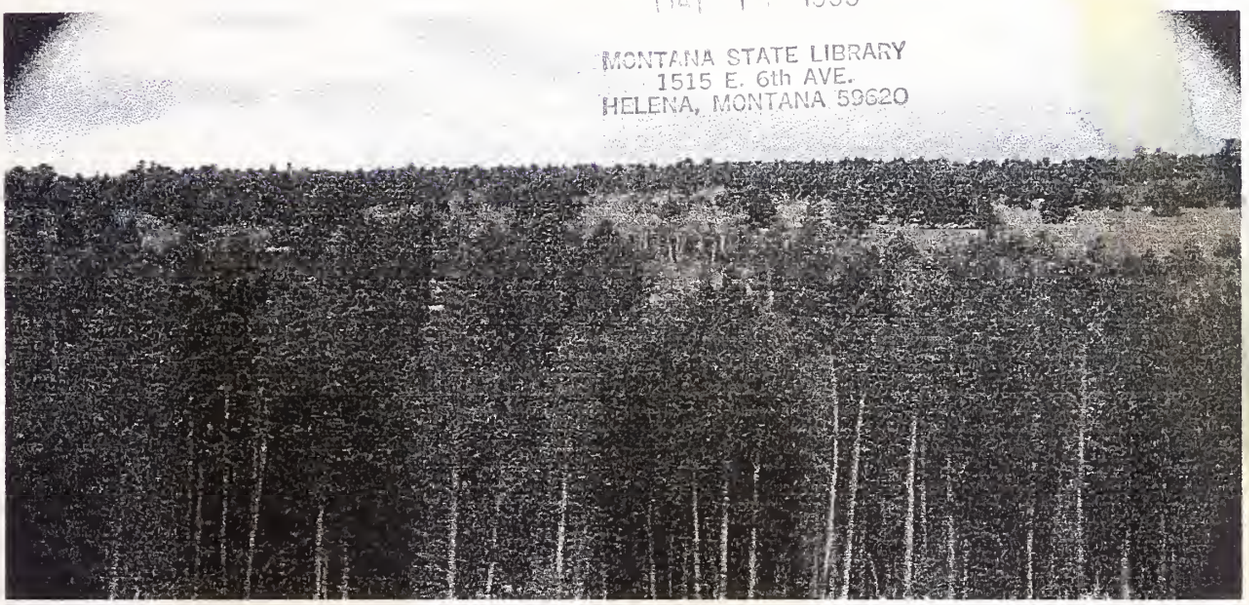
Tobacco Root Vegetation Management Plan



Draft Environmental Impact Statement

United States Department of Agriculture

Northern Region, Forest Service

Beaverhead-Deerlodge National Forest

Madison Ranger District 1999

BEAVERHEAD-DEERLODGE NATIONAL FOREST
TOBACCO ROOT VEGETATION MANAGEMENT PLAN
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Madison County, Montana

Type of Action:	Administrative
Lead Agency:	USDA, Forest Service Beaverhead-Deerlodge National Forest 420 Barrett Street Dillon, MT 59725
Responsible Official:	Deborah L.R. Austin Beaverhead-Deerlodge Forest Supervisor
For Further Information Contact:	Jan M. Bowey Madison Ranger District P.O. Box 428 Sheridan, MT 59729 Phone (406) 842-5432
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Abstract: This Draft Environmental Impact Statement analyzes two alternative ways for managing the security needs of wildlife in the southern Tobacco Root Mountains. This Draft Environmental Impact Statement also analyzes four alternatives for managing vegetation in the southern Tobacco Root Mountains. **Alternative FP-2 and Alternative S are the preferred alternatives.**

The alternatives for managing security needs of wildlife are: **Alternative FP-1** - Would continue using existing Forest Plan Standards and Guidelines for wildlife that focus analysis on the summer habitat needs of elk. These standards apply only to timber harvest. **Alternative FP-2** - Would amend the Beaverhead Forest Plan to establish wildlife security blocks (ranging in size from 220 to 10,671 acres) in the southern Tobacco Root Mountains. Guidelines for managing these security blocks would replace existing Forest Plan Standards and apply to all management activities. 0.75The four alternatives for managing vegetation in the southern Tobacco Root Mountains are: **Alternative R** - Would not initiate any new activities to manipulate vegetation in the southern Tobacco Root Mountains. **Alternative S** - Would treat 18,167 acres of vegetation in the southern Tobacco Root Mountains over the next ten years. **Alternative T** - Would treat 10,730 acres of vegetation in the southern Tobacco Root Mountains over the next ten years. **Alternative U** - Would treat 8,457 acres of vegetation in the southern Tobacco Root Mountains over the next ten years.

The comment period for this draft environmental impact statement will end June 1, 1999. Send comments to Deborah L.R. Austin, c/o Mark Petroni, Madison Ranger District, 5 Forest Service Road, Ennis, MT 59729.

Reviewers should provide the Forest Service with their comments during the review period of the draft environmental impact statement. This will enable the Forest Service to analyze and respond to the comments at one time and to use information acquired in the preparation of the final environmental impact statement, thus avoiding undue delay in the decisionmaking process. Reviewers have an obligation to structure their participation in the National Environmental Policy Act process so that it is meaningful and alerts the agency to the reviewer's position and contentions. Environmental objections that could have been raised at the draft stage may be waived if not raised after completion of the final environmental impact statement. Comments on the draft environmental impact statement should be specific and should address the adequacy of the statement and the merits of the alternatives discussed (40 CFR 1503.3).

United States Department of Agriculture | Forest Service | Beaverhead-Deerlodge National Forest | 420 Barrett Street Dillon, MT 59725-3572 (406) 683-3900

File Code: 1950

Date: April 7, 1999

Dear Reviewer:

Enclosed is the Draft Environmental Impact Statement (DEIS) for the Tobacco Root Vegetation Management Plan.

The DEIS analyzes a proposal to amend the Beaverhead Forest Plan by establishing 29 wildlife security blocks (ranging in size from 220 to 10,671 acres) in the southern Tobacco Root Mountains and replacing Wildlife Standards 7, 8 and 9 with guidelines for managing these blocks. The Beaverhead Forest Plan was approved in 1986 and is scheduled for revision in the next few years.

The DEIS also analyzes four alternatives for manipulating vegetation in the southern Tobacco Root Mountains over the next ten years. Due to the scope of this project, any treatments not included in the first three years would need further NEPA analysis and an additional decision before they could be implemented. These treatments are summarized in the table on the following page.

Please note the Forest Plan Amendment Alternatives (Alternatives FP-1 and FP-2) and the vegetation manipulation alternatives (Alternatives R, S, T and U) are distinct sets of alternatives and can be implemented separately. For example, Alternative FP-2 could be implemented regardless of whether I select Alternative R, S, T, U or any other vegetation manipulation alternative.

The maps included in the DEIS were electronically generated and, as a result, can be printed at various scales. For your review, if you need maps at a different scale than those provided in the DEIS, please contact the District Office in Ennis (406/682-4253) as soon as possible.

Based on my review of the DEIS and discussions with interdisciplinary (ID) team members and other Forest Service resource professionals, I have identified **Alternative FP-2** and **Alternative S** as my preferred alternatives.

The comment period for this DEIS will end **June 1, 1999.** Please send comments to Deborah L.R. Austin, c/o Mark Petroni, Madison Ranger District, 5 Forest Service Road, Ennis, MT 59729. *Also, please note your level of continued interest on the postcard (attached to the front of the DEIS) and return it to the Madison Ranger District.*

Thank you for taking the time to review this DEIS. I look forward to hearing from you.

Sincerely,

DEBORAH L.R. AUSTIN
Forest Supervisor

Type of Treatment Scheduled
(gross acres affected by each treatment that year)

Treatment	1999	2000	2001
Fire/Utilization - Open Douglas fir			
Alternative R	0	0	0
Alternative S	956	1026	621
Alternative T	468	475	203
Alternative U	374	609	477
Fire/Utilization - Aspen			
Alternative R	0	0	0
Alternative S	82	446	435
Alternative T	82	446	435
Alternative U	33	418	207
Fire/Utilization - Sagebrush			
Alternative R	0	0	0
Alternative S	220	335	129
Alternative T	277	335	115
Alternative U	133	296	277
Harvest - Thin from Below			
Alternative R	0	0	0
Alternative S	1789	1130	0
Alternative T	1294	517	0
Alternative U	829	811	0
Harvest - Regeneration Cut			
Alternative R	0	0	0
Alternative S	0	0	0
Alternative T	0	0	0
Alternative U	502	593	0
Harvest - Post and Pole			
Alternative R	0	0	0
Alternative S	256	379	0
Alternative T	175	147	0
Alternative U	202	241	0
Precommercial Thin			
Alternative R	0	0	0
Alternative S	676	189	0
Alternative T	459	273	0
Alternative U	486	222	0
All Treatments			
Alternative R	0	0	0
Alternative S	3979	3505	1185
Alternative T	2755	2193	753
Alternative U	2559	3091	961

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TOBACCO ROOT VEGETATION MANAGEMENT PLAN
DEIS SUMMARY

A. PROPOSED ACTION

The Madison Ranger District proposes to amend the Beaverhead Forest Plan by establishing 29 wildlife security blocks ranging in size from 220 to 10,671 acres in the southern Tobacco Root Mountains. These wildlife security areas are at least 1/4 mile from a road or trail that is open to motorized use during the general hunting season. In addition, no timber harvest activities have occurred in the security blocks. For the southern Tobacco Root Mountains, Wildlife Standards 7, 8 and 9 would be replaced with Guidelines for managing these security blocks. These guidelines would apply to all management activities (not just timber harvest).

Over the next ten years, the Madison Ranger District proposes to treat 18,167 acres of vegetation in the Tobacco Root Mountains. Under this proposal, open, park-like stands of Douglas-fir would be maintained on 3,613 acres by thinning these stands. Aspen would be treated by removing competition from conifers and either burning or cutting the aspen clones. Timber (mostly posts and poles) would be harvested on another 671 acres of stagnated lodgepole pine stands. An additional 1,423 acres of old harvest units would be thinned. These activities would require the construction of about 25 miles of temporary roads which would be obliterated after project completion. To reestablish grasslands, an additional 12,460 acres would be treated using prescribed fire.

B. PURPOSE AND NEED

The purpose of the Tobacco Root Vegetation Management Project is to restore and maintain a desirable mix of vegetation (age, structure and juxtaposition) in the southern Tobacco Root Mountains, while providing diverse and secure wildlife habitat and reducing risk to private property from wildfire. Considering the existing type and condition of vegetation in the project area, this project will emphasize:

- Restoring and maintaining a viable component of aspen
- Restoring and maintaining open, park-like stands of Douglas-fir
- Restoring and maintaining the sagebrush/grass vegetation type
- Providing wood products

C. SCOPE OF THE PROPOSAL

The proposed action is limited to vegetation management opportunities for the specific acres identified for treatment. The analysis area is geographically limited to the southern Tobacco Root Mountains. Management activities are limited to specific prescribed burning, thinning, and associated temporary road building. The proposed action considers vegetation management opportunities over the next ten years. While these activities would not resolve all concerns over the entire analysis area, it would begin moving vegetation towards the desired future condition identified in the Tobacco Root Landscape Analysis.

D. DECISIONS TO BE MADE

The responsible official, the Beaverhead-Deerlodge National Forest Supervisor, will decide how to manage vegetation in the southern Tobacco Root Mountains. Specifically, the Forest Supervisor will decide:

1. whether or not to amend the Beaverhead Forest Plan to establish wildlife security areas or continue management based on the existing wildlife standards, and

2. whether or not to manipulate vegetation in the Tobacco Root Mountains. If an action alternative is selected, the responsible official

must determine what activities will occur and where.

Due to the size and duration of this project, the Forest Supervisor has decided that if any of the action alternatives are chosen, only the first three years of scheduled treatments will be approved.

E. SCOPING AND PUBLIC INVOLVEMENT

Development of the proposed action evolved during three separate processes - a landscape analysis, an environmental assessment (EA) and this draft environmental impact statement (DEIS). The public was kept informed and given the opportunity to be involved throughout the development of all three processes through mailings, public meetings, news releases and field trips.

Comments taken from the letters we received in response to scoping and ID team responses are disclosed in Appendix A. These comments were used during alternative development and were blended with agency input and ID team knowledge to identify the three key issues for this analysis.

F. ENVIRONMENTAL ISSUES

1. What are the potential effects of the proposed action on vegetation?

2. How will proposed prescribed burning, timber harvest and associated temporary road construction effect the availability of wildlife habitats in the southern Tobacco Root Mountains?

3. What effects will proposed prescribed burning activities have on the Middle Mountain and Potosi Roadless Areas?

G. ALTERNATIVES CONSIDERED IN DETAIL

The alternatives were developed to focus on the issues identified by both the Forest Service and the public, and to define those issues. ***Alternatives R, S, T or U could be implemented regardless of whether the responsible official decides to select Alternative FP-1 or FP-2.***

Alternatives FP-2 and S have been identified as the preferred alternatives.

Alternative FP-1

Alternative FP-1 is the no action alternative. It would continue using existing Forest Plan Standards and Guidelines for wildlife. These standards determine the effects to elk from project proposals by using the Elk Effective Cover Calculation Process (EEC) . Implementation of Alternative FP-1 would continue applying Wildlife Standards 7, 8 and 9 to analyze timber related projects within timber emphasis Management Areas. Alternative FP-1 uses a method based on summer habitat needs to determine the effects of proposals on bull elk during the fall hunting season. The method is used within a Habitat Analysis Unit (HAU) ranging in size from 7,000-10,000 acres (home range of elk). A cover:forage ratio is established to determine Elk Use Potential (EUP). Open road density is established to determine Habitat Effectiveness (HE). The Elk Use Potential value is then multiplied by Habitat Effectiveness to determine Elk Effective Cover (EEC). The values of Elk Effective Cover and Elk Use Potential are then compared to Forest Plan Standards 7, 8 and 9 to determine the effects of proposed actions on vulnerability of bull elk.

Alternative FP-2

Alternative FP-2 is the proposed action. Under Alternative FP-2, current Forest Plan Standards 7, 8 and 9 would be replaced with Guidelines developed specifically for the southern Tobacco

Root Mountains that deal with wildlife species throughout the landscape. Security blocks (areas of continuous forest cover greater than 200 acres in size and located more than 1/4 mile from motorized travel routes) are determined by: (1) adding a 1/4 mile buffer on roads and motorized trails open during the general hunting season; (2) removal of areas impacted by past timber harvest activities; and (3) removal of blocks less than 200 acres in size. Alternative FP-2 would replace existing Forest Plan Standards 7, 8 and 9 with the following guidelines applicable only to the portion of the Tobacco Root Mountains lying within the boundaries of the Madison Ranger District.

- Timber harvest will occur (1) outside established wildlife security blocks, (2) on the edge of established security blocks, or (3) concentrated in one security block rather than fragmenting many blocks.

- Restrict activity (harvest, heavy equipment) to certain identified drainages at one time to avoid concurrent activity across the landscape.

- Only temporary roads will be constructed. Temporary roads will be obliterated once they are no longer needed.

Alternative R

Alternative R is the no action alternative. It would not initiate any new activities to manipulate vegetation in the southern Tobacco Root Mountains.

Alternative S

Alternative S is the proposed action. The Madison Ranger District would treat 18,167 acres of vegetation in the southern Tobacco Root Mountains over the next ten years. Open, park-like stands of Douglas-fir would be maintained on 3,613 acres by thinning these stands . Lodgepole pine/Douglas-fir mixed stands would have clumps of older, diseased trees harvested by group selection to replicate a natural fire pattern. The total area treated in these stands would not exceed 40%. Pure Douglas-fir stands would have the understory, smaller trees removed by a diameter-limit harvest (thin-from-below) with the remaining basal area exceeding 60% of the initial stand. Aspen would be treated by removing competition from conifers and either burning or cutting aspen clones. Timber (mostly posts and poles) would be harvested on another 671 acres of stagnated lodgepole pine stands. An additional 1,423 acres of old harvest (clearcut) units would be precommercially thinned. These activities would require the construction of about 25 miles of temporary roads which would be obliterated after project completion. This alternative includes a road use permit which the Montana Department of Natural Resources and Conservation (DNRC) has requested to access their proposed Moore Gulch Timber Sale. To reestablish grasslands, an additional 12,460 acres would be treated using prescribed fire. Treatment would be restricted to 50% or less of sagebrush habitat type acres in a drainage. Burn prescriptions would be developed with the objective of burning a mosaic of 50% burned, distributed over the treatment area such that no point in the burned area exceeds 600 feet from the unburned areas.

Alternative T

Under Alternative T, the Madison Ranger District would treat 10,730 acres of vegetation in the southern Tobacco Root Mountains over the next ten years. Open, park-like stands of Douglas-fir would be maintained on 2,273 acres by thinning these stands. Aspen would be treated by removing competition from conifers and either burning or cutting aspen clones. Timber (mostly posts and poles) would be harvested on another 322 acres of stagnated lodgepole pine stands. An additional 732 acres of old harvest (clearcut) units would be precommercially thinned. Under Alternative T, no temporary roads would be constructed. To reestablish grasslands, an additional 7,403 acres

would be treated using prescribed fire. Treatment would be restricted to 50% or less of sagebrush habitat type acres in a drainage. Burn prescriptions would be developed with the objective of burning a mosaic of 50% burned, distributed over the treatment area such that no point in the burned area exceeds 600 feet from the unburned areas.

Alternative U

Under Alternative U, the Madison Ranger District would treat 8,457 acres of vegetation in the southern Tobacco Root Mountains over the next ten years. Open, park-like stands of Douglas-fir would be maintained on 2,087 acres. Aspen would be treated by removing competition from conifers and either burning or cutting aspen clones. Timber would be harvested, using a regeneration cut, on another 1,095 acres primarily of stagnated, deteriorating lodgepole pine stands. Primarily posts and poles would be harvested from an additional 479 acres. An additional 1,039 acres of old harvest (clearcut) units would be precommercially thinned. These activities would require the construction of about 28 miles of temporary roads which would be obliterated after project completion. This alternative includes a road use permit which DNRC has requested to access their proposed Moore Gulch Timber Sale. To reestablish grasslands, an additional 3,757 acres would be treated using prescribed fire. Burn prescriptions would be developed with the objective of burning a mosaic of 70% burned and 30% unburned.

H. ALTERNATIVES CONSIDERED BUT NOT GIVEN DETAILED STUDY

The 1997 Tobacco Root Vegetation Treatment EA considered seven vegetation manipulation alternatives in detail. Theses alternatives were not analyzed in detail in the DEIS because they are similar to either Alternative R or S.

Alternative A

This was the no action alternative in the 1997 EA. With the exception of a 213 acre prescribed burn in North Willow Creek and the 91 acre Kings Mill Timber Sale (both implemented in 1998), Alternative A is similar to Alternative R.

Alternative B

Alternative B focused ecosystem restoration projects in accessible areas in the low elevation foothills of the southern Tobacco Root Mountains. This alternative was not selected for implementation in 1997 because it did not meet the purpose and need at high elevations and treated fewer acres than Alternative G.

Alternative C

Alternative C initiated ecosystem restoration projects in the southern Tobacco Root Mountains that would lead to vegetation patterns similar to those found prior to European settlement. Alternative C was not selected for implementation in 1997 because it treated fewer acres, and therefore did not meet the purpose and need as well as Alternative G.

Alternative G

For forested areas, Alternative G is similar to Alternative S and was selected for implementation in 1997. This decision was subsequently withdrawn following the settlement agreement.

Alternative H

Alternative H was designed to address different effects and methods for using prescribed fire to accomplish ecosystem restoration projects. This alternative differs from Alternative B by not treating key areas of sagebrush such as elk wintering/calving areas on south and southwest aspects. Alternative H was not selected for implementation in 1997 because it moved fewer

Table S-1
Type of Treatment By Year
Shaded columns are the time period available for decision

Treatment	Year of Treatment (and gross acres affected by each treatment that year)										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total by Method
Fire/Utilization - Open Douglas fir											
Alternative R	0	0	0	0	0	0	0	0	0	0	0
Alternative S	956	1026	621	755	772	680	716	1244	288	756	7814
Alternative T	468	475	203	37	299	480	120	178	18	156	2434
Alternative U	374	609	477	0	154	0	176	0	0	0	1790
Fire/Utilization - Aspen											
Alternative R	0	0	0	0	0	0	0	0	0	0	0
Alternative S	82	446	435	369	4	133	268	330	285	194	2546
Alternative T	82	446	435	369	4	133	268	330	285	194	2546
Alternative U	33	418	207	284	0	65	254	0	0	0	1261
Fire/Utilization - Sagebrush											
Alternative R	0	0	0	0	0	0	0	0	0	0	0
Alternative S	220	335	129	61	294	297	180	248	242	94	2100
Alternative T	277	335	115	287	294	297	241	242	242	93	2423
Alternative U	133	296	277	0	0	0	0	0	0	0	706
Harvest - Thin from Below											
Alternative R	0	0	0	0	0	0	0	0	0	0	0
Alternative S	1789	1130	0	0	694	0	0	0	0	0	3613
Alternative T	1294	517	0	0	462	0	0	0	0	0	2273
Alternative U	829	811	0	0	447	0	0	0	0	0	2087
Harvest - Regeneration Cut											
Alternative R	0	0	0	0	0	0	0	0	0	0	0
Alternative S	0	0	0	0	0	0	0	0	0	0	0
Alternative T	0	0	0	0	0	0	0	0	0	0	0
Alternative U	502	593	0	0	0	0	0	0	0	0	1095
Harvest - Post and Pole											
Alternative R	0	0	0	0	0	0	0	0	0	0	0
Alternative S	256	379	0	0	36	0	0	0	0	0	671
Alternative T	175	147	0	0	0	0	0	0	0	0	322
Alternative U	202	241	0	0	36	0	0	0	0	0	479
Precommercial Thin											
Alternative R	0	0	0	0	0	0	0	0	0	0	0
Alternative S	676	189	0	0	558	0	0	0	0	0	1423
Alternative T	459	273	0	0	0	0	0	0	0	0	732
Alternative U	486	222	0	0	331	0	0	0	0	0	1039
All Treatments											
Alternative R	0	0	0	0	0	0	0	0	0	0	0
Alternative S	3979	3505	1185	1185	2385	1110	1164	1823	815	1044	18167
Alternative T	2755	2193	753	693	1059	910	629	750	545	443	10730
Alternative U	2559	3091	961	284	967	65	430	0	0	0	8457

Alternative I

Alternative I also excluded key areas of sagebrush from prescribed burning. It differs from Alternative H by limiting burned patch size and total burn within a mosaic. Alternative I was not selected for implementation in 1997 because it moved fewer acres of vegetation towards the desired future condition than Alternative MOU.

Alternative MOU

For nonforested areas, Alternative MOU is similar to Alternative S and was selected for implementation in 1997. This decision was subsequently withdrawn following the settlement agreement.

Several other alternatives were also considered either during development of the EA in 1997 or during development of the EIS in 1999. These alternatives, and the reasons why they were not analyzed in detail, are briefly described below.

During development of the Forest Plan alternatives, we considered an alternative to identify wildlife security areas based solely on recommendations made by Hillis and Christensen. We did not develop this alternative in detail because Alternative FP-2 uses concepts described by Hillis and Christensen that were modified to site specifically fit the Tobacco Root Landscape.

An alternative which would treat 1/2 of vegetation in the foothills (ELU 1) in the next ten years was considered. This alternative was based on information that the pre-European fire frequency for ELU 1 had been 20 years, and that ELU 1 was most in need of treatment. This alternative was not fully developed because Alternative C provides a more detailed basis for treatment based on presettlement fire history.

Management activities other than fire and harvest for treating vegetation were considered. All of the alternatives analyzed in detail include hand slashing of some aspen areas before treating the site with prescribed fire. However, the use of hand slashing for all treatment units is not an effective treatment method. Hand-felling Douglas-fir trees colonizing the sage/grass areas over large areas is very expensive. Chaining or other mechanical removal of sagebrush is also expensive and has undesirable effects on soil and wildlife. Herbicide application is controversial and can have negative effects on wildlife. These treatments leave out the process of fire, which the ID team identified as an important factor promoting beneficial nutrient cycles and vegetation patterns.

We considered a proposal to treat only the immediate area around inventoried aspen stands. This approach has been tried on the Madison Ranger District and while it has been successful in some cases, it has also failed. As a result, this alternative was not considered in detail.

Other silvicultural methods for treating timber stands were considered, including the use of clearcutting and seed tree harvest. While these methods were the most economically efficient, they did not meet the social and biological needs specified in the landscape assessment.

I. AFFECTED ENVIRONMENT

1. Vegetation

Vegetative cover on lower elevation slopes is grassland, sagebrush and juniper with scattered patches of Douglas-fir. The mid-elevation zone is forested, dominated by lodgepole pine, Douglas-fir and Engelmann spruce. Higher elevations are dominated by whitebark pine, subalpine fir, alpine grasslands, rocks and scree.

Vegetation includes non-native species, some of which are considered noxious weeds (e.g., knapweed, musk thistle) and some of which are not (timothy, Kentucky bluegrass).

Prior to the arrival of Europeans, Native Americans set fires for a variety of reasons. Lightning fires burned unchecked. By 1865, the disturbance of fire had been largely eliminated through grazing and fire suppression. With the arrival of Europeans in the mid 1860's, mining, logging and associated roading, and domestic livestock grazing became the dominant disturbance processes in the Tobacco Root analysis area, and remain so today. Fire suppression has affected vegetation by allowing vegetation to pass into a later seral stage over a large area, compared to vegetation patterns prior to suppression of fires.

Table S-2 summarizes existing vegetation.

2. Wildlife Habitat

The presence of Europeans has affected wildlife species and their habitat. Europeans initiated mining, timber harvest, grazing, road building and fire suppression. This led to a distribution of plant communities across the landscape that are generally older than would have existed before European influence.

Indicator species include: elk for big game species, sage grouse for sagebrush communities, pine marten for old growth spruce-fir, goshawk for old growth Douglas-fir and trumpeter swan for marshland communities. Threatened and endangered species that could be found on the Madison District are the endangered peregrine falcon, threatened grizzly bear and bald eagle, nonessential experimental gray wolf, proposed Canada lynx and candidate mountain plover. Currently in the Tobacco Root Mountains, there are no peregrine falcon or bald eagle nests, no mountain plovers and only occasional sightings of grizzly bears, gray wolves and lynx. Sensitive species that are known to occur in the Tobacco Root Mountains are the wolverine, northern goshawk and black-backed woodpecker. The Tobacco Root Mountains provide habitat for mule deer, whitetail deer, antelope, elk, moose, mountain goat, black bear and mountain lion. In general, wildlife forage and security needs are being met.

Table S-2
Existing Vegetation By Zone

Vegetation Types (acres of each)	Lowlands & Foothills Zone	Mid-elevation Zone	Timberline & Alpine Zone	Ripar-ian Zone
Shrub Steppe Plant Communities	8076	2290	886	429
Grass/sage steppe vegetation	4863	2675	405	233
Douglas-fir colonizing steppe				
Forested Plant Communities				
Young lodgepole/Douglas-fir	455	5140	3183	238
Douglas-fir savannah	trace	trace	trace	trace
Multistoried Douglas-fir	5533	10,301	374	531
Mature to old growth	1290	16,041	3978	816
lodgepole	22	1136	3129	1076
Spruce and subalpine fir	178	2769	19,749	356
Whitebark pine				
Other Communities				
Distinct aspen cover types	136	321	44	39
Alpine grass and tundra	54	85	5337	21
Riparian vegetation	200	412	1372	337
Rock/scree/talus	58	361	9299	22
Private Lands (veg. not typed)	1147	1452	1751	399
Total Acres in Zone	22,012	42,983	49,507	4,497

3. Roadless Character

The analysis area includes two inventoried roadless areas. These roadless areas have been heavily used by humans over the last 100 years. Historic uses have been mining, grazing, and logging, with the logging mostly to support mining activities and local construction needs. Evidence of these past activities in the form of roads, trails, mining disturbance and structures and partially logged timber stands is common. Some of the old roads and trails have become grown over and are beginning to be obliterated by natural processes. Many of the other old routes are readily apparent and often are still in use. Some areas within the inventoried roadless area boundaries do not have roadless characteristics. Most of these discrepancies are due to roading and timber harvesting activities in the early 1980's. Areas within inventoried roadless that have no roadless characteristics include:

Table S-3
Discrepancies in Roadless Area Boundaries

Roadless Area	Acres Not Meeting Inventoried Roadless Area Characteristics
1-014	285 acres
1-013	1,420 acres

J. EFFECTS OF THE ALTERNATIVES

The following tables compare the ability of the alternatives to meet the purpose and need of this project and summarize the environmental affects of each alternative on the key issues.

Table S-4
Summary of Environmental Consequences
Issue 1 - Vegetation

Measurement Indices	Alternative R	Alternative S	Alternative T	Alternative U
Gross acres of harvest by vegetation cover type				
Multistoried Douglas-fir	0	3613	2273	2087
Mature to Old Growth Lodgepole Pine	0	0	0	1095
Young Lodgepole Pine and Douglas-fir	0	671	322	479
Existing Harvest Units	0	1423	732	1039
Gross acres of burning by vegetation cover type				
Open Douglas-fir	0	7814	2434	1790
Aspen	0	2546	2546	1261
Sagebrush/Grass	0	2100	2423	706
Acres (net) of aspen restored/treated (stands readily identified)	0	124	124	62
Acres (net) of aspen restored/treated (stands with little evidence of aspen)	0	1001	1001	438
Aspen age class structure				
young aspen acres	trace	1125	1125	500
mature aspen acres	540	416	416	478
decadent aspen acres	1960	959	959	1522
% change in aspen age structure				
young aspen acres	0	+1125%	+1125%	+500
mature aspen acres	0	-23%	-23%	-11
decadent aspen acres	0	-51%	-51%	-22

Table S-5
Summary of Environmental Consequences
Issue 2 - Wildlife Habitat

Measurement Indices	Alternative R	Alternative S	Alternative T	Alternative U
Acres of elk winter range and calving area affected by treatment	0 WR 0 Calving	5,520 WR 1,250 Calving	3,450 WR 750 Calving	2,070 WR* 200 Calving*
Acres of security cover for elk affected	Small acreage increase	3,647	1,924	1,428*
miles of temporary road	0	24.3	0	27.5

* 70-80% basal area removed & 70% burn mosaic (more intense treatment)

Table S-6
Summary of Environmental Consequences
Issue 3 - Roadless Character

Measurement Indices	Alternative R	Alternative S	Alternative T	Alternative U
Natural integrity	Some long-term reduction	Long-term Improve-ment	Long-term improve-ment	Long-term improve-ment
Apparent naturalness	No Effect	Minor short-term reduction	Minor short-term reduction	Minor short-term reduction
Remoteness	No Effect	Minor short-term reduction	Minor short-term reduction	Minor short-term reduction
Solitude	No Effect	Minor short-term reduction	Minor short-term reduction	Minor short-term reduction
Special features	No Effect	No Effect	No Effect	No effect
Manageability/boundaries	No Effect	No Effect	No Effect	No Effect

Table S-7
Summary of Environmental Consequences
Forest Plan Alternatives

Comparison Item	Alternative FP-1	Alternative FP-2
Forest Plan Consistency	Uses Current Forest Plan Standards	Replaces Wildlife Standards 7, 8 & 9 - Amends the Forest Plan
Establishes Security Blocks	No	Establishes 29 security blocks (all exceeding 200 ac.)
Management Emphasis	Emphasizes summer needs of elk	Emphasizes maintenance of secure, unfragmented areas
Timber Production	1,134 ac in suitable timber base 15,232 ac (non timber base) available for salvage & shelterwood harvest	16,336 ac in suitable timber base 21,294 acres in non timber base
Location of Management Activities	Emphasizes entering previously unharvested areas	Emphasizes placing mgmt. activities in previously disturbed areas (roaded &/or harvested)
Applies to Management Activities Other Than Timber	No	Yes

Table S-8
Ability to Meet Purpose & Need
Vegetation Manipulation Alternatives

Purpose & Need Component	Alternative R	Alternative S	Alternative T	Alternative U
Aspen	Lose majority of aspen stands in the next 30 years	Begin restoring aspen stands on 1,125 acres	Begin restoring aspen stands on 1,125 acres	Begin restoring aspen stands on 500 acres
Douglas-fir	Continue presence of multistory, multi-age Douglas-fir stands	Convert 3,613 acres of Douglas-fir to open, parklike stands	Convert 2,273 acres of Douglas-fir to open, parklike stands	Convert 2,087 acres of Douglas-fir to open, parklike stands
Sagebrush/grass	Decrease occurrence of grasslands & early seral vegetation. Increase dominance of Douglas-fir.	Reestablish sage/grasslands on 9,914 acres by treating 7,814 acres Douglas-fir colonization & 2,100 acres sagebrush	Reestablish sage/grasslands on 4,857 acres by treating 2,434 acres Douglas-fir colonization & 2,423 acres sagebrush	Reestablish sage/grasslands on 2,496 acres by treating 1,790 acres Douglas-fir colonization & 706 acres sagebrush
Diversity of Wildlife Habitat (across landscape)	Decrease occurrence of aspen & sagebrush/grass communities. Increase occurrence of multistory Douglas-fir stands.	Increase occurrence of aspen & sagebrush/grass communities. Decrease occurrence of multistory Douglas-fir stands.	Increase occurrence of aspen & sagebrush/grass communities. Decrease occurrence of multistory Douglas-fir stands.	Increase occurrence of aspen & sagebrush/grass communities. Decrease occurrence of multistory Douglas-fir stands.
Risk of Intense Wildfire	High hazard due to forested stands with multiple canopy layers & heavy fuels	Reduce fuel on 18,167 acres	Reduce fuel on 9,998 acres	Reduce fuel on 8,870 acres
Wood Products	Provide ~ 4,000 ccf (personal use firewood, post & pole)	Provide ~ 54,000 ccf	Provide ~ 34,784 ccf	Provide ~ 60,854 ccf

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CHAPTER 1
PURPOSE AND NEED FOR ACTION

A. INTRODUCTION

In 1997, Beaverhead-Deerlodge National Forest Supervisor, Deborah L.R. Austin, decided to amend the Beaverhead National Forest Land and Resource Management Plan (Forest Plan) and accomplish ecosystem restoration projects in the southern Tobacco Root Mountains through timber harvest. The Forest Plan Amendment replaced wildlife standards developed in 1986 with guidelines for managing wildlife security areas. This direction, based on ecosystem management principles and habitat fragmentation concerns, specifically managed for large undisturbed blocks (more than 200 acres) of forest cover. The ecosystem restoration projects were designed to restore and maintain a viable component of aspen, restore and maintain open, park-like stands of Douglas-fir and provide wood products.

During the same year, Madison District Ranger, Mark A. Petroni, decided to accomplish additional ecosystem restoration projects in the southern Tobacco Root Mountains through the use of prescribed fire. These projects were designed to restore and maintain the sagebrush/grass vegetation type, restore and maintain a viable component of aspen and restore and maintain open, park-like stands of Douglas-fir.

In January, 1998, decisions made to treat vegetation in the southern Tobacco Root Mountains and to amend the Forest Plan were challenged by a lawsuit. As required by the settlement agreement (dated July 22, 1998) this environmental analysis provides additional analysis of vegetation management options in the southern Tobacco Root Mountains. The settlement agreement allowed treatment of 213 acres of sagebrush/grass with prescribed fire in North Willow Creek (completed in November, 1997) and the treatment of 91 acres of mixed lodgepole pine in the East Fork of Granite Creek through timber harvest (Kings Mill Timber Sale was awarded November, 1997). All other activities were withdrawn, pending additional analysis under the National Environmental Policy Act (NEPA).

B. PROPOSED ACTION

The Madison Ranger District proposes to amend the Beaverhead Forest Plan by establishing 29 wildlife security blocks ranging in size from 220 to 10,671 acres in the southern Tobacco Root Mountains. These wildlife security areas are at least 1/4 mile from a road or trail that is open to motorized use during the general hunting season. In addition, no timber harvest activities have occurred in the security blocks. For the southern Tobacco Root Mountains, Wildlife Standards 7, 8 and 9 would be replaced with the following guidelines:

- Timber harvest will occur (1) outside established wildlife security blocks, (2) on the edge of established security blocks, or (3) concentrated in one security block rather than fragmenting many blocks.
- Timber harvest activity will be limited to one watershed at a time to avoid concurrent activity across the landscape.

- Only temporary roads will be constructed. Temporary roads will be obliterated once they are no longer needed.

For a more detailed description of this proposal, refer to Alternative FP-2 in Chapter 2, Section E (page 14).

Over the next ten years, the Madison Ranger District proposes to treat 18,167 acres of vegetation in the Tobacco Root Mountains. Under this proposal, open, park-like stands of Douglas-fir would be maintained on 3,613 acres by thinning these stands using Stewardship Contracts, paying contractors or Forest Service employees to complete the work, or through commercial timber harvest and underburning. Aspen would be treated by removing competition from conifers and either burning or cutting the aspen clones. Timber (mostly posts and poles) would be harvested on another 671 acres of stagnated lodgepole pine stands. An additional 1,423 acres of old harvest units would be thinned. These activities would require the construction of about 25 miles of temporary roads which would be obliterated after project completion. To reestablish grasslands, an additional 12,460 acres would be treated using prescribed fire.

For a more detailed description of this proposal, refer to Alternative S in Chapter 2, Section H (page 22). This proposal is a combination of the two decisions reached by Forest Supervisor, Deborah L.R. Austin, and District Ranger, Mark A. Petroni, in 1997. Acreage figures have been reduced to reflect the small portions of that decision that were implemented prior to filing of the lawsuit and reflect changes based on analysis of additional field data.

C. PURPOSE AND NEED

The purpose of the Tobacco Root Vegetation Management Project is to restore and maintain a desirable mix of vegetation (age, structure and juxtaposition) in the southern Tobacco Root Mountains, while providing diverse and secure wildlife habitat and reducing risk to private property from wildfire. Considering the existing type and condition of vegetation in the analysis area, this project will emphasize:

- Restoring and maintaining a viable component of aspen
- Restoring and maintaining open, park-like stands of Douglas-fir
- Restoring and maintaining the sagebrush/grass vegetation type
- Providing wood products

The reasons this project is needed are:

1. Wildlife Security Blocks

Wildlife standards established in the 1986 Beaverhead Forest Plan did not recognize the need to provide large blocks of undisturbed, unfragmented areas of contiguous forest cover for mature bull elk, free-ranging predators, interior forest songbirds and other wildlife species. These concerns are documented in the Beaverhead Forest Plan 5 Year Monitoring Report (1993) and the Tobacco Root Landscape Analysis (1994).

The existing Forest Plan wildlife standards are based on the summer needs of elk and do not address bull elk vulnerability during hunting season. Nor do they adequately address the effects of closed roads on elk. These standards use outdated, inaccurate data that does not recognize the effects of topography and

private land, and uses inappropriate land units to describe effects of land management activities on elk, a Forest Plan MIS (Management Indicator Species).

Due to topography and vegetation, most of the Tobacco Root Mountains is not managed specifically for timber production. The existing standards apply only to areas managed for timber production and do not effectively address effects resulting from nontimber management actions.

These standards focus on the management of elk and often do not address the needs of other species, especially free-ranging predators and interior forest songbirds. The existing wildlife standards, combined with Management Area (MA) designations that scatter timber harvest across the landscape, have led to harvest practices that fragment and disturb remaining blocks of unmanaged timber areas. Managed areas, in turn, reforest in a patchwork pattern, rather than undisturbed blocks.

The proposed guidelines were designed to: maintain secure, unfragmented areas; address bull elk vulnerability and associated concerns about free-ranging predators; and interior forest songbirds. By identifying undisturbed blocks of forest cover and considering: 1) the effect of roads and motorized trail use, 2) impacts of past harvest and 3) future harvest needs, security blocks were delineated. This project proposes leaving these security blocks undisturbed or keeping disturbances to a minimum. This action would focus management activities into areas that have been impacted in the past and eventually allow these areas to function as secure, relatively nonfragmented blocks.

2. Aspen

In the Tobacco Root Mountains, aspen has always been a small component of the natural vegetative structure. Currently, it is considered rare. Aspen is declining due to a combination of natural succession, grazing by ungulates, and fire suppression. Identifiable aspen stands comprise less than 1% (less than 600 acres) of the Tobacco Root Analysis Area. These stands fit into two broad situations: 1) recognizable aspen stands that lack vigor and 2) areas formerly occupied by aspen that are now reduced to a few suckers and occasional large aspen skeletons. Some clones have already died and others are at risk of dying. In both situations, other vegetation (primarily conifers) is moving in and dominating the site, out-competing the aspen. Unless some form of management activities are undertaken that reduces competition from other plant species and initiates aspen suckering leading to vigorous stands, all surveyed aspen stands in the southern Tobacco Root Mountains are expected to be lost within 30 years.

3. *Douglas-fir*

In the Tobacco Root Mountains, the occurrence of single-layered, open, park-like stands of Douglas-fir is decreasing. A combination of fire suppression and natural succession has led to multiple canopy levels with young trees growing under large, mature trees and an accumulation of dead material. The multiple canopy layer and dead materials provide ladder fuels for wildfires. Nutrients are tied up in this added material and are not available to the large trees. Most trees are stressed for moisture. These conditions existed historically in some stands, but not at the landscape scale present today.

These forested stands had a history of frequent, low intensity fires which limited new tree establishment, reduced fuel amounts, and periodically recycled nutrients through the soil into live vegetation. This process perpetuated light surface fires and vigorous, large trees which lived for centuries. The multiple canopy layers and accumulation of dead material existing today increase the probability that future wildfires will be intense and difficult to control. Large Douglas-fir trees which historically survived repeated, light, surface fires may not survive these more intense wildfires.

4. Sagebrush/grass

In the Tobacco Root Mountains, sagebrush/grass vegetation types have decreased from approximately 12,000 acres in the mid 1800's to approximately 8,000 acres today. Four thousand acres, previously dominated by sagebrush and grass, are now dominated by Douglas-fir saplings (this is a different type of vegetation than that described under "Douglas-fir"). A combination of natural succession, decades of fire suppression, and heavy livestock grazing in the early 1900's has reduced the occurrence of patches of grasslands and young sagebrush stands; compared to their occurrence under a historical regime of frequent fire. Even areas which are experiencing limited tree establishment are undergoing changes. Grass has decreased as a cover type. The absence of fire may lead to unexpected and undesirable changes in nutrient cycles which, in turn, affect patterns of vegetation.

5. Diverse Wildlife Habitat

Aspen provides a unique and biologically diverse habitat for many wildlife species, including cavity nesting birds. Open, park-like stands of Douglas-fir also provide important wildlife habitat (forest owls, northern goshawk). Grass/sagebrush cover types provide habitat for many wildlife species. Brewer's sparrow, sage grouse, sage thrasher, and pygmy rabbits are associated with a dominant sagebrush cover. Ferruginous hawk, mountain plover, horned lark, and western meadowlark are associated with more open grass cover. Big game use a variety of these types, especially the sagebrush/grassland type for wintering (i.e., mule deer-sagebrush, elk-grass). The presence of grass/sagebrush cover on these areas may help alleviate some of the heavy winter use by elk on private agriculture lands.

6. Risk of Intense Wildfire

The Madison and Ruby Valleys have experienced a period of increased growth, resulting in increased subdivision of agriculture lands. This trend is likely to continue. Popular home sites are often located close to the National Forest for visual purposes and easy access for recreation use. Property values increase as range and forest lands near the National Forest are converted to home sites. The frequent presence of multiple canopy layers and accumulation of dead material (described above for "Douglas-fir") increases the probability that future wildfires will be intense and difficult to control. The difficulty of controlling these fires increases the risk to private developments near the Forest boundary. In the Tobacco Root Mountains, this concern is especially prominent in the North and South

Meadow Creek drainages where the forest canopy extends off the National Forest and often surrounds existing homes. North and South Meadow Creeks also have the largest concentration of high value homes located near the National Forest in the Tobacco Root Mountains. Other areas generally have fewer home sites that are located in drier, sagebrush community types where the intensity of wildfires tends to be less and structure protection is more effective.

7. Wood Products

Local ranchers and individuals rely on firewood and posts and poles from the National Forest. In portions of the Tobacco Root Mountains, the Forest Plan provides for sustained timber production. Thrifty stands of predominately lodgepole pine and Douglas-fir, best meet these objectives.

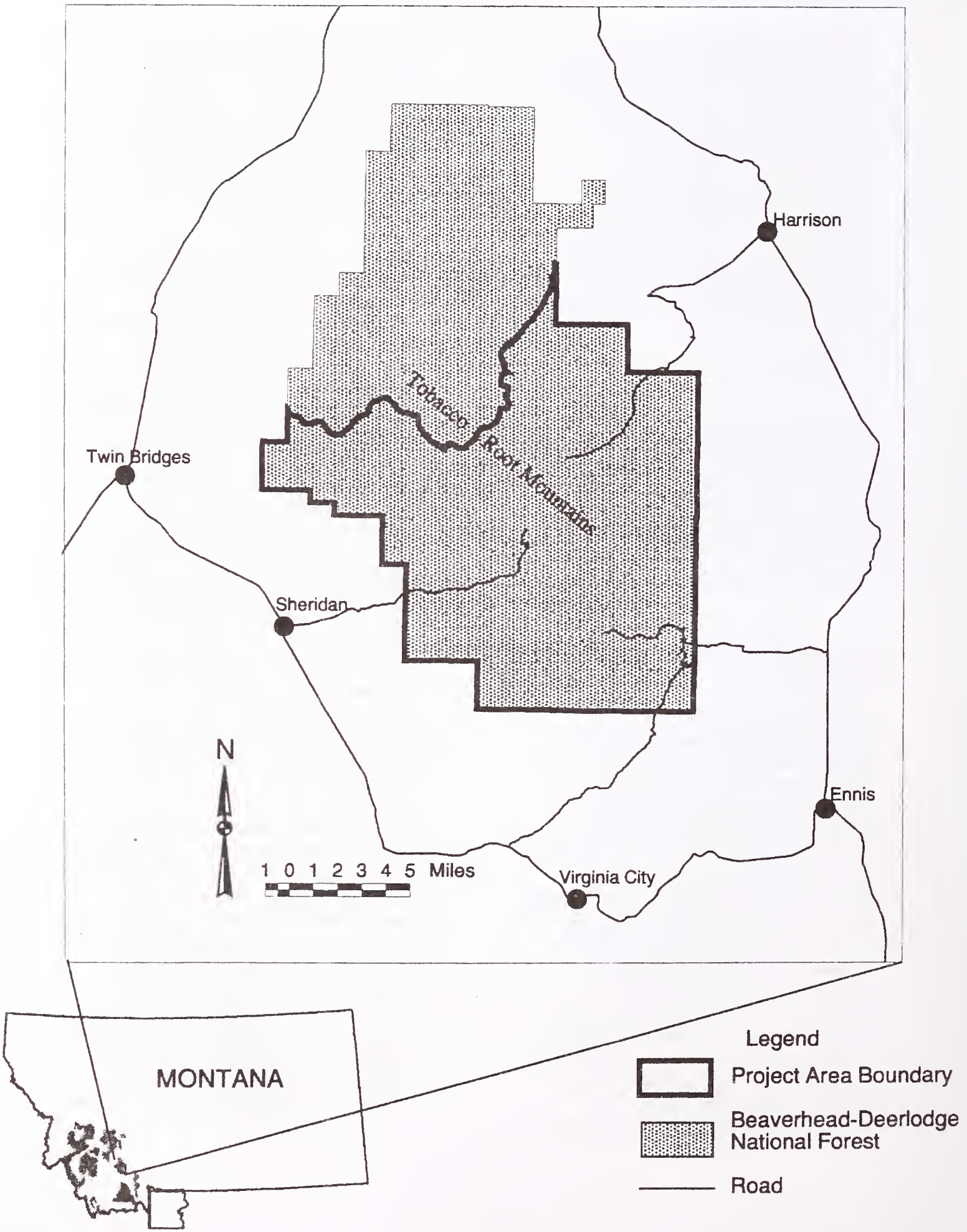
D. SCOPE OF THE PROPOSED ACTION

The proposed action is limited to vegetation management opportunities for the specific acres (18,167 acres) identified for treatment in Chapter 2. Surrounded by the communities of Ennis, Virginia City, Sheridan, Twin Bridges, Pony and Harrison, the analysis area (for cumulative effects) includes approximately 114,000 acres of National Forest System lands on the Madison Ranger District (see Map 1, page 6). Foothills surrounding the National Forest include Bureau of Land Management (BLM) lands, State lands, and private lands. The analysis area is bounded on the north by National Forest System lands on the Jefferson Ranger District. The analysis area is geographically limited to the southern Tobacco Root Mountains because the purpose and need for this project were derived from the Tobacco Root Landscape Analysis. This landscape assessment covered only that portion of the Tobacco Root Mountains within the administrative boundaries of the Madison Ranger District.

Management activities are limited to specific prescribed burning, thinning (Stewardship Contracts, paying contractors or Forest Service employees to complete the work, or through commercial timber harvest and underburning), and associated temporary road building, as described in Chapter 2. Extensive public involvement during completion of the Tobacco Root Landscape Analysis identified a general desire by local residents to see merchantable wood products removed, when practical, before a site is treated with prescribed fire. As a result, this project will consider the removal of wood products, when practical. The same public involvement process also indicated a general desire by local residents that additional, permanent roads not be constructed. As a result, construction of permanent roads will not be considered in the proposed action or any alternatives.

The proposed action is not a general management plan for the area, and this is not a programmatic EIS. The processes and management actions (natural succession, decades of fire suppression, and ungulate grazing) that have led to the current vegetation patterns in the Tobacco Root Mountains cannot be immediately changed. The proposed action considers vegetation management opportunities over the next 10 years. While these activities would not resolve all concerns over the entire analysis area,

Tobacco Root Vegetation Management Plan
Map 1 - Vicinity Map



it would begin moving vegetation towards the desired future condition identified in the Tobacco Root Landscape Analysis. This process also allows analysis of cumulative effects by projecting reasonably foreseeable activities.

If the decision maker selects an action alternative in the Record of Decision (ROD), implementation of the activities specifically identified in the ROD will begin as soon as possible and without further NEPA documentation.

This Environmental Impact Statement was developed under the implementing regulations of the National Environmental Policy Act (NEPA), Council on Environmental Quality, Title 40, Code of Federal Regulations, Part §500-1508; and the National Forest Management Act (NFMA), Title 36, Code of Federal Regulations, Part §219.

Some discussions of existing conditions (Chapter 3) and environmental consequences (Chapter 4) use information from the Tobacco Root Landscape Analysis (pages VII-1 through VII-41, VIII-9, IX-2, IX-3, IX-7 through IX-27, X-1 through X-9, XI-1 through XI-7, Appendix B, Appendix C, Appendix E and Appendix F) and the Beaverhead National Forest Plan.

While the Tobacco Root Landscape Analysis and Beaverhead Forest Plan discuss broad issues such as the determination of suitable timber lands (pages III-41 through 43, III-48 through 51, and III-59 through III-69), the availability of various recreation opportunities (pages IV-53 through IV-58) and management direction for inventoried roadless lands (pages C-176 through C-211), this document focuses on the specific environmental issues relative to the proposed action.

E. DECISIONS TO BE MADE

This EIS is not a decision document. Rather, it documents the results of our environmental analysis of the proposed action and its alternatives. The responsible official, the Beaverhead-Deerlodge National Forest Supervisor, will decide how to manage vegetation in the southern Tobacco Root Mountains. Specifically, the Forest Supervisor will decide:

1. whether or not to amend the Beaverhead Forest Plan to establish wildlife security areas or continue management based on the existing wildlife standards, and

2. whether or not to manipulate vegetation in the Tobacco Root Mountains. If an action alternative is selected, the responsible official must determine what activities will occur and where.

Due to the size and duration of this project, the Forest Supervisor has decided that if any of the action alternatives are chosen, only the first three years of scheduled treatments will be approved. During the three years of treatment, monitoring will be completed to assess the effectiveness of the treatments, and see if the assumptions made in this EIS regarding the intended vegetative condition immediately following treatments are valid. Additional implementation after the first three years may take place only after additional analysis is completed. If implementation of activities scheduled for the first three years is delayed due to weather, budget or other constraints, the activities may be completed on a delayed schedule without further analysis or decision.

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CHAPTER 2
ALTERNATIVES

A. INTRODUCTION

This chapter describes the alternatives, including the proposed action. Two sets of alternatives are described. The first set describes a proposed change to the Beaverhead Forest Plan wildlife standards and includes two alternatives. The second set of alternatives describes a no action alternative and three vegetation manipulation action alternatives that wholly or partially meet the purpose and need identified in Chapter 1. The action alternatives propose specific activities that could be carried out without further National Environmental Policy Act (NEPA) documentation. They are not programmatic alternatives. Several alternatives that were considered but not analyzed in detail are briefly described in Section I (page 29).

This chapter ends by comparing alternatives against the issues identified and the purpose and need for this project. This information, along with Chapter 4 (Environmental Consequences) assists the Forest Supervisor in making an informed choice between alternatives. Additional information relating to the proposal can be found in the project file for this analysis.

B. PUBLIC INVOLVEMENT PROCESS

Development of the proposed action evolved during three separate processes - a landscape analysis, an environmental assessment (EA) and this Environmental Impact Statement (EIS). Each process followed different public involvement processes which are detailed below. The purpose and need for the proposed action was derived from the Tobacco Root Landscape Analysis (TRLA). The TRLA process concluded in 1994 and had extensive public involvement, including six public meetings.

In January, 1997, an EA was published that analyzed nine alternatives. The EA process was initiated on July 13, 1994 when 674 people received postcards asking if they were interested in proposed projects in the Tobacco Root Mountains. This mailing included all box holders in four communities surrounding the analysis area. A press release was also provided to area media contacts. On October 17, 1994, a scoping letter was sent to the 175 people who responded to the postcard. This scoping letter included a form allowing these individuals and organizations to indicate how they wished to be involved in the project. We received 12 forms back and 21 responses to the scoping letter. These initial scoping comments and agency responses may be viewed in the public files at the Madison Ranger District office.

These comments were used to develop issues and alternatives that were analyzed in the Tobacco Root Vegetation Treatment EA (1997). This EA was mailed to 46 individuals and organizations that had previously requested to remain informed of the analysis. A legal notice concerning the availability of the EA was published in the Montana Standard. Six respondents wrote letters regarding the 1997 EA. On March 28, 1997, a meeting was held with five representatives from four environmental groups in the Bozeman area. Comments from this meeting, as well as written comments on the EA, were considered in 1997, prior to reaching the decisions. Two decision notices were issued - one by the Beaverhead-Deerlodge National Forest

Supervisor to amend the Forest Plan and implement ecosystem restoration projects using timber harvest, and a second decision notice issued by the Madison District Ranger to implement ecosystem restoration project using prescribed fire. Legal notices concerning the availability of the decision notices and opportunities of administrative appeals were published in the Montana Standard. Both decisions were appealed under 36 CFR Part 215. Three separate appeals were denied after administrative review. Both decisions were challenged by a lawsuit in January, 1998.

Under the terms of a settlement agreement, the 1997 decisions (with the exception of two projects that had already been implemented) were withdrawn pending additional analysis under the National Environment Policy Act (NEPA). On December 3, 1998, a news release about this project was provided to area media contacts. This news release was printed in the Madisonian and Dillon Tribune. On December 4, 1998, a letter requesting comments on the proposed action was sent to 306 individuals and organization who had either indicated an interest in fire and timber related projects on the Madison District or had specifically indicated an interest in the Tobacco Root Vegetation Management Project. From these public involvement efforts, eleven letters or electronic messages were received. These letters can be viewed in the project file.

A Notice of Intent to prepare an environmental impact statement for the Tobacco Root Vegetation Management Plan was published in the Federal Register (Volume 64, Number 34, pages 8539-8540) on February 22, 1999.

The Tobacco Root Vegetation Management EA was listed in the January, 1996 through April 1997, Quarterly Project Lists for the Beaverhead-Deerlodge National Forest. After the Forest Supervisor reached a decision to revise the 1997 EA and eventually decided to prepare an EIS, the Tobacco Root Vegetation Management Plan was again listed in the Quarterly Project list from October, 1998 through March, 1999. Approximately 700 individuals and organizations receive this list once every three months.

Three public field trips relating to this project were held. The July 22, 1993 trip had seventeen participants. The September 5, 1995 field trip had four participants and the October 30, 1998 field trip had one participant. The 1998 field trip was held at the suggestion of one of the plaintiffs who filed a lawsuit following the 1997 decisions (the plaintiff did not attend). This field trip specifically reviewed the Kings Mill Timber Sale which was designed to meet the purpose and need identified in Chapter 1. A news release about the upcoming field trip was provided to area media contacts and printed in the Madisonian and Montana Standard. All individuals and organizations who had previously indicated an interest in the project received a letter about the trip.

Coordination with Montana Fish, Wildlife and Parks included three special meetings to discuss concerns and mitigation measures. We invited a representative of the Department to all of our interdisciplinary meetings and field trips.

C. ISSUES

Between December, 1998 and March, 1999, over 200 comments were submitted by interested individuals. Each comment was individually addressed and categorized. Appendix A shows the final categorization and rationale for how each issue was handled in this document. These comments are similar to those submitted in 1994. As a result, we have not included the comments

submitted in 1994 in this document. Comments submitted in 1994 and agency responses are available upon request.

Of primary concern to this analysis are the key issues as identified by the interdisciplinary (ID) team and responsible official. Most of the public comments identified concerns for the management of wildlife. These concerns, as wells as concerns about the management of timber and vegetation, were incorporated into the key issues for "vegetation" and "wildlife habitat". A large number of comments also identified concerns about the analysis process. Please refer to Appendix A to determine how each specific concern about the analysis process is addressed in this document. While the ID team did not identify either water quality or fisheries as key issues, the comments indicate a common interest in these topics. As a result, information about the existing condition and effectiveness of mitigation measures for the water and fisheries resources is included. Appendix B contains reports for recreation, heritage resources, air quality and economics.

The key issues identified by the ID team are:

ISSUE 1 - VEGETATION

What are the potential effects of the proposed action on vegetation? Vegetation changes over time. This issue will analyze how vegetation in the southern Tobacco Root Mountains would change under the proposed action and its alternatives (including the no action alternative). Specific vegetative components of concern are described in the Purpose and Need section in Chapter 1.

Indices of measure used to display the effects on vegetation in the southern Tobacco Root Mountains are:

- acres of harvest by gross vegetation cover type
- acres of burning by gross vegetation cover type
- acres of aspen community restored/treated. (Note: Two separate measures will be shown - one for aspen patches readily identified versus those clones in which little evidence of aspen currently exists).
- aspen age class structure (and percent change in age structure)

ISSUE 2 - WILDLIFE HABITAT

How will proposed prescribed burning, timber harvest and associated temporary road construction effect the availability of these wildlife habitats in the southern Tobacco Root Mountains? The existing mix of vegetation provides habitats for a variety of wildlife species. For example, sagebrush is critical to the survival of sage grouse. Sagebrush/grass mixes provide important habitat for big game. Montana Fish, Wildlife and Parks is concerned about changes in sagebrush habitat. Aspen is a rare but important type to several species. Forest stands provide security, thermal and hiding cover for many species. Montana Fish, Wildlife and Parks is concerned with changes in security cover increasing bull elk vulnerability.

Indices of measure used to display the effects on wildlife habitat in the southern Tobacco Root Mountains are:

- acres of elk winter range and calving habitat affected by treatment
- acres of security cover for elk affected
- miles of temporary road

ISSUE 3 - ROADLESS CHARACTER

What effects will proposed prescribed burning activities have on the Middle Mountain Roadless Area (1-013) and the Potosi Roadless Area (1-014)?

Two inventoried roadless areas are included within the analysis area. These roadless areas provide secure habitat for wildlife. Some people simply value land without roads or developments and wish to preserve it for the future. They are concerned about the cumulative effect of removing areas, or even small portions of those areas, out of roadless condition.

Indices of measure used to display the effects on the undeveloped character of these inventoried roadless areas are:

- natural integrity
- apparent naturalness
- remoteness
- solitude
- special features
- manageability/boundaries

D. ALTERNATIVE DEVELOPMENT PROCESS FOR FOREST PLAN AMENDMENT ALTERNATIVES

Alternative FP-1 is the No Action Alternative. It provides a baseline to assess potential impacts and changes using current Forest Plan standards. A timber management philosophy was used to develop existing Forest Plan standards. This philosophy uses 40 acre clearcuts (mostly within lodgepole pine) spaced 600 feet apart within the suitable timber base. The desired outcome is the harvest of mature trees, maximum growth and regeneration of harvestable trees. This method requires the use of existing high quality roads and the construction of new high quality roads to reach unharvested timber areas. Harvest is generally not used to achieve other resource objectives (such as aspen regeneration). Other resource standards are developed specifically for timber management. Wildlife standards are geared towards protecting elk.

Alternative FP-2 was designed using a philosophy of ecosystem management applied across an entire landscape. This philosophy recognizes the importance of biological processes on a landscape and incorporates social wants and needs from the landscape. A combination of biology and sociology identifies vegetative "imbalances" across a landscape, suggests ways to restore the "natural" balance and uses for vegetative "excesses" (i.e. posts and poles, timber, grass). The desired outcome is a "natural" mix of vegetation and in most cases a conversion of the vegetative expression (i.e. from late succession Douglas-fir to earlier succession aspen). This requires the ability to access all Forest Plan Management Areas, use of harvest for other than timber purposes to achieve other resource objectives and use of existing or temporary roads to reach treatment areas. Resource guidelines would be applied to all management activities. Wildlife guidelines incorporate all species.

Alternative FP-2 also incorporates findings from the Beaverhead Forest Plan Five Year Review, the Tobacco Root Landscape Analysis (TRLA) and coordination meetings with Montana Fish, Wildlife and Parks (MFWP). The general public and MFWP are now stressing herd composition, particularly the age class of bull elk, as a greater concern than total population. While Forest Plan standards are currently being met, the level of security called for in the Forest Plan does not appear to adequately address herd composition, given current hunting regulations and season structure.

Recommendations from the Forest Plan Five Year Review that were used to develop Alternative FP-2 include:

- Amend the Forest Plan to address fall hunting season security needs. Identify fall season security needs on an incremental basis for specific areas over time through the Integrated Resource Analysis (NFMA). Delete Forest Plan Wildlife Standard 7 which deals with elk habitat security as it is affected by timber harvest and road construction.

- Delete Forest Plan Wildlife Standard 8 which deals with elk effective cover during hunting season.

- Through the Integrated Resource Analysis process, determine the range of natural variability and the level to be managed for within the range necessary to meet management direction for the site specific area. Incrementally, site specifically amend the Forest Plan to incorporate, as objectives, the level of management within the range of natural variability for that landscape analysis unit.

- Incrementally, site specifically address the individual elements of ecosystem management through project level analysis. Amend the Forest Plan to incorporate those objectives on a site specific basis. The elements considered should include, but not be limited to old growth, snags and down woody material, sensitive plant and animal species and threatened and endangered species.

The TRLA also recognized the above mentioned concerns and identified additional concerns, including (1) Forest Plan standards methodology was developed for summer habitat needs of elk and does not account for mature elk vulnerability during the hunting season, (2) hunting season road and trail use, (3) hiding cover methodology relies on data collected in 1975, (4) topography effects for providing security are ignored, (5) Habitat Analysis Units (HAUs) are generally too small to represent the home range of elk and (6) single species management standards.

Recommendations from the TRLA that were used to develop Alternative FP-2 include:

- Focus management in areas that have been or are being disturbed.

- Maintain large blocks of undisturbed areas over time.

- Base habitats on historic conditions.

- Road management - disturbed versus undisturbed.

E. FOREST PLAN ALTERNATIVES CONSIDERED IN DETAIL

Alternative FP-1

Alternative FP-1 is the no action alternative. It would continue using existing Forest Plan Standards and Guidelines for wildlife. These standards determine the effects to elk from project proposals by using the Elk Effective Cover Calculation Process (EEC) described in Appendix C of the 1986 Forest Plan. Implementation of Alternative FP-1 would continue applying wildlife standards 7, 8 and 9 to analyze timber related projects within timber emphasis Management Areas. These standards are (Forest Plan pages II-26 and II-27):

"7. The 1982 Elk Logging Study Annual Report contains procedures for analyzing elk habitat security as it is affected by timber harvest and road construction activities. An

"elk effective cover" analysis based on this report will be conducted for timber sales and effective cover ratings of at least 70 percent will be maintained during general hunting season. Appendix C depicts the process to be used.

8. Specific areas of the Forest currently do not meet the 70 percent level of elk effective cover during hunting season due primarily to high existing open road densities which are considered desirable for hunter access. In these areas timber management will be permitted, provided there is no increase in total open roads during general hunting season and elk use potential is maintained at or above 95 percent of optimum.

9. Maintain at least two thirds of the hiding cover associated with key habitat components over time. Subsequent timber sale activity will be allowed after regeneration provides hiding cover. Key habitat components are important features for wildlife. They include moist areas (wallows, etc.); foraging areas (meadows and parks); critical hiding cover (see the Glossary for a definition); thermal cover; migration routes and staging areas. These areas will be mapped on a site-by-site basis during project area analysis."

More specifically, Alternative FP-1 uses a method based on summer habitat needs to determine the effects of proposals on bull elk during the fall hunting season. The method is used within a Habitat Analysis Unit (HAU) ranging in size from 7,000-10,000 acres (home range of elk). A cover:forage ratio is established to determine Elk Use Potential (EUP). Open road density is established to determine Habitat Effectiveness (HE). The Elk Use Potential value is then multiplied by Habitat Effectiveness to determine Elk Effective Cover (EEC). The values of Elk Effective Cover and Elk Use Potential are then compared to Forest Plan Standards 7, 8 and 9 to determine the effects of proposed actions on vulnerability of bull elk.

Alternative FP-2

The Beaverhead-Deerlodge National Forest adopted Alternative FP-2 as the proposed action to begin the National Environmental Policy Act (NEPA) process. This is the same alternative selected for implementation by Forest Supervisor, Deborah L.R. Austin in 1997 and subsequently withdrawn under the terms of a settlement agreement (July 22, 1998).

Under Alternative FP-2, current Forest Plan Standards 7, 8 and 9 would be replaced with Guidelines developed specifically for the southern Tobacco Root Mountains. The Tobacco Root Guidelines deal with wildlife species throughout the landscape. These guidelines are not intended specifically for elk and as such do not adhere strictly to recommendations developed for elk (i.e., Hillis et al 1991, Christensen 1993). However, several of the concepts described by Hillis and Christensen are used, considered and/or modified to fit the Tobacco Root Landscape.

More specifically, Alternative FP-2 would determine effects to wildlife species from project proposals by using a combination of: buffered open roads and motorized trails; blocks of timber cover; past, present and future treatment (harvest) areas; and temporal and spatial considerations (i.e., alternate activity areas). Security blocks (areas of continuous forest cover greater than 200 acres in size and located more than 1/4 mile from motorized travel routes) are determined by: (1) adding a 1/4 mile buffer on roads and motorized trails open during the general hunting season; (2) removal of areas impacted by past timber harvest activities; and (3) removal of blocks less than 200 acres in size. Security blocks are determined over the entire landscape and are

displayed on Map 2 (page 16). Using the entire landscape (approximately 114,000 acres) allows the home ranges of various wildlife species to be included (i.e. voles to elk). Because these blocks occur at all elevation ranges, they were separated into high elevation (above 8100 feet) and low elevation (below 8,100 feet) security areas (see Chapter 3, Affected Environment). Future harvest areas are then placed within areas impacted by past harvest, on the edge of existing security blocks or concentrated in one security block (see Chapter 4 Environmental Consequences).

Alternative FP-2 would replace existing Forest Plan Standards 7, 8 and 9 with the following guidelines applicable only to the portion of the Tobacco Root Mountains lying within the boundaries of the Madison Ranger District.

- Timber harvest will occur (1) outside established wildlife security blocks, (2) on the edge of established security blocks, or (3) concentrated in one security block rather than fragmenting many blocks.

- Restrict activity (harvest, heavy equipment) to certain identified drainages (as delineated on Map 3, page 17) at one time to avoid concurrent activity across the landscape.

- Only temporary roads will be constructed. Temporary roads will be obliterated once they are no longer needed.

F. ALTERNATIVE DEVELOPMENT PROCESS FOR VEGETATION MANIPULATION ACTIVITIES

The ID team and responsible official recognized that a wide array of options exist for developing alternatives by delineating units in different locations and treating these units at different times over the entire 114,000 acre analysis area. As a result, the responsible official and ID team used the following criteria, or sideboards, to develop alternatives and select units for treatment.

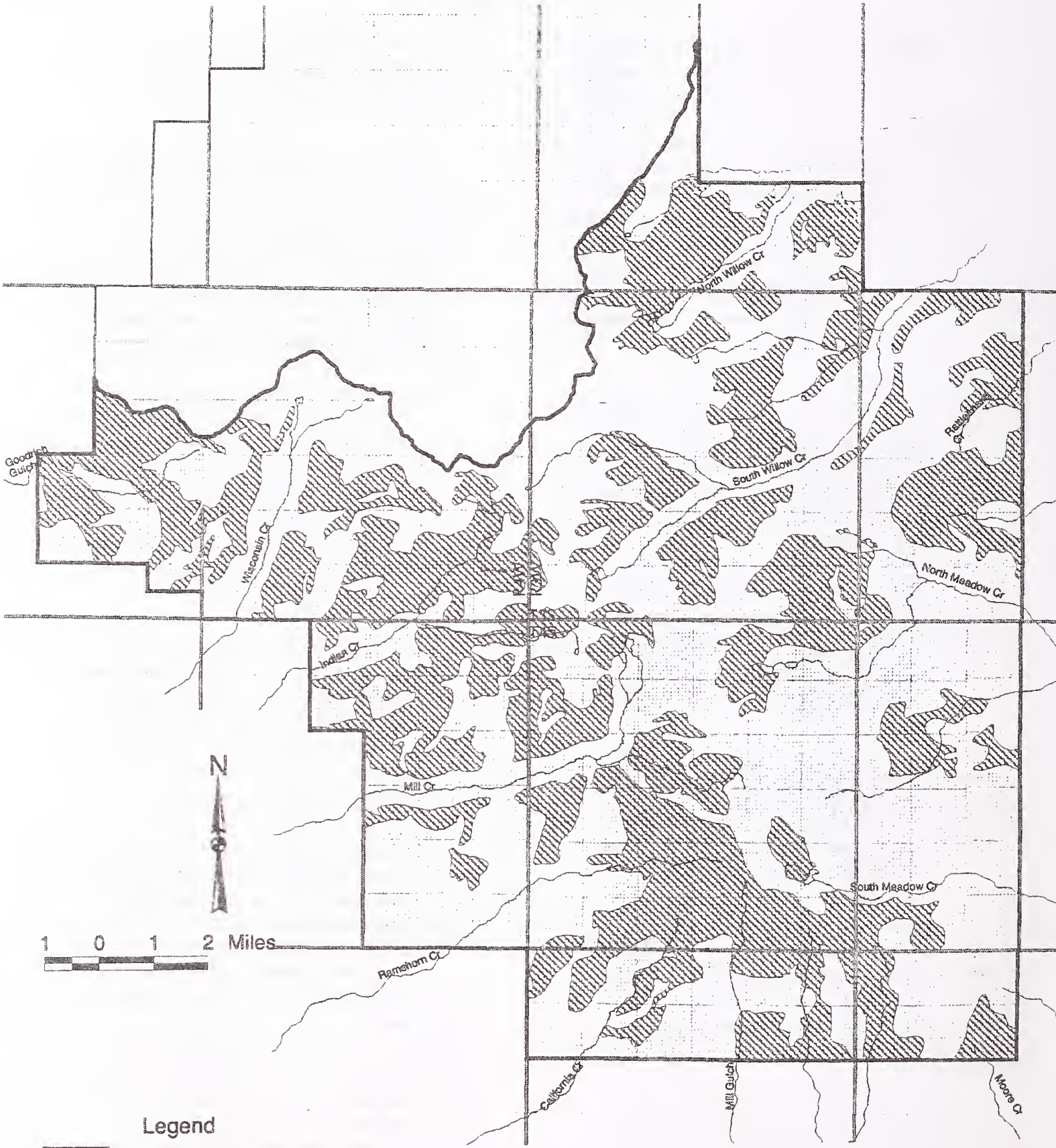
- Site specific attributes of each stand were reviewed by the ID team and an MFWP biologist to determine the desirability for treatment. For example, if key wildlife areas were identified within the stand and treatment could potentially affect the attributes of that key component, the stand may have been dropped from consideration.

- Site specific attributes of each stand and the surrounding areas were reviewed for operational ability. These attributes included access from existing roads, continuity of fuels (for example, could the unit carry a prescribed fire?) and ability to control a prescribed fire.

- Emphasis for selecting units for treatment was given to inventoried aspen stands. Restoration of aspen stands was identified as a priority in the Tobacco Root Landscape Analysis (TRLA) due to the rare occurrence of these stands and the potential to lose them in the next 30 years.

- The location of treatment units was designed to treat a variety of vegetation types (Douglas-fir, Douglas-fir/lodgepole mix, aspen, sagebrush and Douglas-fir colonization). Since the purpose of the project is to restore and

Tobacco Root Vegetation Management Plan
Map 2 - Wildlife Security Blocks

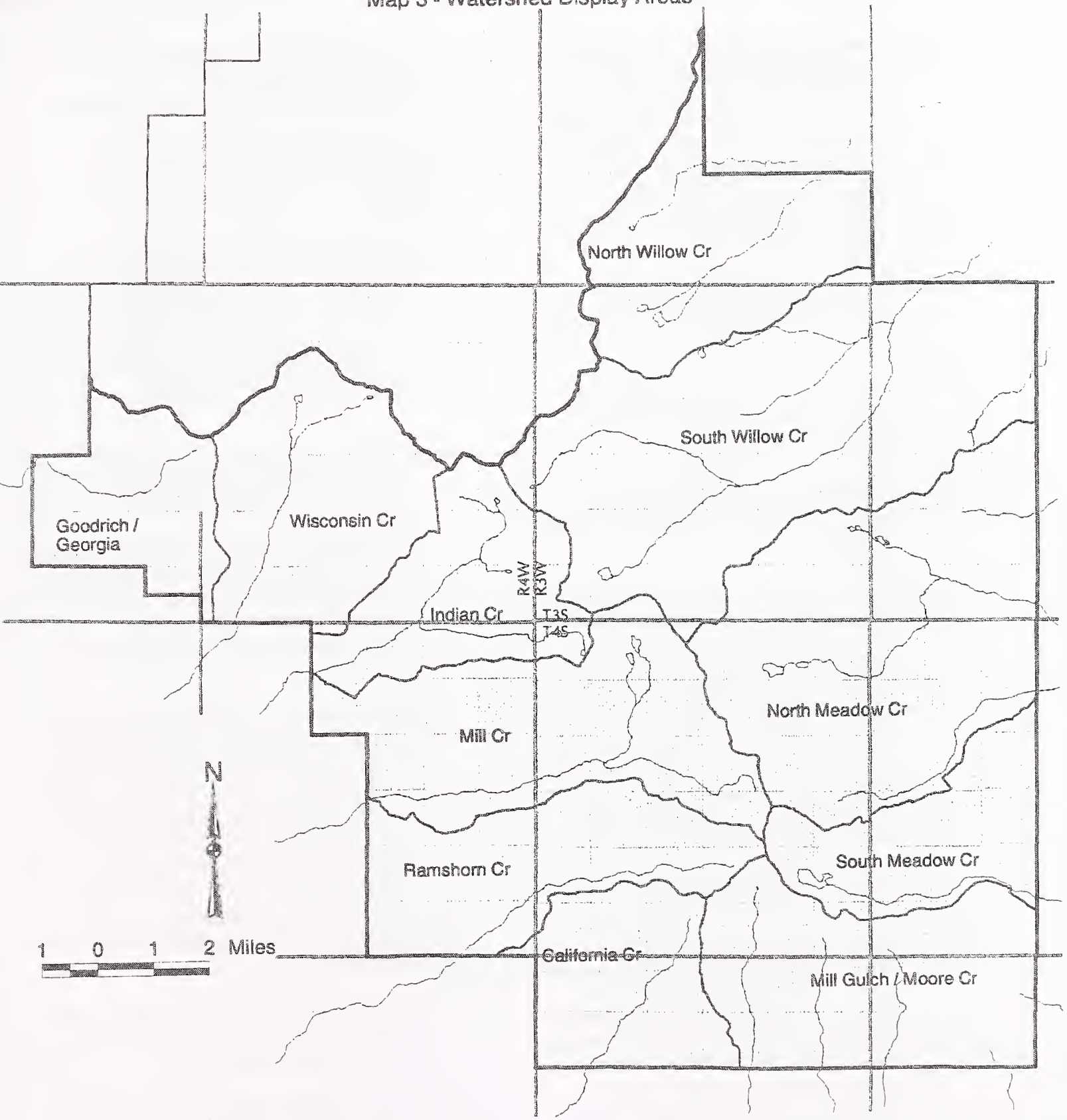


Legend

- Project Area Boundary
- Beaverhead-Deerlodge National Forest
- Wildlife Security Block
- Stream

More detailed, smaller scale maps are available at the District Office in Ennis.

Tobacco Root Vegetation Management Plan
Map 3 - Watershed Display Areas



Legend

- Project Area Boundary
- Beaverhead-Deerlodge National Forest
- Watershed Display Area
- Stream

More detailed, smaller scale maps are available at the District Office in Ennis.

maintain a desirable mix of vegetation, the ID team and responsible official determined that it was important to not focus on one vegetation type. However, the desire to treat a variety of vegetation was balanced out with the priority identified in the TRLA to treat communities with a relatively high fire frequency (ELU 1).

- Potential harvest units located in inventoried roadless areas were dropped from consideration.

- Potential treatment units within the stream buffers were dropped from consideration.

- Treatment was limited by projected budget allocations to complete proposed projects.

- Consideration of the objectives identified in a Memorandum of Understanding (MOU) with Region 3, MFWP (see Appendix E) was given to prescribed fire treatment units in sagebrush habitat types. This MOU was being developed during the same time period as the 1997 EA and was not finalized until after the 1997 decisions were published. Since this process evolved while treatment units were being selected, some of the criteria used for selection were different from criteria described in the final MOU. In some cases, treatment units were dropped from consideration due to attributes identified in draft copies of the MOU. These same units may not be dropped from consideration based on the final MOU. However, projected budget allocations would fund only a certain amount of treatment over the next 10 years so it is unlikely the agency would treat any of these units.

G. FEATURES COMMON TO ALL ACTION VEGETATION MANIPULATION ALTERNATIVES

The following mitigation measures or features are common to Alternatives S, T and U.

1. Prescribed burning will be scheduled within livestock grazing pasture rotations. Location and year planned for each burn are delineated on the alternative maps. Pasture rotations will not be modified solely to meet prescribed burning schedules.

2. Prescribed burns will be completed within objectives and procedures of the Montana/Idaho airshed group.

3. Timber sale landings will not be placed in areas mapped as Foreground Retention, Middleground Retention or Foreground Partial Retention without prior consultation with the Forest landscape architect.

4. Treatments will not follow a straight line (such as the National Forest boundary) or a contour line across a slope for more than 500 feet. Instead, the edge will be scalloped at the approximate scale and irregular edge pattern of the nearest ecotone or vegetative transition zone of sagebrush/grassland to conifer forest. Consult the Forest landscape architect when planning edges in areas mapped as Retention.

5. Harvest and precommercial thinning will be done so that the remaining trees are not uniformly spaced.

6. Aspen will be monitored after treatment. Measures such as fencing or herding will be used in cases where regeneration of aspen is not proceeding as planned due to livestock or wildlife browsing.

7. Timber harvest will be followed by underburning in all stands except post/pole stands of lodgepole pine. Underburning will be primarily a surface fire (rather than intense crown fires), with the dominant tree canopy left after treatment. Underburning may cover up to 100% of the ground surface, but the treatment will rarely cause mortality in the residual stand.

8. Treatment will not occur within 1.5 miles of known sage grouse leks and wintering areas.

9. Prescribed burning and timber harvest will not occur within 100 feet of perennial streams. Timber harvest within other riparian areas will comply with Streamside Management Zone (SMZ) Rules mandated by the SMZ law. The rules are summarized in a booklet provided by the State. Deviations will adhere to Rule 10 (26.6.610) in order to insure protection of fisheries and hydrological function. Map 4 (page 20) shows the location of these special buffers. For tributaries of westslope cutthroat trout streams outside the mapped buffer areas, burning will not occur within 300 feet of the stream without on-site inspection and clearance by the District fisheries biologist.

10. The District fisheries biologist will be consulted during preparation of burn plans, in order to identify and mitigate potential adverse impacts.

11. Montana Fish, Wildlife and Parks (MFWP) will be consulted during preparation of annual burn plans. The District will how MFWP which units are ready for burning and ask MFWP to help identify special areas of critical habitat or other key wildlife elements within each burn unit. The District will consider this input in the formulation of burn plans and implementation of the burn.

12. Temporary roads will generally be used for timber sale activity for two years, post sale activities for one year, and obliterated at the end of the third year. Temporary roads will be recontoured to original contour, with brush placed across the tread. Closure devices will be placed to restrict access during hunting season. Timber sale contracts will specify the location of temporary roads. No permanent roads will be constructed.

13. Temporary road and stream crossings will be approved by the District fisheries biologist prior to construction and meet requirements of the Montana Stream Preservation Act.

14. Harvest activity will not occur during the general hunting season. Log hauling will not be permitted during the first two weeks of the general hunting season. After this period, log hauling will be restricted to roads open to motorized use and will not occur on weekends or holidays.

