

HELENA NATIONAL FOREST

# ANNUAL MONITORING REPORT

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Prepared February 2012

Fiscal Year  
2009

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**Helena National Forest**  
**Forest Plan Annual Monitoring Report**  
**Fiscal Year 2009**

Approved By:



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Helena National Forest Supervisor

FEBRUARY 15, 2012

Date

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## 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.

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### Forest Plan Monitoring

The Regional Forester approved the Land and Resource Management Plan for the Helena National Forest on May 28, 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>.

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### Summary

The Forest Plan lists 48 specific monitoring elements and two of those have more than one part; 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 35 of those elements.

This "Summary" section summarizes the 15 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, C5, C12 (partial), D1.2, D2, D5, E1, E7, E8, F1 (partial), F3 (partial), P4, and 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 variability 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 C12, D1.2, D5, F1, 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.
- Nine elements, A1, A2, C1, C5, 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 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 2008 total number of RVD's (37,424) at Forest developed recreation sites is 47,276 less than the stated number of RVD's in 1981. Even with the addition of 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 44% of the Forest Plan projection.

We 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 2008 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 excessively high. These original use estimates were developed for the Forest Plan EIS (early 1980's) and the documentation of those methodologies is no longer available. As such, any direct comparison with NVUM derived 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.

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 latest 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.

As funding allows, the Forest should continue implementing the 5-Year Action Plan for developed recreation sites to reduce maintenance backlogs, improve visitor service and meet existing standards. The 5-Year Action Plan should be reviewed and revised as needed to reflect changing visitor use and budget constraints.

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

Continue to monitor the implications of user fee collections at Skidway and Gipsy Lake Campgrounds.

Continue to monitor visitor use and demand during the fall season at Aspen Grove campground.

## **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 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 in an assessment of the eastside Region 1 forests.

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 area and North Big Belt Mountains may impact the ROS acreage on the Forest. Although new ROS mapping efforts have been initiated since those travel decisions that project has not been completed. It appears there may be an increase in the number of semi-primitive non-motorized acres. That increase could lift the ROS semi-primitive non-motorized category to the established 25% variation.

Actions in Response to Variability Assessment: Revised 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 consider future 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 December 2012), 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 2008 information is the most current and accurate recreation use information currently available on the Forest. 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 travel plan decisions. In addition employees should monitor recreation activities to note changes and trends that may be occurring.

## **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 Discussion:*

Variability Measure: +10% from previous measurements

### Assessment:

#### Elk Aerial Surveys

The total number of elk observed in 2009 increased by about 9% compared to 2008 and remains within the population objective of 1,700 to 2,300 observed elk. Bull elk made up approximately 189 of the total observed in 2009 compared with 235 in 2008.

The variation (increase of 9%) in the total number observed between 2008 and 2009 is within the acceptable variation of + 10%.

#### Mule Deer Aerial Surveys

The post season count has decreased by 22% since 2008. The post-season fawn: adult ratio has increased by 4%. The buck: doe ratio has decreased by 26%.

The variation reflected in the changes between 2008 and 2009 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.

Recommended Efforts: Recommended efforts include: (1) continue to 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 Fire (1988) 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 – 2,287 observed elk that are within the population objective of 1,700-2,300 observed elk and 434 observed mule deer in the early winter 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 commensurate 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.

## **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: 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: 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: Our recommendations include continuing to rely on MTFWP for primary field information on bighorn sheep population numbers and distribution. We will coordinate with MTFWP for feasibility of bighorn sheep restoration. We will also 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.

## **Element C12 Streamside Cover for Fish, Range portion (partial) -**

### *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.

### *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 sedges 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

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. No fishery evaluations were conducted beyond the monitoring reported here.

When all allotments on the Forest are combined, riparian monitoring comprised of utilization, bank alteration and browsing measurements shows that 78% of the allotments met permitted standards, while 22% did not.

Riparian monitoring conducted on non-bull trout allotments indicated that standards were met on 83%, or 19 of the allotments, while standards exceeded on one or more stream reaches on 17%, or 4 of the allotments which were monitored. Forty-two streams were monitored; 38 met standards; 4 exceeded standards. Deep Creek, East-West French, Indian Flats and JimBall allotments exceeded standards in 2008. These exceedences were discussed with grazing permittees and the Annual Operating Instructions for 2009 were used to correct the exceedence. In 2009, the East-West French and Indian Flats allotment met standards, but Deep Creek and JimBall again exceeded standards. Cellar-Ogilvie and Nelson Favorite also exceeded standards in 2009. The intent of this element was not met for the allotments that exceeded standards.

On the bull trout allotments, Biological Opinion monitoring conducted in 2009 indicated 71% or 12 of the allotments monitored met standards, while standards exceeded on one or more stream reaches on 29%, or 5 of the allotments that were monitored. Twenty-eight streams were monitored; 23 met standards. Standards were exceeded on five of the 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. The Poorman/Willow allotment and Spring Gulch allotments exceeded bank alteration standards in 2009. The variability measure is 100% of the allotments meeting standards; therefore the standards were exceeded for this element.

Preliminary PFC assessments were accomplished on 107 miles of stream. The preliminary investigations show that 36% of streams assessed (38 miles) are meeting the intent of Forest Plan element C12; 41% of the streams assessed (44 miles) are not meeting the intent. More information is needed on 24% of the streams (26 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. There are a total of 18 allotments with preliminary PFC information available. Some allotments have information for the majority of grazed streams while others have only small mileages evaluated.

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.

A Forestwide Riparian Inventory and Monitoring Strategy has been implemented by the Forest, as recommended in the 2008 Monitoring Plan for this element.

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. Adjustments were made in the 2009 grazing season to address the exceedances on the five bull trout allotments—Blossburg, Ophir/Hope, Poorman/Willow, Slate Lake and Spring Gulch as indicated in the above table. Results of the changes will be available in the 2010 monitoring report.

Four non-bulltrout allotments, Deep Creek, East-West French, Indian Flats and JimBall allotments exceeded standards in 2008. These exceedances were discussed with grazing permittees and the Annual Operating Instructions for 2009 were used to correct the exceedance. In 2009, East-West French and Indian Flats met standards. The JimBall and Deep Creek allotments again exceeded standards in 2009. Cellar-Ogilvie, and Nelson-Favorite exceeded standards in 2009. Actions to be taken for the 2010 grazing season include site visits to specific monitoring locations with permittee, evaluation of allotment ranking and consideration of convening an interdisciplinary team to evaluate the allotment.

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, Poorman/Willow 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.

The collection of preliminary PFC information should be gathered 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.

#### **Element D1.2 Available Forage Utilized by Livestock -**

##### *Forest Plan Requirements:*

Monitor percent of available forage utilized by livestock

##### *Variability Measure Discussion:*

Variability Measure: The 2008 monitoring report recommended a change for the variability measure of this element and the recommendation was adopted. The variability assessment for this element is 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

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 2010 report for this element will address the new five year measure.

Assessment: In 2009, 66 allotments, 86 percent of active allotments, were monitored and documented.

- A allotments – 92% measured (100% goal), 88% within standard (80% goal)
- B allotments – 94% measured (80% goal), 84% within standard (80% goal)
- C allotments – 63% measured (50% goal), 95% within standard (100% goal)

This element is outside of variability for 2009. Two A allotments were not measured and one of the 19 C allotments measured were not within the appropriate utilization standard.

Actions in Response to Variability Assessment: Emphasize field presence from C allotments to A allotments.

Recommended Efforts: Continue to monitor this element and allocate field resources in better alignment with priority ranking.

## **Element D2 Allotment Management Planning and Update -**

### *Forest Plan Requirements:*

Monitor allotment management planning and update.

### *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 2005 through 2009. 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. Three allotments are planned for 2010; completing these would not 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.

## **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 2009. At least one requirement within the annual plans was exceeded on 18 of the 77 active allotments. This represents 23% of the active allotments, or 27% 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 second 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 18 allotments which had standards exceeded are listed in the C12 and D1.2 elements. Compliance checks should be made 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 2010 the range staff should make a recommendation to either modify the variability measure or modify management practices.

### **Element E1 Regulated volume prepared for sale -**

#### *Forest Plan Requirements:*

Volume prepared for sale.

#### *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: Harvest volume for FY09 is within acceptable harvest variability standards, however the 5 year average for harvest volume 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 National emphasis on ecosystem management and fuels related programs, lack of signed NEPA decisions ready to implement, and less emphasis on maximizing timber production on timbered lands, thus resulting in fewer acres treated with the 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 implemented 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.

### **Element E7 Reforestation practices and assumptions -**

#### *Forest Plan Requirements:*

Monitor reforestation practices and assumptions

#### *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: The Forest does not meet the variability requirement of planting at least 75% of the projected 600 acres/year over the 5 year timeframe (from 2005-2009, 64%). However, the Forest does meet 50% of the projection in a given monitoring year (for 2009, 64%). Most of the planting over the 5-year periods 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 2005 to 2009, 99% of planned planting was 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 1/2 of the clearcut acres each year, and other regeneration systems such as shelterwood and seed-tree will generally naturally regenerate (II/74). From 2005-2009, the Forest harvested an average of 524 acres/year, and 382 acres/year of planting (73%). 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 bulk of the harvest that occurred in 2007-2009 was intermediate in nature with no reforestation requirements.

Actions in Response to Variability Assessment: 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.

## **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. 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. 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.

### **Element F1 Compliance with local, state, and Federal water quality standards (partial) -**

#### *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).

#### *Variability Measure Discussion:*

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

Assessment Water Quality Monitoring: Sites monitored by YFMP remained relatively stable in terms of the measured parameters. Five of the ten sites were evaluated for the first time in 2009, so no conclusions about trends for these data are available.

Actions in Response to Variability Assessment Water Quality Monitoring: Additional flow measurements and measurements of selected water quality parameters will be established in 2010. Adding these sites will bring the Forest into compliance by having 24 water quality monitoring stations.

Recommended Efforts: Establish two additional baseline water quality sites on major streams on the Forest.

### **Element F3 Productivity changes in sensitive soils (partial) -**

#### *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 For Activity 1:*

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

Assessment: Both plots inside Alice Unit 2 are stable and do not present any erosion hazards. At Plot 21, one data point out of 100 was burned and resulted in high water repellency, but was borderline moderate water repellency; at Plot 20 there were no burned data points and the water repellency was high. The amount of coarse woody debris in the unit (1.50 and 3.22 tons/acre) is below the recommended levels

(5-10 tons/acre for timbered sites), thus is not sufficient for providing quantities for soil productivity and soil protection in timbered sites and does not meet Region 1 guidelines for CWD in timbered sites. Mitigation measures needed 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. The addition of coarse woody debris may also prevent future erosion. Soil disturbance levels observed in this unit (0% and 0%) are in compliance with the Helena National Forest Plan (20%) and Region 1 (15%) guidelines.

Both plots within American Bar Unit 4 have high risk of erosion. On average, the two observations in this unit were approximately 29% (46% and 13%) soil disturbance, which exceeds the Helena National Forest Plan (20%) and Region 1 (15%) guidelines. Region 1 guidelines for CWD for soil productivity are not applied to these sites because the sites are dominated by grasses and shrubs, and do not have the type of cover that could contribute CWD post fire.

Both plots located within the Crow Creek Unit 3 project area are very open with only the occasional Douglas Fir tree encroaching, and are dominated by sagebrush, grasses and rock outcrops. None of the data points exhibited characteristics that indicate elevated risk of erosion hazards or threats resulting from severely burned soils. Soil disturbance conditions observed in this unit (0% and 0%) are in compliance with the Helena National Forest Plan (20%) and Region 1 (15%) guidelines. Region 1 guidelines for CWD for soil productivity are not applied to these sites because the sites are dominated by grasses and shrubs, and do not have the type of cover that could contribute CWD post fire.

Sagebrush, grass and juniper dominated the vegetation in the Crow Creek Unit 33 project area which exhibited very little recorded erosion and no severely burned soils. None of these data points suggest any threat of erosion resulting from the prescribed fire. Soil disturbance conditions observed in this unit (0% and 6%) are in compliance with the Helena National Forest Plan (20%) and Region 1 (15%) guidelines. Region 1 guidelines for CWD for soil productivity are not applied to these sites because the sites are dominated by grasses and shrubs, and do not have the type of cover that could contribute CWD post fire.

Actions in response to variability assessment and recommendations for Activity 1: The amount of coarse woody debris remaining in the Alice Creek unit evaluated above does not meet the Regional Soil Quality Standards for the residual amounts of coarse woody debris. Mitigation measures needed 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.

The American Bar Unit 4 does not meet Region 1 and Helena National Forest Plan detrimental soil standards due to disturbance caused by erosion. Additional mitigation measures to alleviate the poor soil conditions could include hand planting of native trees and shrubs at the site and seeding an annual cover crop and/or planting shrubs to prevent future erosion.

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 Discussion:*

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: 1) Continue current management direction which periodically re-evaluates fire staffing needs; 2) Review acre objective at Forest Plan Revision.

## **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 Discussion:*

Variability Measure: +/- 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.

Recommended Efforts: Continue current management direction which periodically re-evaluates fire staffing needs.

# Monitoring Element Reports

## (A) and (B) Recreation and Wilderness

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### **(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:

2008 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; Hunter Patrols, Trailhead Registers, 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 of visitor use. Through traffic counts (road & trail) and 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 Recreation database. At a minimum, condition surveys are accomplished every five years and 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 completed at all developed recreation sites on the Helena Forest during 2009. These surveys are required every five years.

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.

Coulter Campground was open to day use during the 2009 season but closed to camping due to safety risks associated with the 2007 Meriwether Fire.

Meriwether Picnic Site was open for public use throughout the 2009 season. Rain above Meriwether Canyon did result in significant floods and debris flows through the canyon and picnic site. The amount of material (mud, gravel and boulders) that flowed into the picnic area was considerable. On several occasions the picnic shelter filled with mud. Due to the debris deposits, the site looked rough and foot travel was difficult. Several attempts were made in 2009 to remove the debris from the barge dock to allow the vaults to be pumped. Due to the extent of debris none of these attempts were successful.

Park Lake Campground and Day Use Area were closed to the public for the entire 2009 season due to the large number of hazard trees within those sites. The District attempted to have the hazard trees removed through the use of a commercial timber sale in 2009 without success. A service contract to remove the hazard trees is planned to be implemented in May of 2010.

On the Townsend Ranger District fees were implemented at two campgrounds: Gipsy Lake and Skidway.

Visitor use information was collected during fiscal year 2008 through the National Visitor Use Monitoring Project (NVUM). The following information was estimated from those visitor surveys. The total number of estimated visits to the Helena National Forest in FY 2008 was 454,000. Of that total, approximately 62% visited the Forest for recreation. About 69% of the visitors traveled less than 50 miles to reach the Helena Forest. The next visitor use survey is scheduled for FY 2013.

Use of the Copper Creek campground on the Lincoln Ranger District has increased during the past two years. Campsites that retained large mature green trees along Copper Creek were the preferred sites and received the most use. Lodge Pole saplings were growing rapidly but the area is relatively open and there is little shade. Pheromone packets were used in the campground in 2009, with limited success, to slow the progression of the mountain pine beetles. In 2009 several dead and hazardous trees were identified and cut down.

Aspen Grove campground received heavy weekend use, with most or all of the campsites occupied. Weekday use was sporadic with only 1/3 to 1/2 of the sites occupied. The amphitheater constructed for the Lewis & Clark celebration had no scheduled programs in 2009. Mountain Pine Beetles continue to infest the Lodge Pole pine within the campground. Most of those trees died and have either been removed or will be before the site is open to public use in 2011. Because local private lands and Montana State lands are being closed to motorized use, there is a growing demand for use of the campground during the fall hunting season. The campground was left open during the fall, with reduced services and received low to moderate use throughout the hunting season.

#### *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 Gypsy 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 opened and available for public use beginning 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 Site Visits: 124,000
  - Average Length of Stay: 1.9 hours
  - Total hours at Day Use Sites = 235,600 hours
- Total Recreation Visitor Day's (RVD) at Day Use Sites = 19,633
- Overnight Use Developed Site Visits: 7,000
  - Average Length of Stay: 30.5 hours
  - Total hours at Overnight Sites = 213,500 hours
- Total RVD's at Overnight Sites – 17,791      Total RVD's at Forest Developed Sites = 37,424

### **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 2008 total number of RVD's (37,424) at Forest developed recreation sites is 47,276 less than the stated number of RVD's in 1981. Even with the addition of 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 44% of the Forest Plan projection.

We 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 2008 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 excessively high. These original use estimates were developed for the Forest Plan EIS (early 1980's) and the documentation of those methodologies is no longer available. As such, any direct comparison with NVUM derived 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.

*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 latest 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.

As funding allows, the Forest should continue implementing the 5-Year Action Plan for developed recreation sites to reduce maintenance backlogs, improve visitor service and meet existing standards. The 5-Year Action Plan should be reviewed and revised as needed to reflect changing visitor use and budget constraints.

- Continue to monitor visitor use and demand at Copper Creek campground as vegetation returns within the Snow Talon fire area and water returns to Snowbank Lake.
- Continue to monitor the implications of user fee collections at Skidway and Gipsy Lake Campgrounds.
- Continue to monitor visitor use and demand during the fall season at Aspen Grove campground.

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**(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; 2008 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 website now provides 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 by national protocol. 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. In those travel plan areas wheeled motorized use is now allowed only on designated routes.

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" foot races, 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 2008, 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. The primary recreation activities identified by Forest visitors in FY 2008 in order of priority were: hiking/walking, viewing natural features, viewing wildlife, hunting, driving for pleasure, and relaxing.

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 remains steady 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. Although the area is regenerating well, the lodge pole pines are small and do not inhibit winter travel.

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.

Trails within the Gates of the Mountains Wilderness continue to experience problems due to erosion stemming from the 2007 Meriwether Fire. Major portions of the Willow Creek and Meriwether Canyon trails have been totally washed away as well as sections of the Refrigeration Canyon Trail.

An education plan was approved by District Ranger Harp in 2009.

Several trail projects are initiated and completed on the Forest annually. Construction or reconstruction was accomplished on the following trails in 2009: Beartrap Trail, 7 miles of the Continental Divide Trail, Arrastra Creek Trail and the Chaps Gap Trail. During the past 20 years the Helena National Forest has accomplished three or more trail projects annually. This effort has greatly improved visitor access and reduced the backlog of deferred maintenance needs.

**Data Analysis Methods:**

Recreation information obtained through the National Visitor Use Monitoring Project does not provide use figures for any specific site on the Forest. However, the report does provide information indicating visitor use on 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 can 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
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 have 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 in an assessment of the eastside Region 1 forests.

**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 area and North Big Belt Mountains may impact the ROS acreage on the Forest. Although new ROS mapping efforts have been initiated since those travel decisions that project has not been completed. It appears there may be an increase in the number of semi-primitive non-motorized acres. That increase could lift the ROS semi-primitive non-motorized category to the established 25% variation.

*Actions in Response to Variability Assessment:*

Revised 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 consider future 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 December 2012), 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 2008 information is the most current and accurate recreation use information currently available on the Forest. 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 travel plan decisions. In addition employees should monitor recreation activities to note changes and trends that may be occurring.

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**(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).

In 2009 there were continued travel violations on both the Townsend and Helena Ranger Districts. While travel plan implementation appears to have reduced the number of violations and amount of resource damage, there are still problems remaining. Vehicles traveled behind the gate on the Cottonwood Gulch Road #4155 during the winter when it was closed to motorized travel. The southern portion of the Elkhorn Mountains on the Townsend Ranger District continues to experience travel management violations in the spring as people hunt for antler sheds. The Helena Ranger District constructed several small lengths of jackleg fence in both the Big Belt Mountains and the Little Blackfoot drainage to discourage OHV use from going around seasonal and/or yearlong closures.

Observations, resource impacts and motorized violations by Forest Service personnel suggest a general increase in off-highway vehicle use in the spring, summer and fall. The 2008 NVUM data was not collected in the areas of high ATV use on the Lincoln District. While no actual field counts have been documented, impacts of motorized use have been observed. It should be noted that some illegal ATV use was noted in several areas during the fall hunting season.

Non-winter travel planning has been initiated and roads and trails on the Lincoln District are being evaluated. Proposals have been submitted that represent the interests of ATV users, mountain bikers and stock users.

The Keep Cool Lakes area is located within a block management area comprised of private and State lands. That area remains closed to motorized travel, except over-snow vehicles in winter.

An ATV recreation event held in late May of 2009 and 2010 received over 200 participants. The event occurred on existing roads and designated trails. There continues to be a growing demand for larger, 30 mile, loop trails for ATVs and motorcycles.

Weekend observations of the snowmobile parking areas and snow ranger patrols indicate increased use by over-snow vehicles. Use depends on snow conditions and appears to be sporadic during the week. The Snow Talon fire area will continue to provide good snowmobile opportunities over the next few years until regeneration inhibits travel.

Winter travel plan alternatives for the Lincoln Ranger District are being evaluated to determine the appropriate use and season of use for trails and general forest areas.

### *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 originally diminished after July 1, 2001 when off-route motorized travel was prohibited based on a 3-State OHV Record of Decision. However, motorized violations appear to be increasing and result in resource damage. Continued off-route travel results from the growing popularity of OHV use and the reduced opportunities for OHV use on public lands.

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

A South Belts Travel Plan Decision Notice (and Finding of No Significant Impact) was 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 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 December 2012. 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.

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**(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.

There were no travel plan decisions made in 2009. The Helena National Forest is currently evaluating travel alternatives for the Blackfoot area in Lincoln and the Divide area on the Helena District.

*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.

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**(B1) Wilderness**

**Forest Plan Requirements:**

The Forest Plan requires the following items are monitored annually: 25% of heavy use areas and trails. Additional monitoring occurs on 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; field observations; inspections; research.

#### Current Efforts and Findings:

##### *Documentation of Monitoring Methodology:*

During 2009 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 2008 provided a base level of use estimates for the Scapegoat and Gates of the Mountains Wilderness areas. The two wilderness areas on the Helena Forest received a total of approximately 5,000 visitors. Average duration for those wilderness visits was about 20 hours. The survey also determined that approximately 65% of those visiting wilderness areas on the Helena Forest were male. About 50% of those visiting the Scapegoat and Gates of the Mountains Wilderness areas were between the ages of 20 and 40.

Observations by Forest Service employees indicated visitor use within wilderness areas remained static. The latest report on the Chief's 10-Year Challenge listed the Scapegoat with a score of 74 and the Gates of the Mountains a score of 49.

A wilderness education plan for the Gates of the Mountains was approved by District Ranger Harp in 2009.

In 2007 the Scapegoat wilderness ranger and trail crew foreman positions were combined. In 2008 the wilderness ranger also assumed responsibilities for the Gates of the Mountains wilderness. Campsites in the Gates of the Mountains were monitored in 2009.

##### Gates of the Mountains

The Gates of the Mountains wilderness experienced a major wildfire 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. Additionally, Meriwether and several other drainages experienced severe floods during the spring of 2009.

##### Scapegoat

In 2009 at the Bob Marshall Wilderness Complex public meeting, it was agreed to reduce monitoring and implement additional management actions to address problem areas. This resulted in a very limited number of campsites being inventoried within the Scapegoat Wilderness. Approximately 70 miles of trails were monitored within the Scapegoat.

Pre-season and operating season inspections were completed on outfitter camps during fiscal year 2009. In 2009 volunteers cleared many miles of trail that would not have otherwise been cleared. Although downfall was initially light both years, trees continued to fall throughout the season resulting in the need to maintain a few trails on several occasions. There are approximately 110 miles of system trail within the Scapegoat Wilderness administered by the Lincoln Ranger District. Trail condition surveys within the Scapegoat indicated many trails are not fully maintained to Forest Service standards. The greatest level of visitor use occurs during the early fall big game hunting season and at Heart Lake in the summer. Additionally, the Continental Divide Trail continues to remain popular during the summer.

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***

No trail conditions were completed in 2009. Trails are randomly selected for condition surveys each year by the Washington Office.

***Scapegoat***

No trail condition surveys were completed in 2009. Trails are randomly selected for condition surveys each year by the Washington Office.

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, BMWRC 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 Forest Plan 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 very limited, an appropriate number of trail encounters wasn'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. More visitor encounters were documented during the early fall hunter patrols. Approximately 30 miles of patrol were completed in five days, resulting in contacts both in camp and on the trail. Noted violations were primarily related to food storage. The probabilities of encounters and general level of encounters were within standard for all four Opportunity Classes in 2009.

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.

#### *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. Trends indicate wilderness use is of shorter duration than past years.

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*

Visual observations indicate little change in campsite impacts occurred in 2009. 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 decrease in the number of sites and only one site has 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 improvement in most site conditions. This drainage receives a lot of regular use and there are three moderate and one heavily impacted site in the upper Lander's.

Mainline Trail, Twin Lakes (Geo unit 5-3-1): The trend is improving with static impacts. There was an increase in the use of sites in the Twin Lakes area due to the removal of blowdown across the trail. 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 discernable sites remains static.

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. Signs have been posted discouraging livestock from the campsite on a voluntary basis. The East Fork has three sites out of four with a moderate impacting rating.

Alpine Parks, Arrastra and Dry Creeks (Geo unit 5-5-2): General trend is a slight increase in impacts. Use is expected to continue at present levels and impact trends continue to be static or increased.

Webb Lake, Parker Lake, Sourdough (Geo unit 5-6-1): General trend is static but there is a noted decrease in impacts and at Parker Lake seven sites continue to improve.

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 but remains closed to stock. The main campsites near the hitch rails were heavily impacted but opening the peninsula sites for camping has had little effect on the heavily impacted sites. Due to the high density of moderately and heavily impacted sites, the area is out of standard for opportunity class IV. The area continues to be a priority for visitor contacts.

#### **Variability Measure Discussion:**

##### *Variability Measure:*

Forest Plan Monitoring Requirements state an annual 20% deviation from management plan is acceptable.

##### *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 within the Gates of the Mountains Fire area should be monitored for safety and resource impacts. A few trails or trail segments should be relocated or considered for permanent closure.

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. Within funding constraints the Forest must determine which elements are critical to implement. Increased personnel presence in the field has been identified as an important factor that would increase the score for both the Gates of The Mountains and Scapegoat. Active implementation and/or revision of education plans would also improve the 10-year challenge score in both wilderness areas.

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. .

## **(C) Wildlife, Fish, Riparian**

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### **(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 2009
- Mule deer aerial surveys in Hunting District 380 for winter 2009

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 March 1st and 2nd, 2009 for elk.

*Mule Deer Aerial Surveys:*

Aerial surveys were conducted on January 6th, 2009 for mule deer.

***Monitoring Results:***

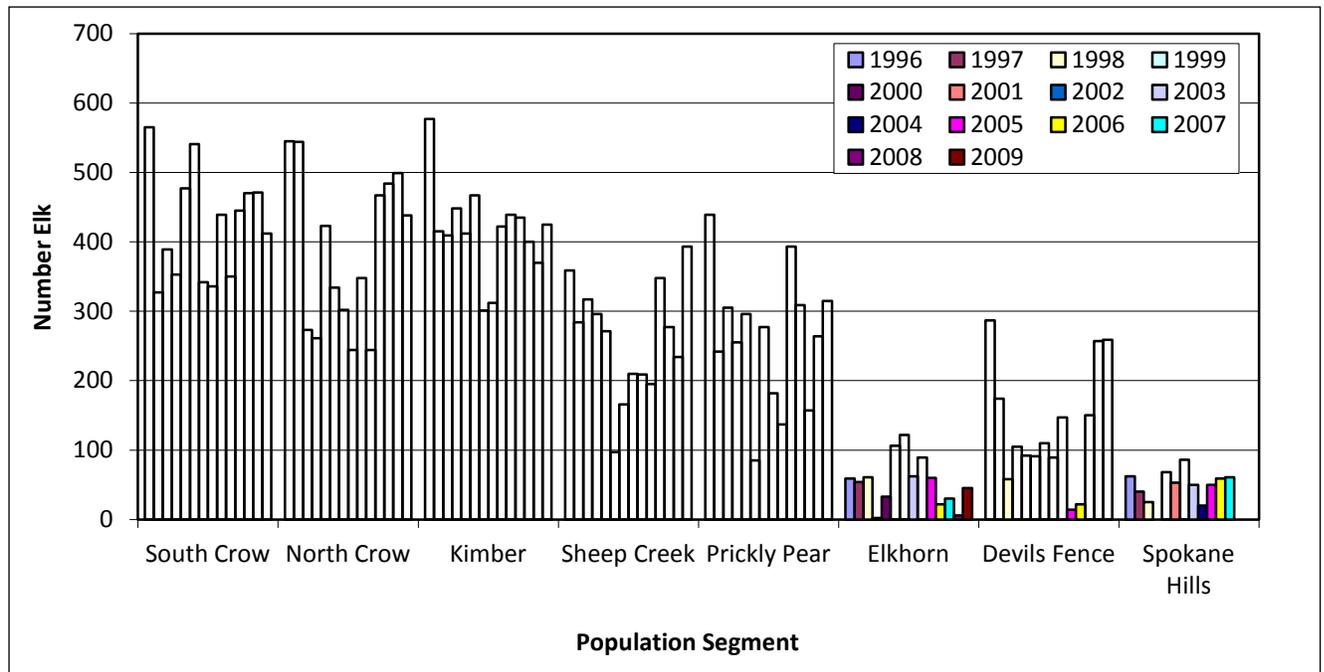
*Elk Aerial Surveys:*

A total of 2,287 elk were observed in 2009 which is an increase of 186 elk over last year's survey (N=2,101) (Tables 1 and 2. Data for 2008 are included for comparison). Conditions were favorable for survey efforts. Calves were not classified from the air as the usual pilot was not available and survey efforts this year focused on bull classification; therefore, there are no data on numbers of cows either. 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 except for increases in the Sheep Creek, Prickly Pear, and Devil's Fence segments.

