HELENA NATIONAL FOREST

ANNUAL MONITORING REPORT

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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.

Forest Plan Monitoring

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

All Forest Plan monitoring requirements can be found 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.

Summary

The Forest Plan has a total of forty-seven monitoring elements. 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 thirty-seven of those elements.

This section summarizes the 13 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. Each element is addressed in detail under individual elements in the main report.

Using the Forest Plan Decision Flow Diagram shown in Appendix A, elements C11 intra-gravel sediment, C12 streamside cover for fish, and D2 allotment management planning, are Forest Plan monitoring element variations for which Forest management practices need to be changed to address issue identified within the element. 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.

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:

Forest Plan Monitoring Requirements state that any 20% variation in visitor use between projected and actual should be documented.

Assessment:

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. An RVD represents an aggregate total of 12 visitor hours, continuous or intermittent.

The 2003 total of 44,821 RVD's at Forest developed recreation sites is 39,879 less than the stated number of RVD's in 1981, which exceeds the variability identified for this element. Even with the addition

of seven rental cabins as developed recreation sites, the amount of visitor use is much less than originally anticipated. The estimated visitor use (based on NVUM surveys) at developed recreation sites in fiscal year 2003 was only 39% of the Forest Plan projection.

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 2003 National Visitor Use Monitoring Project, it appears the recreation use figures identified in the 1986 Forest Plan (based on the best available data at the time) and/or the projected future growth estimates, were high. It is unknown how original use estimates were determined and as a result, any comparison with NVUM use figures is not appropriate.

NVUM data may not provide a fully accurate picture of RVD's on the Forest either. 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. Future NVUM data, to be collected during FY 2008, will likely revise use figures on the Helena National Forest. A comparison at that time will provide a reliable analysis of the true variability of this element.

Actions in response to variability assessment:

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

Element A2: Dispersed Recreation

Forest Plan Requirements:

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

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:

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

Assessment:

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

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

Actions in response to variability assessment:

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

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

Forest Plan Requirements:

Seasonal distribution, movement patterns, population structure and density of elk, mule deer, moose, and mountain goat populations are to be monitored to identify ungulate population segments and year long 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 2007 decreased by about 4% compared to 2006 but was still within the population objective of 1,700 to 2,300 observed elk. The cow elk and calf composition changes between 2006 and 2007 are negligible (24.7 fawns per 100 adults in 2007 and 24.4 per 100 in 2006). Bull elk made up approximately 236 of the total observed in 2007 compared with 93 in 2006, an increase of approximately 153%.

The variation (decrease in 4%) in the total number observed between 2006 and 2007 is below the acceptable variation of + 10%. However, it remains within the population objectives for the Hunting District and is not a land management-oriented practice for the Forest.

Mule Deer Aerial Surveys:

The post season count has increased by 33% since 2006; the spring count increased by almost 3-fold (463 deer in 2007 and 171 in 2006). Both the post-season and spring fawn: adult ratios have decreased by 45% and 47% respectively. The buck: doe ratio has increased by 21%.

The variation reflected in the changes between 2006 and 2007 exceeds the acceptable variation of + 10%. MTFWP regulates the number of deer in the Hunting District through the hunting permit process; therefore, these changes in variation are not associated with a land management-oriented practice. MTFWP continues to regulate the permit system to adjust for these variations.

Elk, Mule Deer, and Moose Ground Surveys:

Elk use patterns such as those observed in the fall of 2006 are possible only under scenarios when early snows are light and sporadic, allowing animals to remain at high elevation beyond the reach of most hunters—and this has been the norm for the last 3-4 years. In some cases, a heavy early snowfall has brought animals down, but subsequent benign weather through the rest of the fall has allowed them to move back up to high elevation where few hunters venture.

In the past, during "normal" falls/winters when snows have continued to accumulate from late October onward, almost all elk and deer have retreated down to private land during much of the hunting season. Both in that case and in the more recent benign falls, the key to improving elk harvest would appear to be more liberal access to private lands near the National Forest, rather than jockeying with motorized access and cover on public land.

In terms of elk use of the Warm Springs Burn, the widespread mosaic of cover and forage generated by the fire allows elk to move throughout much of the area, avoiding hunters, without having to concentrate on local parks and other specific non-forested foraging sites where they would be more vulnerable. As the forest continues to regenerate, these circumstances will change, but for now, they favor elk survival.

Data were not collected in a manner to describe variation associated with this element.

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 or actions that would correct the variability (i.e. hunting permit structure) are not a land management oriented practice.

Element C4: Elk and deer habitat suitability, indicator species

Forest Plan Requirements:

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

Variability Measure:

-10% from previous measurements

Assessment:

Cover and Forage:

FY07 is the first year utilizing R1-VMAP data to describe cover and forage habitat Forest-wide. Therefore, there is no variability assessment for the FY07 Monitoring Report. Out-year reports will describe changes in cover and forage as they occur.

Open Road Densities:

Since we are utilizing a new database for this analysis, data are not comparable between years. Data described in this Monitoring Report will serve as baseline for out year comparisons. Therefore, there is no variability assessment.

Road Closure Effectiveness:

Wagner Atlanta –Monitoring in FY06 indicated that all road closures were effective (100% closure effectiveness). Monitoring in FY07 indicated that two out of the seven road closures were not effective (approximately 71% closure effectiveness) and/or those roads may actually be open as part of the North Belts Travel Plan effort. The decrease in closure effectiveness, 29%, is outside of the variability measurement.

Habitat Effectiveness:

Divide Landscape

(1) Elliston: Because of the absence of elk and the scarcity of deer in the Elliston project area in winter, proposed thinning of "thermal" overstory in Elliston forests should have no meaningful effect on habitat important to local elk or deer in winter. If anything, the more open forest environment should promote forage development and attract more elk and deer use in spring and, possibly, in early and late winter.

(2) Mt Helena: In summer, deer were dispersed through a wider variety of habitats than in fall, making as much use of sites with green forbs—open parkland—as those with browse (particularly, bitterbrush), which drew most of their attention in fall. Otherwise, no striking departure from fall use patterns was noted.

Thinning of young conifers, as proposed in the South Helena Fuels project, should have no meaningful impacts on habitat components important to deer in summer (thermal cover remaining intact). It will, however, remove hiding cover, which could affect the ability of local deer to escape hunters in fall. Given the increasing over-population of deer in the Mt Helena area, as well as in the city of Helena, this should not be a problem.

North Belts Landscape

Portions of the Meriwether Burn that had previously burned in 1984 have been surveyed regularly over the past dozen years with a view toward documenting how wildlife habitats evolve after a large fire. Extensive areas from which forest habitats had been stripped in 1984, while lacking the structural complexity and cover characteristics of the previous forests, had become productive habitats. Many of the sites were occupied by a diverse array of grasses, forbs, and shrubs and provided excellent year-round foraging areas for elk and deer. Forage was not a limiting factor. While hiding cover was sparse, the rugged topography and absence of roads provided a measure of security for hunted animals. The severe re-burn starts the process of post-fire evolution anew: green-up of some vegetation was underway as early as 3 weeks after burning, and much of this area (the 1984 burn) is expected to return to providing good foraging opportunities for deer and elk over the next several years.

Where mature forests have burned, expectations for future elk and deer use are variable. New and rejuvenated edge and ecotone habitat will be useful, but the subtraction of forested cover from extensive areas is likely to be problematic, because of the further reduction of summer thermal cover and escape refugia. Open foraging habitat is now substantially more abundant than forest cover, and forest regeneration in this region of dry Douglas-fir and ponderosa pine habitat types will be a long, slow process requiring several hundred years. The result is a long-term shift in big game habitat patterns.

Aerial Surveys:

Elk – Elk totals in 2006 were 1,613, 488, and 951 for HDs 390, 391, and 392 respectively. Total number of elk in 2007 were 1.742, 509, and 1,241 fro HDs 390, 391, and 392 respectively. Total number of elk increased in 2007 by about 8% in HD 390, 4% in HD 391, and 30% 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 2006 and 2007 in HD 390 and 391 reflect a <10% increase. The changes in HD 392 are greater than 10%. The changes are not related to a management oriented practice.

Mule Deer – The total number of mule deer counted in 2006 were 263 post-season and 296 spring survey. In 2007, there were 578 post-season and 647 spring survey. Mule deer numbers increased by over 100% in 2007 based on post-season counts and based on spring recruitment counts compared with 2006. 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.

Actions in Response to Variability Assessment:

There are no actions needed at this time for all monitoring items with the exception of the Wagner Atlanta Road closure monitoring. Monitoring in 2007 indicates that some roads that were identified for closure during the Wagner Atlanta Timber Sale may actually be open. This could be an artifact of numbering roads during North Belts Travel Planning. Therefore, in order to determine if road closures are effective, field verification is necessary to identify and clarify the roads in question.

Element 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.

Variability Measure:

Any loss of an eagle nest

Assessment:

Eagles have moved nest locations in this area before, and with destruction of the 1999-2007 nest, it is likely they will relocate to a new site nearby in 2008. The area along the river is essentially unburned, and the canyon in which the latest nest had been located retains the majority of its large trees. So, potential nesting sites appear numerous. The variability measure has been exceeded – i.e. any loss of an eagle nest. However, it's important to note that this element was developed at a time when bald eagles were listed on the Endangered Species List; they have since been removed and remain has a sensitive species on the Region 1 Sensitive Species List.

Results in and around the Elliston Project Area are essentially the same as those from previous years, 2004-2006 so there is no departure from the variability measure.

Element 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.

Variability Measure:

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

Assessment:

Very limited sampling was conducted in 2007, but it is likely that this variability measure is not being met. Samples were collected from Hay Creek and Copper Creek. Sediment levels are of concern in Hay Creek as they are approaching 50% in gravels used by salmonids for spawning.

The cooperative effort with the State of Montana in regard to the analysis of the sediment samples continues to support the concept that evaluating sediment levels in spawning gravels is a useful measurement. The findings from 2007 add to the information base and the information is currently considered to be a useful tool that helps assess risk to fisheries associated with sediment generating management activities in watersheds having various types and magnitudes of natural events or human related activities.

Actions in response to variability assessment:

Action to address elevated sediment levels will occur as part of a fuels treatment project planned in the Hay Creek drainage in the future. Likely efforts will include such things as identifying opportunities to reduce sediment delivery from existing roads and sediment delivery associated with domestic livestock grazing. Additional action already taken includes collection of additional substrate core samples tributaries to Hay Creek.

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 Timber sale, the Poorman Timber Sale, the Draft EIS on the Nevada/Dalton Project, Snow-Talon Salvage Sale, the Elliston Fuels Treatment Project, the upcoming Cabin Gulch Draft EIS, and upcoming evaluations for a Fuels treatment in the Hay Creek drainage. The approach is aimed at meeting or exceeding the Forest Plan Standard for General Watershed Guidance #4 (Helena Forest Plan pg II-35). For a stream like Hay Creek it is likely there will be efforts undertaken to reduce sediment delivery from existing levels.

Element C12: Streamside Cover for Fish

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:

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

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

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

Helena Forest Riparian Guidelines (USDA 1998- in project file) are used as a means of maintaining shading and minimizing bank disturbance for the allotments east of the divide. In 2007 bank disturbance was the primary factor evaluated for the allotments evaluated by fisheries personnel and it was assessed visually in relation to the Helena Forest Riparian Guidelines (1998).

Assessment:

Since Cowfish (Lloyd 1985) is no longer used, the Cowfish HSI variability was not used in 2007. Findings from stubble height monitoring, bank disturbance monitoring , the various biological evaluations conducted during grazing allotment updates, and general fishery reviews on other livestock allotments indicate that fish habitat associated with riparian habitat condition and fish populations continue to be affected negatively to varying degrees on a number of grazing allotments across the Forest. Effects to fish habitat vary from minor to adverse and are documented, for the allotments reviewed, in project file memos, field notes, and correspondence.

A total of thirty-nine riparian areas were measured on twenty-five allotments in 2007. Fourteen of the riparian areas or 36% of the areas measured, were above Forest Plan allowable use levels. In terms of allotments measured, twelve (48%) were above allowable use levels. It is reasonable to assume that the measurements reflect allotment conditions, as measurements are taken on key areas.

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 are projected to be minimal and there would be little need for any amendment to the Forest Plan. Consequently efforts to better implement the Riparian Guidelines (1998) will continue, but the efforts are not predicted to be fully successful due to funding constraints that will limit the ability to control livestock use in riparian areas.

Based on findings and recommendations discussed in the 2006 monitoring report, livestock grazing was not to occur on the riparian portion of the Middle Fork of Duck Creek (Gurnett Allotment) in 2007. However, in 2007, there were unauthorized livestock use from adjacent private land and a fence breech from an adjacent allotment resulting in exceeded standards. The reach on the North Fork of Deep Creek, discussed as a problem reach in 2005, was fenced in 2006 to exclude livestock. Cattle gained access to the riparian area through breeches in the fence in some locations and some grazing inside the exclosure occurred.

Efforts to reduce negative livestock effects to westslope cutthroat trout on Spring Gulch (Spring Gulch Allotment) were unsuccessful and very heavy bank trampling greatly exceeding the 11% found on the implementation monitoring transect (depicted in an earlier table within this section). The excessive bank trampling on Spring Gulch occurred on a reach critical to westslope cutthroat trout viability (pictures included in the project file). Consequently, additional assessments by range and fishery personnel are planned for Spring Gulch in 2008.

The Fish and Wildlife Service was informed of the failure to meet bank disturbance standards on several stream transects on Dog Creek and Spring Gulch in the Blossburg and Spring Gulch Allotments and breaches in the exclosure on Snowshoe Creek in the Ophir Hope Allotment. Although re-initiation of formal consultation to address adverse effects on bull trout habitat will not likely occur in 2008, some additional range administration efforts will need to be undertaken to reduce bank disturbance levels. A drift fence on Ray Creek (Baldy Allotment) was installed to limit bank disturbance on an important fishery reach of Ray Creek (Baldy Allotment) in 2006, but monitoring of the area in 2007 to assess success was not completed as planned, but will take place in 2008 instead.

Assessments by range and fishery personnel to reduce problems on Skelly Gulch (Drumlummon Allotment) were initiated with fishery personnel from the Montana Department of Fish, Wildlife and Parks in 2007, but reviews by Montana Department of Fish Wildlife and Parks criticized the lack of success. Further efforts to address concerns on Skelly Gulch are planned in 2008. A riparian restoration project was also completed for a riparian area in the headwaters of Colorado Gulch (Frohner Allotment) which was initiated by soils personnel in response to riparian related problems identified in 2006. There are plans in 2008 for riparian restoration projects in Carl Creek, MacDonald Creek, and the Middle Fork of Spotted Dog Creek.

In addition to the ongoing efforts to 1) implement the Helena Forest riparian guidelines, 2) document problem riparian areas, and 3) address problem riparian areas within allotments, a number of riparian areas have been fenced over the last 15 years to exclude livestock use from riparian areas with the intent

to improve cover and reduce bank disturbance from livestock trampling. Exclosures have been constructed on portions of Elliston Creek, Snowshoe Creek, Pikes Gulch, Trout Creek, Meadow Creek, Uncle George Creek, Dog Creek, Indian Creek, Jenkins Gulch and Eagle Creek. Exclosures on Jenkins Gulch and Pikes Gulch are no longer in place. In 2007 additional maintenance was conducted on portions of the exclosure on Elliston Creek and some of the exclosrue was converted from electric fence to barbed wire fence. Minor maintenance was conducted to the exclosure on Meadow Creek in the Blossburg Allotment.

Additionally, other measures have been taken over the last several years to reduce impacts of livestock grazing to riparian habitats and associated fish habitat on several stream reaches through the use off-stream water developments. Recent examples include uncle George Creek, MacDonald Creek, Fred Burr Creek, and a tributary Clancy Creek.

Element D2: Allotment Management Planning and Update

Forest Plan Requirements:

Monitor allotment management planning and update.

Variability Measure:

Less than 4 plans updated annually, planed objectives are not being met.

Assessment:

An average of 3 allotment management plans were updated from 2002 through 2007. An average of 4.3 allotments have been updated annually over a ten year period. This variability measure has been met over a ten year period, but it is not being met for the past five year period. If the five year trend continues, this element will not be met in the near future.

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. Five allotments were updated in 2007. Two allotments are planned for 2008. This will move the Forest towards meeting the requirements of this element, although at a slower pace than may be required in the long term.

Element D3: Weed Infestations

Forest Plan Requirements:

Monitor weed infestations.

Variability Measure:

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

Assessment:

Based on the 1987 weed EIS, inventories indicate 3,641 acres were infested with noxious weeds. The preferred alternative identified 638 acres to be treated annually, which was 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 acres 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 control.

Element E1: Regulated volume prepared for sale

Forest Plan Requirements:

Volume prepared for sale.

Variability Measure:

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

Assessment:

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

Actions in response to variability assessment:

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

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

Element E7: Reforestation practices and assumptions

Forest Plan Requirements:

Monitor reforestation practices and assumptions

Variability Measure:

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

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 when only planting after harvest is considered (from 2003 to 2007, 59%), or 50% in a given year (for 2007, 41 acres, 7%). The acreage and target increases when non-harvested that were planting are considered (78% over the 5-year timeframe, 24% in 2007). When all

planting is considered, the Forest meets the requirement over the 5-year period but still does not meet the yearly standard. The increase in planting over the 5-year period was in response to the large wildfires and subsequent salvage activity that occurred in 2000 and 2003.

Accomplished planting is within 10% of planned planting over the 5 year monitoring timeframe. From 2003 to 2007, 106% of planned plantings in harvested areas were accomplished. In 2007, 100% of planned plantings in harvest areas were accomplished. When non-harvested units are considered, the accomplishment over the 5-year timeframe falls to 94%, still within the range of variability.

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 the remaining 69% being natural regeneration or no reforestation needed. 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 2003-2007, the Forest harvested approximately 688 acres/year (FACTS query project file), and 354 acres of planting in harvest areas (61%). 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.

Actions in response to variability assessment:

No additional action is needed.

Element P4: Wildfire acres

Forest Plan Requirements:

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

Variability Measure:

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

Assessment:

The variability on average is within acceptable limits if you do not count the large fire years of 2003 and 2007 being above the 25% projected average of wildfire burned acres, if the large fire years of 2003 and 2007 are considered the variability is outside of the acceptable range.

Actions in response to variability assessment:

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

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

Forest Plan Requirements:

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

Variability Measure 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.

Monitoring Reports

(A) RECREATION

(A1) Developed Recreation

Forest Plan Requirements:

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

Intent:

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

Data Sources:

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

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

Current Efforts and Findings:

Documentation of Monitoring Methodology:

The National Visitor Use Monitoring Project (implemented on the Forest in fiscal year 2003) was developed to provide statistically valid use estimates. Through traffic counts (road & trail) and visitor exit surveys, recreation use information was obtained specific to the Helena National Forest.

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

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

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

Monitoring Activity:

Condition surveys were last completed at all developed recreation sites on the Helena Forest during 2004. Because condition surveys are not required again until 2009 (as per national protocol), they were not initiated at the recreation sites in 2007.

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 not approved in 2007 by the Forest Supervisor as planned because public involvement was not completed.

Rental Cabins are reserved and permits issued through the National Recreation Reservation System. Occupancy of the six rental cabins on the Helena Forest totaled 895 nights during 2007. The Indian Flats Cabin on the Helena Ranger District was not available for rent from July 27th through September 29th due to the Meriwether Fire. Receipts at the fee campgrounds on the Helena Ranger District totaled $17,518 during 2007 and reflect approximately 2,800 paid nights of camping.

Coulter Campground and Meriwether Picnic Area were closed August 4, 2007 and remained closed for the remainder of the year due to the Meriwether Fire. While neither of the developed recreation sites received any direct damage from the fire, both were closed for public safety. Recreation facilities that could be easily removed (signs, picnic tables) were moved out of the drainage bottom and placed on higher ground. In September, debris deflectors were constructed around facilities (toilets & picnic shelter) that couldn't be moved in anticipation of debris and water flows the spring and summer of 2008.

Because lands along Park Lake came under Forest Service management in 2007, day use facilities were constructed along the north and south shores of the lake. Improvements consisted of 17 picnic sites, two parking lots, one toilet and 9 fire rings. These facilities were constructed to enhance day use at Park Lake and reduce existing resource damage.

Additionally, improved parking lots were constructed at two trailheads (Never Sweat and Cave Gulch) as part of the North Belts Travel Decision. Both sites were developed primarily to encourage and accommodate increased motorized trail use in that area. There will be some displaced visitors from the Never Sweat trailhead because traditionally it also served as a popular site for dispersed camping.

Visitor use information was collected during fiscal year 2003 through the National Visitor Use Monitoring Project (NVUM). That information, available in the Helena Forest Supervisors Office, is the most current and accurate recreation use information currently available for the Helena Forest.

For the non-fee developed sites on the Townsend Ranger District we have good comprehensive data that shows our traffic patterns; data was compiled using a traffic counter at entry and exit points. The data doesn't reflect overnight stays it only accounts for traffic in and out of the developed sites.

Skidway Campground FY 2007

Month	May	June	July	Aug	Sept	Oct	Nov
Total vehicles	55	295	120	158	202	222	40
Average weekend days **	11	12.8	11.2	8.4	12.7	6	6.3
Average week days	5.5	7.3	6.7	6.3	10.8	7.9	5.3
Remarks	7 days sampled 5/25-5/31			22 days sampled 8/1-8/22	17 days sampled 7/14-7/30		7 days sampled 11/7 - 11/14

Gipsy Lake Campground FY 2007

Month	May	June	July	Aug	Sept	Oct	Nov
Total vehicles	28	207	202	88	147	173	31
Average weekend days **	1.5	7.7	8.9	5	9.3	3.8	5.7
Average week days	7.3	4.8	5.1	3.3	6.3	4.6	4.7
Remarks	7 days sampled 5/25-5/31	22 days sampled		22 days sampled 8/1-8/22			6 days sampled 11/1-11/6

Gipsy Lake Picnic Area FY 2007

Month	May	June	July	Aug	Sept	Oct	Nov
Total vehicles	30	255	262	115	162	112	14
Average weekend days **	6.7	13.6	11.8	8.7	7.2	4.8	3.3
Average week days	2.5	4	6	4	3.8	2.8	2.6
Remarks	7 days sampled 5/25-5/31			16 days sampled			5 days sampled 11/1-11/5

While the Helena Ranger District does not have the same level of data at their non-fee sites, employee observations indicate that use levels have been consistent over the past few years.

Copper Creek campground on the Lincoln Ranger District is still experiencing less use than before the 2003 Snow Talon fire. That is a result of burned trees and vegetation in the campground and the loss of water in Snow Bank Lake. Campsites along Copper Creek which were not impacted by the fire continue to receive the most use. Sites on the north side of the campground are used the least because they no longer have green trees which provide shade.

Aspen Grove campground receives the majority of visitor use during weekends when all the sites are usually occupied. On weekdays the campground is normally 1/3 to ½ full. The amphitheater at Aspen Grove was utilized for both interpretive and educational programs in 2007. It should be noted that use of the amphitheater decreased following the culmination of the Lewis and Clark Bicentennial.

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

Pikes Gulch Campground on the Helena Ranger District was abandoned during the 1990's. Two new developed sites were constructed at Gipsy Lake (campground and picnic area). Eight facilities were added to the developed recreation program as rental cabins (Cummings, Strawberry, Kading, Indian Flats, Rillway, Thompson, Bar Gulch, Eagle Guard). Based on a lack of public use at Strawberry, the cabin was removed from the Rental Program. Although Cummings Cabin was not available for rental in 2007, it is scheduled for improvement and should be available for public use in the future.

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

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

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

Variability Measure Discussion:

Variability Measures:

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

Assessment:

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

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 2003 National Visitor Use Monitoring Project, it appears the recreation use figures identified in the 1986 Forest Plan (based on the best available data at the time) and/or the projected future growth estimates, were high. It is unknown how original use estimates were determined and as a result, any comparison with NVUM use figures is not appropriate.

NVUM data may not provide a fully accurate picture of RVD's on the Forest either. 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. Future NVUM data, to be collected during

FY 2008, will likely revise use figures on the Helena National Forest. A comparison at that time will provide a reliable analysis of the true variability of this element.

Actions in response to variability assessment:

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

Recommended Efforts:

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

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

As funding allows, the Forest should begin implementing the 5-Year Action Plan for developed recreation sites in fiscal year 2008 to reduce maintenance backlogs, improve visitor service and meet existing standards.

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

Monitor visitor use and demand for expanding the fall operating season at Aspen Grove campground. Changes in recreation trends and camping equipment have resulted in increased fall camping.

(A2) Dispersed Recreation

Forest Plan Requirements:

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

Intent:

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

Data Sources:

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

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

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

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

Current Efforts and Findings:

Documentation of Monitoring Methodology:

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

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

Monitoring Activity:

The primary management activity that continues to influence the Recreation Opportunity Spectrum is implementation of the Clancy-Unionville and North Belts Travel Plan decisions. Through those decisions motorized use is now allowed only on designated routes. Gates were placed on three routes in the North Big Belts that are roads with seasonal restrictions and two gates were placed in the Clancy-Unionville area on roads that are closed yearlong. Dispersed recreation activities (camping, fishing, hunting, picnicking, etc) supported by motorized access may have declined as a result of those closures. In addition to the gate installations, a total of 16.7 miles of road were obliterated in the North Big Belts.

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

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

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

In 2007, National Forest lands located adjacent to Park Lake were available for public recreation use (with the exception of camping). Several areas along the lakeshore were popular and utilized for recreation activities such as: picnicking, fishing, hiking, and relaxation. Past observations by Forest Service employees indicate the amount of recreation use along the lakeshore often exceeded use within Park Lake Campground.

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 has increased during the fall 2007 hunting season. This increase was due to the closure of the campground and the increased hunting opportunities in the

fire area. The Snow Talon Fire also created additional snowmobile opportunities (off trail riding and high marking) in the Copper Creek area.

Data Analysis Methods:

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

Monitoring Results:

ROS Category	Acres - as Projected in Forest Plan	25% Variation	Acres – as Identified in Eastside Assessment
Primitive	105,000	78,750 – 131,250	98,214
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. Travel restrictions impacted the type and amount of recreation use in that area but the extent is undetermined. Reconstruction of the Cave Ridge, Never Sweat, and Holiday trails did facilitate increased OHV activity in the North Big Belts.

Variability Measure Discussion:

Variability Measures:

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

Assessment:

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

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

Actions in response to variability assessment:

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

Recommended Efforts:

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

When travel planning has been completed on the Forest (scheduled for December 2009), initiate revised ROS mapping 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 year 2003 to identify visitor use numbers and trends. That information, available in the Helena Supervisors Office, 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 2008. The change in recreation activities may reflect a change in trends either locally or regionally.

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

(A3) ORV compliance and damage

Forest Plan Requirements:

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

Intent:

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

Data Sources:

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

Current Efforts and Findings:

Documentation of Monitoring Methodology:

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

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

Monitoring Activity:

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

Law enforcement statistics document OHV problems on the Helena Forest during fiscal year 2007. There were 15 Violation Notices issued for OHV related incidents in 2007 compared with 18 the previous year. There were 60 Incident/Warning Reports documented for OHV related incidents in 2007 compared with 34 the previous year.

In 2007 there were continued travel management violations on both the Townsend and Helena Ranger Districts. While recent travel plan implementation projects have reduced violations and damage, there are still some problem areas remaining. In the Elkhorn Mountains there appears to be an increase in the number of vehicles driving on closed roads or driving off-route to hunt for elk antlers. Helena District employees also reported an increased amount of off-road travel and damage in the Mullan Pass/Dog Creek area.

Hope Creek

The Head of Uncle Ben Gulch

Hunter patrols during the fall hunting season indicated improved compliance with travel restrictions as the public becomes more aware of the restrictions through signing and physical road closures.

In 2007 a total of 16.7 miles of road were obliterated in the North Belts and in both the North Belts and Clancy-Unionville Travel Plan Decisions areas the Forest moved forward with the installation of several gates and short segments of fence to control traffic on roads that are seasonally closed or areas/roads that have year-long closures.

Progress was made with North Belts Travel plan implementation through the cooperation of the Capital City Trail Vehicle Association. The club, in conjunction with a district crew, installed an ATV bridge over Magpie Creek on Frontage trail #242 as well as partially completed reconstruction of Thompson Creek trail #264. The Hellgate Ridge trail contract was awarded in 2007 but due to large fires on the Forest, construction will not begin until the summer 2008. Work was initiated on the east fork of Doolittle trail #246 in conjunction with Montana Conservation Corps and the Helena Forest trail crews.

Forest Service personnel observed an increase in off highway vehicle use and impacts in 2007. OHV use during the spring, summer and fall resulted in more unauthorized trails on the Lincoln District in the following areas: Sucker Creek, Copper Creek, and Flesher Pass.

The Keep Cool Lakes area is located within private and State land management areas which were closed to motorized travel, except over the snow vehicles in winter.

A special use permit issued by the Lincoln Ranger District authorized an ATV ride in May, 2007 with over 150 participants. The event occurred on existing roads and trails.

Snow ranger patrols and observations of snowmobile trailheads indicated an increase use of snowmobile over previous years. That is due in part to increased snow accumulations and opportunities in the Snow Talon fire area.

Data Analysis Methods:

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

Monitoring Results:

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

OHV problems that occurred in 2007 were similar to those occurring in the past. The primary OHV violation identified on the Helena Forest was: possessing or using a vehicle off National Forest System roads (36 CFR 261.56).

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

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

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

1) 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.
2) To develop travel maps and respective area signing that are clear and understandable.
3) To provide a travel plan that is enforceable.
4) To reduce long-term maintenance costs for the area's transportation system.
5) To improve watershed conditions associated with travel routes.

Variability Measure Discussion:

Variability Measures:

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

Assessment:

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

part of OHV enthusiasts regarding the lack of opportunities, some recreationists may continue to violate travel restrictions.

Actions in response to variability assessment:

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

Recommended Efforts:

In compliance with the 2005 National Forest Travel Management Rule, travel planning is scheduled for completion on the Forest by December 2009. Following travel plan revision, the Forest should develop and update (as needed) a Motorized 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.

(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:

In an effort to limit the growth of the Meriwether Fire, approximately 1.5 miles of dozer line was constructed within the Big Log Inventoried Roadless Area during 2007. That fire line was rehabilitated during the fall of 2007.

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:

No decisions were made or implemented in 2007 that resulted in modifications to Inventoried Roadless lands. This is within the 20,000 acre variation identified with established Forest Plan Monitoring guidelines.

Actions in response to variability assessment:

No actions are needed to respond to this element.

Recommended Efforts:

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

(B1) Wilderness

Forest Plan Requirements:

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

Intent:

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

Data Sources:

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

Current Efforts and Findings:

Documentation of Monitoring Methodology:

During 2007, 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 minimally monitored by district trail crews.

Monitoring Activity:

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

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

During the summer/fall of 2007, a new recreation workforce was implemented on the Helena Forest. A seasonal wilderness ranger position was created to help manage and monitor both the Scapegoat and Gates of the Mountains Wilderness.

Gates of the Mountains

The Gates of the Mountains wilderness experienced a major wildlife during the summer of 2007. Prior to the July fire, little monitoring activity occurred within the wilderness.

Scapegoat

Few campsite inventories were accomplished during 2007. However, pre-season and operating season inspections were completed on most outfitter camps.

In 2007, the Bob Marshall Wilderness Complex (BMWC) completed the fourth 5-year monitoring period. Data received was compiled, analyzed and compared to the previous three monitoring periods. Approximately 70 miles of trail were monitored within the Scapegoat Wilderness in 2007.

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

Intense wildfire in the upper elevations of Meriwether, Willow Creek, Slip Gulch and Big Log Gulch consumed most of the standing timber, shrubs, grasses and duff layer. The loss of vegetative cover and organic matter in these drainages will probably lead to an increase in soil erosion and overland water/debris flows. Trails in these drainages include Mann Gulch, Big Log Gulch, Meriwether Canyon, upper Hunter's Gulch, upper Refrigerator Canyon, Grant Gulch, and Willow Creek for a total of 26 miles of trails impacted. A limited amount of trail work was accomplished by district crews prior to the wildfire.

Scapegoat

Much of the trail work within the Scapegoat Wilderness was completed by volunteers and outfitters who maintained approximately 120 miles of trails during 459 service days. The heaviest downfall continues to be located on trails within the 1988 Canyon Creek fire area. There are approximately 110 miles of system trail within the Scapegoat Wilderness administered by the Lincoln Ranger District. Both the Continental Divide Trail and Heart Lake Trail continued to experience increased use during the summer of 2007.

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

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

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

Visitor encounters

Gates of the Mountains

Because visitor use was traditionally limited, an appropriate number of trail encounters was never 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.

The Meriwether Fire which stated on July 21, 2007 burned approximately 40,522 acres before it was contained on September 29th. Most of the 22,889 National Forest System Lands that burned were in the Gates of the Mountains Wilderness. To protect public and fire fighter safety the Gates of the Mountains Wilderness was closed to the public from July 23rd – September 20th. Even though the Closure Order was lifted prior to the start of the big game hunting season, Helena Forest employee observations indicated the main wilderness trailheads received very limited public use.

Scapegoat

There is little or no evidence that visitor encounters exceed existing ROS standards for primitive and semi-primitive non-motorized areas. Visitor encounters were primarily documented during fall hunter patrols. Approximately 40 miles of patrol were completed in 5 days and resulted in 12 camp contacts and 10 trail contacts. Several warnings were issued for violations of the Food Storage Order. The probabilities of encounters and general level of encounters were within the established standard for all four Opportunity Classes in 2007. The number of days Helena Forest employees worked in the Scapegoat were reduced in 2007 due to budget constraints.

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 in the Gates of the Mountains Wilderness, which is grazed two of every three years (rest rotation system), is in generally good condition. The Moors Mountain grazing allotment was rested in 2007 for reasons of personal convenience.

Scapegoat

Because there are no livestock grazing permits issued for the Scapegoat Wilderness, range conditions are measured as per grazing use by pack and saddle stock. Grazing areas are managed to ensure that forage utilization does not exceed a moderately grazed appearance. All horse and pack stock users are encouraged to plan for the fewest number of animals required for each trip. At campsites, range conditions are incorporated into the condition class results.

The range condition within the Scapegoat Wilderness is generally in good condition and does not exceed a moderately grazed appearance.

Trend and actual use levels

Gates of the Mountains

Based on the Meriwether Fire and restrictions within the wilderness last summer, public use was very limited, even during the big game hunting season.

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

Scapegoat

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

Campsite impacts

Gates of the Mountains

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

Many of the campsites that were previously inventoried were burned during the Meriwether Fire. The Helena District did not have the opportunity to assess impacts to those campsites during the fall of 2007. That work should be initiated in 2008.

Scapegoat

Campsite impacts/trends for the Scapegoat Wilderness are summarized below by geographic area:

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

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

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

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

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

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

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

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

Assessment:

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

Recommended Efforts:

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

Trails and campsites within the Gates of the Mountains should be evaluated and monitored during the 2008 and 2009 field seasons to identify impacts from the Meriwether Fire. Trail segments that are identified with safety concerns or resource impacts should be scheduled for improvement as quickly as possible.

The majority of frequently used campsites in the Scapegoat and Gates of the Mountains Wilderness have been mapped and documented in the past. Annually, 25% of the wilderness campsites should be monitored to ensure resources are not degraded and impacts are deemed acceptable.

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 limitations, the Forest must determine which elements are of the highest priority for implementation.

Convene an ID team to recommend management actions for the Heart Lake area in the Scapegoat.

In association with the Montana Discovery Foundation, the Helena Forest should initiate additional wilderness education efforts, with special emphasis on implementation of the Gates Education Plan.

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

Other Monitoring Efforts:

In 2004 the USDA Forest Service developed a 10-Year Wilderness Stewardship Challenge to define successful wilderness stewardship. There are 10 elements associated with the Wilderness Challenge that are numerically rated from 0-10. A score of 10 is the highest possible for an individual element. A total score of 60 is needed for each wilderness to meet the minimum standard. The following 10 elements are rated to reflect the 2007 condition.

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

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

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

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

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

Element #6 – Wilderness has a completed recreation site inventory.
Scapegoat – score of 10
Gates of the Mountains – score of 6

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

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

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

Element #10 – Baseline workforce in place.
Scapegoat – score of 0
Gates of the Mountains – score of 0

Total score for the Scapegoat is 59 which is slightly less than Minimally Accepted.
Total score for the Gates of the Mountains is 44 which is less than Minimally Accepted.

(C1-C9) WILDLIFE

(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 year long range of each segment in the Elkhorns. This monitoring element applies to Management Areas E1 – E4.

Intent:

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

Data Sources:

Ground and aerial observations; radio tracking; annual Elkhorn wildlife monitoring report (Forest Plan suggested data sources). 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 2007
- Mule deer aerial surveys in Hunting District 380 for spring 2007
- Elk, mule deer, and moose ground surveys

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 reflected in the Forest-wide annual monitoring reports.

Surveys were not conducted for mountain goats.

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. Ground surveys consisted of general field reconnaissance observations.

Monitoring Activity:

Elk Aerial Surveys:

Aerial surveys were conducted on February 25th and 28th, 2007 for elk.

Mule Deer Aerial Surveys:

Aerial surveys were conducted on December 19, 2006 and April 6th, 2007 for mule deer.

Elk, Mule Deer, and Moose Ground Surveys:

Daylong ground surveys were conducted in the McClellan, Strawberry, and Warm Springs Creek drainages on 11 occasions in the fall and early winter of 2006 in order to monitor how elk and mule deer (and, to a lesser extent, moose and white-tailed deer) responded to the combination of hunting pressure and the gradual onset of winter conditions.

The surveys are intended to provide baseline data that will eventually contribute to determining effects of proposed forest thinning on big game habitat use patterns in the North Elkhorns. Some of the surveys are also part of a long-term effort to map the response of native ungulates to the ever-evolving environment generated by the 1988 Warm Springs Fire.

Surveys involved walking long-distance routes throughout a number of sub-drainages at different elevations and throughout a variety of habitats, tallying animals seen and gathering indirect evidence (tracks, scat, feeding) as to behavior, location, movement patterns, and habitat use. Hunters were informally interviewed when encountered—as to their hunting strategies, areas covered, success in locating animals, comparisons to previous years.

Data Analysis Methods:

Other than general observation summaries, no data analyses are conducted for this element.

Monitoring Results:

Elk Aerial Surveys:

A total of 2,029 elk were observed in 2007 which is a decrease of 78 elk over last year's survey (N=2,107) (See Tables, below. Data for 2006 are included for comparison). Snow conditions were favorable for survey efforts; however, due to strong wind, winter range at upper elevations have not been surveyed. Calves were classified from the air with an observed ratio of 26.8 calves: 100 cows. Calf ratios typically range from 35 to 45 calves per 100 cows. Lower than normal calf ratios have occurred from 2001 through 2007. The lower calf ratios are probably a result of continued drought, which affects the physical condition of the cows and their ability to carry a fetus to term or sustain a calf once born. Most herd units are relatively stable or have decreased somewhat in numbers of elk.

A total of 236 bulls were observed of which 71 were yearling bulls and 165 were bulls 2 1/2 years old or older. Overall, bull elk made up 11.8% of the total elk counted. The total number of bulls observed in 2007 represent the second highest number of bulls observed since comparable surveys were conducted beginning in 1983. The objective in the EMU is to have 10% of the elk population comprised of antlered bulls.

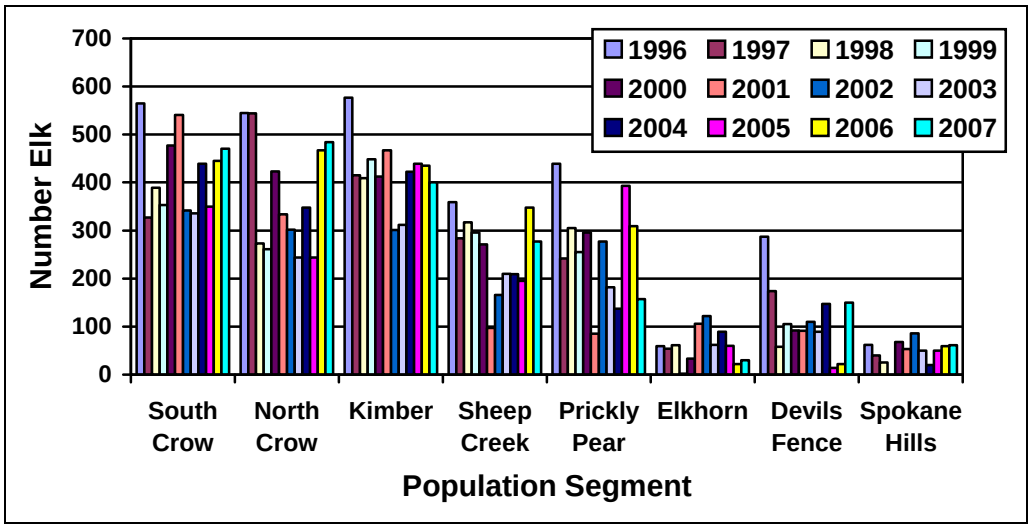
Summary of elk observations in Hunting District 380 for 2007							
Herd Segment	**Total**	**Cows**	**Calves**	**Yearling Bulls**	**Brow-tined Bulls**	**Total Bulls**	**Unclassified**
South Crow	470	335	84	23	28	51	0
North Crow	484	326	98	13	47	60	0
Kimber	400	288	77	11	24	35	0
Sheep Creek	277	222	45	7	3	10	0
Prickly Pear	157	84	29	10	1	11	33
Elkhorn	30	10	9	-	11	11	0
Devil's Fence	150	83	18	7	42	49	0
Spokane Hills	61	40	12	-	9	9	0
Total	2029	1388	372	71	165	236	33

Summary of elk observations in Hunting District 380 for 2006							
Herd Segment	**Total**	**Cows**	**Calves**	**Yearling Bulls**	**Brow-tined Bulls**	**Total Bulls**	**Unclassified**
South Crow	445			5	5	10	0
North Crow	467			10	22	32	0
Kimber	435			5	4	9	0
Sheep Creek	348			8	21	29	0
Prickly Pear	309			1	2	3	0
Elkhorn	22			-	-	-	39

Summary of elk observations in Hunting District 380 for 2006							
Herd Segment	**Total**	**Cows**	**Calves**	**Yearling Bulls**	**Brow-tined Bulls**	**Total Bulls**	**Unclassified**
Devil's Fence	22			2	7	9	0
Spokane Hills	59			1	-	1	0
Total	2107			32	61	93	39

The following figure summarizes the number of elk observed in each herd segment from 1996 – 2007.

Number of elk observed in each herd segment, 1996-2006.



Mule Deer Aerial Surveys:

A total of 786 deer were observed during the winter aerial survey (See Tables, below. Data for 2006 are included for comparison). This was an increase of 195 deer over last year. Aerial surveys were also conducted during the spring of 2007 with a total of 463 deer observed, an increase of 293 over last year. This is well above the ten year average of 305 deer (See data in project file).

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

Summary of mule deer observations in Hunting District 380 for 2006/2007					
Year	**Post-Season Total Deer**	**Fawns: 100 Adults (Post Season)**	**Spring Total Deer**	**Fawns:100 Adults (Spring Recruitment)**	**Bucks:100 Does**
2006/2007	786	24.7	463	21.6	18.8

Summary of mule deer observations in Hunting District 380 for 2006					
Year	**Post-Season Total Deer**	**Fawns: 100 Adults (Post Season)**	**Spring Total Deer**	**Fawns:100 Adults (Spring Recruitment)**	**Bucks:100 Does**
2006	591	44.9	171	40.5	14.9

Elk, Mule Deer, and Moose Ground Surveys:

For the most part, elk and hunter use of the North Elkhorns from mid October through November was stratified into 3 elevational bands. A large majority of hunters worked the mid elevation band between the Forest boundary and the steep upper slopes. Elk were relatively uncommon in this zone, but those present tended to concentrate on densely forested habitats, either in drainage bottoms or in rugged topography, venturing out to forage at night. In the Warm Springs Burn, even though regenerating lodgepole pine saplings often provided a matrix of hiding cover and forage, elk usually spent the daylight hours in unburned refugia of mature timber and emerged into the early-seral lodgepole late in the day. Most elk, however, either moved to lower elevation habitats on private land and along the Forest boundary or they retreated to rugged country at high elevation. This was possible through most of the hunting season because of scant October-November snow accumulation in 2006. Both the high and low elevational zones provided security for elk: the lower zone because of restricted hunting on private land and the higher zone because of rugged terrain and distance from drivable roads.

Once snow began to accumulate in December, virtually all elk came down out of high-country habitats in the Warm Springs Burn to lower elevation haunts near the Forest boundary—at first working open parkland and adjacent mature forest cover on the National Forest and then dropping down onto private grazing land, valley pastures, and agricultural land. Few, if any, elk remained on the National Forest in winter.

Patterns were somewhat similar for mule deer, although most deer descended to private land and Forest boundary regions earlier than elk. The upshot for both deer and elk hunters was a meager harvest.