15. During the winter, no log hauling will be permitted on weekends and holidays.

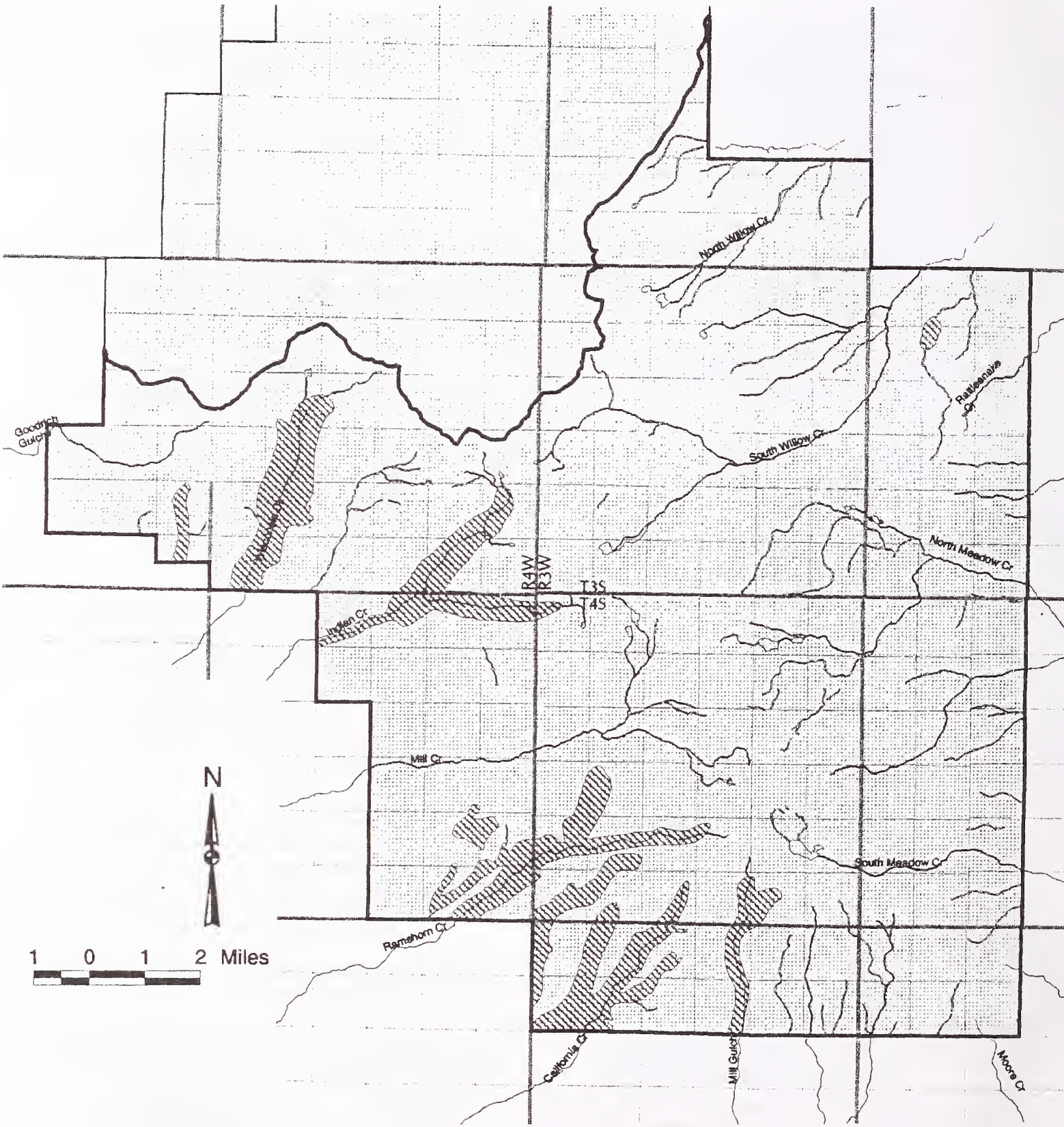
16. No harvest activity will occur in the area of known goshawk nesting territories.

17. Timber sale contracts will specify that trails be protected.

18. People recreating in areas of proposed burning will be notified prior to ignition.

19. Trails through burned areas will be restored immediately following burning.

Tobacco Root Vegetation Management Plan
Map 4 - Stream Buffers



Legend

- Project Area Boundary
- Beaverhead-Deerlodge National Forest
- Stream Buffer
- Stream

More detailed, smaller scale maps are available at the District Office in Ennis.

20. Timber sale contracts will specify periods of operation and limit operations in areas of sensitive soils.

21. Harvest activities will occur in identified drainages (as delineated on Map 3, page 17) at any one time; not across the entire landscape.

22. Prior to any treatment, the area will be surveyed for the presence of heritage resources. If heritage resources are found, they will be recorded and evaluated for inclusion in the National Register of Historic Places. Mitigation of significant heritage resources will be accomplished through site avoidance or data recovery tailored to historic or prehistoric sites.

23. Aspen and Douglas-fir snags will not be harvested. In areas that have lodgepole pine snags, 3 to 5 lodgepole pine snags per acre will be left after harvest activities are completed. These snags will be left in clumps. Snags created by underburning will also be left. In areas that are easily accessed by firewood cutters, snags will be marked with paint and "Wildlife Tree" signs.

24. Equipment that leaves the road will be thoroughly cleaned and inspected prior to entering the area.

25. Sensitive plant surveys will be completed on proposed units and temporary roads prior to sale to identify unknown sensitive plant sites. If any sites are found; impacts to the plants will be avoided, protected or mitigated.

26. Treatment sites will be monitored for noxious weed infestations. If new infestations are found, control measures will be initiated.

27. Prior to commercial use of existing National Forest roads for hauling logs, the roads will be surveyed for locations where eroded material is being moved from the road prism and transported to the stream. Most of these locations will occur in "contributing areas"; approximately 300 feet on either side of a stream crossing, or where the road is located within 300 feet of a perennial or intermittent channel. Once these sites are located, the appropriate measures to prevent sedimentation will be taken. Depending on the site-specific situation, common methods to reduce sediment are: filtering windrows at the toe of the fill slope, surfacing the contributing area, increasing cross-drain frequency, rocking road ditches, making cross-drain culverts more efficient with flared inlets, and vegetating cut/fill slopes. These solutions, as well as others designed for the site specific situation, are possible on any road.

H. DETAILED DESCRIPTION OF VEGETATION MANIPULATION ALTERNATIVES

The three action and one no action alternative for vegetation manipulation are described here. The general location of the analysis area is delineated on Map 1 (page 6). Table 1 (page 28) displays acres and types of treatment by year for each alternative. Table 2 (page 29) describes acres treated in each vegetation type for each alternative. Treatment units are delineated on alternative maps (page 25 through 27).

Any of the following alternatives could be implemented regardless of whether the responsible official decides to select Alternative FP-1 or FP-2.

The following definitions are used in the description of the vegetation manipulation alternatives considered in detail.

Fire/utilization - Primary treatment on these acres is prescribed fire ignited by Forest Service employees. Small amounts of Christmas trees, sawlogs or other forest products may be removed before or after treatment.

Partial harvest/underburn - Trees would be harvested and then the area would be underburned. Once harvest is completed, underburning would commence and extend over another two-year period. The maps and Table 1 indicate the first year of a two year duration in which sales would be sold in a given area. For example, if the map legend and Table 1 show harvest/underburn in 2000, that means we would sell up to the indicated number of acres in several timber sales in 2000 and 2001. Once harvest is completed, underburning would commence and extend over another two-year period.

Partial harvest/no burn - Small diameter lodgepole pine would be harvested. This treatment differs from partial harvest/underburn both in the size of trees removed and in the slash disposal method. The primary product would be posts and poles, with some small sawlogs. The slash resulting from harvest would be trampled or slashed and left to rot. The treatment units would not be underburned after harvest.

Precommercial thinning - Previously harvested units (clearcut) would be thinned by falling sapling-sized trees. These stands do not contain trees big enough to be sawlogs.

Temporary road - A road requiring ground disturbance to create a road prism (cut and fill slope), but not intended for long term use.

Existing road - A road with an existing road prism. This road may require maintenance, such as the removal of vegetation, to allow safe travel by haul trucks.

ALTERNATIVE R

Alternative R is the no action alternative. It would not initiate any new activities to manipulate vegetation in the southern Tobacco Root Mountains. Alternative R is not mapped.

ALTERNATIVE S

The Beaverhead-Deerlodge National Forest adopted this alternative as the proposed action to begin the National Environmental Policy Act (NEPA) process. Alternative S is a combination of the two decisions reached by Forest Supervisor, Deborah L.R. Austin, and District Ranger, Mark A. Petroni, in 1997. Acreage figures have been reduced to reflect the small portions of those decisions that were implemented prior to filing of the lawsuit and reflect changes based on analysis of additional field data.

Alternative S was developed to display effects of treating the maximum number of acres which are readily accessible during the next ten years. Our intent was to move as quickly as possible toward the desired condition of vegetation described in the Tobacco Root Landscape Assessment.

Under Alternative S, the Madison Ranger District would treat 18,167 acres of vegetation in the southern Tobacco Root Mountains over the next ten years. The location of treatment units, type of treatment and years scheduled for treatment are delineated on Map 5 (page 25). Treatment type, by years proposed, is displayed in Table 1 (page 28). Treatments by vegetation types are displayed in Table 2 (page 29). Site specific stand treatment and stand attributes are displayed in Appendix C.

Open, park-like stands of Douglas-fir would be maintained on 3,613 acres by thinning these stands using Stewardship Contracts, paying contractors or Forest Service employees to complete the work, or through commercial timber harvest and underburning (partial harvest/underburn). Lodgepole pine/Douglas-fir mixed stands would have clumps of older, diseased trees harvested by group selection to replicate a natural fire pattern. The total area treated in these stands would not exceed 40%. Pure Douglas-fir stands would have the understory, smaller trees removed by a diameter-limit harvest (thin-from-below) with the remaining basal area exceeding 60% of the initial stand. Aspen would be treated by removing competition from conifers and either burning or cutting aspen clones. Timber (mostly posts and poles) would be harvested on another 671 acres of stagnated lodgepole pine stands (partial harvest/no burn). An additional 1,423 acres of old harvest (clearcut) units would be precommercially thinned. These activities would require the construction of about 25 miles of temporary roads which would be obliterated after project completion.

This alternative includes a road use permit which the Montana Department of Natural Resources and Conservation (DNRC) has requested to access their proposed Moore Gulch Timber Sale (Section 16, T5S, R2W). If approved, this road use permit would allow hauling of logs on the South Meadow Creek Road (4 miles), use of a temporary road associated with the Kings Mill Timber Sale (0.4 miles) and use of portions of a temporary road that would be constructed to treat acres proposed in Alternative S.

To reestablish grasslands, an additional 12,460 acres would be treated using prescribed fire (fire/utilization). Treatment would be restricted to 50% or less of sagebrush habitat type acres in a drainage. Burn prescriptions would be developed with the objective of burning a mosaic of 50% burned, distributed over the treatment area such that no point in the burned area exceeds 600 feet from the unburned areas.

ALTERNATIVE T

This alternative was designed to reduce the amount of acres treated and to analyze the effects of harvest without the construction of temporary roads. Under Alternative T, the Madison Ranger District would treat 10,730 acres of vegetation in the southern Tobacco Root Mountains over the next ten years. The location of treatment units, type of treatment and years scheduled for treatment are delineated on Map 6 (page 26). Treatment type, by years proposed, is displayed in Table 1 (page 28). Treatments by vegetation types are displayed in Table 2 (page 29). Open, park-like stands of Douglas-fir would be maintained on 2,273 acres by thinning these stands using Stewardship Contracts, paying contractors or Forest Service employees to complete the work, or through commercial timber harvest and underburning (partial harvest/underburn). Aspen would be treated by removing competition from conifers and either burning or cutting aspen clones. Timber (mostly posts and poles) would be harvested on another 322 acres of stagnated lodgepole pine stands (partial harvest/no burn). An additional 732 acres of old harvest (clearcut) units would be precommercially thinned. Harvest methods would be the same as Alternative S and are site specifically displayed in Appendix C. Under Alternative T, no temporary roads would be constructed.

To reestablish grasslands, an additional 7,403 acres would be treated using prescribed fire (fire/utilization). Treatment would be restricted to 50% or less of sagebrush habitat type acres in a drainage. Burn prescriptions would be developed with

the objective of burning a mosaic of 50% burned, distributed over the treatment area such that no point in the burned area exceeds 600 feet from the unburned areas.

ALTERNATIVE U

This alternative was designed to efficiently produce commodity products (specifically timber and livestock forage) as described in the 1986 Beaverhead Forest Plan. Harvest units were delineated using Forest Plan standards and guides, including HAU analysis limitations. Units, stand attributes and harvest amount are site specifically displayed in Appendix C.

Prescribed burn units were located to increase forage production for domestic livestock. This is a different philosophy from that used for Alternatives S and T where burn units were located to enhance ecological diversity. In Alternative U, burn units were located on land units suitable for grazing by domestic livestock and in relatively close proximity to water sources. In the development of Alternatives S and T, emphasis was placed on the overall ecological condition of the proposed burn unit, regardless of whether it was located on a steep slope that is rarely grazed by livestock or how far the burn unit is from a water source.

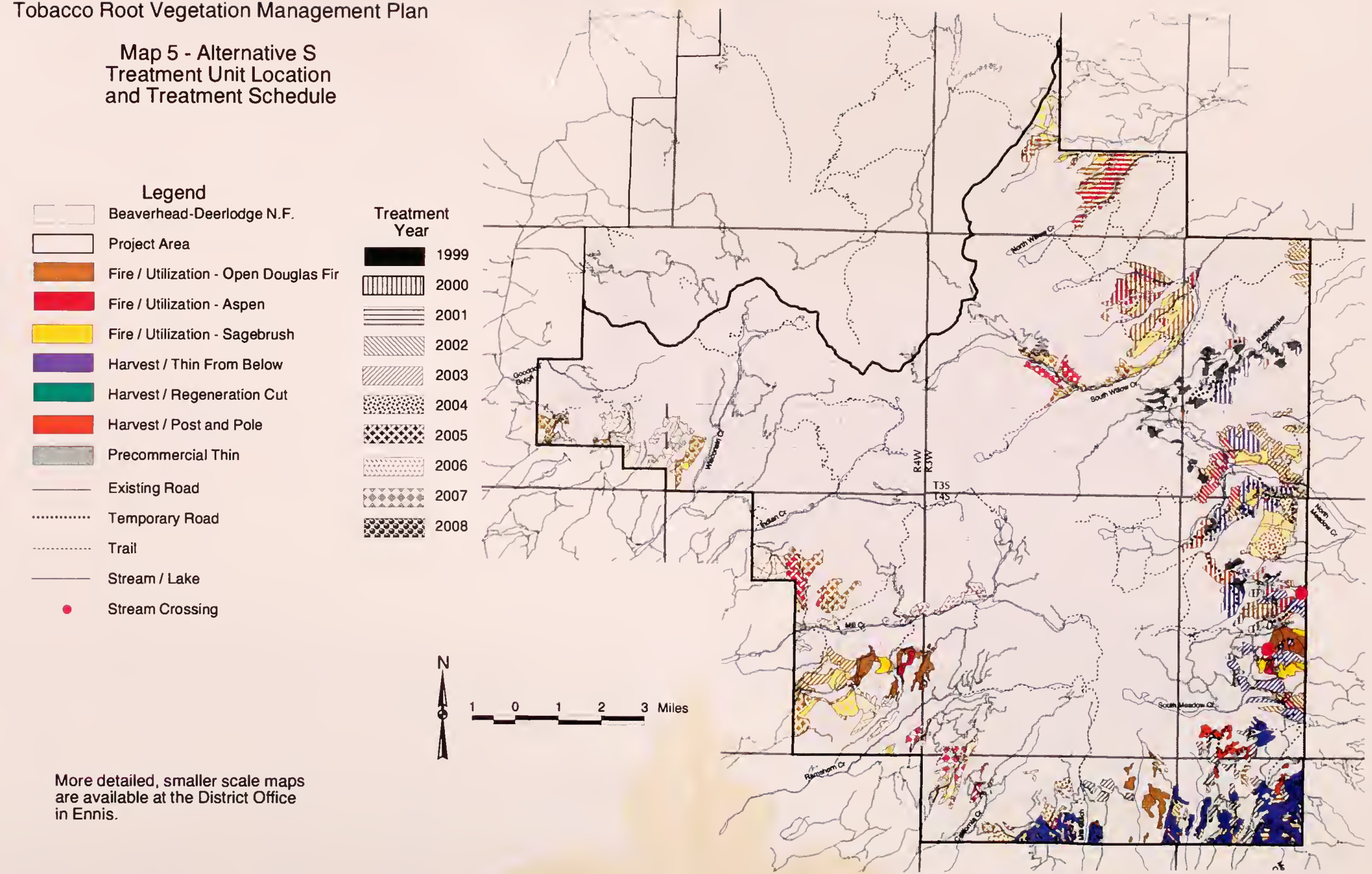
Under Alternative U, the Madison Ranger District would treat 8,457 acres of vegetation in the southern Tobacco Root Mountains over the next ten years. The location of treatment units, type of treatment and years scheduled for treatment are delineated on Map 7 (page 27). Treatment type, by years proposed, is displayed in Table 1 (page 28). Treatments by vegetation types are displayed in Table 2 (page 29). Open, park-like stands of Douglas-fir would be maintained on 2,087 acres as described in Appendix C. Aspen would be treated by removing competition from conifers and either burning or cutting aspen clones. Timber would be harvested, using a regeneration cut, on another 1,095 acres primarily of stagnated, deteriorating lodgepole pine stands as described in Appendix C. Primarily posts and poles would be harvested from an additional 479 acres. An additional 1,039 acres of old harvest (clearcut) units would be precommercially thinned. These activities would require the construction of about 28 miles of temporary roads which would be obliterated after project completion.

This alternative includes a road use permit which DNRC has requested to access their proposed Moore Gulch Timber Sale (Section 16, T5S, R2W). If approved this road use permit would allow hauling of logs on the South Meadow Creek Road (4 miles), use of a temporary road associated with the Kings Mill Timber Sale (0.4 miles) and use of portions of a temporary road that would be constructed to treat acres proposed in Alternative U.

To reestablish grasslands, an additional 3,757 acres would be treated using prescribed fire (fire/utilization). Since the emphasis for locating the proposed units was placed on the ability to produce forage for domestic livestock, burn prescriptions would be developed with the objective of burning a mosaic of 70% burned and 30% unburned.

Tobacco Root Vegetation Management Plan

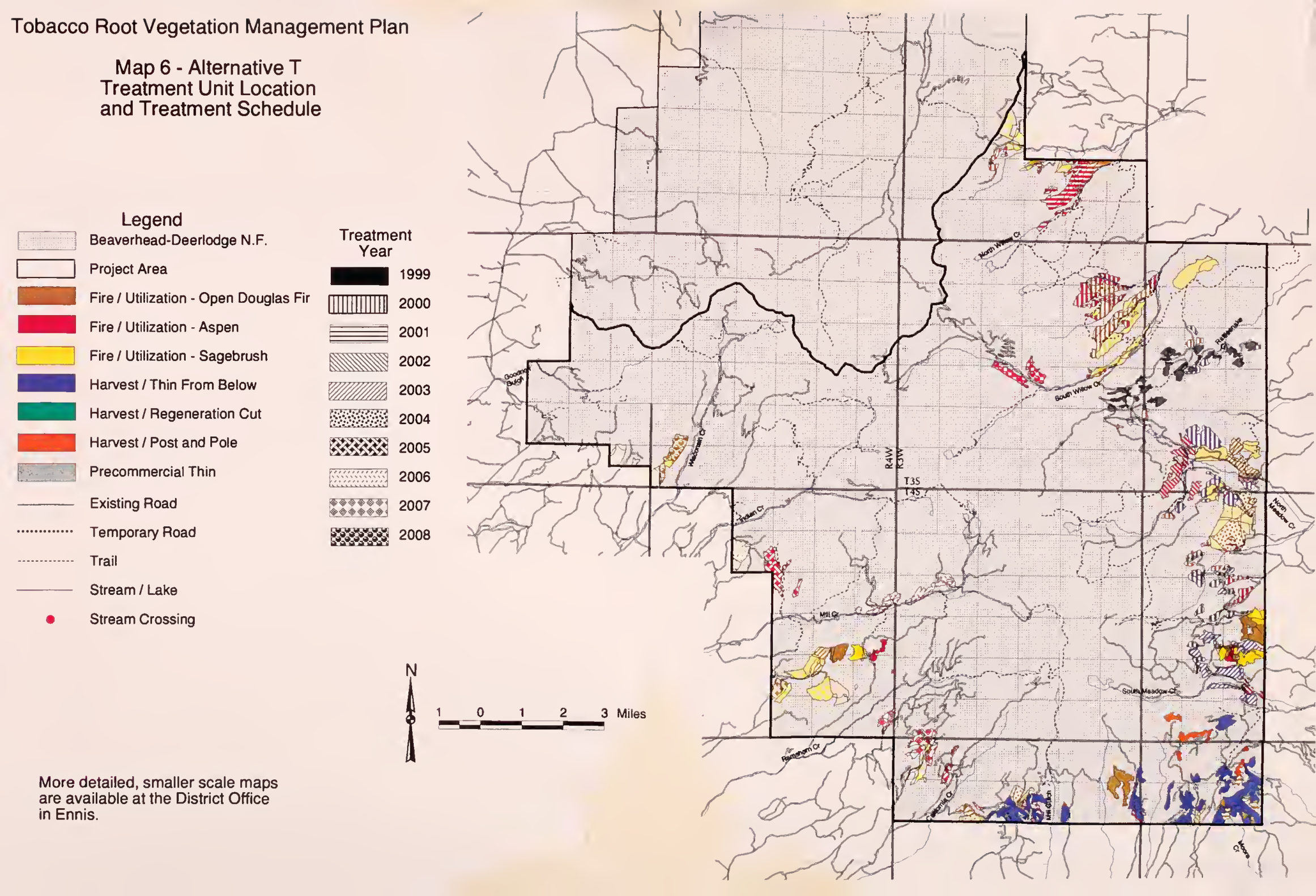
Map 5 - Alternative S
Treatment Unit Location and Treatment Schedule



More detailed, smaller scale maps are available at the District Office in Ennis.

Tobacco Root Vegetation Management Plan

Map 6 - Alternative T
Treatment Unit Location
and Treatment Schedule



More detailed, smaller scale maps are available at the District Office in Ennis.

Tobacco Root Vegetation Management Plan

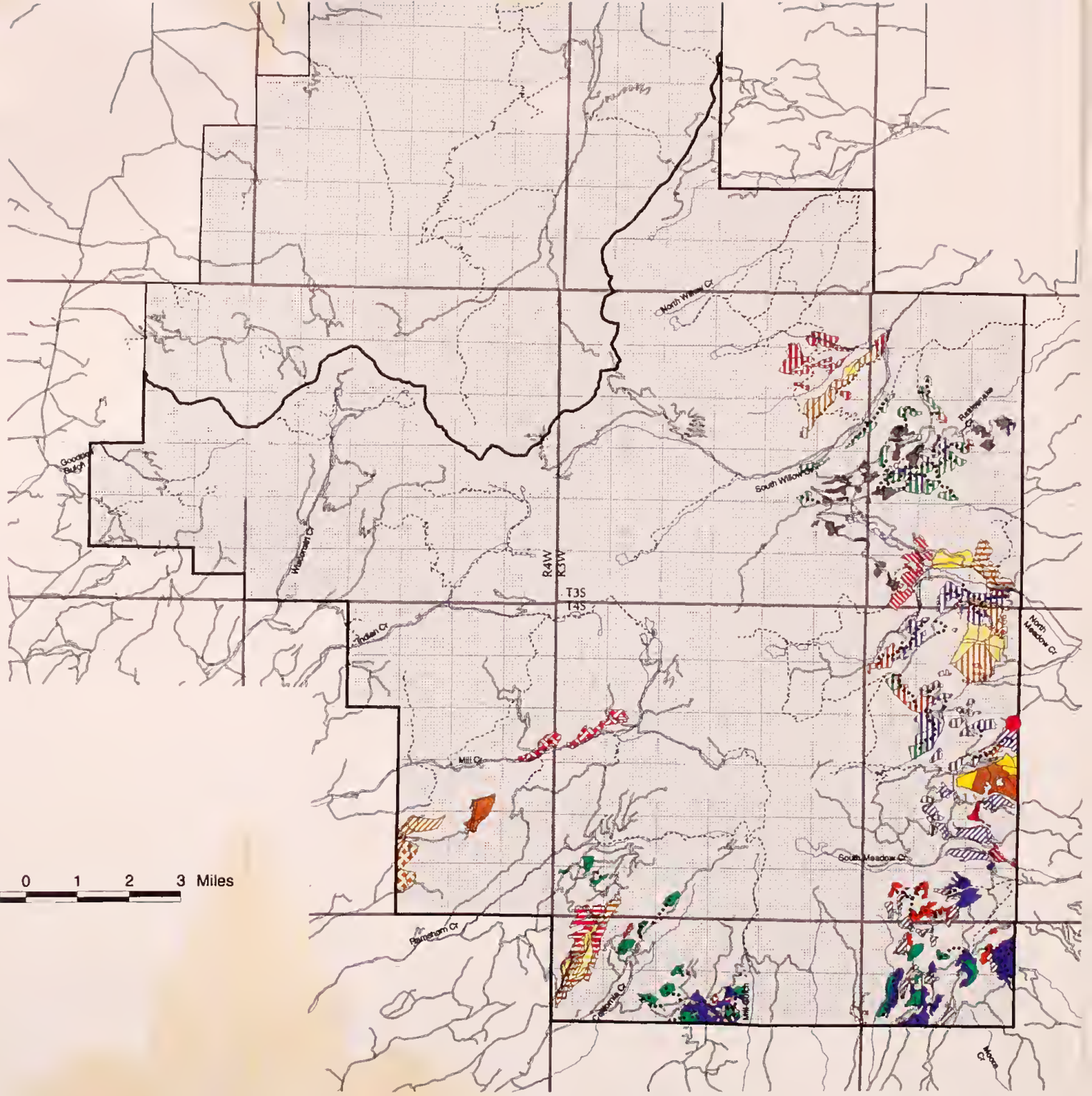
Map 7 - Alternative U
Treatment Unit Location
and Treatment Schedule

Legend

- Beaverhead-Deerlodge N.F.
- Project Area
- Fire / Utilization - Open Douglas Fir
- Fire / Utilization - Aspen
- Fire / Utilization - Sagebrush
- Harvest / Thin From Below
- Harvest / Regeneration Cut
- Harvest / Post and Pole
- Precommercial Thin
- Existing Road
- Temporary Road
- Trail
- Stream / Lake
- Stream Crossing

Treatment Year

- 1999
- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008



More detailed, smaller scale maps are available at the District Office in Ennis.

Table 1
Type of Treatment By Year
Shaded columns are the time period available for decision (see Chapter 1, Section E)

	Year of Treatment (and gross acres affected by each treatment that year)										
Treatment	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total by Method
Fire/Utilization - Open Douglas fir											
Alternative R	0	0	0	0	0	0	0	0	0	0	0
Alternative S	956	1026	621	755	772	680	716	1244	288	756	7814
Alternative T	468	475	203	37	299	480	120	178	18	156	2434
Alternative U	374	609	477	0	154	0	176	0	0	0	1790
Fire/Utilization - Aspen											
Alternative R	0	0	0	0	0	0	0	0	0	0	0
Alternative S	82	446	435	369	4	133	268	330	285	194	2546
Alternative T	82	446	435	369	4	133	268	330	285	194	2546
Alternative U	33	418	207	284	0	65	254	0	0	0	1261
Fire/Utilization - Sagebrush											
Alternative R	0	0	0	0	0	0	0	0	0	0	0
Alternative S	220	335	129	61	294	297	180	248	242	94	2100
Alternative T	277	335	115	287	294	297	241	242	242	93	2423
Alternative U	133	296	277	0	0	0	0	0	0	0	706
Harvest - Thin from Below											
Alternative R	0	0	0	0	0	0	0	0	0	0	0
Alternative S	1789	1130	0	0	694	0	0	0	0	0	3613
Alternative T	1294	517	0	0	462	0	0	0	0	0	2273
Alternative U	829	811	0	0	447	0	0	0	0	0	2087
Harvest - Regeneration Cut											
Alternative R	0	0	0	0	0	0	0	0	0	0	0
Alternative S	0	0	0	0	0	0	0	0	0	0	0
Alternative T	0	0	0	0	0	0	0	0	0	0	0
Alternative U	502	593	0	0	0	0	0	0	0	0	1095
Harvest - Post and Pole											
Alternative R	0	0	0	0	0	0	0	0	0	0	0
Alternative S	256	379	0	0	36	0	0	0	0	0	671
Alternative T	175	147	0	0	0	0	0	0	0	0	322
Alternative U	202	241	0	0	36	0	0	0	0	0	479
Precommercial Thin											
Alternative R	0	0	0	0	0	0	0	0	0	0	0
Alternative S	676	189	0	0	558	0	0	0	0	0	1423
Alternative T	459	273	0	0	0	0	0	0	0	0	732
Alternative U	486	222	0	0	331	0	0	0	0	0	1039
All Treatments											
Alternative R	0	0	0	0	0	0	0	0	0	0	0
Alternative S	3979	3505	1185	1185	2385	1110	1164	1823	815	1044	18167
Alternative T	2755	2193	753	693	1059	910	629	750	545	443	10730
Alternative U	2559	3091	961	284	967	65	430	0	0	0	8457

Table 2
Summary of Net Acres Treated by Treatment Type
(percent of the gross acres of this vegetation treated)

Treatment	Gross Acres in Vegetation Type	Alternative R	Alternative S	Alternative T	Alternative U
Burn/Utilization					
Open Douglas-fir	13089	0	3907 (30%)	1217 (10%)	1253 (10%)
Aspen	2500	0	1125 (45%)	1125 (45%)	500 (20%)
Sagebrush/Grass	4957	0	1050 (21%)	1212 (24%)	494 (10%)
Harvest					
Multi-storied Douglas-fir	16001	0	3613 (23%)	2273 (14%)	2087 (13%)
Mature to Old Growth Lodgepole Pine	22125	0	0	0	1095 (5%)
Young Lodgepole Pine and Douglas-fir	6902	0	671 (10%)	322 (5%)	479 (7%)
Precommercial Thin					
Existing Harvest Units	2114	0	1423 (67%)	732 (35%)	1039 (49%)
No Treatment (ie. Rock/Scree, Alpine Grassland, Whitebark Pine, Spruce/Subalpine Fir)	45554	114250	102461	107369	107303

I. ALTERNATIVES CONSIDERED BUT NOT GIVEN DETAILED STUDY

A wide variety of alternatives were considered by the ID team, some of which were dropped from detailed study for the reasons stated below. The 1997 Tobacco Root Vegetation Treatment EA considered seven vegetation manipulation alternatives in detail. For a detailed description of these alternatives and associated environmental consequences refer to pages II-5 through II-12 and IV-2 through IV-33 of the Tobacco Root Vegetation Treatment EA (1997). These alternatives were not analyzed in detail in this EIS because they were similar to either Alternative R or S. The reasons why these alternatives were not selected for implementation are also described below.

Alternative A - This was the no action alternative in the 1997 EA. With the exception of a 213 acre prescribed burn in North Willow Creek and the 91 acre Kings Mill Timber Sale (both implemented in 1998), Alternative A is similar to Alternative R.

Alternative B - Alternative B focused ecosystem restoration projects using timber harvest and prescribed fire in accessible areas in the low elevation foothills of the southern Tobacco Root Mountains. This alternative was not selected for implementation in 1997 because it did not

meet the purpose and need at high elevations and treated fewer acres than Alternative G.

Alternative C - Alternative C initiated ecosystem restoration projects in the southern Tobacco Root Mountains using timber harvest and prescribed fire that would lead to vegetation patterns similar to those found prior to European settlement. Alternative C was not selected for implementation in 1997 because it treated fewer acres, and therefore did not meet the purpose and need as well as Alternative G.

Alternative G - For forested areas, Alternative G is the same as Alternative S and was selected for implementation in 1997. This decision was subsequently withdrawn following the settlement agreement. Additional field surveys determined that some units in Mill Creek were not as accessible as originally thought. These units were dropped from Alternative S.

Alternative H - Alternative H was designed to address different effects and methods for using prescribed fire to accomplish ecosystem restoration projects. This alternative differs from Alternative B by not treating key areas of sagebrush such as elk wintering/calving areas on south and southwest aspects. Treatment areas would be burned in a mosaic pattern of 30-70% burned area. Alternative H was not selected for implementation in 1997 because it moved fewer acres of vegetation towards the desired future condition than Alternative MOU.

Alternative I - Alternative I also excluded key areas of sagebrush from prescribed burning. It differs from Alternative H by limiting burned patch size and total burn within a mosaic. Elk winter/calving areas would be burned in a mosaic pattern of 20-40% burned area and other nontimber vegetation would be treated in a mosaic pattern of 35-55% burned area. Alternative I was not selected for implementation in 1997 because it moved fewer acres of vegetation towards the desired future condition than Alternative MOU.

Alternative MOU - For nonforested areas, Alternative MOU is the same as Alternative S and was selected for implementation in 1997. This decision was subsequently withdrawn following the settlement agreement.

Several other alternatives were also considered either during development of the EA in 1997 or during development of the EIS in 1999. These alternatives, and the reasons why they were not analyzed in detail, are briefly described below.

During development of the Forest Plan alternatives, we considered an alternative to identify wildlife security areas based solely on recommendations made by Hillis and Christensen. We did not develop this alternative in detail because Alternative FP-2 uses concepts described by Hillis and Christensen that were modified to site specifically fit the Tobacco Root Landscape. The "Hillis model" was designed to apply to moister forests located west of the continental divide. One of the major components of the Hillis model that was modified was a recommendation to buffer roads by 1/2 mile rather than 1/4 mile. Due to the steep terrain of the southern Tobacco Root Mountains, the ID team decided to take a more conservative approach and use 1/4 mile buffers (larger security blocks were identified using this method). The models developed by Hillis and Christianson were specifically designed for elk. Alternative FP-2 was designed to incorporate the needs of a variety of wildlife species. A pure "Hillis model" recognizes the impacts to elk-specific habitat. The FP-2 Alternative is designed to recognize the

impacts to elk-specific habitat, but allows for habitat needs of other species (i.e. the burning of mature coniferous forest may negatively impact elk security habitat, but would benefit black-backed woodpeckers and some interior forest song birds).

An alternative which would treat 1/2 of vegetation in the foothills (ELU 1) in the next ten years was considered. This alternative was based on information in the TRLA that the pre-European fire frequency for ELU 1 had been 20 years, and that ELU 1 was most in need of treatment. This alternative was not fully developed because Alternative C (see description above) provides a more detailed basis for treatment based on presettlement fire history.

Management activities other than fire and harvest for treating vegetation were considered. All of the alternatives analyzed in detail include hand slashing of some aspen areas before treating the site with prescribed fire. However, the use of hand slashing for all treatment units is not an effective treatment method. Hand-felling Douglas-fir trees colonizing the sage/grass areas over large areas is very expensive. Chaining or other mechanical removal of sagebrush is also expensive and has undesirable effects on soil and wildlife. Herbicide application is controversial and can have negative effects on wildlife. These treatments leave out the process of fire, which the ID team identified as an important factor promoting beneficial nutrient cycles and vegetation patterns.

We considered a proposal to treat only the immediate area around inventoried aspen stands. This approach has been tried on the Madison Ranger District and while it has been successful in some cases, it has also failed. These failures have several factors, such as: heavy browsing (even if the treated area is fenced to exclude domestic livestock, the young aspen shoots are usually heavily browsed by moose and elk), lack of vigor in the parent stand, lack of sunlight and heat, high disease susceptibility (aspen stands are usually moister than the surrounding vegetation). In order to burn the aspen sites, fire must be started in surrounding vegetation and forced to burn through the aspen stand. As a result, this alternative was not considered in detail.

Other silvicultural methods for treating timber stands were considered, including the use of clearcutting and seed tree harvest. While these methods were the most economically efficient, they did not meet the social and biological needs as specified in the TRLA.

J. COMPARISON OF ALTERNATIVES

This section presents a comparison of alternatives using the significant issues and the purpose and need identified in Chapter 1. Table 3 (page 33) summarizes expected changes in vegetation. Table 4 (page 33) summarizes expected changes in wildlife habitat conditions. Table 5 (page 34) summarizes expected changes in roadless area characteristics. Table 6 (page 34) briefly compares expected environmental consequences between the Forest Plan alternatives (FP-1 and FP-2). Table 7 (page 35) summarizes how each vegetation manipulation alternative meets the various components of the purpose and need (identified in Chapter 1, Section C) for this project. The purpose of these tables is to present the environmental effects of the alternatives in such a way that they can be easily and efficiently compared. Readers are cautioned that this section displays only a *summary* of the environmental consequences. Detailed descriptions of existing conditions are disclosed in Chapter 3. Detailed descriptions of expected environmental consequences are disclosed in Chapter 4.

K. PREFERRED ALTERNATIVE

Based on environmental analysis included in this DEIS, the responsible official has identified Alternative FP-2 and Alternative S as the preferred alternatives for implementation.

Table 3
Summary of Environmental Consequences
Issue 1 - Vegetation

Measurement Indices	Alternative R	Alternative S	Alternative T	Alternative U
Gross acres of harvest by vegetation cover type				
Multistoried Douglas-fir	0	3613	2273	2087
Mature to Old Growth Lodgepole Pine	0	0	0	1095
Young Lodgepole Pine and Douglas-fir	0	671	322	479
Existing Harvest Units	0	1423	732	1039
Gross acres of burning by vegetation cover type				
Open Douglas-fir	0	7814	2434	1790
Aspen	0	2546	2546	1261
Sagebrush/Grass	0	2100	2423	706
Acres (net) of aspen restored/treated (stands readily identified)	0	124	124	62
Acres (net) of aspen restored/treated (stands with little evidence of aspen)	0	1001	1001	438
Aspen age class structure				
young aspen acres	trace	1125	1125	500
mature aspen acres	540	416	416	478
decadent aspen acres	1960	959	959	1522
% change in aspen age structure				
young aspen acres	0	+1125%	+1125%	+500
mature aspen acres	0	-23%	-23%	-11
decadent aspen acres	0	-51%	-51%	-22

Table 4
Summary of Environmental Consequences
Issue 2 - Wildlife Habitat

Measurement Indices	Alternative R	Alternative S	Alternative T	Alternative U
Acres of elk winter range and calving area affected by treatment	0 WR 0 Calving	5,520 WR 1,250 Calving	3,450 WR 750 Calving	2,070 WR* 200 Calving*
Acres of security cover for elk affected	Small acreage increase	3,647	1,924	1,428*
miles of temporary road	0	24.3	0	27.5

* 70-80% basal area removed & 70% burn mosaic (more intense treatment)

Table 5
Summary of Environmental Consequences
Issue 3 - Roadless Character

Measurement Indices	Alternative R	Alternative S	Alternative T	Alternative U
Natural integrity	Some long-term reduction	Long-term Improve-ment	Long-term improve-ment	Long-term improve-ment
Apparent naturalness	No Effect	Minor short-term reduction	Minor short-term reduction	Minor short-term reduction
Remoteness	No Effect	Minor short-term reduction	Minor short-term reduction	Minor short-term reduction
Solitude	No Effect	Minor short-term reduction	Minor short-term reduction	Minor short-term reduction
Special features	No Effect	No Effect	No Effect	No effect
Manageability/boundaries	No Effect	No Effect	No Effect	No Effect

Table 6
Summary of Environmental Consequences
Forest Plan Alternatives

Comparison Item	Alternative FP-1	Alternative FP-2
Forest Plan Consistency	Uses Current Forest Plan Standards	Replaces Wildlife Standards 7, 8 & 9 - Amends the Forest Plan
Establishes Security Blocks	No	Establishes 29 security blocks (all exceeding 200 ac.)
Management Emphasis	Emphasizes summer needs of elk	Emphasizes maintenance of secure, unfragmented areas
Timber Production	1,134 ac in suitable timber base 15,232 ac (non timber base) available for salvage & shelterwood harvest	16,336 ac in suitable timber base 21,294 acres in non timber base
Location of Management Activities	Emphasizes entering previously unharvested areas	Emphasizes placing mgmt. activities in previously disturbed areas (roaded &/or harvested)
Applies to Management Activities Other Than Timber	No	Yes

Table 7
Ability to Meet Purpose & Need
Vegetation Manipulation Alternatives

Purpose & Need Component	Alternative R	Alternative S	Alternative T	Alternative U
Aspen	Lose majority of aspen stands in the next 30 years	Begin restoring aspen stands on 1,125 acres	Begin restoring aspen stands on 1,125 acres	Begin restoring aspen stands on 500 acres
Douglas-fir	Continue presence of multistory, multi-age Douglas-fir stands	Convert 3,613 acres of Douglas-fir to open, parklike stands	Convert 2,273 acres of Douglas-fir to open, parklike stands	Convert 2,087 acres of Douglas-fir to open, parklike stands
Sagebrush/grass	Decrease occurrence of grasslands & early seral vegetation. Increase dominance of Douglas-fir.	Reestablish sage/grasslands on 9,914 acres by treating 7,814 acres Douglas-fir colonization & 2,100 acres sagebrush	Reestablish sage/grasslands on 4,857 acres by treating 2,434 acres Douglas-fir colonization & 2,423 acres sagebrush	Reestablish sage/grasslands on 2,496 acres by treating 1,790 acres Douglas-fir colonization & 706 acres sagebrush
Diversity of Wildlife Habitat (across landscape)	Decrease occurrence of aspen & sagebrush/grass communities. Increase occurrence of multistory Douglas-fir stands.	Increase occurrence of aspen & sagebrush/grass communities. Decrease occurrence of multistory Douglas-fir stands.	Increase occurrence of aspen & sagebrush/grass communities. Decrease occurrence of multistory Douglas-fir stands.	Increase occurrence of aspen & sagebrush/grass communities. Decrease occurrence of multistory Douglas-fir stands.
Risk of Intense Wildfire	High hazard due to forested stands with multiple canopy layers & heavy fuels	Reduce fuel on 18,167 acres	Reduce fuel on 9,998 acres	Reduce fuel on 8,870 acres
Wood Products	Provide ~ 4,000 ccf (personal use firewood, post & pole)	Provide ~ 54,000 ccf	Provide ~ 34,784 ccf	Provide ~ 60,854 ccf

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CHAPTER 3
AFFECTED ENVIRONMENT

A. INTRODUCTION

This chapter describes the existing condition of the environment that may be affected by the alternatives. The Forest Plan management direction is briefly described. The environment of the area affected by the proposed action is described in terms of specific resources. These resources are vegetation, wildlife habitat, roadless character, hydrology and fisheries. Management direction contained in the Beaverhead Forest Plan is also described in this chapter. For information, other resources that are prominent in the southern Tobacco Root Mountains but would not be significantly affected by implementation of any of the action alternatives are described in Appendix B.

B. DESCRIPTION OF AFFECTED ENVIRONMENT - VEGETATION

The analysis area for vegetation is the southern Tobacco Root Mountains.

Vegetation is described in a general way with this narrative and Table 8 - Existing Vegetation By Zone. This general information is summarized from the Tobacco Root Landscape Analysis, which is part of the project file that is available at the Madison Ranger District. More detailed descriptions of upland forest vegetation, upland nonforest vegetation, riparian vegetation, plant species of special concern and noxious weeds are provided after this general description.

Overview of Tobacco Root Analysis Area Existing Vegetation

Vegetative cover on lower elevation slopes (called Lowland and Foothills Zone in Table 8) is grassland, sagebrush and juniper with scattered patches of Douglas-fir. Mid-elevation Zone is forested, dominated by lodgepole pine, Douglas-fir and Engelmann spruce. Higher elevations are dominated by whitebark pine, subalpine fir, alpine grasslands, rocks and scree.

Vegetation includes nonnative species, some of which are considered noxious weeds (e.g., knapweed, musk thistle) and some of which are not (timothy, Kentucky bluegrass).

Old growth is described in Appendix C of the Tobacco Root Landscape Analysis. Approximately 27% of the 114,000 acres contained in the analysis area exhibit old growth timber characteristics.

Prior to the arrival of Europeans, Native Americans set fires for a variety of reasons. Lightning fires burned unchecked. By 1865, the disturbance of fire had been largely eliminated through grazing and fire suppression. With the arrival of Europeans in the mid 1860's, mining, logging and associated roading, and domestic livestock grazing became the dominant disturbance processes in the Tobacco Root analysis area, and remain so today. Fire suppression has affected vegetation by allowing vegetation to pass into a later seral stage over a large area, compared to vegetation patterns prior to suppression of fires.

From the late 1960's through early 1980's, the Forest Service burned and sprayed sagebrush

in the analysis area. Manual and chemical control of noxious weeds has been ongoing over the last two decades.

Desired condition for upland vegetation includes the following attributes. The ecosystem retains all its evolutionary processes (those that formed the present ecosystem) operating on as many acres as possible, within human restraints and needs for output. The risk of unacceptable or unplanned ecosystem changes is minimized while producing sustainable output for humans. Within those constraints, vegetation resembles patterns occurring prior to arrival of European settlers. Table 8 summarizes existing vegetation.

Forested Upland Vegetation

Landtype attributes, management objectives, desired conditions and processes are contained in Appendix G.

1. Dry Douglas-fir Communities

The Douglas-fir savannah cover type occupies a trace of the analysis area. Multistoried Douglas-fir stands occupy 16,739 acres.

Prior to 1860, Douglas-fir communities were maintained by frequent low intensity fire underburning with very infrequent stand replacement (Arno and Gruell 1983). This resulted in sustained open forest dominated by Douglas-fir. Since 1860, the frequency and area of wildfires occurring in this ecosystem have been reduced by domestic grazing, land use practices and fire suppression procedures. The dry Douglas-fir communities historically experienced frequent (5 to 40 year interval) low intensity fires. Fire exclusion has allowed a substantial level of sagebrush and multiple

Table 8
Existing Vegetation By Zone

Vegetation Types (acres of each)*	Lowlands & Foothills Zone	Mid-elevation Zone	Timberline & Alpine Zone	Riparian Zone
Shrub Steppe Plant Communities				
Grass/sage steppe vegetation	8076	2290	886	429
Douglas-fir colonizing steppe	4863	2675	405	233
Forested Plant Communities				
Young lodgepole/Douglas-fir	455	5140	3183	238
Douglas-fir savannah	trace	trace	trace	trace
Multistoried Douglas-fir	5533	10,301	374	531
Mature to old growth lodgepole	1290	16,041	3978	816
Spruce and subalpine fir	22	1136	3129	1076
Whitebark pine	178	2769	19,749	356
Other Communities				
Distinct aspen cover types	136	321	44	39
Alpine grass and tundra	54	85	5337	21
Riparian vegetation	200	412	1372	337
Rock/scree/talus	58	361	9299	22
Private Lands (veg. not typed)	1147	1452	1751	399
Total Acres in Zone	22,012	42,983	49,507	4,497

* acres of each cover type summarized from TSMRS data base

canopied stagnated Douglas-fir to develop, creating denser and more continuous fuels. This increases the potential for high intensity, stand replacing fires and loss of the large diameter overstory trees. Some researchers have speculated that absence of frequent, low intensity fire allows nutrients to become tied up in standing biomass and not available to new growth (Harvey and others 1989, Hungerford and others 1991).

2. Mixed Douglas-fir/Lodgepole Communities

This mixed cover of Douglas-fir/lodgepole pine type occupies 9,016 acres of the analysis area.

Prior to 1860, Douglas-fir/lodgepole pine communities were maintained by periodic differing intensity fires. Many fires were low intensity, with occasional torching into tree crowns. Differing mixes of species were a result of different fire intensities, seed source and environmental conditions. Generally, stand replacement fires occurred about every 100-300 years. These fires resulted in greater lodgepole pine composition over the shade tolerant Douglas-fir. Since 1860, the frequency and area of wildfires occurring in this ecosystem have been reduced by timber harvest, land use practices and fire suppression procedures. These communities historically experienced less frequent fires of varying intensities than the drier sites. Fire exclusion has allowed a substantial level of fuel buildups, subalpine fir understories and denser, more continuous fuels. This increases the potential for high intensity, stand replacing fires and loss of the large diameter overstory trees.

3. Sagebrush/Grass Communities

The sagebrush/grass cover type occupies 11,681 acres of the analysis area. Douglas-fir colonizing into sagebrush/grass types occupies another 8176 acres.

Prior to 1860, sagebrush/grass communities were maintained by frequent low intensity fires. Since 1860, the frequency and area of wildfires occurring in this ecosystem have been reduced by domestic grazing, land use practices and fire suppression procedures. The sagebrush/grass communities historically experienced frequent (5 to 30 year interval) low intensity fires. This community appeared as grass dominated with a scattered cover of sagebrush. Heavier densities of sagebrush were scattered across the landscape generally associated with rocky outcrops and other topographic features that protected these areas from the frequent wildfires. Those sites where fire intervals approached 30 years would appear as sagebrush dominated with scattered openings of grass. These sites may also support a low density of Douglas-fir around the edge. Fire exclusion has allowed sagebrush density to increase throughout the area along with establishment of Douglas-fir into the community. The prolonged absence of fire in the area has allowed many of these sites to proceed successionally toward a dry Douglas-fir community. A loss in acreage of typical sagebrush/grass types has occurred. Herbicide spraying in the 1970's and 1980's reduced sagebrush cover temporarily, but it has reestablished.

4. Aspen Communities

Aspen cover type is hard to quantify because much of it occurs in small patches. These small patches are difficult to find on aerial photographs and difficult to map at scales as large as this project. Table 8 shows 540 acres of aspen cover type, but that includes only those patches large enough to map. The majority of aspen occurs within other cover types and is not reflected in Table 8.

Prior to 1860, aspen communities were maintained by periodic, varying intensity fires. Since 1860, the frequency and area of wildfires occurring in this ecosystem have been reduced by domestic grazing, land use practices and fire suppression procedures. The aspen communities historically were influenced by the adjacent community's fire frequency. Generally, this community is found on open slopes and along the edge between forest and sagebrush/grass cover types. They experienced frequent (5 to 30 year interval) varying intensity fires. This community is maintained as a fire disclimax. In the absence of disturbance, the aspen is generally replaced by conifer forest. A significant loss in aspen acreage has occurred across the Tobacco Root landscape.

Riparian Vegetation

Riparian areas make up only 2% (2,300 acres) of the land area in the Tobacco Root analysis area, but this level greatly underestimates the importance of these lands. The riparian areas found within the analysis area are quite varied and include small ponds and lakes, streams, fens, marshes, springs and seeps. The vegetation found along and within these areas is also quite varied. Most plant species found in riparian areas are there due to higher moisture requirements. The health of riparian vegetation is intricately tied to the condition and status of the hydrologic functioning of the creeks, springs and marshes.

Streams are the dominant type of riparian area in the Tobacco Root analysis area. The majority of streams are dominated by a forested community, due to the relatively high gradient of the streams and narrow valley bottoms limiting the extent of the riparian influence. Spruce is the dominant species in these communities. Subalpine fir, whitebark pine, Douglas-fir and lodgepole pine are also found on these sites but in lesser amounts. Within the Tobacco Root analysis area, a limited number of stream reaches are dominated by cottonwood and aspen, and are found at lower elevations. A very small portion of stream reaches in the area have shrubs or graminoids as the dominant vegetation. These sites are where the stream gradient flattens and valley bottoms widen allowing the formation of a larger flood plain. These tend to be only small sections of stream and are scattered across the mountain range.

Willows are the principle shrub species of the riparian areas. Alder and birch are found less frequently. The most common willow species include Geyer, Booth, Drummond, Bebb and Wolf. Ground cover is quite varied, but usually is dominated by graminoids such as water sedge, beaked sedge, bluejoint reedgrass, Kentucky bluegrass and mountain brome. The last two species have become dominant on a variety of sites due to past disturbances such as mining and livestock grazing. A whole host of forb species are found in the various riparian communities.

For the majority of the streams in the Tobacco Root analysis area, the riparian plant communities would be classed in a mid to late seral stage and are moving toward the potential natural community. Fire suppression is the one management action that has caused the largest change in community diversity across the landscape. Fire suppression has allowed most stream side plant communities to progress to a tree dominated expression. This has caused a reduction in shrub dominated early seral communities. Willows are generally a shade intolerant species. As they are overtopped by conifers they lose vigor and will slowly be lost from the community. This is a natural progression for these sites in the absence of disturbance. The diversity these willow and graminoid dominated communities provide is increased in a forest dominated landscape such as the Tobacco Root analysis area.

Mining and livestock grazing have impacted many streams in the analysis area. The

majority of these activities are located on the lower reaches of the streams. Placer mining completely modified stream channels and eliminated the native plant communities. Most of the placer mining has ended and the stream channels have stabilized in the condition they were in when the mining stopped. Vegetation on these sites is beginning to recolonize, but only a limited amount of vegetation is currently established. With the loss of soil during mining, the potential for the site has been changed and recovery will take many decades. Graminoids and forbs are the dominant species established, with many being nonnative. Mining sites are one of the primary sites for noxious weed species infestations to establish and spread in the Tobacco Root analysis area.

Livestock grazing has had an impact on the riparian vegetation throughout the analysis area. The majority of stream reaches in the area are not accessible to livestock due to the steep topography. The greatest impact from livestock grazing has occurred on those sites where the valley bottom widens and slope gradients do not restrict movement. Community plant composition on these sites has changed due to the impacts of foraging and browsing by cattle. Soils on these sites tend to be compacted and the variety of plant species is reduced. The dominance of nonnative plants such as Kentucky bluegrass and timothy on these sites reduces the bank holding properties of deep rooted willows and sedges. Forested communities have had much less change than the shrub and graminoid dominated sites.

There are 38 named lakes in the analysis area covering over 350 acres. Countless other small ponds, ephemeral potholes, fens and marshes are found scattered across the Tobacco Root analysis area. Most of these riparian sites are found in the higher elevations. For the lakes and ponds, the adjacent vegetation is generally dominated by conifer forest. The lake shore or pond edge is covered with a variety of species with graminoids being the most common. Many of the ponds are densely covered with pond lilies. Generally, the ephemeral potholes are dry by the end of summer and have a limited amount of vegetation.

The marshes in the Tobacco Root analysis area are generally dominated by sedges. Willows and alder may be found growing along the margins. Spruce and lodgepole pine are the dominant tree species in the adjacent forest community.

Unique features found in the analysis area are the scattered fens. Fens are a type of peatland that receives water from the uplands and has relatively high pH and nutrient levels. These communities have a well developed floating mat of sphagnum mosses. In addition to the mosses, fens can and do host a number of unique plant and animal species. The water input from the uplands is a critical component to the fens and any management actions that affect the water regime may impact them. One fen, labeled Leonard Creek Fen, has recently been surveyed and recommended for preserving in its current condition. (Chadde and Shelly 1994, Vanderhorst and Heidel 1995).

The vegetation around the lakes, ponds, potholes and fens in general has not been adversely impacted by management activities. Livestock grazing has the greatest impact on these riparian areas at this time. Logging, mining, irresponsible OHV use and heavy recreational activities have potential to impact these sites. Currently, livestock impacts are restricted mainly to the edges of these sites. Smaller seeps tend to be impacted more by livestock. Many have become hummocked due to hoof action. Vegetatively, these sites are similar to what would be expected, but increased hoof action has compacted the soils at many sites, lowering productivity.

Plant Species of Special Concern

The Regional Forester of the Northern Region has identified plant and animal species for which viability is a concern, as sensitive. Sensitive species are those recognized on the Update of Northern Region Sensitive Species List (1999) dated March 12, 1999.

Many field surveys have been conducted in the Tobacco Root analysis area. Surveys have been completed in conjunction with timber harvest, range, recreation and wildlife projects in addition to surveys specifically designed to locate sensitive plant populations. Habitats surveyed run from meadow to forested communities and from foothills to alpine summits. In the summer of 1994, an extensive survey of the Analysis Area was completed. The purpose of this survey was to locate and evaluate populations of plant species designated as sensitive by the Forest Service and other species of special concern currently tracked by the Montana Natural Heritage Program (Vanderhorst and Heidel 1995).

Review of survey documentation, existing element occurrence reports, and general habitats available within the analysis area affected by the Tobacco Root Vegetation Management EIS, primarily sagebrush/grass, open Douglas-fir/sagebrush/grass, aspen, Douglas-fir and lodgepole communities, indicated that two sensitive species do occur; giant helleborine, beaked spike-rush. Two additional species, Austin's knotweed and snow cinquefoil occur in the Tobacco Root range, but north of the analysis area. Both have potential to grow within the analysis area. Other species having potential to occur in the analysis area, but surveys to date were unsuccessful in locating populations these include; candystick and peculiar moonwort.

Candystick: This species is known to occur on the southern half of the Beaverhead-Deerlodge National Forest, but has not been found in the Tobacco Root Mountains. The closest known populations are found to the west in the Highland and West Pioneer Mountains. Candystick is found growing in coniferous woods, typically lodgepole pine dominated, at mid- to fairly high elevations, in deep humus.

Peculiar moonwort: This species is known to occur on the southern half of the Beaverhead-Deerlodge National Forest, but has not been found in the Tobacco Root Mountains. The closest known populations are found to the west on the north end of the Anaconda Range. Peculiar moonwort is found to grow in mesic grasslands on well developed soils from the montane to subalpine zones.

Beaked spike-rush: This species is suspected to occur on the southern half of the Beaverhead-Deerlodge National Forest. One population is known in the Tobacco Roots, on private land within the National Forest boundary. Beaked spike-rush typically grows on the margins of hot springs and fens, travertine terraces and shores of sloughs.

Giant helleborine: This species is suspected to occur on the southern half of the Beaverhead-Deerlodge National Forest. One population is known in the Tobacco Roots, this on private land within the National Forest boundary. Giant helleborine can be found in appropriate habitat across western Montana. Typical plant communities are streambanks, lake margins, and around springs and seepage areas, often near thermal waters.

Austin's knotweed: This species is known to occur on the southern half of the Beaverhead-Deerlodge National Forest. One population is known in Tobacco Roots

but outside of the analysis area. Other populations are found to the southeast in the Madison Range and in the Big Belt Mountains to the north. Austin's knotweed grows on open, gravelly, often shale-derived soil of eroding slopes and banks in the montane zone.

Snow cinquefoil: This species is known to occur on the southern half of the Beaverhead-Deerlodge National Forest. One population is known in Tobacco Roots but north of the analysis area. Typically this species is found growing on dry, gravelly soil on high elevation ridges and slopes. The one population found in the Tobacco Roots occurs at much lower elevations on dry mountain mahogany dominated limestone ridgetop.

Existing Condition of Noxious Weeds

The analysis area for noxious weeds is the southern Tobacco Root Mountains.

As discussed within the Tobacco Root Landscape Analysis document, spread of noxious weeds is the greatest threat to the overall vegetative diversity and soil productivity in this mountain range. A variety of noxious weeds are found within the analysis area. Noxious weed control has been completed yearly since the early 1980's. Spotted knapweed and thistles have the highest coverage in the analysis area. Noxious weed control is carried out under the 1987 Beaverhead Noxious Weed Control Program EIS.

Current inventory show 177 acres of spotted knapweed, 77 acres of Canada thistle, 58 acres of musk thistle, and 5 acres of bull thistle. Various other species are found in the analysis area but cover less than 1 acre each, these include hounds tongue, common tansy, yellow toadflax, burdock and black henbane. Weed species that have not established on the National Forest, but are found on adjacent private and public lands, include leafy spurge, diffuse knapweed, sulfur cinquefoil and field scabious. The close proximity of these species increases the threat of transport to and establishment on the National Forest.

Most weed sites cover less than one acre. Plant density is generally light with individual plants scattered across a slope. Canopy coverage is less than 1% on most sites. Sites generally are along roadways, trails or ground that has been disturbed by mining. Disturbed ground provides the best seed bed for weeds to establish by eliminating competition from other native vegetation. Most weed species have evolved to take advantage of this type of situation by being able to germinate and grow in harsh environmental conditions.

The worst weed infestations are by spotted knapweed. The largest individual site covers approximately 40 acres. Plant density on these sites is still very light. Knapweed initially established on these sites along roadways or on mining sites, but has expanded into adjacent undisturbed plant communities. These are priority sites for treatment in the Tobacco Root analysis area with control efforts dating back fifteen years on some areas.

Current management efforts focus treatment on knapweed sites and on those species that have a very limited coverage and high potential for eradication, using an integrated weed management approach. Treatments include use of herbicides, manual grubbing and biological control. Surveys and mapping of weed infestations occur yearly. Prevention is the best tool for fighting noxious weeds. Public and agency education is ongoing. Federal lands in the analysis area require certified noxious weed seed free forage. All hay, straw and whole grains must be certified as being free of weed seed. Activities on the National Forest that require heavy equipment require washing of equipment prior to moving onto the forest.

The primary vector for introduction of most noxious weeds in the Tobacco Root analysis area is transport to the area by vehicles, be it car, truck, motorcycle or OHV. Mapping of noxious weed infestations show the bulk of weed sites located in the lower third of drainages. This corresponds to the high degree of management activities that have and do occur in these areas. All known infestations are being treated.

A discussion of the establishment and spread of noxious weeds is found in the Beaverhead National Forest Noxious Weed Control Program Final EIS, April 1987, pages 3-5. This FEIS also discusses the noxious weeds and the forest weed control program.

C. DESCRIPTION OF AFFECTED ENVIRONMENT - WILDLIFE

Analysis Area for Wildlife

The analysis area for wildlife species is defined by the 114,000 acres of Beaverhead-Deerlodge National Forest administered lands on the south and east slopes of the Tobacco Root Mountain Range.

General Description of Wildlife Existing Conditions

The major wildlife species in the analysis area are listed in Chapter VII of the Tobacco Root Landscape Analysis.

The presence of Europeans has affected wildlife species and their habitat. Bighorn sheep have disappeared. Grizzly bears and wolves have declined to an occasional sighting. Mountain goats, which were not historically present, have been introduced (MFGD 1971). Europeans initiated mining, timber harvest, grazing, road building and fire suppression. This led to a distribution of plant communities across the landscape that are generally older than would have existed before European influence.

Wildlife species considered in this analysis were identified during the scoping process and/or designated as wildlife "indicator species" by the Beaverhead Forest Plan. Indicator species include: grizzly bear, peregrine falcon, bald eagle and gray wolf for threatened & endangered species, elk for big game species, sage grouse for sagebrush communities, pine marten for old growth spruce-fir, goshawk for old growth Douglas-fir and trumpeter swan for marshland communities. The Biological Assessment to determine effects on threatened, endangered and sensitive species is provided in the project file.

Threatened, Endangered and Sensitive Wildlife Species

In a letter to the Forest Supervisor for the Beaverhead-Deerlodge National Forest dated December 14, 1998, the U.S. Fish and Wildlife Service (USFWS) identified species that should be considered on the Madison Ranger District. These species are endangered peregrine falcon, threatened grizzly bear and bald eagle, nonessential experimental gray wolf, proposed Canada lynx and candidate mountain plover. The USFWS indicated that the expected occurrence of the peregrine falcon is a spring and fall migrant, summer/fall resident and nester; grizzly is a resident and transient; bald eagle is a yearlong resident, spring and fall migrant and a nester; gray wolf is transient; Canada lynx is a resident and mountain plover is possible in shortgrass prairie habitat. Currently, in the Tobacco Root Mountains, there are no peregrine falcon or bald eagle nests, no mountain plovers and only occasional sightings of grizzly bears, gray wolves and lynx.

Sensitive species are those recognized on the Update of Northern Region Sensitive Species

List dated March 12, 1999. Wolverine, fisher, pygmy rabbit, northern bog lemming, Townsend's big-eared bat, flammulated owl, northern goshawk, black-backed woodpecker, trumpeter swan, Harlequin duck, common loon and sage grouse are known to occur on the Beaverhead-Deerlodge National Forest. Burrowing owl and Columbian sharp-tailed grouse are suspected to occur on the Beaverhead-Deerlodge National Forest. Based on surveys and observations (1987-1999) only the wolverine, northern goshawk and black-backed woodpecker are known to occur in the Tobacco Root Mountains.

Other Wildlife Species

The Tobacco Root Mountains provide habitat for mule deer, whitetail deer, antelope, elk, moose, mountain goat, black bear and mountain lion for spring through fall seasons. In addition, they provide calving areas for both elk and moose, fawning areas for deer and antelope and kidding areas for mountain goats (see Tobacco Root Landscape Analysis, Chapter VII for a more complete discussion). In general, wildlife forage and security needs are being met.

Past Management

Past activities contributing most to existing habitat conditions in the Tobacco Root Mountains are domestic livestock grazing, timber harvest, mining and most importantly, fire suppression. Big game hunting and road management are additional activities influencing wildlife habitats and populations. As shown on the current Interagency Visitor Map (east half, 1996) the Tobacco Root analysis area is being managed with area restrictions. Many specific roads and trails are also restricted to motorized use seasonally or yearlong.

Years of fire suppression have led to conditions which favor mature (more climax) conditions in habitats than would have existed without the suppression efforts. These shifts have led to an increase in old growth lodgepole pine, old growth Douglas-fir, subalpine fir and sagebrush while showing decreases in aspen, young lodgepole pine, shrubs and grass.

Natural lodgepole pine mosaics in the analysis area are fragmented moderately due to timber harvest. Other forest types have been marginally impacted by harvesting. Past timber harvest has affected existing wildlife habitat by reducing cover and increasing road densities. Eleven timber sales have been harvested in the analysis area since 1984. Within the analysis area, several timber sales (approximately 2600 acres) and road construction projects have occurred in the past few decades.

Sale Name	Harvest Year
Bivens	1987
Chero Mountain	1984-86
Currant	1987
Gibbs	1988
Granite Creek	1985-86
Kings Mill	1998
Mill Gulch	1984
Ramshorn	1985
Sureshot	1986-87
Virginia Creek	1989-91
Washington Creek	1984-86

Mining activity (47 approved Plan of Operations) and livestock grazing (9 allotments) have occurred in the analysis area for the past century.

The Forest Service built campgrounds at Branham Lakes, Balanced Rock, Mill Creek, Sureshot Lakes and Potosi. Roads and trails have also been constructed in the analysis area (see Interagency Visitor Map Southwest Montana).

Wildlife habitat judged by criteria in Alternative FP-1

This method of determining habitats uses existing criteria in the Beaverhead National Forest Plan, including wildlife standards 7,8, and 9.

Habitat Analysis Units (HAU) were established for the Tobacco Root area (ranging in size from 12-21 square miles) to determine Elk Effective Cover (EEC). The following values were determined for the Tobacco Root area.

This information would indicate that T2 and T7-T9 are areas of low cover and that T2 - T6 and T10 all have high road densities to lead to the low values for Elk Effective Cover.

There are 21,551 acres (21.5% of analysis area) of Management Areas with timber emphasis within the analysis area. The combination of Management Areas and HAU's would allow for 1,134 acres of clearcut type timber harvest. This harvest would be distributed within the HAU's as follows: T3 - 541 acres, T5 - 70 acres, T11 - 241 acres and T12 - 282 acres. Harvest would be mostly lodgepole pine between 7,500-8,000 feet elevation within the regulated timber base. Due to harvest unit positioning standards (600 feet between units), harvest would occur in unmanaged areas requiring new road construction to access the timber. The majority of harvest would occur in Ramshorn Creek, Mill Gulch, Washington Creek and Chero Mountain drainages.

Table 9
Habitat Analysis Units

HAU	Size (ac)	Cover (ac)	% Cover	Elk Use Potential	Road Density	Habitat Effective-ness	Elk Effective Cover
T1	9,437	3,259	35	93	0.68	71	66
T2	10,000	2,586	26	60	1.07	58	35
T3	13,004	5,223	40	100	0.86	65	65
T4	7,786	2,633	34	91	1.02	59	54
T5	10,107	3,709	37	97	1.09	57	55
T6	9,287	3,177	34	91	1.29	53	48
T7	11,705	3,334	29	75	0.45	79	59
T8	9,675	2,697	28	70	0.40	80	56
T9	8,397	2,060	25	53	0.34	83	44
T10	9,758	2,918	30	80	0.86	65	52
T11	7,784	2,888	37	97	0.49	77	75
T12	8,264	3,091	37	97	0.47	78	76
Total	115,204*	37,575	33	88	0.76	68	60

* HAU acreage figures were established in the Forest Plan and are based on data collected in 1975. Updated data indicates the analysis area (southern Tobacco Root Mountains) is 114,000 acres.

Wildlife habitat judged by criteria in Alternative FP-2

This method of determining habitat conditions uses the new guidelines proposed in Alternative FP-2. The existing Forest Plan wildlife standards 7, 8 and 9 are not used in this set of criteria.

Twenty-nine security blocks, comprising 37,473 acres (33% of analysis area), are delineated for the analysis area as described in Chapter 2, Alternative FP-2 description. Security blocks range in size from approximately 200 acres to 10,700 acres and average 1,200 in size. Areas located above 8,100 feet elevation are designated to be high elevation security areas and cover 21,439 acres (19% of analysis area) and make up 57% of the security blocks. Areas located below 8,100 feet elevation are designated to be low elevation security areas and cover 16,034 acres (14% of analysis area) and make up the other 43% of the security blocks. The combination of both high and low elevation security blocks provide for summer security, while the low elevation security blocks provide the majority of fall through spring (winter) security.

Existing Condition of Forest Plan Management Indicator Species

The following narrative provides additional information for those management indicator species used to determine effects concerning the issues of the project; elk as they relate to use of security cover and sagebrush/grassland habitats and sage grouse as they relate to use of sagebrush/grassland habitats.

Elk: The Tobacco Root Mountains contain 37,473 acres (33%) of security cover. Security cover is defined as being blocks of timber cover located at least 1/4 mile from a road or motorized trail during hunting season and being at least 200 acres in size. There are 31 security blocks occurring across the Tobacco Root landscape, ranging in size from approximately 200 acres to approximately 10,700 acres, averaging about 1,200 acres in size. This security cover can be broken into two distinct areas: high elevation cover and low elevation cover. High elevation cover (areas over 8,100 feet elevation) make up 57% (21,439 acres) of the security cover blocks and low elevation cover (areas from 6,000 to 8,100 feet elevation) make up the other 43% (16,034 acres) of the security cover blocks. Low elevation security cover would be more important than high elevation security, as it would provide security for a longer portion of the hunting season as weather influence (snow) becomes more severe. Security is also being provided by private landowners, adjacent to the analysis area, who are not allowing hunting. Large numbers of elk take refuge on these areas during the hunting season.

The Madison Ranger District provides approximately 23,000 acres of winter range for elk in the Tobacco Root analysis area. This is approximately 27% of the more than 84,000 acres of available winter range including State of Montana, Bureau of Land Management (BLM) and private ownership lands. South and southwest aspects (critical winter range) occur on 19% (4,500 acres) of the Madison Ranger District portion of the winter range. There are approximately 5,000 acres of known elk calving areas within the Tobacco Root Mountains on the Madison Ranger District in the following locations: Nugget Creek-Lemon Gulch, Horse-Currant Creeks, Mill Gulch-Granite Creek and Sawlog Creek-Table Mountain. There are approximately 8,500 acres of known calving areas located on adjacent BLM, state and private lands. However, calving may occur throughout the area between mid-May and mid-June.

Elk population has averaged approximately 970 head since 1990 with a range 756 in 1991 to 1119 in 1999. The trend has been for a

slightly increasing population. Total bull elk percentage of herd composition has averaged approximately 9% with a range of 7.5% in 1991 to 11.7% in 1998. The majority of the total bull elk are dominated by yearling (spike) and 2-3 year old (raghorn) bulls. Very few (<1%) of the bulls are of a mature age (4+ years) (Bob Brannon, personal communication 1999). This would indicate that the elk population within the Tobacco Root Elk Management Unit (EMU) would be exceeding the objective of a late winter population of 800-900 elk. It would also be meeting the statewide objective of 5 bulls per 100 cows (5% bull elk herd composition) (Youmans 1992).

Elk hunting recreation: Percentage of bull elk harvesting during the first week of the hunting season has ranged from a 3 year average of 40% (1990-1992) to 46% (1993-1995). First week harvest of any one year has been as low as 31% in 1992 to as high as 50% in 1993. Total numbers of hunters have increased from 1,785 in 1990 to 2,692 in 1995 with total hunter days ranging from 9,077 in 1991 to 16,534 in 1995. This increase would be most likely the result of an increase in anterless permits from 250 in 1990 to 600 in 1995 (Bob Brannon, personal communication 1999). This information would indicate that the Tobacco Root EMU objective of no more than 35-40% of the bull harvest taken during the first week of the general hunting season may be exceeded (missing data from 1996 to present). It also indicates that the number of hunters is above the minimum objective of 1,600 hunters and above the minimum of 8,700 hunter days (Youmans 1992).

Sage grouse: Trend information from Montana Fish, Wildlife & Parks (MFWP) indicates populations are stable to decreasing within the area of the Madison Ranger District. This may be due to impacts to sagebrush habitats. Important sagebrush habitats include wintering areas, strutting grounds and nesting/brooding areas. There are no known wintering or strutting grounds located on the Madison Ranger District portion of the Tobacco Root Mountains. Potential nesting and brooding habitat does exist on the forest, however, no observations have been made of sage grouse using this habitat within the Tobacco Root Mountain Range. The Tobacco Root Mountains are located on the northern edge of mapped sage grouse distribution (MFGD 1971). Nesting and brooding habitat would include areas of medium height (7-31 inches) and medium density (20-40% cover) vegetation for nesting. Vegetation types include big, silver, fringed, black and low sagebrush, and mixed stands of big and low sagebrush. Nesting may occur in rabbitbrush, bitterbrush and in tall and short grass communities including giant wildrye, wheatgrass, fescue, needlegrass and bottlebrush squirreltail, junegrass, brome and bluegrass, respectively. Sage grouse nesting in sagebrush have higher nest success than those not using sage. Preference for denser shrub cover appears within a relatively small area around the nest itself (3 feet radius of nest). Nest success is associated with having adequate cover from medium height shrubs and tall grasses at the nest site and residual grass cover from last years vegetation. Brooding habitat is found in sagebrush stands of 10-31% cover with an abundance of forbs and insects. As plants dry and become desiccated, broods move to more mesic sites such as high mountain meadows, springs and low elevation stream bottoms (USDA-Forest Service 1995).

During the pre-laying period, forbs such as phlox, false dandelion, milkvetch and clover make up 20-50% of the diet with sagebrush making up the remainder. Forbs, in particular, appear to influence the reproductive efforts of hens. Sage grouse switch from a sagebrush dominated diet to forbs in May. Wet sites are critical habitats for sage grouse during the summer, including upland springs and wet meadows where forbs may persist longer into summer. Free water is a requirement of sage

grouse though they attain some water through their diet (USDA-Forest Service 1995).

Desired Condition for Wildlife

Provide for native species that are adapted to native plant communities and processes, and for nonnative species that provide some value to society.

D. DESCRIPTION OF AFFECTED ENVIRONMENT - ROADLESS CHARACTER

The analysis area for inventoried roadless lands is the southern Tobacco Root Mountains.

The analysis area includes two inventoried roadless areas. All 5,465 acres of Potosi roadless area (1-014) is contained within the analysis area (see Map 8, page 50). A portion (59,701 acres) of the Middle Mountain roadless area (1-013) is contained in the analysis area (see Map 9, page 51).

Volume 2 of the Beaverhead Forest Plan EIS contains descriptions of these roadless lands (pages C-176 through C-211).

The roadless areas within the analysis area have been heavily used by humans over the last 100 years. Historic uses have been mining, grazing, and logging, with the logging mostly to support mining activities and local construction needs. Evidence of these past activities in the form of roads, trails, mining disturbance and structures and partially logged timber stands is common. Some of the old roads and trails have become grown over and are beginning to be obliterated by natural processes. Many of the other old routes are readily apparent and often are still in use.

Some areas within the inventoried roadless area boundaries do not have roadless characteristics. Most of these discrepancies are due to roading and timber harvesting activities in the early 1980's. Areas within inventoried roadless that have no roadless characteristics include:

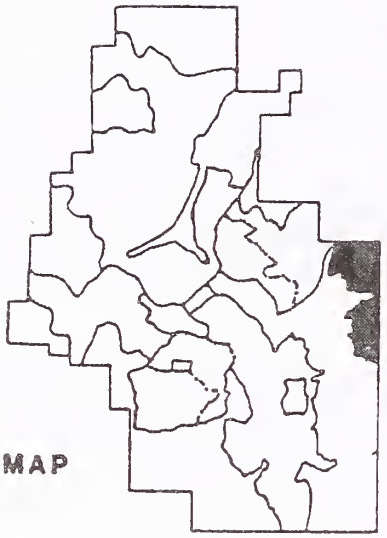
Table 10
Discrepancies in Roadless Area Boundaries

Roadless Area	Acres Not Meeting Inventoried Roadless Area Characteristics
1-014	285 acres
1-013	1,420 acres

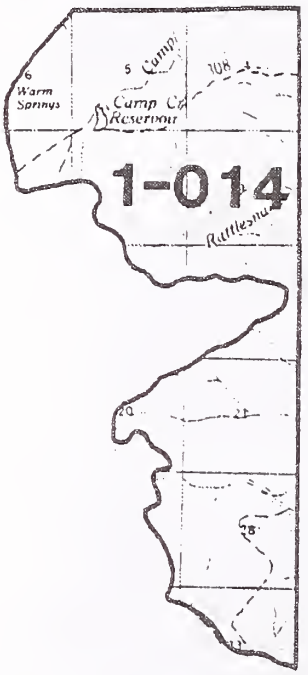
The areas where boundary adjustments are needed are delineated on Map 10 (page 52).

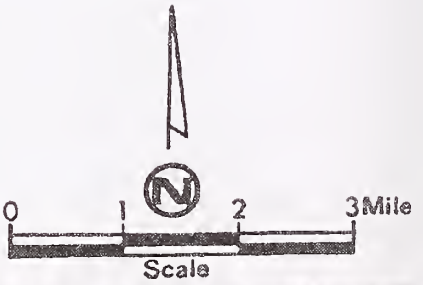
ROADLESS AREA 1-014

POTOSI



KEY MAP

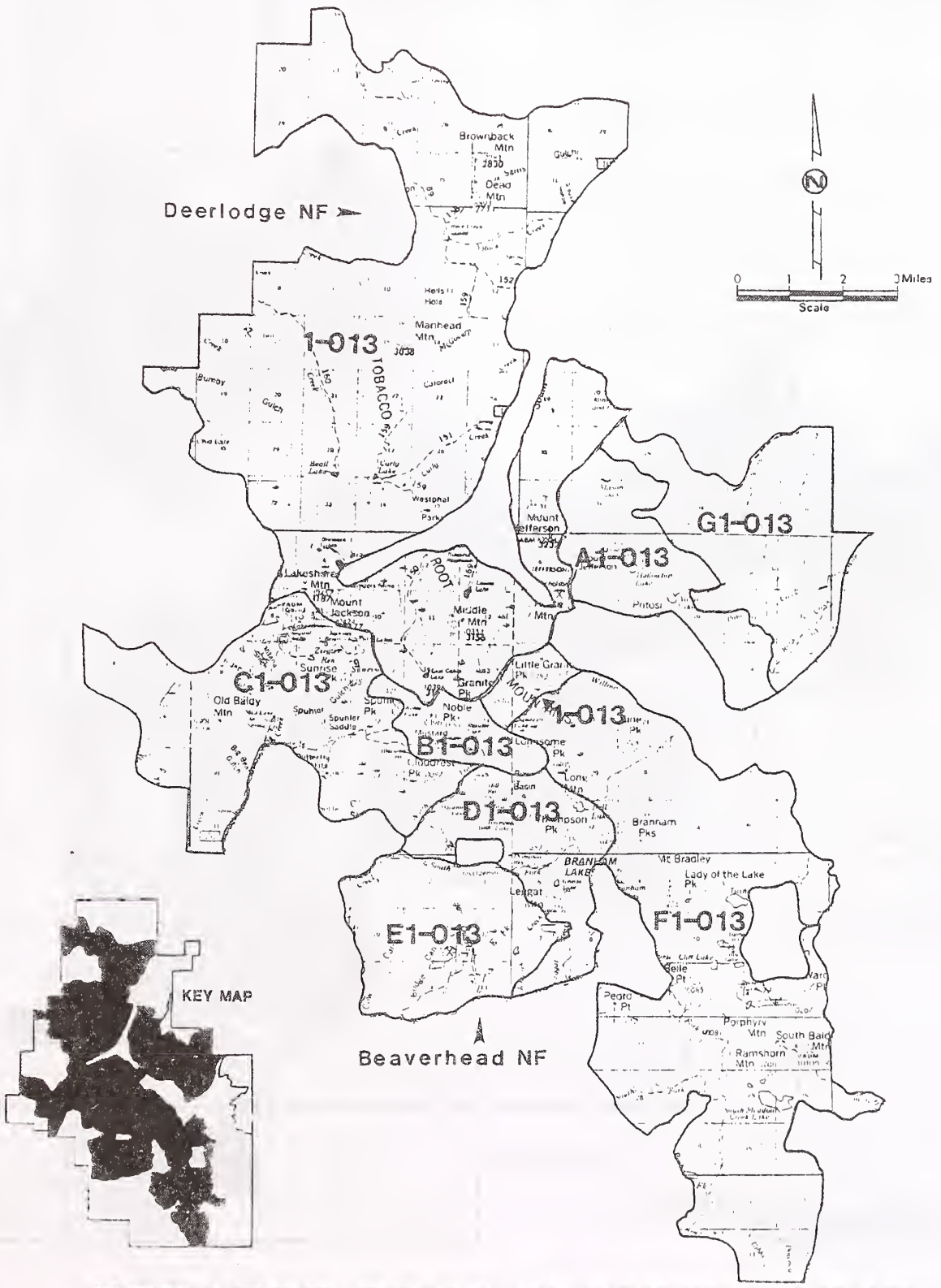




TOBACCO ROOT PLANNING UNIT

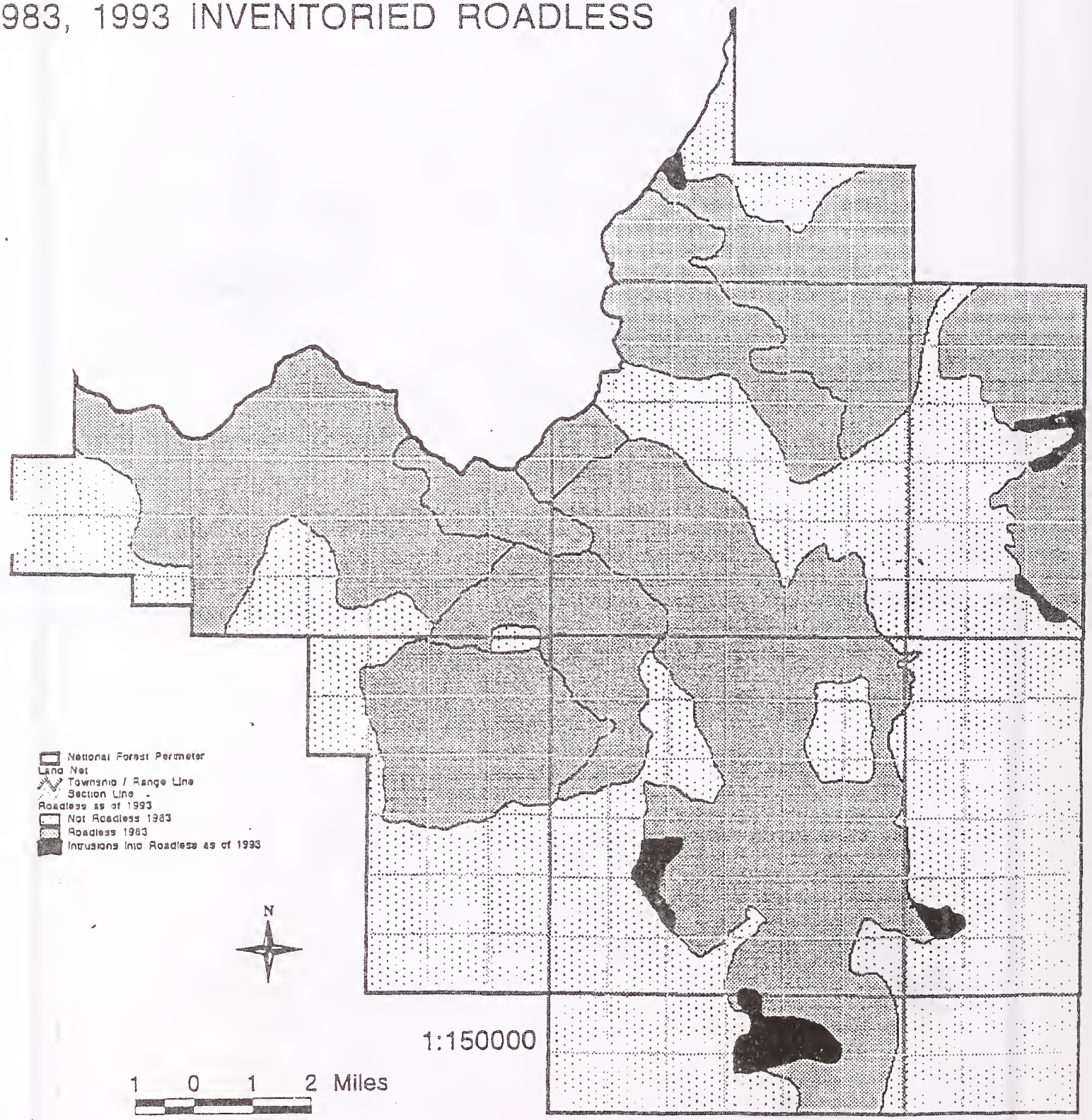
ROADLESS AREA 1-013

MIDDLE MOUNTAIN



TOBACCO ROOT PLANNING UNIT

TOBACCO ROOTS
1983, 1993 INVENTORIED ROADLESS



E. DESCRIPTION OF AFFECTED ENVIRONMENT - HYDROLOGY

Analysis Area for Hydrology

The Tobacco Root project is proposing management actions spatially and temporally distributed within the broad analysis area identified and described in the Tobacco Root Landscape Assessment (TRLA) process. The Tobacco Root analysis area consists of 14 distinct 3rd or 4th order basins suitable for describing effects, including cumulative effects. These streams are Goodrich Gulch, Wisconsin Creek, Indian Creek, Mill Creek, Ramshorn Creek, California Creek, Mill Gulch, South Meadow Creek, Washington Creek, North Meadow Creek, Bell Creek, Upper South Willow Creek, Lower South Willow Creek and North Willow Creek. A basin wide approach is necessary to describe the affects on the water resource. This is because stream channel parameters will integrate all of the effects of land use activities and natural watershed characteristics within a distinct basin. Proposed management actions will require analysis on a basin basis. The lowest point of the analysis area will be where the stream channels cross the National Forest boundary. Below this point, additional land use activities affecting the water resource are derived from private land management, making it impossible to separate out the impacts derived from National Forest System land. The total analysis area amounts to 124,678 acres or 194 square miles.