<b>Herd Segment</b>	<b>Total</b>	<b>Cows</b>	<b>Calves</b>	<b>Yearling Bulls</b>	<b>Brow-tined Bulls</b>	<b>Total Bulls</b>	<b>Unclassified</b>
South Crow	412	No data	No data	12	6	18	394
North Crow	438	No data	No data	6	18	24	414
Kimber	425	No data	No data	11	1	12	413
Sheep Creek	393	No data	No data	18	43	61	332
Prickly Pear	315	No data	No data	26	0	26	289
Elkhorn	45	No data	No data	4	4	8	37
Devil's Fence	259	No data	No data	4	36	40	219
Spokane Hills	0	No data	No data	0	0	0	0
<b>Total</b>	<b>2287</b>	<b>No data</b>	<b>No data</b>	<b>81</b>	<b>108</b>	<b>189</b>	<b>2089</b>

<b>Herd Segment</b>	<b>Total</b>	<b>Cows</b>	<b>Calves</b>	<b>Yearling Bulls</b>	<b>Brow-tined Bulls</b>	<b>Total Bulls</b>	<b>Unclassified</b>
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
<b>Total</b>	<b>2101</b>	<b>996</b>	<b>246</b>	<b>58</b>	<b>177</b>	<b>235</b>	<b>624</b>

**Figure 1. Number of elk observed in each herd segment, 1996-2009.**



A total of 189 bulls were observed of which 81 were yearling bulls and 108 were bulls 2 1/2 years old or older. Overall, bull elk made up 8.3% of the total elk counted. The objective in the Elk Management Unit is to have 10% of the elk population comprised of antlered bulls. The number of yearling bulls observed in 2009 exceeded the average number of yearling bulls surviving the hunting season. Figure 1 summarizes the number of elk observed in each herd segment from 1996 to 2009.

Mule Deer Aerial Surveys

A total of 434 deer were observed during the winter aerial survey (Table 3). Data for 2008 are included for comparison. This was a decrease of 122 deer from last year. However, this total remains above the long term average of 305 deer (See data in project file).

Fawn production during the January survey was 29.5 fawns per 100 adults which was slightly higher than the previous year (28.3 fawns per 100 adults). The buck: doe ratio of 8.5 bucks: 100 does was lower than the previous year.

Year	Post-Season Total Deer	Fawns: 100 Does	Fawns: 100 Adults	Bucks: 100 Does	% Bucks
2009	434	32.0	29.5	8.5	6.0
2008	556	33.2	28.3	16.0	11.5

**Variability Measure Discussion:**

*Variability Measure*

+10% from previous measurements

*Assessment*

Elk Aerial Surveys

The total number of elk observed in 2009 increased by about 9% compared to 2008 and remains within the population objective of 1,700 to 2,300 observed elk. Bull elk made up approximately 189 of the total observed in 2009 compared with 235 in 2008.

The variation (increase of 9%) in the total number observed between 2008 and 2009 is within the acceptable variation of + 10%.

Mule Deer Aerial Surveys

The post season count has decreased by 22% since 2008. The post-season fawn: adult ratio has increased by 4%. The buck: doe ratio has decreased by 26%.

The variation reflected in the changes between 2008 and 2009 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.

**Recommended Efforts:**

Recommended efforts include: (1) continue to 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 Fire (1988) 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 – 2,287 observed elk that are within the

population objective of 1,700-2,300 observed elk and 434 observed mule deer in the early winter 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 commensurate 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.

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## **(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-VMAP1 and field data where available. The model used to identify hiding cover is 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](http://www.fs.fed.us/r1/helena/elkhorns/history/veg_study_phse2.shtml)

## Current Efforts and Findings:

The Elkhorns are currently in the midst of an epidemic mountain pine beetle outbreak (MPB) that is changing the vegetative characteristics of ponderosa pine and lodgepole pine stands. Baseline vegetation has been established and will be 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.

We are currently in the process of re-measuring our intensified grid points in order to identify changes in vegetation based on the mountain pine beetle outbreak. These data will be summarized in the 2010 Forest Plan Monitoring and Evaluation Report. Therefore, the data described in the 2008 Forest Plan Monitoring and Evaluation Report are presented here for continuity.

### *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)<sup>2</sup>. Security habitat is based on the

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<sup>1</sup> R1-VMAP is described in more detail in the following document on file in the Supervisor's Office:

USDA Forest Service. 2011. The Region 1 Existing Vegetation Classification System and its Relationship to Region 1 Inventory Data and Map Products. Numbered Report 11-10.

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

methodology described in Hillis et al (1991)<sup>3</sup>. 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 analyzed in 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.

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 4 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.

<b>Table 4. Forest Plan Hiding Cover Analysis for Standard 3 by Elk Herd Unit</b>				
<b>Elk Herd Unit (EHU)</b>	<b>Total EHU Acres</b>	<b>Acres of Hiding Cover</b>	<b>Percent Hiding Cover in EHU</b>	<b>Meets FP Standard 3?</b>
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

<sup>3</sup> 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 Effectiveness

Table 5. 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

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 5 summarizes habitat effectiveness by herd unit. All herd units comprise at least 50% habitat effectiveness.

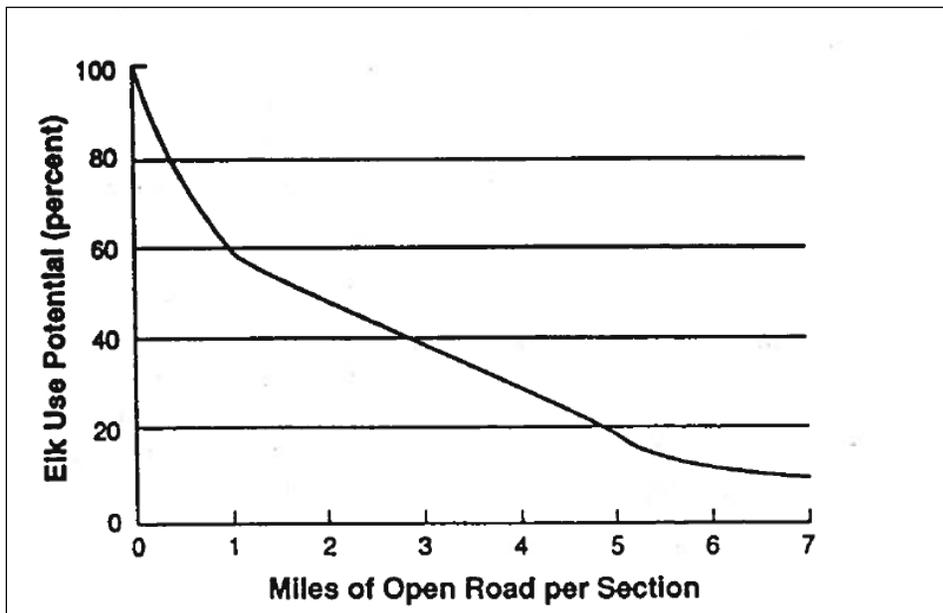


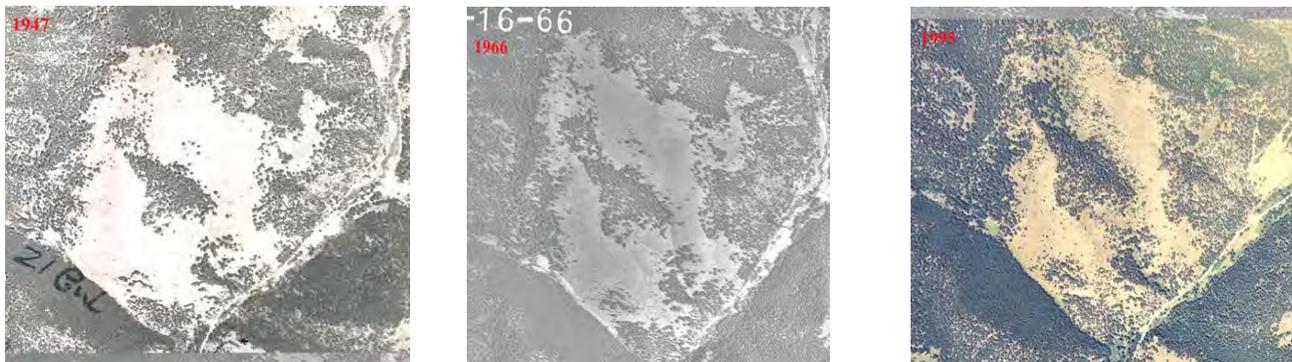
Figure 2. Habitat effectiveness recommendations

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 6 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.

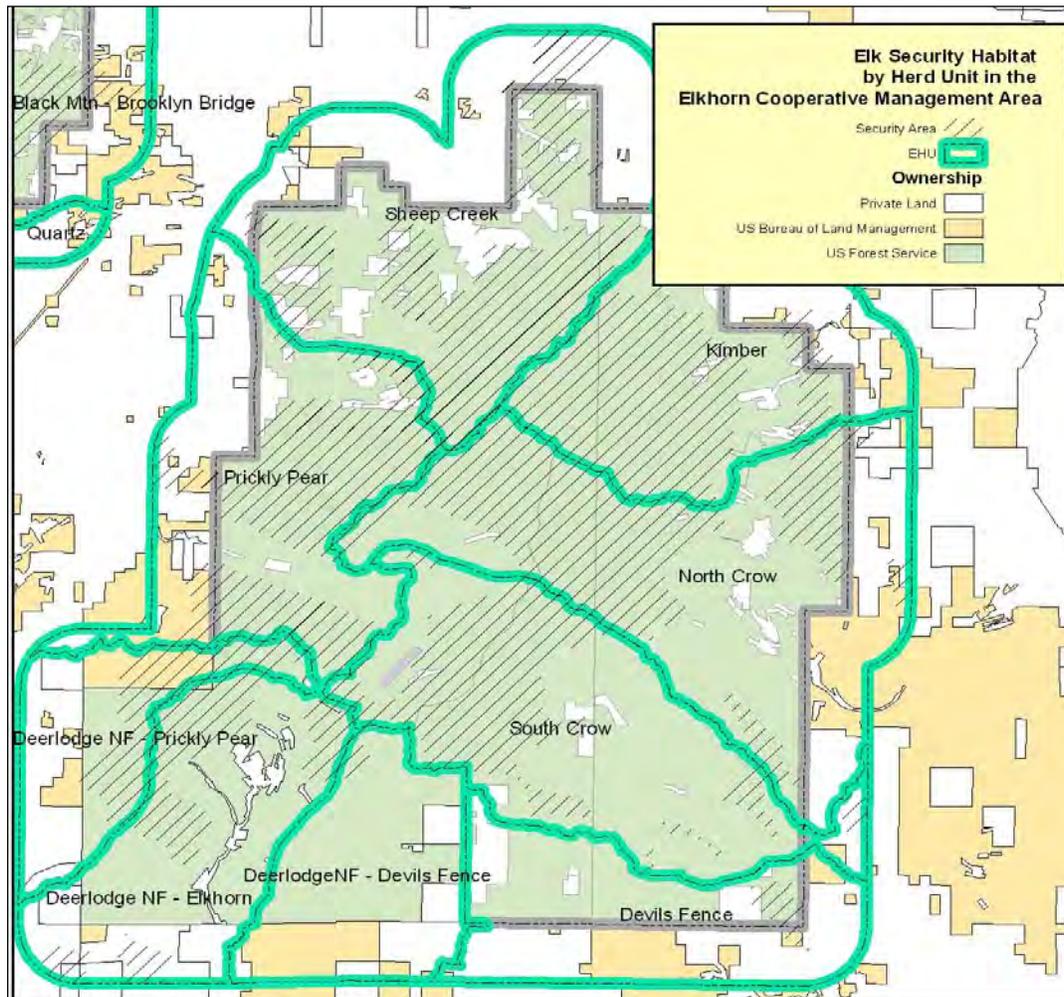
<b>Table 6. Forest Plan Hiding Cover Analysis for Standard 4(a) by Elk Herd Unit</b>					
<b>Elk Herd Unit (EHU)</b>	<b>Total EHU Square Miles</b>	<b>Percent Hiding Cover in EHU</b>	<b>Total Open Road Miles</b>	<b>Open Road Density</b>	<b>Meets FP Standard 4(a)?</b>
Sheep Creek	69	0.11	49.7	0.73	No
Prickly 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
Kimber	47	0.05	32.5	0.69	No
Devil's Fence	32	0.01	34.2	1.08	No

Table 7. 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

*Elk Security*

Table 7 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.

**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<sup>4</sup> with the exception of canopy cover which includes anything > 60%. Table 8 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 8. 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

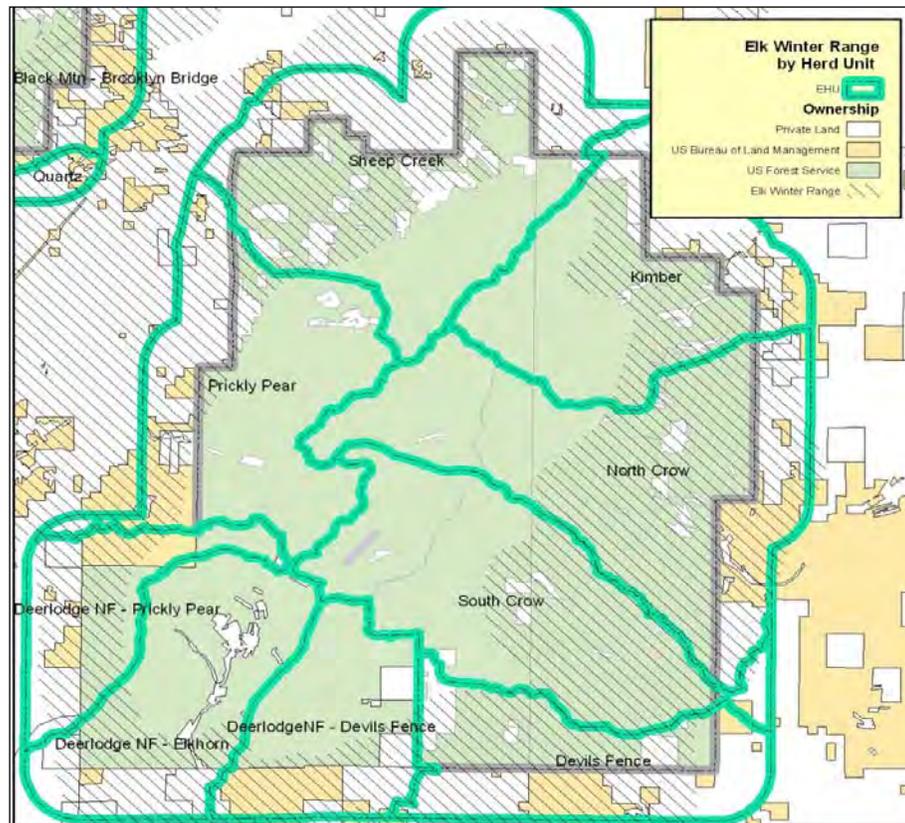


Figure 5. Elk winter range by elk herd unit.

<sup>4</sup> 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 are resulting 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 in subsequent years. 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.

#### *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 19925). 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 Elkhorn's 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'.

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<sup>5</sup> DeSimone, R. and J.Vore. 1992. Elkhorn Mountains 1991 Annual Report. Montana Department Fish, Wildlife, and Parks.

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<sup>6</sup> provides detailed information on the EMU relative to 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.

<b>Table 9. Elk populations and population objectives for the Elkhorn Elk Management Unit</b>			
<b>Elk Management Unit</b>	<b>Hunting Districts</b>	<b>Elk Populations</b>	<b>Population Objectives</b>
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 2009 (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.

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### **(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 human imposed activities by various ungulate populations.

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<sup>6</sup> Montana Department Fish, Wildlife, and Parks. 2005. Statewide elk plan for Montana.

## 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. We are currently in the process of analyzing our monitoring data; results will be provided in the 2010 Forest Plan Monitoring and Evaluation Report. The 2008 data are presented here for continuity.

### *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.

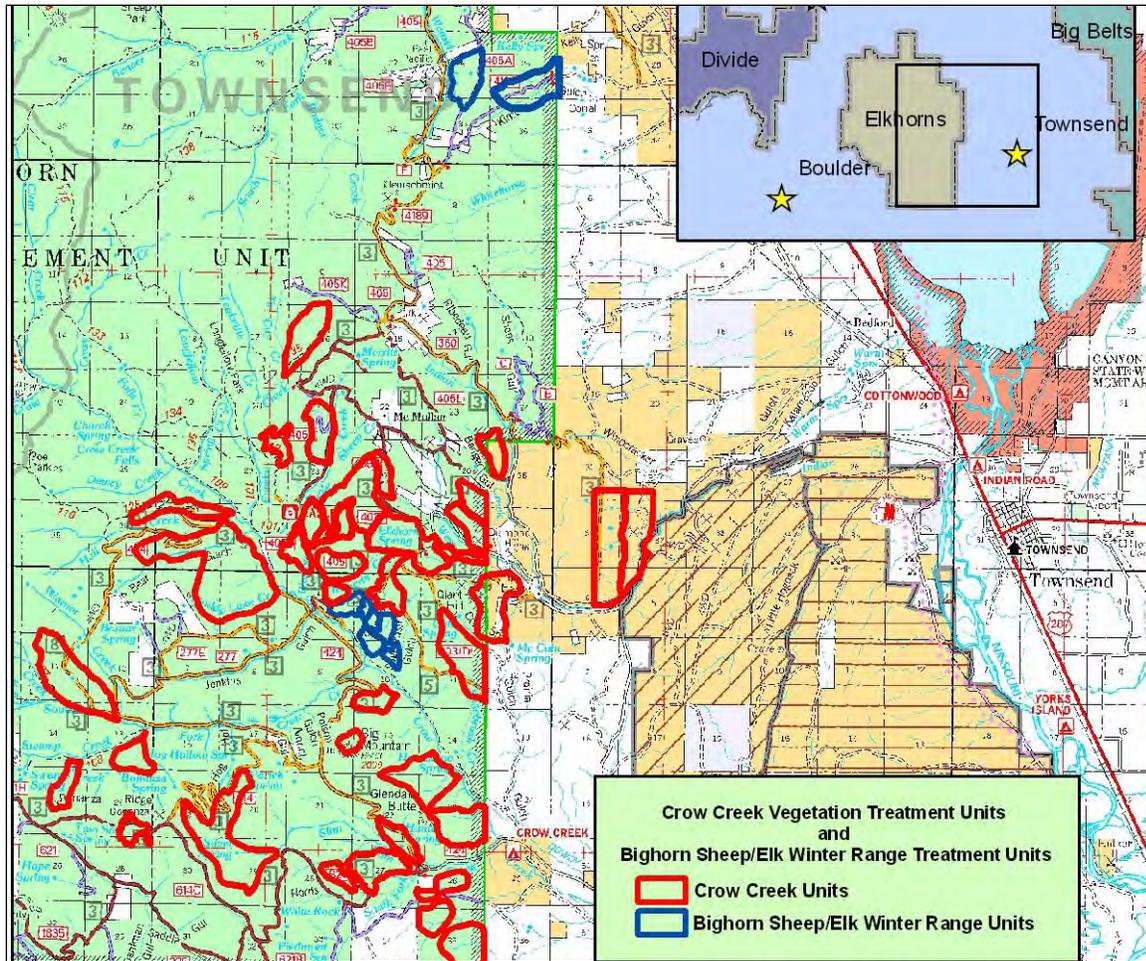
**Monitoring Results:**

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.

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

Figure 6. Crow Creek vegetation and bighorn sheep/elk winter range treatment units.



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.

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).

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).

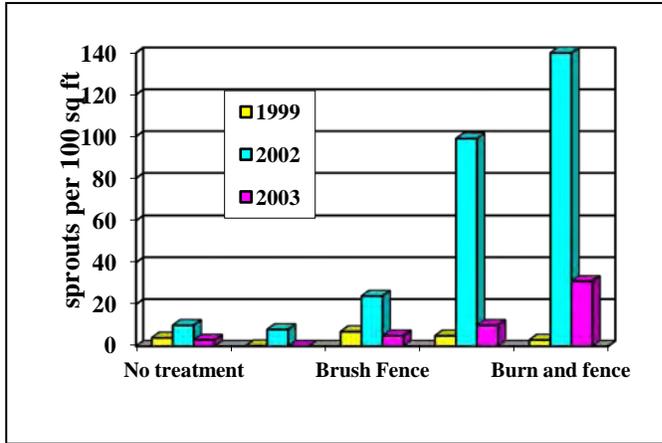


Figure 7. Aspen monitoring results, sprout densities in all treatment types

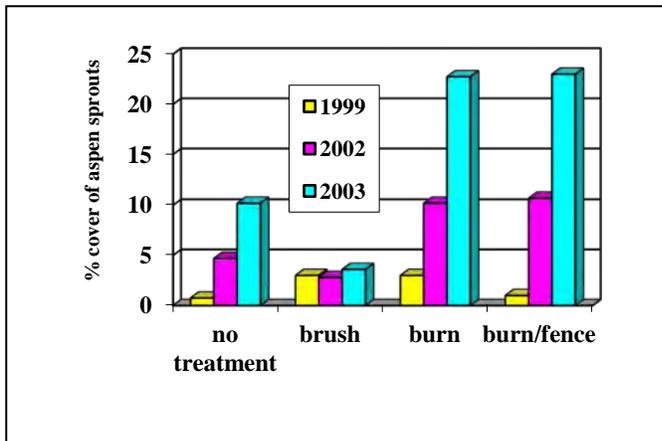


Figure 8. Aspen monitoring results, percent cover of sprouts in all treatment types

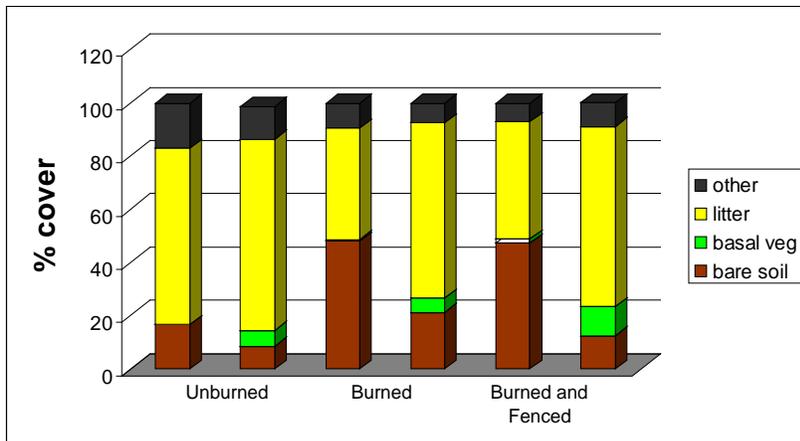


Figure 9. Aspen monitoring results, percent cover in all treatment types

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 7).
- Sprout densities in 2003 declined in all treatments, but stayed the highest in the fenced stands (See Figure 7).
- Sprouting increased dramatically in stands treated with fire (See Figure 8).
- Canopy cover of aspen sprouts increased over time in all treatments except for the aspen stands with brush fences (See Figure 8).
- Burning increases the amount of bare soil the first year (See Figure 9).

### 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 19927). 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.

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<sup>7</sup> DeSimone, R. and J.Vore. 1992. Elkhorn Mountains 1991 Annual Report. Montana Department Fish, Wildlife, and Parks.

- 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.

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#### **(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
- Open road densities generated from INFRA and ARCGIS coverages stored electronically at 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 2009
  - Mule deer surveys in HD 392 for winter and spring 2009

##### **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, cover and forage data as well as a discussion of MTFWP aerial survey data for elk and mule deer. Many of these data were provided in the 2008 Forest Plan Monitoring and Evaluation Report and have not yet been updated with recent re-measurements of intensified grid data. Updates will be provided in the 2010 Forest Plan Monitoring and Evaluation Report.

### ***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 and elsewhere. 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 and Evaluation 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 the 2008 reports 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.

#### *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:***

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).

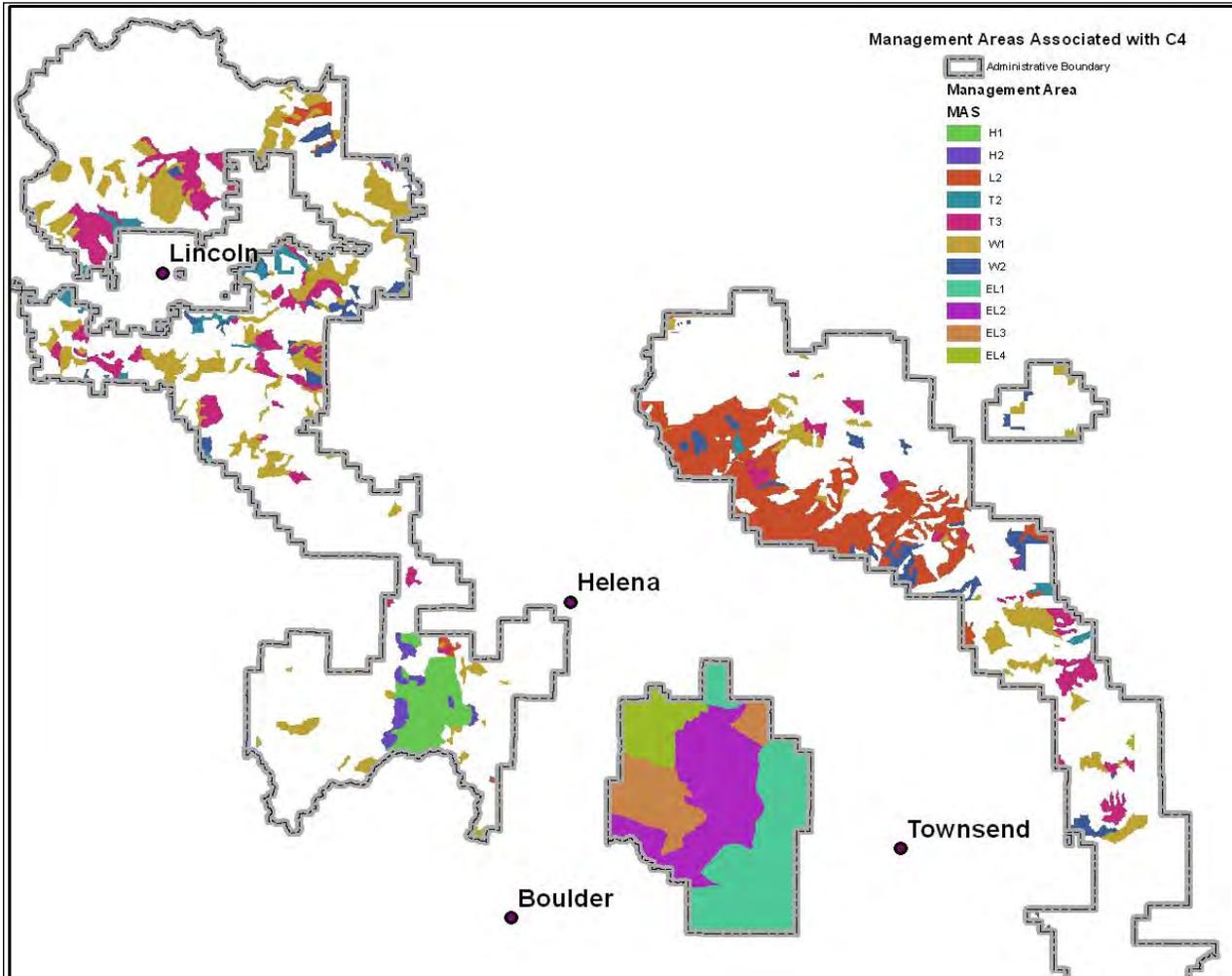


Figure 10 Management Areas associated with C4

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 and Evaluation 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.

<b>Table 14. Open Road Densities by Management Area for Roads Open During Hunting Season</b>					
<b>Management Area</b>	<b>Acres</b>	<b>Square Miles</b>	<b>Open Road Miles</b>	<b>Open Road Density</b>	<b>Open Road Density from 2007 Report</b>
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

*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 15 summarizes elk numbers by hunting district for 2009.

<b>Table 15. Summary of elk observations in Hunting Districts 390, 391, and 392 for 2009</b>							
<b>Hunting District</b>	<b>Total</b>	<b>Cows</b>	<b>Calves</b>	<b>Yearling Bulls</b>	<b>Brow-tined Bulls</b>	<b>Total Bulls</b>	<b>Unclassified</b>
390	2127	1021	255	172	289	461	390
391	728	116	28	32	0	32	552
392	1409	No data	No data	50	7	57	1352

Mule Deer – Surveys were conducted in HD 392 in January and April 2009. Table 16 summarizes the January (post-season) and April (spring counts) 2009.