Variability Measure Discussion:

Variability Measure:

+10% from previous measurements

Assessment:

Elk Aerial Surveys:

The total number of elk observed in 2007 decreased by about 4% compared to 2006 but was still within the population objective of 1,700 to 2,300 observed elk. The cow elk and calf composition changes between 2006 and 2007 are negligible (24.7 fawns per 100 adults in 2007 and 24.4 per 100 in 2006). Bull elk made up approximately 236 of the total observed in 2007 compared with 93 in 2006, an increase of approximately 153%.

The variation (decrease in 4%) in the total number observed between 2006 and 2007 is below the acceptable variation of + 10%. However, it remains within the population objectives for the Hunting District and is not a land management-oriented practice for the Forest.

Mule Deer Aerial Surveys:

The post season count has increased by 33% since 2006; the spring count increased by almost 3-fold (463 deer in 2007 and 171 in 2006). Both the post-season and spring fawn: adult ratios have decreased by 45% and 47% respectively. The buck: doe ratio has increased by 21%.

The variation reflected in the changes between 2006 and 2007 exceeds the acceptable variation of + 10%. MTFWP regulates the number of deer in the Hunting District through the hunting permit process; therefore, these changes in variation are not associated with a land management-oriented practice. MTFWP continues to regulate the permit system to adjust for these variations.

Elk, Mule Deer, and Moose Ground Surveys:

Elk use patterns such as those observed in the fall of 2006 are possible only under scenarios when early snows are light and sporadic, allowing animals to remain at high elevation beyond the reach of most hunters—and this has been the norm for the last 3-4 years. In some cases, a heavy early snowfall has brought animals down, but subsequent benign weather through the rest of the fall has allowed them to move back up to high elevation where few hunters venture.

In the past, during "normal" falls/winters when snows have continued to accumulate from late October onward, almost all elk and deer have retreated down to private land during much of the hunting season. Both in that case and in the more recent benign falls, the key to improving elk harvest would appear to be more liberal access to private lands near the National Forest, rather than jockeying with motorized access and cover on public land.

In terms of elk use of the Warm Springs Burn, the widespread mosaic of cover and forage generated by the fire allows elk to move throughout much of the area, avoiding hunters, without having to concentrate on local parks and other specific non-forested foraging sites where they would be more vulnerable. As the forest continues to regenerate, these circumstances will change, but for now, they favor elk survival.

Data were not collected in a manner to describe variation associated with this element.

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 or actions that would correct the variability (i.e. hunting permit structure) are not a land management oriented practice.

Recommended Efforts:

Continue to monitor: So as to (1) document fall elk and deer use patterns under a wider variety of weather and snow accumulation scenarios, (2) decipher how use patterns shift as regenerating forests in the Warm Springs Burn mature and close in, and (3) see what difference may derive from eventual thinning of mature forests lower in the McClellan and Warm Springs Creek drainages.

(C2) Ungulate habitat evaluation (Elkhorns)

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:

Aerial photos, habitat type inventory, land type inventory, field transects, annual Elkhorn wildlife monitoring report (Forest Plan suggested data sources).

Ecosystem Research Group (ERG) produced the Elkhorn Vegetation Study Phase II Final Report in 2006 that analyzes and describes habitat and range conditions for the North Crow and Kimber Elk Herd Units in the Elkhorns. The final report is available at the Supervisor's Office and on the Elkhorns Wildlife Management Unit website at: http://www.fs.fed.us/r1/helena/elkhorns/history/ElkhornsMountainsWorkingGroup.shtml. See also www.ecosystemrg.com.

Current Efforts and Findings:

No new data has been collected to address this monitoring item since that reported in the 2006 Forest Plan Monitoring Report. Those data are repeated in the 2007 Report in order to provide continuity between monitoring years.

Documentation of Monitoring Methodology:

A detailed description of the methodologies utilized by ERG is located in the "Elkhorn Vegetation Study Phase II Final Report".

Monitoring Activity:

Habitat and range conditions were analyzed by ERG as part of a collaborative effort to determine elk/livestock interactions in the Elkhorns. Phase II of that study is reported in this monitoring element which reflects data collected during two field seasons in the Kimber and North Crow Elk Herd Units (EHU). We provide a synthesis of the habitat and range conditions as described in the Elkhorn Vegetation Study Phase II Final Report".

Data Analysis Methods:

A detailed description of the data analysis methods utilized by ERG is located in the "Elkhorn Vegetation Study Phase II Final Report".

Monitoring Results:

This is the second and final year of data collection in the North Crow and Kimber Elk Herd Units (EHU). ERG concludes that the rangeland habitats in these EHUs are in acceptable condition. The following tables summarize the ecological condition of rangeland in the North Crow and Kimber EHUs. See the Final Report for a description of the conditions.

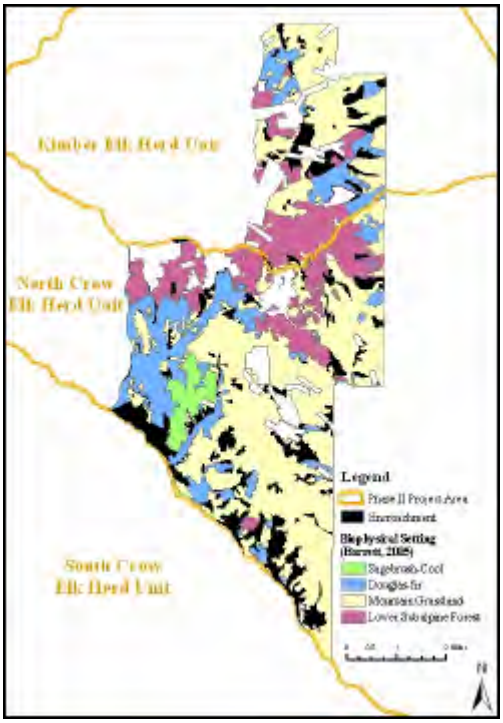
Ecological condition of the rangeland in the North Crow allotment (acres and percentages)				
Excellent	**Good**	**Fair**	**Poor**	**Totals**
6,710 (78%)	1,806 (21%)	86 (1%)	0	8,602

Ecological condition of the rangeland on the allotments in the Kimber EHU (acres and percentages)					
Allotment	**Excellent**	**Good**	**Fair**	**Poor**	**Totals**
East Pacific	833 (57%)	641 (43%)	0	0	1,474
North Beaver	149 (67%)	74 (33%)	0	0	223
Pole Creek	167 (50%)	119 (36%)	47 (14%)	0	333
Whitehorse	483 (42%)	580 (50%)	97 (8%)	0	1,160
Outside Wildlife Management Unit	3,180 (71%)	1,300 (29%)	0	0	4,480
Totals	4,812(63%)	2,714 (35%)	144 (2%)	0	7,670

For the North Crow EHU, ERG concludes that the "ecological condition of the rangeland habitats is lowest on southwest facing slopes in the Crow Creek drainage..." Conifer colonization and noxious weeds are problems in this area. The rangeland habitats in Kimber EHU are in acceptable condition but when compared to the ecological conditions in the North Crow EHU, the rangeland habitats in Kimber are "significantly lower".

ERG also identified extent of conifer encroachment and its effects on rangeland habitat based in part on Barrett's "Role of Fire in the Elkhorn Mountains" (See project file). According to ERG, approximately 2,924 acres of encroachment have occurred in the areas where Barrett's study overlaps the Phase II Vegetation Study Area. Conifer encroachment into grasslands – and most likely sagebrush - has created patches of elk cover that may not have been historically present. The high frequency of fires in grasslands and sagebrush generally limited trees to scattered, small patches. Furthermore, the age-class distribution of sagebrush was probably more varied under historic fire regimes.

The following figure illustrates the extent of conifer encroachment as identified in this study.



Present day forest structure has also changed relative to historic conditions. ERG modeled historic range of variability (HRV) utilizing SIMPPLLE, a modeling system that simulates vegetation patterns and processes (*See* Elkhorn Vegetation Study Phase II Final Report page 5-11 for more information on the SIMPPLLE process). Contrasts exist between historic and present day forest structure. The following table summarizes those changes.

Forest size/structure/density comparison for forested portions of the Phase II Project Area						
Size/ Structure Class	Presently			HRV		
	Percent Canopy Cover			Percent Canopy Cover		
	15-39%	40-69%	70-100%	15-39%	40-69%	70-100%
Seedling/ Sapling (< 5"dbh)	8.3	22.3	0.2	17.9	9.8	0.0
Pole (5-8.9" dbh)	11.4	0.6	0.0	10.9	0.3	0.0
Pole Two Story	1.6	26.2	0.0	0.7	2.2	0.0
Pole Multi-Story	0.0	1.4	1.7	0.0	0.0	0.0
Medium (9-14.9" dbh)	9.1	0.4	0.4	27.6	10.7	0.0
Medium Two Story	9.1	0.7	0.7	0.0	0.3	0.0

Forest size/structure/density comparison for forested portions of the Phase II Project Area						
Size/ Structure Class	Presently			HRV		
	Percent Canopy Cover			Percent Canopy Cover		
	15-39%	40-69%	70-100%	15-39%	40-69%	70-100%
Medium Multi-Story	0.0	2.0	2.0	0.5	0.4	0.0
Large (15-20.9" dbh)	0.6	0.0	0.0	9.2	1.3	0.0
Large Two Story	1.3	0.2	0.2	3.1	2.8	0.0
Large Multi-Story	0.0	0.3	0.3	0.4	0.6	1.2
Totals	41.5	54.3	4.2	70.5	28.3	1.2

Variability Measure Discussion:

These data are intended to provide a baseline from which future variability can be measured. Clearly, landscape conditions have changed from historic vegetative patterns as demonstrated by the increase in conifer cover. However, these changes are outside the scope of the Forest Plan and therefore will not be used to measure variability. Future changes on the landscape, either natural or management-related, will be used as an indication of variability in out-years as those data become available.

Variability Measure:

+10% from previous measurements

Assessment:

ERG concludes that overall rangeland habitats are in reasonable condition. However, conifer encroachment has affected the amount and distribution of grasslands and forest-structure has changed over time. These data are being used to develop a strategy that would address conifer encroachment in the Elkhorns. Estimated completion date for this strategy is fall 2008.

Actions in Response to Variability Assessment:

The Elkhorn Vegetation Study Phase II has provided baseline information that will allow the Forest to determine changes on the landscape over time. Therefore, a variability assessment and any needed actions are not necessary at this time.

Recommended Efforts:

Continue working with the Elkhorns Working Group to develop a strategy for implementing recommendations contained in the Elkhorns Vegetation Study Phase II report.

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

Forest Plan Requirements:

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

Intent:

Evaluate response to man imposed activities by various ungulate populations.

Data Sources:

Field observations, aerial observations, radio-tracking, hunter check stations, field transects, annual Elkhorn wildlife monitoring report (Forest Plan suggested data sources).

Ecosystem Research Group (ERG) produced the Elkhorn Vegetation Study Phase II Final Report in 2006 that analyzes and describes habitat and range conditions for the North Crow and Kimber Elk Herd Units in the Elkhorns. The final report is available at the Supervisor's Office and on the Elkhorns Wildlife Management Unit website at: http://www.fs.fed.us/r1/helena/elkhorns/history/ElkhornsMountainsWorkingGroup.shtml. See also www.ecosystemrg.com.

Current Efforts and Findings:

No new data have been collected to address this monitoring item since that reported in the 2006 Forest Plan Monitoring Report. Those data are repeated in the 2007 Report in order to provide continuity between monitoring years.

Documentation of Monitoring Methodology:

A detailed description of the methodologies utilized by ERG is located in the "Elkhorn Vegetation Study Phase II Final Report".

Monitoring Activity:

As part of the Elkhorns Vegetation Study Phase II, ERG collected data to determine elk/livestock interactions. These data were used to determine the extent to which elk and livestock overlapped and how this could affect forage utilization in the Kimber and North Crow Elk Herd Units (EHU). ERG also analyzes elk security habitat in order to provide a context for changes on the landscape particularly those associated with conifer encroachment.

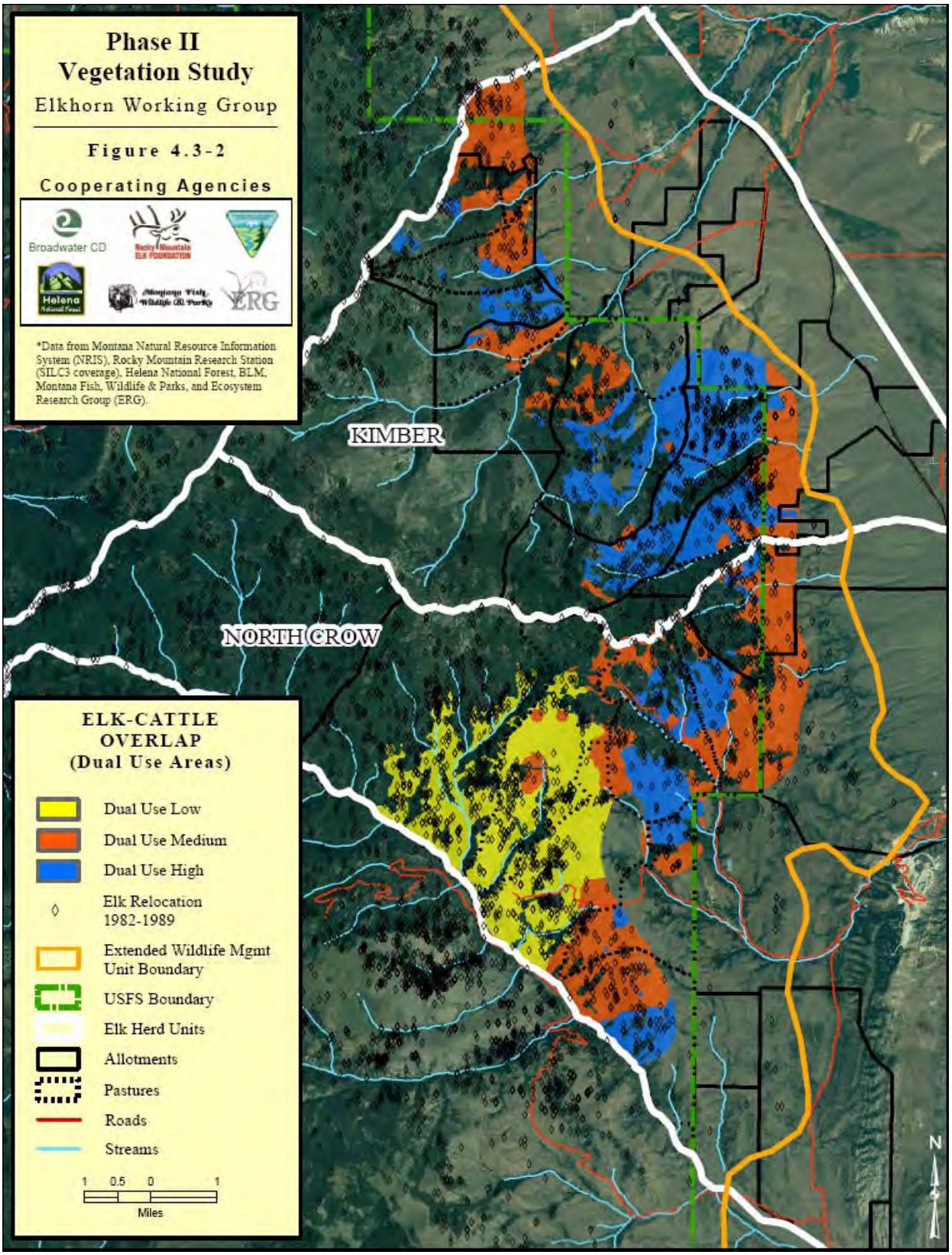
We provide a synthesis of the elk/livestock overlap and elk security analysis as described in the "Elkhorn Vegetation Study Phase II Final Report".

Data Analysis Methods:

A detailed description of the data analysis methods utilized by ERG is located in the "Elkhorn Vegetation Study Phase II Final Report".

Monitoring Results:

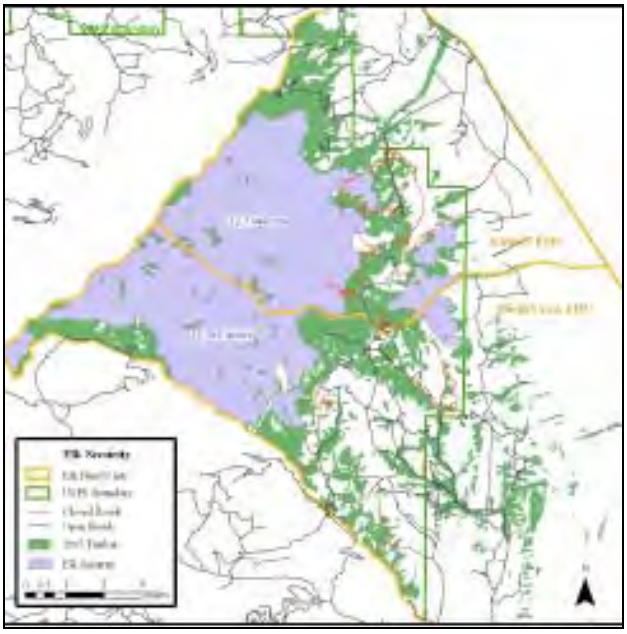
ERG data indicate that elk/cattle overlap occurs in both the North Crow and Kimber Elk Herd Units (EHUs). *(See Phase II Vegetation Study for methodologies used to determine extent of elk/cattle overlap.)* ERG concludes that generally there is enough forage to support current populations of elk and domestic livestock. However, those areas receiving high levels of dual use have resulted in lower ecological conditions that could increase the potential for noxious weed infestations. The following figure illustrates the areas of elk-cattle overlap (*From* Phase II Vegetation Study).



The elk security analysis indicates that there is approximately 45% security habitat in the Kimber EHU and 29% in the North Crow EHU. The security analysis is based on Hills et al. (1991[1]) who recommend

[1] Hillis, J.M., M.J. Thompson, J.E. Canfield, L.J. Lyon, C.L. Marcum, P.M. Dolan, and D.W. Cleery. 1991. Defining elk security: the Hillis paradigm. In *Elk Vulnerability – A Symposium*. Montana State University, Bozeman, MT. April 10-12.

providing at least 30% security habitat within an elk herd unit. The following figure illustrates the security habitat in the Kimber and North Crow EHUs (*From* Phase II Vegetation Study).



Variability Measure Discussion:

These data are intended to provide a baseline from which future variability can be measured. Future changes in elk and cattle interactions as well as changes in elk security will be used as an indication of variability in out-years as those data become available.

Variability Measure:

+10% from previous measurements

Assessment:

ERG concludes that elk/cattle overlap in many areas does not result in poor ecological conditions. This is supported by the data presented in the table above under element C2 on the ecological conditions of rangelands in the Kimber and North Crow Allotments. For example, dual use is occurring in several locations within the North Crow Allotment; however, 99% of its rangeland habitats are in 'good' and 'excellent' condition. As previously noted, though, areas receiving high levels of dual use have resulted in lower ecological conditions that could increase the potential for noxious weed infestations.

Elk security is adequate in both herd units. Changes in conifer cover due to encroachment or other landscape effects have contributed to the pattern of elk security in these herd units.

Actions in Response to Variability Assessment:

The Elkhorn Vegetation Study Phase II has provided baseline information that will allow the Forest to determine changes on the landscape over time. Therefore, a variability assessment and any needed actions are not necessary at this time.

Recommended Efforts:

Continue working with the Elkhorns Working Group to develop a strategy for implementing recommendations contained in the Elkhorns Vegetation Study Phase II report.

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

Current Efforts and Findings:

Several ongoing efforts contribute to our understanding of habitat effectiveness for elk and mule deer. This is our first year of utilizing vegetation data from R1-VMAP; therefore the cover and forage data included in this report will serve as a baseline for outyear comparisons. We discuss open road densities, the effectiveness of our road closures and habitat management activities, as well as a discussion of MTFWP aerial survey data for elk and mule deer.

Documentation of Monitoring Methodology:

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. Analysis algorithms are on file at the Supervisor's Office. The R1-VMAP product actually extends about one mile beyond the Helena National Forest boundary so acre calculations include that extension. Acres used in the calculation are 1,750,178 (compared to approximately one million acres within National Forest management).

Open road density calculations are based on procedures identified in the *Wildlife Forest Plan Big Game Standards Consistency Approach Helena National Forest* on file in the Supervisor's Office. A subset of roads open during hunting season (October 15 – December 1) is included in the analysis. These are: all arterial and collector roads and 25% of local roads. Open road densities are calculated within elk analysis areas[2] and within those management areas for which the monitoring element is intended.

[2] Elk analysis areas are those portions of elk herd units that occur within the National Forest Boundary. Private lands may be included.

Road closure effectiveness monitoring methodologies varied depending on the area under study. Monitoring in the Wagner-Atlanta project area was conducted according to parameters identified in the field data collection form – on file in the Supervisor's Office. Other road closure effectiveness monitoring was based on general field observations.

Habitat effectiveness monitoring was also based on general field observations.

Monitoring Activity:

Cover and Forage:

R1-VMAP was utilized to identify cover and forage. Cover is comprised of all forested stands with canopy closures greater than or equal to 40% and stand size greater than or equal to 40 acres.

Open Road Densities:

Open road densities were calculated to reflect changes in road status associated with implementation of the travel planning. Since we are utilizing a new database for this analysis, data are not comparable between years. Data described in this Monitoring Report will serve as baseline for out year comparisons. The data include all lands within the Helena National Forest within the applicable management areas identified above. Private land does not occur within identified management areas. We also calculated open road density for all elk analysis areas which does include private land.

Road Closure Effectiveness:

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

Habitat Effectiveness:

Divide Landscape

(1) Big Game surveys in the area south of Elliston from the HNF boundary to Slate Lake were begun in 2005 as part of the wildlife analysis for the Elliston Face Fuels Reduction Project and continued on through 2007. Primary purpose of the fieldwork was to determine elk and deer movement and habitat use patterns under a variety of seasonal conditions and over a period of years. Of particular interest was the character, timing, and duration of use in mature forest stands and upland foraging areas from mid fall through mid spring. Primary habitats monitored were closed mature timber, young conifer/aspen complex, and open grassland. Seasonal migration routes between winter and summer ranges were mapped.

In 2007, more attention was given to mapping out key sites within the aspen/conifer complex and considering a range of strategies for effectively rejuvenating aspen under different conditions. Fieldwork indicates that in addition to providing forage for elk migrating through the area in spring and fall, the tangle of aspen and young conifers is providing calving habitat for a small number of cow elk.

(2) The South Helena Fuels area abuts the city of Helena and encompasses much of the Mt Helena recreation area. The deer population is dense and increasing, and it is a prominent issue for residents of Helena and the wildland/urban interface. The area was surveyed in detail in the fall of 2006. In 2007, some of the proposed treatment units—north and south of the Mt Helena ridge—were revisited to clarify the nature of deer and elk use in spring and summer.

North Belts Landscape

The Meriwether fire burned over several thousand acres, mostly in the Gates-of-the-Mountains Wilderness, from late July to early September 2007.

An initial perusal of wildlife habitat conditions in the burn—with an emphasis on big game habitat—was undertaken in September. These were standard wildlife walk-through surveys documented with copious notes and photos. Because the fire was still active in spots and ground conditions frequently unstable,

most observations were confined to the trail system. Areas examined were some of those that have been surveyed on a regular basis in past: Hunters Gulch; Big Log Gulch; Kennedy Springs – Bear Prairie; upper Willow Creek; Spring Gulch – Fields Gulch.

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 describedescribes the monitoring activity in more detail.

Data Analysis Methods:

General observation data were summarized for a majority of the components in this discussion. GIS analyses were used to identify cover/forage and to calculate open road densities. The methodology is in the project file. No specific statistical analyses were utilized.

Monitoring Results:

Cover and Forage:

The following table summarizes forage and cover based on R1-VMAP for FY07. These totals include land that is not within Helena National Forest management.

R1-VMAP Cover and Forage Estimates FY07	
Cover (acres)	Forage (acres)
872,292	480,232

Open Road Densities:

The Forest wildlife staff in 2006/2007 developed a consistent approach to application of Forest Plan standards described in the *Wildlife Forest Plan Big Game Standards Consistency Approach Helena National Forest.* The procedures identified in that protocol vary slightly from those utilized in past analyses including previous Forest Plan Monitoring Reports. As such, data are not comparable between years.

Open road densities for all elk analysis areas for FY07 are estimated at 0.3 miles/square mile. The following table summarizes open road density by elk analysis areas. These data are for all lands within the Forest boundary, regardless of management.

Open Road Density during Hunting Season by Elk Analysis Area				
Elk Analysis Area	***Acres***	***Square Miles***	***Open Road Miles during Hunting Seasons***	***Open Road Density during Hunting Season***
Arrastra Creek	15635	24	10.88	0.45
Atlanta	16026	25	2.85	0.11
Battle Mountain	16111	25	5.18	0.21
Beaver Creek	61412	96	50.07	0.52
Beaver Creek - Lincoln	19986	31	12.71	0.41
Birch Creek	13943	22	8.80	0.40
Black Mtn - Brooklyn Bridge	35873	56	15.35	0.27
Boulder Baldy	17266	27	13.76	0.51
Cabin Creek	16368	26	5.75	0.22
Confederate	7047	11	8.53	0.78
Devils Fence	9692	15	9.63	0.64
Elk Ridge	4974	7	0.23	0.03
Flesher Pass	58119	91	18.50	0.20
Greenhorn	21693	34	18.22	0.54

Open Road Density during Hunting Season by Elk Analysis Area				
Elk Analysis Area	***Acres***	***Square Miles***	***Open Road Miles during Hunting Seasons***	***Open Road Density during Hunting Season***
Greyson	5960	9	4.57	0.51
Hedges	45392	71	32.84	0.46
Hellgate	27601	43	19.92	0.46
Jericho	29363	46	29.21	0.64
Keep Cool	30478	48	10.44	0.22
Kimber	21137	33	10.48	0.32
Landers Fork	108641	170	5.52	0.03
Little Blackfoot	34707	54	22.01	0.41
Little Prickly Pear - Ophir	59310	93	56.42	0.61
Nevada Creek	27098	42	9.13	0.22
North Crow	32591	51	19.53	0.38
North Fork	6324	10	4.13	0.41
Ogden Mtn	28144	44	20.80	0.47
Poorman Creek	43646	68	21.27	0.31
Prickly Pear	20154	31	4.61	0.15
Quartz	23036	36	15.19	0.42
Ray Creek	14648	23	5.97	0.26
Sheep Creek	26858	42	15.16	0.36
Sixmile	9230	14	2.76	0.20
South Crow	31168	49	30.36	0.62
Spotted Dog	28854	45	34.52	0.77
Wagner/Thomas	21581	34	22.52	0.66
White's Gulch	19225	30	8.91	0.30

Open road density by management area is summarized in the table below.

Open Road Density during Hunting Season by Management Area				
Management Area	***Acres***	***Square Miles***	***Open Road Miles during Hunting Season***	***Open Road Density during Hunting Season***
EL1	55182.725	86.223	61.12	0.71
EL2	46435.146	72.554	2.3	0.03
EL3	24496.34	38.275	12.49	0.33
EL4	16355.483	25.555	13.42	0.53
H1	18442.18	28.815	16.57	0.58
H2	4726.591	7.385	5.01	0.68
L2	71845.476	112.258	55.22	0.49
T2	10986.174	17.165	8.34	0.49
T3	43638.31	68.184	23.37	0.34
W1	79449.034	124.139	9.81	0.08
W2	22441.613	35.065	7.03	0.2

Road Closure Effectiveness:

Wagner Atlanta - Seven closed roads, comprising 16.9 miles, were scheduled to be closed upon completion of the Wagner Atlanta Timber Sale. Recipe closures included re-contouring, debris placement, signs, and gates. All of these roads were monitored at least once during October and November, 2007. Road closures on a majority of the roads appear to be effective. However, there is

some confusion over roads closed as part of the Wagner Atlanta Timber Sale and the North Belts Travel Plan in so far as road numbers are not aligned between the two efforts.

Habitat Effectiveness:

Divide Landscape

(1) Elliston: Surveys in and around Elliston Face continue to demonstrate that thermal cover/snow interception properties of mature timber stands in the project area are insufficient to draw elk in during winter months. Adjacent aspen browse, which could potentially attract elk, occurs in more open stands where snow depths are prohibitive. So, elk choose to winter in grasslands north and west of the project area until snow has receded and green-up has begun in higher elevation parks—typically after mid April.

(2) Mt Helena: Survey routes covered proposed thinning units on both the north and south side of the Mt Helena Ridge. As with previous fall surveys, summer surveys found mule deer abundant and widespread. Mule deer were located in all major structural types: mature forest, open parkland, shrubfields, savannah, early-seral conifer thickets, grassland with encroaching conifers. Cover, while fragmented and of varying quality, was widely available. Deer did not appear to use forested cover primarily as a means for eluding humans but more as a refuge from summer heat. A majority of deer appeared habituated to high levels of human activity—most of which occurred predictably along the trail system. No elk or signs of recent elk use were observed.

North Belts Landscape

The fire burned with varying intensity throughout the areas examined, but in general, the sites most severely burned were in the old North Hills burn of 1984 where fuels were light and flashy (drying grasses, forbs, shrubs). Most of the vegetation was essentially atomized and the larger snags and logs (which had provided a modicum of structural variety) reduced to small fragments. So, these habitats have been radically altered in the short term, but should partially regenerate relatively quickly (minus the snag/log component). Deer, and occasionally elk, were exploring these sites—moving through but not lingering.

Mature and old-growth stands in upper Big Log Gulch burned in mosaic fashion—extensive areas incinerated to black snags, others partially burned, and still others burned only in the understory. This mosaic should provide fragmented, but productive big game habitats in coming years.

Some of the most severely burned forest habitats were dense sapling and pole stands such as those on the divide west of Kennedy Springs and on the slopes of Fields Gulch. While these stands previously provided effective hiding cover, they were otherwise relatively sterile environments. Their future utility as big game habitat will vary with the site.

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 although HD 392 did show an increase of about 300 animals this year as compared to 2006. The following table summarizes elk numbers by hunting district for 2007.

Summary of elk observations in Hunting Districts 390, 391, and 392 for 2007

Hunting District	Total	Cows	Calves	Yearling Bulls	Brow-tined Bulls	Total Bulls	Unclassified
390	1742	1237	361	82	62	1742	
391	509	403	84	21	2	509	
392	1241	924	213	93	11	1241	

Mule Deer – Surveys were conducted in HD 392 in December 2006 and April 2007. The following table summarizes the December 2006 (post-season) and spring counts 2007.

Summary of mule deer observations in HD 392, December 2006 and April 2007					
Year	Post-Season Total	Fawns: 100 Adults (Post-Season)	Spring Total	Fawns: 100 Adults (Spring Recruitment)	Bucks: 100 Does
2006/2007	578	23.7	647	22.7	20.7

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. 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:

FY07 is the first year utilizing R1-VMAP data to describe cover and forage habitat Forest-wide. Therefore, there is no variability assessment for the FY07 Monitoring Report. Out-year reports will describe changes in cover and forage as they occur.

Open Road Densities:

Since we are utilizing a new database for this analysis, data are not comparable between years. Data described in this Monitoring Report will serve as baseline for out year comparisons. Therefore, there is no variability assessment.

Road Closure Effectiveness:

Wagner Atlanta –Monitoring in FY06 indicated that all road closures were effective (100% closure effectiveness). Monitoring in FY07 indicated that two out of the seven road closures were not effective (approximately 71% closure effectiveness) and/or those roads may actually be open as part of the North Belts Travel Plan effort. The decrease in closure effectiveness, 29%, is outside of the variability measurement.

Habitat Effectiveness:

Divide Landscape

(1) Elliston: Because of the absence of elk and the scarcity of deer in the Elliston project area in winter, proposed thinning of "thermal" overstory in Elliston forests should have no meaningful effect on habitat important to local elk or deer in winter. The more open forest environment should promote forage development and attract more elk and deer use in spring and, possibly, in early and late winter.

(2) Mt Helena: In summer, deer were dispersed through a wider variety of habitats than in fall, making as much use of sites with green forbs—open parkland—as those with browse (particularly, bitterbrush), which drew most of their attention in fall. Otherwise, no striking departure from fall use patterns was noted.

Thinning of young conifers, as proposed in the South Helena Fuels project, should have no meaningful impacts on habitat components important to deer in summer (thermal cover remaining intact). It will, however, remove hiding cover, which could affect the ability of local deer to escape hunters in fall. Given

the increasing over-population of deer in the Mt Helena area, as well as in the city of Helena, this should not be a problem.

North Belts Landscape

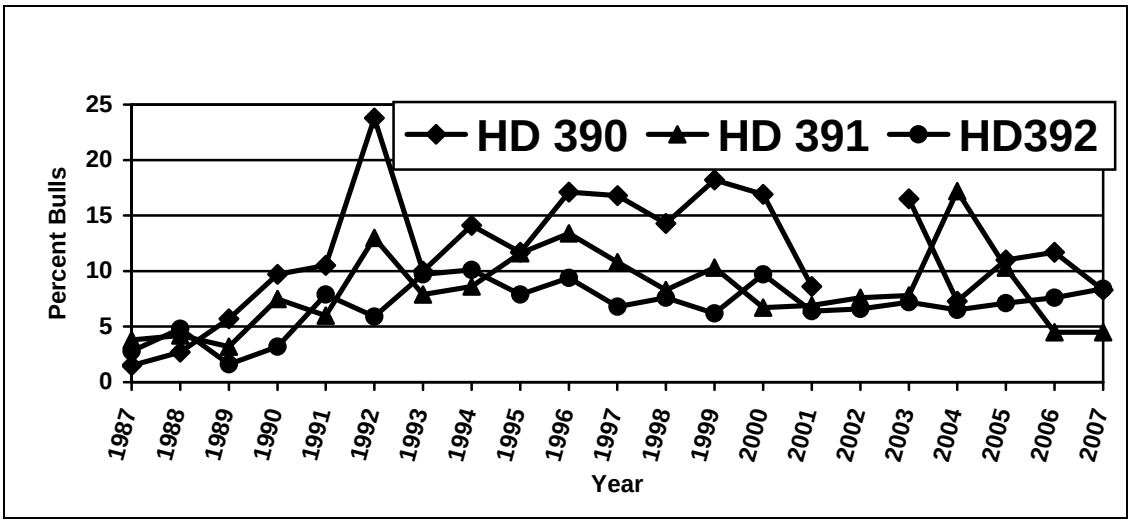
Portions of the Meriwether Burn that had previously burned in 1984 have been surveyed regularly over the past dozen years with a view toward documenting how wildlife habitats evolve after a large fire. Extensive areas from which forest habitats had been stripped in 1984, while lacking the structural complexity and cover characteristics of the previous forests, had become productive habitats. Many of the sites were occupied by a diverse array of grasses, forbs, and shrubs and provided excellent year-round foraging areas for elk and deer. Forage was not a limiting factor. While hiding cover was sparse, the rugged topography and absence of roads provided a measure of security for hunted animals. The severe re-burn starts the process of post-fire evolution anew: green-up of some vegetation was underway as early as 3 weeks after burning, and much of this area (the 1984 burn) is expected to return to providing good foraging opportunities for deer and elk over the next several years.

Where mature forests have burned, expectations for future elk and deer use are variable. New and rejuvenated edge and ecotone habitat will be useful, but the subtraction of forested cover from extensive areas is likely to be problematic, because of the further reduction of summer thermal cover and escape refugia. Open foraging habitat is now substantially more abundant than forest cover, and forest regeneration in this region of dry douglas-fir and ponderosa pine habitat types will be a long, slow process requiring several hundred years. The result is a long-term shift in big game habitat patterns.

Aerial Surveys:

Elk – Elk totals in 2006 were 1,613, 488, and 951 for HDs 390, 391, and 392 respectively. Total number of elk in 2007 were 1.742, 509, and 1,241 fro HDs 390, 391, and 392 respectively. Total number of elk increased in 2007 by about 8% in HD 390, 4% in HD 391, and 30% 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 2006 and 2007 in HD 390 and 391 reflect a <10% increase. The changes in HD 392 are greater than 10%. The changes are not related to a management oriented practice.

The following figure demonstrates changes in elk numbers over time for all three hunting districts.



Mule Deer – The total number of mule deer counted in 2006 were 263 post-season and 296 spring survey. In 2007, there were 578 post-season and 647 spring survey. Mule deer numbers increased by over 100% in 2007, based on post-season counts and on spring recruitment counts compared with 2006.

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.

Actions in Response to Variability Assessment:

There are no actions needed at this time for all monitoring items with the exception of the Wagner Atlanta Road closure monitoring. Monitoring in 2007 indicates that some roads that were identified for closure during the Wagner Atlanta Timber Sale may actually be open. This could be an artifact of numbering roads during North Belts Travel Planning. Therefore, in order to determine if road closures are effective, field verification is necessary to identify and clarify the roads in question.

Recommended Efforts:

Following implementation of both the Elliston and South Helena projects, frequent, targeted monitoring will be needed. Primary objectives of Elliston monitoring will be to determine if regenerating aspen is being over-browsed and if fencing will be needed to ensure aspen recovery. Also, any shifts in elk and deer winter/spring use in the treated areas will need to be documented.

In the South Helena Fuels area, the project wildlife biologist will need to work with crews on the ground to ensure that key habitat components (particularly hiding cover leave-patches) are retained. Following implementation, monitoring will be needed to determine how habitat is being used by deer and elk, and to what degree predictions are validated or off-base.

The northern Big Belts present a number of opportunities to systematically compare via long-term wildlife surveys and photo points the changes in forage and cover in stand replacing burns vs low intensity fire in dry forest types—and the implications for big game populations. The Meriwether fire is the latest in a series of such opportunities. Surveys should begin as soon as practicable in FY2008 and continue in systematic fashion—several per year—for the foreseeable future. The established survey routes from previous years are the logical starting points.

(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). Specifically, data are derived from annual surveys conducted by Montana Department Fish, Wildlife, and Parks (MTFWP) personnel for the Elkhorns (Region 3). In previous years, monitoring specific to MAs W1, P1, and P2 was not conducted because MTFWP conducts annual surveys where bighorn sheep are present and 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 are derived from:

MTFWP bighorn sheep aerial surveys

General field surveys Helena National Forest personnel

Current Efforts & 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 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. General field surveys consisted of recording observations of animal sign and habitat use.

Monitoring Activity:

Bighorn Sheep Aerial Surveys:

Bighorn sheep aerial surveys were conducted on March 30th, 2007 by MTFWP.

General Field Surveys:

North Big Belts Landscape

Any evidence of bighorn sheep use gathered during general field surveys is recorded and entered in the data base.

Divide Landscape

General wildlife surveys were utilized to pick up signs of bighorn sheep on the ground.

Data Analysis Methods:

Other than general observation summaries, no data analyses are conducted for this element.

Monitoring Results:

Bighorn Sheep Aerial Surveys:

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

This year 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. 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 the 2008 Forest Plan Monitoring Report.

General Field Surveys:

North Big Belts Landscape

Bighorn sheep were reintroduced onto BLM land in the northern Big Belt Range in the 1990s. At first, they were confined to BLM and State land north and west of the National Forest but have since extended their range onto HNF land. At this point they are limited almost entirely to the Gates of the Mountains Wilderness Area, where suitable habitat is readily available. Habitat management opportunities are extremely limited in this area. At this point, bighorn populations in the northern Big Belts do not seem to be suffering the pneumonia-generated declines seen in the Elkhorn Mountain population to the south.

Divide Landscape

Aerial surveys did not locate any bighorn sheep in the HNF portion of the Divide landscape in 2007 (none have been observed during winter flights over several decades). During a HNF general wildlife survey on the west side of Baldy Ridge (Spotted Dog drainage), the remains an old bighorn sheep skull—assumed to date from the early 20th century—were found in a stand of large open-grown Douglas-fir amidst open grassland.

Variability Measure Discussion:

Variability Measure:

-10% from previous measurements

Assessment:

Bighorn Sheep Aerial Surveys:

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

General Field Surveys:

North Big Belts Landscape

The bighorn sheep population in the Elkhorn Mountains to the south has been declining in 2007 due to an outbreak of pneumonia. Part of the North Big Belt bighorn population (in the Sleeping Giant area just across the River to the northwest) suffered a similar outbreak in 2001. This year, however, no problems have been evident.

One potential source of variability for coming years is the widespread habitat change generated by the Meriwether Fire, which will undoubtedly influence movements and habitat use patterns by sheep ranging into that part of the National Forest. On some bighorn sheep ranges, wildfires have increased carrying capacity and resulted in population expansion.

Data were not collected in a manner to describe variation associated with this element.

Divide Landscape

Discovery of the old skull indicate the general suitability of the area along the SW side of the HNF for bighorn sheep occupancy—although little is known as to the size and robustness of the historic population there.

Data were not collected in a manner to describe variation associated with this element.

Actions in Response to Variability Assessment:

Bighorn Sheep Aerial Surveys:

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

General Field Surveys:

North Big Belts Landscape

No actions are proposed at this time.

Divide Landscape

No actions are proposed at this time.

Recommended Efforts:

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

(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 from the FY04 Monitoring Report, filed at the Supervisor's Office and the Lincoln Ranger District.
- General habitat summaries based on field observations, filed at the Helena Ranger District
- Northern Divide Grizzly Bear Project at http://nrmsc.usgs.gov/research/NCDEbeardna.htm

Current Efforts and Findings:

Road densities have not changed in grizzly bear habitat since the FY04 Monitoring Report. Those findings are excerpted from that report and presented below under Road Densities.

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. General habitat observations were summarized. The Northern Grizzly Bear Project methodologies are described on their website.

Monitoring Activity:

Road Densities:

Road densities for the Helena National Forest Portion of the Northern Continental Divide Ecosystem (NCDE) were reported in the FY04 Monitoring Report based on a moving windows analysis and area density analysis.

General Habitat Summaries:

Grizzly bear presence and the suitability of habitat for grizzly occupancy were both targeted by general wildlife surveys along the Continental Divide in (1) the Black Mountain area (toward the northern extremity of the Divide landscape) and (2) the Bison Mountain area (toward the southern end). The Black Mountain area was surveyed as part of monitoring of illegal motorized trail use and the Bison Mountain area was surveyed as part of the Continental Divide trail relocation project.

Grizzly Bear DNA Study:

The U.S. Geologic Survey in conjunction with the National Forests within the NCDE and other partners implemented a study to estimate the grizzly bear population size in the NCDE in 2002. Data will be used to estimate the number of grizzly bears in the NCDE. Information on the study design is in the project file and at the website referenced in Data Sources.

Data Analysis Methods:

See the "Moving Window Motorized Access Density Analysis & Security Core Area Analysis for Grizzly Bear" for a discussion of data analysis relative to moving windows analyses. See the Grizzly Bear DNA

website for a discussion of those data analysis processes - http://www.nrmsc.usgs.gov/research/NCDEbeardna.htm. Otherwise, for general observation summaries, no data analyses are conducted.

Monitoring Results:

Road Densities:

There have been no changes in road management for FY07 with the exception of "jammer" road reclamation the miles of which were not used in the following calculations since those roads had already been closed. Therefore the data reported in the FY04 Monitoring Report remain accurate. Those data are summarized below.

Road Densities per the Forest Plan Standards	
Subunit	Existing Condition (Standard = 0.55 mi/sq. mi)
Red Mountain subunit	0.36
Arrastra Mountain subunit	0.47
Alice Creek subunit	0.14
Total (cumulative effect area)	0.34

[1]Forest Plan Standard is 0.55 mi/square mile.

A moving window analysis was also completed for the NCDE. Documentation of the methodology is on file in the Supervisor's Office. The following table summarizes the results of the moving window analysis.

Route Density and Core Security Areas in the Monture-Landers Fork BMU			
Subunit	OMRD[1]	TMRD[2]	Core[3]
Alice Creek Subunit (<75% Forest Service management) (% of area meeting guideline)	15.8	19.5	74.8
Arrastra Mountain Subunit (% of area meeting guideline)	14.6	16.5	74.5
Red Mountain Subunit (% of area meeting guideline)	25.6	22	66.1

[1]Open motorized route density guideline: ≤19% of each subunit with >1.0 mile/mi^2; if <75% FS land management, then no net increase in >1.0 mile/mi^2 open motorized route density class due to FS actions.

[2]Total motorized route density guideline: ≤19% of each subunit with > 2.0 mile/mi^2; if <75% FS ownership, then no net increase in >2.0 mile/mi^2 open route density class due to FS actions.

[3]Core area (>2,500 contiguous acres, ≥0.3 mi. from motorized route, no roads or trails receive "high intensity use" (USDA 1990) and no motorized routes open during non-denning period) guideline: ≥68% of the subunit considered core area; if <75% FS ownership, then no net decrease in potential security core areas due to FS actions.

