Efforts and Findings:

The Forest Plan objective for management of wildfire is to limit the area burned to an annual average of 390 acres or less.

Documentation of Monitoring Methodology:

The 5100-29 Reports compile the individual fire information and are stored in the FIRESTAT database. These are transmitted and reported annually.

Monitoring Activity:

FIRESTAT reports were reviewed to determine acres burned and financial management reports were reviewed to determine costs.

Data Analysis Methods:

Summarization of records.

Monitoring Results:

The current five year average is approximately 5,994 acres burned. See Chart below.

Variability Measure Discussion:

Variation of +/- 25% above projected average of annual wildfire burned acres will initiate action.

Variability Measure:

Variation of +/- 25% above projected average of annual wildfire burned acres.

Assessment:

The variability on average is within acceptable limits if you do not count the large fire year of 2007 being above the 25% projected average of wildfire burned acres, if the large fire year of 2007 is considered the variability is outside of the acceptable range.

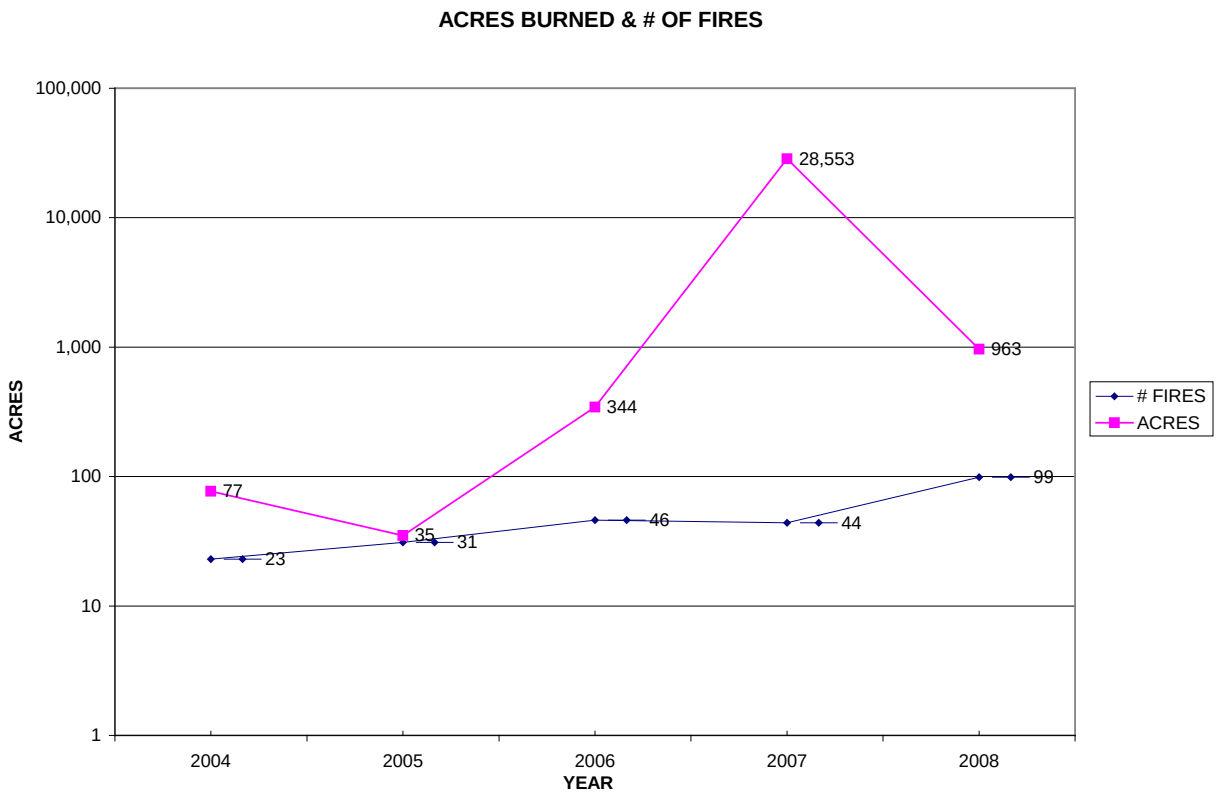
Actions in response to variability assessment:

No change to monitoring element is necessary at this time. Large fires are heavily dependant on weather and drought patterns, large fires will continue to occur during periods of extended dry weather.

Recommended Efforts:

Continue current management direction which periodically re-evaluates fire staffing needs.

Review acre objective at Forest Plan Revision. For clarification due to reorganization, the Forest Fire Management Officer should be identified as responsible for monitoring and reporting findings.


ACRES BURNED & # OF FIRES
100,000
10,000
1,000
100
10
1
ACRES
28,553
963
344
77
35
31
23
46
44
99
2004
2005
2006
2007
2008
YEAR
FIRES
ACRES

(P5) Cost of suppression, protection, organization, and net value change

Forest Plan Requirements:

Monitor annually the cost of suppression, protection, organization, and net value change Report every 5 years.

Intent:

Keep fire management program cost effective.

Data Sources:

Financial reports.

Current Efforts and Findings:

As noted in the previous element, wildfire acres have far exceeded Forest Plan projections and suppression costs have been dramatically higher as well. The National Fire Plan in conjunction with 30-mile mitigation requirements are associated with some of the increases for both WFPR and WFSU costs.

Documentation of Monitoring Methodology:

Financial reports were compiled showing the costs of suppression and final budget figures were reviewed for the total preparedness budget information.

Monitoring Activity:

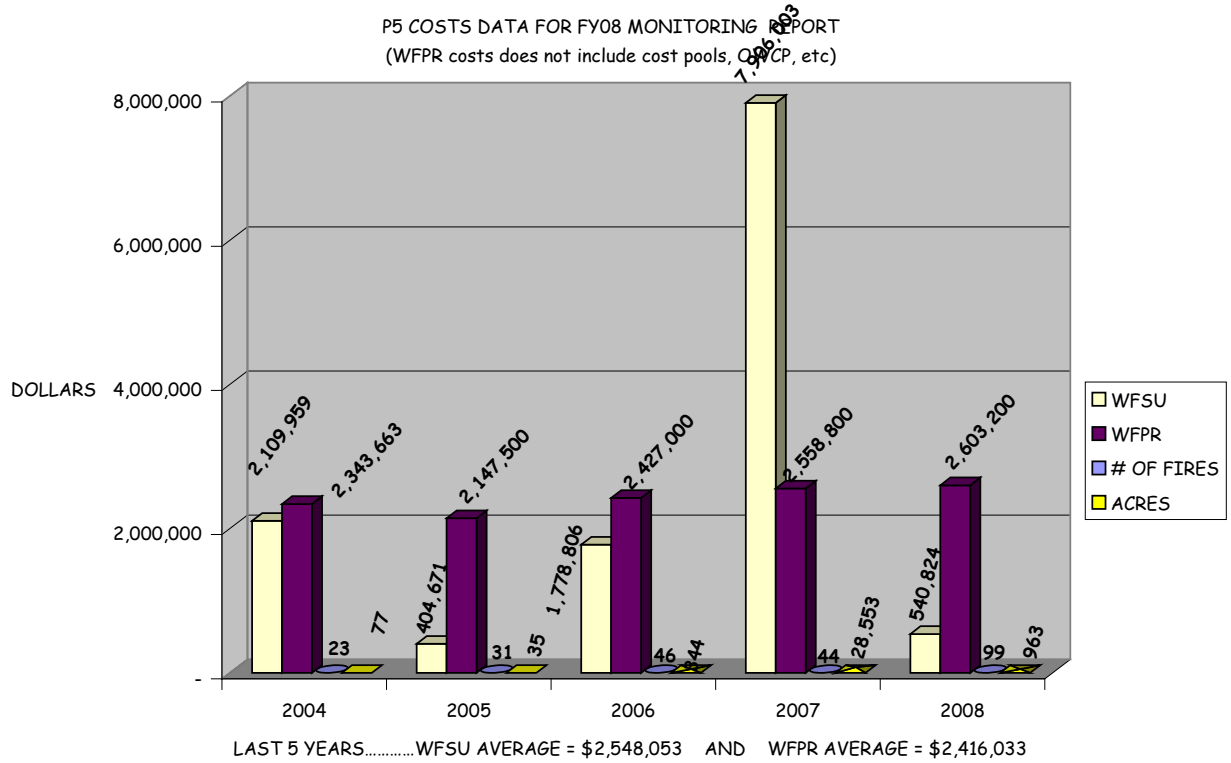
The NFMAS process has been used for budget submissions for the HNF Fire Program. Costs for WFSU were derived from Transaction Register Summaries pulled by B& F. WFPR total allocations were derived from B&F final PBA data. Net Value Change is no longer tracked through fire management programs.

Data Analysis Methods:

Summarization of records.

Monitoring Results:

In 2008 the Forest spent $ 540,824 in the suppression of wildfires. The 5 year average is $ 2,548,053 which includes the large fire cost year of 2007. See Chart I.



Variability Measure Discussion:

Variation of +/- 5% increase in real costs will initiate action.

Assessment:

The Forest has increased its dedicated firefighting workforce considerably since the mid-80's. Congress is now funding wildfire suppression at higher levels than in past.

Variability Measure:

+/- 5% increase in real costs.

Actions in response to variability assessment:

Variability stated cannot be met annually as the true cost of suppression, protection and organization is beyond the control of the forest as an individual unit.

Recommended Efforts:

Continue current management direction which periodically re-evaluates fire staffing needs.

For clarification due to reorganization, the Forest Fire Management Officer should be responsible for monitoring and reporting findings.

(T) ECONOMICS, ADJACENT LANDS, RESOURCES, AND COMMUNITIES, AND ALL RESOURCES

(T1) Economics

Forest Plan Requirements:

Verification of unit cost used in the Forest Plan compare to on-the-ground cost.

Intent:

Acquire accurate cost data.

Data Sources:

Timber sale appraisals, contracts, allotments, management plans, cost/output for various resource programs, sale area betterment plans, and timber sale reports.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Review and summarization of data from data sources described above. The economic information is monitored is available form data sources such as the annual PTSAR report, Annual cut and sold report, TIM database and FACTS.

Monitoring Activity:

Review Forest timber budgets and annual timber volume sold to evaluate unit costs.

Data Analysis Methods:

Total funded program dollars for NFTM and SSSS adjusted to fiscal year 1986 dollars were included in the cost for the timber program. Volume sold by fiscal year was used to display outputs for comparison.

Monitoring Results:

Three of the past five years, unit costs have been within Forest Plan variability. 2004, 2007 and 2008 had very high unit costs. Budgets were generally flat to declining and volume offered was much less than planned. Volume planned to be offered in FY04 was associated with fire salvage sales, while the 2005-2008 program concentrated on endemic MPB mortality, thinning in green stands where MPB is present and fuels reduction projects. The Forest requested and was funded for a program commensurate with expected outputs, however as a result of NEPA appeals most of the project implementation and associated outputs have been delayed. Unit costs, with the exception of 2007 have generally been decreasing over the last five year period. At the same time, unit revenues have generally trended upward. The objective of the T-1 monitoring element is to provide program managers with a tool to assess the overall costs and benefits of a given resource program relative to the programmatic Forest Plan assumptions.

Variability Measure Discussion:

Variability Measure:

In general, +/- 25%. However, very large cost items, such as road constructions and logging cost would have a smaller degree of acceptable variability i.e. 10%.

Assessment:

Concerning the cost/unit of output category, changes in overall agency objectives since 1986 have resulted in much less emphasis on producing timber outputs. The lower quantity of outputs are now affecting certain unit costs , but the lower outputs are tied more to changes in emphasis than having been created by unit cost variability. However, in terms of the flow diagram the Forest has revised the cost/unit portion of the budget as cost/units are revised. In addition, the cost variations the Forest has experienced in comparison with Plan projections have not resulted in a backlog of work or in quality of output deficiencies such that it has not been necessary to reprogram funds for this reason. We have experienced both increases and decreases in timber program costs in comparison with Forest Plan projections, resulting in an overall program that would not merit substantial adjustment. The Forest has met the intent of this element

Actions in response to variability assessment:

Per Forest Plan guidance, the cost deviations were considered within the Decision Flow Diagram found on page IV/20 of the Plan. In review, it was determined that the Forest has experienced both recurring and non-recurring cost deviations, but even in the case of recurring deviations this situation would not result serious consequences. This doesn't constitute a management oriented practice. Per the diagram, this is a cost/benefit oriented situation. At that juncture of the flow diagram, a determination is necessary as to whether the "cost/unit of output is insufficient to maintain quality or quantity of outputs" or whether the "budget is insufficient to produce projected quality or quantity of outputs". The latter category does not fit as the budget is sufficient to support the current program of work. Given that the agency wide objectives have evolved since 1986 in the sense that resource programs are viewed more as a tool to meet Plan goals and objectives than as a mean to accomplish targets, it was concluded that no further action is needed at this time.

Recommended Efforts:

The Forest maintains timber sale appraisals, contracts, sale area betterment plans, and timber sale reports. Various resource program managers also maintain cost/output information and the individual districts maintain allotment management plans. The Helena National Forest records are available for review by interested parties.