<b>Table 16. Summary of mule deer observations in HD 392, January and April 2009</b>					
<b>Year</b>	<b>Post-Season Total</b>	<b>Fawns: 100 Adults (Post-Season)</b>	<b>Spring Total</b>	<b>Fawns: 100 Adults (Spring Recruitment)</b>	<b>Bucks: 100 Does</b>
2009	283	20.3	602	24.9	12.7

**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 at other times in the past. 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 17 synthesizes the data presented in Table 12 above in order to describe the cover/forage ratio 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)<sup>8</sup> 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)<sup>9</sup> indicated that elk use of cover is greatest when it's within 200 yards of forage.

<b>Table 17. Cover/Forage Ratios by Management Area</b>						
<b>Management Area</b>	<b>Total Acres Forage</b>	<b>Total Acres Cover</b>	<b>Total Acres Forage and Cover</b>	<b>Cover/Forage Ratio</b>	<b>Management Area Standard</b>	<b>Comment</b>
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,

<sup>8</sup> 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.

<sup>9</sup> 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 17. 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.
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.
H2	371	3,915	4,286	91:9	Maintain adequate thermal and hiding cover adjacent to	Same as above

Table 17. 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
					forage areas.	
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. Therefore there is no variability assessment at this time.

Open Road Densities:

Figure 11 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

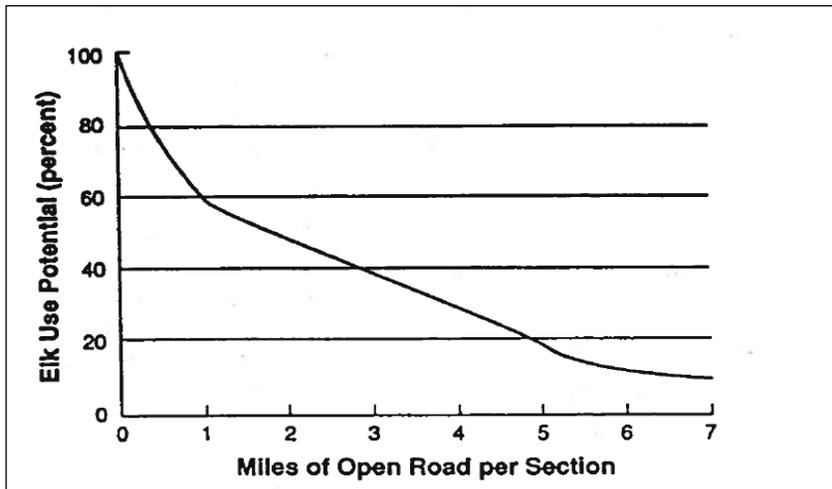


Figure 11 Summer Habitat Effectiveness Based on Open Road Densities

habitat effectiveness, it's useful in understanding overall habitat effectiveness. Lyon (1983)<sup>10</sup> 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.

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.

Aerial Surveys:

Elk – Elk totals in 2008 were 1,618, 432, and 974 for Hunting Districts (HD) 390, 391, and 392 respectively. Total number of elk in 2009 consisted of 2,127 in HD 390, 728 in HD 391, and 1,409 in HD 392. This reflects an increase by about 31.5% in HD 390, 68.5% in HD 391, and 44.7% 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 2008 and 2009 in HD 390, 391, and 392 reflect a >10% increase. These changes are not related to a management oriented practice. Overall, survey results indicate HD's 390, 391, and 392 elk populations increased and have exceeded or are new record numbers.

Figure 12 (excerpted from Montana Fish, Wildlife and Parks annual survey results) illustrates trends in elk numbers from 1989 through 2009.

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

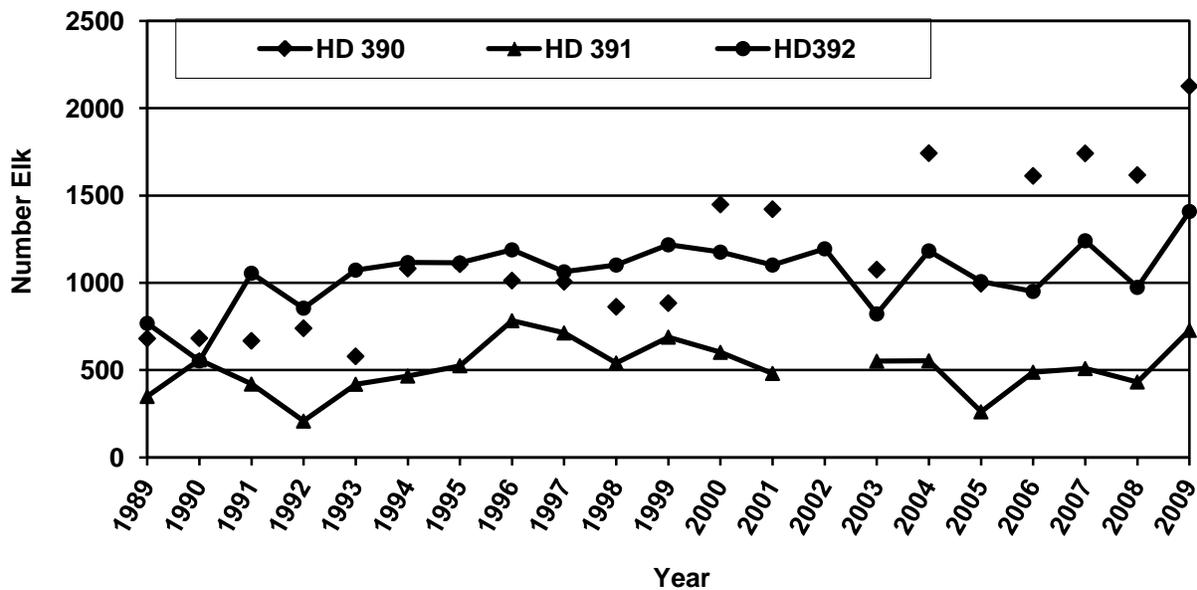


Figure 12. Population Trends in Hunting Districts 390, 391, and 392 from 1989-2009.

Mule Deer – The total number of mule deer counted in HD 392 in 2008 included 241 post-season and 814 during the spring survey. In 2009, there were approximately 283 deer post-season and 602 in the spring. Mule deer numbers increased by about 17% in 2009 based on post-season counts and decreased by about 26% 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. No further actions are necessary at this time.

*Actions in Response to Variability Assessment*

There are no actions needed at this time for all monitoring items described above.

**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 18 summarizes the number of elk observed within all the HDs on the Forest. The total number of

elk counted in 2009 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 11,120 elk counted during 2008 occur on the Forest sometime during the year.

215	281	293	335	339	343	380	390	391	392	446	TOTAL
1,759	*	592	450	1,186	582	2,287	2,127	1,409	728	*	11,120

\*Data not collected in 2009.

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**(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, 2007/2008 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 were derived from 2007/2008 bighorn sheep surveys conducted by MTFWP.

**Current Efforts and 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 were conducted on March 30th, 2007 and January 16th, 2008 by MTFWP.

*Monitoring Results:*

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*

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*

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:**

Our recommendations include continuing to rely on MTFWP for primary field information on bighorn sheep population numbers and distribution. We will coordinate with MTFWP for feasibility of bighorn sheep restoration. We will also 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.

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**(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>
- Northern Divide Grizzly Bear Project at <http://www.nrmsc.usgs.gov/research/NCDEbeardna.htm>
- Grizzly Bear Population Trend Monitoring at <http://fwp.mt.gov/wildthings/tande/monitoring.html>
- Monitoring Bear Populations with Non-invasive Sampling 2009-2013
- [http://www.nrmsc.usgs.gov/research/NGSbear\\_monitoring.htm](http://www.nrmsc.usgs.gov/research/NGSbear_monitoring.htm)

#### 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 Rub Project and the Grizzly Bear Population Trend Monitoring methodologies are described on the respective 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<sup>11</sup> and utilizes the INFRA database to determine open and total road densities. Road densities have been updated due to database validation and updates.

##### Northern Divide Grizzly Bear Project

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.

##### Grizzly Bear Population Trend Monitoring

Since 2004, MTFWP has captured and monitored 104 female grizzly bears in the U.S. and Canada for trend monitoring. Twenty-two new females were captured in 2009. Including management bears and bears captured for other research purposes, 109 individual bears were radio-monitored in 2009. In 2009,

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<sup>11</sup> 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.

forty-nine of these monitored bears were trend females. See the NCDE Grizzly Bear Monitoring annual report<sup>12</sup>.

Monitoring Bear Populations with Non-invasive Sampling 2009-2013

The U.S. Geologic Survey in conjunction with the National Forests within the NCDE and other partners have initiated a study to monitor the bear populations in the NCDE in 2009. The intent of this research project is to evaluate the effectiveness of noninvasive sampling to monitor trends in the threatened grizzly bear population in the NCDE. This effort will result in the collection of bear hair over multiple years to determine how the population changes over time, including changes in abundance, survival rate, regional density, and genetic structure.

**Monitoring Results:**

Road Densities

The moving windows analysis and open road density calculations have been recalculated to reflect updates in the INFRA database. Table 19 summarizes open road densities relative to the Forest Plan Standard.

<b>Table 19. Road Densities Per Forest Plan Standards</b>	
<b>Subunit</b>	<b>Existing Condition (Standard = 0.55 mi/sq. mi)</b>
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 20 summarizes the results of the moving window analysis.

<b>Table 20. Percent Route Density and Core Security Areas in the Monture-Landers Fork BMU</b>			
<b>Subunit</b>	<b>OMRD<sup>1</sup></b>	<b>TMRD<sup>2</sup></b>	<b>Core<sup>3</sup></b>
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
<sup>1</sup> Open motorized route density guideline: ≤19% of each subunit with >1.0 mile/mi <sup>2</sup> ; if <75% FS land management, then no net increase in >1.0 mile/mi <sup>2</sup> open motorized route density class due to FS actions. <sup>2</sup> Total motorized route density guideline: ≤19% of each subunit with > 2.0 mile/mi <sup>2</sup> ; if <75% FS ownership, then no net increase in >2.0 mile/mi <sup>2</sup> open route density class due to FS actions. <sup>3</sup> 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.			

Northern Divide Grizzly Bear Project

Data collection and analysis for 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 13 is excerpted from Mace and Chilton (2011) (See footnote 12) and reflects the area within which grizzly bear trend monitoring is occurring. Results generally indicate that monitored bears were well distributed throughout the NCDE and included multiple age classes. Forty-nine trend females and

<sup>12</sup> Mace, R. and L. Roberts. 2011. Northern Continental Divide Ecosystem Grizzly Bear Monitoring Team Annual Report, 2009-2010. Montana Fish, Wildlife & Parks, 490 N. Meridian Road, Kalispell, MT 59901. Unpublished data.

thirteen management females were monitored by radio instruments during the year. Twenty-one known/probable and man-caused mortalities of grizzly bears in the NCDE occurred during 2009. Management removals accounted for 3% of these mortalities. Eleven trend females have died since 2004, five of which occurred in 2009.

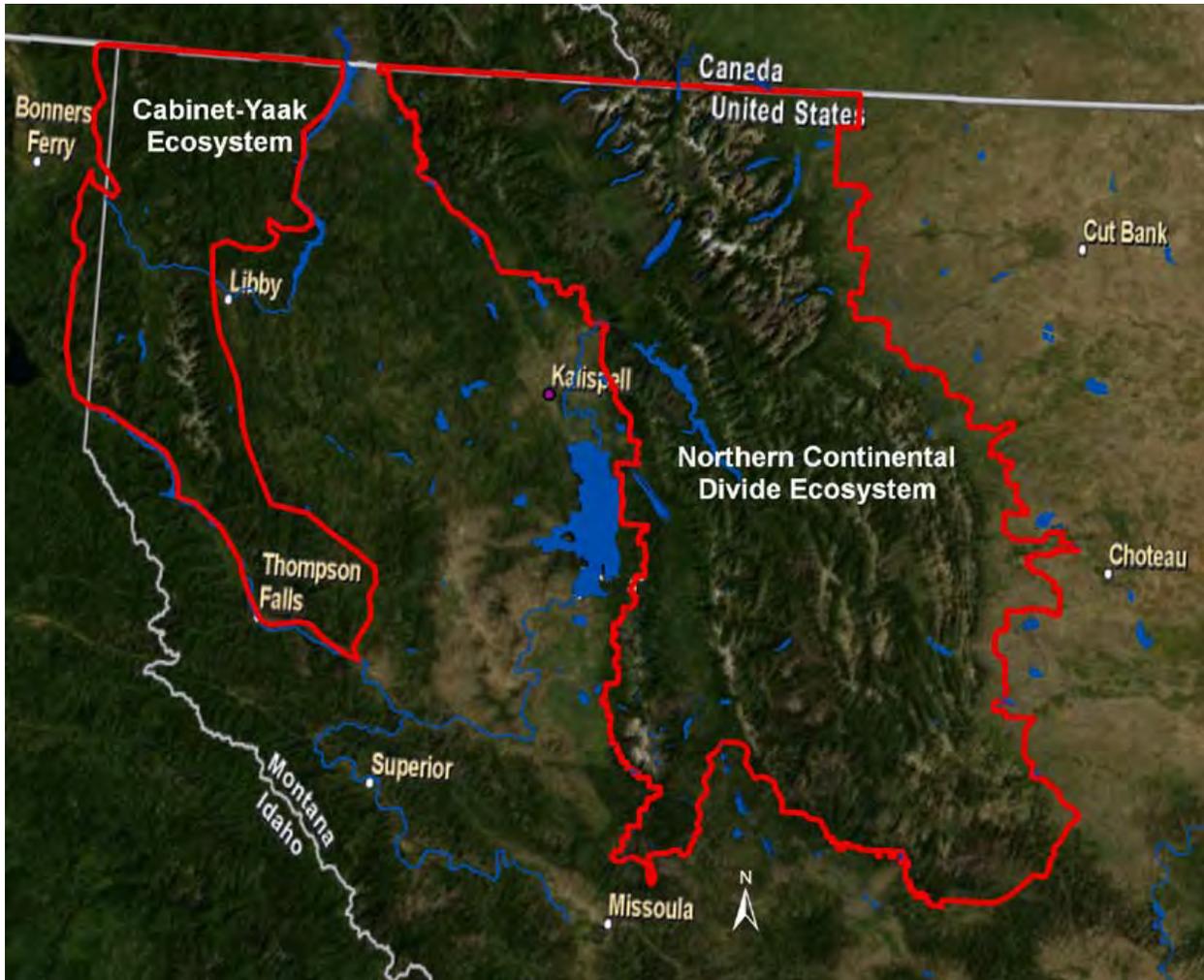


Figure 13. Area grizzly bear trend monitoring is occurring.

*Monitoring Bear Populations with Non-invasive Sampling 2009-2013*

Preliminary data collected in 2009 identified eleven individual grizzlies on the Helena National Forest. No trend data is available.

**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 and Evaluation 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 and Evaluation 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 and Evaluation 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 2009, this conclusion remains in effect.

Changes in the Forest's INFRA database did result in changes to moving window analyses. Table 20, 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.

### Northern Divide Grizzly Bear Project

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. 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.

### Monitoring Bear Populations with Non-invasive Sampling 2009-2013

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 and to continue participation in the non-invasive sampling efforts.

## **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.

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**(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

**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<sup>13</sup>, 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 Multi-level Vegetation Classification, Mapping, Inventory, and Analysis System (USDA 2009)<sup>14</sup>, R1 Grid Intensification using CSE Protocols – Field Procedures

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<sup>13</sup> 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.

<sup>14</sup> USDA Forest Service. 2009. R1 Multi-level Vegetation Classification, Mapping, Inventory, and Analysis System. USDA Forest Service, Region 1, Forest and Range Management, Missoula, MT. 14 pp.

(USDA 2010)<sup>15</sup>, The Region 1 Existing Vegetation Classification System and its Relationship to Region 1 Inventory Data and Map Products (USDA 2011)<sup>16</sup>, and Estimates of Snag Densities for Eastside Forests in the Northern Region (USDA 2008)<sup>17</sup>.

Project level goshawk surveys were conducted according to the Goshawk Field Inventory Methods Helena National Forest 2009 and the Northern Goshawk Inventory and Monitoring Technical Guide (USDA 2006).

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.

*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.

*Project-Level Goshawk Surveys*

Goshawks were monitored in project areas summarized by landscape area in Table 21 utilizing Goshawk Field Inventory Methods Helena National Forest 2008 and the Northern Goshawk Inventory and Monitoring Technical Guide (USDA 2006). Surveys were conducted within the Divide and Blackfoot Landscapes in 2009.

<b>Divide</b>	<b>Blackfoot</b>
Telegraph Mountain Pine Beetle Salvage Project	Stonewall Vegetation Treatment Project Dalton Vegetation Treatment Project

*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.

<sup>15</sup> USDA Forest Service. 2010. Region 1 Grid Intensification using CSE Protocols, Field Procedures. Version 1.3. USDA Forest Service, Region 1, Forest and Range Management, Missoula, MT. 132 pp.

<sup>16</sup> USDA Forest Service. 2011. The Region 1 Existing Vegetation Classification System and its Relationship to Region 1 Inventory Data and Map Products. USDA Forest Service, Region 1, Forest and Range Management, Missoula, MT. 39 pp.

<sup>17</sup> USDA Forest Service. 2008. Estimates of snag densities for Eastside Forests in the Northern Region. USDA Forest Service, Region 1, Forest and Range Management, Missoula, MT. 56 pp.

**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 10.1% to 14.5%. These figures are similar to those reported in the 2008 Monitoring and Evaluation Report and represent an increase over those reported in the 2007 Monitoring and Evaluation 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

Beginning in 2008, snag densities 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 among snag levels reported for 2008 and 2009 with those snag levels prior to 2008. However, general trends can be derived.

Table 22 summarizes snag densities from 2006 through 2009. Note that only the original FIA data points were used prior to 2008; the intensified grid data points are now being utilized to derive estimates (See 'Number of Forested Plots with Non-Null Values' column). Estimates reported in 2009 are based on data derived for the 2008 estimates. We are currently in the process of re-measuring and analyzing our intensified grid data; estimates will be updated in the 2010 Monitoring and Evaluation Report.

<b>Table 22. Forest-wide Snag Densities 2006-2009</b>				
<b>Forest-wide Snag Densities per Acre 2006</b>				
Diameter at Breast Height (dbh)	Number of Forested Plots with Non-Null Values	90% CI For Percent Snags		
		Lower Bound	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
<b>Forest-wide Snag Densities per Acre 2007</b>				
Diameter at Breast Height (dbh)	Number of Forested Plots with Non-Null Values	90% CI For Percent Snags		
		Lower Bound	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
<b>Forest-wide Snag Densities per Acre 2008</b>				
Diameter at Breast Height (dbh)	Number of Forested Plots with Non-Null Values	90% CI For Percent Snags		
		Lower Bound	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
<b>Forest-wide Snag Densities per Acre 2009</b>				
Diameter at Breast Height (dbh)	Number of Forested Plots with Non-Null Values	90% CI For Percent Snags		
		Lower Bound	Estimate	Upper Bound
7-12 inches	607	22.6	26.1	30
12-20 inches	607	5.4	6.5	7.7
20-inch plus	607	0.8	1.2	1.6

Project-Level Goshawk Surveys

*Stone Dry Vegetation Treatment Project*

Goshawk surveys were conducted at pre-determined points in the Stone Dry project area. No goshawks were detected, nor were any nests located.

*Telegraph Mountain Pine Beetle Salvage Project*

Goshawk surveys were conducted at pre-determined points in the Telegraph project area. One goshawk was detected, and one nest located.

*Dalton Vegetation Treatment Project*

Goshawk surveys were conducted at pre-determined points in the Dalton project area. Two adult goshawks were detected at a nest site.

Birds and Burns Research

In 2009, 32 confirmed nests were located and monitored. All nests in 2009 were woodpecker, sapsucker, or flicker 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 14). Snag densities for 2008 and 2009, although not directly comparable to 2006 and 2007 due to different groupings between years and number of plots used to inform the data, indicate that more snags are present Forest-wide (Figure 15). This increase is primarily due to the mountain pine beetle

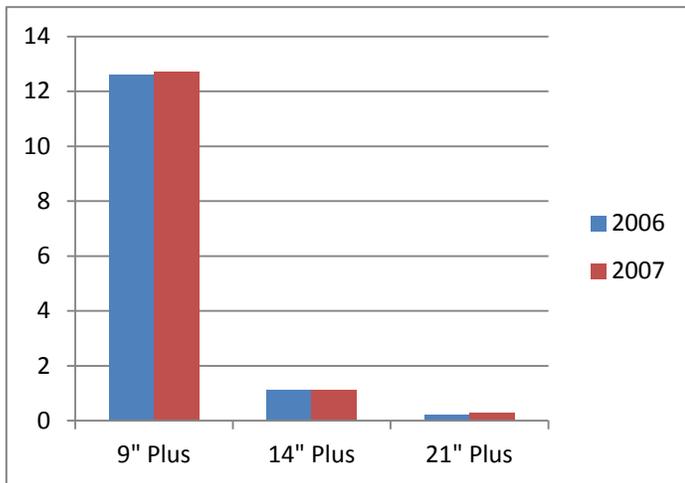


Figure 14. Snag Densities in 2006 and 2007

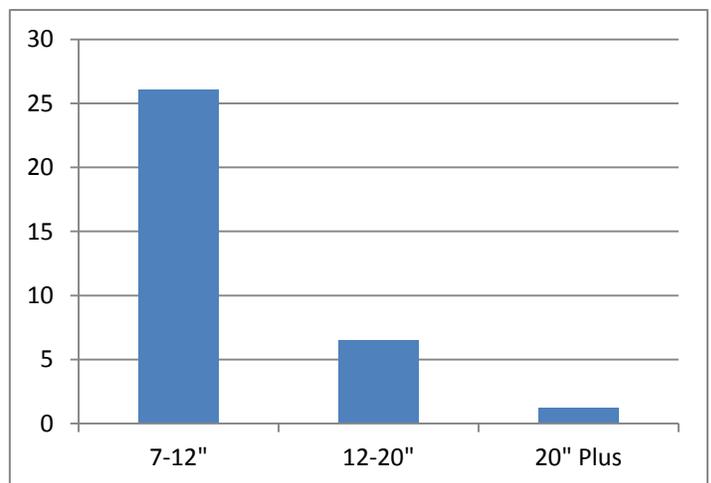


Figure 15. Snag Densities in 2008 and 2009

outbreak Forestwide. Since snags are clearly increasing Forest-wide, the variability measure has not been exceeded.

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.

Birds and Burns Research

Nest success (percentage of nests that successfully fledged at least one young) in 2009 was 87.5 percent with 28 of 32 nests fledging at least one chick (Table 23). Seven hairy woodpecker nests were located and monitored and no pileated woodpecker nests.

Table 23. Number of nests monitored, and the number that successfully fledged at least one young, during the 2009 field season for each bird species on four study units in the Elkhorn Mountains on the Helena National Forest in Montana.						
		Unit1				All units combined
		MC	MT	SC	ST	
Downy Woodpecker	Number of nests monitored	1	3	1	2	7
	Number of nests that successfully fledged young	1	3	1	1	6
Hairy Woodpecker	Number of nests monitored	2	4	0	1	7
	Number of nests that successfully fledged young	2	3	0	1	6
Northern Flicker	Number of nests monitored	1	0	0	0	1
	Number of nests that successfully fledged young	0	0	0	0	0
Red-naped Sapsucker	Number of nests monitored	2	5	0	2	9
	Number of nests that successfully fledged young	2	5	0	2	9
Williamson's Sapsucker	Number of nests monitored	1	0	0	0	1
	Number of nests that successfully fledged young	1	0	0	0	1
American Three-toed Woodpecker	Number of nests monitored	1	1	1	4	2
	Number of nests that successfully fledged young	1	1	0	4	6
Totals	Number of nests monitored	8	13	2	9	32
	Number of nests that successfully fledged young	7	12	1	8	28

1 MC = Maupin control; MT = Maupin treatment; SC = Strawberry control; ST = Strawberry Treatment

**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.

### 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.

### 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 based on the amount present Forestwide. However, as the mountain pine beetle runs its course, old growth will decrease the extent to

which is unknown at this time. However, we are currently re-measuring our intensified grid data points and will recalculate estimates once the data have been analyzed. 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.

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**(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: The Region 1 Existing Vegetation Classification System and its Relationship to Region 1 Inventory Data and Map Products (USDA 2011), R1 Grid Intensification using CSE Protocols – Field Procedures (USDA 2010), and R1 Multi-level Vegetation Classification, Mapping, Inventory, and Analysis System (USDA 2009). 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)<sup>18</sup>.

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<sup>18</sup> 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.

- 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. Eight grid cells were surveyed for a total of 25,600 acres (Table 24 and Figure 16). Each grid cell is approximately 5 mi<sup>2</sup>.

Table 24. Fisher Grid Cell Box Number Surveyed by Area in 2009							
Irish Mine Hill	Nevada Mountain	Little Davis Gulch	Crater Mountain	Charter Oak	Unit 2684	MacDonald Pass	Mullan Pass
2634-1	2638-1	2639-1	2640-1	2678-1	2684-1	2719-1	2720-1
2634-2	2638-2	2639-2	2640-2	2678-2	2684-2	2719-2	2720-2
	2638-3	2639-3	2640-3	2678-3	2684-3	2719-3	2720-3
	2638-4	2639-4	2640-4	2678-4	2684-4		2720-4
	2638-5	2639-5	2640-5	2678-5	2684-5		2720-5
		2639-6	2640-6	2678-6	2684-6		2720-6
			2640-7		2684-7		2720-7
					2684-8		2720-8
					2684-9		2720-9
							2720-10

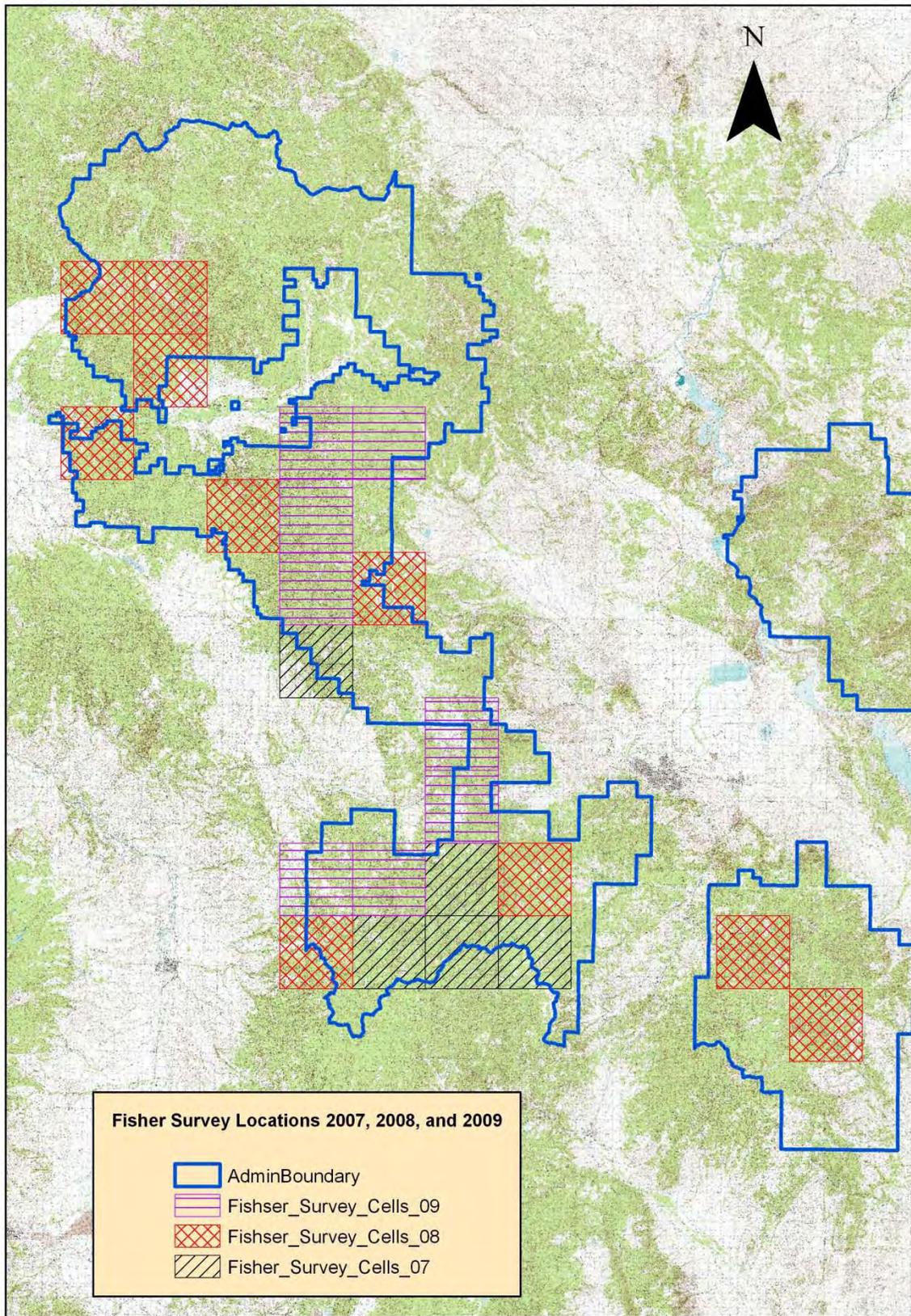


Figure 16 Fisher Survey Locations 2007, 2008, and 2009

Winter Track Surveys

Wild Things Unlimited personnel visited the MacDonald Pass Area between December 10, 2008 and March 25, 2009 to conduct snow track surveys in order to help document general carnivore use levels in the area. Several areas were surveyed: 1) the Telegraph-Minnehaha area; 2) Greenhorn Mountain vicinity; and 3) the Little Blackfoot River and tributaries south of Elliston. 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 Beaver Creek area and in the Rimini/Little Blackfoot area.

