

1.0 Purpose of and Need for the Proposed Action

1.1 Introduction and Background

The South Tobacco Roots (STR) Watershed is located in Madison County, Montana. The Watershed drains portions of the Tobacco Roots, Ruby, and Gravelly mountain ranges and lies within Townships South 3-7 and Ranges 1-5 West, Montana Principal Meridian. The Watershed covers public lands administered by the Bureau of Land Management (BLM) from Twin Bridges east to Ennis, Montana (Map 1, Appendix A).

The STR Watershed boundary follows grazing allotment boundaries and includes some allotments that are only partially within the Watershed. Watersheds are defined, and designated on maps, by natural topographical boundaries (ridgelines/drainages). On the other hand, grazing allotments boundaries are determined by land ownership and may not follow topographical features. Therefore, some of the grazing allotments fall within one or more watersheds or hydrologic units.

Within the Watershed, there are approximately 230,595 total acres of land, of which 33,629 are public lands administered by the BLM. This environmental assessment (EA) addresses only BLM administered lands in the Watershed.

In 2006, a BLM interdisciplinary team (IDT) assessed the public land health in the STR Watershed. The IDT assessed 5 Rangeland (Land) Health Standards: Upland Health, Riparian Health, Water Quality, Air Quality, and providing for Biodiversity. The Watershed Assessment reported the condition/function of resources within the assessment area to the Authorized Officer. The Authorized Officer considered the Assessment Report to determine whether Land Health Standards (Standards) were met, and then signed an Executive Summary and Determination of Standards documenting where Standards were or were not met. The Assessment Report and associated Determination of Standards were completed and released to the public in January, 2007, and are available at the Dillon Field Office or on the internet at http://www.blm.gov/mt/st/en/fo/dillon_field_office.html.

The assessed condition/function and recommendations in the Assessment Report and Determination of Standards, along with comments received through public scoping have been used to develop alternatives to initiate progress towards Proper Functioning Condition (PFC) and address site specific resource concerns where needed. This EA was completed in accordance with established procedures to analyze and implement area, allotment or site specific changes.

By working on a watershed basis, a broader landscape is considered and more consistent management can be applied. It is the BLM's intent to implement watershed management cooperatively. Any proposed changes in management, structural projects or vegetative treatments will be implemented through the BLM's Decision processes.

1.2 Proposed Action

The BLM Dillon Field Office proposes to improve land health, enhance biodiversity and improve public safety within the STR Watershed. BLM also proposes to renew Term Grazing Permits on 30 grazing allotments within the Watershed. Land health would be improved on public lands within the Watershed by:

- Restoring and/or maintaining historic density, structure, and species composition of forest, woodland and aspen habitats through mechanical treatments, commercial timber harvest and prescribed fire.
- Protecting private property by reducing potential wildfire fuels in the increasing wildland urban interface (WUI).
- Restoring and/or maintaining riparian, wetland and aquatic habitats (vegetation composition, structure, streambank stability, channel morphology) through revised livestock grazing management where livestock is contributing to riparian habitat degradation, structural projects, and vegetative treatments.
- Restoring and/or maintaining upland health and sagebrush habitats (species composition and structure) through structural projects and vegetation treatments.
- Eradicating new and containing existing noxious weed infestations through the use of Integrated Weed Management tools and through re-vegetation or reduced weed interference. Increasing desirable native plants and decreasing noxious and invasive species.

1.3 Need For the Action

The Fundamentals of Rangeland Health and subsequent Land Health Standards require the BLM to initiate management actions that ensure, “Watersheds are in, or are making significant progress toward, properly functioning condition, including their upland, riparian-wetland, and aquatic components...” (43 CFR 4180.1 (a)), if an assessment determines one or more of the Land Health Standards are not being met. In the STR Assessment Report, the IDT described several causal factors combining to negatively impact the biological, physical, and ecological processes in the Watershed. As a result, the Authorized Officer determined that one or more of the Standards are not met in 26 of the 30 allotments assessed. Table 1 lists the determination of each standard by allotment.

Table 1: Determination of Standards by Allotment

Allotment, number, category* & BLM Acres	Are Healthy Rangelands Standards Met?				
	Uplands	Riparian	Water Quality	Air Quality	Biodiversity
Baker Summit #10487 (C) Acres: 428	Yes	Yes	Yes	Yes	No ²
Ballard #10456 (I) Acres: 1,022	Yes	Yes	No ¹	Yes	No ²

Allotment, number, category* & BLM Acres	Are Healthy Rangelands Standards Met?				
	Uplands	Riparian	Water Quality	Air Quality	Biodiversity
Cal-Creek # 10507 (M) Acres: 6,170	Yes	No	No	Yes	No ²
Copper Mountain # 10531 (I) Acres: 549	Yes	NA	NA	Yes	No
Cow Creek # 20446 (C) Acres: 48	No	NA	NA	Yes	No ²
Downey Creek # 20581 (M) Acres: 398	Yes	Yes	Yes	Yes	No ²
Dry Lakes # 20526 (C) Acres: 1,146	Yes	Yes	Yes	Yes	No ²
Elser # 20477 (C) Acres: 301	Yes	Yes	Yes	Yes	No ²
Fletcher-Moore # 30428 (I) Acres: 1,721	Yes	No	Yes	Yes	No ²
Funk # 10478 (C) Acres: 271	Yes	Yes	No ¹	Yes	Yes
Georgia Gulch # 20348 (I) Acres: 2,077	Yes	No	Yes	Yes	No ²
Granite Creek # 10468 (M) Acres: 1,655	Yes	NA	NA	Yes	No ²
Granite-Moore # 10427 (M) Acres: 1,412	Yes	No	Yes	Yes	No ²
Hillside # 10514 (C) Acres: 282	Yes	NA	NA	Yes	No ²
Hungry Hollow # 10491 (C) Acres: 2,418	No	No	Yes	Yes	No ²
Lott # 10331 (C) Acres: 389	Yes	NA	NA	Yes	Yes
McGovern # 00957 (M) Acres: 1,639	Yes	No	Yes	Yes	No ²
Mill Gulch # 10475 (M) Acres: 531	Yes	Yes	No ¹	Yes	No ²
Mill Gulch Isolated # 20450 (C) Acres: 98	Yes	No	Yes	Yes	No ²

Allotment, number, category* & BLM Acres	Are Healthy Rangelands Standards Met?				
	Uplands	Riparian	Water Quality	Air Quality	Biodiversity
Miller #20418 (C) Acres: 40	Yes	NA	NA	Yes	No ²
Ramshorn Creek # 10552 (I) Acres: 2,037	Yes	No	No	Yes	No ²
Sand Coulee # 20679 (I) Acres: 590	No	No	Yes	Yes	No ²
South Daisy # 20399 (M) Acres: 1,382	Yes	Yes	Yes	Yes	No ²
Valley Garden # 10547 (C) Acres: 81	Yes	NA	NA	Yes	Yes
Virginia City Hill # 10521 (M) Acres: 2,470	Yes	No	Yes	Yes	No ²
Wisconsin Creek # 10501 (I) Acres: 1,381	Yes	No	Yes	Yes	No ²
Wisconsin Creek Isolated # 10523 (C) Acres: 40	Yes	NA	NA	Yes	Yes
Un-allotted Wilderness Study Area (WSA) Acres: 1198	Yes	NA	NA	Yes	Yes
<p>* Categories are assigned to allotments based on resource management goals: I=improve, M=maintain, C=custodial ¹ Streams running through the Ballard, Funk and Mill Gulch allotments are on the Montana Department of Environmental Quality (DEQ) 303(d) list of impaired streams. However, on the public land portion of the allotments, BLM authorized activities are not contributing to the streams impairment status. ² The scope and scale of forest health, conifer expansion, noxious weeds infestations and heavy fuel loading affected the biodiversity of the landscape.</p>					

Since Land Health Standards were not met in some areas due to unhealthy forest and hazardous fuels conditions, “other program guidance for the appropriate steps to be taken” to make progress toward meeting Standards (as referenced in H-4180-1) includes the Healthy Forests Restoration Act, the Healthy Forests Initiative, the National Fire Plan and the Dillon Fire Management Plan to implement appropriate treatments. Prescribed fire, commercial harvest, and non-commercial mechanical and herbicide treatments are being proposed, where appropriate, to restore some measure of resiliency in these stands. One of the emphasis items of the National Fire Plan, the Healthy Forests Initiative, and the 10-year Cohesive Strategy is to reduce hazardous fuel accumulations and restore the health and natural processes within forests and rangelands. The objectives are to reduce the risks of catastrophic wildland fire to people, communities, and natural resources while restoring forest and rangeland ecosystems to closely match their historical structure, function, diversity and dynamics. Actions proposed under this EA would fulfill the

following goals and actions of the Forest and Woodland Vegetation and Forest Products section in the Record of Decision and Approved Dillon Resource Management Plan (RMP):

- Goal 1, Action 4: Treat up to 4,000 acres in the Cool and Moist habitat type in the following geographic areas (south Tobacco Roots, southern Ruby Mountains, Barton/Idaho Gulch areas).
- Goal 1, Action 5: Treat up to 10,000 acres in the Warm and Dry and Warm and Very Dry habitat types in the following geographic areas (south Tobacco Roots, southern Ruby Mountains, Barton/Idaho Gulch areas)
- Goal 2: Provide opportunities for traditional and non-traditional uses of forest products by incorporating sound ecological principles while contributing to the economic stability of the community.

Livestock management within 9 allotments included in this EA has been determined by the Authorized Officer to be a significant causal factor in failing to meet one or more of the Land Health Standards. The allotments requiring livestock management changes are: Benchmark, Cal-Creek, Cow Creek, Granite-Moore, Fletcher-Moore, Mill Gulch Isolated, Ramshorn Creek, Sand Coulee and Virginia City Hill. Pursuant to 43 CFR 4180.2(c), livestock-caused failure to meet any of the Standards mandates BLM to change the terms and conditions of the grazing permit for the applicable grazing allotment prior to the next grazing season and implement actions that will result in significant progress toward fulfillment of the Standards. Further, BLM guidance stipulates that if other actions are necessary and cannot be implemented before the next grazing season interim adjustments will be made prior to the next grazing season and a schedule for final changes must be developed and documented (H-4180-1). Practices and activities subject to standards and guidelines include the development or revision of Allotment Management Plans (AMPs), establishment of terms and conditions of permits, leases and other grazing authorizations, and range improvement projects such as vegetation manipulation, fence construction and development of water sources.

Noxious and invasive weeds are a serious and pervasive threat to land health in the STR Watershed. Generally, weeds affect land health throughout the Watershed in riparian and upland habitats, reduce biodiversity in many site specific locations and, if left untreated, pose a serious risk in many additional areas across the landscape. These aggressive and competitive invader species have the potential to spread into adjacent upland and riparian habitat, crowd out native vegetation, establish monocultures and reduce plant and wildlife biodiversity. Federal legislation, such as the Carson – Foley Act of 1968 and the Federal Noxious Weed Act of 1974, as amended by Sec.15 – Management of Undesirable Plants on Federal Lands, 1990, directs the BLM to eradicate or reduce noxious weeds on federal lands through the use of Integrated Weed Management methods.

1.4 Scope of this Environmental Analysis – Scope, Plan Conformance, Critical Elements, Issues

1.4.1 Scope

The scope of the proposed action includes implementing commercial and non-commercial timber harvests, prescribed burning, vegetation treatments and authorizing livestock grazing. Proposed vegetation treatments are designed to restore specific habitat types on public lands. The proposed action may also include installation, construction, removal or modification of fences, roads, stream crossings, and water developments.

The proposed action addresses several program areas that affect land health. It is not an all-inclusive management plan or a programmatic EA.

1.4.2 Conformance with BLM Land Use Plans, Programs, and Policies

This document is tiered to the Dillon RMP approved in 2006. The range of management alternatives considered are in conformance with the RMP and applicable guidance is in the Record of Decision and Approved Dillon RMP, which may be accessed on the internet at <http://www.mt.blm.gov/dfo/rmp/index.html>.

Actions to meet identified objectives of improved forest health and enhanced habitat are proposed in one of three initial focus areas for treatments (as established by the RMP, Forest and Woodland Management, Actions 4 and 5). All alternatives in this EA, except the No Action Alternative, propose treatments in support of these identified actions, allocations, and objectives.

The proposed action is also in conformance with the Federal Land Policy and Management Act, the Taylor Grazing Act, the Standards for Rangeland Health and Guidelines for Grazing Management (43 CFR 4180), the Interim Management Policy for Lands Under Wilderness Review, the Healthy Forests Initiative, the Healthy Forests Restoration Act, BLM policies and Federal regulations.

The goals, objectives and management recommendations in the Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout in Montana, the BLM's National Sage-grouse Strategy, and the Management Plan and Conservation Strategies for Sage Grouse in Montana were also considered during alternative development.

1.4.3 Critical Elements of the Human Environment

Critical Elements of the Human Environment, as defined by BLM Manual 1790-1, must be considered in all BLM EAs and Environmental Impact Statements. The scoping process indicated which Critical Elements may be affected by the alternatives.

Table 2: Critical Elements of the Human Environment

Critical Element	Not present	Present, but not affected	May be affected*	Comments
Air Quality			X	Burning of slash materials may result in short term air quality deterioration. Prescribed burning is done in accordance with the MT/Dakotas Fire Management Plan and is coordinated with MT DEQ and the MT/ID Airshed Group. During prescribed fire season, the Smoke Monitoring Unit supports the Montana/Idaho Airshed Group to prevent/reduce the impact of smoke on area communities, especially when it could contribute to a violation of national air quality standards.
Areas of Critical Environmental Concern (ACECs)			X	Proposed fuels treatments in unit ALD 1 would be designed and implemented to protect cultural resources within the Virginia City ACEC. Any actions would be in accordance with the guidelines for ACEC management as specified in the Dillon RMP. See Issue # 2, WUI in Section 1.4.4.1 below.
Cultural Resources			X	See features common to all alternatives in Section 2.3.1; and a broader discussion of Cultural Resources in Chapter 3 section 3.2.6.3
Environmental Justice	X			
Farmland (prime or unique)	X			
Floodplains ¹			X	Discussed under Issue # 3 – Riparian, Wetland and Aquatic Habitat and Associated Species.
Hazardous and Solid Wastes	X			
Invasive Non-native Species			X	Discussed under Issue # 5 – Noxious Weeds.
Native American Religious Concerns	X			
Threatened & Endangered (T&E) species			X	See Biological Evaluation in EA file MT-050-06-11 in the Dillon Field Office.
Water Quality (drinking or ground)			X	Discussed under Issue # 3 – Riparian, Wetland and Aquatic Habitat and Associated Species.
Wetlands/Riparian Zones			X	Discussed under Issue # 3 – Riparian, Wetland and Aquatic Habitat and Associated Species.
Wild and Scenic Rivers	X			
Wilderness		X		The Ruby Mountain WSA will continue to be managed in accordance with the Interim Management Plan and Guidelines for Lands Under Wilderness Review.
* An “X” in this box means that the resource is further evaluated in the affected environment and environmental impacts sections.				
¹ Floodplains are part of stream systems. Actions which improve streams and riparian habitats will comply with Executive Order 11988 in that they are designed to restore and preserve the natural and beneficial values served by floodplains.				

1.4.4 Description of Issues, Resource Concerns and Objectives

Primary resource issues and related resource concerns were identified during the STR Watershed Assessment and documented in the STR Assessment Report and Executive Summary (available at the Dillon Field Office). Additional issues and concerns were also identified during public scoping. A range of management alternatives to address these specific issues and concerns are in Chapter 2. The relative effectiveness of each alternative in mitigating the issues will be analyzed in detail in Chapter 4. Issues have a direct bearing upon the proposed action and the process of how the purpose and need will be achieved, and are used to drive the development of alternatives. Resource concerns do not necessarily drive the development of alternatives, but are addressed by actions proposed in the alternatives.

Five primary land health or public safety issues and two additional resource concerns are listed below. A brief description or explanation of each issue and management objectives for improving land health and are included. Progress toward meeting some objectives can be quantifiably measured, e.g. acres of prescribed burns completed. However, other objectives, like reducing sediment input into streams, are evaluated based on measurable indicators such as relative changes in riparian vegetation composition and abundance.

1.4.4.1 Issues

Issue # 1: Forest Health and Fuels Management

Fire exclusion over the last 120 years has resulted in a departure from the historic range of variability by altering the structure, density, and plant species composition within forest and grassland communities. Fuel continuity has increased within areas that were historically maintained in a more open condition by moderate to high fire frequencies. Aspen is declining throughout its range due to conifer encroachment. Rocky Mountain juniper has expanded in the lower to mid elevation areas well beyond its historical occurrence. Conifer stand densities have increased and are currently experiencing insect and disease outbreaks. Consequently, high intensity fires are more likely to occur in areas that historically experienced low intensity, frequent fires. Increased fuel continuity will promote fires that burn larger areas with high levels of severity. Also, fires will tend to burn more uniformly and result in a less mosaic pattern of burned and unburned fuels.

Forest Health was found to be Functional-At-Risk (FAR) with a downward trend in the Watershed. Fuels conditions, forest health and conifer encroachment have been determined to be causal factors in 26 allotments in the STR Watershed **not** meeting one or more of the Standards for Land Health.

Objectives

- Restore/maintain historic density, structure, and species composition of forest and woodland habitats with special emphasis on reducing juniper and Douglas-fir encroachment in former grass/sage dominated communities.

- Improve forest health and increase resiliency to insects, disease, drought and wildland fire.
- More effectively control wildfire, especially in Wildland Urban Interface (WUI) areas.
- Maintain/enhance existing aspen stands and promote successful regeneration of aspen.
- Where possible, salvage dead/dying forest stands from epidemic insect activity and treat remaining stands to increase their resistance to insect activity. Utilize resulting forest products where feasible.
- Manage Douglas-fir habitat to maintain security and thermal cover in important big game fall and winter range between Wisconsin Creek and Mill Gulch.

Issue # 2: Wildland Urban Interface (WUI) and Protection of Private Property from Wildland Fire

There is a wildfire threat to numerous individual dwellings, subdivisions and other properties within the Watershed. Limited access and “choke points” on several main access roads and the relative remoteness of some private residences put some properties at an elevated risk.

Objectives

- Reduce fuel loading and continuity to protect private property from wildfire and protect historic cultural values in the Virginia City ACEC and neighboring Virginia City historic district.
- Reduce fuel loading and continuity near or along ingress/egress routes to facilitate effective emergency evacuation procedures and wildfire suppression efforts.
- Coordinate with private landowners and other affected agencies to maximize effectiveness of fuel treatments.

Issue # 3: Riparian, Wetland, Aquatic Habitat and Associated Species

One of the Western Montana Standards for Rangeland Health is “Riparian and Wetland Areas are in PFC.” PFC is defined as the ability of a stream or wetland to perform its riparian functions. These functions include sediment filtering, bank building, water storage, aquifer recharge and hydrologic energy dissipation. Streams or wetlands that are categorized as FAR with an upward trend also meet the riparian health standard. The indicators used to determine riparian health are discussed in the STR Watershed Assessment Report.

The riparian health standard was **not** met in 13 grazing allotments. The STR Assessment Report documents several contributing factors including the expansion of conifers into riparian habitat, decreasing deep rooted riparian vegetation, stream channel alteration, historic and current placer mining, urban development, roads, sedimentation and livestock grazing.

Riparian habitats are used by approximately 75% of wildlife species for at least some portion of their annual life cycle. Conifer expansion into riparian areas has a profound effect on ecological processes. Heavy juniper encroachment into many stream drainages is altering hydrological functions, drying out adjacent flood plains, reducing plant community complexity, increasing sedimentation from uplands and decreasing wildlife biodiversity.

Objectives

- Restore deciduous woody and herbaceous riparian habitat types with emphasis on reducing juniper and disturbance induced species composition.
- Restore stream dimension to a functional pattern and profile.
- Reduce sediment loads into streams from adjacent public lands.
- Maintain or enhance habitat for Westslope cutthroat trout (WCT) in Harris and California Creeks.
- Maintain and enhance habitat for cold water fisheries.
- Restore, maintain or enhance native vegetation and hydrology to springs, seeps and wet meadows with emphasis on ecological function, biodiversity, and rare plant species and their habitats.
- Protect springs and spring brooks from excessive ungulate impact.

Issue # 4: Upland Health, Sagebrush Steppe Habitat and Associated Species

“Uplands are in PFC” is identified as one of the Western Montana Standards for Rangeland Health. The determination of upland health was based on the evaluation of three criteria: degree of soil stability and watershed function, nutrient cycles and energy flows, and available recovery mechanisms. The indicators used to determine upland health are discussed in the STR Assessment Report.

Conifer expansion into mountain big sagebrush habitat is reducing the availability and productivity of this habitat for a variety of wildlife and livestock uses. Widespread expansion of juniper is reducing the availability and productivity of lower elevation sagebrush and grassland habitat types. The reduction of native herbaceous vegetation and increasing invasive species is affecting upland health, particularly at lower elevations in the Watershed.

Objectives

- Increase cover and frequency of native perennial herbaceous species where concerns were documented.
- Maintain residual herbaceous cover for ground nesting birds, specifically sage grouse.
- Manage big sagebrush communities in the Watershed so that at least 70% provide the vegetation composition and structure to sustain sage grouse populations and other sagebrush obligate species such as antelope and pygmy rabbits.
- Maintain 15-25% of taller sagebrush canopy cover (primarily big sagebrush

- subspecies), as applicable within site potential.
- Restore open sagebrush communities and enhance elk calving on Copper Mountain and between Mill Gulch and Granite Creek in habitats that are currently dominated by Douglas-fir.
 - Restore sagebrush communities in suitable habitats that are currently dominated by juniper.

Issue # 5 Noxious and Invasive Species

Large scale infestations of noxious weeds were determined to be the primary causal factor for two allotments in the STR Watershed **not** meeting one or more of the Standards for Land Health (Hungry Hollow and Brandon Pasture).