(T2) Adjacent lands, resources, and communities Forest Plan Requirements:

The effect of National Forest management on adjacent lands, local economies, recreation opportunities, down stream water uses, visual quality, and local air quality is to be monitored. Likewise, effects of management on adjacent lands on National Forest land goals and objectives are to be monitored.

Intent:

Determine effects of Forest Plan on other ownership. Determine effects of management of other ownership on Forest Plan.

Current Efforts and Findings:

Part of the focus of the Forest Service Chief's Healthy Forest Initiative is on healthy local economies as well as healthy forests. This includes consideration for opportunities to enhance recreation-related businesses as well. The Forest Service maintains a State and Private Forestry division that helps local individuals, organizations, and governments to work cooperatively with this agency. At the local level, project analyses provide discussion of management effects to recreation, water, visual quality, and air quality. As to activities on adjacent lands, the Chief has identified conversion of open timberlands and rangelands to smaller developed parcels as one of the four threats to maintaining present resource values on National Forest system lands. This should help foster discussion of this aspect of long-term management of the Forests. At the local level, we monitor adjacent activities primarily through cumulative effects analyses. The Forest has been working cooperatively with the City of Helena, Tri-County Working Group and adjacent landowners in developing and implementing fuels reduction projects so as to minimize risk from wildfire to local residences.

Variability Measure Discussion:

Variability Measure:

Unacceptable results of an ID Team review would initiate action.

Assessment:

Resource management conflicts and cumulative effects considerations continue to be identified, evaluated, and addressed through biological and social assessments, analysis, management modifications, mitigation measures, or other management actions. At this time no unacceptable impacts have been identified.

Actions in response to variability assessment:

Within variability, no action is required.

Recommended Efforts:

No actions are recommended at this time.

(T3) All Resources – Emerging Issues or Changing Social Values

Forest Plan Requirements:

Effects of emerging issues or changing social values.

Intent:

Keep publics informed, through educational and environmental programs; raise FS awareness to public concerns.

Data Sources:

Forest Service/Montana Discovery Foundation public education programs, public involvement in the NEPA due process, and appeals/litigation trends.

Current Efforts and Findings:

Current processes on the Helena NF that helps keep the public informed/educated and helps increase the Helena NF's awareness to public issues/concerns are summarized in this evaluation under Community Outreach, SOPA/PALS, NEPA processes, and Appeals.

There are many other ways to which issues and values are learned and shared that are invaluable. Some of these include employee day-to-day contacts with the public, the front office helping answer questions and taking care of forest user needs, the daily work provide through the Forest's public affairs and outreach, the hall talk at community forums, as well as the camp ground host attending to camper's need. All of these and more, aid in accomplishing better understanding of the emerging resource issues and values of those whom appreciate, enjoy, and utilize our natural resources. However, these types of ongoing contacts would be difficult to include in an evaluation such as this but are essential in who the Forest Service is and how it serves the people that participate in the arena of natural resources. The elements for this monitoring item includes Community Outreach, SOPA/PALS, NEPA Process, and Appeals.

Community Outreach:

The Montana Discovery Foundation and the Helena NF combine efforts toward ongoing community outreach programs such as learning/teaching sessions, presentations, field activities, Youth Forest Monitoring Program and lecture series all of which serve as invaluable sources of public/agency interaction.

SOPA/PALS:

The Helena NF Planning staff continues to provide a Schedule of Proposed Actions (SOPA) that is required quarterly (36 CFR Part 220) and provides notice of upcoming Forest proposals, which may undergo environmental analysis and documentation. The SOPA is available hard-copy if requested or electronically at the Helena NF website (www.fs.fed.us/r1/helena) or if interested in projects across the nation as well as those on the Helena NF go to www.fs.fed.us/sopa.

The SOPA is accessible through a national database called Planning, Appeals, and Litigation System (PALS). The PALS data-base contains coverage nationwide and is a searchable database that can hone in on the Helena NF, if desired. This data base is available 24 hours a day.

NEPA Process:

Once public interest is conveyed in a specific project such as through the SOPA process, continued involvement is accomplished by the general public through participation in the formal NEPA processes. Numerous opportunities are available by reading and participating in individual projects through the scoping period, in legal notices and news releases, in public meeting, and during comment periods. Of course public input is welcomed at any time during a projects NEPA due process.

Through these NEPA processes; the interested publics, organization, other agencies, and tribes all have the opportunity to be involved as much or as little as they desire. This involvement creates opportunity for understanding, education, collaboration, debate or concurrence for both the interested publics and the agency. These processes foster a direct correlation to this monitoring item's intent in keeping the public informed through educational and environmental programs while raising the Forest Service's awareness to public concern.

Appeals:

If projects are appealed, there is a Region One process that reviews these appeals and identifies the appeal points presented by the appellant. Identified appeal points end up being an indication of the environmental issues the public holds concern for. These appeal points can be those indicators showing the potential emerging issues of the day and may show trends in our changing social values for the pleasure and uses of our National forests.

Documentation of Monitoring Methodology:

Community Outreach:

Ongoing community outreach programs continue to improve on the Helena NF. Programs with area students, presentations by experts and discussion panels have occurred, and contacts with community leaders and elected officials continue.

SOPA/PALS:

The Helena NF specialists at the District and Supervisor's Office provide the needed information regarding proposed and on-going projects throughout the year to the PALS coordinator at the Supervisor's Office. It is interred electronically to the national database and becomes available to the general public as well as to the Forest Service, other agencies, and Congress. Also included in PALS is the ability to track the disposition of each NEPA decision. This information is a tool in assessing accomplishment of agency goals and objectives. There are a number of reports that can be derived through this system such as number of signed decisions at the decision memo, decision notice, record of decision level, and the ability to display resource issue trends in appeal and litigation results. This information is available on the PALS national database and through the quarterly mailing of the SOPA. The public can also view this information on the Helena NF web page to see Forest projects that may be of interest to them.

NEPA Process:

Forest NEPA processes document all that occurs with a given project from conception through decision. Most all projects have a specific project record that contains files, analyses, and evaluations used as the evidence toward a well-informed decision. In addition to these resource specialist's reports, the project record contains information of the public involvement process that documents public issues and concerns regarding the proposal.

In the context of these documents, the emerging issues and changing social values can be discerned particularly at the public scoping and comment period phase. The scoping and comment periods are required public involvement processes and are evaluated along with agency responses, documented, and filed in the project record.

Appeals:

At the Regional Office (RO) in Missoula, a panel of three Region 1 Forest or Grassland employees convenes to identify the appeal points presented by an appellant in regard to a specific project. Once the panel completes its task, it is presented to an appeal review officer the results and recommendations from this panel that is affirmed or modified by the reviewing officer. The results are compiled, documented, and presented to an appeal-deciding officer to conclude by affirming, affirming with conditions, or concurring with the appellant and returning the project back to the responsible unit to withdraw the decision. These findings can be used by the Helena NF to improve current and future projects and to accommodate understanding and awareness as intended for this Forest monitoring item.