General Habitat Summaries:

(1) Grizzly bears have been reported in both of the areas surveyed. Reports in the Black Mountain area (in drainages north, east, and south of there) have been relatively numerous in recent years. Field investigation discovered no grizzly sign (although black bears were sighted on 2 occasions). Habitat south of Black Mountain was found to be particularly conducive to grizzly occupancy and movement: Forest cover is relatively continuous, but productive sites are located throughout; the area is unroaded; and, with the exception of the clandestine trail, the potential for negative encounters with humans is very low.

(2) Grizzly reports from the vicinity of Bison Mountain are of more recent vintage, but at least one has been confirmed by MFWP. Lately, most have been of a large male bear. Survey work along 6 miles of the Divide between HNF Road #1863-A1 and the existing Continental Divide trail south of Bison Mountain found the broad ridge to be a good travel route for bears and other wildlife on the move—continuously forested and essentially roadless—but deficient in productive habitat that might attract and hold grizzlies. The productive sites are downslope on both sides of the Divide—but particularly to the north and west (upper Ontario, Bison, and Monarch Creeks). Fresh black bear scat was found, but there were no signs of grizzlies.

Grizzly Bear DNA Study:

Data collection has been completed for the Northern Divide Grizzly Bear Project. The study indicates 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. For more information, go to: http://www.usgs.gov/newsroom/article.asp?ID=2024

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 FY04 Monitoring Report summarizes the road density analysis used to determine if the variability threshold has been exceeded. Since there are no changes in road management in 2007, that analysis is still applicable and summarized as follows: An analysis conducted for the 1987 Monitoring Report indicated that at that time there were 58.6 miles of road in the NCDE excluding the Scapegoat Wilderness. This equated to an open road density of 0.40 miles/square mile. A habitat effectiveness estimate of 95% was also calculated based on methodologies described in the *Wildlife Documentation Helena National Forest 1983* located in the Supervisor's Office.

To determine if the variability measure has been exceeded, road construction and decommission data were compared with those calculated for the 1987 Monitoring Report. Open road densities in 2004 were 0.34 miles/square mile with a habitat effectiveness of approximately 96%.

Based on this FY04 analysis, the -10% variability that would initiate actions had not been reached. Since there have been no changes in 2007, this conclusion remains in effect.

	1987	**2004**
Open Road Density	0.40 miles/square mile	0.34 miles/square mile
Habitat Effectiveness	95%	96%

General Habitat Summaries:

(1) Black Mountain: The presence of grizzly bears in the area around Black Mountain and the high quality of habitat on the broad bench-land on its south side are primary reasons to completely eliminate the motorized trail that has been cut illegally through the forest there. It is highly likely that this area is an effective corridor through which bears are moving between the Blackfoot and Divide landscapes, and it is be important to minimize the negative impacts of motorized use and elevated levels of human activity.

(2) Bison Mountain: locating a 6-mile segment of hiking trail along the Continental Divide east and north of Bison Mountain should have no meaningful effect on grizzly bear use of the ridge. Surveys suggest that the Divide ridge in this area is likely to serve as a movement corridor for bears, but, because of the absence of productive habitat components, is not an area that would otherwise attract and hold them for periods of time. The chance of negative encounters with humans will remain very low.

Grizzly Bear DNA Study:

The baseline data collected from the Northern Divide Grizzly Bear Project are aimed at helping federal, state, and tribal wildlife agencies in managing the northwest Montana grizzly population. It will assist the Montana Department of Fish, Wildlife, and Parks in conducting grizzly population trend studies and help the U.S. Fish and Wildlife Service with monitoring program efforts and recovery criteria. At this time, there is no variability assessment.

Recommended Efforts:

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

Continue surveying habitat throughout the Divide corridor, as time permits, with the aim of producing a complete map of key habitat areas for grizzly bears and the human-induced barriers that compromise their use.

Conduct more intensive surveys to map specific grizzly bear habitat components—to obtain a more quantitative gauge as to the potential of the North Belts to serve as a viable linkage zone for grizzlies—particularly after the Meriwether Fire, which has burned through extensive areas of potential grizzly habitat.

(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 from "Estimates of Old Growth for the Northern Region and National Forests" 2007, on file in the Supervisor's Office
- Northern Region Landbird Monitoring Program Birds in Old Growth 2007
- Northern Region Landbird Monitoring Program observations for pileated and hairy woodpeckers on file at the Supervisor's Office and at the following website: http://avianscience.dbs.umt.edu/
- FIA snag density estimates on file in the Supervisor's Office
- Project Level Goshawk Surveys for 2007; maps and data are on file at the Supervisor's Office
- Goshawk Old Growth Surveys; maps and data are on file at the Supervisor's Office
- Goshawk Intensive Nest Surveys; maps and data are on file at the Supervisor's Office
- General Field Surveys

Current Efforts and Findings:

The snag data reported below are from the FY05 Monitoring Report.

Documentation of Monitoring Methodology:

- FIA data are collected according to the methodology described at the following website:

http://www.fs.fed.us/rm/ogden/data-collection/field-manuals.shtml.

- Monitoring methodology for the Northern Region Landbird Monitoring Program is located at the following website and on file at the Supervisor's Office:

http://avianscience.dbs.umt.edu/documents/methods2007_OG.doc
http://avianscience.dbs.umt.edu/research_landbird_methodsmanual.htm
http://www.fs.fed.us/psw/programs/snrc/featured_topics/msim/

- FIA snag 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", on file in the Supervisor's Office and at the following website. Snag estimates were run with fire included and excluded from the estimates. The FY06 Forest Plan Monitoring Report provided estimates that removed plots that had been burned; for that reason we include updated figures that also exclude burned plots. However, in order to provide a more complete picture of snags Forest-wide, we also include estimates with burned plots included. http://fsweb.r1.fs.fed.us/forest/inv/fia_data/analysis.htm
- Project level goshawk surveys were conducted according to the "Helena National Forest Goshawk Monitoring Protocol" Version July 9, 2004.
- Goshawk old growth surveys were conducted in polygons that had been established as part of the Northern Region Landbird Monitoring Program Birds in Old Growth 2007 and were conducted according to the "Helena National Forest Goshawk Monitoring Protocol" Version July 9, 2004.
- Goshawk intensive nest searches were conducted according to the "Helena National Forest Goshawk Monitoring Protocol" Version July 9, 2004.
- Pileated woodpecker and northern goshawk observations were noted as a matter of course during field reconnaissance.

Monitoring Activity:

Old Growth:

Forest Inventory and Analysis (FIA) data were used to determine old growth acres Forest-wide and are summarized below. The percentage of old growth reported in 2007 has not changed from that reported in 2006.

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

Pileated and hairy woodpecker observations were collected as part of the 2007 Landbird Monitoring Program Birds in Old Growth surveys. Observations were also summarized for 1994 through 2006 as part of the FY06 Forest Plan Monitoring Report. These data were collected according to the Northern Region Landbird Monitoring Program Field Methods referenced under *Data Sources.* See also the Avian Science Center Website at: *http://avianscience.dbs.umt.edu/research.htm*

Snag Densities:

Snag densities were derived from the FSVEG Summary Database.

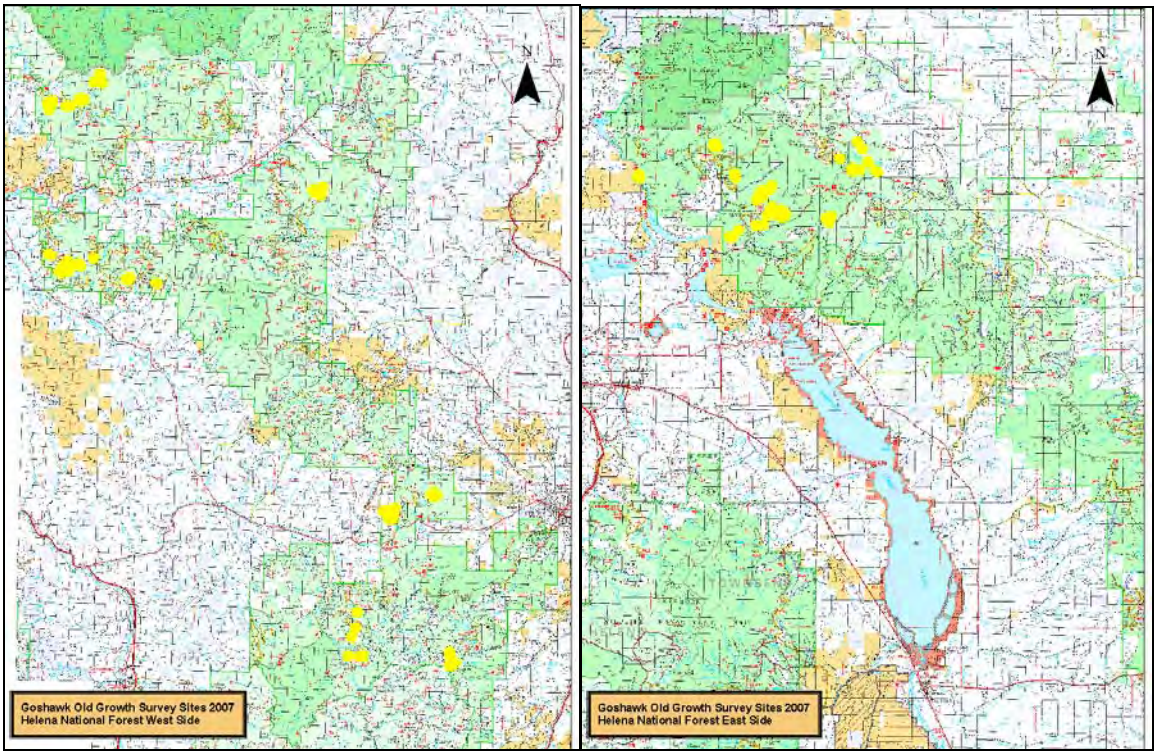
Project-Level Goshawk Surveys:

Goshawks were monitored in project areas utilizing broadcast calling surveys. Areas surveyed are summarized in the Table below by Landscape.

Goshawk survey areas by Landscape		
Big Belts	Divide	Blackfoot
Hay Peggy	Elliston Face	Stone Dry
Cabin Gulch	Warmsprings	
	Little Blackfoot	

Goshawk Old Growth Surveys

Goshawk surveys were conducted at old growth plots that were identified as part of the Northern Region Landbird Monitoring Program that focused on bird in old growth for 2007. The following figure identifies those locations that were surveyed in 2007.



Goshawk Intensive Nest Surveys:

Goshawk intensive nest surveys were conducted in four areas of previous goshawk nesting. These were: Camas Creek, Deep Creek, and Gipsy Lake.

General Field Surveys:

Goshawk habitat and goshawk presence were monitored during general wildlife surveys as well as within the Meriwether Fire perimeter. The Meriwether Fire (July-Sept. 2007) burned through a considerable amount of mature forest habitat known to have been consistently occupied by goshawks. Areas in Big Log Gulch across to upper Willow Creek have been surveyed systematically for goshawks since 2002. Forest stands in Hunters Gulch, Big Log Gulch, and upper Willow Creek were surveyed soon after the fire in September to assess the status of goshawk habitat.

Pileated woodpeckers and their sign were one of the key checklist items on all general field surveys. Additionally, forest stands in Hunters Gulch, Big Log Gulch, and upper Willow Creek were surveyed soon after the Meriwether Fire in September to assess the status of pileated woodpecker habitat. The

Meriwether Fire (July-Sept. 2007) burned through a considerable amount of mature forest habitat known to have been consistently occupied by pileated woodpeckers.

The following table summarizes those areas where pileated woodpecker and goshawks were inventoried as part of general field surveys.

Pileated Woodpecker and Goshawk Inventory Areas by Landscape		
Big Belts	Divide	Blackfoot
Big Log Gulch	Baldy Ridge	
Willow Creek	Mt. Helena	
Hunter's Gulch	MacDonald Pass – Priest Pass	
	Black Mountain	

Data Analysis Methods:

General observation data were summarized for a majority of the components in this discussion. Snag densities and old growth estimates were derived from the FSVEG Summary Database. See project file for detailed information on the summary database.

Monitoring Results:

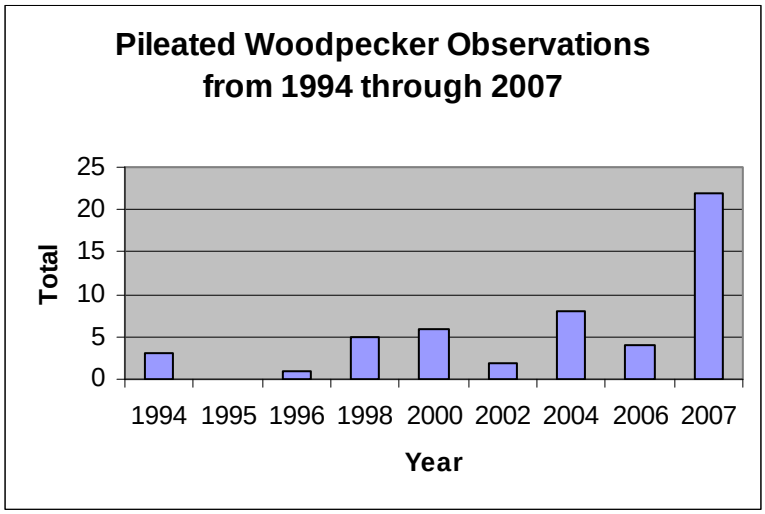
Old Growth:

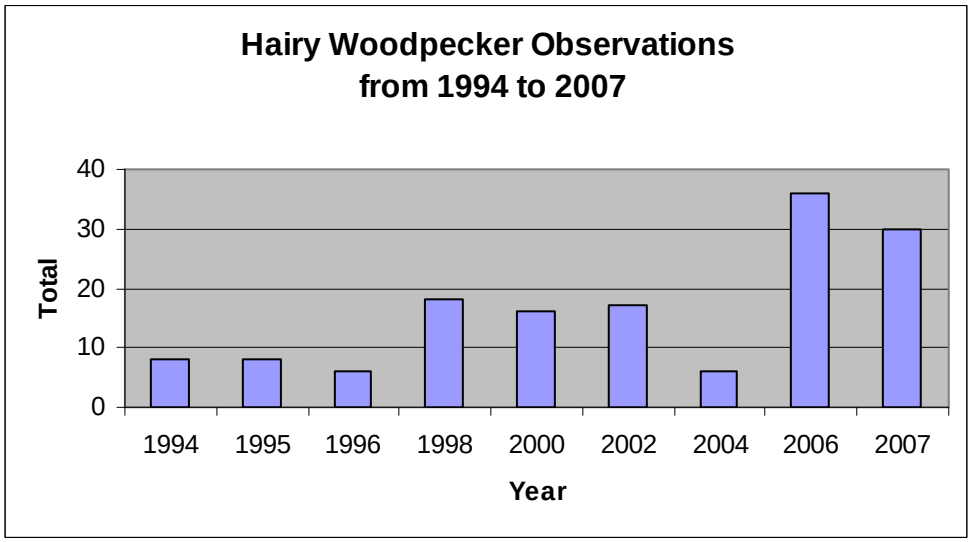
FIA data for the Helena National Forest was collected from 1996 – 1998. Ten percent of the FIA survey points are remeasured annually. The estimated percentage of old growth on all forested lands on the Helena National forest is 10.9% with a 90% confidence interval of 7.8% to 14.1%. These are the same figures reported in the FY06 Monitoring Report.

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

Pileated woodpecker observations are summarized in the Figure below. Data collected in 2006 and 2007 are not comparable for those collected between 1994 and 2004. Different methodologies were utilized, the 2006 data are confined to the Big Belts whereas the earlier data are Forest-wide, and the 2007 data are confined to old growth stands Forest-wide. Pileated woodpeckers are not common on the Helena National Forest. Other portions of Region One, particularly west-side Forests, generally have between 5-10% occurrence rates compared to 1.5% on the Helena Forest. This is less than 10 individual observations per year for most years.

Hairy woodpecker observations are summarized in the Figure below. Data collected in 2006 and 2007 are not comparable for those collected between 1994 and 2004. Different methodologies were utilized, the 2006 data are confined to the Big Belts whereas the earlier data are Forest-wide, and the 2007 data are confined to old growth stands Forest-wide. Hairy woodpeckers tend to be more common than pileated woodpeckers although the data indicate only slight increases in observations. Regionally, the Helena National Forest is about average in occurrence rates.





Snag Densities:

The following tables summarize snag densities per acre, Forest-wide for 2006 and 2007. The 9 inch+ category includes all size classes; the 14 inch+ is a subset of the 9 inch category and the 21 inch+ is a subset of both the 9 inch and the 14 inch categories. Snags are also summarized by landscape for 2007; all size classes are included from 9 inches+. Data do not reflect recent mountain pine beetle (and other) mortality which has led to a rapid increase in snags of all size classes. Data are provided that include estimates with and without burned plots included.

Estimates do not vary significantly between those with burned plots included and those with burned plots excluded: 12.4 snags per acre with burned plots included and 12.7 snags per acre with those plots excluded. Snags are well distributed at the landscape level although the Elkhorn data indicate a range from 0 to 21.2 or 21.7 (depending on if burned plots are included or excluded). This could be the result of a small sample size (n=13).

Forest-wide Snag Densities per Acre 2006 (Burned Plots Excluded)				
Diameter at Breast Height (dbh)	Number of Forested Plots with Non-Null Values	**90% CI For Percent Old Growth** Lower Bound	Point Estimate	Upper Bound
9 inch plus	126	8.3	12.6	17.2
14-inch plus	126	0.7	1.1	1.8
21-inch plus	126	0.1	0.2	0.4
Forest-wide Snag Densities per Acre 2007 (Burned Plots Excluded)				
Diameter at Breast Height (dbh)	Number of Forested Plots with Non-Null Values	**90% CI For Percent Old Growth** Lower Bound	Point Estimate	Upper Bound
9 inch plus	125	8.4	12.7	17.5
14-inch plus	125	0.6	1.1	1.8
21-inch plus	125	0.1	0.3	0.4

Forest-wide Snag Densities per Acre 2007 (Burned Plots Included)				
Diameter at Breast Height (dbh)	Number of Forested Plots with Non-Null Values	**90% CI For Percent Old Growth** Lower Bound	Point Estimate	Upper Bound
9 inch plus	137	8.8	12.4	16.5
14-inch plus	137	0.6	1.2	1.8
21-inch plus	137	0.1	0.2	0.4

Snag Densities per Acre by Landscape 2007 (Burned Plots Excluded)				
Diameter at Breast Height (dbh)	Number of Forested Plots with Non-Null Values	**90% CI For Percent Old Growth** Lower Bound	Point Estimate	Upper Bound
Blackfoot	40	10.2	21.5	34.3
Divide	33	3	7.1	12
Elkhorns	13	0	8.3	21.7
Big Belts	39	5.2	9.8	14.6

Snag Densities per Acre by Landscape 2007 (Burned Plots Included)				
Diameter at Breast Height (dbh)	Number of Forested Plots with Non-Null Values	**90% CI For Percent Old Growth** Lower Bound	Point Estimate	Upper Bound
Blackfoot	46	10.5	20.6	32.4
Divide	33	2.6	7.1	12.2
Elkhorns	13	0	8.3	21.2
Big Belts	45	5.1	9	13.3

Project-Level Goshawk Surveys:

Hay Peggy

No new nests were located in the Hay Peggy Project Area. Both nests were inactive in 2007 although a goshawk was observed defending a territory in the vicinity of the northern most nest in 2007, most likely an alternate nest to that located in 2007.

Cabin Gulch

A new nest was located in 2007 in the Cabin Gulch Project area in the vicinity of the Middle Fork of Cabin Gulch. Habitat characteristics of the nest stand and home range are described in the *Draft Cabin Gulch Wildlife Specialist Report* located in the Supervisor's Office.

Elliston

The goshawk nest in the Elliston Face project area was inactive again in 2007 However, an additional nest, also inactive, was found near the west edge of the project area in late spring in the Kinney Gulch drainage.

In mid May, an adult goshawk, defending a territory, was encountered about 2 miles south of the Elliston project area along the forest/grassland edge—on the ridge between Elliston Creek and the Little Blackfoot. No nest was located.

Warmsprings

Goshawk surveys were conducted at pre-determined points in the Warmsprings Project Area. Other portions of the project area were goshawks had previously been identified were also surveyed. No goshawks were detected.

Little Blackfoot

Goshawk surveys were conducted at pre-determined points in three general locations in the Little Blackfoot area. One goshawk was detected north of Treasure Mountain and east of Negro Mountain. No goshawk nests were located.

Stone Dry

Goshawk surveys were conducted at pre-determined points in the vicinity of Lincoln Springs. One goshawk was detected southeast of the Lincoln Gulch Cemetery. No goshawk nests were located.

Goshawk Old Growth Surveys:

There were a total of 319 subpoints identified as part of the *Northern Region Landbird Monitoring Program – Birds in Old Growth* inventory effort for 2007. Of those, 111 (35%) were surveyed for goshawk detections. The following table identifies those old growth points and subpoints that were surveyed for goshawks. Only one subpoint had a goshawk observation.

Summary of Old Growth Points and Subpoints Surveyed for goshawk Detections

Point	Subpoint	Goshawk Observed?	Point	Subpoint	Goshawk Observed?	Point	Subpoint	Goshawk Observed?
712004	1		712051	1		712077	1	
712004	2		712051	3		712077	2	
712004	3		712051	4		712077	3	
712004	4		712051	5		712080	1	
712004	5		712051	6		712080	4	
712004	6		712051	7		712082	1	
712004	7		712051	8		712082	2	
712007	2		712053	1		712084	1	
712007	3		712053	2		712084	2	
712007	4		712053	4		712084	3	

Summary of Old Growth Points and Subpoints Surveyed for goshawk Detections								
Point	Subpoint	Goshawk Observed?	Point	Subpoint	Goshawk Observed?	Point	Subpoint	Goshawk Observed?
712007	3B		712053	5		712084	4	
712007	3C		712053	6		712084	5	
712007	3D		712073	3		712084	6	
712007	3E		712074	1		712088	1	
712015	1		712074	3		712089	1	
712019	1		712074	4		712089	2	
712019	2		712074	5		712089	3	
712019	3		712074	6		712090	5	
712019	4		712074	7		712090	6	
712019	5		712074	8		712090	7	
712019	6		712074	9		712106	1	
712019	7		712074	10		712106	2	
712019	8		712074	11		712106	3	
712019	9		712074	12		712106	4	
712019	10		712074	13		712106	5	
712033	1		712074	14		712109	1	
712036	1	Goshawk Observation	712074	15		712109	2	
712036	2		712074	16		712109	3	
712041	1		712074	17		712109	4	
712041	2					712109	5	
712041	3					712109	6	
712041	4					712109	7	
712041	5					712109	8	
712041	6					712109	9	
712041	7					712109	10	
712048	2					712110	1	
712048	3					712110	2	
712048	4					712111	3	
712048	5					712111	4	
712048	6					712111	5	
						712111	6	
						712111	7	

Goshawk Intensive Nest Surveys:

There was only one goshawk observation associated with the intensive surveys of Camas Creek, Deep Creek, and Gipsy Lake. None of the nests that were previously located were found during these efforts. This could be due to nest deterioration or difficulty relocating the nests due to new observers. These data are intended as updates to the status of Forest-wide goshawk nesting. As such, there is no variability assessment associated with these data.

General Field Surveys:

Big Log Gulch, Willow Creek, and Hunters Gulch

Results of past goshawk surveys have been variable from year to year, but 3 potential nesting territories were identified—two in Big Log Gulch and one in upper Willow Creek. The 2007 survey indicates that, for the most part, forest stands in the mid region of Big Log Gulch have probably been too severely burned and fragmented to support goshawk nesting in the near future—although some areas could provide

foraging opportunities. Stands in upper Big Log Gulch—particularly old-growth components along the bottom—remain enough intact to support nesting goshawks. Damage has been severe in many areas, but numerous foraging opportunities remain over a broad expanse. The area is probably capable of supporting only one goshawk pair. Stands in upper Willow Creek, while retaining many large overstory trees, appear too badly damaged to continue to support a goshawk territory.

Pileated woodpeckers, though not the target of the surveys, were observed fortuitously in a number of locations over the years in the area burned by the Meriwether Fire. Their most consistent locations were in the bottom of upper Big Log Gulch and in upper Willow Creek. Both of these areas exhibited characteristics of old-growth forest with numerous large trees. Opportunities for pileated woodpeckers have been substantially reduced, but both Big Log Gulch and Willow Creek should still be able to support a small local population, given the number of large trees surviving the fire.

Black Mountain, Baldy Ridge, Mt. Helena, and MacDonald Pass/Priest Pass

In late June, a goshawk was observed in the vicinity of Irish Mine Hill, Baldy Ridge. Nesting habitat in this area is highly fragmented because of timber harvest on private land. But the bird's aggressive behavior indicated that an active nest was nearby.

The goshawk nest located on the north side of Mt Helena ridge in 2006 was checked and found to be inactive in 2007. Foraging goshawks were observed elsewhere in the vicinity of Mt Helena, however.

Wildlife surveys along the Continental Divide between MacDonald and Priest Passes noted excellent goshawk nesting habitat—especially in the region south of Priest Pass—but no birds were picked up.

Pileated woodpeckers were detected along the Mt. Helena Ridge, in the Elliston Project area, near Slate Lake, south of Priest Pass, in Hope Creek, and on the east side of Black Mountain.

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:

In 2007, the estimated percentage of old growth Forest-wide was 10.9%. These are the same data reported in 2006. As the FIA data are re-measured and the analysis updated, this information will be included in those out-year monitoring reports for which the updates exist. This report is considered baseline information for future variability analyses. Data remain within the variability measure since there are no changes in estimates between 2006 and 2007.

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

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

Snag Densities:

The number of snags reflected in the Summary Database between 2006 and 2007 do not reflect any significant measurable difference. Therefore, changes between 2006 and 2007 are within the range of acceptable variation. As noted, mountain pine beetle and other insect outbreaks have resulted in an explosion of snags on the landscape. This is not reflected in the data included here.

Project-Level Goshawk Surveys:

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

Goshawk Old Growth Surveys:

We surveyed approximately 35% of those units identified as old growth for the purposes of the *Northern Region Landbird Monitoring Program – Birds in Old Growth* inventory efforts. The Forest Plan states that 20% of 'old growth habitat units' will be surveyed annually. Goshawk surveys in old growth resulted in only one observation. This could be due to several factors including timing of survey efforts and suitability of the overall area as goshawk habitat. Survey efforts are consistent with the measurement frequency identified in the Forest Plan. Data are not collected in a manner that would lead to an assessment of variability. Rather, they are intended to determine the extent to which current old growth is providing goshawk habitat.

Goshawk Intensive Nest Surveys:

These data are intended as updates to the status of Forest-wide goshawk nesting. As such, there is no variability assessment.

General Field Surveys:

Big Log Gulch, Willow Creek, and Hunters Gulch

Post-fire surveys have focused, so far, only on areas regularly monitored for goshawk and pileated woodpecker activity in the past. The Meriwether fire has obviously reduced, although not eliminated, the capacity of these areas to support populations of the two species. Preliminary investigation suggests that potential for viable goshawk territories has been reduced from three to one. Previous levels of pileated woodpecker occupancy are unknown, but the expectation is that some birds will continue to occupy portions of Big Log Gulch and Willow Creek. The Meriwether fire burned more than 40,000 acres, and the area-wide loss of habitat for mature forest species has been substantial.

Black Mountain, Baldy Ridge, Mt. Helena, and MacDonald Pass/Priest Pass

As in previous years, these old-growth indicator species were seldom found in association with old-growth during project-level goshawk surveys. Goshawk nests and observations were always associated with mature forest, but were sometimes found in patchy or fragmented forest environments. Pileated woodpeckers occurred in habitats with large, mature trees—but these components were sometimes scattered among forests dominated by smaller trees. In some cases, they were making use of mature aspen stands. Survey effort was insufficient to draw conclusions as to variability at population level.

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.

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

As program funding and priorities allow, we recommend continuing participating in this program as its long-term trend monitoring contributes to our understanding of bird species diversity across the Forest.

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:

Continue systematic survey of previously-occupied ranges and continue to investigate potential home ranges as indicated by 2002-2006 mapping and by recent fortuitous sightings. Employ intensive sampling where goshawks have previously been located and more extensive sampling in areas where they have not been found so far.

Carry out more extensive examination of goshawk territories burned over by the Meriwether fire and assess the potential for future occupancy. 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.

Goshawk Old Growth Surveys:

Continue to conduct goshawk surveys in areas identified in old growth as funding allows.

Goshawk Intensive Nest Surveys:

Continue to survey and monitor known nests, as funding allows, in order to determine abundance and distribution of nesting goshawks Forest-wide. Return to standard monitoring schedule of known goshawk activity centers and of areas likely to harbor goshawk territories as soon as time and resources permit.

General Field Surveys:

Continue to tally pileated woodpeckers whenever seen or heard and compile basic habitat description, particularly with regard to old-growth characteristics and the abundance and dispersion of large trees and logs. Also note any use of mature aspen.

(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 FIA data for estimating marten habitat, fisher surveys, and general habitat surveys.

Current Efforts and Findings:

FIA data have not changed since the FY06 Monitoring Report; however, the marten habitat model has been refined so figures are not comparable between FY06 and FY07.

Documentation of Monitoring Methodology:

- FIA data are collected according to the methodology described at the following website: http://www.fs.fed.us/rm/ogden/data-collection/field-manuals.shtml.

- 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)[3]. The model was refined in 2007 to improve its accuracy.
- Fisher surveys were conducted according to *U.S. Rocky Mountain Fisher Survey Protocol.* These survey efforts will also detect marten presence.

Monitoring Activity:

FIA Data:

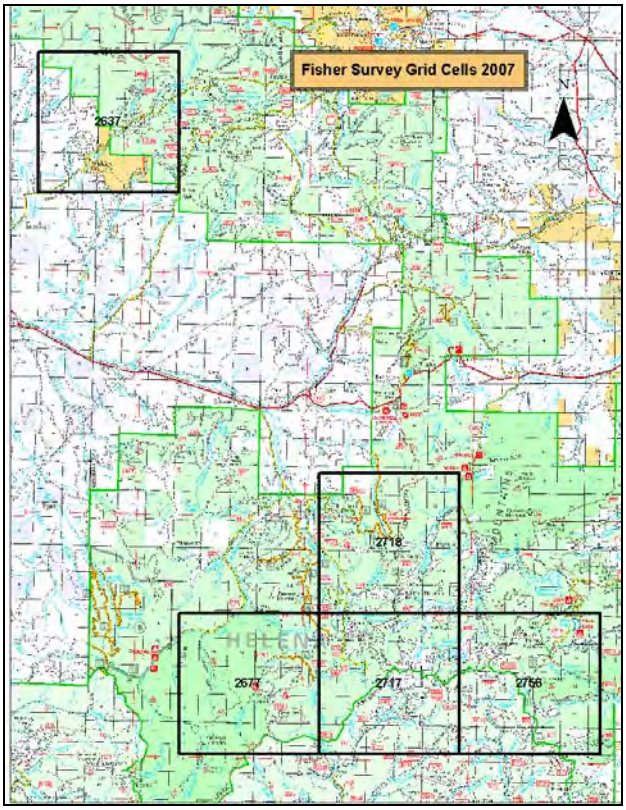
Forest Inventory and Analysis (FIA) data were used to determine mature forest habitat acres Forest-wide as well as by landscape in order to determine distribution and abundance of marten habitat.

Fisher Hair Snare Surveys:

Surveys were conducted according to the *U.S. Rocky Mountain Fisher Survey Protocol.* Five grid cells were surveyed for a total of 16,000 acres. Each grid cell is approximately 5 mi^2. The following table and figure identify the grid cells that were surveyed.

Fisher Grid Cell-Box Number Surveyed by Area				
Hahn Creek	Ontario Creek	Monarch Creek	Lava Mountain	Ophir Creek
2718-1	2717-1	2677-1	2756-1	2637-1
2718-2	2717-2	2677-2	2756-2	2637-1
2718-3	2717-3	2677-3	2756-3	2637-3
2718-4	2717-4	2677-4	2756-4	2637-4
2718-5	2717-5		2756-5	
2718-6	2717-6		2756-6	

[3] 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.



General Habitat Surveys:

Suitable marten habitat was noted wherever encountered during survey work. No surveys specific to marten habitat were conducted in 2007, but post-fire surveys in the Meriwether Burn give a sense of the magnitude of potential habitat loss for marten and other mature forest species.

Winter Track Surveys:

Wild Things Unlimited personnel visited the MacDonald Pass Area during five days in winter 2005-2006, to conduct snow track surveys in order to help document general carnivore use levels in the area. Several types of track surveys were conducted: 1) surveys of the roadside along Highway 12, between Mileposts 19 and 31; 2) surveys along secondary roads north and south of Highway 12, including Mullan Pass Road, Priest Pass Road, Lily Lake Road, and Minnehaha Creek Road, and 3) off-road transects north and south of Highway 12.

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.

Data Analysis Methods:

Mature conifer estimates were derived using the FSVEG Summary Database that provides a statistical estimate with confidence intervals using FIA data. General observation data were summarized for a majority of the components in this discussion.

Monitoring Results:

FIA Data:

FIA data were used to estimate marten habitat across the Forest. Forest-wide, about 29.1% of forested stands were identified as marten habitat. This estimate has a lower confidence interval of 24.3 and an upper confidence interval of 33.9. The following table summarizes marten habitat estimates by landscape.

Estimates of Marten Habitat by Landscape 2007				
	Number of Forested Plots with Non-Null Values	**90% CI For Percent Old Growth**		
		Lower Bound	Point Estimate	Upper Bound
Blackfoot	46	17.4	25.7	34.1
Divide	33	26.3	37	47.9
Elkhorns	13	4.3	15.4	28.9
Big Belts	45	22.9	31.6	41.2

Fisher Hair Snare Surveys:

The following table summarizes the results of the fisher hair snare surveys. Even though hair samples were removed from several survey stations, none of them were marten.

FISHER SURVEY GRID RESULTS				*FISHER SURVEY GRID RESULTS*			
Forest	**Grid_Cell**	**Box**	**Sample**	***Forest***	***Grid_Cell***	***Box***	***Sample***
Helena	2637	1	Y	Helena	2718	1	Y
Helena	2637	2	N	Helena	2718	2	Y
Helena	2637	3	Y	Helena	2718	3	Y
Helena	2637	4	N	Helena	2718	4	N
Helena	2677	1	N	Helena	2718	5	N
Helena	2677	2	N	Helena	2718	6	N
Helena	2677	3	Y	Helena	2756	1	Y
Helena	2677	4	Y	Helena	2756	2	Y
Helena	2717	1	N	Helena	2756	3	Y
Helena	2717	2	Y	Helena	2756	4	Y
Helena	2717	3	Y	Helena	2756	5	N
Helena	2717	4	N	Helena	2756	6	Y
Helena	2717	5	Y				
Helena	2717	6	Y				

General Habitat Surveys:

Suitable habitat for marten was noted around Black Mountain, south of Priest Pass, in upper Spotted Dog Creek, around Slate Lake, and in the vicinity of Esmeralda and Meyers Hills. Suitable habitat (particularly with large woody debris) is widely available throughout the Divide landscape, but most often, separated from other such patches by less optimal habitat (forested but without abundant large snags and logs).

The Meriwether Fire burned over 40,000 acres. Only portions of the area consisted of mature forest capable of supporting marten year-round (relatively dense forest stands with pockets of large dead trees and downed woody debris). Most sites examined in Big Log Gulch and Willow Creek, previously capable of harboring marten, have been largely stripped of their capacity to do so—with standing timber destroyed or thinned out and woody debris greatly reduced. It may still suffice for "travel" between more suitable habitat pockets.

Winter Track Surveys:

Tracks of five carnivore species (bobcat, red fox, marten, coyote, and weasel) were detected during the surveys, as well as tracks of three prey species (snowshoe hare, red squirrel, and grouse), and three ungulate species (deer, elk, and moose). No signs of rare carnivores such as wolverine, lynx, or fisher were detected.

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:

FIA analysis indicates that marten habitat is abundant and well distributed. However, since this year's data will represent baseline, there will be no variability assessment. Assessments will be conducted in out-years as FIA 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. We assume that use of this protocol to identify marten will allow us to determine presence in those areas that were surveyed. 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.

General Habitat Surveys:

Survey work in Big Log Gulch and Willow Creek clearly indicates that marten habitat in the northern Big Belts, previously undercut by the 1984 North Hills Fire, has been measurably reduced further in the Meriwether Burn. It is possible that in severely burned stands the presence of large snags and the potential for considerable new downed timber in the future will provide some components that may be used by marten. But, given the disinclination of marten to use un-canopied habitat, even when deadfall and potential prey are abundant, these will serve the purpose only where unburned stands of closed-canopied forest remain nearby to provide core habitat. At this point, the impact on population viability remains to be determined.

Data is similar to that collected in previous years but, at this point, remain insufficient to estimate variability with any precision.

Winter Track Surveys:

Out-year surveys will provide data to assess variability.

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 FIA 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.

General Habitat Surveys:

While surveying for potential goshawk and pileated woodpecker territories in the Meriwether Burn, take note of potential for marten occupancy and for marten presence in the same habitats.

Conduct winter tracking surveys in areas not covered by Montana Fish, Wildlife, and Parks survey routes to verify presence of marten in suitable habitat areas (as well as wolverine, lynx, fisher).

Winter Track Surveys:

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

(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, general field observations were compiled for this element as well as an active nest survey. Reports are available on file at the Helena Ranger District.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

General field reconnaissance was utilized for all portions of this element.

Monitoring Activity:

An active bald eagle nest within the perimeter of the Meriwether Burn south of Fields Gulch on the Missouri River was checked to ascertain its condition after the fire.

The presence of eagles, eagle nests, and potential nesting sites are noted during all wildlife surveys in suitable habitat areas (ample riparian zones, along rivers, near lakes). The Elliston Fuels project area, in particular, was perused for bald eagle activity because of its proximity to the Little Blackfoot River and the abundance of large trees amidst mature forest that could serve as roosting, perching, or nesting sites.

Data Analysis Methods:

General observation data were summarized. Field notes are in the project file.

Monitoring Results:

The " Fields Gulch nest" was established at its current location in 1999—halfway up a steep, cliff-flanked canyon about ½ mile upstream from Fields Gulch . It was set up in a big, gnarled ponderosa pine partway up a cliff and scree slope. Prior to 1999, eagles had been nesting lower down toward the Missouri River near the mouth of the same canyon. The new nest had been monitored each year since its establishment—usually from above via the Missouri River Canyon trail, but occasionally from the river below. It has fledged young each year since 1999. Monitoring from the River earlier in 2007 indicated that the nest had fledged at least one young in July. In September, the nest site on the south side of the

canyon was inspected from the usual viewing site on the north rim (about ¼ mi away). The canyon had escaped the 1984 North Hills Burn, but not the Meriwether Fire, which had burned through the drainage about 8 weeks previously. Burning was selective: some areas were untouched, others had underburned, and a few patches suffered severe overstory scorching. The nest tree was not visible—apparently having burned and fallen into the canyon out of sight. No eagles were observed in the area.

No eagle nests or other active eagle components were found in or near the Elliston project area. Both bald and golden eagles were occasionally observed well overhead during surveys, but none were "in" the project area.

Variability Measure Discussion:

Variability Measure:

Any loss of an eagle nest

Assessment:

Eagles have moved nest locations in this area before, and with destruction of the 1999-2007 nest, it is likely they will relocate to a new site nearby in 2008. The area along the river is essentially unburned, and the canyon in which the latest nest had been located retains the majority of its large trees. So, potential nesting sites appear numerous. The variability measure has been exceeded – i.e. any loss of an eagle nest. However, it's important to note that this element was developed at a time when bald eagles were listed on the Endangered Species List; they have since been removed and remain has a sensitive species on the Region 1 Sensitive Species List.

Results in and around the Elliston Project Area are essentially the same as those from previous years, 2004-2006 so there is no departure from the variability measure.

Actions in Response to Variability Assessment:

The Decision Flow Diagram (Helena National Forest Plan, p. IV/20) was utilized to determine if any actions were needed in response to the variability assessment. Since this is the first noted occurrence of a bald eagle nest lost to a wildfire, it is reasonable to assume that it is unlikely to occur with any frequency. Therefore no actions are needed at this time.

Recommended Efforts:

As program funding and priorities allow, continue to survey along the Missouri River beginning in late spring 2008 with the expectation of locating a new nest site somewhere nearby the one lost to the Meriwether Fire. Coordinate with various HNF personnel and members of the public using the river to tally eagle sightings from that direction and aid in next location.

As program funding and priorities allow, survey the upper Little Blackfoot River corridor more intensively: the potential for viable bald eagle nesting sites appears good.

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.

Divide Landscape General Field Surveys/Elk

Monitoring Activity:

1) Field surveys of roads and trails throughout the Divide landscape have been underway for several years to assess the nature of impacts on local wildlife. In 2007, in anticipation of the Divide Travel Plan, field surveys covered (a) the user-created Black Mountain-Ophir Creek motor trail; (b) the Elliston-Slate Lake road/trail

system; (c) roads in upper Ontario, Monarch, and Bison Creeks; (d) motor trails along the Continental Divide between MacDonald and Priest Passes; (e) proliferating ATV routes along Baldy Ridge in the Little Blackfoot drainage; and (f) system and non-system roads in the Meyers Hill/Esmeralda Hill area.

(2) The MacDonald Pass grazing allotment, which had been surveyed in the late summer of 2006 after livestock had been in the area for several weeks, was examined again in early summer 2007 prior to the arrival of cattle. The purpose of revisiting the allotment in spring was to gauge the degree to which the influx of cattle later in the summer influenced elk and deer distribution and habitat use.

(3) Survey work was continued in the Elliston Face Fuels Reduction project area. Surveys were conducted in all seasons and focused on the timing and pattern of big game habitat use prior to anticipated thinning of mature forests.

Analysis:

(1) Road/Trail survey: (a) The Black Mountain-Ophir motor trail is still being used by motor bikes—although to a lesser extent than in 2004-2006. Users have not extended the illegal trail, and one alternative route abandoned in 2006 remains unused. Signing has been improved: the route of the CD foot trail is now obvious and a sign indicating that motorized use is not allowed has been installed below. Elk, mule deer, and black bears were observed along the trail, and signs of bobcats, coyotes, and mountain lions were observed.

(b) South of Elliston: The 4wd road system (#1871-A3) on the ridge between HNF Road #314 (Tree Farmer Rd) and Road #1871-A1 (Slate Lake Rd) is muddy, rutted, and difficult to drive in spring and fall—a circumstance which limits use. The ridge is an important elk migration route between winter and summer ranges, and elk are particularly prominent in the open grasslands in spring. Because vehicle traffic is limited in these seasons, it does not appear to be displacing elk. Most use is from ATVs and trail bikes in summer (with off-road riding a minor problem). There is also some use by grazing permitees in summer and hunters in fall (until snow prohibits access). Snowmobile use occurs after elk have passed through in the fall and before they move the other way in spring. Further south on the Slate Lake Rd, the gated segment of the road out to the Lake is still picking up a little illegal use, but not as much as in the past.

(c) The gated road system in upper Bison and Ontario Creeks is also picking up some illegal ATV use from a couple sources. On the west side, ATVs and bikes are still going around the gate toward the end of road #4104 in upper Monarch Creek, although less so than in the past. More vehicles appear to be coming in from Road #495 in upper Ontario Creek to the east. Surveys indicate that the upper Bison/Ontario Creek drainage provides diverse, productive wildlife habitat because of the mosaic of different-aged forests and riparian habitat. The last 1/3 mile of Road #495 in Ontario Creek is wet and muddy, and although partially blocked by a kelihump, is still being driven by ATV's. The area is prime summer elk habitat.

(d) An old 4wd route—a non-system road—runs from the electronic site above MacDonald Pass down to Priest Pass about 1½ miles to the north. The route is narrow, winding, steep, and eroded—and is picking up ATV use. This area is a mosaic of different-aged timber stands and small parks and looks to be fairly heavily used by elk in summer.

(e) Baldy Ridge: A number of newly pioneered ATV and motor bike routes, as well as off-road 4wd tracks, have been established since previous surveys in 2004. Not all were traced to their origins, but the bulk of them appear to be connecting to roads down in Spotted Dog Creek to the west, and some may be leading up from private land. Much of Baldy Ridge is wide open with thousands of acres of weed-free native grassland. Elk continue to use the area through the fall. No sign of the Spotted Dog wolf pack was evident, but they have been reported in this area. We also have had reports of a grizzly bear further north off the east side of the ridge—but no sign was found.

(f) Surveys in the Meyers-Esmeralda Hill area examined a labyrinthine network of system and non-system roads. Most of the work, including a detailed map and photo record of the road maze and its implications for wildlife, extended well into November (FY2008).