Large scale ground disturbances from historic mining (dredging) along most streams in the Watershed as well as small dispersed areas in the uplands, combined with infrastructure (roads, timber harvest, etc.) has provided open niches for noxious and invasive species. These opportunistic and very competitive species have spread throughout the Watershed primarily along road systems, utility corridors and within other disturbed areas but are also beginning to encroach into some undisturbed upland sites. Most of these noxious weeds are unpalatable and/or poisonous to animals thereby giving them a competitive advantage over desirable grasses and forbs. Noxious and invasive species germinate early in the growing season utilizing available water and soil nutrients eventually resulting in, or moving towards, monocultures of vegetation. Monocultures, or areas with reduced vegetative diversity, have increased bare ground and reduced water percolation into the soil causing increased runoff and soil erosion.

Cheatgrass, though not a noxious weed, is an issue in the STR Watershed because it occurs in various sized patches throughout the lower elevations in the Watershed. Cheatgrass is an extremely competitive early cool season species that flourishes in disturbed sites and has the potential to shorten the fire return interval because it becomes a fine flashy fuel as it cures in early summer.

Objectives

- Contain, control and/or eradicate existing infestations of noxious weeds using Integrated Weed Management methods.
- Prevent new infestations of noxious weeds from getting established.
- Obtain and maintain an inventory of weed locations within the area to help develop priority control objectives and methods.
- Prevent or minimize the spread of cheatgrass.

Site-specific noxious weed objectives and monitoring methods to measure progress are found in Appendix B, STR Monitoring Plan.

1.4.4.2 Resource Concerns

1. Special Status Species

Special Status Species include federally listed Threatened, Endangered, Proposed, and Candidate Species, and BLM Sensitive Species. See the STR Watershed Biological Evaluations (BE) on T&E species, Special Status Plants, and Special Status Fish in Appendix C.

Objective

- Provide habitat to maintain a viable and diverse populations of native plant and animal species, including special status species.

2. Socioeconomics

Utilization of timber resources from public lands has historically resulted in an economic benefit to Madison County. The potential for utilization of commercial forest products still exists.

Many ranches that hold grazing permits on public lands administered by the BLM have developed operations that tightly weave public land grazing preferences together with private land management. For these ranches, calving, breeding, haying, feeding, shipping, summer pasturing, and marketing schedules have evolved in tandem with the stocking rates and season of use on the public land allotments.

Businesses in Twin Bridges, Sheridan, Alder, Virginia City and Ennis which are likely to profit from recreational uses that occur in the STR Watershed area. The BLM currently authorizes two commercial operators who provide outdoor recreation opportunities to the public in the STR Watershed.

Table 56 on page 286 of the Proposed Dillon RMP and Final EIS shows employment and labor income response related to livestock grazing management, timber management and recreation use for the area influenced by the Dillon Field Office.

Objective

- Continue to contribute to the local economy by providing an opportunity for sustainable uses on public land through livestock grazing, utilization of forest products, and recreational opportunities.

1.5 Decisions to be Made

The BLM is preparing this EA to allow the Authorized Officer to make a reasoned and informed decision regarding unhealthy forest conditions, hazardous fuels conditions, noxious weed management, mitigation of conifer expansion into sagebrush steppe habitat

and riparian areas, and revision or renewal of Term Grazing Permits. Revised Term Grazing permits will contain appropriate Terms and Conditions to initiate significant and measurable progress towards achieving the Land Health Standards and established goals and objectives within the STR Watershed.

The Dillon Field Manager will choose the alternative that best addresses the issues and resource concerns identified through public scoping and in the STR Watershed Assessment Report.

The Dillon Field Manager must also determine if the selected alternative is a major Federal Action that significantly affects the quality of the human environment. If he determines that it is, then an EIS must be prepared before the STR Management Plan can proceed.

Implementation of the Decisions issued as a result of this EA will begin in 2007, but full implementation may take five to ten years and is subject to budget constraints. The decisions will be implemented in consultation and coordination with the affected permittees, the agencies having lands or managing resources within the area and other interested parties. As with all similar BLM decisions, affected parties will have an opportunity to protest and/or appeal these decisions.

1.6 Applicable Legal and Regulatory Requirements

- Title 43, Code of Federal Regulation, Part 4100
- Taylor Grazing Act of June 30, 1934, as amended
- Sikes Act of 1960, as amended (Habitat improvement on Public Land)
- National Historic Preservation Act of 1966, as amended
- Carlson-Foley Act of 1968 (Weed Control on Public Lands)
- National Environmental Policy Act of 1969 (NEPA)
- Endangered Species Act of 1973
- Federal Noxious Weed Act of 1974, as amended in 1988, 1994
- Federal Land Policy and Management Act of 1976 (FLPMA)
- Fishery Conservation and Management Act of 1976
- Clean Water Act of 1977
- Public Rangelands Improvement Act of October 25, 1978
- Fish and Wildlife Improvement Act of 1978
- State of Montana Streamside Management Zone Law of July 1991
- National Fire Plan of 2000
- Healthy Forests Initiative of 2002
- Healthy Forests Restoration Act of 2003
- Dillon Resource Management Plan of 2006

1.7 Coordination Requirements

According to 43 CFR subparts 4110, 4120, 4130 and 4160, coordination requirements include affected permittees or lessees, the interested public, the State having lands or

responsible for managing resources within the area, other Federal or State resource management agencies, and the Resource Advisory Council.

“Interested public” means an individual, group or organization that has submitted a written request to the Authorized Officer to be provided an opportunity to be involved in the decision making process for the management of livestock grazing on specific grazing allotments or has submitted written comments to the Authorized Officer regarding the management of livestock grazing on a specific allotment.

Following the STR Watershed Assessment Report and Determination of Standards, BLM met with other federal agencies, state agencies, permittees and the interested public while developing this EA. A full list of persons and agencies consulted is in Chapter 5.

2.0 Description of Alternatives

This chapter describes the alternative development process, alternatives considered but eliminated from further analysis, and alternatives that will be carried forward and fully analyzed. At least three management alternatives will be fully analyzed: the No Action Alternative (continuation of current management) and two action alternatives. In some allotments more than three alternatives may be considered. Various combinations of tools, allowable use levels, grazing strategies and projects were discussed at length and carefully considered during scoping and during the formulation of the alternatives by the IDT.

2.1 Process Used to Formulate Alternatives

The development of management alternatives for the STR Watershed was guided by provisions of FLPMA, NEPA, and the planning criteria listed in Chapter 1. Other laws and BLM planning regulations and policy also directed alternative considerations and focused the alternatives on appropriate watershed-level decisions. Chapter 1 discusses the driving issues and resource concerns considered during alternative development. The Affected Environment (Chapter 3) discusses resource concerns and other factors considered during alternative development.

Forest health and fuels treatment areas will be identified for the entire Watershed in both action alternatives. Specific activities proposed for implementation in the near future will be analyzed within the context of this document. Other long term activity plans will be included in Alternative C of this EA but will require supplemental NEPA documentation to analyze site specific details once they are determined.

2.2 Alternatives Considered but Eliminated from Further Analysis

Proposed alternatives that would not make significant progress towards meeting the objectives of the proposed action (section 1.2) or that are not consistent with the intent of current BLM legal and regulatory requirements or policy are not analyzed in this document. Alternatives proposing exclusive production or protection of one resource at the expense of other resources are not considered. FLPMA mandates the BLM to manage public lands for multiple use and sustained yield. This eliminates alternatives such as closing all public land to livestock grazing or oil and gas leasing, or managing only for wildlife values at the exclusion of other considerations. In addition, resource conditions do not warrant watershed-wide prohibitions of any specific use. Each alternative considered in this EA allows for some level of support, protection, and/or use of all resources present in the planning area.

2.2.1 Elimination of Livestock Grazing

Eliminating livestock grazing on all BLM-administered lands in the STR Watershed was considered, but eliminated from detailed study because it does not meet the purpose and need of this EA. This management action was previously analyzed in the Mountain

Foothills EIS (March 1980), the Dillon RMP (February, 2006), and was rejected because it is not consistent with the intent of other applicable acts, laws, and policies.

2.3 Description of Alternatives

2.3.1 Features Common to all Alternatives, Including the No Action

Fire Management

- The management of naturally occurring wildfire in the northern portion of the Ruby Mountain WSA will continue as defined in the Dillon RMP and Dillon Fire Management Plan. Fire is desired in this area and may be managed to improve vegetation and watershed condition. Suppression action will be initiated on fires that do not fall within defined parameters or are a threat to public safety or private property.

Livestock Management

- Term Grazing Permits will be renewed for 21 allotments determined **not** to have resource issues or concerns relating to current livestock management. These allotments are: Baker Summit, Ballard, Brandon, Brandon Isolated, Copper Mountain, Downey Creek, Dry Lakes, Funk, Elser, Georgia Gulch, Granite Creek, Hillside, Hungry Hollow, Lott, Mill Gulch, McGovern, Miller, South Daisy, Valley Garden, Wisconsin Creek and Wisconsin Creek Isolated.
- Temporary electric fence, livestock supplement placement, riding, and herding are encouraged and if warranted, may be required as means of improving livestock distribution in all alternatives. When used, livestock supplement should be placed on ridges or terraces at least ¼ mile from the nearest livestock water source in areas naturally devoid of vegetation.

Travel Management and Roads

- Travel restrictions under the Dillon RMP Travel Management Plan will be implemented. Roads identified as open to public use will be signed as open, similar to the way roads are signed as open on State Wildlife Management Areas, with a green dot or arrow symbol on a flexible sign post (see Travel Management Map 2, Appendix A). Roads not identified as open to public use will be:
 - Left unsigned unless there is evidence of regular use.
 - Signed closed if there is evidence of regular use.
 - Obliterated to the extent possible (made unnoticeable), at least at the intersection with an open route, if signing is ineffective to discourage regular use.
 - Physically closed to prevent vehicle traffic only when continued use is causing significant unacceptable resource impacts or user conflicts.

Noxious Weeds

- Management of noxious weeds will continue in cooperation with Madison County, federal and state agencies, private landowners and other partners.
- All invasive species on the Montana state noxious weed list will be treated as resources allow.
- Areas where landowner support and cooperation is the highest will be given the highest priority for treatment.

Special Status Species

- Amend term grazing permits in migration/dispersal corridors on California Creek, Virginia City Hill, Fletcher Moore, Benchmark, Dry Lakes, Ballard, Mill Gulch, Downy Creek, South Daisy, Granite Moore allotments to state that depredation losses from grizzly bear and wolves are possible.
- Initiate sagebrush habitat inventory to identify important sage grouse seasonal habitats with emphasis on locating active leks and brood-rearing habitats.
- Activities that disturb mineral soil (such as blading, plowing, ripping, etc.) may not be allowed within the boundaries of populations of special status plants. In habitats likely to support rare plants, field inspections will be conducted to search for special status plant species prior to authorizing surface disturbing activities. If rare plants are found in the course of the botanical survey, adverse impacts will be mitigated through project abandonment or redesign.

Wilderness

- Manage the Ruby Mountain WSA in accordance with the Interim Management Plan and Guidelines for Lands Under Wilderness Review.

Recreation

- Dispersed recreational activities will continue to be managed consistent with other resource management objectives. Special Recreation Permits will continue to be considered on a case-by-case basis with the exception of big game hunting. Outfitted big game hunting will continue to be limited to existing permits and use levels will be based on historical use levels. Opportunities for big game hunting, wildlife viewing, horseback riding, and other backcountry recreation will be maintained.

Cultural Resources

- As required by Section 106 of the National Historic Preservation Act, a Class III cultural resource inventory is required prior to the implementation of any proposed range or habitat improvement projects. Should significant cultural resources be identified, adverse impacts will be mitigated through project abandonment or redesign. Care will be taken to avoid and protect significant cultural resources and any standing structures (should they occur) during the course of any proposed prescribed fire treatments. In addition, personnel from the BLM should be notified of the presence and location of any cultural resources if

encountered by any of contractors or permittees during the course of operations on public lands.

Monitoring

- Under all alternatives, resource monitoring will be conducted to measure progress toward meeting site-specific objectives. Monitoring will be done according to the monitoring plan shown as Appendix B.

2.3.2 Description of Alternative A - No Action (Continuation of Current Management)

No Action is defined as the continuation of current management. This alternative will be analyzed to serve as baseline information for the Authorized Officer to make a reasoned and informed decision.

Conifer Treatments

Under the No Action Alternative, no new conifer treatments (for forest health, fuels reduction, or encroachment treatment) would be implemented.

Livestock Grazing Management

Under Alternative A, livestock management would continue as per the current Terms and Conditions in all 30 grazing allotments. No new range improvement projects would be constructed.

Table 3: Current Grazing Allotments Summary

Allotment name, number and category	Authorization Number	Season of Use	Livestock Number & Kind	¹ Grazing System	BLM Stocking Rate:	BLM AUMs	BLM Acres	Other Ownership	Total Acres
Baker Summit 10487 (C)	2500172	5/15-10/20	2 Cattle	Season Long	16:1	26	428	0	428
	2500087	5/15-10/28	3 Cattle						
Ballard 10456 (I)	2505663	6/15 – 9/29	36 Cattle	Season Long	8:1	127	1022	905	1927
Benchmark 20489 (M)	2505664	5/1-9/1 in south pasture	131 Cattle	Season Long	4:1	212	1057	3980	4881
	2505694	10/3-11/1 in north pasture	131 Cattle						
Brandon 20481 (M)	2505775	6/2 - 6/15	113 Cattle	Season Long	10:1	65	652	188	840
	2500146		58 Cattle						

Allotment name, number and category	Authorization Number	Season of Use	Livestock Number & Kind	¹ Grazing System	BLM Stocking Rate:	BLM AUMs	BLM Acres	Other Ownership	Total Acres
Brandon Isolated 10448 (C)	2500146	5/1 – 6/15	1 Cattle	Season Long	4:1	2	8	116	124
Cal Creek 10507 (M)	2500087	6/1 – 10/15	965 Cattle	RR	5:1	1130	6066	15734	21904
Copper Mountain 10531 (I)	2505535	6/15 – 10/15	83 Cattle	Season Long	5:1	104	549	1226	1775
Cow Creek 20446 (C)	2505732	5/16 – 5/31	6 Cattle	Season Long	10:1	5	48	0	48
Downey Creek 20581 (C)	2505663	6/1 – 10/14	5 Cattle	Season Long	18:1	22	398	1347	1745
Dry Lakes 20526 (C)	2505779	6/1 – 10/23	32 Cattle	Season Long	7:1	152	1146	5112	6258
Elser 20477 (C)	2505728	7/1 – 10/10	7 Cattle	Season Long	13:1	23	301	414	715
Fletcher-Moore 30428 (I)	2505694.	5/15 – 12/1	33 Cattle	Season Long	8:1	213	1721	6960	8681
Funk 10478 (C)	2505729	6/1 – 10/30	5 Cattle	Season Long	12:1	23	271	842	1113
Georgia Gulch 20348 (I)	2500148	5/1 - 9/1	78 Cattle	DR	9:1	232	2077	1641	3719
Granite Creek 10468 (M)	2505720	5/16 – 9/29	60 Cattle	Season long	9:1	184	1655	597	2252
Granite-Moore 10427 (C)	2505694.	5/20 – 10/20	31 Cattle	Season Long	9:1	157	1412	136	1548
Hillside 10514 (C)	2505766	5/1 – 2/28	3 Cattle	Season Long	8:1	36	282	534	816
Hungry Hollow 10491 (C)	2500154	5/15 – 0/29	32 Cattle	Season Long	14:1	177	2418	5625	8043
Lott 10331 (C)	2505705	8/16 – 0/14	20 Cattle	Season Long	10:1	39	379	800	1189
	2505792	06/12 - 6/13	trailing permit						
Mc Govern 00957 (M)	2500112	6/01-10/01	121 Cattle	Season Long	7:1	249	1639	4236	5875
	2500087	6/01-10/15	84 Cattle						
Mill Gulch 10475 (M)	2505726	6/15 – 9/24	53 Cattle	DR	7:1	80	531	262	793

Allotment name, number and category	Authorization Number	Season of Use	Livestock Number & Kind	¹ Grazing System	BLM Stocking Rate:	BLM AUMs	BLM Acres	Other Ownership	Total Acres
Mill Gulch Isolated 20450 (C)	2505726	6/1 – 10/1	5 Cattle	Season Long	5:1	20	98	325	423
Miller 20418 (C)	2500103	3/1 – 2/28	2 Horse	Season Long	10:1	4	40	122	162
Ramshorn 10552 (I)	2505784	5/20-7/2	183 Cattle	Season Long	10:1	204	2037	1629	3666
	2500944	6/1-6/30	70 Cattle						
Sand Coulee 20679 (I)	2500167	5/1 – 11/15	6 Cattle	Season Long	14:1	42	590	43	633
South Daisy 20399 (M)	2505682	6/21–7/15	14 Cattle	Season Long	16:1	89	1382	242	1624
	2505694	7/15 – 10/14	12 Cattle						
Valley Garden 10547 (C)	2505594	6/1 – 7/21	6 Cattle	Season Long	8:1	10	81	0	81
Virginia City Hill 10521 (M)	2505664	5/1 – 11/24	187 Cattle	RR	4:0	396	2722	5712	8182
	2500145	6/15 – 9/01	15 Cattle			39			
Wisconsin Creek 10501 (I)	2505753	6/15 – 10/25	55 Cattle	Season Long	7:1	202	1381	338	1715
Wisconsin Creek Isolated 10523 (C)	2505753	5/15 - 10/12	5 Cattle	Season Long	20:1	2	40	0	40
TOTALS					7:2	4,530	32,431		

¹Abbreviations: RR= rest rotation, DR = deferred rotation

Noxious Weeds

Under Alternative A, treatment of noxious weeds would continue as in the past with the vectors of spread (roads, trails, and washes) being the primary targets. On average, one hundred acres would be treated with herbicides annually within the Watershed.

2.3.3 Features Common to Alternatives B and C

Commercial Harvest/Prescribed Fire

- Both action alternatives will analyze utilizing conventional ground-based harvesting equipment and/or helicopter logging.
 - Ground based harvest techniques would include hand or machine falling

and then tractor and/or cable yarding the merchantable timber to landings. Ground-based harvest equipment would require yarding distances of up to 1,500' for practical operations and access to log landings.

- Helicopter harvesting would include hand or machine falling (on slopes <45%) and then helicopter yarding the merchantable timber to landings. Helicopter yarding distances would be up to one mile but usually under ½ mile.
- Standard timber sale contract provisions which provide protection from erosion, sedimentation, and soil compaction would be adhered to.
- Harvest activity and associated operations in helicopter yarding units would be allowed year-round. Harvest activity and associated operations in ground based yarding units would be permitted between December 2 and October 15; activity would be allowed between October 16 and December 1 in one drainage at a time.
- All harvest activity would be under a three year contract.
- At the minimum, an average of two to five existing snags or green recruitment snags would be left per acre within all commercial harvest units. The only exception would be in previously treated Douglas-fir stands in the Meadow Creek area as described in section 2.3.3 below.
- Retention patches of uncut timber would be scattered throughout the harvest units to provide wildlife screening cover and reduce sighting distances.
- If market conditions permit, biomass material may be removed from within mechanical treatment units. Sufficient residual biomass material (10-20 tons/acre) would be left on site to maintain nutrient recycling and desirable microsite conditions.
- Log landings would be reseeded with native grasses/forbs.
- One season of rest may be needed prior to prescribed burning to allow sufficient fine fuels (grasses) to ensure a successful burn. Generally, two growing seasons of rest will be required following burns to allow re-growth and re-establishment of vegetation in the treated areas.
- Prescribed burning treatments that are associated with harvest would be intended to consume residual slash and to kill or remove 60% or more of encroaching conifers less than thirty feet tall. Prescribed burn treatments would target areas where Douglas-fir or juniper is encroaching into grassland/sagebrush or into aspen clones. Some portions of the identified harvest/prescribed burn units do not contain a merchantable wood product, but encroachment is present and would be targeted for treatment using prescribed fire. Prescribed burn unit boundaries within harvest units would be based on topographical features such as ridges and drainages.
- Treatment by prescribed fire would only be completed where the ground fuels and conifer trees are in a condition that would meet the prescription objectives. Prescribed burning requires an approved burn plan prior to implementation. In areas where vegetation conditions would not allow prescribed fire to achieve the objectives alone, a combination of mechanical treatments followed by prescribed burning may be utilized. In conifer encroachment areas, an emphasis would be placed on maintaining 50% of the mature sagebrush canopy cover on a drainage basis.

- The implementation of prescribed fire treatments would occur over the next five to ten years. Units would be burned as fuel and weather conditions allow. Fire managers would coordinate the timing of prescribed fire treatments (seasonally) and the area treated per year to minimize public resource use conflicts.
- In Harvest units, prescribed burning would take place within five years following harvest to consume residual slash.
- Treatment of noxious weeds and cheatgrass in association with harvest/burn units would be determined on a case-by-case basis.
- The BLM staff would coordinate prior to vegetation treatments to determine if prescribed burns, commercial harvesting and road construction require an extended buffer zone of up to 300' adjacent to fish bearing streams, or if treatment is desirable within the SMZ as allowed under alternative practices protocol.
- Guidelines as described in the Montana Streamside Management Zone (SMZ) law will be the minimum standard design features for harvest operations unless alternative practices authorizations are obtained.

Silvicultural Prescriptions

Silvicultural prescriptions for all commercial harvest treatment units are as follows. Assume removal of merchantable products where practical from treatment units.