Drainage Basin Description

The Land Systems Inventory (LSI) database contains information which describes watershed characteristics. This includes landtype, slope, geology, aspect, elevation, vegetation and water yield. This data depicts the inherent watershed processes and functions, setting a foundation for understanding how land management activities will interact. Interpretation of the LSI database queries cannot provide site specific analysis, but rather integrates watershed attributes into the basin as a whole. For example, steep unstable ground proximal to the stream channel would affect sediment processes much more than if located at the ridgetop. The TRLA describes LSI watershed characteristics for the major basins within the Tobacco Root analysis area.

Past Management of Watersheds

Past management activities that have affected the water resource include livestock grazing, road building, timber harvest, mining and recreation. Further information can be found in the Tobacco Root Landscape Assessment, "STREAM TYPES" and "PAST PROJECT REVIEWS" sections.

Designated Beneficial Water Uses

Water uses that might potentially be impacted include any water rights and beneficial uses of water as specified by State of Montana water quality standards.

The designated beneficial uses of water are specified by the Surface Water Quality Standards, as stated under Title 16, Chapter 20, Sub-Chapter 6 - SURFACE WATER QUALITY STANDARDS, in the Administrative Rules of Montana (ARM). The classification of waters on the Beaverhead-Deerlodge National Forest include A-1 and B-1 waters. The following is a description of beneficial uses under these two classifications and a reference to the water quality standards designed to protect them:

A-1 Classification (ARM 16.20.617) are waters suitable for drinking, culinary and food processing purposes after conventional treatment for removal of naturally present impurities. Water quality must be suitable for bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and

agricultural and industrial water supply. Specific water quality standards for waters classified A-1 are given in ARM 16.20.617 3(a) through 16.20.617 3(iv).

B-1 Classification (ARM 16.20.618) are waters suitable for 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. Specific water quality standards for waters classified B-1 are given in ARM 16.20.618 2(a) through 16.20.618 2(iv).

Indian Creek is classified as A-1 waters. The remainder of the streams are classified as B-1.

Data Collection and Analysis for Hydrology Descriptions

Data collected specifically for this analysis includes physical measurements necessary for stream type classification, channel stability ratings, cumulative bankfull widths and depths, and bank erosion potential ratings. Water quality data was collected at Indian, Wisconsin, Leonard, South Meadow, North Meadow, South Willow and North Willow Creeks during the 1970's. The purpose of this data collection was to monitor grazing, land development and other resources on water quality. The lab analysis was performed by the Water Quality Bureau, Montana State Department of Health and Environmental Sciences. Suspended sediment and water quantity data has also been collected at gaging stations located on Mill and South Willow Creeks. The purpose of this monitoring is to validate the R1R4 WATSED model. The samples were analyzed at the USGS water lab in Helena. All data is located on file at the Supervisor's Office in Dillon.

Water Quality

Sediment is the primary water quality parameter when dealing with logging, road construction and maintenance, mining and livestock management. Sediment modeling for timber harvest and road construction exists in the form of the R1R4 WATSED model. Sediment model predictions that express the effects of grazing and mining do not exist. Sediment characterizations are best expressed using the Wolman Pebble count and hollow core substrate sampling. The water quality parameters collected have not been analyzed for a trend analysis. Analysis of the Mill Creek and South Willow Creek USGS gauging stations show that both streams are "sediment dependent". This means that stream energy is usually sufficient to transport introduced sediment during spring runoff. This characteristic is prevalent throughout much of the Tobacco Root analysis area. It does not mean that any sediment reaching a channel cannot impair beneficial uses. California, Currant, Ramshorn, Harris and lower Wisconsin have all been identified as having elevated sediment loads through field analysis. The effects of elevated sediment are likely felt below the National Forest boundary on these streams.

Streamflow Regime

Streamflow data over time is available only on Mill and South Willow Creeks. The data has been used to characterize hydrographs. The total water yield determined by the LSI database is model driven. Effects of timber harvest, roads and livestock management on the timing and magnitude of streamflow is strictly theoretical. Impacts to the streamflow regime are generated from soil compaction, vegetation manipulation and physical alteration of the stream channel. The magnitude of change is likely to be very insignificant throughout the Tobacco Root analysis area as a whole. However, there may

be localized areas where impacts are significant.

Stream Channel Morphology

This section provides the crux of the analysis, as impacts from land management activities on hydrologic function are best expressed by changes in stream channel parameters. The tools used in the TRLA analysis describe existing and potential condition of channel morphology. Potential condition is supported by the use of "representative reaches". This approach compares a stream reach in a degenerative state with one functioning at or near potential. Representative reaches used for comparison should have reasonably similar valley bottom width and gradient, drainage area and geology. This lays out the framework for comparison with an impacted stream and is useful in depicting a desired future condition (DFC) for the surveyed stream reaches. The TRLA describes stream morphology characteristics in detail for 19 stream reaches, including DFCs. Streams on the west side have steep, well armored and straight channels. They are relatively resilient to management impacts. Streams on the east side have lower gradients with higher amounts of granite in their watersheds. This makes them relatively more sensitive to management impacts than streams on the west side. The streams are functioning properly in general. Exceptions do occur in some localized stream reaches affected by mining, road building, timber harvest and grazing.

Regulatory Framework

Clean Water Act (1972, Amended 1987):

Section 101> The objective of this act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters.
Section 208(2)(F)> A process to identify agriculturally and silviculturally related non-point sources of pollution, and set forth procedures and methods to control to the extent feasible such sources.
Section 303> States have responsibility to develop and review water quality standards.
Section 313> Requires all Federal Agencies to control and abate water pollution under all Federal, State, and local requirements. Executive Order 12088 specifies this compliance.
Section 319> Requires Federal consistency with the State Non-Point Source (NPS) program. The State NPS program includes a process for identifying Best Management Practices (BMPs) to control identified sources.

Compliance with state requirements for protection of waters within Montana means that "land management activities must not generate pollutants in excess of those that are naturally occurring, regardless of the stream's classification. 'Naturally occurring' is defined by the Administrative Rules of Montana as that water quality condition resulting from runoff or percolation over which man has no control or from developed lands where all 'reasonable' land, soil and water conservation practices have been applied". Forest Service Handbook 2509.22, Soil and Water Conservation Practices Handbook, lists Soil and Water Conservation Practices (SWCPs), some of which may be recognized through a memorandum of understanding as BMPs by the state. Compliance with Montana water quality law requires that: 1) BMPs or SWCPs are applied, 2) Beneficial Uses are not impaired, and 3) Monitoring takes place to test whether BMPs are protecting Beneficial Uses.

The National Forest Management Act requirements for the conservation of soil and water resources are listed in 36 CFR 219.27(f). "Conservation of soil and water resources involves the analysis, protection, enhancement, treatment, and evaluation of soil and water resources and their responses under management and shall be guided by instructions in official technical handbooks".

The Clean Water Act Section 303(d) and 40 CFR (Part 130) requires each state to identify waterbodies that are water quality limited. After water quality limited waterbodies have been identified, they are prioritized and targeted for Total Maximum Daily Load (TMDL) development. When final approval is granted by the EPA, the 303(d) list becomes part of the annual Montana 305(b) Report. After TMDLs have been established and source controls have been implemented, targeted waterbodies are removed from the 303(d) list when monitoring demonstrates achievement of water quality standards. This process is designed to return impaired waterbodies and aquifers to their natural condition.

Streams identified as water quality limited which may be partially or wholly within the Tobacco Root analysis area include segments of California, Currant, North Meadow, North Willow, Ramshorn, South Meadow, South Willow and Wisconsin Creeks. Project implementation will rely on agreement with the Water Quality Division of the Department of Environmental Quality that any management actions will not impede recovery of designated stream segments.

F. DESCRIPTION OF AFFECTED ENVIRONMENT - FISHERIES AND AMPHIBIANS

The analysis area is that portion of the Tobacco Root Mountains within the Madison Ranger District of the Beaverhead-Deerlodge National Forest (see Map 1, page 6) and is identical to that described for Hydrology.

Biological Conditions

Several species of fish and amphibians are found in the analysis area. Native fish include westslope cutthroat trout and mottled sculpin (Brown 1971). Native amphibians include Boreal toads and spotted frogs (Reichel and Flath 1995). Nonnative fish found in the area include rainbow, brook and Yellowstone cutthroat trout. Beginning in the late 1880s, nonnative trout were planted in lakes and streams throughout Montana. Although Montana Fish, Wildlife and Parks (MFWP) does not presently stock streams, the geographical expanse of past stocking combined with the self sustaining success of the planted trout have resulted in the presence of nonnative trout species in most of the streams of the analysis area. Approximately 32 streams flow out of the forest. Some of the streams in the larger drainages have multiple tributaries which have names. For instance, Mill creek is considered one stream flowing off the forest, but it has seven named tributaries flowing into it. So, although there are about 32 streams flowing off the forest, there are more streams than that within the analysis area. Of the 32 streams flowing off the forest, 25% have no fish, 25% contain westslope cutthroat trout with a genetic purity level of 90% or greater and 50% of the streams contain nonnative trout.

There are 36 high mountain lakes in the analysis area. Of the lakes, 25% (9) are barren, 66% (24) contain nonnative trout and we don't know what's in 8% (3) of the lakes. Twenty-seven of the lakes are, or have been at one time, stocked with trout not native to this part of Montana. Some of the lakes with fish are self sustaining while others require stocking on a regular schedule.

Spotted frogs, a nonsensitive amphibian, is found in riparian areas. Fisheries habitat surveys have reported seeing spotted frogs in only a few streams.

Past Biological Management Affecting Aquatic Species

The introduction of nonnative trout into the Montana river and lake systems in 1889 has had serious effects on the native trout and aquatic species in southwest Montana.

Nonnative rainbow trout found in streams and Yellowstone cutthroat trout found in the high mountain lakes are able to hybridize with the native westslope cutthroat trout. Brook and brown trout, also nonnative species, directly compete with native trout for food and habitat niches. As a result of the nonnative trout introduction, westslope cutthroat trout are now found in less than 5% of their historical range. The stocking of trout in high mountain lakes that were once barren of fish has resulted in the elimination or serious reduction of frogs and salamanders in these types of lakes.

Although MFWP currently does not stock trout in rivers and streams or in barren high mountain lakes and lakes where there is a potential to hybridize a westslope cutthroat trout population, the damage from past stocking is done, and with only few exceptions, cannot be reversed.

Physical Conditions

The streams within the analysis area vary from those which seasonally contain water in response to rain or melting snow to those which contain water all year long. The streams on the National Forest portion of the Tobacco Root Mountains are relatively short, from 1 to 6 miles, and either flow into another stream or directly off the forest. All the streams in the analysis area have their headwaters in the Tobacco Root range. Most of the streams travel through rocky, steep-sloped country and are relatively straight and stable, with cobble or boulder-sized bottom substrate. Low gradient reaches, however, are common; these streams meander and are narrow and deep. These reaches typically have smaller sized bottom particles, lower rock content in the banks, and are more easily impacted by human-caused activities.

Past Land Management Activities Affecting Aquatic Species

The effects of past land management activities vary due to the type of activity and the physical nature of the stream where the activity took place. Many of the streams in the Tobacco Root Mountain range have been placer mined (Fisheries Survey Files). This type of mining physically alters the stream channel causing the total modification and disruption of fish habitat in the operation area. Downstream habitat is also affected by fine sediment released into the stream. The physical changes to the stream from placer mining are still visible along the streams and are still affecting fish decades after placer mining was halted. Along most of the placer mined streams, limited natural stream rehabilitation has taken place and some fish habitat features have reappeared, but the natural recuperative abilities of the streams have not been able to overcome heavy placer modifications such as cobble/boulder moving and stream channel relocation. Along a few streams where private ownership of the creek bottom occurs, such as Bivens Creek, placer mining still takes place. Due to the 1872 Mining Law, placer mining on National Forest System lands can still occur. On California creek, exploratory placer mining has occurred several times in the last decade.

Road building, timber harvesting and domestic livestock grazing has taken place in the past or is currently occurring in the Tobacco Root range (Fisheries Survey Files). These activities have affected fish habitat by the introduction of sediment into the streams and by altering streambanks. Along the higher gradient, heavily boulder armored streams, these activities have little adverse effects, but in low gradient reaches with soft banks, sediment settles out and the banks are highly susceptible to mechanical damage. The Tobacco Root range has a large number of l roads both along the creeks and crisscrossing the mountains. This is primarily due to

mining exploration and timber harvesting. Currently, the effects on fish habitat from timber harvests, roads and grazing are most prominent in low gradient reaches and where granitic soils are present. Although some of the past habitat impacts could have an effect on individual fish, the populations are still viable.

Sensitive Native Fish

Fluvial Arctic grayling are found in the upper Ruby River drainage and in the lowermost reaches of Meadow Creek. These systems are located either outside the analysis area or beyond the cumulative affects area.

Westslope cutthroat trout once had a native range that included both sides of the Continental Divide, the upper Missouri, upper and middle Columbia and south Saskatchewan basins. Presently, westslope cutthroat trout are found in less than 5% of their historical range (USDA Forest Service 1995 & 1996). Primary factors which have affected westslope cutthroat trout are hybridization and competition with nonnative trout and habitat loss. The decline in westslope cutthroat trout distribution has resulted in their current designation as a "sensitive species" by the Northern Region of the Forest Service, and "a species of special concern" by Montana Fish, Wildlife and Parks. In 1997, the U.S. Fish and Wildlife Service was petitioned to list westslope cutthroat trout. At this time, the trout has not been listed.

Eight streams within the analysis area contain westslope cutthroat trout at a purity level of 90% or greater. Most of the populations are isolated from downstream nonnative trout populations due to various stream conditions or physical barriers.

Sensitive Native Amphibians

Boreal (Western) toads are likely present in the analysis area, although none have been reported. No formal amphibian surveys have been conducted in the Tobacco Root mountain range (Roedel, personal communication). Fisheries surveys have not recorded seeing toads, but amphibians were not the primary focus of the surveys. Boreal toads use a variety of habitats (Stebbins 1985). The young are found close to streams and ponds. The adults breed in lakes, ponds and slow streams in the spring. After breeding, the adult toads are mostly terrestrial and are found from valley bottoms to high elevations (Reichel and Flath 1995). Boreal toads were once common in western Montana, but are now uncommon.

Northern leopard frogs were once found throughout Montana, but are now apparently extinct in western Montana. Formal surveys for leopard frogs have not occurred, and no record of there presence have been noted in fisheries survey notes. It is unlikely that leopard frogs are found in the Tobacco Root mountain range. Northern leopard frogs live in or near water in nonforested habitats, and prefer densely vegetated areas such as wet sedge-meadows or cattail marshes (Reichel and Flath 1995).

CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

A. INTRODUCTION

Chapter 4 describes the effects, or potential impacts, on the physical and cultural environment from implementing the proposed action and its alternatives. Resource specialists on the interdisciplinary (ID) team used the descriptions of existing condition from Chapter 3 and alternatives described in Chapter 2 to predict likely effects of each alternative.

Specialists started their Chapter 4 analyses with general effects that could be caused by any of the alternatives. These appear under the heading "Effects Common to All Action Alternatives". Following the general discussion is a resource by resource description of effects predicted for each alternative.

Cumulative effects describe the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Past and present management was described in Chapter 3 of this EIS. The following discussion is our best projection of the reasonably foreseeable future actions within and adjacent to the analysis area.

Grazing: Livestock grazing will continue throughout the analysis area. This activity will continue under the management direction established in recently updated Allotment Management Plans (1998 and 1993).

Mining: Mining activity is occurring under 47 approved Plans of Operations in the southern Tobacco Root Mountains. Most of this activity is localized exploration. Mineral exploration is likely to continue at a similar level in the reasonably foreseeable future. Limited exploration for oil and gas is expected.

Timber Harvest: The State of Montana is proposing to harvest approximately 100 acres south of the analysis area (Section 16, T5S, R2W). Only limited harvest of firewood is currently occurring on National Forest System lands other than that proposed in this document.

Road Construction and Access: We may reconstruct and surface the Mill Creek Road (7.6 miles) and we may pursue public access in the South Fork of Hot Springs Creek Area.

Recreation: We may reconstruct the Mill Creek Campground, reconstruct the Mill Gulch Trail, and construct the Heather Hike Trail.

B. ENVIRONMENTAL EFFECTS OF ALTERNATIVES FP-1 AND FP-2

Alternative FP-2 would identify 29 security areas within the Tobacco Root Landscape as areas to consider in dealing with management activities. Alternative FP-1 does not identify security areas. Alternative FP-2 focuses management activities into areas outside of identified security blocks, on the edge of security blocks or to totally displace security blocks to maintain unfragmented areas or to allow establishment of future security areas. Alternative FP-1 focuses timber management into unfragmented timber areas and does not allow for the establishment of future security areas by the use of a timber rotation.

Wildlife:
Alternative FP-2 provides a method to maintain security areas within a landscape for wildlife which would lead to long term

stabilization or increases within portions of or over an entire population. Alternative FP-1 would continue to impact security areas within a landscape which would lead to long term decreases within portions of or over an entire wildlife population.

Timber Production:
Alternative FP-1 would provide 1,134 acres (mostly lodgepole pine) available for potential wood production harvest, all within the suitable timber base. An additional 15,232 acres (nontimber base) would be available for salvage and shelterwood harvest removing up to 60% of the basal area. However, there would be little emphasis with current Forest Plan direction to harvest timber in this nontimber base.

Alternative FP-2 would provide 37,630 acres, (360 acres of aspen, 8,700 acres of Douglas-fir, 11,470 acres of lodgepole pine, 2,700 acres of subalpine fir, 5,900 acres of various seedling/saplings and 8,500 acres of whitebark pine) available for potential timber harvest. Of this total acreage 16,336 acres would be included in the suitable timber base and 21,294 acres would be included in the nontimber base (based on criteria from the 1986 Forest Plan).

This discussion is for determining the effects of each alternative on undisturbed, unfragmented (security) stands of timber and associated wildlife benefits within the Tobacco Root Mountains.

Alternative FP-1

Direct and Indirect Effects

Harvest could occur within 1,134 acres (4.6% of the suitable timber base) removing mostly mature lodgepole pine through clearcutting. The combination of 40 acre clearcut units spaced 600 feet apart and associated harvest roads has the potential to impact nine undisturbed timber stands (these stands would qualify as security blocks in Alternative FP-2). This impact would be in the form of fragmentation that leaves a patchwork of open areas intertwined with stringers of continuous timber. A short term increase in available edge leading to a long term interruption in continuous undisturbed canopy of mature trees would be the outcome. This may lead to an increase in vulnerability of mature bull elk, free ranging predators and interior forest song birds leading to long term population (or a portion of a population) declines.

Additionally, salvage and shelterwood harvest removing up to 60% of the basal area could occur on 15,232 acres. However, existing Forest Plan management direction places a higher priority on clearcutting than on partial harvesting.

Cumulative Effects

Many years of the above situation (combination of timber harvest methods) has lead to a fragmented pattern on portions of the landscape. A continuation of these methods compounds the existing fragmentation by impacting remaining undisturbed areas. The past impacts would not allow for long term recovery of undisturbed, unfragmented timbered areas. This has potential to increase long term wildlife population declines.

Alternative FP-2

Direct and Indirect Effects

Harvest could occur within 16,336 acres (66.5% of the suitable timber base) removing mostly mature Douglas-fir/lodgepole pine mix through partial cutting (i.e., salvage and shelterwood removing about 1/3 of the basal area). The identification of 31 security areas allows for the potential to maintain or limit the impact of management activities to them. Areas that have been impacted from past activities could be treated to regenerate into a more secure area. Harvest as a treatment

method could be used to achieve nontimber resource objectives (i.e., aspen regeneration). These security areas would increase the potential to lessen vulnerability of mature bull elk, free ranging predators and interior forest song birds leading to long term maintenance or increases (i.e., lynx, wolverine) in their populations (or a portion of a population).

Cumulative Effects

Potential to maintain or provide additional security of a landscape would increase as harvest is focused to lessen human caused fragmentation. Providing undisturbed, unfragmented areas presently, as well as in the future, may lead to a long term stabilization or increase in wildlife populations.

C. ENVIRONMENTAL CONSEQUENCES FOR VEGETATION

(1) UPLAND FORESTED VEGETATION

EFFECTS COMMON TO ALL ACTION ALTERNATIVES

All action alternatives would introduce prescribed fire, which has more predictable effects than wildfires. Prescribed fire would also produce communities with younger plants and more species of plants which follow disturbance, compared to present conditions. The resulting communities would contain more grass, aspen, shrubs and lodgepole pine than today. Douglas-fir and subalpine fir would decrease. Insect and disease activity would increase over the short term due to disturbance. However, after 5 years insect and disease activity would be less due to healthier stands. Sagebrush would decrease in the short term. In the long term, the grass/sagebrush cover would likely increase.

ALTERNATIVE R

Restoration of Natural Role of Fire - Alternative R would not restore fire to the ecosystem. Aspen has become a very minor and threatened component. Douglas-fir has replaced aspen, lodgepole pine and shrubs on the dry Douglas-fir sites. Subalpine fir and spruce are replacing Douglas-fir and lodgepole pine on the moister Douglas-fir/lodgepole sites. Lack of fire would continue this trend with aspen becoming more scarce. Douglas-fir would continue to colonize and dominate sites which are currently occupied by sagebrush and grass.

Supply of Wood Products - Alternative R would provide firewood from an unknown amount of acres through salvage of dead material.

Precommercial thinning as described in the Forest Plan would not occur.

Approximately 10 acres per year of post and pole areas would be harvested by personal use permits to handle current demand (10 acres X 10 years = 100 acres). This personal use amount is not covered under this project, but is a cumulative effect.

Fuel loading - Alternative R would not reduce fuels which present an increasing risk of catastrophic wildfires. This would not prevent the large scale erosion that occurs from these large, hot and intense fires.

Other activities not included in this proposal would treat approximately 100 acres of forested vegetation by harvesting post and poles and zero acres of nonforested vegetation within drainages that are in close proximity to an urban interface in South Meadow, Potosi and Pony. This would result in a small reduction in fuel loadings and fire risk within these areas. Fuel loadings and management outside the analysis area would continue to play the predominant role in fire risk.

Old Growth - There would be no direct effects to forest old growth from Alternative R. It would meet the Forest Plan Old Growth standards.

ALTERNATIVE S

Restoration of Natural Role of Fire - Alternative S would restore fire to the ecosystem on 16,073 acres.

Thinning post and pole stocked stands on 671 acres would simulate cool, light surface fires which would have thinned the stands naturally.

Supply of Wood Products - Alternative S would provide wood products from 14,644 acres. These products would include sawtimber from areas harvested prior to burning, post and pole products from the commercial thin areas, Christmas trees from Douglas-fir encroachment areas and firewood from accessible fire killed snags.

Alternative S would precommercially thin 1423 acres of naturally regenerated clearcuts.

Fuel Loading - Alternative S would reduce fuels on 16,073 acres.

Alternative S would treat approximately 1200 acres of forested vegetation and 2000 acres of nonforested vegetation within drainages that are in close proximity to an urban interface in South Meadow, Potosi and Pony. This would have a small reduction in fuel loadings and fire risk within these areas. Fuel loadings and management outside the analysis area would continue to play the predominant role in fire risk.

Old Growth - Alternative S would harvest 3,613 acres within old growth forest. The harvest would result in 30-40% of the smaller trees being harvested, leaving large live Douglas-fir, snags and woody debris. Alternative S would meet Forest Plan standards for old growth.

ALTERNATIVE T

Restoration of Natural Role of Fire - Alternative T would restore fire to the ecosystem on 9,676 acres.

Thinning post and pole stocked stands on 322 acres would simulate cool, light surface fires which would have thinned the stands naturally.

Supply of Wood Products - Alternative T would provide wood products from 7,575 acres. These products would include sawtimber from areas harvested prior to burning, post and pole products from the commercial thin areas, Christmas trees from Douglas-fir encroachment areas and firewood from accessible fire killed snags.

Alternative T would precommercially thin 732 acres of naturally regenerated clearcuts.

Fuel Loading - Alternative T would reduce fuels on 9,676 acres.

Alternative T would treat approximately 1000 acres of forested vegetation and 1500 acres of nonforested vegetation within drainages that are in close proximity to an urban interface in South Meadow, Potosi and Pony. This would have a small reduction in fuel loadings and fire risk within these areas. Fuel loadings and management outside the analysis area would continue to play the predominant role in fire risk.

Old Growth - Alternative T would harvest 2,273 acres within old growth forest. The harvest would result in 30-40% of the smaller trees being harvested, leaving large live Douglas-fir, snags and woody debris. Alternative T would meet Forest Plan standards for old growth.

ALTERNATIVE U

Restoration of Natural Role of Fire - Alternative U would restore fire to the ecosystem on 6,939 acres.

Thinning post and pole stocked stands on 479 acres would simulate cool, light surface fires which would have thinned the stands naturally.

Supply of Wood Products - Alternative U would provide wood products from 6,712 acres. These products would include sawtimber from areas harvested prior to burning, post and pole products from the commercial thin areas, Christmas trees from Douglas-fir encroachment areas and firewood from accessible fire killed snags.

Alternative U would precommercially thin 1,039 acres of naturally regenerated clearcuts.

Fuel Loading - Alternative U would reduce fuels on 6,939 acres.

Alternative U would treat approximately 1200 acres of forested vegetation and 2000 acres of nonforested vegetation within drainages that are in close proximity to an urban interface in South Meadow, Potosi and Pony. This would have a small reduction in fuel loadings and fire risk within these areas. Fuel loadings and management outside the analysis area would continue to play the predominant role in fire risk.

Old Growth - Alternative U would harvest 3,182 acres within old growth forest. The harvest would result in 30-40% of the smaller trees being harvested in the Douglas-fir stands, leaving large live Douglas-fir, snags and woody debris. Within the lodgepole pine/Douglas-fir mixed stands, 75% of the stand area would be harvested by group selection, leaving snags and woody debris. Alternative U would meet Forest Plan standards for old growth.

(2) UPLAND NONFORESTED VEGETATION INCLUDING RIPARIAN AND PLANT SPECIES OF SPECIAL CONCERN

This section reviews environmental consequences related to nonforested and riparian habitats found within the analysis area.

EFFECTS COMMON TO ALL ACTION ALTERNATIVES

Fire would have direct effects on the vegetation, soils and the overall diversity within the Tobacco Root analysis area. Fire has a direct physical impact on those plants burned and on the soil through thermal heating. Fire intensities are not uniform across an area, but vary due to fuel load, topography and microsite weather conditions. Fire is the major physical process that shaped the type and distribution of plant communities across the analysis area. Many of the effects of fire are keyed to individual species and at the soil microbe levels that are not readily evident. Many of these interactions are not completely known and understood at this time. This landscape developed over the centuries with fire as a major disturbance process and the various plants, animals and communities evolved under this interaction.

Factors (such as fire) that cause a change in plant community succession and the overall distribution and variety of cover types will indirectly affect the plant and animal species associated with them. Management strategies that maintain or enhance the vertical and horizontal diversity within cover types and through vegetative communities will result in a healthier ecosystem. Providing the natural range of plant communities possible in an area along with the range of successional stages commonly associated with these communities will allow for the greatest diversity possible in the area.

Factors that have cumulative effects on vegetative diversity in and adjacent to the Tobacco Root analysis area include road building and maintenance, mining operations, livestock grazing and recreation activities. Livestock grazing is the dominant activity for other public and private lands adjacent to the analysis area. Improper livestock management may harm plants and affect community health and structure. Road building and mining have the potential to eliminate all vegetation on the site. In reviewing activities on other public and private lands adjacent to the analysis area, there is potential for additional prescribed fire in the sagebrush/grass cover type. In the reasonably foreseeable future, no other public agency has plans for prescribed fire in the area. All wildfires are actively suppressed, as per Forest Service direction.

Activities are not scheduled within the riparian zone in the Tobacco Root analysis area. Harvesting and burning planned in this document includes buffers adjacent to streams and riparian zones.

All action alternatives restore the role of fire to the ecosystem. Prescribed fire helps maintain and improve the overall plant community diversity in the analysis area. Fire effects would be similar between alternatives. Burning prescriptions are planned to produce a mosaic of varying patch sizes and plant distributions over the landscape. Horizontal and vertical structure would be maintained or improved.

In general, herbaceous plants respond positively to fire. The action alternatives, which use prescribed fire, would produce more aspen than is present now. Sagebrush dominated cover might decrease, but the grass/sagebrush mixed type would increase, compared to present coverage.

Idaho fescue is the dominant grass species found in the southern Tobacco Root Mountains. Studies have shown this species to be susceptible to damage from fire. Studies completed on the district and elsewhere have shown damage from fire to individual plants, but overall impacts to this species have been minor. High intensity, late summer fires tend to be the most detrimental to this plant. Recent studies suggest the impact to Idaho fescue may be keyed to competition with other plants on the site, specifically, competition for soil and water, more than to direct fire damage (DeFosse and Robberecht 1996). The Forest Service has developed fire prescriptions to help mitigate this concern. This and other concerns, such as maintaining a mosaic of burned and unburned patches of vegetation, drive fire prescriptions to produce a relatively cool burning fire even when accomplished in the fall of the year.

Mountain big sagebrush (*Artemisia tridentata* spp. *vaseyana*) has three subspecies of which only one occurs within the analysis area. All big sagebrush taxa are easily killed by fire. Even low intensity fires burning beneath the shrub crown can kill this species. Although this species is killed by fire "Mountain big sagebrush seed germination is enhanced by heat treatment" (Hironaka and others 1983). District surveys show high numbers of sagebrush plants growing in past burn areas. Numbers range from just over 700 plants per acres on a site burned two years previous to over 7000 plants per acre on sites burned nine years earlier. Studies on sagebrush control using fire and herbicides show a 30 to 15 year life (return to pretreatment sagebrush cover), respectively, of the different treatments (Harniss and Murry 1973, Johnson 1969, Wambolt and Payne 1986, Schwecke and Hann 1989). Monitoring on the Madison Ranger District shows similar results from 1960 to 1970 herbicide treatments and burns.

Two other sagebrush species, silver and three-tip also occur in the Tobacco Root analysis area, but in very limited coverage. These sprout after fire and are generally unharmed

by fire. Of the other shrub species that can be found in the treatment area most sprout and are undamaged or only slightly damaged by fire. Bitterbrush and mountain mahogany are found on dry rocky slopes and generally do not sprout after fire. These two species are found in limited coverage in the analysis area and are found in higher coverages off the National Forest. Treatment units were selected to avoid these communities.

Three less desirable shrub species are rubber rabbitbrush, green rabbitbrush and gray horse-brush. These species do sprout and have been known to increase in density and coverage to unacceptable levels after fires. These species are generally found in very low numbers in the analysis area. Past burns on the district, including management ignited and natural ignitions, have shown no significant increase in coverage by these species following fire.

The burning proposed in these alternatives would not eliminate sagebrush from these sites nor convert them to grassland community types. These alternatives would produce a fairly even mix of different shrub densities. No one canopy cover class would dominate. The view of the sagebrush/grass type would be one of grass dominated openings intermixed with moderately dense to dense stands of sagebrush. Alternative S affects the highest percentage of this type at 21%. This is based on the total acres of this community type found in the analysis area. Most of the alternatives affect one quarter or less of this community type, leaving the majority for the maintenance or development of a mature sagebrush component. The fire would produce a varied pattern of burned and unburned areas. The size and shape of the more open areas would be irregular, with an increase in edge effect in the community. The vertical and horizontal structure within the sagebrush/grass vegetation would be maintained.

In areas where Douglas-fir is colonizing out into sagebrush/grass types, fire used in action alternatives would eliminate most of the seedling and sapling trees. Douglas-fir would maintain no more than 10% canopy cover after burning. These sites would have the appearance of an open sagebrush/grass community with large conifers scattered across the area. The treatment of these sites would prevent the conifers from completely filling in and changing the general appearance of the site to one of a dense conifer forest. Fire in these situations would help maintain these sites in a sagebrush/grass community as occurred naturally. A site in the Tobacco Root analysis area, burned in 1969, bears this out. Prior to the burn, the site had very dense sagebrush cover and conifers were well established across the site. Some portions of the area were dominated by conifer. The fire burned very hot, killing most of the conifers and removing almost 100% of the sagebrush. Currently, the site supports a healthy, vigorous stand of sagebrush and grass. Canopy coverage of sagebrush averages 15% across the site with many patches at 20-25% cover. Sites that supported dense stands of conifers prior to the burn, now have a moderate to heavy cover of sagebrush.

Fire can be an effective tool in regenerating aspen clones. Burning aspen clones stimulates suckering even without complete overstory removal. Fire intensities and effects would vary between various clones. Fire would barely enter many aspen communities, influencing only the edges of clones. This would cause a thinning of the mature trees and encourage an all-aged, multilevel stand condition. Some stands would burn at a higher intensity, killing all mature trees and produce an even-aged stand.

In stands with encroaching conifers or grass/sagebrush, fire would stimulate aspen regeneration and also set back the conifer encroachment. By running fire through the

clones, the site would be maintained in an earlier successional state dominated by aspen.

Young aspen suckers are preferred by livestock and big game as browse. If livestock and big game concentrate their use on these suckers, they can severely damage the aspen and negate any benefits of the treatment. District monitoring of aspen treatments, including burning and cutting, show very little difference in aspen sucker production between areas protected from livestock and wildlife browsing and adjacent areas that are unprotected. "...even though aspen has been heavily browsed, it would continue to grow and gain height" (USDA 1995). By controlling the timing and intensity of livestock use after treatment and treating large enough acreage to keep wildlife from concentrating in small areas, overuse on the suckers should be controlled.

Aspen condition would improve under the action alternatives. Fire would stimulate aspen growth along with setting back conifer development within individual stands. Reaction of individual aspen stands to fire is dependent on fire intensity. These alternatives would increase aspen coverage in the Tobacco Root analysis area. Sites to be treated are typically dominated by fairly dense conifer forest with only remnant individual aspen trees remaining. Aspen is generally not evident on these sites. A portion of the aspen to be treated are mature to overmature stands that are at the stage of breaking up and have conifers established within the clone. Less than 50% of the easily identifiable aspen clones would be treated. The age structure of the aspen in the analysis area is currently centered in the mature to over mature/decadent age classes. The action alternatives would convert about one third of these aspen stands to young age class.

Action alternatives would likely increase herbage production in sagebrush/grass, aspen and Douglas-fir/sagebrush-grass cover types after fire. The increased production is caused by the reduced competition with shrubs and trees and nutrient input to the soil from the burned material. Monitoring on the Madison Ranger District has shown a 2.0-4.0 times increase in herbage production, two to three years after treatment. The increased production would gradually level off and then decline as sagebrush or tree cover returns to pretreatment levels. Some sites on the district have shown this increased production continuing into the ninth year post burn.

For the first two to three years after a burn, graminoids, forbs and to a lesser extent shrubs, are highly palatable to grazing animals. Livestock and big game would select burned areas for grazing. As with aspen, the selection of burned areas by grazing animals requires added management guidelines. Burning units should be of sufficient size to keep animals from concentrating on small areas. Burn units would have at least one full growing season rest from livestock grazing after treatment.

ALTERNATIVE R

This alternative would not restore the natural process of fire into the Tobacco Root analysis area. Plant communities would progress successionally in the absence of fire's historic influence. Upland vegetation diversity would decline. With the continued lack of fire, aspen communities would continue to decline as they move toward conifer dominance. Sites where Douglas-fir are establishing in the sagebrush/grass community would progress toward conifer dominance and a forest community type. Sagebrush cover would progress to a more uniform dense coverage. Overall horizontal and vertical diversity within the landscape would be reduced.

In the sagebrush/grass type, with the absence of fire, the shrub canopy would close. Larger acreages of heavy (20-30% canopy cover) sagebrush cover would dominate. As the

canopy cover increases, grass and forb densities would decline. This is followed by a decrease in species density and diversity in the community. Along with the decline of understory species, there is a reduction in forage production and availability. Given time, conifers would start to establish on these sites.

Those sites of sagebrush/grass community where Douglas-fir has established would continue to progress to a forested community type. Douglas-fir would increase its density and cover. The understory response would be similar to that described above. As the conifer overstory closes, shrub, graminoid and forb species now present on the site would be replaced by more shade tolerant species. Overall plant community diversity would decline as would the horizontal and vertical structure. Douglas-fir would continue to expand into the sagebrush/grass communities as it has over the last forty to fifty years. Total acres of sagebrush/grass community would be less under this alternative, compared to action alternatives.

Aspen clones would continue to deteriorate. There is the potential to lose close to 50% of the aspen to old age and conifer forest types. Surveys done across the Madison Ranger District in recent years show half the aspen in a deteriorated condition. Clones had no substantial or healthy regeneration and nearly all had some conifer encroachment. Without some treatment to stimulate regeneration, these stands are predicted to convert to conifer cover types. The exact time that all aspen in the stands are lost varies from clone to clone, but within 30 years, all of the aspen stands which were surveyed are projected to be lost. Aspen would become even more scarce across the Tobacco Root analysis area than it currently is.

ALTERNATIVE S

Approximately 4,957 net acres of nonforest vegetation (9914 gross) would be treated by fire. This is based on a 50/50 ratio of burned to unburned area in a treatment unit. These acres can be further broken down to 1050 net acres (21% of this vegetation type found in the analysis area) of sagebrush/grass dominated areas, 3907 acres (30%) where Douglas-fir has established into the sagebrush/grass community, and 1125 acres (45%) of aspen. Of these 1125 acres of aspen, 89% are currently sites which show little evidence of aspen. Fire would maintain the current distribution and make up of the various plant communities found across the analysis area. The mosaic of varying patch sizes between and within the different cover types would be maintained or improved. This alternative would treat the most acres by prescribed fire of all the alternatives. Alternative S treats less than 30% of the total net acres for the sagebrush/grass or open Douglas-fir vegetative communities under consideration. It would also treat less than 50% of the total net acres for aspen.

ALTERNATIVE T

Approximately 2429 net acres of nonforest vegetation (4857 gross) would be treated by fire. This is based on a 50/50 ratio of burned to unburned area in a treatment unit. These acres can be further broken down to 1212 net acres (24% of this vegetation type found in the analysis area) of sagebrush/grass dominated areas, 1217 acres (10%) where Douglas-fir has established into the sagebrush/grass community, and 1125 acres (45%) of aspen. Of these 1125 acres of aspen, 89% are currently sites which show little evidence of aspen. Fire would maintain the current distribution and make up of the various plant communities found across the analysis area. The mosaic of varying patch sizes between and within the different cover types would be maintained or improved. This alternative

would treat a mid range of acres by prescribed fire of the alternatives. Alternative T treats less than 25% of the total net acres for the sagebrush/grass or open Douglas-fir vegetative communities under consideration. It would also treat less than 50% of the total net acres for aspen.

ALTERNATIVE U

Approximately 1748 net acres of nonforest vegetation (2496 gross) would be treated by fire. This is based on a 70/30 ratio of burned to unburned area in a treatment unit. These acres can be further broken down to 494 net acres (10% of this vegetation type found in the analysis area) of sagebrush/grass dominated areas, 1253 acres (10%) where Douglas-fir has established into the sagebrush/grass community, and 500 acres (20%) of aspen. Of these 500 acres of aspen, 89% are currently sites which show little evidence of aspen. Fire would maintain the current distribution and make up of the various plant communities found across the analysis area. The mosaic of varying patch sizes between and within the different cover types would be maintained or improved. This alternative would treat the least acres by prescribed fire of all the alternatives. Alternative U treats less than 10% of the total net acres for the sagebrush/grass or open Douglas-fir vegetative communities under consideration. It would also treat less than 20% of the total net acres for aspen.

EFFECTS ON SENSITIVE PLANTS

Candystick: This species has not been found in the Tobacco Root Mountains. The closest known populations are found to the west in the Highland and West Pioneer Mountains. This species is found growing in coniferous woods, typically lodgepole pine dominated, at mid to fairly high elevations, in deep humus. Candystick is an obligate mycotroph with lodgepole pine the dominant host. Potential for this species is low for this area. Field surveys specifically for this species over the last seven years have located no population of candystick.

Alternative R would have no affect on this species. Potential affects on this species are similar for all the action alternatives. Removal of the host plant will destroy the individuals tied to that host. Precommercial thinning and post/pole harvest will not impact this species. These activities occur in habitats unsuitable for this species. The partial harvest proposed under this project would involve stands that are approximately 90% Douglas-fir and 10% lodgepole pine. These sites are generally not suitable for this species. If a population does occur in an area, removal of 30-40% of the basal area (mostly understory) of the stand would not impact candystick unless the host tree is removed. Approximately half of the regneration harvest units in Alternative U are dominated by lodgepole pine. These sites represent habitat preferred by candystick. Harvest prescriptions for these unit call for the removal of about 75% of the basal area, thereby having a higher potential for impact to this species. Treatment units will be surveyed for this species. If a population of candystick is found, the unit will be modified to assure no impact to the population.

Alternatives S and U propose construction of temporary roads to access some units for the removal of trees. Ground disturbance due to temporary road construction may impact populations or individuals. Ground disturbance from the construction of these roads would destroy individuals and habitat for this species. Temporary road locations will be surveyed specifically for this species. If populations are found, the road location will be moved to assure no impact to the population.

Due to the low potential for this species in the analysis area and field surveys prior to development of harvest activities, all

alternatives developed for this project will have no impact on candystick.

Peculiar moonwort: This species has not been found in the Tobacco Root Mountains. The closest known populations are found to the west on the north end of the Anaconda Range. Peculiar moonwort is found to grow in mesic grasslands on well developed soils from the montane to subalpine zones. Sites selected for treatment in this project exclude sites where this species would be found. Typical sites where this species grows would be outside treatment units, but populations could be impacted by ground disturbance caused by temporary road construction found in Alternatives S and U. Temporary road locations will be surveyed specifically for this species. If populations are found, the road location will be moved to assure no impact to the population. All alternatives developed for this project will have no impact on peculiar moonwort.

Beaked spike-rush: Typical plant communities for beaked spike-rush are margins of hot springs and fens, travertine terraces and shores of sloughs. Timber harvest within riparian areas must comply with Streamside Management Zone (SMZ) Rules, mandated by the SMZ Law. Some drainages have additional buffer areas in which burning and harvest would be excluded to insure protection of fisheries and hydrological function. The SMZ Law and riparian buffers eliminates activities in habitat where this species may be found. All alternatives developed for this project will have no impact on beaked spike-rush.

Giant helleborine: Typical plant communities for giant helleborine are streambanks, lake margins, and around springs and seepage areas, often near thermal waters. Timber harvest within riparian areas must comply with Streamside Management Zone (SMZ) Rules, mandated by the SMZ Law. Some drainages have additional buffer areas in which burning and harvest would be excluded to insure protection of fisheries and hydrological function. The SMZ Law and riparian buffers eliminates activities in habitat where this species may be found. All alternatives developed for this project will have no impact on giant helleborine.

Austin's knotweed: Populations are known on the Madison Ranger District in the Tobacco Root and Madison Ranges. The one population known in the Tobacco Root Range is located outside of the analysis area. This species grows on open, gravelly, often shale-derived soil of eroding slopes and banks in the montane zone. Typical sites where Austin's knotweed grow would be outside treatment units, but populations could be impacted by ground disturbance caused by temporary road construction found in Alternatives S and U. Timber harvest activities will have little impact to this species. Temporary road locations will be surveyed specifically for this species. If populations are found, the road location will be moved to assure no impact to the population. All alternatives developed for this project will have no impact on Austin's knotweed.

Snow cinquefoil: This species is known to occur on the southern half of the Beaverhead-Deerlodge National Forest. One population is known in Tobacco Roots but north of the analysis area. Typically this species is found growing on dry, gravelly soil on high elevation ridges and slopes. These types of site were not selected for prescribed fire treatments. Timber harvest activities will have no impact to habitat typical for this species. Populations could be impacted by ground disturbance caused by temporary road construction found in Alternatives S and U. Temporary road locations will be surveyed specifically for this species. If populations are found, the road location will be moved to assure no impact to the population. All alternatives developed for this project will have no impact on snow cinquefoil.

Sensitive plant species due to their limited occurrence can be greatly affected by noxious weeds. Not only may the noxious weed out compete the sensitive plant, but inappropriate weed control measures may destroy individuals or eliminate the population. Refer to the noxious weed section below for the discussion on the affects of this project on noxious weeds.

EFFECTS ON NOXIOUS WEEDS

Fire, whether naturally or management ignited, has the potential to stimulate the spread of noxious weeds. The effects range from killing the plant to stimulating its growth. Most forbs are unaffected by fire. Many plants would take advantage of the decreased competition and reduced soil litter after a fire to increase in vigor and expand their coverage.

Due to their aggressive nature, noxious weeds can increase after a fire or any other disturbance. Most weed infestations in the analysis area are found along roadways, trails or mining disturbance. These areas are the primary sources for the spread of weeds regardless of fire presence. At current weed infestation levels, fire would not cause an exponential increase in weed density. Any increases would be detected during annual treatment and monitoring of weed sites. Treatment would be adjusted to site needs. Reduction of overstory trees and shrubs would generally make weed infestations more noticeable. These sites would most likely be detected earlier, with a smaller area of impact, after a fire than if the area was not treated and the weeds were allowed to spread under cover of the adjacent trees and shrubs.

The prescribed fire program proposed under the Tobacco Root Vegetation Management EIS would cause no significant increase in the noxious weed infestations in the analysis area.

The ground disturbance associated with the construction of temporary road for logging along with logging activities such as skidding and decking create prime sites for weed invasion. Timber harvest contracts would require washing of logging equipment prior to delivery to the work site.

All action alternatives in the Tobacco Root Vegetation Management EIS have a higher potential for increasing weed infestations due to the ground disturbance associated with timber harvest than the no action alternative. Due to current noxious weed management activities and timber harvest contract clauses for washing of equipment, the potential for new weed infestations to establish or for current weed infestations to expand is quite low.

CONSISTENCY WITH FOREST PLAN STANDARDS

There are no specific standards relating to diversity, therefore a consistency finding can not be made specific to this concern. In review of Forest Plan standards that reference vegetation, all would be achieved under each alternative.

D. ENVIRONMENTAL CONSEQUENCES FOR WILDLIFE HABITAT

Timber harvest and prescribed fire in the Tobacco Root analysis area has the potential to affect wildlife resources in two primary ways: 1) habitat alteration; and 2) disturbance (from project activities and post activity public access). The most prevalent effect of habitat alteration is the potential for a reduction in carrying capacity. Carrying capacity may potentially be reduced by placing harvest, burn and road locations in or near seasonal use areas such as birthing/nursery areas and winter ranges.

Disturbance from associated timber harvest and prescribed fire activity may displace wildlife out of preferred habitats and place them under undue stress. This is of particular importance during winter (wintering, trapping), spring (birthing, nesting) and fall (hunting) seasons. Increased public access may increase vulnerability of those species that are hunted and trapped and may cause shifts in traditional use patterns.

Recommended Mitigation

1. Obliterate all temporary roads from harvest activity to a condition that is more obstructive than the surrounding terrain.

2. If temporary roads are needed through the time period that includes hunting season, then closure devices should be placed to restrict access during the hunting season until these roads are obliterated.

3. Restrict harvest activity during general hunting season.

Effectiveness of Above-listed Mitigation

Observations from the West Fork Salvage Timber Sale area and other areas on the forest have shown that obliterated temporary roads are close to 100% effective in limiting vehicle travel. However, openings through forest patches may somewhat improve access to foot and horseback travel as opposed to the adjacent forested areas.

Closure devices, such as jack and pole gates, are between 85-100% effective in limiting vehicle travel. However, the temporary roads provide easier access to foot and horseback travel than the adjacent forested areas. This is short term until obliteration takes place.

Restriction of harvest activities during general hunting season allows hunted species to have access to project areas for escape and migration. Many areas of the West Fork Timber Salvage area have shown use by big game after harvest activities had been finished for the hunting season.

Recommended Monitoring for Wildlife

Continue to use the Forest Plan monitoring items numbers 1-1, 1-2, 1-3, 1-4, 1-6, 1-8, 1-9, 1-10 (as modified) and 1-11. These monitoring items deal with elk populations, forage and security, population trends, and winter range conditions for other wildlife species such as moose, deer and big horn sheep, threatened and endangered species, cavity nesting species and diversity of plant communities.

CONSISTENCY WITH FOREST PLAN STANDARDS FOR WILDLIFE

Alternatives R, S, T and U are consistent with all Forest Plan wildlife standards.

EFFECTS COMMON TO ALL ACTION ALTERNATIVES FOR WILDLIFE

The timber harvest and prescribed burning techniques attempt to change the trend of vegetation (and therefore, wildlife habitats) in the Tobacco Root analysis area to a more natural disturbance condition. Years of fire suppression have led to conditions which favor mature (more climax) conditions in habitats than would have existed without the suppression efforts. These shifts have led to an increase in old growth lodgepole pine, old growth Douglas-fir, subalpine fir and sagebrush while showing decreases in aspen, young lodgepole pine, shrubs and grass. The shifts toward presuppression habitats should benefit many of the species that are showing declining trends in the west (Butts 1992a & 1992b, Dobkin 1994, Hayward & Verner 1994, Hutto 1995, Reynolds *et al* 1992, Ruggiero *et al* 1994).

Focusing activity in areas that have had past activity would maintain blocks of undisturbed

forest. These blocks benefit all wildlife species. Partial harvest and temporary roads would limit potential fragmentation (allows cover to remain relatively undisturbed) and have little effect on vulnerability (allows security areas to remain and does not increase access into undisturbed areas).

Management activities would be designed to increase the amount of early successional stages throughout the area. Short term effects of burning would be to displace wildlife use until the next growing season or until a similar structure returned within the vegetation as existed prior to burning. Long term effects would be an overall change to a more fire determined mosaic pattern and an increase in fire dependent vegetation.

Burning may increase the potential for the area to provide sage grouse leks as it would decrease the sagebrush canopy cover. This decrease in sagebrush may decrease the potential for the area to provide wintering areas for sage grouse (USDA-Forest Service 1995), however, this is unlikely due to the overall elevation of the National Forest System lands. The same decrease in sagebrush may increase the quality of the sage grouse brooding habitat as the forb and insect component would increase (Barnett & Crawford 1994, Drut, Pyle & Crawford 1994).

The historic mosaic patterns and vegetative components would begin to trend to a more young age structure with less Douglas-fir/sagebrush and more aspen and fire dependent shrubs. This would begin to establish the desired condition for habitats for the Tobacco Root analysis area (see Tobacco Root Landscape Analysis).

The area used to determine effects is defined by the Madison Ranger District, Beaverhead-Deerlodge National Forest administered lands on the south and east slopes of the Tobacco Root Mountain Range.

Threatened, Endangered and Sensitive Wildlife Species Effects:

Timber harvest and prescribed burning are not likely to adversely affect any of the threatened or endangered species found on the Madison Ranger District. There are no known bald eagle or peregrine falcon nests in the Tobacco Root analysis area and the potential for them is low. The entire Tobacco Root Mountain Range is outside the Greater Yellowstone Recovery Area for grizzly bears and is within the Yellowstone Nonessential Experimental Area for gray wolves and as such, activity in the Tobacco Root analysis area would not effect recovery efforts. The project proposal would not jeopardize the continued existence of Canada lynx.

Many of the sensitive wildlife and bird species are showing downward trends due to habitat changes that can be attributed to a lack of fire. Fire blackened snags, young lodgepole and fir stands, and aspen, willow, shrub and grass communities are declining. Species such as black-backed woodpeckers, flammulated owl, northern goshawk and sage grouse may benefit from the effects of fire on various habitats. As a result, some individuals or habitats may be impacted by activity, but this would not lead to a trend for federal listing of any of the sensitive wildlife or bird species (see the Biological Assessment for a complete discussion of effects of the selected alternative on threatened, endangered and sensitive species).

Management Indicator Species Effects:

Elk: Harvest activity would affect elk in two ways: 1) removal of cover (trees) and 2) displacement. Removal of trees has the potential to affect thermal cover and hiding/security cover. Thermal cover is important in areas next to winter ranges to provide an area where elk can escape the effects of cold and wind to conserve energy needed to survive during winter. Young

Douglas-fir can provide both thermal and hiding/security cover. Some of this young Douglas-fir would be burned and/or harvested. Hiding/security cover is needed to escape hunters. A high level of hiding/security cover may better distribute harvest through the hunting season. Some hiding/security cover would be burned and/or harvested. Partial harvest of 30%-40% basal area would have little effect on hiding/security cover. Burning of young Douglas-fir and underburning of mature Douglas-fir would have a limited effect on thermal cover as some of this young fir would be replaced by young aspen stands. Hiding/security cover would have little effect from burning as blackened trees would remain standing to provide cover and aspen stands would increase within the burn area. Maintaining blocks of undisturbed cover throughout the Tobacco Root analysis area would provide both thermal cover and hiding/security areas for elk.

Displacement is of concern in winter range, calving areas and security blocks. Harvest would be occurring in some areas of security, but activity would not take place during hunting season. Harvest would not effect winter range or calving habitats (sagebrush areas). Burning would occur in winter range and calving areas. This burning may displace some calving and wintering activity in the short term, however, prescribed fire may increase the overall availability of sagebrush, aspen and Douglas-fir ecotone in the long term throughout the area. Burning would remove the young Douglas-fir trees that are displacing sagebrush openings and aspen throughout the area. The loss of sagebrush/grassland openings may contribute to the movement of elk to private lands in winter. Prescribed fire would provide habitats with a better winter forage opportunity for elk. Creation of a Douglas-fir "savannah" condition from underburning may decrease elk vulnerability by providing a forage opportunity within limited cover, as opposed to foraging in open areas adjacent to cover.

Sage Grouse: Due to their dependence upon sagebrush/grassland habitat for food and cover, sage grouse are limited to the range types dominated by sagebrush, principally big sagebrush (Artemisia tridentata), but also its related species (Klebenow 1972). Partial timber harvest would have no effect on these habitats. Prescribed fire would have the potential to change the structure within these habitats. Strutting (breeding areas) grounds and wintering areas would be important seasonal use areas. These areas receive historical use by sage grouse. Prescribed fire within these areas may displace sage grouse to less suitable areas. The Madison Ranger District contains no known strutting or wintering areas, so the likelihood of impacting such areas is very low.

The majority of the sagebrush areas on the district would provide suitable nesting and brooding (raising of young) habitat. Moist meadows, upland springs and mesic sites are critical to adults and chicks in summer. The 100 feet riparian no burn buffer would provide sagebrush within these types of areas. During the pre-laying period, forbs make up 20%-50% of the diet with sagebrush making up the rest. Forbs, in particular, appear to influence the reproductive effort of hens (Barnett & Crawford 1994, Drut, Pyle & Crawford 1994). Prescribed fire would provide a more forb rich community within the sagebrush/grassland areas than currently exists. This may be beneficial to sage grouse on summer areas. An additional benefit would be the reduction of young Douglas-fir succession into sagebrush/grassland areas. This would provide an opportunity for an increase in sagebrush/grassland habitats. Any loss in sagebrush cover from prescribed burning may be partially offset by the increase in grass species cover (USDA-Forest Service 1995).

Pine Marten: In southwestern Montana, the marten is a forest dweller requiring forested habitats and is vulnerable to fur trapping.

Marten may be found in all forested habitats, but show a preference for mesic habitats. In most cases, they avoid open areas (Fager 1991). Vulnerability is most likely influenced by the fur market and access to habitat by trappers. Use of temporary roads would not increase access and therefore would have no effect on vulnerability. Harvest would not occur in riparian areas, so effect on mesic habitats would be very low. Fire suppression activities have resulted in many acres of old growth Douglas-fir and lodgepole pine. Partial harvest and prescribed burning would have little effect on these old growth areas. Pine marten would show little effect from the project.

Goshawk: In the Rocky Mountains, nests are frequently found in mature dense stands of lodgepole pine, fir and quaking aspen. Foraging areas include dense woodlands, clearings and open fields. Disturbance during nesting season (April through August) may displace goshawks from nesting areas. Activity would not occur in the area of known goshawk territories. Prescribed fire in sagebrush/grassland would have little effect on goshawks. Harvest and prescribed fire in timber may remove potential nest sites. Mature lodgepole pine and fir are not limiting in the Tobacco Root analysis area so any removal of trees would have little effect on goshawks. Fire would increase the distribution of aspen throughout the area. In the long term, the aspen stands provide an additional nesting opportunity. This additional opportunity should offset any loss in the lodgepole and fir areas. Foraging opportunities may be increased from the creation of the Douglas-fir "savannah" areas.

Habitat changes resulting from fire suppression in ponderosa pine and mixed-species stands, and to a lesser extent spruce-fir forests, are: 1) the replacement of open, single storied stands by dense multistoried stands through tree regeneration, 2) loss of natural openings due to tree invasion, and 3) changes in the abundance and composition of plant species in both the understory and overstory due to plant succession (Reynolds *et al* 1992).

Accumulated fuels and dense forest conditions resulting from fire suppression have also increased the potential loss of goshawk habitat through catastrophic wildfire and epidemic infestations of insects and diseases. Increased shading from the dense regeneration has also reduced herbaceous and shrubby understories that provide important foods and cover for goshawk prey. In addition to these changes, timber harvesting, which began in the 1800's, has focused on large trees, resulting in few remaining mature and old forests and associated habitat attributes (Reynolds *et al* 1992).

Given the improbability of returning to the previous frequencies of natural disturbances, some active management (mainly thinning and prescribed fire) would be necessary to produce and maintain the desired conditions for sustaining goshawks and their prey (Reynolds *et al* 1992).

ALTERNATIVE R

Direct and Indirect Effects:

Since no timber harvest or prescribed burning would be taking place, any changes to habitat would be due to natural disturbances (i.e., fire, insects, wind). Without such disturbances, succession would continue and produce changes in available habitats as well. This change would be away from early successional stages (seedling/sapling, aspen) to an older stage (mature/old growth lodgepole pine, Douglas-fir). Short term effects to available habitats would be slight, however, long term effects would be more noticeable. Elk winter range and calving areas would become less available over time as Douglas-fir succession would displace sagebrush and aspen areas being used for winter range and calving. Elk may increase use of adjacent

private lands as winter forage opportunity would be lost.

There would be no impact on security areas and additional cover would occur in the existing harvest units as lodgepole pine establishes. This would help to slightly increase security within the localized area, however, most of the harvest units are located adjacent to roads.

Potential for the area to provide sage grouse leks may decrease as sagebrush canopy cover would increase. This increase in sagebrush may improve the potential for the area to provide wintering areas for sage grouse (USDA-Forest Service 1995), however, this is unlikely due to the overall elevation of the National Forest System lands. The same increase in sagebrush may decrease the quality of sage grouse brooding habitat as the forb and insect component would decrease (Barnett & Crawford 1994, Drut, Pyle & Crawford 1994).

Aspen would continue to be lost to increasing Douglas-fir encroachment without the presence of a large wildfire. The majority of aspen in the area would be in a mature/old growth form with very little suckering occurring. Stands would continue to deteriorate and be lost as available habitat in the absence of a wildfire.

The historic mosaic patterns and vegetative components would trend to a more old age structure with more Douglas-fir, sagebrush, and less aspen and fire dependent shrubs than what would be desired for the Tobacco Root analysis area (see Tobacco Root Landscape Analysis).

There would be no irreversible nor irretrievable commitment of wildlife habitat due to Alternative R.

Cumulative Effects

The analysis area for cumulative effects is the south and east portion of the Tobacco Root Mountains and adjacent private, state, BLM and other National Forest System lands.

Activities that have occurred in the analysis area in the past, are currently occurring, and that would occur in the future may in themselves have little impact on wildlife species. When considered together, the effects may have a large cumulative impact to the species occurring in the area.

Actions which are considered in this cumulative effects analysis are listed at the beginning of this chapter under "Reasonably Foreseeable Projects" Effects:

Current trends in range management are for an improvement in riparian conditions. Grazing management updates would be designed to improve riparian areas and maintain or improve upland conditions. This would generally result in the same or fewer numbers of livestock and maintaining or shortening the current season of use. This would have a beneficial effect for wildlife and bird species.

Mineral activity is likely to occur at the current rate in the analysis area. This activity poses an impact on wildlife species by being unpredictable in nature. Roads needed to access claims increase vulnerability by easing access into areas. Mining activity has the potential to displace wildlife species out of preferred areas.

Timber harvest proposed with this project would remove from 30%-40% (Alternatives S & T) to 70%-80% (Alternative U) of the basal area within a stand. Harvest proposed on adjacent State of Montana lands in the Moore Creek area would be designed to remove a greater portion of the volume. A removal of 30%-40% of basal area would have a slight impact on security cover. Removing a large

portion of the timber volume within a stand would have greater impact on security cover. Due to the small area involved with the timber sale on state lands and the low amount of basal area proposed for removal from the forest, the effect to security would be low.

Subdivision has occurred adjacent to the Tobacco Root analysis area near Wisconsin Creek, Mill Creek, California Creek and North and South Meadow Creeks. A current subdivision is located on Washington Creek. Subdivisions decrease wildlife habitat. They also displace wildlife into less preferred areas. This impact is highest on winter ranges, migration routes, calving/fawning areas or other high use wildlife habitats.

Reconstruction of campgrounds and trails, and reconstruction and surfacing of roads would not impact any new areas. Burbridge and Neff (1976) reported that slow moving vehicles on primitive roads were more disturbing to elk (wildlife) than rapid moving vehicles on an improved forest highway. Surfacing may help to improve the flow of traffic.

Recreational use/activity must be dealt with in two distinct ways: 1) legal use and 2) illegal use. Legal use of trails, roads, etc., is restricted during different seasons of the year. Impacts to winter range, calving areas, etc., can be kept to a minimum with use limited at various times. Wildlife can change behaviors to avoid recreational use that occurs in a predictable nature (i.e., on open trails, roads, areas). Ward (1976) observed that elk (wildlife) tend to be undisturbed by repeated events of a predictable nature, such as vehicle traffic that does not stop.

Illegal use of trails, roads and restricted areas poses the greatest impact to wildlife species. This type of use not only destroys habitat (i.e., wet bogs, forage), but displaces animals from preferred habitats. These areas in the Tobacco Root analysis area tend to be located away from designated open routes. Wildlife species have changed their behavior to avoid areas with off highway vehicle (OHV) activity. Surprise encounters with illegal use cause these species to flee secure types of areas, increasing their vulnerability. This type of activity combined with other activities (mining activity, subdivisions) poses the greatest cumulative impact to wildlife.

ALTERNATIVE S

Direct and Indirect Effects:

This alternative would burn 24% of the winter range located within the National Forest portion of available winter range, which would be 7% of the entire winter range within the Tobacco Root analysis area. Removal of 3,512 acres of young Douglas-fir would increase the total available winter range by maintaining grass/sagebrush rather than an establishing Douglas-fir stand. Burning winter range would displace use for a short period of time immediately following the burn. This alternative would burn 25% of the calving grounds located within the National Forest portion of available calving grounds, which would be 14% of the entire calving grounds within the analysis area. Burning within elk calving areas would displace calving for a short period immediately following the burn. However, burning would maintain the sagebrush/aspen ecotone where most elk calving takes place (Thomas & Toweill 1982). Montana Fish, Wildlife and Parks Area Biologist contends that burning would not be necessary to maintain elk calving habitat (Peterson 1995).

Timber harvest (removal of 30%-40% basal area) would occur within 5 security blocks, impacting 4% (1,539 acres) of the total acres of security areas available. Impact to the security areas would be low due to the low number of trees being removed, use of temporary roads, and location of the harvest generally occurring on the edges of the security areas. In addition to the harvest,

burning would occur within 19 security blocks (includes those impacted from harvest), impacting an additional 6% (2,108 acres) of the total acres of security areas available. Impact to the security areas would be low, as the burning would be of an underburn nature leaving most mature trees and pockets of young Douglas-fir. Harvest and burning would impact a total of 10% (3,647 acres) of the available security areas. Short term effects of the harvest and burning may be an increase in bull elk vulnerability with the loss of cover. Long term effects of this harvest may be to lessen vulnerability within the area as the forage cover edge would become less abrupt. Elk may no longer have to leave timber cover to forage as they could stay within the more open timber/forage mix. Montana Fish, Wildlife and Parks Area Biologist contends that harvest and burning would have a large increase in bull elk vulnerability in the short term and the effect would continue through the long term until cover could establish.

Due to the proposal not changing the photo interpretation (PI) type of the proposed treatment units, there would be no change in Elk Effective Cover. This is a result of the sensitivity of the EEC model not showing a change in EEC without a PI type change. A removal of over 60% basal area is needed to show a PI type change and a corresponding EEC change. Assuming that restriction of temporary roads would be near 100% effective, there would be no change in EEC cover based on the presence of the temporary roads. This is another limit of the EEC model.

Burning 1,125 acres of aspen would begin to establish a young age class of aspen that would help to maintain these communities and available habitat over time.

There would be no irreversible nor irretrievable commitment of wildlife habitat due to Alternative S.

Cumulative Effects:

General cumulative effects would be the same as those described for Alternative R. The difference would be an additional impact from harvesting/burning activity disturbance and displacement from impacted habitats. Vulnerability of wildlife species may be slightly increased in the short term as they would be displaced into "new" areas. Montana Fish, Wildlife and Parks Area Biologist contends that there would be a large increase in vulnerability.

ALTERNATIVE T

Direct and Indirect Effects:

This alternative would burn 15% of the winter range located within the National Forest portion of available winter range, which would be 4% of the entire winter range within the Tobacco Root analysis area. Removal of 1,380 acres of young Douglas-fir would increase the total available winter range by maintaining grass/sagebrush rather than an establishing Douglas-fir stand. Burning winter range would displace use for a short period of time immediately following the burn. This alternative would burn 15% of the calving grounds located within the National Forest portion of available calving grounds, which would be 9% of the entire calving grounds within the analysis area. Burning within elk calving areas would displace calving for a short period immediately following the burn. However, burning would maintain the sagebrush/aspen ecotone where most elk calving takes place (Thomas & Toweill 1982). Montana Fish, Wildlife and Parks Area Biologist contends that burning would not be necessary to maintain elk calving habitat (Peterson 1995).

Timber harvest (removal of 30%-40% of stand area) would occur within 4 security blocks, impacting 2% (644 acres) of the total acres of security areas available. Impact to the

security areas would be low due to the low number of trees being removed, use of temporary roads, and location of the harvest generally occurring on the edges of the security areas. In addition to the harvest, burning would occur within 17 security blocks (includes those impacted from harvest), impacting an additional 3% (1,280 acres) of the total acres of security areas available. Impact to the security areas would be low as the burning would be of an underburn nature leaving most mature trees and pockets of young Douglas-fir. Harvest and burning would impact a total of 5% (1,924 acres) of the available security areas. Short term effects of the harvest and burning may be an increase in bull elk vulnerability with the loss of cover. Long term effects of this harvest may be to lessen vulnerability within the area as the forage cover edge would become less abrupt. Elk may no longer have to leave timber cover to forage as they could stay within the more open timber/forage mix. Montana Fish, Wildlife and Parks Area Biologist contends that harvest and burning would have a large increase in bull elk vulnerability in the short term and this affect would continue through the long term until cover could establish.

Due to the proposal not changing the photo interpretation (PI) type of the proposed treatment units, there would be no change in Elk Effective Cover. This is a result of the sensitivity of the EEC model not showing a change in EEC without a PI type change. A removal of over 60% basal area is needed to show a PI type change and a corresponding EEC change.

Burning 1,125 acres of aspen would begin to establish a young age class of aspen that would help to maintain these communities and available habitat over time.

There would be no irreversible nor irretrievable commitment of wildlife habitat due to Alternative T.

Cumulative Effects:

General cumulative effects would be the same as those described for Alternative R. The difference would be an additional impact from harvesting/burning activity disturbance and displacement from impacted habitats. Vulnerability of wildlife species may be slightly increased in the short term as they would be displaced into "new" areas. Montana Fish, Wildlife and Parks Area Biologist contends that there would be a large increase in vulnerability.

ALTERNATIVE U

Direct and Indirect Effects:

This alternative would burn 9% of the winter range located within the National Forest portion of available winter range, which would be 3% of the entire winter range within the Tobacco Root analysis area. Removal of 1,191 acres of young Douglas-fir would increase the total available winter range by maintaining grass/sagebrush rather than an establishing Douglas-fir stand. Burning winter range would displace use for a short period of time immediately following the burn. This alternative would burn 4% of the calving grounds located within the National Forest portion of available calving grounds, which would be 2% of the entire calving grounds within the analysis area. Burning within elk calving areas would displace calving for a short period immediately following the burn. However, burning would maintain the sagebrush/aspen ecotone where most elk calving takes place (Thomas & Toweill 1982). Montana Fish, Wildlife and Parks Area Biologist contends that burning would not be necessary to maintain elk calving habitat (Peterson 1995). In addition, burning outside of the sagebrush MOU recommendations would increase effects on sagebrush habitats and associated wildlife use.

Timber harvest (removal of 70%-80% basal area) would occur within 5 security blocks, impacting 3% (953 acres) of the total acres of security areas available. Impact to the security areas would be high due to the number of trees removed within the security areas. In addition to the harvest, burning would occur within 12 security blocks (includes those impacted from harvest), impacting an additional 1% (475 acres) of the total acres of security areas available. Impact to the security areas would be low as the burning would be of an underburn nature leaving most mature trees and pockets of young Douglas-fir. Harvest and burning would impact a total of 4% (1,428 acres) of the available security areas. Short term effects of the harvest and burning may be an increase in bull elk vulnerability with the loss of cover. Long term effects of this harvest would be to increase vulnerability of bull elk as the created openings remain until tree cover is once again established within the cutting units. Montana Fish, Wildlife and Parks Area Biologist contends that harvest and burning would have a large increase in bull elk vulnerability in the short term and this affect would continue through the long term until cover could establish.

Elk Effective cover would be affected in the HAU's as indicated on the following table.

Table 11
Elk Effective Cover by Habitat Analysis Unit

HAU	Size (ac)	Cover (ac)	% Cover	Elk Use Potential	Road Density	Habitat Effective-ness	Elk Effective Cover
T3	13,004	4,774	37	97	0.86	65	63
T5	10,107	3,639	36	95	1.09	57	54
T11	7,784	2,619	34	91	0.49	77	70
T12	8,264	2,894	35	93	0.47	78	73
Total	115,204*	36,590	32	86	0.76	68	58

* HAU acreage figures were established in the Forest Plan and are based on data collected in 1975. Updated data indicates the analysis area (southern Tobacco Root Mountains) is 114,000 acres.

Burning 500 acres of aspen would begin to establish a young age class of aspen that would help to maintain these communities and available habitat over time.

There would be no irreversible nor irretrievable commitment of wildlife habitat due to Alternative U.

Cumulative Effects:

General cumulative effects would be the same as those described for Alternative R. The difference would be an additional impact from harvesting/burning activity disturbance and displacement from impacted habitats. Vulnerability of wildlife species would be increased with the creation of the new forest openings. This increase would diminish over time as trees regenerate in the cutting units.

E. ENVIRONMENTAL CONSEQUENCES FOR ROADLESS CHARACTER

Effects Common to All Alternatives

None of the activities in any of the proposed alternatives would eliminate any acres from

inventoried roadless areas, nor would any temporary roads be constructed in inventoried roadless areas. However, inventoried boundaries should be adjusted to reflect the areas that no longer have roadless characteristics due to earlier activities. These areas are described in Chapter 3.

None of the proposed alternatives would result in harvest of timber from inventoried roadless areas, except to the minor extent that dead wood could be gathered for firewood by the public in some areas that the public would be willing to carry wood to existing routes open to motorized use.

ALTERNATIVE R

Alternative R does not propose any activities, either in or out of roadless. There would be no direct or immediate effect on roadless characteristics.

Fire suppression actions would continue as in the past, effectively excluding fire as a part of the natural ecological process except in the case of a fire severe enough to escape suppression efforts. With the unnatural buildup of fuels from long-term exclusion of fire, any fire that escaped suppression efforts would be more severe than would have likely occurred naturally. Thus, some indirect effects of Alternative R would be detrimental to integrity of natural processes.

Effects Common to All Action Alternatives

All action alternatives propose prescribed burning to approximate the effects of natural fire. The proposed burns would result in blackened areas and alteration of vegetative succession with the intent of mimicking natural fires. The effects of prescribed fire on other roadless characteristics should be within the range of the effects that natural fire regime would have. There would be more open timber stands and more vegetation in earlier successional stages. These prescribed fires should have no detrimental effects on natural area characteristics or wilderness features except for the short term presence of management personnel during the actual burn.

Allowing fire to more nearly approximate its natural role would move toward restoring natural integrity of long-term ecological processes.

Burns are planned to use primarily natural features and black lines to keep burns within planned areas. But some critical resource areas may require creating firelines with reduced fuels by cutting smaller trees, limbing larger trees, and digging firelines down to mineral soil. In these situations, there would be some minor effect on natural integrity and apparent naturalness of the area.

Since none of the action alternatives propose treatments other than broadcast burning within roadless areas, the direct effect of each alternative is directly related to the acreage proposed for burning within roadless areas. Acres proposed for each alternative for prescribed burning in inventoried roadless areas are shown in Table 12.

No other direct effects on the roadless area quality as described by the indices listed in Chapter 2, Issue 3 are anticipated.

Table 12
Acres Burned in Roadless Area

Alternative	Acres Burned
R	0
S	3,999
T	2,419
U	1,056

Mitigation

Where firelines are dug to control burns within roadless areas, firelines will be restored to natural contours following the burns.

Alternative S

Alternative S is the only alternative that proposes any treatment other than burning within roadless areas. Alternative S proposes 140 acres of precommercial thinning within the inventoried roadless area boundary. The precommercial thinning would occur in regenerated timber stands produced by previous clearcuts. This is within areas described in the Affected Environment section of this document as not having roadless characteristics due to roading and timber harvest activities in the early 1980's. Precommercial thinning in existing clearcuts that are already accessed by permanent roads will have little additional impact on the roadless qualities of the area.

Irreversible or irretrievable effects.

The effects described above do not constitute irreversible or irretrievable commitments of roadless area resources.

Cumulative Effects

Activities outside inventoried roadless areas can potentially have effects on roadless characteristics. All the action alternatives propose some timber harvest activity in areas between previously harvested areas and the boundaries of inventoried roadless areas.

These activities will have some effect on the feeling of remoteness and solitude within inventoried roadless areas during the period when mechanized activities are going on outside the roadless area, but near enough that sounds of the activities will be heard within the roadless areas. The areas where this will occur are the Chero Mountain area adjacent to the Potosi Roadless Area (1-014) and in the vicinity of North Meadow Creek, Dulea and Gibbs Creeks near the Middle Mountain Tobacco Root Roadless Area (1-013).

Once the timber harvest activity is complete, the visual evidence of the harvest will probably not be readily evident to people using any of the common approaches to the roadless areas.

Since no permanent roads will be constructed and temporary roads will be obliterated, no lasting effects such as easier access or higher levels of use within the roadless areas should occur.

F. ENVIRONMENTAL CONSEQUENCES FOR HYDROLOGY

Proposed activities which could potentially affect water resources include timber harvest and yarding, temporary road construction and burning. Potential effects include direct, indirect and cumulative.

EFFECTS COMMON TO ALL ACTION ALTERNATIVES

Timber Harvest Effects on Hydrology

Direct effects are caused by the action, occurring at the same time and place. Sediment introduced directly into a stream channel, such as from a stream crossing, constitutes a direct effect. Indirect effects are caused by the action and occur at a later time or farther removed in distance. Road construction which results in sediment at some later time is one example. Cumulative effects result from the incremental effects of the proposed action when added to other past, present and reasonably foreseeable future actions.

Timber harvest activities are generally light treatments consisting of precommercial

thinning of regeneration in old harvest units, post and pole removal or removal of 30-40% of the basal area. None of the treatments would affect the canopy to the extent necessary to affect water yield. It is likely there would be some localized increase in soil-water as a result of decreasing transpiration in the vicinity of understory vegetation that has been removed by fire or timber harvest. However, much of that savings would be taken up by the remaining vegetation. The lack of regeneration harvest in any alternative precludes water yield concerns in any individual watershed.

Burning Effects on Hydrology

The direct effects of fire are usually associated with burning material entering a waterbody, potentially resulting in elevated temperatures and/or nutrient levels. The indirect effects include possible decreases in interception and infiltration, with possible increases in surface and mass erosion, nutrient loading and sedimentation. Changes in streamflow regime and snow accumulation could also result. The significance of effects may vary as a function of parameters including, but not limited to, fire intensity/duration, soil characteristics, precipitation patterns, vegetative cover types, slope and aspect.

Cumulative Effects of Vegetation Removal

The removal of a vegetative canopy, either by timber harvest or burning, has the potential to increase water yields or to alter peak flows within a given watershed. Increases in peak flows could possibly lead to channel destabilization and/or sediment increases. Whether or not this occurs depends mainly on the percentage of the area treated and the intensity of the treatment. Watersheds that have large portions of their areas treated by activities that remove all of the crown cover are at a greater risk than watersheds that have small portions of area treated by activities that leave most of the crown cover intact. Research results as to what percentage of a basin can be harvested before increases in peak flows occur are mixed. In the pacific northwest, an area with a much different hydrologic regime than the Tobacco Roots, Jones and Grant (1996) showed that in small watersheds, peak flows increased as much as 50% after 10-25% of the area had been clearcut and roaded. On the other hand, in the Colorado Rockies, an area similar to the Tobacco Roots, road building and clearcutting 24% of a watershed increased average annual streamflow, but had no effect on peak flows.

Whether or not an increase in peak flows leads to a degradation of stream channels and increased sedimentation depends on the stream type (Rosgen 1996) within the basin. Stream types that have large substrate and steeper gradients (A1, A2, A3, B1, B2, B3 for example) are less susceptible to channel erosion than those with small substrate and flatter gradients (B4, B5, C4, C5). See Effects by Watershed for a discussion of cumulative effects by individual watershed.

Tools Used in Effects Analysis for Hydrology

Direct, indirect and cumulative effects from implementing any action alternative will be analyzed on a narrative level. In addition, indirect and cumulative effects are modeled using the Cumulative Effects (CE) model and the WATSED model.

Timber harvest, temporary road construction and burning activities proposed under Alternative S represents the relatively highest level of potential watershed impacts for any basin. Analysis of this alternative determines the need for further analysis of other alternatives.

The CE model was used to provide an overall perspective of treatment activities. The model analysis did not recognize the scheduling of activities throughout the ten year planning period. Rather, it lumped all activities into a

one year period, disregarding any recovery between scheduled activities. The result is an overestimation of effects. Washington Creek showed the largest EDA increase of 6%, resulting in a new total of 27%. This can be interpreted as an insignificant increase, given the spread of activities over a ten year period.

The WATSED model was run on Washington Creek for Alternative S for the reasons described above. The results were compared to Forest Plan Standard #6 for Fisheries (no sediment production greater than 50% over natural). The highest sediment production from timber and temporary road construction resulted in 45% over natural during the third year of activity, diminishing in subsequent years.

Timber Harvest and Road Construction Effects on Hydrology

Direct Effects: Two stream crossings are planned for the entire landscape under Alternative S (see Map 5). The crossings are on Sawlog Creek and Dry Leonard Creek, neither of which is a "red flag" or water quality limited segment (WQLS) stream. Both are intermittent streams with B stream types at the channel locations. Proper location, design and installation of these crossings would ensure that sediment introduction would be kept to a minimum. This assumption is based on implementing the Soil and Water Conservation Practices (SWCPs) and the 124 Stream Permit process. If necessary, the streams would be dewatered. Thus, any impacts are determined as insignificant.

Indirect Effects: Determination of indirect effects is based on the assumption that features common to all alternatives, implementation of SWCPs and adherence to the Montana Streamside Management Zone Law and Rules would take place. Features common to all alternatives include design of timber harvest, temporary roads, and burning units which do not jeopardize any "red flag" or WQLS streams. The CE and WATSED model results provide an additional basis for determining indirect effects. Under the "worst case scenario" (Washington Creek, Alternative S), Forest Plan Standard (Fisheries #6) was not exceeded. CE model results indicated increases of 6% or less, not accounting for recovery due to scheduling of activities. Indirect effects of implementing any action alternative can be described as insignificant.

Burning Effects on Hydrology

Direct Effects: Prescribed fire treatment of sagebrush/grass community types represents 70-84% (depending on alternative) of the total proposed burning treatments. These treatment areas exhibit very low probabilities of burning brush rolling into streams, or water yield increases. Implementation of buffer strips on all treatment areas would further ensure that direct effects would be insignificant, if present at all.

Prescribed fire treatments of Douglas-fir stands consist of underburning in open stands of mature trees with the idea of removing understory species. These treatments would leave the overstory intact and would not be expected to have an effect on water yield from the stands. Implementation of buffer strips would further ensure that direct effects would be insignificant.

Indirect Effects: Relatively light fuel loadings and proposed fire prescriptions would keep fire intensities below damaging levels. While exceptions may occur on a local scale, the overall effect on any one watershed is insignificant.

Cumulative Effects: Past, present and reasonably foreseeable future activities that could potentially affect water resources include mining, road building and maintenance, livestock management and timber harvest on State Lands. Where past

management impacts occur, the cumulative effect of implementing any action alternative would not further degrade existing condition or prevent recovery of an affected stream reach. Future mining impacts, while difficult to predict where and when, would undergo sufficient mitigation requirements.