(2) In the MacDonald pass grazing allotment, elk use of key wet habitats (numerous stringer meadows flanking streams on the east side of the Divide) was found to be surprisingly sparing in late spring and early summer—even though cattle were not present and suitable forage was prolific. Likewise, elk use of upland grasslands in much of the allotment is not as heavy as expected. Mule deer, however, do not appear to be avoiding these habitats in spring and early summer. Moose and black bear use was noted as well.

(3) As in previous years (2004-2005), elk did not use the Elliston Fuels project area as winter range. Elk remained in open grassland habitats across Highway 12 to the north throughout the winter. This suggests that thinning of mature forests in this area will have essentially no effect on elk in winter. Elk moved up through the project area in late April and into adjacent grasslands where they foraged on green-up on sites grazed by cattle the summer before. As in previous years, there appeared to be minimal competition between elk and livestock—their use being partitioned both spatially and in time.

Variability Measure Discussion:

Variability Measure:

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

Assessment:

(1) The motorized intrusion into unroaded habitat in the Black Mountain area has not expanded since 2005, and, in fact, use by bikers and ATV riders seems to be lighter. Likewise, the closure on the last 1½ mi of the Slate Lake road, which has been a problem in the past, appears to be picking up fewer violations. Reasons for the perceived decline are speculative at present.

Motorized use of the ridge between Elliston and Slate Lake is similar to previous years. Elk continue to use the migration route along the ridge in spring and fall as they move between summer and winter ranges. Current patterns of motorized use of the road system do not appear to be compromising the effectiveness of the migration route, and there is no compelling reason to close the route system at present.

Pioneering of new routes in the Baldy Ridge/Spotted Dog area is increasing. This use needs to be confined, but solutions are difficult: the area is isolated and difficult for law enforcement to access on a regular basis. In addition, the wide-open grassland makes it difficult to prevent off-route riding and pioneering of new trails.

Motorized intrusion into the closed road system in upper Bison and Ontario Creeks can be remedied with some barriers and signing on the east side at open road #495 and with some flanking barriers at the upper Monarch Creek gate on road #4104. This will enhance habitat effectiveness for elk and a number of other wildlife species in this productive headwaters habitat complex.

(2) Limited fieldwork in the MacDonald Pass allotment suggests that factors other than cattle presence in summer are preventing elk from exploiting productive habitats along the Divide toward MacDonald Pass. Human activity could be a factor, or elk could simply be taking advantage of a more natural movement corridor up out of Dog Creek further north.

(3) Use of the Elliston Face project area was similar to past years. It is possible that harsher winter conditions in future winters could push elk into project area forests—although it is more likely they will move several miles to the west where snow conditions are more benign (as in the past). Thinning of the forest environment as proposed in the Elliston Fuels project may result in more elk use of the area in spring and fall (and possibly winter) as foraging opportunities increase. The testing of these hypotheses awaits future developments.

Recommended Efforts:

(1) Monitor the closure and signing of the Black Mountain trail to help keep the closure intact—involving law enforcement personnel if necessary.

Add new barriers and signing to the east end of the upper Bison/Ontario Creek closed road system to re-establish the effectiveness of that non-motorized area. Use fencing or more formidable natural barriers to increase effectiveness of the Monarch Creek gate toward the end of Road #4104.

The effectiveness of the gate on the Slate Lake road could be enhanced further with some additional flanking barriers on the downhill side.

Effectively close the ATV/bike route between Priest Pass and the electronic site north of MacDonald Pass.

Devise a system to contain the pioneering of new motorized routes in the Baldy Ridge area. In particular, eliminate user-created connecting routes between Spotted Dog Creek and the upper ridge.

(2) Continue monitoring spring/summer elk movements further to the north along the Divide: In particular, note focal habitats and use patterns in relation to livestock.

(3) Continue monitoring big game use patterns in the Elliston project area and the surrounding region through implementation of the Elliston fuels project.

Big Belts Landscape General Field Surveys/Elk

Monitoring Activity:

Hidden Valley: One of the less orthodox decisions in the North Big Belts Travel Plan (2005) was to open the gate at the bottom of the Hidden Valley road system (#4119) for the hunting season—keeping it closed the rest of the year. Previously, Hidden Valley roads had been closed to vehicles year-round to provide for big game security and wildlife habitat effectiveness in general. 2007 surveys looked at big game presence and hunter use in and around the valley during the first fall with the open gate.

Analysis:

Hidden Valley was logged in the 1980's, leaving a mosaic of clearcuts and partial cuts of varying density interspersed with dense mature forests, old-growth formations, riparian areas, natural meadows, and upland parks. Surveys in 2003, 2004, and 2005 indicated heavy elk and deer use, primarily from late spring through early fall. Few elk and deer were present during the hunting season. Surveys also noted that black bears, mountain lions, bobcats, coyotes, red foxes, moose, snowshoe hares, marten, grouse, goshawks, red-tailed hawks, and pileated woodpeckers were present and often widespread. Because of its diverse and productive habitats and the low level of human activity, the valley appeared to hold potential for a variety of species-at-risk—including lynx, grizzly bears, and wolverines.

In FY2007, Hidden Valley surveys were conducted in early-mid hunting season with tracking snow on the ground. During the first 2 weeks of the season vehicle traffic up into the valley was heavy. The road was icy and muddy, but still easily drivable by 4wd rigs through the end of October. Tracks of 3 elk were noted below the Valley in the bottom of Indian Creek, but there was no sign of elk in Hidden Valley itself. A small number of deer had been using Road #4119 as a travelway. Surveys saw no obvious signs of any hunter success through the end of October. As an aside, the Hidden Valley gate had been rammed by a vehicle and was badly bent before its opening on Oct. 15.

Variability Measure Discussion:

Variability Measure:

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

Assessment:

In past years, access to the Hidden Valley road has been limited after the first part of November because of snow and ice on the steep road (#138) that winds down from Indian Flats. Still, a few hunters would continue to drive the precarious route as late as mid-November, parking at the Hidden Valley gate, and hiking

up the road to hunt. During the first half of the season, camps were often established by the gate. Hunting success, judging by gut piles and blood trails at the gate, was occasional. This year, the number of vehicles taking advantage of the newly open road through the first 12 days of the season was considerable.

The decision to open the road during the hunting season was based on the hypothesis that it would provide a popular hunting opportunity but that it would have minimal impact on the local elk population because few elk remained in Hidden Valley or within reach of the road system after mid-October. The initial survey effort indicates that the expectation of high hunter use and low impact on the elk population appears accurate—so far.

Recommended Efforts:

Continue to monitor the Hidden Valley road system, both early and late in the hunting season, to check on elk/deer presence and hunter success. Resist any pressure to open the road during other seasons, as the valley currently provides valuable spring-summer-early fall habitat for a variety of wildlife species out of reach of most human activity.

(C10-C13) WILDLIFE AND FISH

(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 2007 consisted of review of guidance that hazard tree removal at campgrounds and trailheads followed mitigation measures described in the programmatic biological assessment on Recreation Facility Maintenance (USDA Forest Service 2000a).

Monitoring methodology:

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

Monitoring Activity:

Individual hazard tree removal within INFISH RHCAs occurred at campgrounds/road and trail crossings. Any hazard tree removal that occurs is required to meet the project description specified in the

programmatic biological assessment on Recreation Facility Maintenance (USDA Forest Service 2000a) for which concurrence from the U.S. Fish and Wildlife Service (USDI 2000) was obtained.

Data Analysis Methods:

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

Monitoring Results:

Removal of hazard trees at campgrounds and trailheads met guidance in the programmatic biological assessment (2000a). Removal of trees for firewood is occurring in violation of what is specified in firewood cutting permits. The magnitude of violation has been low in the past but has increased substantially in 2007 associated with tree mortality from insects and likely higher home heating prices. The magnitude of effect from illegal firewood cutting activities is likely to increase further as the pine beetle epidemic continues and demand for firewood increases.

Variability Measure Discussion:

Variability Measure:

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

Assessment:

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

Actions in response to variability assessment:

Line officers and law enforcement were informed of firewood cutting violations

Recommended Efforts:

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

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

(C11) Intra-gravel sediment

Forest Plan Requirements:

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

Intent

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

Data Sources:

Sediment Samples from McNeil Core Sampling. Nine samples from each of thirty 1000 ft sample sections as referenced in the Forest Plan have been replaced with 15 samples as a means to assess existing conditions in drainages prior to conducting management activities (Hay Creek on the Townsend District), and to assess rates of sediment recovery following large fire events (Copper Creek on the Lincoln District).

Current Efforts and Findings:

Monitoring methodology:

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

Monitoring Activity:

A total of 15 substrate core samples were collected from two streams on the Forest in 2007 by Forest Service fishery personnel. The streams sampled are shown in the table below.

Data Analysis Methods:

Sampling of stream substrates is a direct means of measuring potential effects of Forest projects that are projected to result in increased delivery of sediment to fishery streams. The method is also useful as a means to estimate the baseline reproductive success of salmonids associated with the fine sediment levels in stream spawning gravels.

In a cooperative effort with the State of Montana to develop a means to provide a broad level approach to initially screen for water quality limited streams, over 600 substrate core samples from Helena Forest streams since 1986 on the Lincoln Ranger District (USDA 2006 and other project file sediment information for streams from both the Townsend and Helena Ranger Districts) were evaluated rigorously via statistical analysis (summary info in project file). The purpose of the evaluation was to try to obtain some broad measure by which to gauge the degree of sediment effect on various streams as compared to an overall reference value. Because the variation around the average value of fine sediments for streams of a specific geology was similar to the variation around the mean value for sediment when findings from all streams were lumped together, the average sediment level for all streams pooled together was determined to be the baseline level to use to assess relative degree of sediment effects. The overall average level of fine sediment less than 6.4 mm in diameter was found to be 35.2% with a standard deviation of 10.2. Consequently for a stream to be significantly different (90% confidence level) from the average (or baseline) and exceed the Forest Plan variability measure, fine sediment levels (less than 6.4 mm in diameter) would have to approach 50%.

Monitoring Results:

Table 1 Fine sediment Levels and Fredle Indices (Lotspeich and Everest 1981) for spawning gravels from streams sampled on the Helena Forest in 2006.

Stream Name	Average Percentage of fine sediment less than 6.4 mm	Average Fredle Index Value
Hay Creek	48%	Not calculated
Copper Creek	28.9%	5.4

Variability Measure Discussion

Variability Measure:

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

Assessment:

Very limited sampling was conducted in 2007. Samples were collected from Hay Creek and Copper Creek. Sediment levels are of concern in Hay Creek as they are approaching 50% in gravels used by salmonids for spawning.

The cooperative effort with the State of Montana in regard to the analysis of the sediment samples continues to support the concept that evaluating sediment levels in spawning gravels is a useful measurement. The findings from 2007 add to the information base and the information is currently considered to be a useful tool that helps assess risk to fisheries associated with sediment generating management activities in watersheds having various types and magnitudes of natural events or human related activities.

Actions in response to variability assessment:

Action to address elevated sediment levels will occur as part of a fuels treatment project planned in the Hay Creek drainage in the future. Likely efforts will include such things as identifying opportunities to reduce sediment delivery from existing roads and sediment delivery associated with domestic livestock grazing. Additional action already taken includes collection of additional substrate core samples tributaries to Hay Creek.

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 Timber sale, the Poorman Timber Sale, the Draft EIS on the Nevada/Dalton Project, Snow-Talon Salvage Sale, the Elliston Fuels Treatment Project, the upcoming Cabin Gulch Draft EIS, and upcoming evaluations for a Fuels treatment in the Hay Creek drainage. The approach is aimed at meeting or exceeding the Forest Plan Standard for General Watershed Guidance #4 (Helena Forest Plan pg II-35). For a stream like Hay Creek it is likely there will be efforts undertaken to reduce sediment delivery from existing levels.

Recommended Efforts:

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

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

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

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

(C12) Streamside Cover for Fish

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.

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.

Riparian utilization level standards that are added to new allotment management plans are based on the following guidelines rather than the above detailed Forest Plan Standards. 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 westslope cutthroat trout, or meeting some other resource value.

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

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

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.

The Cowfish Methodology (Lloyd 1985) was originally specified as one of the means to assess riparian conditions from a fishery perspective. 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 Forest Service 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 from a fishery perspective include biological assessments, biological evaluations, fishery effects analyses conducted on four livestock allotment updates in 2007, general fishery reviews conducted on several ongoing allotments, proper functioning condition assessments, allotment utilization measurements, assessments by Montana Department of Fish Wildlife and Parks biologists of habitat occupied by westslope cutthroat trout, and riparian/migratory songbird assessments. These newer methodologies and evaluation approaches replace transects and 1000 foot sections identified in the Forest Plan.

Current Efforts and Findings*:*

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).

General fishery evaluations, biological assessments, and biological evaluations were completed in 2007 in association with updates to four livestock allotments (East and West Nevada Allotments, North Fork Deep Creek Allotment and Sixmile Allotment). Additionally, general fishery reviews were conducted for ongoing livestock grazing activities on various other grazing allotments. Ten ongoing allotments, where effects to fish habitat were evaluated as a general fishery review, included portions of the Spring Gulch, Ophir /Hope, Grassy Mountain, Deep Creek, Gurnett, Drumlummon, Clark Canyon, Hat, Dog, and Spotted Dog Allotments

Implementation monitoring efforts have shown that the Forest has met stubble height requirements on allotments west of the continental divide with only a few exceptions (findings from Helena Forest Implementation monitoring-in project file). The bank disturbance monitoring conducted by range personnel as part of the implementation monitoring module on established transects for biological term and condition monitoring sites has also indicated that levels are being met on specific sites monitored on 4 allotments west of the continental divide with limited exceptions; all on the Blossburg Allotment.

However, spot evaluations conducted by fisheries personnel at locations other that the established transects on three of the same allotments discussed above indicated that bank disturbance was exceeded on some reaches highly susceptible to being impacted by livestock grazing for Spring Gulch on the Spring Gulch and Ophir/Hope Allotments, as well as Dog Creek in the Blossburg Allotment (detail in project file and fishery field notes from 2007). General fishery evaluations on the Spring Gulch allotment indicated that livestock grazing was having severe detrimental effects to westslope cutthroat trout populations (pictures are located in fishery files). Other general fishery evaluations conducted by Forest Service fishery personnel on a tributary to Sulphur Bar Creek and Greyson Creek on the Grassy Mountain Allotment documented negative effects to fish habitat due to high bank disturbance levels (details and photos in the project file). General fishery evaluations also found extensive bank disturbance levels on the main stem of Carl Creek and some of its unnamed tributaries (details and photos in the project file). Excessive bank disturbance was documented on some reaches of Fred Burr Creek in the Dog Creek Allotment, a tributary to Spotted Dog Creek in the Spotted Dog Allotment, and Clark Canyon Creek on the Clark Canyon Allotment. Additionally, evaluations by Montana Department of Fish Wildlife and Parks Fishery Personnel found detrimental effects occurring to cutthroat trout on Skelly Gulch within the Drumlummon Allotment (documentation in the project file, the Middle Fork of Duck Creek within the Gurnett Allotment (documentation in the project file) and Whites Gulch in the Whites Gulch Allotment.

Monitoring methodology:

Monitoring to meet the Terms and Conditions (USDI 1998 pages 98-99) of the U.S Fish and Wildlife Service 1998 Bull Trout Biological Opinion is being conducted as directed by the Implementation and Monitoring Team using regional protocol (protocol available through the Pacfish/infish Special Project Section on the Rocky Mountain Research Station Website www.fs.fed.us/rm/pubs_other/rmrs). For livestock grazing, use of the residual stubble height of vegetation on the greenline is the minimum monitoring element associated with the Implementation Monitoring. For the Helena Forest the minimum stubble height on the greenline is currently established at 6 inches.

Additionally, monitoring to meet the Terms and Conditions of a 1999 Biological Opinion for several grazing allotments on the Helena Forest focuses on bank disturbance monitoring. The monitoring to

meet the intent of the site specific Biological Opinion utilizes a pace transect measurement to determine the percentage of streambank that has been disturbed by livestock on the specific transect in any given year. Bank disturbance levels are not to exceed 20% and beginning in 2006 a standardized protcol for measuring bank alteration for national forests in Region 1 was adopted (USDA 2005).

Proper Functioning Condition ((PFC) Survey - The approach used is documented in the project file (USDI/ USDA 1998).

Biological Assessment - A standardized format for the assessment is used for proposed activities as agreed to by the Montana Bull Trout Level 1 Team (attachment A). Streams 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 and updates to those documents are also part of 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 (Attachment B, found in the project file) 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. The rationale for the conclusion regarding the effect is included in documentation. This No Effect Checklist is used in place of an in-depth biological analysis or biological evaluation if no effects or very low levels of 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 as field notes with regard to effects or concern for possible effects to fishery resources associated with condition of riparian vegetation and stream morphology.

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 2007 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:

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.

Streambank disturbance is measured on several transects for the Blossburg, Spring Gulch, Hat Creek and Ophir/Hope Allotments. Other streams evaluated in a qualitative fashion included Carl Creek, portions of Cedar Bar and Greyson Creeks, tributaries to Sulphur Bar Creek, Clark Canyon Creek, Fred Burr Creek, and the South Fork of Spotted Dog Creek. Walk through surveys estimating bank disturbance by pacing was the methodology used. Utilization by weight of forage in some riparian areas is also used.

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

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. Impacted reaches are photographed with photographs located in fishery files.

Monitoring Results:

Biological Opinion monitoring conducted west of the continental divide in 2007 has indicated that bank disturbance levels have been exceeded for one important stream reach of Dog Creek on the Blossburg Allotment (documentation in the project file). General surveys conducted by fishery personnel indicated that bank disturbance levels were exceeded on reaches of six other allotments west of the divide (Spring Gulch, Ophir /Hope, Spotted Dog, Clark Canyon, and Dog). East of the divide bank disturbance levels were very high on some stream reaches of Greyson Creek and tributaries to Sulphur Bar Creek in the (Grassy Mountain Allotment), Carl Creek, Hay Creek, tributaries to Hay Creek, Faulkner Creek and Battle Mountain Creek in the Deep Creek Allotment (Fishery Field notes and various pictures in the project file). On the Gurnett Allotment bank disturbance levels were substantially elevated again as documented by MDFWP personnel. Livestock were supposed to be excluded on a fork of Duck Creek on the Gurnett Allotment, but somehow cattle still found their way into the drainage. Consequently, the risk for negative

effect to westslope cutthroat trout remains elevated. MDFWP fisheries personnel also documented substantial concerns with excessive bank disturbance on the Whites Gulch Allotment and the Drumlummon allotments (findings a presented to Forest Line Officers in 2008 by the Montana Department of Fish, Wildlife and Parks).

Biological assessments, biological evaluations, and fishery effects analyses were completed on the East Nevada (Burns and Walch 2007a, 2007b), West Nevada (Burns and Walch 2007c and 2007d), North Fork (Walch 2007), and Sixmile (Harper 2006) Allotments. The above documents concluded that fish habitats in East Nevada and West Nevada Allotments have been affected negatively by grazing to varying degrees, but effects were concluded to be insignificant where significant is defined as an effect large enough to result in reduced viability for the local fish populations present. Effects to fisheries were minor on the other two allotments.

Livestock forage utilization (as measured by percent weight) and or bank disturbance was measured on within 23 allotments by range personnel (see table below). In some cases findings from range personnel and fishery personnel within the same allotment is different. A good example is Spring Gulch which is shown in the Table below as having 11% bank disturbance but fishery findings indicate bank disturbance levels of at least 40 to 50% and even up to 80% on some reaches. When fishery findings are combined with range findings the overall assessment is that there are substantial concerns regarding livestock effects to select riparian areas on numerous allotments across the Forest.

The following table shows riparian forage utilization and bank disturbance monitoring that was completed in 2007 by range personnel using paced transects.

2007 Riparian Monitoring					
Allotment	**Riparian Area**	**Type of Grazing System / Season of Use**	**% Utilization**	**% Browse**	**% Streambank Trampling**
Deep Creek	Mike Day Creek	deferred, late	45**		
	Left Fork of Faulkner Creek	deferred, late	45**		
	Carl Creek	deferred, mid to late	47**		
South Crow	South Fork of Crow Creek	deferred, mid to late	38** allowable pfc 20-30%		39** allowable pfc 5-10%
Gurnett Creek	Duck Creek	Rested, trespass use	50**		
Ray Creek	North Fork Deep Creek	Deferred, late (some trespass)	55**		
Dry Creek	Dry Creek	Deferred, trespass	60**		
Whites Gulch	Whites Creek	Deferred, late	45** allowable pfc 20-30%		40** allowable pfc 5-10%
Alice Creek	Upper	Deferred/ Early	35		20
	Middle	Deferred/ Early	35		15
	Lower	Deferred/ Early	35		15
Canyon Cr / Sandbar	Sandbar	Continuous/ Early	40		<5
Chimney Creek	Chimney	Continuous/ Late	40**		20

2007 Riparian Monitoring					
Allotment	**Riparian Area**	**Type of Grazing System / Season of Use**	**% Utilization**	**% Browse**	**% Streambank Trampling**
East Nevada	Nevada	Deferred Rot/ Late	Minimal		5
	Washington	Deferred Rot/ Early	Minimal		5
	Jefferson	Deferred Rot/ Early	Minimal		5
Horsefly	Black Diamond	Continuous/ Early	None		<5
Marsh Creek	North Fork Marsh	Deferred Rot/ Early			20
	Marsh	Deferred Rot/ Late	40**		30
Moose Creek	Moose	Deferred Rot/ Early	<5		
	Wasson	Deferred Rot/ Early	35		11
	Wilson	Deferred Rot/ Late	10		<5
Stonewall	Beaver	Continuous/ Early	30		18
Shingle Mill	Shingle Mill	Continuous/ Early	35		10
Tar Head	Trout	Deferred Rot/ Early	55**		18
	Tarhead	Deferred Rot/ Late	33		10
West Nevada	Madison	Continuous / Early	30		10
	Clear Creek	Continuous/ Early			10
Willow Creek	Willow	Continuous/ Early	46**		11
Blossburg	Dog Creek	Deferred Rot/ Early	20		
	Meadow Creek	Deferred Rot/ Early	22		<5
Clancy	Blizzard Basin	Rest Rotation/ Late	75**		75**
Clarks Canyon	Clarks Canyon	Continuous/ Early	40		
	Trout	Continuous/ Early	40		
Maupin	Strawberry	Deferred Rot/ Early	35		0
Ophir / Hope	Lower Spring Gulch	Continuous/ Early			7
Slate Lake	Elliston Creek	Deferred Rot/ Early	40		
	Slate Creek	Deferred Rot/ Late	40**		
Spring Gulch	Spring Gulch	Continuous/ Early			11

**Indicates allowable use exceeded

Variability Measure Discussion:

Variability Measure:

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

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

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

Helena Forest Riparian Guidelines (USDA 1998- in project file) are used as a means of maintaining shading and minimizing bank disturbance for the allotments east of the divide. In 2007 bank disturbance was the primary factor evaluated for the allotments evaluated by fisheries personnel and it was assessed visually in relation to the Helena Forest Riparian Guidelines (1998).

Assessment:

Since Cowfish (Lloyd 1985) is no longer used, the Cowfish HSI variability was not used in 2007. Findings from stubble height monitoring, bank disturbance monitoring , the various biological evaluations conducted during grazing allotment updates, and general fishery reviews on other livestock allotments indicate that fish habitat associated with riparian habitat condition and fish populations continue to be affected negatively to varying degrees on a number of grazing allotments across the Forest. Effects to fish habitat vary from minor to adverse and are documented, for the allotments reviewed, in project file memos, field notes, and correspondence.

A total of thirty-nine riparian areas were measured on twenty-five allotments in 2007. Fourteen of the riparian areas or 36% of the areas measured, were above Forest Plan allowable use levels. In terms of allotments measured, twelve (48%) were above allowable use levels. It is reasonable to assume that the measurements reflect allotment conditions, as measurements are taken on key areas.

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 at least six grazing allotments (Blossburg, Spring Gulch, Ophir/Hope, Clark Canyon, Dog, and Spotted Dog) with some adverse effects to fish habitat and fish populations likely occurring on those allotments. Evaluation of the Clark Canyon Allotment by fishery personnel did occur in 2007 and it again confirmed that the negative impacts found in 2005 were occurring to some degree again in 2007. East of the continental divide bank disturbance levels evaluated by Forest Service fishery personnel or personnel from the Montana Department of Fish Wildlife and Parks were found to be very high on some reaches of streams within the Gurnett, Whites Gulch, Deep Creek, and Grassy Mountain Allotments.

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 are projected to be minimal and there would be little need for any amendment to the Forest Plan. Consequently efforts to better implement the Riparian Guidelines (1998) will continue, but the efforts are not predicted to be fully successful due to funding constraints that will limit the ability to control livestock use in riparian areas.

Based on findings and recommendations discussed in the 2006 monitoring report, livestock grazing was not to occur on the riparian portion of the Fork of Duck Creek (Gurnett Allotment) in 2007. However, in 2007, there were unauthorized livestock use from adjacent private land and a fence breech from an adjacent allotment resulting in exceeded standards. The reach on the North Fork of Deep Creek, discussed as a problem reach in 2005, was fenced in 2006 to exclude livestock. However, cattle gained access to the riparian area through breeches in the fence in some locations and some grazing inside the exclosure occurred.

Efforts to reduce negative livestock effects to westslope cutthroat trout on Spring Gulch (Spring Gulch Allotment) were unsuccessful and very heavy bank trampling greatly exceeding the 11% found on the implementation monitoring transect (depicted in an earlier table within this section). The excessive bank trampling on Spring Gulch occurred on a reach critical to westslope cutthroat trout viability (pictures included in the project file). Consequently, additional assessments by range and fishery personnel are planned for Spring Gulch in 2008.

The Fish and Wildlife Service was informed of the failure to meet bank disturbance standards on several stream transects on Dog Creek and Spring Gulch in the Blossburg and Spring Gulch Allotments and breaches in the exclosure on Snowshoe Creek in the Ophir Hope Allotment. Although re-initiation of formal consultation to address adverse effects on bull trout habitat will not likely occur in 2008, some additional range administration efforts will need to be undertaken to reduce bank disturbance levels. A drift fence on Ray Creek (Baldy Allotment) was installed to limit bank disturbance on an important fishery reach of Ray Creek (Baldy Allotment) in 2006, but monitoring of the area in 2007 to assess success was not completed as planned, but will take place in 2008 instead.

Assessments by range and fishery personnel to reduce problems on Skelly Gulch (Drumlummon Allotment) were initiated with fishery personnel from the Montana Department of Fish, Wildlife and Parks in 2007, but reviews by Montana Department of Fish Wildlife and Parks criticized the lack of success. Further efforts to address concerns on Skelly Gulch are planned in 2008. A riparian restoration project was also completed for a riparian area in the headwaters of Colorado Gulch (Frohner Allotment) which was initiated by soils personnel in response to riparian related problems identified in 2006. There are plans in 2008 for riparian restoration projects in Carl Creek, MacDonald Creek, and the Middle Fork of Spotted Dog Creek.

In addition to the ongoing efforts to 1) implement the Helena Forest riparian guidelines, 2) document problem riparian areas, and 3) address problem riparian areas within allotments, a number of riparian areas have been fenced over the last 15 years to exclude livestock use from riparian areas with the intent to improve cover and reduce bank disturbance from livestock trampling. Exclosures have been constructed on portions of Elliston Creek, Snowshoe Creek, Pikes Gulch, Trout Creek, Meadow Creek, Uncle George Creek, Dog Creek, Indian Creek, Jenkins Gulch and Eagle Creek. Exclosures on Jenkins Gulch and Pikes Gulch are no longer in place. In 2007 additional maintenance was conducted on portions of the exclosure on Elliston Creek and some of the enclosure was converted from electric fence to barbed wire fence. Minor maintenance was conducted to the exclosure on Meadow Creek in the Blossburg Allotment.

Other measures have been taken over the last several years to reduce impacts of livestock grazing to riparian habitats and associated fish habitat on several stream reaches through the use off-stream water developments. Recent examples include uncle George Creek, MacDonald Creek, Fred Burr Creek, and a tributary Clancy Creek.

Recommended Efforts:

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. There is also a need to ensure that existing pasture fences are fully functional during the grazing season to ensure that planned control of livestock will occur. 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, Gurnett, and Drumlummon. The Grassy Mountain, Deep Creek Marsh, and Tarhead Allotments need additional reviews to reduce impacts to riparian and fish habitat supporting brook trout as well as westslope cutthroat trout. Permittees need to be notified well in advance of any exceedance in bank disturbance levels or fenceline problems so that they can move livestock or repair fences in a timely fashion to help assure that bank disturbance levels are not exceeded.

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), Fred Burr Creek (Dog Allotment), South Fork of Spotted Dog Creek (Spotted Dog Allotment), portions of Hay Creek and selected tributaries (Deep Creek Allotment), tributaries to Carl and Cedar Bar Creeks and Greyson Creek (Grassy Mountain allotment), South Fork of Quartz Creek, Kady Gulch, and Clancy Creek (Clancy Allotment). For the Fork of Duck Creek (Gurnett Allotment), continued exclusion of livestock is recommended for the reach critical to westslope cutthroat trout egg survival. Exclusion of livestock is also recommended for Greyson Creek to reduce risk of egg mortality for westslope cutthroat trout that are competing with brook trout.

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. There has been very limited success in implementing Forest Riparian Guidelines without the use of exclosures. Nearly 10 years of adaptive management approaches on the Blossburg Allotment have demonstrated the difficulties in keeping bank disturbance levels below 20%.

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 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 all streams west of the continental divide in Montana for the Helena, Lolo, B-D, Flathead and Kootenai National Forests.. These baselines provide a comprehensive documentation of existing habitat conditions based on all past and ongoing activities and are very helpful in conducting cumulative effects analyses.

As a means to characterize and quantify the amount of riparian habitat affected by livestock grazing and the degree to which that habitat is affected by livestock grazing on the Helena Forest, it is recommended

that a Forest-wide effort be undertaken to characterize the amount of riparian habitat within each allotment, characterize the various levels of sensitivity of that habitat to being damaged by livestock grazing, and finally assess and record the condition of those habitats. Vegetation types, stream gradients, as well as overall geology and specific soil types are some of the attributes that should be used as an initial means to assess the susceptibility of riparian habitats to being damaged by livestock grazing.

The Forest plans to begin a Forest-wide riparian inventory in 2008. Those results will be included in the 2008 Monitoring Report.

(C12) Streamside Cover for Fish (Wildlife Portion)

Riparian Songbird Assessment

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. Specifically, the "Structure and Grazing in Tall Willow Riparian Communities East Side Forests" report was utilized for the riparian songbird assessment.

Current Efforts and Findings*:*

In 2001, the Avian Science Center and the Forest Service, as part of the Northern Region Landbird Program, initiated a study designed to determine effects of grazing on riparian willow communities and their associated avian species. This was a two year study conducted in 2001 and 2003. Data have recently been analyzed and are still in preparation for publication. A synopsis of those data is presented here and is excerpted from the FY06 Monitoring Report since there are no new data to report at this time. The final report is expected to be released in the fall of 2008.

Documentation and monitoring methodology:

Methodologies are described in the "Structure and Grazing in Tall Willow Riparian Communities East Side Forests" report.

Monitoring Activity:

The goal of the "Structure and Grazing in Tall Willow Riparian Communities East Side Forests" study was to collect and develop information on avian species responses to riparian conditions. Riparian zones constitute a small percentage of western landscapes while providing habitat for several avian species. Riparian areas are also amongst the most modified land types in the west (Chaney et al. 1990[4]).

[4] Chaney, E.; W. Elmore; and W.S. Platts. 1990. Livestock grazing on western riparian areas. Produced for the Environmental Protection Agency by Northwest Resource Information Center, Inc., Eagle, ID.

Grazing has been identified as the major factor affecting wildlife habitat productivity in the western U.S. (Kauffman and Krueger 1984[5]). Tall-willow community types are important avian habitat on east-side forests. Moderate and heavy grazing has created change in shrub structure in a significant proportion of this community type. Specific objectives included:

1. Determine the effects on bird community composition and individual species abundance from vegetative changes due to variable-level cattle grazing and browsing in tall-willow riparian areas.
2. Determine the relationship of vegetative physical structure, components, and plant species composition to bird abundances within and among low-, medium-, and high-structured tall-willow riparian areas.
3. Conduct vegetative sampling to compare structure and components among treatment types.

Study sites were located in willow community and habitat types dominated by tall (>2 m) species of willow. Study sites were located at low to mid elevations within coniferous forests and were at least 0.75 mi long (in order to contain at least 5 bird counting points).

Grazed and ungrazed tall-willow riparian sites were categorized based upon the degree of physical evidence of grazing at the site. Selection criteria used included trails and the severity of trampling, as well as grazing and browsing evidence in streamside areas.

A 10-minute bird point count was conducted at each of the sampling points in a site. Points were visited three times during the breeding season from mid-May to early July. All birds seen or heard within the count period are recorded. Point counts were conducted from the third week of May through the second week of July, in the first five hours after sunrise, and not when there continuous rain or high winds.

Data Analysis Methods:

Data analysis for the "Structure and Grazing in Tall Willow Riparian Communities East Side Forests" study is summarized in that report.

Monitoring Results:

Riparian Songbird Assessment – The following table summarizes transect data and number of bird species observed per transect for the "Structure and Grazing in Tall Willow Riparian Communities East Side Forests" study. These data are region-wide. Forest-wide data have not been split out because of small sample size. This applies to all the data summarized below.

Summary of transect results for the riparian willow study					
Quad	Transect #	Number of Points	Number of Visits	Treatment[1]	Number of Bird Species
Whites City	1207	6	3	High	36
Six Mile Mountain	1201	7	3	High	33
Nelson	1203	8	3	High	48
Esmeralda Hill	1205	7	3	Moderate	34
Greenhorn Mountain	1208	6	3	Moderate	33
Bison Mountain	1209	8	4	Moderate	31
Giant Hill	1202	7	3	Moderate	27

[5] Kauffman, J.B., and W.C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications: a review. J. Range Manage. 37(5):430-438

Summary of transect results for the riparian willow study					
Quad	Transect #	Number of Points	Number of Visits	Treatment[1]	Number of Bird Species
Elliston	1206	7	3	Moderate	34
Whites City	1204	9	3	Low	26

[1]See report for treatment descriptions.

The following table summarizes bird species by treatment type.

Summary of bird species (mean)[1] by treatment type			
Species	Apparent Grazing Pressure		
	Low (N=14)	Moderate (N=12)	High (N=10)
Willow flycatcher	.24	.35	.19
Dusky flycatcher	.58	.64	.58
Warbling Vireo	.84	.43	.68
American robin	.77	1.04	.85
Gray catbird	.14	.00	.01
Yellow warbler	1.30	1.46	.44
Northern waterthrush	.09	.01	.03
MacGillivray's warbler	.41	.13	.41
Common yellowthroat	.54	.25	.21
Wilson's warbler	.21	.12	.02
Song sparrow	.77	.44	.31
Lincoln's sparrow	.62	.76	.92
White-crowned sparrow	.13	.53	.12
Lazuli bunting	.09	.03	.07
Brown-headed cowbird	.34	.55	.35

[1]See data results in project file for standard error.

No conclusions are available at this time since these data are in preparation for publication. Conclusions will be reported in out-year monitoring reports as they become available.

Variability Discussion:

Variability Measure:

Decline in habitat suitability index (HIS) from present as measured by Cowfish Model (90% confidence) or a HIS of less than 0.6 as measured by Cowfish.

There are no between year variability measures associated with the "Structure and Grazing in Tall Willow Riparian Communities East Side Forests" study at this time.

Assessment:

Preliminary data indicate that several species of birds that are restricted to willow riparian habitats avoid areas of heavy willow grazing. These species include but are not limited to the willow flycatcher, the song sparrow, and the common yellowthroat. Other species such as the dusky flycatcher and the

American robin have a wider tolerance for grazed willow communities. As data are summarized and published, more information will be presented on the effects of willow grazing on avian communities.

Actions in response to variability assessment:

There are no actions in response to a variability assessment associated with the "Structure and Grazing in Tall Willow Riparian Communities East Side Forests" study.

Recommended Efforts:

Continue monitoring avifauna in riparian habitats to develop baseline data associated with Forest-wide streams.

(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.

Data Sources:

Invertebrate collections from thirty 1000 foot stream reaches (6 samples per reach from the same reaches sampled under Element C11).

Current Efforts and Findings:

During 2007 aquatic invertebrates were collected on a number of streams by the Helena Youth Forest Monitoring Group.

Documentation of monitoring methodology:

The Forest Plan calls for an assessment of aquatic invertebrates using the Biotic Condition Index or BCI (Winget and Mangum 1979 pages 1-13). The protocol to collect adequate samples of aquatic invertebrates to determine the BCI requires use of modified surber nets (Winget and Mangum 1979 page 23). However, sampling conducted by the Forest Youth Monitoring Group from the Helena Forest used an abbreviated approach for collecting and analyzing samples; using a Diversity Index Value and Pollution Tolerance Index as measures of water quality. Sampling for 2007 included a single collection of aquatic invertebrates from several streams and sorting of the organisms to the broad classification category of order such as flies/midges (dipetera), caddis flies (trichoptera), stoneflies (plecoptera), mayflies (ephemeroptera), beetles (coleoptera) aquatic worms (oligochaeta), alderflies (neuroptera), snails (gastropoda), and leeches.

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:

Data is not yet available for 2007

Variability Measure Discussion:

Variability Measure:

Currently stated as annual decrease from present in Biotic Condition Index (90% confidence). The limited data from 2007 will not likely be adequate to make any conclusion as to whether there is or is not a change in the BCI forest wide.

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 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. See element C-11 above for discussion of how sediment varies in drainages with more human disturbance compared to ones with less disturbance.

Actions in response to variability assessment:

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

Recommended Efforts:

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

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

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

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

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

(D1.1) Utilization of Forage in Transitory Range

Forest Plan Requirements:

Monitor utilization of forage in transitory range

Intent:

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

Data Sources:

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

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Regeneration surveys are conducted according to FSM Sivicultural Practices 2409.17.

Monitoring Activity:

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

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

Allotment	Sale Area	Survey Year	Damage noted
Deep Creek Grassy Mtn.	Maudlow/Toston Fire Salvage	2002-2007 ongoing	None Reported
Magpie	Cave Gulch Fire Salvage	2002-2007 ongoing	None Reported
NA	Snow Talon Fire Salvage	2004-2007	None Reported

Data Analysis Methods:

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

Monitoring Results:

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

Variability Measure Discussion:

Variability Measure:

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

Assessment:

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

Actions in response to variability assessment:

No action is needed.

Recommended Efforts:

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

(D1.2) Available Forage Utilized by Livestock

Forest Plan Requirements:

Monitor percent of available forage utilized by livestock

Intent:

Determine actual use by livestock and if utilization constraints of Forest Plan are met. The Forest Plan identified utilization standards for riparian areas as follows. These are listed in several of the permits that do no have current Allotment Management Plans and are used for upland monitoring as well as riparian:

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 August1. The late pasture is the pasture(s) used after this date.

The Forest-Wide standards of the Forest Plan state (II/22) Allowable forage utilization of these [key] plants should be based on local range conditions, soil stability, timing of use and known individual plant requirements. 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 following table is excerpted from the Handbook.

Allowable use Guides by Grazing System and Range Category

Grazing System	Allowable Use of Total Forage Produced High Good to Excellent Condition Class		Allowable Soil Disturbance or Recovery Criteria
	Dry Ranges	**Moist Ranges**	
	Mountain Grassland, Palouse and mixed Grass Prairie Resettlement Range	Mountain Meadows, Bluegrass Bottoms	
Rest rotation	65% on heavy use pasture; 40% on light use pasture	Meadow 70% - Bluegrass 80% on heavy use pasture; 50% on light use pasture for both	Bare spots, tramped areas, and streambank damage caused during heavy use year should be healed or stabilized within the following rest period.
Deferred-Rotation	55% on heavy use pasture; 35% on light use pasture	65% on heavy use pasture; 45% on light use pasture	Disturbance areas on heavy use pasture should be stabilized or healed prior to use the following year.
	Allowable Use on Key Areas by Condition Class		
Season long – Mid *Spring - Low Fall and Winter – High Rotation – Mid Refers to allowable use recommended for condition class	Good – Excellent 40 – 50% Fair 25 – 40% Poor 10 – 25% Very Poor 0 – 10%	Good – Excellent 50- 60% Fair 30 – 50% Poor 15 - 30% Very Poor 0 – 15%	**20% Maximum Disturbance** – Moist ranges good – excellent condition on slopes 0-15%. **15% Maximum Disturbance** – Fair condition moist ranges. Dry ranges – fair condition under 15% slopes, good or better condition 16-25% slopes. **10% Maximum Disturbance** – Moist ranges in poor or lower condition. Dry ranges good-excellent condition 26-45% slopes, fair condition 16-25% slopes, and poor condition 0-15% slopes.

*If use is concentrated in a short period, as a week or two, and substantial regrowth will result, allowable use can be increased to the high use recommended for the condition class. Significant regrowth seldom occurs on dry ranges after mid June in Region 1. Allotment management plans that have been updated more recently have the following, more stringent utilization standards by "stand stage". The stand stage process is described in "Methodology".

Stage Stand Allowable Utilization Levels --Upland Utilization

Herbaceous	Timing of Use[1]		Timing of Use[2]			Timing of Use[3]
Vegetation	**Early**	**Mid**	**Early**	**Mid**	**Late**	**Yearlong**
Stage 1	50%	45%	60%	50%	40%	45%
Stage 2	45%	35%	50%	40%	30%	35%
Stage 3	35%	25%	35%	30%	25%	20%
Stage 4	0-5%	0-5%	0-5%	0-5%	0-5%	0-5%

[1] These levels assume that the area is used for only a portion of the year every year

[2] These levels assume that the area is used for only apportion of the year and NOT every year; i.e. receives periodic rest.

[3] This level assumes that the area is used for the entire grazing season.

Data Sources:

Range inspection records, utilization studies, range analysis.

Current Efforts and Findings:

All seventy-eight active allotments across the forest are categorized using A, B or C. These categories can change from year to year 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.

Documentation of Monitoring Methodology:

Mapping Methodology

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

Utilization Methodology

According to the Range Analysis Handbook (R-1 FSH 2209.21 4/77 AMEND 21, pg. 421-424-1) utilization can be monitored by ocular estimates, grazed plant, grazed loop methods and clipped-weight methods. The method used to determine utilization for 2007 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 competed, 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:

Allotment Name	Ranking (A, B, C)	Timing of Use				Average Use %
		Early	Mid	Late	Continuous	
Blossburg	A		40			40
Ophir Hope	A	No Monitoring				
Slate Lake	A	35		30		33
Spring Gulch	A	No Monitoring				
Alice Creek	A	60	55	40		52
Chimney Creek	A				25	25
East Nevada	A				22	22
Moose Creek	A	30		35		33
Stonewall	A				47	47
West Nevada	A				38	38
Willow Creek	A				35	35
South Crow	A	50	26	34		37
North Crow	A	36		40		38
Dahlman	A	28	48			38
North Fork	A		29			29
Deep Creek	A	29	36	36		34
Summary of “A” Allotments Monitored:		38	39	36	33	36
16 “A” Allotments total, 14 monitored:						
Big Buffalo	B		55			55
Clancy	B		33	75		54
Grouse Ridge	B	65	55			60
Hat Creek	B	45				45
Indian Flats	B		40			40
Jim Ball	B		55			55
McClellan	B	50				50
Maupin	B	28				28

Allotment Name	Ranking (A, B, C)	Timing of Use				Average Use %
		Early	Mid	Late	Continuous	
Nelson Favorite York	B	40				40
Spotted Dog	B				40	40
Clarks Canyon	B				25	25
Canyon Cr/Sandbar	B		15			15
Horsefly	B		35			35
Keep Cool	B	20				20
Shinglemill	B				30	30
Marsh Creek	B	52		45		48
East Pacific	B			32		32
Pole Creek	B	28	32	29		30
Grassy Mountain	B			26		26
Dry Creek	B	41				41
Magpie	B		31			31
Whites Gulch	B			27		27
Avalanche	B		35			35
Summary of "B" Allotments Monitored:		40	35	38	32	37
30 "B" Allotments total; 23 monitored						
MacDonald Pass	C				35	35
Dog Creek	C				33	33
North Beaver	C			25		25
Diorite	C		34	34		34
Whitehorse	C			47		47
Thompson	C				28	28
Boulder Bar	C	45	40	40		42
Wagner/Snedaker	C		10			10
Gould	C				35	35
Tarhead	C	55		40		47
Summary of "C" Allotments Monitored:		50	28	37	33	34
33 "C" Allotments total, 10 monitored:						

Data Analysis Methods:

Overall utilization was determined by taking the average utilization in each pasture monitored and dividing it by the number of monitoring transects. The average of 2005-2007 was then calculated. This value was compared with the Range Analysis Handbook (pg.633-1) guidelines based on grazing system and condition class. One basic assumption was that everything was in good to fair condition. The standards for continuous grazing are assumed to be early use in all allotments. All continuous use allotments have an early turn on date and are grazed until the end of the season or allowable use is met.