Dead/Dying Douglas-fir

Where practical, cut and remove up to 95% of dead/dying trees <35" diameter at breast height (DBH). Leave all Douglas-fir snags >36" DBH unless they present safety hazard. Harvest all green Douglas-fir with extensive budworm damage and/or evidence of successful bark beetle attack



Granite Creek area



California Creek area
Historic Douglas-fir savannah with second growth understory

Green Douglas-fir and Mixed Conifer

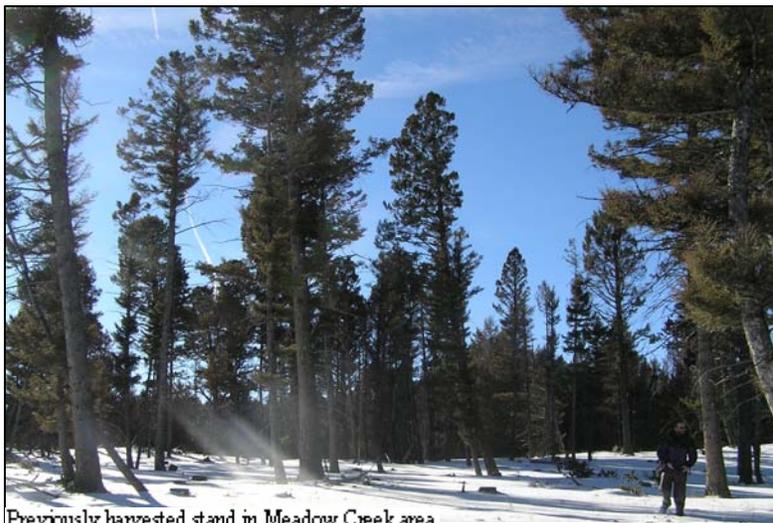
Thin Douglas-fir from below to an average residual basal area of 80 ft²/acre where trees occur. Basal area would vary from 20 to 120 ft²/acre depending on local site conditions and historic fire occurrence.

For associated intermixed species:

- Lodgepole pine – harvest all live infested trees and 90% of dead/dying trees. Where green un-infested lodgepole exists, patch cut up to 5 acres, leaving groups of 10-25 trees per acre where feasible. Patch cuts would be separated by leave patches of up to 5 acres.
- Subalpine fir – cut
- Engelmann spruce - in patches >1 acre in size, patch cut in up to ½ acre blocks. Leave all Engelmann spruce in SMZs, and if in patches <1 acre in size.



Mixed conifer stand in Fletcher Creek area



Previously harvested stand in Meadow Creek area

Previously managed Douglas-fir
(primarily in the Meadow Creek area)

Cut and remove recent dead/dying trees as needed to maintain residual stand health. Leave all existing snags unless they pose a safety hazard.

Aspen

Cut all conifers within two aspen tree heights of viable aspen clones. All non-merchantable material would be left on site to protect aspen sprouts from browsing. Follow up prescribed burning would aim to consume the fine hazardous fuels but retain the larger woody component.



Lodgepole pine <6" DBH

Do not treat. Where logging access is necessary, minimize skid trails.

Upland Conifer Treatments

- In upland conifer treatment units, the goal would be to kill/remove 60% or more of conifers, primarily juniper, less than 30 feet tall. Treatments would focus on reducing fuels near critical transportation routes and other areas with continuous conifer fuels near the WUI and to restore sagebrush steppe habitat. Treatments would avoid areas with slopes greater than 70%, rocky areas, or where ground vegetation is sparse and mineral soil is exposed. Within treatment areas, discontinuous patches or islands of conifers would be left untreated in non-uniform shapes. Untreated islands would vary from 1/10th of an acre to several acres in size. Treatments would be a combination of cutting (followed by lopping and scattering), herbicide targeting juniper, cutting and piling to be burned in areas with sufficient moisture to prohibit fire spread, and/or removal of wood material for biomass utilization or other minor forest products (e.g. fence posts, decorative wood). No new roads or stream crossings would be required for upland conifer treatments. Herbicide treatment would include Spike 20P or Spike 80 DF under the drip line, Tordon 22K applied around the basal bark of individual juniper trees, or Velpar L applied to the foliage of smaller trees. Labels would be strictly adhered to.
- Pre-treatment weed inventory/control and post treatment weed control would be completed within each unit.

Riparian Conifer Treatments

- An application for SMZ Alternative Practice would be filed with the Montana Department of Natural Resources and Conservation (DNRC) for treating of conifers within the SMZ. SMZ laws and stipulations contained within the approved Alternative Practice would be followed for all vegetation treatments in or near riparian areas.

- In riparian juniper treatments, the goal would be to kill/remove 100% of the juniper within the riparian zone. Depending on the tool(s) used, a range of 80 – 95% mortality would be considered successful. The tools that would be used include mechanical, chemical and prescribed fire. These treatments may be followed by seeding with an appropriate native seed mix depending on the current canopy cover of juniper and herbaceous understory composition and cover.
- No new roads or stream crossings would be constructed to complete the riparian juniper treatments.
- Mechanical treatment would consist of sawing down the juniper with chainsaws and other hand tools. On specified reaches, the felled juniper would be oriented along the stream bank to mitigate potential erosion and streambank impacts by authorized livestock and wild ungulates.
- Herbicide treatment would include Spike 20P or Spike 80 DF under the drip line, Tordon 22K applied around the basal bark of individual juniper trees, or Velpar L applied to the foliage of smaller trees. Labels would be strictly adhered to.
- Pre-treatment weed inventory/control and post treatment weed control would be completed within each unit.
- Implement appropriate post-treatment livestock management on all riparian juniper treatment areas to allow woody and herbaceous plant restoration. Post treatment management would include a minimum of two growing seasons of rest from livestock use to allow vegetative response from existing or seeded understory vegetation. Resumption of grazing would be in accordance with AMPs for affected allotments and pastures. Other tools, such as orienting the felled juniper along the stream, temporary fencing or hot tape may be used to allow the appropriate rest. Effectiveness monitoring would be established in each treatment unit (Appendix B) and would be used to determine if additional rest is necessary to meet objectives.

Livestock Management

- Changes would be initiated during the 2007 grazing season. Up to five years would be allowed to phase in projects and operational changes described under action alternatives, increasing economic and logistic feasibility for permittees and the BLM.
- AUMs reduced from current active use would be held in suspended non-use on the revised Term Grazing Permits.
- Annual utilization guidelines on cool season bunch grasses would be 50% (to maintain plant health/vigor) OR when livestock use on sedges averages 4 inches along the greenline (to prevent excessive trailing along streams) on non-fisheries or non native fisheries streams and 6 inches on WCT streams, whichever occurs first. These annual use guidelines would be applicable to all allotments included in the STR as a tool to help determine moves between pastures and in conjunction with long term trend data to determine management effectiveness.
- **The Benchmark Allotment** would be divided and incorporated into the **Granite-Moore** and **Virginia City Hill** allotments (Map# 3, Appendix A).
- The **Virginia City Hill Allotment** would be divided into two allotments along state Highway 287. The portion north of the highway would remain the V.C. Hill

Allotment and pastures south of highway would be a new allotment named **Madison Overlook** (Map# 3, in Appendix A).

Table 4: Administrative Changes to Allotments under Alternatives B & C

Allotment Name, Number and Category	Authorization Number	Livestock Number & Kind	Begin Date	End Date	Percent Public Land	BLM AUMs
Granite-Moore 10427 (M)	2505694	Livestock numbers and season of use vary by Action Alternative. See table # 11 for Alternative B and table # 21 for Alternative C.			41	198
Virginia City Hill 10521 (M)	2505664	340 cattle	06/01	10/15	37	567
Madison Overlook XXXX (M)	2500145	177 cattle	06/01	11/15	29	284

- The Lake Pasture (pasture #58), containing 241 acres and 44 AUMs of forage, would be removed from the **Cal Creek Allotment**. The permittee will voluntarily relinquish the grazing preference on the public land within this pasture (see Map # 4, Appendix A).

Table 5: Changes to Cal-Creek Allotment

	Number/Kind	Total Acres	BLM Acres	% Public Land	BLM AUMs
Current	965 Cattle	21,904	6,170	26	1,131
Alternative C	832 Cattle*	20,431	5,929	29	1,087

* Animal units are based on the following formula: season of use x number of livestock / 30.41666 (average # of days in a month) x % public land

Most of the private land in the Lake Pasture was sold in 2006. This private property is designated as part of the base property for the Cal-Creek Allotment and in accordance with BLM regulations, if a permittee loses ownership of all or part of his/her base property, the permit or lease based upon the lost property shall terminate immediately (43 CFR 4110.2-1 (d)). The permit will be adjusted on a pro rata basis (43 CFR 4110.2.2 (c)(1)).

Individuals or business entities that acquire all or a portion of designated base property must submit an application for the transfer of a proportional amount of the grazing preference within 90 days of the date of sale. The new owner of the base property in the Lake Pasture is not in the livestock business and did not submit a timely application. Therefore, at the request of the Cal- Creek permittee the Lake Pasture would be removed from the Allotment to mitigate possible future land use conflicts.

The Dillon RMP outlines management guidance on Allotments that are relinquished or cancelled (Livestock Grazing, Action # 21, page 43). It states (in part) that voluntarily relinquished allotments (or pastures) will be evaluated to determine if they meet the Standards for Rangeland Health. If they do, as is the case of the Lake Pasture, then a determination will be made if it can be managed as a distinct grazing unit, or if it is in an area where a Resource Reserve Allotment is needed. The Lake Pasture is not manageable as a distinct unit or allotment or recommended as a Resource Reserve Allotment. Therefore, it would be designated as un-allotted. Incidental livestock use would continue by two herds trailing through on the county road. Trailing cattle would not be authorized to overnight on public land in the Lake Pasture.

- Alternatives B and C would include adjustments to grazing management and/or construction of structural range improvement projects to mitigate site specific riparian/wetland concerns in nine grazing allotments. The effected allotments are **Benchmark, Cal-Creek, Cow Creek, Fletcher-Moore, Granite-Moore, Mill Gulch Isolated, Ramshorn Creek, Sand Coulee, and Virginia City Hill.**
- In the **Wisconsin Creek Allotment**, reconstruct a dysfunctional water development in upper RU-135 and consider fencing out two additional secondary springs in the drainage. An enclosure fence would be built to protect the main spring source and the associated wetland habitat. A couple hundred yards below the spring an old headbox would be replaced and water diverted into a water trough adjacent the drainage (Map 6, Appendix A).

Noxious Weeds

- Target Dalmatian toadflax in the Brandon Pasture allotment with *Mecinus janthinus*, a stem boring weevil, and herbicide to keep the infestation from spreading and to reduce both the size and density of the infestation.
- Concentrate treatments on large infestations of spotted knapweed in the west half of section 19 in the Hungry Hollow allotment.
- Any new noxious weed infestations would be targeted for prompt eradication before they have a chance to get well established.
- The STR Watershed would be divided into three weed treatment units. Each unit would receive a more intensive treatment once every third year on a rotating schedule.
- The BLM would try to acquire abandoned mine reclamation monies to help with treatment of weeds on mining property as well as search out other sources of funding to help with control in other areas.
- Seed head weevils, *Larinus minutus*, root boring weevils, *Cyphocleonus achates*, and root boring moths, *Agapeta zoegana*, would be released as biological controls on larger infestations of spotted knapweed to reduce the competitiveness and help control spread of knapweed.

Roads

- Existing two track or currently closed roads that do not meet State of Montana BMP standards would either be upgraded to meet BMPs or would not be used for forest product removal. Use of existing public access roads would be evaluated for additional watershed protection measures as needed on a case by case basis.
- Construction standards on new temporary roads would be to the minimum required for safe transport of merchantable material. Road locations would be designed to minimize stream or wet area crossings.
- All currently closed two track and new temporary roads used for forest health treatments would be closed upon the completion of forest management activities except in unit GRA 4 as specified in section 2.3.4 below. Post-treatment road closure would be accomplished by placing slash material on the road surface to preclude vehicle use and/or recontouring, and reseeded with native grasses/forbs. Roads that could be left open in Alternative C would be determined by additional NEPA if the decision is made to implement those treatment units.

Stream Crossings

- All applicable State and Federal Permits would be obtained and all permit conditions would be followed. State of Montana Best Management Practices (BMPs) and the SMZ laws would be followed for all forest health treatments or road activities in or near riparian areas.
- Projects which are likely to cause turbidity impacts would require file a State of Montana 318 Authorization (Short Term Water Quality standards for Turbidity) if determined necessary.
- New stream crossings on existing or new roads would be constructed based on site specific resource concerns and could be culvert installations, hardened crossings or bridges.
- Crossings constructed on temporary roads would be removed after the project is completed, reshaped and re-seeded with native grasses/forbs.

Water Developments

- All applicable State and Federal Permits would be obtained and all permit conditions would be followed.
- Springs and natural wet meadows would be protected when developing water for livestock. Spring sources and in most situations, associated riparian wetland habitat, would be fenced to exclude livestock use on all developed springs. Adequate water would be left at the spring source to maintain wetland hydrology, hydric soils, and hydric vegetation. Flow measurements would be gathered at springs proposed for new development. Springs that have inadequate flows to provide a reliable water source for authorized livestock while maintaining existing wetland/riparian habitat would not be developed. Photographs would be taken to document pre-development spring conditions.
- Any water developments and associated stock tanks that are no longer in use would be removed, but fence enclosures to protect the spring source may be retained and maintained.
- Wildlife escape ramps would be installed in all water troughs.

- No new roads would be authorized as a result of water developments. Permit holders may be authorized to travel along pipeline routes to perform maintenance as defined in the term grazing permit.
- All old materials (pipeline, troughs, head boxes, etc) would be cleaned up and removed when springs are re-developed or maintained.
- Soil disturbance resulting from pipeline installation would be seeded with a native seed mix during the fall following construction.

Fences

- Any new or replacement boundary fences would normally be a 4-wire fence and any new interior (pasture) fences would normally consist of 3 wires, constructed in conformance with BLM Fencing Handbook H-1741-1.
- Existing BLM fences that impede wildlife movement would be modified or rebuilt to BLM specifications on a prioritized schedule.

2.3.4 Description of Alternative B

Forest Health, Upland Conifer and Prescribed Fire Treatments

Alternative B would allow salvage harvest of dead/dying timber, sanitation harvest of live trees, thinning of high density conifer stands, harvest of conifers in and around aspen stands, and opportunities for commercial removal of biomass as well as public utilization of forest products. Prescribed burns would also be implemented to reduce residual slash after harvest activities, protect WUI areas, promote aspen, and reduce conifer expansion into aspen, sagebrush and grasslands.

Table 6 outlines the proposed units, objectives, treatment types, prescriptions and the affected allotments under Alternative B. Unit locations and boundaries are shown on the Map 7, Appendix A.

Table 6: Forest Health, Upland Conifer, and Prescribed Fire Treatments, Alternative B

Unit Name	Allotment	Acres	Objective(s)*	Treatment Type(s)
ALD 1	Cal-Creek	485	↓ juniper encroachment, protect WUI	Upland conifer treatment
CAL 3	Cal-Creek	406	↑ forest health	Commercial harvest/Prescribed fire
GRA 1	Granite-Moore	87	↓ conifer encroachment	Prescribed fire
GRA 2	Granite-Moore	18	↓ conifer encroachment	Prescribed fire
GRA 3	Granite-Moore	26	↑ forest health	Commercial harvest/Prescribed fire
GRA 4	Granite-Moore	103	↑ forest health	Commercial harvest/Prescribed fire
HUN 1	Hungry Hollow	209	↓ juniper encroachment	Upland conifer treatment
MEA 1	So. Daisy	29	↓ conifer encroachment, protect WUI	Prescribed fire
MEA 2	So. Daisy & Fletcher-Moore	728	↑ forest health	Commercial harvest/Prescribed fire

Unit Name	Allotment	Acres	Objective(s)*	Treatment Type(s)
MEA 3	So. Daisy	703	↑ forest health, protect WUI	Commercial harvest/Prescribed fire
MEA 4	So. Daisy	230	↑ forest health, protect WUI	Commercial harvest/Prescribed fire
MIL 1	Mill Gulch	208	↓ conifer encroachment	Prescribed fire
NUG 2	Georgia Gulch	76	↑ forest health	Commercial harvest/Prescribed fire
QUA 1	Cal-Creek	96	↓ juniper encroachment, protect WUI	Upland conifer treatment
RAM 1	Ramshorn	232	↑ forest health	Commercial harvest/Prescribed fire
RAM 2	Ramshorn	43	↑ forest health	Commercial harvest/Prescribed fire
WIS 1	Wisconsin Creek	182	↓ conifer encroachment, protect WUI	Prescribed fire
WIS 2	Wisconsin Creek	138	↓ conifer encroachment, protect WUI	Prescribed fire
WIS 3	Wisconsin Creek	116	↓ conifer encroachment, protect WUI	Prescribed fire
WIS 4	Wisconsin Creek	372	↑ forest health	Commercial harvest/Prescribed fire

* Abbreviations: ↑=increase ↓=decrease

Description of Commercial Harvest Units

Treatment would follow the silvicultural prescriptions and design features described above in Section 2.3.3.

CAL 3 - The north side of California Creek is a south-southwesterly, dryer aspect with green Douglas-fir, scattered lodgepole pine, and intermixed pockets of aspen in moist areas. The south side of California Creek is a northerly, cooler aspect with mixed conifers (Douglas-fir/lodgepole pine and Engelmann spruce in the stream bottom). Both sides have active spruce budworm defoliating the Douglas-fir and mountain pine beetle is present in lodgepole pine at endemic levels with a high probability to reach epidemic levels. The north side would be tractor yarded with products removed utilizing an existing road (requiring two new temporary culverts) and two new temporary roads. The south side would primarily be cable yarded with some small areas of tractor yarding with products removed utilizing a new temporary road.

GRA 3 - This unit consists of mixed conifers (lodgepole pine/Douglas-fir). Spruce budworm is epidemic with mountain pine beetle currently at endemic and expected to reach epidemic levels. Products would be tractor yarded down to the existing Granite Creek road system through a young lodgepole pine stand.

GRA 4 – This unit consists mainly of dead/dying Douglas-fir due to epidemic spruce budworm (estimated 30-50% mortality). The remaining live Douglas-fir are continuing to be defoliated and the majority of this stand will likely die without thinning in the next two years. Scattered aspen clones and scattered patches of dead/dying lodgepole pine due to mountain pine beetle are present in the unit. Products would be tractor yarded and removed utilizing a new temporary road (requiring a new temporary culvert).

MEA 2, 3, 4 - These units consist of two types of Douglas-fir stands: (1) previously managed stands that were thinned in the 1980s and have limited spruce budworm impacts (~20% have budworm activity), and (2) directly adjacent unthinned stands that are dead/dying due to severe spruce budworm activity. Products would be tractor or cable yarded and removed by existing roads and new temporary roads (requiring three new temporary culverts).

NUG 2 - This unit consists primarily of green Douglas-fir with endemic spruce budworm. The riparian area along Nugget Creek at the bottom of the unit has a major deciduous component of aspen, cottonwood, dogwood, mountain maple, water birch, and decadent willow, with conifers encroaching and overtopping deciduous species in some areas. An application for an SMZ Alternative Practice would be filed to allow removal of encroaching conifers in the riparian area. Douglas-fir rooted directly in or adjacent to the stream channel would be left in place. Products would be helicopter yarded and removed utilizing the Wet Georgia Road, which would require reconstruction on unmaintained portions and one stream crossing. It would also require reconstruction of an unnamed existing road from the stream crossing to the unit location in Nugget Creek.

RAM 1, 2 - These units consist of a historic Douglas-fir savannah structure with an understory of second-growth Douglas-fir and juniper (green Douglas-fir/mixed conifer stands). Spruce budworm is currently at endemic levels and increasing. Treatment would aim to restore the savannah structure by harvesting second-growth merchantable material and treating sub-merchantable material with prescribed fire following harvest. The presence of WCT may require expansion of the SMZ; prescribed burning within 200' of the SMZ may be restricted or prohibited to reduce or eliminate potential introduction of ash or sediment into the creek. Slash below this no burn zone would be hand lopped to with 18" of the ground and left to decompose. The exact buffer width would be determined on-the-ground by the BLM Forester and Fisheries Biologist. Products would be helicopter yarded to existing roads. Up to six helicopter landings would be utilized along the existing roads. Watershed protection measures such as filter fabric placement, re-spreading and or chipping of slash residues, and recontouring /reseeding disturbed areas would be implemented. Retention of some of the slash material would be considered on a case by case basis for public use firewood or biomass utilization.

WIS 4 - Spruce budworm is currently at endemic levels and increasing. Old stumps and horse logging skid trails scattered throughout this stand indicate that this stand has been a source for local wood products since the 1860s to 1880s. As a result of historic logging, young patches of Douglas-fir are interspersed with older Douglas-fir trees that were left behind. It is estimated that approximately ½ of the upper portion of this stand was cut for wood products. Unless a demand exists for the smaller diameter trees at the time of sale preparation, the majority of these previously entered stands would be untreated. With the exception of scattered older trees, most of the lower portion of this stand has filled with Douglas-fir trees over the past 100-120 years. Products would be tractor and cable yarded and removed utilizing an existing road (requiring reconstruction and one rebuilt

culvert) and a new temporary road. To access this unit, a permanent road re-route and closure of an existing route would be completed.

Permitted removal of firewood or other minor forest products would be available to the public in units **WIS 4, RAM 1, RAM 2, GRA 3, GRA 4 and MEA 2**. Access would be through existing open roads, except in unit **GRA 4**, and any seasonal restrictions would apply. After harvesting operations are completed in unit **GRA 4**, a gate would be installed on the new temporary road and would be open to the public for up to five years. Then the gate would be removed and the road would be either physically closed or recontoured, and reseeded. All other new temporary roads would be closed or reclaimed upon the completion of harvest activity, and would not be available for wood product removal. Where access for firewood or other forest product materials is impractical or creates unacceptable resource conflicts, residual slash material would be burned upon the completion of the purchaser’s activity when conditions permit.

The road and crossing requirements for conifer treatments proposed under Alternative B are shown on Table 7 below and on maps in Appendix A. All other units would be accessed using existing roads only.