**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. Table 25 summarizes marten habitat estimates by landscape for 2007 and 2008. The 2009 estimates are the same as those reported for 2008 since updated figures are not yet available for 2009. We are currently in the process of re-measuring our intensified grid data points; updated marten habitat estimates will be reported in the 2010 Monitoring and Evaluation Report.

<b>Table 25. Estimates of Marten Habitat by Landscape 2008</b>				
<b>Landscape</b>	<b>Number of Forested Plots with Non-Null Values</b>	<b>90% CI For Percent Old Growth</b>		
		Lower Bound	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
<b>Estimates of Marten Habitat by Landscape 2007</b>				
<b>Landscape</b>	<b>Number of Forested Plots with Non-Null Values</b>	<b>90% CI For Percent Old Growth</b>		
		Lower Bound	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 26 summarizes the results of the fisher hair snare surveys. Highlighted rows indicate areas where hair samples were retrieved. No fishers were detected. Martens were detected at sites 2684-8 and 2720-9.

<b>Irish Mine Hill</b>	<b>Nevada Mountain</b>	<b>Little Davis Gulch</b>	<b>Crater Mountain</b>	<b>Charter Oak</b>	<b>Unit 2684</b>	<b>MacDonald Pass</b>	<b>Mullan Pass</b>
2634-1	2638-1	2639-1	2640-1	2678-1	2684-1	2719-1	2720-1
2634-2	2638-2	2639-2	2640-2	2678-2	2684-2	2719-2	2720-2
	2638-3	2639-3	2640-3	2678-3	2684-3	2719-3	2720-3
	2638-4	2639-4	2640-4	2678-4	2684-4		2720-4
	2638-5	2639-5	2640-5	2678-5	2684-5		2720-5
		2639-6	2640-6	2678-6	2684-6		2720-6
			2640-7		2684-7		2720-7
					2684-8		2720-8
					2684-9		2720-9
							2720-10

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, mountain lion, bobcat, fisher, 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.

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**(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](http://fieldguide.mt.gov/detail_ABNKC10010.aspx)

*Monitoring Activity and Data Analysis Methods*

<b>Table 27. Summary of Bald Eagle Observations by County for 2007, 2008, and 2009 (Source: Montana Natural Heritage Database)</b>		
<b>County</b>	<b>Observation Date</b>	<b>Number Reported</b>
Meagher	3/1/2008	3
Broadwater	3/1/2008	2
	6/14/2008	1
Jefferson	12/10/2007	1
	3/1/2008	1
	3/1/09	1
Lewis and Clark	12/15/2007	1
	3/1/2008	9
	3/1/2008	3
	4/12/2008	1
	6/14/2008	1
	10/2/2008	1
	11/28/2008	1
3/1/2008	3	

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 2009 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 27 by those counties within which the Forest occurs. Only those observations reported from the time of delisting through 2009 are summarized.

Figure 17 is excerpted from the Heritage Database and includes all bald eagle observations in Lewis and Clark, Broadwater, Jefferson, and Meagher counties for 2007, 2008, and 2009.

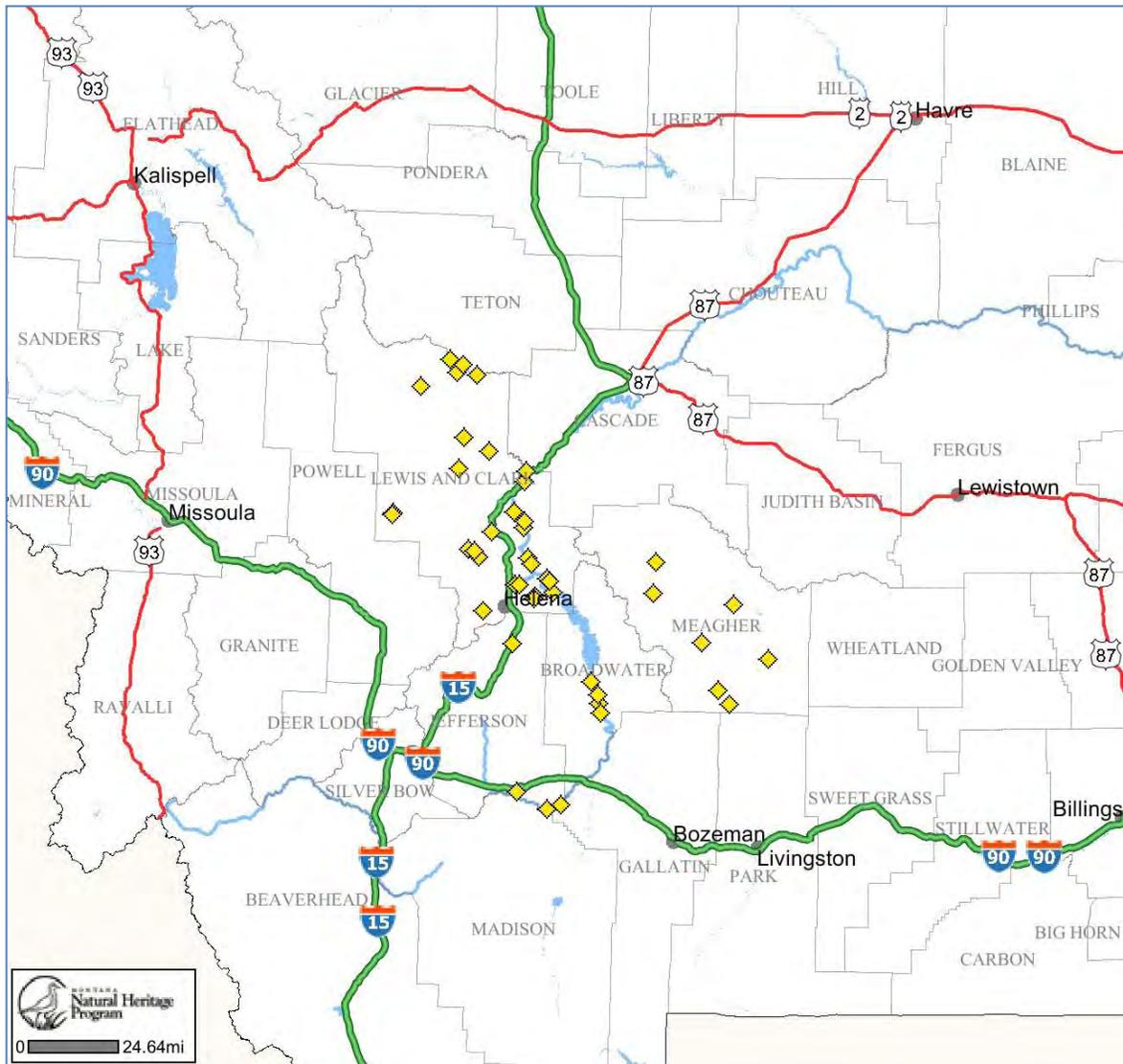


Figure 17. Bald eagle observations from the Montana Natural Heritage program.

**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.

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## 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.

### 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

Nine transects were surveyed in 2009 in the Helena area and flammulated owls were detected at 6 points on 2 of 9 transects (Table 28).

Table 28. Citizen Science Flammulated Owl Survey Sites and Associated Owl Detections			
Site	Number of Visits	Owl Detected	Number of Points with Owls
York Gulch	1	No	0
Magpie Creek	1	No	0
Park Lake	1	No	0
Mount Helena	2	No	0
Owl Gulch	1	No	0

<b>Table 28. Citizen Science Flammulated Owl Survey Sites and Associated Owl Detections</b>			
<b>Site</b>	<b>Number of Visits</b>	<b>Owl Detected</b>	<b>Number of Points with Owls</b>
Tenmile Creek	1	Yes	0
Priest Pass	1	No	1
Unionville	2	Yes	5
<b>TOTAL</b>		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 22% of transects. The spring weather conditions in 2009 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 2009 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*

Fourteen sites were visited in the Meriwether area during June of 2009. Fourteen woodpeckers were detected all of which were either hairy or downy woodpeckers.

**Variability Measure Discussion:**

*Variability Measure*

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

*Assessment*

Most of the woodpecker observations occurred in areas of high intensity fire. Only five woodpeckers were detected in low intensity areas. Although black-backed woodpeckers were not observed during survey efforts, they were observed at other times in the burn area.

**Recommended Efforts:**

We recommend that the YFMP crews continue to monitor 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 and 2009 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/ptct_protocol_2007.pdf)
- [http://avianscience.dbs.umt.edu/documents/projects/habitat\\_relationship/2004\\_LBMP\\_methods\\_000.pdf](http://avianscience.dbs.umt.edu/documents/projects/habitat_relationship/2004_LBMP_methods_000.pdf)

### Analysis

Points were stratified into three 'cover' types: grassland (4 points), sagebrush (17 points), and 'mixed' which reflected a combination of cover types (12 points). Figure 18 illustrates the number of species detected by cover type.<sup>19</sup>

### Variability Measure Discussion:

#### Variability Measure

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

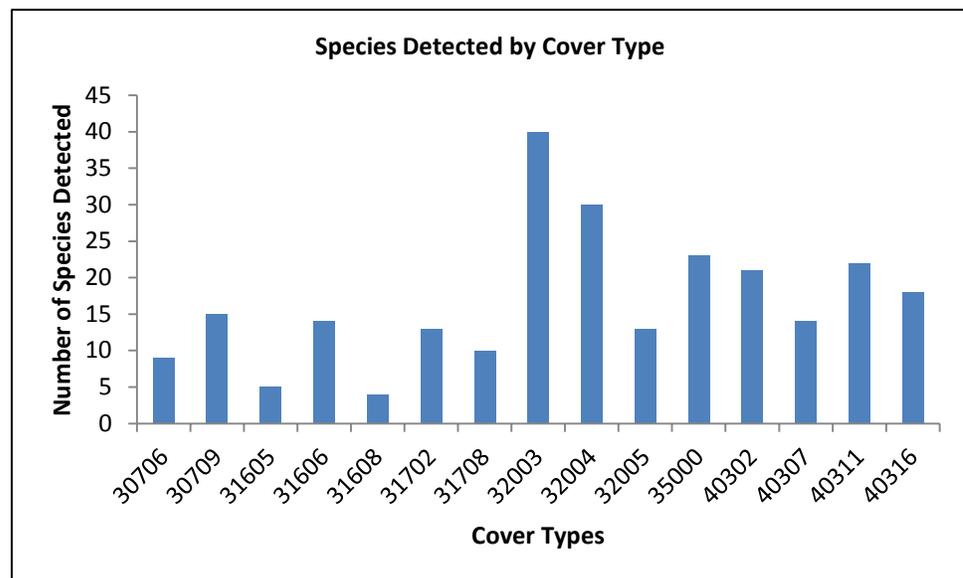
#### Assessment

A majority of the species were detected in the 'Sagebrush type (32003). Several bird species were also detected in the mature, conifer encroachment cover type (35000).

#### 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.

Figure 18. Species detected by cover type.



<sup>19</sup> See 'Cover Types' below.

### *Cover Types*

30706 – Grassland, Idaho fescue dominant, medium structure, sparse cover, ungrazed  
30709 – Grassland, Idaho fescue dominant, low structure, sparse cover, ungrazed  
31605 – Grassland, unidentified dominant species, medium structure, medium cover, ungrazed  
31606 – Grassland, unidentified dominant species, medium structure, sparse cover, ungrazed  
31608 – Grassland, unidentified dominant species, low structured, medium cover, ungrazed.  
31702 – Grassland, other dominant species, high structure, medium cover, ungrazed  
31708 – Grassland, other dominant species, low structure, medium cover, ungrazed  
32003 – Sagebrush, big sagebrush dominant, medium structured, dense cover, ungrazed.  
32004 – Sagebrush, big sagebrush dominant, medium structure, sparse cover, ungrazed  
32005 – Sagebrush, big sagebrush dominant, low structure, dense, ungrazed  
35000 – Conifer encroachment  
40302 – Douglas-fir, mature  
40307 – Douglas-fir, patch cut, tall shrub or sapling/seedling >2 m  
40311 – Douglas-fir, shelterwood cut, tall shrub or sapling/seedling 2nd growth stage  
40316 – Douglas-fir, seed tree cut, pole-sapling stage

### **Lynx Multistory Habitat Validation Surveys**

#### *Monitoring Activity*

The Northern Rockies Lynx Management Direction (NRLMD) provides that “vegetation management projects that reduce snowshoe hare habitat in multi-story mature or late successional forest may occur” in certain circumstances as identified in Standard VEG S6 in the NRLMD. However, there are exceptions if the vegetation management is a fuels treatment project within the wildland urban interface (WUI), of which portions of the Stonewall and Dalton Project areas meet those criteria. Treatments are not allowed occur in multi-story snowshoe hare habitat NOT within the WUI unless they meet one or more of the following exceptions:

1. Within 200 feet of administrative sites, dwellings, or outbuildings, recreation sites, and special use permit improvements, including infrastructure within permitted ski area boundaries;
2. For research studies or genetic tree tests evaluating genetically improved reforestation stock;
3. For incidental removal during salvage harvest (e.g. removal due to location of skid trails)

Otherwise, treatment of multi-story snowshoe hare habitat is not allowed.

In order to determine adequate ‘multi-story snowshoe hare habitat’ the Northern Region of the Forest Service has developed interim guidance for assessing this habitat condition (See Horizontal Cover – Interim Guidance for Assessing Multi-storied Stands Within Lynx Habitat).

#### *Analysis*

The Horizontal Cover – Interim Guidance for Assessing Multi-storied Stands Within Lynx Habitat was used to identify sample points within mapped multi-story snowshoe hare habitat<sup>20</sup>. The following process was used to identify sample points:

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<sup>20</sup> Multi-story habitat is mapped according to criteria identified in the *Criteria for Wildlife Models Helena National Forest Version June 2009* and is based on R1-VMAP.

1. Multi-story polygons that were outside of the WUI and within treatment units were selected as long as they were approximately 2 acres or greater.
2. Random points were generated in ARCMAP using Hawth Tools. Two sample points were generated for every ten acre polygon according to the protocol.
3. Data were collected as identified in the protocol and the Estimating Horizontal Cover schematic.

*Stonewall Project Area*

Five polygons were surveyed that were mapped as multi-story snowshoe hare habitat. None of the five polygons met the threshold to be considered horizontal cover. Table 29 summarizes the survey points and the results of the survey efforts along with the associated polygon number.

<b>Table 29. Stonewall Project Area Lynx Multi-story Survey Polygons and Results</b>			
<b>ARCMAP Polygon ID</b>	<b>Lynx Survey Point ID</b>	<b>Plot Average Percentage</b>	<b>Meets 48% Threshold</b>
75	SDLynx1	14	No
	SDLynx2	3	
76	SDLynx3	18	No
	SDLynx4	26	
100	SDLynx5	18	No
	SDLynx6	47	
73	SDLynx7	42	No
	SDLynx8	19	
88	SDLynx9	44	No
	SDLynx10	NA	No

Telegraph Project Area

Twenty-three polygons were surveyed that were mapped as multi-story snowshoe hare habitat. Of those, seven met the 48% summer horizontal cover threshold value and will therefore be dropped from treatment consideration. Table 30 identifies those points that were surveyed and which ones met the threshold along with the associated polygon number.

<b>Table 30. Telegraph Project Area Lynx Multi-story Survey Polygons and Results</b>			
<b>ARCMAP Polygon ID</b>	<b>Lynx Survey Point ID</b>	<b>Plot Average Percentage</b>	<b>Meets 48% Threshold</b>
101	TELynx1	5	No
	TELynx2	12	
102	TELynx3	11	No
	TELynx4	34	
139	TELynx9	32	No
	TELynx10	11	
165	TELynx39	89	Yes
	TELynx40	88	
169	TELynx5	22	No
	TELynx6	27	
177	TELynx11	22	No
	TELynx12	19	
179	TELynx7	16	No
	TELynx8	35	
199	TELynx41	7	No
	TELynx42	4	
199	TELynx43	8	No
	TELynx44	2	
341	TELynx45	22	No
	TELynx46	2	
743	TELynx23	46	Yes
	TELynx24	54	
753	TELynx25	48	Yes
	TELynx26	68	
797	TELynx27	<48 all directions	No
	TELynx28	<48 all directions	
836	TELynx29	3	No
	TELynx30	21	
856	TELynx31	<48 all directions	No
	TELynx32	<48 all directions	
865	TELynx33	88	Yes
	TELynx34	72	
898	TELynx35	11	No
	TELynx36	49	
965	TELynx37	34	No
	TELynx38	26	
994	TELynx13	Rock	Yes
	TELynx14	77	
1005	TELynx15	84	Yes
	TELynx16	84	
1021	TELynx17	<48 all directions	No
	TELynx18	<48 all directions	
1046	TELynx19	8	No
	TELynx20	15	
1065	TELynx21	47	Yes
	TELynx22	61	

## Variability Measure Discussion:

### *Variability Measure*

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

### *Assessment*

Based on survey results in both the Stonewall and Telegraph Project areas, it is reasonable to conclude that most of the stands mapped as multistory hare habitat actually do not provide the requisite structure.

### *Recommended Efforts:*

We recommend that modeling and mapping efforts are refined in an effort to focus field validation efforts.

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## **(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).

### *Documentation of 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 2002-2008 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.

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**(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 NF 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:

##### *Documentation of 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 2009.

##### *Data Analysis Methods:*

No monitoring was completed in 2009.

##### *Monitoring Results:*

No monitoring was completed in 2009.

#### 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.

##### *Assessment:*

No monitoring was completed in 2009.

##### *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 EIS. The approach is aimed at meeting or exceeding the Forest Plan Standard for General Watershed Guidance #4 (Helena Forest Plan pg II-35).

#### 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.

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## **(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. No new data have been collected in 2009; the following information reflects the 2008 survey efforts.

#### *Documentation and monitoring methodology*

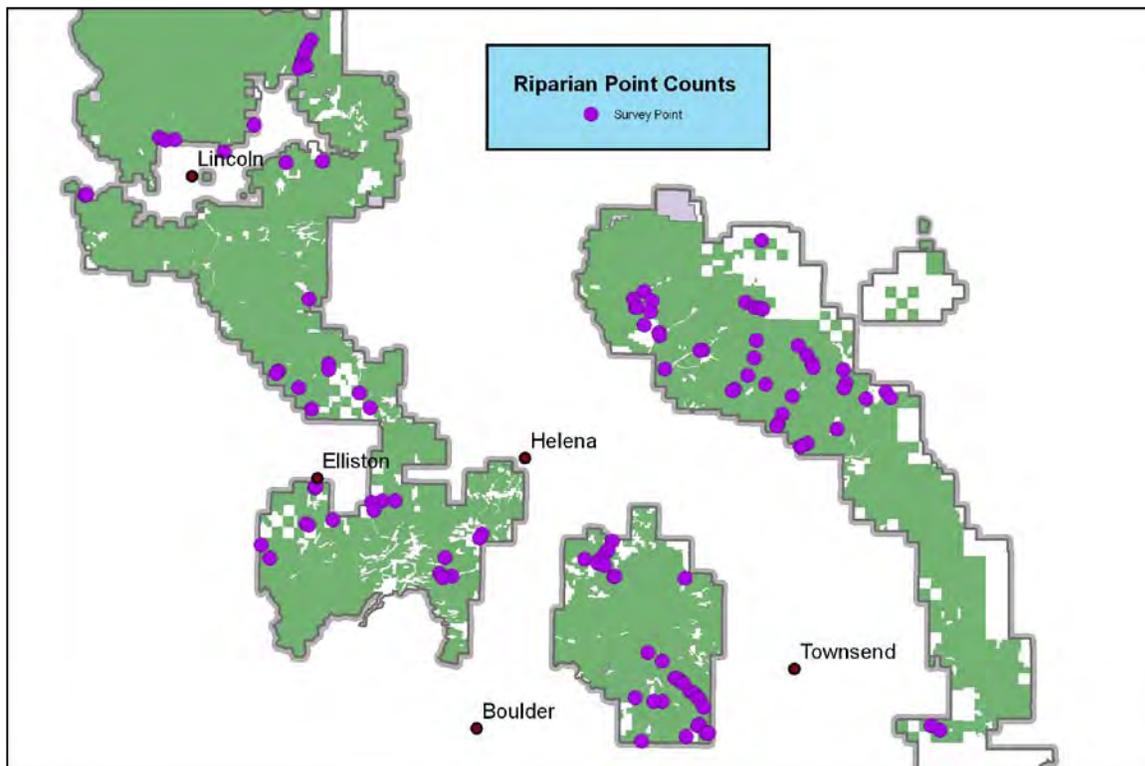
The monitoring methodology is based on the Northern Region Landbird Monitoring Point Count Protocol (2007) and the general Field Methods Protocol (2004) which are located at the following website and on file at the Supervisor's Office:

- [http://avianscience.dbs.umt.edu/documents/projects/habitat\\_relationship/ptct\\_protocol\\_2007.pdf](http://avianscience.dbs.umt.edu/documents/projects/habitat_relationship/ptct_protocol_2007.pdf)
- [http://avianscience.dbs.umt.edu/documents/projects/habitat\\_relationship/2004\\_LBMP\\_methods\\_000.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 19). 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 19. Landbird observations.



## Monitoring Results:

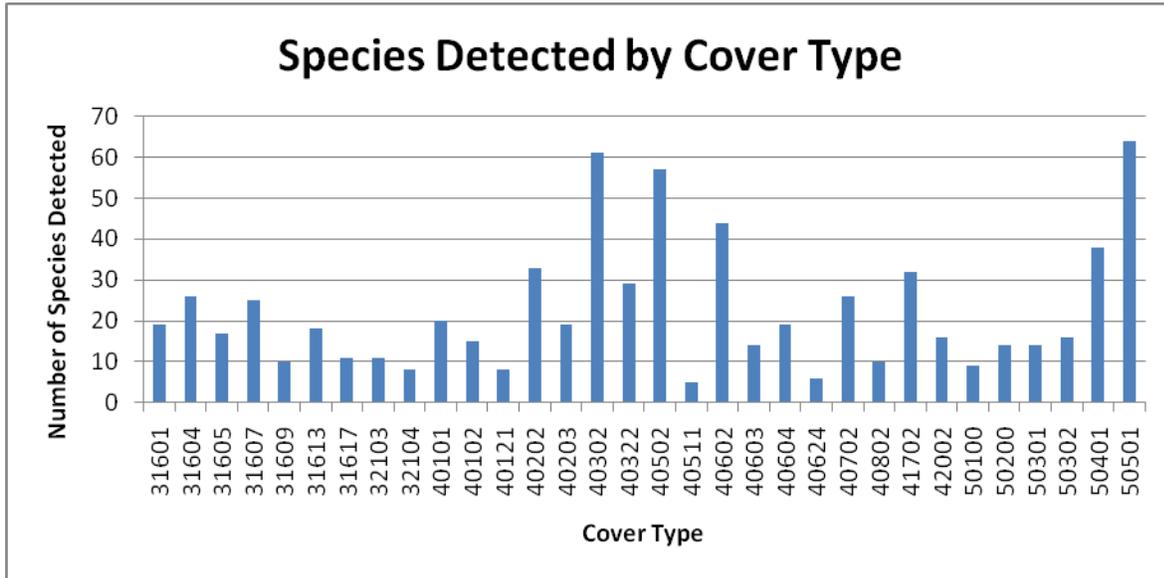


Figure 20 illustrates the number of different species detected by cover type<sup>21</sup>.

## Variability 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 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 78% of the allotments met permitted standards, while 22% 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.

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<sup>21</sup> See Cover Type descriptions below.

### 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

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**(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

**New Information and Updated Standards**

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.

<b>Annual Riparian Zone Key Species Forage Utilization (percent by weight)</b>									
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.

<b>Annual Flood Plain Soil Disturbance (percent)</b>					
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 bulltrout 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 streams west 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 (Annual Operating Plans) since 1998 on those allotments that have monitoring in place.

<b>Allowable Use Standard On Herbaceous</b>	<b>Allowable Use Standard on Sedges</b>	<b>Allowable Use Standard On Woody species</b>	<b>Stream Bank Disturbance</b>
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 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 PBO 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-like vegetation at the time of measurement within the floodplain. Two values are 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 following 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 nineteen grazing allotments had PFC survey information collected in 2008 and 2009. A total of approximately 107 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 Surveyed	Percent of Surveyed Miles	Functioning in a condition to Meet Forest Plan/FSH 2209.21-98-1
Total Functioning At Risk	73	(68%)	[See details next row]
FAR Trends: Upward Downward Not Apparent	26 21 26	(35% of the FAR) (29% of the FAR) (36% of the FAR)	Meeting* Not Meeting Likely Not Meeting**
Non-functional	23	21%	Not meeting
Proper Functioning Condition	12	11%	Meeting
Total Miles	107		

\*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 36% of streams assessed (38 miles) are meeting the intent of Forest Plan element C12; 41% of the streams assessed (44 miles) are not meeting the intent. More information is needed on 24% of the streams (26 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.

Approximately four miles of streams were assessed that were not included in a livestock allotment. Approximately 2 miles were functioning at risk; 1 mile was proper functioning condition; 1 mile was non-functioning. The remaining streams were included in allotments, as shown in the following table, which shows functional ratings by allotment

ALLOTMENT NAME	FUNCTIONAL RATING	Stream Miles Surveyed	Miles/ Percent of Grazed Streams Surveyed	Percent Functional Rating for the Allotment	Functioning in a condition to Meet Forest Plan/FSH 2209.21-98-1	Remarks
<b>BIG BUFFALO</b>	PFC	2		100%	Meeting	
<b>BIG BUFFALO Total</b>		2	8/25%			Need additional information
<b>BROWNS GULCH</b>	FAR Total Trend: Not Apparent	~3 0.7 1.3		~70% (24% of the FAR) (76% of the FAR)	Likely not meeting Meeting	
	Upward					
	NF	0.1		~4%	Not meeting	
	PFC	~1		~27%	Meeting	
<b>BROWNS GULCH Total</b>		~4	4/90%+			No livestock grazing in this allotment since 2004.

<b>CLANCY</b>	FAR Total Trend: Not Apparent Upward	~2 0.7 1.3		~93% (33% of the FAR) (67% of the FAR)	Likely not meeting Meeting	
	PFC	0.1		7%	Meeting	
<b>CLANCY Total</b>		~2	12/17%			New allotment management plan scheduled for 2009.
<b>DEEP CREEK</b>	FAR Total Trend: Downward Not Apparent Upward	~15 4.9 5.5 4.8		79% (33% of the FAR) (36% of the FAR) (32% of the FAR)	Not meeting Likely not meeting Meeting	
	NF	3		16%	Not meeting	
	PFC	1		3%	Meeting	
<b>DEEP CREEK Total</b>		20	44/45%			New allotment management plan scheduled for 2009.
<b>DOG CREEK</b>	FAR Trend: Downward Not Apparent Upward	~3 0.9 1.4 0.8		75% (30% of the FAR) (44% of the FAR) (26% of the FAR)	Not meeting Likely not meeting Meeting	
	NF	~1		25%	Not meeting	
<b>DOG CREEK Total</b>		4	4/100%			New allotment management plan scheduled for 2011.
<b>FROHNER</b>	FAR Trend: Not Apparent	~1 0.8		100% (100% of the FAR)	Likely not meeting	
<b>FROHNER Total</b>		~1	11/20%			Need additional data
<b>GRASSY MOUNTAIN</b>	FAR Trend: Downward Not Apparent Upward	~5 1.2 1.5 2.2		80% (25% of the FAR) (30% of the FAR) (45% of the FAR)	Not meeting Likely not meeting Meeting	
	NF	~1		20%	Not Meeting	
<b>GRASSY MOUNTAIN Total</b>		~6	17/36%			New allotment management plan scheduled for 2011.
<b>HAT CREEK</b>	FAR Trend: Downward Not Apparent Upward	~11 2.9 1.5 2.2		70% (25% of the FAR) (30% of the FAR) (45% of the FAR)	Not meeting Likely not meeting Meeting	

	NF	~1		4%	Not meeting	
<b>HAT CREEK Total</b>		~16	16/100%			New allotment management plan scheduled for 2011.
<b>KEEP COOL LIVERPOOL</b>	FAR Trend: Not Apparent  Upward	~3 1.4 1.4		100% (50% of the FAR) (50% of the FAR)	Likely not meeting Meeting	
<b>KEEP COOL LIVERPOOL Total</b>		~3	23/13%			IDT review
<b>LITTLE BUFFALO</b>	PFC	2.1		100%	Meeting	
<b>LITTLE BUFFALO Total</b>		2.1	15/14%			Need additional data
<b>MAUPIN</b>	FAR Trend: Not Apparent	~1 0.9		36% (100% of the FAR)	Likely not meeting	
	NF	<1		11%	Not meeting	
	PFC	B		54%	Meeting	
<b>MAUPIN Total</b>		3	22/14%			IDT review
<b>MCCLELLAN*</b>	PFC	<1		100%	Meeting	
<b>MCCLELLAN Total</b>		<1	38/0.8%			
<b>QUARTZ CREEK ROWE GULCH</b>	PFC	<1		100%	Meeting	
<b>QUARTZ CREEK ROWE GULCH Total</b>		<1	8/6%			Need additional data
<b>RAY CREEK</b>	FAR Trend: Not Apparent	<1 0.6		15% (100% of the FAR)	Likely not meeting	
	NF	~1		20%	Not meeting	
	PFC	~3		65%	Meeting	
<b>RAY CREEK Total</b>		~4	4/100%+			New allotment management plan completed.
<b>SLATE LAKE</b>	FAR Trend: Downward Not Apparent  Upward	~9 4.0 2.7 1.9		63% (47% of the FAR) (31% of the FAR) (22% of the FAR)	Not meeting Likely not meeting Meeting	
	NF	~4		28%	Not meeting	
	PFC	~1		9%	Meeting	
<b>SLATE LAKE Total</b>		~14	21/65%			New allotment management plan scheduled for 2011.