Monitoring Results:

Utilization was measured on forty-seven of the seventy-eight active allotments in 2007, thirty-three of the active allotments in 2006 and thirty-nine of the active allotments in 2005. Of the forty-seven allotments monitored, 88% of the "A", 76% of the "B", and 30% of the "C" allotments were monitored. The remaining "B" and "C" allotments that were not monitored are allotments that generally are in non-use, in compliance or do not have major issues like T&E species. The average utilization for 2005 was 30%, in 2006 it was 42% and in 2007 it was 36%. The average of the three years was 33% and when compared with the 2007 average of 36%, there is a 3% difference.

The utilization constraints of the Forest Plan and FSM Range Analysis handbook actual use standards by livestock were met approximately on 87% of the forty-seven allotments monitored in 2007.

Variability Measure Discussion:

Variability Measure:

+/- 10% variance from present over a sustained (3 yr) period.

Assessment:

As noted above, the variance for 2007 as compared to average of years 2005-2007 was 3%. This element was met for 2007 in the allotments monitored.

The variability measure for this element is difficult to interpret in a meaningful way. It appears that the comparison occurs between the current year's use and an average of the past three years. A three year period was provided for the 2007 report.

The intent of this element is clear—to measure forage utilization by livestock. That information is presented here, and a comparison of actual use to the Forest Plan standards is presented in the above table.

Actions in response to variability assessment:

No actions are necessary as the element is being monitored and is within the variability measure.

Recommended Efforts:

The element will continue to be monitored with an emphasis on the identified "A" allotments and if time permits the "B" and "C" allotments. All "B" and "C" allotments should be measured at least once every three years. All monitoring, including the permittees, should be inputted into the Rangeland INFRA monitoring section by pasture each year. This database would provide a historic look at monitoring on any key area, upland or riparian.

A more meaningful variability assessment for this element would be that 100% of the allotments are within the utilization standards specified in the allotment management plan, or the Forest Plan if a current allotment management plan doesn't exist. If an allotment is not in compliance over an averaged three year period, an action should be taken to assess the allotment and determine what action is needed to bring the grazing into compliance with the standard.

(D2) Allotment Management Planning and Update

Forest Plan Requirements:

Monitor allotment management planning and update.

Intent:

Insure allotment management plan updates occur at 15 year intervals, that plan is being adhered to, management objectives are being met and improvements are maintained. This is a five year average assessment.

Data Sources:

FSRAMIS (range inspection reports). This database has been replaced by the INFRA database. Environmental documents, specialist reports and allotment inspections have been used in assessing this element.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

This element is an assessment of the number of allotment management plants updated, averaged over a five year period. The past ten years of allotment planning are shown for context.

Monitoring Activity:

Allotment management plan updates for the past ten years were assessed as to the condition and trend of those allotments to assess this element.

District	Allotment Name	NEPA Decision Date
4	Poorman/Willow	27-Aug-97
4	Stemple South Poorman	27-Aug-97
Total number of allotments updated in 1997: 2 allotments		
1	North Beaver	18-Jun-98
1	East Pacific	18-Jun-98
1	Pole Creek	18-Jun-98
1	Whitehorse	18-Jun-98
2	Tizer	18-Jun-98
2	Mcclellan	18-Jun-98
2	Maupin	18-Jun-98
2	Browns Gulch	18-Jun-98
2	Cochran	23-Jun-98
2	Nelson-Favorite	23-Jun-98
2	Jimball	23-Jun-98
2	Jimtown	23-Jun-98
2	Big Log	23-Jun-98
2	Ew French	23-Jun-98
2	Moors Mountain	23-Jun-98
2	York Hills	23-Jun-98
2	Hilger	23-Jun-98
2	Willow Creek	23-Jun-98
2	Indian Flats	23-Jun-98
2	Grouse Ridge	23-Jun-98
2	Cellar-Ogilivie	22-Sep-98

District	Allotment Name	NEPA Decision Date
Total number of allotments updated in 1998: 21 allotments		
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
1	Baldy	16-Feb-06
2	Big Buffalo	23-Jan-06
2	Empire	27-Sep-06
2	Frohner	23-Jan-06
4	Gould Creek	26-Sep-06
2	Little Buffalo	23-Jan-06
2	Macdonald Pass	27-Sep-06
2	Quartz Creek Rowe Gulch	23-Jan-06
1	East Weston	14-Jul-06
1	Weston Spring	14-Jul-06
Total number of allotments updated in 2006: 11 allotments		
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		

Data Analysis Methods:

These are observational data which have been summarized.

Monitoring Results:

Fourteen allotment management plans were updated from 2002 through 2007. A total of forty-three allotments have been updated in the past ten years.

Variability Measure Discussion:

Variability Measure:

Less than 4 plans updated annually, planned objectives are not being met.

Assessment:

An average of 3 allotment management plans was updated from 2002 through 2007. An average of 4.3 allotments has been updated annually over a ten year period. This variability measure is not being met for the past five year period, but it has been met over a ten year period.

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. Five allotments were planned for updates in 2007. Two allotments are planned for 2008. This will still improve movement towards meeting the requirements of this element.

Recommended Efforts:

Place additional emphasis on allotment plan updates. Continue to monitor updated allotment management plan implementation. Conduct utilization studies and monitoring as required in the environmental documents. Permits should be adjusted if changes projected in the environmental analyses do not occur. Make any future AMP revisions adaptive management so that issues can be addressed without having to repeat the NEPA process except for site specific items, such as additional water developments or fences.

(D3) Weed Infestations

Forest Plan Requirements:

Monitor weed infestations.

Intent:

Monitor weed infestations, effectiveness of control measures activities responsible, implementation of IPM techniques.

Data Sources:

Sources include Allotment inspection records, reforestation exams, range analysis, mining projects, INFRA data base, CE projects, KV plans, and the Weed EIS.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Ocular estimates and previous years data records are utilized in evaluating treatment effectiveness to plan and assess future treatment priorities (roads, campgrounds, trailheads). A combination of ocular, photo points, population counts (sweeps), and nested rooted frequency (stem counts, canopy cover, and stem density) are utilized to monitor biological populations and effectiveness. Research plots are designed to determine effectiveness of the treatments, or rate of invasive species spread. Research plots are set up to measure percent cover, density and rooted frequency. Risk analysis and modeling was conducted to provide data for the development of the Weed EIS and be utilized as a management tool for noxious weeds. This information is located in the Weed EIS project file and the weed monitoring files present at each district.

Monitoring typically consists of photo-points, stem counts, net sweeping and/or ocular observation, and detailed vegetation analysis.

Monitoring Activities:

Monitoring / Mapping

Monitoring occurs annually across various areas of the Forest. However, the level or intensity of monitoring depends upon the level of funding. It provides an overview of treatment effectiveness and provides information for adaptive management.

Fourteen biological release sites and 2,977 herbicide acres were monitored in FY 07. Due to the long term nature of biological control, it may not be cost effective to do extensive monitoring every year.

Monitoring objectives of biological control release are to:

- determine if the insects have become established at the release site;
- measure the general size of the bio-control agent population at one or two points in time;
- assess the spread of these insects away from the immediate release site;
- quantify the population of the target weed species at each release site to permit describing change over time;
- note site characteristics at each location to eventually permit correlating these characteristics with success or failure of insect population establishment; and
- establish permanent photo points at each release site to display changes in plant populations over time.

Table 1 – FY 07 Biological Monitoring

Site	Bio Agent	Target Species	Photo Points	Stem Counts	Ocular Assessments	Net Sweep
Cave Gulch/Coxey Gulch	Mecinus janthinus	DT			Yes	Reduction on plant size, vigor, and stems/acre
Ohio Gulch	Mecinus janthinus	DT	Yes	Yes	Yes	Establishment
Horse Gulch/Magpie	Apthona nigriscutus/flava	LS			Yes	Minimal stems found/Feeding damage evident/Redistribution is ongoing
	Larinus minutus	SK				
Cement Gulch						
Deep Creek Pass	Larinus minutus	SK				Establishment/Increase populations
Hamilton Place	Apthona nigriscutus	LS	Yes		Yes	Feeding damage evident, Redistribution is ongoing
Stubblefield	Apthona nigriscutus	LS	Yes		Yes	Feeding damage evident, Redistribution is ongoing
Grizzly Gulch	Apthona nigriscutus	LS	Yes		Yes	Feeding damage evident, Redistribution is ongoing
Wing Ranch	Apthona nigriscutus	LS	Yes		Yes	Feeding damage evident, Redistribution is ongoing
Walker Gulch	Apthona nigriscutus/flava	LS	Yes		Yes	Feeding damage evident, Redistribution is ongoing
Milburn Place	Apthona nigriscutus/flava	LS	Yes		Yes	Feeding damage evident, Redistribution is ongoing
Nelson Gulch	Apthona nigriscutus/flava	LS	Yes		Yes	Feeding damage evident, Redistribution is ongoing
Horse Pasture	Apthona nigriscutus/flava	LS	Yes		Yes	Feeding damage evident, Redistribution is ongoing
Horse Gulch	Apthona nigriscutus/flava	LS	Yes		Yes	Feeding damage evident, Redistribution is ongoing
Whites Gulch, Indian creek,	Cyphocleonus achates	SK			Yes	Feeding damage evident, Roots infested – insectary

Site	Bio Agent	Target Species	Photo Points	Stem Counts	Ocular Assessments	Net Sweep
Cabin Gulch						nearly free of knapweed
Aldrich Gulch	Mecinus janthinus	DT & CT			Yes	Minimal feeding damage at the insectary, added a release
	Apthona nigriscutus	LS				
	Apthona nigriscutus	LS				
	Apthona nigriscutus	LS				
	Apthona nigriscutus	LS				
	Apthona nigriscutus/flava/lacertosa	LS				
	Apthona nigriscutus	LS				
	Larinus minutus	SK				
	Larinus minutus	SK				
	Apthona nigriscutus/flava	LS				
	Apthona nigriscutus	LS				
	Apthona cyparissiae	LS				

The following steps are undertaken when evaluating biological release sites:

- determine if the insects have become established at the release site;
- measure the general size of the bio-control agent population at one or two points in time;
- assess the spread of these insects away from the immediate release site;
- quantify the population of the target weed species at each release site to permit describing change over time;
- note site characteristics at each location to eventually permit correlating these characteristics with success or failure of insect population establishment; and
- establish permanent photo points at each release site to display changes in plant populations over time.

Herbicide Effectiveness Monitoring

A total of 2,977 acres were monitored in 2007. On the Townsend district 523 acres were monitored, displaying upwards of 90% control on spotted knapweed, while other weed species such as toadflax and spurge displayed lower rates in the 70 and 80 percent control. The Helena district monitored 1,994 acres with spring efficacy of treatments revealing upper 70's to low 80's, while fall efficacy of treatments show higher levels of control (90's) on all target species. The Lincoln district monitored 460 acres with excellent control (high 90 percent) on spotted knapweed.

Table 2, below, displays the effectiveness of various herbicide treatments on the target species. Effectiveness monitoring provides significant information for future strategies and planning efforts.

Table 2 – FY 07 Herbicide Effectiveness Monitoring

Site	Target Species	Method/Observations
Cabin Gulch	Knapweed, thistles, hounds-tongue	Several new patches of weeds were located
Atlanta Creek	Common tansy, thistle	Monitored off road treatment and mapping
Cave Gulch Fire Area	Dalmatian toadflax, leafy spurge, knapweed.	Twenty herbicide effectiveness plots were not read this year. To date, treatments display a range of 70 to 90% control. Post effectiveness monitoring of fall aerial contract in 2006 indicates treatment is affecting target species, while non-target species display no immediate effects. Sensitive plant locations were buffered and herbicide drift and water quality monitoring was in place at the time of application.
Jimtown Fire Area	Dalmatian toadflax, leafy spurge, knapweed.	Herbicide effectiveness plots established in 2001 were not read this year. To date, treatments display a range of 70 to 90% control. Post effectiveness monitoring of fall aerial contract in 2006 indicates treatment is affecting target species, while non-target species display no immediate effects. Buffers were placed around water seeps and the Jimtown Road at the time of application.
Belts Mtn. Range	Spotted knapweed, Dalmatian toadflax, leafy spurge, common tansy, hounds-tongue, Canada thistle, musk thistle	Photo points established and ocular site condition noted. Treatment and effectiveness monitoring will continue to be monitored. Areas of infestations have continually grown. Level of treatment does not meet or exceed annual spreading rate.
Divide Mtn. Range	Spotted knapweed, Dalmatian toadflax, leafy spurge, common tansy, hounds-tongue, Canada thistle, musk thistle, orange hawkweed (New Invader)	Photo points established and ocular site condition noted. Treatment and effectiveness will continue to be monitored. Areas of infestations have continually grown. Level of treatment doesn't meet or exceed annual spreading rate.
Blackfoot. Range	Spotted knapweed, Dalmatian toadflax, leafy spurge, common tansy, hounds-tongue, Canada thistle, musk thistle, orange hawkweed,	Photo points established and ocular site condition noted. Treatment and effectiveness will continue to be monitored, determining treatment priorities for the coming years. Areas of infestations have continually grown. Level of treatment doesn't meet or exceed annual spreading rate.
Elkhorn, Belts, Divide, and Blackfoot road rights of way	Spotted knapweed, Dalmatian toadflax, leafy spurge, common tansy, hounds-tongue, Canada thistle, musk thistle, orange hawkweed, oxeye daisy, henbane	Ocular observations are conducted to determine effectiveness and to plan/prioritize treatment areas for coming years is on going. Roadside treatment is the number one priority of treatment. Effectiveness of treatments is very high.
Marsh Creek	Thistle	Photo points established and ocular site condition noted. Treatment and effectiveness will continue to be monitored. Area of infestation has been reduced over the past few years. A 50% decline in acres treated have resulted from continuous monitoring and spot treatment.
Poorman KV	Spotted knapweed Musk thistle	Ocular, this road system was initially treated under the sale contract upon entry. Follow up treatments are being accomplished with KV funding. This road system was highly infested and will require retreatment to reduce the soil seed bank and get this road system in good condition. Control and monitoring under sale plan dollars continues evident by a reduction in acres treated from year to year.
Alice Creek	Yellow toadflax, St. Johnswort	Photo points established and ocular observations were made to monitor infestation size and effectiveness of treatment.

Site	Target Species	Method/Observations
		Infestation has remained stable over the past two years. No St. Johnswort plants were observed in the fall of 2006. This is one year after initial treatment.
Patterson Prairie	Spotted knapweed	Ocular estimates of infestation canopy cover and site description noted. Monitoring in 2006 indicates a 70% reduction in area treated from the previous years.
Road right-of-ways, Ogden, Dalton, Copper Creek	Knapweed, Hounds-tongue, Yellow toadflax	Ocular observations to determine herbicide effectiveness and planning to prioritize treatment areas indicate reductions ranging from 55% – 78% in land treated. There is a direct correlation between levels of effectiveness and species treated.
Lincoln Trail heads & Campgrounds	Spotted knapweed	Ocular observations, Determine application needs and signing. Trail heads on the district have a low level of weed infestations and are remaining stable under approximately 50% herbicide treatment effectiveness.
Aspen Grove Campground	Spotted knapweed	Ocular, general site condition and infestation size and canopy cover noted. Herbicide effectiveness has decreased the size of infestation by 50%.

Data Analysis Methods:

Simple statistics were performed on the data.

Monitoring Results:

Effectiveness monitoring indicates mixed success. The variability of success becomes grossly evident depending upon species and site characteristics. Effectiveness monitoring has increased since 2001 due to the increased funding. Herbicide treatment on 20% of inventoried acres contained and controlled weed infestations from increasing across the Forest. Table 4 and the following charts display data collected from over 25 herbicide effectiveness plots established in 1999.

Biological control was elevated significantly in 2001, releasing approximately 1 million insects each year until 2004. Insect populations have been recorded as having the physical capability to survive harsher climatic conditions on most of the release sites. Higher than expected survival rates appear to be reducing target weed species and rate of spread. Photo points identify reductions in plant density and plant cover, and redistribution efforts are ongoing.

Research

Research was planned through the implementation of an aerial contract, but since the contract was not awarded the research was cancelled.

Variability Measure Discussion:

Variability Measure:

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

Assessment:

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

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

Actions in response to variability assessment:

Significant expansion of the noxious weed program was a result of the 2000 fire season. Budgets gained significantly, rising to several million dollars each year, providing the foundation for halting weed expansion. A Noxious Weed EIS has been prepared identifying the need for action. The Record of Decision has been approved allowing for adaptive management including aerial treatment on lands outside the grizzly bear recovery zone. Education, monitoring, research and herbicide and biological control from 2001 through 2005 have held noxious weeds in check.

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

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

A risk analysis was completed for the Helena National Forest and found that an estimated 319,700 acres on the Forest are currently susceptible to weed invasion based on acres of rangeland and forested areas with less than 35 percent tree canopy coverage, including 43,000 acres burned in 2000.

Table 3—Total FY07 Helena National Forest Direct Weed Control (Acres)

Control Type	D1	D2	D4	Total
Herbicides (Acres)	1225	517.5	1477	3,279.5
Biological Agents (acres)	30	37	0	67
Pulling (Acres)	1	3	1	5
TOTAL	1256	557.5	1478	3351.5

Table 4-- FY 07 Herbicide Treatment By Fund Code (Acres)

Fund Code	D1	D2	D4	Total
CWKV - KV				
CWKV-KV-CONTRACT				
NFVW – Weed Mgt.	549	517.5	169	1,235.5
NFVW-NW-CONTRACT GROUND				
CWK2	676		208	884
NFVW-COOP			1100	1100
CWK2-CONTRACT GROUND				
CWK2-CONTRACT AERIAL				

Fund Code	D1	D2	D4	Total
RAC – Resource Advisory Committee				
STEWARDSHIP				
Administrative Site				
TOTAL	1,225	517.5	1,477	3,279.5

Table 5 – FY 07 Herbicides Used

Herbicide	Registration#
2,4-D	228-145
	01381-00103
	71368-1
	34704-120
	5905-501
PICLORAM	62719-6
PICLORAM	62719-6
IMAZAPIC	241-365
CLOPYRALID	62719-259
METSULFURON METHYL	352-439
CLOPYRALID/2,4-D (CURTAIL)	62719-48
CHLORSULFURON	352-522
DIGLYCOLAMINE	100-884
GLYPHOSATE	42750-59
DICAMBA (VET10G)	28-309

Targeted weed species: white top, musk thistle, diffuse knapweed, spotted knapweed, oxeye daisy, Canada thistle, houndstongue, leafy spurge, St. Johnswort, Dalmatian toadflax, yellow toadflax, sulfur cinquefoil, common tansy, tall buttercup, and orange hawkweed.

Manual Treatment

Pulling occurred on approximately 5 acres of weed infested areas on the Helena NF. This activity was focused on small infestations in backcountry areas, trailheads, ranger stations, campgrounds, grazing allotments, administrative sites and burned areas. Table 6 below provides details on this activity.

Table 6 – FY 07 Weed Pulling

Ranger District	Acres Pulled	Location/Target Weed
Townsend	1	Knapweed pulled in Whites gulch between the salt ground and ridge in the South pasture
Helena	1	Knapweed, Perennial pepper weed, Dalmatian toadflax were pulled at various times on administrative sites to eliminate non-target mortality.

Ranger District	Acres Pulled	Location/Target Weed
Helena	2	Knapweed, and Dalmatian toadflax were pulled at various times in the Gates of Mountains Wilderness area, specifically at Meriweather and Coulter campgrounds to eliminate non-target mortality and recreation/public visitor herbicide concerns.
Lincoln	1	Knapweed, yellow toadflax, common tansey, and St. John's wort were pulled at various times on administrative sites, and riparian areas to eliminate non-target mortality and recreation/public visitor herbicide concerns. Aspen Campground and Moose Creek Trailhead.
TOTAL	5	

Weed Education

Weed education, awareness and prevention are a high priority on the forest. Basic weed awareness and identification training is provided to the districts at orientation and field identification handbooks and weed calendars are made available to employees. Weed education is an ongoing activity on the Helena NF and is not limited to formal presentations. Constant interaction occurs between the Helena NF weed staff and all functional areas and specialists. Districts are signing trailheads with weed awareness information, "Weed Free Feed Required" signs are posted on major forest access roads; recreation site bulletin boards and "Leave No Weeds" posters and other weed information brochures.

Table 7 – FY 07 Education Presentations

Date	Teacher	School	# of Presentations	# of Students
May 07	Jay Winfield, Phil Walsh, Jim Nelson	Dearborn WMA	2	40
May 07	Diane Johnson, Tracy Schilling, Jay Winfield, Phil Walsh, Jim Nelson, Wes Simpson, and Misty Hamilton	Winston WMA	2	20
May 07	Shawn Heinert	Lincoln school district	6	65
June 07	Shawn Heinert	Patterson Prairie WMA	1	10
June 07	Phil Walsh, Jim Nelson, Jay Winfield	Dearborn WMA	1	18
June 07	Jay Winfield	Last Chance BCH	2	16
June 07	Jay Winfield	Last Chance BCH	1	6

Recommended Efforts:

Continue an aggressive approach in noxious weed management under the 2006 Noxious Weed EIS and prepare and release the second Record of Decision authorizing treatment in the Grizzly Bear Recovery Zone.

Plan and implement treatment of 6,000 plus acres annually to curtail the annual spread rate and meet the goals and objectives outlined in the 2006 weed EIS. Increase funding to support the aggressive effort identified in the noxious weed EIS. The new weed EIS is consistent with the new state wide weed management plan that is currently implemented by all counties across the state of Montana. Noxious weed management strategies include; control, containment, and eradication of new invaders.

(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 1) 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 (1997 through 2007). An assessment of ongoing annual monitoring is summarized as well. Annual monitoring is important to help identify long term trends of use, which determine condition and trend.

Documentation of Monitoring Methodology:

Rangeland condition and trend has been monitored through quantitative data collection with ECODATA, TERRA and FSVEG protocols, specifically cover/frequency and ocular plant composition methods, and qualitative stand stage mapping which is based on ECODATA inventory.

The Region 1 rangeland data collection system from the mid-80's through the early 90's was collectively called ECODATA. Cover/frequency, line intercept and plant composition protocols were used throughout the Forest during that time. ECODATA has been replaced by the NRIS national database TERRA protocols which are very similar to ECODATA protocols. ECODATA legacy data has been "rolled over" into the TERRA system.

Allotments that are being inventoried for the purpose of plan update are mapped using stand stage protocols, and additional data collection using quantitative protocols such as plant composition data or cover/frequency data is used to validate the stand stage mapping. Protocol descriptions for plant composition and line intercept can be found on the NRIS website http://fsweb.wo.fs.fed.us/rge/inventory/index.shtml . The protocol for cover/frequency is described on the FIREMON website, but will be included in the TERRA protocols in the future. http://www.fire.org/index.php?option=com_content&task=category&sectionid=5&id=18&Itemid=42

The stand stage methodology is found in the project file. ECODATA 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.

Monitoring Activity:

Allotment management plan updates for the past ten years are shown in the following table. Actions that were taken in the plan updates are shown and monitoring and actions taken since the plan update are summarized as well.

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
POORMAN/WILLOW	27-Aug-97	The AMP decreased the grazing season and head months Vegetation: key areas have been established, a long term (effectiveness) monitoring plot was established in 2003 on Willow and will be read again in 2008 to establish data to determine change in trend. Hydrology: Three short term (implementation) monitoring plots were established to monitor riparian area utilization, stubble height and bank alteration to meet the requirements of the Infish Biological Opinion. Improvements: reconstruct 1 water development, reconstruct 1.5 miles of fence and 1 cattleguard	Average upland utilization was 30%, standards were met, 6" stubble height and 12% bank disturbance, 10% riparian use Improvements: 1.5 miles of fence and 1 cattleguard has been constructed Likely to not have decreased condition due to the reduction, proper utilization and improvement construction.
STEMPLE SOUTH POORMAN	27-Aug-97	Combined with Poorman/Willow,	Poorman drainage was removed from the allotment due to fisheries concerns. No decrease in allotment conditions
NORTH BEAVER	18-Jun-98	Increase in the season of use 5 days Improve riparian and upland conditions and distribution Vegetation: key areas have been established Wildlife: Do random measurements within any grazing area prior to June 30 to insure that stubble heights of at least 6" are left. Improvements: reconstruct 1 water development, reconstruct 2 fences	ECODATA plots were re-read or re-photographed in 2004-2005 due to ERG study for the Elkhorns, Average utilization was 23%, standards were met, permittees did ocular estimates of elk use prior to livestock entering the forest. Improvements: Water developments and fences have been reconstructed and 2 new developments have been constructed Likely to not have decreased condition due to proper utilization and improvement construction.
EAST PACIFIC	18-Jun-98	No change in stocking rate or season of use Improve riparian and upland conditions and distribution Vegetation: key areas have been established Wildlife: Measure utilization levels on core winter range areas to insure 3" forage base. Hydrology: establish long term cross sections in representative	ECODATA plots were re-read or re-photographed in 2004-2005 due to ERG study for the Elkhorns, Average utilization was 35%, meeting standards utilization and for core winter range for elk Riparian cross sections reread in; Lower Weasel Creek – 1998 Upper Weasel Creek – 1999 These transects have only been read once so a comparison is not available.

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
		riparian areas Improvements: reconstruct 8 water development, reconstruct 4 fences, one private boundary	Wildlife utilization was monitored with the ERG study prior to livestock entering the forest. Improvements: 6 water developments have been reconstructed and 2 fences have been constructed using electric fence. 2 fences were reconstructed in 2001. Likely to not have decreased condition due to proper utilization and improvement construction.
POLE CREEK	18-Jun-98	No change in stocking rate or season of use Improve riparian and upland conditions and distribution Vegetation: key areas have been established Hydrology: establish long term cross sections in representative riparian areas Improvements: reconstruct 4 water development, reconstruct 1 fence if monitoring indicates the need	ECODATA plots have been re-read or re-photographed in 2004-2005 due to ERG study for the Elkhorns, Average utilization was 19%, monitored by FS and permittees Riparian cross sections reread in; Pole Creek – 1999 These transect has been read once so a comparison is not available. Wildlife utilization was monitored with the ERG study prior to livestock entering the forest. Improvements: 3 water developments have been reconstructed and a new one constructed that was not identified in AMP, monitoring indicates that the fence is not necessary in Horsethief park. Likely to not have decreased condition due to proper utilization and improvement construction.
WHITEHORSE	18-Jun-98	No change in stocking rate or season of use Vegetation: key areas have been established Hydrology: establish long term cross sections in representative riparian areas Wildlife: Measure utilization levels on core winter range areas to insure 3" forage base. Improvements: reconstruct 4 water development, reconstruct 1 fence	ECODATA plots have been re-read or re-photographed in 2004-2005 due to ERG study for the Elkhorns, Average utilization was 21%, meet utilization standards and for core winter range for elk. Riparian cross sections reread in; Kimber Creek – 1999, 2003 Carex and redtop are more established on the bank, trapping sediment. The greenline is getting wider because livestock impacts have been minimized. Wildlife utilization was monitored with the ERG study prior to livestock entering the forest. Improvements: 4 water developments have been

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
			reconstructed and all interior fences were reconstructed with a grant in 2001. Likely to not have decreased condition due to proper utilization and improvement construction.
TIZER	18-Jun-98	No objectives for this allotment. It will be closed	Allotment has been closed
MCCLELLAN	18-Jun-98	Move turn on date later – to June 28 Maintain/rebuild improvements: construct 6 new improvements Establish permanent ecodata plots in stage 3 areas. Read every 10 years. (Lower Corral Gulch and Casey Meadows). Reclassify stage 3 areas - year 5 & 10 Establish & monitor key areas. Map utilization distribution years 3, 5, 10. Establish cross sections on low similarity reaches wildlife/fisheries monitor for ruffed grouse populations & residual stubble height for ground nesting birds. monitor for desirable brooktrout habitat in occupied drainages . Monitor WCT areas. Establish photo points and do disturbance transects	Turn on date has been changed Maintenance has been kept up, one new water development and the hardened water crossing have been built. Several other projects deemed not needed or not feasible Two areas of stage 3 are on the allotment, however no ecodata plots have been established Key areas have not been established and utilization distribution has not been mapped, however areas of concern are monitored and utilization measured A riparian transect has been established on Corral Gulch and reread once, however no low similarity reaches were identified in the EA (p. III-62) No information was available. Likely to not have decreased condition due to proper utilization and improvement construction.
MAUPIN	18-Jun-98	Maintain/rebuild improvements: construct 4 new improvements (3 water, one cattle guard), maintain existing improvements Establish permanent ecodata plots in stage 3 areas: Upper Strawberry, Gardner Ranch, section 8 fenced in with ungrazed private inholdings.	1 water development has been reconstructed, one built and 1 cattleguard installed. Maintenance has been worked on, however with only 1 permittee left there is a back log here. One of the stage 3 areas is no longer being grazed as it was part of an on-off situation that no longer exists, second area is private ground now fenced out of allotment, and the third

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
			will never recover as it is a parking & kegger site.
		Establish & monitor key areas. Map utilization distribution years 3, 5, 10.	No key areas have been established although problem areas are monitored for utilization.
		Establish cross sections on representative reaches of aggregate 11. Monitor years 1, 3, 5, & 10	No riparian cross sections have been established.
		wildlife/fisheries	No wildlife monitoring was available.
		monitor for ruffed grouse populations, monitor stubble height for ground nesting birds, monitor for desirable brook trout habitat in occupied drainages (no WCT this allotment)	
		Establish photo points and do disturbance transects	
			One permittee has been moved to another allotment so stocking level is way down. Another permittee lost his permit due to out of season unauthorized use.
			Will be considering partially filling these vacancies through grant process so that existing permittee does not have enormous improvement load that used to be divided between 3 permittees.
			It is unlikely that condition has decreased as overall stocking has decreased.
BROWNS GULCH	18-Jun-98	Manage cooperatively with the adjacent BLM allotment.	Currently not stocked with livestock (last grazed in 2000) Permit waived back to government.
		Hydrology: establish cross section in representative reaches of low similarity (N. Fk Warm Springs creek) & improve to moderate similarity	Riparian cross section established 1999(?) on North Fork Warm Springs creek, read in 2000.
		Relocate Bauer drift fence	Fence not relocated – has not been an issue with this allot vacant and adjacent allotment under stocked
		Establish permanent ecodata plots in stage 3 areas Improve stage 3 areas to stage 2 in 10 year period	Ecodata plots not established: this area would be along the ridge in section 24
		Establish & monitor key areas.	Key areas not established,
		Map Utilization distribution years 3, 5, 10	Not done because allotment is vacant

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
		Benefits wildlife by maintaining 30% of area suitable for spring ground nesting,	Occasional trespass in Badger creek area, however this allotment has essentially been rested for 8 years. Unlikely to restock in foreseeable future as lack of water is a problem. It is unlikely that this allotment has decreased in condition due to lack of stocking.
COCHRAN	23-Jun-98	No active grazing (available for forage reserve)	A portion of this area burned in 2007 in the Meriwether fire
NELSON-FAVORITE	23-Jun-98	Improvements: fence maintenance needed; construct 2 water developments; construct a stock driveway for access to Lions Gulch; Sweats Gulch pipeline; extend Two Rocks pipeline; construct new fences sec 13, 24, 22 & 23. Establish permanent ecodata plots in stage 3 areas and read every 10 years, reassess stage 3 & 4 areas in years 5 & 10; map utilization distribution years 3,5,10 Establish cross section transects in aggregates 3,14,15,16,29 and read in years 1,3,5, &10 Identify and monitor key areas Permittee will record management activity. Maintain 30% of grassland habitat for nesting April to June 30 with stubble height of 6" or more, leave residual forage for elk winter/spring range.	Improvements: 2 new water developments have been built and maintenance/tank replacement done on several other older developments. Prior to 2007 grazing season a new fence was built to split a pasture and with an eye towards being able to make use of Devils Tower area. Some proposed improvements on hold in part because of travel planning in progress There is only one small stage 3 area on the York Hills area and no stage 4 areas. No ecodata plot has been established, no utilization distribution has been mapped, Utilization is checked in areas of concern, usually after cattle have gone home No transects have been established No key areas have been established Permittee does provide a lot of information though not in a timely manner. Permittee has only used small area of this allotment in 2006 and 2007 due to late date of moving cattle off the higher elevation allotments It is unlikely that this allotment has decreased in condition due to decreased livestock use.
JIMBALL	23-Jun-98	Establish permanent ecodata plots in stage 3 areas and read every 10 years. Reclassify stage 3 & 4 areas – years 5 & 10	There is only one stage 3 area on this allotment (and no stage 4 areas) and it is now in an area that is fenced and only used for gathering & trailing. This area also includes a long stretch of NF

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
		Map utilization distribution in years 3,5, & 10 Establish cross sections in representative reaches of aggregates 3, 14, and 24. Read in years 1, 3, 5, &10 Establish and monitor key areas Wildlife – random monitoring for stubble heights at least every 3 years, monitor ruffed grouse populations, establish photo points in riparian disturbance areas Fisheries – establish photo points and do disturbance monitoring every 3 years	& FAR Pikes Creek. However fire team let permittee put cattle in here in 2007 and we definitely lost some of the improved conditions we had gained since fencing. No ecodata plots have been established Utilization distribution has not been done however areas of concern are checked for utilization. No cross sections have been established (no aggregate 24) Key areas not established No wildlife monitoring was available. Improvements: 4 water developments have been reconstructed It is unlikely that this allotment has decreased in condition.
JIMTOWN	23-Jun-98	No active grazing, may be used on a case by case basis in emergency situations and/or intermittent resource relief	No inspections have been done since this area was closed. Some weed treatments have taken place
BIG LOG	23-Jun-98	No active grazing Not a part of the Beaver Soup AMP's	This Allotment was combined with the Nelson Allotment in 1960 and some time after then (year unknown) what had been the Big Log portion of the allotment was removed from grazing.
EAST-WEST FRENCH	23-Jun-98	15% reduction – season & numbers Nested rooted frequency plots in 1998 & 2004 inside & outside the 3 exclosures Establish ecodata plots in stage 3 areas (3 locations) Map utilization distribution years 3, 5, 10 Establish & monitor riparian cross sections on reaches of aggregates 3 & 24 Establish & monitor key areas Wildlife – random measurements every 3 years to	Season & numbers have been reduced No monitoring transects or plots have been established. The old exclosures have been removed and not yet rebuilt No utilization distribution done. No riparian cross sections have been established.(No aggregate 24) Key areas have not been established

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
		assure 6" stubble height, monitor ruffed grouse populations Fisheries – disturbance monitoring with photo points Construct 6 water developments	Improvements: 6 water developments have been constructed. Some changes in locations due to heritage concerns Allotment was in non use for personal convenience in 2007 It is unlikely that this allotment has decreased in condition due to the decrease in livestock stocking.
MOORS MOUNTAIN	23-Jun-98	Establish ecodata plots in stage 3 areas and reread every 10 years (head of Porcupine Creek) Reassess stage 3 & 4 areas (there are no stage 4 areas) Map utilization distribution in years 3, 5, & 10 Determine and monitor key areas Permittee will record management activities	Due to riding requirements in the plan, this pasture/allotment has not been grazed since 2004 Improvements: 1 water development was reconstructed and Trail # 263 out of the bottom of the Porcupine Creek drainage has been relocated, and the rehabilitation of the old trail and stream crossings have been completed. It is unlikely that this allotment has decreased in condition due to the decrease in livestock stocking
YORK HILLS	23-Jun-98	Combined with Nelson-Favorite to provide opportunities considering a rotation of both spring and fall grazing based on plant characteristics and water availability.	See Nelson-Favorite
HILGER	23-Jun-98	No active grazing-allotment closed	No decrease in allotment conditions
WILLOW CREEK	23-Jun-98	No active grazing-allotment closed	No decrease in allotment conditions
INDIAN FLATS	23-Jun-98	Divide allotment into 2 pastures, construct a water development at the head of Pikes creek Establish ecodata plots in stage 3 areas to be read every 10 years Reassess stage 3 & 4 areas year 5 & 10 Map utilization distribution years 3,5, & 10 Establish riparian cross sections in aggregates 3, 5, 11 and read in years 1, 3, 5, &10 Determine and monitor key areas	Improvements: the allotment has been divided into two pastures and a new water development built in the new north pasture. Permittees are good about maintenance There is one area of stage 3 in the Indian Flats Pasture, no ecodata plots established Not done – we have no stage 4 areas Not done Not done Not done

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
		Permittee will record management activities Maintain grass habitat for nesting birds & monitor grouse populations Maintain habitat conditions in high & moderate similarity & occupied by WCT. Establish photo points & monitor disturbance every 3 years	Not done It is unlikely that this allotment has decreased in condition due to the development of new improvements.
GROUSE RIDGE	23-Jun-98	Construct 5 water developments Establish ecodata plots in stage 3 areas Reclassify existing stage 3 & 4 areas – year 5 & 10 Map utilization distribution in years 3, 5, & 10 Establish cross sections on representative reaches of aggregates 3, 6, & 29 and read prior to September & livestock use (?) Determine & monitor key areas (riparian & uplands) Wildlife: insure that there is sufficient stubble height (6") for ground nesting birds. Monitor grouse populations, Set up photo monitoring points in riparian disturbance transects	One water development has been reconstructed and a new one built. A new fence has divided what was known as the Buckner Hill pasture into 2 pastures. Some other water developments deemed not feasible or not needed or the locations (2) had heritage concerns There are no stage 3 or 4 areas Utilization is monitored however has not been mapped over the whole allotment This has not been done This has not been done This has not been done It is unlikely that this allotment has decreased in condition due to the development of new improvements.
CELLAR-OGILIVIE	22-Sep-98	Approximately 20% reduction in season and/or numbers Convert old Parker 3 step transects to Ecodata. Map Utilization distribution once in the next 10 years. Establish and monitor key areas. Establish riparian cross sections. Re-do PFC surveys on Cellar and Ogilvie Gulches in years 1, 5,	Season has been shortened to 1.5 mos. Not done Allotment wide utilization mapping and establishment of key areas has not taken place, however due to this being a high priority allotment with compliance problems all areas of concern are watched throughout the season. As a result the permittee had some numbers suspended in 2005 and

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
		10 Wildlife: do big game surveys years 3, 5, 7 to determine distribution, do breeding bird surveys years 1, 5, 10	2006. Due to drought, part of the permit has been in non use for resource protection and still there are utilization issues. I believe that this allotment is over stocked. Transitory range is no longer available as growth of trees in old cutting units has limited forage availability as have weeds on the private inholding on the North Fork of Little Prickly Pear. I believe we should look at opportunities to either phase out this allotment or provide more forage if another allotment becomes available in the area. Improvements: 1 fence constructed to keep cattle from drifting north towards Marsh Creek, maintenance is generally kept up. It is likely that this allotment has decreased in condition due to decreased stocking.
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. Likely to not have decreased 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. Likely to not have decreased condition due to reduction and improvement construction.
WHITES GULCH	28-Jan-00	Stocking is the same but season of use may vary	Improvements: 7 water developments have been

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
		Vegetation: key areas have been established Improvements: reconstruct 9 water development	reconstructed, 2 fences were reconstructed but not identified in the AMP for reconstruction. Likely to not have decreased 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	Plans will be implemented in the 2008 grazing season. In 2006 and 2007 permittee tried temporary fencing in several locations so that when permanent fence is built it will be in the best location to keep cattle from drifting east towards Travis Creek. The old Colorado Mtn spring has been rebuilt and is providing water on the west side of the Colorado Mtn pasture It is unlikely that conditions on this allotment have decreased.
LITTLE BUFFALO	23-Jan-06	Big Buffalo, Little Buffalo and Frohner will be used together in a flexible/adaptive manner allowing for adjustments in dates and numbers and allowing for rest of Little Buffalo or Frohner in a given year. Areas of concern to be monitored were identified in the DM: Brooklyn Bridge, riparian stringers, Go Devil Creek, Travis/Big Buffalo junction Random soil sampling as part of Forest wide monitoring	New Plans will be implemented in the 2008 grazing season. Permittee has developed a new watering source in the Go Devil pasture, but continuing drought has severely limited water on this allotment. It is unlikely that conditions on this allotment have decreased.
FROHNER	23-Jan-06	Big Buffalo, Little Buffalo and Frohner will be used together in a flexible/adaptive manner allowing for adjustments in dates and numbers and allowing for rest of Little Buffalo or Frohner in a given year. Areas of concern to be monitored were identified in the DM: Little Corral Gulch riparian and uplands, Park Lake campground (recreation conflicts), sedge bogs and wetlands Random soil sampling as part of	New plans will be implemented in the 2008 grazing season. Due to the new plan this allotment was rested in 2007

Allotment Name	NEPA Decision Date	Action Taken in Plan Update	Monitoring, Results and/or Actions Taken since Plan update
		Forest wide monitoring program	It is unlikely that conditions on this allotment have decreased.
QUARTZ CREEK/ROWE GULCH	23-Jan-06	New plans for this allotment include the ability to be able to use portions of adjacent allotments if necessary due to drought conditions or other resource concerns. Areas of concern to monitor are identified in the DM: unnamed drainage above Rye Field, Rowe Gulch riparian and upland, sedge bogs in the North Fork drainage, beaver influenced areas/wetlands Random soil sampling as part of Forest wide monitoring	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. It is unlikely that conditions on this allotment have decreased.
BALDY	16-Feb-06	Stocking is the same but season of use may vary Vegetation: key areas have been established Hydrology: establish long term cross sections in representative riparian areas Maintain existing improvements, no new ones planned.	Permit was waived to new permittee so implementation of AMP has not yet begun until new permittee is familiar with AMP and objectives. It is unlikely that conditions on this allotment have decreased.
EAST WESTON	14-July-06	Combined with Weston Springs	Land now in private ownership
WESTON SPRINGS	14-July-06	Closed due to land exchange	Land now in private ownership
GOULD CREEK	26-Sep-06	Continue current management Vegetation: key areas have been established Hydrology: establish long term cross sections in representative riparian areas Maintain existing improvements, no new ones planned.	Implemented in 2007 to continue current management, continue annual inspections There has been no change in vegetative condition, livestock distribution and location throughout the grazing season improved in 2007 due to improvement maintenance.
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 pulled in Fiscal 2007. Decision will be reissued in 2008. 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
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 pulled in Fiscal 2007. Decision will be reissued in 2008. No change in vegetative or resource condition.
MACDONALD PASS	27-Sep-06	Stocking is the same but season of use may vary Vegetation: key areas have been established Hydrology: establish long term cross sections in representative riparian areas	Decision was pulled in Fiscal 2007. Decision will be reissued in 2008. No change in vegetative or resource condition.
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.
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 It is unlikely that condition has decreased.
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 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 It is unlikely that conditions on this allotment have decreased.
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 It is unlikely that conditions on this allotment have decreased.

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. In addition to Forest Service analysis, the work of 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 2008.

Analysis:

Environmental analyses were completed for all the allotments included in the condition and trend portion of this element. Annual monitoring is assessed to determine whether livestock utilization is appropriate.

Monitoring Results:

Forty allotments which had updated allotment management plans in the past 10 years were included in this analysis (some allotments were combined or closed during the allotment planning process). Thirty-nine of the allotments were likely to not have decreased in condition, based on utilization, reductions and improvement construction as noted above. One allotment had a possible decrease in condition, based on no improvements or changes on the allotment. This represents 51% of the allotments on the Forest. It is reasonable to assume that this is a representative sample.

Variability Measure Discussion:

Variability Measure:

5% increase in acres with downward trend or a 5% decline in acres by condition class.

Assessment:

Of forty allotments presented here, forty are likely to not have decreased in condition, based on utilization, reductions and improvement construction as noted in the above table, while four allotments had a possible decrease in condition, based on utilization measurements. This is a representative sample of allotments across the Forest. 10% of the allotments possibly have a decline in acres by condition

class. It is likely that the Forest is within the variability of this element because the high utilization levels only occurred one year out of three with the exception of one allotment.

Condition and trend is a long-term assessment. The above table shows various actions that were taken in the management update process. On those allotments where grazing reductions have occurred, it is reasonable to assume that condition and trend have improved as livestock grazing decreases with reduction in season or numbers. On allotments where grazing levels were maintained, actions such as developing new water sources, improved management techniques including herding and riparian fencing should result in improved conditions.

The next update to the plan where new inventory is collected is the true measure of this element. The information presented here can be used to indicate whether improvements can be expected from actions that have been taken but the true assessment can occur with the next analysis of the allotments that are shown in the above table.

Actions in response to variability assessment:

Continue annual utilization and permit compliance monitoring to ensure plans are being implemented appropriately. Plan and execute inventory updates on at least a 15 year interval. Ensure that baseline inventory is completed in order to have a comparison for trend.

Recommended Efforts:

Ensure that plans are updated and implemented on a scheduled basis. Ensure permit compliance through utilization monitoring.

(D4.2) Conifer/Brush Encroachment

Forest Plan Requirements:

Identify/determine encroachment by conifers/bush to grassland aspect.