Table 7: Roads and Crossings, Alternative B

Unit Name	Allotments	Yarding Type	Upgrade to Existing Road (miles)	New Permanent Road (miles)	New Temp. Road (miles)	Existing Road to be Closed (miles)	Stream Crossings		
							Existing	Rebuilt	New
CAL 3	Cal-Creek	Ground	.3	-	3.3	-	-	-	2
GRA 4	Granite-Moore	Ground	-	-	.6	-	-	-	1
MEA 2	Fletcher-Moore & So. Daisy	Ground	-	-	.1	-	-	-	1
MEA 3	South Daisy	Ground	-	-	.9	-	-	-	-
MEA 4	South Daisy	Ground	-	-	1.0	-	-	-	2
NUG 2	Georgia Gulch	Helicopter	3.36	-	.2	-	-	-	1
WIS 4	Wisconsin Cr.	Ground	1.8	.4	1.1	.2	-	1	-
TOTALS			5.46	.4	7.2	.2	0	1	7

Riparian Conifer Treatments

Under Alternative B, 5.32 miles of riparian habitat would be treated to reduce/remove juniper using a variety of tools. Alternative B includes those riparian areas that based on resource values and current condition, were determined to be the highest priority for treatment to restore or maintain PFC. Included are streams with WCT habitat, water quality impairment, and/or are within WUI treatment units.

The following table outlines the proposed units, objectives and treatment types for riparian juniper treatments in Alternative B. Unit locations and boundaries are shown on Map 7, Appendix A.

Table 8: Riparian Juniper Treatments, Alternative B

Unit Name	Allotment	Reach Name & #	Miles	Objective(s)*	Treatment Type(s)
HOR 1	Sand Coulee & Ramshorn	Horse Creek RU-1; RU-2, RU-73	2.29	↓ juniper encroachment to restore riparian function & WCT habitat	Herbicide, limited mechanical, Rx
RAM 3	Ramshorn	Currant Creek RU-74	.6	↓ juniper riparian encroachment to improve WCT habitat and water quality	Mechanical, primarily in lower part of reach.
RAM 4	Ramshorn	Ramshorn tributary RU-76	.77	↓ juniper riparian encroachment to improve water quality and restore aspen	Mechanical in lower reach; prescribed fire and/or mechanical in upper reach.
RAM 5	Ramshorn	Ramshorn tributary RU-77	.65	↓ juniper riparian encroachment to improve water quality	Mechanical/chemical followed by seeding.
CAL 2	Cal-Creek	Upper California Cr. RU-60	.25	↓ juniper riparian encroachment to maintain PFC and improve WCT habitat	Mechanical/chemical followed by seeding.
HAR 1	Cal-Creek	Upper Harris Cr. RU-25	.61	↓ juniper riparian encroachment to maintain PFC and improve WCT habitat	Mechanical/chemical removal of juniper, specifically on lower 1/3 of reach.
ALD 1r	Cal-Creek	Three-mile Creek RU-279	.15	↓ juniper riparian encroachment to improve riparian function and water quality; protect WUI and Virginia City ACEC	Primarily herbicide, may be some mechanical to enhance WUI treatment.
TOTAL MILES			5.32		

* Abbreviations: ↑=increase ↓=decrease

Permits would be made available to the general public to mechanically remove posts, firewood, Christmas trees and/or decorative wood in all units where there is public access on existing roads.

Description of Riparian Conifer Treatment Units by Stream Reach

HOR 1 (Horse Creek RU-1, 2, and 73) - A combination of mechanical and chemical would be used to treat juniper. Felled juniper would be oriented along the streambank along the lower portion of RU-2 as a barrier to authorized livestock. The treated area would be seeded with native riparian species along the greenline and upland species within the floodplain. Optional projects include in-stream rip-rap to improve gradient, silt fabric to reduce sedimentation along sections of the existing road, and relocation the existing fence to the south along the top of the ridge.

RAM 3 (Currant Creek RU-74) - Mechanical treatment of juniper would occur, primarily in the lower portion of the reach.

RAM 4 (Ramshorn trib. RU-76) - Mechanical treatment of juniper would be used in the lower section of the reach. Felled juniper would be oriented along the streambank as a barrier to trailing livestock. Mechanical treatment followed by prescribed fire would be used to treat the upper portion of this reach with the goal of stimulating aspen. An enclosure, approximately one acre would be constructed around the spring source.

RAM 5 (Ramshorn trib. RU-77) - A combination of mechanical and herbicide treatment would be used followed by seeding in the treated areas. Felled juniper would be oriented along the streambank as a barrier to authorized livestock.

CAL 2 and HAR 2 (Upper California RU-60 and Upper Harris RU-25) - A combination of mechanical and herbicide treatments would be used to remove juniper to maintain PFC and improve WCT habitat on both of these reaches.

ALD 1r (Three-mile Creek Ru-279) – Hazardous fuels would be reduced primarily using herbicide treatment. Knapweed would be treated simultaneously. Some mechanical treatment may be used to enhance ALD1 WUI treatments.

Livestock Management

Cal-Creek # 10507

Livestock Management

- The livestock management plan for the Cal-Creek Allotment was developed in cooperation with the Natural Resource Conservation Service (NRCS), implemented in 1984, and reviewed and updated in 2003. The six year rest-rotation system incorporates 18 pastures. Some pastures contain a relatively large percentage of public land and others none. Based on geography and topography the pastures are divided into three grazing units which are grazed by three separate herds. One pasture within each grazing unit is rested every year.
- To address site specific riparian concerns, implement rest one in **3** years for the BLM pasture. Animal units, animal unit months of forage and the seasonal rotational schedule would be in accordance with the Cal-Creek Management Plan.

Table 9: Cal-Creek Grazing Management Plan, Alternative B

Grazing Unit 1 – Herd A								
Pasture Name	Livestock Number	% Public Land *	Year 1 (2010)	Year 2 (2011)	Year 3 (2012)	Year 4 (2007)	Year 5 (2008)	Year 6 (2009)
Bivens/Harris 39	170	29	10/01 – 10/15	6/26 – 7/16	7/15 – 8/05	6/15 – 7/06	REST	9/22 – 10/15
			24 Aums	61 Aums	36 Aums	37 Aums		39 Aums
Baboon 40	170	29	8/22 – 9/30	7/17 – 8/26	9/01 – 10/10	8/14 – 9/24	7/01 – 8/04	REST
			63 Aums	66 Aums	65 Aums	66 Aums	58 Aums	
Big Cal. 41	170	29	7/23 – 8/21	8/27 – 9/25	6/15 – 7/14	REST	8/05 – 9/04	6/15 – 7/20
			47 Aums	49 Aums	168 Aums		50 Aums	58 Aums
Little Cal. 42	170	29	REST	6/15 - 6/25	10/11 – 10/15	9/25 – 10/15	9/05 – 9/16	7/21 – 8/05
				18 Aums	8 Aums	34 Aums	19 Aums	26 Aums
Potato Mt. 43	170	29	7/11 – 7/22	9/26 – 10/10	REST	8/02 – 8/13	6/15 – 6/30	8/06 – 8/21
			18 Aums	24 Aums		19 Aums	23 Aums	26 Aums
Wakefield 44	170	29	6/15 - 7/10	REST	8/6 – 8/31	7/07 – 8/01	9/17 – 10/15	8/22 – 9/21
			41 Aums		42 Aums	42 Aums	47 Aums	50 Aums
Total annual days of use and AUMs for Unit 1, Herd A			154 days	118 days	123 days	123 days	123 days	123 Days
			193 Aums	218 Aums	319 Aums	198 Aums	197 Aums	199 Aums
Grazing Unit 2 – Herd B								
Pasture Name	Livestock Number	% Public Land *	Year 1 (2010)	Year 2 (2011)	Year 3 (2012)	Year 4 (2007)	Year 5 (2008)	Year 6 (2009)
Water Gulch 1 45	400	29	6/25 – 7/15	REST	7/16 – 8/06	6/26 – 7/16	6/01 – 6/20	7/26 – 8/15
			80 Aums		84 Aums	80 Aums	76 Aums	80 Aums
Water Gulch 2 46	400	29	REST	6/01 – 6/25	6/01 – 6/25	7/17 – 8/12	6/21 – 7/15	7/01 – 7/25
				95 Aums	95 Aums	103 Aums	95 Aums	95 Aums
Water Gulch 3 47	400	29	6/01 – 6/24	6/26 – 7/20	REST	6/01 – 6/25	7/16 – 8/10	8/16 – 9/10
			92 Aums	95 Aums		95 Aums	99 Aums	99 Aums
Brown's Gulch 55	400	29	7/16 - 8/05	7/21 – 8/20	8/07 – 9/05	REST	8/11 – 9/10	6/01 – 6/30
			80 Aums	118 Aums	114 Aums		118 Aums	114 Aums
BLM 56	400	29	8/06 – 9/01	REST	6/26 – 7/15	8/13 – 9/07	REST	9/11- 10/01
			103 Aums		76 Aums	99 Aums		80 Aums
Total annual days of use and AUMs for Unit 2, Herd B			93 days	81 days	97 days	99 days	103 Days	123 days
			355 Aums	308 Aums	369 Aums	377 Aums	388 Aums	468 Aums
Grazing Unit 3 – Herd C								
Pasture Name/No.	Livestock Number	% Public Land *	Year 1 (2010)	Year 2 (2011)	Year 3 (2012)	Year 4 (2007)	Year 5 (2008)	Year 6 (2009)

Irrigated Private	350	29	6/01 – 7/10	6/01 - 7/10	6/01 – 7/10	6/01 – 7/10	6/01 – 7/10	6/01 – 7/10
			Private	Private	Private	Private	Private	Private
Sheep Flat 48/50	350	29	REST	7/11 - 7/30	9/06 – 9/30	8/11 - 8/30	REST	10/06 – 10/26
			67 Aums	83 Aums	67 Aums	70 Aums		
Raspberry 49	350	29	7/11 - 8/05	REST	7/11 – 8/05	8/31 – 9/20	7/11 – 8/05	9/11 – 10/05
			87 Aums		87 Aums	70 Aums	87 Aums	83 Aums
V Pasture 51	350	29	8/06 - 9/05	7/31 – 8/30	REST	7/11 – 8/10	8/06 – 9/05	8/11 – 9/10
			103 Aums	103 Aums		103 Aums	103 Aums	103 Aums
Schutlz 57	350	29	9/06 – 10/05	8/31 – 9/30	8/06 – 9/05	REST	9/06 – 10/05	7/11 – 8/10
			100 Aums	103 Aums	103 Aums		100 Aums	103 Aums
Total annual days of use and AUMs for Unit 3, Herd C			87 days	82 Days	82 days	72 days	87 days	108 days
			290 Aums	273 Aums	273 Aums	240 Aums	290 Aums	359 Aums
Total annual AUMs for all 3 herds			838	799	961	815	875	1026

* The relative amount of public land is an average of all pastures containing public land within the allotment.

Projects

- BLM Pasture (Map 4, Appendix A)
 - Develop interior spring (T6S R3W section 26) and pipe to a nearby trough to reduce time spent in riparian areas adjacent to Threemile and Daylight Creek
 - Construct up to ¼ mile of drift fence between private and public land across Daylight Creek.
- Water Gulch (Map 8, Appendix A)
 - Construct riparian enclosure fence around the spring and associated wetlands in upper Water Gulch (T5S R3W SW½ Section 32).
 - Develop the spring and pipe water to a trough approximately ¼ mile away on the adjacent bench.

Cow Creek # 20446

Livestock Management

- Same as Alternative A.

Projects

- Work cooperatively with lessee to repair the boundary fence between the public land and the adjacent private property to control access by unauthorized livestock.
- Maintain the common boundary fence separating the Cow Creek and Brandon Pasture allotments to control livestock drifting into Cow Creek.

Fletcher-Moore # 30428

The lessee grazes the Fletcher-Moore allotment in conjunction with the Granite-Moore allotment, private land, and a Forest Service permit. Public land in the Fletcher-Moore allotment would be grazed every other year in conjunction with private rangeland.

Livestock Management

- Authorize grazing every other year as shown below.

Table 10: Proposed Authorized Use, Fletcher-Moore, Alternative B

Year	Number/Kind	Begin Date	End Date	% Public Lands	BLM AUMs
2007	33 Cattle	05/15	12/01	100	218
2008		REST			
2009	33 Cattle	05/15	12/01	100	218

Projects (Map 9, Appendix A)

- Construct a riparian enclosure fence around ¼ mile reach of Fletcher Creek (MA-110) through public land (T5S R2W section 26).

Granite-Moore # 10468

The lessee plans to build a private fence along the west side of the Granite Creek road which would provide management flexibility in the upper East Fork of Granite Creek. The fence would allow the lessee to drift cattle through his private rangeland to his Forest Service allotment every other year without using the Granite-Moore allotment. This management change would facilitate resting the upper East Fork of Granite Creek and Moore Creek tributary every other year.

Livestock Management

- Change management category from Custodial (C) to Improve (I).
- Authorize a 60 day split season of use in the spring and fall every other year. The early season would be 30 days between 06/01 and 06/30 and the fall season would be 30 days between 10/15 and 11/14. The following year the allotment would be completely rested.

Table 11: Proposed Authorized Use, Granite-Moore, Alternative B

Year	Number/Kind	Begin Date	End Date	% Public Lands	BLM AUMs
2007	245	REST		41	198
2008	245	06/01	06/30	41	198
		10/15	11/14		
2009	245	REST		41	198

Projects (Map 10, Appendix A)

- Construct a hardened water gap/stream crossing on the East Fork of

Granite Creek (RU-209) just south of the boundary fence with the Beaverhead-Deerlodge National Forest.

- Cut selected Douglas fir/lodgepole pine trees along ½ mile of the East Fork of Granite Creek (RU-209) and orient the fallen trees along the stream to decrease access by livestock.
- Create a riparian pasture isolating Postlewaite Creek (RU-200). This would require an additional 1.25 miles of fences enclosing approximately 90 acres of public land. Based on carrying capacity and resource conditions, 70 cattle would be authorized to use the Riparian Pasture for 5 days two out of three years under the same terms and conditions described above in Table 12.

Mill Gulch Isolated # 20450

This allotment contains 325 acres of private and State land and 98 acres of BLM administered land. Resource concerns are impacts by livestock to riparian habitat along the Mill Gulch tributary which runs through the public land portion of the allotment.

Livestock Management

- Limit grazing to 30 days annually between 6/01 and 10/15.
- “Hot season” use between 7/15 and 9/15 would be limited to one year in three.

Table 12: Proposed Authorized Use, Mill Gulch Isolated, Alternative B

Year	Number/Kind	Begin Date	End Date	% Public Lands	BLM AUMs
2008	20	06/01	06/30	100	20
2009	20	07/01	07/31	100	20
2010	20	09/15	10/15	100	20

Projects (Map 11, Appendix A)

- A spring would be developed and piped to a trough on private land, above the riparian corridor on BLM administered land. This would provide cattle an alternative watering source and decrease utilization in the riparian area along Mill Gulch tributary RU-79.

Ramshorn Creek # 10552

Livestock Management

- The pasture containing Ramshorn Creek would be divided by constructing a 2.5 mile division fence on the south ridge above the creek. The northern pasture (Ramshorn pasture) would contain Ramshorn Creek, several tributaries, and Currant Creek. The southern pasture (Home pasture) would contain mostly private land and no riparian habitat on the public land acreage (Map 12, Appendix A).

- The Ramshorn pasture would be authorized for grazing 2 out of 3 years. The Home pasture would be authorized every season for a maximum of 30 days.
- The 44 day season of use (5/20 to 7/02) would be apportioned based on forage availability with a maximum of 30 days in either pasture.
- Designate exclusive grazing use of the Ramshorn and Home pastures to operator #2505784, and the Horse pasture to operator # 2500944.
- Season of use in the Horse pasture would remain 06/01 to 06/30.

Table 13: Proposed Authorized Use, Ramshorn Creek, Alternative B

Operator	No. and Kind	Pastures	Year	Dates	% PL	Type Use	AUMS
2505784	180	Ramshorn	2007	05/20 – 07/02	52	Active	135
			2008	REST			
			2009	05/20 – 07/02			
		Home	Annual	05/20 – 07/02			
2500944	70	Horse	Annual	06/01 - 06/30	100	Active	69

Projects (Map 12, Appendix A)

- Construct a 3 wire pasture division fence above the Ramshorn Creek drainage. The fence would run approximately 2.5 miles across public and private lands in T5S R4W sections 2, 3, 9 and 10.
- Physically close ¼ mile of two track road that crosses Ramshorn Creek and runs adjacent to non-functional stream reach RU-75.
- Construct riparian corridor fence with a hardened water gap on RU-75 to control access by livestock to riparian habitat.

Sand Coulee # 20679

Livestock Management

- Implement a 3 year rest-rotation grazing system with a 45 day early and fall treatment. Early season would be 06/01 to 7/15 and late 09/01 to 10/15.
- Change number of animal units from 6 to 26.
- Active AUMs would remain at 39.

Table 14: Proposed Authorized Use, Sand Coulee, Alternative B

Year	Number/Kind	Begin Date	End Date	% Public Lands	BLM AUMs
2007	26 Cattle	06/01	07/15	100	39
2008	26 Cattle	09/01	10/15	100	39
2009		REST			

Projects (Map 12, Appendix A)

- Upgrade/re-construct the water development at the head of Sand Coulee by replacing the leaking water trough and rebuilding the spring enclosure fence.

Virginia City Hill # 10521

The south pasture of the Benchmark allotment would be included in the Virginia City Hill allotment as part of Features Common to All Alternatives (section 2.3.3).

Livestock Management

- The V.C. Hill allotment is part of a comprehensive grazing unit that combines private, state and public lands administered by the BLM. The allotment has 10 pastures, seven of which contain some public land. The lessee and the NRCS have worked on a ranch plan for several years incorporating water developments, pipelines, water storage tanks, fences and a grazing management plan to improve livestock distribution on private and public lands within the entire grazing unit. Livestock management alternatives have been developed with the cooperation of the permittee and the NRCS and are in direct response to resource concerns identified on public land during the STR assessment.
- Change season of use from 05/01 – 11/24 to 06/01- 10/15 reflecting the dates in the NRCS grazing plan.
- Incorporate the south pasture from the Benchmark allotment, and the AUMs, into the V.C. Hill allotment.
- Increase authorized animal units from 187 to 340 because of the shortened season of use and additional AUMs.
- Change percent public land in the V.C. Hill allotment from 31% to 37% based on the average acres of public land in seven pastures.
- Active AUMs would remain at 567

Table 15: Current Authorized Use for Benchmark and V. C. Hill allotments

Allotment	Number and Kind	Begin Date	End Date	% PL	Type Use	AUMS
Benchmark	131 cattle	05/01	09/01	32	Active	171
Virginia City Hill	187 cattle	05/01	11/24	31	Active	396

Table 16: Revised Terms and Conditions, V.C. Hill (including south pasture Benchmark)

Allotment	Number and Kind	Begin Date	End Date	% PL	Type Use	AUMS
Virginia City Hill	340 cattle	06/01	10/15	37	Active	567

- Under this alternative a modified deferred-rotation grazing system would be implemented in the seven pastures containing public land within the allotment.

Table 17: Proposed Grazing Management Plan, V.C. Hill, Alternative B

BLM Pastures	2007				2008				2009				2110			
	# of cattle	Dates	% PL	PL AUMs	# of cattle	Dates	% PL	PL AUMs	# of cattle	Dates	% PL	PL AUMs	# of cattle	Dates	% PL	PL AUMs
West	340	7/03-7/25	37	95	340	6/08-6/30	37	95	340	7/13-8/05	37	95	340	7/15-8/07	37	95
Heifer	340	7/26-	37	54	340	7/01-	37	54	340	7/01-	37	54	340	8/07-	37	54

		8/07				7/12				7/12				8/20		
Bobcat	340	8/08-8/25	37	74	340	7/13-7/31	37	74	340	6/01-6/17	37	74	340	9/27-10/15	37	74
West Slade	340	8/26-9/06	37	45	340	8/01-8/11	37	45	340	6/18-6/30	37	45	340	9/14-9/26	37	45
Elbow	340	9/07-9/08	37	8	340	8/12-8/13	37	8	340	10/16-10/17	37	8	340	7/09-7/10	37	8
BLM	340	9/09-9/26	37	74	340	8/14-8/31	37	74	340	9/28-10/15	37	74	340	6/21-7/08	37	74
Care	340	9/27-10/01	37	21	340	9/01-9/05	37	21	340	10/23-10/27	37	21	340	6/16-6/20	37	21
TOTAL		90 days		371		90 days		371		90 days		371		90 days		371

Projects (Map 13, Appendix A)

- In conjunction with the NRCS a fence would be constructed on private land (T6S R2W section 17) in 2007. This fence would divide the Slade pasture into West Slade and Bobcat pastures. It would provide the operator management flexibility including reducing the number of days cattle use the West Slade pasture (which contains RU-199).
- Connect a spur pipeline into an existing pipeline located on public land in the West pasture (T6S R2W section 18). The new spur would be approximately 5/8 of a mile in length and provide water to a trough located in the West Slade pasture on upper Slade Creek (section 8) reducing pressure on RU-199.
- Construct an exclosure fence around the spring and associated riparian/wetland habitat at the head of Postlewaite Creek (RU-200).
- Modify the west boundary fence of the Elbow pasture to include approximately 5 acres of adjacent private property. This fence adjustment would provide livestock access to a water development on private property reducing pressure on Slade Creek (RU-198) in the Elbow pasture.

Noxious Weeds

- Treat 150 to 200 acres annually with herbicide using both ground and aerial applications. Helicopter spraying would be used in conjunction with ground treatments along major spread vectors by either spraying a wider buffer zone along the spread vector or reaching areas that are inaccessible or harder to treat by ground methods. Aerial spraying would only be used in areas with large and persistent infestations or areas where repeated trips in to do ground treatments would likely cause resource damage.
- In the weed treatment unit receiving intensive treatment, emphasis would be put on pushing the weed infestations back out of riparian areas and away from the seed spread vectors.
- Use abandoned mine lands funding to hire two summer seasonals whose main area of focus would be noxious weed control on abandoned mine lands in the STR Watershed.