<b>SPOTTED DOG TROUT CR</b>	FAR Trend: Downward Not Apparent  Upward	~14 5.7 2.9 4.9		84% (42% of the FAR) (22% of the FAR) (36% of the FAR)	Not meeting Likely not meeting Meeting	
	NF	~3		16%	Not meeting	
<b>SPOTTED DOG TROUT CR Total</b>		~16	19/84%			New allotment management plan scheduled for 2011.
<b>STONEWALL</b>	FAR Trend: Upward	<1 0.6		50% (100% of the FAR)	Meeting	
	PFC	<1		50%	Meeting	
<b>STONEWALL Total</b>		~1	7/17%			IDT review
<b>TARHEAD</b>	FAR Trend: Not Apparent	0.2 0.2		20% (100% of the FAR)	Likely not meeting	
	NF	0.8		80%	Not meeting.	Addressed in recent AMP
<b>TARHEAD Total</b>		1.0	15/7%			
<b>TENMILE PRIEST PASS</b>	FAR Trend: Downward Not Apparent	~2 0.7 1.5		43% (32% of the FAR) (68% of the FAR)	Not meeting Likely not meeting	
	NF	~3		51%	Not meeting	
	PFC	<1		6%	Meeting	
<b>TENMILE PRIEST PASS Total</b>		5	40/13%			IDT review
<b>Grand Total</b>		~103 miles				

#### Fishery Evaluations

No fishery evaluations were completed in 2009 beyond the riparian monitoring reported here.

#### Shading of Streams and Fish Habitat.

Grass stubble heights are measured along the greenline of riparian areas. On most of the transects, a 6 inch stubble height for sedges is used.

General fishery reviews entail walk-through surveys utilizing visual estimates for streamside forage conditions as well as bank disturbance levels.

#### Livestock Utilization Monitoring

Livestock forage utilization was measured on forty-two streams, within twenty-three allotments.

The following table shows riparian monitoring that was completed in 2009 using paced transects. Asterisk

(\*) indicates standards were exceeded when the monitoring occurred.

2009 Riparian Annual Use Monitoring—Non Bull Trout Allotments					
Allotment	Riparian Area	% Utilization	% Browse	% Streambank Trampling	Remarks/ Action Taken
Avalanche	Avalanche	0		5	Met standards
	Doolittle	10		15	Met standards
Big Buffalo	Buffalo Creek	35		15	Met standards
	Corral Gulch	30		20	Met standards
	Travis Creek	35		10	Met standards
	N Fk Travis Creek	20		5	Met standards
Camas Creek	Little Camas Ck	NM		NM	
Cellar Ogilvie	Cellar Gulch	35*		15	Exceeded. Moved to next pasture after measurement
	Ogilvie	40		20	Met standards
Clancy	Clancy Creek	30		15	Met standards
	Kady Gulch	15		5	Met standards
	Blizzard Basin	NM		NM	
	Snowdrift	10		10	Met standards
	S. Fork Quartz	0		0	Met standards
Dahlman	Two Sam Spring	25		NM	Met standards
Deep Creek	Carl Creek	NM		NM 57*	
	Mike Day	8		50*	Exceeded. note just 8% utilization. Not
	Mid Fk Falkner	NM		NM	
	L Fk Faulkner	NM		NM	
	Hay Creek	NM		NM	
	Unnamed Trib	NM		NM	
Dry Creek	Dry Creek	40		0	Met standards
Drumlummon	Skelly Gulch	5		5	Met standards
East West French	East West French	NM		NM	
	French Creek	55		20 15	Met standards
Frohner	Little Corral Gulch	30		15	Met standards
Gould	Gould Ck	NM		NM	

Grassy Mountain	Right Fork of Sulphur Bar	NM		NM	
Grouse Ridge	Bowman	35		10	Met standards
	Fantail	NM NMian			
	Indian	25		10	Met standards
	Trout	30		15	Met standards
Gurnett Creek	Duck Creek	NM		10	Met standards
Indian Flats	Pikes Gulch	55		20	barely within standard, may bump to A priority in 2010
	Indian Gulch	45		20	Met standards
Jim Ball	Pikes Gulch	40		30*	Exceeded. mostly a trailing area. Either reroute in 2010 or truck through. Discuss with permittee.
Little Buffalo	Go Devil	NM		NM	
Magpie	Lower Magpie	NM		NM	
	Upper Magpie	NM		NM	
	Magpie Meadows	NM		NM	
Marsh Creek	N Fk Marsh	30		10	Met standards
Maupin	Maupin Creek	30		10	Met standards
	Strawberry	35		10	Met standards
	Willard Creek	30		10	Met standards
McClellan	Miller Creek	NM		NM	
	Crystal Creek	NM		NM	
McQuithy	McQuithy	35		15	Met standards
	Beartrap	35		15	Met standards
Nelson Favorite York	Cottonwood Gulch	15		15	Met standards
	Bull Run	25		15	Met standards
	Owl Gulch	35		35*	Exceeded. monitor more frequently in 2010, discuss with permittee at spring meeting
	Sweats Gulch	15		15	Met standards
North Crow	Eagle	50		0	new fence built, late
	Eureka	NM		NM	
	Indian Creek	NM		NM	
North Fork	Spring Gulch	NM		NM	sheep trailed through

Quartz Rowe	South Fork Quartz	40		20	Met standards
Ray Creek	North Fork of Deep Creek	10		5	riparian exclosure fence in place
South Crow	S Fk Crow Creek	NM		NM	
	Jenkins Gulch	NM		NM	
Tarhead	Trout	NM		NM	
	Tarhead	NM		NM	
Tenmile/Priest Pass	Lazyman Gulch	20		10	Met standards
	Bear Gulch	30		15	Met standards
	Mike Renig Gulch	30		15	Met standards
Whites Gulch	Miller Gulch	NM		NM	
	Whites Gulch	0		0	riparian exclosure in place
	Number 16 Gulch	NM		NM	

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

2009 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"/10"	0%	5%	Met standards
	Middle	3"/9"	0%	5%	Met standards
	Lower	3"/7"	0%	5%	Met standards
Blossburg	Dog Creek	6"/6"		12%	Met standards
	Mullan	Not recorded			
	Meadow Creek	6"/8"		21%	Discussed the 1% exceedance with permittees and made grazing adjustments with how and where cattle are pushed through the area.
Canyon Cr/Sandbar	Sandbar	3"/10"	0%	5%	Met standards
Clarks Canyon	East Portion	3"/7"	0%	10%	Met standards
Chimney	Chimney	3"/5"	0%	18%	Met standards

Creek	Rossin	3"/5"	0%	Not recorded	Few cows used the area. Report stated that standards were met
Dog Creek	North Pasture**	Not recorded	Not recorded	Not recorded	
East Nevada	Nevada	3"/8"	0%	13%	Met standards
	Washington	Not recorded	Not recorded	Not recorded	
	Jefferson**	3"/8"	0%	5%	Met standards
Hat Creek	Hat Creek	3"/5"	0%	19%	Met standards
	South Pasture	3"/6"	0%	5%	Met standards
Horsefly	Black Diamond	3"/11"	5%	0%	Met standards
Keep Cool/ Liverpool	Keep Cool	Not recorded	Not recorded	0%	Met standards
Moose Creek	Moose	3"/8"	0%	5%	Met standards
	Wasson/2274	3"/6"	0%	5%	Met standards
	Wilson	Not recorded	Not recorded	Not recorded	
Poorman/ Willow Creek	Willow Ck	3"/6"	0%	29%	Exceeded
	Sauerkraut**	Not recorded	Not recorded	Not recorded	
	Upper Willow	Not recorded	Not recorded	Not recorded	
Ophir Hope	North Fork Ophir Creek/2149	3"/11"	0%	5%	Met standards
	Lower Spring	3"/5"	0%	22%*	Exceeded. Made adjustments to grazing use, improved water development, and adjusted rotation duration.
Shingle Mill	Shingle Mill	Not recorded	Not recorded	Not recorded	
Slate Lake	Elliston Creek/2154	6"/7"	0%	41%*	Exceeded. Discussed w/ permittee and met at the site, made adjustments to how the livestock are pushed on and enter the Forest.
	Slate Creek	6"/8"	0%	5%	Met standards
	Hurd Creek/2153	3"/8"	Not recorded	5%	Met standards
Spotted Dog	Spotted Dog Creek/2152	3"/10"	0%	14%	Met standards

Spring Gulch	Upper Reach Spring	Not recorded	Not recorded	30%*	Exceeded. Discussed with permittee and installed a fence in cooperation with the fisheries and hydro department to exclude the area from grazing. The area was at 17% disturbance as a result of big game prior to livestock entering the allotment.
	Middle Reach Spring	3"/6"	0%	Not recorded	Met standards
Stonewall	Beaver	3"/5"	0%	5%	Met standards
West Nevada	Madison/2278	3"/10"	0%	0%	Met standards
	Clear 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 approximately 107 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 comprised of utilization, bank alteration and browsing measurements were taken on 40 allotments. The monitoring shows that 78% of the allotments met permitted standards, while 22% did not.

Riparian monitoring conducted on non-bull trout allotments indicated that standards were met on 83%, or 19 of the allotments, while standards exceeded on one or more stream reaches on 17%, or 4 of the allotments which were monitored. 42 streams were monitored; 38 met standards; 4 exceeded standards.

On the bull trout allotments, Biological Opinion monitoring conducted in 2009 indicated 71% or 12 of the allotments monitored met standards, while standards exceeded on one or more stream reaches on 29%,

or 5 of the allotments that were monitored. Twenty-eight streams were monitored; twenty-three met standards. Standards were exceeded on five of the streams in bull trout allotments that were measured.

Preliminary PFC assessments were accomplished on 107 miles of stream. The preliminary investigations show that 36% of streams assessed (38 miles) are meeting the intent of Forest Plan element C12; 41% of the streams assessed (44 miles) are not meeting the intent. More information is needed on 24% of the streams (26 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. There are a total of 18 allotments with preliminary PFC information available. Some allotments have information for the majority of grazed streams while others have only small mileages evaluated.

#### **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 sedges 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

##### *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. No fishery evaluations were conducted beyond the monitoring reported here.

When all allotments on the Forest are combined, riparian monitoring comprised of utilization, bank alteration and browsing measurements shows that 78% of the allotments met permitted standards, while 22% did not.

Riparian monitoring conducted on non-bull trout allotments indicated that standards were met on 83%, or 19 of the allotments, while standards exceeded on one or more stream reaches on 17%, or 4 of the allotments which were monitored. Forty-two streams were monitored; 38 met standards; 4 exceeded standards. Deep Creek, East-West French, Indian Flats and JimBall allotments exceeded standards in 2008. These exceedences were discussed with grazing permittees and the Annual Operating Instructions for 2009 were used to correct the exceedence. In 2009, the East-West French and Indian Flats allotment met standards, but Deep Creek and JimBall again exceeded standards. Cellar-Ogilvie and Nelson Favorite

also exceeded standards in 2009. The intent of this element was not met for the allotments that exceeded standards.

On the bull trout allotments, Biological Opinion monitoring conducted in 2009 indicated 71% or 12 of the allotments monitored met standards, while standards exceeded on one or more stream reaches on 29%, or 5 of the allotments that were monitored. Twenty-eight streams were monitored; 23 met standards. Standards were exceeded on five of the 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. The Poorman/Willow allotment and Spring Gulch allotments exceeded bank alteration standards in 2009. The variability measure is 100% of the allotments meeting standards; therefore the standards were exceeded for this element.

Preliminary PFC assessments were accomplished on 107 miles of stream. The preliminary investigations show that 36% of streams assessed (38 miles) are meeting the intent of Forest Plan element C12; 41% of the streams assessed (44 miles) are not meeting the intent. More information is needed on 24% of the streams (26 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. There are a total of 18 allotments with preliminary PFC information available. Some allotments have information for the majority of grazed streams while others have only small mileages evaluated.

#### *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.

A Forestwide Riparian Inventory and Monitoring Strategy has been implemented by the Forest, as recommended in the 2008 Monitoring Plan for this element.

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. Adjustments were made in the 2009 grazing season to address the exceedances on the five bull trout allotments—Blossburg, Ophir/Hope, Poorman/Willow, Slate Lake and Spring Gulch as indicated in the above table. Results of the changes will be available in the 2010 monitoring report.

Four non-bulltrout allotments, Deep Creek, East-West French, Indian Flats and JimBall allotments exceeded standards in 2008. These exceedances were discussed with grazing permittees and the Annual Operating Instructions for 2009 were used to correct the exceedence. In 2009, East-West French and Indian Flats met standards. The JimBall and Deep Creek allotments again exceeded standards in 2009. Cellar-Ogilvie, and Nelson-Favorite exceeded standards in 2009. Actions to be taken for the 2010 grazing season include site visits to specific monitoring locations with permittee, evaluation of allotment ranking and consideration of convening an interdisciplinary team to evaluate the allotment.

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, Poorman/Willow 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.

The collection of preliminary PFC information should be gathered 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.

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### **(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**

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### **(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:

<b>Allotment</b>	<b>Sale Area</b>	<b>Survey Year</b>	<b>Damage noted</b>
Deep Creek Grassy Mtn.	Toston/Maudlow Fire Salvage	2002-2009 ongoing	None Reported
Magpie	Cave Gulch Fire Salvage	2002-2009 ongoing	None Reported
No allotments	Snow Talon Fire Salvage	2004-2009	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.

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**(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 Standards/Allowable 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 Analysis 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 Vegetation	Timing of Use (deferred)		Timing of Use (rest)			Timing of Use (continuous)
	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 RANGE

(previously TERRA) protocols which are very similar to ECODATA protocols. ECODATA legacy data has been "rolled over" into the RANGE inventory 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 2009 is summarized here. Specific monitoring activity, measurements and results by individual allotment are in the project file.

In 2009, 66 allotments, 86% of active allotments, were monitored and documented.

- Allotments measured of the 77 total active allotments

- A allotments – 24 or 92% of A allotments
- B allotments – 30 or 94% of B allotments
- C allotments – 12 or 63% 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	Ave. Util (%)	Year(s) Exceeded	Remarks / Action Taken
Ophir Hope (hb standard)	A	Cont.	10		60	35	09	exceeded, take issue to 2010 permittee mtg, measure in 10
Alice Cr (fp standard)	A	Defer. Rotate	50	60	30	47	09, 07	exceeded, moved pastures. take issue to 2010 permittee mtg,
Blossburg (fp standard)	A	Defer. Rotate	55	37	40	44	09, 06	exceeded, moved pastures. take issue to 2010 permittee mtg,
Hat Cr (fp standard)	B	Defer. Rotate		55	20	38	09,07,06	exceeded, moved pastures. take issue to 2010 permittee mtg,
Dog Creek (fp standard)	B	Defer. Rotate	60			60	09,08,04	exceeded, moved pastures. take issue to 2010 permittee mtg,
TenMile PriestP. (fp standard)	B	Rest Rotate		50	45	48	09	exceeded, take issue to 2010 permittee mtg, measure in 10
Clancy (fp standard)	B	Defer. Rotate	30	30	55	38	09, 07	new standards will be implemented in 2010 as a result of 2009 analysis and decision
Indian Flats(s standard)	B	Defer. Rotate	40	40	50	43	09	exceeded, take issue to 2010 permittee mtg, measure in 10
Spring Creek (s standard)	C	Defer. Rotate			49	49	09	unauthorized use from another area. continue to measure.

- Allotments monitored of the 77 total – 66 or 86%
  - A allotments – 24 or 92% of 26 A allotments
  - B allotments – 30 or 94% of 32 B allotments
  - C allotments – 12 or 63% of 19 C allotments
- Average utilization over all allotments monitored this year – 27%
- Average utilization for the last three years over all allotments monitored those years – 32 %
- Allotments which have been monitored at least once in the last three years – 73 or 95%
- Number of allotments which have been monitored three years in the last five – 52 or 68%
- Average number of years an allotment is monitored – 3
- Allotments exceeding utilization standards in 2009 – 9 or 14% of allotments measured
  - A allotments – 3 or 12% (Ophir, Alice Cr, Blossburg)
  - B allotments – 5 or 16% (Ten Mile, Clancy, Hat Cr, Indian Flats, Dog Cr)
  - C allotments – 1 or 5% (Spring Creek)
- Allotments out of compliance three consecutive years – 0
- Allotments out of compliance three years within the last five – 1 or 1%
  - Hat Creek allotment

#### Variability Measure Discussion:

##### *Variability Measure:*

The 2008 monitoring report recommended a change for the variability measure of this element and the recommendation was adopted. The variability assessment for this element is 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

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 2010 report for this element will address the new five year measure.

##### *Assessment:*

In 2009, 66 allotments, 86 percent of active allotments, were monitored and documented.

- A allotments – 92% measured (100% goal), 88% within standard (80% goal)

- B allotments – 94% measured (80% goal), 84% within standard (80% goal)
- C allotments – 63% measured (50% goal), 95% within standard (100% goal)

This element is outside of variability for 2009. Two A allotments were not measured and one of the 19 C allotments measured were not within the appropriate utilization standard.

*Actions in Response to Variability Assessment:*

Emphasize field presence from C allotments to A allotments.

**Recommended Efforts:**

Continue to monitor this element and allocate field resources in better alignment with priority ranking.

**(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 (2000-2009) 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

District	Allotment Name	NEPA Decision Date
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
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 nor are the two allotments closed.)		
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 (withdrawn 2009)
2	Empire	30-Sep-08 (withdrawn 2009)
2	Macdonald Pass	30-Sep-08 (withdrawn 2009)
Total number of allotments updated in 2008: 0 (Austin, Empire and MacPass decisions withdrawn in March 2009)		
4	Marsh Creek	24-Sep-09
4	Tarhead	24-Sep-09
1	Ray Creek	21-Aug-09
2	Clancy	10-Dec-09
Total number of allotments updated in 2009: 4		

*Data Analysis Methods:*

These are observational data which have been summarized.

*Monitoring Results:*

The management plans for four allotments were updated in 2009. Also, three decisions previously signed in 2008 were withdrawn in 2009, so the plan updated is no longer considered updated for those three allotments. Over the past five year period (2005 – 2009) 15 allotment management plans were updated. A total of 19 allotments have been updated in the past ten year period (2000-2009).

**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 2005 through 2009. 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. Three allotments are planned for 2010; completing these would not 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.

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**(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, road inspections, INFRA data base, CE projects, KV plans, and the Weed EIS.

## Current Efforts and Findings:

### *Documentation of Monitoring Methodology:*

The data for this element will be compiled in the fiscal year 2010 report.

### Monitoring Activities:

The monitoring activities for this element will be described in the fiscal year 2010 report.

### *Data Analysis Methods:*

The data for this element will be analyzed in the fiscal year 2010 report.

### *Monitoring Results:*

The monitoring results for this element will be disclosed in the fiscal year 2010 report.

## Variability Measure Discussion:

### *Variability Measure:*

Noxious weeds increase distribution by 5%; other weedy species by 10%; infestations appear in previously unaffected areas.

### *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.

The variation in this element is a recurring variation. By following the decision flow diagram (Appendix A), one can conclude that until a revision of the forest plan is initiated, or a change in the variability measure itself is made, this element will continue to be outside of the variability measure.

**Recommended Efforts:**

Continue efforts to analyze data for fy2010 report.

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**(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, RANGE (previously 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 RANGE (previously 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 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.

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring Results and, or Actions Taken since Plan Update
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 forest wide monitoring.	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
LITTLE BUFFALO	23-Jan-06	<p>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</p> <p>Random soil sampling as part of Forest wide monitoring</p>	<p>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.</p> <p>It is unlikely that conditions on this allotment have deteriorated. This allotment was rested in 2008.</p>
FROHNER	23-Jan-06	<p>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:</p> <p>Little Corral Gulch riparian and uplands, Park Lake campground (recreation conflicts), sedge bogs and wetlands.</p> <p>Random soil sampling as part of Forest wide monitoring program</p>	<p>New plans will be implemented in the 2008 grazing season. This allotment was rested in 2007.</p> <p>In 2008, the average utilization was 33% which is below the allowable mean for season long grazing system (35%).</p> <p>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.</p>

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring Results and, or Actions Taken since Plan Update
QUARTZ CREEK/ROWE GULCH	23-Jan-06	<p>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.</p> <p>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</p> <p>Random soil sampling as part of Forest wide monitoring</p>	<p>AMP signed in 2008.</p> <p>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.</p> <p>In 2008, the average utilization was 50% which is at the allowable mean for deferred rest rotation grazing system (50-45%).</p> <p>It is unlikely that conditions on this allotment have deteriorated, despite being at utilization standards this grazing season. However if this continues conditions could decrease monitoring.</p> <p>over time, so emphasize 2009</p>
BALDY	16-Feb-06	<p>Stocking is the same but season of use may vary</p> <p>Vegetation: key areas have been established</p> <p>Hydrology: establish long term cross sections in representative riparian areas</p> <p>Maintain existing improvements, no new ones planned.</p>	<p>Permit was waived to new permittee so implementation of AMP has not yet begun until new permittee is familiar with AMP and objectives.</p> <p>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.</p> <p>It is unlikely that conditions on this allotment have deteriorated.</p>
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

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring Results and, or Actions Taken since Plan Update
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 cross sections in representative riparian areas 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
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.

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring Results and, or Actions Taken since Plan Update
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 separate decision.	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.
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

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring Results and, or Actions Taken since Plan Update
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 removed	None
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

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring Results and, or Actions Taken since Plan Update
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	Decision was withdrawn again in March 2009.	
EMPIRE	30-Sep-08	Decision was withdrawn again in March 2009.	
MACDONALD PASS	30-Sep-08	Decision was withdrawn again in March 2009.	

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring Results and, or Actions Taken since Plan Update
MARSH CREEK	24-Sep-09	<p>Stocking and season of use adjusted prior to NEPA</p> <p>Maintain a grazing frequency that on average over time allows plants full growth prior to grazing or re-growth following the grazing season.</p> <p>Meet riparian allowable use trigger standards for stubble height, bank alteration, and riparian</p> <p>Graze specified portion of Marsh Creek, identified as susceptible site, for no more than 21 days [headwater reach NW ¼ of the SE ¼ of Section 34 (T13N R7W); approx. ¼ mile long reach in vicinity]</p> <p>Monitor site on Marsh Creek (above) as an additional riparian key site identified</p> <p>Timber regeneration stands less than 15 years old or less than 5 feet tall need to be monitored to assure damage from livestock is not occurring.</p>	<p>Adaptive management will be applied to this allotment so implementation will begin 2010</p> <p>Through adaptive management, have option to adjust duration, timing and grazing system.</p> <p>Initial Action: limit grazing to 21 days</p> <p>Adaptive management options to meet the criteria: adjust timing, adjust duration, install electric fence, install permanent fence</p> <p>Short-term implementation monitoring at this site</p> <p>Adaptive management options to meet the criteria include salt placement, herding, electric fence, adjusting of duration or timing of grazing.</p>

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring Results and, or Actions Taken since Plan Update
TARHEAD	24-Sep-09	<p>Stocking and season of use adjusted prior to NEPA</p> <p>Maintain a grazing frequency that on average over time allows plants full growth prior to grazing or regrowth following the grazing season.</p> <p>Meet riparian allowable use trigger standards for stubble height, bank alteration, and riparian</p> <p>Protect upper Tarhead Creek riparian</p> <p>Graze specified portions of Trout and Weino Creeks, identified as susceptible sites, for no more than 21 days</p> <p>[Trout Creek – SE ¼ of Section 5 (T13N R6W); approx. ½ mile long]</p> <p>[Weino Creek – NE ¼ of Section 21 (T14N R6W); approx. ¼ mile long]</p> <p>Monitor 2 additional riparian key sites identified above (on Trout and Weino Creeks) as susceptible sites</p> <p>Timber regeneration stands less than 15 years old or less than 5 feet tall need to be monitored to assure damage from livestock is not occurring.</p>	<p>Adaptive management will be applied to this allotment so implementation will begin in 2010</p> <p>Through adaptive management, have option to adjust duration, timing, and grazing system.</p> <p>Construct riparian exclosure fence and install off-stream water development</p> <p>Initial Action: limit grazing to 21 days</p> <p>Adaptive management options to meet the criteria: adjust timing, adjust duration, install electric fence, install permanent fence</p> <p>Short-term implementation monitoring at these sites</p> <p>Adaptive management options to meet the criteria include salt placement, herding, electric fence, adjusting of duration, or timing of grazing.</p>

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring Results and, or Actions Taken since Plan Update
RAY CREEK	21-Aug-09	Stocking rate decreased by 12%, season of use the same Vegetation: key areas will be established Hydrology: establish PIBO plot in representative riparian areas. Drop trees along reach of stream to keep livestock off and firewood cutters. Improvements: reconstruct interior and boundary fence between the North Fork allotment and existing water development. Construct 2 new developments.	Adaptive management will be applied to this allotment so implementation will begin in 2010. In 2009, the average utilization was 38% .
CLANCY	10-Dec-09	Vegetation: key areas will be established Hydrology: establish PIBO plot in representative riparian areas. Adjust pasture rotation	Adaptive management will be applied to this allotment so implementation will begin in 2010.

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-two allotments which had updated allotment management plans in the past 10 years (2000-2009) were included in this analysis. Of those 32 allotments, 19 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 19 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 19 active allotments was at the

allowable use standard threshold in 2009 (Indian Flats). It is unlikely the condition of the vegetation will show a downward trend unless this utilization level continues for several years.

The 19 active allotments monitored in this element represent 25% of the allotments on the Forest. The 32 allotments represent 42% 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 32 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 2009 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.

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**(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 2009.

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
2009	636	28	305	969
2000-2009	8177	5496	7044	20717

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:*

20,717 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. The 20,717 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, that is, 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.

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**(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.

Sixty-six of the 77 active allotments (86%) have documented permit compliance checks in 2009. 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 2009) 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 2009 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 2009, there were no formal letters of permit non compliance given. There were nine (12%) allotments had an exceedence of one or both forage utilization standards (C12, D1.2). So, a total of 18 allotments had an issue with permit compliance. This represents 23% of the 77 active allotments or 27% of the measured allotments.

Allotment Name	Compliance Issue	Action Taken	Remarks:
Willow Creek	C12 exceeded.	Exceeded. monitor more frequently in 2010, discuss with permittee at spring meeting.	
Ophir Hope	C12 and D1.2 exceeded.	Exceeded. Made adjustments to grazing use, improved water development, and adjusted rotation duration.	Continue to rank A. Try to get NEPA on forest POW so we can convene an IDT.
Spring Gulch	C12 exceeded.	Exceeded. Discussed with permittee and installed a fence in cooperation with the fisheries and hydro department to exclude the area from grazing.	The area was at 17% disturbance as a result of big game prior to livestock entering the allotment.
Dog Creek	D1.2 exceeded.	Exceeded. Moved pastures; take issue to 2010 permittee meeting.	
Jim Ball	C12 exceeded.	Exceeded. mostly a trailing area. Either reroute in 2010 or truck through. Discuss with permittee.	
Cellar Ogilvie	C12 exceeded.	Exceeded. Moved to next pasture after measurement	
Indian Flats	D1.2 exceeded	exceeded. take issue to 2010 permittee meeting, measure again in 2010.	
Nelson Favorite	C12 exceeded	Exceeded. monitor more frequently in 2010, discuss with permittee at spring meeting.	
Spring Creek	D1.2 exceeded.	unauthorized use from another area. continue to measure.	
Blossburg	C12 and D1.2 exceeded.	Discussed the 1% bank disturbance exceedance with permittees and made grazing adjustments with how and where cattle are pushed through area.	The utilization level in the early pasture at standard when measured; cattle were moved out of pasture.
Slate Lake	C12 exceeded.	Exceeded. Discussed w/ permittee and met at the site, made adjustments to how the livestock are pushed on and enter the Forest.	
Alice Creek	D1.2 exceeded.	Exceeded. Moved pastures; take issue to 2010 permittee meeting.	