Intent:

Conifer encroachment is managed through the use of prescribed fire, sometimes coupled with mechanical treatment. Burning that has occurred in the past 10 years is addressed for this portion of the element.

Data Sources:

INFRA database, allotment inspection records, transect data, photo plots, wildlife surveys, and burn area monitoring, environmental documents, FSVEG. FSRAMIS was identified as a data source in the Forest Plan. This database has been replaced with the INFRA database, so it is not available or appropriate as a data source.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Observational data, written records and FSVEG information were summarized for this element.

Data Analysis Methods:

Observational data have been summarized. No further analysis beyond summarization has been done.

Monitoring Activity:

No specific activities are accomplished at a Forest scale to determine changes for this element. A fire history study was completed on the east portion of the Elkhorns in 2005 (Barrett,) that indicated substantial losses of grassland aspect have occurred for the past 100 years. Visual comparisons between

historic photos (1930's and 1940's) and 1990 aerial photos indicate that conifers have increased while grasslands have decreased on a project by project basis.

Conifer encroachment is treated on a project-by-project basis. The following table shows the acres that have been treated by Ranger District from 1996 to 2007.

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
1997-2007	9320	6683	7756	23,759

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:

23,759 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. 23,759 acres of conifer encroachment treatment, shown in the above table, is approximately 23% 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 12% 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, i.e. the canopy cover of trees on encroached land, may be a more appropriate measure of this concern. Once a baseline for encroachment is established, the ability to measure change in canopy cover on those areas be possible, and meaningful.

(D5) Permit Compliance

Forest Plan Requirements:

Permit Compliance

Intent:

Insure livestock use complies with range readiness, proper utilization and permit requirements.

Data Sources:

Allotment inspections.

Current Efforts and Findings:

Approximately 80-90% of the seventy-eight active allotments were checked either through range readiness or allotment inspections. Forty-six of the seventy-eight active allotments were checked for permit requirements this included monitoring riparian and upland, improvement responsibilities, etc... Approximately 40% of the allotments are checked for range readiness. These calculations are based on the following:

All 78 active allotments across the forest 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.

Documentation of Monitoring Methodology:

The Forest Service Handbook, (FSH 2209.13 – Grazing Permit Administration, Chapter 10 – Term Grazing Permits) are guidelines that are following when issuing a permit, procedures on dealing with non-compliance issues and non-use, either resource protection or personal convenience non-use. Forest Plan Standards for allowable use for riparian and uplands are also used in conjunction with the Forest Service

Handbook. Allotments with current Allotment Management Plans have more stringent utilization standards.

Monitoring Activity:

Allotment Name	**Compliance Issue**	**Action Taken**	**Remarks:**
Blossburg	Bank disturbance standards –due to agreement with FWS for 2007, private portions of Dog Creek do not have to comply if permittees totally protect a mile of Dog Creek in the Measdow Creek Pasture	range improvements and adaptive management, trying different things each year	Action not taken because FS have been working with permitees to implement range management practices and or structures to help mitigate the stream bank concerns
Slate Lake	Bank disturbance, utilization in Slate Creek & Elliston Creek drainages	Adaptive management Discussed at annual meeting	Upland utilization generally within standards. Use along Slate Creek is high and heavy bank trampling identified at main cattle crossing. Lower Elliston riparian exclosure electric portions were breached. Long term plans are to rebuild the old electric exclosures with barbed wire because they are hard to maintain and are often breached. New plan needed for permittee to have better direction
Spring Gulch	Bank disturbance		More mitigation work needs to be continued by Forest service which was started in 2006
Alice Creek	Cattle were not removed from the allotment in a timely manner, permittee did make some effort a few different times.	Permittee was given a written notice in 2007, on the timely removal of livestock at the end of the grazing season.	Not removing livestock in a timely manner will result in a notice of non-compliance and appropriate actions will be taken- such as billed for unauthorized use and/or reduction of numbers. The continuation of non-compliance may result in other appropriate actions taken against the permit.
Dahlman	Did not move through pastures as prescribed	2 letters putting the permittee “on notice” were sent in 2007	Permittee is taking non-use in 2008 and will use this season to make decisions about keeping the permit or not.
Whites Gulch	Excessive riparian use occurred in Whites Creek but upland standards were met throughout the allotment	problem will be addressed in the spring permittee meeting in 2008	Build a riparian fence to exclude livestock from creek and cutthroat trout habitat.

Data Analysis Methods:

For 2007 there were six issues of permit compliance across the forest. Four were being dealt with by adaptive management (working with the permittee) on riparian utilization and streambank standards. Two permittee were given letters putting them on notice that if they didn't comply in 2008 they would receive a 25% suspension for minimum of two years based on exceeded utilization levels and operating outside of AOI.

If we have a cool, wet spring, most allotments are checked for range readiness prior to livestock entering the forest. On normal years, allotments in higher elevations are checked for range readiness.

Since the beginning of the drought cycle in 2000, the line officers have the authority to offer resource protection non-use. This allows the permittees to take non-use (less than 90% of permitted numbers or season of use) without it counting towards the 3 out of 4 years of personal convenience non-use in a 10 year period, to protect the resource. Many permittees have taken advantage of the resource protection non-use. The Townsend District had nine permittees that took resource protection non-use either in permitted numbers or season of use (going on late or coming off early). This gives the permittee the flexibility to do what is best for the resource. Many times, permittees are billed for full numbers and season but if the precipitation does not happen, they are credited on the next year's bill for of amount of non-use they voluntarily took.

Monitoring Results:

There has been a 10% change from the annual operating instructions (plan) because of resource protection non-use but not from non-compliance issues. Eight percent of the 78 active allotments had some kind of permit compliance issue as displayed in the table above.

Variability Measure Discussion:

Variability Measure:

10% +/- Change from annual plan

Assessment:

This resource element has been met across the forest for 2007 as demonstrated above.

Actions in response to variability assessment:

No actions are necessary as the element is being monitored and is within the variability measure.

Recommended Efforts:

Continue to offer resource protection non-use especially with the changing weather patterns. This gives the permittees flexibility to adjust where they need to for management of the livestock. This is also beneficial to the resource because it allows for longer deferred grazing periods or fewer animals on the allotment. During drought years, this also provides more forage for the wildlife if the permits are not stocked to their full potential.

(E) REGULATED VOLUME, TIMBER

(E1) Regulated volume prepared for sale

Forest Plan Requirements:

Volume prepared for sale.

Intent:

The intent of this monitoring element is to insure that the base harvest schedule is followed and that the 10 year timber sale is adhered to.

Data Sources:

Data sources used to compile information for this element are 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 FY07 offer was primarily sawlog volume associated with the Jimtown Fuels and Elliston Face Stewardship project.

Monitoring Results:

Timber sale program statistics indicate that in FY07, the Helena National Forest offered 7.5 MMBF (7.5 MMBF roaded, 0.0 MMBF inventoried roadless) of an 10.0 MMBF financed program, which included a combination of personal use firewood, post and pole, and commercial sawlog sales.

The past 5-year average accomplishment for the Helena National Forest is 7.6 MMBF of a 12.5 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:

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

Actions in response to variability assessment:

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

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

Recommended Efforts:

Continue to maintain a 5-year timber sale schedule.

(E2) Timber assumptions

Forest Plan Requirements:

Timber assumptions: volume, productivity, condition class, slope, recovery, logging, acres harvested are validated and assumptions are correct in the Forest Plan.

Intent:

The intent of this monitoring element is to insure that: 1) board foot/cubic foot ratios are correct, 2) volume/acre yield is correct, 3) working groups accurately reflect productivity, 4) condition class assignments are correct, 5) scheduled logging systems (cable, tractor and helicopter) are used, and 6) schedule of acres harvested is correct.

Data Sources:

Sources of data include sale reviews, silvicultural prescriptions, environmental documents, cruise summaries and the Forest Activity Tracking System (FACTS). The Forest Plan lists TSMRS as a data source. This database has been replaced with National FACTS database, which is the appropriate data source to use for this element.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Review and summarization of data from all available data sources described above.

Monitoring Activity:

Item 1. Review cruise summaries and volume offered to determine board foot/cubic foot ratio and compare to projections in the Forest Plan, Item 2. Review cruise summaries and environmental documents and compare to projections in the Forest Plan to determine if volume/acre yield is correct. Item 3. Review working groups to ensure they accurately reflect productivity. Item 4 is monitored through stand exams and age projections associated with the recent analyses. Item 5: Scheduled logging systems (tractor and cable systems) to determine whether they are in use in approximately the same ratio as projected. Item 6: Determine whether schedule of harvest is correct. All items are to be measured annually for one sale per district and reported every 5 years.

Data Analysis Methods:

A shift in emphasis as described in E1 has also resulted in a shift of budgets. This emphasis shift also indirectly influences volume prepared for sale. Implementation of salvage harvest and fuels reduction projects for example 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 FY07 the Helena offered 2 timber sales on the Helena district. The sale specific FY07 analysis for the Elliston Face Stewardship on the Helena district is discussed in detail for this report.

Elliston Face Stewardship Project- Helena Ranger District

Volumes offered for Elliston Face Stewardship Contract in FY07 had a board foot/cubic foot ratio of 2.02/1.0 and an average volume/acre of 7.2 MBF.

The past five year average on the Helena National Forest for board foot/cubic foot ratio is 2.03/1.0 and the average volume/acre harvested is 6.4 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. The Elliston Face Stewardship Project was planned for 100% tractor. Logging systems for FY07 are within the acceptable variability limits. Logging methods used over the last 5 years have been distributed between tractor (40%), cable (33%) and helicopter (27%). This deviation in distribution from Forest Plan recommendations reflects the Forest priority to treat all suitable lands within fire perimeters.

Variability Measure Discussion:

Variability Measure:

Sale reviews question validity of assumptions + or – 15 % of Forest averages.

Assessment:

Results of current board foot/cubic foot ratios indicate a lower ratio than originally predicted in the Forest Plan. This could be directly related to volume tables used in projections for the Plan and volume tables developed locally and used as part of the cruise program. Volume per acre projections in the Plan were primarily prioritizing regeneration harvest techniques and within the past 5 years the Helena has implemented primarily intermediate harvests and fire salvage which has resulted in a lower volume per acre than project in the Plan.

Condition Class assignments are descriptions of existing conditions in timbered stands based on a classification system maintained in the TSMRS database and utilized in the Forest Plan. TSMRS is no longer in use and its replacement, FACTS, does not include condition classes. Forest Plan condition classes are those found and defined in the FSH 2409.21e Timber Management Control Handbook. The classification assigns codes of 1-7 to timbered stands based on desirable stocking in relation to actual stocking as well as in terms of desirable tree species. Condition class is described briefly in appendix B of the Forest Plan EIS (B/13); the Forest Plan does not indicate the desirable abundance of condition classes nor assign guidelines. Instead, the classes are referenced as one of the criteria for assigning timber suitability and volume output estimates. Monitoring of this element would include verifying that the condition class assignment in TSMRS is appropriate based on site-specific analyses and prescriptions, thereby helping to validate the volume output assumptions developed for the Forest Plan. However, we do not track this element currently with respect to database information because the classification is no longer maintained. Instead, volume predictions and timber suitability are assessed through NEPA analyses, field exams, and prescriptions.

Although condition classes are not specifically monitored due to a change in classification schema used and database limitations, the intent of assessing condition class validity is to help assess timber suitability and volume predictions. This intent is met on the Forest through NEPA documentation, field exams, and detailed silvicultural prescriptions.

The Forest Plan EIS projects 1,940 acres of harvest per year and the harvest is monitored for a five-year period. In the past five years the Forest Plan projected 9,700 acres of harvest. In the past five years (2003-2007) the Forest has harvested 3438 acres (average 688/year or 35% of projection). 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.

Actions in response to variability assessment:

No additional action is needed at this time.

Recommended Efforts:

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

(E3) Silvicultural assumptions and practices

Forest Plan Requirements:

Monitor silvicultural assumptions and practices.

Intent:

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 2007, implementation monitoring was done by the Silviculturist for the Snow Talon, Greyson Bugs, and Jimtown timber sales. Sale preparation was monitored in the Elliston Face and Clancy Unionville projects. 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 uneven-aged and even-aged management are considered as treatment options; utilizing all information available the silviculturist determines the most appropriate method. Clearcutting was only used when it was the optimal method.

The management focus for harvest prescriptions during this monitoring period has been to increase stand resiliency and forest health 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 would have had in specific ecosystems. For the

most part, uneven-aged management is applied to warm and dry forests that were naturally thinned by fire, and even-aged management is applied to cool and moist forests that were naturally affected by historic stand replacement fires. Appendix H/1 of the Forest Plan specifies silvicultural practices by habitat type groups that include assumptions for rotation age, CMAI, harvest system, and reforestation requirements. Most of the areas harvested during this monitoring period fall in one of the Douglas fir habitat type groups, which generally indicate shelterwood systems and a rotation age from 120-150. While many of the harvest prescriptions for this monitoring year focused on salvage, these assumptions are correct and desired results are being achieved. Appendix M/1 of the Forest Plan provides guidance for all vegetation management practices occurring on the Helena National Forest including management guidelines for habitat type groups. These practices and guidelines are being implemented where vegetative management is occurring. In review of recently completed harvest prescriptions, conclusions described are accurate.

Monitoring Results:

1) In 2007, harvest projects occurred in the Greyson Bugs Salvage and Jimtown timber sales. 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. Greyson Bugs prescriptions are 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.

2) 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).

3) 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.

4) 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.

5) 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 2007 harvest prescriptions being implemented included Greyson Bugs and Jimtown. During the 5-year planning timeframe, additional sales reflected include Snowtalon Salvage, Baldy 8, Granite Whitebark, Poorman, Wagner Atlanta, Cave Gulch Fire Salvage, Maudlow-Toston fire salvage, and Grassy Bugs Salvage. 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, 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.

(E4) Firewood removal

Forest Plan Requirements:

Firewood removal

Intent:

The intent of this requirement is to insure that potential firewood from timber sales and road building is made available to the general public before slash disposal.

Data Sources:

Post sale reviews.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Review timber sale areas after harvest activities are completed for availability of firewood for the public.

Monitoring Activity:

Forest personnel visit on-going and closed sale areas to view/evaluate firewood opportunities and monitor how the public is utilizing the firewood.

Data Analysis Methods:

Firewood is being offered to the public from slash piles in ongoing timber sales on the Forest. Current firewood opportunities are promoted by Forest personnel in the Snow Talon Fire Salvage, Greyson Bugs Salvage, and the Alamo Decks timber sales.

Monitoring Results:

Firewood has been made available from 100% of timber sales on the Helena National Forest. Press releases have been made in local newspapers to advise the Public of firewood gathering opportunities.

The on-going mortality as a result of insect activity and recent large fires of 2000 and 2003 on the Forest have increased availability of standing dead trees for firewood across the Helena Forest. The Forest awarded 1 commercial firewood sales in FY 2007 in slash piles associated with the Snow Talon Fire Salvage.

Variability Measure Discussion:

Variability Measure:

Annually firewood will be made available from 75% of all timber sales.

Assessment:

The Forest is within compliance with the variability measure for firewood management.

Actions in response to variability assessment:

No additional action is needed.

Recommended Efforts:

Continue proactive firewood management opportunities.

(E5) Size of openings

Forest Plan Requirements:

Monitor size of openings.

Intent:

The intent of this requirement is to insure that forest management practices comply with the environmental analysis which insures that openings conform to Forest Plan standards.

Data Sources:

NEPA documentation, FACTS database, implementation, and post-harvest monitoring documentation from Silviculturist and IDT, silvicultural prescriptions.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Review and summarization of data from all available data sources described above.

Monitoring Activity:

Environmental documents and implementation are monitored by the Forest Silviculturist to insure that opening sizes conform to standards and final implementation acres are recorded in FACTS (query in project file). NEPA documentation was reviewed for sales and compared with accomplishments in FACTS to assess opening size and whether the process for requesting large openings was necessary and/or followed. In some cases post-harvest monitoring was performed by the IDT and/or Silviculturist; these documents are provided in the project file. Silvicultural prescriptions are reviewed to ensure appropriateness of openings and checked for consistency with the NEPA planning.

The Forest Plan specifies that openings will normally be 40 acres or less, and if this size is exceeded, a 60-day public review and Regional Forester approval is needed. The Timber Management, Silvicultural Practices Handbook (FSM 2470) provides further detail by specifying some exceptions. One such exception states that where natural catastrophic events such as fire or insect and disease attacks have occurred, 40 acres may be exceeded without the public review and Regional Forester approval provided the public is notified and the environmental analysis supports the decision. Other exceptions provide for openings up to 60 acres without public review and Regional Forester approval, including cases where these openings reduce disturbances to other resources, occur in dwarf mistletoe or root rot areas, or best provide for visual quality objectives.

Data Analysis Methods:

Several projects, such as Greyson, Snowtalon, and Jimtown, have recently had ID team and/or silviculturist reviews (project file). In these projects, implementation unit size was similar to the size analyzed in NEPA documents. Prescriptions and FACTS show that harvest accomplished is consistent with NEPA planning, and during this monitoring period no openings were created that required Regional Forester approval. No documentation shows unacceptable results of ID team or administrative review results with respect to opening size. Rationale for the increase in size relates to treatment areas “fitting the landscape” which results in reduced visual effect, decreased fragmentation and reduced long-term

disturbance (as fewer entries are needed to manage vegetation). This is considered for all projects in the planning phase.

Monitoring Results:

Regional Forester approval was granted for openings greater than 40 acres in Clancy Unionville, Nevada Dalton, and North Elkhorns, which were planned during the 5-year period but not implemented. Several other projects that were implemented in the monitoring period (2003-2007) 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). All of these projects occurred in wildfire areas, and fit into the exception above not requiring the 60-day public review and Regional Forester Approval. However, the Forest did scope with the public and provide requests to the Regional Office for this activity. Intermediate harvest such as shelterwood preparation, commercial thinning, or liberation harvest do not constitute openings. There are no notations in post-harvest monitoring documentation indicating that the results of harvest were not consistent with planned unit design. As of 2007, projects in the planning phase which will include proposals for openings over 40 acres include Cabin Gulch.

The other sales in the 5-year monitoring period were Baldy 8, Granite Whitebark, Poorman, Beaver Dry, Cave Gulch Salvage, Wagner Atlanta, Grassy Bugs Salvage, Lincoln Compound, Black Butte Salvage, Maudlow-Toston salvage, and Greyson Bugs Salvage. Clearcutting is only used when it is the optimal method, as documented in the NEPA decision and detailed silvicultural prescriptions.

Variability Measure Discussion:

Variability Measure:

Unacceptable results of an ID team or administrative review.

Assessment:

The Forest is within stated variability for this element.

Regional Forester approval is obtained where openings exceed 40 acres and the rationale for the larger openings is disclosed in the environmental document. Regional Forester approval is not required for projects where natural catastrophic events such as fire, windstorms, insects and disease have occurred provided the public is notified in advance and the environmental analysis supports the decision.

Actions in response to variability assessment:

Within stated variability, no additional action is needed.

Recommended Efforts:

Continue compliance with the requirements of the Helena Forest Plan with regard to opening size.

Continue to treat forest landscapes at the scale of the environment.

(E6) Regenerated yield projections

Forest Plan Requirements:

Regenerated yield projections.

Intent:

Insure that regenerated yield projections are correct.

Data Sources:

Permanent plot records, FACTS database, silvicultural prescriptions

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Review and summarization of data from all available data sources described above.

Monitoring Activity:

The FACTS database was queried for plot installation or plot measurement activity. In addition, the database was checked for stocking survey results as a surrogate for permanent plot data. Prescriptions are written and reforestation measures prescribed considering yield projections.

Data Analysis Methods:

Thirty-three permanent growth plots have been establish across the Forest, 19 since 1986. For consistency in data collection across the Region, the Regional Office took responsibility of establishment and re-measurements of the permanent growth plots. At this time they evaluated and stratified all plots across the Region for similarities in habitat type and treatment. The RO determined it was no longer feasible or necessary to re-measure all plots on every Forest. Consequently, similar habitat types and treatment types were deleted from the measurement program. The plots have been established and monitoring has been ongoing although the Region has not been able to visit the stands as frequently as originally intended.

Based on stocking surveys, the Forest is generally successful in meeting reforestation goals as prescribed using our current knowledge of growth and yield. Where regeneration is unsuccessful, prescriptions are adjusted and adaptive management used.

Monitoring Results:

No permanent growth plots were established or measured in 2007. 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 2007, 2,860 acres were surveyed; of this, about 18% (526 acres) were found to be failing. Of these failing stands, 400 acres are in areas that have not been logged, but were burned by wildfire. The remaining 126 acres of regeneration failure are in units that were logged (Cave Gulch fire salvage, Maudlow-Toston salvage, Poorman timber sale, SnowTalon fire salvage, Upper Copper, and Wagner-Atlanta) where the original reforestation expectations of the prescription were not met.

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. We are meeting the intent of this element.

Actions in response to variability assessment:

Within stated variability, no additional action is needed.

Recommended Efforts:

Continue to work with the Regional Office with growth and yield monitoring; continue to monitor regeneration and apply observations to future silvicultural prescriptions.

(E7) Reforestation practices and assumptions

Forest Plan Requirements:

Monitor reforestation practices and assumptions

Intent:

Silvicultural prescriptions, reforestation records, post sale administrative review and FACTS are monitored to insure that 1) regeneration is obtained within 5 years after final harvest cut, and 2) scheduled planting is accomplished.

Data Sources:

FACTS database, silvicultural prescriptions, post sale administrative review, stocking surveys, stake row surveys, post-harvest monitoring and exams. The Forest Plan lists TSMRS as a data source. This database has been replaced with National FACTS database, which is the appropriate data source to use for this element.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Review and summarization of data from all available data sources described above.

Monitoring Activity:

The FACTS database was queried to show areas in need of regeneration, reforestation status and results of stocking surveys, and planned versus accomplished planting (project file). Prescriptions are reviewed in conjunction with surveys to assess validity of assumptions and success of regeneration. Stake rows are performed on limited areas and are mainly used to assess the performance of nursery stock; however, they also provide some information in general terms of monitoring reforestation success.

Data Analysis Methods:

We use exam information to compare with desired/targeted reforestation conditions and to track reforestation as well as harvest accomplishments. This information is compiled and available in FACTS. The Regional Office generally conducts an annual review of reforestation indices, however, this review was not accomplished for 2006 due to the transition to FACTS so are not available for analysis for this monitoring period.

Planting usually occurs in the first two years after completion of harvest. In 2007, 41 acres were planted in recently harvest units (7% of the projected 600 acres/year). An additional 101 acres were planted in previously managed areas (plantations) that burned in recent wildfires. Over the 5 year planning timeframe, from 2003 through 2007, 1,770 acres were planted in harvest areas averaging to 354 acres per year or 59% of the projected acres in the Forest Plan. With the addition of planting in fire areas, the totals amount to 2,356 since 2003, averaging 471 acres/year.

When plantings are not accomplished, it is due to lack of funding, 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.

Monitoring Results:

All silvicultural prescriptions specify whether a harvest unit requires regeneration; if so, the method of natural or artificial regeneration is prescribed based on the most cost effective way of meeting

sustainability goals. Stands treated with regeneration harvest are measured with systematic stocking surveys 1, 3, and 5 years after site preparation or planting to monitor reforestation. In the event of a natural regeneration failure, planting is scheduled. In addition to harvest units, stands regenerated after wildfire are also monitored (with emphasis placed on timber management areas) to ensure re-stocking; failures in these areas are also scheduled for planting as funding allows. The FACTS database contains information on scheduled natural regeneration and planting, reforestation status, and accomplishments.

For 2007, stands planted in 2003 following harvest were reviewed. 415 acres were planted and 38% are certified as stocked and 62% progressing. An additional 150 harvested acres were prescribed for natural regeneration in 2003; of these, 100% are certified. Planting which has occurred after 2003 is not expected to be certified as of this monitoring report; stands listed as progressing are scheduled for the appropriate stocking surveys. An additional 219 acres was planted in 2003 outside of harvest areas; 37% of this acreage is currently certified 63% is progressing. These results are indicative of sites where seedlings are successful but take a few years to grow to prescription specifications.

Planting has been accomplished as recommended in silvicultural prescriptions and post harvest monitoring exams (see project file). Planned activities in prescriptions and changes as a result of surveys are entered into FACTS each season. According the FACTS, from 2003 to 2007, 2,506 acres in harvested and non-harvested areas were planned for planting, and 2,356 acres were accomplished (94%). Of this, about 1,797 were planned in harvested areas and 1,906 acres of those accomplished (106%). In 2007, 100% of the harvested areas planned for planting were accomplished (41 acres). These plantings occurred in the Snow Talon fire salvage harvest area. Including fire areas, 142 acres were planned in 2007 and were 100% accomplished.

Variability Measure Discussion:

Variability Measure:

The Forest Plan projects 600 acres of tree planting per year with (1) acceptable variability of less than 75% of scheduled accomplishment in a five year period and (2) less than 50% accomplishment in any one year. Overall, there will be no more than plus or minus 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 when only planting after harvest is considered (from 2003 to 2007, 59%), or 50% in a given year (for 2007, 41 acres, 7%). The acreage and target increases when non-harvested that were planting are considered (78% over the 5-year timeframe, 24% in 2007). When all planting is considered, the Forest meets the requirement over the 5-year period but still does not meet the yearly standard. The increase in planting over the 5-year period was in response to the large wildfires and subsequent salvage activity that occurred in 2000 and 2003.

Accomplished planting is within 10% of planned planting over the 5 year monitoring timeframe. From 2003 to 2007, 106% of planned plantings in harvested areas were accomplished. In 2007, 100% of planned plantings in harvest areas were accomplished. When non-harvested units are considered, the accomplishment over the 5-year timeframe falls to 94%, still within the range of variability.

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 the remaining 69% being natural regeneration or no

reforestation needed. 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 2003-2007, the Forest harvested approximately 688 acres/year (FACTS query project file), and 354 acres of planting in harvest areas (61%). 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.

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.

(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 past 5 years (2003-2007) the Forest has not accomplished any pre-commercial thinning. Non-commercial projects have occurred on the Forest in the form of fuels slashing and fuels treatments, which in some cases accomplish similar objectives although often do not occur in past harvest units. Like planting, TSI projects are dependant 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 dependant 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 (2003-2007, average 688 acres/year) the relative TSI target would be about 82 acres to meet the intent, if not the value, of the Forest Plan element.

The FACTS query showed areas scheduled to be thinned during this monitoring period; this amount (1,529 acres from 2003-2007) would average to 306 per year, nearly the quantity predicted in the Forest Plan. This is attributed to thorough record keeping and long-term database maintenance of planned activities. However, all planned thinning lies within areas currently mapped as potential lynx habitat.

Monitoring Results:

No thinning was done in 2007 due to a lack of funding and changing management policies concerning lynx habitat. Over the 5 year timeframe no pre-commercial thinning has been accomplished in the FACTS database although 1,529 acres were planned in accordance with silvicultural prescriptions.

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.

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. The Forest has accomplished 0% of this goal. Annually the Forest has accomplished less than 50% of the thinning objective.

Actions in response to variability assessment:

The deviation is beyond the control of the Forest. No additional action is needed at this time.

Recommended Efforts:

The lynx amendment for Northern Region has been finalized as of 2007, 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. All TSI projects within Lynx habitat are still pending based on interpretation of the new direction and assessment of needs and priorities. The new direction does provide exemptions for tree improvement test plantations; thinning of 2 lodgepole pine test plantations is scheduled for 2008. Continue to consider and prescribe pre-commercial thinning as appropriate in silvicultural prescriptions.

(E9) Lands suitable for timber production

Forest Plan Requirements:

Lands suitable for timber production.

Intent:

Evaluate the accuracy of suitable lands classification in the Forest Plan; periodically re-examine lands identified as not suited for timber production to determine if they have become suited and could be returned to timber production.

Data Sources:

Data sources include environmental analyses; stand exams, project plans, and timber planning process.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Review and summarization of data from all available data sources described above.

Monitoring Activity:

Evaluate the accuracy of suitable timberlands classification using the timber planning process, stand exams and environmental analyses. Suitability is considered during the preparation of site-specific silvicultural prescriptions. Post-fire assessments and stocking surveys are used to assess the re-stockability of lands currently in the suitable base that have not been recently harvested; this process is ongoing for the large fires of 2000 and 2003. Finally, stocking surveys, administrative reviews, and other post-harvest monitoring of harvest areas are used to determine if timber suitability assumptions in terms of re-stocking have been met. In cases where failures have occurred or re-stocking cannot be achieved the need to remove the area from the suitable timber base is assessed. Review Forest Plan amendments, specifically, Amendment #'s 5, 8, 9 and 18, and environmental documents to insure consistency with land suitability as described in the Forest Plan.

Data Analysis Methods:

The suitability stage I analysis was used to evaluate lands classified as suitable and unsuitable on the Helena National Forest. The 5-step analysis includes: analysis of lands capable of producing at least 20 CF per acre per year, available for timber production, review of technology available to produce timber without irreversible resource damage and limitations on reforestation. Site-specific Forest Plan amendments to modify suitability have been completed for 4 environmental analyses since 1986 (238 acres added to suitable, 100 acres removed). None have occurred in this planning timeframe. Field exams have been conducted extensively to determine the regeneration ability of both suitable and non-suitable timber lands in recently burned lands (since 2000). At the completion of this exercise and following the development of prescriptions, the need for an additional amendment to remove or add areas to the suitable base will be assessed, specifically for burned areas where natural recovery is the best silvicultural practice and for failures from historic sales where re-stocking cannot be assured.

Harvest in non-suitable management areas is well documented and analyzed in NEPA documents and silvicultural prescriptions and have been found to meet all Forest Plan objectives and guidance relative to harvest on non-suitable lands. The need for Forest Plan amendments for projects is assessed during the NEPA planning phase and no such amendments have been proposed or accomplished during this monitoring period.

Monitoring Results:

No silvicultural harvest prescriptions were prepared in 2007 which included site specific recommendations to change suitable timber lands. However, harvest has occurred in management areas considered not suitable for timber during the monitoring period (10 acres 2007). During the 5 year monitoring period, 1,085 acres of unsuitable lands have been harvested with a variety of prescriptions (the bulk being 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.

Exams in burned areas have determined that given the difficulty in re-stocking (due primarily to site harshness), about 570 acres are prescribed for "natural recovery" in suitable lands (project file). 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.

FACTS was also queried to show stands listed as reforestation failures. The results show 847 acres failing in the suitable timber base, and 51 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. See the 2006 monitoring report project file for a draft, internal document describing the reforestation assessment strategy.

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 2007, and for the overall 5 year period since 2003. 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.

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 and may occur in the future.

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.

Recommended Efforts:

Continue to evaluate land suitability at the project level as well as assessing wildfire areas and past regeneration failures, and recommend Forest Plan amendments as necessary.

(F) SOIL AND WATER

(F1) Compliance with local, state, and Federal water quality standards

Forest Plan Requirements:

Monitor for compliance with local, state and Federal water quality standards. Ten percent of timber sales or other projects that create soil disturbance must be monitored annually. Flow measurements and measurement of selected water quality parameters (24 stations) will be made throughout the Forest. Activities identified as not meeting water quality standards, or as leading to long-term watershed degradation, would initiate action (i.e. modify the activity so that it will meet water quality standards).

Intent

To ensure compliance with local, state, and Federal water quality statutes.

Data Sources:

Over the past three decades, data have been collected at 39 water quality monitoring sites on the Helena National Forest (HNF) to monitor the majority of HNF timber sales and other major projects. The number of years during which data were collected at each site has varied based on project needs. In addition to HNF data collection, other data collection efforts on the Forest have included various TMDL inventory and

monitoring programs, the HNF Youth Forest Monitoring Program, PIBO inventory and monitoring, and monitoring done by other governmental agencies (e.g. MT DEQ, US EPA).

Current Efforts and Findings:

Monitoring methodology:

Suspended sediment samples were collected daily using ISCO automatic water samplers, and periodically using DH-48 hand samplers following standard procedures (Edwards & Glysson, 1999). Bedload samples were obtained using a Helley-Smith bedload sampler following standard procedures (Edwards & Glysson, 1999). Suspended sediment and bedload samples were processed in the Helena National Forest Water Quality Lab using standard filtration methods (Guy, 1969). Flow measurements were recorded using Price AA and Pygmy 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). Youth Forest Monitoring protocols are outlined in the Youth Forest Monitoring Program Report for 2007.

Monitoring Activity:

Water quality monitoring sites on the Helena National Forest where data were collected in 2007 are listed in Table 1. Sites are either Helena National Forest (HNF) watershed monitoring sites or YFMP monitoring sites. HNF sites are generally monitored every year over the period of record, and YFMP sites are generally monitored every three years. Stage and stream flow at the HNF sites were measured with a flowmeter several times during the peak flow season, and a recording water-level sensor collected daily data.

Among water resource issues, HNF management activities are most likely to influence the delivery to and transport of sediment in streams through ground disturbance and roads, and water yield through vegetation removal. Additional water resource impacts resulting from HNF management activities could include chemical contamination of surface water during and after aerial weed spraying operations (no aerial spraying occurred on the HNF during 2007). Sediment flux and water yield were monitored directly at HNF sites.

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 2007 monitoring sites related to past or ongoing HNF projects are on Sulphur Bar, Deep, and Copper Creeks—all classified by the state as B-1 streams (ARM 17.30.610). Beneficial uses of B-1 streams are “drinking, culinary, and food processing purposes, after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply” (ARM 17.30.623(1)). The beneficial use most likely to be affected by HNF projects is fish habitat, given its sensitivity to heightened sediment levels.

Table 1. Water quality monitoring sites where data were collected in 2007. Data at YFMP sites are collected once per year.

Site	Sampling period	Parameter	Years sampled
Deep Creek (HNF)	Mar-Sep	Q*, TSS*, BL, WT	1991-94, 2001-07
Sulphur Bar Creek (HNF)	Mar-Jul	Q, TSS, BL, WT	1991-93, 2002-07
Cabin Creek (HNF)	Mar-Jul	Q, TSS, BL, WT	1978-93, 2006-07
Copper Creek (HNF)	Apr-Aug	Q*, TSS*, BL, WT	2004-07

Site	Sampling period	Parameter	Years sampled
Beartrap Creek (YFMP)	Jun-Aug	WT, pH, DO, SC, XS, PC, SI, SL	2007
Blackhall Meadows (YFMP)	Jun-Jul	WT, pH, DO, SC, MI, XS, SI, SL	2007
Copper Creek (YFMP)	Jun-Jul	WT, pH, DO, SC, MI, XS, PC, SI, SL	2007
EF McClellan Creek (YFMP)	Jun-Jul	WT, pH, DO, SC, MI, XS, PC, SI, SL	2004, 2007
Eureka Creek (YFMP)	Jun-Jul	WT, pH, DO, SC, MI, XS, PC, SI, SL	2001, 2004, 2007
Heart Lake (YFMP)	Jun-Jul	WT, pH, DO, SC, MI, XS	2003-07
Indian Creek (YFMP)	Jun-Jul	WT, pH, DO, SC, MI, XS, PC, SI, SL	2004, 2007
Jackson Creek (YFMP)	Jun-Jul	WT, pH, DO, SC, MI, XS, PC, SI, SL	2004, 2007
Keep Cool Creek (YFMP)	Jun-Jul	WT, pH, DO, SC, MI, XS, PC, SI, SL	2004, 2007
Magpie Creek (YFMP)	Jun-Jul	WT, pH, SC, MI, XS, PC, SI, SL	2001-07
Minnehaha Creek (YFMP)	Jun-Jul	WT, pH, DO, SC, MI, XS, PC, SI, SL	2007
Stonewall Creek (YFMP)	Jun-Jul	WT, pH, SC, PC	2007
Sucker Creek (YFMP)	Jun-Jul	WT, pH, DO, SC, MI, XS, PC, SI, SL	2007
Swamp Creek (YFMP)	Jun-Jul	WT, pH, DO, SC, MI, XS, PC, SI, SL	2001, 2004, 2007
Wasson Creek (YFMP	Jun-Jul	WT, pH, DO, SC, MI, XS, PC, SI, SL	2007
Whites Gulch (YFMP)	Jun-Jul	WT, pH, DO, SC, MI, XS, PC, SI, SL	2001, 2004, 2007

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

Monitoring related to the Maudlow-Toston fire (2000) and salvage sale (2002-05), along with the Deep Creek Hazardous Fuels Reduction project (2007) continued at the sites on Deep Creek and Sulphur Bar 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 2007 in anticipation of the Cabin Gulch project, which is currently in the planning stage. The 2007 Youth Forest Monitoring program monitored sixteen different streams on the forest. Seven of the sixteen sites were evaluated for the first time in 2007; thus, for these sites, no trend data are available.

Analysis:

Analysis methods generally consisted of comparing data collected at HNF and YFMP monitoring sites in 2007 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) and so direct comparisons among years are generally of limited value in determining the effects of management activities. To make meaningful inter-annual comparisons, sediment data were normalized by flow volume, and flow characteristics (e.g. peak flow and number of days of high flow) were evaluated. Measured bedload was generally a small fraction of measured suspended load and so was not included in this discussion.

In order to estimate total annual water and sediment yield at the two sites with daily records (Copper and Deep Creeks), mean annual hydrographs were developed using the existing spring-summer-fall data, and synthesizing winter flow data. Missing days in each year's daily record were filled using the mean annual hydrograph. Constant sediment concentrations of 8 mg/l (Deep Creek) and 6 mg/l (Copper Creek) were applied for each day without a measurement. Details of this analysis are on file at the HNF Supervisor's Office.

Analysis methods used by the Youth Forest Monitoring program are outlined in the YFMP annual report, available at the HNF Supervisor's Office.

Variability Discussion:

Variability Measure:

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

Monitoring Results and Discussion:

Maudlow-Toston Fire, Salvage Sale

The Maudlow-Toston fire and salvage sale were monitored at the Deep Creek-Pasture and the Sulphur Bar Creek monitoring sites. Daily total suspended solids (TSS) and hourly stream discharge data at Deep Creek (Pasture Site) from 2007 are shown in Figure 1. The daily TSS measured during the spring and summer in Deep Creek were substantially lower than in previous years by all measurement methods (Table 2). Accordingly, average and total suspended load values were less in 2007 than in the previous five years.

The reduction in sediment loads follows a general downward trend since 2002 that suggests a gradual recovery from the Maudlow-Toston fire of 2000. For example, 2002 was a hydrologically similar year to 2007 at this site—average measured flow, peak flow, number of high-flow events, and annual water yield were nearly identical (Table 3). Over the same sampling period, the average daily suspended load was 83% less in 2007 than in 2002, and the estimated annual suspended load was 81% less.

Work on the Maudlow-Toston salvage sale started during the summer of 2002 and was completed in September 2005. The data records suggest that in-stream sediment variability during and after the project were a function primarily of meteorological/hydrologic events, rather than ground-disturbing activities. The high sediment loads in 2003 can be directly tied to a high peak flow event. Ground disturbance related to the salvage operations, in addition to the effects of the Maudlow-Toston fire, probably contributed to the sediment flux to streams in this and other years in the record. However, it is difficult to separate these effects, and it is unlikely that the project contributed significantly to sediment loads in 2003 or in any year in the record. Sediment levels measured in 2007 do not appear to constitute an impairment of beneficial uses in this stream.

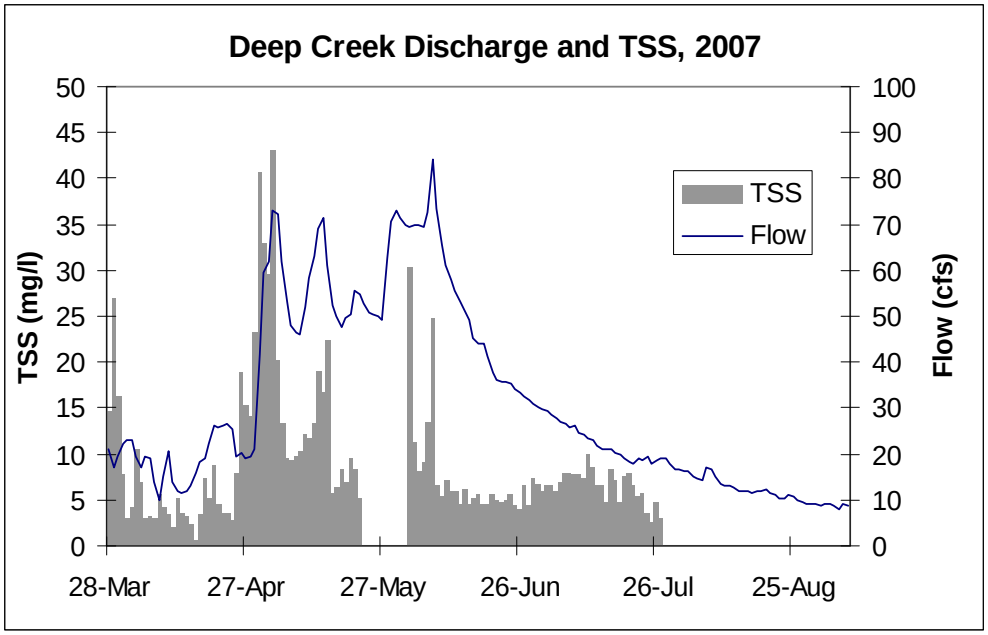


Figure 1. Measured total suspended solids (TSS) and flow volume for Deep Creek (Pasture Site) in 2007. Gaps in the TSS chart indicate that no samples were collected on those dates.

Table 2. Sediment data from daily measurements, Deep Creek-Pasture Site. Suspended load (tons/day) is the product of daily discharge, daily average TSS, and a unit conversion factor.

Year	Days measured	Ave. meas. daily TSS (mg/l)	Ave. daily normalized TSS** (mg/l/cfs)	Ave. meas. daily susp. load (ton/day)	Ave. daily susp. load* (ton/day)	Total ann. susp. load* (tons)
2002	112	52.7	1.22	7.2	2.6	950
2003	111	79.3	1.35	24.9	7.7	2810
2004	167	20.3	0.52	3.6	1.7	620
2005	92	40.3	0.90	5.9	1.7	620
2006	112	27.5	0.48	4.9	1.7	620
2007	112	9.0	0.28	1.0	0.5	180
Average	119	38.2	0.79	9.3	2.7	1120

*Average daily and total suspended load for the entire water year were calculated with the measured data and estimated values for the dates where no data were collected. **Average daily normalized TSS is the average value of measured daily TSS divided by daily discharge.

Data from the Sulphur Bar Creek monitoring site consisted of spot measurements during the spring and summer of 1991-93 and 2002-07. Flow-normalized TSS measurements show that sediment levels did not increase appreciably between the early 1990s and the early 2000s (post-fire), with the exception of 2004-05 (Figure 2). The higher normalized values in 2005 probably reflect the non-linear relationship between TSS and discharge (there was a relatively large flow event in 2005 as compared to other years in the record), but the higher normalized measurement in 2004 may be an indication of an impact of the salvage operations, although this was discounted in the 2005 Forest Plan Monitoring Report. Nonetheless, 2007 followed 2006 as a year with low normalized sediment levels, suggesting that the landscape has recovered from immediate post-fire conditions enough to reduce in-stream sediment to background levels. Sediment levels measured in 2007 do not appear to constitute an impairment of beneficial uses in this stream.

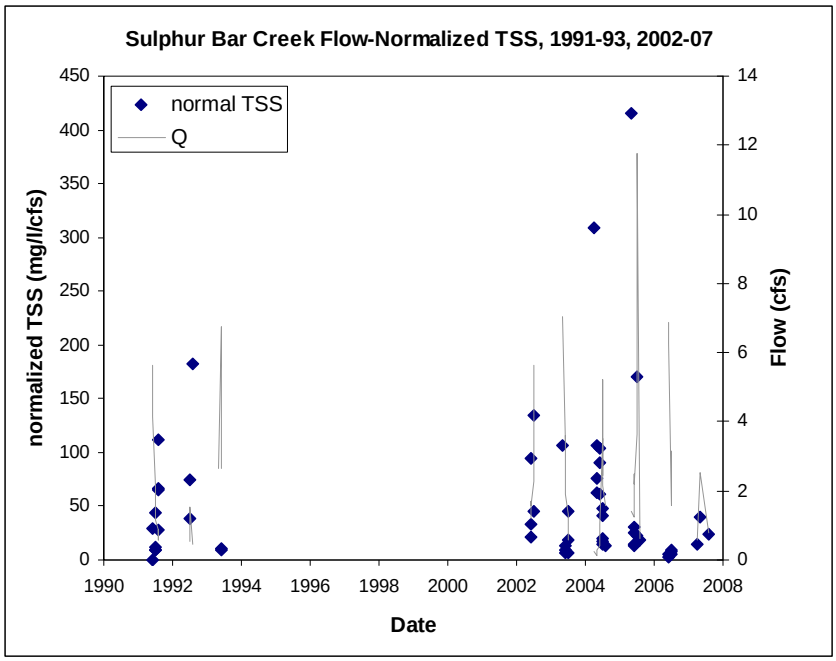


Figure 2. Flow-normalized measured total suspended solids (TSS) and flow volume for Sulphur Bar Creek.