2.3.5 Description of Alternative C

Forest Health, Upland Conifer and Prescribed Fire Treatments

Under Alternative C all the forest health, upland conifer and prescribed fire treatments proposed in Alternative B would be carried forward, and additional treatment units are proposed. Table 18 outlines the proposed units, objectives, and treatment types for the units proposed under Alternative C. Unit locations and boundaries are shown on Map 14 in Appendix A. Silvicultural prescriptions are the same as described above in section 2.3.3.

Table 18: Forest Health, Upland Conifer, and Prescribed Fire Treatments, Alternative C

Unit Name	Allotment	Acres	Objective(s)*	Treatment Type(s)
ALD 1	Cal-Creek & McGovern	485	↓ juniper encroachment, protect WUI	Upland conifer treatment
BIV 1	Copper Mt.	270	↑ forest health	Commercial harvest/Prescribed fire
BIV 2	Copper Mt. & Cal-Creek	180	↓ conifer encroachment	Prescribed fire
CAL 1	Cal-Creek	460	↓ conifer encroachment, protect WUI	Prescribed fire
CAL 3	Cal-Creek	406	↑ forest health, protect WUI	Commercial harvest/Prescribed fire
GIB 1	Ballard	176	↑ forest health	Commercial harvest/Prescribed fire
GIB 2	Ballard & Dry Lakes	375	↓ conifer encroachment, protect WUI	Upland conifer treatment
GIB 3	Dry Lakes & Downey	263	↑ forest health, ↓ conifer encroachment, protect WUI	Upland conifer treatment
GRA 1	Granite-Moore	87	↓ conifer encroachment	Prescribed fire
GRA 2	Granite-Moore	18	↓ conifer encroachment	Prescribed fire
GRA 3	Granite-Moore	26	↑ forest health	Commercial harvest/Prescribed fire
GRA 4	Granite-Moore	103	↑ forest health	Commercial harvest/Prescribed fire
GRA 5	Granite-Moore	344	↑ forest health	Commercial harvest/Prescribed fire
HUN 1	Hungry Hollow	209	↓ juniper encroachment	Upland conifer treatment /Reseed
MEA 1	South Daisy	29	↓ conifer encroachment, protect WUI	Prescribed fire
MEA 2	South Daisy & Fletcher-Moore	728	↑ forest health, protect WUI	Commercial harvest/Prescribed fire
MEA 3	South Daisy	703	↑ forest health, protect WUI	Commercial harvest/Prescribed fire
MEA 4	South Daisy	230	↑ forest health, protect WUI	Commercial harvest/Prescribed fire
MEA 5	Miller	28	↑ forest health, protect WUI	Commercial harvest/Prescribed fire
MIL 1	Mill Gulch	208	↓ conifer encroachment	Prescribed fire
MIL 2	Mill Gulch	37	↑ forest health	Commercial harvest/Prescribed fire
MIL 3	Mill Gulch	33	↑ forest health	Commercial harvest/Prescribed fire
MIL 4	Mill Gulch	172	↑ forest health	Commercial harvest/Prescribed fire
NUG 1	Georgia Gulch	121	↓ conifer encroachment	Prescribed fire
NUG 2	Georgia Gulch	76	↑ forest health	Commercial harvest/Prescribed fire
QUA 1	Cal-Creek	96	↓ juniper encroachment, protect WUI	Upland conifer treatment
QUA 2	Cal-Creek	47	↓ juniper encroachment, protect WUI	Upland conifer treatment
RAM 1	Ramshorn Creek	232	↑ forest health	Commercial harvest/Prescribed fire
RAM 2	Ramshorn Creek	43	↑ forest health	Commercial harvest/Prescribed fire
WAT 1	Cal-Creek	196	↓ conifer encroachment, protect WUI	Upland conifer treatment
WIS 1	Wisconsin Cr.	182	↓ conifer encroachment, protect WUI	Prescribed fire
WIS 2	Wisconsin Cr.	138	↓ conifer encroachment, protect WUI	Prescribed fire

Unit Name	Allotment	Acres	Objective(s)*	Treatment Type(s)
WIS 3	Wisconsin Cr. & Funk	116	↓ conifer encroachment, protect WUI	Prescribed fire
WIS 4	Wisconsin Cr.	372	↑ forest health, protect WUI	Commercial harvest/Prescribed fire

* Abbreviations: ↑=increase ↓=decrease

Description of Commercial Harvest Treatment Units

Units **CAL 3, GRA 3, GRA 4, MEA 2, MEA 3, MEA 4, NUG 2, RAM 1, RAM 2, and WIS 4** would be treated as described above under Alternative B. The additional forest health treatment units proposed under Alternative C would require negotiation with several landowners for physical access to the units, as well as supplemental NEPA documentation to analyze site-specific details once they are determined. A general description of these units follows for analysis of the proposed forest health treatments on a watershed scale. Implementation of forest health, upland, and riparian conifer treatments using stewardship authority will be considered on a case-by-case basis.

BIV 1 – This unit consists mainly of green Douglas-fir with increasing spruce budworm activity. Treatment would aim to restore Douglas-fir savannah structure and reduce Douglas-fir encroachment.

GIB 1 – This unit consists mainly of dead/dying Douglas-fir with increasing spruce budworm activity. Treatment would aim to restore Douglas-fir savannah structure. Products would be tractor yarded and removed utilizing new temporary roads.

GRA 5 - This unit is similar to GRA 4 but with more Douglas-fir and less aspen clones. Dead/dying Douglas-fir from spruce budworm defoliation is currently at 50% or more of the stand. Products would be tractor yarded and removed by existing and/or new temporary roads.

MEA 5 – This unit consists mainly of green Douglas-fir with increasing spruce budworm activity. Treatment would aim to restore Douglas-fir savannah structure and reduce fuel loading within the WUI directly north of this unit. Products would be tractor yarded and removed by both an existing and a new temporary road.

MIL 2, 3, 4 – These units consist mainly of dead/dying Douglas-fir with spruce budworm affecting at least 1/3 of the stand and increasing. Treatment would aim to restore the Douglas-fir savannah structure. Products would be cable and helicopter yarded and removed by both existing and new temporary road. This area would also involve a permanent road re-route and closure of a non-functional existing access road .

Preliminary road and stream crossing estimates for additional units proposed in Alternative C are in the table below. Supplemental NEPA documentation would be completed to refine these numbers and locations.

Table 19: Roads and Crossings, Alternative C

Unit Name	Allotment	Yarding Type	Upgrade to Existing Road (miles)	New Permanent Road (miles)	New Temp. Road (miles)	Existing Road to be Closed (miles)	Stream Crossings		
							Existing	Rebuilt	New
BIV 1	Copper Mt.	Ground/Helicopter	8.5 or 4.75 ¹	-	-	-	-	to be determined	
CAL 3	Cal-Creek	Ground /Helicopter	.3	-	3.3	-	-	-	2
GIB 1	Ballard	Ground	3.2	.5	1.5	.4	-	-	1 ²
GRA 4	Granite-Moore	Ground	-	-	.6	-	-	-	1
GRA 5	Granite-Moore	Ground	-	-	2.6	.5	-	-	1
MEA 2	So. Daisy & Fletcher-Moore	Ground	-	-	.1	-	-	-	1
MEA 3	So. Daisy	Ground	-	-	.9	-	-	-	-
MEA 4	So. Daisy	Ground	-	-	1.0	-	-	-	2
MEA 5	Miller	Ground	.25	-	.5	-	-	-	-
MIL 4³	Mill Gulch	Ground	-	-	1.9	-	-	-	-
NUG 2	Georgia Gulch	Helicopter	3.36	-	.2	-	-	-	1
WIS 4	Wisconsin Creek	Ground	1.8	.4	1.1	.2	-	1	-
TOTALS			17.41or 13.66	0.9	13.7	1.1		1	6

¹ Would be determined by subsequent NEPA documentation

² Permanent culvert installation

³ access to MIL 4 would require some of the roadwork associated with GIB 1 (.5 miles new permanent road, 1.0 miles upgrade to existing road, .4 miles existing road to be closed, and 1 permanent culvert)

Riparian Conifer Treatments

Under Alternative C, 17.03 miles of riparian habitat would be treated to reduce/remove juniper using a variety of tools. Alternative C includes all the riparian areas in the STR Watershed in which juniper encroachment was determined to be a cause for FAR or NF riparian health or a threat to PFC. All the riparian reaches in Alternative B are included, plus an additional 11.71 miles.

The following table outlines the proposed units, objectives, and treatment types for riparian juniper treatments in Alternative C. Unit locations and boundaries are shown on Map 14, Appendix A.

Table 20: Riparian Conifer Treatments, Alternative C

Unit Name	Allotment	Reach Name & #	Miles	Objective(s)*	Treatment Type(s)
HOR 1	Sand Coulee & Ramshhorn	Horse Creek RU-1; RU-2, RU-73	2.29	↓ juniper encroachment to restore riparian function & WCT habitat	Chemical, limited mechanical, Rx

Unit Name	Allotment	Reach Name & #	Miles	Objective(s)*	Treatment Type(s)
RAM 3	Ramshorn	Currant Creek RU-74	.6	↓ juniper riparian encroachment to improve WCT habitat and water quality	Mechanical, especially in lower part of reach.
RAM 4	Ramshorn	Ramshorn trib. RU-76	.77	↓ juniper riparian encroachment to improve water quality and restore aspen	Mechanical in lower reach; prescribed fire and/or mechanical in upper reach.
RAM 5	Ramshorn	Ramshorn trib. RU-77	.65	↓ juniper riparian encroachment to improve water quality	Mechanical/chemical followed by seeding.
CAL 2	Cal-Creek	Upper California Cr. RU-60	.25	↓ juniper riparian encroachment to maintain PFC and improve WCT habitat	Mechanical/chemical followed by seeding.
HAR 1	Cal-Creek	Upper Harris Cr. RU-25	.61	↓ juniper riparian encroachment to maintain PFC and improve WCT habitat	Mechanical/chemical removal of juniper, specifically on lower 1/3 of reach.
ALD 1r	Cal-Creek	Threemile Creek RU-279	.15	↓ juniper riparian encroachment to improve riparian function and water quality and protect WUI.	Primarily chemical, may be some mechanical to enhance WUI treatment. Intensive weed management would be included in treatment. Seeding would follow weed and juniper treatment
CAL 3	Cal-Creek	California Creek RU-21	2.13	↓ juniper riparian encroachment to maintain riparian function and improve water quality and WCT habitat	Mechanical in bottom and first terrace along south side of creek. Followed by prescribed fire along south side of creek.
RAM 6	Ramshorn	Ramshorn Creek RU-3 lower section Ramshorn trib RU-111	.72	↓ juniper riparian encroachment to improve riparian function and water quality and release/stimulate aspen (RU-3) and cottonwood (RU-111)	Chemical/ mechanical. May be opportunity for stewardship project or free use permits in this unit.
GEO 1	Georgia Gulch	Wet Georgia Creek RU-35 & RU-132	2.25	↓ juniper riparian encroachment to improve riparian function and water quality	Mechanical/chemical. Intensive weed management would be included in treatment.
BRO 1	Cal-Creek & McGovern	Browns Gulch RU-186	2.16	↓ juniper riparian encroachment to improve riparian function and water quality and protect WUI	Mechanical/chemical. Intensive weed management would be included in treatment. Seeding would follow weed and juniper treatment.
MOO 1	Granite-Moore & V.C. Hill	Postlewaite Creek RU-200 & RU-201 Slade Creek RU-198 & RU-199 Moore Creek trib. MA-109	3.92	↓ juniper riparian encroachment to improve/restore riparian function and water quality	Mechanical/chemical. Intensive weed management would be included in treatment. Seeding would follow juniper treatment on reach RU-198 and may be included in areas currently heavily infested with weeds.

Unit Name	Allotment	Reach Name & #	Miles	Objective(s)*	Treatment Type(s)
SPR 1	Brandon Pasture	Spring Park Creek RU-52	.53	↓ juniper riparian encroachment to improve riparian function and water quality	Mechanical with some limited chemical. Weed management would be included in treatment.
TOTAL MILES			17.03		

* Abbreviations: ↑=increase ↓=decrease

Permits would be made available to the general public to mechanically remove posts, firewood, Christmas trees and/or decorative wood in all units where there is public access on existing roads.

Description of Riparian Conifer Treatment Units by Stream Reach

Units **HOR 1**, **RAM 3**, **RAM 4**, **RAM 5**, **CAL 2**, **HAR 2**, and **ALD 1r** would be treated as described above under Alternative B.

CAL 3 – (California Creek RU-21) Juniper would be mechanically treated along the bottom of California Creek, primarily in old beaver dams, and along the first terrace above the creek along the south side. If the adjacent proposed timber sale is completed, prescribed fire would be used along the south side of the creek in the riparian and upland areas. Seeding and some stabilization work with juniper slash may occur in areas along the north side of the creek where old mining disturbances have left bare or cheatgrass infested banks.

RAM 6 – (Ramshorn Creek RU-3 lower end and Ramshorn trib. RU-111) Herbicide and mechanical treatment would be used to treat juniper to maintain PFC and release/stimulate aspen (RU-3) and cottonwood (RU-111).

GEO 1 – (Wet Georgia Gulch RU-35 & RU-132) Mechanical and herbicide treatments would be used to treat juniper. Intensive weed management would be included in the treatment to control existing spotted knapweed density and prevent further spread. Areas with little understory would be seeded with native upland species (the stream is entrenched). Silt fabric may be used in areas along the road to mitigate sediment input to the stream.

BRO 1– (Browns Gulch RU-186) Limited mechanical and herbicide treatments would be used to treat juniper. Intensive weed management would be included with treatment to reduce density of existing knapweed infestation. Areas that currently have little desirable native vegetation in the understory would be seeded following treatment. Silt fabric and juniper slash may be placed along the banks on both sides of the creek to reduce mass wasting erosion that is currently occurring.

MOO 1 – (Postlewaite Creek RU-200 & RU-201, Slade Creek RU-198 & RU-199, Moore tributary RU-109). A combination of herbicide and mechanical treatments would be used to treat juniper. Felled juniper would be oriented along RU-199 and RU-200 as a barrier to authorized livestock. Intensive weed management would be included in the

treatment to reduce existing spotted knapweed and musk thistle infestations and reduce further spread. Areas along RU-198 and RU-200 would be seeded following juniper and weed treatments.

SPR 1 – (Spring Park Creek RU-52) Mechanical treatments would be used along with some limited herbicide treatment of juniper. Weed management would be included in the treatment to treat existing spotted knapweed and dalmation toadflax infestations and reduce further spread.

Livestock Management

Cal-Creek # 10507

Livestock Management

- Implement a four year rest-rotation grazing system in the BLM pasture requiring rest every other year.

Table 21: Proposed Authorized Use for BLM pasture, Cal-Creek, Alternative C

Year	Number/Kind	Begin Date	End Date	% Public Lands	BLM AUMs
2007	250 Cattle	REST		53	131
2008	250 Cattle	6/15	7/14	53	131
2009	250 Cattle	REST		53	131
2010	250 Cattle	9/15	10/14	53	131

Projects

- BLM Pasture (Map 4, Appendix A)
- Fence out all of Daylight Creek through public land in the northeast corner of the BLM pasture.
- Water Gulch (Map 8, Appendix A)
- Construct an enclosure fence around the spring and the entire one-half mile spring brook in Upper Water Gulch (RU- 283).
- Install a headbox at the lower end of the spring brook and pipe water to a watering trough on the adjacent bench.
- Maintain the existing BLM project fence (#6633) in T7S R3W Section 1, creating a 100 acre riparian pasture on Butcher Gulch (RU-281) and tributary (RU-280). Limit grazing use to five days within the scheduled use period for the pasture.

Cow Creek # 20446

Livestock Management

- Re-designate the 48 acres in the Cow Creek allotment as un-allotted and not re-issue a 10 year term grazing lease.

Projects

- Same as Alternative B

Fletcher-Moore # 30428

Livestock Management

- If the proposed land exchange (see below) is completed, the Allotment would be reduced to 320 acres of public land adjacent to the Forest Service in T5S R2W section 10. This action would reduce the number of public land AUMs to 41, change the season to 07/01 to 10/15, and the number of authorized cattle to 12. The allotment would be managed as a Custodial allotment.

Table 22: Proposed Authorized Use, Fletcher-Moore, Alternative C

Allotment	Number and Kind	Begin Date	End Date	% PL	Type Use	AUMS
Fletcher-Moore # 30428	12 cattle	07/01	10/15	100	Active	41

Projects (Map 3, Appendix A)

- Explore options to exchange approximately 1350 acres of public land in the lower portion of the allotment (T5S R1&2W sections 23, 25, 26, & 30) for lessee’s private land of equal size and/or value in upper Granite Creek. If selected this action would impact livestock management on the Granite-Moore Allotment because the acquired property would be adjacent to and managed in conjunction with Granite-Moore. If the exchange is undertaken, upon completion, an EA would be completed to analyze a full range of management alternatives for the acquired land in accordance with BLM and NEPA regulations. Changes to the AMP’s and terms and conditions on the grazing leases for the Fletcher-Moore and Granite-Moore Allotments would be implemented at the completion of the NEPA process.

Granite-Moore # 10468

Livestock Management

- Implement a 45 day three year rest-rotation grazing system. First year would be spring use between 6/1 and 7/15, followed by a fall treatment between 10/15 and 11/30, and complete rest for the entire allotment the third.

Table 23: Proposed Authorized Use, Granite-Moore, Alternative C

Year	Number/Kind	Begin Date	End Date	% Public Lands	BLM AUMs
2007	326	06/01	07/15	41	198
2008	326	10/15	11/30	41	198
2009	326	REST		41	198

Projects (Map 10, Appendix A)

- To implement proposed grazing management changes, construct approximately seven miles of boundary fence between public and private land. These fences would allow the adjacent private land owner discretionary use of private rangeland and provide the BLM management control.

Mill Gulch Isolated # 20450

Livestock Management

- Livestock grazing in the two riparian pastures enclosing RU-79 would be limited to five days during the authorized season of use for the entire Allotment as outlined in Alternative B.

Projects (Map 11, Appendix A)

- Enclose two parcels of BLM administered land with 1.25 miles of 3 wire boundary fence in T5S R3W sections 22 & 27, creating two riparian pastures.
- A spring on private land would be developed as described under Alternative B.

Ramshorn Creek # 10552

Livestock Management

- Rest the Ramshorn pasture every other grazing season. Season of use and other terms and conditions as under Alternative B.
- Rest the Horse pasture one grazing season in three.

Table 24: Proposed Authorized Use, Ramshorn Creek, Alternative C

Operator	No. and Kind	Pastures	Year	Dates	% PL	Type Use	AUMS
2505784	180	Ramshorn	2007	05/20 – 07/02	52	Active	135
			2008	REST			
			2009	05/20 – 07/02			
			2110	REST			
		Home	Annual	05/20 – 07/02			
2500944	70	Horse	2007	06/01 - 06/30	100	Active	69
			2008	REST			
			2009	06/01 – 06/30			

Projects (Map 12, Appendix A)

- Same as Alternative B.

Sand Coulee # 20679

Livestock Management

- Implement a 30 day season or use on public land. Grazing would be authorized in a three year rest-rotation system with a spring season (06/01-06/30), a fall season (09/01-9/30) followed by complete rest year three.
- Change the number of authorized cattle to 40.

Table 25: Proposed Authorized Use, Sand Coulee, Alternative C

Year	Number/Kind	Begin Date	End Date	% Public Lands	BLM AUMs
2007	40 Cattle	06/01	06/30	100	39
2008	40 Cattle	09/01	09/30	100	39
2009		REST			

Projects (Map 12, Appendix A)

- Same as Alternative B.

Virginia City Hill # 10521

Livestock Management

- Implement the administrative terms and conditions described under Alternative B.
- A four year rest-rotation grazing system would be implemented to help mitigate impacts under this alternative. These three pastures would be rested one of four years. Four pastures with no riparian habitat or issues and properly functioning uplands would be used in a deferred-rotation every year.

Table 26: Proposed Authorized Use, Virginia City Hill, Alternative C

BLM Pastures	2007				2008				2009				2110			
	# of cattle	Dates	% PL	PL AUMs	# of cattle	Dates	% PL	PL AUMs	# of cattle	Dates	% PL	PL AUMs	# of cattle	Dates	% PL	PL AUMs
West	340	7/03-7/25	37	95	340	6/08-6/30	37	95	340	7/13-8/05	37	99	340	7/15-8/06	37	95
Heifer	340	7/26-8/07	37	54	340	7/01-7/13	37	54	340	7/01-7/12	37	54	340	8/07-8/19	37	54
Bobcat	340	8/08-8/25	37	74	340	7/14-7/31	37	74	340	6/01-6/17	37	74	340	9/29-10/15	37	70
West Slade	340	REST	37	0	340	8/01-8/11	37	45	340	6/18-6/30	37	54	340	9/16-9/28	37	54
Elbow	340	8/26-8/28	37	12	340	8/12-8/14	37	12	340	9/28-9/30	37	12	340	REST	37	0
BLM	340	8/29-9/20	37	95	340	8/15-9/01	37	74	340	REST	37	0	340	6/20-7/07	37	74
Care	340	9/21-9/25	37	21	340	9/02-9/06	37	21	340	9/23-9/27	37	21	340	6/15-6/19	37	21
TOTAL		85 days		351		91 days		375		76 days		314		89 days		368

Projects (Map 13, Appendix A)

In addition to projects proposed under Alternative B,

- Exclose spring at the head of RU-200.
- Develop spring in the Care pasture at T5S R2W section 28 SWSW¼.
- Develop spring in the lower BLM pasture at T6S R2W section 5 NENE¼.

Noxious Weeds

- Treat more than 250 acres annually with herbicide using both ground and aerial application.
- In the intensively treated areas, all large infestations would be aerially treated by helicopter.
- Use additional funding to contract with a private applicator to treat additional areas of weed infestations in the STR.
- Biological control would be used as described under Alternative B.