Monitoring Activity:

Community Outreach:

Documenting events through brochures and newsletters such as "*Community Naturalists"* and counting participation during events such as Snow School, Moonlight Hike, Hosted Hikes, Wildflower Walks, Adopt-a –Species, Education trunks, Celebrating Wildflowers, Heritage Site Stewardship, International Migratory Bird Day, Youth Forest Monitoring Program, and the Forest for Every Classroom series are just but a few of the events that were provided in 2008.

SOPA/PALS:

The following information is submitted and available from the SOPA: Project Name, Type of Project, Location, Type of NEPA possible Document, Status of Project, Decision Date (actual/estimated), projected Implementation Date, and a Forest Contact.

NEPA Process:

The projects listed in the SOPA all have some level of detail in their project records and in the NEPA documents that give some indication of the emerging public issues or changing social values. Specifically, the public scoping process and comment period give the best feel for these issues or values.

In 2008, some projects that showed some public interest included the MacPass Biathlon, Ray Creek Allotment, Marsh/Tarhead Allotments, and Divide Travel.

Appeals:

There were eleven appeal submitted on two projects on the Helena NF during 2008. The projects included the Montana Army National Guard Biathlon Range and the South Belts-Travel Plan.

Data Analysis Methods:

Community Outreach:

Periodically, brochures, news articles, letters, etc. are made available to the interested publics. Sponsored events are tracked on a spreadsheet including date, Organization, Location, # of Participants, and Activity conducted.

SOPA/PALS:

The SOPA is continuously updated and officially provided on a quarterly basis. However, the SOPA is continuously updated and available on the national webpage 24-hours a day. The general public, interested organization, the agency, other government entities, and Congress can query reports from this national database at any time. This database can be used to track individual projects along with past and present appeals/litigation.

NEPA Process:

The interdisciplinary teams (IDT) for each of the projects on the Helena NF conducts a level of analysis that evaluates the public input received during the due process. The public input process is sometimes referred to as 'content analyses'. The IDT evaluates the public input and, with the review and concurrence from the responsible official, determines if the comment is within the scope of the project, may be used as the foundation of an additional alternative, can be used to mitigate a concern, improve the proposal, or applied to resource effects analyses.

Appeals:

The above appeals on the Helena NF in 2008 were reviewed and appeal points identified with Forest responses developed. These Forest's responses were then sent to the Regional Office where a R1 Appeal Panel was convened for evaluation to be concurred or modified by an appeal review officer and then approve or changed by the appeal deciding officer. The appealed project may be affirmed, affirmed with conditions, or remanded to the Forest.

Monitoring Results:

Community Outreach:

There is continued interest and support for the opportunities provided by the partnership between the Montana Discovery Foundation and the Helena NF. Numerous programs and events were provided through this effort in 2008 with over 7,400 participants getting involved. Nearly 29,000 volunteer hours were recorded contributing to programs that were well received and highly successful. The Youth Forest Monitoring Program also involved high school students from three countries who border the Helena and

B-D National Forests. Fifteen high school students learned forest ecology concepts, do hands-on rehabilitation projects and worked alongside forest professionals.

SOPA/PALS:

On an average, there were about 35-40 projects listed in any given quarterly SOPA in 2008 that contained a variety of projects from mineral extraction/exploration, fuels reduction, watershed improvement, range improvement, travel management, vegetation manipulation, to special uses. The projects included environmental analyses of categorical exclusions (CE), environmental assessments (EA) and environmental impact statements (EIS); resulting decision memos, decision notices/FONSIs, or record of decisions. The status of these projects on the SOPA varied from the scoping period, developing the proposal, conducting analysis, complete, or on hold.

NEPA Process:

The variety of NEPA projects including CEs, EAs, and an EISs, all have their unique set of circumstances. Of these NEPA projects, the higher profile projects include South Belts Travel, Montana Army National Guard Biathlon Range, Ray Creek Allotment Plan, and Marsh/Tarhead Allotment Plans. Other ongoing projects that received interest but are closing on decisions were Elliston Fuels Reduction and Blackfoot Winter Travel. This does not intend to minimize the other Forest projects or their issues, it's just that the below listed projects are the ones that received the most public interest and required more agency effort in conducting analyses and public involvement processes in 2008.

The key points in these projects are summarized below (not inclusive).

Project Name	Type of Document	Key Issues, Concerns or Suggestions
Montana Army National Guard Biathlon (Continued from 2007)	EA	Displacement of traditional Nordic skiing Wildlife habitat/connectivity Adequate future snowfall Costs of maintenance and continued uses Analysis processed under an out dated Forest Plan Controversy and other concerns warrants and EIS
Ray Creek Allotment	EA	Affect on Wildlife Needs Affect on Riparian Areas Cost to Administer the Allotment
Marsh/Tarhead Allotments	EIS	Potential impacts to adjacent land owners Spread of Noxious Weed Affect on Wildlife Needs Affect on Water Quality for Fish Streambank Integrity

All of these issues or concerns may be pertinent or perceived but distinguishing the difference is not the purpose of this monitoring item; the purpose is to become more knowledgeable and aware of the emerging issues and changing public demands and to appropriately evaluate them through educational opportunities, programs, and the due processes for environmental analyses.

Appeals:

The Montana Army National Guard Biathlon Range and the South Belts Travel Plan were both EAs with the decision documents being decision notices supported by Findings of No Significant Impact. Most of the appeal points echoed the issues brought up during the NEPA due process. The following table displays the results of the appeal process.

Project	Appellant	Appeal Rule	Outcome
Montana Army National Guard Biathlon Range			
	William Greiner	215	Affirmed
	Helena Hunters & Anglers	215	Affirmed
South Belts Travel Plan			
	Capital Trail Vehicle Assoc.	215	Affirmed
	Citizens for Balanced Use	215	Affirmed
	Charles Hedrick	215	Affirmed
	Angela Helvey	215	No Comments Filed
	Joe Jepson	215	Insufficient Info
	Joe Jepson	215	Appellant Withdrew Appeal
	Montana Multiple Use Assoc.	215	Affirmed
	Jack Sautter	215	Affirmed
	Western Environmental Law Office	215	Affirmed

Variability Measure Discussion:

There is not a definitive measure in determining success in keeping publics informed, through educational and environmental programs or in raising the agency's awareness to public concern except to track public participation and involvement by listening to what they've said and what they've submitted during the programs and events and NEPA/appeal processes.