Improvements in livestock management have recently been implemented or proposed for all allotments in the Tobacco Root analysis area. Implementing any action alternative would not prevent upward trends in hydrologic function realized by improved grazing practices. However, careful monitoring of rangeland treated with fire is needed to ensure proper plant recovery before grazing is reintroduced. Otherwise, a reduction in plant vigor or composition could result in soil loss and/or reduced infiltration. In conclusion, no shift in stream channel equilibrium or significant degradation of water quality is expected for any stream.

CONSISTENCY WITH THE FOREST PLAN AND OTHER REQUIREMENTS FOR HYDROLOGY

Each alternative would be consistent with Forest Plan water resource standards in addition to management requirements listed in 36 CFR 219.27 (a), (b), (e) and (f).

EFFECTS BY WATERSHED

Following are the effects by watershed of Alternative S. This is the alternative that proposes the most activity in any watershed. If Alternative S is within the capabilities of a watershed, then Alternatives T and U can be assumed to be within that capability also. BMP's are employed on all activities. The BMP's designated are preemptive rather than mitigative. In other words, they avoid areas where possible watershed problems would occur. Two BMP's are especially effective: 1) All activities would observe a 100 foot buffer strip on either side of perennial and intermittent streams. 2) The temporary roads would not be placed in locations where eroded material can reach an intermittent or perennial stream. If these BMP's are effectively employed, the need for more site-specific, mitigative BMP's is avoided. There are two exceptions to BMP 2. The temporary crossings on Sawlog and Dry Leonard Creeks would employ mitigative BMP's to reduce, but not eliminate sediment. These BMP's might include dry season installation, dewatering of channel for installation, filter windrows, straw bale emplacement, surfacing approaches and rocking ditches. Specific BMP's would be designated during the design phase. Neither of these streams has been designated WQLS.

Cataract Creek - Approximately 17% of the watershed would be treated with fire and about 1.5% with harvest techniques. Neither the intensity nor the treatment would affect the hydrologic regime of the watershed. There would be no temporary road construction and the current road density of 1.2 mi./sq. mi. would not be increased.

North Willow Creek - A portion of North Willow below the National Forest boundary has been designated WQLS by the State of Montana. Therefore, there cannot be any exacerbation of the existing condition and BMP's must be employed on all activities. Approximately 18% of the watershed would be treated with fire. There is no timber harvest. Neither the intensity nor the treatment would affect the hydrologic regime of the watershed. There would be no temporary road construction and the current road density of 0 mi/sq. mi. would not be increased.

South Willow Creek - A portion of South Willow has been designated a WQLS by the State of Montana. Therefore, there cannot be any exacerbation of the existing condition and BMP's must be employed on all activities. Approximately 12% of the watershed would be treated with fire and an additional 3% with

timber harvest. Neither the intensity nor the treatment is sufficient to affect the hydrologic regime of the watershed. There would be 1.33 miles of temporary road constructed near the south drainage divide. There are no stream channels near this location and it would not affect water quality. The existing road density would temporarily increase to 1.23 mi./sq. mi.

Wisconsin Creek - A portion of Wisconsin Creek has been designated a WQLS by the State of Montana. Therefore, there can be no exacerbation of the existing condition and BMP's must be employed on all activities. Approximately 2% of the watershed would be treated with fire. Neither the treatment nor the intensity is sufficient to affect the hydrologic regime of the watershed. There would be no roads built and the existing road density of 1.24 mi/sq. mi. would not be increased.

Hot Springs Creek - Approximately 6% of the watershed would be treated with fire and an additional 2% treated by timber harvest. Neither the treatment nor the intensity is sufficient to affect the hydrologic regime of the watershed. There would be .07 miles of temporary road built which would not affect the existing road density.

North Meadow Creek - A portion of North Meadow Creek has been designated WQLS by the State of Montana. Therefore, there can be no exacerbation of the existing condition and BMP's must be used on all activities. Approximately 12% of the watershed would be treated with fire and an additional 14% with timber harvest. Neither the treatment nor the intensity is sufficient to affect the water regime of the drainage. There would be 4.55 miles of temporary road built. There are no intermittent or perennial stream channels near the road locations. The road density would temporarily increase to 1.46 mi/sq. mi., but because of road location aquatic resources would not be affected.

Mill Creek - Approximately 8% of the watershed would be treated with fire. There would be no timber harvest. Neither the intensity nor the treatment is sufficient to alter the hydrologic regime of the watershed. There would be no roads built and the existing road density of 1.14 mi./sq. mi. would not be increased.

Washington Creek - There would be 10% of the watershed treated with fire and an additional 14% with timber harvest. Neither the intensity nor the treatment is sufficient to alter the hydrologic regime of the watershed. There would be 2.51 miles of temporary road constructed, temporarily increasing the existing road density to 1.52 mi./sq. mi. Because of road location aquatic resources would not be affected.

Sawlog Creek - There would be 11% of the watershed treated with fire and an additional 10% treated with timber harvest. Neither the treatment nor the intensity is sufficient to alter the hydrologic regime of the watershed. There would be approximately 0.9 miles of temporary road constructed. There would be one stream crossing of an intermittent channel, which would likely leave some sediment in the channel despite Soil and Water Conservation Practices being employed. Road density would temporarily increase to 3.47 mi/sq. mi., but because of road location aquatic resources would not be affected.

Leonard Creek - There would be 11% of the watershed treated with fire and an additional 10% treated with harvest. Neither the intensity nor the treatment is sufficient to affect the hydrologic regime of the watershed. There would be 0.4 miles of temporary road constructed and one crossing of an intermittent channel that would likely leave some sediment in the stream despite Soil and Water Conservation Practices being employed. Road density would increase to 3.25 mi./sq. mi., but because of the location aquatic resources would not be affected.

Ramshorn Creek - A portion of Ramshorn Creek has been designated as a WQLS by the State of Montana. Therefore, there can be no exacerbation of the existing situation and BMP's must be employed on all activities. There would be 9% of the watershed treated with fire and no timber harvest. Neither the treatment nor the intensity is sufficient to affect the hydrologic regime of the watershed. There would be no roads constructed and the existing road density of 2.03 mi./sq.mi. would not be increased.

Horse Creek - There would be 39% of the watershed treated with fire. There would be no timber harvest and no road construction. Neither the treatment nor the intensity is sufficient to affect the hydrologic regime of the watershed.

Currant Creek - Part of Currant Creek has been designated a WQLS by the State of Montana . Therefore, there can be no exacerbation of existing condition and BMP's must be used on all activities. There would be 38% of the watershed treated with fire. There would be no timber harvest and roadbuilding. Neither the treatment nor the intensity is sufficient to affect the hydrologic regime of the watershed.

South Meadow Creek - A portion of South Meadow Creek has been designated a WQLS by the State of Montana. Therefore, there can be no exacerbation of the existing condition, and BMP's must be employed on all activities. There would be 4% of the watershed treated with fire and 5% treated with timber harvest. Neither the treatment nor the intensity is sufficient to affect the hydrologic regime of the watershed. There would be .08 miles of temporary road built. There are no intermittent or perennial channels near this road location and aquatic resources would not be affected. Road density would temporarily increase to 2.18 mi/sq. mi., but because of road location aquatic resources would not be affected.

Mill Gulch - There would be 3% of the watershed treated with fire and an additional 5% with timber harvest. Neither the treatment nor the intensity is sufficient to alter the hydrologic regime of the watershed. There would be .69 miles of temporary road constructed. There are no intermittent or perennial stream channels near the road location, so there would be no affect on aquatic resources. The existing road density would temporarily increase to 1.52 mi/sq. mi.

Bivens Creek - There would be 9% of the watershed treated with fire and none with timber harvest. Neither the intensity nor the treatment is sufficient to affect the hydrologic regime of the watershed. There would be no increase in the existing road density of 4.39 mi/sq. mi.

California Creek - A portion of California Creek has been designated as a WQLS by the State of Montana. Therefore, there can be no exacerbation of the existing condition and BMP's must be employed on all activities. There would be 3% of the watershed treated with fire and an additional 2% with timber harvest. Neither the intensity nor the treatment is sufficient to affect the hydrologic regime of the watershed. There would be no roads constructed.

Harris Creek - There would be 6% of the watershed treated with fire and no timber harvest. Neither the treatment nor the intensity is sufficient to affect the hydrologic regime of the watershed.

G. ENVIRONMENTAL CONSEQUENCES FOR FISHERIES AND AMPHIBIANS

Timber harvests and prescribed fire in the Tobacco Root analysis area have the potential to affect fisheries habitat by 1) causing excessive sediment introduction into streams;

2) changing channel morphology and reduce channel stability; 3) altering woody debris recruitment into the stream; 4) significantly altering daily or seasonal temperature regimes; and 5) changing chemical and/or biological components of the stream such that fish are negatively impacted. Depending on the intensity and duration of the impacts, the expected effect of such habitat impacts is the reduction of fish numbers.

Mitigation Measures Common to all Action Alternatives

The following mitigation measures were developed to help protect fisheries and stream function These mitigation measures are common to each action alternative. Effectiveness of these mitigation measures is displayed in Table 13 (page 89).

1. A buffer zone map (Hydrology and Fisheries Screen) has been developed that identifies areas where timber harvesting, thinning and burning activities are excluded. The buffer zones are 100 feet for none cutthroat streams and 300 plus feet for streams containing westslope cutthroat trout.

2. Prescribed burning would not occur within 100 feet of perennial streams not shown on the buffer map.

3. Where westslope cutthroat trout are present or stream function is a concern, the 100 foot buffer would be extended to at least 300 feet to ensure adequate protection during prescribed burning or timber harvesting. This is would occur if new information concerning a westslope cutthroat trout population and/or stream function is obtained.

4. Along tributaries of streams with westslope cutthroat trout that are outside of the mapped buffered areas, burning will not occur within 300 feet of the stream without an on-site inspection and clearance by the District fisheries biologist. The criteria for allowing burning with 300 feet, but no closer than 100 feet of the stream, would be that "no impacts" to the westslope cutthroat trout would occur.

5. Timber harvest must comply with Streamside Management Zone rules.

6. Consultation with the fisheries biologist would occur during development of burn plans.

7. Temporary roads and stream crossings will be approved by the fisheries biologist prior to construction.

8. Temporary roads constructed for this project will be recontoured and obliterated after use.

Sensitive Aquatic Species

Westslope cutthroat trout (WCT) are the only sensitive fish species present in the analysis area. Eight Tobacco Root streams contain WCT populations. All of these populations are isolated from down stream, nonnative populations by virtue of stream conditions or physical barriers.

The implications of managing isolated cutthroat populations are considerable. For many of the remaining populations, the length of stream available is commonly "pushing" what is required for population maintenance. Recent data collected on WCT populations in the upper Missouri River drainage suggest that the healthiest populations inhabit at least two miles of stream (Shepard MFWP; personal communication with Brammer MFWP). Where available stream lengths are restricted, management practices which maximize high quality habitats are important for the long term health of the population. In general, isolated populations require greater measures of protection.

Sensitive Amphibian Species

Boreal (Western) toads were once common in western Montana, but now are uncommon and found in localized areas (Reichel and Flath 1995). Specific surveys for Boreal toads were not conducted in the Tobacco Root mountain range. Sometimes during fish habitat surveys amphibians are seen and noted, but there is no record of Boreal toads being seen.

Northern Leopard Frogs were once widespread throughout Montana, but are now apparently extinct in western Montana (Reichel and Flath 1995). As with the Boreal toad, no specific surveys have been conducted for Northern leopard frogs. There are no records of leopard frogs ever being seen within the fisheries surveys files .

CONSISTENCY WITH FOREST PLAN STANDARDS

Alternatives S, T and U are consistent with Forest Plan fisheries standards 1, 2, 3, 5 and 6. Standard 4 deals with livestock grazing and is not applicable for this project. The Upper Missouri Westslope Cutthroat trout Short-term strategy, adopted into the Forest Plan in 1997, will be met. These standards would be met due to the fisheries mitigation measures common to all action alternatives.

Table 13
Effectiveness of Mitigation Measures
Fisheries

Mitigation Measure	Adverse Condition Corrected	Effectiveness of Mitigation on Westslope cutthroat trout habitat	Effectiveness of Mitigation on Rainbow and Brook trout habitat
Streamside Buffer (100 ft.) (No activity)	•Sedimentation •Reduced woody debris •Increased water temperature	Does not apply to westslope cutthroat streams.	•Depends on slope, but usually very effective. •100% effective for maintaining LWD recruitment & existing temperatures.
Streamside Buffer (300 plus ft.) (No activity)	•Sedimentation •Reduced woody debris •Increased water temperature	100% effective.	100% effective for protecting habitat of any other trout species found in stream.
No burning within 100 plus ft. of perennial streams.	•Sedimentation	100% effective. Filtering ground cover maintained.	100% effective. Filtering ground cover maintained.
No burning within 300 ft. of creeks tributary to westslope cutthroat trout streams.	•Sedimentation	100% effective. Filtering ground cover maintained.	Not applicable.
State Streamside Management Zone rules	•Sedimentation •Reduced woody debris •Increased water temperature	Does not apply to westslope cutthroat streams.	50 to 75% effective •Sediment: Probably will occur •LWD recruitment: Potentially some will be harvested •Temperature: Some potential increase
Temporary roads recontoured and obliterated	•Sedimentation	Very effective in reducing long-term sediment.	Very effective in reducing long-term sediment.
Consultation with Fisheries biologist prior to locating roads and stream crossings and when developing burn plans.	•Sedimentation •Reduced woody debris •Increased water temperature	Double check to ensure that buffers are in place, there are no new stream crossings & temp. road locations will not affect WCT.	•Double check to ensure that buffers are in place. • That the two stream crossings are adequately located. • Temp. road locations will not adversely affect rainbow or brook trout

EFFECTS COMMON TO ALL ACTION ALTERNATIVES FOR FISHERIES AND AMPHIBIANS

Westslope cutthroat trout - None of the action alternatives will have any direct, indirect or cumulative impacts to westslope cutthroat trout habitat or the population of this sensitive fish due to the mitigation measures. The long-term affects of the proposed vegetative treatments and burning will affect westslope cutthroat trout either beneficially or adversely.

Boreal toads - Young toads live near riparian areas, while adults are terrestrial after the spring breeding season. The riparian buffers will protect the young and breeding adults from impacts. Individual, adult toads in the uplands may be lost during timber harvests, burning or from traffic along roads, but the population will not be affected because of the limited size of the activity areas compared to the whole drainage (Roedel, personal communication).

Northern leopard frogs - These frogs live exclusively near water and riparian areas. Because of the buffer zones along streams, there will be no impacts the Northern leopard frogs.

Nonsensitive Fish Species - Due to the fisheries mitigation measures, none of the action alternatives will have adverse direct, indirect or cumulative effects on rainbow, brook and Yellowstone cutthroat trout populations.

EFFECTS OF ALTERNATIVE R FOR FISHERIES AND AMPHIBIANS

Alternative R, because it does not harvest timber, conduct thinning or have prescribed fires, will have no impacts on westslope cutthroat trout, Boreal toads or Northern leopard frogs.

EFFECTS COMMON TO ALL ALTERNATIVES FOR FISHERIES AND AMPHIBIANS

For all alternatives, the affects of a large, stand replacing wildfire, if located in the upper 3/4 of a drainage containing westslope cutthroat trout, would probably result in the loss of that population.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

There is no irreversible or irretrievable commitment of the fisheries or amphibian resources as a result of this project,

RELATIONSHIP BETWEEN SHORT TERM USE AND LONG TERM PRODUCTIVITY

The long term productivity of the fisheries and amphibian resources will not be affected by the short term use and treatment of the upland vegetation.

PROBABLE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

The environmental effects on the fisheries and amphibian resources from natural events, such as floods, wildfires, landslides, earthquakes, fish diseases, wind storms, etc. cannot be avoided. Also, depending on the severity of fire and weather conditions, the effects of human-caused wildfires on the fisheries resource may be unavoidable.

H. UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse effects are summarized here. Please reference sections C, D, E, F and G for detailed descriptions and a complete listing.

Alternative R

The no action alternative would result in the loss of inventoried aspen stands in the southern Tobacco Root Mountains in the next 30 years. Fuel would not be reduced. Diverse wildlife habitat provided by aspen stands would be lost in the next 30 years. Less elk winter range and calving areas would be available. The integrity of natural processes would decline due to lack of fire.

Action Alternatives

Prescribed burning: Above ground matter would be removed immediately following the burn. The burned area will remain visible for a short time reducing visual quality and recreation opportunities in some areas and temporarily reducing apparent naturalness, remoteness and solitude. Smoke would be generated into the atmosphere and air quality would be degraded for a short time. Wildlife would be temporarily displaced from the burn areas. In the short term, hiding cover would be reduced, increasing elk vulnerability.

Timber harvest: Visual quality would be slightly reduced. Wildlife would be temporarily displaced from the harvest areas. In the short term, hiding cover would be reduced, increasing elk vulnerability.

Temporary road construction: For Alternative S, temporary road stream crossings would contribute sediment to Dry Leonard and Sawlog Creeks. Wildlife would be temporarily displaced during road construction.

I. RELATIONSHIP OF SHORT TERM USES AND LONG TERM PRODUCTIVITY

The relationship of short term uses and long term productivity is summarized here. Please reference sections C, D, E, F and G for detailed descriptions and a complete listing.

Alternative R

Aspen would continue to provide diverse habitat for wildlife species in the short term. The long term productivity of these stands would be lost within the next 30 years. Vegetation would continue to move toward later seral stages and fuels would continue to increase, thereby increasing the risk of catastrophic fire which could result in the loss of productivity on these sites.

Action Alternatives

Prescribed burning: Forage production would be decreased immediately following the burn, while the amount of herbage production would begin increasing the following spring. The productivity of the burned areas would not be destroyed and may be temporarily enhanced by the availability of the minerals in the ash. The overall plant community diversity will be maintained and improved in the long term. Habitat for some wildlife species would be reduced, while habitat for other species would be increased. Long term productivity of wildlife habitat would be maintained. The integrity of natural processes would increase as more natural vegetation patterns return to the landscape through the use of prescribed fire. While burned areas are black, apparent naturalness, remoteness and solitude would be reduced, these characteristics would be maintained and improved in the long term. The temporary impacts of smoke from prescribed burning would have minor short term effects on air quality.

Timber harvest: Merchantable timber would be harvested, but harvest methods to be used would result in little effect on the long term productivity of the area harvested. Habitat for some wildlife species would be reduced, while habitat for other species would be increased.

Long term productivity of wildlife habitat would be maintained.

Temporary road construction: For Alternative S, temporary road stream crossings would contribute sediment to Dry Leonard and Sawlog Creeks, but the long term productivity of the streams would not be affected.

J. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Alternative R

The would be no irreversible commitment of resources resulting from the no action alternative. An irretrievable loss of aspen would occur.

Action Alternatives

There would be no irreversible nor irretrievable commitment of resources resulting from any of the action alternatives.

K. POSSIBLE CONFLICTS WITH PLANS AND POLICIES OF OTHER JURISDICTIONS

All alternatives would be consistent with federal, regional, state and local land use plans, policies and controls except Alternative U. A burn mosaic in excess of 50% in sagebrush habitat types is not consistent with the Memorandum of Understanding with FWP, Region 3 and the Beaverhead-Deerlodge National Forest.

L. ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL OF ALTERNATIVES

Alternative R

Under the no action alternative, energy use would be limited to existing management activities including fire suppression, road maintenance, etc. The Beaverhead Forest Plan EIS (page IV-42) states that the "Energy required in the fire suppression program is dependent on the number and kind of fires. In extreme fire years, this use can be a substantial portion of the total energy expended by the Forest." The EIS (page IV-82) states that "Road construction and maintenance requires the largest amount of energy use of any activity on the Forest." Other existing management activities require some additional small amounts of energy use.

Action Alternatives

Prescribed burning: The Beaverhead Forest Plan EIS (page IV-43) states that "Some energy will be consumed in monitoring the planned fire. This will be a minor amount compared to the energy needed to suppress such fires and a minor portion of the total Forest use." Some energy would also be used to implement the prescribed burns, but again, it would be minor compared to the energy needed to suppress a wildfire.

Timber harvest: The energy required to harvest timber under this proposal is substantial. Table IV-17 on page IV-61 of the Beaverhead Forest Plan EIS displays total energy requirements for harvest operations.

Temporary road construction: As disclosed above, road construction and maintenance requires the largest amount of energy use on the forest. Energy use for maintenance of temporary roads associated with this proposal would end once the roads are obliterated.

CHAPTER 5
BIBLIOGRAPHY

Allen, A.W. 1987. The relationship between habitat and furbearers *in* Novak *et al.* Wild furbearer management and conservation in North America. Chapt. 18, pp.164-179.

Arno, S.F. and G.E. Gruell. 1983. Fire history at the forest-grassland ecotone in southwestern Montana. J. Range Mngt. 36(3), May 1983.

Barnett, J.K. and J.A. Crawford. 1994. Pre-laying nutrition of sage grouse hens in Oregon. J. Range Mngt. 47:114-118.

Brannon, B. 1999. Personal communication, Montana Fish, Wildlife & Parks, Wildlife Biologist.

Brown, C.J.D. 1971. Fishes of Montana. Big Sky Books, Montana State University, Bozeman, MT.

Burbridge, W.R. and D.J Neff. 1976. Coconino National Forest-Arizona Game and Fish Department Cooperative Roads-wildlife study *in* Proc. Elk-logging-roads Symp. ed. S.R. Hieb, pp. 44-57. Moscow: Univ. Idaho. 142pp.

Butts, Thomas W. 1992a. Lynx biology and management a literature review and annotated bibliography. USDA-Forest Service, Northern Region, Missoula, MT. 115pp.

Butts, Thomas W. 1992b. Wolverine biology and management a literature review and annotated bibliography. USDA-Forest Service, Northern Region, Missoula, MT. 106pp.

Chadde, S. and S. Shelly. 1994. Significant peatlands of western Montana: site descriptions and major features. USDA, Forest Service, Northern Region, Missoula, MT. 48pp.

Christy, R.E., S.D. West. 1993. Biology of bats in Douglas-fir forests. Gen. Tech. Rep. PNW-GTR-308. Portland, OR: USDA-Forest Service, Pacific Northwest Research Station. 28pp.

Christensen, A. G., L.J. Lyon and J.W. Unsworth. 1993. Elk management in the northern region: considerations in forest plan updates or revisions. Gen. Tech. Rep. INT-303. Ogden, UT: USDA-Forest Service, Intermountain Research Station. 10pp.

DeFosse and Robbererecht. 1996. Effects of competition on the postfire recovery of 2 bunchgrass species. J. Range Mngt. 49:137-142.

Dobkin, D.S. 1994. Conservation and management of neotropical migrant landbirds in the northern rockies and great plains. Univ. of Idaho Press. Moscow, Idaho. 220pp.

Drut, M.S., W.H. Pyle and J.A. Crawford. 1994. Technical Note: Diets and food selection of sage grouse chicks in Oregon. J. Range Mngt. 47:90-93.

Fager, C. 1991. Harvest dynamics and winter use of the pine marten in southwest Montana. Job progress report W-100-R-4. Montana State University, Bozeman, MT. 73pp.

Fischer, R.A., K.P. Reese and J.W. Connelly. 1996. An investigation on fire effects within xeric sage grouse brood habitat. J. Range Mngt. 49:194-198.

Fisher, W.C. and B.D. Clayton. 1983. Fire ecology of Montana forest habitat types east of the Continental Divide. USDA Gen. Tech. Rep. INT-141. 83 pp.

Harniss, R.O. and R.B. Murray. 1973. 30 years of vegetal change following burning of sagebrush-grass range. J. Range Mngt. 26:322-325.

Harvey, A.E., M.F. Jurgensen and R.T. Graham. 1996. Fire-soil interactions governing site productivity in northern Rocky Mountains *in* D.M. Baumgartner, D.W. Breuer and B.A. Zamora eds. Prescribed fire in the intermountain region: forest site preparation and range management, Symposium Proceedings, Washington State University, Pullman, WA.

Hayward, G.D. and J. Verner, tech. editors. 1994. Flammulated, boreal, and great gray owls in the United States: A technical conservation assessment. Gen. Tech. Rep. RM-253. USDA-Forest Service, Rocky Mountain Forest and Range Experiment Station. Fort Collins, CO. 214pp.

Hillis, J.M., M.J. Thompson, J.E. Canfield, L.J. Lyon, C.L. Marcum, P.M. Dolan and D.W. McCleerey. 1991. Defining elk security: the Hillis paradigm *in* Christensen, A.G. and others comps. Proceedings: elk vulnerability symposium; 1991, April 10-12, Montana State Univ. Bozeman, MT. 38-54.

Hironaka, M., M.A. Fosberg and A.H. Winward. 1983. Sagebrush-grass habitat types of southern Idaho. Bull. 35. Moscow, ID. University of Idaho. Forest, Wildlife and Range Exp. Sta.

Hungerford, R. and others. 1991. Influence of fire on factors that affect site productivity *in* Harvey and others comps. Gen. Tech. Report INT-280. p 32-50.

Hutto, R.L. 1995. USFS Northern Region songbird monitoring program distribution and habitat relationships. USFS contract #R1-95-05, Second Report. Univ. of Montana, Missoula, MT. 120pp.

Interagency Grizzly Bear Committee. 1987. Grizzly bear compendium. U.S. Fish and Wildlife Service, Missoula, MT. 540pp.

Jensen, M.E. and P.S. Bourgeron. 1993. Eastside forest ecosystem health assessment. Volume II Ecosystem management: principles and applications. USDA. 397 pp.

Johnson, U.M. 1969. Life expectancy of a sagebrush control in central Wyoming. J. Range Mngt. 22:177-182.

Klebenow, D.D. 1972. The habitat requirements of sage grouse and the role of fire in management *in* Annual proceedings tall timbers fire ecology conference no. 12, Lubbock, TX. 305-315p.

Koehler, G.M. and J.D. Brittell. 1990. Managing spruce-fir habitat for lynx and snowshoe hares. J. For. 88:10-14.

Mariani, J., B. Ruegiger, J. Taylor, C. Paige, A. Christensen, P. Dolan, R. Krager, S. Ritter, M. Hillis and D. Davis. 1994. Black-backed woodpecker, Northern Rockies. USDA-Forest Service. Missoula, MT. 5pp.

Montana Bird Distribution Committee. 1996. P.D. Skaar's Montana bird distribution, Fifth Ed. Special Publication No. 3. Montana Natural Heritage Program, Helena, MT. 130pp.

Montana Fish and Game Department. 1971. Game management in Montana. Montana Fish and Game Department, Game Management Division. W-3-C. Helena, MT. 238pp.

Muenchau, B.L. 1995. Ferruginous hawk. Pine Ridge Ranger District, Nebraska National Forest. Chadron, NE. 8pp.

Peterson, J.G. 1995. Sagebrush ecological implications of sagebrush manipulation. Montana Management Division, Montana Fish, Wildlife and Parks. W-101-R-2. Helena, MT. 49pp.

Reichel, J, and D. Flath. Identification of Montana's Amphibians and Reptiles. Montana Outdoors, May/June.

Reynolds, R.T., R.T. Graham, Reiser, M. Hildegard and others. 1992. Management recommendations for the northern goshawk in the southwestern United States. Gen. Tech. Rep. RM-217. USDA-Forest Service, Rocky Mountain Forest and Range Exp. Station. Ft. Collins, CO. 90pp.

Roedel, M. 1999. Personal communication. Montana Heritage Program

Rosgen, D.L. 1996. Applied river morphology. Wildland Hydrology, Publisher.

Ruggiero, L.F., K.B. Aurbury, S.W. Buskirk, L.J. Lyon and W.J. Zieinski, tech. editors. 1994. The scientific basis for conserving forest carnivores American marten, fisher, lynx and wolverine in the western United States. Gen. Tech. Rep. RM-254. USDA-Forest Service, Rocky Mountain Forest and Range Exp. Station. Ft. Collins, CO. 184pp.

Servheen, C. and P. Sandstrom. 1993. Ecosystem management and linkage zones for grizzly bears and other large carnivores in the northern rocky mountains in Montana and Idaho. Endangered Species Tech. Bulletin. Vol. XVIII No. 3. pp. 10-13

Schwecke, D.A. and W. Hann. 1989. Fire behavior and vegetation response to spring and fall burning on the Helena National Forest. *in* D.M. Baumgartner, D.W. Breuer and B.A. Zamora eds. Prescribed fire in the intermountain region: forest site preparation and range management, Symposium Proceedings, Washington State University, Pullman, WA. pp. 135-142.

Sneva, F.A. 1972. Grazing return following sagebrush control in eastern Oregon. J. Range Mngt. 25:174-178.

Stebbins, R.C. 1985. Western Reptiles and Amphibians. Peterson Field Guide.

Theil, R.P. 1985. The relationship between road densities and wolf habitat suitability in Wisconsin. Am. Midl. Nat. 113:404-407.

Thomas, J.W. 1979. Wildlife habitats in managed forests the blue mountains of Oregon and Washington. Agric. Handbook No. 553. USDA-Forest Service, Pacific Northwest Forest and Range Exp. Station. Portland, OR. 512pp.

Thomas, J.W. and D.E. Toweill. 1982. Elk of North America: ecology and management. Stackpole
Books, Harrisburg, PA. 698 pp.

Thompson, J.E. (compiler). 1995. Analysis in support of ecosystem management. Analysis Workshop III, April 10-13, 1995, Fort Collins, CO. USDA Forest Service, Ecosystem Analysis Center, 1995. 360 pp.

USDA Forest Service. 1986. Beaverhead National Forest Land and Resource Management Plan.

USDA Forest Service. 1988. Handbook 2509.22, Soil and water conservation practices handbook. Regions 1 and 4.

USDA Forest Service. 1994. Handbook 462: National forest landscape management vol.2,4. R1-80-11. visual character types and variety class description.

USDA Forest Service. 1994. Sustainable ecological systems: implementing an ecological approach to land management. Gen. Tech. Rpt. RM-247. Fort Collins, CO. 363 pp.

USDA Forest Service. 1994. Beaverhead National Forest Oil and Gas EIS.

USDA Forest Service. 1994. Tobacco root landscape analysis documentation, unpublished report. Madison Ranger District, Beaverhead-Deerlodge National Forest.

USDA Forest Service. 1995a. Aspen management and monitoring. Unpublished report to the files. Madison Ranger District, Beaverhead National Forest.

USDA Forest Service. 1995b. Range permit reissuance-sage grouse. Prepared by M. Maj and J. Mariani, Region 1, Missoula, MT.

USDA Forest Service. 1995. Conservation Assessment for Inland Cutthroat Trout. Gen. Tech. Rep. 256. Rocky Mountain Forest and Range Exp. Station. Ft. Collins, CO. pp. 1-15.

USDA Forest Service. 1996a. Status of the interior columbia basin summary of scientific findings. Gen. Tech. Rpt. PNW-GTR-385. Portland, OR. 144 pp.

USDA Forest Service. 1996. Conservation Assessment for Inland Cutthroat Trout. Intermountain Region. Ogden, Utah. pp. 1-10.

USDI Fish and Wildlife Service. 1987. Northern rocky mountain wolf recovery plan. USDI Fish and Wildlife Service, Denver, CO. 119pp.

USDI Fish and Wildlife Service. 1994. 50 CFR Part 17 Establishment of a nonessential experimental population of gray wolves in Yellowstone National Park in Wyoming, Idaho, Montana, Central Idaho and Southwestern Montana; Final Rules. Federal Register. Vol. 59, No. 224. November 22, 1994. 60252-60281pp.

USDI Fish and Wildlife Service. 1993. Grizzly bear recovery plan. Missoula, MT. 181pp.

Vanderhorst, J. and B.L. Heidel. 1995. Sensitive plant survey in the Tobacco Root Mountains, Madison County, Montana. Unpublished report to the Beaverhead and Deerlodge National Forests. Montana Natural Heritage Program. Helena, MT. 66pp. plus appendices.

Wambolt, C.L. and G.F. Payne. 1986. An 18-year comparison of control methods for Wyoming big sagebrush in southwestern Montana. J. Range Mngt. 39:314-319.

Ward, A.L. 1976. Elk behavior in relation to timber harvest operations and traffic in the medicine bow range in south-central Wyoming *in* Proc. Elk-logging-roads symp., ed. S.R. Hieb, pp.32-43. Univ. Idaho, Moscow, ID. 142pp.

Youmans, H.B. 1992. Statewide elk management plan for Montana. Montana Dept. of Fish, Wildlife and Parks, Wildlife Division. Helena, MT. 171pp.

CHAPTER 6
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CHAPTER 8
GLOSSARY

Affected environment - Resources (including social and economic elements) within or adjacent to a geographic area that could be changed by proposed actions; the relationship of people to that environment.

Airshed - a basic unit in which air quality is managed.

Alternative - A combination of actions and practices applied in specific terms and tied to specific locations to achieve a desired management emphasis. One of several policies, plans, or projects proposed for decision making.

Analysis area - A delineated area of land subject to analysis of (1) responses to proposed management practices in the production, enhancement, or maintenance of forest and rangeland outputs and environmental quality objectives, and (2) economic and social impacts.

Biological assessment - The legal record of findings for U.S. Fish and Wildlife Service proposed, threatened, or endangered species.

Biological diversity - The range and variety of species that collectively represent the living plants and animals within a local, regional, or continental landscape.

Biological evaluation - The legal record of finding for USDA Forest Service, Region 1 sensitive species.

Browse - That part of the current leaf and twig growth of shrubs, woody vines, and trees available for animal consumption.

Candidate species - Any species not yet officially listed as threatened or endangered, but that are undergoing a status review or are proposed for listing according to Federal Register notices published by the Secretary of the Interior or the Secretary of Commerce.

Canopy - The continuous cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth, such as sagebrush.

Cumulative effect - The effect on the environment which results from an incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Desired future condition (DFC) - As used in the Forest Plan, the desired future condition of the forest describes what the forest will look like as Forest Plan management direction is implemented. The two points in time chosen for description are after 10 and 50 years of implementation.

Diversity - (1) The relative abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area. (2) The distribution and abundance of different plant and animal communities and species within the area covered by a Land and Resource Management Plan (36 CFR Part 219.3(g)).

Ecological status - Ecological status relates the degree of similarity between current vegetation and potential vegetation for a site. It can be measured on the basis of species composition within a particular community type or on the basis of community type composition within a riparian complex. The categories for ecological status include early seral, mid seral, late seral,

and potential natural community(ies) (PNC), based on the degree of similarity to the potential natural community. Early seral is very dissimilar to PNC and similarity to PNC increases as seral stage becomes later.

Ecosystem - A complete, interacting system of organisms considered together with their environment (for example: a marsh, a watershed, or a lake).

Effects - Physical, biological, social, and economic results (expected or experienced) resulting from natural events or management activities. Effects can be direct, indirect, and/or cumulative.

Endangered species - Any species which is in danger of extinction throughout all or a significant portion of its range and listed as such by the Secretary of the Interior in accordance with the Endangered Species Act of 1973.

Environment - The aggregate of physical, biological, economic, and social factors affecting organisms in an area.

Environmental analysis - An analysis of alternative actions and their predictable short and long-term environmental effects that include physical, biological, economic, social, and environmental design factors and their interactions.

Environmental Impact Statement (EIS) - A formal public document prepared to analyze the impacts on the environment of the proposed project or action and released for comment and review. An EIS must meet the requirements of the National Environmental Policy Act and directives of the agency responsible for the proposed project or action. The document is issued in a draft version, which is intended for public disclosure, review and comment, and a final version, upon which a decision is based.

Ephemeral streams - Streams that flow only as a direct response to rainfall or snowmelt events. They have no baseflow.

Erosion - The wearing away of the land's surface by water, wind, ice, or other physical processes. It includes detachment, transport, and deposition of soil or rock fragments.

Existing road - A road with an existing road prism. This road may require maintenance, such as the removal of vegetation, to allow safe travel by haul trucks.

Fire/utilization - Primary treatment on these acres is prescribed fire ignited by Forest Service employees. Small amounts of Christmas trees, sawlogs, or other forest products may be removed before or after treatment.

Floodplain - The area adjacent to the active stream channel which is inundated during flows which exceed bankfull level. The floodplain acts as an energy dispersion zone during flood flows, and functions as an area of deposition.

Forest Plan monitoring - Monitoring and evaluation comprise the management control system. It will provide the decision maker and the public information on the progress and results of implementing the Forest Plan. In general, monitoring is designed to gather the data necessary for the evaluation. During evaluation, data provided through the monitoring effort are analyzed and interpreted. This process will provide annual and periodic summary data necessary to determine if forest plan goals and objectives are being met; if management standards are being applied; and if the effects of management are as they were predicted.

Forest Plan Standards - Resource management standards designed to facilitate meeting of Forest goals and objectives as outlined in Chapter II of the 1986 Beaverhead Forest Plan.

Functioning - Proper functioning condition (functioning): Riparian-wetland areas are functioning properly when adequate vegetation, landform or large woody debris is present to dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality; filter sediment, capture bedload and aid floodplain development; improve flood-water retention and ground-water recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration and temperature necessary for fish production, waterfowl breeding and other uses; and support greater biodiversity. The functioning condition of riparian-wetland areas is a result of interaction among geology, soil, water and vegetation.

Guidelines - A description of a preferred or advisable course of action. Guidelines may describe a preferred or advisable method for conducting resource activities specific to the plan area. They may also describe a preferred or advisable sequence or priority for carrying out various types of projects if this helps achieve a forest plan goal.

Habitat - A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

Habitat type - An aggregation of all land areas potentially capable of producing similar plant communities at climax. The collective area which one plant association occupies or will come to occupy as succession advances. The habitat type is defined and described on the basis of the vegetation and its associated environment.

Heritage resources - The physical remains of human activity (artifacts, ruins, burial mounds, petroglyphs, etc.) and conceptual content or context (as a setting for legendary, historic, or prehistoric events, such as a sacred area of native peoples) of an area.

Indirect effects - Effects separated in time or space from the causative actions.

Interdisciplinary team - A group of resource specialists representing several disciplines, for example, fisheries, hydrology, soils, range management, and wildlife. The structure of the interdisciplinary team will depend upon the issues, concerns and opportunities associated with the project at hand. In revision of allotment management plans, one key individual(s) that will always be included is the permittee(s)."

Irretrievable Commitment - Irretrievable commitments are those that are lost for a period of time. If an interstate is constructed through a forest, the timber productivity of the right-of-way is lost for as long as the highway remains. The construction of the highway signals an irretrievable loss in exchange for the benefits of the highway.

Irreversible Commitment - Irreversible commitments are those that cannot be reversed, except perhaps in the extreme long term. The classic instance is when a species becomes extinct; this is an irreversible loss. Mining is a similar case; once ore is removed, it can never be replaced.

Issue - A problem or subject of concern raised by the public or by agency employees during scoping. Issues important to the decision at hand are analyzed in the EIS.

Lek - A site where grouse traditionally gather for sexual display and courtship.

Management Area (MA) - Areas in the National Forest designated by the Forest Plan as having similar management objectives and a common management prescription.

Management direction - A statement of multiple use, other goals, and objectives, with associated management prescriptions, standards, and guidelines for attaining them (36 CFR Part 219.3).

Management Indicator Species (MIS) - Indicator species are those animals or plants whose presence is a fairly certain indication of a particular set of environmental conditions. Management indicator species are those wildlife species selected in the planning process to monitor the effects of planned management activities on viable populations of all wildlife and fish species, including those species that are socially or economically important.

Management prescriptions - Management practices, and intensities of those practices, selected and scheduled for application on a specific area to attain multiple use and other goals and objectives.

Mitigate - Avoid or minimize impacts by limiting the degree or magnitude of the action and its implementation; to rectify the impact by repairing, rehabilitating, or restoring the affected environment; to reduce or eliminate the impact by preservation and maintenance operations during the life of the action.

Monitoring - An examination, on a sample basis, to determine how well objectives have been met and a determination of the effects of those management practices on the land and environment.

National Environmental Policy Act of 1969 (NEPA) - Public Law 91-190. Establishes environmental policy for the nation. Among other items, NEPA requires federal agencies to consider environmental values in decision making processes.

National Environmental Policy Act (NEPA) process - An interdisciplinary process, mandated by the National Environmental Policy Act, which concentrates decision making around issues, concerns, and alternatives, and the effects of those alternatives on the environment.

National Forest Management Act (NFMA) - A law passed in 1976 as amendments to the Forest and Rangeland Renewable Resources Planning Act, which requires the development of regional and forest plans and the preparation of regulations to guide that development.

National Forest System - All National Forest lands reserved or withdrawn from the public domain of the United States; all National Forest lands acquired through purchase, exchange, donation, or other means; the National Grasslands and land utilization projects administered under Title III of the Bankhead-Jones Farm Tenant Act (50 Stat. 525, 7 U.S.C. 1010-1012); and other lands, waters, or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as a part of the system.

National Register of Historic Places - A listing maintained by the National Park Service of areas which have been designated as being of historical value. The Register includes places of local and State significance, as well as those of value to the Nation as a whole.

No action alternative - An alternative where no activity would occur, or where current management practices would continue unchanged. The development of a no action alternative is requested by regulations implementing the National Environmental Policy Act (NEPA) (490 CFR 1502.14). The no action alternative provides a baseline for estimating the effects of other alternatives.

Nonpoint source pollution - Diffuse sources of water pollution that come from indefinable sources such as agricultural, timber harvest and road construction activities.

Objective - A concise, time specific statement of measurable planned results that respond to preestablished goals. An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals.

Partial harvest/no burn - Small diameter lodgepole would be harvested. This treatment differs from partial harvest/underburn both in the size of trees removed, and in the slash disposal method. The primary product would be posts and poles, with some small sawlogs. The slash resulting from harvest would be piled and burned, or slashed and left to rot. The treatment units would not be underburned after harvest.

Partial harvest/underburn - Trees would be harvested and then the area would be underburned. Once harvest is completed, underburning would commence and extend over another two-year period. The maps and Table 1 indicate the first year of a two year duration in which sales would be sold in a given area. For example, if the map legend and Table 1 show harvest/underburn in 2000, that means we would sell up to the indicated number of acres in several timber sales in 2000 and 2001. Once harvest is completed, underburning would commence and extend over another two-year period.

Perennial stream - A stream which normally flows throughout the year.

Plant association - A kind of climax plant community consisting of stands with essentially the same dominant species in corresponding layers.

Potential natural community (PNC) - The biotic community that would become established if all successful sequences were completed without interferences by man under the present environmental conditions.

Present net value (PNV) - The difference between the discounted value of all benefits and the discounted value of all costs over the analysis period.

Precommercial thinning - Previously harvested units (clearcut) would be thinned by falling sapling-sized trees. These stands do not contain trees big enough to be sawlogs.

Prescribed burning - The intentional application of fire to wildland fuels, in either their natural or a modified state, under conditions that allow the fire to be confined to a planned area and, at the same time, produce the heat intensity and rate of spread required to gain certain planned objectives (for example, silviculture, wildlife management, etc.)

Prescribed fire - A fire burning under specified conditions which would accomplish objectives in strict compliance with an approved plan, and so that the conditions under which the burning takes place and the expected results are specific, predictable, and measurable.

Project file - More detailed documentation of an environmental analysis, usually located in files in the Forest Service District Office or the Forest Supervisor's Office.

Proposed action - Under NEPA, a proposed action is a proposal made by an agency to authorize, recommend, or carry out an action to meet a specific purpose and need.

Public involvement - A Forest Service process designed to broaden the information base upon which agency decisions are made by 1) informing the public about Forest Service activities, plans and decisions, and 2) encouraging public understanding about and participation in the planning processes which lead to final decision making.

Purpose and need - A statement in the Notice of Intent and EIS that explains why an action is being proposed and what need the agency is trying to meet through the action.

Record of Decision (ROD) - A document separate from but associated with an environmental impact statement that publicly and officially discloses the responsible (decision making) official's decision about the alternatives assessed in the environmental impact statement, and the alternative chosen to implement.

Scoping process - An early and open public participation process for determining particular issues to be addressed in an environmental document and for identifying the significant issues related to a proposed action.

Sensitive species - Those plant or animal species that merit concern due to limited or declining population size or a reduction in habitat and as recognized by the Regional Forester.

Seral - A biotic community that is developmental; a transitory stage in an ecologic succession.

Seral stages - The developmental stages of an ecological succession.

Similarity to potential - The potential of a stream is a description of its shape and form under natural conditions, including disturbances in the watershed such as fire and climatic change. An assessment of similarity compares the existing shape and form of the stream to its potential.

Significant - As used in the National Environmental Protection Act: requiring consideration of context and intensity or severity of impact. This includes:
beneficial and adverse impacts
the degree that the action affects public safety
unique characteristics of the geographic area
highly controversial effects
highly uncertain effects
the degree to which an action may establish a precedent for future actions
cumulative impacts
cultural and historic resources
Threatened and Endangered Species, and
compliance with environmental laws.

Standards - Limitations to be placed on management activities within a plan area to ensure compliance with applicable laws and regulations or to limit the discretion to be permitted during project decision making. Standards are limited to those actions that are within the authority and ability of the agency to meet or enforce.

Successional stage - A phase in the gradual replacement of one community of plants by another.

Suitability - The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone (passed). A unit of land may be suitable for a variety of individual or combined management practices.

Temporary road - A road requiring ground disturbance to create a road prism (cut and fill slope).

Threatened and Endangered Species (TES) - Any species of the plant or animal kingdom at risk of extinction or whose viability is in doubt. Federal codes are defined as follows:

Endangered (E): Any species that is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary to constitute a pest whose protection under the Endangered Species Act would present an overwhelming and overriding risk to man.

Threatened (T): Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Total Maximum Daily Load (TMDL) - The maximum allowable load of a pollutant to a water body that will result in the body's water quality meeting standards. Consists of existing and future point sources, existing and future nonpoint sources, and a margin of safety.

Vegetation - Plants in general, or the sum total of the plant life above and below ground in an area.

Vegetation type - A plant community with distinguishable characteristics.

Vegetative community -A group of one or more populations of plants in common spatial arrangement with common nutritive and growth functions.

Vegetative community types - An aggregation of all plant communities distinguished by floristic and structural similarities in both overstory and undergrowth layers. A unit of vegetation within a classification.

Watershed - The total area above a given point on a stream that contributes water to the flow at that point.

Water Quality Limited Segment (WQLS) - A stream segment that is violating applicable state water quality standards and/or that is unable to support beneficial uses, even after the application of technology based effluent limitations. A WQLS will require a TMDL before it can be removed from the state list of WQLS's.

Westslope cutthroat trout - Genetically pure cutthroat trout which have been analyzed using an electrophoresis process in which the purity of a sample of trout is determined by the location pattern of genes in a gel matrix.

Wetlands - Areas that are inundated by surface or ground water frequently enough to support (and under normal circumstances do support) a prevalence of vegetation or aquatic life that require saturated or seasonally saturated soil conditions for growth and reproduction.

Wildlife Security Block - A 200 acre, or larger, block of land that is at least 1/4 mile from a road or trail that is open to motorized use during the general hunting season and has not been previously harvested for timber.

APPENDIX A
ISSUE RESOLUTION

The following appendix describes how each issue generated from external (general public) scoping was addressed during the analysis process. The full content of letters received during the scoping comment period is available in the project file. The following is a summary of concerns identified between December, 1998 and March, 1999. Rationale for how each concern was addressed is described in *italics*.

Each concern was also placed into a broad category. Readers are encouraged to read each item to determine the specific area of concern. By placing the concerns into a category, the responsible official can identify broad areas of concern and the public emphasis placed on these concerns. Some categories are quite broad. For example, the category "timber" includes concerns for logging practices, stand composition, snags and down wood debris. Some concerns could be placed into several categories. For example, the statement "Temporary roads may lead to increased motorized use" could be placed in either the "road" or "travel management" categories. An alpha-numeric letter is denoted in **bold** type at the end of each comment to indicate which category this comment was placed in. The categories and symbol letter for each category are summarized in the following table.

Category Title	Number of Comments	Symbol
Roads	13	RD
Water	26	WT
Monitoring	9	M
Wildlife	72	WF
Cumulative Effects	13	CE
Timber	26	TB
Noxious Weeds	10	WD
Soils	6	S
Economics	9	E
Roadless Areas	14	RL
Travel Management	7	TL
Fisheries	14	F
Heritage Resources	2	H
Recreation	1	RC
Analysis Processes	57	P
Vegetation	15	V
General	8	G
Biodiversity	6	B
Air Quality	3	AQ

1. Needed restoration work includes road closures and obliteration, and means to eliminate human-caused erosion sources. The Beaverhead-Deerlodge needs to examin(e) the ecological impacts caused by its road system. Unneeded roads should be closed after removal of culverts/stream crossings, decompaction and/or full recontouring. We expect that during the NEPA process for

proposed projects, nonsystem roads be targeted for even more substantial action. For all proposed projects, any roads that are not on the Forest inventory within a properly defined cumulative effects analysis area should be obliterated if the Forest does not propose to immediately make them a part of the inventory. **RD**

See Chapter 1, Section D, Scope of the Proposed Action. Analysis of the existing transportation system is beyond the scope of this project.

2. It is critical that timber sale project analyses disclose the potential impacts of underfunded maintenance, and the direct, indirect and cumulative effects poorly maintained roads have on water quality. When proposing new road construction, please estimate the quantitative increase in risk of road failure during all phases of such roads' existence as compared to the same slopes without roads. You should also indicate the degree of the various modes of travel "closed" roads will experience. (T)he Beaverhead-Deerlodge should strive to increase road closure effectiveness -- in the meantime, thorough monitoring must take place in order to account for the cumulative effects of road density in conjunction with other projects. **RD**

See Chapter 1, Section D, Scope of the Proposed Action. Analysis of the existing transportation system is beyond the scope of this project. See Chapter 3, Section E for a description of the affected environment, Hydrology, and Chapter 4, Section F for Environmental Consequences for Hydrology. See Chapter 4. Section D, for discussion of effectiveness of road closures. See also Chapter 2. Section G, Items 12, 13, and 14.

3. Project NEPA documentation should include the watershed analysis methodology as outlined in Ecosystem Analysis at the Watershed Scale (Federal Guide for Watershed Analysis) as referred to in the INFISH Decision Notice. NEPA analyses should show that the proposed alternatives would comply with the Clean Water Act and all state water quality laws and regulations. Merely designating Best Management Practices (BMPs) is not sufficient for compliance with the Clean Water Act and NFMA. For BMPs to work, their actual effectiveness in preventing water quality degradation must be considered. This means completing the feedback loop by considering all available applicable monitoring information before selection of BMPs. For example, what BMP failures have been noted for past projects with similar landtypes or other circumstances? Water models the Forest Service generally use underestimate the amount of water yield increases in the affected watersheds affected by past, present and proposed activities. As far as we know, validation of models based upon quantitative monitoring data has never been performed on the Beaverhead-Deerlodge. **WT**

The watershed methodology used is described in Chapter 3, Hydrology. Although decisions and directions made in INFISH are for areas West of the Continental Divide, we take much the same approach here. All alternatives comply with the Clean Water Act and State laws. While BMP's are specified for each activity on the ground, they are employed as "insurance" rather than the major deterrent to sediment production. The major deterrent to sediment production is the location of the proposed activities. Given that there is a 300 foot buffer strip on each side of all perennial and intermittent streams ensures that material eroded as a result of ground disturbance will not reach the streams as sediment. The application of BMP's at the sites further reduces, but does not eliminate, the potential for erosion. While some studies have shown that models that predict water yield increases tend to underestimate those increases, the studies were conducted west of the continental divide in watersheds with a substantial percentage of their area in a harvested condition. Studies done east of the

divide in areas similar to the Beaverhead-Deerlodge, indicate that water yield/peak flow increases are not of a magnitude to affect stream channels, especially the stable channels that are generally found within this project area. Furthermore, the small percentage of the area of the Tobacco Root watersheds affected by vegetation manipulation eliminates the possibility of significant peak flow increases.

4. For every project proposal, it is important that the results of past monitoring be incorporated into planning. All Interdisciplinary Team Members should be familiar with the results of all past monitoring pertinent to the project area, and any deficiencies of monitoring that have been previously committed to. For that reason, we expect that the following be included in the NEPA document or project file: A list of all past projects (completed or ongoing) implemented in the project area. The results of all monitoring done in the Project area as committed to in the NEPA documents of those past projects. The results of all monitoring done in the Project area as a part of the Forest Plan monitoring and evaluation effort. A description of any monitoring, specified in those past projects or the Forest Plan for the project area, which has yet to be gathered and/or reported. If the results of past monitoring are uncertain or incomplete to the degree that more logging and road building constitutes unwarranted risks, new proposals should be shelved until monitoring results are conclusive. **M**

The results of specific monitoring projects are referenced and summarized in Chapters 3 and 4 for vegetation, wildlife habitat, roadless characteristics, hydrology and fisheries.

5. (T)he Forest Service should firmly establish that the species which presently or historically are believed to have had habitat in the analysis area are still part of viable populations on the landscape following the impacts from past development actions on lands of all ownership. Since this is not forthcoming from Forest Plan monitoring efforts, it should be a priority for project analyses. The analysis must cover a large enough area to include a cumulative effects analysis area that would include truly viable populations. If the analysis cannot identify viable populations of MIS and TES species of which the individuals in the analysis area are members, the analysis fails to assure the maintenance of viable populations, violates NFMA, and falls far short of meeting the requirements of a scientifically sound "ecosystem" analysis. Biologists should assure that the indicator species identified in the Forest Plan are appropriate indicators of environmental changes in the project area. It is not appropriate to take for granted that those listed in the Forest Plan are the only appropriate MIS, or that even using TES species will encompass the habitat needs of all wildlife and fish. The continued fragmentation of the Forest also needs to be a major issue in all analyses. **WF**

Refer to Chapter 3 Section C, Description of Affected Environment - Wildlife. Cumulative Effects analysis area is outlined in Chapter 4 Section D, Environmental Consequences for Wildlife Habitat, Cumulative Effects. Refer to Chapter 1, Purpose and Need for Action. Designation of Forest Plan MIS and use of TES is beyond the scope of the project. Refer to Chapter 2, Issue 2 - Wildlife Habitat.

6. The Beaverhead-Deerlodge should designate reserve blocks to support old-growth associated species of wildlife, including boreal owl, pine marten, black-backed woodpecker, lynx, pileated woodpecker, fisher, and several species of migratory birds. Environmental analyses should state the sizes of old growth stands in project areas. Please consider the edge effect from natural and man-made openings including roads, in order to evaluate quality of reserve blocks. **WF**

Refer to Chapter 1, Purpose and Need for Action. Refer to Chapter 3 Section B, Description of Affected Environment - Vegetation and Section C, Description of Affected Environment - Wildlife (note pileated

woodpecker does not occupy habitat on the Madison Ranger District). Refer to Chapter 4, Section D, Environmental Consequences for Wildlife Habitat.

7. In addition to considering direct impacts of the proposed action, cumulative effects analyses should assess indirect effects on wildlife, soils, water quality, and biodiversity resulting from livestock grazing and motorized (on- and off-road) travel. **CE**

A direct, indirect and cumulative effects analyses are included in Chapter 4 for vegetation, wildlife habitat, roadless characteristics, hydrology and fisheries. These reports include analysis of grazing by domestic livestock (only on active allotments within the project area) and motorized travel.

8. Please examine past logging activities, including such information as year and regeneration success level for each past activity in the analysis area and in the cumulative effects area. Please disclose the sizes and condition of man-made openings already existing in the area, and exactly where the proposed cutting units are in relation to the old logged areas so that it can be assured that Regional Guide and Forest Plan standards for dispersal can be met. Please do studies that consider landtypes, habitat types, slopes, aspect, etc. for each project, so that there would be assurance of successful regeneration. Please disclose (by providing maps, tables, and other documentation) the level of regeneration success from past even-aged logging in the immediate and surrounding compartments, explaining the dates of logging, the problems encountered and duration needed before certification of restocking. Evaluate the potential for regeneration efforts in some cutting units to fail due to natural events such as pocket gophers, frost pockets and growth of brush. If it is possible that such factors will be a problem for regeneration, leading to expensive measures taken such as control of pocket gophers, then the area's suitability for timber is an issue. Likewise, it is a potential that herbicide treatment or burning of competing vegetation will be needed to achieve regeneration, this raises a whole new set of cumulative impacts your timber sale environmental analyses should be dealing with up front. Where planting is anticipated necessary to achieve full stocking, please consider that planted trees are known to have poorly developed root structures, which has implication for the long-term development of "regenerated" stands. **TB**

Past logging information and stand records were utilized in preparation of Appendix C. The District has voluminous information on site-specific stand treatments used in this analysis and incorporated in Target Stand analysis.

9. We believe that it is necessary to perform field surveys to determine the level of available snag and downed woody material in the cumulative effects area, since it is quite possible that excess snags in the proposed project area are needed to offset the lack of snags in areas previously logged. (P)roject analyses must acknowledge that OSHA regulations require that soft snags anywhere near loggers must be felled for safety. This means vast portions of all cutting units will be depleted of standing soft snags. Such differences between Forest Plan standards and guidelines and this OSHA regulation is usually not acknowledged. **TB**

The Madison Ranger District has over 20 years of field surveys for this information in the Tobacco Root analysis area. This information was incorporated in Appendix C.

10. Hejl et al (1995) suggest that you "allow or reintroduce natural disturbance patterns" to provide for bird diversity. We would like you to consider this recommendation with respect to project planning.

By surveying bird abundance and diversity before and after each project, you may be able to identify management directions that ensure maintenance of viable populations of birds. **WF**

Refer to Tobacco Root Landscape Assessment, EIS Chapter 1, Purpose and Need for Action and Chapter 4 Section D, Environmental Consequences for Wildlife Habitat.

11. Project analyses should discuss the potential of spreading noxious weeds into areas currently infested. You should be considering the cumulative effects of subsequent herbicide use and other intensive treatments of noxious weeds at the project level. Such cumulative impacts extend into the realm of economic impacts, since the public will be paying for the later "treatment" of noxious weeds that projects almost invariably spread. Once introduced, it virtually impossible to eradicate weeds, therefore the costs of weed treatment should be projected as an ongoing expense. **WD**

Chapter 2, Section G, Items 24 and 26 addresses this concern. Appendix B addresses costs.

12. We are opposed to the creation of clearcuts (by any name) due to the resulting damage to wildlife habitat, water quality and fisheries. Evaluate the likelihood of consequential blowdown of remaining trees in the cutting units or trees bordering the cutting units, based upon past logging in similar areas. What is the likelihood of later salvage actions in the same area as a result of blowdown caused by the proposed logging? Analysis of the "no action" alternative should discuss natural forest succession. Based upon monitoring of results of previous logging in the area, discuss how the action will affect insect infestations and other disease outbreaks and how likely is it that the action will stress other trees near the cutting units, increasing their susceptibility to attack by insects or diseases. Please assess the hazard of human-caused wildfire, given that slash left after cutting and slash burning are a fire risk to adjacent forested areas. **TB**

These issues are addressed in Chapters 3, and 4. Clearcuts are not proposed and the rationale is displayed in Chapter 2, Alternatives considered but not given detailed study.

13. For each project, a soils scientist should actually go out on the ground and check a representative sample of areas that have been impacted by the various previous management activities. The soils scientist should measure the degree of disturbance in past cutting units in project area, examining all the variables such as yarding and site preparation methods that have led to detrimental soil conditions. This information is necessary to evaluate the cumulative effects of a proposed project on soil quality. New logging activities will change grazing patterns, which needs to be considered in analyses. Disclose areas of unstable and highly erosive soils which could result in mass movement. Create maps which show all soil disturbing actions overlaid with landtypes for project files. **S**

Refer to Chapter 2, Section G, Chapter 3 and Chapter 4.

14. Along with the costs of the specific project activities, the costs of road maintenance proportionately attributable to projects should be analyzed. Also, the costs of carrying out both the current fire suppression policy and later projects proposed to "restore" the land because of fire suppression should be considered. In this era of increased responsibility to the taxpayer for providing the highest benefits in return for public investments, we request that you document how your decisions and the selected alternatives maximize the net public benefit. In other words, you should give consideration to, and adequately document, who benefits from each project and what source of funding pays for each expense incurred. Please provide an itemized list of monetary costs and benefits for all

alternatives (including the no-action alternative). Opportunity costs should also be a part of project analyses. These are the economic values/uses forgone by using a particular forested area for logging (as opposed to preservation) plus the economic benefits that could be realized by using the funds spent in other ways. Opportunity costs associated with timber sales include the economic value of a wide range of "ecosystem services" such as filtration of water that will be destroyed by logging, the value of recreation that will be displaced, as well as the forgone economic benefits associated with using the timber sale funds for watershed and fisheries restoration, cooperative forestry projects on nearby state or private lands, or other alternative uses. Economics is another reason why we strongly desire to see, for each project proposal, at least one alternative analyzed that would only involve rehabilitation and recovery. The long-term benefits of not having to spend money for road maintenance or other management activities and administration in the project area should be compared to the expenses incurred from both the action alternatives and the no-action alternative. **E**

The economic analysis includes much of this information and is Appendix B. The economics of a "healthy ecosystem" are beyond the scope of this project and can be found in some of the literature listed in the Bibliography.

15. The analysis should include an alternative which recommends wilderness designation for all or part of the roadless areas which will be developed under the alternatives. (W)e would like you to address projects' full potential impacts on critical ecosystem features by closely examining land beyond the immediate analysis area and considering the cumulative landscape scale effects of continued habitat alteration within and adjacent to unroaded forest land. **RL**

See Chapter 1, Section D, Scope of the Proposed Action. Analysis of areas for wilderness designation is beyond the scope of the project. See Chapter 4. Section D for cumulative effects on habitat.

16. (I)f you create 38 new miles of temporary road and then obliterate it, how are you going to keep the ATV's out of the obliterated roads. Do you have a new plan. This has been tried before and failed. **TL**

See Chapter 4, Section D for discussion of effectiveness of road closures. See also Chapter 2, Section G, items 12, 13 and 14.

17. Displacement of wildlife as well as any other impacts due to preparation activities (i.e. roadbuilding), timber harvest and prescribed fire needs to be thoroughly examined. **WF**

Refer to Chapter 4 Section D, Environmental Consequences for Wildlife Habitat.

18. Management indicator species in the area should be identified and the proposal's potential impacts on these species examined. **WF**

Refer to Chapter 3 Section C, Description of Affected Environment - Wildlife and Chapter 4 Section D, Environmental Consequences for Wildlife Habitat.

19. Migration corridors, rutting complexes, primary feeding areas and other key wildlife habitat should be identified and the impacts of the proposed action on these areas analyzed. **WF**

Refer to Chapter 3 Section C, Description of Affected Environment - Wildlife and Chapter 4 Section D, Environmental Consequences for Wildlife Habitat.

20. The analysis should examine the impacts of habitat fragmentation and the reduction of thermal and security cover and habitat effectiveness resulting from roadbuilding and timber harvest. **WF**

Refer to Chapter 2 Section C, Issues, Issue 2 - Wildlife Habitat and Chapter 4 Section D, Environmental Consequences for Wildlife Habitat.

21. The DEIS must examine the potential effects of the proposed activities on listed threatened, endangered, and sensitive species as well as those proposed for listing. This should include an evaluation of the cumulative effects to these species, especially in view of the potential for increased use of the project area during timber harvest and the increased number of roads. **WF**

Refer to Chapter 4, Section D, Environmental Consequences for Wildlife Habitat - Threatened, Endangered and Sensitive Wildlife Species Effects and Biological Assessment (prepared for Final EIS)

22. Any activity proposed within riparian corridors or in the vicinity of springs, lakes and wetlands should be examined with respect to effects on these areas including water quality, sedimentation, fisheries, and wildlife. **WT**

The affects of activities near water bodies are analyzed in Chapter 4.

23. The DEIS should analyze the impacts of the proposed activities on the area's fisheries. Eight streams in the project area contain westslope cutthroat trout. **F**

See Chapter 4, Environmental Consequences for Fisheries.

24. We are concerned about the potential for soil erosion and the resulting effects of sedimentation in the areas' streams and waterways. Proposed activities including roadbuilding, stream crossings, timber harvest and prescribed fire should be assessed in terms of their effects on soil and slope conditions. **WT**

The affects of activities on the water resource are analyzed in Chapter 4.

25. The DEIS should provide an analysis of potential impacts to the project area streams' water quality. **WT**

The affects of activities on the water resource are analyzed in Chapter 4.

26. A survey of cultural, historic, and archeological resources should be conducted as part of the DEIS. **H**

Please reference the "Heritage Resource" report in Appendix B. Cultural, historic and archeological resources (especially those associated with historic mining activities) are common in the southern Tobacco Root Mountains. Most of the project area has been intensively surveyed. Mitigation measure #22 was included in the event unknown sites are discovered during management activity.

27. The DEIS should address the effects of this proposal on the recreation resources of the area. **RC**

See Appendix B, Recreation Effects.

28. The DEIS should also address the potential for increased motorized use due to the 30+ miles of new roads, the potential for unauthorized use and trespass into areas closed to motorized use, and the impacts this motorized use would have on the area's other resources. **TL**

Effectiveness of road closures and effects of illegal motorized use is discussed in Chapter 4, Section D.

29. The proposed management activities should not be allowed in roadless areas. In an area as fragmented by roads as the Tobacco Roots, roadless areas provide a core of intact wildlife and fisheries habitat. The DEIS should include alternatives that do not intrude on roadless areas. **RL**

See Chapter 1, Section C, for discussion of need for wildlife security blocks. See Chapter 4, Sections B, D, and G, for effects on wildlife security and fisheries. See Chapter 2, Section E, for discussion of alternatives. And Chapter 4, Section E, for the range of effects on roadless.

30. The DEIS should include useful, informative maps. Specifically: Maps should show towns, trails, roads and topographic features including stream drainages, mountains and lakes. Maps should indicate existing and planned roads, existing and planned stream crossings and roads that should be obliterated. Maps should show the roadless areas and indicate any activities proposed for the areas. Maps should show the Management Area boundaries within the project area. Maps should include vegetation, hydrology and wildlife overlays. Seasonal use, denning and calving areas, and migration routes should be shown for species such as moose, elk, and black bear. The same wildlife overlays should be shown for sensitive, threatened and endangered species. **P**

Management Area boundaries are delineated in the Beaverhead Forest Plan (pages IV-53, IV-55 and IV-57). Roadless area, hydrology and wildlife security area maps are included in the DEIS. Refer to Chapters 3 and 4 for written descriptions of seasonal use, etc. for moose, elk , black bear and TES species. Vegetation maps are available in the project file. Due to the large size of the project area and the complexity of the mapping, we were unable to reproduce this map at the large scale necessary for publication within the DEIS. Vegetation maps are available upon request.

31. A complete cumulative effects analysis should be included on not only the effects of this proposal, but the effects of this proposal combined with other foreseeable activities in the area on Forest Service, BLM, state, and private lands. **CE**

All action alternatives (including the proposed action) were developed to implement a ten year program specifically so effects analysis would include "reasonably foreseeable" activities. Proposals on adjacent BLM, state and private lands were analyzed based on the "analysis area" identified for each resource area in Chapters 3 and 4.

32. The DEIS should include measures to mitigate the impacts of the proposed activities on the affected resources listed above. **P**

Mitigation measures are listed in Chapter 2, Section G.

33. The DEIS should provide a reasonable range of alternatives, including an alternative that does not enter roadless areas and emphasizes wildlife and biological diversity rather than commodity production. P

Alternatives considered in detail are described in Chapter 2, Sections E and H. No timber harvest in inventoried roadless areas is proposed in Alternatives R, T and U (only precommercial thinning is proposed in Alternative S. Wildlife and biological diversity are emphasized in Alternative FP-2.

34. A Forest Plan amendment should be completed prior to any logging of unsuitable timber lands. P

Many of the MAs in the southern Tobacco Root Mountains (for example, MA-25) are designated in the Forest Plan as "not suited for scheduled timber management". Please note that this reference is different than "unsuitable for harvest". During the development of the Forest Plan, these MAs were identified as areas that would not be managed for timber production. In these MAs the project focuses on restoring the ecosystem, rather than producing maximum amounts of timber available fore harvest. Therefore, this project does not propose logging MAs that are "not suited for scheduled timber management" and a Forest Plan Amendment is not necessary

35. A Forest Plan amendment should be completed before new road construction is allowed in management areas where this activity is prohibited by the Forest Plan. P

No temporary road construction is proposed in management areas that prohibit this type of activity.

36. A Forest Plan amendment should be completed to address cumulative effects of the greatly accelerated sagebrush and ecotonal burning program on the District and Forest. P

Cumulative effects of sagebrush burning are disclosed in Chapter 4. Because prescribed burning activities proposed in this document complies with constraints in the Forest Plan, an amendment is not necessary.

37. An Environmental Impact Statement (EIS) should be completed to address significant changes in land management policy. P

This DEIS was prepared to analyze (site specifically) reasonably foreseeable vegetation manipulation activities and a proposed amendment to the Forest Plan to manage existing blocks of undisturbed wildlife habitat in the southern Tobacco Root Mountains.

38. An EIS should be completed to address cumulative impacts to wildlife that will occur with this proposal. WF

Refer to Chapter 4 Section D, Environmental Consequences for Wildlife Habitat, Cumulative Effects.

39. An evaluation of potential increases to inventoried roadless lands (IRAs) should be completed during this project work, especially where unroaded lands adjoin existing IRAs. RL

Refer to Chapter 1, Section D, for the Scope of the Proposed Action. Analysis of potential increases to inventoried roadless areas is beyond the scope of this project.

40. The public should be provided ample opportunity to review all proposed activities in the field, including sagebrush burning units, logging units, and all new roads. NEC's greatest concern is reviewing the proposed harvest on unsuitable Douglas fir stands. We would like to see many examples of these units where cut or leave trees have been flagged for identification. **P**

Three public field trips relating to this project have been held. The initial field trip was well attended (17 participants). Unfortunately, attendance dwindled. The third field trip was attended by one individual. This final field trip specifically reviewed the items of concern identified in this comment and was held at the suggestion of the organization providing the comment. Announcements of this field trip were published in local newspapers and individual letters were mailed to all parties interested in this project (including the organization providing this comment). Weather and community activities did not influence attendance. While NEC has repeatedly requested a field trip, representatives have not attended those field trips that were held. Due to the lack of attendance, another field trip is not scheduled. See "Kings Mill Field Trip Notes" in the project file.

41. The Forest should provide the public with an estimated full accounting of all logging costs and revenues. A recent GAO report disclosed that the Forest Service uses timber sales to generate revenue for the agency, and NEC would not like to see this practice used in the Tobacco Roots under the guise of "ecosystem management." Therefore, we would like all costs fully disclosed for the logging and road building program. **E**

Appendix B discloses the economic analysis.

42. NEC would also like to see a full accounting of the costs and benefits of the burning program, particularly in regard to the management of grazing allotments on which these burns will be located. How will the costs of these burning programs affect permittees on these allotments? Is wildlife habitat being destroyed to create more forage for private grazing interests, and if so, why is this a public benefit? **E**

Appendix B discloses the economic analysis. Benefits such as "ecosystem health" and "site conversion" to a different plant successional stage are beyond the scope of this economic analysis.

43. The District needs to disclose the long term plans for all logging units. If stands are going to be opened to "restore" structure, how will this openness be maintained over time, and what will the costs be? **TB**

Appendix C discloses the target stands for this proposal. Target stands were developed from the TRLA. Long term treatments are beyond the scope of this document.

44. The District also needs to disclose what the long term plans are for logging on unsuitable acres. This entry will be a commercial thin, so will future entries be planned as well? **TB**

Future entries beyond 10 years are beyond the scope of this project. Desired future condition is located in Appendix G and the TRLA.

45. The analysis should fully disclose the length of time each new temporary road will be open, and identify specific closure dates so that the public can understand what the disturbance impacts of these roads will be. **RD**

See Chapter 2, Section G, item 12.

46. The level of information in the NEPA document should fully define each treatment unit, and its effect on the environment, to the public. NEC is concerned about the agency completing a general programmatic document which contains little helpful information to the public. **P**

Stand specific data is included in Appendices C and D.

47. NEC is concerned about viability of wildlife. What type of data from monitoring and other sources will be used to demonstrate that populations of wildlife are currently viable, and that similar management practices (logging, burning and road construction) have not significantly impacted local and landscape viability of wildlife in other areas of the Forest? **WF**

Refer to Madison Ranger District 2620 Wildlife Survey files, EIS Bibliography and Chapter 4 Section D, Environmental Consequences for Wildlife Habitat.

48. NEC is concerned about management of wildlife in the District's "ecosystem management" proposal. What conservation strategies for wildlife, including both forest and sagebrush species, will be implemented as a part of this program to ensure that their habitat needs will be met over the short and long term? **WF**

Refer to Chapter 1 Purpose and Need for Action and the Bibliography. Development of conservation strategies for species without them is beyond the scope of this proposal.

49. NEC is concerned about population monitoring of forest and sagebrush wildlife. What surveys will be done to identify key occupied habitats and general locations of wildlife in the project area, so that management can be effective? **WF**

Refer to Chapter 4, Section D, Environmental Consequences for Wildlife Habitat, Recommended Monitoring for Wildlife and Madison Ranger District 2620 Wildlife Survey files.

50. NEC is concerned about inadequate disclosure of program activities to the public regarding logging of trees, construction of more roads, and burning of sagebrush and ecotones. We specifically request that the size of each analysis area be limited to no more than 5,000-6,000 acres so that local impacts can be reasonably evaluated. These impacts include things like open road densities during logging, hiding cover, big game security, big game winter and calving habitat, and losses of forest interior habitat and old growth. **P**

Specific items of concern are disclosed in Chapter 4. Rather than select a random number, as recommended in this comment, the ID team and responsible official specifically decided to analyze all reasonably foreseeable activities in the southern Tobacco Root Mountains. For example, we could analyze road densities on a 5,000 acre portion of the southern Tobacco Root Mountains, but this does not effectively analyze the effects of these road densities to bull elk vulnerability during the general hunting season since the entire project area provides habitat for elk and numerous roads (in and out of

this 5,000 acre portion) may be open to motorized use during the hunting season. Please refer to Chapter 2, Section D.

51. We would also like to have reasonably sized maps for each of these small analysis areas provided which disclose existing and planned habitat conditions for things as unfragmented sagebrush, calving habitat, big game winter range, old growth, hiding cover, security, roads, motorized trails, forest interior blocks, and MIS/SS habitats. **P**

We provided the largest sized maps that we could publish in the quantities needed for an EIS. Because these maps are electronically produced, we can print maps at a wide array of scales. As stated on each map, more detailed, smaller scale maps are available upon request from the District office in Ennis.

52. For each individual analysis area, NEC would like the District to provide a tabulation of all treatment units, including acreage. For forests, we would like to know the habitat type and phase of the site, the current and proposed basal areas and canopy closures, and the projected timber volume that will be produced with harvest. For burning areas, we would like to know the distribution of sagebrush and patch size. **V**

Appendices C and D provide most of this information in the requested format. Habitat type information was too voluminous for the format and is available in the district stand data base folders.

53. NEC is concerned about wildlife species that find cover and other needs in ecotonal areas. Will these species be defined, their habitat needs identified, and projected losses of habitats evaluated? **WF**

Refer to Chapter 2, Section C Issues, Issue 2 - Wildlife Habitat and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat.

54. NEC is concerned about the function of the Tobacco Roots as a grizzly bear and wolf biological corridor. Where will core security areas be maintained for these species to enhance movement and dispersal? **WF**

Refer to Chapter 1 Purpose and Need for Action, Chapter 4, Section D, Environmental Consequences for Wildlife Habitat, Threatened, Endangered and Sensitive Species Effects and Biological Assessment (prepared for Final EIS).

55. NEC is concerned about the declining lynx. What areas are currently suitable for snowshoe hares? Will motorized access meet Region 1 direction? Will motorized access be increased because of the proposed programs? Does the District have monitoring data on the effects of past harvest on hare habitat? **WF**

Refer to Chapter 4, Section D, Environmental Consequences for Wildlife Habitat, Threatened, Endangered and Sensitive Species Effects and Biological Assessment (prepared for Final EIS).

56. NEC is also concerned about the impact of new road construction corridors on the wolverine. How will this affect security in various seasons for this species? Will Region 1 road density recommendations be met? **WF**

Refer to Chapter 1 Purpose and Need for Action, Chapter 4, Section D, Environmental Consequences for Wildlife Habitat, Threatened, Endangered and Sensitive Species Effects and Biological Assessment (prepared for Final EIS).

57. NEC is concerned about habitat fragmentation on big game, management indicator species, sensitive wildlife species, forest songbirds, and wildlife associated with sagebrush areas. How will fragmentation impacts be addressed with the proposed logging, roading and burning programs? **WF**

Refer to Chapter 1 Purpose and Need for Action and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat.

58. NEC is concerned about vulnerability of big game species, in regard to both cover and access. Will the District fully define existing conditions and trends for vulnerability in the Tobacco Roots, demonstrate potential impacts to security based on similar activities in other areas of the Forest, and be able to ensure that no significant increases will occur with this "ecosystem management?" **WF**

Refer to Chapter 1 Purpose and Need for Action, Chapter 3, Section C, Description of Affected Environment - Wildlife and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat

59. NEC is concerned about snag habitat for species that can utilize logged areas as habitat. What information and analysis will be completed to demonstrate that snag losses will not be significant in logged units, and that snag recruitment will also not be significantly changed? **TB**

Appendices C and D display proposed stand treatments and volumes. Chapter 2, Section G, Item 23 specifically addresses snags.

60. NEC is concerned that the District will not identify any specific criteria by which to measure significance of impacts on wildlife. Will the measures which trigger significant impacts be identified so that the public can understand how conclusions were drawn? **WF**

Appropriate parameters are used. Refer to Chapter 2 Section, Section C, Issues, Issue 2 - Wildlife Habitat.

61. NEC is concerned about off-road vehicle use and how it will be affected by the construction of 38 miles of new roads, and opening timber stands. Will this negative impact on wildlife be evaluated? **TL**

See Chapter 4, Section D, for effects of alternatives on wildlife.

62. NEC is concerned about noxious weeds, which will be greatly enhanced with the proposed logging, roading and burning. Are noxious weed surveys being completed for all proposed treatment areas, to ensure no current populations will be increased? What has been the past effectiveness of noxious weed control, what are the costs, and how do these results reflect potential management of noxious weeds in the southern Tobacco Roots? **WD**

Noxious weeds and decreasing their problem was one of the highest issues in the TRLA. However logging has NOT greatly enhanced noxious weeds on the Madison District. Noxious weeds are addressed in Chapter 2, Section G, Items 24 and 26. Also refer to Chapters 3 and 4, Noxious Weeds.

63. NEC is concerned about the arbitrary nature of Forest Plan amendments which deal with only a limited portion of the Forest, and which in addition may not be very timely, since revision of the Forest Plan will be required in the near future. **P**

Alternative FP-1 allows the responsible official to continue managing wildlife habitat in the southern Tobacco Root Mountains per direction in the 1986 Forest Plan. Alternatives R, S, T and U can be implemented regardless of the decision to select Alternative FP-1 or FP-2.

64. NEC is concerned about inadequate descriptions of wildlife security blocks planned for the Tobacco Roots. Will large scale maps of each security area be provided which display all motorized access routes and all hiding cover? **WF**

Refer to Chapter 3, Section C, Description of Affected Environment - Wildlife. A large scale map is provided. Smaller, detailed maps are available upon request. See Comment #51.

65. NEC is concerned about cumulative impacts of logging in the southern Tobacco Roots. Will a map of past harvest units be provided for each individual treatment area so that the public can understand what level of logging has already occurred? Also, the Forest needs to provide the status of cover within all previous logging units. **CE**

Previous harvest units are identified on alternative maps. Appendix C contains individual stand attributes including trees/acre. Cover is addressed as a major issue throughout the document.

66. NEC is concerned about application of the existing Forest Plan to the southern Tobacco Roots. How will existing Forest Plan management area direction be implemented, and how will the District disclose that management area standards are being met? **P**

Refer to resource reports in Chapter 4.

67. What role does the Tobacco Root Landscape Analysis play in driving the proposed project. The concern here is tiering activities to a document that has not been through NEPA review. **P**

The Tobacco Root Landscape Analysis (TRLA) (1) provided updated data for the southern Tobacco Root Mountains at a scale large enough to address cumulative effects (at the landscape level) for future projects, (2) described opportunities for management activities, and (3) made recommendations for future Forest Plan Revisions. The purpose and need identified in Chapter 1 of this DEIS was derived from the opportunities identified in the TRLA. This DEIS is not "tiered" to the TRLA. Much of the updated information data from the TRLA is "incorporated by reference" into the DEIS.

68. NEC is concerned about public involvement. Will the full range of publics that use this area be notified and provided an opportunity to participate in the management of their public lands? **P**

Public involvement activities to date are described in Chapter 2, Section B.

69. NEC is concerned about the burning of sagebrush and ecotones in regards to elk and deer winter range, elk and calving habitat, big game cover, sensitive bird species, and other wildlife associated with this habitat. Will the District fully disclose how treatment decisions on these sagebrush habitats

were made, as well as how these decision fully incorporated the Memorandum of Understanding developed with the Montana Department of Fish, Wildlife and Parks? **P**

Wildlife habitat was identified as a key issue by the ID team (Chapter 2, Section C). Please refer to Chapter 4, Section D for expected environmental consequences to wildlife habitat from implementing the proposed action and its alternatives. Alternatives S and T incorporated recommendations from the Memorandum of Understanding with Region 3, Montana Fish, Wildlife and Parks.

70. NEC is concerned about the treatment of aspen stands. Will a map be provided of all these areas so that the public can review them? Will these areas be subsequently degraded by cows after burning, since many aspen areas on the Tobacco Roots are heavily trampled by cows. **V**

Inventoried aspen stands proposed for treatment are delineated on Maps 5, 6 and 7. Mitigation measure #6 (Chapter 2, Section G) was developed to prevent heavy browsing of treated aspen by cattle.

71. NEC is concerned about the past vagueness of project descriptions regarding burning. The District indicated for some burning areas, "some" logging may occur first. The type of activity for these areas, as well as associated roads, should be fully disclosed. **P**

Location of temporary roads are delineated on Maps 5, 6 and 7. Small amounts of Christmas trees, sawlogs or other forest products may be removed from fire/utilization treatments before or after treatment (see the definition for "fire/utilization" in the glossary).

72. New roads constructed for post and pole harvest should be identified and the length of time they will be open should be identified. **RD**

Proposed temporary roads for the action alternatives are shown on Maps 5, 6 and 7. See Chapter 2, Section G, Mitigation Measure #12 for discussion of temporary roads.

73. NEC is concerned about the impacts to IRAs that may occur to this project by increased public access created from new roads. **RL**

Refer to Chapter 4, Section E for discussion of effects on roadless areas.

74. NEC is concerned about the provision of project descriptions to the general public. Will this information be provided in the NEPA document, or will the public be forced to make individual trips to the District to try and find information? **P**

Project descriptions for Alternatives FP-1, FP-2, R, S, T and U are described in Chapter 2. If these descriptions are not sufficient, please let us know what specific information needs to be included so we may provide it in the FEIS.