2.4 Summary Comparison of Alternative Actions

Table 27: Comparison of Conifer Treatments

	Alternative A	Alternative B	Alternative C
Commercial Harvest			
Total acres	0	2919	3979
% of BLM Forest/Woodlands Treated	0%	31%	46%
% of STR Forest/Woodlands Treated	0%	4.7%	6.5%
Prescribed Fire*			
Total acres	0	778	1539
% of BLM Treated	0%	2.3%	4.6%
% of STR Treated	0%	0.3%	0.7%
Upland Conifer Treatments			
Total acres	0	790	1671
% of BLM Treated	0%	2.3%	5.0%
% of STR Treated	0%	0.3%	0.7%
Riparian Conifer Treatments			
Total miles	0	5.32	17.03
All Treatments			
Total	0 acres; 0 miles	4487 acres; 5.32 miles	7189 acres; 17.03 miles
% of BLM Treated	0%	13.8%	22.7%
% of STR Treated	0%	2.0%	3.3%

*Mechanical treatment may also be used to facilitate prescribed burning where necessary

Table 28: Comparison of Livestock Management Proposed Alternatives

Allotment	Terms & Conditions	Alternative A	Alternative B	Alternative C
Benchmark # 20489	NA	Incorporate into the Granite-Moore and V.C. Hill allotments	Same as A	Same as A

Allotment	Terms & Conditions	Alternative A	Alternative B	Alternative C	
Cal-Creek # 10507	Season of Use	06/01 – 10/15	06/01 – 10/15	06/01 – 10/15	
	Livestock Number	832 cattle	832 cattle	832 cattle	
	Active BLM AUMS	1087 (adjusted for the removal of the Lake Pasture from the allotment under Common to All Alternatives)	1087 (adjusted for the removal of the Lake Pasture from the allotment under Common to All Alternatives)	1087 (adjusted for the removal of the Lake Pasture from the allotment under Common to All Alternatives)	
	Percentage Public Land	29	29	29	
	Grazing System (see Table 10 for a detailed description)	Remove the Lake Pasture from the allotment. Rest-Rotation; pastures containing BLM administered lands are rested once every six years.	Remove the Lake Pasture from the allotment. 3 year rest-rotation for the BLM pasture; all other pastures continue with the 6 year rest-rotation system implemented in 1984.	Remove the Lake Pasture from the allotment. 4 year deferred-rest-rotation for the BLM pasture, with rest every other year; all other pastures continue with the 6 year rest-rotation system implemented in 1984.	
	Projects	No new projects	<ul style="list-style-type: none"> • 2 spring enclosures and water developments (1 in Water Gulch RU-283 and one in the BLM pasture). • Up to ½ mile pipeline to trough in Water Gulch • Up to ¼ mil of Drift fence across Daylight Creek on ownership boundary (T6S R3W section 25). 	<ul style="list-style-type: none"> • 2 spring developments as in Alternative B; but fence entire ½ mile RU-283 in Water Gulch. • Pipe water from headbox in lower RU-283 to a trough on adjacent bench. • Construct ½ mile fence enclosing Daylight Creek in BLM pasture (T6S R3W section 26). • Maintain old pasture boundary fence in BLM pasture, creating a riparian pasture on upper Butcher Gulch (RU-280). 	
Cow Creek # 20446	Season of Use	05/16-05/31	No change	Re-designate as un-allotted public land. Do not issue new ten year grazing permit.	
	Livestock number	10 cattle	No change	NA	
	Active BLM AUMs	5	No change	NA	
	Grazing System	Custodial	Custodial	NA	
	Projects	none	Maintain allotment boundary fences and fence between private base property and public land.	Maintain the fence between private and public land.	
Fletcher-Moore	Season of Use	05/15-12/01	Year 1	5/15-12/01	07/01-10/15
			Year 2	REST	

Allotment	Terms & Conditions	Alternative A		Alternative B		Alternative C	
# 30428	Livestock Numbers	33 cattle		33 cattle		12 cattle	
	Active BLM AUMs	218		218		41	
	Grazing System	Custodial		Rest-rotation; rest every other season		Custodial	
	Projects	No new projects		· Riparian pasture fence on MA-110		· No new projects · Possible land exchange	
Granite-Moore # 10427	Season of Use	06/01-10/20		06/01-06/30 & 10/15-11/14 Split season: 60 days, Rest every other year.		Year 1 - 06/01-07/15 Year 2 - 10/15-11/30 Year 3 – REST (rest 1 in 3 years)	
	Livestock Numbers	130 cattle		245 cattle		326 cattle	
	Percent public land	41%		41%		41%	
	Active BLM AUMs	198 (includes 41 from Benchmark north pasture)		198 (includes 41 from Benchmark north pasture)		198 (includes 41 from Benchmark north pasture)	
	Grazing System	Season Long		Split season, two 30 day periods of use; rest every other year		3 year rest-rotation – 45 day season of use	
Projects	None		· hardened water gap/stream crossing on the East Fork of Granite Creek · Thin encroaching Douglas fir/lodgepole pine trees along ½ mile of the East Fork of Granite Creek · Create a riparian pasture isolating Postlewaite Creek (RU-200)		· 7 miles of boundary fence between public and private land · Projects from Alternative B except for riparian pasture.		
Mill Gulch Isolated # 20450	Season of Use	06/01 - 10/01		30 days maximum use between 06/01 - 10/01		5 days maximum use in riparian pastures within season of use	
	Livestock Numbers	5 cattle		20 cattle		20 cattle	
	Active BLM AUMs	20		20		20	
	Grazing System	Custodial		Deferred-Rotation		Deferred-Rotation	
	Projects	No new projects		· Develop spring on the private uplands adjacent to public land and RU-79.		· Fence along public land boundaries creating 2 small riparian pastures containing RU-79. · As in B, develop spring on the private uplands	
Ramshorn Creek # 10552	Season of Use	Operator 2505784	05/20 – 07/02 (Up to 30 days)	Operator 2505784	Ramshorn 05/20-07/02 Up to 30 days 2 of 3 years, REST 1 in 3 years	Operator 2505784	Ramshorn Pasture 05/20-07/02 2 of 4 years, REST every other year

Allotment	Terms & Conditions	Alternative A		Alternative B		Alternative C	
					Home 05/20-07/02 annually		Home Pasture 05/20-07/02 annually
		Operator 2500944	Horse Pasture 06/01 – 06/30	Operator 2500944	Horse Pasture 06/01 – 6/30	Operator 2500944	Horse Pasture 06/01 – 6/30 Rest one in 3 years
	Livestock Numbers	Operator 2505784	180 cattle	Operator 2505784	180 cattle	Operator 2505784	180 cattle
		Operator 2500944	70 cattle	Operator 2500944	70 cattle	Operator 2500944	70 cattle
	Active BLM AUMs	Operator 2505784	135	Operator 2505784	135	Operator 2505784	135
		Operator 2500944	69	Operator 2500944	69	Operator 2500944	69
	Grazing System	Custodial		Operator 2505784	Rest- Rotation	Operator 2505784	Rest- Rotation
					Operator 2500944	Custodial	Operator 2500944
	Projects	No new projects		<ul style="list-style-type: none"> • 2.5 mile division fence above the Ramshorn Creek drainage • Close ¼ mile of two track road that crosses Ramshorn Creek and runs adjacent to non-functional stream reach RU-75 • Construct riparian corridor fence with a hardened water gap on RU-75 		<ul style="list-style-type: none"> • Same as Alternative B 	
Sand Coulee # 20679	Season of Use	05/01 – 11/15		06/01 – 07/15		06/01 – 06/30	
				09/01 – 10/15		09/01 – 09/30	
				REST		REST	
	Livestock Numbers	5 cattle		26 cattle		40 cattle	
	Active BLM AUMs	39		39		39	
	Grazing System	Custodial		Rest-Rotation		Rest-Rotation	
Projects	No new projects		<ul style="list-style-type: none"> • Reconstruct water development at the head of Sand Coulee Creek. 		<ul style="list-style-type: none"> • Same as Alternative B 		
Virginia City Hill # 10521	Season of Use	06/01 – 10/15		06/01 – 10/15		06/01 – 10/15	
	Livestock Numbers	340 cattle		340 cattle		340 cattle	
	Active BLM AUMs	567		567		567	
	Grazing System	Rest-Rotation		Deferred Rotation		Rest-Rotation, Riparian rested one in 4 years.	

Allotment	Terms & Conditions	Alternative A	Alternative B	Alternative C
	Projects	No new projects	<ul style="list-style-type: none"> • Pasture division fence constructed on private land in section 17 (T6S R2W) in 2007 • 5/8 of a mile pipeline spur to a trough located in the West Slade pasture on upper Slade Creek • Construct fence enclosure around the spring and associated riparian/wetland habitat at the head of Postwaitle Creek, RU 200, develop spring and install water trough for livestock. • Modify the west boundary fence of the Elbow pasture to include approximately 5 acres of adjacent private property providing access to a water development on private property. 	In addition to projects from Alternative B, <ul style="list-style-type: none"> • Develop spring in the Care pasture at T5S R2W section 28 SWSW¼. • Develop spring in the lower BLM pasture at T6S R2W section 5 NENE¼.

Table 29: Comparison of Noxious Weed Herbicide Treatments

	Alternative A	Alternative B	Alternative C
Acres Treated with herbicides annually	100 acres Ground	150 – 200 acres Ground and aerial	>250 acres Ground and aerial

3.0 Affected Environment

This chapter describes the existing condition of specific environmental components that may be affected by the proposed action. The description of the affected environment is related to the specific issues and resource concerns identified in Chapter 1, but also encompasses the wider landscape of the entire STR Watershed.

A more detailed and comprehensive description of the current conditions in the watershed are provided in the South Tobacco Roots Assessment Report, January 2007, and is available for review at the Dillon Field Office or on line at http://www.blm.gov/mt/st/en/fo/dillon_field_office.html.

3.1 General Setting

Elevations on BLM administered lands within the STR Watershed range from approximately 4,500 to 8,500 feet. Topography varies from stream drainage bottoms to steep mountain ravines.

Vegetation reflects the diversity of ecological conditions across the landscape. The dominant plant communities and habitat types change according to soils, precipitation, elevation, slope and aspect. A wide variety of vegetation is found from wetland and riparian species dependent on water and moist soils to sagebrush and grass dominated plant communities that thrive on dryer upland sites. Forested habitats cover the higher elevations. The watershed's diverse landscape and vegetation provides habitat and structural niches for a wide variety and abundance of wildlife.

Average annual precipitation within the watershed varies from less than 14 inches on the lower benches to more than 24 on the higher peaks of the Tobacco Roots.

3.2 Description of Affected Resources/Issues

3.2.1 Issue # 1: Forest Health and Fuels Management

Forested and woodland habitats comprise approximately 29% of the entire watershed. These areas are generally found from 5,800' to above 8,500'. The close association of much of this forested habitat with adjoining sagebrush and riparian habitats supports a broad array of wildlife species.

Woodlands at the lowest elevations are composed of limber pine, Douglas-fir and Rocky Mountain juniper intermixed in sagebrush. Limber pine is rapidly declining in some areas due to drought and white pine blister rust. Rocky Mountain juniper stocking is increasing with little to no insect/disease related issues. Conifer encroachment into sagebrush/grasslands is common in the lower to mid elevations. Four areas of BLM administered lands north of Hwy 287 were studied by comparing aerial photography from 1950's and that taken in 2001 (Map 15, Appendix A). Within these areas a 12% increase of conifer cover was found across all habitat types. The percentage increase of conifer

encroachment or fill in where there was conifer species present in the 1950's was estimated at 51%. This figure is likely an underestimate, because high altitude photography was not able to discern the beginning stages of this process where seedling or sapling size trees have become established in sagebrush/grassland areas.

Aspen composes less than 1% of the forest across all ownerships in the valley of which 14 % is on BLM administered lands. However, the frequent number of dead aspen stems found in the lower to mid elevations shows that the landscape historically had much more aspen. These areas are now occupied by Douglas-fir. The remaining live aspen clones that are intermixed with mature conifer stands are rapidly declining. Unfortunately, with this decline comes a corresponding reduction in its availability to wildlife species which depend upon this important habitat component.

Generally, Douglas-fir forests have a component of older, larger trees that are more than 250 years of age. These occur as either individuals or small groups. They occupy areas that were historically experienced light intensity, relatively frequent ground fires. Such trees usually have visible evidence of historic fire in the form of scars known as "catfaces", or blackened areas on portions of the bark and in some cases burned off stubs where the lower branches were burned. Where scarring occurred, one or more fire events can often be detected. Some of the larger to largest Douglas-fir are being killed by the Douglas-fir bark beetle. The most recent insect and disease survey shows that this insect has increase substantially from 2004 to 2005 (Map 16, Appendix A).

Associated with these older trees is a co-dominant or understory component of Douglas-fir well under 150 years of age. There is little to no evidence of fire scars on any of the trees in that age group. These trees are much more dense and numerous than the older cohort. Unless there has been a recent disturbance, growth rings of most trees are very narrow and show little vigor for the past 30 to 50 years or more. The dense stocking, along with prolonged drought, has promoted increased spruce budworm damage populations in recent years. Spruce budworm affects all species of conifers except juniper and lodgepole pine. Spruce budworm activity was at epidemic levels in the early 1980s and is currently at or nearing epidemic levels once again. The 1980s epidemic was not as lethal as the current one on intermediate and even dominant trees. Currently, mortality has increased dramatically in the past 12 to 18 months.

Lodgepole pine intermixes with the upper levels of Douglas-fir forests and begins to dominate on north and east slopes. Stand ages vary from 80 to over 150 years old. Generally, lodgepole pine structure is dense. There is variability in the stocking rates from as few as 500 stems per acre in older, larger diameter stands to over 1700 stems per acre in the younger, smaller diameter stands. Most of the young stands are the result of management activities (harvest) over the past 20 to 30 years. Virtually all of these young stands are vigorous and do not support bark beetle activity. There is some evidence of low intensity fire scars on some of the older lodgepole pine, but it is not widespread. Mountain pine beetle activity in lodgepole stands more than 80 years old has increased dramatically since the late 1990s. Epicenters of mountain pine beetle are now expanding at rapid rates in these stands. Mountain pine beetle and Douglas-fir bark beetle have been

present at endemic levels in lodgepole pine and Douglas-fir communities. However, the dramatic increase in mountain pine beetle and Douglas-fir beetle from 2004 to 2005 is a strong indicator of a potential epidemic. Subalpine fir seedlings and saplings can often be found in the understory of lodgepole pine stands. The presence of subalpine fir reproduction, which is very vulnerable to fire, is another indication of the lack of recent fire. The pine engraver beetle may be present in the area. Commandra blister rust and dwarf mistletoe are common in lodgepole pine but are very limited in stands less than 50 years old. While these agents most often occur on a localized level, they do not appear to be playing a substantial role in lodgepole pine community at this time.

Above the lodgepole pine, subalpine fir and Englemann spruce begin to dominate conifer stands up to the timber line. As with the previous tree species, drought and insects are playing an increasing role in stand break up. Balsam bark beetle, which affects subalpine fir, is present at its highest level since 1980 and could be considered to be at or near epidemic levels. The higher elevation lodgepole pine and mixed conifer forest provides summer habitat for mule deer and elk, and yearlong habitat for moose and large carnivores. Most wildlife species utilizing this habitat are seasonally migratory or have adapted to cope with significant winter snowfall

The highest forested areas of BLM administered lands in the southern portion of the watershed have a whitebark pine component intermixed with subalpine fir, Englemann spruce and Douglas-fir. As with the limber pine, white pine blister rust is causing major mortality on whitebark pine throughout the Watershed.

Management of potential wildfire and fuels are the primary wildlife habitat concerns in the STR Watershed. The increasing distribution and density of Douglas-fir and juniper has enhanced fall security cover, but subdivision development and road use is restricting seasonal uses by elk and mule deer in some areas. Increasing herbaceous cover on many private lands, and large quantities of dead/dying timber throughout the watershed, is creating a significant fire hazard that potentially may have widespread impacts on wildlife habitats. The rising density of residential structures and roads into some areas of the watershed compounds the risk.

Primary forest wildlife habitat concerns are extensive areas of dead/dying Douglas-fir in Wisconsin Creek and from Mill Gulch eastward to Granite Creek. Also, increasing expansion and dominance by juniper at lower elevations from Virginia City and Alder Gulch westward to Sand Coulee and Baker Summit are impacting wildlife habitats.

3.2.2 Issue # 2: Wildland Urban Interface (WUI) and Protection of Private Property from Wildland Fire

Private land at the foothills of the Tobacco Roots Mountains has experienced relatively rapid residential development in the past ten to fifteen years and this is expected to continue. As of August 2006, over 400 dwellings or structures are within one mile of BLM lands in the assessment area (Madison County GIS, 2006). Continuous fuels surrounding private structures and limited access put these properties at an elevated risk

of being threatened by wildfire. The occurrence of a large wildfire between the irrigated agricultural lands of the valley bottoms and the higher elevation, unpopulated National Forest will require a major suppression effort. Accounting for public safety and protecting private property will be extremely expensive due to the number and physical location of many of the existing properties.

3.2.3 Issue # 3: Riparian, Wetland, Aquatic Habitat and Associated Species

The STR assessment area is located primarily within the larger Ruby River Watershed. The Ruby River, and many of its tributaries, is a water quality limited stream, according to Montana Department of Environmental Quality (DEQ). Waters of Montana are required to support Fisheries and Aquatic Life. The information in this section addresses the physical and to some extent the biological conditions of the streams and their associated riparian and wetland habitats. The condition of riparian vegetation, stream bed materials, channel geometry and the ability of riparian areas to attenuate flood water, recharge groundwater, maintain riffles and pools are closely associated with a streams ability to support aquatic life and fisheries. Upland and forest health conditions are also related to the condition of streams since sediment inputs to streams are influenced by upland sources.

The major streams within the STR Watershed Planning Area include Alder Gulch, California Creek, Granite Creek, Indian Creek, Mill Creek, Ramshorn Creek, Wisconsin Creek and Moore Creek. All of these streams, with the exception of Moore Creek, flow into the Ruby River. Moore Creek flows into the Madison River. Each of these streams has several associated tributaries shown in Table 4 below.

The majority of riparian habitats in the STR are Douglas-fir, juniper and aspen riparian habitat types. Spruce habitat types are associated with higher elevation stream reaches. Willow habitat types are found on stream reaches on flatter terrain and generally lower elevations within the watershed (Table 4).

According to historic photos, stumps and fire scars, the riparian habitats in the watershed are primarily fire dependant habitats that have generally not burned in recent history (120 years). Lengthening the historic fire return interval in these systems has allowed more conifers, (Rocky Mountain juniper and Douglas-fir), to expand into the riparian habitat at the expense of deciduous woody vegetation such as aspen, willow, mountain alder and river birch. This conifer expansion is more pronounced in the lower portions of the stream reaches.

Nearly all of the primary streams and most secondary tributaries within the watershed were placer mined or hydraulically dredged during the gold rush (1863-1870). Some of the main stream reaches have been mined several more times during the past 137 years. Consequently, most of the streams in the watershed now have altered gradients and channels and downgraded hydrological potential. Placer mining lowered the water table, making the associated valley bottoms dryer and more conducive to conifer expansion. Also, during this period of intense mining activity beavers were trapped out of the area.

As a result the water table was lowered further resulting in the loss of deciduous woody habitat types. The streams furthest north in the watershed and at higher elevations were impacted less than those closer to Virginia City, the hub of the mining activity. The combination of placer mining and beaver trapping has altered many reaches in the same manner as a major debris flow flood event would. Afterward, stream channel types shift and begin to evolve. During channel evolution streams move through a series of unstable types and eventually reach more stable types (Rosgen 1990, Schumm et al. 1984 and Simon and Hupp 1986).

The scattered ownership pattern in the STR Watershed further complicates riparian management because upstream sediment sources affecting riparian health may be outside the BLM's authority to mitigate. Also, because of the steep topography roads generally have been constructed in the valley bottoms adjacent to streams. Some of these roads are BLM roads, but many are Madison County or private roads.

Noxious and invasive species, discussed below under Standard # 5, are present in varying degrees along many riparian areas within the watershed primarily because of the disturbance caused by historic placer mining. Noxious weeds affect riparian health and function depending on the degree of infestation. Weeds are also present along many roads and utility corridors within the watershed.

The higher elevation, steeper streams in the northwestern portion of the STR such as Indian, Noble Fork, Ramshorn, Wisconsin Creek and Mill Creek are steep cascading stream systems that are very stable with conifer-dominated habitat types.

There are 14 perennial streams on public land that support cold water fisheries. Common sport fish species in the assessment area are brook trout (*Salvelinus fontinalis*) and rainbow trout (*Oncorhynchus mykiss*). These non-native species were introduced into the area in the early 1900's or before. Brook trout are the most common salmonid found on public land within the assessment area, occurring in most perennial waters capable of supporting a fishery. Rainbow trout are incidentally to commonly found in the lower reaches of several streams. On occasion, Brown Trout (*Salmo Trutta*) are caught in the lower reaches of Granite Creek.

Fish streams on public land within the assessment area do not generally support popular recreational fishing. Portions of Granite Creek support a small sport fishery for rainbow trout and brook trout. Wisconsin Creek provides approximately 50 angler use days per year. Ramshorn and Indian creeks provide an additional 100 or so angler days (MFWP 2004). Several other streams likely support light fishing use as well but were not identified in the most recent MFWD fishing use report.

Native species such as mountain whitefish (*Prosopium Williamsoni*), longnose sucker (*Catostomus catostomus*), white sucker (*Catostomus commersoni*), mottled sculpin (*Cottus bairdi*) and westslope cutthroat trout (*Oncorhynchus clarki lewisi*) are found in portions of some streams.

Historic land use practices within the watershed have caused a decline in riparian health and/or habitat which has contributed to a loss of habitat for WCT and other native and non-native fish species. Fish habitat conditions on streams within the South Tobacco Root Assessment area ranged from fair to good. Impacts to fish habitat were primarily from past mining activities and livestock.

Table 30 describes the fishery inventory in the watershed.