Variability Measure & Assessment:

In accumulating and evaluating the elements of Community Outreach, SOPA/PALS, NEPA Process, and Appeals; the Helena NF is able to adapt to the ever-changing public concerns, needs, and desires of their National Forests. As events and programs have been provided, the amount of interest measured in public participation can give a since of how well the Helena NF along with partners like the Discovery Foundation is providing timely, current environmental subjects. Attendants of these programs are variable and do provide a since of interesting and emerging environmental issues.

The Helena NF addresses issues throughout NEPA and appeal processes. Scoping, comment periods, and appeal opportunity allow the interested public to be involved and give a chance to voice concerns and bring to the Helena NF possible perspectives not explored or overlooked. The Helena NF adapts and adjusts actions through management activities such as mitigation that are developed to reduce, avoid, compensate, etc. potential environmental impacts. The Helena NF also takes learned lessons from a given Forest project and applies these lessons to the design and development of future Forest projects.

In looking at the cross section of differing data including community outreach, SOPA/PALS, NEPA Processes, and Appeals, the intent of this Forest Plan Monitoring Item T3 is being met.

Actions in response to variability assessment:

As the Helena NF works with the Montana Discovery Foundation and other partners, programs and events can be provided as new and rising issues and concerns become evident. Community events and programs can be offered that address environmental issues in a reasonable manner.

Through Forest project processes, the Helena NF assesses public raised issues and develops a different strategy or approach in designing Forest projects. In that process the options explored in a given project analysis provides scientific anticipated results that lead to making better informed decisions.

This is an ongoing process in striving to educate our interested publics as well as keeping the Helena NF aware of the public concerns at hand.

Recommended Efforts:

Continuation of current efforts are and will continue to be excellent tools in keeping our publics informed to environmental issues and in keeping the Helena NF aware of possible emerging issues and changes in public values in respect to uses and resource needs. Efforts could be made in searching other avenues of education and potential partnerships in improving public and Forest employee education with the demands of our Forests and as new forest science brings to our attention different perspectives and awareness of our natural resources.

This Forest Plan monitoring item is key in striving to accomplish the purpose statement as described in the National Environmental Policy Act to encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation.

These described processes are not formal methodology protocols for monitoring item T3 but are formal in their own right and should continue to be used in helping to determine emerging public issues and heightened Helena NF awareness of these issues.

(T4) All Resources-Lands as not Meeting Physical or Biological Characteristics

Forest Plan Requirements:

Evaluate lands identified as not meeting physical or biological characteristics.

Intent:

Verify allocations in the Forest Plan.

Data Sources:

EAs, EISs, ID Team evaluation, Ranger District assessments, timber sale feasibility analysis, Landscape Analyses, etc.

Current Efforts and Findings:

During this monitoring year of 2008, no decisions or assessments revealed any physical or biological characteristics that contradict the allocation as designated in the Forest Plan, particularly in the Management Area descriptions. No new Forest Plan amendments were processed making changes to management allocation.

In the near future, the Helena National Forest is scheduled for plan revision. Intricate in that process will be the latest science, methodology, improved inventory, and technological advances that will allow for much improved refinement for describing the Forest's physical and biological characteristics.

Documentation of Monitoring Methodology:

The methodology or protocol for Forest Plan amendments is described in FSM 1900 Chapter 1920 under 1926.5 – Amendment.

Upon receiving advice from the interdisciplinary team that the plan requires change, the Responsible Official shall (paraphrased):

- Determine whether changes are significant or not significant
- Document determination in a decision document
- Provide appropriate public notification.

Monitoring Activity:

There were no interdisciplinary site-specific projects in 2008 that identified the need for a Forest Plan allocation change.

Data Analysis Methods:

The determination that no allocation changes were needed was through a variety of environmental analyses conducted in 2008.

Monitoring Results:

No Forest Plan allocation changes during 2008 were identified.

Variability Measure Discussion:

All changes will be evaluated annually.

Variability Measure:

Lands identified as not meeting physical or biological suitability characteristics due to changed conditions or data errors, are evaluated annually through the interdisciplinary project specific processes (NEPA).

Assessment:

Through the site-specific due process, data errors and biological and physical characteristics changes are typically discovered during the analysis process in evaluating anticipated effects for a given action. Updates are recorded in the appropriate resource data bases and are used in future analysis and reporting. Small inclusions of unsuitable lands are typically dropped from project activities and identified in the data base. Larger blocks of unsuitable lands are typically addressed through a Forest Plan non-significant amendment. No Forest Plan allocation changes during 2008 were identified; the variability measure for this element was met.

Actions in response to variability assessment:

No actions or responses needed at this time.

Recommended Efforts:

Continue the current level of compliance with this Forest Plan monitoring element through the project-specific, interdisciplinary process supported by pre-project (NFMA), resource data collection/surveys and post project monitoring of implementation and effectiveness. Anticipate the Forest needs in the upcoming Forest Plan revision to begin inventory and database needs to address allocations across the Helena NF, where applicable and approved.

HERITAGE RESOURCES

Forest Plan Requirements:

The Forest Plan does not identify any monitoring requirements for cultural resources.

Cultural resource monitoring is completed annually to comply with the National Historic Preservation Act of 1966 (NHPA), Archaeological Resources Protection Act of 1979 (ARPA) and Forest Service policy (FSM 2362.5).

Current Efforts and Findings:

FY08 Activity:

In 2008, Helena National Forest (HNF) archaeologists reviewed 43 forest projects in compliance with the NHPA Section 106. Of this total, 22 projects were subject to field survey because of their potential to adversely affect cultural resources. This fieldwork resulted in the discovery of 12 cultural resources. Six projects have the potential to adversely affect previously identified or newly discovered cultural resources. Mitigation measures to protect and monitor these cultural resources have been implemented.

NHPA Section 110 cultural resource stewardship projects completed in 2008 include preservation planning, reconnaissance-level field survey, building restoration, archaeological site stabilization, archaeological site testing and public interpretation.

Cultural resource condition monitoring was completed across the HNF on a limited and opportunistic basis in 2008 due to HNF workforce reorganization, competing work priorities, budget issues, and other factors.

All NHPA Section 106 and Section 110 field surveys, stewardship projects and monitoring were reported (February 2009) in the forest's 2008 cultural resource compliance report to the Montana State Historic Preservation Office (MTSHPO), as required under a USDA Forest Service-Northern Region programmatic agreement with the MTSHPO and federal Advisory Council on Historic Preservation. Tribal consultation regarding the HNF annual program of work and for specific projects was completed in 2008.

Analysis:

Over 1000 cultural resources are currently identified on the HNF as a result of project and non-project field surveys completed since 1978. Annual resource monitoring in 2008 focused primarily on those cultural resources listed on or eligible for the National Register of Historic Places. The most significant of these properties are classified and managed as "Priority Heritage Assets" (PHA), in accordance with Statement of Federal Financial Accounting Standards 29.