Table 3. Stream flow data from hourly stage measurements, Deep Creek (Pasture Site).

Year	Days measured	Average measured discharge (cfs)	Peak discharge (cfs)	Days Q>80 cfs	Measured water yield (AF)	Est. annual water yield* (AF)
2002	122	31	80	0	7503	12,310
2003	111	46	248	11	10,326	15,685
2004	167	34	189	5	11,457	14,784
2005	182	31	84	7	11,134	15,559
2006	169	38	98	12	12,738	16,665
2007	163	31	84	1	10,102	13,902
Average	152	35	131	6	10,543	14,818

*Estimated annual water yield was calculated using measured data, along with estimates from the mean annual hydrograph developed for this station for the dates not measured.

Snow-Talon fire and salvage sale

Effects from the Snow-Talon fire and salvage sale were monitored at the Copper Creek monitoring site. Daily total suspended solids (TSS) and hourly stream discharge data at Copper Creek from 2007 are shown in Figure 3. Daily suspended sediment load measured during the spring and summer in Copper Creek was substantially higher in 2006-07 than in 2004-05 (Table 4). However, levels in 2007 were generally lower than in 2006. Additionally, flow-normalized TSS values from 2007 were lower than in any of the prior three years, and 2007 average daily measured TSS was in line with low 2004-05 values.

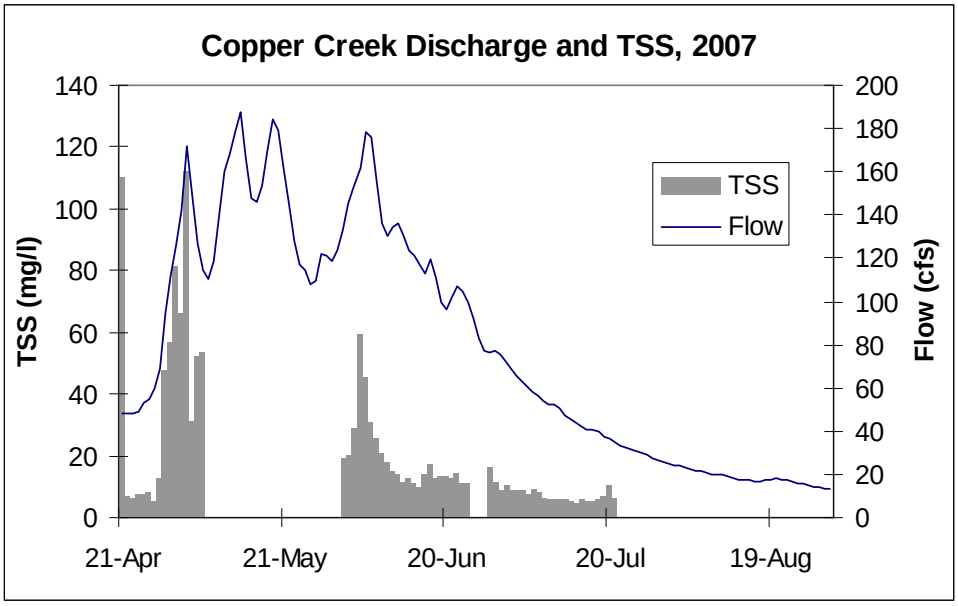


Figure 3. Measured total suspended solids (TSS) and flow volume for Copper Creek in 2007. Gaps in the TSS chart indicate that no samples were collected on those dates.

Table 4. Sediment data from daily measurements, Copper Creek. Suspended load (tons/day) is the product of daily discharge, daily average TSS, and a unit conversion factor.

Year	Days measured	Ave. meas. daily TSS (mg/l)	Ave. daily normalized TSS** (mg/l/cfs)	Ave. meas. daily susp. load (ton/day)	Ave. daily susp. load* (ton/day)	Total ann. susp. load* (tons)
2004	115	15.4	0.42	2.2	1.1	402
2005	106	14.5	0.25	3.0	1.2	438
2006	96	40.0	0.39	6.2	1.9	694
2007	64	20.5	0.22	6.3	1.4	511
Average	95	22.6	0.32	4.4	1.4	511

*Average daily and total suspended load for the entire water year were calculated with the measured data and estimated values for the dates where no data were collected. **Average daily normalized TSS is the average value of measured daily TSS divided by daily discharge.

The most likely explanation for higher sediment flux at this site in 2006-07 than in 2004-05 is the higher flows during those two years (Table 5), coupled with slow recovery of ground vegetation and duff in the burned area. Peak flows and number of days with high-flow events were substantially higher in 2006-07, as was estimated annual water yield. Given the high variability in streamflow over the past four years, it is difficult to conclude whether the Snow-Talon salvage sale (2005-07) had any impact on sediment levels. The project most likely had no effect on in-stream sediment levels, given that operations were restricted to winter months. Moreover, increased sediment would be difficult to separate out from the effects of the Snow-Talon fire of 2003. Sediment levels measured in 2007 do not appear to constitute an impairment of beneficial uses in this stream.

Table 5. Stream flow data from hourly stage measurements, Copper Creek.

Year	Days measured	Average measured discharge (cfs)	Peak discharge (cfs)	Days Q>120 cfs	Measured water yield (AF)	Est. annual water yield* (AF)
2004	115	55	161	3	12,636	14,632
2005	182	43	132	3	15,526	19,891
2006	183	59	222	30	21,301	24,882
2007	132	80	187	37	20,848	25,433
Average	153	59	176	18	17,578	21,210

*Estimated annual water yield was calculated using measured data, along with estimates from the mean annual hydrograph developed for this station for the dates not measured.

Cabin Gulch

Cabin Gulch was monitored from 1981-93 and again in 2006-07. Data are presented in this report not as an assessment of ongoing projects, but to provide background information in anticipation of the proposed Cabin Gulch project, which is still in preparation at the time of writing. Sediment levels in Cabin Creek have fluctuated considerably over the period of record, based in part on flow variability. Normalized TSS measurements show that per-unit sediment levels were heightened in the late 1980s to early 1990s

(Figure 4), perhaps in response to management activities occurring in the basin in this period. Monitoring will continue at this site in FY2008.

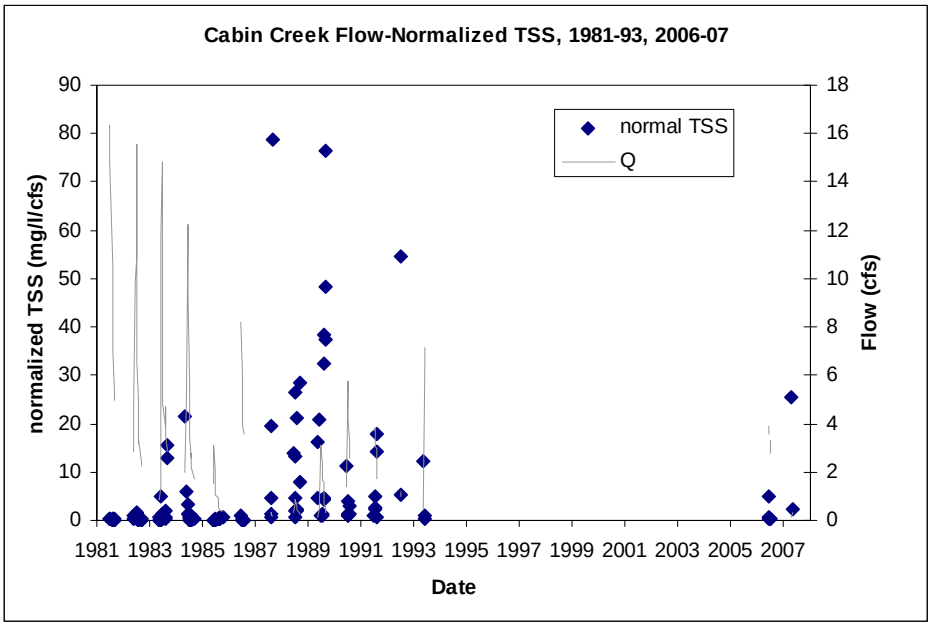


Figure 4. Flow-normalized measured total suspended solids (TSS) and flow volume for Cabin Creek.

Youth Forest Monitoring Program

The 2007 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 in Whites Gulch has been monitored in 2001, 2004, and 2007, and was established to monitor changes resulting from stream channel restoration and cattle grazing in the Whites Gulch allotment. Diversity of aquatic macroinvertebrates has increased over this period, and measured conductivity has decreased incrementally. Additionally, fine-grained sediment percentage has decreased over the period. These indicators suggest that the site may be gradually improving since the end of the restoration project in 2000.

At the Magpie Creek site (2001-02, 04-07), measured parameters have remained relatively stable in the years since the Cave Gulch fire of 2000. Sites on East Fork McClellan, Eureka, Indian, Jackson, Keep Cool, and Swamp Creeks also remained relatively stable in terms of the measured parameters. Details of the YFMP analysis are in the YFMP annual report filed at the HNF Supervisor's Office.

Assessment:

Based on analysis of streams downstream of the Snow-Talon and Maudlow-Toston salvage sales and several grazing allotments, the Forest is within compliance with the variability measure for compliance with local, state and Federal water quality standards. Stream monitoring sites did not show any impairments to beneficial uses in 2007.

Actions in response to variability assessment:

The 2007 field data appear to be within the range of acceptable variability, and so no action is required.

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 two streams potentially affected by the 2007 aerial weed spraying

Monitor effectiveness of BMPs recommended in hydrologist reports for FY 2008 projects

Continue to encourage Youth Forest monitoring efforts

(F2) Soil and water improvement projects

Forest Plan Requirements:

Soil and water improvement projects

Intent

To eliminate backlog of soil and water restoration acres by year 2000.

Data Sources:

Project EAs and accomplishment reports. Soil and water improvement projects are monitored through accomplishment reports to eliminate backlog of soil and water restoration acres.

Current Efforts and Findings:

Monitoring Methodology:

Monitoring methodology included inspections by COR and CO to assess whether projects were proceeding according to contract. Visits were also made by the Forest Hydrologist to document progress on the projects.

Monitoring Activity:

Two watershed improvement projects were monitored in 2007: North Belts Travel Plan road decommissioning and Blackhall Meadows stream channel restoration. Snow-Talon road decommissioning was not monitored because this work was not accomplished in 2007 (it is planned for 2008).

Analysis:

Both watershed restoration projects were completed as planned.

Variability Discussion:

Variability Measure:

Variability which would initiate action: < 80% accomplishment of target in five-year period.

Monitoring Results:

The HNF Watershed Program has been within 5% of its watershed target for all five-year periods. In FY2007, watershed targets accomplished included 59 acres of road decommissioning (obligated) in the Snow-Talon area, 30 acres of road decommissioning in the North Belts travel planning area, and 10 acres of stream channel restoration in Blackhall Meadows.

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 FY2007 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 2008 to assess whether closures were effective, and whether vegetation is recovering. Establish baseline monitoring for planned FY2008 projects.

(F3) Productivity changes in sensitive soils

Forest Plan Requirements:

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

Intent:

To insure that management practices do not adversely affect soil productivity.

Data Sources:

EA's, review of proposed activities, field examinations and laboratory testing.

Current Efforts and Findings:

Annual Report Available:

A separate report is available for each of the three monitoring activities conducted in FY07. Monitoring activity 1 evaluates results of timber harvest management actions. Monitoring activity 2 assesses the outcome of fuels management and prescribed fire actions. Monitoring activity 3 documents rangeland conditions associated with allotment management actions.

FY07 Monitoring Activity 1:

Forest soil science personnel conducted field assessments of soil conditions in three Timber Sale Areas harvested within the past 1 to 5 years. Areas sampled included a total of three harvest units in the Poorman (1 unit), Snow Talon (1 unit), and Greyson (1 unit) Timber Sale Areas. Soil samples from harvested areas were compared to samples from adjacent un-harvested areas, which served as the baseline data. Data from these field reviews serves as information to document post-harvest soil conditions, and to evaluate effectiveness of soil-related Best Management Practices (BMPs) as well as compliance with Forest Plan and Region soil management standards.

Documentation of Monitoring Methodology for Activity 1

Field soil conditions were judged using a modification of Howes' protocol for 4 qualitative disturbance classes. Data points were sampled in a randomly oriented, systematic grid pattern, with a sampling intensity of 10 points per acre. At each data point, presence or absence of visual indicators for soil compaction, rutting, displacement, severe burning, surface erosion, mass wasting, and ground cover was recorded, along with the disturbance class rating (Howes 2000; USDA Forest Service 2007).

FY07 Analysis for Activity 1:

The full report documenting the findings of these field reviews conducted during summer 2007 is on file at the Helena National Forest Supervisor's Office. This full report includes documentation of the

monitoring methodology, data collected, and results of the monitoring data analysis. Key conclusions are recounted in the following paragraphs and below in the "FY07 Within Forest Plan Variability" summary.

For monitoring in three timber sale (TS) harvest units (e.g. Poorman TS unit 10, Snow Talon TS unit 44, and Greyson TS unit 3), the extent of the following types of soil disturbance were evaluated in the field: compaction, rutting, displacement, severe burning, accelerated erosion, and mass wasting. In assessing the amount of area affected by all types of detrimental soil disturbance (i.e. compaction, rutting, displacement, erosion, severe burning, and mass wasting) in timber harvest units, the mean value for aerial extent of moderate to severe soil disturbance on these 3 sites was 6%, and ranged from 0% to 11%.

Timber Sale Name & Unit Number:	**Poorman TS Unit 10**	**Snow Talon TS Unit 44**	**Greyson TS Unit 3**
Year & Season Of Harvest:	2002 Summer	2005-2006 Winter	2006-2007 Winter
Harvest Prescription:	Green tree regeneration cut	Post-fire salvage	Green tree thinning – bug salvage
Harvest Methods:	Trees cut using feller-buncher; Yarding with grapple-skidder on designated skid trails; whole tree removal	Trees cut using feller-buncher; Yarding with grapple-skidder on designated skid trails; whole tree removal	Trees cut using feller-buncher; Yarding with grapple-skidder on designated skid trails; whole tree removal
Slash Disposal Methods:	Slash piles burned at landings	Slash piles to be burned at landings – not yet implemented	Slash piles to be burned at landings – not yet implemented
Acres Evaluated:	Approx. 15	Approx. 8.5	Approx. 15
Total Points Sampled:	150	85	153
Points In Classes Of Moderate To Severe Soil Disturbance:	8 (~5%)	None (0%)	11 (~8%)
Field Notes:	Sample points included evaluation of skid trails, a landing & a reclaimed temporary road within the unit boundary	Sample points included evaluation of skid trails within the unit, but did not include evaluation of the road adjacent to the unit boundary or the landing on the opposite side of the road.	Sample points included evaluation of skid trails within the unit boundary & a landing immediately adjacent to the unit

In conclusion, results of the monitoring in timber harvest units document that the aerial extent of all types of soil disturbance (i.e. compaction, rutting, displacement, severe burning, accelerated erosion, and mass wasting) "detrimentally" affects less than 15% of the area in the evaluated timber harvest units. Results of this monitoring show that Best Management Practices (BMPs) were effective in limiting the amount of area affected by detrimental soil disturbance to comply with the Forest Plan measure of soil variability (i.e. limiting extent of detrimental disturbance to 20% or less of the activity area; Table F3-1).

Variability Measure Discussion For Activity 1:

Variability Measure:

The measure of Forest Plan variability for soil productivity is when changes from baseline levels of the soil's chemical and physical properties exceed 20%.

Assessment:

The results of FY07 monitoring indicate that the implementation of BMPs in timber harvest units have been effective in limiting detrimental soil disturbance to comply with the Forest Plan measure of variability for 20% change in soil properties. Thus, the results of monitoring indicate that this element is within the variability measure established by the Forest Plan. This conclusion is corroborated by forestry BMP monitoring conducted by the Forestry Division of Montana Department of Natural Resources & Conservation. In a "Comparison of BMP Audit Results – 2006 with all previous Audits" the percentage of BMPs providing adequate soil and water protection increased from 80% in 1990 to 97% in 2006 (MT DNRC 2006, page 2).

Actions in response to variability assessment:

Because BMPs are currently effective in achieving compliance with Forest Plan variability for monitoring element F-3 when implementing management practices, the Forest Plan "Decision Flow Diagram" says to "continue practices; Re-evaluate at next measurement period" (Figure IV – 1, page IV / 20). Thus, there is no need to change current management practices relating to Forest Plan monitoring element F-3.

Recommended Efforts For Activity 1:

Further soil monitoring should be conducted in 2007, and subsequent years, to validate the continued effectiveness of implementing soil-related BMPs with timber harvest activities.

Monitoring Activity 2:

During June 2006, Forest soil science personnel conducted field assessments of post-treatment soil conditions at two sites within Unit 1, and 1 site within Unit 2 of the Alice Creek Fuels Treatment Project. Data from these field reviews serves as information to document post-treatment soil conditions, and to evaluate compliance with Forest Plan and Region 1 soil management standards, as well as effectiveness of soil-related Best Management Practices (BMPs).

In addition, Forest soil science personnel conducted field assessment of pre-treatment soil conditions at two sites within Unit 5 of the Alice Creek Fuels Treatment Project. The data from pre-treatment evaluation serves as a baseline for evaluating post-fire conditions once prescribed burning is implemented. Because no management activities have been implemented in Unit 5, this data will not be evaluated for compliance with Forest Plan or Region 1 soil management guidelines, and will not be summarized in this report.

Documentation of Monitoring Methodology for Activity 2

A total of 5 soil monitoring plots were evaluated within 3 prescribed fire treatment units for the Alice Creek Fuels Treatment Project on the Lincoln Ranger District. Sample points were randomly selected for locating the monitoring plots for post-treatment field evaluation within Unit 1 and Unit 2, and for pre-treatment evaluation in Unit 5 of the Alice Creek Fuels Treatment Project. Each random point served as plot center for soil monitoring plots 07DM004 and 07DM006 in Unit 1, plot 07DM012 in Unit 2, and plots 07DM011 and 07DM009 in Unit 5.

At each soil monitoring plot, a total of 100 sample points were evaluated along 7 transects, with each transect being 75 feet in length. The 7 transects were oriented in a pre-defined hexagonal pattern, starting at the plot center point and directionally laid out according to the standard FIREMON sampling method (2005).

At each of the 100 sample points, both qualitative and quantitative data were recorded:

- For the qualitative assessment, visual indicators of severe soil burning and erosion (e.g. sheet, rill and gully erosion, and mass wasting) were documented (Howes 2000).
- For the quantitative assessment, bare ground versus soil cover was recorded at each sample point, and measurements made for the amount of coarse woody material which was retained for long-term nutrient cycling (FIREMON 2005; Brown et al. 2003).

Analysis For Activity 2 :

The full report documenting the findings of these field reviews is on file at the Helena National Forest Supervisor's Office. This full report includes documentation of the monitoring methodology, data collected, and results of the monitoring data analysis. Key conclusions are recounted in the following paragraphs and below in the "FY07 Within Forest Plan Variability" summary.

Data from the field assessment of post-treatment soil conditions in Unit 1 of Alice Creek Fuels Project documents that implementation of the prescribed burning did not achieve all soil management goals associated with Forest Plan standards, Region 1 guidelines, and Best Management Practices specified during the project planning process (Farley 2004):

- Visual data demonstrates that soil conditions in Unit 1 exceeded Forest Plan and Region 1 guidelines for limiting the area affected by severe soil burning (i.e. 22% of the activity area was affected by severe soil burning). Thus, the outcome of prescribed burn implementation did not meet the goal to limit the area of severe soil burning to comply with soil management guidelines.
- Visual and soil cover data indicates Unit 1 had an average of 87% soil cover retained with burning, in compliance with the amount of soil cover recommended in project BMPs (i.e. greater than 75% soil cover on slopes with 46-60% gradient).
- Visual data indicates approximately 16% of the area in Unit 1 was affected by detrimental surface erosion. This meets the Helena National Forest Plan soil guidance for limiting change in soil physical and chemical properties to less than 20%, but slightly exceeds the Region 1 soil guidelines to limit detrimental soil disturbance to affect no more than 15% of an activity area. Thus, the amount of soil cover recommended with project BMPs was slightly less than needed to effectively limit detrimental erosion.
- FIREMON fuel loading data indicates the amount of coarse woody material retained following prescribed burning is below the recommended threshold of 10 tons per acre in Unit 1 (Brown et al. 2003), except at the site where trees were felled for the purpose of fire control efforts. Thus over the long-term, this site may be nutrient deficient because of the lack of larger material for long-term nutrient cycling. This condition could be mitigated by felling small trees (i.e. 3 to 6 inch diameter) to recruit coarse woody material for long-term nutrient cycling.

Data from the field assessment of post-treatment soil conditions in Unit 2 of Alice Creek Fuels Project documents that implementation of the prescribed burning did achieve all soil management goals associated with Forest Plan standards, Region 1 guidelines, and Best Management Practices specified during the project planning process (Farley 2004):

- Visual data demonstrates that soil conditions in Unit 2 complied with Forest Plan and Region 1 guidelines for limiting the area affected by severe soil burning (i.e. none of the activity area was affected by severe soil burning). Thus, the outcome of prescribed burn implementation did meet the goal to limit the area of severe soil burning to comply with soil management guidelines.
- Visual and soil cover data indicates Unit 2 had an average of 96% soil cover retained with burning, in compliance with the amount of soil cover recommended in project BMPs (i.e. greater than 75% soil cover on slopes with 46-60% gradient).
- Visual data indicates approximately none of the area in Unit 2 was affected by detrimental surface erosion. This meets the Helena National Forest Plan soil guidance for limiting change in soil physical and chemical properties to less than 20%, as well as the Region 1

soil guidelines to limit detrimental soil disturbance to affect no more than 15% of an activity area.

- FIREMON fuel loading data indicates the amount of coarse woody material on this site is below the recommended threshold of 10 tons per acre in Unit 2 (Brown et al. 2003); although the reasons for such a low amount of coarse woody material is unclear since the site remained unburned with implementation of extremely low intensity prescribed fire in 2002. Over the long-term, this site may be nutrient deficient because of the lack of larger material for long-term nutrient cycling. This condition could be mitigated by felling small trees (i.e. 3 to 6 inch diameter) to recruit coarse woody material for long-term nutrient cycling.

In summary, soil conditions in Unit 2 generally complied with Forest Plan and Region 1 soil management guidelines. However, soil conditions in Unit 1 exceeded Forest Plan and Region 1 guidelines for limiting severe soil burning. Thus, the outcome of prescribed burn implementation did not meet the goal to limit the area of severe soil burning to comply with soil management guidelines. Soil conditions in Unit 1 met the recommended BMPs for retaining ground cover. Thus, the outcome of prescribed burn implementation did meet the goal to limit the area of erosion to comply with the Forest Plan guidelines, though the Region 1 guidelines for limiting erosion were slightly exceeded in Unit 1. The unpredicted high wind event most likely is the reason for the outcome of prescribed burn implementation exceeding soil management guidelines, because those high winds caused the prescribed fire to burn with greater intensity than planned. Thus, it should not be concluded that the burn prescription was inadequate and consequently the cause for exceeding soil management guidelines with implementation of prescribed fire in Unit 1.

Variability Measure Discussion For Activity 2:

Variability Measure:

The measure of Forest Plan variability for soil productivity is when changes from baseline levels of the soil's chemical and physical properties exceed 20%.

Assessment:

Although Unit 2 complied with Forest Plan and Region 1 soil management standards, the results of FY07 monitoring indicate that a deviation was observed for Unit 1 for the Forest Plan and Region 1 soil management goals associated with prescribed fire implementation.

Actions in response to variability assessment:

Monitoring indicates that the Forest exceeded the variability measure for Activity 2. Specifically, in Unit 1 the variability in soil conditions following burning exceed the acceptable Forest Plan limits (refer to Appendix A, Decision Flow Diagram, Helena National Forest Plan; 1986, page IV/20). However, this is a first time (i.e. non-recurring) variation. It is my professional judgment that continuation of prescribed burning would not result in serious consequences because the variation occurred as a result of an unplanned weather event and not because the planned parameters in the burn prescription were inadequate. Therefore, prescribed burning should be continued, with re-evaluation of soil variability compared to Forest Plan standards following future implementation of prescribed fire.

Nonetheless, there is a need to change current management practices associated with planning prescribed fire projects and relating to Forest Plan monitoring element F-3, because the amount of soil cover recommended with project BMPs was slightly less than needed to effectively limit detrimental erosion to comply with Region 1 soil guidelines. Therefore, the amount of soil cover recommended for retention with prescribed burning should be slightly increased for future projects.

Recommended Efforts For Activity 2:

Further soil monitoring should be conducted in 2007, and subsequent years, to validate the effectiveness of implementing soil-related BMPs in prescribed burn units.

FY07 Monitoring Activity 3:

Forest soil science personnel conducted field assessments of soil conditions on primary range sites within the Tarhead, Marsh Creek and East Nevada Grazing Allotments on the Lincoln Ranger District. For analysis purposes, soil samples from grazed areas were compared to baseline information available in pertinent scientific literature, because there were no known un-grazed sites to provide site-specific baseline data for comparison. Data from these field reviews serves as information to document current soil conditions on primary range sites, and to evaluate trends in rangeland health with ongoing grazing, which can provide a feedback loop for adaptive management in the future.

Documentation of Monitoring Methodology for Activity 3:

Key areas for primary rangelands were identified through discussions with Shawn Heinert, Rangeland Management Specialist on the Lincoln District of the Helena National Forest. One key area for primary rangelands was selected for soil monitoring in each of the three allotments. At each of the key sites, multiple indicators of soil health were evaluated at 20 sample points. The sample points were located along a randomly oriented transect, with spacing of the sample points dependent upon the size of the key area to be evaluated.

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 sod root mat using a soil auger);

Depth and color of the "A1" soil horizon (i.e. topsoil) was recorded (measured by digging into the soil surface using a soil auger);

Presence and type of soil cover, such as live plants, large rocks, coarse woody material, or bare ground (i.e. no cover);

Visible evidence of soil erosion, such as plant pedastalling, and soil rills or gullies;

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

In addition to the indicators evaluated for each of the 20 sample transect points, two other types of soil data were collected:

Triplicate soil bulk density core samples were collected for the A1 horizon (i.e. topsoil) at a subset of 3 randomly-selected transect points (using a bulk density hammer);

Triplicate tests of soil infiltration rate were conducted for the same subset of 3 transects points (using a single ring infiltrometer with 12 inch diameter).

Analysis For Activity 3:

The full report documenting the findings of these field reviews on primary range sites, conducted during summer 2007, is on file at the Helena National Forest Supervisor's Office. The full reports include documentation of the monitoring methodology, data collected, and results of the monitoring data analysis. Key conclusions are recounted in the following paragraphs.

The average depth of the sod mat (i.e. the layer of abundant very fine and fine size plant roots) was measured as 6.8 inches on the Tarhead Allotment site, 7.7 inches on the Marsh Creek Allotment site, and 6.5 inches on the East Nevada Allotment site. On average, the sod mat filled 95-100% of the layer of topsoil for sites evaluated in these three allotments. The sod mat serves as an important source for nutrient cycling in the topsoil. These monitoring results indicate that the root mat is healthy and is providing an adequate source for sustained nutrient cycling on these sites.

The topsoil color ranged from brown to very dark grayish brown on the Tarhead Allotment site, very dark grayish brown on the Marsh Creek Allotment site, and black on the East Nevada Allotment site. These relatively dark colors indicate the topsoil is rich in organic material which is providing an adequate source for sustained nutrient cycling for all three sites.

For all three allotments, soil cover protected 100% of the sampled points from erosion, and there was no visible evidence on the sites evaluated. Thus, all sites evaluated were physically stable for each of the three allotments.

The soil structure was observed as granular for the 3 sites evaluated. Thus, monitoring results showed no physical evidence of soil compaction on any of the sites evaluated. Both the bulk density samples and the infiltration test results also serve as proxy data for evaluating potential effects of soil compaction.

The average bulk density values were measured as 1.4 grams per cubic centimeter (g/cc) at the Tarhead Allotment site, and ranged from 0.98-1.13 g/cc at the Marsh Creek Allotment site to 1.16-1.25 g/cc at the East Nevada Allotment site. All bulk density values are below the threshold (i.e. 1.45 to 1.55 g/cc for soil with a loam texture) where root growth would be limited (Daddow and Warrington 1983). Thus, the bulk density samples do not show evidence of substantial impacts from soil compaction.

The average soil infiltration rates were measured as 6.1-9.8 Liters per 32.5 minutes (L/32.5 min) at the Tarhead Allotment site, and ranged from 1.1 to 5.1 L/32.5 min at the Marsh Creek Allotment site and 4.0 to 7.8 L/32.5 min at the East Nevada Allotment site. For comparison, infiltration rates averaged 8.6 liters per 32.5-minute test (the median value was 6.3 liters per 32.5 minutes), and ranged from 0.5 to 26.5 liters per 32.5 minutes on similar upland range sites (30 sites were evaluated) in the Little Belt Mountains (USDA Forest Service 2002). Thus, infiltration rates at the Tarhead Allotment site were comparable to average values on similar sites in the Little Belt Mountains. However, infiltration rates at the Marsh Creek and East Nevada Allotment sites were below the average values compared to similar sites in the Little Belt Mountains. The reason for relatively lower infiltration rates at the Marsh Creek and East Nevada Allotment sites is uncertain: are the infiltration rates naturally lower, or have management activities caused a reduction in infiltration rates?

Variability Measure Discussion For Activity 3:

Variability Measure:

The measure of Forest Plan variability for soil productivity is when changes from baseline levels of the soil's chemical and physical properties exceed 20%.

Assessment:

This element cannot be assessed in this report. An "FY07 Within Forest Plan Variability" assessment is not included with this report, because this range site data is intended for use as a baseline to evaluate variability in the future.

Actions in response to variability assessment:

These baseline conditions will be included in a pool of sites randomly selected for trend monitoring in subsequent year(s) and to provide information for future Forest Plan Monitoring Report(s). Because an assessment of variability for range site conditions is not included with this report, there are no actions to recommend in response.

Recommended Efforts For Activity 3:

Further soil monitoring should be conducted in subsequent years to validate the continued effectiveness of implementing soil-related BMPs associated with rangeland management actions.

(F4) Availability of adequate water to maintain management options, water rights.

Forest Plan Requirements:

Insure 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:

Documentation of Monitoring Methodology:

Review of ongoing adjudications and various projects.

Monitoring Activity:

Continued to monitor the last remaining case in Basin 41I. Water rights for Snowbank Lake were also investigated.

Data Analysis Methods:

Final Master's reports were issued on the outstanding water rights cases associated with the adjudication in Basin 41I (main stem Missouri) except for one in 2005. There was no change in 2006. The one outstanding claimant has withdrawn their claims just recently.

It was discovered that no statement of claim was filed for the water right for Snowbank Lake water diversion and that the Forest has lost its water right for that diversion. A possible water rights transfer or new water right was investigated for this site in 2005. Investigation and search for water right was completed in 2005 and a contract was let to submit an Application to Change a Water Right in 2006. This application was finally submitted to DNRC as of March 19th, 2007.

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. Application has been submitted to acquire a suitable water right for Snowbank Lake.

Variability Measure Discussion:

Variability Measure:

Variability which would initiate action – Any change which would require acquisition of additional water rights.

Assessment:

A suspected paperwork mix-up necessitates possible Forest action to acquire (re-acquire) water rights on Snowbank Lake.

Actions in response to variability assessment:

Work through the statewide adjudication process for Snowbank Lake.

Recommended Efforts:

Follow through on water rights application to the State for Snowbank Lake.

(G)MINERALS

(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:

I. Hard Rock Mineral Activities

This monitoring item was developed during a period of high mineral activity, particularly exploration drilling for low grade gold deposits. The State of Montana passed a law prohibiting cyanide in new heap leach gold operations. Since 2000 there has been only one exploration drilling project for a low grade gold deposit at Miller Mountain in the Big Belts. That project was completed and most of the bond released in the Fall of 2005. The project owner ceased activities and reclaimed his drill sites and roads due to a lack of a potential buyer. There were no new proposals in 2007.

Small scale placer prospecting activities account for the bulk of the hard rock minerals projects on the forest during the period 2006-7. The forest administers between 50-75 of these projects per year with 6-10 new or amended projects annually as well a similar number that are reclaimed and closed. These projects have been approved with Categorical Exclusions and are generally as such a small scale (less than ½ acre per project on average) that other FS land uses do not affect the project permitting and scope. The consistency in applications and projects suggests that stipulations are not severely restrictive, however, regulatory changes that lead to larger bond amounts are not usually well received by the miners and can result in the scaling back or redesign of a project proposal. Regulatory changes related to Bull Trout listing in drainages west of the Continental Divide have increased project mitigations and Plan of Operations processing timelines for small scale placer projects. Some miners have found these mitigations to be severely restrictive, particularly with respect to available periods for operations.

A small handful of underground lode operations remain active at low levels, including the Bigler mine and White Hope mine.

In 2005, the Helena forest signed a decision for travel planning in the northern Big Belt Mountains. The result of this decision 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.

II. 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, however, 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.

Several parcels were withheld from the leasing process initiated in 2007 due to roadless designation. 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 0 acres leased. The Helena Forest is expected to receive additional lease applications in the future and is also expecting to be able to review and submit them to BLM in a timely fashion.

In the winter of 2005, a deep exploration well was initiated near Flesher Pass seeking natural gas in Mississippian carbonates underlying the Lewis Overthrust. This wildcat well was drilled from private land to private minerals that 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.

III. 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 15-20 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.

IV. 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.

V. Abandoned Mines

The Helena Forest has nearly 150 identified abandoned or inactive hard rock mine sites. Documented impacts from some of these sites includes water quality impairment, loss of vegetation growth, and metals bearing sediments that are harmful to human health and aquatics. Since 1995, the Forest has reclaimed 21 sites ranging from <0.1 acre to over 10 acres in an effort to reduce metals contamination to headwaters streams. The Forest currently has 2 mine waste repositories on NFS lands to maintain and monitor and is a cooperator at the Luttrell Regional Repository which has wastes from over 10 Forest Service mine sites and numerous EPA lead mine sites in it. Mine wastes from the Little Blackfoot watershed were disposed in the Luttrell Pit in 2006.

The Mike Horse dam, located in the Upper Blackfoot watershed on NFS lands was evaluated for stability in 2005. The dam was found to be in a deteriorating condition. The Forest is working within the CERCLA framework and responsible parties to resolve the long term issue of this dam. A draft EE/CA was prepared and released for public and agency comment in the fall of 2006. A cleanup decision was rendered in summer of 2007. The decision included the removal of the dam and placement of the impounded tailings in an onsite repository.

Numerous hazardous mine openings in the area south of the city of Helena were inventoried in fall 2007. These sites are planned for closure in 2008.

Documentation of Monitoring Methodology:

Monitoring protocols include project review by Forest Geologist of 5-10 projects with District Minerals Administrators annually through informal discussions during various stages of project NEPA and permitting. Emails and project file meeting notes between the minerals administrator and the district ranger, miner, or Forest geologist are generally the documentation that is used.

Monitoring Activity:

Monitoring activity includes discussions by Forest Geologist with mineral administrator and district rangers, as well as individual operators.

Data Analysis Methods:

Review CE's and project file documentation. Discuss projects with mineral administrators.

Monitoring Results:

The consistency in new applications and projects suggests that stipulations are not severely restrictive, however, regulatory changes that lead to larger bond amounts are not usually well received by the miners and can result in the scaling back or redesign of a project proposal. Regulatory changes related to Bull Trout listing in drainages west of the Continental Divide have increased project mitigations and Plan of Operations processing timelines for small scale placer projects. Some miners have found these mitigations to be severely restrictive, particularly with respect to available periods for operations.

Variability Measure Discussion:

Variability Measures:

- Departure from approved operating plan or violation of assigned stipulations.
- Unacceptable review of lease application by ID Team
- Unacceptable restrictions on mineral development

Assessment:

1. Variability item #1 – a small percentage of hard rock mineral projects invariably result in a departure by the miner from what was approved and bonded. Usually this is a result of miscommunication or lack of cooperation on the part of the miner. The resulting resources impacts, overall, are minor as these projects are localized in nature and relatively infrequent.
2. Variability item #2 – does not apply as the Forest completed its leasing analysis and ROD in 1998 which resulted in identification Forest Wide of areas available to lease and areas unavailable to lease.
3. Variability item #3 – no mineral activities have been eliminated as a result of forest service restrictions. 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

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:

No action needed at this time. Continue at the current level of compliance with the monitoring element.

(P) PROTECTION

(P1) Acres and volumes in insects and disease infestations

Forest Plan Requirements:

Monitor acres and volumes of insect and disease infestations.

Intent:

Assure harvest emphasizes removal of high risk trees for mountain pine beetle attack, and to keep an inventory of acres of high risk stands for insect and disease infestations.

Data Sources:

NEPA documentation, R1 Forest Health Protection trip reports and Aerial Detection Surveys, 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. 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 2006, volume in stands at risk to mountain pine beetle was sold in Jimtown Fuels and work on the project began in late 2007. In the 5 year planning timeframe, much of the timber harvest has been focused on fire salvage. However, several projects did target stands at risk to mountain pine beetle (Lincoln Compound, Grassy Bugs and Greyson Bugs).

Monitoring Results:

Most insects and diseases continued to increase across the Forest in 2007 and during the 5-year monitoring period since 2003. The exception is Douglas-fir beetle, which was on the rise during the first part of the period but as of 2007 is on the decline. In localized areas risk to Douglas-fir beetle remains high and new outbreaks are possible especially following western spruce budworm defoliation and fire activity, as noted in a 2006 Forest Health protection trip report (MFO-TR-06-17, 2006 project file). Mountain pine beetle is increasing in severity and distribution across the Forest. The bulk of this infestation is in lodgepole pine, but ponderosa pine and whitebark pine are affected as well. See MFO-TR-07-10 and MFO-TR-07-27 (project file). Western spruce budworm defoliation also continues to increase. This insect has caused notable mortality in the Flesher Pass area in particular, as noted a 2006 Forest Health Protection trip report (MFO-TR-06-10, project file). Based on 2006 and 2007 Aerial

Detection surveys, mountain pine beetle activity in particular is increasing in infestation patch size and distribution (2007 Bark Beetle Conditions report, project file). The most prominent disease on the Forest continues to be white pine blister rust, which is continues to cause significant mortality in whitebark pine and is often present coincident with mountain pine beetle (MFO-TR-06-05, 2006 project file).

Several NEPA documents were written during this period that focused on areas at high risk to infestation; also, some projects implemented during this time were focused on insects. In 2007, the planning process was continued for the following projects responding at least in part to current and potential infestations: **Cabin Gulch** (EIS), **Hay Peggy** (EIS), **Elliston Face Fuels** (CE), and **Clancy Unionville** (EIS). Projects that have been at least partially implemented since 2002 include Jimtown Fuels (2007), Greyson Bugs (2006), Snow Talon (2006), Grassy Bugs (2004), and Lincoln Compound (2004).

Silvicultural review of the Greyson timber sale in progress as documented in 2007 confirmed that mountain pine beetle activity lessened within treatment areas (project file). A mountain pine beetle strategy was developed with the help of the RO for an infested unit in the Elliston project (project file). Insect conditions were monitored in the Clancy Unionville project and prescriptions updated accordingly (project file). The American Bar and Deep Creek fuels reduction projects (prescribed burning) were also monitored and the potential for insect infestation assessed (project file).

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.

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 and in planning for the Elliston Face Fuels reduction project and Cabin Gulch EIS. No negative IDT reviews have occurred in any treatments with respect to insects and disease.

The Forest is very proactive in monitoring insect and disease activity, and by considering opportunities to treat for mountain pine beetle in conjunction with all projects is meeting the intent of the standard. The deviation from this standard during this monitoring period is due to the large scale wildfires and subsequent salvage harvest activities.

Insect and disease activity across the Forest is extensive, but is not a result of management actions other than fire suppression. 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. Continue to look for opportunities to treat areas at high risk to mountain pine beetle.

(P2) Air quality

Forest Plan Requirements:

Annually monitor air quality.

Intent:

Assure prescribed fire meets state and Federal air quality standards.

Data Sources:

The State DEQ 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 monitors 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 operates Particulate Matter (PM) samplers in Helena and Great Falls.

Data Analysis Methods:

N/A

Monitoring Results:

No violation notices were received to indicate that standards had been exceeded. This information is summarized annually by state DEQ. Measurements are in compliance as determined by DEQ.

Variability Measure Discussion:

Variation of +/- 10% beyond standards and guides will initiate action

Variability Measure:

+/- 10% beyond standards and guides.

Assessment:

Variability is within acceptable limits.

Actions in response to variability assessment:

No change necessary.

Recommended Efforts:

Continue current management direction.

(P3) Fuel treatment outputs

Forest Plan Requirements:

Monitor fuel treatment outputs.

Intent:

Assure balanced fuel treatment reports.

Data Sources:

National Fire Plan Operating Reporting System (NFPORS).

Current Efforts and Findings:

Fuel treatment outputs have in the past been tied closely to timber harvest fuel treatments. Fuel treatment methods continue to change over time and acres treated within harvest areas have declined. Congress is currently funding natural fuels treatment (treatments not associated with timber harvest) at a higher level than has been set in the past.

Documentation of Monitoring Methodology:

The National Fire Plan Operating Reporting System (NFPORS) is currently used to track fuels accomplishment acres. Data gathered from previous monitoring reports was used to determine trends.

Monitoring Activity:

National Fire Plan Operating Reporting System (NFPORS) report for fuels accomplishments in FY07.

Data Analysis Methods:

N/A

Monitoring Results:

A total of 5,548 acres of natural fuels were treated in FY07.

Variability Measure Discussion:

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

Variability Measure:

+/- 25% of programmed targets. The assigned target for FY07 was 6,891 acres. 81% of programmed target was accomplished.

Assessment:

Variability is within acceptable limits.

Actions in response to variability assessment:

No change is necessary.

Recommended Efforts:

Shift emphasis of monitoring to natural fuel treatment areas. For clarification due to reorganization, the Forest Fire Management Officer should be identified as responsible for monitoring and reporting findings.

(P4) Wildfire acres

Forest Plan Requirements:

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

Intent:

Assume wildfire acres are within projected annual burned acres and determine the adequacy of the fire management organization.

Data Sources:

FIRESTAT database

Current Efforts and Findings:

The Forest Plan objective for management of wildfire is to limit the area burned to an annual average of 390 acres or less.

Documentation of Monitoring Methodology:

The 5100-29 Reports compile the individual fire information and are stored in the FIRESTAT database. These are transmitted and reported annually.

Monitoring Activity:

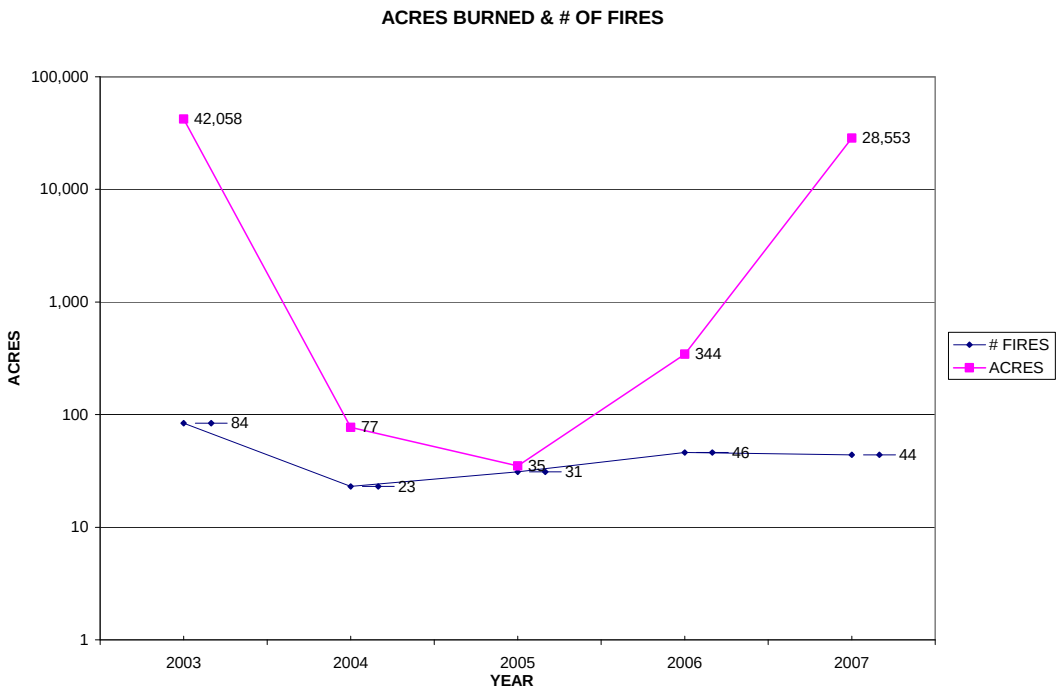
FIRESTAT reports were reviewed to determine acres burned and financial management reports were reviewed to determine costs.