Table 30: Fisheries Inventory

Stream	Species present
Harris Creek	WCT / 100% purity
California Creek	WCT95%-100% Brook trout
Currant Creek	98% WCT Brook trout
Ramshorn Creek	WCT/98%
Wisconsin Creek	WCT/97% Brook/Rainbow
Indian Creek	WCT/96%
Horse Creek	WCT/ 95%
Mill Gulch	WCT 94% Brook trout
Nugget Creek	WCT/91%
Downey Creek	Brook trout
Gibbs Creek	Brook trout
Dulea Creek	Brook trout
Granite Creek	Brook/Rainbow trout

Findings for Riparian Health

The IDT concluded that riparian conditions along 12.3 stream miles is either PFC or FAR with an upward trend. Conversely, 12.6 miles are FAR static, trend not apparent or downward or non functioning (NF).

Resource concerns related to streams and wetlands observed by the IDT included: alteration of stream morphology (channel shape and gradient), vegetative composition, vegetative cover, structure and vigor of streamside vegetation (specifically aspen, willows and sedges), conversion of deciduous communities to conifer (primarily Rocky Mountain juniper), noxious weed infestations in riparian zones and excessive sediment from roads, stream banks, and/or upstream disturbances such as active or abandoned mines.

The density of Douglas-fir is increasing on most streams capable of supporting this riparian habitat type within the STR assessment area. Consequently, deciduous woody canopy and understory vegetation density is decreasing, as is the diversity of the wildlife

species dependent upon this habitat. This change in wildlife abundance and diversity is expected to continue as the natural transition from willow and aspen to Douglas-fir habitat progresses.

Increasing juniper cover is adversely affecting riparian habitat on most streams in the STR assessment area. Wildlife habitat values have been compromised where juniper has increased to the exclusion of willow, aspen, and herbaceous vegetation. Channel degradation and down cutting have also reduced the extent of riparian habitat. This condition is most pronounced on lower elevation reaches on Harris Creek, several tributaries to Ramshorn Creek, Horse Creek, Slade Creek, and Postlewaite Creek.

Primary riparian concerns by allotment

Table 31 shows the percent juniper canopy cover on several streams where increasing juniper was identified as one of the primary threats to riparian health.

Table 31: Rocky Mountain Juniper Canopy Cover along specified stream reaches

Allotment	Reach #	Reach Name	% Canopy Cover of Juniper	Length (miles)
Brandon Pasture	RU-52	Spring Park	35-45	.53
Cal-Creek	RU-21	California ^{1,2}	15-25	2.13
	RU-60	California	1-5	.25
	RU-279	Three-Mile	Juniper canopy cover noted as a concern by IDT, % canopy unavailable	.15
	RU-25	Upper Harris ¹	5-15	.61
Georgia Gulch	RU-132	Wet Georgia Gulch	15-25	1.15
	RU-35	Wet Georgia Gulch	15-25	1.1
McGovern	RU-186	Browns Gulch	15-25	2.16
Ramshorn	RU-74	Currant Creek ^{1,2}	25-35	.6
	RU-1	Horse Creek	55-65	.9
	RU-73	Horse Cr trib.	35-45	.46
	RU-3	Ramshorn Creek ²	Juniper canopy cover noted by IDT as a concern, % canopy unavailable	1.64
	RU-76	Ramshorn trib ²	35-45	.77
	RU-77	Ramshorn trib ²	45-55	.65
	RU-111	Ramshorn Trib ²	Juniper canopy cover noted by IDT as a concern, % canopy unavailable	.47

Sand Coulee	RU-2	Horse Creek	55-65	.93
VC Hill	RU-201	Postlewaite	5-15	.47
	RU-198	Slade Creek	25-35	.63
	RU-199	Slade Creek	25-35	.67
Granite-Moore	MA-109	Moore trib	25-35	1.08
	RU-200	Postlewaite	25-35	1.07

¹ Westslope Cutthroat Trout, ² Stream on the 2006 303d List

Georgia Gulch

Wet Georgia Creek – Channel degradation has reduced the extent of riparian habitat resulting in a high percent mature/dead/decadent willow in the lower reach. Juniper is increasing in density in all reaches.

Ramshorn Creek

Horse Creek – Channel degradation has reduced the extent of riparian habitat resulting in a high percent mature/dead/decadent willow in the lower reach. Juniper is increasing in density in all reaches. Fences along the road in Horse Creek are a barrier to wildlife movement and are aggravating livestock impacts to riparian habitat in localized areas.

Ramshorn Creek tributaries – Aspen and willow are being replaced by juniper on most of the north side tributaries to Ramshorn Creek. Livestock trailing is contributing to streambank instability and downcutting.



Rocky Mountain juniper in riparian area (left) and along slope; Horse Creek RU-1

California Creek

Harris Creek, California Creek, Quaking Aspen – Increasing density of juniper canopy in all of these streams is reducing plant community diversity and wildlife uses.

Browns Gulch– Extensive occurrence of noxious weeds adjacent to the riparian area, increasing juniper canopy and mass wasting banks are compromising habitat potential and wildlife use.

Water Gulch – The riparian herbaceous community is comprised exclusively of disturbance-induced species and nearly all deciduous woody vegetation has been eliminated. Excessive livestock utilization and trailing are resulting in excessive bank disturbance and inhibiting habitat stabilization and recovery.

Butcher Gulch, Daylight Creek, Three-mile Creek – Rest from livestock grazing has initiated some improvement in plant community composition and vigor on Three-mile Creek but recent intense grazing treatments have compromised some of that recovery. Excessive livestock utilization and trailing on Butcher Gulch and Daylight Creek are resulting in excessive bank disturbance and inhibiting habitat stabilization and recovery.

Grassy Lake and surrounding wetlands – Heavy livestock utilization and trampling is reducing wetland productivity and residual cover. Plant community composition is dominated by disturbance-induced species. Sensitive plant habitat may be compromised.

Ballard

Gibbs Creek - Declining willow and aspen canopy and composition is reducing structural diversity and potential wildlife use.

Downey Creek

Dulea Creek, Downy Creek – Increasing Douglas-fir canopy and declining willow/aspen canopy and composition has reduced structural diversity and potential wildlife use.

Virginia City Hill/Benchmark

Slade Creek – Heavy livestock utilization and bank trampling is changing vegetation composition and enhancing dominance by disturbance-induced herbaceous species. Dense juniper canopy on the lower reach is excluding most other deciduous shrubs and limiting herbaceous productivity.

Benchmark/Granite Moore North

Postlewaite Creek, Moore Creek tributaries – Heavy livestock utilization and bank trampling is changing vegetation composition and enhancing dominance by disturbance induced herbaceous species, musk thistle, and spotted knapweed. Dense juniper canopy is excluding most other deciduous shrubs and limiting herbaceous productivity.

Fletcher Moore

Moore Creek – Heavy browsing on willow/aspen regeneration is limiting habitat potential and structural diversity.

3.2.4 Issue # 4: Upland Health, Sagebrush Steppe Habitat and Associated Species

The vast majority (89%) of the uplands in the watershed are functioning properly and meeting the Standard for Upland Health. Four allotments, including about 3,700 acres, were found to be FAR with a non apparent or downward trend. Within two of these allotments, Brandon Pasture and Hungry Hollow, the cause for FAR conditions is widespread noxious weed infestations (spotted knapweed and dalmation toadflax) in the uplands. The Hungry Hollow allotment also has areas in which juniper expansion has affected upland health. Within the Sand Coulee and Cow Creek Allotments, several key evaluation indicators show the uplands are moderately at risk. Increased bare ground, increased interspaces between plants, increased litter movement and pedestaling around the base of some plants are evidence of soil loss from erosion. Plant community composition and overall plant production is moderately departed from the potential of these ecological sites. Within the Sand Coulee Allotment, Rocky Mountain junipers are increasing across the upland range and consequently grasses are declining. Past and/or current livestock management is contributing to the FAR conditions in the Sand Coulee and Cow Creek Allotments.

A wide variety of sagebrush habitats are found in the STR watershed. Basin big sagebrush is found in most dry drainages and along the fringes of many riparian zones. Much of this habitat type has been affected by mining activity, livestock grazing, subdivision and road building. Substantial private land areas of basin big sagebrush have been converted to agricultural uses or subdivisions. Mountain big sagebrush occurs at higher elevations and has been significantly affected by Douglas-fir and juniper expansion. Wyoming big sagebrush is not common in the STR and is found only in the western part of the assessment area. Three-tip sagebrush and black sagebrush are widespread from Granite Creek to Quaking Aspen Creek, particularly in the Water Gulch area. Other sagebrush-associated shrub communities include black greasewood, chokecherry, snowberry, and mock orange which provide local habitat diversity for a variety of wildlife species.

Conifer expansion within sagebrush habitats is occurring throughout the STR, with juniper dominant at lower elevations and Douglas-fir at higher elevations. This expansion is providing increased cover and structure, especially for big game, but is also changing or reducing the long-term composition and productivity of herbaceous vegetation, depending on canopy and effective precipitation. These changes are shifting wildlife uses toward those species that prefer mixed forest habitats over those requiring more open habitats. The Wisconsin Creek area, Copper Mountain, and Mill Gulch to Granite Creek area have seen the most pronounced increase in Douglas-fir cover on mountain big sagebrush habitats. Juniper has increased significantly in uplands from Ramshorn Creek to Water Gulch, and from Virginia City to Hungry Hollow, in very dry mountain big sagebrush, three-tip and black sagebrush habitats.

Past sagebrush treatments on private and public lands have resulted in localized loss of mountain big sagebrush canopy. Protection and maintenance of these sagebrush habitats is critical for mule deer, sage grouse, pygmy rabbit and other sagebrush-dependent wildlife species. Sagebrush habitat fragmentation from roads, residential development, and expanding Douglas-fir and juniper cover has reduced the availability of suitable habitat for many wildlife species, particularly during the winter. Big game movement between these remaining suitable habitats is further constrained by fences that restrict free passage. The only relatively continuous suitable sagebrush habitat in the assessment area extends from upper Water Gulch eastward across Virginia City Hill and into Moore Creek and Moran Creek.

Sage grouse have declined substantially in the STR since the 1970's. Only two sage grouse leks have been documented on public land, one east of Laurin, the other in Water Gulch. However, neither of these leks has been occupied for several years. Although sage grouse are still present in reduced numbers in the portions of the STR, the only occupied habitat appears to be east of Granite Creek in the Virginia City Hill vicinity and southwest to Axolotl Lakes. Identification of leks and remaining seasonal habitat that supports these grouse should be a wildlife priority in the STR.

Surveys for pygmy rabbits in the STR during the 1990's did not locate any occupied habitat, and the area was considered to be on the fringe of suitable habitat for this species.

However, subsequent surveys by Montana Natural Heritage Program and BLM since 2000 have documented occupied habitat in Wet Georgia Gulch, Indian Creek, Granite Creek, Herman Gulch, and Alder Gulch.

Primary sagebrush concerns by allotment

Georgia Gulch

Knapweed and cheatgrass are prevalent throughout the Wet Georgia watershed with poor herbaceous composition in sagebrush communities. Livestock trampling and mechanical damage has reduced structural diversity in basin big sagebrush communities along the creek. These conditions are reducing habitat suitability for elk and mule deer winter use and potential pygmy rabbit occupancy.

Copper Mountain

Cheatgrass is increasing in disturbance areas, often expanding from burned areas, logging and road building on adjoining private lands. The amount of open sagebrush habitat is being reduced by Douglas-fir expansion. This increase in canopy may reduce habitat suitability for spring elk calving use as less open sagebrush/herbaceous habitat is available, but on the other hand provides increased fall security cover.

Ballard

Douglas-fir expansion throughout sagebrush habitat has provided additional fall habitat security for deer and elk. However, this increase in canopy may reduce habitat suitability for spring elk calving and mule deer winter use as less open sagebrush/herbaceous habitat is available.

Virginia City Hill, California Creek, Dry Lakes, Benchmark

Cumulative sagebrush fragmentation on private lands within and adjacent to these allotments is reducing the availability of suitable sagebrush habitat for sage grouse, mule deer, and pygmy rabbit.

Hungry Hollow

Juniper expansion in Section 25 has significantly reduced sagebrush and herbaceous cover, and potential wildlife use. Knapweed is increasing in the area. Habitat conditions in the adjacent McGovern and Baker Summit allotments indicate a much higher productivity potential.

3.2.5 Issue # 5: Noxious and Invasive Species

Noxious and invasive weeds are one of the primary resource concerns within the STR Watershed. Weeds affect land health in varying degrees in riparian and upland habitats.

They also reduce biodiversity in isolated areas while posing widespread risk to the biodiversity of many additional locations in the watershed. Historic mining (dredging) along most streams in the watershed, as well as small dispersed areas of the uplands, combined with mining infrastructure (roads, timber harvest, etc), caused large scale soil disturbances providing noxious and invasive species an opportunity to establish. Because of the aggressive and competitive nature of these noxious weeds, they have spread throughout the watershed, primarily along road systems, utility corridors, and other disturbed areas, but are also beginning to encroach into some undisturbed upland areas.

The two noxious weeds of greatest concern in the STR Watershed are spotted knapweed (*Centaurea maculosa*) and dalmation toadflax (*Linaria dalmatica*).

Spotted knapweed is an aggressive perennial invader and a prolific seed producer, whose seeds remain viable for up to ten years. It is found in large infestations scattered throughout the watershed especially along roads, mining areas, dredged streams and other disturbance areas. Because of the extent and location of existing infestations, the potential is high for knapweed to be spread by vehicles, livestock, wildlife, recreation and other activities.

Dalmatian toadflax, is another aggressive perennial introduced from southeastern Europe as an ornamental, is difficult to control due to a waxy leaf and an extensive and deep root system. Large, scattered infestations of dalmatian toadflax are found in the Brandon Pasture allotment and smaller more scattered infestations are found in other areas of the watershed. Due to its aggressive nature and ability to reproduce by both seeds and creeping root stalks the potential for spread is high.

Other invasive noxious weeds present in isolated locations within the STR watershed are houndstongue (*Cynoglossum officinale*), Hoary cress or Whitetop (*Cardaria draba*), Black henbane (*Hyoscyamus nigar*), musk thistle (*Carduus nutans*) and Canada thistle (*Cirsium arvense*).

Since 1989, the BLM has been involved in cooperative weed control efforts with Madison County. Throughout this period, the goal has been to prevent new noxious weed infestations and reduce or eradicate existing infestations on public lands within Madison County using Integrated Pest Management (IPM).

The following table shows the herbicide treatments applied in the STR Watershed during the past three years.

Table 32: Weed Treatments

Year	Acres Treated	Acres Inventoried
2004	75	900
2005	90	1,000
2006	120	1,500+

Through a cooperative project, involving the BLM, Madison County and various private landowners, over 100 acres heavily infested with noxious weeds were aerially treated in Wet Georgia Allotment in 2004, over 200 acres in Granite Creek Allotment in 2005; and more than 200 acres in the Wet – Dry Georgia Gulch area in 2006. Biological controls such as the seed head fly (*Urophora sp*), knapweed root-boring weevil (*Cyphocleonus achates*), knapweed flower weevil (*Larinus minutus*), and toadflax stem weevil (*Mecinus janthinus*) are present at release sites within the STR Watershed.

Cheatgrass (*Bromus tectorum*) is established and spreading into disturbed areas throughout the watershed. Relatively large infestations were observed by IDT members in some of the major stream corridors and adjacent uplands, specifically on south or west facing slopes. Cheatgrass is an extremely competitive early cool season species that flourishes in disturbed sites. Old mining sites, roads, construction locations, burned areas and other disturbed areas have allowed cheatgrass to become established. Once established, cheatgrass, a winter annual, has the potential to change (shorten) the fire return interval because it dries out in early summer and becomes a fine, flashy fuel. Cheatgrass tends to form monocultures. It currently affects habitat quality and biodiversity in localized areas, but the seed source is present throughout most of the watershed, so could potentially spread into new areas of natural and/or human caused disturbance.

Recreationists have expressed concern about their inability to access roads on public lands blocked by closed/posted private lands in localized areas within the watershed. During the field assessment it was noted that noxious weeds occur at substantially higher rates along accessible roads than where access is blocked by private roads. In fact, area landowners have identified the spread of noxious weeds as one of their main reasons for denying public access across their lands.

3.2.6 Additional Resource Concerns and Critical Elements

3.2.6.1 Special Status Species

See Biological Evaluations in the EA file, MT-050-06-11, in the Dillon Field Office.

The bald eagle is the only listed species of wildlife that regularly occurs in the South Tobacco Roots analysis area, although that use is almost exclusively on private lands along the Ruby River. Transient grizzly bear and wolf use is possible, but intensive inventory on Forest Service lands in 2004 did not document the presence of either species. Four sensitive mammals (ie. wolverine, pygmy rabbit) and 14 sensitive birds (i.e. sage grouse, golden eagle, northern goshawk, loggerhead shrike) occur at least seasonally in the South Tobacco Roots. Ten migratory Birds of Conservation Concern (USFWS) also occur in this area (ie. mountain plover, golden eagle, loggerhead shrike, Brewer's sparrow).

None of the plants currently listed as endangered or threatened under the Endangered Species Act are known to be growing on BLM lands in the Dillon Field Office. Fifty

sensitive plant species inhabit BLM lands in the Dillon Field Office. Suitable habitat exists in the STR watershed for several of these species, but to date only one has been found on BLM lands within the STR watershed. Idaho sedge (*Carex idahoensis*) typically occurs in sub-irrigated soils associated with low gradient streams or springs and seeps and occupies ecotones (area where adjacent communities blend) between wet meadow and sagebrush steppe. A small population of Idaho sedge occurs in a depression wetland northeast of Grassy Lake in the Cal-Creek allotment. It is the only documented sensitive plant species in riparian and wetland habitats, on public land, in the watershed. Rocky Mountain dandelion (*Taraxacum eriophorum*) and mealy primrose (*Primula incana*) are sensitive plant species known to occupy nearby wetland habitats and may occur on public land within the area. Mealy primrose is found in saturated, often calcareous wetlands while Rocky Mountain dandelion can occur in overflow ecological sites as well as in open riparian and wetland areas. No sensitive plant species have been documented in upland habitats on BLM administered lands in the STR assessment area. Sensitive plants have been found on nearby upland habitats and include spiny skeletonweed (*Pleiacanthus spinosus*), buff fleabane (*Erigeron parryi*), showy townsendia (*Townsendia florifera*), and taper-tip desert-parsley (*Lomatium attenuatum*). No immediate threats or concerns were identified for these species or their habitat.

Genetically pure westslope cutthroat trout (WCT) have declined substantially on public land within the planning area to a few small populations located in Harris Creek and the head waters of California Creeks. Most populations in streams that flow through BLM administered land in the STR Assessment area are characterized by small isolated populations found in headwater habitat. Remaining pure populations are a result of some form of barrier that has prevented introgression by rainbow trout. Nine streams in the assessment area have WCT populations. The upper reaches of California and Harris Creek support a 100% pure WCT population. Wisconsin, Ramshorn, Indian, Nugget, Mill Gulch and lower California Creeks support hybridized populations. Bivens and Horse Creeks are listed as supporting WCT populations, however, BLM sampling inventories in 2006 failed to collect any WCT within the boundaries of public lands in either drainage. WCT may still persist within these areas and in areas outside the sampling sections. Sampling efforts may have failed to collect WCT due to very low numbers or they may persist upstream on National Forest lands.

3.2.6.2 Socioeconomics

There are 28 operators currently authorized to graze livestock for a total of 4,530 AUMs on the 30 allotments within the STR watershed. Many have operations that combine public land grazing allotments and private land pastures in a comprehensive management plan. In most cases, private land owned by the permittees is adjacent to, or intermingled with, the public land grazing allotments. Changes in numbers of livestock, seasons of use, and/or increased labor inputs may have a considerable economic impact on some operators.

Two commercial operators are authorized to provide outdoor recreation opportunities to the public in the STR Watershed. One conducts day-use big game hunting trips within

the Fletcher/Moore Creek drainage in conjunction with the adjacent privately owned Valley Garden Ranch. The other conducts day-use horseback trips in the Fletcher Creek area in conjunction with their authorized use on the adjacent National Forest. No overnight commercial use, special recreation events, or vendors are authorized within the watershed.

3.2.6.3 Cultural Resources

In conjunction with the Mountain Foothills Grazing EIS in the late 1970s, a Class II cultural resources inventory was conducted for a 10% sample of lands within the Dillon Resource Area. Results of the sample inventory indicated that cultural site densities in the South Tobacco Roots Planning Area were lower than that observed in other planning areas, with the average site density of one site for just under every two square miles.

An examination of existing records on file with the BLM-Dillon Field Office has provided information on the number and type of known cultural resources and level of previous cultural resource inventory conducted on public lands within the South Tobacco Roots Watershed analysis area. Within the study area, approximately 1437 acres of public land have been intensively inventoried for cultural resources at the Class III level. All inventories have been specifically project compliance related in advance of a number of proposed federal undertakings including: small range improvements (fences, water developments), road rights-of-way, timber sales, and land exchanges. The inventory projects vary from as little as 1 acre, to as much as 450 acres in extent, and public lands within at least ten grazing allotments have had no Class III cultural resources inventory at all.

As a result of past Class II and Class III cultural resource inventory, there are a total of 87 recorded cultural properties within the South Tobacco Roots Watershed study area. Of that number 80% (n=70) are historic, 16% (n=14) are of prehistoric origin, and 4% (n=3) have both historic and prehistoric components. No paleontological sites are located within the watershed.

The majority of the sites associated with the study area are historic in general, more specifically mining related. Recorded historic site types include: mine and mining structures (n=44); roads (n=7); mining ditches (n=6); power pole (n=5); cabins (n=4); trash dumps or scatters (n=2); homesteads (n=1); and cairns (n=1). Site types associated with prehistoric sites include: Lithic scatters (n=8); cairn (n=3); food processing (n=1); rock shelter (n=1); and stone hut (n=1). The three multi-component sites are each composed of a prehistoric lithic scatter and a small historic trash scatter. Of the 87 sites identified, 21 have been recommended eligible and 7 recommended potentially eligible for the National Register of Historic Places. Only one site has been formally evaluated for significance and eligibility for the National Register of Historic Places. Site 24MA1672 was determined NOT eligible for the National Register.