In 2008, cultural resource condition and deferred maintenance assessments for 22 PHA's were completed and entered into the INFRA database to meet FS reporting requirements. Other cultural resources were opportunistically spot checked during the course of other project work.

The only vandalism problem identified through monitoring efforts was at the Evening Star Mill-Western Mining Company historic site (24PW601), where weathered boards are being removed from old structures. The same complex had been previously splattered with paint as a result of a paintball gun shoot-out in 2007 or earlier. Although the site is relatively inaccessible, the public is definitely using it for recreational purposes. More concerted law enforcement presence will be necessary in 2009.

Careless renters caused some damage to the exterior logs of Rillway Cabin (24BW857) in 2008. Apparently a cardboard box filled with hot stove ashes was placed outside the cabin and the ensuing fire

charred the logs. There was no structural damage but considerable work will be needed to remove the charring. The R1 Historic Preservation Team was notified and plans are being made to complete repairs.

In the winter of 2008, the Lewis & Clark County Roads Department used heavy equipment to clear ice jams in the creek channel adjacent to (north of) the historic Moose Creek Ranger Station (24LC1608) to reduce flooding and icing on the Rimini Road. This area was once part of the historic ranger station complex and now serves as the parking area. Nearly all riparian vegetation and the existing footbridge were ripped up by this action. The County was apprised of this adverse effect situation and agreed to remove the channel debris and reconstruct the parking area. The footbridge was repaired and stabilized in 2008. Willows and other riparian vegetation need to be re-established to again particularly the backyard area behind Moose Creek cabin.

Another Lewis and Clark County-related issue was the partial collapse of a lime storage building associated with late 19th Century lime processing in Dry Gulch in the Helena South Hills. County road maintenance is slowly undercutting and destabilizing the stone building. The southeast corner of the building had collapsed into a pile of rubble on the Dry Gulch Road. The County moved the rubble and debris off the road but was concerned about the ultimate disposal of these materials (the FS agreed that the rubble could be hauled off as it no longer had much historical value). County road engineers were further concerned about the long-term maintenance and safety implications of this structure. On-site discussions between the County and FS did not occur in 2008 but will undoubtedly take place in 2009. Although the County's desire is to entirely remove this building for safety purposes, the HNF is currently investigating ways to stabilize it. Lime kilns (frequently mistaken as ore smelters by the public) are considered by some to be a common cultural site type south of Helena but they are, in fact, a finite and diminishing resource.

Many cultural resources, particularly old cabins and wood mining ruins, continue to deteriorate due to age and weathering. Livestock grazing atop archaeological properties, and in and around old buildings and ruins, has accelerated this deterioration in some cases.

Based on results of project (effectiveness) monitoring, a Phase 2 erosion remediation plan was developed in 2007 for a 3,000 year-old archaeological property on the Missouri River by a private engineering firm on behalf of Pennsylvania Power and Light-Montana and the HNF. The plan was implemented in 2008.

Recommended Efforts:

Cultural resource monitoring should be added as a component of the HNF Forest Plan when it is revised. To comply with federal legislation and agency policy, cultural resource monitoring should continue as an important part of the HNF annual program of work.

Time lags often occur between NEPA analyses and project implementation, when cultural resource mitigation-protection measures are applied. Fuels treatment and road obliteration projects for recently completed travel plans are two examples. A better system for multi-year project tracking is needed to insure that cultural resource protection measures are implemented. In some cases, additional HNPA Section 106 field survey may be required for certain actions provided for in the NEPA decision. This tracking system would likely benefit all forest resource programs.

Forest projects may expose cultural resources to vandalism and artifact theft as a result of increased road access, visibility and other factors. Projects should be carefully monitored during and after construction, and access should be changed or made more challenging to abate and discourage cultural resource vandalism.

Recurrent impacts to some cultural resources have not been adequately addressed. For example, although some livestock control measures have been implemented, damage is still occurring atop cultural resources atop Lewis and Clark Pass and on Grassy Mountain in the south Big Belt Mountains. Measures that provide multiple resource benefits, such as riparian fencing, should be implemented to also protect cultural resources affected by livestock grazing.

All forest personnel should continue to note resource damage to cultural resources, and promptly involve law enforcement where vandalism, collecting and digging is occurring. Cultural resource monitoring, vulnerability evaluations, and damage assessments should be completed on a timely and systematic basis to comply with ARPA and agency policy.

Cultural resource protection, stabilization and restoration measures should be implemented for threatened, disturbed or vandalized-looted cultural resources. Funding to support these projects should be acquired through agency initiatives, grants, and other sources. Opportunities to involve partners and the public in these efforts should be sought.

Historic preservation plans for significant heritage priority assets, such as Eagle Guard Station, Hellgate Pictographs, and Moose Creek Ranger Station, should be developed and their management guidance followed. Plans are also needed for the Alice Creek-Lewis and Clark Pass and Mann Gulch Historic National Register Districts. All plans should include a monitoring component.

Historic preservation guidelines for historic cabins in the Forest Service cabin rental program should be developed. These should include the acceptable range of use, visitor capacity, repair and maintenance, and other management factors. These guidelines should also be included with annual operation and maintenance plans for District developed recreation facilities.

An historic preservation analysis should be completed for those cabins proposed for inclusion on or removal from the cabin rental program as a result of the recent recreation site facility analysis. Those isolated cabins acquired by the HNF through Special Use Permit termination should be included for study. The fate of these cabins has been held in abeyance and they are rapidly deteriorating beyond repair and future use.

The HNF should continue to aggressively pursue cultural resource public outreach and education via *Passport in Time* and other volunteer projects, guided hikes and other educational events, and interpretive signing and other media. These efforts create greater public awareness of the value and importance of conserving cultural resources on the HNF.

YOUTH FOREST MONITORING PROGRAM (YFMP)

Youth Forest Monitoring

Background

The Youth Forest Monitoring Program (YFMP) is a seven-week summer internship for high school students who learn forest ecology and field techniques while providing additional monitoring of forest health for the Helena National Forest. The program, which began in 1998 with one field instructor and four students, now accepts 15 students, employs 4 field instructors, and is based out of the towns of Helena, Lincoln, and Deer Lodge. In 2008, the Deer Lodge Program was in its second year, monitoring on an additional forest, the Beaverhead-Deerlodge.

Partnerships and funding in 2008 included support from Lewis & Clark County, Jefferson County, Powell County, Montana Discovery Foundation and University of Montana – Helena College of Technology. A Matching Awards Grant from the National Forest Foundation funded an additional field instructor, providing more planning time for the program manager. This grant also funded new protocol for monitoring black-backed woodpeckers.