Allotment Name	Compliance Issue	Action Taken	Remarks:
Deep Creek	C12 exceeded.	Exceeded. Discuss with permittee at spring meeting.	Note, just 8% utilization. Either monitor more frequently or push to get range NEPA back on forest POW.
Hat Creek	D1.2 exceeded.	Exceeded. Moved pastures; take issue to 2010 permittee meeting.	
Clancy	D1.2 exceeded.	new standards will be implemented in 2010 as result of 2009 decision.	
Ten Mile Priest Pass	D1.2 exceeded.	exceeded. take issue to 2010 permittee meeting, measure again in 2010.	

**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 2009. At least one requirement within the annual plans was exceeded on 18 of the 77 active allotments. This represents 23% of the active allotments, or 27% 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 second 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 18 allotments which had standards exceeded are listed in the C12 and D1.2 elements. Compliance checks should be made 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 2010 the range staff should make a recommendation to either modify the variability measure or modify management practices.

## (E) Regulated Volume, Timber

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**(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:***

The FY09 offer was primarily volume associated with the Clancy Unionville project, Park Lake Hazard Tree Removal, and McDonald Pass Hazard Tree Removal. Clancy Unionville was identified as part of the Forest base harvest schedule but had been held up in litigation for several years until it cleared the court system in FY08. Park Lake and McDonald Pass Hazard Tree Removal were new projects developed in response to the mountain pine beetle epidemic on the forest.

***Monitoring Results:***

Timber sale program statistics indicate that in FY09, the Helena National Forest offered 15.3 MMBF of a 17.1 MMBF financed program, which included a combination of personal use firewood, post and pole, and commercial sales.

The past 5-year average accomplishment for the Helena National Forest is 6.8 MMBF of a 13.5 MMBF 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:***

Harvest volume for FY09 is within acceptable harvest variability standards, however the 5 year average for harvest volume 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 National emphasis on ecosystem management and fuels related programs, lack of signed NEPA decisions ready to implement, and less emphasis on maximizing timber production on timbered lands, thus resulting in fewer acres treated with the 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 implemented 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.

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### **(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 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 FY09 the Helena offered 3 timber sales, all located on the Helena ranger district. The sale specifics for these sales are discussed below.

**Clancy Unionville Timber Sale**

Volumes offered for Clancy Unionville in FY09 had a board foot/cubic foot ratio of 1.96/1.0 and an average volume/acre of 15.7 MBF

**MacDonald Pass Hazard Tree Removal**

Volumes offered for MacDonald Pass Hazard Tree Removal in FY09 had a board foot/cubic foot ratio of 2.02/1.0 and an average volume/acre of 5.4 MBF

**Park Lake Hazard Tree Removal**

Volumes offered for Park Lake Hazard Tree Removal in FY09 had a board foot/cubic foot ratio of 2.29/1.0 and an average volume/acre of 6.3 MBF

The average board foot/cubic foot ratio for FY2009 is 1.96/1.0 and the average volume/acre harvested is 14.9 MBF. The past five year average on the Helena National Forest for board foot/cubic foot ratio is 2.01/1.0 and the average volume/acre harvested is 8.4 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. Clancy Unionville, Park Lake Hazard Tree Removal, and MacDonald Pass Hazard Tree Removal were planned for 81% tractor and 19% cable. This is within acceptable variability limits. Logging methods used over the past 5 years have been distributed between tractor (83%), and cable (17%). This is within acceptable variability limits.

Item 6: The Forest Plan estimates that 1,940 acres of harvest annually will be accomplished. In FY09, 1,086 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 a mixture of regenerations harvests, intermediate harvests, and fire salvage which has met the average volume per acre standards in the Forest 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. During FY09 the forest accomplished 1,086 acres of harvest in Clancy Unionville, Park Lake Hazard Trees, Jimtown Fuels, Macdonald Pass Hazard Tree Removal, Holter Powerline, Ovando Powerline, and Mullan Tunnel Powerline. In the five-year period from 2005-2009, the Forest accomplished 2,620 acres (average 524/year or 27% of projection). In addition to the projects listed for 2009, projects where accomplishments occurred during the 5-year period include Cave Gulch Salvage, Beaver Dry, Maudlow-Toston Salvage, Black Butte Salvage, Greyson Bugs Salvage, Snow Talon Fire Salvage, Moose Creek Cabin, Strawberry Lookout, and the sale of several log decks.

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 is not within the measure of 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 element E3.

**Recommended Efforts:**

Continue to evaluate all items of this element at the project level using all available information.

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**(E3) Silvicultural assumptions and practices**

**Forest Plan Requirements:**

Monitor silvicultural assumptions and practices.

*Intent:*

Silvicultural diagnoses, prescriptions, EA's, and FACTS are to be monitored in order to 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 2009, implementation monitoring was done in MacDonald Pass Hazard Trees and burn preparation was reviewed in Poorman (Ethel burn units). See the project file for these documents. 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 unevenaged and evenaged 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 rather than maximizing growth and yield. Therefore, stands have not been necessarily harvested as soon as rotation age is reached or re-stocked to their 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, unevenaged management is applied to warm and dry forests that were naturally thinned by fire, and evenaged 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 the five year monitoring period (2004-2009) 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. Areas harvested in 2009 were mostly regeneration harvests aimed at the re-establishing stands with widespread mountain pine beetle mortality. 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 2009, 2,497 acres had silviculture exams, diagnoses, and/or detailed prescriptions prepared for out year projects.
- 2) In 2009, 1,086 acres of harvest was implemented in the Clancy Unionville, Park Lake, Jimtown, MacDonald Pass Hazard Trees, and various powerline right-of-way projects. 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. The Clancy Unionville, Park Lake, and MacDonald Pass Hazard Tree prescriptions are appropriately even-aged. 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 2009 harvest prescriptions being implemented included Clancy Unionville, Park Lake, MacDonald Pass Hazard Trees and 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, Cave Gulch Fire Salvage, Maudlow-Toston fire salvage, Grassy Bugs Salvage, and other miscellaneous small projects. 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 completed projects, including silvicultural reviews of timber sale preparation and administration. Monitor prescriptions for accomplishment of desired results by completing thorough post-treatment examinations.

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#### **(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 Clancy Unionville, and Greyson Bugs Salvage.

###### *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 ongoing mountain pine beetle epidemic has dramatically increased to amount of easily available firewood throughout the forest. There were no commercial firewood sales in FY 2009. Additionally, in FY 2008 and 2009 the Forest expanded its firewood program to provide special permits to interested adjacent landowners to allow them to remove green infested trees (marked by FS personnel) as personal use firewood within 100 feet 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.

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**(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, 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 the IDT and/or Silviculturist performed post-harvest monitoring; 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 Clancy Unionville 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. Several other projects that were implemented in the monitoring period (2005-2009) 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. No projects in 2009 had opening sizes over 40 acres requested or implemented. However, the Clancy Unionville SIR (2009) did assess the potential need for a request due to several adjacent clearcut units totaling over 40 acres. It was determined, that because the opening sizes were in response to large scale insect mortality no approval was necessary; however the activity was documented in the SIR and the public notified. 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. As of 2009, projects in the planning phase that will include proposals for openings over 40 acres include Cabin Gulch and potentially Warm Springs, Telegraph, and Stonedry.

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.

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**(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 established 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 2009. 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 20,000 acres have had stocking surveys. In 2009, 2,654 acres were surveyed; 312 acres (12%) were failing. 381 acres were planted and 740 acres of natural regeneration were 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.

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**(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. New in 2009, a reforestation timeframe report is available which draws information from FACTS and displays the success of regeneration within the 5-year timeframe following harvest.

**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). The Regional Reforestation Timeframe web-based report was also run to assess the success of regeneration within the 5-year timeframe following regeneration harvests. 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. New in 2008/2009, the Regional Reforestation Timeframe report helps provide some of the information historically captured in TSMRS reforestation indices reports.

Planting usually occurs in the first three years after completion of harvest. In 2009, 381 acres were planted in recently harvested or previously managed areas that burned in recent wildfires (64% of the projected 600 acres/year). In the 5 year planning timeframe, 2005 through 2009, 1,908 acres were planted averaging 382 acres per year or 64% of the projected acres.

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 wildfires 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 2009, stands planted in 2005 were reviewed. 403 acres were planted; 51% are certified, 32% are progressing, and 18% have failed. 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. The failures in 2005 are likely largely attributed to planting season (summer or fall, a practice which is no longer done due to droughty conditions), and most are planned for replanting in 2010. Planting which has occurred after 2004 or 2005 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 to FACTS, from 2005 to 2009, all but 22 planned acres were accomplished (99%). This 22 acre stand was planned in 2009 and could not be accomplished due to a mistake in tree sowing at the nursery; the unit is scheduled for 2010.

#### **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:*

The Forest does not meet the variability requirement of planting at least 75% of the projected 600 acres/year over the 5 year timeframe (from 2005-2009, 64%). However, the Forest does meet 50% of the projection in a given monitoring year (for 2009, 64%). Most of the planting over the 5-year periods 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 2005 to 2009, 99% of planned planting was 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 2005-2009, the Forest harvested an average of 524 acres/year, and 382 acres/year of planting (73%). 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 bulk of the harvest that occurred in 2007-2009 was intermediate in nature with no reforestation requirements.

*Actions in Response to Variability Assessment:*

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.

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**(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, (2005-2009) the Forest accomplished one 13 acre pre-commercial thinning project. This project involved thinning a test plantation. 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 (2005-2009; average 524 acres/year) the relative TSI target would be about 73 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 1,246 acres as of 2009. Most of this planned thinning lies within areas currently mapped as potential lynx habitat, or is not covered by a current NEPA analysis. Many pre-commercial thinning units are proposed in new upcoming projects currently in the analysis phase, however, including Cabin Gulch, Telegraph, and Stonedry.

***Monitoring Results:***

Only 13 acres of thinning was done in 2009 due to a lack of funding, changing management policies concerning lynx habitat, and a lack of current NEPA analyses that include precommercial thinning. In the FACTS database, about 1,246 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. 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. 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.

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**(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 but nearing completion 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, Amendments 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 2009 that included site specific recommendations to change suitable timber lands. However, a minimal amount of harvest has occurred in management areas considered not suitable for timber during the monitoring period to benefit other resources (32 acres in 2009). During the 5 year monitoring period 2005-2009, 387 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 2009, the results of these surveys have determined that due the difficulty in re-stocking (primarily site harshness), 993 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. The results as of 2009 show 966 acres failing in the suitable timber base, and 198 acres in unsuitable areas. 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:*

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.

The Forest is within variability measures for this element for the monitoring period 2009, and for the overall 5 year period since 2005. Lands specified as suitable in the Forest Plan total 251.6 thousand acres; past 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. 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 993 acres prescribed for natural recovery represent less than 1/2% of a change to the suitable base.

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 one-half of one percent 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

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### (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 FY 2009 three rain gauge monitoring sites were installed and three prescribed burn units were monitored. Information was also gathered on a large number of roads on the Helena National Forest. Road sediment data was collected on 43 6th Hydrologic Unit Code (HUC) watersheds, amounting to over 600 sediment points. Stream surveying was conducted along 55 stream reaches in 13 watersheds. Riparian areas in ten range allotments within 12 6th-HUC watersheds were monitored to determine conditions in relation to grazing allotment management. Finally, 31 decommissioned roads were monitored for closure effectiveness during FY2009. A subset of HNF roads is generally evaluated every year in order to determine locations of sediment sources and potential roads to be decommissioned. 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).

Road sediment source assessments were evaluated at every location where sediment may be delivered from a Forest Service roadway to a stream channel or active floodplain during surface runoff. Surveying methods used to complete this assessment are outlined in the 2009 Helena National Forest Watershed Program Hydrology Field Methods Handbook. Prescribed burn fire-monitoring typically involved walking

the perimeter of the entire unit and hiking transects through the unit. Visual observations by an experienced hydrologic technician were noted on a standard field form. These observations noted the severity of the burn, locations of burned areas (hillside, riparian area, valley bottom, etc) and evidence of sediment delivery into adjacent streams as a result of this management activity. Stream surveying data was collected using standard Forest Service stream surveying procedures (Harrelson et al. 1994). Previously decommissioned roads were monitored by trained field crews to evaluate treatment and closure effectiveness. Observational data collected on a standard field form specified closure method, presence/absence of unauthorized motorized use, vegetative recovery and evidence of soil erosion.

Monitoring of riparian areas within livestock grazing allotments followed methods that are intended to provide a rough assessment of riparian conditions. This monitoring followed the Properly Functioning Condition (PFC) assessment protocol outlined in the BLM technical report Riparian Area Management – TR 1737-15 (Prichard, 1998). Youth Forest Monitoring protocols are outlined in the Youth Forest Monitoring Program Report for 2009.

#### *Monitoring Activity:*

Water quality monitoring sites on the Helena National Forest where data were collected in 2009 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 discharge at the HNF sites were measured with a flow meter several times during the peak flow season, and recording water-level sensors collected daily data. The Forest Plan for the Helena National Forest states that flow measurements and measurements of selected water quality parameters will take place at 24 stations throughout the Forest. In 2009, 15 stations were used to collect flow and water quality data.

Among water resource issues, HNF management activities are most likely to influence the delivery to and transport of sediment in streams through hillslope and bank disturbance, burning, and roads, as well as water yield through large-scale green-tree 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 did not occur on the HNF in 2009. Sediment flux and water yield were monitored directly at some HNF sites. In 2009, prescribed burn units located on the Helena and Lincoln Ranger Districts were surveyed. Precipitation and flood data were collected in Meriwether Gulch for the purpose of post-fire analysis and monitoring. Riparian condition in several range allotments were monitored by a HNF range crew. Road sediment source delivery points were monitored by trained HNF hydrology crews. Finally, roads decommissioned during 2009 were monitored to determine treatment effectiveness.

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 2009 monitoring sites related to past or ongoing HNF projects were on Beartrap, Cabin, Deep, Snowbank 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 of B-1 streams most likely to be affected by HNF projects is fish habitat, given its sensitivity to heightened sediment levels.

Monitoring related to the Deep Creek Hazardous Fuels Reduction project (2007-08) continued at the sites on Deep Creek. At the Copper Creek water quality site, water quality was monitored for the Snow Talon salvage sale (2005-07). Monitoring at the Cabin Gulch water quality site continued in 2009 in anticipation of the Cabin Gulch project, which is currently in the planning stage. Monitoring at Snowbank Creek was implemented to monitor effects from an improvement project completed in 2009 on a diversion used to fill Snowbank Lake. Monitoring related to the Mike Horse reclamations continued on Beartrap Creek. The

2009 Youth Forest Monitoring program monitored fourteen different streams on the forest. Seven of the fourteen sites were evaluated for the first time in 2009; thus, for these sites, no trend data are available.

Table 1. Water quality monitoring sites where data were collected in 2009. Data at YFMP sites are collected once per year.

Site	Sampling period	Parameter	Years sampled
Beartrap Creek (HNF & YFMP)	May-Aug	Q, WT, pH, DO, SC, MI, XS, PC, SI, SL	1991-1993, 1997-1998, 2008-2009
Cabin Gulch (HNF)	Apr-Aug	Q, TSS, BL, WT	1978-93, 2006-09
Copper Creek (HNF)	Apr-Sep	Q*, TSS*, BL, WT	2004-09
Deep Creek (HNF)	Mar-Sep	Q*, TSS*, BL, WT	1991-94, 2001-09
Snowbank Creek (HNF)	June	Q, WT	2005, 2008-2009
Sulphur Bar Creek (HNF & YFMP)	Mar-Jul	Q, TSS, BL, WT, pH, DO, SC, XS, PC, SI, SL	1991-93, 2002-09
Buffalo Gulch (YFMP)	July	WT, pH, DO, SC, MI, XS, PC, SI, SL	2009
Corral Creek (YFMP)	June	WT, pH, DO, SC, MI, XS, PC, SI, SL	2009
Crow Creek, South Fork (YFMP)	July	WT, pH, DO, SC, MI, XS, PC, SI, SL	2009
Deep Creek (YFMP)	June	WT, pH, DO, SC, MI, XS, PC, SI, SL	2009
Magpie Creek (YFMP)	July	WT, pH, DO, SC, MI, XS, PC, SI, SL	2001-09
Meriwether Creek (YFMP)	July	WT, pH, DO, SC, MI, XS, PC, SI, SL	2008-2009
Slim Sam Creek (YFMP)	June	WT, pH, DO, SC, MI, XS, PC, SI, SL	1999, 2000, 2002-2006, 2008, 2009
Vermont Creek (YFMP)	June	WT, pH, DO, SC, MI, XS, PC, SI, SL	2009
Web Lake (YFMP)	July	WT, pH, DO, SC, MI, XS, PC, SI, SL	2008, 2009

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

#### Analysis:

Analysis methods generally consisted of comparing data collected at HNF and YFMP monitoring sites in 2009 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); direct comparisons among years are generally of limited value in determining the effects of management activities.

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. Outdated flow and suspended sediment instruments experienced frequent and random equipment failures and subsequent loss of data. As a result there are data gaps that limit the usefulness of the data for 2009. New instruments are scheduled to be installed in 2010. Details of this analysis are on file at the HNF Supervisor's Office.

Prescribed-fire monitoring data including photos, GPS coordinates and field observations were analyzed to determine if there was sediment delivery into adjacent streams as a result of this management activity. Analysis of post wildfire monitoring for Meriwether Gulch precipitation data was completed. The resulting raw precipitation data was converted into precipitation per rain event. Monitoring data from road decommissioning projects was compiled and evaluated to determine if the correct treatment was applied and if the closure method was effective. Stream surveying data was entered into an electronic database.

This data will be compared to stream survey data collected in coming years at the same locations to determine effects of management activities on fluvial geomorphology. 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:*

##### Water Quality Monitoring

Data from Beartrap, Cabin Gulch, Copper, Deep and Snowbank Creek monitoring sites consisted mainly of spot measurements during the spring and summer of 2009.

#### Cabin Gulch

Cabin Gulch was monitored from 1981-93 and again in 2006-09. These 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 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, perhaps in response to management activities occurring in the basin in this period. Monitoring will continue at this site in FY2010.

#### Beartrap Creek

Monitoring related to the Mike Horse reclamations continued on Beartrap Creek. Beartrap Creek was monitored from 1991-93, 1997-1998 and again in 2008-09. Monitoring will be increased at this site in FY2010.

#### Copper Creek

Continuous monitoring at Copper Creek has taken place since 2004. However, in 2009 numerous electrical issues arose with the ISCO automated suspended sediment sampler and the capacitance-rod water-level sensor. As a result, only a handful of spot measurements were determined to be accurate. Given the limited number of sample points, estimates of flow and sediment yield were not possible at this site for 2009. New flow and suspended sediment instruments are scheduled to be installed in 2010 which should prevent similar issues.

#### Snowbank Creek

Monitoring efforts at Snowbank Creek began in 2005. After a lapse of monitoring for several years, spot measurements at this site were recorded in 2008-2009. The sites on Snowbank Creek were implemented to monitor effects from an improvement project completed in 2009 on a diversion used to fill Snowbank Lake. Monitoring will be increased at this site in FY2010.

#### Deep Creek

Deep Creek was monitored from 1991-1994 and again in 2001-2009. In FY 2009 the automated suspended sediment sampler and capacitance-rod water-level sensor at this location experienced frequent malfunctions. Six spot measurements provide the only reliable data for this site in FY 2009. New flow and suspended sediment instruments are scheduled to be installed in FY2010 which should prevent similar issues.

Youth Forest Monitoring Program

The 2009 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 2001-09, and has done a sufficient job of monitoring changes resulting from the Cave Gulch fire of 2000. 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. These indicators suggest that this site may be gradually improving since the Cave Gulch fire.

Sites on Slim Sam, Web Lake and Sulphur Creeks also remained relatively stable in terms of the measured parameters. Seeing as five of the ten sites were evaluated for the first time in 2009, no trend data is available. Details of the YFMP analysis are in the YFMP annual report filed at the HNF Supervisor's Office.

Road Decommissioning Monitoring

During the fall of 2009 four areas were monitored in the North Belts Travel Plan project area within the Helena National Forest. Road decommissioning in this area occurred mainly during 2008 and 2009. The goals of this monitoring were to a) document if road closure technique used matches original recommended closure, b) determine type of closure sign or method used, c) document if there is erosion or sediment delivery into streams as a result of decommissioning efforts, and d) if road decommissioning/closure method is effective. Thirty-one roads were monitored during 2009 (Table 2). Results from road decommissioning monitoring pertaining to erosion, compliance with closure recommendation and effectiveness were positive (Table 3).

Table 2. Summarized data from HNF road decommissioning monitoring FY 2009.

HNF Road Decommissioning Monitoring FY 2009		
Project	Area	Number of roads monitored
North Belts	Magpie	8
North Belts	York	5
North Belts	Grouse Ridge	11
North Belts	Confederate Gulch	7

Table 3. Summarized data from HNF road decommissioning monitoring FY 2009.

HNF Road Decommissioning Monitoring Criteria FY 2009			
Evaluation Criteria	Yes	No	Uncertain
Treatment matches recommendation	27	2	2
Erosion resulting from decommissioning	2	28	1
Decommissioning effective	21	7	3

Over 80% of the treatments matched their recommendations. The few that did not match recommendations were short sections where ripping took place instead of re-contouring. In both cases a fire crew followed up by falling trees on this ripped area to deter motorized travel. The uncertain areas noted there was too much snow on the ground to tell if the correct method was utilized.

Ninety percent of the decommissioned roads that were monitored showed no evidence of erosion. The two roads that showed sign of erosion coincide with roads where the decommissioning was not effective.

The result of this inadequate closure was motorized travel on a newly ripped surface that was susceptible to erosion. One road was covered in snow to such an extent that signs of erosion were not visible, thus its placement in the uncertain category.

Finally, 21 of the decommissioned roads were determined to be fully successful. Most of the ineffective decommissioning efforts resulted from users driving over ripped areas. To help prevent these activities from occurring fire crews fell trees across these ripped sections. The decommissioned roads where the closure effectiveness was noted as uncertain were monitored shortly after the project was completed and not enough time had elapsed to be certain if these efforts were fully effective.

Prescribed Burn Monitoring

During the fall of 2009 three prescribed burn units were monitored on the Helena and Lincoln Ranger Districts. The goals of this monitoring were to a) document burning in riparian habitats, b) determine if there is evidence of an increase in sediment delivery into streams in the burn units as a result of prescribed burning and c) document the recovery of vegetation in riparian areas and hill slopes.

Prescribed burn units that were adjacent to stream channels (perennial, intermittent, or ephemeral) were evaluated. Table 4 shows the data collected at these units.

<b>Prescribed Burn Fire-Monitoring Helena National Forest 2009</b>					
<b>Project</b>	<b>Acres</b>	<b>Burning in Riparian Area</b>	<b>Burning in valley bottom</b>	<b>Does Channel exist in burn unit</b>	<b>Evidence of sediment delivery to stream</b>
Ethel 30	423	No	No	Yes	No
American Bar Unit #5	256	Yes	Yes	Yes	No
American Bar Unit #3	69	Yes	Yes	Yes	No

Table 4. Information from 2009 prescribed-burn sediment delivery monitoring.

In addition to the above data, additional information about each prescribed burn units is as follows:

Ethel 30 – This prescribed burn was completed in the spring of 2009 and monitoring took place in September 2009. As with most prescribed-fire units, the burn pattern was a mosaic. A majority of the unit area showed little or no signs of burning when surveyed. Erosion or sediment delivery to streams were not observed.

American Bar Unit #3 – The prescribed burn for this unit was completed in the fall of 2008, and monitoring was done in the fall of 2009. Most of the ground vegetation (grasses and forbs) in this unit was burned in the prescribed fire. Although the prescribed fire burned most of the ground vegetation in this unit, vegetation in the riparian area and on the hill slopes recovered quickly. Grasses and forbs on the hill slopes were 12-18” tall at the time of monitoring, ten months after the burn. The prescribed burn appeared to have been of low intensity near the stream channel. No evidence was observed of hillslope erosion or sediment delivery to stream channels. However, no rain data exist for the site so conclusions cannot be made on the intensity of storm events encountered following the burn.

American Bar Unit #5 – It appears as though this prescribed burn was of low intensity given the low level of fuels available in this unit. Nonetheless, the fire burned through the majority of the unit, reducing shrub encroachment and enhancing natural openings. The vegetation in the riparian area and on the hill slopes recovered quickly. Based on field observations, vegetation on the hill slopes and valley bottoms has fully recovered. Currently vegetation covers the entire unchannelized valley bottom and hill slopes. Similar to unit #3, no evidence was observed of hillslope erosion or sediment delivery to stream channels. No rain data exists for this unit, thus conclusions cannot be made on storm event intensity or duration following the burn.

In the case of American Bar Units #3 and #5, prescribed burning occurred more than one year prior to being monitored. Given this period of time, it is possible that evidence of sediment delivery into streams could be covered by dense riparian vegetation that typically follows after a burn. However, evidence of erosion and deposition is generally visible for at least two years following the event, due to patterns of hillslope/rill and depositional zone morphology, as well as other characteristics.

*Road Sediment Source Monitoring*

During FY 2009, hydrology crews collected road sediment source data on 43 6th HUC watersheds on the Helena National Forest. Crews collected descriptive data at over 600 sediment-delivery points. Surveyed watersheds were selected based on present and upcoming HNF project areas (e.g. Blackfoot Travel Plan).

The number of sediment-delivery points identified in the field provides a general indication of the condition of Forest Service roads on the HNF. When used in an erosion/sedimentation model (e.g. WEPP), the data collected at these points provides a quantitative estimate of actual erosion and sediment delivery from roads. This type of analysis is done when evaluating the potential impact of proposed management activities, and to identify where improvements are needed. The estimates derived from WEPP analysis provide a baseline from which comparisons can be made after road improvement projects have been completed. Road improvements are typically done in conjunction with other management activities. In an ongoing effort to determine sediment delivery from Forest roads road sediment source monitoring will continue in FY 2010. A comprehensive review of this data is available at the Helena National Forest Supervisors Office.

*Range (Riparian) Monitoring*

During FY 2009 the range crew monitored ten range allotments that were within twelve 6th-HUC watersheds on the Helena National Forest. This crew monitored 158 reaches within these allotments, totaling 73 miles of streams. The final output of this survey is a functional rating for each stream reach of either properly functioning condition, functional-at-risk, or nonfunctional. A more detailed discussion of these reaches and ratings, as well as how this data ties into Forest Plan monitoring can be found in the C12 element of this FY2009 Forest Plan Monitoring Report.

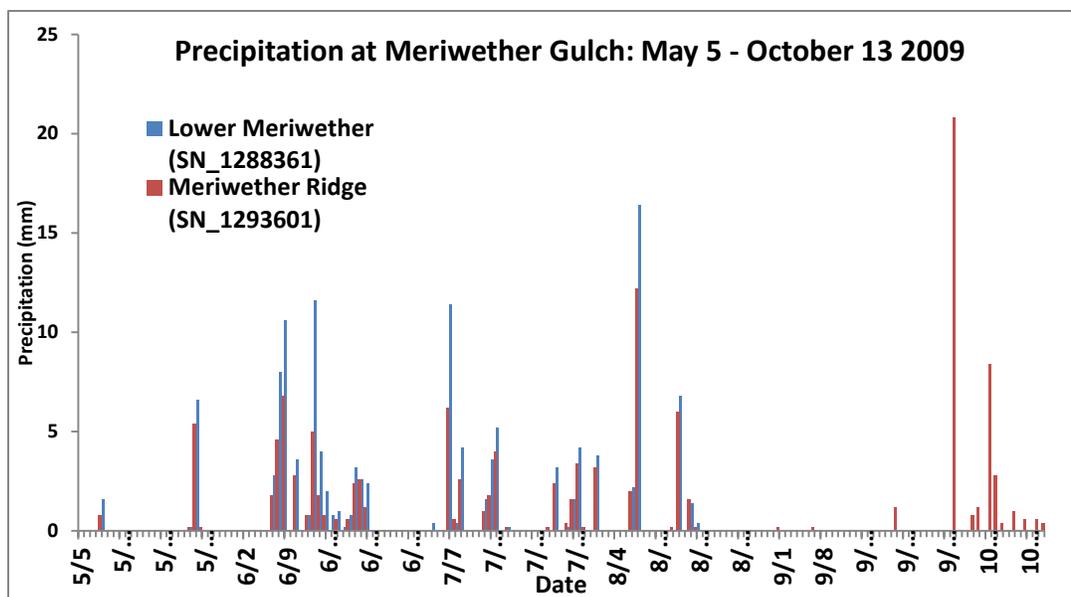
<b>HNF Range Monitoring Assessment of Riparian Conditions using PFC</b>	
<b>Functional Rating</b>	<b>Number of reaches</b>
Properly Functioning Condition	7
Functioning-At Risk	126
Nonfunctional	25

Table 5. Summarized data from HNF PFC data for range monitoring.