Data Analysis Methods:

Summarization of records.

Monitoring Results:

The current five year average is approximately 14,213 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 years of 2003 and 2007 being above the 25% projected average of wildfire burned acres, if the large fire years of 2003 and 2007 are considered the variability is outside of the acceptable range.

Actions in response to variability assessment:

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

Recommended Efforts:

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

Review acre objective at Forest Plan Revision. For clarification due to reorganization, the Forest Fire Management Officer should be identified as responsible for monitoring and reporting findings.

(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:

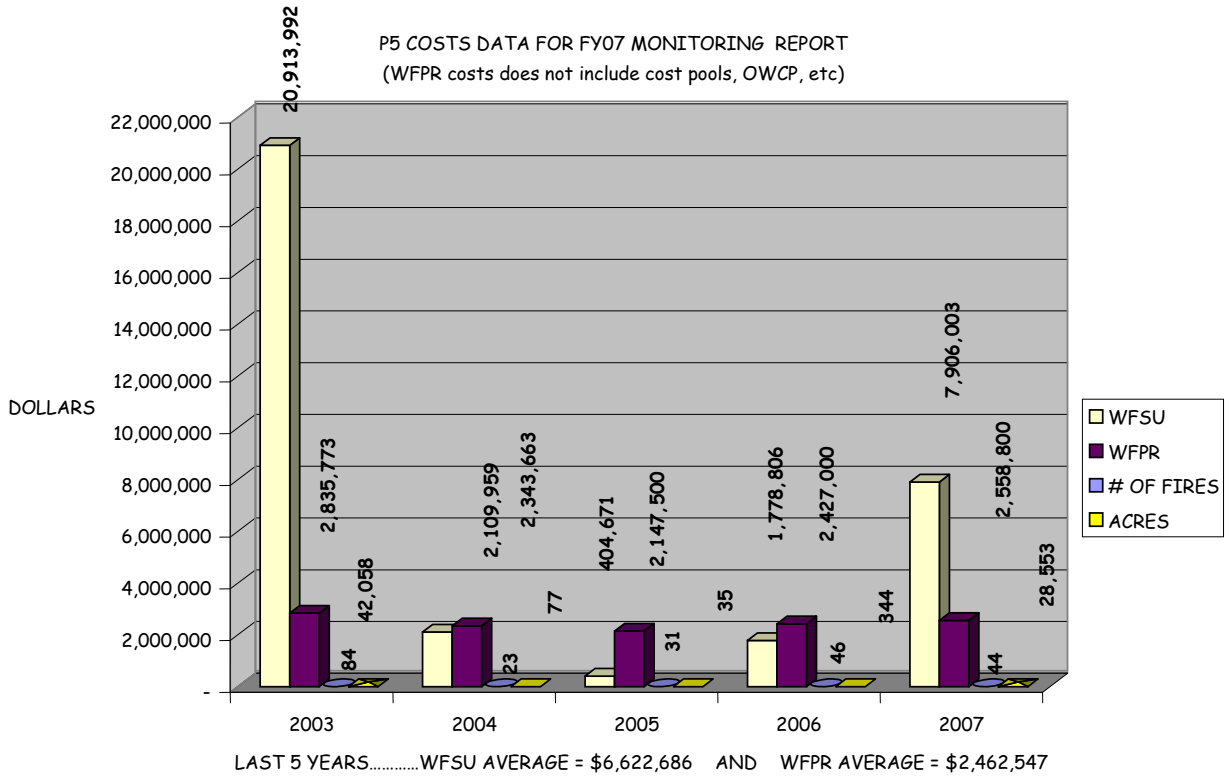
The NFMAS process has been used for budget submissions for the HNF Fire Program. Costs for WFSU were derived from Transaction Register Summaries pulled by the Budget & Finance (B&F) office. WFPR total allocations were derived from B&F final program budget advice data. Net Value Change is no longer tracked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

Data Analysis Methods:

Summarization of records.

Monitoring Results:

In 2007 the Forest spent $ 7,906,003 in the suppression of wildfires. The 5 year average is $ 6,622,686 which includes the large fire cost years of 2003 and 2007.



Variability Measure Discussion:

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

Assessment:

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

Variability Measure:

+/- 5% increase in real costs.

Actions in response to variability assessment:

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

Recommended Efforts:

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

For clarification, due to reorganization, the Forest Fire Management Officer should be responsible for monitoring and reporting findings.

(L1) FACILITIES

(L1) Roads

Forest Plan Requirements:

Local roads in place and collector roads constructed.

Intent:

Insure that assumptions are valid concerning: 1. Local/collector road density 2. Local/collector road standards.

Data Sources:

INFRA Travel Routes inventory, accomplishment reports, EA's, transportation plans, and final construction reports. TIS inventory has been replaced by the FS intranet database program, INFRA (I-Web).

Current Efforts and Findings:

Currently, no new roads are being constructed without prior Roads Analysis and NEPA decisions.

Documentation of Monitoring Methodology:

New Road Construction is required to meet requirements of the Forest Service Manual and Best Management Practices (BMPs).

Monitoring Activity:

Any new road construction would be subjected to following the Forest Plan and NEPA.

Data Analysis Methods:

Methods to analyze newly constructed roads would be by a Final Inspection Report which would be filed in the Project folder and then entered into INFRA.

This newly constructed road would also continue to be monitored as per L2 requirements.

Monitoring Results:

Resource Element L1 monitors the miles of local roads in place and the miles of collector roads constructed on an annual basis. The Forest Plan stated that there were 1607 miles of system roads on the HNF in 1980 (the base year for the Forest Plan) and predicted that 22 miles of road (9 miles of

collectors and 13 miles of locals) would be built each year. This would increase the total system miles to 2520 after five decades (or about year 2035). The attached table shows the miles of road in the system (now called the Transportation Atlas) by year since 1986. The table also shows the miles of road constructed each year. Where there are blanks in the table there is no information available. For two years, 2001 and 2002 the data is incorrect. There was an error in the database that caused many roads to be double counted. Data for those two years should not be considered.

Helena National Forest Road Information

Year	Miles in System	Miles Closed Yearlong	Miles of Collector Constructed	Miles of Local Road Constructed	Forest Plan Projections, Miles	Forest Plan Projected Collectors & Locals, Mi. to be Constructed Each Yr.
1986	1607	207	6	15.2		
1987			6.5	16		
1988			4.8	12		
1989			3.2	8.1		
1990			2.6	6.5		
1991			2.2	5.3		
1992	1680	325	3.3	8.2	1761	+22
1993	1680	325	1	3	1783	+22
1994	1940	568	0.5	0.9	1805	+22
1995	1990	570			1827	+22
1996	1887				1849	+22
1997	1776	335	0	0	1871	+22
1998	1899	339	0	0	1893	+22
1999	1837	334	0	2	1915	+22
2000	1954	297	0	0	1937	+22
2001	(1)	(1)	0	0	1959	+22
2002	(1)	(1)	0	0	1981	+22
2003	2847	888	0	0	2003	+22
2004	2832	888	0	0	2025	+22
2005 (2)	2829	888	0	0.3 (3)	2047	+22
2006 (2)	2831	893	0	0	2069	+22
2007 (2)	2854	967	0	0.5 (4)	2091	+22

- (1) For two years (2001 and 2002) the data is incorrect. There was an error in the database that caused many roads to be double counted. Data for those two years should not be considered.
- (2) These number varies slightly from the 2004 number due to actual on the ground surveys and therefore the adjustment of the mileage.
- (3) The 0.3 miles of road constructed was at MacDonald Pass to access a trailhead.
- (4) The 0.5 miles constructed was at the Cave Gulch and Never Sweat Trailheads.

The Forest Plan assumed the total system miles should have been 1761 in 1992, 1871 in 1997, and 2,025 in 2004. The actual numbers were 1680 in 1992 (a 5% variance from the predicted), 1776 in 1997 (a 5% variance) and 2832 in 2004 (a 40% variance). The total miles in the system stayed within the plus or minus 20% tolerance until 2003. The reason for exceeding the variance in 2003 and 2004 is that the

definition of a road in the Forest Plan differs from the definition used today as a result of the National Forest Service policy change with the new National Roads Policy adopted in 2001. The Forest Plan assumed that the 1607 miles of road inventoried in 1980 comprised all of the roads on National Forest land that were being used by vehicles. Low standard, low traffic "Jeep trails"/ roads, were not considered part of the system at that time. As per the 2001 Road Policy, all vehicle travel-ways including these low standard routes are considered system roads. Over the years many of these routes were added to the system, while others were decommissioned (obliterated). Partially to implement the new National Road Policy and partially to prepare for forest-wide travel planning the Forest began an effort in 2001 to inventory all of the existing roads on the Forest. In 2001 and 2002 the roads database incorrectly double counted many of these new roads that were added to the system. That is why the values for those years are incorrect.

In 2005 an adjustment was made to the mileage due to on the ground condition surveys. Not all roads are surveyed every year and so adjustments will probably continue as other roads are surveyed.

The Forest Plan predicted that the Forest would build 9 miles of new collector roads and 13 miles of local roads each year between 1986 and 2035. The table above shows that since the plan as been adopted there hasn't been a year when that many miles of road were built. In 1986 and 1987 the total miles of road constructed came close to that prediction (well within the variance of 20%), but beginning in 1988 the miles of road construction was outside the 20% variance from the predicted 22 miles per year. The annual miles of road construction fell sharply in the early 1990's and, since 1995, very few new roads have been constructed on the Forest. The predicted miles of new road construction assumed the Forest would be building roads in inventoried roadless areas to access timber stands. After the mid-1990's no roads have been built in inventoried roadless areas due to changes in national policy and public support. Road construction outside inventoried roadless areas has almost completely stopped, with timber harvest using existing roads, temporary roads or logging systems (helicopter) that don't require closely spaced roads.

Variability Measure Discussion:

Variability Measure:

Variation of +/- 20% of predicted miles of road will initiate action.

Assessment:

The actual number of road miles is under the projected amount using the Forest Plan definition. However, under the 2001 Road Policy definition, the Forest is well within the variability limits.

Actions in response to variability assessment:

No action is needed since the Forest is within the variability as defined by the 2001 Road Policy.

Recommended Efforts:

With the virtual elimination of road construction to support the timber program, measuring the miles of collector road constructed is no longer a meaningful monitoring element. The total miles in the system is a valid element and one that is done annually when the forest prepares the Road Accomplishment Report (RAR). The RAR also annually tracks the miles of road by maintenance level, miles reconstructed, miles receiving maintenance, and miles decommissioned. All of these are valid monitoring elements and should be included in the revised Forest Plan. In addition to the items covered by the RAR another new monitoring element that should be considered during Forest Plan revision would be the miles of road open to dual use.

(L2) Road Management

Forest Plan Requirements:

Monitor road management.

Intent:

Insure that assumptions are valid concerning:

1) Collector roads.
   - a. yearlong closures
   - b. seasonal closures

2) Local roads
   - a. yearlong closures
   - b. seasonal closures

Data Sources:

INFRA Data base.

Actual road condition surveys to record lengths, condition and needed improvements.

Travel Routes Inventory maintenance plans and travel plans are used to insure that assumptions are valid concerning yearlong closures, and seasonal closures of collector and local roads. TIS data base has been replaced by INFRA data base. Travel Management plans are subjected to the NEPA process.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Random sampling on forest roads is occurring yearly for required Annual and Deferred Maintenance needs, and the INFRA data base is updated.

Monitoring Activity:

Qualified road/engineering personnel perform monitoring activity. This is a process in which personnel go out to the field and to the randomly selected specified road. A complete road condition survey is completed. This is usually when road lengths, maintenance levels, and closure restrictions are reviewed.

Data Analysis Methods:

Analysis of the data is checked against approved Travel Plans on record.

Monitoring Results:

Resource Element L2 monitors the miles of road closed to vehicle use either seasonally or year long. The variability that would cause action is plus or minus 30% of the predicted road miles. The Forest Plan stated that of the 1607 miles of road in the system 207 were closed either year long or seasonally. The plan predicted that the miles closed would increase to 327 by the end of the first decade and to 870 miles by the end of the fifth decade. There is no way to measure the miles of road closed seasonally on an annual basis, however the miles with year round closures by year since 1992 is known. In 1997, at the end of the first decade of the Forest Plan, there were 335 miles closed year long. This is only a 2% variance from the predicted number of closures. In 2007 there were 967 miles closed year long, which is slightly above what the plan predicted would be closed by 2035.

Of the total system miles of road in 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 2007, 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.

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

(T1) Economics

Forest Plan Requirements:

Verification of unit cost used in the Forest Plan compared to on-the-ground cost.

Intent:

Acquire accurate cost data.

Data Sources:

Timber sale appraisals, contracts, allotments, management plans, cost/output for various resource programs, sale area betterment plans, and timber sale reports.

Current Efforts and Findings:

Documentation of Monitoring Methodology:

Review and summarization of data from data sources described above. The economic information is monitored is available form data sources such as the annual PTSAR report, Annual cut and sold report, TIM database and FACTS.

Monitoring Activity:

Review Forest timber budgets and annual timber volume sold to evaluate unit costs.

Data Analysis Methods:

Total funded program dollars for NFTM and SSSS adjusted to fiscal year 1986 dollars were included in the cost for the timber program. Volume sold by fiscal year was used to display outputs for comparison.

Monitoring Results:

Two of the past five years, unit costs have been within Forest Plan variability. 2003,2004 and 2007 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 FY03 and FY04 was associated with fire salvage sales While the 2005- 2007 program concentrated on MPB mortality and green sales. The Forest requested and was funded for a program commensurate with expected outputs, however as a result of NEPA appeals most of the green sales 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 range from

$160 (86 M$) to $ 239 (86M$) with higher receipts, $463 (86M$) associated with large fire salvage in 2003-2004. 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.

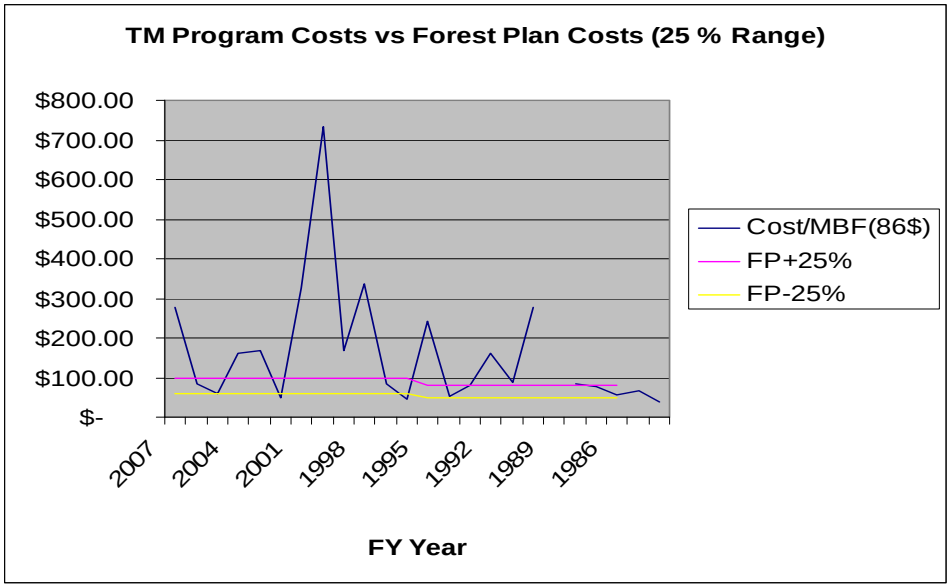
Variability Measure Discussion:

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. 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.



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.

Recommended Efforts:

The Forest maintains timber sale appraisals, contracts, sale area betterment plans, and timber sale reports. Various resource program managers also maintain cost/output information and the individual districts maintain allotment management plans. The Helena National Forest records are available for review by interested parties.

(T2) Adjacent lands, resources, and communities

Forest Plan Requirements:

The effect of National Forest management on adjacent lands, local economies, recreation opportunities, down stream water uses, visual quality, and local air quality is to be monitored. Likewise, effects of management on adjacent lands on National Forest land goals and objectives are to be monitored.

Intent:

Determine effects of Forest Plan on other ownership. Determine effects of management of other ownership on Forest Plan.

Current Efforts and Findings:

Part of the focus of the Forest Service Chief's Healthy Forest Initiative is on healthy local economies as well as healthy forests. This includes consideration for opportunities to enhance recreation-related businesses as well. The Forest Service maintains a State and Private Forestry division that helps local individuals, organizations, and governments to work cooperatively with this agency. At the local level, project analyses provide discussion of management effects to recreation, water, visual quality, and air quality. As to activities on adjacent lands, the Chief has identified conversion of open timberlands and rangelands to smaller developed parcels as one of the four threats to maintaining present resource values on National Forest system lands. This should help foster discussion of this aspect of long-term management of the Forests. At the local level, we monitor adjacent activities primarily through cumulative effects analyses. The Forest has been working cooperatively with the City of Helena, Tri-County Working Group and adjacent landowners in developing and implementing fuels reduction projects so as to minimize risk from wildfire to local residences. The Forest has also completed 4,720 acres of grassland restoration/habitat enhancement in partnership with the Rocky Mountain Elk Foundation.

Variability Measure Discussion:

Variability Measure:

Unacceptable results of an ID Team review would initiate action.

Assessment:

Resource management conflicts and cumulative effects considerations continue to be identified, evaluated, and addressed through biological and social assessments, analysis, management modifications, mitigation measures, or other management actions. At this time no unacceptable impacts have been identified.

Actions in response to variability assessment:

Within variability, no action is required.

Recommended Efforts:

No actions are recommended at this time.

(T3) Forest Plan Table IV-1 Monitoring Requirements

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, NEPA processes public involvement, issue and target group analysis, and appeals/litigation trends.

Current Efforts and Findings:

Current processes in this evaluation on the Helena NF that help keep the public informed/educated and to increase the Helena NF's awareness to public issues/concerns can be summarized under Community Outreach, SOPA/PALS, Forest NEPA processes, and Regional Appeals.

There are other means that aid in accomplishing this effort such as the invaluable day-to-day contacts employees of the Helena NF make throughout the Forest with various programs and in the field contacts that are essential in continuing and improving understanding of our agency resource objectives and for awareness of public needs, issues, and concerns. However, this evaluation will focus on the above data sources, which tend to have the biggest impacts on this effort.

Community Outreach:

Ongoing community outreach programs such as learning/teaching sessions, presentations, and lectures series. See the section ***'Monitoring Activity'*** below for a list of numerous efforts in events and programs that were provided during 2007.

SOPA/PALS:

In an effort to improve public service, the Helena NF Planning staff continues to produce a Schedule of Proposed Actions (SOPA) that is required quarterly and is intended to provide notice of upcoming Forest proposals, which may undergo environmental analysis and documentation. The SOPA is sent to interested and affected agencies, organization, and persons both electronically and hard-copy.

The SOPA is produced through a National database called Planning, Appeals, and Litigation System (PALS). The PALS data-base contains coverage nationwide, is a searchable database, and can be used locally as well as nation-wide. This system provides 24-hour availability for the agency, congress, interested publics and organizations a way to get information or how to get involved with specific Helena NF projects.

Forest NEPA:

Once public interest is conveyed in a specific project such as through the PALS process described above, continued involvement is afforded through the formal NEPA processes by being involved and reading information provided in the scoping period, legal notices, news releases, comment periods, and on-going involvement throughout a given project. See the provided SOPA list for the extent of NEPA projects that were processes during 2007.

Through these NEPA processes; the interested publics, organization, other agencies, and tribes all have the opportunity to be involved as much or as little as they desire. This involvement creates opportunity for understanding, education, collaboration, 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.

Forest Appeals:

If projects are appealed, there is a Region One process that reviews these appeals and identifies the appeal points presented by the appellant. Identified appeal points end up being an indication of the environmental issues the public holds concern for. These appeal points can be those indicators showing the potential emerging issues of the day and may show trends in our changing social values for the pleasure and uses of our National forests.

Documentation of Monitoring Methodology:

Community Outreach:

Ongoing community outreach programs continue to grow on the Helena NF. Learning sessions with area students, presentations by experts and discussion panels have occurred, and contacts with community leaders and elected officials continues.

SOPA/PALS:

The Helena NF specialists at the District and Supervisor's Office provide the needed information throughout the year to the PALS coordinator at the Supervisor's Office to keep the database current with projects proposed or on-going for the Helena NF. It is interred electronically to the National database and becomes available to the general public as well as to the agency and Congress. 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, or record of decision level. Not only is this information available on the National database and through the quarterly mailing of the SOPA, the public can also view this information on the Helena NF web page and see Forest projects that may be of interest to them.

Forest NEPA:

Forest NEPA processes document all that occurs with a given project from conception through decision. Most all projects have a specific project record that contains files, analyses, and evaluations used as the evidence toward a well-informed decision. In addition to these resource specialist's reports, the project record contains information of the public involvement process that documents public issues and concerns for the proposal.

In the context of these documents, the emerging issues and changing social values can be discerned particularly at the scoping and comment period phase of public involvement process. The scoping and comment periods are required public involvement processes for a given NEPA project. The public input is filed, documented, and agency responses developed (when applicable).

Forest Appeals:

At the Regional Office (RO) in Missoula, a panel of three Region 1 Forest or Grassland employees convenes to identify the appeal points presented by an appellant in regard to a specific project. Once the panel completes its task, it is presented to an appeal review officer to review the findings and affirms or modifies the team's findings. The results are compiled, documented, and presented to an appeal-deciding officer to conclude by affirming, affirming with conditions, or concurring with the appellant and returning the project back to the responsible unit to withdraw the decision.

These findings can be used by the Helena NF to improve current and future projects and to accommodate understanding and awareness as intended for this Forest monitoring item.

Monitoring Activity:

Community Outreach:

Documenting events through brochures and newsletters such as "*Community Naturalists"* and counting participation during events such as Moonlight Hike, Conserve Resources/Don't be a Litter Bug, Mine

Tours/All About Bats, Campfire Safety, Nature Crafts/Nature Walks, Rocks are Cool, Pollination, Wilderness Education, Forest Health Lecture Series, Celebrating Wildflowers, Arbor/Earth Day Programs, Pond Day, etc. are but a few of the events that were provided in 2007.

SOPA/PALS:

The following information was submitted and is available from the SOPA: Project Name, Type of Project, Location, Type of NEPA Document, Status of Project, Decision Date (actual/estimated), projected Implementation Date, and a Forest Contact.

Forest NEPA:

The projects listed in the SOPA all have some level of detail in their project records and in the NEPA documents that give some indication of the emerging public issues or changing social values. Specifically, the scoping process and comment period give the best feel for these issues or changes.

In 2007, the larger projects and ones with public interest included the Cabin Gulch Vegetation, Hay Peggy Fuels, South Belts Travel, Divide Travel, Montana National Guard Biathlon Range, South Helena Hazardous Fuels, Blackfoot/North Divide Winter Travel, and Marsh/Tarhead Allotment.

Forest Appeals:

The appeals on the Elliston Face Hazardous Fuels Project (Native Ecosystems Council, 04/24/2007 and Alliance for the Wild Rockies 5/21/2007) were the only appeals on the Helena NF during 2007.

Data Analysis Methods:

Community Outreach:

Periodically, the *"Community Naturalists"* are mailed to the interested publics. Sponsored events are tracked on a spreadsheet including date, Organization, Location, # of Participants, and Activity conducted.

SOPA/PALS:

The SOPA is continuously updated and provided on a quarterly basis via a web page and hard copy mailings. The general public, the agency, and Congress can request reports from the PALS database. Currently it can be used to track NEPA projects and those that deal with cooperating agencies. In the future, appeal and litigation will be traceable.

Forest NEPA:

For larger projects, the interdisciplinary teams (IDT) for each of the projects conducts a level of analysis that evaluates the public input received during for these projects. This process is sometimes referred to as 'content analyses'. The IDT evaluates the public input and, with the 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 the concern, or used to enhance and improve the resource effects analyses.

Forest Appeals:

The above appeals on the Helena NF in 2007 were reviewed and appeal points identified.

Monitoring Results:

Community Outreach:

There is continued interest and support for the *"Community Naturalists"*. Numerous programs and events were provided through the Montana Discovery Foundation. In 2007, over 4,900 people participated in the Helena NF/Montana Discovery Foundation sponsored events.

SOPA/PALS:

There were about 43-50 projects listed in any given quarterly SOPA in 2007 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, environmental assessments and environmental impact statements; resulting or moving toward decision memos, decision notices/FONSIs, or record of decisions. The status of these projects varied from scoping, developing the proposal, conducting analysis, complete, or on hold.

Forest NEPA:

The variety of NEPA projects including CEs, EAs, and an EIS, all have their unique set of circumstances. Of these NEPA projects, the higher profile projects include South Belts Travel, Montana Army National Guard Biathlon Range, South of Helena Hazardous Fuels, and the Blackfoot – North Divide Winter Travel. This does not intend to minimize the other Forest projects or their issues, it's just that the above listed projects are the ones that received the most public interest and required more agency effort in conducting analyses and public involvement processes.

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

Project Name	Type of Document	Key Issues Or Concerns
South Belts Travel	EA	Displacement of Motorized Users Motorized Use Within Inventoried Roadless Areas Narrow Scope of the Decision
Montana Army National Guard Biathlon	EA	Displacement of traditional Nordic skiing Wildlife habitat/connectivity Adequate future snowfall Costs of maintenance and continued uses Analysis processed under an out dated Forest Plan Controversy and other concerns warrants and EIS
South Helena Hazardous Fuels	CE	Proper use of Categorical Exclusions Cumulative Effects
North Divide Winter Travel	EA	Grizzly bear issues of emergence, denning, etc Use conflict between motorized & non-motorized in regard to solitude, quite trails, and safety. Use in Inventoried Roadless Areass, Research Natural Areas & the Continental Divide National System Trail.

All of these issues or concerns may be pertinent or perceived. That's 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 address them through educational opportunities, programs, and the due processes for environmental analyses.

Forest Appeals:

The Elliston Project decision was documented as a decision memo under Category 10. The decision was withdrawn due to a court conclusion that disallows the use of Category 10. However, during the scoping/comment period of this decision there were a number of procedural challenges along with a couple of highlighted concerns. One was the conflict among agency maps delineating winter range and the other was whether or not the documentation addressing snags was adequately analyzed.

Variability Measure Discussion:

There is not a definitive measure in determining success in keeping publics informed, through educational and environmental programs or in raising the agency's awareness to public concern except to track public

participation and involvement by listening to what they've said and what they've submitted during the programs and events and NEPA/appeal processes.

Variability Measure & Assessment:

In evaluating the elements of Community Outreach, SOPA/PALS, Forest NEPA, and Forest Appeals; the Helena NF is able to adapt to the ever-changing public concerns, needs, and desires of their National Forests. As events and programs have been provided, the amount of interest measured in public participation can give a since of how well the Helena NF along with partners like the Discovery Foundation is providing timely, current environmental subjects. Attendants of these programs are variable but do address interesting and emerging environmental issues.

The Helena NF addresses issues throughout NEPA and appeal processes. Scoping, comment periods, and appeal opportunity allow the interested public to be involved and give a chance to voice concerns and bring to the Helena NF possible perspectives not quite explored. The Helena NF adapts and adjusts actions through management activities such as mitigation that are developed to reduce, avoid, compensate, etc. potential environmental impacts. The Helena NF also takes learned lessons from a given Forest project and applies these lessons to the design and development of future Forest projects.

In looking at the cross section of differing data including community outreach, SOPA/PALS, Forest NEPA, and Forest Appeal, the intent of this Forest Plan Monitoring Item T3 is being met.

Actions in response to variability assessment:

As the Helena NF works with the Montana Discovery Foundation and other partners, programs and events can be provided as new and rising issues and concerns become evident. Community events and programs can be offered that address environmental issues in a timely manner.

Through Forest project processes, the Helena NF assesses public raised issues and develops a different strategy or approach in designing Forest projects.

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 should be made in searching other avenues of education and potential partnerships in improving public and Forest employee education with the demands of our Forests and as new forest science brings to our attention different perspectives and awareness of our natural resources.

This Forest Plan monitoring item is key in striving to accomplish the purpose statement as described in the National Environmental Policy Act to encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation.

These described processes are not formal methodology protocols for monitoring item T3 but are formal in their own right and should continue to be used in helping to determine emerging public issues and heightened Helena NF awareness of these issues.

(T4) All Resources

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 2007, no decisions or assessments revealed any physical or biological characteristics that contradict the allocation as designated in the Forest Plan, particularly in the Management Area descriptions. No new Forest Plan amendments were processed making changes to management allocation.

In the near future, the Helena National Forest is scheduled for plan revision. Intricate in that process will be the latest science, methodology, improved inventory, and technological advances that will allow for much improved refinement for describing the Forest's physical and biological characteristics.

Documentation of Monitoring Methodology:

The methodology or protocol for Forest Plan amendments is described in FSM 1900 Chapter 1920 under 1926.5 – Amendment.

Upon receiving advice from the interdisciplinary team that the plan requires change, the Responsible Official shall (paraphrased):

- Determine whether changes are significant or not significant
- Document determination in a decision document
- Provide appropriate public notification.

Monitoring Activity:

There were no interdisciplinary site-specific projects in 2007 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 2007.

Monitoring Results:

No Forest Plan allocation changes during 2007 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

HERITAGE RESOURCES

Cultural Resource Monitoring

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:

Activity:

In 2007, Helena National Forest (HNF) archaeologists reviewed 51 forest projects in compliance with the NHPA Section 106. Of this total, 25 projects were subject to field survey because of their potential to adversely affect cultural resources. This fieldwork resulted in the discovery of six cultural resources. Three projects have the potential to adversely affect previously identified or newly discovered cultural resources. Mitigation measures to protect and monitor these cultural resources will be implemented.

NHPA Section 110 cultural resource stewardship projects completed in 2007 include preservation planning, reconnaissance-level field survey, National Register of Historic Places nomination, building restoration, archaeological site stabilization, and public interpretation.

Cultural resource condition monitoring was completed across the HNF on a limited and opportunistic basis in 2007 due to HNF workforce reorganization, competing work priorities, budget issues, and other factors. Area-specific cultural resource monitoring was completed in the aftermath of the Meriwether Fire in the Gates of the Mountains Wilderness north of Helena.

All NHPA Section 106 and Section 110 field surveys, stewardship projects and monitoring were reported (February 2008) in the forest's 2007 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 2007.

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 2007 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.

2007 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.

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.

A windstorm event in 2007 did not badly harm the historic Lincoln town site. Monitoring revealed that no ruins and few historic artifacts were exposed in tree roots and tree wells. In a related context, the minerals withdrawal for the Lincoln town site was extended for another 20-year period in 2007.

The total number of cultural resources affected by the 2007 Meriwether Wildfire is currently unknown. Damage assessments were completed for some but not all of the 46-previously identified cultural resources within the fire perimeter. Wildfire and associated suppression activities (i.e. bulldozer line construction) burned or disturbed 10 cultural resources. The Mann Gulch Wildfire Historic District was also burned-over. Suppression activities (i.e. slurry dumps) did not adversely affect the firefighter monuments or crosses in Mann Gulch. However, some historic artifacts now exposed in the burned-over landscape are vulnerable to illegal collection by visitors to Mann Gulch.

Burned Area Emergency Rehabilitation (BAER) assessments were completed for 12 cultural resources located in settings highly vulnerable to post-fire flooding and debris flow events as a result of the Meriwether fire. Emergency data recovery (recordation) was completed at one cultural resource (historic pictographs) deemed impossible to protect in the event of a severe flood-debris flow event in Meriwether Canyon.

Based on results of project (effectiveness) monitoring, a Phase 2 erosion remediation plan was developed in 2007 for a 3,000 year-old archaeological property on the Missouri River by a private engineering firm on behalf of Pennsylvania Power and Light-Montana and the HNF. The plan will be implemented in 2008.

A NHPA Section 106 memorandum of agreement (MOA) was developed by the HNF and MTSHPO to allow minerals exploration in two Gold Rush-era placer mining camps. MOA stipulations require on-site monitoring by HNF heritage and mineral program staff during project activity. Mineral exploration was not initiated in 2007 due to fire restrictions. Work is scheduled for 2008.

Recommended Efforts:

Cultural resource monitoring should be added as a component of the HNF Forest Plan when it is revised. To comply with federal legislation and agency policy, cultural resource monitoring should continue as an important part of the HNF annual program of work.

Time lags often occur between NEPA analyses and project implementation, when cultural resource mitigation-protection measures are applied. Fuels treatment and road obliteration projects for recently completed travel plans are two examples. A better system for multi-year project tracking is needed to insure that cultural resource protection measures are implemented. In some cases, additional HNPA Section 106 field survey may be required for certain actions provided for in the NEPA decision. This tracking system would likely benefit all forest resource programs.

Forest projects may expose cultural resources to vandalism and artifact theft as a result of increased road access, visibility and other factors. Projects should be carefully monitored during and after construction, and access should be changed or made more challenging to abate and discourage cultural resource vandalism.

Recurrent impacts to some cultural resources have not been adequately addressed. For example, although some livestock control measures have been implemented, damage is still occurring atop cultural resources atop Lewis and Clark Pass and on Grassy Mountain in the south Big Belt Mountains. Measures that provide multiple resource benefits, such as riparian fencing, should be implemented to also protect cultural resources affected by livestock grazing.

All forest personnel should continue to note resource damage to cultural resources, and promptly involve law enforcement where vandalism, collecting and digging is occurring. Cultural resource monitoring, vulnerability evaluations, and damage assessments should be completed on a timely and systematic basis to comply with ARPA and agency policy.

Cultural resource protection, stabilization and restoration measures should be implemented for threatened, disturbed or vandalized-looted cultural resources. Funding to support these projects should be acquired through agency initiatives, grants, and other sources. Opportunities to involve partners and the public in these efforts should be sought.

Historic preservation plans for significant heritage priority assets, such as Eagle Guard Station, Hellgate Pictographs, and Moose Creek Ranger Station, should be developed and their management guidance followed. Plans are also needed for the Alice Creek-Lewis and Clark Pass and Mann Gulch Historic National Register Districts. All plans should include a monitoring component.

Historic preservation guidelines for historic cabins in the Forest Service cabin rental program should be developed. These should include the acceptable range of use, visitor capacity, repair and maintenance, and other management factors. These guidelines should also be included with annual operation and maintenance plans for District developed recreation facilities.

An historic preservation analysis should be completed for those cabins proposed for inclusion on or removal from the cabin rental program as a result of the recent recreation site facility analysis. Those isolated cabins acquired by the HNF through Special Use Permit termination should be included for study. The fate of these cabins has been held in abeyance and they are rapidly deteriorating beyond repair and future use.

The HNF should continue to aggressively pursue cultural resource public outreach and education via Passport in Time and other volunteer projects, guided hikes and other educational events, and interpretive signing and other media. These efforts create greater public awareness of the value and importance of conserving cultural resources on the HNF.

YOUTH FOREST MONITORING PROGRAM (YFMP)

Youth Forest Monitoring

Background

The Youth Forest Monitoring Program (YFMP) is a seven-week summer internship for high school students who learn forest ecology and field techniques while providing additional monitoring of forest health for the Helena National Forest. The program, which began in 1998 with one field instructor and four students, now includes 15 students, 4 field instructors, and is based out of the towns of Helena, Lincoln, and Deer Lodge. The Deer Lodge team was new for 2007 and provided YFMP monitoring on an additional forest, the Beaverhead-Deerlodge.

Partnerships and funding in 2007 included support from Lewis & Clark County, Jefferson County, Powell County, Montana Discovery Foundation and University of Montana – Helena College of Technology. A new grant was received from the National Forest Foundation's Matching Awards Program to help cover supplies and training.

YFMP students completed forest health monitoring activities at 40 sites on the Helena National Forest between June and August 2007. Site data, monitoring reports, and presentations are available for review at the Helena National Forest Supervisor's Office. Photo points were established at each site as part of the data collection process.

Helena Weed Monitoring Team

Weed monitoring data was collected at 13 sites across the Helena National Forest: Heart Lake in the Scapegoat Wilderness; Lincoln District: Alice Creek, Copper Creek, Davis 9, and the land north of the Lincoln Ranger District office; Helena District: Armstrong Mine, Blackhall Meadows, Jimtown Road timber sale, and Springhill Repository; Townsend District: Hellgate Gulch, Oregon Gulch, Oregon Gulch/M. Brown site, and Crow Creek.

Nested rooting frequency, canopy cover, ground cover, and density measurements were taken using updated field forms based on the Oregon Gulch/Melissa Brown site layout. Data collection was identical to previous site visits at permanent sites.

Four recommendations from the Weed Team include:

(1) Continue to monitor dalmation toadflax on the Alice Creek site in Lincoln. Annually this area has been used as a grazing allotment during July. There is a large infestation of dalmation toadflax at the site. Repeated spraying of 2-4D has had some minimal affects on the weed population, as evidenced by browning leaves and wilting stems. However, the density of dalmation toadflax increased between 2006 and 2007, from 6.632 stems/ft^2 to 11.756 stems/ft^2 (Belt Transect Method).

(2) Continue to support biological control in the South Fork of Crow Creek Road areas in the Elkhorns. Weevils have successfully reduced live spotted knapweed from .604 stems/ft^2 in 2003 to .488 stems/ft^2 in 2007 (Belt Transect Method). However, dalmation toadflax density continues to increase – from .032 stems/ft^2 in 2003, to .112 stems/ft^2 in 2007 (Belt Transect Method). Yearly monitoring will be necessary.

(3) Spray for noxious weeds at Springhill Repository, near Helena, as soon as possible. Leafy spurge, spotted knapweed, and dalmation toadflax are present in large quantities along the edge and on private property surrounding this reclaimed mine site. The concern is that long tap-rooted weeds could spread in the repository, break through the tarp barrier, and reach contaminated soil, reintroducing heavy metals into the outer environment.

(4) Release biological control agents in the Oregon Gulch site. Spray chemicals initially used after the 2000 Cave Gulch burn should have worn off to a level that will not hinder insect survival. Areas that underwent high intensity burn have a higher density of dalmation toadflax. Caution should be used when applying herbicides after high intensity fires, as native vegetation can be negatively affected.

Helena Stream Monitoring Team

The YFMP Stream Monitoring Team collected data at 16 sites on the Helena National Forest. Heart Lake in the Scapegoat Wilderness; Lincoln District: Beartrap Creek, Copper Creek, Keep Cool Creek, Stonewall Creek, Sucker Creek and Wasson Creek; Helena District: Blackhall Meadows, East Fork of McClellan Creek, Minnihaha Creek and Jackson Creek; Townsend District: Eureka Creek, Indian Creek, Magpie Creek, Whites Creek and Swamp Creek.

Stream morphology was monitored through stream channel profile, stream bed composition through pebble count, and stream slope and sinuosity. Water quality data was collected in all streams with running water, with the exception of Blackhall Meadows, which was taken further downstream. These tests include temperature, pH, dissolved oxygen, and conductivity. Macroinvertebrate sampling was once again added to the toolbox of monitoring protocol, and compared to previous year's collection data. Grazing, recreation use and mining were the top three impacts on monitored sites. Recommendations offered by the Stream Team include:

(1) Continue to monitor at Blackhall Meadows, a new site for 2007. Montana Conservation Corps and soil scientists from the Helena National Forest constructed a wildlife and cattle exclosure around an eroded groundwater feature that feeds into three watersheds. YFMP students collected stream monitoring data before the fence construction, and will return in 2008 to compare results.

(2) Expand YFMP monitoring into mine reclamation sites. Students participated in old riparian fence deconstruction, and took lab water monitoring samples at two reclaimed mine sites: Armstrong and Beatrice. Results from these water samples were submitted to the Townsend District geologist, Beth Ihle.

(3) Monitor spotted knapweed encroachment at Whites Gulch. Overall stream monitoring results indicated improved water quality. A noticeable difference in weed density was noted along the banks of Whites Gulch by comparing photo point pictures from 2004 and 2007.

Helena Soil Monitoring Team

Soils monitoring data was collected by YFMP students at 11 sites on the Helena National Forest. These sites included Heart Lake in the Scapegoat Wilderness; Lincoln District: Davis 9, Ethyl 30 and land north of Lincoln Ranger District office; Helena District: Armstrong Mine, Blackhall Meadows, Bull Sweats3, Jimtown Road timber sale, Oregon Gulch and Springhill Repository; Townsend District: Hellgate Canyon. Monitoring protocol included soil structure analysis, soil color, soil temperature, vegetative cover, rooting depth, erosion rate, infiltration rate, and downed woody debris.

Recommendations from the Soil Team include:

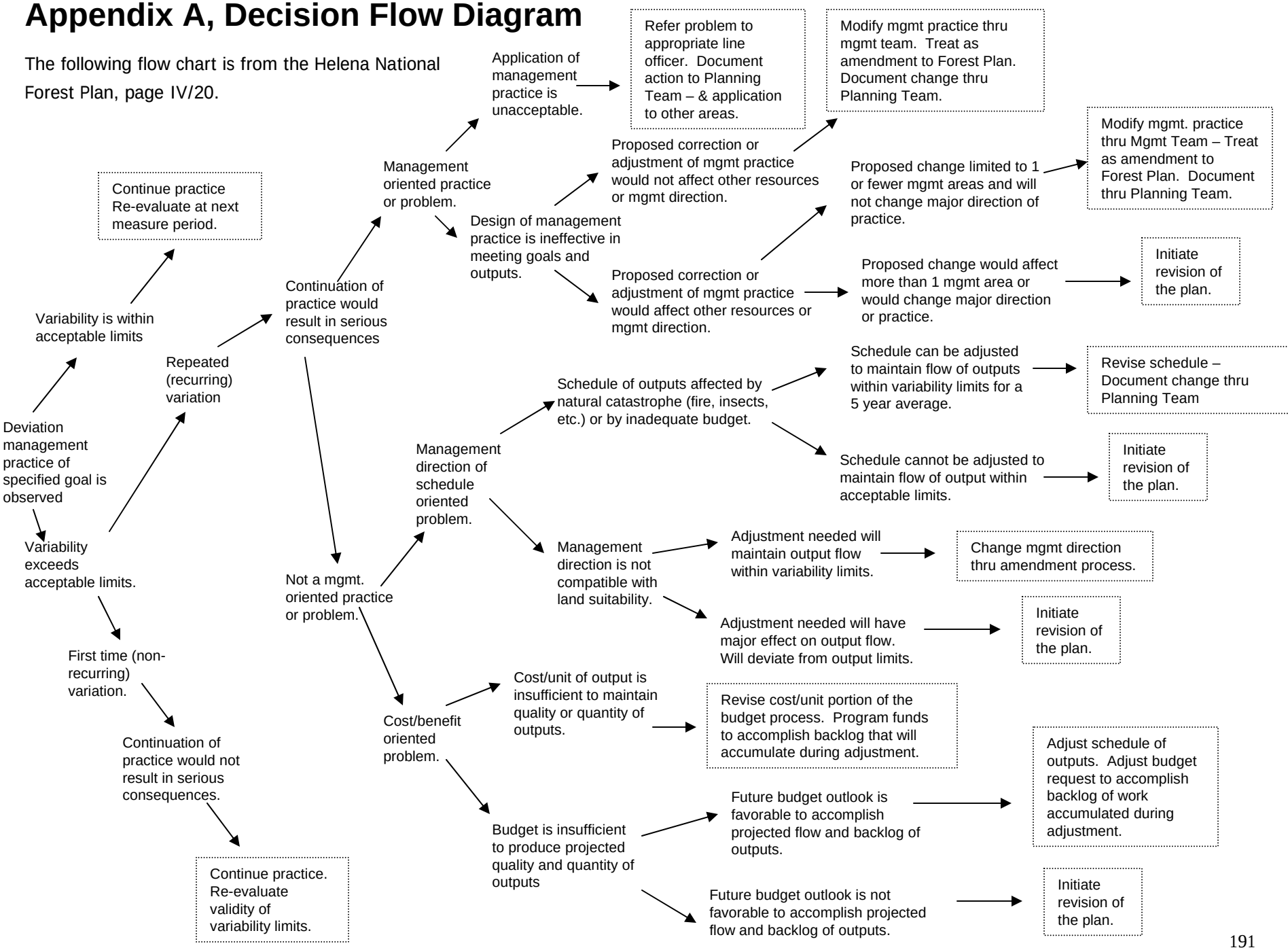
(1) Return to monitor Blackhall Meadows in 2008 after the fence exclosure is completed. Picture photo points have been established at the construction boundary for comparison.

(2) Monitor the effects of the Jimtown Road timber sale on soil compaction and ground cover. Three monitoring sites have been established over the proposed sale which should be completed by summer field season 2008.

(3) Continue to use prescribed burns as a tool to invigorate the health of ponderosa pine stands as in Bull Sweats 3. A prescribed burn in 2005 reduced douglas fir ladder fuels and increased infiltration rates and rooting depths in monitoring sites.

Appendix A, Decision Flow Diagram

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



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