75. NEC is concerned about the impacts of the projects on Westslope Cutthroat Trout, as well as on the watersheds (WQLS) upon which they depend. What is the "ecosystem management" proposal for this species in this project? How will these populations also be restored? **F**

Potential impacts to westslope cutthroat trout and WQLS and disclosed in Chapter 4, Sections F and G. Please note that this project analyzes options for managing vegetation in the southern Tobacco Root

Mountains. Proposals to restore westslope cutthroat trout populations are outside the scope of this analysis.

76. NEC is concerned about the impact of sagebrush control on raptors, especially the Golden Eagle and Flammulated Owl. Will burning impacts on these species be evaluated? **WF**

Refer to Chapter 4, Section D, Environmental Consequences for Wildlife Habitat.

77. NEC is concerned about the separation of grazing activities into two separate NEPA analysis when sagebrush burning is actually being done for cattle, while the grazing analysis failed to identify this as an important management action for grazing allotments. **P**

The purpose of this project is to restore and maintain the sagebrush/grass vegetation types (see Chapter 1, Section C). Prescribed fire in this vegetative community increases herbage production. This is an effect of using prescribed fire as a tool to restore ecosystem health. Prior analyses specifically avoided selecting treatment units based on availability of this increased herbage production for grazing by domestic livestock. Alternative U was developed due to repeat requests to analyze commodity production. Please refer to Chapter 2, Section H, Alternative U.

78. NEC is concerned about the use of logging to replicate natural processes. The agency should provide current literature and monitoring which demonstrates this approach will be effective in maintaining viable populations of wildlife. **TB**

The Bibliography lists numerous literature citations that demonstrate the effectiveness of ecosystem restoration. Perhaps the most recent scientific findings can be found in the Interior Columbia River Basin analysis and scientific findings.

79. NEC is concerned about the coordination between the Forest and the MDFWP for management of wildlife and big game. Will the MDFWP's role in management design be anything other than notification of the project and solicitation of comments? Will the MDFWP be able to review each treatment unit with the Forest prior to completion of decisions? **P**

Coordination with MFWP is summarized in Chapter 2, Section B. Continued coordination efforts are identified in Chapter 2, Section G, Item #11. Each proposed treatment unit has been reviewed with a local representative of MFWP (see Chapter 2, Section F).

80. NEC requests that at least one public field trip be held to address sagebrush burning, both in regards to wildlife, grazing, and the MOU developed between the agency and the MDFWP. NEC also requests that at least one public field trip (with plenty of advance notice) be completed to show specifically how logging will occur in Douglas fir stands (trees to be logged or saved would already be flagged so the public can understand how the trees would be marked). **P**

Please refer to Comment #40 and #68, above.

81. NEC requests that the planning stage of this project facilitate full public involvement and understanding of project merits and implementation, including clarity of project descriptions and impacts in the NEPA document, and allowance of adequate field review where projects and road locations are well defined on the ground. **P**

Please refer to Comments #40 and #68, above.

82. American Wildlands is very concerned about the impacts to wildlife, water quality, linkage zones, and fisheries from this ten year project. **G**

Impacts to wildlife habitat (including linkage zones), water quality and fisheries are disclosed in Chapter 4.

83. There are a number of issues which were never addressed in the 1997 EA, but that are important in the scope of this project. Supplemental analysis must include an economic analysis, address the impacts of 38 miles of temporary road, and disclose total and open road densities. Impacts to old growth and disclosure of the volume of timber that will be logged is also important. Additionally, maps of temporary roads, existing roads, past harvest units, mine sites, etc. would be very helpful. **G**

An economic analysis is included in Appendix B. Road densities are displayed in Chapter 3, Table 9 and Chapter 4, Table 12. Impacts to old growth are described in Chapter 4, Section C. Estimated timber volume is displayed in Chapter 2, Table 7. Temporary and existing roads are delineated on Maps 5, 6 and 7. Mine sites are delineated on the 1996 Southwest Montana Interagency Visitor/Travel Map , East Half.

84. Adequate information must be provided to assure the public that 38 miles of newly constructed road, stream crossings, and several thousand acres of timber harvest will maintain or improve water quality in the project area. **WT**

The affects of activities on the water resource are analyzed in Chapter 4.

85. We would like to see updated hydrology data collection and analysis for many of the project area creeks. California, Currant, Ramshorn, Harris, and lower Wisconsin Creeks have all been identifie(d) as having elevated sediment loads. We would like to see existing and predicted sediment loads for these streams. **WT**

The most recent data collected on these streams was taken in 1991. These are the data that led to the streams being included on the State of Montana WQLS list, at Forest Service recommendation. These data are part of the existing condition analysis (Chapter 3) and are the reason the Forest Service considered the watersheds as "red flag" drainages in the Tobacco Root Landscape Analysis. That fact has carried over into the analysis for this project, and activities in these watersheds have been designed to not exacerbate the existing condition. Further data collection is not likely to change this situation. An analysis of the effects on individual watersheds is given in Chapter 4.

86. California, Current, North Meadow, North Willow, Ramshorn, South Meadow, South Willow, and Wisconsin Creek are WQLS streams. We would like to see an analysis of what the probable cause of impairment for each stream is and how that cause will be affected by the proposed alternatives. For example, if the probable cause of impairment of California Creek is sediment, then we would like to see the projected increase in sedimentation for California creek. **WT**

See response to Comment #85, above.

87. (I)t is necessary to disclose any water quality limited segments (WQLSs), as listed in the state of Montana's Section 305(b) report under the Clean Water Act. These waterbodies should be protected from any additions of pollutants that have caused their impairment. **WT**

See response to Comment #85, above.

88. (P)lease discuss the state water quality classifications for the streams within the project area. Water quality that does not currently meet state water quality standards should be improved. All alternatives should be developed so that any WQLSs will not be affected by actions such as road construction or logging. It would also be worthwhile to develop the alternatives so that water quality in such streams is improved. **WT**

See response to Comment #85, above.

89. This requires working in conjunction with MT DEQ in developing a Total Maximum Daily Load (TMDL) for any WQLSs. The timeline necessary to develop this proposal provides adequate time for the State of Montana to develop TMDLs. Until TMDLs are completed for each WQLS in the project area, the Forest Service is not allowed to increase additions of pollution, even temporarily. In the absence of TMDLs, we ask that all action alternatives be developed so not to increase pollution delivery to any WQLSs in the project area. **WT**

See response to Comment #85, above.

90. Under the water quality analysis we would like the Forest Service to indicate the sources of pollution and the quantities. The agency must indicate activities within an alternative and their effects - NEPA's direct effects. This is required instead of, or in addition to, a net overall improvement/degradation determination by alternative. This is so the public can discern which activity is increasing or decreasing sedimentation. Therefore, it is necessary to separate the analysis of the effects of logging, roading and burning, from the benefits of any mitigation or restoration measures. **WT**

Chapter 4 includes a discussion of the likely effects of the various activities by alternative and by watershed.

91. The Tobacco Roots have a high road density and a network of low standard roads. Analyses must address roads and transportation and the effects on wildlife security and water quality. Please indicate where roads have been and will be constructed, how many stream crossings already exist, where the new ones will be, what the total and open road density is, and which roads are in the transportation plan and which should be obliterated. **RD**

Maps 5, 6 and 7 show existing and proposed roads for each alternative. Chapters 3 and 4 discuss the existing situation and the effects of the proposed alternatives for hydrology and wildlife. The wildlife section discusses road densities.

92. Motorized use of both trails and roads needs to be addressed in relation to its impacts on wildlife security. Motorized trails within the roadless area should also be disclosed if there are any. **TL**

The effects of existing motorized routes on wildlife habitat is disclosed in Chapter 3, C, and the effects of temporary roads in Chapter 4, Section D. Motorized roads and trails currently exist within the roadless areas and these routes including any use restrictions that apply to them are shown on the "1996 Southwest Montana Interagency Visitor/Travel Map , East Half" . Existing motorized roads and trails within the roadless areas were not specifically addressed because any changes would be outside the scope of this project. See Chapter 1, Section D.

93. AWL would like to see a map indicating the roadless areas and any activities that may impact or fragment the last portions of this unfragmented habitat. **RL**

Inventoried Roadless Area maps are provided in Chapter 3.

94. The District must consider alternatives that do not propose activities in inventoried roadless areas. **RL**

See Chapter 2, Section E for discussion of alternatives. And Chapter 4, Section E for the range of effects on roadless.

95. We would like an in-depth analysis of the proposed Forest Plan amendments to replace wildlife standards with security blocks. This methodology must be scientifically validated by independent biologists. **WF**

Refer to Beaverhead Forest Plan 5 Year Monitoring Report (1993), Tobacco Root Landscape Analysis (1994), EIS Chapter 4 B. Environmental Effects of Alternatives FP-1 and FP-2, Christensen et al 1993 and Hillis et al 1991 (special emphasis placed on the list of authors and literature cited for Christensen and Hillis).

96. Please include an analysis of the effects of the proposed activities on all forest management indicator species (MIS). The biologist should insure that indicator species identified are in fact appropriate indicators of environmental health in the area for this type of project. The NEPA document should include information from monitoring the effects of previous similar logging and road construction activities on MIS. **WF**

Refer to Comment #5, above.

97. The agency must address the reduction of hiding and thermal cover, effective habitat, and security during hunting seasons for big game. **WF**

Refer to Chapter 4 Section D, Environmental Consequences for Wildlife Habitat.

98. It is also necessary to include the effect(s) of such projects on all aspects of habitat for all wildlife species in the project areas. It is important not to manage for single species, but to include the entire ecosystem, including all wildlife species. The Forest Service should offer viable specific mitigation measures which compensate for any possible adverse impacts to all wildlife in the project area. The relative effectiveness rating should accompany each mitigation measure. **WF**

Refer to Chapter 1 Purpose and Need for Action, Chapter 2 Section G. Features Common to All Action Vegetation Manipulation Alternatives and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat, Effectiveness of Above-listed Mitigation.

99. (T)he EIS must contain a biological assessment and evaluation of the impacts of this project on TES species. This should include an evaluation of the cumulative effects to these species, taking into consideration the potential increased use of the project area during logging and by the increased number of roads. **WF**

Refer to Chapter 4, Section D, Environmental Consequences for Wildlife Habitat, Threatened, Endangered and Sensitive Wildlife Species and Biological Assessment (prepared for Final EIS).

100. The snag management plan should assure that an adequate amount of cavities - both hard and soft snags - as well as down large woody debris are available over the full timber rotation in the managed stands. Accordingly, wind firm green trees should be left unharvested. The deleterious effects of the removal of large quantities of standing dead on cavity nesting/snag dependent species must be evaluated. An MIS for this resource should be selected and the consequences evaluated and discussed in the EA and BE. **TB**

Refer to Chapter 2, Section G, Features Common to All Action Vegetation Manipulation Alternatives, #23. This mitigation leaves all of the best suited snags within the harvest areas (aspen and Douglas-fir as well as provides for the less used lodgepole pine snags). Removal of large quantities of standing dead is not the design of the proposed harvest (see Chapter 1, Purpose and Need for Action). The design of harvest leaves up to 70% of available trees within the harvest areas. Use of an underburn following harvest has potential to create additional snags in the short term and long term within the harvest area. MIS selection is beyond the scope of this proposal.

101. AWL would like to see all riparian areas excluded from timber harvest. **TB**

Riparian areas are addressed in Chapter 2, Section G, Item 9.

102. There should be no crossing of riparian areas by ground based logging equipment or for road construction. **TB**

Please refer to Comment #101, above.

103. Eight project area streams contain westslope cutthroat trout. Impacts to fisheries must be disclosed site specifically. **F**

Refer to Chapter 4, Environmental Consequences for Fisheries. There will be no impacts to westslope cutthroat trout populations due to the very large buffers applied to streams containing cutthroat trout.

104. 100 foot buffers on sensitive fish bearing streams is inadequate; they should have 300 foot buffers. **F**

One hundred foot buffers along streams containing sensitive fish are adequate; depending on the streamside conditions, channel type, slope, geology, etc. To lessen the risk of affecting sensitive fish, for the burning portions of all action alternatives, all tributaries to westslope cutthroat streams will have a

300 ft. buffer (See Features Common to all Action Vegetation Manipulation Alternatives in Chapter 2). Also, all the streams in the analysis area containing westslope cutthroat trout populations have extensive buffers some being 600 ft. and others extending out to 2,000 ft. depending on terrain (see Hydrologic and Fisheries Screen Map). No new stream crossings on cutthroat streams will be built.

105. Please include a careful analysis of the impacts of the proposed activities to fisheries. This should include considerations of sedimentation, channel stability, and increases in stream water temperature. F

Refer to Chapter 4, Environmental Consequences for Fisheries and Comment #104.

106. The NEPA document should disclose the current condition of the fisheries habitat, including spawning and pool and riffle habitat, and what the anticipated effects of the project will be. This analysis should be done separate from the effects of any mitigation or restoration measures, so it can be determined what the effects of the logging, road building and burning will be. In addition, mitigation measures may lessen deleterious effects, but cannot stop them completely. Please include baseline, current and predicted sediment loads for the streams in the project area. F

Refer to Chapter 3, Description of Affected Environment-Fisheries and Chapter 4, Environmental Consequences for Fisheries. We know we want to protect westslope cutthroat trout from any human-caused adverse impacts, therefore we've developed extremely strict mitigation measures to ensure that these fish are protected. The alternatives were modified and located after mitigation measures for fish were developed. None of the alternatives have components which will impact cutthroat trout. We believe that no potential adverse affects to westslope cutthroat trout will occur due to the buffers along cutthroat streams. The 100 ft. buffers along the other streams are adequate to protect the nonnative brook and rainbow trout found in them. For information about current sediment conditions, refer to Chapter 3, Fisheries and Chapter 4, Hydrology for predicted sediment loads.

107. The NEPA document must discuss the project's compliance with INFISH standards and guidelines for the protection of native fish. Priority watersheds and riparian habitat conservation areas must be disclosed and any proposed modifications to them must be discussed. F

INFISH standards and guidelines apply for areas west of the Continental Divide; this project is east of the divide.

108. AWL would like a thorough discussion of the BMP's and mitigation measures proposed to control sediment from entering any streams and to protect soils and wildlife. This discussion must include their relative effectiveness in achieving their intended goal(s), how dependent they are on outside sources of funding, the likely consequences should those funding sources not be realized, and specific locations where BMPs and mitigation measures will be applied. Naturally, any costs should be disclosed in the economic analysis. The discussion must go beyond a mere listing of the measures to be applied. M

A detailed monitoring program will be incorporated into the decision document for this project.

109. Application of BMP's and mitigation measures does not necessarily insure compliance with State and Federal water quality standards, or Forest Plan standards. The Forest Service and BLM must implement a monitoring program that should be outlined in the NEPA document. M

See Comment #109, above.

110. The NEPA document should include a soil survey map of the project area. If harvest activity or road construction is planned in any area with unstable soils and/or steep slopes, specific mitigation measures should be documented. **S**

No temporary road construction is planned on unstable soils. Soils were not considered a significant issue do to mitigation measures applied to all action alternatives, so no soil survey map was included in the document.

111. Please include a schedule for visits by the Forest Soil Scientist to the project area to determine whether or not any site specific zones of unstable soils may occur in the proposed harvest units or road construction sites. **P**

See Comment #110, above.

112. The NEPA document should also include a discussion of the project specific and cumulative effects on long-term site productivity. **S**

See Comment #110, above.

113. The amount of land already out of production due to roads, skid trails, old mining sites, etc., as well as the aerial extent of disturbance from tractor logging and road construction by this project should be addressed in the NEPA document. **S**

See Comment #110, above.

114. AWL would like the NEPA document to detail all other projects (USFS, BLM, private...) that would lead to cumulative effects. It would also be helpful if you would provide maps documenting past harvest activities and existing roads, including information such as year, regeneration level, and cover level for each area of activity. Such an analysis will help identify the amount of mature timber available in each of the pertinent watersheds and subwatersheds and the cumulative percent effected by this sale. **CE**

See Comment #31, above.

115. Recent case law directs that the agencies validate Forest Plan direction at the project specific and site-specific levels. Accordingly, we would like to see the Interdisciplinary Team test the assumptions made in the Forest Plan regarding the management area boundaries and the appropriate direction for these areas within the project area. Please document that the objectives, guidelines and standards are being met in each management area (MA) by implementation of this proposal. A map of the MA boundaries in relation to the analysis and project areas should be included. **P**

See Comment #30, above.

116. Whether natural or planted regeneration is proposed, a resource analysis and statistical evaluation which supports your decision should be provided. In the absence of statistical viability, you must identify and implement a technology which will assure reforestation within five years. TB

Appendix C contains site specific information on past stand practices. The current District Silviculturist has over 20 years of site specific experience within the analysis area on regeneration success and viability. Five year regeneration is beyond the scope of this project, since no final harvest is proposed.

117. The NEPA document must provide a reasonable range of alternatives. An alternative that maximizes biodiversity and wildlife habitat instead of simply treating forests for timber production emphasis or single species management is necessary under Ecosystem Management. P

See Comment #33, above.

118. Potential habitat of TES plant species and the field reconnaissance of these areas should be included in the BE for the NEPA document. The proposed harvest units, roads, and other activities that impact TES plants and their habitat should be addressed for each alternative. A map displaying the actual routes taken in the surveys would be helpful. Please include the botanical qualifications of the personnel that perform the field work. AWL advocates for the protection of unoccupied habitat within the project area if a TES plant population(s) should be located in or near the area. V

Refer to Chapter 2, G Features Common to all Action Alternatives. Also refer to Chapters 3 and 4, Plant Species of Special Concern. See Chapter 6 List of Preparers.

119. AWL would like to see an analysis of biodiversity in the following manner: An evaluation of the existing condition of the important elements of the ecosystem, including composition, structure, and processes, and the projected state of these elements after implementation of the proposal. The discussion should include how these elements will be changed (adversely and positively) due to each alternative. B

Refer to Chapter 4 Section D, Environmental Consequences for Wildlife Habitat.

120. Please disclose any rare elements within the analysis area: geologic anomalies, disjunct species populations, special communities, elk wallows, bogs, etc. G

Please see Chapter 4, Sections C and D.

121. The NEPA documentation should provide a meaningful discussion of the physical and biological connectivity of the analysis area. In particular, its relationship to the surrounding landscape and the ecosystem "flows" at both the landscape and project levels (i.e., connectivity of forest patches within the analysis area as well as to unmanaged blocks outside the project area). B

Refer to Tobacco Root Landscape Analysis (1994), Chapter 3 Affected Environment and Chapter 4 Environmental Consequences.

122. When analyzing species of limited distribution or of biological concern such as TES and MIS species, we ask that the various hierarchical levels be evaluated. The project level numbers and

distribution, metapopulations, as well as the overall resiliency of each species to the effects of the proposal require discussion. **WF**

Refer to Chapter 4, Section D, Environmental Consequences for Wildlife Habitat.

123. The NEPA documentation should include a comprehensive economic evaluation documenting all costs and benefits related to the proposed action. This evaluation should contain all direct and induced costs, including fire suppression and protection activities. Included should be all costs related to the project, including costs of preparing the NEPA documents, specialist support and consultation, costs associated with travel management and administration, road closure administration, weed control, brush disposal, reforestation and planting, stand exams, timber stand improvement, KV projects and all other costs required by TSPIRS. **E**

Appendix B contains the economic analysis.

124. Sources of noxious weeds in and adjacent to the project area should be disclosed. The NEPA document should address the methods used to control noxious weed establishment. The funding necessary to implement weed monitoring, protection and treatment if it is necessary and whether it is adequate should be included. **WD**

Noxious weeds are addressed in Chapter 2, Section G, Items 24 and 26. Also refer to Chapters 3 and 4, Noxious Weeds. Funding is disclosed in Appendix B.

125. A substantive amount of cultural resource field reconnaissance is necessary to analyze the effects of the various proposed activities to this non-renewable resource. Without a sufficient quantity of field review it is impossible to evaluate the consequences of the various alternatives for the NEPA document. We feel that contract clauses are no substitute for inadequate field work before a decision is made. **H**

See Comment #26, above.

126. The fragmentation of the forested area within the project area needs to be assessed. The effects of logging and roading to species (i.e. forest interior songbirds) dependent on contiguous blocks of unaltered forested habitat should be evaluated. With so much of the surrounding area fragmented, we would like an MIS selected for this issue to evaluate the amount of habitat available at the watershed level, the quantity cumulatively impacted, and the packing of species that would occur if the project degrades what is left in the area. **WF**

Refer to Chapter 1 Purpose and Need for Action and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat. See Comment #5, above.

127. How do each of the project alternatives affect possible biological corridors in the project area, including species-specific assessments of corridor location and use? This assessment should emphasize corridor use of both MIS (i.e. elk) and TES species. The intrusion of the past [and] future development in the area and these impacts to functioning corridors should be evaluated. **WF**

Refer to Chapter 4, Section D, Environmental Consequences for Wildlife Habitat.

128. We would also be interested in visiting the project site prior to commenting on the forthcoming environmental analysis. P

See Comments #40 and #80, above.

129. It has come to my attention that this project has been proposed before, and was appealed. How has this project changed in the course of the two years? Are you going to conduct new analysis for the assessment document, we do not feel that it would be right for you to utilize the analysis from this past proposal. P

The project has had numerous changes. See the entire document. The project has been refined over the past two years with additional site specific information, additional analysis and new tools used in information display. We feel it will give the deciding official the best information to make a decision.

130. In general we are against the extraction of natural resources, especially from an already impacted area. We ask you to consider focusing solely on restoration with this project. G

See Chapter 2, Sections E, H and I.

131. The Ecology Center feels that there needs to be a serious shift in policy and thinking, away from extraction of natural resources, and to a more restoration and preservation based stand point. Ideally we would like to see all National Forest end commercial logging on Forest Service lands. P

Ecosystem restoration is the focus of this project (see purpose and need described in Chapter 1). Harvesting commercial products was included due to a desire expressed by local residents during the development of the TRLA (see Chapter 1, Section D). Whether or not commercial logging should occur on National Forest System lands is a national issue and beyond the scope of this analysis.

132. Please refer to the letter sent to the Beaverhead-Deerlodge National Forest Supervisors Office, in October of this year. It raises additional issues that we feel that you must address. P

Please reference various comments in this appendix.

133. The Ecology Center and the Alliance for the Wild Rockies is extremely concerned that this project will have significant impacts to wildlife, water quality, linkage zones, and fisheries during the ten year duration of this project. G

Analysis of potential effects to wildlife (including linkage zones), water quality and fisheries are disclosed in Chapter 4.

134. We feel it is important that all Interdisciplinary Team Members should be familiar with the results of all past monitoring pertinent to the project area, and any deficiencies of monitoring that has been previously committed to. This includes: The results of all monitoring done in the Project area as a part of the Forest Plan monitoring and evaluation effort. A list of all past projects (completed or ongoing) implemented in the project area. The results of all monitoring done in the Project area as committed to in the NEPA documents of those past projects in the area. A description of any monitoring, specified in those past projects or the Forest Plan, which has yet to be gathered and/or reported. M

Monitoring associated with the key issues is summarized in Chapters 3 and 4.

135. Please disclose in the analysis the results of monitoring of habitat conditions, distribution, and populations of Sensitive and other management indicator species in the Forest in response to Forest Plan requirements and as this relates to the proposed action. **WF**

Refer to Madison Ranger District 2620 Wildlife Survey files and Chapter 3, Section C, Description of Affected Environment - Wildlife.

136. Due to the degree of impacts in the area from past actions and because of the importance of the area for biological diversity, you must prepare an alternative that would facilitate rehabilitation and restoration of the environment and that proposes no further road building or logging. This analysis should be fully analyzed for proper comparison with other action alternatives. The alternative should include road closures and obliteration, watershed rehabilitation, and means to eliminate any human-caused erosion sources. These actions should not depend upon receipts from timber sales. **RD**

See Chapter 1, Section D, for Scope of the Proposed Action. Also see Chapter 2, 1 for alternatives considered but not given detailed study. The scope of this project includes only vegetative management activities, the other rehabilitation requested is outside the scope of the project.

137. The proposed project will be fairly massive in size and duration. As a result we believe that if you take a good hard look at the significance of impacts of all past, presently ongoing, and reasonably foreseeable proposed and future activities, including those on nearby land of all ownership within and near the project area, additional impacts from the proposed projects may be too adverse on some resources. **CE**

Please refer to Comment #31, above.

138. This action should be analyzed as if its effects are additive with those of past actions. This proposed action would be implemented in an area that has been heavily impacted from past extraction. **CE**

Please refer to Comment #31, above.

139. (T)he significance of the impacts of past actions -- impacts on wildlife, watersheds, fisheries, Sensitive plants, soils, regeneration potential of forest stands, etc. of all past, presently ongoing, and reasonably foreseeable future activities, including those on nearby land of all ownership within and near the project area must be considered as an integral part of the analysis, and must be documented in your decision. **CE**

Please refer to Comment #31, above.

140. It has been well established that site specific Biological Evaluations (BEs) must be prepared for all actions such as this. Further, the Forest Service Manual requires that BEs consider cumulative effects. **P**

A Biological Assessment (BA) will be prepared for the FEIS.

141. Please examine a cumulative effects analysis area to be utilized to analyze each resource or issue considered within this proposal. For each planned project a logical cumulative effects analysis area must be chosen for each resource, whether it be water quality, elk habitat, lynx viability, etc. **CE**

Please refer to Comment #31, above.

142. We refer you to Our Approach to Effects Analysis, Region One Desk Reference, where it presents the concepts of the Logical Resource Unit and the Cumulative Effects Analysis Area. Therein also is the suggestion that, for many (but not all) resources, watershed boundaries often are the most appropriate boundaries for projects' geographic analyses. We strongly suggest that a watershed perspective be adapted for this analysis. **WT**

Refer to Chapter 4, Environmental Consequences for Hydrology. Effects of the various activities are given by watershed.

143. Take your cumulative effects analysis to the regional level. That is, take a good look at the fragmentation of wildlife habitat that continues to accumulate in the Northern Rockies. **P**

Please refer to Comment #31, above.

144. The cumulative impacts of motorized on- and off-road travel on wildlife, soils, water quality, and biodiversity must also be considered. **TL**

See Chapter 3 for existing effects and Chapter 4 for effects associated with and cumulative with this project.

145. We urge that scientifically sound snag retention requirements be employed within this project area. **TB**

Refer to Comment #59, above.

146. Please complete field surveys for snag and downed woody material in the project area and in the cumulative effects area, since it is quite possible that excess snags in this proposal area are needed to offset the lack of such habitat in areas previously logged. **TB**

Refer to Comment #59, above.

147. We do have a number of concerns as to how well snag retention guidelines work.... The following suggestions...may be useful for the BH-DL to think about when analyzing this project. Retain snags with the most potential value to wildlife, especially those in riparian areas and those that are distant from roads (and are less likely to be taken by wood cutters). Limit the time an area is open for firewood gathering, emphasize available downed wood at landings when possible. When planning prescribed fires, avoid burning snags by altering boundaries and by removing fuel from around snags. Allow burning snags to burn themselves out rather than felling them, since some species such as lynx, Vaux's swift nest/den in these snags hollowed out by fire. (I)nclude a clause in the sale contract that prohibits removal of snags and downed wood by the contractor during logging activity.

Heavy loss of snags during logging indicates that logging methods used are posing a severe threat to the level of snags in the forest. **TB**

Refer to Comment #59, above.

148. The Forest Service must follow through on it's responsibility to design and implement conservation strategies with in this project for Sensitive and other species of concern. **P**

This project analyzes vegetation management opportunities in the southern Tobacco Root Mountains. Conservation strategies for Sensitive species is outside the scope of the analysis (see Chapter 1).

149. We specifically request that you "express habitat objectives, outputs, and effects in quantitative terms using...Habitat Capability...(and) Acres" [FSM 2623(1&2)] for all Management Indicator Species. That is, each alternative analyzed should have separate quantified data based upon Forest Plan monitoring and site specific surveys. **WF**

Refer to Chapter 3, Section C, Description of Affected Environment - Wildlife and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat.

150. We request that you "Consider for selection (as MIS) all Sensitive species in the...project area" (FSM 2621.1(2). This means not just taking for granted that those listed in the Forest Plan are the only appropriate MIS. Please document your selection of MIS, showing due consideration for all TES species. The biologist(s) should assure that the indicator species identified in the forest plan are in fact appropriate indicators of environmental changes in these areas for this type of project. **WF**

Refer to Chapter 3, Section C, Description of Affected Environment - Wildlife and see Comment #5, above.

151. It is an absolute necessity that thorough surveys for Proposed, Threatened, Endangered, and Sensitive species and management indicator species be conducted before NEPA documents are finalized so that effects can be expressed in terms of populations and habitat acres, and the public can have an opportunity to comment on the adequacy of proposed mitigation. **WF**

Refer to Madison Range District 2620 Wildlife Survey files, Chapter 3, Section C, Description of Affected Environment - Wildlife and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat.

152. We request that studies address the related issues of "population viability" and "distribution throughout its geographic range" in regards to all species of concern, in order to comply with USDA Regulation 9500-4 and 36 CFR 219.19. To adequately analyze population viability, you must explicitly consider population dynamics. **WF**

Refer to Chapter 4, Section D, Environmental Consequences for Wildlife Habitat. Population viability and geographic range distribution are beyond the scope of this proposal.

153. The District should fully analyze population growth rate, population size, linkages to other populations, and the dynamics of other populations in examining population dynamics. **WF**

See Comment #152, above.

154. (T)he analysis should establish that the species in the analysis area are still part of the viable populations in the surrounding landscape following the impacts from past development actions on lands of all ownership. The analysis should be expanded to include a cumulative effects analysis area that would include truly viable populations. Identification of viable populations must be done at some geographic scale. This means if the analysis cannot identify viable populations of MIS and TES species of which the individuals in the analysis area are members, the analysis fails to assure the maintenance of viable populations, violates NFMA, and falls far short of meeting the requirements of a scientifically sound "ecosystem" analysis. **WF**

Refer to Tobacco Root Landscape Analysis (1994) and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat, Cumulative Effects.

155. Please include in your analysis the possible effects of noxious weed introduction on Sensitive plant populations and other components of biodiversity. **WD**

Refer to Chapter 2, Section G and Chapters 3 and 4, Plant Species of Special Concern and Noxious Weeds.

156. Please include in the analysis the results of monitoring of noxious weed infestation from past management actions in the District. **WD**

See Comment #155, above.

157. (P)lease consider the cumulative impacts on migratory song birds due to further fragmentation of the interior forest canopy. **WF**

Refer to Chapter 1 Purpose and Need for Action and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat, Cumulative Effects.

158. Will the proposed activities impact species that depend upon vast areas which are relatively inaccessible to people? These include increasingly rare species such as the grizzly bear, gray wolf, caribou, wolverine, fisher, pine marten, lynx, goshawk, etc. The analyses should fully discuss the impacts of making these animals more accessible to hunting and trapping, and displaced due to project activities. **WF**

Refer to Chapter 1 Purpose and Need for Action, Chapter 3, Section C, Description of Affected Environment - Wildlife (note that caribou have not occupied habitat on the Madison Ranger District) and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat.

159. We are requesting the Forest Service analyze the current status of wildlife corridors for all MIS and TES species, and effects of each of the alternatives on the linkages. That means that corridors within the analysis area, and linkages with areas adjacent to the analysis area need to be examined, plus the value of the entire analysis area as part of a larger corridor within or between ecosystems. **WF**

Refer to Tobacco Root Landscape Analysis (1994), Chapter 1 Purpose and Need for Action, Chapter 3, Section C, Description of Affected Environment - Wildlife and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat.

160. The continued fragmentation of the Forest also needs to be a major analysis issue for this proposal. That is, the size of blocks of interior forest that existed historically before management actions (including fire suppression) were initiated needs to be a point of comparison with both the present condition and in terms of all action alternatives. (T)his should be a landscape ecology type analysis which looks at the larger picture of the fragmentation of habitat in surrounding concentric circles. Will the proposed alternatives tend to further fragment the habitat for plants and other wildlife, given the already fragmented landscape from past logging and road building activities? **B**

Refer to Chapter 2, Section C, Issues, Chapter 4, Section C, Environmental Consequences for Vegetation and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat.

161. Disclose whether past management actions have extirpated or significantly reduced any plant or animal species from the analysis area. **WF**

Refer to Tobacco Root Landscape Analysis (1994).

162. Disclose how combined past management actions have affected or reduced the diversity of habitat types in the analysis area, the entire National Forest, and the region. **CE**

Refer to the Tobacco Root Landscape Analysis (1994) for the analysis area. The National Forest and Region were beyond the scope of this project.

163. We feel it is critical for the analysis team to take a critical look at how the proposed project will impact old growth. **V**

Chapter 4, Section C, Environmental Consequences for Vegetation.

164. Jack Ward Thomas, Leonard F. Ruggiero, R. William Mannan, John W. Schoen, and Richard A. Lancia in "Management and Conservation of Old-Growth Forests in the United States" (1988 Wildlife Society Bulletin, 16:252-262) stated that "...the best probability of success is to preserve all remaining old growth and, if possible, produce more." Please address this statement made by a group of scientists that includes the current Forest Service Chief as it pertains to old growth management in this proposal area. **V**

The current Forest Service Chief is Mike Dombeck. Potential impacts to old growth is disclosed in Chapter 4.

165. Proper management of the old growth resource would include making sure the old growth that is designated represents all types in the proper proportion, size, and spatial relationship to maintain viable populations of old growth dependent species. **V**

See Comment #163, above.

166. Components of biodiversity should be examined at all levels, including genetic, species, ecosystem, landscape, and regional. B

Refer to Tobacco Root Landscape Analysis (1994) and EIS Chapter 4 Environmental Consequences for site specific information. Regional analysis is beyond the scope of this proposal.

167. In the identification process of old growth habitat, we would like to see the analysis team perform on-the-ground verification of areas chosen from photo interpretation and database examination. V

Appendix C contains site specific stand attributes. The Madison District timber data base contains this verification.

168. Disclose the precise criteria used to designate old growth. Who made the decisions regarding old growth designations and what are that person's qualifications? Measure and disclose the sizes of old growth stands in the area. Tell how much habitat each block provides for interior old growth dependent species, considering the edge effect from natural and man-made openings including roads. V

Old growth is defined, mapped and described in Appendix C of the TRLA.

169. We request a careful analysis of the impacts to fisheries, especially Westslope Cutthroats, and water quality, including considerations of sedimentation, increases in peak flow, channel stability, risk of rain-on-snow events, and increases in stream water temperature. F

Refer to Chapter 4, Environmental Consequences for Fisheries and Hydrology.

170. Please disclose the locations of seeps, springs, bogs and other sensitive wet areas, and the effects on these areas of the project activities. WT

Our maps show the locations streams and tributaries, but not seeps, springs, bogs or other wet areas. Refer to Chapters 3 and 4, Riparian Vegetation. All riparian areas have as a minimum a 100 foot buffer where no activities will occur.

171. Where livestock are permitted to graze, we ask that you assess the present condition and continue to monitor the impacts of grazing activities upon vegetation diversity, soil compaction, streambank stability and subsequent sedimentation. CE

Affects of livestock grazing in the Tobacco Root range was recently analyzed in 1996. Refer to the Tobacco Root Grazing Management Environmental Analysis and Decision Notice. Cumulative affects and specific mitigation related to this project are discussed in this document. Refer to Chapter 2, G and Chapters 3 and 4, Vegetation.

172. Please disclose in the NEPA document the results of up-to-date monitoring of fish habitat and watershed conditions, as required by the Forest Plan. F

The information summarized in Chapter 3 for fisheries and hydrology contains the most current information available.

173. The NEPA analysis should show that the proposed alternatives would comply with the Clean Water Act and all state water quality laws and regulations. Please note that designating BMPs is not sufficient for compliance with CWA and NFMA. **WT**

Refer to Chapter 4, Environmental Consequences for Hydrology, and Comment #3, above.

174. Discuss the actual effectiveness of proposed BMPs in preventing sediment from reaching water courses in or near the analysis area. What BMP failures have been noted for past projects with similar landtypes? We would like to see a thorough discussion of the BMPs and mitigation measures you would propose. This discussion must go beyond a mere listing, and include the following: their relative effectiveness in achieving their intended goal(s), based upon experience in the District; how dependent they are on outside sources of funding (e.g. K-V funds); the likely consequences should those funding sources not be realized. Naturally, any mitigation costs (e.g. K-V funds) should be disclosed in the economic analysis. **M**

Effectiveness of BMPs is discussed in Chapter 4, Hydrology.

175. We are opposed to the creation of clearcuts. In fact, we are opposed to even-aged management due to the resultant damage to wildlife habitat and fisheries. **TB**

Clearcutting is not proposed.

176. Please examine past logging activities, including such information as year and regeneration success level for each past activity in the analysis area and in the cumulative effects area. Please disclose the sizes and condition of man-made openings already existing in the area, and exactly where the proposed cutting units are in relation to the old logged areas. **TB**

Harvested units are displayed on alternative maps. Stand attributes are site specifically displayed in Appendix C.

177. Evaluate the likelihood of consequential blowdown of remaining trees in the cutting units or trees bordering the cutting units, based upon past logging in similar areas. What is the likelihood of the District later doing salvage actions in this area as a result of the actions from this proposal such as from escaped slash burns? **TB**

Issues are discussed in Chapter 2, Section C. This subject was evaluated as not an issue due to past harvest success in the analysis areas.

178. Please fully disclose, via analysis of the "no action" alternative, forest succession and ecosystem functions and structures. **P**

Potential environmental effects of the no action alternative (Alternative R) are disclosed in Chapter 4.

179. Based upon monitoring of results of previous logging in the area, discuss how the action will affect insect infestations and other disease outbreaks and how likely is it that the effect will be to stress other trees near the cutting units, causing them to be more susceptible to attack by insects or diseases. **TB**

Chapter 4, Section C states that the proposed treatment will result in healthier stands less susceptible to insect and disease epidemics. However, short term disturbance will create conditions for small population buildups available for natural predation by songbirds and other animals.

180. Please assess the hazard of human-caused wildfire, given that slash left after cutting and slash burning are a fire risk to adjacent forested areas. **TB**

Fire risk and fuels are discussed in Chapter 4, Section C, Environmental consequences for vegetation.

181. A serious evaluation should also be made of the cumulative impact to the soil's A-horizon in the analysis area including how long it will take before those soils will sustain the life and processes that existed before they endured logging activities. This needs to be fully disclosed in your decision document for this proposed sale. Disclose the areas of unstable and highly erosive soils which would result in mass movement and erosion. Include maps that show all land and soil types in the NEPA document. Analyze how much soil compaction and surface erosion has occurred in the proposal area because of past actions and what the likely increases will be for the alternatives proposed. **S**

See Comment #110, above.

182. Please do studies that consider landtypes, habitat types, slopes, aspect, etc. for this project, so that there would be assurance of successful regeneration. Please disclose (by providing maps and other documentation) the regeneration success level from past even-aged logging in the immediate and surrounding compartments, explaining the dates of logging, the problems encountered and duration needed before certification of restocking. **TB**

See Comment #8, above.

183. (T)he Forest Service should...tell the full economic story of just what the project's impacts would be to taxpayers, not just local economic interests. Along with the costs of the specific project actions, the costs of road maintenance proportionately attributable to this project and the cumulative economic impacts of carrying out fire suppression policy and the resultant need to carry out such projects as this one should be disclosed. **E**

Please refer to Comment #14, above.

184. (W)e request that you document how your decisions and the selected alternatives maximize net public benefit. In other words, you should give consideration to, and adequately document, who would benefit from this project and who would pay for it. Please provide an itemized list of monetary costs and benefits for the project, including the no-action alternative. **E**

Please refer to Comment #14, above.

185. Economics is another reason why we strongly desire to see an alternative that would only involve rehabilitation and recovery. The long-term benefits of not having to spend money for doing road maintenance or other management activities and administration in the analysis area should be compared to the expenses incurred from both the action alternative(s) and the no-action alternative. **E**

Please refer to Comment #14, above.

186. What is and what would be the Open Road Density in the project and cumulative effects analysis areas? **RD**

Refer to Chapter 3, Section C, and Chapter 4, Section D.

187. A summary of all roads--temporary, system, nonsystem, other public and private, etc.--and their location is also requested for inclusion in the environmental analysis. As per Forest Service Manual 7703.1 and 7711.2, has the Forest documented each road in the project area? When will unnecessary roads be obliterated and revegetated, as required by NFMA? Locations of road closures should be revealed, the method of closure, and what if any traffic would be allowed on the "closed" roads. In addition, the Forest Service must examine the effectiveness of its road closures, thereby fully considering the negative affects on wildlife habitat and biodiversity of both closed and open roads. Closed or not, these roads are of concern to the overall quality of associated watersheds. **RD**

See Chapter 3, Section C for effects of existing roads on wildlife habitat, and Chapter 4, Section D, for effects of proposed temporary roads and effectiveness of road obliteration and closures. The overall analysis of the existing road system is outside the scope of this project, See Chapter 1, Section D

188. Please look for opportunities to perform road habilitation work and to repair other sediment sources caused by past management activities in the cumulative effects analysis area. **RD**

See Chapter 2, Section G, item 27.

89. (A)ny impacts that would degrade the wilderness characteristics of a roadless area are unwise. **RL**

See Chapter 4, Section E for environmental effects on roadless.

190. As part of this analysis, the roadless boundaries should be validated. **RL**

See Chapter 3, Section D.

191. On the issue of whether the roadless area and undeveloped quality of the analysis area requires the preparation of an EIS, NEPA mandates the preparation of an EIS for any "major federal action significantly affecting the quality of the human environment" [42 U.S.C. 4332(2)(C)]. Projects that irreversibly damage the recreational value and resources associated with roadless areas and undeveloped lands constitute a "major federal action significantly affecting the quality of the human environment." **RL**

An EIS is being prepared.

192. The decision to develop a previously undeveloped area is an irreversible and irretrievable decision, the impacts of which must be analyzed in an EIS" [National Audubon Society v. U.S. Forest Service, 21 E.L.R. 20828, 20830 (D. Ore. 1990)]. **P**

See Comment #191, above.

193. The Forest Service should recognize and consider the unique ecological values associated with designated and de facto roadless areas within what is otherwise a heavily logged and fragmented national forest system. **RL**

See Chapter 3, Section D, and Chapter 4, Section E.

194. The courts also have recognized the unique ecological values associated with roadless areas and the need for the Forest Service to consider the undisputed "environmental significance" of these areas in a project EIS. **RL**

See Comment #191, above.

195. You should consider the unique functions of roadless areas as refugia for solitude dependent wildlife and at-risk fisheries, reservoirs of undisturbed genetic material, connecting corridors within an increasingly fragmented landscape and natural "control" areas for experimental "management" and scientific research. You must address the project's full potential impact on these critical ecosystem features by closely examining land beyond the immediate analysis area and considering the cumulative landscape scale effects of continued habitat destruction within and adjacent to unroaded forest land. These cumulative impacts include not only present and foreseeable future effects, but also the accumulated, incremental effects of past human activity, including prior degradation or destruction of undisturbed habitat. See 40 CFR § 1508.7 **RL**

Effects of the proposal and alternatives are disclosed in Chapter 4.

196. NEPA requires that the Forest Service consider the best available scientific and technical information in making its decisions. The scientific literature on biological diversity makes it clear that logging project assessments should consider, among other things, size distribution and connectivity for various types of habitat patches, amount and distribution of important types of such patches (such as roadless areas) which have been reduced by prior human activity, disturbed and historic vegetative mosaic patterns across the forest, cumulative effects of past activity from a watershed or regional ecosystem level, and edge effects of further forest fragmentation. **TB**

Refer to Chapter 2, Section C, Issues, Issue 2 - Wildlife Habitat and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat. Also refer to Tobacco Root Landscape Assessment.

197. We applaud your use of temporary roads. If the entire road system is designed and constructed properly, new roads should not be necessary. **RD**

This comment is a statement of support for the proposed action.

198. Please be very specific about what you intend to accomplish by "establishing 29 wildlife security blocks." The security concept is commonly applied in managing elk, bears, and other large mammals, but should be evaluated for its effects on other wildlife. Some species such as lynx, for example, appear to be adapted to dynamic disturbance in forests. To constrain disturbance within or around "blocks" may counteract the habitat benefits of disturbance. **WF**

Refer to Chapter 1 Purpose and Need for Action and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat.

199. (A)s you apply the concept of fragmentation, please be specific about what ecological processes are fragmented. A patchwork of forests of various ages, for example, may disrupt movement patterns of moles, voles, and mice, but probably offers a single continuous patch of accessible ground to lynx. **B**

Refer to Chapter 1 Purpose and Need for Action and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat.

200. The proposal says nothing about potential for restoration projects. We are interested in watershed conditions and populations of native fishes that can be improved along with vegetative condition. Under the pilot authority for Stewardship End results Contracting, it should be easier to combine watershed restoration. Please consider this within the range of alternatives. **P**

The possibility of using Stewardship Contracting is included in Alternatives S and T. Alternatives S, T and U consider different options for restoring desired vegetative communities within the analysis area. Analysis of hydrology and fisheries is included in Chapters 3 and 4.

201. I agree with the proposed amending of the Beaverhead Forest Plan by establishing 29 wildlife security blocks ranging in size from 220 to 10,671 acres. **WF**

This comment is a statement of support for the proposed action.

202. Concerning the guidelines, I believe that timber harvests should ALWAYS occur OUTSIDE of the established security blocks rather than within any of them and that NONE should be FRAGMENTED. **WF**

Refer to Chapter 2, Section C, Issues, Issue 2 - Wildlife Habitat.

203. I also believe that a buffer zone of at least one-fourth to one-half mile should be established on the edge of each security block between the security block and the timber harvest activity. This will help to buffer the security blocks from negative environmental impacts. **WF**

Refer to Chapter 2, Section D, Alternative Development Process for Forest Plan Amendment Alternatives and Chapter 2, Section E, Forest Plan Alternatives Considered in Detail, Alternative FP-2.

204. I also believe that, where possible, each or all security blocks should be interconnected by linkage corridor so that the wildlife can move freely between the security blocks. **WF**

Refer to Chapter 4, Section D, Environmental Consequences for Wildlife Habitat.

205. I agree with timber harvest being limited to one watershed at a time. I would also hope that timber harvest would be prohibited in the riparian areas. **TB**

No timber harvest activities are proposed in riparian areas. This comment is a statement of support for the proposed action.

206. I agree with the temporary roads being obliterated. I would hope that as few roads would be constructed as possible, far less than 38 miles if possible. **RD**

See Chapter 2 for description of alternatives. Range of temporary roads proposed is from 0 to 28. This comment is a statement of support for the proposed action.

207. I would also recommend that no roads be built within present or potential grizzly bear habitat so that the bears will not be habituated to humans or exposed to human-bear conflicts. **WF**

Refer to Chapter 1 Purpose and Need for Action and Chapter 2 G. Features Common to All Action Vegetation Manipulation Alternatives.

208. Also, avoidance of loss of wildflowers, particularly rare and endangered species, is important. **V**

Refer to Chapter 3, Section B Description of affected environment-vegetation and Plant Species of Special Concern and Chapter 4, Section C.

209. I would also hope that no old-growth trees be harvested. **V**

Refer to Chapter 3, Section B Description of affected environment-vegetation and Chapter 4.

210. I would also recommend that no whitebark pine be harvested or destroyed during the proposed project. **V**

Refer to Chapter 3, Section B Description of affected environment and Chapter 4.

211. (W)hat criteria do you use to determine what constitutes a "wildlife security block"? How do you determine the size of these blocks? What is the minimum size for a block to be viable in supporting wildlife? How is this determined? Are fisheries considered or addressed in these blocks, or are they dealt with separately? **WF**

Refer to Chapter 2, Section D, Alternative Development Process for Forest Plan Amendment Alternatives.

212. Who were the plaintiffs in the lawsuit over these projects? **P**

Plaintiffs in the lawsuit that was filed in 1998, were Native Ecosystems Council and American Wildlands.

213. I would appreciate a map of the affected areas, especially anything between Boulder Lakes and Branham Lakes, generally east of Twin Bridges - including the proposed 38 miles of roads. **P**

Maps of the project area are included in Chapter 1 and 2. Boulder Lakes are outside the analysis area. Branham Lakes are within the analysis area.

214. First, we support efforts to manage vegetation in your forest to contain the hazards of insects, diseases and uncontrolled fire. We also strongly support and applaud your planned practices that

provide products and opportunities for diverse use on the forest. To this end, we support the activities that will result in healthy forests and that will capture the productive potential available from the forest resource base. We specifically oppose wasteful management practices that do not capture mortality and other losses of available forest products when such losses become significant in terms of volumes and economic potential. **G**

This comment is a statement of support for the proposed action.

215. (W)e are concerned with the restrictive wording on certain aspects of the proposal. We believe you should retain more management flexibility on the items such as proportion of basal area reduced by harvest and miles of temporary road. We are simply concerned that such narrow parameters for these items eliminates the flexibility to respond to a diversity of conditions that managers will encounter on the land. It has certainly been our experience that the creation of "open park like stands of Douglas-fir" sometimes requires a greater reduction of basal area than the indicated 1/3. This is especially true as tree diameters become smaller and stem density per acre becomes greater, a condition not uncommon in southwest Montana. **TB**

See Appendix C, Site Specific Stand Information. Stand treatments are specific to the individual stand and vary according to stand condition. See also Chapter 2, H, for descriptions of proposed vegetative treatments by alternative.

216. Lots of mature timber and it needs to be cut. Why do they cut down timber to improve grass, but won't sell any logs for building cabins? **TB**

See Chapter 1, Section C, Purpose and Need.

217. We are concerned about declines in elk vulnerability that will occur as a result of additional cover losses, habitat fragmentation, and more access. **WF**

Refer to Chapter 2, Section C, Issues, Issue 2 - Wildlife and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat.

218. We are concerned about the losses of even small patches of hiding cover, and its fragmentation, with logging and road construction. **WF**

See Comment #217, above.

219. We are concerned about degradation of big game winter range and calving habitat due from prescribed fire. **WF**

See Comment #217, above.

220. We are concerned about the loss of mule deer winter range, cover and fawning habitat due to prescribed burning on fall-winter-spring ranges. **WF**

See Comment #217, above.

221. We are concerned about habitat manipulation without development and implementation of conservation strategies for sensitive wildlife species and management indicator species. **WF**

See Comment #48, above.

222. We are concerned about vegetation management practices which have no biological association to wildlife populations and management. **WF**

Refer to Tobacco Root Landscape Analysis (1994) and EIS Chapter 1 Purpose and Need for Action.

223. We are concerned about goshawks due to logging of forest interior habitat. **WF**

Refer to Chapter 2, Section C, Issues, Issue 2 - Wildlife and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat.

224. We are concerned about the completion of wildlife surveys to determine key occupied areas and habitats for the management plans. **WF**

Refer to Madison Ranger District 2620 Wildlife Survey files and Chapter 3, Section C, Description of Affected Environment - Wildlife.

225. We are concerned about the loss of undisturbed older growth timber which creates optimum habitat for cavity nesters. **WF**

Refer to Chapter 1 Purpose and Need for Action.

226. We are concerned about the loss of sagebrush habitats for songbirds, raptors and game birds which depend upon this habitat for local viability. **WF**

Refer to Chapter 2, Section C, Issues, Issue 2 - Wildlife Habitat.

227. We are concerned about the management and fragmentation of old growth habitat to ensure viability of associated species. **WF**

Refer to Chapter 1 Purpose and Need for Action.

228. We are concerned about the provision of large blocks of undisturbed, unfragmented forest habitat for forest songbirds which require this type of habitat for local viability. **WF**

See Comment #227, above.

229. We are concerned about habitat fragmentation across this landscape due to roads and logging. **WF**

Refer to Chapter 1 Purpose and Need for Action and Chapter 2, Section D, Alternative Development Process for Forest Plan Amendment Alternatives.

230. We are concerned about the lack of adherence to Forest Plan direction for management areas. **P**

Refer to Comment #34, above.

231. We are concerned about the logging of unsuitable timber lands. **TB**

Refer to Comment #34, above.

232. We are concerned about the agency's failure to use current science to evaluate proposed actions. **P**

Refer to Chapter 4.

233. We are concerned about the agency planning of massive treatment projects whereby the public is unable to review proposed treatment areas and roads. **P**

Refer to Comment #40, above.

234. We are concerned about the lack of description of proposed treatment units by acreage, size, timber volume to be removed, or location on the ground, as well as road access. **TB**

Appendix C contains site specific stand information and treatment.

235. We are concerned about the lack of definition for security habitat in the proposed amendment. We would like to have maps provided of each security area and the hiding cover which occurs within them. **WF**

Refer to Chapter 2, Section D, Alternatve Development Process for Forest Plan Amendment Alternatives and Chapter 3, Section C, Description of Affected Environment - Wildlife.

236. We are concerned about the misrepresentation of sagebrush burning as "ecosystem management" when it is actually being done for livestock forage. **V**

Refer to Comment #77, above.

237. We are concerned about the Forest's failure to define the association between prescribed burning and forage management for livestock. **V**

Refer to Comment #77, above.

238. We are concerned about the lack of cumulative effects analysis between two related actions, livestock grazing and prescribed burning of sagebrush. **CE**

Refer to Comment #77, above.

239. We are concerned about the reduction of conifer cover for wildlife, both game and nongame species, due to prescribed burning. **WF**

Refer to Chapter 2, Section C, Issues, Issue 2 - Wildlife Habitat and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat.

240. We are concerned about the lack of recognition of habitat values of ecotones for wildlife. **WF**

Refer to Chapter 2, Section C, Issues, Issue 2 - Wildlife Habitat and Chapter 4, Section D, Environmental Consequences for Wildlife Habitat.

241. We are concerned about a lack of surveys for wildlife in the analysis area. **WF**

Refer to Madison Ranger District 2620 Wildlife Survey files.

242. We are concerned about the lack of analysis within reasonable units of land (5,000-10,000 acres) so that wildlife habitat values, such as hiding cover and road densities, can be evaluated on a local perspective. **WF**

Refer to Chapter 1 Purpose and Need for Action and Chapter 2, Section D, Alternative Development Process for Forest Plan Amendment Alternatives.

243. We are concerned about the development of any new access in areas which are not currently roaded. **TL**

See Chapter 4, E, for discussion of effects on roadless characteristics.

244. We are concerned about the degradation of the Tobacco Root mountains as a biological corridor and recovery habitat for the grizzly bear. **WF**

Refer to Chapter 3, Section C, Description of Affected Environment - Wildlife, Chapter 4, Section D, Environmental Consequences for Wildlife Habitat and Biological Assessment (prepared for Final EIS).

245. We are concerned about the impact of forest opening on snowshoe hares and the lynx. **WF**

Refer to Chapter 2, Section C, Issues, Issue 2 - Wildlife Habitat, Chapter 4, Section D, Environmental Consequences for Wildlife Habitat and Biological Assessment (prepared for Final EIS).

246. We are concerned about how management of sagebrush habitats is being planned to ensure viability of associated species and big game. **WF**

Refer to Chapter 4.

247. We are concerned about the implementation of management objectives which were developed without public involvement through the landscape analysis process. **P**

Please refer to Comment #67, above.

248. We are concerned about the violation of Forest Plan direction for wildlife in management areas that emphasize wildlife. **WF**

Refer to Chapter 4, Section D, Environmental Consequences for Wildlife Habitat, Consistency with Forest Plan Standards for Wildlife.

249. We are concerned about the failure of the Forest Service to consider public issues in the management of public lands. **P**

Refer to Chapter 2 and Appendix A for details about how public comments were used to identify key issues and alternatives.

250. We are concerned about the failure of the Forest Service to identify the publics that are requesting the proposed management programs. **P**

Public involvement activities to date are described in Chapter 2, Section B.

251. We are concerned about arbitrary divisions of planning units for Forest Plan amendments. **P**

Refer to Chapter 1, Section D.

252. We are concerned about deletion of wildlife Forest Plan standards to allow more timber harvest. **WF**

Refer to Chapter 1 Purpose and Need for Action and Chapter 2, Section D, Alternative Development Process for Forest Plan Amendment Alternatives.

253. We are concerned about the completion of Forest Plan amendments at the very end of the planning period. **P**

Refer to Chapter 1, Section D and Chapter 2, Section D.

254. We are concerned about the lack of cumulative effects analysis of Forest Plan amendments on wildlife at the Forest level. **WF**

Refer to Chapter 1 Purpose and Need for Action and Chapter 4 B. Environmental Effects of Alternative FP-1 and FP-2, Cumulative Effects. Being site specific for the project area, analysis at the Forest level is beyond the scope of this proposal.

255. We are concerned about the lack of cumulative effects analysis of burning impacts at a Forest-wide level. **CE**

The scope of this analysis is geographically limited to the southern Tobacco Root Mountains (see Chapter 1, Section D). A Forest-wide analysis is outside the scope of this project.

256. We are concerned about the failure of the agency to consider public issues and concerns in management decisions. **P**

See Comment #249, above.

257. One [additional issue] concerns the new moratorium on roadless lands development, and the Chief's suggestion that the Forest Service identify more wilderness areas for preservation. NEC would like to see this done in the Tobacco Roots planning area. We would also like to have an

evaluation included whereby currently unroaded areas, or even roaded areas which are key to wildlife, could be restored or designated as roadless and wilderness areas. **RL**

See Chapter 1, D, Scope of the Proposed Action. Identification of additional wilderness areas or restoration of existing roaded areas is beyond the scope of the proposed action.

258. Another issue we would like to raise is the ongoing practice of the Forest Service cutting public trees to finance their budget. We recently received a copy of the General Accounting Office report that summarized the distribution of monies collected by the Forest Service on timber sales. This report concluded that only about 8% of the monies generated from timber sales was returned to the general treasury. Most of the money that didn't go to the counties went back into the Forest Service budget to finance more timber sales. NEC would like to request that your economic analysis define where the timber dollars will go, and who will benefit from this activity. **E**

Appendix B contains the economic analysis which describes costs that will be spent on the project such as KV, BD and wildlife. The distribution of timber sale receipts is beyond the scope of this project.

259. NEC would also like to make a request that at least 2 field trips be provided to the public before a draft EIS is completed, not only so that the agency can benefit from public comments on your proposed activities, but so that the public can gain a better understanding of this HUGE project, as well as have ample opportunity to ask questions in the field. The reason we are requesting two separate field trips is so there will be ample time to discuss the two quite different management programs, one logging and the other burning. (W)e would also like to request that adequate public notice be provided (at least a month ahead). ...NEC would even like to receive a phone call regarding field trip dates. **G**

See Comments #40 and #68, above.

260. ...I urge you to continue to consider and take advantage of commercial timber harvest as a means of accomplishing goals for this project. Stumpage receipts could be a significant factor in reducing out-of-pocket costs to the taxpayers, while providing jobs and associated benefits. **E**

See Appendix B, economic analysis.

261. Please include information in the EIS about temporary roads and how effectively they will be obliterated and what impacts may remain once they are obliterated. **RD**

See Chapter 4, Section D, for a discussion of effectiveness of mitigation with respect to temporary roads. See also Appendix B, Effects on Recreation resulting from Action Alternatives.

262. We would also appreciate scientific review of the proposed security area amendment. **WF**

See Comment #95, above.

263. Finally, we are interested in attending a field trip in the spring or summer regarding the proposal. What is the timeline for the DEIS? Are you anticipating holding a field trip? **G**

See Comments #40 and 68, above.

264. Documents must have a clear and logical Purpose and Need Statement and an adequate explanation of the rationale for the establishment of the analysis area boundary. The analysis area should include the environment potentially affected by implementation of the alternatives and should be a logical unit for projecting and measuring effects. We note that potential impacts to biodiversity, wildlife and fish, water quality, wetlands, stream drainage patterns, air quality, fragmentation and connectivity to other projects, may extend beyond the immediate project area. An appropriate analysis area should encompass the potentially affected environment, and should be able to serve as a baseline to compare projected impacts and for measuring actual effects. **P**

The purpose and need for this project is disclosed in Chapter 1, Section C. The scope of the project is disclosed in Chapter 1, Section D. Analysis area for each key issue is disclosed in Chapter 3.

265. The EIS should support the purpose and need with a range of alternatives that will meet the objectives of the purpose and need and that address issues of concern. Alternatives requiring land and resource management plan amendments should be clearly identified. If additional activities are proposed for the project area under the Knutsen-Vanderburg Act (KV), they should also be described in the EIS. The alternatives should: a. Rigorously explore and objectively evaluate all reasonable alternatives that meet the purpose and need for the project. b. Include reasonable alternatives not within the jurisdiction of the lead agency. c. Include a no action alternative. The no action alternative should be constructed to cover a period at least equal to the time over which cumulative watershed effects will be evaluated. d. Identify the agency's preferred alternative(s). e. Include appropriate mitigation measures not already included in the proposed action or alternatives. **P**

Refer to Chapter 2, Sections D, E, F, H and I.

266. Also, if there are any nearby actions or adjacent developments that are closely related to the proposed action it would be appropriate to analyze and discuss those related developments as a connected action (40 CFR 1508.25). **P**

Refer to Chapter 2, Section H.

267. We recommend that tables, maps, and figures be used to present and display specific features of alternatives (harvest units, road construction & reconstruction, road obliteration, prescribed burns, watershed improvements, etc.) so that features of the different alternatives can be understood and evaluated in a comparative manner. **P**

Refer to Chapter 2.

268. It is helpful if the rationale for inclusion and location of harvest and burn units, road management, etc., is also discussed. **P**

Refer to Chapter 2, Section F.

269. The EIS should succinctly describe the existing conditions (using watershed analysis where applicable) within the analysis area. The discussion of existing conditions should include, but are not limited to a discussion of existing: 1. Water Quality, Aquatic Habitat and Wetlands 2. Air

Quality (Present summary of monitoring data if available) 3. Wildlife/T&E Species Analysis 4. Noxious Weeds and Exotic Plants. P

The Existing Condition of water quality, fisheries, wildlife (including T&E Species) and noxious weeds is disclosed in Chapter 3.

270. (T)he EIS should present the environmental impacts of the alternatives. All activities and associated impacts related to project implementation must be disclosed. Statements made in the assessment should be substantiated either by data and analysis included in the document, or by reference to readily available supporting documents. When referencing documents or data not included in the NEPA document, a summary, matrix or data table displaying the information should be included to ensure the reader understands the quality and type of analysis actually completed. Environmental analysis documents frequently do not reflect the level of analysis and data compilation actually completed. Unless clearly documented, the reviewer is unable to establish whether data exists to support conclusions within the analysis. P

Refer to Chapter 4.

271. The EIS should include a discussion of unavoidable adverse environmental effects, short-term and long-term environmental considerations, and any irreversible or irretrievable commitments of resources which would be involved in the proposal should it be implemented. This section should address: a. Direct effects and their significance. b. Indirect effects and their significance. c. Possible conflicts between the proposed action and the objectives of Federal, regional, State, and local (and in the case of a reservation, Indian tribe) land use plans, policies and controls for the area concerned. d. The environmental effects of alternatives including the proposed action. (The baseline condition of the resource of concern should include a description of how conditions have changed over time and how they are likely to change in the future with and without the proposed action.) e. Energy requirements and conservation potential of various alternatives and mitigation measures. f. Natural or depletable resource requirements and conservation potential of various alternatives and mitigation measures. g. Effects to Historic and cultural resources. h. Means to mitigate adverse environmental impacts. P

Direct and indirect effects for each significant issue are disclosed in Chapter 4, Sections B through G. Possible conflicts with plans and policies of other jurisdictions is disclosed in Chapter 4, Section K. A descripiton of baseline conditions for significant issues are disclosed in Chapter 3. Energy requirements and conservation potential of alternatives is disclosed in Chapter 4, Section L. Means to mitigate adverse environmental impacts are disclosed in Chapter 2, Section G.

272. A comprehensive discussion of appropriate mitigation for direct, indirect and cumulative impacts is required by the CEQ regulations (40 CFR 1502.14(f)). This discussion should include identification of Standard Operating Procedures used by timber sale administrators and others that result in project mitigation as a matter of normal program management. Judicial reviews of NEPA cases have supported not only the need for identifying mitigation measures, but also a discussion of mitigation measure effectiveness. The EIS should provide a quantitative (if possible) and/or qualitative description of site-specific mitigation effectiveness. Prior timber harvest activities, including timber sales, in comparable areas could be used as a basis for these discussions. P

Mitigation measures are described in Chapter 2, Section G.

273. NEPA requires that cumulative impacts be addressed as a summary of the individual impacts of this and all other past, present, and "reasonably foreseeable" future projects, including activities on private, adjacent land irrespective of what agency or entity has decision-making authority or analysis responsibility. The cumulative, site-specific effects of these projects on the analysis area's environment, including evaluation of direct and indirect effects of these projects on all applicable resource categories, including water quality, aquatic habitat, wetlands, air quality and wildlife habitat, must be analyzed and disclosed. A common inadequacy of documents is the lack of analysis or disclosure of the sum of individual effects of all projects on the local environment. A summary listing of other projects occurring in the vicinity without the accompanying analysis is insufficient. **CE**

A cumulative effects analysis for each significant issue is disclosed in Chapter 4.

274. The document should clearly describe water bodies within the analysis area which may be impacted by project activities. Identifying affected watersheds on maps of the various alternatives helps convey their relationship with project activities. The EIS should reveal what data is available and the condition (reliability, gaps in data, etc.) of that information. **WT**

Refer to Chapter 3, Section E and Chatper 4, Section F.

275. The EPA considers the collection of baseline water quality and aquatic habitat data at the project level important to provide a comparison with projected impacts as well as actual project impacts. Water quality and aquatic habitat impacts associated with implementation of the alternatives should be fully evaluated and disclosed. Where water quality and aquatic habitat information for individual water bodies exist, it must be presented. This would include inventories; baseline data information such as temperature, sediment, turbidity, channel morphological conditions, the presence of toxic substances; water quality and the existence of any known point or non-point pollution sources or other problems. The EIS should discuss the capability of surface and ground water resources to assimilate point and non-point pollution from the project. **WT**

Refer to Chapter 3, Sections E and F, and Chapter 4, Sections F and G.

276. The EIS should show the extent to which aquatic habitat could be impaired by project activities, including effects on stream structure and channel stability, streambed substrate including seasonal and spawning habitats, large organic material supplies (woody debris), streambank vegetation, and riparian habitats. The analysis should disclose whether the project will cause any reductions in habitat capability or impair designated uses. Other information relevant to the analysis, such as aquatic species habitat and the condition and productivity of that habitat, should also be included. Particular attention should be directed at evaluating and disclosing the **cumulative effects** of increased water yield, and increased levels of erosion and sedimentation. **WT**

Refer to Chapter 4, Sections F and G.

277. Existing water quality standards applicable to the affected water bodies should be presented to provide a basis for determining whether beneficial uses will be protected and water quality standards met. The EIS should clearly demonstrate that project implementation will comply with State Water Quality Standards (ARM 17.30 Subchapter 6), including an antidegradation analysis, as specified in

the EPA Antidegradation Policy (40 CFR 131.12) and Montana Nondegradation Rules (ARM 17.30 Subchapter 7). **WT**

Please see Comments #75 and #85, above.

278. The EIS should provide a quantitative basis to judge whether biological, chemical, and physical parameters, such as organic, microbial, and nutrient loading, temperature, turbidity and sediment accumulation, aquatic habitat will be kept at levels that will protect and fully support designated uses and meet Montana Water Quality Standards under each of the action alternatives. **WT**

Please see Comments #75 and #85, above.

279. Special attention should be made regarding the state's identification of water bodies with impaired uses in its Clean Water Act Section 303(d) report, as well as the magnitude and sources of such impairment. The EIS should identify the specific parameters resulting in a 303(d) listing and how the proposed project might affect these parameters (e.g. temperature, sediment, phosphorus, riparian habitat). Most importantly, the EIS should demonstrate that any implementation activities, including timber harvest, thinning, prescribed fire, and/or road building will not result in further degradation of 303(d) listed waters. **WT**

Please see Comments #75 and #85, above.

280. Stream segments designated as "water quality impaired" and/or "threatened" listed on the States 303(d) list need development of a Total Maximum Daily Load (TMDL). The Forest Service should contact the Montana Dept. of Environmental Quality (MDEQ) in Helena to determine if any waterbodies in the project area are listed by the State as impaired or threatened (i.e. water quality limited) in need of a TMDL. The TMDL process identifies the maximum load of a pollutant (e.g. sediment, nutrient, metal) a waterbody is able to assimilate and fully support its designated uses; allocates portions of the maximum load to all sources; identifies the necessary controls that may be implemented voluntarily or through regulatory means; and describes a monitoring plan and associated corrective feedback loop to insure that uses are fully supported. **WT**

Please see Comments #75 and #85, above, and various correspondence with MDEQ in the project file.

281. We recommend that the Forest Service contact the Planning, Prevention, and Assistance Division of the MDEQ to ensure that TMDL requirements can be met. MDEQ may also be able to provide information regarding specific water resources in the project area. **WT**

Please see Comments #75, #85 and #280, above.

282. Opportunities for improvement and restoration of streams and watersheds should be included in the EIS. **WT**

See Chapter 3, Section E.

283. The U.S. Fish & Wildlife Service determined that the Columbia River distinct population segment of bull trout (*Salvelinus confluentus*) should be given threatened status under the Endangered Species Act (effective July 10, 1998). Federal agencies need to prepare and disclose a biological assessment

in the draft EIS for their activities which may affect bull trout, and the final EIS should include the associated US Fish & Wildlife Service (FWS) Biological Opinion or formal concurrence. **F**

There are no bull trout east of the Continental Divide. This project does not extend west of the Continental Divide. There are no bull trout in the project area or downstream of the project area; therefore they will not be impacted in any way by this project

284. Bull trout require cold clear water with large clean gravel and cobble substrate that they hide within. Important bull trout habitat characteristics for spawning and rearing streams include channel stability, habitat complexity (i.e. large woody debris, undercut banks, boulders, pools, etc.) large clean substrate, cold water temperature, and migratory corridors. Spawning are often associated with cold water springs, groundwater infiltration, and the coldest streams in a watershed. Forest activities that degrade habitat characteristics, and cause erosion and transport of fine sediment to spawning and rearing streams may adversely affect bull trout. **F**

See Comment #283, above.

285. The FWS bull trout determination published in the Federal Register (50 CFR Part 17, June 10, 1998, page 31658 indicated that: "Logging and road building in riparian zones reduce stream shading and widen stream channels, allowing greater sunlight penetration, surface water warming, and winter anchor ice formation. Timber extraction in riparian areas that results in increased water temperatures in spawning and rearing areas may cause bull trout to decline. Logging in riparian areas reduces recruitment of large woody debris, thereby reducing stream habitat complexity. Loss of riparian vegetation destabilizes streambanks and increases erosion and sediment delivery to streams. Road construction that involves channelizing streams may cause reduced habitat complexity and increased sediment delivery." These impacts need to be considered in planning and designing timber sale and ecosystem management projects in bull trout watersheds. We also encourage the Forest Service to review the document entitled "The Relationship Between Land Management Activities and Habitat Requirements of Bull Trout" dated May 1998, prepared by the Montana Bull Trout Scientific Group for the Montana Bull Trout Restoration Team; and to use the Interagency Bull Trout Matrix being developed by the FWS and fisheries biologists from the Forest Service and BLM. **F**

See Comment #283, above.

286. A discussion of project area geology, topography, soils and stream stability in terms of erosion and mass failure potential may be necessary to adequately portray the potential risk to water quality, aquatic habitat and other resources from the implementation of specific alternatives. Section 313 of the Clean Water Act requires that Federal agencies comply with State and Local pollution requirements. Therefore, the appropriate State-identified Best Management Practices (BMPs) to reduce potential non-point sources of pollution from this project's proposed activities must be designed into the alternatives under consideration and disclosed. **WT**

See Chapter 3, Section E and Chapter 4, Sections F and G.

287. The soils in the project area should be described and related to landform stability and watershed sensitivity. The EIS should: a. Describe local geologic material, areas of stable and unstable terrain, mass soil failure problems, and local erosion concerns in the planning area. b. Identify erosion

hazards and how they tie to geology, landforms, and specific locations in the planning area. c. Show areas of potentially high soil erosion and mass soil failure risk on maps showing the location of project activities. Special design considerations should be presented for harvest unit, skid trail and road construction proposed in areas of high mass soil failure risk, although EPA recommends that such areas be avoided. **S**

See Comment #110, above.

288. Stream protection strategies should be outlined. For example, the EIS should identify if fish habitat could be impaired by vegetation management and timber harvest activities, including road construction, and/or conditions of existing roads. The analysis should discuss whether projects could cause reductions in habitat capability or impair designated uses for specific water bodies. **WT**

See Chapter 2, Section G, Mitigation Measures #9, #10, #13 and #27 and Chapter 4, Sections F and G.

289. The EIS should indicate which roads built for forest management activities will be removed from the Forest Development Road System and which roads will remain on the System. For those roads remaining on the System, mitigation measures for water quality should include provisions for road inspection and maintenance. Areas of concern include number of road stream crossings; road drainage; culvert sizing and potential for washout; culvert allowance of fish migration, effects on stream structure; seasonal and spawning habitats; large organic material supplies; and riparian habitats. In addition, the EIS should describe the frequency of maintenance activities for these roads and whether adequate funding id anticipated for road maintenance. For those roads scheduled for closure, the EIS should identify how individual roads will be closed (e.g. administratively, gates or barriers, obliteration). The document should describe necessary inspection and non-traffic-generated maintenance activities for closed, but unobliterated, roads. It should also describe obliteration and rehabilitation methods and their effectiveness for roads whose road prisms will be physically removed. Periods of road closure (e.g. for wildlife security) should be clearly described. **RD**

None of the alternatives proposes any permanent road construction. See Chapter 2, Section G, #27 for roads related mitigation measures. Management of the existing road system in general is beyond the scope of this proposed action - see Chapter 1, Section D.

290. If the proposed action involves modifications to the Forest's Travel Management Plan that identifies designated routes available for motorized vehicle use, we recommend that the plan include appropriate limitations and restrictions on motorized vehicle use to protect against erosion, transport of sediment to streams, and degradation of aquatic habitat by off-road vehicle use in wetlands and other environmentally valuable areas. **TL**

See Chapter 1, Section D, Scope of the Proposed Action. Modifications of the Travel Management Plan are beyond the scope of this proposal.

291. The EIS should include a strong, explicit commitment to monitoring, such as that in the Forest Service Pacific Northwest Region's Forest Monitoring and Evaluation Guide in which the Regional Forester stated, "All programs and projects should contain appropriate levels of monitoring funds in their costs - or they should not be undertaken." (USDA FS 1993). **M**

A detailed monitoring plan will be developed for the Final EIS.

292. The proposed water quality/aquatics monitoring program to be used for determining effects on water quality and the aquatic environment must be disclosed in the assessment. The achievement of water quality standards for non-point source activities occurs through the implementation of BMPs. Although BMPs are designed to protect water quality, they need to be monitored to verify their effectiveness. If found ineffective, the BMPs need to be revised, and impacts mitigated. The EIS should show a commitment to BMP monitoring within the framework of project monitoring plans and illustrate how monitoring results may be used in refining BMPs. **M**

Refer to Comment #291.

293. The EIS should include a discussion of how the three types of monitoring (implementation, effectiveness and validation monitoring) are incorporated into proposed harvest activities. In addition, the relationship between project monitoring activities and the forest-wide monitoring plan should be described. **M**

Refer to Comment #291

294. The EIS should include a discussion of monitoring for each resource category determined to be significant through the scoping process, including water quality. The monitoring plan should help assess how well the preferred alternative addresses issues and concerns. The monitoring plan should include types of surveys, location and frequency of sampling, parameters to be monitored, budget commitments, and procedures for using data or results in guiding current and future activities. The design of this monitoring program must: 1) ensure State water quality objectives and standards are met, 2) provide a mechanism to initiate additional measures if needed to meet State water quality standards and goals, 3) evaluate the effectiveness of Best Management Practices utilized in this project, 4) evaluate the accuracy of estimates made in the analysis, and 5) provide a feedback mechanism for future projects. *A list of references are provided by the EPA.* **M**

Refer to Comment #291.

295. The EIS should identify wetlands and riparian areas potentially affected by project activities. EPA considers the protection, improvement, and restoration of wetlands and riparian areas to be a high priority. Wetlands and riparian areas increase landscape and species diversity, and are critical to the protection of designated water uses. Possible impacts on wetlands and riparian areas include damage or improvement to: water quality, habitat for aquatic and terrestrial life, channel & bank stability, flood storage, ground water recharge, sources of primary production, and recreation and aesthetics. **WT**

See Chapter 3, Section B, Riparian Vegetation and Chapter 4, Section C.

296. The EIS must clearly describe the existing wetlands within the analysis area (isolated wetlands as well as riparian wetlands) their acreage, type and ecological role and how both acreage and function will be protected. Road construction, land clearing and earthwork generally include sedimentation and hydrologic impacts which at some level may cause changes to surface and subsurface drainage patterns and, ultimately, wetland integrity and function. **V**

All Riparian areas have a minimum of a 100 foot buffer where no activities will occur. Site specifie analysis expanded these buffer where appropriate. Refer to Chapter 2, G Features Common to all Action alternatives. Also Chapters 3 and 4, Riparian Vegetation.

297. If harvest activities are proposed within riparian areas, an assessment of the potential impacts on riparian functions and values should be included in the EIS. The EIS should describe impacts to wetlands, and explain how impacts, if any occur, will be mitigated (i.e. mitigation means sequence of avoidance, minimization, rehabilitation, and then compensation for unavoidable impacts). Possible effects could include impacts on water quality; aquatic habitat; channel and bank stability; and ground water recharge and discharge. We encourage the Forest Service to delineate and mark perennial seeps and springs and wetlands on maps and on the ground before harvesting so that timber contractors will be able to avoid them. We recommend establishment of riparian habitat buffer zones to avoid adverse impacts to streams and riparian areas. V

See Comment # 296, above.

298. Executive Order 11990 requires that all Federal Agencies protect wetlands. In addition, national wetlands policy has established an interim goal of **No Overall Net Loss of the Nation's remaining wetlands**, and a long-term goal of increasing quantity and quality of the Nation's wetlands resource base. Wetland impacts should be avoided, and then minimized, to the maximum extent practicable, and then unavoidable impacts should be compensated for through wetland restoration, creation, or enhancement. V

Refer to Chapter 1, Purpose and Need. Riparian areas are not treated in this project. Also see Comment #296, above

299. An air quality analysis should be completed if prescribed burning is proposed. The EPA does not object to the judicious use of prescribed fire to control forest fuel accumulation and to influence forest composition and structure (e.g. low intensity fire in specific planned locations spread out over time so that some vegetative cover could become reestablished before the next phase of prescribed fire, with fire carried out during climatic conditions that minimize air quality impact). AQ

Air quality is discussed in Appendix B.

300. Particulate concentrations that exceed health standards have been measured up to three miles downwind of a prescribed burn. Residences, recreation sites, or areas of expected human activity potentially affected by burning activity should be identified in the EIS. In addition, prescribed fire could have impacts on Class II areas and federally-designated Class I areas. AQ

Air quality is discussed in Appendix B.

301. The air quality analysis should not be based entirely on compliance with the State Implementation Plans (SIPs) and State Smoke Management Plans. Blanket statements regarding compliance with applicable plans and regulations do not identify anticipated air quality impacts. An assessment of these potential impacts is needed to illustrate that burning can be done in compliance with applicable plans and regulations. The Clean Air Act and SIPs require that prescribed burning not cause or contribute to violations of National Ambient Air Quality Standards (NAAQS) or Prevention of Significant Deterioration (PSD) increments. In addition, burning may not cause visibility

impairment in federally-designated Class I areas. The air quality analysis should include the following steps: 1. Assessment of the need for burning as compared to other silvicultural and vegetation management methods, such as scarification, piling unmerchantable material, and yarding unmerchantable material. 2. Description of the location and frequency of proposed burning activities. 3. Quantification of the amounts, types of material, and acreage to be burned. 4. Description of the type(s) of burns proposed (e.g. broadcast burns, piled burns, understory burns). 5. Description of measures to reduce emissions (e.g. management of fuel moisture content, site preparation, and fuel removal through firewood programs, reduction of fugitive dust emissions occurring from vehicles traveling on dirt roads with speed limits or watering or use of dust suppressants on roads, etc.). 6. Quantification of emissions of regulated air pollutants for each alternative. 7. Description of applicable regulatory and/or permit requirements, including smoke management plans. 8. Assessment of local meteorological and climatic conditions and existing air quality. A windrose should be presented to indicate the direction of the prevailing winds. Windroses, representative of each quarter of the year, would be beneficial to give the public an idea of the direction of prevailing winds during the spring, summer, and fall seasons when prescribed burning is likely to occur. 9. Qualitative description of air quality impacts focused on new or increased impacts on downwind communities and visibility impacts in Class I areas. The location of potentially affected air quality nonattainment areas should be identified. Section 176(c) of the Clean Air Act, the conformity provision, requires that all federal actions conform to existing State Implementation Plans (SIP's). Under section 176(c), the federal agency responsible for a proposed action is required to determine if its action will conform to the applicable SIP before the action is taken. Therefore, the EIS should demonstrate project compliance with the conformity provision. In addition, the location of all potentially affected Class I air quality areas should be identified. The Clean Air Act requires air quality impact analyses for PSD sources on Class I airsheds. EPA exempts sources located farther than 200 kilometers from a Class I airshed from such analysis. A Class I designation imposes the most stringent requirements under the Clean Air Act. The EIS needs to present an air quality analysis as described above and specifically demonstrate compliance with Class I increments and other air quality related values that could be affected by burning. Modeling of downwind concentrations of pollutants to document compliance with NAAQS, PSD increments (if applicable) and visibility impacts in Class I areas (if affected) may be necessary. Neither the NAAQS nor the PSD increment may be violated. If the analysis indicates that potential exceedances could exist, reductions in particulates from burning activities may be necessary. 10. Description of the existing monitoring network (if needed, development of a plan to revise or expand monitoring). The EPA believes monitoring of activities will be beneficial to improving understanding of impacts upon air quality. We encourage you to develop a monitoring plan to help you establish a quantitative and qualitative understanding of the impacts to air quality. Such a monitoring plan would also help to validate quantitative predictions for future activities. Careful scheduling of the many burning activities to coincide with proper climatological and meteorological conditions will be necessary to avoid air quality problems. 11. Identification of the risk of reduced air quality from natural events if a no-burning alternative is chosen. **AQ**

Air quality is discussed in Appendix B.

302. The EIS should demonstrate coordination with the U.S. Fish & Wildlife Service (FWS) and Montana Department of Fish, Wildlife & Parks (MDFWP) to address potential fish and wildlife issues associated with the alternatives including; road access and wildlife security; wildlife displacement; impacts upon fish and wildlife habitat; and impacts upon sensitive species and species

of special concern (e.g. Townsend's big-eared bat, flammulated owl, black-backed woodpecker, fisher, wolverine, bull trout, westslope cutthroat trout, etc.). WF

Refer to various memos and letters in the Project File.