*Rain Gauge Data*

In anticipation of flooding and hyper-concentrated floods in Meriwether Gulch following the Meriwether fire of 2007, two rain gauges were installed in 2008, and a third in 2009. This monitoring is not evaluating the effectiveness of management activities in that no hillslope treatments were done in the Meriwether drainage because it is a designated wilderness. Instead, the precipitation data has been collected in an effort to determine the magnitude of rain event needed to trigger flooding in this type of post-fire geomorphic setting. The rain gauge located in the upper Meriwether basin was damaged by wildlife, and no data were recovered from this site. Efforts were taken in FY 2010 to make these rain gauges more resilient to wildlife. Figure 1 shows data collected in 2009. A separate report on flooding at Meriwether was prepared, and is available at the HNF Supervisor's Office.

Figure 1. Precip data from rain gauges located in Meriwether drainage.



**Assessment:**

Water Quality Monitoring

Sites monitored by YFMP remained relatively stable in terms of the measured parameters. Five of the ten sites were evaluated for the first time in 2009, so no conclusions about trends for these data are available.

Road Decommissioning Monitoring

The majority of decommissioned roads monitored show evidence that road closure techniques used matches original recommended closure, there is no erosion or sediment delivery into streams as a result of decommissioning efforts, and road decommissioning/closure methods are effective.

Prescribed Burn Monitoring

The results from prescribed burn monitoring indicate there was no evidence of sediment delivery into adjacent streams as a result of this management activity. This data will continue to be used by management personnel to determine burn prescriptions in the future. Prescribed burn monitoring will continue in 2010. Additional details in regards to prescribed burn monitoring activities on the Helena National Forest are in the 2009 report filed at the HNF Supervisor’s Office.

Road Sediment Source Monitoring

Road sediment source monitoring identified many segments of road that are sources of sediment to streams during runoff events. Data were not used to estimate sediment delivery for this report—this type of analysis is ordinarily done in conjunction with environmental assessment of proposed management activities. However, annual-maintenance road improvements are prioritized in part based on the number of identified sediment delivery points. In watersheds with stream segments listed by the state as impaired due to sedimentation/siltation from forest roads, it is likely that HNF roads are contributing to the impaired condition of the stream segment. However, the existence of forest roads with sediment delivery points in a sediment-impaired drainage does not violate this Forest Plan standard, as the existence of the road network is not an “activity” per se—activities as intended in this standard include, for example, timber harvest or fuel-reduction work. In these cases, the HNF places additional emphasis on repairing the problematic roads through annual maintenance or project mitigation work, or closing and obliterating unneeded roads through travel planning.

### Range Monitoring

Riparian areas monitored by the range crew indicated that seven reaches were categorized as properly functioning. For those reaches that are nonfunctional or functioning-at risk with an upward trend, allotment management should manage toward the standards listed in (Helena National Forest, 1998). Additional assessment can be found in the C12 portion of this monitoring report.

### Rain Gauge Data

Rain gauge and flood data collected in Meriwether Gulch was utilized for the purpose of post-fire analysis and monitoring. As a result of spring and summer floods within Meriwether Gulch, additional flood retention walls were installed in the fall of 2009 to protect structural resources at a developed site.

### **Actions in Response to Variability Assessment:**

#### Water Quality Monitoring

Additional flow measurements and measurements of selected water quality parameters will be established in 2010. Adding these sites will bring the Forest into compliance by having 24 water quality monitoring stations.

#### Road Decommissioning Monitoring

All of the parameters monitored show that the HNF is in compliance with this Forest Plan standard, therefore no action is required.

#### Prescribed Burn Monitoring

All of the parameters monitored show that the HNF is in compliance with this Forest Plan standard, therefore no action is required.

#### Road Sediment Source Monitoring

When the HNF engages in project activities in watersheds with roads that were identified to have sediment delivery points, the Forest should improve or decommission these roads before and after the project activities. Problem roads in watersheds with state-identified sediment-impaired stream reaches should receive high priority for improvements using annual maintenance funds.

### Range Monitoring

Data collected through this monitoring effort will be utilized by range specialists. Allotment management with stream segments identified as functional-at risk or nonfunctional due to livestock impacts must be modified so that conditions begin to improve. Streams within allotments that were identified as showing a downward trend due to livestock impacts should be evaluated. Corrective action must be initiated through the appropriate allotment management plan. Additional actions can be found in the C12 portion of this monitoring report.

### Rain Gauge Data

Precipitation data will continue to be monitored and utilized by the Forest Hydrologist. Measures will be taken in 2010 to prevent wildlife from interfering with rain gauges in Meriwether Gulch. If intense flooding continues to frequent this area, additional actions may be taken to protect at-risk resources.

### **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 future projects.
- Monitor effectiveness of BMPs recommended in hydrologist reports for FY 2010 projects.
- Continue to encourage Youth Forest monitoring efforts.

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**(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 Watershed Program staff to document progress on the projects.

*Monitoring Activity:*

Three major watershed improvement projects were implemented in 2009: North Belts Travel Plan road decommissioning, and riparian fencing in the Spotted Dog watershed and near MacDonald Pass.

*Analysis:*

All watershed restoration projects were completed as planned. These projects will be monitored in subsequent years to determine effectiveness.

**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 five-year periods. In FY2009, core watershed targets accomplished included 75 acres of road decommissioning in the North Belts travel planning area, and 20 acres of riparian-area protection along streams in the Spotted Dog and MacDonald Pass areas.

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 FY2009 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 2010 to assess whether closures were effective, and whether vegetation is recovering. Establish baseline monitoring for planned FY2010 projects.

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**(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. These standards are more rigorous than the original 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 data collection and analysis methods are used to assess this element.

**Current Efforts and Findings:**

A individual report is available in the project file for each of the two monitoring activities conducted in FY09.

- Monitoring activity 1 assesses the outcome of fuels management and prescribed fire actions.
- Monitoring activity 2 documents upland rangeland conditions associated with allotment management actions.

**Monitoring Activity 1 (Fuels Management)**

Documentation for Monitoring Methodology for Activity 1

Forest soil science personnel conducted field assessments of soil conditions at two plots within three fuels management areas; Alice Creek Unit 2, American Bar Unit 4, and Crow Creek Units 3 and 33. For information regarding soil surface texture for each landtype within monitoring units refer to Table 1.

Table 2 displays the number of sample plots per unit within each project area, when the unit was burned, the date monitoring was performed and the acres within each burn boundary.

The Alice Creek Unit 2 was burned in 2006 and 2008. Plots 20 and 21 were on steep slopes (>35%) and were dominated by lodgepole pine.

The American Bar Unit 4 was burned in the fall of 2008 and the spring of 2009. Plots 30 and 58 were on landscapes dominated by grasses, rough fescue, and sagebrush.

Crow Creek Unit 3 and Unit 33 were burned in the fall of 2007. Unit 3 was dominated by sagebrush, Douglas fir and fescue with many weeds. Unit 33 was dominated by sagebrush, juniper and skunk brush.

**Table 1: Display of surface texture per landtype at each plot number**

Project Name	Unit Designation	Plot	Landtype	Surface Texture	Landtype Characteristics
Alice Creek	Unit 2	Plot 20	392	Very Channery Loam	This Landtype is dominated by slopes ranging from 40-60%. Soils are formed on argillites, siltites and quartzites and typically have medium-textured surface layers ranging from 20-40 inches deep over bedrock.
		Plot 21	49A	Loam	This Landtype is dominated by slopes ranging from 10-40%. Soils are formed on metasedimentary rocks and typically have a medium textured surface layer ranging from 20 to 40 inches deep with 35-60% rock fragments in the subsurface layers.
American Bar	Unit 4	Plot 30	150	Silt Loam to Silty Clay Loam	This Landtype is dominated by slopes ranging from 10-40%. Soils are formed on Limestone, basalt and metasedimentary rock and typically have a medium to fine surface layer. Subsoils contain 35-50% angular rock fragments. This Landtype is prone to landslides and wet soils.
		Plot 58			
Crow Creek	Unit 3	Plot 37	37	Cobbly Loam	This Landtype is dominated by slopes ranging from 10-40%. Soils are formed on material derived from basaltic rocks and typically have a medium textured surface layer and range in depth from 4 to 40 inches depending on slope. Subsoils may contain 35-60% rock fragments.
		Plot 54			
	Unit 33	Plot 334	29C	Silt Loam	This Landtype is dominated by slopes ranging from 10-25%. Soils are formed on argillites, siltites, quartzities and basalts and typically have medium-textured dark-colored surface layers ranging from 7-20 inches deep over bedrock. Subsoils contain 35-80% angular rock fragments.
Plot 335					

Information derived from “Soil Survey of Helena National Forest Area, Montana” (USDA Forest Service and Natural Resources Conservation Service 2001)

**Table 2: Project name, units within the project, plot number, acres and dates burned and monitored**

Project Name	Unit Designation	Plot	Acres	Date Burned	Date Monitored
Alice Creek	Unit 2	20	308	2006 and 2008	8/10/2009
		21			8/17/2009
American Bar	Unit 4	30	117	Fall 2008/ Spring 2009	6/3/2009
		58			5/29/2009
Crow Creek	Unit 3	30	129	Fall 2007	8/19/2009
		54			8/20/2009
	Unit 33	334	57		8/18/2009
		335			8/18/2009

Data Collection and Analysis

Randomly generated potential plot centers were produced using a random point generating program known as Hawth’s Tools, which is an extension for ArcGIS 9.2 downloadable from the Internet. This program randomly placed dots (i.e. potential plot centers) throughout the defined polygon, in this case the burn perimeter. Roughly 20 potential plot centers were placed inside each unit. Potential plot centers were then randomly selected in the office prior to reaching the field and are referred to as randomly selected plot centers. Spacing of randomly selected plot centers varied and was dependent upon the size of the unit. The number of visited randomly selected plot centers 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 seven transects, with each transect being 75 feet in length. The seven transects were oriented in a pre-defined hexagonal pattern. The transects occur along the six sides of the hexagon plus one transect starting at the plot center. The transects are 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. 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.

If upon arrival to any of the randomly selected plot centers the crew discovered none of the transects would fall within a burned area, they would then move to the next randomly selected plot center that met this criterion. The intent was to avoid collecting prescribed burn data in unburned areas. In Crow Creek Unit 3, Plot 54 and Alice Creek Unit 2 Plot 20 no residual soil effects were noted from the burns, but crews verified that the area had been burned based on the burn marks on the remaining vegetation.

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) was 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). 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 seven 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 4).

Data collected with the mini-disk infiltrometer was entered into Excel and then further divided by burned and unburned status (Table 5). 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.

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 7).

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 6. 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 3.

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).

**Table 3: 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 1*

The burn pattern across all units was a mosaic; however no large pockets of severe burn were located. Sample plots evaluated represent burn conditions across that specific unit. Specifically, this generalization was verified by David Marr, Forest Soil Scientist, for all plots within the American Bar and Alice Creek Projects. The remaining Crow Creek Units burned homogenously according to the District AFMO, David Nunn. The sample plots with the Crow Creek Units were representative of the burned conditions for the entire unit.

**Table 4: Visual data and soil cover data for soil monitoring plots within all fuel treatment projects**

Location Unit and Plot	Severely Burned	Sheet Erosion	Rill Erosion	Gully Erosion	Mass Movement	% of Total Disturb.*	Bare Ground	Soil Cover
Alice 2, Plot 20	0	0	0	0	0	0	0	100%
Alice 2, Plot 21	0	0	0	0	0	0	0	100%
American Bar 4, Plot 30	0	5%	41%	0	0	46%	9%	91%
American Bar 4, Plot 58	1%	8%	4%	0	0	13%	51%	49%
Crow Creek 3, Plot 37	0	0	0	0	0	0	16%	84%
Crow Creek 3, Plot 54	0	0	0	0	0	0	2%	98%
Crow Creek 33, Plot 334	0	0	0	0	0	0	8%	92%
Crow Creek 33, Plot 335	0	6%	0	0	0	6%	22%	78%

Region 1 Soil Quality standard is 15% detrimental soil disturbance

**Table 5: Average surface infiltration data for both burned and unburned data points on soil monitoring plots within all fuel treatment projects**

			BURNED					UN-BURNED				
Location Unit and Plot	Surface Soil Type	Number of Samples Burned/ UnBurned (B/UB)	Average Surface Soil Hydraulic Conductivity (mL/min) <b>BURNED</b>	ST DEV	Average Seconds to 1st bubble <b>BURNED</b>	ST DEV	Water Repellency Class <b>BURNED</b>	Average Surface Soil Hydraulic Conductivity (mL/min) <b>UN-BURNED</b>	ST DEV	Average Seconds to 1st bubble <b>UN-BURNED</b>	ST DEV	Water Repellency Class <b>UN-BURNED</b>
Alice 2, Plot 20	Very Channery Loam	0/100	NA	NA	NA	NA	NA	1.6	1.7	11.4	7.3	High
Alice 2, Plot 21	Loam	1/99	1.9	1.5	6.6	9	High	3	NA (1 point)	2	NA (1 point)	Moderate
American Bar 4, Plot 30	Silt Loam to Silty Clay Loam	72/28	5.9	3.9	5.4	5.4	Moderate	6.7	3.1	2	2	None
American Bar 4, Plot 58		73/26	4.2	3.7	14.6	18.2	High	6.2	3.4	3	2.5	Low
Crow Creek 3, Plot 37	Cobbly Loam	24/76	2.3	1.4	12.6	1.4	High	3.6	2.5	3.6	2.5	Moderate
Crow Creek 3, Plot 54		0/98	NA	NA	NA	NA	NA	3.7	2.8	8.3	11.1	Moderate
Crow Creek 33, Plot 334	Silt Loam	13/87	2.1	1.3	7.5	7.1	Moderate	2.7	2	5.5	6.3	Moderate
Crow Creek 33, Plot 335		19/81	2.9	1.4	4.6	3.2	Moderate	3.4	2.5	6.2	8.3	Moderate

**Table 6: Water repellency class for burned and unburned sites**

Location Unit and Plot	Water Repellency Class <b>BURNED</b>	Water Repellency Class <b>UN-BURNED</b>
Alice 2, Plot 20	NA	High
Alice 2, Plot 21	High	Moderate
American Bar 4, Plot 30	Moderate	None
American Bar 4, Plot 58	High	Low
Crow Creek 3, Plot 37	High	Moderate
Crow Creek 3, Plot 54	NA	Moderate
Crow Creek 33, Plot 334	Moderate	Moderate
Crow Creek 33, Plot 335	Moderate	Moderate

The combustion of organic materials can create water repellent layers within the mineral soil when the volatilized organic materials cool and coalesce on soil particles (Robichaud 2004). Natural water repellent conditions are common in some soils, such as volcanic ash-cap soils.

For all data points, the water repellency class was evaluated based on both the average hydraulic conductivity and the average time to the first bubble and in many cases those two values resulted in different water repellency classes. In such cases the most limiting (highest water repellency class) was used to determine the water repellency class for the plot. Table 6 displays the water repellency classes assigned to each plot. In most cases, the water repellency increased from the unburned sites to the burned sites.

For example Alice Unit 2, Plot 21 Un-Burned, the water repellency class based on the average hydraulic conductivity (3.0 mL/min) is moderate, but the water repellency class based on the average time to the first bubble (2 seconds) is none and therefore a moderate water repellency class was assigned to the plot.

Again, the water repellency values should only be used as one piece of data and taken in context with all other parameters collected, most importantly, the amount of erosion. One year after the prescribed burn was implemented, some plots are determined to have a High or Moderate water repellency, no erosion was observed, and an adequate amount of woody material and/or ground cover remains conditions may be assumed to be stable. This is also dependent upon the duration, intensity and arrival time of rain, snow and wind events. Low intensity, short duration storms with wind speeds occurring after spring vegetation has established probably would not result in erosion or other detrimental conditions.

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, and the R1 RSQ standard is, 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 sagebrush or grassland dominated sites.

**Table 7: Fuel load data showing tons per acre of surface organic material, by size class, within all fuel treatment projects.**

Location Unit and Plot	Dead Woody Class				Total (Ton/ac)
	Fine Woody Debris			Coarse Woody Debris	
	< 0.25 in. (1-hr)	0.25 - 1 in. (10-hr)	1 - 3 in. (100-hr)	> 3 in. (1000-hr and greater)	
Alice 2, Plot 20	0.16	0.38	0.43	1.50	2.5
Alice 2, Plot 21	0.03	0.13	0.74	3.22	4.1
American Bar 4, Plot 30	0.00	0.00	0.00	0.00	0.0
American Bar 4, Plot 58	0.00	0.00	0.28	0.31	0.6
Crow Creek 3, Plot 37	0.08	0.17	0.14	0.00	0.4
Crow Creek 3, Plot 54	0.04	0.00	0.28	0.00	0.3
Crow Creek 33, Plot 334	0.04	0.44	0.56	0.00	1.0
Crow Creek 33, Plot 335	0.09	0.17	1.40	0.80	2.5

Alice Creek unit 2 is the only forested site monitored. As outlined above in the data collection and analysis section; vegetation type and cover varied for all of the units and sometimes varied between data points. The Region 1 guidelines for CWD for soil productivity will only be applied to timbered sites that have the potential to contribute CWD after a burn.

**Variability Measure Discussion For Activity 1:**

*Variability Measure:*

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

*Assessment:*

Both plots inside Alice Unit 2 are stable and do not present any erosion hazards. At Plot 21, one data point out of 100 was burned and resulted in high water repellency, but was borderline moderate water repellency; at Plot 20 there were no burned data points and the water repellency was high. The amount of coarse woody debris in the unit (1.50 and 3.22 tons/acre) is below the recommended levels (5-10 tons/acre for timbered sites), thus is not sufficient for providing quantities for soil productivity and soil protection in timbered sites and does not meet Region 1 guidelines for CWD in timbered sites. Mitigation measures needed 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. The addition of coarse woody debris may also prevent future erosion. Soil disturbance levels observed in this unit (0% and 0%) are in compliance with the Helena National Forest Plan (20%) and Region 1 (15%) guidelines.

Both plots within American Bar Unit 4 have high risk of erosion. On average, the two observations in this unit were approximately 29% (46% and 13%) soil disturbance, which exceeds the Helena National Forest Plan (20%) and Region 1 (15%) guidelines. Region 1 guidelines for CWD for soil productivity are not applied to these sites because the sites are dominated by grasses and shrubs, and do not have the type of cover that could contribute CWD post fire.

Both plots located within the Crow Creek Unit 3 project area are very open with only the occasional Douglas Fir tree encroaching, and are dominated by sagebrush, grasses and rock outcrops. None of the data points exhibited characteristics that indicate elevated risk of erosion hazards or threats resulting from severely burned soils. Soil disturbance conditions observed in this unit (0% and 0%) are in compliance with the Helena National Forest Plan (20%) and Region 1 (15%) guidelines. Region 1 guidelines for CWD for soil productivity are not applied to these sites because the sites are dominated by grasses and shrubs, and do not have the type of cover that could contribute CWD post fire.

Sagebrush, grass and juniper dominated the vegetation in the Crow Creek Unit 33 project area which exhibited very little recorded erosion and no severely burned soils. None of these data points suggest any threat of erosion resulting from the prescribed fire. Soil disturbance conditions observed in this unit (0% and 6%) are in compliance with the Helena National Forest Plan (20%) and Region 1 (15%) guidelines. Region 1 guidelines for CWD for soil productivity are not applied to these sites because the sites are dominated by grasses and shrubs, and do not have the type of cover that could contribute CWD post fire.

#### *Actions in response to variability assessment and recommendations for Activity 1*

The amount of coarse woody debris remaining in the Alice Creek unit evaluated above does not meet the Regional Soil Quality Standards for the residual amounts of coarse woody debris. Mitigation measures needed 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.

The American Bar Unit 4 does not meet Region 1 and Helena National Forest Plan detrimental soil standards due to disturbance caused by erosion. Additional mitigation measures to alleviate the poor soil conditions could include hand planting of native trees and shrubs at the site and seeding an annual cover crop and/or planting shrubs to prevent future erosion.

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

#### *Monitoring Activity 2 (Rangeland Conditions)*

##### *Documentation of Monitoring Methodology for Activity 2*

During the 2009 field season, soil site conditions were assessed, documented and reported on the Grassy Mountain and Hat Creek range allotments. Grassy Mountain allotment was monitored both in 2009 and 2007; this report will include both sets of results. The 2007 monitoring on the Grassy Mountain allotment is also detailed in the 2007 Forest Plan Monitoring Report. Monitoring in the Hat Creek allotment was started in 2009; however, weather conditions precluded collecting a complete set of data so the Hat Creek allotment will be addressed within the 2010 Forest Plan

Monitoring Report. Monitoring on all allotments occurred toward the end of the permitted grazing season.

Grassy Mountain Allotment: The Grassy Mountain allotment is comprised of the following landtypes: 14A, 34, 39, 39A, 49, 49A, 390, 391. Primary grazing lands in Grassy Mountain allotment fall upon landtypes: 49A, 39C, 390 and 391. Transitory grazing lands are comprised of landtypes: 14A, 34, 39, 39A, and 49.

In the Grassy Mountain allotment, 2009 and 2007 monitoring occurred on Landtype 39C. Slopes ranging from 10 to 25 percent dominate Landtype 39C. Soils are formed on material derived from metasedimentary rocks and typically have a loam textured surface layer ranging from 20 to 40 inches thick with 40 to 60 percent angular rock fragments in the subsurface layers.

**Table 8. Table showing allotment name, transect site ID, allotment acres & landtype.**

Allotment Name	Transect Number	GPS Coordinates	Allotment Acres	Landtype	Family Classification
Grassy Mountain	09DM002	0489134 mE 5123370 mN	5,293	39C	loamy-skeletal, mixed, Argic Cryoborolls
	07DM018	489940 mE 512544 mN			

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 because it is assumed that if the primary rangelands which receive the most livestock use meet the soil quality standards then the transitory rangelands in the same allotment which receive less livestock use are either in a similar or better condition. Thus, the conditions of the monitoring location in allotment are assumed to be representative of conditions throughout the upland portions of 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 the transect was randomly oriented. The transect 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);

Visible evidence of compaction, such as platy or massive soil structure

At the Grassy Mountain allotment, two other types of soil data were collected at 3 out of the 20 sample points. The 3 sample points, 09DM002-03, 09DM002-07, and 09DM002-14 and 07DM018-03, 07DM018-08 and 07DM018-13 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) at 3 randomly-selected transect points 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 Grassy Mountain allotment, bulk density, infiltration and point data were collected on September 11, 2009 for transect number 09DM002 and collected on September 14, 2007 for transect number 07DM018. Site conditions were cool and dry on September 11, 2009 and unrecorded on September 14, 2007.

Data Analysis

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 9).

**Table 9. Table displaying the average data values collected across the 20 sample points.**

Allotment Name	Grassy Mountain	
Monitoring Site	09DM002	07DM018
Top Soil Color	Brown to Very Dark Grayish Brown	Dark Brown to Very Dark Brown
Soil Structure	Granular with Subangular Blocky and Weak Platy	Granular
Soil Texture	Loam	
Avg. depth to vf/f* root decrease (in)	15	4.7
Avg. depth of A Horizon (in)	16	6.4
% of A Horizon filled w/roots	98%	75%
% of points w/live surface cover	100%	85%
Sample Point Spacing (ft)	150	75

Infiltration data was also entered into Excel spreadsheets to calculate the amount of water the average amount of infiltration (refer to Table 10).

**Table 10. Infiltration values for the Grassy Mountain Allotment**

Allotment Name	Transect Number	Sample Number	Closest Data Point Reference	Infiltration (mL/32.5 min)	Average Infiltration (mL/32.5 min)	Average Infiltration (L/32.5min)	
Grassy Mountain	09DM002	1	3	10020			
		2		7320			
		3		5020	7453	7.5	
		1	7	9930			
		2		9430			
		3		11490	10283	10.3	
		1	14	6900			
		2		8440			
		3		17700	11013	11.0	
	07DM018	3	1	3	9180		
			2		9840		
			3		17980	12333	12.3
		1	8	16180			
		2		14540			
		3		14160	14960	15.0	
		1	13	14520			
		2		7800			
		3		0	7440	7.4	

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 Table 11).

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).

Monitoring Results for Activity 2

There is no well-defined benchmark value 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 2009 field season. 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.

**Table 11. Bulk Density values for the Grassy Mountain Allotment**

Allotment Name	Transect Number	Sample Number	Closest Data Point Reference	Bulk Density of Sample (g/cm <sup>3</sup> )	Average Bulk Density (g/cm <sup>3</sup> )	
Grassy Mountain	09DM002	1	3	1.04	1.11	
		2		1.22		
		3		1.07		
		1	7	1.17	1.15	
		2		1.17		
		3		1.10		
		1	14	1.19	1.13	
		2		1.04		
		3		1.15		
	07DM018	1	1	3	1.52	1.40
			2		1.29	
			3		1.40	
		1	8	1.42	1.35	
		2		1.37		
		3		1.27		
1		13	1.20	1.08		
2			1.02			
3			1.03			

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<sup>3</sup> to 1.60 g/cm<sup>3</sup>.

**Variability Measure Discussion For Activity 2:**

*Variability Measure:*

The objectives of this field evaluation were to determine if rangeland management practices are in compliance with Region 1 (R1) Soil Quality Standards (SQS) and Helena National Forest Plan Standards. The R1 Soil Quality Standards requires that activities not exceed 15% detrimental soil disturbance from baseline conditions.

**Assessment:**

Grassy Mountain allotment

Site conditions on the allotment previously identified as the primary upland range locations appear to have no detrimental impacts. Soil science personnel did not observe any evidence of soil erosion by water or wind, vegetated ground cover is 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 sample points.

Four of the six soil infiltration rates are higher than the comparison value of 8.6 L/32.5 min average, the other values were greater than the median comparison value of 6.3 L/32.5 min. Based on the soil's ability to absorb and retain water, it appears that this site's infiltration 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 1.50 g/cm<sup>3</sup> to 1.60 g/cm<sup>3</sup>. 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.

The low occurrence of invasive weed species, acceptable ranges in bulk densities, acceptable range of infiltration rates, granular structure, adequate rooting depth, significant A-horizon presence and continuous live vegetative cover all indicate a healthy and productive upland range site.

*Actions in response for variability assessment and recommendations for Activity 2*

There are no recommendations of mitigating any existing conditions for the Grassy Mountain allotment based on the data presented above. In the 2008 Forest Plan Monitoring report, there were no recommendations mitigating any existing conditions for either Deep Creek or Dry Creek Range Allotments. Both allotments were within the acceptable limits of disturbances outlined by the Helena National Forest Plan and the Region 1 Soil Quality Standards.

**Variability Measure Discussion For Timber Harvest Management Activities:**

Forest soil science personnel did not monitor soil conditions in timber sale areas in 2009 due to the lack of timber harvest activities in the previous year.

*Actions in response for variability assessment and recommendations for Timber Harvest Management Activities*

In the 2008 Forest Plan Monitoring report forest soil science personnel recommended that further activity in the Jimtown 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 Forest 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.

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**(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:*

Support of Forest Service Northern Region water rights work on the HNF was ongoing throughout 2009. Channel cross sections and flow stations were established in eight watersheds during FY2009 in anticipation of data collection needed to apply for in-stream flow water rights during FY2010.

**Analysis:**

Forest Service Northern Region water rights work on the HNF was ongoing throughout 2009.

**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:*

Within variability; no action required.

**Recommended Efforts:**

Continue to monitor water rights adjudication in watersheds on the Forest in FY 2010.

## (G)MINERALS

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### (G1) Forest Service Land Uses That May Affect Minerals Activities

#### 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 have been no new proposals.

Small scale placer prospecting activities account for the bulk of the hard rock minerals projects on the forest during the period of 2009, along with a few underground lode activities. The forest administers between 40-60 of these projects per year with 10-12 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 on such a small scale (less than 1/2 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.

Since 2008 the Helena Forest has been actively engaged in closing or securing mining openings for safety reasons. This activity is resulting in addressing 30 mining related features in 2009.

Some miners see these closures as a loss of opportunity for prospecting. Conversely the mining industry overall sees the removal of mining related hazards as a good business practice.

#### 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. There is a concern that since the leasing analysis is over 10 years old, there may be a need to update it in some fashion in order to process future leases.

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 are 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. In 2008, the US Department of the Interior Bureau of Land Management issued a Record of Decision and Resource Management Plan Amendments for Geothermal Leasing in the Western United States (December, 2008). National Forest lands in Montana were included in the analysis for this project but not the decision. The analysis identified portions of the Helena National Forest are prospectively valuable for geothermal resources areas. There have been no lease requests or applications for exploration for geothermal activity on the Helena National Forest. The Forest would first have to complete a programmatic leasing analysis identifying lands available for lease before any lease requests could be considered.

#### 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. The Forest and DEQ are considering placing waste in an alternative repository site and planning for removing waste in 2012.