YFMP students completed forest health monitoring activities at 58 sites on the Helena National Forest between June and August 2008. Site data, monitoring reports, and presentations are available for review at the Helena National Forest Supervisor's Office. Photo points were established at each site as part of the data collection process.

Helena Weed Monitoring Team

Weed monitoring data was collected at 10 sites across the Helena National Forest: Webb Lake in the Scapegoat Wilderness; Lincoln District: Alice Creek, Moose Creek; Helena District: Big Log Gulch, Blackhall Meadows, Jimtown Road timber sale, Meriwether Campground, Springhill Repository; Townsend District: Slim Sam, Weston.

Nested rooting frequency, canopy cover, ground cover, and density measurements were taken at all sites. Four recommendations from the Weed Team include:

(1) Continue to support biological control at Weston, where significant reduction of Canada thistle and houndstongue has taken place through these measures. Originally monitored in 2005, by 2008 only one Canada thistle plant and no Houndstongue plants were found within the study plot. The team recommends monitoring this site again in 2011 since the area is part of a grazing allotment, and weeds may once again be introduced into the site.

(2) Spray for noxious weeds at Springhill Repository, near Helena, as soon as possible. Leafy spurge, spotted knapweed, and dalmation toadflax are present in large quantities along the edge and on private property surrounding this reclaimed mine site. The concern is that long tap-rooted weeds could spread in the repository, break through the tarp barrier, and reach contaminated soil, reintroducing heavy metals into the outer environment.

(3) Revisit Meriwether Campground on an annual basis. This site was burned by wildfire in 2007. Two monitoring baselines were established, one in a high intensity burn, the other in a low intensity burn area. In 2008 no weeds were recorded at either plot. Close monitoring of this site will allow for quick action should new weed populations occur in these sensitive areas.

(4) Institute a spray plan for Moose Creek weed site, located west of Lincoln along Ogden Road approximately half a mile past the gate. Spotted knapweed density reduced from 196 stems in the study plot in 2006 to 134 stems in 2008. However Canada thistle more than doubled from 16 stems to 47 stems in the study plot. Annual monitoring is recommended by the YFMP team until a spray plan is initiated.

Helena Stream Monitoring Team

The YFMP Stream Monitoring Team collected data at 14 sites on the Helena National Forest. Ringtail Creek in the Scapegoat Wilderness; Lincoln District: Beartrap Creek, Nevada Creek, Park Creek, Stonewall Creek, Willow Creek; Helena District: Blackhall Meadows, Meriwether Creek; Townsend District: Magpie Creek, Pikes Creek, Roberts Creek, Sheps Creek, Slim Sam Creek, Weston Creek.

Stream morphology was monitored through stream channel profile, stream bed composition through pebble count, and stream slope and sinuosity. Water quality data was collected in all streams with running water, with the exception of Blackhall Meadows, which was taken further downstream. These tests include temperature, pH, dissolved oxygen, and conductivity. Macroinvertebrate sampling was once again added to the toolbox of monitoring protocol, and compared to previous year's collection data. Grazing, wildfire, and mining were the top three impacts on monitored sites.

Recommendations offered by the Stream Team include:

(1) Continue to monitor at Blackhall Meadows. Montana Conservation Corps and soil scientists from the Helena National Forest constructed a wildlife and cattle exclosure around an eroded groundwater feature that feeds into three watersheds. YFMP students collected stream monitoring data before the fence construction in 2007 and returned in 2008 to compare results. Diversity of macroinvertebrates increased

further downstream from the study site although fewer pollution intolerant species were found than in 2007. Water chemistry tests were inconclusive as to the overall health status of the stream. Further monitoring on a 2-year basis should indicate whether Blackhall Meadows continues to improve.

(2) Consider resting the Slim Sam creek area (within the South Crow grazing allotment) until stream health indicies improve at the site. Macroinvertebrate samples indicated further stress at the site: the ratio of pollution intolerant species to pollution tolerant species decreased from 61.5% in 2005 to 40% in 2006, to 10.78% in 2008. Pollution tolerant midges were the primary species found in the samples. Moreover a pebble count survey indicated a marked increase in silt in the stream bed between 2005 and 2008. The YFMP stream team recommends further monitoring in 2009 to assess the health of Slim Sam Creek.

(3) Begin a monitoring regime at Meriwether Creek, a tributary to the Missouri River, which reappeared after 20 years immediately following the 2007 Meriwether Fire. In 2008 baseline data was collected for this new stream. Water flow had increased in the area as a result of the loss of trees and other vegetation from the high intensity fire. Few macroinvertebrates were collected in this newer stream, however future monitoring will provide an excellent opportunity to observe changes as the area recovers.

(4) Reclamation at Mikehorse Dam appears to be making positive improvement in the stream quality of its outlet, Beartrap Creek. Annually monitored since 2006, the stream bed had been covered in an orange filmy sludge. A combination of high spring runoff or the new remediation project may have been responsible for the removal of this sludge since 2007. Many more macroinvertebrates, including pollution intolerant species as well as amphibians were recorded in 2008 indicating improved stream health. Annual monitoring is recommended at this site to observe the results of the ongoing reclamation project.

Helena Soil Monitoring Team

Soils monitoring data was collected by YFMP students at 8 sites on the Helena National Forest. These sites included Webb Lake in the Scapegoat Wilderness; Lincoln District: Alice Creek; Helena District: Big Log Gulch, Blackhall Meadow, Jim Town Road, Spring Hill Repository; Townsend District: Slim Sam, Weston.

Monitoring protocol included soil structure analysis, soil color, soil temperature, vegetative cover, rooting depth, erosion rate, infiltration rate, and downed woody debris.

Recommendations from the Soil Team include:

(1) Place Blackhall Meadows soil site on a 2-year monitoring rotation. 2008 monitoring compared soil compaction both before a habitat improvement project and afterwards. An exclosure fence was constructed around a groundwater feature that exhibited a high degree of erosion due to cattle and wildlife wallowing. Preliminary observations indicated a higher infiltration rate (porosity of soil) inside the fencing versus outside the fencing. Soil monitoring in 2010 will confirm whether conditions continue to improve at this study site. Photopoints are also being used to record changes over time.

(2) Return to monitor 3 study plots on the Jim Town Road timber sale in 2010. Significant changes had occurred to the area since the 2007 winter timber sale. These sites had been monitored both before and after the sale with the hopes of capturing any erosion effects from the logging project. Initial data indicates that only one of the three sites exhibited increased compaction, primarily due to the placement of the plot right in the middle of a drag line. Future monitoring will focus on how the land improves with the help of project rehabilitation (road removal, weed spraying, and prescribed burns).