303. If the proposed activities could affect threatened or endangered (T & E) species (e.g. grizzly bear, bald eagle, peregrine falcon, wolf, bull trout, etc.) the draft and final EIS should include the Biological Assessment and the final EIS should include the associated FWS Biological Opinion or formal concurrence for the following reasons: 1. NEPA requires public involvement and full disclosure of all issues upon which a decision is to be made; 2. The Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA strongly encourage the integration of NEPA requirements with other environmental review and consultation requirements (40 CFR 1502.25); and 3. The Endangered Species Act (ESA) consultation process can result in the identification of mandatory, reasonable, and prudent alternatives which can significantly affect project implementation. The potential effects on listed species are relevant to forest management activity decisions. Since both the Biological Assessment and the EIS must evaluate the potential impacts of the project on listed species, they can jointly assist in analyzing the effectiveness of project alternatives and mitigation measures. EPA recommends that the final EIS and Record of Decision not be completed prior to the completion of ESA consultation. If the consultation process is treated as a separate process, the Agencies risk FWS identification of additional significant impacts, new mitigation measures, or changes to the preferred alternative. If these changes have not been evaluated in the final EIS, a supplement to the EIS would be warranted. P

A Biological Assessment will be prepared for the final EIS. Refer to Chapter 4 for potential effects to T&E species.

304. Biodiversity has become a significant issue in the northern Rocky Mountains. Maintenance of biodiversity can minimize the need for listing species as threatened or endangered. Upland and stream corridors should be retained in the planning area to help maintain genetic diversity. The EIS should provide information on the location and size of such corridors. The "affected environment" and "environmental consequences" sections of the EIS need to discuss what effect project activities could have on gene pools and species diversity. The state of the art of this issue is changing rapidly. The scale used for the analysis must be described and explained. A landscape scale perspective is generally considered appropriate unless the presence of biotic species that operate over a wide range of landscapes (i.e. wide ranging predators, neo-tropical birds, etc.) indicate a larger scale is needed for a specific component of the analysis. Most analyses of effects on the gene pool, connectivity to adjacent landscapes and fragmentation would be difficult or ineffective at a smaller than landscape scale. Where indicator species are used, they should be representative of discrete conditions (i.e. fidelity to a specific habitat or condition) rather than ubiquitous in their use of various habitats. The document should address: 1. The diversity and uniqueness of flora and fauna that exists in the analysis area (e.g. old growth, sensitive plants, etc.). A review of local climatic diversity, topography and how well defined the ecotones are may be of benefit in determining how much biodiversity exists. The presence of threatened, endangered or sensitive species; communities that are at the edge of their range; or the identification of "gap" habitats would indicate greater need for analysis than would homogeneous habitats. [Note: A "gap" represents an element of diversity that is not represented in a protected area such as wilderness of National Park. This may constitute a potential "gap" in perceived protection of total, existing biodiversity.] Similarly, a discussion of the

presence of a large "natural" habitat (i.e. wilderness area, National Park, roadless area) near the proposed project which provides increased stability of local diversity would be appropriate. 2. The effects of the proposed alternative actions on the maintenance of diversity. 3. The cumulative effects of known past projects, approved future projects and proposed future projects on diversity stability, fragmentation, connectivity with adjacent landscapes, and disruption to processes of functions. 4. How the proposed project would improve, protect or adversely affect existing diversity, and potential mitigation measures. **B**

Refer to the Tobacco Root Landscape Analysis (1994), EIS Chapter 1 - 4 and Biological Assessment (prepared for Final EIS).

305. The document should list the noxious weeds and exotic plants that occur in the resource area. In cases where noxious weeds are a threat, EPA recommends that the document detail a strategy for prevention, early detection of invasion, and control procedures for each species. Plant seeds can be carried from a source area by the wind, wildlife or pack animals, on equipment tires and tracks, by water, and on the boots of hikers. Care should be taken to implement control procedures in all source areas to avoid spread to unaffected areas. The EIS should provide a quantitative (if possible) and/or qualitative description of site-specific mitigation effectiveness. Prior noxious weed and vegetation management including herbicide applications or use of biological agents or prescribed fire and selective harvest in comparable areas could be used as a basis for these discussions. **WD**

The effect this project has on the establishment or spread of noxious weeds is described in Chapters 3 and 4, Noxious Weeds. Also refer to Chapter 2, G Features Common To All Action Alternatives. The actual treatment of noxious weeds is outside the scope of this document. Treatment of noxious weeds in the project area is currently accomplished under the 1987 Beaverhead National Forest Noxious Weed EIS.

306. If aerial herbicide applications are proposed we recommend that the Procedures for Mixing, Loading and Disposal of Pesticides, a Spill Plan, and Aerial Spray Recommendations and Mitigation Measures be included in an appendix of the EIS to assure that applicators and the public understand the safety measures and precautions to be used. **WD**

See Comment #305, above.

307. We encourage inclusion of discussion of herbicide effectiveness research results and experience with handpulling vs. herbicide application to evidence a proactive approach to disclosing and explaining to the public potential options for addressing the weed infestation, and explaining why certain application methods may be dropped from further consideration. **WD**

See Comment #305, above.

308. We recommend revegetation (reseeding with native grass mix) of disturbed or treated areas to seed sites where the vegetation density is low enough to allow introduction of noxious weeds, or reinfestation after treatment, or erosion. The goal of the seeding program should be to establish the sustainability of the area. **WD**

All ground disturbance areas will be revegetated. The district currently relies heavily on the soil seed bank for revegetation. Monitoring over the last few years has shown a high success rate for

revegetation of temporary roads and other disturbed ground. Use of the soil seed bank has given a more diverse vegetative cover and eliminated the potential for introduction of noxious weeds or other undesirable plant species through contaminated seed lots. Also see Comment #305, above.

309. We also believe that all potable, agricultural, and recreational uses of surface and ground water immediately downstream or down gradient from proposed herbicide application areas should be clearly disclosed and evaluated for potential effects from herbicide applications. We encourage the Forest Service to consider conducting before-and-after bioassays in surface and ground waters in the drainages where significant amounts of herbicide is to be sprayed. Actual impacts to the aquatic ecosystem and public health from proposed herbicide applications can only be detected through monitoring. Surface and ground waters near herbicide application sites should be monitored to identify and detect herbicide transport to such waters. At a minimum, we believe that area streams should be sampled before the spraying, immediately following spray application, and immediately after the first major rainfall following application. The monitoring program should display sampling locations relative to area of herbicide treatment, parameters to be monitored, methodologies to be used, frequency, pattern and number of samples to be collected, etc. Without this information the EIS is inadequate to fully assess the role of monitoring and evaluation in project implementation. **WT**

No herbicide treatments are proposed in this project. Please see Comment #305, above.

310. We also note that bioassay techniques using aquatic species sensitive to the herbicides to be used would be appropriate for detecting aquatic impacts from herbicide applications (e.g. stoneflies, cutthroat trout). EPA has prepared a toxicity testing manual entitled, "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms", EPA/600/4-90/027, September 1991. Toxicity testing procedures are described in this manual, including procedures using rainbow and brook trout. *Provides contacts if we have questions.* A rapid bioassay technique for detecting herbicides in water, a leaf disc buoyancy procedure, is available. Please contact us if you are interested in such a procedure. **F**

No herbicide treatments are proposed in this project. See Comment #305, above.

311. Information on the carcinogenicity of chemicals proposed for use should be presented. *Provides website.* We also believe that health concerns other than carcinogenicity stemming from possible exposure to low levels of herbicides, such as endocrine disruption or reproductive effects should be addressed in the EIS proposing significant amounts of herbicide application. *Provides information on some chemicals and provides a contact pesticide specialist.* **WD**

See Comment #305, above.

312. Air quality is an issue that needs to be analyzed when prescribed burning is proposed. **AQ**

Air quality is addressed in Appendix B.

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APPENDIX B
OTHER RESOURCES

Recreation

The analysis area for recreation is the project area.

The Tobacco Root Mountains currently provide a wide variety of recreation opportunities. Major recreation uses include recreational driving, dispersed and developed site camping, hiking, hunting, fishing, off highway vehicle riding, horseback riding, wildlife viewing, nature study, snowmobiling, cross-country skiing, picnicking, fire wood gathering and other similar activities.

An analysis of Beaverhead Forest Users conducted in 1992, by A & A Research estimated the percent of individuals who participated in recreational activities on the Beaverhead National Forest:

94% drive and enjoy scenery	94% wildlife observation
73% hike	59% camp
57% fish	55% lake recreation
51% river recreation	51% wilderness use
46% hunt	34% gather firewood
14% snowmobile	14% motorcycle & off road vehicles
14% cross-country ski	13% horseback riding

These figures are for the Beaverhead National Forest as a whole and so are not directly applicable to the Tobacco Root Mountains, but they are an indication of the types of recreational activities occurring in the area. Observations indicate that these proportions are generally true for the Tobacco Root Mountains as well. Trends in recreation use are toward consistent growth for most activities.

Most information on existing levels of recreation use is based on observation rather than systematic sampling. While the existing information is probably adequate for most planning purposes, systematic sampling to refine and confirm existing information would be highly desirable.

The Tobacco Root Mountains are a rugged mountain range with many of the high peaks along the range's backbone reaching above timberline, and typically narrow and deep canyons. There are meadows and other open areas below timberline, but the majority of the area is forested.

There are many small streams, several of which provide fishing opportunities, but no large streams. Mountain lakes and reservoirs are numerous and most are currently accessible by motorized vehicles of some type.

Mining activities have been common in the Tobacco Root project area since the 1860's. These activities have resulted in an extensive network of low standard roads in many areas. Many of

these roads are still open to either full-sized or trail vehicles and driving these roads is one of the common recreation activities in the area.

Summer activities constitute the bulk of the recreation activities in the area as a whole, but the period of the most concentrated use is the first two weeks of the general big game hunting season.

Winter recreational activities, such as snowmobiling and cross-country skiing, have been well established for many years. There are 12 miles of groomed and marked snowmobile trails in the analysis area and many more miles of routes regularly used by snowmobilers and skiers.

Existing recreation facilities include four campgrounds, several heavily used dispersed areas (two with toilets) and approximately 70 miles of trail.

The Forest Plan allocates much of the Tobacco Root project area to Management Area 8, which emphasizes dispersed recreation.

Existing management concerns include the ability to accommodate increasing demand for dispersed and developed recreation without resource damage, ability to be responsive to new or changing recreation demands without displacing existing uses, management of off highway vehicles, condition of some of the existing trails, condition of some of the heavily used dispersed recreation areas and developed recreation sites, impacts of unauthorized recreation activities on social and physical resources, and conflicts among users.

Recreation Opportunity Spectrum

The Recreation Opportunity Spectrum (ROS) is a system designed to inventory, analyze and manage National Forest recreation settings and opportunities. The system categorizes National Forest System lands into six classes. Each class is defined by its setting (the existing condition) and by the probable recreation experience and activities (based on allocations in the Forest Plan) it affords. The following table displays the acres within the four classes the Forest Plan designates within the Tobacco Root project area.

Table B-1
Recreation Opportunity Spectrum

Rural	821 acres
Roaded Modified (Motorized)	39,990 acres
Roaded Natural	49,396 acres
Roaded Natural (Motorized)	9,753 acres
Semiprimitive Motorized	11,008 acres
Semiprimitive Nonmotorized	31,326 acres

Recreation Effects

Effects of No Action Alternative (Alternative R) on Recreation

This alternative would cause no short term changes in recreation opportunities or experiences.

In the long term, this alternative would result in some changes in the settings available for recreationists. The changes would occur mostly at lower elevations (Ecological Land Unit {ELU} 1). Many areas of grass and sagebrush that provide a feeling of openness and unrestricted space will gradually convert to timber stands. Views from roads and trails will change from offering frequent opportunities for wide vistas to more restricted views of forested areas in the immediate foreground.

Open park-like timber stands in the lower areas will continue the trend toward dense multistoried stands with more restricted views and more difficult cross-country travel except on maintained roads and trails.

Aspen stands which provide both visual variety and a wider range of recreation settings will continue to decrease in abundance and distribution over the long term.

Opportunities to view larger wildlife species will become less frequent due to increasing areas of forest cover and increasing density of existing forest cover.

Effects on Recreation Resulting from Action Alternatives

Effects of all the action alternatives on recreation would be generally similar, but the magnitude of the effects will vary among alternatives.

The action alternatives would reverse the trends described above for the no action alternative. The action alternatives would result in more open vistas from roads and trails and in timber stands being more open than with the no action alternative.

Over time aspen would be brought back as a more common component of the vegetative community, providing more visual variety.

Opportunities to view the larger wildlife species would remain constant or become more common due to increasing open areas and park-like timber stands.

Burning, harvesting and timber hauling activities will temporarily interfere with recreation activities in specific locations. The portion of the Tobacco Root project area affected by these activities, in any one year, would be relatively minor, less than 10% for Alternative S and less for the other two action alternatives. The duration of impact of burning grass and sagebrush on recreation activities is short, one or two years.

The visual effect of treatments that involve timber stand changes are more lasting. Visual evidence of timber treatment such as fresh slash and evidence of fire following underburning would be evident from viewpoints in or adjacent to the treatment areas for 3-5 years. Stumps would be evident when actually walking through treated stands for at least 20-25 years. The visual effects of more open stands would also be evident immediately following treatment and would last for many years.

Alternative S

This alternative treats the most acres of any of the action alternatives, with most of the difference being in the number of acres of Douglas-fir stands to be opened up by underburning and by thinning from below followed by underburning (see Table 1, Chapter 2). This alternative would result in more acres of relatively open stands of Douglas-fir than either of the other action alternatives. Treatments of forested lands focus on Douglas-fir, but there would be some treatment of intermixed lodgepole pine. The lodgepole pine would be thinned by small groups and would result in small openings in the lodgepole stands.

This alternative treats the same amount of aspen as Alternative T and in the long term would result in more visual variety than Alternatives R or U. In the short term the aspen stands treated to reestablish new stands would have a period when mature aspen is less visible than at present.

This alternative creates 24.3 miles of temporary road which would be obliterated when project work is complete. These road corridors would remain visible until sufficient vegetation returned to the road corridors to make them essentially unnoticeable, which would take 2-4 years in nonforested areas and 15-25 years in forested areas.

Other than the visual effects described above, the short term effects on recreation activities would the presence of activities such as burning and logging, and traffic associated with these activities. During the period when temporary roads are open, access for firewood would be much improved and nonmotorized access for hunting would be easier. Only a portion of the proposed 24.3 miles of temporary road would be in existence at any one time.

Long term recreation effects, other than visual, would be easier cross-country nonmotorized travel. Such off route recreational travel is not now prevalent in the analysis area except during hunting season, and this is not likely to change. Some hunters will probably find the more open stands more enjoyable to hunt. Expected effects on wildlife hiding cover is discussed in wildlife effects in Chapter 4.

Long term changes in ROS classes would be that approximately 2790 acres would change from Roaded Natural to Roaded Modified, and approximately 420 acres would change from Semiprimitive Nonmotorized to Roaded Natural.

Alternative T

Vegetative visual effects of this alternative would be similar to Alternative S, except treatment of Douglas-fir stands would be on fewer acres and there would be no temporary roads. There are other differences in treatment acres, but they would probably not be apparent to recreationists except if specific areas treated were part of the individual recreationist's use of the area.

There would be no improved temporary access for firewood gathering.

Approximately 420 acres would change from ROS class of Semiprimitive Nonmotorized to Roaded Natural.

Alternative U

This alternative treats the fewest acres of any of the action alternatives. See Table 1, Chapter 2. There would be much less burning than in the other two action alternatives with a corresponding change in visual effects of burning. Only about half as much aspen would be treated as in the other action alternatives with less short term impact on aspen and less long term rehabilitation of aspen. There would be less thinning of Douglas-fir from underneath than in the other two action alternatives, with correspondingly less opening up of these Douglas-fir stands.

Alternative U would have slightly more temporary roads than Alternative S described above. Effects from temporary roads would be similar to Alternative S.

The primary difference between Alternative U and Alternatives S and T is that Alternative U includes 1095 acres of regeneration harvest, primarily in lodgepole pine stands. There are no treatments proposed that would remove all the trees from any area. Regeneration treatments would leave 10 to 20% of the existing overstory trees. This would be a noticeable change from the existing appearance.

Fewer forested acres would change to more open stands, but the stands treated for regeneration would be more open following treatment than stands thinned from below.

Approximately 3410 acres would change from Roaded Natural to Roaded Modified.

Mitigation for Recreation

The effects to recreation were based on mitigation identical in all action alternatives. Timber sale contracts would specify that trails will be protected in timber sale areas. Harvest activity will not be allowed during the general hunting season. Log hauling will not be permitted during weekends in winter nor on weekends during hunting season. Due to the popularity of snowmobiling and cross-country skiing in the North and South Meadow Creek drainages, winter (December 2 through May 14) logging and plowing of roads for winter logging will not be permitted in those two drainages.

People recreating in the vicinity of burn areas will be notified before burning starts. Trails through burn areas will be restored immediately following the burn.

Heritage Resources

The Affected Environment and Forest Plan Management Direction are taken from the Beaverhead National Forest Oil and Gas EIS (1994).

Analysis Area of Heritage Resources

All federal lands considered within this document are treated as "affected environment". Past, current and future management actions all contribute to a downward trend in the heritage resource base given the fact it is nonrenewable.

Past Management of Heritage Resources

Past actions on Beaverhead-Deerlodge National Forest lands in the Tobacco Root project area have affected heritage resources, often adversely. One hundred years of resource extraction, road and trail construction, recreational development and use, unauthorized artifact collection, and outright vandalism have impacted heritage resources. Current stewardship of heritage resources is based upon mitigation measures that can justify adverse impact to a finite resource of national importance.

Regulatory Framework for Heritage Resources

The following laws are the major statutes which guide and define the management of prehistoric and historic sites on the Beaverhead-Deerlodge National Forest:

The National Historic Preservation Act of 1966, as amended

The Archeological Resources Protection Act of 1979

The American Indian Religious Freedom Act

The Native American Graves Protection and Repatriation Act of 1990

National Environmental Policy Act and the National Forest Management Act

The Beaverhead National Forest Management Plan (Forest Plan)

Existing Condition of Heritage Resources

The principles which guide heritage resource management on the forest are set forth in the Forest Plan. The forest-wide goals specific to cultural resources state we shall "Locate and protect cultural resources to maintain their scientific and historical values" (p.II-2,11). We approach this goal through an objective which states heritage resources will be "...managed to maintain their scientific, social, and historical values," management will be "...in compliance with...applicable federal laws and Forest Service regulations," and when"...activities such as timber harvest and mineral development occur on the forest, additional inventory and, as necessary, mitigation will occur." Finally inventories will be designed to "...provide additional information leading to improved understanding of previous human activities on the forest" (p.II-7,h.).

An additional set of six forest-wide standards are also applied to any management action which may impact heritage resources on the forest (pp.II-32,33). In part, these standards mandate archeological inventories before any forest undertaking which may affect heritage resources, evaluation of the significance of known heritage resources, and makes preservation of significant resources in place the desired management action whenever possible.

Methodology for Heritage Resources

These sources were searched for data relevant to the occurrence of heritage properties on the forest: the National Register of Historic Places; the Montana State Historic Preservation Plan; the Beaverhead National Forest Master Site/Inventory Atlas; previous Inventory Reports; GLO Plats; Homestead Entry

Surveys; Mineral Surveys; Land Status Records; historic Forest Service maps; historic county maps; and aerial photos.

Recorded heritage properties and heritage inventories in the Tobacco Root Project Area are within an electronic data base built for the Beaverhead National Forest Oil and Gas EIS (1994) up until the 1993 field season. A total of 63 inventories have been completed as of February, 1996, in the Tobacco Root Planning Unit. Sixty-one historic sites and 26 prehistoric sites have been recorded in the Tobacco Root Planning Unit.

Heritage Properties

Classes of heritage properties are divided into historic and prehistoric sites. Prehistoric sites range in complexity from small chipped-stone scatters to multi-component camps, trails, and religious sites. The possibility also exists that wooden drivelines or corrals associated with game trapping are present in the analysis area. Similarly, wooden wickiups may be present in the analysis area.

Historic sites in the analysis area are overwhelmingly related to mining, ranching, and homesteading. Each one of these properties is made up of features such as wooden structures, adits, ditches, roads, trails, and dumps. There are likely eligible historic and archeological districts in the Tobacco Root Project Area which would include a cluster or clusters of historic or prehistoric sites eligible as a group for listing in the National Register (e.g., Tidal Wave Mining District).

Traditional Cultural Properties are also an issue in the analysis area. The American Indian Religious Freedom Act (PL-95-341) directs federal agencies to consider the effects of their actions on sites and areas important to Indian religious belief or ceremonial use.

The Ruby Valley Conservation District has also expressed interest in preserving as many heritage properties and traditional cultural uses as possible which relate to ranching and mining.

Heritage Resources Effects

The remains of 12,000 years of human history are located in the vicinity of the Tobacco Root Mountains in the Beaverhead-Deerlodge National Forest. Many of these archeological and historic sites are significant for their scientific, historic, cultural and aesthetic values. There may also be sites or geographical locations in the Tobacco Root project area with ceremonial or religious importance to specific American Indian tribes or groups. However, ceremonial sites or traditional cultural properties were not identified by consulted tribal groups.

Monitoring for Heritage Resources

Monitoring for heritage resources is accomplished through the process directed by Section 106 of the National Historic Preservation Act. Prior to the implementation of the chosen alternative the project area would be surveyed for the presence of archeological and historic resources. If heritage resources occurred at the proposed project location, they would be recorded and evaluated for inclusion in the National Register of Historic Places.

Mitigation for Heritage Resources

The mitigation of adverse impacts to significant heritage resources (designated MA-3 in the Forest Plan) is accomplished through site avoidance or data recovery tailored to historic or prehistoric sites.

Direct Effects Common to All Alternatives for Heritage Resources

Timber harvest, temporary road construction, and prescribed fire all will have a direct effect on heritage resources. These actions may damage wooden structures such as buildings and flumes. They may alter the integrity of prehistoric sites. Such actions can increase erosion across these sites. The No Action Alternative (A) will also have a direct effect on heritage resources due to neglect of historic properties. However, effects to significant heritage resources will be mitigated through Section 106 of the National Historic Preservation Act.

Indirect Effects Common to All Alternatives for Heritage Resources

Timber harvest, temporary road construction, and prescribed fire may have an indirect effect on heritage resources. Long term indirect effects to archeological and historic sites are erosion, neglect, and natural deterioration.

Air Quality

Description Of The Affected Environment

Airshed Characteristics

The analysis area for air quality is airshed 7. The airshed class is 2.

The objectives of the local airshed group and ambient air quality standards are disclosed at the end of this report.

The effects of smoke from prescribed burning within the project area and the Madison Ranger District in general is affected by the season of burning, the overall stability of the atmosphere, wind flows, topography and the time of day that burning occurs.

Spring and summer seasons have usually produced the best times for smoke dispersal as daytime heating and general windflows help raise the smoke columns high into the atmosphere and disperse them rapidly. By mid-September, the air quality naturally begins to deteriorate as nighttime inversions often develop. Inversions are hard to break during stable high pressure systems. The effects of prescribed burning on air quality is usually most severe from mid-September through November when smoke dispersal may be poor for much of the time. Air quality is poorest from December through February in spite of allowing no prescribed burning during that period.

Stable high pressure systems, especially during the fall and winter months, cause inversions and poor smoke dispersal. During the spring and summer months, there is usually enough daytime heating to lift the smoke high into the atmosphere, even during stable high pressure systems. Strong winds help

disperse smoke in northeast to southeast direction. The state of Idaho and Yellowstone National Park will not be affected by the proposed treatments.

Topography of the area allows for adequate smoke dispersal, except when inversions occur. Units to be burned are located on slopes above drainages and valleys where prevailing winds disperse smoke. When inversions occur, smoke can settle into the drainages and valleys (Gallatin Valley).

The time of day of burning is important for adequate smoke dispersal. Smoke dispersal is best when the daytime heating is greatest corresponding to when the winds are the strongest. Fuel moistures are also critical to successful burning. The project area has a very narrow range where fuel moistures allow ignition and combustion.

Public use of the project area usually takes place during the summer and fall months. Public use is highest during the general fall hunting season. Numerous restrictions apply to the project areas for resource reasons.

Although there is no known historical air quality data for the natural ecosystem in Airshed 7, fire historically played a major part in the vegetative conditions of the area. Unlike presettlement burning, today's prescribed burning is scheduled by forest managers to take place during periods of good smoke dispersal.

Air Quality Effects

All of the action alternatives have common activities and effects.

Air quality is affected by any harvest-related activity that deals with slash disposal and prescribed burning. Timber harvest can create considerable amounts woody debris. This residue provides fuel that will increase the intensity of wildfires when they occur. This fuel type also has a longer period each year when it poses risk of fire, compared to natural fuels.

Prescribed burning is conducted within the limits of a fire plan and prescription that describes the acceptable range of weather, moisture, fuel and fire behavior parameters, and ignition methods.

One of the most obvious effects of prescribed burning is the impact on air quality and its temporary impairment of visibility. Overall, the amount of smoke produced by natural processes during the fire season probably exceeded that amount generated today by prescribed burning.

Effects Common to All Action Alternatives Regarding Air Quality

The proposed fuel management treatments for all action alternatives involve prescribed burning. Many factors contribute to the amount of smoke produced from a burn. These include the weather conditions, combustion processes, fuel properties (moisture, loading, arrangement), and type of burn. Unlike the effects of some forest management practices on other resources, the effects of smoke on air quality are of short duration.

Differences among the proposed alternatives are related to the number of acres and amount of fuel to be treated. The effects of the alternatives will be the acres of planned prescribed burning. The following prescribed burning methods will be used in all action alternatives:

Underburning is used in harvest/underburn treatments. Leave trees will be the fire tolerant species Douglas-fir. Since underburning is deliberately slow (to protect leave trees) combustion is less efficient than with broadcast burning. More smoke per acre can be produced than with other methods. Well developed convection columns are seldom obtained as fire intensities are deliberately moderated to facilitate leave tree survival. Smoke generated from underburns typically drifts with the prevailing wind present on the unit.

Broadcast burning is used in the grass, sage, and Douglas-fir encroachment areas. It will also be used in the Forest Plan alternative U regeneration treatments. We labelled this treatment burn/utilize. They normally are ignited as rapidly as possible, within the capabilities of the holding crews. They create higher intensity fires that burn with greater efficiency than understory burns. All action alternatives in this proposal limit the amount of blackened area by requiring mosaics of burned and unburned vegetation.

Pile burning will be used along temporary roads and in landing areas following supplemental salvage by firewood cutters. It is also used in the harvest/no underburn treatments. Combustion can be very efficient but varies widely due to several factors. Unlike understory and broadcast burning, which is done in the spring, summer, and fall. we burn piles in late fall when escape potential is lowest. This means most pile burning occurs in fall days with adequate ventilation. This can lead to greater emissions over a shorter period of time. Also, there is usually more competition within the airshed as woodstove users begin to heat homes.

For all action alternatives, smoke generated in this area could affect the air quality in southwestern Montana. Little potential exists for smoke to drift into the following Class I Airshed and local communities. Yellowstone National Park, a Class I Airshed lies approximately 50 miles southeast of the area, away from normal drift patterns. Butte, a nonattainment classified area, is located 50 miles northwest of the area and is also outside of normal drift patterns. The Gallatin Valley lies 20 miles to the northeast, directly in front of prevailing wind patterns. It currently does not have legal definition as a nonattainment airshed. Smoke created during optimum burning conditions will also be added to the common practice of stubble burning. The stubble burning itself has already initiated conflicts between user groups and may result in further smoke restrictions.

The principal impact to air quality in Class I Airsheds from prescribed burning is the temporary visibility impairment caused by smoke. This may reduce the quality of forest recreation experiences as vistas, beyond the boundaries of the Class I Airsheds, may be temporarily obscured by smoke and haze.

Fall burning requires approval from the Montana State Airshed Group.

Dust and exhaust from vehicles during timber harvest would contribute short-term effects to air quality. Effects would be localized to the immediate vicinity of the operations.

Mitigation Measures Common to All Action Alternatives for Air Quality

As detailed in Chapter II, several measures or management techniques will be used to mitigate the effects of prescribed burning and smoke on air quality. The Montana Airshed Group operates an air quality monitoring unit from September 1 to November 30, annually. This monitoring unit regulates prescribed burning, of all major burners in the airshed, by restricting or curtailing burning activities when poor ventilation conditions exist or are forecast. Besides operation of the monitoring group in the fall, the following measures will be used to help reduce emissions and/or mitigate the effects of smoke from prescribed burning:

- Because one of the objectives of prescribed burning is to reduce the threat of wildfires, burning itself is a smoke mitigation measure. The smoke from prescribed fire can be managed to a degree, whereas the smoke from wildfires is unmanageable.

- Spring and early summer burning will be maximized to help reduce the amount of fuel consumed, to allow for more favorable smoke dispersal conditions, and to conduct burns during periods of less competition within the airshed.

- District burn bosses have the authority to terminate any burn in the event smoke behavior is not as forecast and there is potential for smoke to adversely impact local communities.

- Machine piles of logging debris will be reasonably free of dirt and sufficiently cured to facilitate combustion.

Effects on Air Quality by Alternative

Direct and Indirect Effects on Air Quality

There would be no direct effects to the air quality or human health from Alternative R. Indirect effects to the air quality would occur when a wildfire escapes initial attack efforts and starts to burn in unmanaged stands or in untreated fuels. Smoke from wildfires is unmanageable and the severity of air quality degradation is unpredictable. Air quality impacts from wildfire would normally occur during the summer months when visitor use in affected airsheds is highest.

Effects on Air Quality Resulting From Action Alternatives

Smoke created by burning activities would temporarily reduce air quality. Much of the burning and subsequent loss of air quality will occur in the spring and autumn seasons. Other direct and indirect effects of prescribed burning are listed in Table B-2, B-3 and B-4. They summarize planned prescribed burning acres by burn type, tons of fuel consumed and total PM-10 emissions.

Table B-2
ACRES AND METHOD OF FUEL TREATMENT

Alternative	R	S	T	U
Broadcast Burn Forested	0	3,613	2,273	3,182
Broadcast Burn Grass/Sage	0	12,460	7,403	3,757
Pile Burning	0	50	0	56
Total Acres to be Burned	0	16,123	9,676	6,995

TABLE B-3
TONS FUEL CONSUMED/ALTERNATIVE (TONS/ACRE * ACRES)

Alternative	R	S	T	U
Broadcast Burn @ 21 tons/ac	0	75,873	47,733	66,822
Broadcast Burn Grass/Sage @ 5 tons/ac	0	62,300	37,015	18,785
Pile Burning @ 50 tons/ac	0	2,500	0	2,800
Total tons consumed	0	140,673	84,748	88,407

TABLE B-4
PM-10 EMISSIONS LBS/ALTERNATIVE (TONS * LBS EMISSIONS/TON)

Alternative	R	S	T	U
Broadcast Burn 12 #/ton (flaming)	0	910,476	572,796	801,864
Broadcast Burn Grass/Sage 12 #/ton (smoldering)	0	747,600	444,180	225,420
Pile Burning 7 #/ton (flaming)	0	17,500	0	19,600
Total lbs of emissions	0	1,675,576	1,016,976	1,046,884

Cumulative Effects of Alternatives on Air Quality

Alternative R (no action)

Air quality would not be affected until a wildfire escapes initial attack efforts. At that time, there would be a higher level of particulate matter released than prescribed burning because of the greater amount of fuel consumed. The eventual wildfire would have a much different impact than what a prescribed fire would have under a controlled situation. Prescribed fire impacts usually last for a short period of time and are managed and mitigated by means discussed in Chapter II. Air quality from wildfires could be impacted for weeks. However, with current management practices, the probability of a large wildfire is low for the next 10 years.

Action Alternatives

The cumulative effects on regional air quality, due to forest management activities, are difficult to quantify. Because prescribed burning reduces fuel loading, the potential for fires escaping initial attack is minimized. Therefore, the long term effects of smoke on air quality are reduced, compared to no treatment. As discussed earlier, prescribed burning of forest fuels seems to be a minor although possibly significant contributor of PM-10 emissions when compared to other sources. Under favorable weather conditions, the impacts of all PM-10 contributors is minimized. However, unhealthy impact on local air quality can be created from stagnant atmospheric conditions, smoke from prescribed burns, wildfires, residential wood burning, wind blown dust, vehicle exhaust, road dust and other sources of air pollution.

In the late spring, summer, and autumn seasons, burning of vegetation is a common management practice occurring in the Madison, Gallatin and Jefferson Valleys. Weather patterns, topography, and fuel characteristics during these burning seasons are the key factors affecting air quality. Spring burning conditions have the least impact on air quality. The reasons for this are summarized below.

- Large woody fuel and duff moistures are high. High fuel moistures in large woody fuels and duff limit the amount of fuel consumed. This limits the amount of emissions produced. Also, smoldering fires are less likely to persist when duff is moist.

- Spring weather patterns and normal daytime heating lessens the chance for temperature inversions. Without inversions, the chances for the cumulative effects of air pollution to have health impacts are minimized as dispersion and ventilation cleanses the airsheds.

- Unstable weather patterns allow for better smoke dispersion during the actual burning process.

- Fuels outside burn units have higher fuel moistures which minimizes the risk of an escaped burn. An escaped burn would produce emissions greater than those predicted.

- Cumulative impacts of PM-10 concentrations are reduced during spring months as a major contributor (residential wood smoke) produces fewer emissions (less wood stove use due to warmer temperatures).

Fall burning would have the potential to have the greatest impacts on air quality. To minimize the potential, this season is closely regulated by the Montana Smoke Management Group who make daily evaluations on whether or not members may burn, based on local and prevailing weather information and existing air quality conditions.

OBJECTIVES AND PROCEDURES OF THE MONTANA/IDAHO STATE AIRSHED GROUP

Objectives:

Several objectives are listed in the Montana/Idaho Smoke Management Agreement. First is to minimize or prevent accumulation of smoke during the fall prescribed burning season when burning is necessary for conducting accepted forest management practices such as hazard reduction, site preparation and wildlife habitat improvement. This is done by prohibiting or restricting burning at times and places

where stagnant weather conditions result in poor smoke dispersion, and by conducting prescribed burns when ventilation and air quality conditions are good. The development of alternative methods shall be encouraged when such methods are practical.

A second objective is to develop a smoke management plan for reporting and coordinating burning operations on all forest and range lands in the states. Guidelines in the plan will be based upon technical information currently available on smoke dispersion and on State and Federal air quality regulations.

The third objective is to improve the smoke management program through regular review and evaluation. One or two general meetings of members are held annually to exchange ideas, review operations and offer suggestions for improving the program.

Operation of the Monitoring Unit:

A two person Monitoring Unit came into being in 1978. A fire management specialist from the Montana Division of Forestry serves as the program coordinator. The other member of the Monitoring Unit is a meteorologist.

Local airshed coordinators representing Montana's ten airsheds and Idaho's three airsheds communicate daily during the fall burning season with the Monitoring Unit. These volunteer coordinators handle coordination, problem solving and communications at the local airshed level. Member field offices conduct the actual burns and initiate the reporting process by reporting to their local airshed coordinator.

Meteorological support and intelligence for the Monitoring Unit operation combines federal and state resources. The National Weather Service fire-weather forecasters, located in Missoula provide daily weather forecasts and discussions to state and federal forestry interests throughout the summer fire season and the fall prescribed burning season. Their forecasts and an afternoon discussion between the National Weather Service forecaster and the Monitoring Unit meteorologist provide the meteorological basis for forecasting smoke dispersion conditions and for imposing burning restrictions for the following day. These restrictions are issued no later than 4 p.m. on the day before they are effective.

In order to supplement the meteorological data available to the National Weather Service forecasters and to the Monitoring Unit, a balloon sounding program at four sites in western Montana, and at two sites in Idaho is conducted daily during the operational program.

Daily Planned Burn Reporting And Data Handling:

The Memorandum of Agreement states that each agency or company conducting prescribed fire operations will, not later than August 30th of each year, submit to the Program Coordinator in the Monitoring Unit a complete list of prescribed fires that their company or agency anticipates burning during the fall of that year. These lists are submitted by subunits of each member to their group representative, and the group representative submits the final list from their agency or company to the Program Coordinator.

Once the fall program begins, each agency or company planning to conduct a prescribed burn must report to the local airshed coordinator, the number of burns planned and the total acreage of those burns 1 day prior to the planned ignition. If a burn is planned in an impact zone, the specific burn number must be reported. This information is compiled individually by the 13 local airshed coordinators and

relayed electronically to the Program Coordinator in the Monitoring Unit. By reviewing this data the volume of burning planned for the next day can determined. Based on this information combined with weather data, the Monitoring Unit decides whether or not to place restrictions within airsheds or in impact zones.

Weather and atmospheric ventilation conditions are by far the most important variables that affect air quality and smoke accumulation. Restrictions on burning are infrequent in September, but increase markedly in October and November. Since the smoke management program began in 1978, there have been burning restrictions during the September-November period for western airsheds in Montana (1,2, and 3) on an average of 21 days per season.

It is generally agreed that the Montana/Idaho Smoke Management Program instituted in 1978 has reduced the contribution of pollutants from the airsheds, during periods of poor ventilation. There is a continuing need to monitor and measure air quality in Montana and North Idaho too assess the effectiveness of all air pollution control programs, including Smoke Management.

AMBIENT AIR QUALITY STANDARDS*
For Six Criteria Pollutants & Visibility**
(in ug/m3 unless otherwise stated)

POLLUTANT	AVERAGING TIME	FEDERAL STD	MONTANA STD	IDAHO STD
PM-10 (Particulate Matter, 10 microns)	Annual 24-Hour	50 150	50 150	50 150
Nitrogen Dioxide	Annual 1-Hour	100 -	100 566	100 -
Carbon Monoxide	8-Hour 1-Hour	10,000 40,000	9 ppm 23 ppm	10,000 40,000
Sulfur Dioxide	Annual 24-Hour 1-Hour	80 365 -	.02 ppm (52.4 ug/m3) .10 ppm (262 ug/m3) .50 ppm (1810 ug/m3)	80 365
Ozone	1-Hour	235	.10 ppm	235 (0.12 ppm)
Lead	Calendar Quarter	1.5	1.5	1.5
Visibility Total Suspended Particulate (TSP)	Annual 24-Hour	- - -	3 x 10 -5 meter scattering coefficient	- - 260

*Annual standards are never to be exceeded. Other standards are not to be exceeded more than once a year.

**Primary standards only. Secondary standards are not listed.

Research has not provided a relationship of ug/m3 with lbs of PM-10 produced.

PREVENTION OF SIGNIFICANT DETERIORATION
(PSD) INCREMENTS (ug/m3)

	CLASS I	CLASS II	CLASS III
Sulfur Dioxide			
Annual	2	20	40
24-Hour	5	91	182
3-Hour	25	512	700
Total Susp. Part. (TSP)			
Annual	2	19	37
24-Hour	10	37	75
Nitrogen Dioxide			
Annual	2.5	25	50

Burn Prescriptions:

The following broad prescription parameters apply to all burning except machine piles and landing piles:

Temperature: 45-85 degrees Fahrenheit
Relative Humidity: 15-50 percent
Eye level Winds: 0-20
10 hr Fuel Moisture: 8-20
100 hr Fuel Moisture: 15-45

Each burn must be approved by the airshed coordinator before it can be burned.

Site conditions of each individual unit would determine where in the prescription parameters the unit would be burned. For example, a high elevation north slope unit that is wet most of the year may require burning in August with temperatures in the 80's and low relative humidities to achieve the desired results. If the project is greater than 25 acres or greater than 25 fuel tons per acre on any planned burn day, emission models will be activated and the site specific burn prescription will be modified to meet dispersion criteria.

Machine piles and landing piles are typically burned after receiving significant precipitation and risk of escape is minimal. Often there is snow on the ground before piles are burned. Normally conditions are such that fire will not spread from the immediate vicinity of the pile.

AIRSHED DIRECT/INDIRECT EFFECTS

Action Alternatives	**No Action Alternative**
Direct Effects:	
More sustainable ecosystems	No impact on air quality from prescribed burns
Impact to local, regional air	Increased susceptibility to insect and disease

Impact human health	Increased potential for future exposure to wildfire smoke
Enhance forage and browse production	Decreased rate of nutrient release back into the soil
	Conflicts with State slash laws
Enhance vegetation diversity and move towards desired condition	Unnatural fuel accumulations
Loss of hiding cover	Continued increase in forested vegetation and hiding/thermal cover

Indirect Effects:

Increase local fuelwood supply	No additional impact on air quality and human health from prescribed burning
Temporarily affect public perceptions in sensitive areas	Eliminates risk of escaped prescribed fire
Aesthetics	Natural decomposition occurs

Machine piles and landing piles are typically burned after receiving significant precipitation and risk of escape is minimal. Often there is snow on the ground before piles are burned. Normally conditions are such that fire will not spread from the immediate vicinity of the pile.

Economic Effects

This economic effects analysis compares direct monetary costs and benefits associated with each proposed alternative in the Tobacco Root Vegetation Management DEIS. It provides the decision maker comparative information on the relative economic effects of the alternatives. This analysis does not evaluate the economic effects of indirect costs, i.e., impacts to physical, biological, or recreational resources.

This analysis was conducted on the economic effects of implementing three different alternatives over the project life. The present net values are calculated based on direct costs and benefits per year for implementing the proposed actions.

The economic benefit for this project is the expected receipts from the sale of forest products. The county receives 25% of the receipts as payment in lieu of taxes, and this amount represents the county's benefit. Timber sale preparation, timber sale administration, burning, noxious weed treatment, aspen fencing, wildlife projects, and project monitoring are costs of the proposed action. The timber cost and benefit values were derived from data entered in the Timber Sale Program Information Reporting System (TSPIRS). Burning costs are based on past district project expenses. The analysis of the timber

harvest alternatives was conducted using the Timber Sale Planning and Analysis System (TSPAS). Detailed reports of the economic analysis of each alternative are contained in the project file.

Assumptions Used in the Analysis

The analysis is in terms of 1999 dollars.

Future costs and benefits are discounted at 4% to calculate the present net value as specified in Forest Service Manuals.

Project activities would begin in 2000 and end in 2010, although activities would not necessarily occur in each year of each alternative. See scheduling of activities by year.

Timber harvest benefits come from the sale of sawtimber, post and pole material, and firewood.

Timber harvest costs include environmental protection, road maintenance temporary road development, specified road reconstruction for watershed mitigations, burning, monitoring exams, regeneration exams, temporary road obliteration, noxious weed control, aspen fencing, miscellaneous wildlife projects, precommercial thinning, trail rehabilitation, project analysis/documentation, sale preparation and harvest administration.

Economic Analysis of Tobacco Root Vegetation Treatment Alternatives

Four alternatives were developed in detail: Alternatives R, S, T and U. Alternative R is the No Action alternative, so an economic analysis was not conducted on this alternative. Listed below is a comparison of the economic effects of each alternative including the present value (PV) of costs and benefits, overall present net value (PNV), the benefit/cost ratio and the projected county receipts.

Alternative	S	T	U
Acres	3613	2273	3182
Harvest Volume (CCF)	39924	23594	52280
Total PV (1999 $1000)	6596	2726	10760
Total PV Costs (1999 $1000)	3596	2593	3302
Overall PNV (1999 $1000)	3000	133	7458
Benefit/Cost Ratio	1.83	1.05	3.25
Receipts to County ($1000) (Not discounted)	2170	897	3540

Summary

The alternatives with the best economic returns, ranked in order, are U, S and T. The differences between the economic comparisons can be attributed mainly to total harvest volumes and harvest volume per acre. The returns for Alternative T are reduced even more because longer skidding distances and more expensive logging methods are required to implement this alternative.

APPENDIX C
STAND ATTRIBUTES
FORESTED VEGETATION

The following pages contain a spread sheet identifying specific attributes of each forested stand.

Abbreviations used in this spreadsheet are:

AF = Subalpine fir
A.H. = Area harvest - harvesting all trees in a small area
DF = Douglas-fir
LP = Lodgepole pine
PCM = Precommercial thinning
QA = Quaking aspen
TFB = Thin from below
UB = underburn - burning below the existing canopy

HAU	Mgmt area	Standid	Pi stratum	cover class	acres	Alt U cu.ft harv/ac	Alt U Unit No.	Alt S cu.ft. harv/ac	Alt T cu.ft. harv/ac	aspen Trees/ac	stand 'ft/3 vol/ac	Tot. BA/ BA Harv	Species Hv	Treatment
T11	21	60506006	P3WLP3	LP	40	2509	126				3345*	141	lp	75%area. harv. Broadcast Burn
T11	21	60506019	L2WLP1	LP	31	1778	126				3888	199/91	lp	Com.Thin From Below <8"dbh
T11	19	60506026	P3WLP3	LP	6	2509	125				3345*	141	lp	75% A.H. B.B.
T11	21	60506027	P3WLP2	LP	0	2509	125				3345*	141	lp	75% A.H. B.B.
T11	19	60506028	P2WLP1	LP	5	2083	125				2875*	134/100	lp	Com.Thin <8"dbh
T11	19	60601013	D4WDF3	DF	47	1466	125				2349	141/88	df	Thin from below <14', underburn
T11	19	60601016	D4WDF3	DF	10	1098	124				3095	158/55	df	TFB <14", UB
T11	19	60601017	P3WLP2	LP	23	2625	124				3500*	142	df	75% A.H. B.B.
T11	19	60601018	F3WDF2	DF	47	2250	124				3000*	120	df	TFB 75% B.A. U.B.
T11	21	60601028	P3WLP2	LP	4	0	126				679	43	df	Broadcast burn , salvage
T11	16	60603006	L3WLP3	LP	6	2509	120				3345*	141	lp	75% A.H. B.B.
T11	16	60603007	P3WLP3	LP	32	2509	120				3345*	141	lp	75% A.H. B.B.
T11	16	60603008	P3WLP3	LP	2	2509	120				3345*	141	lp	75%A.H. B.B.
T11	16	60603021	L3WLP3	LP	17	2509	121				3345*	141	lp	75% A.H. B.B.
T11	16	60603022	L2WLP2	LP	18	2509	121				3345*	141	lp	75% A.H. B.B.
T11	19	60603023	L2WLP1	LP	2	1828	123	1828	1828		3903	222/104	lp,df	FP,, Prop=lp<9" dbh
T11	16	60603024	F3WDF3	DF	17	1949	122				2599*	132	df	TFB 75%BA, UB
T11	16	60603028	F4WDF4	DF	23	2358	122				3144	121	lp,df	TFB 75% BA, UB
T11	19	60603029	D3WDF2	DF	37	2179	122				2905*	143	df	TFB 75% BA, UB
T11	16	60603030	F3WDF2	DF	15	2179	122				2905*	143	df	TFB 75% BA, UB
T11	20	60604002	P3WLP2	LP	16	3797	118				5063	211	lp,df	75% A.H. B.B.
T11	20	60604005	D4WDF3	DF	8	2275	118/119				3033	166	df,lp	TFB <14", UB.
T11	20	60604006	P3WLP3	LP	24	2954	119				3938	155	lp,df	TFB <12", U.B.
T11	20	60604012	L2WLP1	LP	8	2625	119				3500*	230	lp	75%A.H. B.B.
T11	20	60604020	P3WLP2	LP	6	1181	88	1181	1181		3345*	141	lp	75% A.H. B.B.
T11	20	60604021	F3MDF3	DF	18	591	88/116	591	591		1605	114/42	df	TFB < 14" U.B.
T11	20	60604022	D3MDF2	DF	13	0	116	0	0		596*	37	df	Burn, salvage
T11	20	60604023	D3WDF3	DF	14	1017	116	1017	1017		2905*	143	df	TFB <10", UB
T11	20	60604024	L3WLP2	LP	14	2509	117				3345*	141	lp	75% A.H., B.B.
T11	20	60604025	L2WLP1	LP	13	2775	117				3341	130/108	lp	TFB <14" UB
T11	20	60604026	D3MDF3	DF	17	0	118				1223*	79	df	Burn, salvage
T11	20	60604027	F3WDF3	DF	29	1949	118				2599*	132	df	TFB 75% BA, UB
T11	20	60604028	P3WLP2	LP	12	2509	118				3345*	141	lp	75% A.H. B.B.
T11	20	60604029	P3WLP2	LP	17	2509	117				3345*	141	lp	75% A.H. B.B.
T11	20	60604030	P2WLP2	LP	14	2509	117				3345*	141	lp	75% A.H. B.B.
T11	24	60604919	NGRDF5	DF	20			300	300		606	49/31	df	Prop=DF<14dbh salv., underburn
T12	20	60701001	P3WLP3	LP	3	0	84	0	0		0		-	no treatment
T12	20	60701002	P3WLP3	LP	5			1519	1519		3950	156/60	lp,df	TFB <13", UB
T12	20	60701006	L3WLP2	LP	23	2132	114				2843	105	lp	75% A.H. B.B.
T12	20	60701009	D3WDF3	DF	17	1040	76/114	1040	1040		2599*	132	df	TFB <10", UB
T12	20	60701013	P4WLP4	LP	7	2250	113				3000*	140	lp	75% A.H. B.B.
T12	20	60701017	D3MDF3	DF	8	367	76/114	367	367		1223*	79	df	TFB <10", UB
T12	20	60701018	D3MDF3	DF	9	360	76	360	360		1483*	72	df	Burn, salvage
T12	20	60701019	F3WDF3	DF	35	639	81/115	639	639		1472	99/43	df	TFB <12", UB
T12	20	60701021	D3WDF4	DF	7	1162	98	1162	1162		2905	143	df	TFB 40%BA, UB
T12	20	60701022	D4WDF4	DF	5	834	99	834	834		2086*	117	df	TFB <10", UB
T12	20	60701023	F4WDF4	DF	7	1191	81	1191	1191		5237	233/53	df,lp	TFB <9", UB
T12	20	60701024	D3WDF3	DF	17	910	85	910	910		2599*	132	df	TFB <10", UB
T12	20	60701025	F3WDF3	DF	8	1894	97	1894	1894		5091	215/80	df	TFB <12", UB
T12	20	60701026	D3WDF3	DF	7	3023	96	3023	3023		5230	237/137	df	TFB <14", UB

HAU	Mgmt area	Standid	Pi stratum	cover class	acres	Alt U cu.ft harv/ac	Alt U Unit No.	Alt S cu.ft. harv/ac	Alt T cu.ft. harv/ac	aspen Trees/ac	stand `ft/3 vol/ac	Tot. BA/ BA Harv	Species Hv	Treatment
T12	20	60701027	D3WDF3	DF	13	1759	95	1759	1759		4217	163/68	lp,df	TFB <14" UB
T12	20	60701028	D3MDF3	DF	25	984	86	984	984		2179	124/56	df	TFB <14", UB
T12	20	60701029	D3WDF4	DF	11	1162	89	1162	1162		2905*	143	df	TFB <10" UB
T12	20	60701030	F3MDF3	DF	33	721	77	721	721		2488	142/45	df,lp	TFB <14", UB
T12	20	60701031	F3WDF2	DF	11	1017	87	1017	1017		2905*	143	DF	TFB < 10", UB
T12	20	60701032	F3MDF3	DF	8	428	83	428	428		1223*	79	DF	TFB <10", UB
T12	20	60701033	UHWQA3	QA				X	X	479T/A			-	BURN
T12	20	60701036	L3WLP3	LP	7	1673	113				3345*	141	LP	75%A.H. B.B.
T12	20	60701037	L3MDF3	DF	2	0	113				1483*	72	DF	BURN, SALVAGE
T12	20	60701038	P3WLP2	LP	3	1673	113				3345*	141	LP	75% A.H. B.B.
T12	20	60701050	D2WDF1	DF	4	1500	92				2000*	120	DF	TFB 75%BA, UB
T12	20	60701055	F2MDF6	DF	2			X	X		1600*	60	DF	BURN, SALVAGE
T12	20	60701056	D3MDF3	DF	1	1500	74	X	X		2000*	120	DF	TFB 30% BA, UB
T12	19	60702002	L2WLP2	LP				X	X		5897	230/80	DF,LP	TFB <9", UB
T12	19	60702005	D3WDF3	DF				X	X		1369	80/60	DF	TFB <14", UB
T12	19	60702011	F3MDF3	DF				X	X		1223*	79	DF	TFB 40%BA, UB, QAHARV
T12	20	60702013	D3WDF4	DF	0			X	X		3865	170/70	DF	TFB <14", UB
T12	20	60702014	D3MDF5	DF	34			X	X		2370	125/37	DF	TFB <14", UB
T12	16	60702029	D3MDF3	DF	0	926	112				1851	110/55	DF	TFB <14", UB
T12	16	60702039	P3WLP3	LP	4	2266	112				4531	183	LP	75% A.H. B.B.
T12	16	60702056	L1NLP0	LP				X	X		3500 T/A		LP	PRECOM THIN
T12	16	60702057	D4NLP0	LP				X	X		1050T/A		LP	PRECOM THIN
T12	16	60702058	P1NLP0	LP				X	X		2600T/A		LP	PRECOM THIN
T12	16	60702059	L1NLP0	LP				X	X		3000T/A		LP	PRECOM THIN
T12	1	60703026	D4MDF3	DF				X	X		968	40/10	DF	TFB <14", UB
T12	1	60703027	F3MDF3	DF				X	X		2565	169/48	DF	TFB < 9" ,UB
T12	1	60703028	F3WDF2	DF				X	X		3639	208/112	DF	TFB <14", UB
T12	1	60703031	D3MDF3	DF				X	X		2063	145/85	DF	TFB <14", UB
T12	1	60703034	D4WDF3	DF				X	X		1710	95/35	DF	TFB <14", UB
T12	1	60703042	P3WLP3	LP				X	X		4904	205/70	LP	33% A.H. UB
T12	1	60703048	A3MWB3	DF				X	X		1115	54/22	DF,LP	TFB <14", UB
T12	20	60703059	D3MDF6	DF	24	302	78	302	302		1246	66/16	LP,DF	TFB <14", UB
T12	20	60704001	F3WDF2	DF	7	1060	101				3198	175/58	DF	TFB <9", UB
T12	20	60704002	D3WDF3	DF	15	3379	93				3942	210/180	DF	TFB <14" ,UB
T12	20	60704005	F3WDF3	DF	22	1186	79	1186	1186		2387	127/50	LP,DF	TFB <12", UB
T12	20	60704007	L3WLP3	LP	19	1673	104				3345*	141	LP	75% A.H.B.B.
T12	20	60704008	F3WDF3	DF	31	1034	72	1034	1034		1768	80/47	LP,DF	TFB <12", UB
T12	20	60704012	P3WLP3	LP	56	2939	61	2939	2939		4068	263/190	LP	FP=75 A.H,PROP= TFB <9", UB
T12	20	60704013	F3WDF3	DF	20	878	75	878	878		2926	142	DF	TFB 30% BA, UB
T12	20	60704014	L3WLP3	LP	23	2628	102/103				3504	147	LP	75% A.H. UB
T12	20	60704038	P3WLP3	LP	12	2509	103				3345*	141	LP	75% A.H. B.B.
T12	20	60704039	L3WLP2	LP	13	2509	102				3345*	141	LP	75% A.H. B.B.
T12	20	60704040	L2WLP1	LP	10	2156	103				2875*	134	LP	75% A.H. B.B.
T12	20	60704041	P3WLP3	LP	13	2351	103				4701	180	LP	75% A.H. B.B.
T12	20	60704044	L3WLP2	LP	14	2336	103				3114*	141	LP	75% A.H. B.B.
T12	20	60704045	P3MLP3	LP	20	1264	103				1685	68	LP	75% A.H. B.B.
T12	20	60704047	P3WLP3	LP	25	2336	104				3114*	141	LP	75% A.H. B.B.
T12	20	60704048	L2WLP2	LP	14	2336	65	1246	1246		3114*	141	LP	FP =75%A.H PROP=40% A.H., B.B
T12	20	60704050	D3MDF3	DF	15	0	82	0	0		1223*	45	DF	BURN SALVAGE
T12	20	60704051	F3WDF3	DF	24	1949	91				2599*	132	DF	TFB 75% BA, UB

HAU	Mgmt area	Standid	Pi stratum	cover class	acres	Alt U cu.ft harv/ac	Alt U Unit No.	Alt S cu.ft. harv/ac	Alt T cu.ft. harv/ac	aspen Trees/ac	stand 'ft/3 vol/ac	Tot. BA/ BA Harv	Species Hv	Treatment
T12	20	60704112	L1NLP0	LP				X	X		2000 T/A		LP	PRECOM THIN
T12	20	60704113	L1NLP0	LP				X	X		1576 T/A		LP	PRECOM THIN
T12	20	60704114	L1NLP0	LP				X	X		800 T/A		LP	PRECOM THIN
T12	20	60704116	L1NLP0	LP				X	X		2890 T/A		LP	PRECOM THIN
T12	20	60704117	L1NLP0	LP				X	X		600 T/A		LP	PRECOM THIN
T12	20	60704118	L1NLP0	LP				X	X		2500T/A		LP	PRECOM THIN
T12	20	60705005	L3WLP2	LP	26	2147	105				2862	143	LP	75%A.H., B.B.
T12	20	60705008	P3WLP3	LP	24	1158	70	658	658		1755	80/30	LP,DF	FP=66%A.H., PROP=33% A.H. UB
T12	20	60705011	L3WLP3	LP	1	1881	109/110/11	1163	1163		3876	171/83	LP,AF	FP=TFB<12', PROP=<8" UB
T12	20	60705012	L3WLP3	LP	46	1749	109/110	816	816		2332	120/42	LP	TFB<9" UB
T12	20	60705015	L2WLP1	LP	5			1931	1931		2875*	134/90	LP	TFB<9" UB
T12	20	60705017	L2WLP1	LP	9	1650	109/110				2200	107	LP	75% A.H. U.B.
T12	20	60705018	P3WLP3	LP	19	1775	104				2367	96	LP	75% A.H. U.B.
T12	20	60705019	L3WLP4	LP	11	2509	109/110				3345*	141	LP	75% A.H. U.B.
T12	20	60705023	D3WLP3	LP	32	2633	106/107/10	1342	1342		3511	123/47	LP	FP=75%A.H. PROP<12" U.B.
T12	20	60705025	P3WLP3	LP	26	2509	104				3345*	141	LP	75% A.H. U.B.
T12	20	60705032	D3MDF2	DF	48	456	90	456	456		1251	85/31	DF	TFB <14" U.B.
T12	20	60705033	F3WDF3	DF	20	1949	94	780	780		2599*	132	DF	TFB 30%BA,U.B.
T12	20	60705034	F3WDF3	DF	8	1949	100	780	780		2599*	132	DF	TFB 30% BA, U.B.
T12	20	60705038	L3WLP2	LP	37	2509	106				3345*	141	LP	75% A.H. U.B.
T12	20	60705039	D4MDF3	DF	45	309	106/108	309	309		1328	73/17	DF	TFB<14", UB
T12	20	60705040	D3MDF3	DF	30	1429	80	1429	1429		3309	169/73	DF	TFB<14", UB
T12	20	60705101	L1NLP0	LP	35			X	X		576T/A		LP	PRECOM THIN
T12	20	60705103	L1NLP0	LP	30			X	X		800T/A		LP	PRECOM THIN
T12	20	60705105	L1NLP0	LP	19			X	X		545T/A		LP	PRECOM THIN
T12	20	60705109	L1NLP0	LP	23			X	X		704T/A		LP	PRECOM THIN
T12	20	60705110	L1NLP0	LP	31			X	X		1000T/A		LP	PRECOM THIN
T12	20	60705111	L1NLP0	LP	23			X	X		600T/A		LP	PRECOM THIN
T12	20	60705112	L1NLP0	LP	7			X	X		1000T/A		LP	PRECOM THIN
T12	20	60705114	L1NLP0	LP	17			X	X		460T/A		LP	PRECOM THIN
T12	20	60705115	L1NLP0	LP	13			X	X		1636T/A		LP	PRECOM THIN
T6	16	74201001	D4WDF2	DF	50	708	51	708	708	3-5	1864	93/35	DF	TFB<12", UB
T6	16	74201002	F4WDF2	DF	27	1416	50	1416	1416	1-2	3726	154/58	DF,LP	TFB<12",LP<10" UB
T6	16	74201005	L1NLP0	LP	16			X	X		540T/A		LP	PRECOM THIN
T6	16	74201006	L1NLP0	LP	19			X	X		500T/A		LP	PRECOM THIN
T6	16	74201007	L4WLP3	LP	61	2589	48/49	1139	1139	2-3	3452	150/62	LP	FP=75%A.H. PROP=33%A.H. B.B.
T6	16	74201008	L1NLP0	LP	17			0	0		600T/A			NO TREATMENT, THIN 1996
T6	16	74201023	P3WLP3	LP	86	1466	52	968	968		2932	143/44	LP	FP=75%A.H, PROP=33%A.H.B.B.
T6	16	74201025	P4WLP3	LP	55	1126	55	743	743		2251	102/33	LP	FP=75%A.H, PROP=33%A.H.B.B.
T6	16	74201026	F4WDF3	DF	110	1441	56	1441	1441	5-10	3514	126/52	LP,DF	TFB <14" UB
T6	24	74201032	D3MDF4	DF	16			709		3-5	2149*	118	DF	TFB < 11" UB
T6	24	74201033	UECDF4	DF	14			0						UNDERBURN
T6	22/16	74201036	UFRDF4	DF	26	617	53	617	617	3-5	1102	82/46	DF	TFB <14" INCL ASPEN,UB
T6	14	74201051	NMR031	NF		0	54							NO TREATMENT
T6	22	74203001	DFMDF4	DF	82			1017	1017	5-10	2990*	148/50	DF	TFB< 14", UB
T6	20	74203004	F3MDF3	DF	78	688	59	688		1-2	2149*	156/50	LP,DF	TFB<14", UB
T6	16	74203008	L1NLP0	LP	23			0	0					NO TREATMENT
T6	13	74203009	F3WDF2	DF	107	1181	57	1181	1181		4071	170/50	LP,DF	A.H. 33%, BB
T6	20	74203014	L2SLP1	LP	56	3248	62	2469	2469		4331	213/121	LP	TFB <9"
T6	20	74203016	L2SLP1	LP	36	2395	127	2012	2012		3193	219/138	LP	TFB <7"

HAU	Mgmt area	Standid	Pi stratum	cover class	acres	Alt U cu.ft harv/ac	Alt U Unit No.	Alt S cu.ft. harv/ac	Alt T cu.ft. harv/ac	aspen Trees/ac	stand 'ft/3 vol/ac	Tot. BA/ BA Harv	Species Hv	Treatment
T6	20	74204005	L1NLP0	LP	9			0	0		1500T/A		AF,LP	PRECON THIN
T6	20	74204007	L2SLP1	LP	9	4158	64	3356	3326		5544	323/195	LP	TFB <7"
T6	20	74204009	L3SLP1	LP	30	3367	67	2514	2514		4489	201/112	LP	TFB <9"
T6	20	74204010	F4MDF3	DF	56	1071	69	1071	1071	3-5	3692	170/50	DF,LP,AF	TFB LP=<9", DF=<14" UB
T6	20	74204014	F4LLP0	DF	24			0	0				LP	PRECON THIN
T6	20	74204015	L2SLP1	LP	37	2216	63	1566	1566		2955	136/72	LP	TFB <9"
T6	20	74204017	P4WLP3	LP	86	2228	60	921	921		2970	112/35	LP,DF,AF	FP=75%A.H, PROP=33%A.H BB
T6	20	74204020	L1NLP0	LP	31			0	0		3500T/A		LP	PRECOM THIN
T6	20	74204021	F4MDF4	DF	88	627	66	627	627		2024	116/36	DF	TFB <14" UB
T6	20	74204040	P4WLP4	LP	13	3677	68	1520	1520	2-3	4903*	200	LP,DF	FP=75%A.H.PROP=30%A.H. UB
T6	24	74204043	D3MDF3	DF	22			618	618	2-3	2289	132/36	DF	TFB <14", UB
T6	24	74204044	UFRDF6	DF	79			0	0	1-2	309	22/05	DF	UNDERBURN
T6	20	74204047	D4WLP4	DF	45	1082	73	1082	1082	1-2	3182	132/45	DF,LP	TFB-UB<14"
T6	20	74204048	D4MDF3	DF	29	518	71	518	518	1-2	2070	96/24	DF,LP	TFB-UB <14"
T6	24	74204053	F4MDF3	DF	116			636	636	3-5	2356	128/34	DF,LP	TFB-UB LP<9" DF,14
T6	24	74204055	D3MDF3	DF	36			860	860	3-5	2457	123/43	DF,LP	TFB-UB <14"
T6	24	74204056	UFR041	NF	10			0	0	5-10				
T6	24	74204057	D3MDF3	DF	29			822	822	10-20	2741	132/39	DF,LP	TFB-UB <14"
T6	24	74204058	F4MAV	DF	24			1083	1083		2926	120/44	DF,LP	TFB-UB<12"
T6	24	74204059	D3MDF3	DF	24			571	571	1-2	1783	94/30	DF,LP	TFB-UB <14"
T6	24	74204060	P3WDF3	LP	33			930	930		3100	152/46	DF,LP	TFB-UB <9"
T6	24	74204062	D4MDF3	DF	27			818	818	10-30	2920	165/46	DF,LP	TFB-UB <14"
T6	24	74204065	D3LDF3	DF	31			915	915		1366	75/50	DF	SW-UB DF<16"
T6	20	74204067	NGR042	NF	1			0	0	3-5				
T5	16	74301002	P4WLP4	LP	131	1373	40	687	687		2081	127/82	LP,AF	FP=75%A.H.,PROP=33%A.H. BURN
T5	16	74301003	P4WLP3	LP	80	2206	46				2941	164/108	LP,AF	FP=75%A.H.,BURN
T5	16	74301011	P4WLP3	LP	2	2039	37				2719	134/88	LP,AF	FP= 75%A.H., BURN
T5	16	74301012	L2SLP1	LP	55	2519	36	2183	2183		3358	200/130	LP,AF	FP=75%A.H.PROP TFB+66%BA
T5	16	74301013	L2SLP1	LP	69	2267	39	2055	2055		3022	192/130	LP,AF	FP=75%A.H.PROP TFB+66%BA
T5	16	74301018	L3SLP2	LP	92	2319	38	2133	2133		3092	189/130	LP,AF	FP=75%A.H.PROP TFB+66%BA
T5	16	74301021	L3SLP1	LP	2			2051	2051		3155	200/130	LP	PROP=75%TFB BA
T5	16	74301024	P1NLP0	LP	37			X	X		652T/A		LP	PRECOM THIN
T5	16	74301025	P1NLP0	LP	48			X	X		1261T/A		LP	PRECOM THIN
T5	16	74302003	F4WDF3	DF	31	971	44	971		2-5	2942	140/90	LP,DF	TFB 33%BA UB
T5	16	74302009	L2SLP1	LP	26			0	0		3900T/A		LP	PRECOM THIN
T5	16	74302013	P4WLP3	LP	75	2055	41	904	904	4-5	2740	120/80	LP,DF	FP=75%AH PROP=33%TFB UB
T5	16	74302015	P3WLP3	LP	33	2498	43	1099		3-5	3331	147/100	DF,LP	FP=75%AH PROP=33%TFB UB
T5	16	74302016	P4WLP4	LP	33	2217	45	975		1-2	2956	161/100	DF	FP=75%AH PROP=33%TFB UB
T5	16	74302018	L2SLP2	LP	35	2161	47				3324	169/110	LP	200 T/A COM THIN
T5	20	74204045	D3MMV	DF	10			391	391		1260	83/26	DF	TFB <12", UB
T5	16/24	74302023	P1NLP0	LP	19			X	X		1400T/A		LP	PRECOM THIN
T5	16	74302024	P1NLP0	LP	33			X	X		3600T/A		LP	PRECOM THIN
T5	16	74302025	P1NLP0	LP	14			X	X		1200T/A		LP	PRECOM THIN
T5	16	74302026	P1NLP0	LP	10			X	X		900T/A		LP	PRECOM THIN
T5	16	74302028	P1NLP0	LP	40			X	X		1100T/A		LP	PRECOM THIN
T5	16	74302029	P1NLP0	LP	13			X	X		1200T/A		LP	PRECOM THIN
T5	16	74302030	P1NLP0	LP	21			X	X		1500T/A		LP	PRECOM THIN
T5	16	74302031	P1NLP0	LP	9			X	X		1000T/A		LP	PRECOM THIN
T5	16	74302038	F4MDF3	DF	31			650	650		2098	107/33	DF,LP	TFB <14"UB
T5	16	74302050	F4MDF3	DF	11	2243	42	987			2990*	155	DF,LP	TFB FP=75%BA,PROP=DF<9"UB

HAU	Mgmt area	Standid	Pi stratum	cover class	acres	Alt U cu.ft harv/ac	Alt U Unit No.	Alt S cu.ft. harv/ac	Alt T cu.ft. harv/ac	aspen Trees/ac	stand 'ft/3 vol/ac	Tot. BA/ BA Harv	Species Hv	Treatment
T5	24	74303006	UECDF2	DF	3			0	0	3-5				BURN, SALV
T5	20	74401001	D5WDF4	DF	59	1392	31	1392	1392	3-5	3762	177/62	DF,LP	TFB<12" UB
T5	20	74401006	P4WLP3	LP	1			1034	1034	5-10	3133	140/50	LP,DF,AF	TFB <12" UB
T5	20	74401012	L2SLP1	LP	83	2206	35	2206	2206		3197	178/122	LP	83T/A COM THIB
T5	20	74401016	P3WLP4	LP	78	1555	33	1213	1213		3110	131/51	LP,AF	FP=75%A.H. PROP=<12"UB
T5	20	74401018	L2SLP1	LP	20			2200	2200		2619	195/163	LP	107T/A COM THIN
T5	20	74401020	P3WLP4	LP	35	2069	32	1104	1104		2759	120/48	LP	TFB<9"
T5	20	74401028	P1NLP0	LP	38			X	X		500T/A		LP	PRECOM THIN
T5	20	74401036	F3WDF3	DF	4			987	987		3290*	177	DF	TFB 30%BA UB
T5	20	74401038	F4WDF4	DF	6			883	883		2942*	144	DF,LP	TFB30%BA UB
T5	20	74401045	F4WDF3	DF	116	933	25	933	933	2-3	3456	151/41	DF	FP=75% A.H.PROP=<12"UB
T5	20	74401047	UFRDF3	DF	67	242	27	242	242	3-5	1610	93/14	DF	SALV<14' B.B.
T5	20	74401050	F3MDF2	DF	23	514	29	514	514	10-20	1657	86/27	DF,LP	TFB<12", UB
T5	20	74401093	D3WDF3	DF	5	1128	34	1128	1128	5-10	3133	140/50	LP,DF,AF	TFB<12", UB
T4	20	74402012	L2SLP1	LP	9	3178	26	3178	3178	3-5	4237	195	LP	TFB<9"
T4	20	74402023	L1NLP0	LP	28			0	0		1200T/A		LP	PRECOM THIN
T4	20	74402024	L1NLP0	LP	11			0	0		1210T/A		LP	PRECOM THIN
T4	20	74402025	P1NLP0	LP	26			0	0		750T/A		LP	PRECOMTHIN
T4	20	74402035	L2SLP1	LP	54	1601	30	1601	1601		2760	143/82	LP	TFB <7"
T4	20	74402037	L2SLP2	LP	10	1601	28				2760	143/82	LP	TFB<7"
T4	20	74403016	L1NLP0	LP	7			0	0		2600T/A		LP	PRECOM THIN
T4	20	74403017	L1NLP0	LP	40			0	0		1670T/A		LP	PRECOM THIN
T4	20	74403018	L3SLP1	LP	9			1675	1675		2500	150/100	LP	TFB <9"
T4	25	74404007	L2SLP1	LP	22			2698	2698		4497	201/121	LP	TFB<9"
T4	25	74404048	UECDF4	DF	47			743	743	2-3	2124	127/45	DF	TFB <14", UB
T4	25	74404043	UECDF4	DF	176			845	845	2-3	2726	140/44	DF	TFB <14", UB
T3	20	74501038	L2SLP2	LP	24	1827	21	1827	1827		2900	134/84	LP	TFB<9"
T3	20	74501040	F4WDF4	LP	40	3226	5	1290	1290		4301	132/33	LP	FP=75%A.H.PROP=30%A.H.BURN
T3	20	74501042	P4WLP4	LP	18	2684	4				3579	182/130	LP	75%A.H. BURN
T3	20	74501063	L1NLP0	LP	42			0	0		1506T/A		LP	PRECOM THIN
T3	20/24	74501064	L1NLP0	LP	22			0	0		400T/A		LP	PRECOM THIN
T3	20	74501065	L1NLP0	LP	8			0	0		1200T/A		LP	PRECOM THIN
T3	20	74501066	L1NLP0	LP	7			0	0		1285T/A		LP	PRECOM THIN
T3	20	74501074	L3WLP3	LP	11	2177	5				2902	117	LP	75%A.H. BURN
T3	18	74502014	P3WLP2	LP	3	1875	20				2500	102	LP	75%A.H. BURN
T3	24	74502039	L2SLP2	LP	12			1494	1494		2299	158/102	LP	TFB<7"
T3	20	74502043	L3WLP2	LP	33	2879	6				3838	166	LP	75%A.H. BURN
T3	18	74507001	P4WLP3	LP	13	2862	2				3816	132	LP	75%A.H. BURN
T3	18	74507002	P4WLP3	LP	22	1551	2				2068	101	LP	75% A.H. BURN
T3	20	74507005	P3WLP3	LP	2	2631	3				3508	159	LP	75%A.H. BURN
T3	18	74507008	P4WLP3	LP	40	2500	2				5000	208	LP	50%A.H.BURN
T3	1	74507012	L1NLP0	LP	9			0	0		2800T/A		LP	PRECOM TIIIN
T3	22	74507017	L1NLP0	LP	16			0	0		1510T/A		LP	PRECOM THIN
T3	23	74507018	L1NLP0	LP	10			0	0		1010T/A		LP	PRECOM THIN
T3	20	74507048	P3WLP3	LP	25	2353	3				3137	225	LP	75%A.H. BURN
T3	18	74508001	F3WLP3	LP	9	2468	1				3290*	177	DF	TFB 75% BA
T3	20	74508004	L3WLP3	LP	102	1580	09/10/22	1580	1580		4789	251/	LP,AF	FP=50%A.H.,PROP=33%A.H.BURN
T3	20	74508007	L3WLP2	LP	203	1460	9				2920	165	LP	FP=50% A.H. BURN
T3	22	74508011	L1NLP0	LP	15			0	0		2887T/A		LP	PRECOM THIN
T3	22	74508012	L1NLP0	LP	8			0	0		1162T/A		LP	PRECOM THIN

HAU	Mgmt area	Standid	Pi stratum	cover class	acres	Alt U cu.ft harv/ac	Alt U Unit No.	Alt S cu.ft. harv/ac	Alt T cu.ft. harv/ac	aspen Trees/ac	stand 'ft/3 vol/ac	Tot. BA/ BA Harv	Species Hv	Treatment
T3	20	74508013	L1NLP0	LP	24			0	0		1334T/A		LP	PRECOM THIN
T3	20/22	74508014	L1NLP0	LP	14			0	0		2133T/A		LP	PRECOM THIN
T3	20	74508016	L1NLP0	LP	26			0	0		1161T/A		LP	PRECOM THIN
T3	22	74508017	L1NLP0	LP	12			0	0		1510T/A		LP	PRECOM THIN
T3	20	74508019	L1NLP0	LP	40			0	0		1500T/A		LP	PRECOM THIN
T3	20	74508025	L1NLP0	LP	7			0	0		1506T/A		LP	PRECOM THIN
T3	20	74508043	L3SLP2	LP	15	1724	6				3448	189	LP	FP=50%A.H. BURN
T3	20	74508043	L3SLP2	LP	116	X	7/8						LP	
T3	20	74508044	L1NLP0	LP	49			0	0		658T/A		LP	PRECOM THIN
T3	20	74508045	L3SLP3	LP	46	2045	8				2726	149	LP	FP 75%A.H. BURN
T3	18	74508060	F3WDF3	DF	12	1420	1				4304	190	DF	33%TFB, UB
T3	18	74508061	F3WDF3	DF	40	622	1/20				2096	130	LP,DF	33%TFB, UB
T3	18	74508062	P3WLP3	DF	13	2012	6/20				2682	164	LP,DF	75%A.H., BURN
T3	20	74508064	L1NLP0	LP	6			0	0		750T/A		LP	PRECOM THIN
T3	20	74508065	L1NLP0	LP	6			0	0		450T/A		LP	PRECOM THIN
T3	20	74508071	L3SLP2	LP	28	2625	8				3500	189	LP	75%A.H. BURN
T3	20	74509004	L3SLP2	LP	6	1586	11/12/22/23	698	698		2114	158	LP	FP=75%A.H.PROP=33%A.H.BRN
T3	20	74509008	P4WLP3	LP	36	2804	12				3739	152	LP	75%A.H.BURN
T3	20	74509010	P3WLP2	LP	92	1496	11/14				2991	140	LP	50%A.H.BURN
T3	20	74509011	L3SLP3	LP	62	991	13				1981	120	LP	50%A.H.BURN
T3	20	74509012	L3SLP2	LP	63	1847	15				2462	163	LP	75%A.H. BURN
T3	20	74509021	L2SLP2	LP	77	792	21				1056	127	LP	75%A.H. BURN
T3	20	74509022	L2SLP1	LP	13	1542	18	678	678		2056	125	LP	FP=75%A.H.PROP=33%AH, BRN
T3	20	74509023	P3WLP3	LP	35	1261	24	555	555		1681	124	LP	FP=75%A.H.PROP=33%AH, BRN
T3	20	74509026	P3WLP3	LP	13	1460	17				2920	119	LP	75%A.H. BURN
T3	20	74509027	L3SLP2	LP	49	1450	17				2900	148	LP	75%A.H. BURN
T3	20	74509031	L3SLP2	LP	4	2675	17				3566	280	LP	75%A.H. BURN
T3	20	74509055	L1NLP0	LP	13			0	0		1274T/A		LP	PRECOM THIN
T3	20	74509056	L1NLP0	LP	37			0	0		928T/A		LP	PRECOM THIN
T3	20	74509057	L1NLP0	LP	32			0	0		1119T/A		LP	PRECOM THIN
T3	20	74509058	L1NLP0	LP	47			0	0		427T/A		LP	PRECOM THIN
T3	20	74509059	L1NLP0	LP	14			0	0		3438T/A		LP	PRECOM THIN
T3		74509060	UECDF3	LP		X	19	0	0				LP	
T3	16	74701001	L1NLP0	LP	3			0	0		3400T/A/		LP	PRECOM THIN
T3	16/22	74701002	L2SLP1	LP	72			2250	2250		3000	193/145	LP	TFB <6"
T3	16	74701003	L1NLP0	LP	4			0	0		2300T/A		LP	PRECOM THIN
T3	16	74701018	L4WLP4	LP	4			990	990		3000	140	LP	33%A.H., BURN

TFB = Thin from below
PCM = Pre commercial Thin.
A.H. = Area Harvest-harvesting all trees in a small area
ub = underburn-burning below existing canopy
burn

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APPENDIX D
STAND ATTRIBUTES
NON-FORESTED VEGETATION

The following pages contain a spread sheet identifying specific attributes of each non-forested stand.

Table Abbreviations

PI Stratum

First 3 digits	
FORESTED For Forested sites the first three digits are broken down into Species, Size and Crown Closure.	**OTHER FORESTED (Unsuitable > 10% forest stocking) / NON FORESTED (< 10% forest stocking)** For Other Forested / Non-Forested sites the first three digits follow these three letter codes.
Species D=Douglas-f'ir (pure stand) L=Lodgepole pine (pure stand) S=Spruce spp. A=Alpine fir dominant F=Mixed conifer Douglas-fir dominant P=Mixed conifer lodgepole pine dominant Size 1=Regeneration 0-3" dbh 2=pole size 3-6" dbh 3=small sawtimber 6-12"dbh 4=medium sawtimber 12-18"dbh 5=large sawtimiber 18"+ Crown Closure S=Stagnant(fine texture) W=70-100% M=40-70% L = 10-40% N= 0-10%	UFR= Fringe, encroachment or drysite species USC= Scree URE= Too rocky or harsh to regen. in 5 years UEC= Isolated, geographic, or uneconomical, + WBP UHW= Hardwoods, aspen NRO= Bare rock NBR= Brush fields, krumholz,tundra, avalanch chutes NGR= Grasslands, Sagebrush NDV= Developed areas, mines,powerline corridors,ski NWA= Lakes and reservoirs NMR= marsh, streams, bogs
ADDITIONAL PI STRATUM CODES (Last 3 Digits) **NON FORESTED** Shrub Dominated 010 011 Tall Shrub community 012 moist sagebrush/cinquefoil shrub 013 dry sagebrush shrubland 014 low willow shrub meadow 015 moist rocky sagebrush shrubland Herb Dominated components 020 Forb Meadows 021 forb dominated seep 022 wet forb meadow 023 moist forb meadow 024 dry forb meadow	**FORESTED** Lodgepole pine(L and P strata) LPO nonforested/seed/sapl. LP1 Closed canopy, even-aged younger, stagnated P&P LP2 Closed canopy, mature LP3 Ragged canopy, overmature, mixed species, "Old Growth" LP4 Ragged Canopy, deteriorated, heavy mort., multi-specied, "Old Growth" Douglas-fir (D and F strata) DFO nonforested/seed/sapl DF1 Dense even-aged, closed canopy, younger DF2 Closed canopy, mature

Graminoid Meadows and grasslands 030
- 031 marsh/fen
- 032 wet meadow
- 033 moist grassland and meadow
- 034 high elevation'rock/'grassland
- 035 dry grassland and meadow

Forested Opening Components 040
- 041 wet forest opening
- 042 moist to dry forest opening. (with a few scattered large trees)

Miscellaneous Components
- 051 tundra, high alpine turf
- 052 exposed bedrock
- 053 talus (unless more important feature mixed in)
- 054 streamcourse
- 055 standing water
- 056 cliffs
- 057 shrub, dominated avalanche chute
- 058 grainoid/forb dominated. avalanvhe chute
- 059 agriculture lands
- 060 urbanized areas

FORESTED

Aspen types
- QA0 young, recently distrubed <10 feet tall
- QA1 yound, small, pole size, vigorus trees
- QA2 pole-sized to mature with even canopy, little mortality
- QA3 Mature to overmature, conifer present, near point of break up.
- QA4 climax-mature to overmature aspen, multi-aged aspen will persist.
- DF3 Ragged canopy, overmature, multi-aged. multi-specied, "Old Growth"
- DF4 Ragged canopy, detcriorate, heavy mort. multi-specied. multi-aged, islands, "Old Growth"
- DF5 Douglas-fir colonization onto sage or grass sites. (< 10% canopy stocking, saplings)
- DF6 Douglas-fir colonization, mature-overmature, onto sage or grass sites. (< 10% canopy stocking, saplings)

Spruce-fir types (S and A strata)
- SFO recently disturbed, high elev cirque, rockwall, krumholz. (may be joined with talus)
- SP1 even-aged,closed stands
- SF3 multiple sized/aged w. old trees, snags present. "Old Growth"
- SF5 spruce fir colonization on high sites.

Whitebark pine types
- WBO recently disturbed, early seral stage
- WB1 whitebark pine dominated post/pole younger stand, closed canopy
- WB2 closed canopy, mature, whitebark pine
- WB3 Mature, multiple canopy/density,species "Old Growth"
- WB4 Mature-overmature, mortality, raggedcanopy, multi-specied.
- WB5 Mixed age, density, species. (Scattered throughout high alpine site, colonization.