### *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, administration and permitting. Emails and project file meeting notes between the minerals administrator and the ranger, miner or Forest geologist is 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. Unacceptable review of lease application by ID Team
3. Unacceptable restrictions on mineral development

### *Assessment:*

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. There was one non-compliance action take on a claimant in 2009. The Forest is within the variability for this measure.

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. What is possible in the next 5 years are protests of potential new lease applications based on changes in wildlife analysis methodologies and mapped ranges since the 1998 leasing analysis. The result of protests could lead to non-issuance of a lease or delays in lease issuance.

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:**

Recommendation 1 – Continue to invest in skills training of mineral administrators and continue to ensure adequate administration staffing for mineral operations.

Recommendation 2 - Forest needs to consider updating Forest leasing analysis.

## **(L) Facilities**

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### **(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

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.
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
2009 (2)	3060.4	1113	0	0	2135	+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.

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**(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 2007, 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 2007. 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 and 34% in 2007.

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 2007 cumulatively represents the situation in the years between 1986 and 2009, 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

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### (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:*

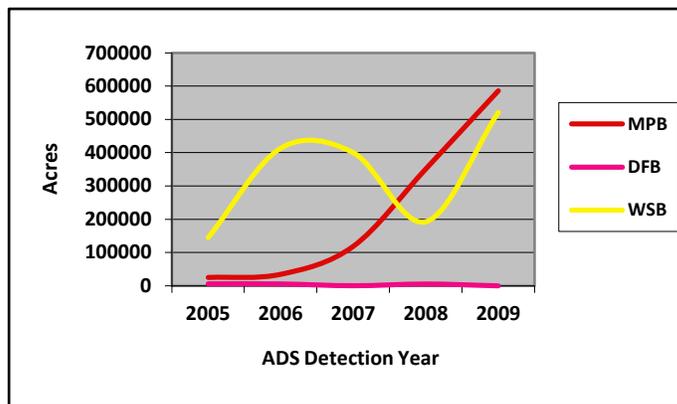
Trends of increasing insect and disease activity across the Forest have continued during this monitoring period and can be expected to continue. As a result, most treatments either proposed or implemented contain a strong focus on salvage of dead and dying trees as well as increasing resiliency of residual 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 and 2009 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 2009 and during the 5-year monitoring periods since 2005. Aerial Detection Survey (ADS) is used to quantify yearly levels of activity. Regionally, MPB is has infested over 4 million acres as detected in 2009 (Gibson 2009). The HNF is one of the most impacted National Forests in the Region. On the HNF, MPB infestation is estimated at 585,557 acres (Gibson 2009), roughly 60% of the administrative land base. The numbers of trees killed on an infested acre is highly variable, from just a few to over 200 trees per acre. While over 80% of trees killed were lodgepole pine, ponderosa and whitebark pines are also affected. A MPB assessment was done on the HNF in 2008. Hazard, or

susceptibility, is based on stand structure while risk is a function of hazard and the presence/abundance of beetle populations (Shore & Safranyik 1992). There are an estimated 335,373 acres of high hazard on the HNF, 32% of the land base (USDA 2008b). Based on the infestation found in 2009 ADS, the epidemic has clearly moved into moderate and low hazard areas. It is expected that up to 90% of pine over 5" diameter will be killed in high hazard areas. Low and moderate hazard stands in proximity to high hazard stands will also experience mortality (50-80%). While little mature pine will remain after the outbreak, some smaller trees will survive. DFB activity is decreasing Regionally and on the HNF. Still, DFB is increasing in localized areas, primarily in areas of WSB defoliation, and the hazard to this insect remains high in many areas. This insect is estimated to infest about 1,700 acres across the Helena reporting area, only 107 within the HNF boundary (Gibson 2009). DFB mortality may be difficult to detect in highly defoliated areas where the signs of beetle mortality are less obvious. WSB continues to affect large areas across the Region and the HNF. 2009 ADS shows 521,000 acres with WSB defoliation across the HNF reporting area (Gibson 2009).

**Figure 1 HNF Insect Infestation 2005-2009**



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 2009 the planning process was continued for the following projects responding in part to current and potential infestations: Cabin Gulch (EIS), Grassy Mtn. (EA), Elliston Face Fuels (CE), and Clancy Unionville (EIS). Projects that have been implemented since 2005 include Jimtown Fuels (2007), Greyson Bugs (2006), Snow Talon (2006), Grassy Bugs (2004), and Lincoln Compound (2004). Also, in 2009, trees infested with mountain pine beetle were removed in the MacDonald Pass Hazard Tree project. 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, Warm Springs, South Hills, Telegraph, Stonedry). Additional projects are programmed after these first areas, including Tenmile, Dalton, East Stemple, 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 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, 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 2009 include a focus on stands at high risk to 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.

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**(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.

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**(P3) Fuel treatment outputs**

**Forest Plan Requirements:**

Monitor fuel treatment outputs.

*Intent:*

Assure balanced fuel treatment reports.

**Data Sources:**

Forest Activity Tracking System(FACTS).

**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 Forest Activity Tracking System(FACTS) is currently used to track fuels accomplishment acres. Data gathered from previous monitoring reports was used to determine trends.

*Monitoring Activity:*

Forest Activity Tracking System(FACTS) report for fuels accomplishments in FY09.

*Data Analysis Methods:*

N/A

*Monitoring Results:*

A total of 10,126 acres of natural fuels were treated in FY09.

**Variability Measure Discussion:**

Variation of +/- 25% of programmed targets will initiate action.

*Variability Measure:*

+/- 25% of programmed targets. Forest actually accomplished 86% of assigned FY09 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.

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**(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:**

Forest Activity Tracking System(FACTS) 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 and Forest Activity Tracking System (FACTS) databases compile the individual fire information and are stored in their respective databases. These are transmitted and reported annually.

***Monitoring Activity:***

Forest Activity Tracking System(FACTS) 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 5,997 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.

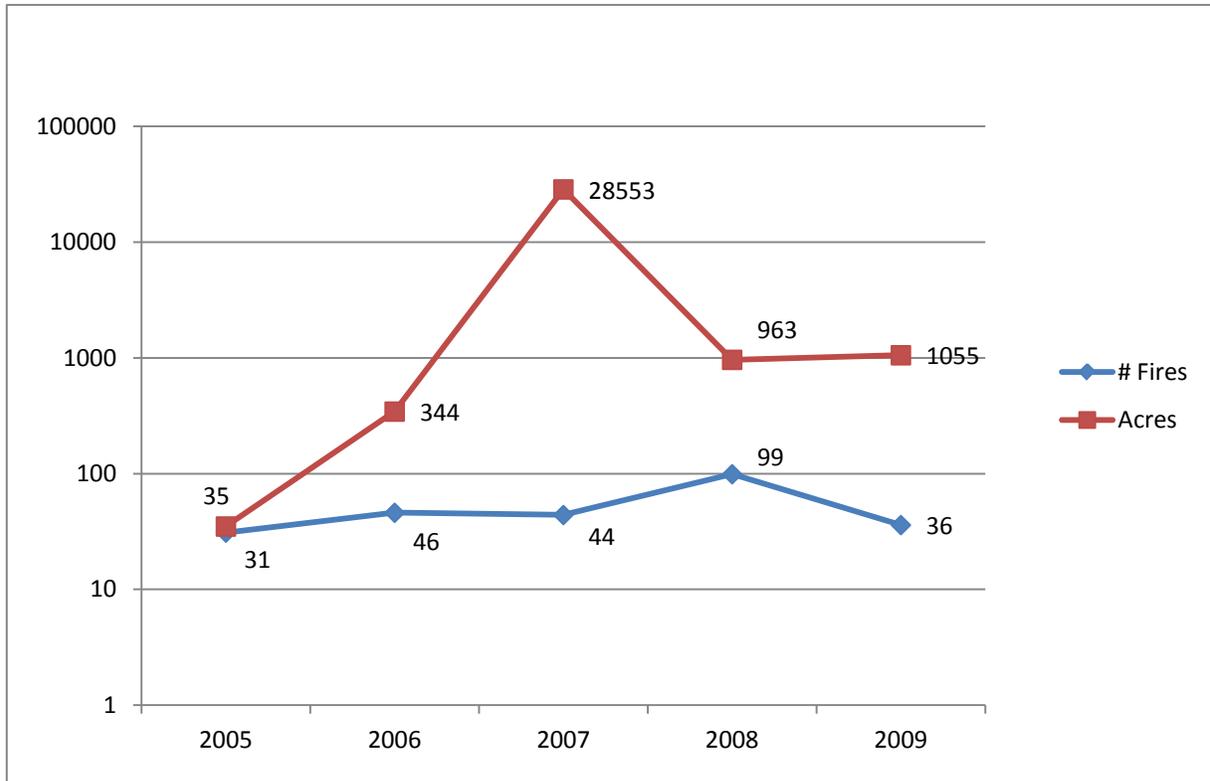
***Actions in Response to Variability Assessment:***

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.

**Acres Burned and # of Fires**



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**(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:*

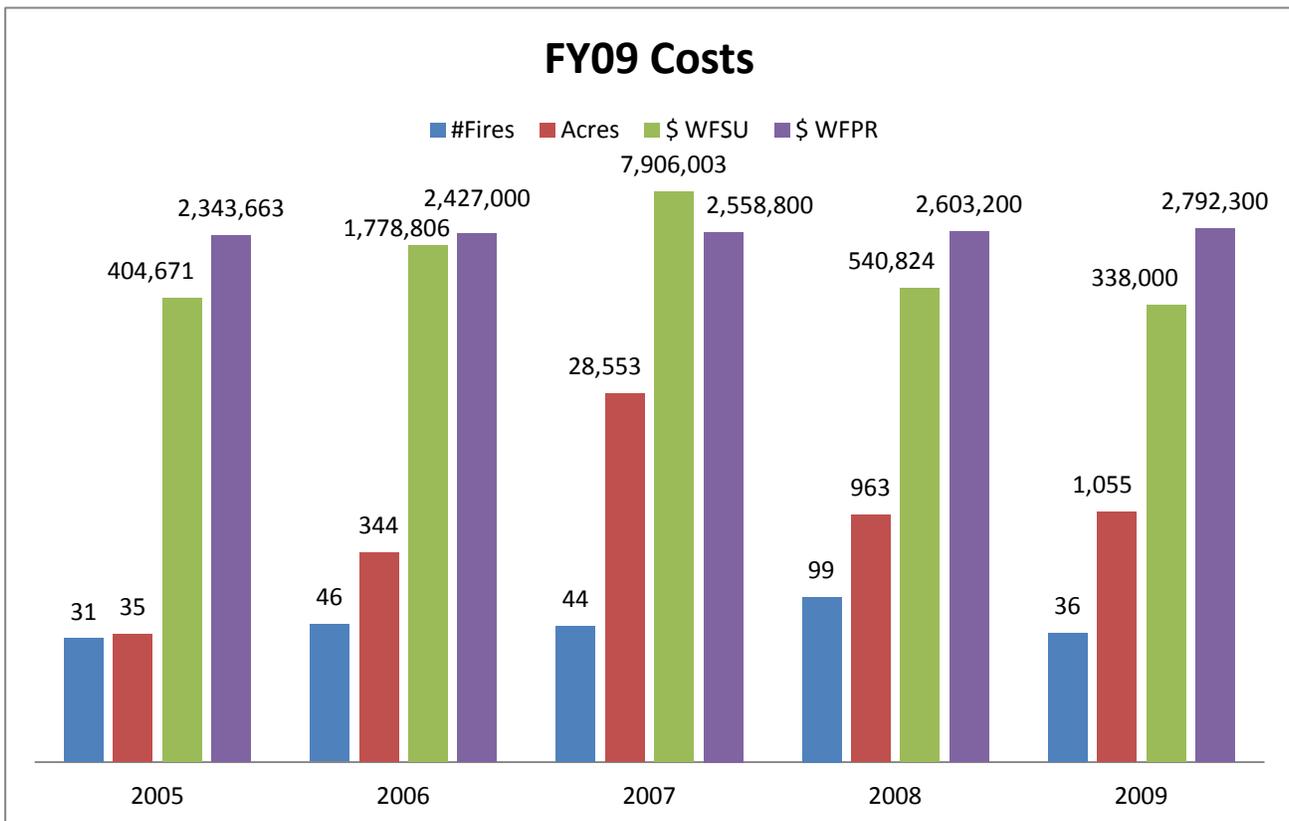
The NFMAS process has been used for budget submissions for the HNF Fire Program. Costs for WFSU were derived from Transaction Register Summaries pulled by B& F. WFPR total allocations were derived from B&F final PBA data. Net Value Change is no longer tracked through fire management programs.

*Data Analysis Methods:*

Summarization of records.

*Monitoring Results:*

In 2009 the Forest spent \$ 338,000 in the suppression of wildfires. The 5 year average is \$ 2,193,661 which includes the large fire cost year of 2007. See Chart Below.



(WFPR costs does not include cost pools, OWCP, etc)

**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.

## **(T) ECONOMICS, ADJACENT LANDS, RESOURCES, AND COMMUNITIES, AND ALL RESOURCES**

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### **(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 from 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:*

Two of the past five years, unit costs have been within Forest Plan variability. 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 the 2005-2009 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.

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**(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.

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**(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/objections trends. These sources are available through local and national data bases and are searchable under a calendar year basis; therefore, Forest Plan Monitoring Element T3 is discussed for the calendar year 2009 rather than the fiscal year 2009. This calendar year approach does not change the intent of this monitoring element in education and awareness with our national forest resources. The effects of emerging issues or changing social values occur year-round.

**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/Objections.

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 include Community Outreach, SOPA/PALS, NEPA Process, and Appeals/Objections.

**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:**

A Schedule of Proposed Actions (SOPA) 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 through a National database called "Planning, Appeals, and Litigation System" (PALS). That PALS database contains coverage nationwide and is a searchable database that can hone in to the Helena National Forest or you can navigate directly to any State, Forest, Grassland, Scenic Area, Recreation Area, or Tallgrass Prairie SOPA page by going to [www.fs.fed.us/sopa/](http://www.fs.fed.us/sopa/)

**NEPA Process:**

Once public interest is conveyed in a specific project such as through the SOPA process discussed above, involvement may be continued by the general public through participation in the formal NEPA process. Numerous opportunities are available by participating in individual projects of your

choice and interest. This can be accomplished by contacting the listed responsible official in the SOPA. Here you can get involved in the scoping period, in scheduled public meetings, and during comment periods. Of course public input is welcomed at any time during a projects NEPA due process.

Through these NEPA process; 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/Objections:

There are two processes that citizens, organization or other agencies can be involved beyond the above NEPA processes. One is for the 2003 (36 CFR 215) Notice, Comment, and Appeal Procedures and the 2008 (36 CFR 218) Pre-decisional Administrative Review Process for the Healthy Forests Restoration Act. If projects are appealed or objected, the Forest Service in Region 1 has an evaluation process that reviews these appeals and objections. That process identifies the key points presented by the appellant or objector that show indication for environmental issues of which the public holds concern. These points can also reveal potential emerging issues and trends of the day highlighting the nation's social values for the pleasure and uses of our National forests.

Anyone or organization can get involved in the appeal and objection processes only when they have provided specific information during the above NEPA process for a specific project. To learn more on how to become eligible to participate in these processes, there are further instructions under the agency's rules and regulations at 36 CFR 215.13 and 36 CFR 218.7.

To view particular appeals and objections, there is a searchable national database that can hone in to the Helena National Forest or you can navigate directly to any State, Forest, Grassland, Scenic Area, Recreation Area, or Tallgrass Prairie to see current and past appeals/objections by going to [www.fs.fed.us/emc/applit/](http://www.fs.fed.us/emc/applit/)

#### *Documentation of Monitoring Methodology:*

##### Community Outreach:

Community outreach programs continue to be provided by the Montana Discovery Foundation and the Helena NF. Programs with area students, presentations by experts and discussion panels have occurred, and contacts with community leaders and elected officials are ongoing.

##### 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. That information 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 SOPA report.

#### NEPA Process:

The NEPA process documents information that is pertinent to the decision from conception through decision. Most all projects have a specific project file that contains documents, analyses, evaluations, and databases used as the evidence toward a well-informed decision. In addition to those resources, the project file contains information of the public involvement process that documents public issues, suggestions, and concerns regarding the proposal.

In those amassed records, within the context of these documents, particularly the public input, reside the emerging issues and changing social values of our natural resources.

#### Appeals/Objections:

At the Regional Office (RO) in Missoula, a panel of Region 1 employees convenes to identify the appeal and objection points in regard to a specific project. The findings from this panel 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, numerous lecture series, moonlight hikes, Kid's College, winter survival, Moose Creek Open House, moonlight hikes, Adopt-a-Species, celebrating wildflowers, wilderness education, Leave-No-Trace, caving, avalanche best practices, etc. are just a few of the events that were provided in 2009.

#### SOPA/PALS:

The following information is 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 found in those records give some indication of the emerging public issues or changing social values. Specifically, the required NEPA public scoping processes and comment periods give the best feel for these issues or values.

In 2009, some projects that received public interest included the Blackfoot Winter Travel, Cabin Gulch Veg. Project, Forest-Wide Hazardous Tree Removal, Park Lake Camp Ground Hazardous Tree Removal, and the continued due process for Divide Travel.

#### Appeals/Objections:

There were no 36 CFR 215 appeals or 36 CFR 218 objections during 2009.

#### *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 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.

#### 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/Objections:

If an appeal or objection were received, employees on the Helena NF would have reviewed and the key points identified with agency responses developed. Those responses are then sent to the Regional Office where a R1 Panel would convene to evaluate the Forest responses to be concurred or modified by an appeal review officer and then approve or modified 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 and growing 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 2009 with over 7,600 participants getting involved. Thousands of 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 counties that border the Helena and B-D National Forests. In this youth program, high school students learned forest ecology concepts, accomplished hands-on rehabilitation projects and worked alongside forest professionals.

#### SOPA/PALS:

There was a range of 25-35 projects listed in any given quarterly SOPA in 2009 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 in decision memos, decision notices/FONSI, or record of decisions. The status of these projects as displayed 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 Divide Travel Plan, Elliston Face Fuels Reduction Project, Grassy Mountain Fuels & Vegetation Treatment Project, and Warm Springs Habitat Enhancement Project. There are many other projects as well, but these are bigger ticket projects that received public attention in 2009.

The key points in these projects are summarized below (not inclusive).

<b>Project Name</b>	<b>Type of Document</b>	<b>Key Issues, Concerns or Suggestions</b>
Divide Travel Plan	EA	Balance between motorized & non-motorized uses Motorized use near residence in Sweeny Creek Ford Crossings/Sediment primary concern for Bull Trout Motorized routes in inventory roadless areas Continental Divide national Scenic Trial Opening of routes for over snow use
Elliston Face Fuels Reduction Project	EA	Elk Security Lynx Viability Pileated/Hairy Snag Habitat Old Growth Habitat – Goshawk Bull Trout/Westslope Cutthroat Soil Productivity Process – Range of Alternatives
Grassy Mountain Fuels & Vegetation Treatment Project	EIS	Wildland Urban Interface Sagebrush Loss Watershed Health Changes in Habitat Heritage Values
Warm Springs Habitat Enhancement Project	EA	Ponderosa Pine Habitat Aspen Habitat Watershed Health Big-Game Hiding Cover Goshawk

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/Objections:**

No appeals or objections in 2009.

**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 provided by the Montana Discovery Foundation and the Forest Service and through the agencies procedural NEPA/appeal/objection due processes.

*Variability Measure & Assessment:*

In accumulating and evaluating the elements of Community Outreach, SOPA/PALS, NEPA Process, and Appeals/Objections; resource managers can adapt or try to address the changing public concerns, needs, and desires for their National Forests. As events and programs have been provided, the amount of interest measured in public participation can give a sense of how well the Helena NF along with partners like the Discovery Foundation is providing timely, current environmental subjects. Attendance to these programs are variable and do provide a sense of interesting and emerging environmental issues. Attendance for 2009 did increase from that of 2008.

Likewise in addressing issues throughout the NEPA and appeal/objection processes gives a sense of the issues and concerns our publics may have. Scoping, comment periods, and appeal/objection 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 possibly overlooked. The Helena NF adapts and adjusts proposed 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 and applies them to the design and development of future Forest projects.

In looking at the community outreach programs and the due process for SOPA/PALS, NEPA, and Appeals/Obligations, the intent of 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 responsive to new and rising issues and concerns as they 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 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 in finding that balance between resource needs and human uses through the many different perspectives and heightened awareness of our general public, our resource professionals, and 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 processes, described above, involving public participation 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 employee awareness of these issues.

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**(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 2009, 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 significant 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 2009.

***Monitoring Results:***

No Forest Plan allocation changes during 2009 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.

**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.

## Programs without Monitoring Requirements

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### **Cultural Resource Monitoring**

**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:**

**FY09 Activity:**

The Helena National Forest Heritage staff conducted Section 106 review on 24 projects in 2009. Fourteen required some level of field investigation and ten required no inventory. Section 106 review resulted in 21 determinations of No Effect and three determinations of No Adverse Effect. Mitigation measures to protect and monitor these cultural resources will be implemented.

NHPA Section 110 cultural resource stewardship projects completed in 2009 included historic preservation efforts at two historic cabins, work along a historic ditch to address public safety and historic integrity, site monitoring in several areas throughout the Forest and interpretive tours of the historic Charter Oak mining complex.

Cultural resource condition monitoring was completed across the HNF on a limited and opportunistic basis in 2009 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 2010) in the forest's 2009 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 2009.

**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 2009 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", in accordance with Statement of Federal Financial Accounting Standards 29.

The 2009 monitoring did not identify any cultural resources that had been adversely affected by malicious vandalism, artifact collecting or illegal digging. Dispersed recreation and OHV use has degraded several cultural resources located in the south Elkhorn Mountains (Crow Creek) and in the North Big Belts. Flooding and the associated deposition continue at Meriwether Campground but no site damage was recorded.

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.

**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 HNEPA 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.

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## **Youth Forest Monitoring Program (YFMP)**

### **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 15-16 students, employs 4 field instructors, and is based out of the towns of Helena, Lincoln, and Deer Lodge. Since 2007, a crew has been stationed in Deer Lodge, monitoring on an additional forest, the Beaverhead-Deerlodge.

Partnerships and funding in 2009 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 equipment, supplies, and a week-long overnight training camp for the diverse set of student teams.

YFMP students completed forest health monitoring activities at 49 sites on the Helena National Forest, including 14 woodpecker sites between June and August 2009. 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.

### **Weed Monitoring Teams**

Weed monitoring data was collected at 12 sites across the Helena National Forest: Webb Lake in the Scapegoat Wilderness; Lincoln District: Alice Creek, Copper Creek, Davis 9, Helena District: Grizzly Gulch, Meriwether Campground, Priest Pass, Springhill Repository, Tree Farmer Road; Townsend District: Magpie Gulch, Slim Sam, South Fork of Crow Creek.

Nested rooting frequency, canopy cover, ground cover, and density measurements were taken at all sites. Three recommendations from the Weed Team include:

(1) Use a combination of mechanical and biological control to reduce the amount of noxious weeds at Magpie Gulch. This area is still recovering from a high intensity burn that took place during the Cave Gulch Wildfire of 2000. Canada thistle, Leafy spurge, Dalmatian toadflax and

Spotted knapweed are present in this plot, with significant increases in thistle and knapweed between 2006 and 2009. Monitoring should take place every 1-3 years depending on what and if, action is taken.

(2) Dalmatian toadflax and Cheat grass have increased in frequency at the Slim Sam plot in the Elkhorns Wildlife Management Unit. This is a concern to the YFMP students because Slim Sam is a grazing allotment with potential to spread noxious weeds within the Elkhorns - the only wildlife management unit in the national forest system. Students suggest increasing and concentrating releases of biological controls in the study plot, and monitor the effects of a planned prescribed burn scheduled to take place in 2010.

(3) Backpack spray Canada thistle and Spotted knapweed in the Springhill Repository, where taproots from these noxious weeds might penetrate a tarp layer covering decades old mine waste. Truck spraying may be used above and below the repository site. Annual monitoring will be necessary to detect changes in frequency of noxious weeds such as Spotted knapweed, which increased 10-20 percent between 2008 and 2009.

### Stream Monitoring Teams

The YFMP Stream Monitoring Teams in Lincoln and Helena collected data at 13 sites on the Helena National Forest. Webb Lake outlet/Ringtail Creek in the Scapegoat Wilderness; Lincoln District: Beartrap Creek, Stonewall Creek, Wasson Creek; Helena District: Buffalo Creek, Corral Creek, Meriwether Creek; Townsend District: Deep Creek, Magpie Creek, Slim Sam Creek, South Fork of Crow Creek, Sulfur Bar Creek, Vermont 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. 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 Lincoln and Helena-based Stream Teams include:

(1) Limit grazing at Slim Sam stream allotment as conditions there slowly improve. This area is prone to drought, and has been frequently monitored since 1999. While macroinvertebrate samples have indicated a slow recovery as evidenced by an EPT ratio that has increased from 47% in 2006 to 99% in 2009, diversity of macroinvertebrate species has decreased from 2.22 to .35. A prescribed burn is scheduled for early 2010. The team recommends revisiting this site after the burn to monitor this management impact.

(2) Monitor the dramatic changes occurring at Meriwether Creek. This creek is a tributary to the Missouri River, which reappeared after 20 years immediately following the 2007 Meriwether Fire. Only 16 midges were found in 2008. In 2009, a full compliment of 100 samples was easily found using YFMP stream monitoring protocol. Like Slim Sam Stream, Meriwether also has a very low diversity value – only 3 species were collected, all of which are pollution intolerant. One of the challenges in the rebirthing of this new stream, is that the stream channel is still in flux, and washouts are becoming a weekly occurrence during rainstorms.

(3) Continue monitoring water quality at Beartrap Creek, an outlet of Mikehorse Dam, which is in the midst of a remediation project for mining contaminants. There is concern that contaminants dislodged from the dam by the reclamation process may impact stream health further downstream. In 2006, when this site was first monitored, an orange filmy sludge covered the stream bed. This sludge was gone in 2007, perhaps due to high spring runoff which scoured the area in a brief flood event. Data from 2006-2009 has shown an increase in EPT value of 20% to 80%. Pebble count graphs through these years, display a trend towards stream bed stabilization,

as silt sized particles are being replaced by pebble and cobble sized particles common in high mountain stream habitats. All data collected so far indicates that the ongoing reclamation project is working. Yearly stream monitoring is recommended.

### **Soil Monitoring Teams**

Soils monitoring data was collected by YFMP students at 9 sites on the Helena National Forest. These sites included Webb Lake in the Scapegoat Wilderness; Lincoln District: Davis 9; Helena District: Armstrong Mine, Bull Sweats Unit 3, Bull Sweats Unit 9, Magpie Gulch, Meriwether Campground, Priest Pass, and Springhill Repository.

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 Lincoln and Helena-based Soil Teams include:**

(1) Schedule yearly monitoring at Meriwether Campground, home of a tributary into the Missouri River. This area is under great flux as much of the vegetation upstream burned in the 2007 Meriwether Wildfire. The resulting rain-induced washouts common in Spring and Summer have been impacting soil layers at the campground situated at the mouth of Meriwether Campground. This is the first year data has been collected at the site.

(2) Monitor Priest Pass soil sites in 2010. Evidence of increased ATV traffic may be contributing to decreases in rooting depth at prescribed burn sites. This area is becoming a popular site for non designated recreation, and is simultaneously undergoing severe stress from a mountain pine beetle outbreak. Situated at high elevations near the Continental Divide, there is concern that soil disrupted above may find its way down into creek tributaries and impact stream health at lower elevations.

(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 2007 prescribed burn at Davis Unit 9 in the Lincoln District. Before the burn, a downed woody debris study indicated 15 tons of lodgepole pine per acre. The 2009 monitoring data calculated only 13 tons of lodgepole pine per acre on the site. This indicates that the timber management objective of reducing wildfire risk was met.

### **Helena Woodpecker Monitoring**

In 2009, the Youth Forest Monitoring Program began its second year of woodpecker monitoring in the Meriwether Fire perimeter. Of interest was the black-backed woodpecker, a species primarily found in Canada, but more recently beginning to expand its habitat into the northern United States. Data collected by students will be used to increase knowledge about the black-backed woodpecker and how an increase in wildfire occurrence will affect its southern boundaries.

During the course of six days in late June (6/24/09-6/29/09), over 14 sites were monitored for the presence of black-backed woodpeckers using an electronic calling device. These sites were a compilation of old random sites selected in 2008 as well as several new random sites. Woodpeckers were found at ten sites, though none were black-backed woodpeckers. Recorded were 14 Hairy and Downy woodpeckers, ranging between juveniles and adults. Sightings occurred from midmorning to early afternoon. Most of the woodpeckers were seen in higher intensity burns, and five were seen in the low intensity burn sites. The woodpeckers' activities varied between foraging and flying. As noted in 2008, woodpeckers responded better to the drumming call rather than the screech call.

Recommendations for 2010 include June through early July monitoring, earlier morning monitoring, and division of teams into more groups to increase sites surveyed.

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# Appendix A, Decision Flow Diagram

The following flow chart is from the Helena National Forest Plan, page IV/20.