(3) Continue to use prescribed burns as a tool to decrease wildfire danger in areas with high levels of ladder fuels. The importance of prescribed burns was demonstrated by monitoring the results of a 2005 prescribed burn at Alice Creek in the Lincoln District. Before the burn, a downed woody debris study

indicated 2.969 tons of lodgepole pine per acre. The 2008 monitoring data was only 1.868 tons of lodgepole pine per acre. This indicates that the timber management objective of reducing wildfire risk was met.

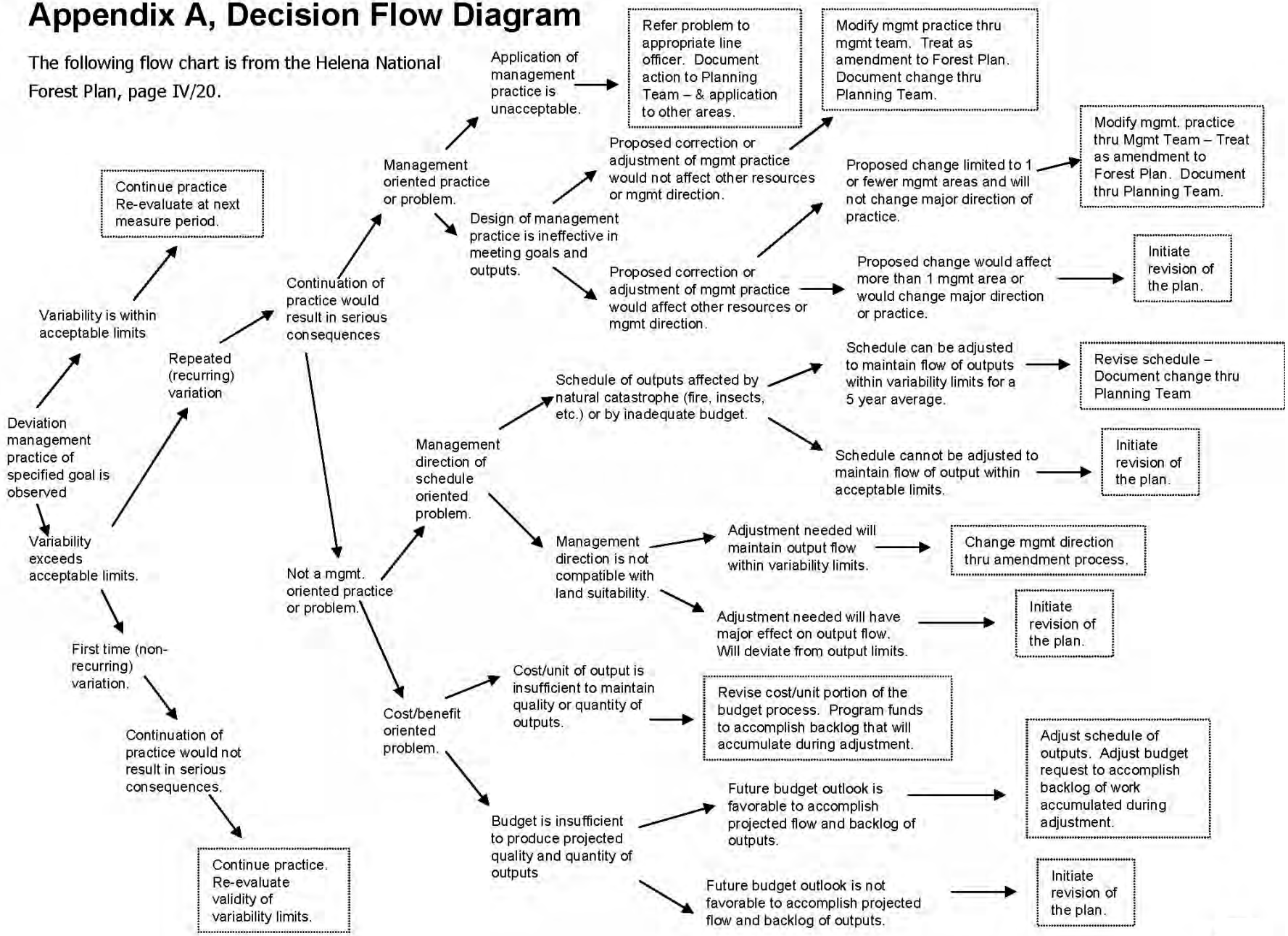
Helena Woodpecker Monitoring

Starting in 2008, the Youth Forest Monitoring Program also initiated a new monitoring protocol for black-backed woodpeckers. Primarily found in Canada, this species is beginning to expand its habitat boundaries into the northern Unites States, primarily in areas which have been impacted by wildfire. Considered a sensitive species, not much is known about the black-backed woodpecker and how increased wildfire occurrence will affect its southern boundaries.

The focus for study was a variety of random points within the 2007 Meriwether Fire perimeter. During the course of three weeks, over 18 sites were monitored for the presence of black-backed woodpeckers using an electronic calling device. A total of 17 woodpeckers were sighted, nine of which were black-backed and eight of which were three-toed woodpeckers. All were adult age. YFMP students observed that the drumming call was more effective than the screech call for getting a response. Furthermore, the black-backed woodpeckers were more likely to be found in high intensity burn areas rather than low intensity burn areas. Initially this information suggests that black-backed woodpeckers do frequent Montana forests within a year after a wildfire. Continued monitoring in 2009 will be used to indicate whether these birds continue to inhabit such forests for successive years after a fire.

LIST OF PREPARERS

Forest Plan Monitoring Element	Person Responsible
A1, A2, A3, A4, B1	Dave Payne
C1, C2, C3, C4, C5, C6, C7, C8, C9	Denise Pengeroth
C10, C11, C13	Len Walch
C12	Len Walch, Lois Olsen, Tracy Schilling, Shawn Heinert, Mandy Alvino, Dave Callery, Denise Pengeroth
D1, D2, D4, D5	Tracy Schilling, Shawn Heinert, Mandy Alvino, Diane Johnson, Lois Olsen
D3	Jay Winfield
E1, E2, E3, E4, E5, E6, E7, E8, E9, P1	Sharon Scott, Amanda Milburn, Scott Johnson
F1, F2, F4	Dave Callery
F3	David Marr
G1	Beth Ihle
P2, P3, P4, P5	Brad McBratney, Rita Chandler
L1, L2	Eric Barclay
T1, T2	Sharon Scott
T3, T4	Jan Fauntleroy
Heritage Monitoring	Kyle McGuire
YFMP Monitoring	Kathy Bushnell
Writer-editor	Mandy Alvino
GIS support	Velia Diemert
Team leader	Lois Olsen

Appendix A, Decision Flow Diagram

The following flow chart is from the Helena National Forest Plan, page IV/20.