Limber pine types (dry sites/juniper)
- PFO recently disturbed, early seral stage
- PF1 young evenaged stand
- PF2 mature stands
- PF3 overmature/mortality stands
- PF5 colonization, similar to DF5 except PF
- PF6 colonization, similar to DF6 except PF

Existing/Potential/Desired Cover Class

- ASP Aspen Dominated
- ASP-DF Aspen with Douglas fir colonization
- ASP-SAG Aspen with sagebrush
- ASP-SHRUB Aspen with shrub understory other than sagebrush, generally willow.
- ASP-WGRA Aspen with wet grassland/meadow.
- DF Douglas fir dominated
- DF-ASP Douglas fir dominated with aspen clones present
- DF-SAG Douglas fir dominated with sagebrush understory
- DF L Douglas fir dominated, low canopy coverage, understory other than sagebrush.
- GRA Grassland dominated.
- GRA-ASP Grassland dominated with aspen clones
- LP Lodgepole dominated
- LP-ASP Lodgepole dominated with aspen clones present
- ROCK-DF Rocky forested ground, Douglas fir dominated
- ROCK-PF Rocky forested ground, Limber pine dominated
- SAG Sagebrush dominated.
- SAG-DF Sagebrush dominated, with Douglas fir colonization
- SAG-PF Sagebrush dominated, with Limber pine colonization
- SF-ASP Subalpine fir dominated with aspen clones present
- SHRUB Shrub dominated, other than sagebrush, generally willow
- SHRUB-ASP Shrub dominated with aspen clones
- WBP White bark pine dominated
- WBP-ASP White bark pine dominated with aspen clones present
- WGRA Wet grassland/meadow.
- WGRA-ASP Wet grassland/meadow with aspen clones

Big Game Winter Range / Calving Area	
E	Elk Winter Range
D	Deer Winter Range
M	Moose Wither Range
C	Elk Calving Area

Alt. S, Alt. T, Alt. U	
ASPEN	Aspen Treatment
OPEN DF	Open Douglas Fir Treatment
SAG/GRA	Sagebrush/Grass Treatment

Stand ID	PI Stratum	Acres	Existing Cover Class	Potential Cover Class (In the absence of disturbance)	Desired Cover Class	Big Game Winter Range	Elk Calving Area	Alt. S	Alt. T	Alt. U
60101909	NGR033	1	GRA	DF	GRA					
60102904	NGRDF5	19	SAG-DF	DF	SAG					
60102906	NGRDF5	20	SAG-DF	DF	SAG					
60102907	NGR013	4	SAG	DF	SAG					
60102910	NGR013	7	SAG	DF	SAG					
60102910	NGR013	15	SAG	DF	SAG	E				
60102911	NGRDF5	18	SAG-DF	DF	SAG	E				
60102912	NRODF5	1	ROCK-DF	DF	ROCK-DF					
60102912	NRODF5	9	ROCK-DF	DF	ROCK-DF	E				
60102913	USCDF5	1	DF-SAG	DF	DF-SAG	E				
60102913	USCDF5	23	DF-SAG	DF	DF-SAG					
60102914	NGR013	10	SAG	DF	SAG	E				
60102915	NGRDF5	5	SAG-DF	DF	SAG	E				
60102916	NGR033	3	GRA	DF	GRA					
60102917	NGR013	3	SAG	DF	SAG					
60102917	NGR013	12	SAG	SAG	SAG					
60102918	NGRDF5	36	SAG-DF	DF	SAG					
60102920	NGR033	42	GRA	DF	GRA					
60103010	NGR033	3	GRA	DF	GRA			OPEN DF		
60103901	NGR035	4	GRA	DF	GRA	E				
60103902	NGRDF5	2	SAG-DF	DF	SAG			OPEN DF		
60103905	NGR013	2	SAG	SAG	SAG					
60103906	NGRPF5	23	SAG-PF	PF	SAG					
60103907	NROPF5	3	ROCK-PF	PF	ROCK-PF	E				
60103907	NROPF5	5	ROCK-PF	PF	ROCK-PF					
60103908	NGRPF5	2	SAG-PF	PF	SAG					
60103909	NGRPF5	10	SAG-PF	PF	SAG					
60103910	NGRPF5	2	SAG-PF	PF	SAG	E				
60103911	NGRPF5	6	SAG-PF	PF	SAG					
60103912	NGR035	18	GRA	DF	GRA					
60103914	NGRPF5	5	SAG-PF	PF	SAG					
60104900	NGR013	5	SAG	DF	SAG			OPEN DF		
60104901	NGR013	4	SAG	DF	SAG			OPEN DF		
60104902	NGRDF5	1	SAG-DF	DF	SAG			OPEN DF		
60104902	NGRDF5	81	SAG-DF	DF	SAG	E		OPEN DF		
60104903	USCDF6	2	DF-SAG	DF	DF-SAG	E		OPEN DF		
60104904	USCDF6	4	DF-SAG	DF	DF-SAG	E				
60104905	USCDF6	2	DF-SAG	DF	DF-SAG	E				
60104906	USCDF6	3	DF-SAG	DF	DF-SAG	E		OPEN DF		
60104910	NGRDF5	18	SAG-DF	DF	SAG	E				
60104912	USCDF6	5	DF-SAG	DF	DF-SAG	E				
60104913	NGRPF5	29	SAG-PF	DF	SAG			OPEN DF		
60104915	NGRDF5	8	SAG-DF	DF	SAG		C	OPEN DF	OPEN DF	
60104916	NGRDF6	49	DF-SAG	DF	DF-SAG			OPEN DF		
60104917	NGR012	1	SAG	DF	SAG					
60104917	NGR012	18	SAG	SAG	SAG					
60104918	NGRPF5	8	SAG-PF	PF	SAG					
60104919	NGR013	5	SAG	DF	SAG	E		OPEN DF		
60104919	NGR013	44	SAG	DF	SAG			OPEN DF		
60104920	NGR013	9	SAG	DF	SAG			OPEN DF		
60104920	NGR013	13	SAG	DF	SAG					
60104920	NGR013	61	SAG	SAG	SAG	E				
60104921	NGRDF5	6	SAG-DF	DF	SAG	E		OPEN DF		
60104921	NGRDF5	12	SAG-DF	DF	SAG			OPEN DF		
60104922	NGRPF5	5	SAG-PF	PF	SAG	E		OPEN DF		
60104922	NGRPF5	19	SAG-PF	PF	SAG			OPEN DF		
60104923	NGRDF5	4	SAG-DF	DF	SAG	E		OPEN DF		
60104924	NGRDF5	2	SAG-DF	DF	SAG	E		OPEN DF		
60104924	NGRDF5	3	SAG-DF	DF	SAG			OPEN DF		
60104924	NGRDF5	5	SAG-DF	DF	SAG		C	OPEN DF		
60104925	NGRDF5	1	SAG-DF	DF	SAG			OPEN DF		
60104925	NGRDF5	11	SAG-DF	DF	SAG		C	OPEN DF		
60104925	NGRDF5	18	SAG-DF	DF	SAG	E		OPEN DF		
60104925	NGRDF5	1	SAG-DF	DF	SAG		C			
60104925	NGRDF5	2	SAG-DF	DF	SAG	E				
60104926	NGR013	4	SAG	DF	SAG	E		OPEN DF		
60104926	NGR013	8	SAG	DF	SAG			OPEN DF		

Stand ID	PI Stratum	Acres	Existing Cover Class	Potential Cover Class (In the absence of disturbance)	Desired Cover Class	Big Game Winter Range	Elk Calving Area	Alt. S	Alt. T	Alt. U
60104926	NGR013	10	SAG	DF	SAG		C	OPEN DF		
60104927	NGRDF5	6	SAG-DF	DF	SAG	E		OPEN DF		
60104927	NGRDF5	9	SAG-DF	DF	SAG		C	OPEN DF		
60104927	NGRDF5	10	SAG-DF	DF	SAG			OPEN DF		
60104928	NGR035	2	GRA	DF	GRA			OPEN DF		
60104928	NGR035	34	GRA	DF	GRA	E		OPEN DF		
60104928	NGR035	1	GRA	DF	GRA	E				
60105023	UFRDF6	13	DF-SAG	DF	DF-SAG			OPEN DF		
60105042	D3WDF3	14	DF-ASP	DF	DF-ASP		C	ASPEN	ASPEN	
60105042	D3WDF3	17	DF-ASP	DF	DF-ASP		C			
60105901	NGRDF6	3	DF-SAG	DF	DF-SAG					
60105904	NGR013	75	SAG	SAG	SAG		C	SAG/GRA	SAG/GRA	
60105904	NGR013	14	SAG	DF	SAG			OPEN DF	OPEN DF	
60105904	NGR013	1	SAG	DF	SAG		C	OPEN DF		
60105904	NGR013	6	SAG	DF	SAG	E		OPEN DF		
60105904	NGR013	3	SAG	DF	SAG		C			
60105904	NGR013	4	SAG	DF	SAG	E				
60105904	NGR013	6	SAG	DF	SAG					
60105905	NGRDF6	2	DF-SAG	DF	DF-SAG	E		OPEN DF		
60105905	NGRDF6	70	DF-SAG	DF	DF-SAG			OPEN DF		
60105905	NGRDF6	5	DF-SAG	DF	DF-SAG	E				
60105905	NGRDF6	8	DF-SAG	DF	DF-SAG					
60105906	NGRDF5	6	SAG-DF	DF	SAG		C			
60105907	NGRDF6	4	DF-SAG	DF	DF-SAG		C	OPEN DF		
60105908	NGRDF5	1	SAG-DF	DF	SAG		C			
60105908	NGRDF5	6	SAG-DF	DF	SAG					
60105909	UHWQA2	1	ASP	DF	ASP					
60105909	UHWQA2	1	ASP	DF	ASP		C			
60105909	UHWQA2	2	ASP	DF	ASP	E				
60105909	UHWQA2	6	ASP	DF	ASP					
60105910	NGRDF6	4	DF-SAG	DF	DF-SAG			OPEN DF		
60105910	NGRDF6	10	DF-SAG	DF	DF-SAG	E		OPEN DF		
60105910	NGRDF6	5	DF-SAG	DF	DF-SAG					
60105910	NGRDF6	13	DF-SAG	DF	DF-SAG	E				
60105911	NGRDF6	1	DF-SAG	DF	DF-SAG	E				
60105911	NGRDF6	12	DF-SAG	DF	DF-SAG					
60105912	UFRDF6	4	DF-SAG	DF	DF-SAG			OPEN DF		
60105912	UFRDF6	20	DF-SAG	DF	DF-SAG	E		OPEN DF		
60105913	NGRDF5	4	SAG-DF	DF	SAG	E		OPEN DF		
60105913	NGRDF5	36	SAG-DF	DF	SAG			OPEN DF		
60201004	D3MDF6	1	DF L	DF	DF L	E		OPEN DF		
60201004	D3MDF6	5	DF L	DF	DF L			OPEN DF		
60201011	D3LDF6	19	DF L	DF	DF L			OPEN DF	OPEN DF	
60201011	D3LDF6	2	DF L	DF	DF L					
60201900	NGR013	57	SAG	SAG	SAG		C	SAG/GRA	SAG/GRA	
60201900	NGR013	2	SAG	DF	SAG		C	OPEN DF	OPEN DF	
60201900	NGR013	11	SAG	DF	SAG	ED	C	OPEN DF	OPEN DF	
60201901	NGRDF5	28	SAG-DF	DF	SAG	E		OPEN DF		
60201901	NGRDF5	52	SAG-DF	DF	SAG			OPEN DF		
60201902	NGR042	1	GRA	DF	GRA					
60201906	NGRDF5	28	SAG-DF	DF	SAG			OPEN DF		
60201906	NGRDF5	62	SAG-DF	DF	SAG		C	OPEN DF		
60201907	NGRDF5	16	SAG-DF	DF	SAG		C	OPEN DF		
60201907	NGRDF5	19	SAG-DF	DF	SAG	D	C	OPEN DF		
60201908	NGR013	2	SAG	SAG	SAG	D		SAG/GRA	SAG/GRA	
60201908	NGR013	16	SAG	SAG	SAG	ED		SAG/GRA	SAG/GRA	
60201908	NGR013	16	SAG	DF	SAG	D		OPEN DF	OPEN DF	
60201908	NGR013	30	SAG	DF	SAG	ED	C	OPEN DF	OPEN DF	
60201908	NGR013	45	SAG	DF	SAG			OPEN DF	OPEN DF	
60201908	NGR013	6	SAG	DF	SAG	D	C	OPEN DF		
60201908	NGR013	44	SAG	DF	SAG	ED				
60201908	NGR013	75	SAG	DF	SAG					
60201908	NGR013	13	SAG	SAG	SAG	D				
60201908	NGR013	44	SAG	SAG	SAG	ED				
60201909	NGRDF5	46	SAG-DF	DF	SAG			OPEN DF	OPEN DF	
60201909	NGRDF5	28	SAG-DF	DF	SAG					
60201910	NGR035	5	GRA	DF	GRA			OPEN DF		

Stand ID	PI Stratum	Acres	Existing Cover Class	Potential Cover Class (In the absence of disturbance)	Desired Cover Class	Big Game Winter Range	Elk Calving Area	Alt. S	Alt. T	Alt. U
60201911	NGR013	9	SAG	DF	SAG					
60202001	D3WDF5	16	DF L	DF	DF L					
60202002	D4LDF3	43	DF-ASP	DF	DF-ASP					
60202900	NGRDF6	9	DF-SAG	DF	DF-SAG					
60202901	NGRDF5	69	SAG-DF	DF	SAG					
60202902	NGR042	2	GRA	DF	GRA					
60202915	NGRDF5	27	SAG-DF	DF	SAG					
60202916	NGR013	14	SAG	DF	SAG					
60202917	NGR013	6	SAG	DF	SAG					
60203900	NGR042	8	GRA	DF	GRA					
60205002	UFRDF5	6	SAG-DF	DF	SAG					
60205005	UFRDF5	10	SAG-DF	DF	SAG					
60205006	UFRDF5	5	SAG-DF	DF	SAG					
60205016	D2WDF1	29	DF-ASP	DF	DF-ASP					
60205025	F3LDF4	51	DF-ASP	DF	DF-ASP					
60205036	A3WSF1	22	SF-ASP	SF	SF-ASP					
60205037	A3MSF1	65	SF-ASP	SF	SF-ASP					
60205062	P3WLP2	19	LP-ASP	LP	LP-ASP					
60205900	NGR013	56	SAG	DF	SAG					
60205900	NGR013	1	SAG	SAG	SAG					
60205901	NGRDF5	12	SAG-DF	DF	SAG					
60205902	NGR033	16	GRA	DF	GRA					
60205903	NGRDF5	7	SAG-DF	DF	SAG					
60205904	NGR033	4	GRA	DF	GRA					
60205909	NGR013	32	SAG	DF	SAG					
60205911	NGR013	15	SAG	DF	SAG					
60205913	NGR013	10	SAG	DF	SAG					
60205914	NGR033	17	GRA	DF	GRA					
60205915	NGRDF6	30	DF-SAG	DF	DF-SAG					
60206900	NGR033	5	GRA	DF	GRA					
60206903	NGR012	11	SAG	DF	SAG					
60206909	NGRDF5	16	SAG-DF	DF	SAG					
60206910	NGRDF6	8	DF-SAG	DF	DF-SAG					
60206911	NGR033	6	GRA	DF	GRA					
60206916	NGR033	7	GRA	GRA	GRA					
60206924	NGR033	11	GRA	GRA	GRA					
60206936	NGR035	23	GRA	DF	GRA					
60206937	NGR033	5	GRA	DF	GRA					
60301001	D3MDF2	9	DF-ASP	DF	DF-ASP					
60301019	F3MDF3	125	DF-ASP	DF	DF-ASP					
60301900	NGRDF6	30	DF-SAG	DF	DF-SAG					
60301909	NGR033	4	GRA	DF	GRA					
60301911	NGR033	6	GRA	DF	GRA					
60301912	NGRDF5	60	SAG-DF	DF	SAG					
60302934	NGR033	3	GRA	DF	GRA					
60303901	NGR033	19	GRA	GRA	GRA					
60304902	NGR033	25	GRA	DF	GRA					
60304904	UFRDF6	18	DF-SAG	DF	DF-SAG					
60305903	NGR033	3	GRA	DF	GRA					
60306001	D3WDF2	5	DF-ASP	DF	DF-ASP	ED		ASPEN	ASPEN	
60306013	P3WLP3	23	LP-ASP	LP	LP-ASP					
60306900	NGR013	26	SAG	DF	SAG	ED		OPEN DF	OPEN DF	
60306900	NGR013	117	SAG	DF	SAG	E		OPEN DF	OPEN DF	
60306900	NGR013	1	SAG	DF	SAG	ED		OPEN DF		
60306900	NGR013	2	SAG	DF	SAG	E		OPEN DF		
60401002	D4WDF3	61	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
60401003	D3WDF3	54	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
60401005	D4MDF4	12	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
60401007	D4WDF3	11	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
60401011	D2MDF2	6	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
60401012	F3WDF2	33	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
60401012	F3WDF2	25	DF-ASP	DF	DF-ASP					
60401013	UHWQA3	18	ASP-DF	DF	ASP			ASPEN	ASPEN	
60401029	NRO013	7	SAG	DF	SAG			OPEN DF		
60401029	NRO013	8	SAG	DF	SAG	E		OPEN DF		
60401900	NRO013	1	SAG	DF	SAG			OPEN DF		
60401900	NRO013	2	SAG	DF	SAG	ED		OPEN DF		

Stand ID	PI Stratum	Acres	Existing Cover Class	Potential Cover Class (In the absence of disturbance)	Desired Cover Class	Big Game Winter Range	Elk Calving Area	Alt. S	Alt. T	Alt. U
60401900	NRO013	5	SAG	DF	SAG	E		OPEN DF		
60401900	NRO013	2	SAG	SAG	SAG	ED				
60401901	NGR013	2	SAG	DF	SAG			OPEN DF		
60401901	NGR013	20	SAG	DF	SAG	D		OPEN DF		
60401901	NGR013	2	SAG	SAG	SAG	D				
60401902	NGR013	1	SAG	DF	SAG	E		OPEN DF		
60401902	NGR013	9	SAG	DF	SAG			OPEN DF		
60401903	NGR013	18	SAG	DF	SAG	ED		OPEN DF		
60401903	NGR013	45	SAG	DF	SAG			OPEN DF		
60401903	NGR013	53	SAG	DF	SAG	E		OPEN DF		
60401904	NGR013	40	SAG	DF	SAG			OPEN DF		
60401905	NGRDF6	106	DF-SAG	DF	DF-SAG			OPEN DF		
60401908	NGR024	41	GRA	GRA	GRA					
60401912	UFRDF6	2	DF-SAG	DF	DF-SAG	D		OPEN DF		
60401912	UFRDF6	11	DF-SAG	DF	DF-SAG			OPEN DF		
60402002	UFRDF5	15	SAG-DF	DF	SAG	M		OPEN DF		
60402010	D3MDF3	26	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
60402014	D3W035	12	GRA	DF	GRA			OPEN DF		
60402015	D3LDF6	19	DF L	DF	DF L			OPEN DF		
60402018	D3MDF6	9	DF L	DF	DF L			OPEN DF		
60402900	NGRDF5	18	SAG-DF	DF	SAG			OPEN DF		
60402901	NGRDF5	3	SAG-DF	DF	SAG			OPEN DF		
60402901	NGRDF5	23	SAG-DF	DF	SAG	M		OPEN DF		
60402903	NGRDF5	1	SAG-DF	DF	SAG			OPEN DF		
60402903	NGRDF5	14	SAG-DF	DF	SAG	M		OPEN DF		
60402903	NGRDF5	75	SAG-DF	DF	SAG			OPEN DF		
60402904	NGR013	8	SAG	DF	SAG			OPEN DF		
60402909	NGR013	8	SAG	DF	SAG			OPEN DF		
60402910	UFRDF5	54	SAG-DF	DF	SAG			OPEN DF		
60402911	NGRDF5	36	SAG-DF	DF	SAG			OPEN DF		
60402914	NGR035	10	GRA	DF	GRA			OPEN DF		
60403013	F3WDF3	11	DF-ASP	DF	DF-ASP	M		ASPEN	ASPEN	
60403013	F3WDF3	1	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
60403022	L3WLP3	9	DF-ASP	LP	DF-ASP	M		ASPEN	ASPEN	ASPEN
60403023	D3LDF3	9	DF-ASP	DF	DF-ASP	M		ASPEN	ASPEN	
60403023	D3LDF3	16	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
60403025	UHWQA2	16	ASP	DF	ASP	M		ASPEN	ASPEN	ASPEN
60403026	F3LDF2	10	DF-ASP	DF	DF-ASP	M		ASPEN	ASPEN	ASPEN
60403027	P3LDF3	7	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
60403027	P3LDF3	10	DF-ASP	DF	DF-ASP	M		ASPEN	ASPEN	ASPEN
60403036	F3LDF5	6	DF L	DF	DF L					
60403902	NGR013	12	SAG	DF	SAG	M				
60403904	NGRQA1	19	ASP-SAG	DF	ASP-SAG	M		ASPEN	ASPEN	ASPEN
60403905	NGRQA1	10	ASP-SAG	DF	ASP-SAG	M		ASPEN	ASPEN	ASPEN
60403905	NGRQA1	13	ASP-SAG	DF	ASP-SAG			ASPEN	ASPEN	ASPEN
60403906	NRO056	14	ROCK-ASP	ROCK	ROCK-ASP			ASPEN	ASPEN	ASPEN
60403907	NGRDF6	19	DF-SAG	DF	DF-SAG					
60403909	NGR035	13	GRA	GRA	GRA					
60403911	NGR033	5	GRA	GRA	GRA					
60403912	NGR035	20	GRA	GRA	GRA					
60403913	NGR035	40	GRA	GRA	GRA					
60403915	NGR035	31	GRA	GRA	GRA					
60403927	NMR033	3	GRA	GRA	GRA					
60403930	NGR035	19	GRA	GRA	GRA					
60404001	A3MWB3	10	WBP-ASP	WBP	WBP-ASP	M		ASPEN	ASPEN	ASPEN
60404001	A3MWB3	76	WBP-ASP	WBP	WBP-ASP			ASPEN	ASPEN	ASPEN
60404900	NGR035	50	GRA	GRA	GRA					
60404907	NGRDF5	14	SAG-DF	DF	SAG					
60404908	NGR013	3	SAG	DF	SAG					
60404908	NGR013	8	SAG	DF	SAG	M				
60404910	UFRDF5	3	SAG-DF	DF	SAG	M				
60405002	A3WWB3	14	WBP-ASP	WBP	WBP-ASP			ASPEN	ASPEN	
60405005	USCWB3	58	WBP-ASP	WBP	WBP-ASP			ASPEN	ASPEN	ASPEN
60405900	NGR013	9	SAG	DF	SAG					
60405902	NGRDF5	41	SAG-DF	DF	SAG					
60405903	NRO035	31	GRA	GRA	GRA					
60405905	NGR035	29	GRA	GRA	GRA					

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60405907	NGR035	13	GRA	GRA	GRA					
60405911	NRO035	40	GRA	GRA	GRA					
60407910	NMR033	25	GRA	GRA	GRA					
60409900	NGRDF5	11	SAG-DF	DF	SAG	E		OPEN DF		
60409900	NGRDF5	12	SAG-DF	DF	SAG			OPEN DF		
60409900	NGRDF5	2	SAG-DF	DF	SAG	E				
60409900	NGRDF5	7	SAG-DF	DF	SAG					
60409901	NGRDF5	17	SAG-DF	DF	SAG					
60409904	NGRDF5	7	SAG-DF	DF	SAG	E		OPEN DF		
60409905	NGR013	6	SAG	DF	SAG			OPEN DF		OPEN DF
60409905	NGR013	16	SAG	DF	SAG			OPEN DF		
60409908	NGR013	2	SAG	DF	SAG			OPEN DF		OPEN DF
60409908	NGR013	6	SAG	DF	SAG	E		OPEN DF		
60409908	NGR013	50	SAG	DF	SAG			OPEN DF		
60409909	NGRDF5	21	SAG-DF	DF	SAG			OPEN DF		
60409910	NGR012	13	SAG	DF	SAG			OPEN DF		
60409911	UFRDF5	19	SAG-DF	DF	SAG			OPEN DF		
60409911	UFRDF5	2	SAG-DF	DF	SAG					
60409912	NGRDF5	1	SAG-DF	DF	SAG	E		OPEN DF		
60409912	NGRDF5	21	SAG-DF	DF	SAG			OPEN DF		
60501008	D3LDF5	3	DF L	DF	DF L			OPEN DF	OPEN DF	OPEN DF
60501900	NGR013	3	SAG	SAG	SAG	E	C		SAG/GRA	
60501900	NGR013	6	SAG	SAG	SAG	ED			SAG/GRA	
60501900	NGR013	46	SAG	SAG	SAG	E			SAG/GRA	
60501901	NGR013	5	SAG	SAG	SAG	E			SAG/GRA	
60501901	NGR013	51	SAG	DF	SAG			OPEN DF	OPEN DF	
60501902	NGR013	11	SAG	SAG	SAG			SAG/GRA	SAG/GRA	
60501902	NGR013	8	SAG	DF	SAG	E	C	OPEN DF	OPEN DF	
60501902	NGR013	23	SAG	DF	SAG	E		OPEN DF	OPEN DF	
60501903	NGR013	21	SAG	SAG	SAG	E		SAG/GRA	SAG/GRA	
60501904	NGR013	44	SAG	SAG	SAG	E		SAG/GRA	SAG/GRA	
60501904	NGR013	1	SAG	SAG	SAG	E	C			
60501906	NGR012	68	SAG	DF	SAG	E		OPEN DF		OPEN DF
60501907	NGRDF5	14	SAG-DF	DF	SAG	ED		OPEN DF		
60501908	NGRDF5	6	SAG-DF	DF	SAG	ED		OPEN DF		OPEN DF
60501908	NGRDF5	1	SAG-DF	DF	SAG	E		OPEN DF		
60501909	NGRDF5	26	SAG-DF	DF	SAG	E		OPEN DF		OPEN DF
60501910	NGRDF5	3	SAG-DF	DF	SAG	E		OPEN DF		OPEN DF
60501910	NGRDF5	45	SAG-DF	DF	SAG	ED		OPEN DF		OPEN DF
60501910	NGRDF5	5	SAG-DF	DF	SAG	ED				
60501911	NGR013	3	SAG	SAG	SAG	ED				
60501911	NGR013	86	SAG	DF	SAG	ED		OPEN DF	OPEN DF	OPEN DF
60501912	NGR013	39	SAG	SAG	SAG	ED		SAG/GRA	SAG/GRA	
60501912	NGR013	10	SAG	SAG	SAG	ED	C			
60501913	NGRDF5	8	SAG-DF	DF	SAG	ED		OPEN DF		
60501913	NGRDF5	8	SAG-DF	DF	SAG	ED	C	OPEN DF		
60501914	NGR013	2	SAG	SAG	SAG	ED				
60501914	NGR013	43	SAG	SAG	SAG	ED	C			
60501915	NGRDF5	25	SAG-DF	DF	SAG	E	C	OPEN DF		
60501916	NGR013	141	SAG	SAG	SAG	E	C	SAG/GRA	SAG/GRA	
60501916	NGR013	49	SAG	SAG	SAG	ED	C			
60501917	NGR013	77	SAG	SAG	SAG	ED	C			
60501918	NGR013	1	SAG	SAG	SAG	ED				
60501918	NGR013	27	SAG	DF	SAG	ED	C	OPEN DF		OPEN DF
60501918	NGR013	58	SAG	DF	SAG	ED		OPEN DF		OPEN DF
60501919	NGR013	2	SAG	SAG	SAG	ED				
60501919	NGR013	133	SAG	SAG	SAG	ED	C			
60501919	NGR013	8	SAG	DF	SAG	E	C	OPEN DF		
60501919	NGR013	55	SAG	DF	SAG	ED	C			
60501921	NGRDF5	2	SAG-DF	DF	SAG	E		OPEN DF		OPEN DF
60501921	NGRDF5	3	SAG-DF	DF	SAG	E	C	OPEN DF		OPEN DF
60501921	NGRDF5	10	SAG-DF	DF	SAG			OPEN DF		OPEN DF
60501921	NGRDF5	1	SAG-DF	DF	SAG	E	C	OPEN DF		
60501922	NGR013	46	SAG	SAG	SAG	ED	C			
60501922	NGR013	60	SAG	SAG	SAG	ED				
60502009	D3LDF5	5	DF L	DF	DF L			OPEN DF		OPEN DF
60502009	D3LDF5	2	DF L	DF	DF L		C	OPEN DF		

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60502009	D3LDF5	13	DF L	DF	DF L	E	C	OPEN DF		
60502009	D3LDF5	31	DF L	DF	DF L			OPEN DF		
60502009	D3LDF5	14	DF L	DF	DF L					
60502009	D3LDF5	14	DF L	DF	DF L	E	C			
60502023	D2MDF5	3	DF L	DF	DF L	E	C	OPEN DF		
60502023	D2MDF5	1	DF L	DF	DF L	E	C			
60502024	D2MDF1	5	DF-ASP	DF	DF-ASP	E	C	ASPEN	ASPEN	
60502029	D3MDF6	1	DF L	DF	DF L			OPEN DF		OPEN DF
60502029	D3MDF6	3	DF L	DF	DF L					
60502031	D3MDF1	5	DF-ASP	DF	DF-ASP	ED	C			
60502032	D3MDF2	4	DF-ASP	DF	DF-ASP	ED	C			
60502033	UHWQA2	2	ASP	DF	ASP	E	C	ASPEN	ASPEN	
60502033	UHWQA2	2	ASP	DF	ASP	ED	C			
60502034	UHWQA3	2	ASP-DF	DF	ASP	EMD	C			
60502900	NGR013	67	SAG	SAG	SAG			SAG/GRA	SAG/GRA	
60502900	NGR013	55	SAG	DF	SAG					
60502902	NGR033	1	GRA	DF	GRA					
60502902	NGR033	1	GRA	DF	GRA	E	C			
60502902	NGR033	3	GRA	DF	GRA		C			
60502903	NGR033	1	GRA	DF	GRA	E	C	OPEN DF		
60502904	NGRDF5	14	SAG-DF	DF	SAG			OPEN DF	OPEN DF	OPEN DF
60502905	NGR013	75	SAG	DF	SAG			OPEN DF	OPEN DF	OPEN DF
60502906	NGRDF5	7	SAG-DF	DF	SAG			OPEN DF		OPEN DF
60502907	D3LDF6	9	DF L	DF	DF L			OPEN DF		
60502907	D3LDF6	1	DF L	DF	DF L					
60502909	NGRDF5	1	SAG-DF	DF	SAG		C	OPEN DF		OPEN DF
60502909	NGRDF5	10	SAG-DF	DF	SAG			OPEN DF		OPEN DF
60502909	NGRDF5	3	SAG-DF	DF	SAG		C			
60502909	NGRDF5	15	SAG-DF	DF	SAG					
60502911	NGRDF5	1	SAG-DF	DF	SAG	E	C	OPEN DF		
60502911	NGRDF5	3	SAG-DF	DF	SAG			OPEN DF		
60502911	NGRDF5	2	SAG-DF	DF	SAG					
60502911	NGRDF5	4	SAG-DF	DF	SAG	ED	C			
60502911	NGRDF5	9	SAG-DF	DF	SAG	E	C			
60502912	NGR013	76	SAG	SAG	SAG	E	C	SAG/GRA	SAG/GRA	
60502912	NGR013	5	SAG	SAG	SAG	E	C		SAG/GRA	
60502913	NGRDF5	12	SAG-DF	DF	SAG	E	C	OPEN DF		
60502914	NGRDF5	7	SAG-DF	DF	SAG	E	C	OPEN DF		
60502915	NGRDF5	14	SAG-DF	DF	SAG	E	C	OPEN DF		
60502916	NGRPF5	10	SAG-PF	DF	SAG	E	C	OPEN DF		
60502916	NGRPF5	3	SAG-PF	DF	SAG	ED	C			
60502916	NGRPF5	6	SAG-PF	DF	SAG	E	C			
60502917	NGR033	2	GRA	DF	GRA	E	C	OPEN DF		
60502918	NGR013	29	SAG	SAG	SAG	E	C	SAG/GRA	SAG/GRA	
60502918	NGR013	10	SAG	DF	SAG	EMD	C	OPEN DF		
60502918	NGR013	33	SAG	DF	SAG	ED	C	OPEN DF		
60502918	NGR013	4	SAG	DF	SAG	E	C			
60502918	NGR013	4	SAG	DF	SAG	EMD	C			
60502918	NGR013	5	SAG	DF	SAG	ED	C			
60502921	NGRPF5	2	SAG-PF	DF	SAG	EMD	C	OPEN DF		
60502921	NGRPF5	14	SAG-PF	DF	SAG	ED	C			
60502921	NGRPF5	80	SAG-PF	DF	SAG	EMD	C			
60502922	NGRPF5	7	SAG-PF	DF	SAG	ED	C			
60502923	NGR033	3	GRA	DF	GRA			OPEN DF		
60502923	NGR033	3	GRA	DF	GRA		C	OPEN DF		
60502923	NGR033	4	GRA	DF	GRA	E	C	OPEN DF		
60503005	D3MDF2	1	DF-ASP	DF	DF-ASP	ED				
60503005	D3MDF2	4	DF-ASP	DF	DF-ASP	ED	C			
60503005	D3MDF2	9	DF-ASP	DF	DF-ASP	E				
60503010	D3MDF3	13	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
60503011	D4WDF3	10	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
60503013	D4WDF3	21	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
60503034	D3MPF3	4	DF L	DF	DF L	ED				
60503036	D3LDF5	32	DF L	DF	DF L	ED				
60503037	D3MDF3	7	DF-ASP	DF	DF-ASP	ED				
60503039	D3MDF5	20	DF L	DF	DF L	E				
60503042	UHWQA2	2	ASP	DF	ASP	E				

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60503045	D2LDF5	10	DF L	DF	DF L			OPEN DF		
60503045	D2LDF5	1	DF L	DF	DF L					
60503047	D2WDF1	4	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
60503088	UFRDF5	1	SAG-DF	DF	SAG					
60503088	UFRDF5	4	SAG-DF	DF	SAG	E				
60503900	NGR013	11	SAG	SAG	SAG	EMD	C	SAG/GRA		
60503900	NGR013	1	SAG	SAG	SAG	ED				
60503900	NGR013	9	SAG	SAG	SAG	ED	C			
60503900	NGR013	14	SAG	SAG	SAG	EMD				
60503900	NGR013	3	SAG	DF	SAG	EMD	C	OPEN DF		
60503900	NGR013	49	SAG	DF	SAG	ED	C	OPEN DF		
60503900	NGR013	3	SAG	DF	SAG	EMD				
60503900	NGR013	7	SAG	DF	SAG	EMD	C			
60503900	NGR013	23	SAG	DF	SAG	ED	C			
60503900	NGR013	49	SAG	DF	SAG	ED				
60503901	NGR013	7	SAG	DF	SAG	ED				
60503902	NGR042	2	GRA	DF	GRA					
60503903	NGRDF5	19	SAG-DF	DF	SAG					
60503903	NGRDF5	19	SAG-DF	DF	SAG	E				
60503904	NGR013	3	SAG	DF	SAG	E				
60503905	NGR013	2	SAG	DF	SAG	ED				
60503905	NGR013	3	SAG	DF	SAG	E				
60503906	NGRDF5	9	SAG-DF	DF	SAG	E				
60503907	NGR033	7	GRA	DF	GRA			OPEN DF		
60503908	NGR042	2	GRA	DF	GRA			OPEN DF		
60503909	NGRDF6	29	DF-SAG	DF	DF-SAG			OPEN DF		
60503910	NGRDF5	21	SAG-DF	DF	SAG			OPEN DF		
60503911	NGR013	3	SAG	DF	SAG			OPEN DF		
60503913	NGRDF6	5	DF-SAG	DF	DF-SAG			OPEN DF		
60503913	NGRDF6	8	DF-SAG	DF	DF-SAG					
60503914	NGR013	4	SAG	DF	SAG					
60503915	NGR033	2	GRA	DF	GRA					
60503916	NGR033	6	GRA	DF	GRA					
60503919	NGRDF5	55	SAG-DF	DF	SAG					
60503920	NGRDF6	5	DF-SAG	DF	DF-SAG					
60503922	NGR042	4	GRA	DF	GRA					
60503923	NGR035	6	GRA	DF	GRA					
60503924	NGR035	3	GRA	DF	GRA					
60503925	NGR033	16	GRA	DF	GRA					
60503926	NGR013	6	SAG	DF	SAG					
60503927	NGRDF5	12	SAG-DF	DF	SAG					
60503928	NGR033	25	GRA	DF	GRA			OPEN DF		
60503929	NGRDF5	92	SAG DF	DF	SAG			OPEN DF		
60503929	NGRDF5	6	SAG-DF	DF	SAG					
60503930	NGR033	1	GRA	DF	GRA	E		OPEN DF		
60503930	NGR033	10	GRA	DF	GRA			OPEN DF		
60503930	NGR033	2	GRA	DF	GRA	E				
60503930	NGR033	4	GRA	DF	GRA					
60504012	F2LDF5	11	DF L	DF	DF L					
60504013	L3WLP3	20	DF-ASP	LP	DF-ASP					
60504017	A3LDF5	42	DF L	DF	DF L					
60504900	NGR013	7	SAG	DF	SAG					
60504901	NGRDF6	37	DF-SAG	DF	DF-SAG					
60504903	NGR013	12	SAG	DF	SAG					
60504910	NGR033	2	GRA	DF	GRA					
60504912	NGR033	2	GRA	DF	GRA					
60504913	UFRDF6	23	DF-SAG	DF	DF-SAG					
60505900	NGR035	5	GRA	DF	GRA					
60505901	NGR035	4	GRA	DF	GRA					
60505904	NGR033	4	GRA	DF	GRA					
60506003	D3WDF2	6	DF-ASP	DF	DF-ASP	E		ASPEN	ASPEN	
60506003	D3WDF2	30	DF-ASP	DF	DF-ASP	ED		ASPEN	ASPEN	
60506005	UFRDF5	3	SAG-DF	DF	SAG	ED		OPEN DF		
60506005	UFRDF5	23	SAG-DF	DF	SAG	EMD		OPEN DF		
60506005	UFRDF5	2	SAG-DF	DF	SAG	ED				
60506005	UFRDF5	2	SAG-DF	DF	SAG	EMD				
60506007	L1NLP0	1	DF-ASP	LP	DF-ASP	ED		ASPEN	ASPEN	

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60506007	L1NLP0	10	DF-ASP	LP	DF-ASP	E		ASPEN	ASPEN	
60506007	L1NLP0	2	DF-ASP	LP	DF-ASP	ED				
60506007	L1NLP0	8	DF-ASP	LP	DF-ASP	E				
60506008	F3WDF2	1	DF-ASP	DF	DF-ASP	ED		ASPEN	ASPEN	
60506008	F3WDF2	7	DF-ASP	DF	DF-ASP	ED				
60506009	D3WDF3	9	DF-ASP	DF	DF-ASP	E		ASPEN	ASPEN	
60506009	D3WDF3	10	DF-ASP	DF	DF-ASP	ED		ASPEN	ASPEN	
60506009	D3WDF3	1	DF-ASP	DF	DF-ASP	ED				
60506017	NGR041	2	GRA-ASP	GRA	ASP	ED				
60506900	NGR013	5	SAG	DF	SAG	EMD		OPEN DF		
60506900	NGR013	1	SAG	DF	SAG	EMD				
60506900	NGR013	7	SAG	SAG	SAG	EMD				
60506901	NGR013	2	SAG	DF	SAG	ED				
60506901	NGR013	2	SAG	SAG	SAG	ED				
60506903	NGR013	1	SAG	DF	SAG	E		OPEN DF		
60506904	NGRDF5	5	SAG-DF	DF	SAG	E		OPEN DF		
60506904	NGRDF5	1	SAG-DF	DF	SAG	E				
60601006	F3MDF3	12	DF-ASP	DF	DF-ASP					
60601014	D3MDF5	13	DF L	DF	DF L					
60601024	D3MDF2	1	DF-ASP	DF	DF-ASP	E		ASPEN	ASPEN	
60601024	D3MDF2	10	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
60601024	D3MDF2	13	DF-ASP	DF	DF-ASP					
60601026	F3WDF2	16	DF-ASP	DF	DF-ASP					
60601039	D2MDF2	7	DF-ASP	DF	DF-ASP					
60601900	NGR013	1	SAG	DF	SAG	E		OPEN DF		
60601901	NGR013	6	SAG	DF	SAG			OPEN DF		
60601902	NGRDF5	9	SAG-DF	DF	SAG	E		OPEN DF		
60601902	NGRDF5	2	SAG-DF	DF	SAG					
60601902	NGRDF5	4	SAG-DF	DF	SAG	E				
60601903	NGR013	3	SAG	DF	SAG					
60601904	NGRDF5	8	SAG-DF	DF	SAG					
60601905	NGRDF5	3	SAG-DF	DF	SAG					
60601906	NGR035	2	GRA	DF	GRA					
60601907	NGR035	6	GRA	DF	GRA					
60601908	NGRDF5	7	SAG-DF	DF	SAG					
60601909	NGRDF5	6	SAG-DF	DF	SAG					
60601910	NGRDF5	10	SAG-DF	DF	SAG					
60601911	NGR035	3	GRA	DF	GRA					
60601912	NGR035	6	GRA	DF	GRA					
60602010	F3WDF2	26	DF-ASP	DF	DF-ASP					
60602011	D3LDF6	1	DF L	DF	DF L	E				
60602011	D3LDF6	2	DF L	DF	DF L	E				
60602014	D3MDF2	44	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
60602014	D3MDF2	17	DF-ASP	DF	DF-ASP					
60602017	D4WDF3	19	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
60602017	D4WDF3	3	DF-ASP	DF	DF-ASP					
60602019	D3WDF2	39	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
60602019	D3WDF2	5	DF-ASP	DF	DF-ASP					
60602020	UHWQA3	2	ASP-DF	DF	ASP	EM				
60602021	D3WDF2	5	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
60602021	D3WDF2	17	DF-ASP	DF	DF-ASP					
60602022	D3WDF3	19	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
60602022	D3WDF3	7	DF-ASP	DF	DF-ASP					
60602023	D3MDF2	8	DF-ASP	DF	DF-ASP					
60602024	D3MDF3	15	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
60602024	D3MDF3	3	DF-ASP	DF	DF-ASP					
60602029	D3WDF3	5	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
60602029	D3WDF3	21	DF-ASP	DF	DF-ASP					
60602031	D4WDF3	6	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
60602031	D4WDF3	10	DF-ASP	DF	DF-ASP					
60602032	D4WDF3	1	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
60602032	D4WDF3	12	DF-ASP	DF	DF-ASP					
60602034	D3MDF3	31	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
60602034	D3MDF3	6	DF-ASP	DF	DF-ASP					
60602035	D3WDF3	14	DF-ASP	DF	DF-ASP					
60602041	UHWQA3	11	ASP-DF	DF	ASP					
60602042	UHWQA3	20	ASP-DF	DF	ASP					

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60602052	F3LDF6	10	DF L	DF	DF L					
60602063	D3MDF6	41	DF L	DF	DF L	EM				
60602900	NGR013	2	SAG	SAG	SAG	ED				
60602900	NGR013	20	SAG	SAG	SAG	EM				
60602900	NGR013	47	SAG	SAG	SAG					
60602900	NGR013	76	SAG	SAG	SAG	E				
60602901	NGRDF5	5	SAG-DF	DF	SAG	E				
60602901	NGRDF5	12	SAG-DF	DF	SAG					
60602902	NDVDF6	6	DF L	DF	DF L			OPEN DF		
60602903	NGRDF5	4	SAG-DF	DF	SAG			OPEN DF		
60602904	NGRDF6	2	DF-SAG	DF	DF-SAG			OPEN DF		
60602905	NGR013	11	SAG	DF	SAG					
60602908	NGRDF5	67	SAG-DF	DF	SAG			OPEN DF		OPEN DF
60602908	NGRDF5	3	SAG-DF	DF	SAG			OPEN DF		
60602908	NGRDF5	19	SAG-DF	DF	SAG					
60602909	NGR013	80	SAG	SAG	SAG			SAG/GRA	SAG/GRA	SAG/GRA
60602909	NGR013	9	SAG	SAG	SAG					SAG/GRA
60602909	NGR013	4	SAG	DF	SAG			OPEN DF		OPEN DF
60602910	NGR033	27	GRA	DF	GRA			OPEN DF		OPEN DF
60602910	NGR033	17	GRA	DF	GRA					OPEN DF
60602911	NGRDF5	18	SAG-DF	DF	SAG			OPEN DF	OPEN DF	OPEN DF
60602911	NGRDF5	8	SAG-DF	DF	SAG					OPEN DF
60602912	NGRDF5	1	DF-ASP	DF	ASP-SAG	E		ASPEN	ASPEN	ASPEN
60602912	NGRDF5	8	DF-ASP	DF	ASP-SAG			ASPEN	ASPEN	ASPEN
60602912	NGRDF5	3	DF-ASP	DF	ASP-SAG					
60602912	NGRDF5	5	DF-ASP	DF	ASP-SAG	E				
60602912	NGRDF5	14	DF-ASP	DF	ASP-SAG	ED				
60602913	NGR013	9	SAG	SAG	SAG			SAG/GRA	SAG/GRA	SAG/GRA
60602913	NGR013	1	SAG	SAG	SAG	ED				SAG/GRA
60602913	NGR013	9	SAG	SAG	SAG	E				SAG/GRA
60602913	NGR013	2	SAG	SAG	SAG	E				
60602913	NGR013	29	SAG	SAG	SAG	ED				
60602914	NGR013	4	SAG	DF	SAG			OPEN DF		OPEN DF
60602914	NGR013	12	SAG	DF	SAG					OPEN DF
60602914	NGR013	12	SAG	DF	SAG	E				OPEN DF
60602914	NGR013	16	SAG	DF	SAG	ED				OPEN DF
60602914	NGR013	20	SAG	DF	SAG	ED				
60602914	NGR013	6	SAG	SAG	SAG	E				
60602915	NGR013	7	SAG	SAG	SAG			SAG/GRA	SAG/GRA	SAG/GRA
60602915	NGR013	12	SAG	SAG	SAG					SAG/GRA
60602915	NGR013	2	SAG	DF	SAG	E				OPEN DF
60602916	UFRDF5	18	SAG-DF	DF	SAG			OPEN DF		OPEN DF
60602916	UFRDF5	2	SAG-DF	DF	SAG					
60602917	UFRDF5	15	SAG-DF	DF	SAG					
60602918	NBR011	7	SHRUB-ASP	SHRUB	ASP-SHRUB	ED				
60602919	D2MDF5	2	DF L	DF	DF L	ED				
60602920	NGRDF5	1	SAG-DF	DF	SAG			OPEN DF		OPEN DF
60602920	NGRDF5	9	SAG-DF	DF	SAG	E				OPEN DF
60602920	NGRDF5	23	SAG-DF	DF	SAG					OPEN DF
60602921	D2WDF2	6	DF L	DF	DF L	E				OPEN DF
60602922	NGRPF5	7	SAG-PF	DF	SAG	E				OPEN DF
60602923	NGRPF5	1	SAG-PF	DF	SAG	E				OPEN DF
60602923	NGRPF5	7	SAG-PF	DF	SAG	ED				OPEN DF
60602923	NGRPF5	1	SAG-PF	DF	SAG	ED				
60602924	NGRPF6	1	PF-ASP	PF	PF-ASP	ED				
60602924	NGRPF6	7	PF-ASP	PF	PF-ASP	E				
60602925	NGR013	11	SAG	DF	SAG			OPEN DF		OPEN DF
60602925	NGR013	7	SAG	DF	SAG					
60602926	NGRDF5	13	SAG-DF	DF	SAG					
60602927	NGRPF5	10	SAG-PF	DF	SAG	E				
60602927	NGRPF5	17	SAG-PF	DF	SAG	EM				
60602928	UFRDF2	15	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
60602928	UFRDF2	5	DF-ASP	DF	DF-ASP					
60603015	P3LDF6	7	SAG-DF	DF	SAG					
60603019	F4WDF4	18	DF-ASP	DF	DF-ASP					
60603026	D3LDF5	15	DF L	DF	DF L					
60603029	D3WDF2	41	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	

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60603029	D3WDF2	18	DF-ASP	DF	DF-ASP					
60603033	F3WDF3	1	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
60603033	F3WDF3	25	DF-ASP	DF	DF-ASP					
60603034	D4WDF4	4	DF-ASP	DF	DF-ASP	EM				
60603034	D4WDF4	21	DF-ASP	DF	DF-ASP					
60603035	D3MDF6	8	DF L	DF	DF L					
60603036	D3MDF3	1	DF-ASP	DF	DF-ASP					
60603036	D3MDF3	7	DF-ASP	DF	DF-ASP	EM				
60603038	D3MDF6	12	DF L	DF	DF L	EM				
60603038	D3MDF6	59	DF L	DF	DF L	E				
60603901	NGRDF5	48	SAG-DF	DF	SAG					
60603902	NGR042	6	GRA	DF	GRA					
60603903	NGRDF6	9	DF-SAG	DF	DF-SAG					
60603904	NGRDF5	6	SAG-DF	DF	SAG			OPEN DF		
60603904	NGRDF5	2	SAG-DF	DF	SAG	E				
60603904	NGRDF5	10	SAG-DF	DF	SAG	EM				
60603904	NGRDF5	128	SAG-DF	DF	SAG					
60603905	NGRDF5	5	SAG-DF	DF	SAG					
60603906	NGR013	1	SAG	SAG	SAG	E				
60603906	NGR013	6	SAG	SAG	SAG	EM				
60603906	NGR013	3	SAG	DF	SAG	E				
60603906	NGR013	27	SAG	DF	SAG	EM				
60603907	NGR012	25	SAG	DF	SAG			OPEN DF		
60603908	NGR013	33	SAG	DF	SAG					
60603909	NGRDF5	10	SAG-DF	DF	SAG	EM				
60603910	NGR013	6	SAG	SAG	SAG	EM				
60603910	NGR013	1	SAG	DF	SAG	E				
60603910	NGR013	3	SAG	DF	SAG					
60603910	NGR013	6	SAG	DF	SAG	EM				
60603911	NGR033	9	GRA	DF	GRA					
60604024	L3WLP2	1	DF-ASP	LP	DF-ASP			ASPEN	ASPEN	
60604024	L3WLP2	12	DF-ASP	LP	DF-ASP	E		ASPEN	ASPEN	
60604024	L3WLP2	1	DF-ASP	LP	DF-ASP					
60604024	L3WLP2	1	DF-ASP	LP	DF-ASP	E				
60604032	D4WDF3	36	DF-ASP	DF	DF-ASP	E				
60604058	UHWQA2	3	ASP	DF	ASP					
60604900	NGRDF5	51	SAG-DF	DF	SAG	E		OPEN DF	OPEN DF	
60604900	NGRDF5	11	SAG-DF	DF	SAG	E				
60604901	NGR013	2	SAG	DF	SAG	E	C	OPEN DF		
60604901	NGR013	16	SAG	DF	SAG	E		OPEN DF		
60604901	NGR013	1	SAG	DF	SAG	E	C			
60604901	NGR013	3	SAG	DF	SAG	E				
60604902	NGR013	5	SAG	DF	SAG	E	C	OPEN DF		
60604903	NGR035	1	GRA	DF	GRA	E				
60604903	NGR035	2	GRA	DF	GRA					
60604904	NGRDF6	7	DF-SAG	DF	DF-SAG					
60604906	NGR013	35	SAG	DF	SAG					
60604907	NGR012	9	SAG	DF	SAG					
60604908	NGRDF5	6	SAG-DF	DF	SAG			OPEN DF		
60604909	NGR035	6	GRA	DF	GRA			OPEN DF		
60604909	NGR035	37	GRA	DF	GRA					
60604910	NGR035	12	GRA	DF	GRA			OPEN DF		
60604911	NGR012	12	SAG	DF	SAG					
60604912	NGR033	2	GRA	DF	GRA					
60604913	NGRDF5	25	SAG-DF	DF	SAG					
60604914	NGRDF5	31	SAG-DF	DF	SAG					
60604915	NGR012	4	SAG	DF	SAG			OPEN DF		
60604915	NGR012	15	SAG	DF	SAG	E		OPEN DF		
60604915	NGR012	2	SAG	DF	SAG					
60604915	NGR012	13	SAG	DF	SAG	E				
60604916	NGRDF5	47	SAG-DF	DF	SAG	E		OPEN DF	OPEN DF	
60604917	NGRDF5	10	SAG-DF	DF	SAG	E				
60604918	NGR013	4	SAG	SAG	SAG	E				
60604918	NGR013	2	SAG	DF	SAG	E		OPEN DF		
60604918	NGR013	7	SAG	DF	SAG	E				
60701019	F3WDF3	4	DF-ASP	DF	DF-ASP	E				
60701019	F3WDF3	5	DF-ASP	DF	DF-ASP					

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60701019	F3WDF3	8	DF-ASP	DF	DF-ASP	M	C			
60701019	F3WDF3	17	DF-ASP	DF	DF-ASP	E	C			
60701022	D4WDF4	5	DF-ASP	DF	DF-ASP	E	C			
60701032	F3MDF3	1	DF-ASP	DF	DF-ASP	E	C	ASPEN	ASPEN	ASPEN
60701032	F3MDF3	2	DF-ASP	DF	DF-ASP	E		ASPEN	ASPEN	ASPEN
60701032	F3MDF3	7	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
60701033	UHWQA3	7	ASP-DF	DF	ASP			ASPEN	ASPEN	ASPEN
60701039	P3WLP3	2	LP-ASP	LP	LP-ASP			ASPEN	ASPEN	
60701039	P3WLP3	11	LP-ASP	LP	LP-ASP					
60701039	P3WLP3	20	LP-ASP	LP	LP-ASP	M				
60701055	F2MDF6	1	DF L	DF	DF L			OPEN DF		
60701055	F2MDF6	1	DF L	DF	DF L	E		OPEN DF		
60701058	UFRDF5	29	SAG-DF	DF	SAG			OPEN DF	OPEN DF	
60701900	NGRDF5	74	SAG-DF	DF	SAG			OPEN DF		
60701900	NGRDF5	45	SAG-DF	DF	SAG					
60701903	NGRDF5	11	SAG-DF	DF	SAG	M				
60701904	NGR033	3	GRA	DF	GRA	M				
60701905	NGRDF3	19	DF-ASP	DF	ASP-SAG	M	C			
60701906	NGR013	2	SAG	DF	SAG	M	C			
60701907	NGR033	4	GRA	DF	GRA	E	C	OPEN DF		
60701908	NGRDF3	1	DF-ASP	DF	ASP-SAG	M	C	ASPEN	ASPEN	ASPEN
60701908	NGRDF3	2	DF-ASP	DF	ASP-SAG	E		ASPEN	ASPEN	ASPEN
60701908	NGRDF3	7	DF-ASP	DF	ASP-SAG	E	C	ASPEN	ASPEN	ASPEN
60701908	NGRDF3	10	DF-ASP	DF	ASP-SAG			ASPEN	ASPEN	ASPEN
60701909	NMR011	4	SHRUB-ASP	SHRUB	ASP-SHRUB	E	C	ASPEN	ASPEN	ASPEN
60701909	NMR011	2	SHRUB-ASP	SHRUB	ASP-SHRUB	E	C			
60701910	NGR013	2	SAG	DF	SAG	E	C	OPEN DF		
60701911	NMR014	2	SHRUB-ASP	SHRUB	ASP-SHRUB			ASPEN	ASPEN	ASPEN
60701912	NGRDF6	9	DF-SAG	DF	DF-SAG	E	C	OPEN DF		
60701915	NGR013	61	SAG	DF	SAG			OPEN DF	OPEN DF	
60702014	D3MDF5	2	DF L	DF	DF L	M				
60702014	D3MDF5	10	DF L	DF	DF L	E				
60702014	D3MDF5	23	DF L	DF	DF L	M	C			
60702014	D3MDF5	41	DF L	DF	DF L					
60702014	D3MDF5	49	DF L	DF	DF L	E	C			
60702015	D3MDF3	20	DF-ASP	DF	DF-ASP	E	C			
60702019	D3MDF6	29	DF L	DF	DF L	E	C			
60702035	F3MDF6	10	DF L	DF	DF L					
60702042	D3LDF5	2	DF L	DF	DF L					
60702042	D3LDF5	3	DF L	DF	DF L	E	C			
60702042	D3LDF5	16	DF L	DF	DF L	E				
60702043	D4MDF6	2	DF L	DF	DF L	E				
60702043	D4MDF6	13	DF L	DF	DF L	E	C			
60702900	NGR013	5	SAG	DF	SAG	E	C	OPEN DF		
60702900	NGR013	3	SAG	SAG	SAG	E	C			
60702901	NGR013	2	SAG	DF	SAG	E	C			
60702901	NGR013	3	SAG	DF	SAG	E				
60702902	NGRDF5	2	SAG-DF	DF	SAG	E	C			
60702902	NGRDF5	8	SAG-DF	DF	SAG	E				
60702902	NGRDF5	103	SAG-DF	DF	SAG					
60702903	NGR013	9	SAG	DF	SAG	E	C			
60702904	NGRDF5	4	SAG-DF	DF	SAG					
60702904	NGRDF5	9	SAG-DF	DF	SAG	M				
60702905	NGR042	3	GRA	DF	GRA					
60702906	NGRDF5	37	SAG-DF	DF	SAG			OPEN DF		
60702907	NGRDF5	14	SAG-DF	DF	SAG			OPEN DF		
60703027	F3MDF3	26	DF-ASP	DF	DF-ASP	E	C			
60703059	D3MDF6	13	DF L	DF	DF L	E				
60703059	D3MDF6	18	DF L	DF	DF L					
60703068	UFRDF5	65	SAG-DF	DF	SAG			OPEN DF	OPEN DF	
60703900	NGRDF6	8	DF-SAG	DF	DF-SAG	E	C	OPEN DF		
60703900	NGRDF6	3	DF-SAG	DF	DF-SAG	E	C			
60703901	NGRDF5	111	SAG-DF	DF	SAG			OPEN DF	OPEN DF	
60703901	NGRDF5	6	SAG-DF	DF	SAG	E		OPEN DF		
60703901	NGRDF5	2	SAG-DF	DF	SAG	E				
60703902	NGRDF5	3	SAG-DF	DF	SAG			OPEN DF		
60703903	NMR014	4	SHRUB-ASP	SHRUB	ASP-SHRUB	E		ASPEN	ASPEN	ASPEN

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60703903	NMR014	12	SHRUB-ASP	SHRUB	ASP-SHRUB	E	C	ASPEN	ASPEN	ASPEN
60703903	NMR014	3	SHRUB-ASP	SHRUB	ASP-SHRUB	E	C			
60703904	NMR014	2	SHRUB-ASP	SHRUB	ASP-SHRUB	E		ASPEN	ASPEN	ASPEN
60703904	NMR014	4	SHRUB-ASP	SHRUB	ASP-SHRUB	E	C	ASPEN	ASPEN	ASPEN
60703904	NMR014	1	SHRUB-ASP	SHRUB	ASP-SHRUB	E	C			
60703905	NGRDF5	5	SAG-DF	DF	SAG	E		OPEN DF		
60703905	NGRDF5	55	SAG-DF	DF	SAG			OPEN DF		
60703907	NGRDF6	12	DF-SAG	DF	DF-SAG			OPEN DF		
60703908	NGR033	16	GRA	GRA	GRA					
60703910	NGR013	4	SAG	DF	SAG			OPEN DF		
60703911	NGR035	31	GRA	DF	GRA			OPEN DF		
60703912	NGR035	10	GRA	DF	GRA			OPEN DF		
60703914	NGR035	7	GRA	DF	GRA			OPEN DF		
60704900	NGR042	10	GRA	DF	GRA	E	C	OPEN DF		
60704901	NGRDF6	8	DF-SAG	DF	DF-SAG			OPEN DF		
60704902	NGR033	4	GRA	DF	GRA					
60705001	UFRDF6	12	DF-SAG	DF	DF-SAG			OPEN DF		
60705900	NGR035	2	GRA	DF	GRA		C	OPEN DF		
60705900	NGR035	13	GRA	DF	GRA			OPEN DF		
60705901	NGR042	5	GRA	DF	GRA		C	OPEN DF		
60705905	NGR042	7	GRA	DF	GRA		C	OPEN DF		
60705907	NGR042	1	GRA	DF	GRA		C	OPEN DF		
60705907	NGR042	3	GRA	DF	GRA			OPEN DF		
60705908	NGRDF5	8	SAG-DF	DF	SAG	E	C	OPEN DF		
60705909	NGRDF6	7	DF-SAG	DF	DF-SAG		C	OPEN DF	OPEN DF	
60705909	NGRDF6	30	DF-SAG	DF	DF-SAG	E	C	OPEN DF	OPEN DF	
60705909	NGRDF6	3	DF-SAG	DF	DF-SAG	E	C			
60705910	NGR035	6	GRA	DF	GRA	E	C	OPEN DF		
60706900	NMR035	10	GRA	DF	GRA					
60706901	NGR035	4	GRA	DF	GRA					
74201019	NGR013	26	SAG	SAG	SAG			SAG/GRA	SAG/GRA	
74201019	NGR013	8	SAG	DF	SAG	E		OPEN DF	OPEN DF	
74201030	NGRDF5	17	SAG-DF	DF	SAG	E				
74201030	NGRDF5	34	SAG-DF	DF	SAG					
74201031	NGR013	58	SAG	SAG	SAG	E				SAG/GRA
74201031	NGR013	78	SAG	DF	SAG	ED		OPEN DF		OPEN DF
74201034	NGR033	11	GRA	GRA	GRA	ED				
74201035	NGR013	102	SAG	SAG	SAG	ED		SAG/GRA	SAG/GRA	
74201037	D3MDF4	5	DF-ASP	DF	DF-ASP	E		ASPEN	ASPEN	ASPEN
74201037	D3MDF4	7	DF-ASP	DF	DF-ASP	ED		ASPEN	ASPEN	ASPEN
74201038	NGR013	2	SAG	DF	SAG	E		OPEN DF	OPEN DF	
74201038	NGR013	4	SAG	DF	SAG	ED		OPEN DF	OPEN DF	
74201041	NGR013	34	SAG	DF	SAG	ED		OPEN DF		
74201042	S5WSF3	10	DF-ASP	DF	DF-ASP	ED		ASPEN	ASPEN	ASPEN
74201043	UHWQA3	21	ASP-DF	DF	ASP	ED		ASPEN	ASPEN	ASPEN
74201043	UHWQA3	1	ASP-DF	DF	ASP	ED				
74201044	D3LDF3	13	DF-ASP	DF	DF-ASP	ED		ASPEN	ASPEN	ASPEN
74201045	NGR013	23	SAG	DF	SAG	E		OPEN DF		
74201045	NGR013	25	SAG	DF	SAG	ED		OPEN DF		
74201045	NGR013	1	SAG	DF	SAG	ED				
74201046	D3MDF3	7	DF-ASP	DF	DF-ASP	E		ASPEN	ASPEN	ASPEN
74201046	D3MDF3	13	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
74201047	UFR042	24	GRA	DF	GRA					
74201052	USC042	8	GRA	DF	GRA					
74201056	NGR042	44	GRA	DF	GRA					
74201063	UFR042	10	GRA	DF	GRA					
74201064	NGR013	21	SAG	DF	SAG	ED		OPEN DF		
74201065	UHWDF4	4	DF-ASP	DF	DF-ASP	ED		ASPEN	ASPEN	ASPEN
74201067	NGR033	4	GRA	GRA	GRA	ED				
74201069	UFRDF5	6	SAG-DF	DF	SAG	E		OPEN DF	OPEN DF	
74201069	UFRDF5	6	SAG-DF	DF	SAG	ED		OPEN DF	OPEN DF	
74201070	NGR035	8	GRA	SAG	GRA	ED			SAG/GRA	
74201071	NGRDF5	4	SAG-DF	DF	SAG	E		OPEN DF	OPEN DF	
74201071	NGRDF5	6	SAG-DF	DF	SAG			OPEN DF	OPEN DF	
74201072	NGRDF5	16	SAG-DF	DF	SAG			OPEN DF	OPEN DF	
74201073	NGR042	12	GRA	DF	GRA					
74201074	NGRDF5	65	SAG-DF	DF	SAG	ED		OPEN DF	OPEN DF	OPEN DF

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74201075	NGR015	26	SAG	DF	SAG	ED		OPEN DF	OPEN DF	OPEN DF
74201076	NGR013	25	SAG	SAG	SAG	ED		SAG/GRA	SAG/GRA	SAG/GRA
74201077	NGR013	35	SAG	SAG	SAG	ED			SAG/GRA	SAG/GRA
74201078	NGRDF5	77	SAG-DF	DF	SAG	ED		OPEN DF	OPEN DF	OPEN DF
74201080	F4WDF3	2	DF-ASP	DF	DF-ASP	ED		ASPEN	ASPEN	ASPEN
74201080	F4WDF3	2	DF-ASP	DF	DF-ASP	ED				
74203020	NGR042	2	GRA	DF	GRA					
74203022	UFR042	15	GRA	DF	GRA					
74203024	UFR042	32	GRA	DF	GRA	E				
74203024	UFR042	37	GRA	DF	GRA					
74203028	UFRDF5	16	SAG-DF	DF	SAG	ED		OPEN DF		
74203028	UFRDF5	29	SAG-DF	DF	SAG	E		OPEN DF		
74204028	UFRDF6	3	DF-SAG	DF	DF-SAG	D		OPEN DF		
74204028	UFRDF6	5	DF-SAG	DF	DF-SAG			OPEN DF		
74204029	UFR042	10	GRA	DF	GRA	D				
74204031	UFRDF5	22	SAG-DF	DF	SAG			OPEN DF		
74204037	UFRDF6	12	DF-SAG	DF	DF-SAG		C	OPEN DF	OPEN DF	
74204042	UFRDF6	5	DF-SAG	DF	DF-SAG	D		OPEN DF	OPEN DF	
74204042	UFRDF6	7	DF-SAG	DF	DF-SAG	D	C	OPEN DF	OPEN DF	
74204042	UFRDF6	18	DF-SAG	DF	DF-SAG	D		OPEN DF	OPEN DF	
74204046	NBR012	1	SAG	DF	SAG	ED		OPEN DF	OPEN DF	
74204046	NBR012	8	SAG	DF	SAG	ED		OPEN DF	OPEN DF	
74204049	UFRDF5	12	SAG-DF	DF	SAG	ED		OPEN DF	OPEN DF	
74204051	UFRDF5	21	SAG-DF	DF	SAG	ED		OPEN DF	OPEN DF	
74204054	UFRDF5	23	SAG-DF	DF	SAG	ED				
74204054	UFRDF5	2	SAG-DF	DF	SAG	D	C	OPEN DF	OPEN DF	
74204061	UFRDF5	2	SAG-DF	DF	SAG	D	C	OPEN DF	OPEN DF	
74204061	UFRDF5	18	SAG-DF	DF	SAG	ED	C	OPEN DF	OPEN DF	
74204061	UFRDF5	21	SAG-DF	DF	GRA	D	C	OPEN DF	OPEN DF	
74204063	NGR042	4	GRA	DF	GRA	D		OPEN DF		
74204067	NGR042	1	GRA	DF	GRA	E				
74301031	NGR035	7	GRA	SAG	GRA					
74301031	NGR035	3	GRA	DF	SAG					
74301034	UFR013	2	SAG	DF	DF-ASP	D		ASPEN	ASPEN	
74302012	F3MDF3	3	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
74302012	F3MDF3	18	DF-ASP	DF	SAG	D				
74302032	NGRDF5	5	SAG-DF	DF	GRA					
74302036	UFR042	3	GRA	DF	GRA					
74302037	NGR042	2	GRA	DF	SAG	D	C	OPEN DF		
74302039	NGR013	1	SAG	DF	SAG	D		OPEN DF		
74302039	NGR013	4	SAG	DF	SAG	ED	C	OPEN DF		
74302039	NGR013	10	SAG	DF	DF-ASP	D		ASPEN	ASPEN	
74302040	D4MDF4	10	DF-ASP	DF	DF-ASP	ED	C	ASPEN	ASPEN	
74302041	D5MDF4	4	DF-ASP	DF	DF-ASP	ED	C			
74302041	D5MDF4	7	DF-ASP	DF	DF-ASP	ED	C	ASPEN	ASPEN	
74302043	D5MDF4	2	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
74302043	D5MDF4	2	DF-ASP	DF	DF-ASP	E		ASPEN	ASPEN	
74302043	D5MDF4	8	DF-ASP	DF	DF-ASP	D		ASPEN	ASPEN	
74302043	D5MDF4	22	DF-ASP	DF	DF-ASP	ED		ASPEN	ASPEN	
74302043	D5MDF4	29	DF-ASP	DF	DF-ASP	E				
74302043	D5MDF4	1	DF-ASP	DF	SAG	ED		OPEN DF		
74302044	NGRDF5	3	SAG-DF	DF	SAG	D		OPEN DF		
74302044	NGRDF5	8	SAG-DF	DF	SAG	E		OPEN DF		
74302044	NGRDF5	51	SAG-DF	DF	SAG			OPEN DF		
74302044	NGRDF5	61	SAG-DF	DF	DF L	E		OPEN DF		
74302045	D3MDF5	17	DF L	DF	DF L			OPEN DF		
74302045	D3MDF5	26	DF L	DF	GRA	ED		OPEN DF		
74302049	NGR033	9	GRA	DF	GRA					
74302049	NGR033	3	GRA	SAG	GRA	E				
74302049	NGR033	33	GRA	SAG	SAG	ED			SAG/GRA	SAG/GRA
74302051	NGR013	14	SAG	SAG	GRA					
74302052	UFR042	6	GRA	DF	SAG	ED				
74302058	NGR013	27	SAG	DF	SAG	ED	C	OPEN DF		
74302060	NGR013	4	SAG	DF	SAG	ED		SAG/GRA	SAG/GRA	SAG/GRA
74303001	NGR013	11	SAG	SAG	SAG	ED	C	SAG/GRA	SAG/GRA	SAG/GRA
74303001	NGR013	29	SAG	SAG	SAG	ED	C	OPEN DF	OPEN DF	OPEN DF
74303001	NGR013	16	SAG	DF	SAG	ED	C			

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74303001	NGR013	227	SAG	DF	SAG	ED		OPEN DF	OPEN DF	OPEN DF
74303001	NGR013	2	SAG	DF	SAG	ED				
74303002	UHWQA3	9	ASP-DF	DF	ASP	E		ASPEN	ASPEN	ASPEN
74303003	UFRDF4	7	DF-ASP	DF	DF-ASP	ED		ASPEN	ASPEN	ASPEN
74303003	UFRDF4	1	DF-ASP	DF	DF-ASP	ED				
74303004	UFRQA3	9	ASP-DF	DF	ASP	ED		ASPEN	ASPEN	ASPEN
74303004	UFRQA3	1	ASP-DF	DF	ASP	ED				
74303005	UECDF3	7	DF-ASP	DF	DF-ASP	ED		ASPEN	ASPEN	ASPEN
74303007	UHWQA3	7	ASP-DF	DF	ASP	ED	C	ASPEN	ASPEN	ASPEN
74303010	NGR013	11	SAG	SAG	SAG	ED	C	SAG/GRA	SAG/GRA	SAG/GRA
74303011	NGR013	4	SAG	SAG	SAG	ED		SAG/GRA	SAG/GRA	SAG/GRA
74303011	NGR013	46	SAG	SAG	SAG	ED	C	SAG/GRA	SAG/GRA	SAG/GRA
74303012	NGR013	58	SAG	SAG	SAG	ED		SAG/GRA	SAG/GRA	SAG/GRA
74303013	NGR013	10	SAG	SAG	SAG	E				
74303013	NGR013	15	SAG	SAG	SAG	ED				
74303014	NGR013	1	SAG	SAG	SAG					
74303014	NGR013	109	SAG	SAG	SAG	E				
74303015	NGR013	6	SAG	SAG	SAG	E		SAG/GRA	SAG/GRA	
74303015	NGR013	33	SAG	SAG	SAG	ED		SAG/GRA	SAG/GRA	
74401021	P3WLP4	48	LP-ASP	LP	LP-ASP	E		ASPEN	ASPEN	
74401032	NGR033	1	GRA	SAG	GRA	E		SAG/GRA	SAG/GRA	SAG/GRA
74401032	NGR033	5	GRA	SAG	GRA	ED		SAG/GRA	SAG/GRA	SAG/GRA
74401032	NGR033	9	GRA	DF	GRA	ED		OPEN DF		OPEN DF
74401032	NGR033	10	GRA	DF	GRA	E		OPEN DF		OPEN DF
74401032	NGR033	2	GRA	SAG	GRA	E				
74401032	NGR033	3	GRA	SAG	GRA	ED				
74401034	D4MDF4	17	DF-ASP	DF	DF-ASP	E		ASPEN	ASPEN	ASPEN
74401034	D4MDF4	1	DF-ASP	DF	DF-ASP	E				
74401035	UFRDF5	2	SAG-DF	DF	SAG	ED		OPEN DF	OPEN DF	OPEN DF
74401035	UFRDF5	10	SAG-DF	DF	SAG	ED	C	OPEN DF	OPEN DF	OPEN DF
74401037	NGR035	4	GRA	DF	GRA	ED	C	OPEN DF	OPEN DF	
74401039	UFRDF5	24	SAG-DF	DF	SAG	ED		OPEN DF		
74401040	NGR035	14	GRA	DF	GRA	ED		OPEN DF		
74401042	F3WDF3	4	DF-ASP	DF	DF-ASP	ED		ASPEN	ASPEN	ASPEN
74401042	F3WDF3	8	DF-ASP	DF	DF-ASP	ED				
74401043	NGR032	15	WGRA-ASP	WGRA	ASP-WGRA	ED		ASPEN	ASPEN	ASPEN
74401043	NGR032	3	WGRA-ASP	WGRA	ASP-WGRA	ED				
74401044	NMR032	5	WGRS-ASP	WGRA	WGRS-ASP	ED		ASPEN	ASPEN	ASPEN
74401048	NGR033	12	GRA	SAG	GRA	E		SAG/GRA	SAG/GRA	
74401049	UHWQA3	8	ASP-DF	DF	ASP	E		ASPEN	ASPEN	ASPEN
74401052	UFRDF5	5	SAG-DF	DF	SAG	E				
74401053	UFRDF5	9	SAG-DF	DF	SAG	E		OPEN DF		
74401054	NGR035	19	GRA	SAG	GRA					
74401054	NGR035	55	GRA	SAG	GRA	ED				
74401054	NGR035	234	GRA	SAG	GRA	E				
74401087	NGRDF5	18	SAG-DF	DF	SAG	ED	C	OPEN DF	OPEN DF	OPEN DF
74401087	NGRDF5	47	SAG-DF	DF	SAG	ED		OPEN DF	OPEN DF	OPEN DF
74401087	NGRDF5	2	SAG-DF	DF	SAG	ED		OPEN DF		OPEN DF
74401087	NGRDF5	1	SAG-DF	DF	SAG	ED	C	OPEN DF	OPEN DF	
74401087	NGRDF5	2	SAG-DF	DF	SAG	ED				
74401088	NGR012	5	SAG	SAG	SAG	ED	C	SAG/GRA	SAG/GRA	SAG/GRA
74401088	NGR012	42	SAG	SAG	SAG	ED		SAG/GRA	SAG/GRA	SAG/GRA
74401089	NGR013	46	SAG	SAG	SAG	ED		SAG/GRA	SAG/GRA	SAG/GRA
74401089	NGR013	1	SAG	SAG	SAG	E		SAG/GRA	SAG/GRA	
74401090	UFRDF5	1	SAG-DF	DF	SAG	ED		OPEN DF	OPEN DF	OPEN DF
74401090	UFRDF5	12	SAG-DF	DF	SAG	ED		OPEN DF		OPEN DF
74401090	UFRDF5	4	SAG-DF	DF	SAG	ED				
74401091	NGR033	49	GRA	SAG	GRA	E		SAG/GRA	SAG/GRA	
74401092	NGR013	61	SAG	DF	SAG	E		OPEN DF		
74401098	NGR013	2	SAG	SAG	SAG	E				
74401098	NGR013	5	SAG	SAG	SAG	ED				
74402010	F3MDF4	33	DF-ASP	DF	DF-ASP	E		ASPEN	ASPEN	ASPEN
74402010	F3MDF4	3	DF-ASP	DF	DF-ASP	E				
74402011	F3MDF4	45	DF-ASP	DF	DF-ASP	E		ASPEN	ASPEN	ASPEN
74402029	UFRQA3	18	ASP-DF	DF	ASP	E		ASPEN	ASPEN	ASPEN
74402029	UFRQA3	1	ASP-DF	DF	ASP	E				
74402038	UFR042	7	GRA	DF	GRA	E				

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74402040	NGRDF5	9	SAG-DF	DF	SAG					
74402042	UFRDF3	81	DF-ASP	DF	DF-ASP	E		ASPEN	ASPEN	ASPEN
74402042	UFRDF3	14	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
74402042	UFRDF3	2	DF-ASP	DF	DF-ASP	E				
74402043	UFRDF5	10	SAG-DF	DF	SAG			OPEN DF		
74402043	UFRDF5	10	SAG-DF	DF	SAG	E		OPEN DF		
74402044	NGRDF5	46	SAG-DF	DF	SAG	E		OPEN DF		
74402051	NGR042	7	GRA	DF	GRA					
74402051	NGR042	10	GRA	DF	GRA	E				
74402052	NGR042	7	GRA	DF	GRA					
74402055	NGR042	7	GRA	DF	GRA					
74402056	NGR033	20	GRA	GRA	GRA					
74402056	NGR033	27	GRA	GRA	GRA	E				
74402057	UFR042	4	GRA	DF	GRA					
74402061	NGR042	6	GRA	DF	GRA					
74402062	UFRDF5	20	SAG-DF	DF	SAG					
74402063	NGRDF5	4	SAG-DF	DF	SAG					
74402068	UFRDF5	4	SAG-DF	DF	SAG	E				
74402069	NGR042	4	GRA	DF	GRA					
74402070	UFRDF5	9	SAG-DF	DF	SAG	E				
74402073	NGR035	15	GRA	GRA	GRA	E				
74402075	NGR035	114	GRA	GRA	GRA					
74402083	UFRDF5	20	SAG-DF	DF	SAG					
74402088	NGR042	7	GRA	DF	GRA					
74402118	NGR035	2	GRA	GRA	GRA					
74402119	NGR042	1	GRA	DF	GRA					
74403020	NGR042	2	GRA	DF	GRA					
74403022	NGRDF5	66	SAG-DF	DF	SAG					
74403038	NGR042	1	GRA	DF	GRA					
74403039	NGR035	14	GRA	GRA	GRA					
74403041	NGRDF5	3	SAG-DF	DF	SAG					
74403042	NGRDF5	8	SAG-DF	DF	SAG					
74403045	NGRDF5	5	SAG-DF	DF	SAG					
74404026	UFRDF5	47	SAG-DF	DF	SAG	ED		OPEN DF		
74404026	UFRDF5	1	SAG-DF	DF	SAG	ED				
74404029	NGR035	1	GRA	SAG	GRA					
74404029	NGR035	73	GRA	SAG	GRA					
74404037	NGRDF5	5	SAG-DF	DF	SAG	E				
74404037	NGRDF5	42	SAG-DF	DF	SAG					
74404040	UFRDF5	7	SAG-DF	DF	SAG			OPEN DF		
74404040	UFRDF5	28	SAG-DF	DF	SAG	E		OPEN DF		
74404041	UECDF4	1	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
74404041	UECDF4	30	DF-ASP	DF	DF-ASP	E		ASPEN	ASPEN	ASPEN
74404042	UFRDF5	18	SAG-DF	DF	SAG	E		OPEN DF		
74404044	UFRDF4	20	DF-ASP	DF	DF-ASP	E		ASPEN	ASPEN	ASPEN
74404046	UFRDF5	8	SAG-DF	DF	SAG	E		OPEN DF		
74404047	NGR013	150	SAG	SAG	SAG	E		SAG/GRA	SAG/GRA	SAG/GRA
74404047	NGR013	23	SAG	DF	SAG	ED		OPEN DF		
74404051	UFRDF6	20	DF-SAG	DF	DF-SAG	E		OPEN DF	OPEN DF	OPEN DF
74404051	UFRDF6	62	DF-SAG	DF	DF-SAG	ED		OPEN DF	OPEN DF	OPEN DF
74404056	UFR033	1	GRA	DF	GRA	D		OPEN DF		
74404056	UFR033	20	GRA	DF	GRA	ED		OPEN DF		
74404057	UFRDF5	5	SAG-DF	DF	SAG	D				
74404058	UFRDF5	16	SAG-DF	DF	SAG	D		OPEN DF		
74404058	UFRDF5	17	SAG-DF	DF	SAG	ED		OPEN DF		
74404058	UFRDF5	8	SAG-DF	DF	SAG	ED				
74404061	NGRDF5	10	SAG-DF	DF	SAG	D				
74404065	NGRDF5	15	SAG-DF	DF	SAG					
74404068	NGR013	1	SAG	DF	SAG			OPEN DF		
74404068	NGR013	3	SAG	DF	SAG	E		OPEN DF		
74404068	NGR013	44	SAG	DF	SAG	ED		OPEN DF		
74404069	UFRDF5	26	SAG-DF	DF	SAG	ED		OPEN DF	OPEN DF	OPEN DF
74404070	NGRDF5	33	SAG-DF	DF	SAG	ED		OPEN DF	OPEN DF	OPEN DF
74404070	NGRDF5	1	SAG-DF	DF	SAG	ED		OPEN DF	OPEN DF	
74404072	NGR013	68	SAG	SAG	SAG	ED		SAG/GRA	SAG/GRA	
74404074	NGR033	5	GRA	DF	GRA	ED		OPEN DF	OPEN DF	
74404075	NGRDF5	12	SAG-DF	DF	SAG	ED		OPEN DF		

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74404076	NGRDF5	55	SAG-DF	DF	SAG	E		OPEN DF	OPEN DF	OPEN DF
74404076	NGRDF5	1	SAG-DF	DF	SAG	ED		OPEN DF	OPEN DF	
74404077	NGR033	11	GRA	DF	GRA	ED		OPEN DF	OPEN DF	OPEN DF
74404077	NGR033	45	GRA	DF	GRA	ED				
74404079	NGR033	8	GRA	DF	GRA	E		OPEN DF		
74404080	NGRDF5	23	SAG-DF	DF	SAG					
74404081	NGR013	51	SAG	SAG	SAG					
74501067	NGR035	34	SAG	SAG	SAG	E				
74501070	NGR042	3	GRA	DF	GRA					
74501071	NGRDF5	11	SAG-DF	DF	SAG					
74501074	L3WLP3	16	DF-ASP	LP	DF-ASP					
74501075	NGR035	19	GRA	SAG	GRA					
74501081	NGR042	3	GRA	DF	GRA					
74501086	NGR013	37	SAG	DF	SAG					
74501100	NGR035	8	GRA	GRA	GRA	E				
74501100	NGR035	124	GRA	GRA	GRA					
74501102	UFRDF5	28	SAG-DF	DF	SAG	E				
74501103	F3WDF3	14	DF-ASP	DF	DF-ASP	E				
74501104	F3WLP3	8	DF-ASP	DF	DF-ASP	E				
74501109	NGR035	11	GRA	DF	GRA	ED				
74501114	NGRDF5	2	SAG-DF	DF	SAG	E				
74501114	NGRDF5	5	SAG-DF	DF	SAG	ED				
74501115	UFRDF4	1	DF-ASP	DF	DF-ASP	ED				
74501115	UFRDF4	30	DF-ASP	DF	DF-ASP	E				
74501121	NGRDF5	4	SAG-DF	DF	SAG	ED		OPEN DF		
74501123	UFRDF5	24	SAG-DF	DF	SAG	ED		OPEN DF		
74501125	NGRDF5	30	SAG-DF	DF	SAG	ED		OPEN DF		
74501134	UFRDF5	44	SAG-DF	DF	SAG	ED		OPEN DF		
74501135	NGRDF5	11	SAG-DF	DF	SAG	ED		OPEN DF		
74501137	NGR033	3	GRA	DF	GRA	ED		OPEN DF		
74501139	UFRDF5	39	SAG-DF	DF	SAG	ED		OPEN DF		
74501140	NGRDF5	52	SAG-DF	DF	SAG	ED		OPEN DF		
74501144	NGR035	18	GRA	DF	GRA	ED		OPEN DF		
74501147	NGRDF5	4	SAG-DF	DF	SAG	E				
74501147	NGRDF5	72	SAG-DF	DF	SAG	ED				
74501148	NGRPF5	18	SAG-PF	DF	SAG	E				
74501149	NGR035	58	GRA	SAG	GRA					
74501149	NGR035	81	GRA	SAG	GRA	E				
74501151	NGR013	34	SAG	DF	SAG					
74501152	NGR035	19	GRA	GRA	GRA	E				
74501152	NGR035	48	GRA	SAG	GRA					
74501153	NGRDF5	7	SAG-DF	DF	SAG	E				
74501153	NGRDF5	11	SAG-DF	DF	SAG					
74501154	NGR035	8	GRA	GRA	GRA					
74501154	NGR035	46	GRA	SAG	GRA	E				
74501155	NGRDF5	17	SAG-DF	DF	SAG	E				
74501156	NGRDF5	42	SAG-DF	DF	SAG	E				
74501157	NGR033	53	GRA	SAG	GRA	E				
74501159	UFRDF6	10	DF-SAG	DF	DF-SAG	E				
74502013	UECDF4	37	DF-ASP	DF	DF-ASP	D				
74502013	UECDF4	115	DF-ASP	DF	DF-ASP					
74502014	P3WLP2	6	LP-ASP	LP	LP-ASP	D				
74502014	P3WLP2	49	LP-ASP	LP	LP-ASP					
74502015	NGR035	33	GRA	SAG	GRA					
74502016	NGR035	21	GRA	SAG	GRA					
74502017	UECDF4	15	DF-ASP	DF	DF-ASP					
74502018	NGRDF5	13	SAG-DF	DF	SAG	D				
74502018	NGRDF5	26	SAG-DF	DF	SAG					
74502019	UFRDF5	14	SAG-DF	DF	SAG	D				
74502020	NGR035	54	SAG	SAG	SAG	E			SAG/GRA	
74502020	NGR035	172	SAG	SAG	SAG				SAG/GRA	
74502020	NGR035	1	GRA	DF	GRA	ED				
74502020	NGR035	3	GRA	DF	GRA					
74502020	NGR035	13	GRA	DF	GRA	D				
74502021	NGR033	32	GRA	DF	GRA	D				
74502023	NGR035	6	GRA	SAG	GRA					
74503001	NGR035	106	SAG	SAG	SAG					

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74503001	NGR035	16	GRA	DF	GRA	E				
74503003	P3WLP3	12	LP-ASP	LP	LP-ASP					
74503004	UECLP2	12	LP-ASP	LP	LP-ASP	E				
74503004	UECLP2	12	LP-ASP	LP	LP-ASP	ED				
74503004	UECLP2	17	LP-ASP	LP	LP-ASP					
74503004	UECLP2	37	LP-ASP	LP	LP-ASP	D				
74503009	UFRDF5	23	SAG-DF	DF	SAG	D				
74503011	NGRDF5	10	SAG-DF	DF	SAG	ED				
74503012	NGR035	35	GRA	DF	GRA	ED				
74503013	NGR042	1	GRA	DF	GRA	ED				
74503015	UECDF3	19	DF-ASP	DF	DF-ASP	ED				
74503016	UFRDF5	6	SAG-DF	DF	SAG	E				
74503016	UFRDF5	6	SAG-DF	DF	SAG	ED				
74503017	UFRDF4	1	DF-ASP	DF	DF-ASP	ED				
74503017	UFRDF4	12	DF-ASP	DF	DF-ASP	E				
74503018	NGRDF5	7	SAG-DF	DF	SAG	E				
74503019	UECDF2	6	DF-ASP	DF	DF-ASP	E				
74503020	NGRDF5	4	SAG-DF	DF	SAG					
74503020	NGRDF5	13	SAG-DF	DF	SAG	E				
74503020	NGRDF5	16	SAG-DF	DF	SAG	ED				
74503023	NGR013	6	SAG	SAG	SAG					
74503023	NGR013	36	SAG	SAG	SAG	E				
74503024	F4WDF3	4	DF-ASP	DF	DF-ASP	ED				
74503024	F4WDF3	8	DF-ASP	DF	DF-ASP	E				
74503028	NGRDF5	7	SAG-DF	DF	SAG	ED				
74503030	NGR033	6	GRA	DF	GRA	E				
74503030	NGR033	43	GRA	DF	GRA					
74503030	NGR033	2	GRA	GRA	GRA					
74504008	NGRDF5	37	SAG-DF	DF	SAG			OPEN DF		
74504015	P3WLP2	1	LP-ASP	LP	LP-ASP	D		ASPEN	ASPEN	ASPEN
74504015	P3WLP2	13	LP-ASP	LP	LP-ASP			ASPEN	ASPEN	ASPEN
74504015	P3WLP2	6	LP-ASP	LP	LP-ASP					
74504016	NGR035	7	GRA	DF	GRA			OPEN DF		
74504016	NGR035	18	GRA	DF	GRA	D		OPEN DF		
74504017	UFRDF5	28	SAG-DF	DF	SAG			OPEN DF		
74504017	UFRDF5	2	SAG-DF	DF	SAG					
74504018	UECDF3	35	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
74504018	UECDF3	1	DF-ASP	DF	DF-ASP					
74504019	F3WDF4	37	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
74504019	F3WDF4	8	DF-ASP	DF	DF-ASP					
74504020	NGR013	97	SAG	DF	SAG			OPEN DF	OPEN DF	
74504020	NGR013	9	SAG	DF	SAG					
74504021	UFRDF5	17	SAG-DF	DF	SAG			OPEN DF	OPEN DF	
74504022	NGRDF5	5	SAG-DF	DF	SAG			OPEN DF	OPEN DF	
74504022	NGRDF5	1	SAG-DF	DF	SAG					
74504024	UHWQA2	22	ASP	DF	ASP			ASPEN	ASPEN	ASPEN
74504024	UHWQA2	1	ASP	DF	ASP					
74504025	UFRDF4	37	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
74504028	UECDF4	59	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
74504030	UFRDF5	14	SAG-DF	DF	SAG			OPEN DF		
74504030	UFRDF5	2	SAG-DF	DF	SAG					
74505007	NGRDF5	28	SAG-DF	DF	SAG			OPEN DF	OPEN DF	OPEN DF
74505007	NGRDF5	1	SAG-DF	DF	SAG			OPEN DF	OPEN DF	
74505011	NGRDF5	11	SAG-DF	DF	SAG			OPEN DF		
74505011	NGRDF5	2	SAG-DF	DF	SAG					
74505012	NGRDF5	21	SAG-DF	DF	SAG			OPEN DF		
74505018	L2WLP1	39	DF-ASP	LP	DF-ASP			ASPEN	ASPEN	ASPEN
74505018	L2WLP1	1	DF-ASP	LP	DF-ASP					
74505022	NGR035	14	GRA	SAG	GRA			SAG/GRA	SAG/GRA	
74505023	P3WLP2	13	LP-ASP	LP	LP-ASP			ASPEN	ASPEN	ASPEN
74505025	NGR033	27	GRA	SAG	GRA			SAG/GRA	SAG/GRA	SAG/GRA
74505027	UHWQA2	28	ASP	DF	ASP			ASPEN	ASPEN	ASPEN
74505027	UHWQA2	6	ASP	DF	ASP					
74505028	NGR035	12	GRA	DF	GRA			OPEN DF	OPEN DF	
74505033	NGRDF5	21	SAG-DF	DF	SAG			OPEN DF		
74505034	NGRDF5	67	SAG-DF	DF	SAG			OPEN DF	OPEN DF	
74505034	NGRDF5	1	SAG-DF	DF	SAG			OPEN DF		

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74506001	UFRDF3	19	DF-ASP	DF	DF-ASP	D		ASPEN	ASPEN	ASPEN
74506001	UFRDF3	24	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	ASPEN
74506001	UFRDF3	2	DF-ASP	DF	DF-ASP	D				
74506004	NGR013	86	SAG	SAG	SAG			SAG/GRA	SAG/GRA	
74506007	P3WDF2	16	LP-ASP	LP	LP-ASP			ASPEN	ASPEN	ASPEN
74506009	UFRDF5	1	SAG-DF	DF	SAG	D		OPEN DF		
74506009	UFRDF5	53	SAG-DF	DF	SAG			OPEN DF		
74506010	NGR033	71	GRA	SAG	GRA			SAG/GRA	SAG/GRA	
74506010	NGR033	3	GRA	SAG	GRA					
74506011	S4WSF3	2	DF-ASP	DF	DF-ASP					
74506013	P3MLP4	7	LP-ASP	LP	LP-ASP			ASPEN	ASPEN	
74506013	P3MLP4	2	LP-ASP	LP	LP-ASP					
74506014	UFRDF4	4	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
74506015	UECDF3	2	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
74506016	S4WSF3	1	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
74506016	S4WSF3	5	DF-ASP	DF	DF-ASP					
74506023	NGRDF5	36	SAG-DF	DF	SAG			OPEN DF		
74506024	NGR013	30	SAG	DF	SAG			OPEN DF		
74506024	NGR013	10	SAG	DF	SAG					
74506025	NGRDF5	58	SAG-DF	DF	SAG			OPEN DF		
74506026	NGR013	75	SAG	SAG	SAG			SAG/GRA	SAG/GRA	
74506026	NGR013	7	SAG	DF	SAG					
74506026	NGR013	8	SAG	SAG	SAG					
74506027	NGRDF5	1	SAG-DF	DF	SAG	D		OPEN DF		
74506027	NGRDF5	152	SAG-DF	DF	SAG			OPEN DF		
74506027	NGRDF5	2	SAG-DF	DF	SAG					
74506028	NGR035	109	GRA	SAG	GRA			SAG/GRA	SAG/GRA	
74506029	NGR013	116	SAG	DF	SAG			OPEN DF	OPEN DF	OPEN DF
74506030	NGRDF5	65	SAG-DF	DF	SAG			OPEN DF	OPEN DF	OPEN DF
74506030	NGRDF5	5	SAG-DF	DF	SAG			OPEN DF	OPEN DF	
74506030	NGRDF5	8	SAG-DF	DF	SAG					
74506031	NGR035	12	GRA	SAG	GRA			SAG/GRA	SAG/GRA	SAG/GRA
74506032	NGR033	16	GRA	SAG	GRA			SAG/GRA	SAG/GRA	
74506033	NGR013	46	SAG	DF	SAG			OPEN DF	OPEN DF	OPEN DF
74506033	NGR013	1	SAG	DF	SAG					
74507019	NGR035	35	GRA	GRA	GRA					
74507022	NGRDF5	18	SAG-DF	DF	SAG					
74507024	NGR042	12	GRA	DF	GRA					
74507027	NGR042	10	GRA	DF	GRA					
74508062	P3WLP3	26	LP-ASP	LP	LP-ASP					
74508062	P3WLP3	33	LP-ASP	LP	LP-ASP	D				
74508066	NGR035	4	GRA	SAG	GRA					
74508067	NGR035	2	GRA	SAG	GRA					
74508068	NGR042	10	GRA	DF	GRA					
74508070	NGR042	10	GRA	DF	GRA					
74508073	NGR042	6	GRA	DF	GRA					
74508074	NGR042	36	GRA	DF	GRA					
74508077	NGR035	6	GRA	GRA	GRA					
74508081	NGR035	5	GRA	DF	GRA	D				
74508081	NGR035	26	GRA	SAG	GRA					
74508083	NGR033	11	GRA	DF	GRA	D				
74508084	NGR042	5	GRA	DF	GRA					
74509061	NGR042	3	GRA	DF	GRA	ED				
74509078	UFRDF5	11	SAG-DF	DF	SAG					
74509082	NGR042	6	GRA	DF	GRA	E				
74601006	NGR042	7	GRA	DF	GRA					
74601010	NGR033	14	GRA	GRA	GRA					
74602001	UFRSF5	62	SP-ASP	SF	SP-ASP			ASPEN	ASPEN	
74602006	UHWQA1	16	ASP	DF	ASP			ASPEN	ASPEN	
74602007	UECDF3	16	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
74602017	UFRDF5	22	SAG-DF	DF	SAG			OPEN DF		
74602020	UFRLP2	3	LP-ASP	LP	LP-ASP					
74602021	UFRDF6	8	DF-SAG	DF	DF-SAG			OPEN DF		
74602022	NGR013	46	SAG	DF	SAG			OPEN DF		
74602022	NGR013	3	SAG	DF	SAG					
74602023	NGR035	107	GRA	DF	GRA			OPEN DF		
74602023	NGR035	1	GRA	DF	GRA					

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74603027	P3WLP2	88	LP-ASP	LP	LP-ASP			ASPEN	ASPEN	
74603027	P3WLP2	5	LP-ASP	LP	LP-ASP					
74603031	UFRDF5	37	SAG-DF	DF	SAG			OPEN DF		
74603031	UFRDF5	2	SAG-DF	DF	SAG					
74603032	F4MDF4	5	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
74604033	UFRDF5	45	SAG-DF	DF	SAG			OPEN DF		
74605020	NGR042	2	GRA	GRA	GRA					
74701004	NGR035	4	GRA	GRA	GRA	E				
74701009	UFRDF6	18	DF-SAG	DF	DF-SAG			OPEN DF		
74701010	NGR013	1	SAG	SAG	SAG	E		SAG/GRA	SAG/GRA	
74701010	NGR013	102	SAG	SAG	SAG			SAG/GRA	SAG/GRA	
74701010	NGR013	4	SAG	SAG	SAG					
74701011	UHWQA1	12	ASP	DF	ASP			ASPEN	ASPEN	
74701011	UHWQA1	1	ASP	DF	ASP					
74701044	NGR012	29	SAG	DF	SAG			OPEN DF		
74701045	NGR013	1	SAG	DF	SAG	E		OPEN DF		
74701045	NGR013	20	SAG	DF	SAG			OPEN DF		
74701045	NGR013	1	SAG	DF	SAG	E				
74701045	NGR013	4	SAG	DF	SAG					
74701046	NGR012	1	SAG	DF	SAG			OPEN DF		
74701046	NGR012	8	SAG	DF	SAG	E		OPEN DF		
74701046	NGR012	2	SAG	DF	SAG	E				
74701047	NGR012	18	SAG	SAG	SAG			SAG/GRA	SAG/GRA	
74701047	NGR012	18	SAG	SAG	SAG	E		SAG/GRA	SAG/GRA	
74701047	NGR012	2	SAG	SAG	SAG					
74701047	NGR012	2	SAG	SAG	SAG	E				
74701048	NGR033	13	GRA	GRA	GRA					
74701049	NGR034	49	SAG	SAG	SAG					
74701050	NGR012	1	SAG	SAG	SAG			SAG/GRA	SAG/GRA	
74701050	NGR012	37	SAG	SAG	SAG	E		SAG/GRA	SAG/GRA	
74701050	NGR012	2	SAG	SAG	SAG	E				
74701051	NGR013	8	SAG	SAG	SAG	E		SAG/GRA	SAG/GRA	
74701052	NGR013	26	SAG	DF	SAG	E		OPEN DF		
74701052	NGR013	36	SAG	DF	SAG			OPEN DF		
74701052	NGR013	1	SAG	SAG	SAG					
74702004	L3WLP3	45	DF-ASP	LP	DF-ASP			ASPEN	ASPEN	
74702005	L3WLP3	26	DF-ASP	LP	DF-ASP			ASPEN	ASPEN	
74702044	UECWB3	63	WBP-ASP	WBP	WBP-ASP					
74702045	UECWB5	15	WBP-ASP	WBP	WBP-ASP					
74702071	P3SLP2	15	LP-ASP	LP	LP-ASP	E		ASPEN	ASPEN	
74702072	NGR012	11	SAG	SAG	SAG			SAG/GRA	SAG/GRA	
74702073	UHWQA2	2	ASP	DF	ASP	E		ASPEN	ASPEN	
74702075	P3SLP2	6	LP-ASP	LP	LP-ASP	E		ASPEN	ASPEN	
74702075	P3SLP2	2	LP-ASP	LP	LP-ASP	E				
74702076	NGR042	7	GRA	DF	GRA	E		OPEN DF		
74702076	NGR042	3	GRA	DF	GRA	E				
74702088	NGR042	6	GRA	DF	GRA			OPEN DF		
74702089	NGRDF5	10	SAG-DF	DF	SAG			OPEN DF		
74702090	UFRLP2	3	LP-ASP	LP	LP-ASP	E		ASPEN	ASPEN	
74702090	UFRLP2	11	LP-ASP	LP	LP-ASP			ASPEN	ASPEN	
74702092	P3WLP2	7	LP-ASP	LP	LP-ASP			ASPEN	ASPEN	
74702093	UFRDF6	14	DF-SAG	DF	DF-SAG			OPEN DF		
74702094	P3WLP2	69	LP-ASP	LP	LP-ASP			ASPEN	ASPEN	
74702095	F3MDF3	44	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
74702095	F3MDF3	3	DF-ASP	DF	DF-ASP					
74702096	UFRDF6	17	DF-SAG	DF	DF-SAG			OPEN DF		
74702097	UHWQA2	6	ASP	DF	ASP			ASPEN	ASPEN	
74702098	NGR013	69	SAG	DF	SAG			OPEN DF		
74702098	NGR013	10	SAG	DF	SAG					
74702099	UFRDF3	11	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
74702099	UFRDF3	12	DF-ASP	DF	DF-ASP	D		ASPEN	ASPEN	
74702100	NGR012	26	SAG	DF	SAG			OPEN DF		
74702102	UHWQA1	8	ASP	DF	ASP			ASPEN	ASPEN	
74702102	UHWQA1	11	ASP	DF	ASP	D		ASPEN	ASPEN	
74702103	NGR012	9	SAG	DF	SAG	D		OPEN DF		
74702106	F3WDF3	4	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
74702107	F3WDF2	3	DF-ASP	DF	DF-ASP	D		ASPEN	ASPEN	

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74702108	P3WLP2	10	LP-ASP	LP	LP-ASP	D		ASPEN	ASPEN	
74702109	UFRDF6	18	DF-SAG	DF	DF-SAG	D		OPEN DF	OPEN DF	
74702110	NGR012	44	SAG	DF	SAG	D		OPEN DF	OPEN DF	
74702110	NGR012	3	SAG	DF	SAG	D		OPEN DF		
74702110	NGR012	9	SAG	DF	SAG	D				
74702111	UFRDF3	14	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
74702111	UFRDF3	40	DF-ASP	DF	DF-ASP	D		ASPEN	ASPEN	
74702111	UFRDF3	2	DF-ASP	DF	DF-ASP					
74702111	UFRDF3	4	DF-ASP	DF	DF-ASP	D				
74702112	NGR042	6	GRA	DF	GRA	E				
74702113	NGR033	13	GRA	SAG	GRA			SAG/GRA		
74702114	NGRDF5	13	SAG-DF	DF	SAG			OPEN DF		
74702115	NGR013	17	SAG	DF	SAG	E		OPEN DF		
74702115	NGR013	39	SAG	DF	SAG			OPEN DF		
74702116	NGR035	3	GRA	SAG	GRA	D		SAG/GRA	SAG/GRA	
74702116	NGR035	32	GRA	SAG	GRA			SAG/GRA	SAG/GRA	
74702116	NGR035	1	GRA	SAG	GRA	D		SAG/GRA		
74702116	NGR035	1	GRA	SAG	GRA	D				
74702117	NGR033	7	GRA	DF	GRA	D		OPEN DF		
74702117	NGR033	13	GRA	DF	GRA			OPEN DF		
74702117	NGR033	2	GRA	DF	GRA	D				
74702118	NGR012	22	SAG	SAG	SAG	E				
74702119	NGR033	5	GRA	SAG	GRA	E		SAG/GRA	SAG/GRA	
74702119	NGR033	1	GRA	DF	GRA	E		OPEN DF		
74702119	NGR033	12	GRA	SAG	GRA	E				
74702125	UHWQA3	41	ASP-DF	DF	ASP	D		ASPEN	ASPEN	
74702126	NGR035	5	GRA	SAG	GRA			SAG/GRA	SAG/GRA	
74702126	NGR035	20	GRA	SAG	GRA	E		SAG/GRA	SAG/GRA	
74702126	NGR035	1	GRA	SAG	GRA					
74702126	NGR035	5	GRA	SAG	GRA	E				
74703003	L2SLP1	20	DF-ASP	LP	DF-ASP			ASPEN	ASPEN	
74703003	L2SLP1	2	DF-ASP	LP	DF-ASP					
74703009	NGR042	25	GRA	DF	GRA			OPEN DF		
74704024	NGRDF5	37	SAG-DF	DF	SAG					
74704026	NGR035	4	GRA	GRA	GRA					
74704028	UFRDF5	3	SAG-DF	DF	SAG					
74704032	S4MSF3	3	DF-ASP	DF	DF-ASP			ASPEN	ASPEN	
74704033	NBR011	3	SHRUB-ASP	SHRUB	ASP-SHRUB			ASPEN	ASPEN	
74704035	NBR011	1	SHRUB-ASP	SHRUB	ASP-SHRUB			ASPEN	ASPEN	
74704036	NBR011	11	SHRUB-ASP	SHRUB	ASP-SHRUB			ASPEN	ASPEN	
74704036	NBR011	1	SHRUB-ASP	SHRUB	ASP-SHRUB					
74705007	D4LDF6	10	DF L	DF	DF L	D		OPEN DF		
74705007	D4LDF6	24	DF L	DF	DF L			OPEN DF		
74705008	UFR042	7	GRA	DF	GRA	D		OPEN DF		
74705009	NMR011	2	SHRUB-ASP	SHRUB	ASP-SHRUB	D				
74705011	NGR042	11	GRA	DF	GRA					
74705013	NGR012	18	SAG	DF	SAG					
74705016	UREDF4	21	DF-ASP	DF	DF-ASP	D				
74705016	UREDF4	44	DF-ASP	DF	DF-ASP					
74705018	UFRDF6	10	DF-SAG	DF	DF-SAG	D				
74705019	NGR033	46	GRA	SAG	GRA	D				
74705021	UFRDF6	9	DF-SAG	DF	DF-SAG	D				
74705024	UFRDF6	5	DF-SAG	DF	DF-SAG	D				
74705025	NGR012	15	SAG	SAG	SAG	ED				
74705025	NGR012	27	SAG	SAG	SAG	D				
74705027	UFRDF6	13	DF-SAG	DF	DF-SAG	ED				
74705028	NGR042	3	GRA	DF	GRA	E				
74705028	NGR042	4	GRA	DF	GRA	ED				
74705029	D3WDF3	10	DF-ASP	DF	DF-ASP	ED				
74705029	D3WDF3	19	DF-ASP	DF	DF-ASP	E				
74705030	UFRDF6	3	DF-SAG	DF	DF-SAG	ED				
74705030	UFRDF6	3	DF-SAG	DF	DF-SAG	E				
74705031	UREDF3	4	DF-ASP	DF	DF-ASP					
74705031	UREDF3	44	DF-ASP	DF	DF-ASP	E				
74705035	NGR042	4	GRA	DF	GRA					
74705036	NGR012	9	SAG	DF	SAG	E				
74705039	F3WDF2	26	DF-ASP	DF	DF-ASP	E				

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74705041	NGR012	9	SAG	SAG	SAG	ED				
74705041	NGR012	48	SAG	SAG	SAG	E				
74705044	URE011	5	SHRUB-ASP	SHRUB	ASP-SHRUB	E				
74705044	URE011	6	SHRUB-ASP	SHRUB	ASP-SHRUB	ED				
74705046	NGR042	1	GRA	DF	GRA	E				
74705047	UREDF2	6	DF-ASP	DF	DF-ASP					
74705047	UREDF2	8	DF-ASP	DF	DF-ASP	E				
74705048	UFRDF6	6	DF-SAG	DF	DF-SAG	E				
74705050	NGR035	3	GRA	DF	GRA					
74705050	NGR035	6	GRA	DF	GRA	E				
74705050	NGR035	35	GRA	GRA	GRA	E				
74705050	NGR035	110	GRA	GRA	GRA					
74705051	F4LDF3	2	DF-ASP	DF	DF-ASP					
74705051	F4LDF3	3	DF-ASP	DF	DF-ASP	E				
74705053	UFRDF5	5	SAG-DF	DF	SAG	E				
74705056	UFR042	2	GRA	DF	GRA	E				
74705057	UREDF3	2	DF-ASP	DF	DF-ASP					
74705057	UREDF3	18	DF-ASP	DF	DF-ASP	E				
74705058	NGRDF6	1	DF-SAG	DF	DF-SAG	E				
74705058	NGRDF6	19	DF-SAG	DF	DF-SAG					
74705060	NGR035	27	GRA	GRA	GRA					
74705062	P2SLP1	8	LP-ASP	LP	LP-ASP					
74705065	L4WLP4	31	DF-ASP	LP	DF-ASP					
74705066	NGR042	11	GRA	DF	GRA					
74705069	F4WDF3	12	DF-ASP	DF	DF-ASP					
74705071	NGR012	20	SAG	SAG	SAG					
74705072	NBR011	2	SHRUB-ASP	SHRUB	ASP-SHRUB					
74705073	NGR033	38	GRA	GRA	GRA					
74705074	NGR035	28	GRA	GRA	GRA					
74705075	NGR012	56	SAG	DF	SAG					
74705076	NGR013	1	SAG	SAG	SAG	ED				
74705076	NGR013	15	SAG	SAG	SAG	E				
74705076	NGR013	18	SAG	DF	SAG	ED				
74705077	NGR012	7	SAG	SAG	SAG	E				
74705078	NGR012	4	SAG	SAG	SAG	E				
74705078	NGR012	13	SAG	SAG	SAG	ED				
74705079	NBR011	3	SHRUB-ASP	SHRUB	ASP-SHRUB	ED				
74705080	NGR013	61	SAG	SAG	SAG	ED				

APPENDIX E

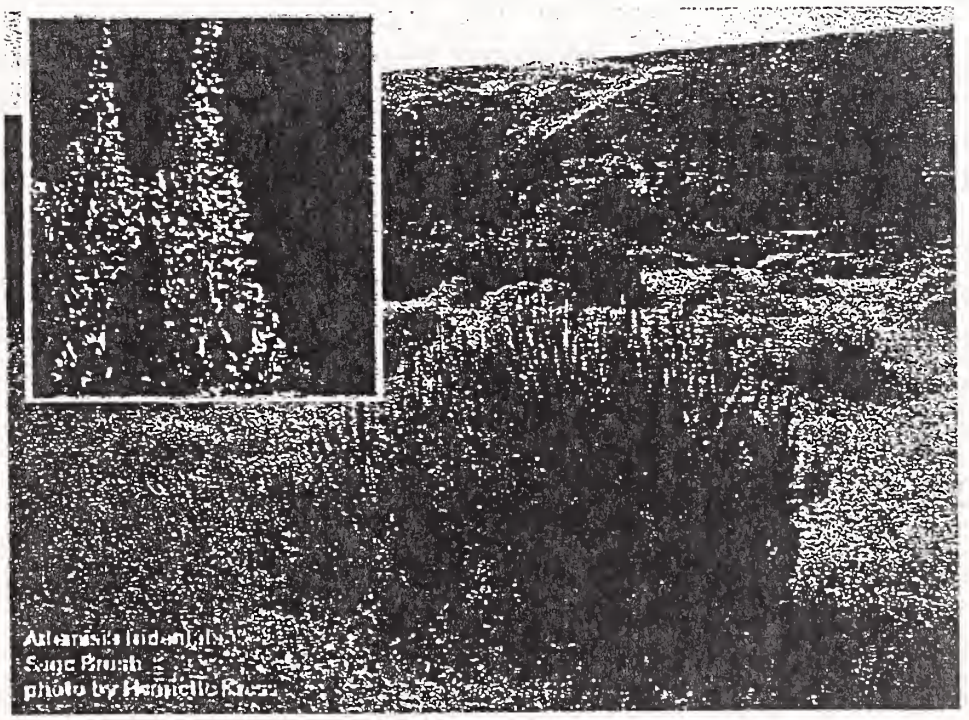
MEMORANDUM OF UNDERSTANDING

BETWEEN

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Beaverhead-Deerlodge National Forest

and

STATE OF MONTANA
Region 3
Montana Fish, Wildlife & Parks



The intent of this MOU is to address mutually acceptable operating guidelines for vegetative manipulation in certain plant community types. The NEPA analysis associated with these vegetative manipulation projects will address these guidelines, and at least one alternative that incorporates them fully will be analyzed to display to the public and the decision maker the effects associated with the implementation of these guidelines.

MOU

I. PURPOSE

The purpose of this MOU is to integrate the respective management responsibilities of the USFS and FWP to assure that wildlife species and populations, and the habitats that sustain them, are maintained. There is a mutual acknowledgment that naturally occurring vegetative communities have intrinsic value and that they each play a role in the functioning of ecosystems. In recognition of the dependence of wildlife species upon the occurrence, extent, juxtaposition, and condition of various vegetative communities, the role these habitats play in the ecosystem, the effects of natural processes such as fire and plant succession, and with the recognition that it is in the best interest to work together to achieve our individual agency responsibilities; the USFS and FWP enter into this formal agreement.

This MOU outlines processes to assure coordination and cooperation between the two agencies during the planning, implementation and evaluation phases of USFS vegetation manipulation projects directed toward the vegetative communities of sagebrush, Douglas fir, aspen/willow and mahogany/bitterbrush.

II. AGREEMENT AREA

The area covered by this MOU consists of all lands administered by the Beaverhead-Deerlodge National Forest that lie within the boundary of Region Three of Montana Fish, Wildlife & Parks.

III. ADMINISTRATION

Nothing in this memorandum will obligate the parties of this agreement to expend funds or to enter into any contract or other obligations.

Specific work projects or activities that involve the transfer of funds, services, or property among the parties of this MOU will require the execution of separate agreements or contracts, contingent upon the availability of funds as appropriated by Congress or the State Legislature.

Each subsequent agreement or arrangement involving the transfer of funds, services or property between the parties to this MOU must comply with all applicable statutes and regulations, including those applying to procurement activities.

This MOU in no way restricts the cooperators from participating in similar activities or arrangements with other public or private agencies, organizations, or individuals.

No part of this agreement modifies existing authorities under which the parties currently operate.

This MOU will become effective on the date of the last signature by participants. It may be renegotiated or canceled at any time at any initiative of one of the participants, following at least a 60-day notice period to the other cooperators.

Supplements or amendments to this MOU may be proposed by any party and will become effective upon approval by all parties. Following any change in the MOU membership, all parties must reapprove the MOU.

The parties agree to review and assess the effectiveness of this MOU annually.

Unless otherwise terminated under the terms of this section, this MOU will remain in full force and will be formally reviewed on or before July 1, 1999.

In the execution of this MOU, there will be no discrimination by any of the parties against any person because of race, creed, color, religion, national origin, handicap or gender.

IV. AUTHORITIES

FEDERAL LAND POLICY AND MANAGEMENT ACT OF 1976 (42 U.S.C.1701 Et.seq. as amended)

National Forest Management Act of 1976 (16 U.S.C. 16009 note)

Intergovernmental Cooperation Act of 1968 (42 U.S.C. 4201)

V. STATEMENT OF JOINT OBJECTIVES

All parties desire to develop processes and procedures within the context of ecosystem management, to ensure that all concerned are able to efficiently and effectively meet their responsibilities as public entities.

All parties desire to develop a dynamic collaborative approach that builds or improves trusting relationships.

All parties will be mutually respectful of each other's goals and objectives through recognition of values, expectations, and needs of people and wildlife within the context of ecosystem management.

Identify a process to assure coordination and cooperation between the two agencies

during Forest and/or landscape level analysis and planning, as well as the planning, implementation, and evaluation phases of USFS vegetation manipulation projects directed toward the vegetative communities of sagebrush, Douglas fir, aspen/willow and mahogany/bitterbrush.

Define a procedure for resolving disputes.

Define common conservation objectives and strategies for maintaining viable sagebrush, Douglas fir, aspen/willow and mahogany/bitterbrush vegetative communities.

Develop and apply mutually agreed upon definitions to terms where confusion or disagreement exists.

VI. ORGANIZATION ROLES AND RESPONSIBILITIES

The parties to which this MOU applies are the U.S. Forest Service and Montana Fish, Wildlife & Parks. They recognize that their respective authorities are distinctly different. Each is guided by specific laws and regulations that pertain to their respective level of government and administrative responsibilities. However, they recognize the need to better coordinate with each other as well as share a broader vision of how their coordinated actions can contribute to successfully implementing an ecosystem approach to resource management in the agreement area.

RESPONSIBILITIES

FOREST SERVICE - The FS is a land management agency responsible for the management of the national forests including the area encompassed by the Beaverhead-Deerlodge National Forest.

MONTANA FISH, WILDLIFE & PARKS - The department is responsible for the management of fishery, wildlife, recreational, cultural, and historic resources of the State of Montana.

VII. FOREST AND/OR LANDSCAPE LEVEL ANALYSIS AND PLANNING - ROLES AND PROCESS

A. A group consisting of the Beaverhead-Deerlodge Forest Supervisor, Region Three Supervisor of the Montana Fish, Wildlife & Parks, and when appropriate, county commissioners, and local heads of other State and Federal land management agencies will meet as needed.

The role of this group is to:

1. Divide southwest Montana into a series of geographic areas, reflecting similar attributes such as landforms, land use patterns, vegetative communities, social issues, etc., that will be used as the basic units for coordinated planning.

2. Establish planning area priorities.

3. Aid in maintaining consistency and direction among planning areas.

4. Provide oversight to the process.

B. The Region Three Wildlife Manager will serve on the Area Resource Manager's Taskforce. This taskforce will be made up of Forest Service district rangers, BLM resource area managers, and the local heads of other land and resource management agencies. The role of this task force is to:

1. Provide the control, direction, and day-to-day coordination of specific planning projects.

2. Coordinate the activities of the interagency resource teams.

3. Resolve conflicts that arise during the development of the Desired Future Condition.

C. The local FWP biologist serves on the Interagency resource team. This team will consist of state and federal resource agency specialists. The role of this team is to:

1. Conduct coordinated area assessments to determine existing conditions. (See Appendix 1 for inventory checklist)

2. Coordinate respective agency program objectives where possible.

3. Identify areas where conflict may exist between existing agency plans, and opportunities for collaborative management.

4. Divide individual landscape planning areas into ecological subunits.

VIII. PROJECT LEVEL PLANNING - ROLES AND PROCESS

Our objective is to allow a field season for FWP biologists to review projects covered under this MOU. For all proposed projects involving vegetative manipulation of

sagebrush/grassland, Douglas fir (excluding timber harvest), aspen/willow and mahogany/bitterbrush communities the following will occur:

A. By April 1, the Forest will provide FWP a forest-wide list (known as the Quarterly Report) of all known relevant projects that are being proposed for analysis and/or implementation through the following calendar year. After completing steps B, C, and D, below those projects requiring NEPA will then be placed on the January quarterly project list.

B. Information to be provided for each proposed project includes objective of project, location, number of acres (total project acres and estimate of actual percent of area to be treated), status of NEPA, and proposed date of implementation.

C. On or before July 1, local FWP biologist will work with district biologist and/or ID team to agree upon inventory needs and responsibilities. (See Appendix 1 for inventory checklist)

D. Field reviews on projects identified as "of concern" by the local FWP biologist will be jointly scheduled with Forest Service district personnel and completed prior to November 1.

E. Within the appropriate timeframes during the NEPA process the local FWP biologist will provide written input for each project "of concern."

F. Local FWP biologists are encouraged to participate in ID team meetings. Where interest in participation has been expressed, the Forest will work to coordinate meeting dates.

G. Local FWP biologists will be provided with all public scoping notices for projects covered by this MOU.

H. Local FWP biologists will be provided with the Forest's Quarterly Project List that lists all projects being proposed on the forest.

It is recognized that on rare occasions and because of extenuating circumstances projects may arise independently of this MOU process. These projects would be geographically and temporarily isolated. They would still require consultation and collaboration between the Forest Service and FWP and sufficient time for field inventories/surveys (two month advance notice). Since the intent of this MOU is to prevent the occurrence of "exceptions," the frequency of exceptions should be extremely rare.

5) areas containing unique sagebrush species

6) in fragile watersheds

7) key calving, fawning, elk, and breeding areas

2. In sagebrush grasslands outside of those identified to meet the mature/old growth strategy, vegetative management may be initiated. In those areas where sagebrush is treated the treatments will be done no more frequently than once in 30 years. (See Appendix 4 Conservation Objective for graphic display) The objective for treatment unit mosaics will be 50 percent untreated. In addition, treatment area pattern should be such that no point within the treated area is located more than 600 feet from untreated area. (See Appendix 5 for mosaic calculation procedure.)

3. A Forest Service decision concerning vegetative manipulation of sagebrush/grasslands that does not meet the conservation objectives identified in this MOU will not occur without analysis and collaboration with Montana Fish, Wildlife & Parks.

4. Both agencies will work together to identify opportunities to aid in working with local landowners to pursue implementation of this conservation strategy on private lands.

5. **POST TREATMENT MONITORING:** All burns will be mapped within one year of treatment and mosaic and patch size will be calculated. A report by burn unit, which compares burn objectives with accomplishment will be prepared by each ranger district yearly. This report will be provided to Fish, Wildlife & Parks by February 15 each year. Treatments where prescriptions were significantly exceeded will be mitigated through modifying adjacent future treatments.

B. Future conservation strategies will be developed to address Douglas fir colonization zones, aspen/willow and mahogany/bitterbrush communities.

Dick Quesenberry

DEBORAH L.R. AUSTIN
for
Forest Supervisor
Beaverhead-Deerlodge NF

4/9/98
Date

Stephen L. Lewis

STEVE LEWIS
Region 3 Director
Montana Fish, Wildlife & Parks

4-10-98
Date

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IX. PROCEDURE FOR RESOLVING DISPUTES

It is our objective to work together to resolve technical disagreements at the local level through face to face discussions. Where agreements can't be reached the Regional Wildlife Manager and the Forest Resource Staff Officer will review the situation. After review and discussion these individuals will make a recommendation to the Forest Supervisor and Region Three Supervisor on how to resolve the issue. If an arbitration board is used, it should be composed of experts jointly agreed to and equally funded by both agencies. The arbitration board will make a recommendation for the final decision by the Forest Supervisors' and/or Regional Supervisor.

X. PROJECT IMPLEMENTATION COORDINATION

The Forest Service will provide the local FWP biologist, by March 1, a list of all burning projects that are planned for implementation that calendar year.

XI. VEGETATIVE COMMUNITY OBJECTIVES AND CONSERVATION STRATEGIES

Vegetative manipulation projects which meet the following criteria will be considered to have met management objectives of both agencies.

A. SAGEBRUSH CONSERVATION OBJECTIVE

It is our objective to maintain a viable sagebrush community within ecological units agreed upon between the agencies.

The strategy for meeting this objective is to achieve and/or maintain a component (minimum of 50%) of mature and old growth (30 years and older) sagebrush/grassland habitat type.

1. Criteria

a. Location priorities to maintain mature/old growth are:

1) winter range for elk, deer, antelope and sage grouse

2) habitats for species of special concern (see Appendix 2)

3) existing stands 30 years and older

4) migration corridors

APPENDIX 2
SPECIES OF SPECIAL AND ECOLOGICAL CONCERN

This list of species identifies those that can be used to address effects of management on sagebrush communities. These communities include stands of pure sagebrush, sagebrush/grassland and sagebrush/Douglas-fir complexes. Obligates are those species dependent on sagebrush habitats for their viability. Near obligates are species that use sagebrush habitats for one part of their life cycle, in a particular season (i.e. mule deer winter range) or use sagebrush habitats in great enough frequency such that these habitats contribute to the species viability over it's range in southwestern Montana. Non-obligate species are those that occur in sagebrush habitats but use many other habitats as well. It is recognized that non-obligates use sagebrush communities and these should be addressed when appropriate. For example in southwestern Montana sagebrush areas are critical for elk winter ranges and calving habitats. This and other similar circumstances are to be addressed in landscape and project level assessments.

Species at Risk include: Sage Grouse, Brewer's Sparrow and Pygmy Rabbit (see R1 Protocol For Species at Risk); Sage Grouse are currently a Region 1 Sensitive species.

Other obligate and non-obligate species and their unique habitat requirements should be addressed in landscape and project level assessments. Some of these may include but are not limited to: sagebrush voles, Sage Thrashers, and sage sparrows.

SPECIES FOUND IN SAGEBRUSH HABITATS

SPECIES	OBLIGATE	NEAR-OBLIGATE	NON-OBLIGATE	HABITAT(S)
Reptiles & Amphibians				
Plains Spadefoot (*Scaphiopus bombifrons*)		X		sagebrush, grassland
Long-toed Salamander (*Ambystoma macrodactylum*)			X	sagebrush to alpine
Great Plains Toad * (*Bufo cognatus*)			X	sagebrush, short-grass prairie, savannah
Woodhouse's Toad * (*Bufo woodhousii*)			X	streams in sagebrush, short-grass prairie
Tiger Salamander * (*Ambystoma tigrinum*)		X		ponds and streams in sagebrush and prairie
Sagebrush Lizard * (*Sceloporus graciosus*)	X			sagebrush
Short-horned Lizard * (*Phrynosoma douglasi*)		X		sagebrush, grassland, open forest with loose or sandy soil
Western Rattlesnake (*Crotalus viridis*)			X	sagebrush, ponderosa pine, mixed grass-conifer
Mammals				
Merriam Shrew * (*Sorex merriami*)	X			sagebrush, sagebrush-grassland, occasionally dry grassland
Preble's Shrew		X		sagebrush, sagebrush-grassland

APPENDIX 1
INVENTORY CHECKLIST

The following checklist needs to be reviewed early in the analysis process to aid in determining what inventories are appropriate for the given project.

WILDLIFE

- Threatened, Endangered and Sensitive species
- Management Indicator Species
- Species of Ecological Concern (game and non game - see Appendix)
  - species specific seasonal uses
  - home ranges
  - occurrence of habitat or potential habitat
  - corridors

PLANTS

- Sensitive Plants
- Sagebrush taxa
- Successional stage
- Age structure of vegetation
- Plant species composition list (i.e. a pre-treatment list that identifies composition of sprouters and noxious weeds)
- Habitat types
- Existing land use (cumulative effects area)
- Numbers/distribution (present and historical), acres and condition of sagebrush
- Management history

Badger (Taxidea taxus)			X	sagebrush, grassland, open forest, alpine zone
Pronghorn (Antilocapra americana)		X		sagebrush, open prairies grassland
Mule Deer (Odocoileus hemionus)		X		sagebrush, open forest
Elk (Cervus canadensis)			X	sagebrush flat, mountain meadows, semi-open forest
Bighorn Sheep (Ovis canadensis)			X	mountain slopes, rocky terrain, low foothills, sagebrush
Birds				
Sharp-tailed Grouse (Tympanuchus phasianellus)		X		grassy sagebrush, grasslands, mountain meadows, cultivated fields
Sage Grouse (Centrocercus urophasianus)	X			sagebrush
Northern Harrier (Circus cyaneus)			X	open fields, grasslands, sagebrush, prairies, marshes
Swainson's Hawk (Buteo swainsoni)			X	sagebrush, open grassland, agricultural lands, open woodland
Ferruginous Hawk (Buteo regalis)		X		sagebrush, grasslands, prairies, mountain meadows
Golden Eagle (Aquila chrysaetos)		X		mountain meadows, grasslands, marshes, sagebrush
Merlin (Falco columbarius)			X	grassland, open woodland, agricultural land, marshes, sagebrush
American Kestrel (Falco sparverius)			X	sagebrush, agricultural land, grasslands, prairies, mountain meadows
Prairie Falcon (Falco mexicanus)		X		sagebrush, plains, short-grass prairie
Short-eared Owl (Asio flammeus)			X	grassland, prairie, marshes, sparse sagebrush
Long-eared Owl (Asio otus)			X	sagebrush, forest, orchards, thickets, riparian woodland, woodlots

(Sorex preblei)				
White-tailed Jackrabbit (Lepus townsendii)			X	sagebrush, grassland, alpine tundra
Black-tailed Jackrabbit (Lepus californicus)	X			sagebrush, open prairies
Desert Cottontail * (Sylvilagus audubonii)		X		sagebrush, dry grassland, open plains, juniper, foothills
Pygmy Rabbit (Sylvilagus idahoensis)	X			sagebrush
Porcupine (Erethizon dorsatum)			X	sagebrush, forested mountains, brushy grassland, sagebrush, rivers, streams
Northern Pocket Gopher (Thomomys talpoides)			X	everywhere but dense forest
Ord's Kangaroo Rat * (Dipodomys ordii)		X		sagebrush and grassland with loose sandy soil
Great Basin Pocket Mouse (Perognathus parvus)		X		sagebrush
Least Chipmunk (Tamias minimus)	X			sagebrush, grassland, alpine tundra, coniferous forest
Black-tailed Prairie Dog (Cynomys ludovicianus)			X	dry grassland, sagebrush-grassland
Richardson's Ground Squirrel (Citellus richardsonii)			X	sagebrush, short-grass plains
Northern Grasshopper Mouse * (Onychomys leucogaster)			X	sagebrush, grassland, prairies plains
Sagebrush Vole (Lagurus curtatus)	X			sagebrush
Prairie Vole * (Microtus ochrogaster)		X		dry grassland, sagebrush-grassland, prairies, fence rows
Long-tailed Vole (Microtus longicaudus)			X	sagebrush-grassland, dense sub-alpine conifer forest, alpine tundra, riparian areas
Montane Vole (Microtus montanus)			X	sagebrush-grassland, dry grassland, riparian willows, alpine tundra
Spotted Skunk (Spilogale gracilis)			X	rocky sagebrush and grasslands prairies, sparsely wooded areas

Burrowing Owl (Speotyto cunicularia)			X	grassland, prairie, sagebrush
Cassin's Kingbird * (Tyrannus vociferus)			X	grassland, open woodland, sagebrush, agricultural land
Say's Phoebe (Sayornis saya)		X		sagebrush, open woodland, grassland, agricultural land
Horned Lark (Eremophila alpestris)			X	short-grass plains, sagebrush, pastures, mountain meadows, alpine tundra
Cliff Swallow (Hirundo pyrrhonota)			X	cliffs in grassland, sagebrush, riparian areas
Pinyon Jay (Gymnorhinus cyanocephalus)		X		sagebrush, juniper
Black-billed Magpie (Pica pica)		X		sagebrush, riparian areas, agricultural land, aspen, low coniferous forest
Rock Wren (Salpinctes obsoletus)		X		rocky habitats with sparse vegetation, badlands, cliffs
Blue-gray Gnatcatcher * (Polioptila caerulea)		X		sagebrush, juniper, thickets
Sage Thrasher (Oreoscoptes montanus)	X			sagebrush
Mountain Bluebird (Sialia currucoides)			X	sagebrush-juniper, open woodland, mountain meadow, forest edge
Loggerhead Shrike (Lanius ludovicianus)		X		sagebrush, prairies, montane meadows, juniper woodland, cropland
Brewer's Blackbird (Euphagus cyanocephalus)			X	riparian areas, grassland, sagebrush, mixed-coniferous forest, wet meadows
Western Meadowlark (Sturnella neglecta)			X	sagebrush-grassland, prairie, hayfields, wet meadows, short-grass prairie, cropland
Brown-headed Cowbird (Molothrus ater)			X	sagebrush, agricultural land, thickets, forest clearings, aspen, open forest
Orchard Oriole * (Icterus spurius)		X		sagebrush, juniper woodland, riparian woodland, farms

Sage Sparrow (Amphispiza belli)	X			sagebrush
Brewer's Sparrow (Spizella breweri)	X			sagebrush (nesting), short-grass prairie, montane thickets
Clay-colored Sparrow (Spizella pallida)			X	riparian and prairie thickets, riparian woodland, sagebrush-grassland, grassland, early successional stages of forests
Vesper Sparrow (Pooecetes gramineus)		X		sagebrush, dry grassland, prairie edges, abandoned fields
Lark Sparrow (Chondestes grammacus)		X		sagebrush flats, grassland with shrubs, grassland edges, open woodland
Field Sparrow * (Spizella pusilla)		X		sagebrush, open woodland brushy ravines, abandoned hayfields, forest clearings
Grasshopper Sparrow (Ammodramus savannarum)			X	sagebrush-grassland, prairies, disturbed grassland
McCown's Longspur (Calcarius mccownii)		X		sagebrush prairies, short to mid-grass prairies, grassland, small-grain stubblefields
Green-tailed Towhee (Pipilo chlorurus)		X		sagebrush, brushy slopes, riparian woodlands
Rosy Finch (Leucosticte arctoa)			X	sagebrush, cliffs, mountain meadows, talus slopes, grassland, agricultural land
Lazuli Bunting (Passerina amoena)		X		thickets within sagebrush, riparian woodland, thickets, aspen, canyons with brush
House Finch (Carpodacus mexicanus)			X	sagebrush, open woods, riparian woodlands, urban areas
Lark Bunting (Calamospiza melanocorys)		X		sagebrush-grassland, prairies, hayfields, abandoned cropfields
Common Redpoll (Carduelis flammeus)			X	sagebrush, sub-arctic forests, grassland, cities in winter

* Indicates species not currently known to occur on the Beaverhead/Deerlodge National Forest.

This list was compiled by Lee Ballinger and Jina Mariani (FS) and reviewed and edited by Gary Hammond, Bob Brannon and Dennis Flath (MDFWP's). Habitats information was taken from field guides and references specific to Montana.

APPENDIX 3

DEFINITIONS

Vegetation

Sagebrush/Grassland Habitat Type: Artemisia nova/Agropyron spicatum, A. nova/Festuca idahoensis, A. tridentata/Agropyron spicatum, A. tridentata/Festuca idahoensis, A. tridentata/Festuca scabrella, A. triparita/Festuca idahoensis habitat types (Mueggler and Stewart 1980). These habitat types occupy all environments with the potential to support the previously cited species at climax.

Old Growth Sagebrush/Grassland Habitat: Sagebrush communities with no large scale disturbance for at least 60 years. Large scale disturbances would include fire, herbicide treatments, mowing, cultivation or any activity that removed or killed the sagebrush canopy. Old growth stands are generally characterized by having 10 - 30%+ live canopy cover of sagebrush depending on environmental conditions. Dead and decadent plants are relatively common. The percentage of herbaceous cover is variable and composed of a diverse mix of forbs and graminoids.

Sagebrush Taxa: Sagebrush taxa found in southwest Montana include: Artemisia tridentata ssp. tridentata, A.t. ssp. wyomingensis, A.t. ssp vaseyana, A.t. ssp. spiciformis, A. arbuscula ssp. arbuscula, A. nova, A. longiloba, A. cana ssp. cana, A.c. ssp. viscidula, A. tripartita ssp. tripartita. The uniqueness of a sagebrush taxa is related to it's relative abundance within a landscape.

Douglas fir (and other tree species) colonization areas: Sites will be classed as forested habitat type if tree species are present and reproducing successfully. A species is considered reproducing successfully if 10 or more individuals per acre occupy the site. Trees will be counted if they are one foot or taller. Trees should be scattered throughout the area. Do not use exact counts if young trees are clumped and located in small (less the 1/100th acre, radius plot) microsites within the area. Generally count these groups as one individual.

Watershed

Fragile Watershed: Drainages sensitive to management activities due to altered hydrologic function or presence of a sensitive fisheries. These drainages are delineated through landscape level analysis and the IDT process.

Burn Mosaic

Landscape Mosaic - The spacial and temporial interspersion of burned and unburned areas across a watershed. This is used in planning unit locations and scheduling of burns.

Within Unit Mosaic - The spacial interspersion of burned and unburned areas across a burn unit.

Patch - An area of uniform vegetative cover. This may be defined using canopy cover, habitat type or other unique parameters depending on objectives or management concerns.

Wildlife

Key Wildlife Sites and Habitats

Elk/Deer/Antelope Winter range: the area used by these species during the winter months from December 1st through May 15th.

Sage Grouse Wintering Habitat: sagebrush is essential for cover and is the only food used by Sage Grouse in the winter. Wintering occurs in sagebrush steppe cover types; elevations vary depending on snow depth. These areas are all characterized by contiguous and dense cover of tall sagebrush. Some of these areas include but are not limited to areas of dense sagebrush associated with drainages near riparian areas, ridges or southwest slopes.

Calving/Fawning Habitat: areas between winter range and summer range where cows or does give birth to calves or fawns. This may be a specific area where a majority of calving for a herd takes place. It may also be scattered locations throughout the herd home range.

Wildlife Movement Corridors: areas where species find suitable habitats for travel within home ranges (such as big game seasonal migration), or use for dispersal and emigration to other areas of suitable habitat (see R1 Connectivity Protocol, 1996).

Sage Grouse Brooding Rearing Habitat: areas of suitable habitat selected for nesting and brood rearing. These areas are found in sagebrush steppe habitats and may occur up to 23 miles from a lek. Broods are dependent on areas of dense sagebrush cover with interspersed forbs and an abundance of insects. During summer areas of dense sagebrush cover adjacent to moist habitats (streamsides, high mountain wet meadows, seeps and springs) become critical use areas.

Sage grouse Leks: traditional sites where Sage Grouse gather in late winter and early spring. On these leks male Sage Grouse compete for territories and perform ritualized displays (strutting) to attract females for breeding. These areas will be protected from treatments for at least 1 mile around the periphery (of a lek) and greater if deemed necessary from inventory and assessment.

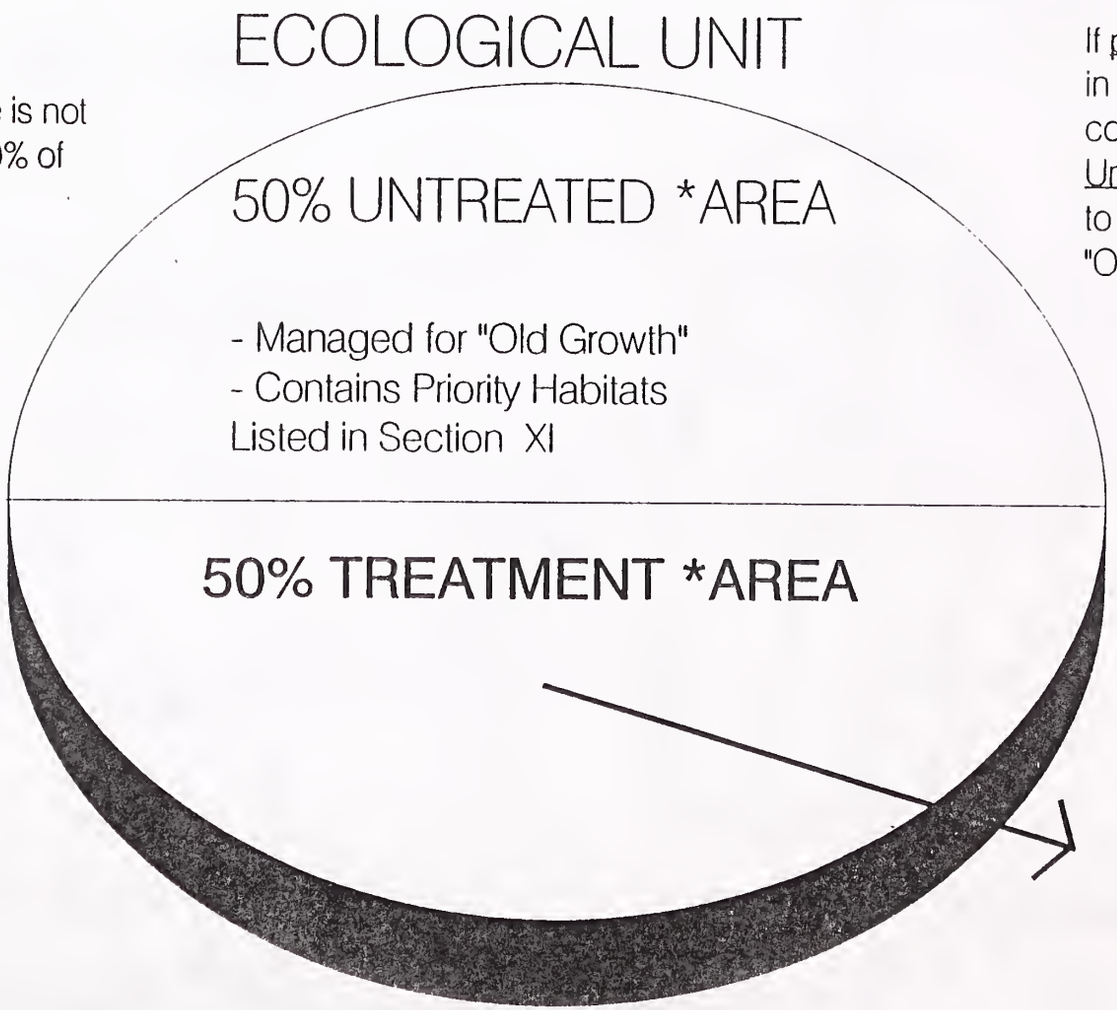
Literature Cited

Mueggler, W.F., and W.L. Stewart. 1980. Grassland and shrubland habitat tyes of western Montana. USDA For. Rept. INT-66, Ogden UT.

USDA Forest Service Region 1 1996. Connectivity Protocal. Terrestrial Peer Group Protocols for Ecosystem Management and Forest Planning. 91 p.

Appendix 4
Sagebrush Conservation Objective
For Management of Sagebrush/Grasslands within Ecological units

If priority habitats comprise greater than 50% of ecological unit, Forest Service is not mandated to manage over 50% of ecological unit as "Old Growth"



If priority habitats in ecological unit constitute less than 50% of Untreated Area, objective will still be to manage 50% of ecological unit for "Old Growth"

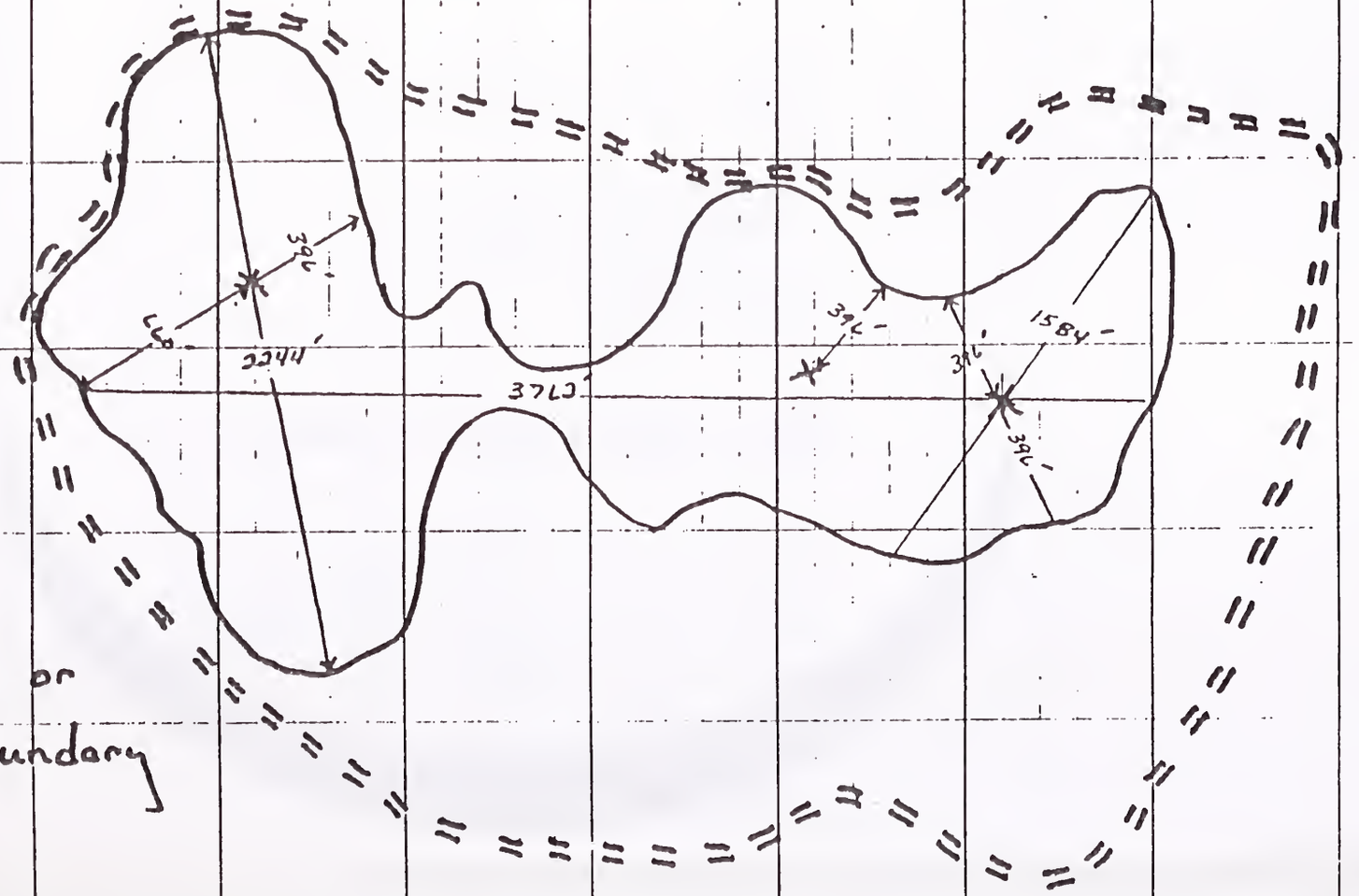
No More than 50% of Treatment Area will be blackened (mosaic pattern) within a 30 year period

*AREA is described as the land within the ecological unit containing sagebrush/grasslands

Appendix 5 Mosaic - Scale Calculation

200 acres within Polygon or Prescription Boundary (Treatment Area)
97 acres blackened ≈ 50% of Treatment area
no point within blackened area more than 600' from unburned area - meets distance criteria

Burn meets objectives



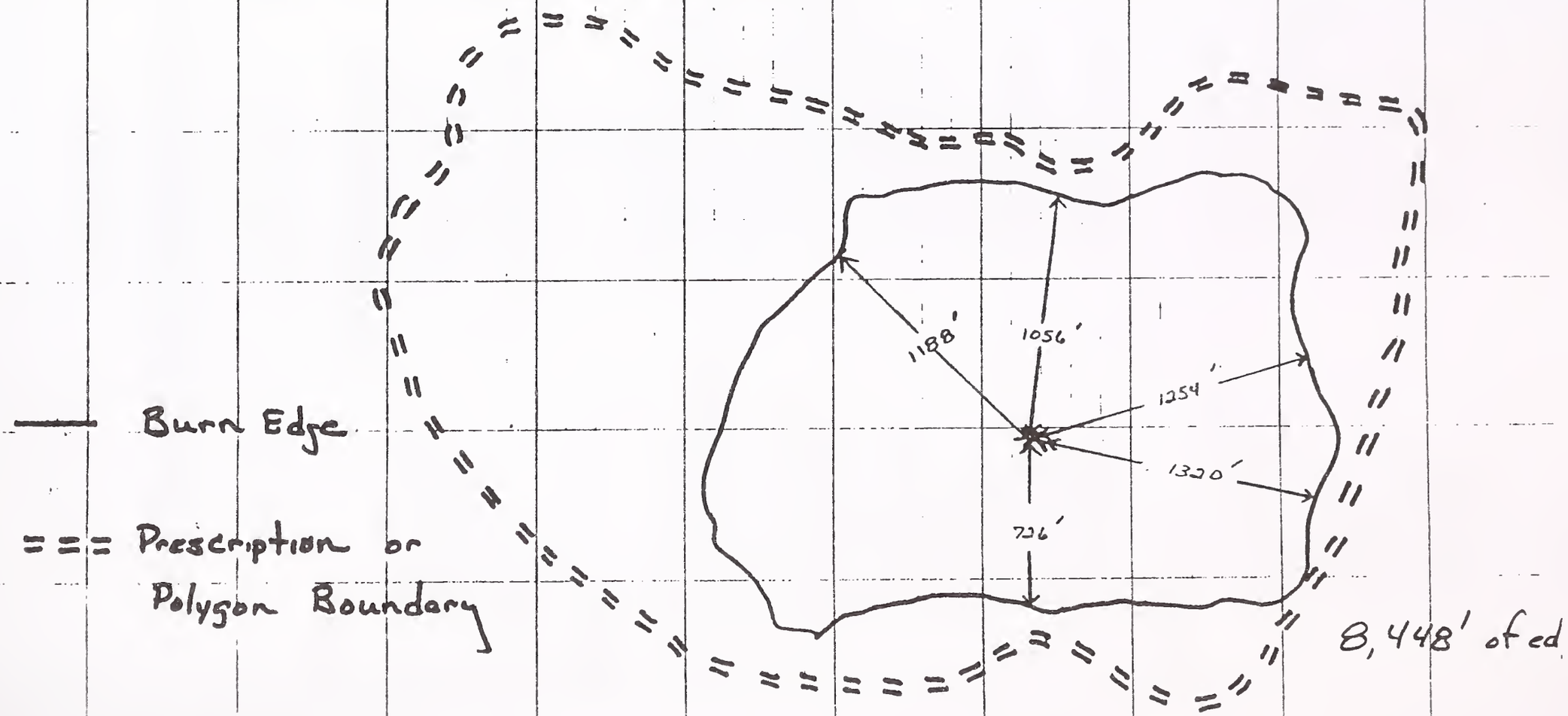
—— Burn Edge

=== Prescription or Polygon Boundary

Appendix 5 Mosaic-Scale Calculation

200 Acres within Polygon or Prescription Boundary (Treatment Area)
180 Acres blackened ≈ 50 % of Treatment Area
more than 600' from unburned area - does not meet distance criteri

Burn does not meet objectives



— Burn Edge

=== Prescription or Polygon Boundary

Scale: 8" = 1 mile

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APPENDIX F

COMMON AND SCIENTIFIC NAMES OF PLANTS & ANIMALS MENTIONED IN THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

Common Name	Scientific Name
TREES	
subalpine fir	*Abies lasiocarpa*
Engelmann spruce	*Picea engelmannii*
lodgepole pine	*Pinus contorta*
whitebark pine	*Pinus albicaulis*
aspen	*Populus tremuloides*
Douglas-fir	*Pseudotsuga menziesii*
SHRUBS	
alder	*Alnus incana*
silver sagebrush	*Artemisia cana*
mountain big sagebrush	*Artemisia tridentata* spp. *vasyana*
three-tip sagebrush	*Artemisia tripartita*
birch	*Betula spp.*
mountain mahogany	*Cercocarpus ledifolius*
rubber rabbitbrush	*Chrysothamnus nauseousus*
green rabbitbrush	*Chrysothamnus viscidiflorus*
snakeweed	*Gutierrezia sarothrae*
common juniper	*Juniperus communis*
bitterbrush	*Purshia tridentata*
Bebb willow	*Salix bebbiana*
Booth willow	*Salix boothii*
Drummond willow	*Salix drummondiana*
Geyer willow	*Salix geyeriana*
Wolf's willow	*Salix wolfii*
gray horsebrush	*Tetadymia canescens*
GRAMINOIDS	
bluebunch wheatgrass	*Agropyron spicatum*
mountain brome	*Bromus carinatus*
bluejoint reedgrass	*Calamagrostis canadensis*
pinegrass	*Calamagrostis rubescens*
water sedge	*Carex aquatilis*
elk sedge	*Carex geyeri*
Nebraska sedge	*Carex nebrascensis*
beaked sedge	*Carex utriculata*
inflated sedge	*Carex vesicaria*

Idaho fescue	*Festuca idahoensis*
Kentucky bluegrass	*Poa pratensis*
timothy	*Phleum pratense*

FORBS

candystick	*Allotropa virgata*
burdock	*Arctium minus*
peculiar moonwort	*Botrychium paradoxum*
diffuse knapweed	*Centaurea diffusa*
spotted knapweed	*Centaurea maculosa*
musk thistle	*Carduus nutans*
Canada thistle	*Cirsium arvense*
bull thistle	*Cirsium vulgare*
hounds tounge	*Cynoglossum officinale*
beaked spike-rush	*Eleocharis rostellata*
giant helleborine	*Epipactis gigantea*
leafy spurge	*Euphorbia esula*
black henbane	*Hyoscyamus niger*
field scabious	*Knautia arvensis*
dalmatian toadflax	*Linaria dalmatica*
yellow toadflax	*Linaria vulgaris*
Austin's knotweed	*Polygonum douglasii* spp. *austiniae*
snow cinquefoil	*Potentilla quinquefolia*
common tansy	*Tanacetum vulgare*

BIRDS

goshawk	*Accipiter gentilis*
boreal owl	*Aegolius funereus*
golden eagle	*Aquila chrysaetos*
ruffed grouse	*Bonasa umbellus*
great horned owl	*Bubo virginianus*
red-tailed hawk	*Buteo jamaicensis*
rough legged hawk	*Buteo lagopus*
ferruginous hawk	*Buteo regalis*
Swainson's hawk	*Buteo swainsoni*
Franklin's grouse	*Canachites canadensis*
sage grouse	*Centrocercus urophasianus*
trumpeter swan	*Cygnus buccinator*
blue grouse	*Dendragapus obscurus*
peregrine falcon	*Falco peregrinus anatum*
bald eagle	*Haliaeetus leucocephalus*
great gray owl	*Strix nebulosa*
flammulated owl	*Otus flammeolus*
black-backed woodpecker	*Picoides arcticus*

FISH

westslope cutthroat trout	*Oncorhynchus clarki lewisi*
fluvial arctic grayling	*Thymallus arcticus*
rainbow trout	*Oncorhynchus* mykiss
brook trout	*Salvelinus fontinalis*
Yellowstone cutthroat trout	*Oncorhynchus clarki bouvieri*

AMPHIBIANS

Boreal (Western) toad	*Bufo boreas boreas*
Northern leopard frog	*Rana pipiens*
Spotted frog	*Rana pretiosa*

MAMMALS

moose	*Alces alces*
coyote	*Canis latrans*
gray wolf	*Canis lupus*
beaver	*Castor canadensis*
elk	*Cervus canadensis*
mountain lion	*Felis concolor*
lynx	*Felis lynx*
wolverine	*Gulo luscus*
bobcat	*Lynx rufus*
pine marten	*Martes americana*
fisher	*Martes pennanti*
mule deer	*Odocoileus hemionus*
white-tailed deer	*Odocoileus virginianus*
mountain goat	*Oreamnos americanus*
Townsend's big-eared bat	*Plecotus townsendi*
black bear	*Ursus americanus*
grizzly bear	*Ursus arctos*
red fox	*Vulpes fulva*

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APPENDIX G

LANDTYPE ATTRIBUTES AND DESIRED CONDITIONS FOR VEGETATION

FORESTED UPLAND VEGETATION

A. Dry Douglas-fir Communities

1. Landtype Attributes for dry Douglas-fir communities

Dry Douglas-fir habitat types on north facing slopes, foothills and protected sites.

Fire groups 4, 5 (Fisher, Clayton 1983): The theoretical climax forest on Group 4 and 5 habitats is an all-aged or multistoried Douglas-fir forest. Such a forest is unlikely to be achieved because of the prolonged fire free period necessary for its development. Most old growth forests will be open stands with varying understories depending on the stand's fire history.

2. Management Objectives for dry Douglas-fir communities

These stands were assigned a wide variety of management areas in the Beaverhead Forest Plan. These include MA-1, MA-13, MA-20, MA-24, MA-25. Overall the general management goals are: intensive range management, intensive wildlife management including wildlife winter range. Timber harvest will not be scheduled (except in MA-13, MA-20). Timber salvage and firewood removal are permitted. Prescribed fire can be used for a wide range of objectives, primarily wildlife and range.

3. Desired Vegetative Condition for dry Douglas-fir communities

Successional stage: Dominated by open park-like Douglas-fir. The term "savannah" was used in the Tobacco Root Landscape Analysis to describe this. Approximately 20-50 trees per acre. This differs from a true savannah as the higher numbers of trees will influence the growth and composition of the ground vegetation.

Species composition: Douglas-fir should make up 90% of the basal area. The trees should exceed 120 years of age with thick corky bark and absence of close/low hanging limbs that would make the tree susceptible to ground fires.

Structure/age: The final desired structure is roughly single story with not greater than 10% in regeneration/pole size class. Age of the stand exceeds 150 years.

Ground vegetation: Should be native grasses/forbs with less than 10% of the area containing sagebrush. Only native vegetation is acceptable with intensive knapweed control.

Snags and Woody Debris: Retain/provide dead trees and patches for woodpecker feeding and other wildlife species (6-10 trees/acre). Retain a range of 3-10 tons per acre of downed woody debris in larger size classes greater than 10 inches.

4. Desired Treatment for Ecological Processes

Low Intensity Prescribed Fire: Stand underburning is desired for fuel reduction including needle and duff reduction, for fire dependant vegetation stimulation, to fire scar 5-20% of the trees, and kill undesired conifer reproduction. Fire scarring assists in continuing natural processes and develops ample resin for future long term durability of future snags. Underburning would continue at intervals of 5-40 years. Mortality from underburning of trees greater than 12 inches dbh should be generally less than 25% for the first treatment.

Salvage Harvest: Thinning from below in order to salvage merchantable material, reduce ladder fuels, and open crown canopy will help lower the risk for prescribed fire. The public strongly requested that salvage treatment be done in conjunction with burning where access either exists or can be achieved with temporary roads (IX-2). This treatment is permitted in all management areas affected. The treatment will occur in one stage. The overstory will be removed leaving approximately 1/3 of the basal area, then underburned.

5. See Project file for a list of stands fitting this description.

B. Mixed Douglas-fir/Lodgepole Pine Communities

1. Landtype Attributes

Moist Douglas-fir and subalpine fir habitat types on benches, north slopes, and gentle slopes.

Fire group 6, 7 (Fisher, Clayton 1983): The theoretical climax forest on Group 6 habitats is an all-aged or multistoried Douglas-fir forest. The theoretical climax for Group 7 habitats is subalpine fir. Such forests were unlikely because of the prolonged fire free period necessary for their development. Most old growth forests will be closed stands with varying understories depending on the stand's fire history.

2. Management Objectives

These stands were assigned a wide variety of management areas in the Beaverhead Forest Plan. These include MA-1, MA-13, MA-16, MA-20. Overall the general management goals are: forest management either custodial or intensive with high wildlife values including wildlife winter range. Timber harvest will be scheduled on suitable lands. Timber salvage and firewood removal are permitted. Prescribed fire can be used for a wide range of objectives, primarily wildlife and disposal of activity fuels.

3. Desired Vegetative Condition

Successional Stage: All stages with a mix of 10-30% seedling/sapling, 40-60% mature, 10-30% old growth. Patch size varies with 15-100 acres.

Species composition: Douglas-fir should make up 30-40%, lodgepole 40-60%, and subalpine fir 0-10% of the basal area.

Structure/age: The final desired structure is roughly single story with not greater than 10% in regeneration/pole size class. Age of the stand exceeds 100 years.

Ground vegetation: Should be native grasses/shrubs with less than 10% of the area containing regeneration.

Snags and Woody Debris: Retain/provide dead trees and patches for woodpecker feeding and other wildlife species 6-10 trees/acre. Retain a range of 5-20 tons per acre of downed woody debris in larger size classes greater than 10 inches.

4. Desired Treatment for Ecological Processes

Low Intensity Prescribed Fire: Stand underburning is desired for fuel reduction including needle and duff reduction, for fire dependant vegetation stimulation, to fire scar 5-20% of the trees and kill undesired conifer reproduction. Fire scarring assists in continuing natural processes and develops ample resin for future long term durability of future snags. Underburning would continue at intervals of 20-40 years. Mortality from underburning of trees greater than 12 inches dbh should generally be less than 25% for the first treatment.

Shelterwood/Salvage Harvest: Harvest from below in order to salvage merchantable material, reduce ladder fuels, and open the crown canopy to help lower the risk for prescribed fire. The public strongly requested a salvage or other treatment be done in conjunction with burning where access either exists or can be achieved with temporary roads. This treatment is permitted in all management areas affected. The treatment will occur in two stages. The first stage will be to remove approximately 1/3 of the basal area, then underburn. The second treatment will occur 20-40 years later depending on species composition and stand vigor. Either reserve trees will be selected while a new stand is developed, or continuing harvest will take 50% of the remaining basal area from below, followed by underburn, leaving a shelterwood seed cut.

Intermediate Treatments: Thinning and improvement cutting will be desired in cases where extreme stocking exists. This will occur in MA-16 and MA-20 where timber productivity was the predominant management objective. Thinning is to maintain good stand health to meet the diversity of management objectives. It should not be construed to mean individual tree health as amounts of decay and insect activity is also desired.

5. Project file lists the stands in this category.

C. Sagebrush/grass Communities

1. Landtype Attributes

Sagebrush/grass habitat types on east, south and southwest facing slopes and foothills.

Fire group 5 (Fisher, Clayton 1983): The theoretical climax community on these sites with fire exclusion is an all-aged or multistoried Douglas-fir forest. Under a historical fire frequency these sites would be maintained as a sagebrush/grass community. These sagebrush/grass communities would range from grass dominated to sagebrush dominated depending on the sites fire history.

2. Management Objectives

These stands were assigned a wide variety of management areas in the Beaverhead Forest Plan. These include MA-1, MA-8, MA-20, MA-24, MA-25. Overall the general management goals are: intensive range management, intensive wildlife management including wildlife winter range. Timber harvest will not be scheduled (except in MA-20). Timber salvage and firewood removal are permitted. Prescribed fire can be used for a wide range of objectives, primarily wildlife and range.

3. Desired Vegetative Condition

Successional Stage: Dominated by sagebrush/grass communities. This community displays a variety of species compositions and range of sagebrush canopy coverages. Successional trends toward Douglas-fir dominated communities is not acceptable.

Species composition: Should be native shrub/grasses/forbs. The dominant shrub will be mountain big sagebrush. The dominant grasses will be Idaho fescue and blue bunch wheatgrass. Sagebrush density will vary across the landscape. Typically these sites will be grass dominated with sagebrush comprising less than 10% canopy coverage, this will occur in approximately 90% of this community type. Sagebrush dominated sites, greater than 10% canopy coverage, will occur in no more than 10% of this community site. Douglas-fir coverage will be limited to less than 10% canopy coverage and will occur in no more than 10% of the community type.

Structure/age: Patch size for the grass dominated sites will be from 5-2500 acres. Sagebrush dominated sites will vary from 1-200 acres and sites with Douglas-fir will be small 5-50 acres. These are found in a mix, scattered across the landscape.

4. Desired Treatment for Ecological Processes

Low Intensity Prescribed Fire: Burn stand to best represent natural wildfire conditions within limits of acceptable fire control and protection of various resources. Kill undesired conifer reproduction. Underburning would continue at intervals of 5-30 years. The treatment will occur in one stage. If less than 30% of the unit is burned this would be classed as an unsuccessful treatment.

Salvage Harvest: Allow harvesting of merchantable material such as Christmas tree, sagebrush or juniper prior to prescribed burning. The public requested salvage of such material be done in conjunction with burning where access exists. This treatment is permitted in all management areas affected.

5. See Project file for list of sagebrush/grass stands to be treated.

D. Aspen Communities

1. Landtype Attributes

Aspen types are found across all aspects and from valley bottom to ridgetop.

Fire groups: Due to the limited extent of aspen, fire effects and general plant succession are heavily influenced by the adjacent plant communities. The theoretical climax community on most sites in the

Tobacco Root project area, with fire exclusion, is an all-aged or multistoried conifer forest. Under a historical fire frequency these sites would be maintained as an aspen community.

2. Management Objectives

Aspen can be found in all management areas in the Beaverhead Forest Plan. Prescribed fire can be used for a wide range of objectives, primarily wildlife and range.

3. Desired Vegetative Condition

Successional Stage: Dominated by dense aspen. A full range of age classes from young sprouts/sapling to mature to overmature stands should be present across the landscape. Successional trends toward conifer dominated communities is not acceptable.

Species composition: The dominant tree will be aspen with native shrubs, grasses and forbs. Aspen stands display a variety of understory species compositions that range from shrub to forb dominated.

Structure/age: Patch size will range from 1-20 acres. Majority of stands should be in a young or mature age class with few overmature to decadent stands.

4. Desired Treatment for Ecological Processes

Low to Moderate Intensity Prescribed Fire: Burn stand to best represent natural wildfire conditions within limits of acceptable fire control and protection of various resources. Kill undesired conifer reproduction. Underburning would continue at intervals of 5-30 years. The treatment will occur in one stage. Where possible burn in conjunction with adjacent vegetation to run fire through the entire clone. Fires that do not run through the entire clone and only affect the stand fringe are acceptable.

Manual Felling and Girdling: At sites where prescribed fire is impractical due to fire control or other resource objectives, manual felling or girdling may be used to simulate the effects of fire. Snags will be retained. Girdling will be used to produce additional snags as needed. All mature trees will be felled or girdled in a clone to stimulate maximum sprouting.

Salvage Harvest: Allow harvesting of merchantable material such as fire wood. The public requested salvage of such material be done in conjunction with burning, where access exists. This treatment is permitted in all management areas affected.

5. Project file contains lists stands of aspen treated.

E. Riparian Vegetation

Desired Condition of Riparian Vegetation

Maintain or improve the structure, composition and function of the various riparian community types found within the Tobacco Root Project Area. Emphasize restoration of riparian function and plant communities on those sites that have been impacted by past management actions. Those sites currently dominated by willow or graminoids will be maintained. Succession to forest dominated communities

will be prevented. Use of natural processes, where appropriate and feasible, will be the primary agent to accomplish this.

The dominant natural processes affecting riparian vegetation are natural herbivory and spring flooding. Natural occurring fires were infrequent but important to regenerate willow, aspen and other fire dependant species along with mineral cycling and maintaining the overall landscape diversity found in the analysis area. Fire patterns were influenced largely by the adjacent plant communities.

Willow dominated communities should have a dense, vigorous canopy of willow with the understory dominated by native wet site graminoids and forbs. Nonnative species will be a minor component of the community. Few decadent stands will be found.

Most forested riparian communities, ponds, potholes, marshes and fens are currently meeting the desired condition. Plant composition and vigor has been affected by livestock grazing, logging, mining and concentrated recreational activities in a portion of these communities. Human activities will be managed at levels to allow stream banks and vegetation to maintain or improve.