Nine of the recorded sites are considered contributing elements to the Virginia City ACEC and have been recommended eligible for the National Register of Historic Places.

Of these sites, four are historic roads (24MA2039, 24MA2041, 24MA2042, 24MA2043) and five are historic mines (24MA1164, 24MA1177, 24MA1193, 24MA1197, 24MA2022).

An examination of individual site forms also indicated that potential adverse impacts had occurred at 22 (25%) of the recorded sites. These impacts were primarily the results of natural erosion (n=11); road maintenance (n=4); continued mining (n=3); cattle traffic (n=2); and rodent disturbance (n=2).

To date, traditional cultural properties or traditional life-way values of special concern to Native American Groups have not been specifically identified within the South Tobacco Roots Watershed area. However, certain site types such as food processing and habitation locations retain particular importance to most Native American Groups. For that reason, sites 24MA162, 24MA387, 24MA454, 24MA460, and 24MA1339 are expected to hold importance to Native Americans and should be afforded special considerations.

4.0 Environmental Consequences

4.1 Introduction

This chapter discloses the scientific and analytic basis for comparison of the alternatives and describes the probable consequences (impacts, effects) of each alternative on the issues and resource concerns. The environmental consequences are analyzed and disclosed by alternative. This chapter also discloses the cumulative, or combined, impacts of alternative actions with past, present and reasonably foreseeable actions within the watershed.

Carefully planned resource specific monitoring under all alternatives will provide data for adaptive management within the watershed. The monitoring plan for the STR is attached as Appendix B.

4.2 Predicted Effects of Alternatives

4.2.1 Predicted Effects Common to All Alternatives, Including the No Action

Issue # 1: Forest Health and Fuels Management

Wildlife habitat provided by Douglas-fir stands will continue to decline throughout the watershed as canopy cover is reduced due to mortality caused by insects and/or removal of trees from proposed forest health treatments. The extent and persistence of this cover loss will depend on the continued intensity of insect infestations, drought, and forest activities implemented on other adjoining lands. Remnants of Douglas-fir cover are more likely to be maintained where Douglas-fir stands were previously thinned, individual trees or small groups of trees exhibit a genetic advantage or more vigorous growth, and/or in stands with natural openings throughout.

Limber pine and whitebark pine will continue to decline due to drought and white pine blister rust, and may become nonexistent in some areas. Management strategies to reduce white pine blister rust are cost and labor intensive (Hagle et al, 1989). Information on treatment methods shown to effectively promote limber pine and reduce mortality from white pine blister rust are very limited (Schoettle, 2004).

A gradual opening of forest canopy in sagebrush habitats without fire may enhance sagebrush recovery over treatments with fire.

Issue # 2: Wildland Urban Interface (WUI) and Protection of Private Property from Wildland Fire

Residential development is expected to continue in the area. Increasing numbers and densities of privately owned structures will result in more complex and intense fire suppression efforts in the event of a wildfire.

The management of naturally occurring wildfire in the northern portion of the Ruby Mountain WSA will continue as defined in the Dillon RMP and Dillon Fire Management Plan. Fire is desired in this area and may be managed to improve vegetation and watershed condition. Suppression action will be initiated on fires that do not fall within defined parameters or are a threat to public safety or private property.

Issue # 3: Riparian, Wetland, Aquatic Habitat and Associated Species

Livestock Management

The use of temporary electric fencing and salt and mineral supplements will continue to be used as management tools. Proper salting improves cattle distribution and utilization but is more effective in changing livestock behavior when done in conjunction with other management practices and/or projects. Although strategic salt placement is an inexpensive and effective distribution tool, research has shown that it is not as persuasive in modifying livestock distribution patterns as water developments (Ganskopp 2001) or the strategic placement of energy or protein supplements such as low-moisture blocks (Bailey and Welling 1999).

Effective animal husbandry practices, riding and herding, will continue to be emphasized and utilized to improve distribution, sustain resources and increase animal production. TR 1737-20, Grazing Management Processes and Strategies for Riparian-Wetland Areas (2006) states: “Successful application of low-stress stockmanship enables the rider or range manager to control the duration that plants and soils are exposed to grazing animals. This controls overgrazing and over resting, both of which lead to deterioration of range health. Proper handling can thus improve livestock distribution and rangeland condition and trend, and it can lead to improved riparian conditions that benefit fisheries and wildlife while improving water quality.”

Issue # 4: Upland Health, Sagebrush Steppe Habitat and Associated Species

Livestock Management

Land Health Standards on 21 allotments in the STR Watershed are **not** being impacted by current livestock management. Although Forestry/Fuels, WUI, biodiversity or noxious weeds issues may be present on some of these allotments, current grazing practices are not contributing to site specific resource concerns. Therefore, no changes to the terms and conditions of these grazing permits/leases will be implemented. No change to the Land Health Standards would be expected as a result of this action. Included allotments are: Baker Summit, Ballard, Brandon Pasture, Brandon Isolated, Copper Mountain, Downey Creek, Dry Lakes, Elser, Funk, Georgia Gulch, Granite Creek, Hillside, Hungry Hollow, Lott, McGovern, Mill Gulch, Miller, South Daisy, Valley Garden, Wisconsin Creek and Wisconsin Creek Isolated.

Temporary electric fence, livestock supplement placement (salt, protein block), riding, and herding are encouraged and if warranted, may be required as a means of improving

livestock distribution in all alternatives. When used, livestock supplement should be placed on ridges or terraces at least ¼ mile from the nearest livestock water source in areas naturally devoid of vegetation.

Issue # 5: Noxious and Invasive Species

Human activities, such as road maintenance activities, recreation, gravel mining, and other disturbances, as well as livestock, wildlife and birds, wind, water and fire have the potential to spread weeds into and within the watershed. Noxious weeds will continue to be treated as resources allow through the existing cooperative effort between the BLM, Madison County, private landowners and other partners.

Travel management implementation will prevent further weed spread along closed routes.

Resource Concern # 1: Special Status Species

Biological Evaluations (BE) are in the EA file (MT-050-06-11) in the Dillon Field Office for T & E Wildlife Species, Special Status Plants and Special Status Fish.

No listed T&E species will be affected by proposed actions in the watershed. None of the proposed actions would affect transient use by grizzly bear or wolves through the migration/movement corridor joining this area with the Gravelly Range over Virginia City Hill.

All of the WCT populations in the STR are classified at high risk of extinction due to limited population segments in restricted habitat. Competition with non-native trout and the current drought cycle will continue to unfavorably influence WCT habitat and populations throughout the watershed.

Resources Concern# 2: Socioeconomics

The BLM does not have access to financial or business records for permittees that graze livestock on allotments included in this EA. Therefore, it is impossible to provide a detailed or quantifiable discussion of individual ranch operations or economic conditions. The 2007 BLM AUM cost is \$1.35 while private land lease rates in Montana for 2007 average \$16.20/AUM.

Economic impacts to area businesses and commercial outfitting operations in the area are not expected to be affected by any of the alternatives. Refer to Chapter 4 on page 302 and Table 56 on page 286 in the Dillon Proposed RMP and Final EIS for further information.

4.2.2 Predicted Effects of Alternative A - No Action (Continuation of Current Management)

Under this Alternative none of the livestock management related resource issues or concerns identified by the IDT and documented in the STR Assessment Report would be addressed. Site-specific objectives would not be met and some allotments would continue being out of conformance with the Standards for Rangeland Health (43 CFR 4180).

Issue # 1 Forest Health and Fuels Management

Spruce budworm and bark beetles would continue to cause mortality of Douglas-fir, lodgepole pine, and subalpine fir. The effect of this would be decreased canopy cover, increased fuel loading, and the potential for more severe impacts from wildland fire and insects/disease as compared to historical levels. Forest health would continue to decline, particularly in the Douglas-fir communities. Douglas-fir would cease to exist on a localized stand basis for 20 to 40 years. The forest structure would not be expected to return to its current stocking and size class distribution with live trees for at least 80 to 100 years.

The density, structure, and species composition of forest stands would continue to be departed from historic conditions without a natural disturbance. Fire behavior would progress toward a long-interval stand-replacement fire regime. This could reduce vegetative diversity on the landscape and may reduce values for wildlife habitat, watershed protection, and esthetics (Arno, 2000). Juniper would continue to encroach into riparian and woodland settings, aspen would continue to decline, and Douglas-fir encroachment into sagebrush/grassland meadows would continue. As stated in Hyerdahl et al (2006), “in the continued absence of fire, mountain big sagebrush and grasslands in southwestern Montana are likely to become more homogeneous as Douglas-fir trees continue to encroach.”

Forested cover and security habitat for wildlife would decline throughout all forested lands in the watershed under Alternative A as Douglas-fir mortality increases. Mule deer and elk use would be seasonally reduced with the loss of security cover, although increased forage availability may compensate for this loss in some areas dependent on other disturbances. Use by bird species favoring more open habitat would potentially increase while those requiring denser forested canopies would decline.

Issue # 2: Wildland Urban Interface (WUI) and Protection of Private Property from Wildland Fire

Fuel loading would continue to increase at all elevation zones across the watershed. High fuel loads in proximity to residential development on private lands and near essential access routes would increase the cost and decrease the effectiveness of wildfire suppression efforts. High fuel loads near ingress/egress routes would affect emergency

evacuation procedures. This alternative would not provide protection for the Virginia City historic district or ACEC.

Issue # 3: Riparian, Wetland, Aquatic Habitat and Associated Species

The STR Assessment Report determined that current livestock management is contributing to riparian habitat concerns in 9 grazing allotments. Maintaining current authorized use on FAR and NF streams would perpetuate undesirable impacts to herbaceous, and in some cases, woody plant communities. Under Alternative A, no new AMPs or projects (fences, water developments) would be initiated to address the identified resource concerns on 19 stream reaches and one wetland area.

Observed impacts like heavy utilization of deep rooted bank holding sedges, increasing non-native herbaceous species, bank disturbances, overwidening of stream channels, sedimentation and hummocking would be expected to continue at current unfavorable levels. Sedge utilization in some riparian areas and meadows would remain higher than preferred for maintenance of proper functioning streams and riparian plant communities. Some site specific riparian habitats would continue to be impacted by ungulate browsing on palatable woody species resulting in limited recruitment and regeneration. Wildlife habitat in some riparian areas would continue to be affected by reduced vegetative and woody cover, species composition and structural diversity. Decreased aspen, willow and sedge dominated communities limit biodiversity by reducing habitat available for amphibians, migratory birds, nesting waterfowl, and browse for wild ungulates.

Juniper would continue to proliferate in many riparian zones. The conversion from deciduous woody habitat types (willow, aspen, dogwood) to Douglas-fir and juniper dominated habitats would continue in many drainages in the STR. Ecological impacts would include loss of deciduous woody species (primarily aspen, willow and red-osier dogwood), and deep-rooted herbaceous species, narrowing of riparian zones, lowered water tables, increased bare ground, increased erosion, stream sedimentation and channel entrenchment. Where increasing juniper was determined to be a primary cause of FAR conditions, downward trend would continue. Without disturbances favoring regeneration and/or protection of aspen saplings from browsing, they would likely become non-existent in some areas. Some older Douglas-fir habitats would continue to be converted to spruce habitat types, increasing their vulnerability to disturbances.

Conditions and trends to fishery habitat under Alternative A would remain in their current condition. There would be no expected improvement to fish habitat on stream reaches determined to be FAR or NF. In streams such as East Fork Granite Creek, where habitat conditions may be limiting populations and growth potential, habitat requirements may not be met. In streams with fishery habitat in PFC, such as Mill Gulch, fishery habitat needs would continue to be met.

The potential for severe wildfire is the highest under Alternative A. A high severity burn replacing forested habitat with bare ground would negatively affect hydrological functions. Vegetative evapotranspiration and ground water infiltration would be reduced.

Increased water runoff would increase stream flows resulting in higher potential for bank erosion and increased sediment inputs from uplands adjacent to streams. However, in some cases sediment from floodwaters would be trapped by streamside vegetation building floodplains. Moody et al. (2001), found that post wildfire, there was an increase in runoff and erosion rates followed by a subsequent decrease toward pre-fire rates. In this study, erosion rates increased 200 fold, and about 67% of the initially eroded sediment was still stored in the watershed after four years with an estimated residence time of 300 years.

In addition to erosion, wildfire can have physical, chemical and biological effects on soil. Soil volume, porosity and organic matter are associated with soil productivity. Wildfire can result in reductions in soil organic matter, alteration of structure, and increases in hydrophobicity. Chemical effects can include increase in pH, loss of cation exchange capacity and loss of nutrients by volatilization. Biological effects include direct mortality and loss of habitat to soil organisms (Poff, 1996).

Wildfire suppression activities have a cumulative ecological effect when added to the impacts of the fire itself. Backer et al. (2004) indicated that suppression activities can cause substantial impacts, including soil disturbance, weed spread, disturbance to cultural sites, etc. Activities commonly include construction of firelines, helicopter pads, and temporary roads.

If a high severity fire occurred in the watershed, impacts to fisheries could be severe depending on the location of the fire. Increased runoff and sediment would have a negative impact on WCT populations, at least in the short term. Conversely, if a low severity fire occurred, impacts to the WCT fishery in Harris Creek or California Creeks could be beneficial. Reduced conifer populations could release additional water for important riparian hydrologic functions which may provide conditions for additional or improved WCT habitat.

Issue # 4: Upland Health, Sagebrush Steppe Habitat and Associated Species

Four grazing allotments did **not** meet the Upland Health Standard. Two failed because of livestock impacts and two others due to noxious and invasive species encroachment.

Years of spring grazing by cattle and horses in the uplands of the Sand Coulee Allotment have reduced the vigor and complexity of the plant community. The grazing lease was transferred to new owners of the private base property in 2005 and they have voluntarily taken non-use the past 2 years. Even under the No Action Alternative progress toward meeting the upland health standard would be expected as new management strategies, e.g. rotating season of use and reduced numbers are being implemented.

The Cow Creek Allotment did not meet upland standard. A poorly maintained boundary fence allowed unauthorized horses access from adjacent private land. That fence has been repaired and the uplands in the Allotment are expected to improve even if this Alternative is chosen by the Authorized officer.

Existing conditions in sagebrush and upland habitats would persist under this alternative. Expansion of Douglas-fir into mid-elevation sagebrush grasslands, and increased composition of juniper in lower elevation habitats would provide increased habitat diversity and structure, but higher stand densities may eventually reduce habitat productivity and reduce heterogeneity across the landscape (Hyerdahl et al, 2006). Without any natural or human caused disturbances some areas currently occupied by sagebrush and scattered conifer seedlings would be converted to a forest cover type within approximately 30 years.

Issue # 5: Noxious and Invasive Species

Spread of noxious and invasive species outside of known infestations would be prevented or mitigated. Due to resource constraints, density and/or size of current infestations may not be reduced. Noxious and invasive species would continue to effect vegetative composition and cover, causing increased run-off and soil erosion, reducing forage for livestock and wildlife and affecting biodiversity and upland and riparian health in portions of the watershed.

Resource Concern # 1: Special Status Species

Conditions and trends to WCT habitat under Alternative A would remain static. In Horse Creek, where habitat conditions may be limiting populations, habitat requirements may not be met. In streams with WCT habitat in PFC, such as Harris Creek, habitat requirements are being met.

Resource Concern # 2: Socioeconomics

Under Alternative A, forage availability and number of authorized AUMs is expected to continue at current levels. Economic benefits attributed to livestock use of BLM lands would remain unchanged. Cattle grazing on 33,600 acres of public lands would provide 4,530 AUM's of forage in Madison County. The dependency of livestock operators on BLM forage would remain unchanged. BLM forage often provides a critical element of the livestock producer's matched complement of grazing, forage, and hay production. The number of operators would remain the same at 27 permittees. Because authorized grazing use on public land allotments would remain static the real estate values of private base properties would be unchanged.

Existing economic trends and BLM expenditures would continue under Alternative A. Economic and social conditions were analyzed in further detail for the Field Office under Alternative A in Chapter 4 (p 314) of the Proposed Dillon RMP and Final EIS.

4.2.3 Predicted Effects Common to Alternatives B and C

Livestock Management

Benchmark Allotment

The administrative action to eliminate the Benchmark Allotment and incorporate the north pasture in the Granite-Moore Allotment and the south pasture in the V.C. Hill Allotment would not increase the amount of forage authorized to be harvested on public lands, only reassign them to adjacent allotments. Operators in these allotments would have increased management flexibility including alternating season of use (pasture rotations), duration of season and incorporating pasture rest. This action would allow for improved management on several stream reaches that did not meet the Riparian Land Health Standard (RU 200, 201 and MA- 111). Proposed grazing management changes and rangeland improvement projects affecting these reaches are analyzed below under Issue # 3, Riparian, Wetland, and Aquatic Habitat and Associated Species.

Virginia City Hill Allotment

The administrative action to divide the V.C Hill Allotment into two allotments (V.C. Hill north of Highway 287, and Madison Overlook Allotment south of Highway 287) would not change the grazing preference (authorized AUMs) for either of the two operators who now share the V.C. Hill Allotment. They already have exclusive grazing authorizations north or south of Highway 287 based on private base properties. No net change in forage allocation on public lands would result from this action. This action is not in response to, or has an effect on, any of the five Land Health Standards.

Cal-Creek Allotment

The grazing lessee for the Cal-Creek Allotment sold the private base property in Lake Pasture. To avoid potential land use conflict, the pasture would voluntarily be relinquished by the lessee. This action would reduce the number of public land acres in the allotment from 6,170 to 5,929 and change the percent public land within the allotment to 29% based on the relative amount of total acres by ownership. Total number of AUMs authorized for cattle grazing in the Cal-Creek allotment would be reduced by 44 to 1,087. The number of cattle authorized to graze public lands within the allotment would also be adjusted to 832 (Table 21), correlating to the change in AUMs and percent public land.

Although incidental trailing use on the county road would continue by two herds, no overnight stays are authorized in this pasture.

No grazing in this area would eliminate potential adverse impacts by livestock to the only known population of BLM sensitive plant species in the STR Watershed. According to the Montana Heritage Foundation, a small population of Idaho sedge (*Carex idahoensis*) is located in wet or moist habitat adjacent the county road in the Lake Pasture (BLM will confirm the presence of this population).

Wisconsin Creek Allotment

Building a riparian/wetland exclosure protecting the main spring on RU-135 would eliminate livestock impacts at the spring and associated wetland community and allow it to improve within site potential. The physical habitat of a spring is the most important factor influencing its riparian plant and animal community (BLM TR 1737-17). Habitats in better condition usually support a diverse riparian community. By providing offsite water for livestock time spent in the riparian area would be reduced significantly. If given the choice, cattle prefer to drink out of a trough 74% of the time (Clawson, 1993).

Issue # 1: Forest Health and Fuels Management

Effects from forest health treatments are dependent on current stand conditions. Portions of drainages east and north of Mill Creek have 80% or more of dead/dying Douglas-fir. Higher levels of mortality have created openings in the forest canopy that have not existed for 80 years or more. Current conditions with large areas of dead trees provide less hiding and thermal cover than is provided by live trees. Removal of up to 95% of dead/dying Douglas-fir less than 35" DBH would further decrease available cover. However, a similar effect would occur with no treatment in 5 to 30 years as dead trees fall over or break off. Douglas-fir stands that are mainly dead/dying would primarily be salvage harvested to recover the product value and promote regeneration of a new healthy stand of Douglas-fir. Post-treatment, these stands would be very open with an average density of 5 to 15 trees per acre. Mature green Douglas-fir trees would be widely scattered throughout; regeneration would be slower and patchy, mainly occurring within a few hundred yards around remaining live trees (Shearer, 1981).

Douglas-fir stands to the west/northwest of Mill Creek are experiencing the first of several stages of defoliation as this insect spreads to new sources of food. Where sufficient green trees remain, treatments would remove smaller trees to reduce intra stand competition for nutrients, water and sunlight. There may be a lag time of up to 5 years before these trees respond to less competition, due to the residual effects of prolonged overstocking, spruce budworm defoliation and drought conditions. Post-treatment, these stands with lower levels of spruce budworm activity would have higher densities of live trees and regeneration would likely occur more quickly and more evenly distributed across the stand. Treatments in these stands would result in reduced forested cover and security for wildlife immediately post-treatment, but would likely have increased cover and security in the long-term as regeneration occurs, compared to untreated areas experiencing increasing tree mortality. Wildlife species diversity would change to those favoring more open habitats from those preferring more dense vertical cover and structure. This change would be most pronounced for migratory birds.

Thinning Douglas-fir trees before additional mortality occurs from spruce budworm defoliation would retain the presence of this species across portions of the watershed. As seen in the Meadow Creek area, stands that were thinned prior to the spruce budworm outbreak have less mortality than unthinned stands. Without treatment, mature and immature trees would largely die off for a time on a localized drainage basis. Removal of

these trees by logging and following up with cool season prescribed fire would create favorable ground conditions to promote localized Douglas-fir regeneration (Steinberg, 2002). The remaining mature trees would provide a seed source for natural regeneration. The length of time this takes would vary greatly and would largely be influenced by the spacing of remaining mature trees. Reducing the density of Douglas-fir would increase the availability of water and nutrients for the remaining trees. The residual stand would have increased vigor; however, some leave trees would subsequently die due to the epidemic levels of spruce budworm and repeated defoliation. Restoration of a savannah structure would increase potential for these stands to survive a wildfire event.

In all stands, Douglas-fir regeneration would be vulnerable to serious damage or mortality from spruce budworm larvae. However, opening up the stand through timber harvest would allow a larger percentage of the larvae to reach the forest floor where they would be consumed by predators (Fellin and Dewey, 1992). As susceptible trees are removed and environmental conditions improve, resistance to insect populations would increase (Furniss et. al, 1979). The effects of this restoration would last for 20 to 40 years and decrease the long term potential for epidemic levels of spruce budworm. However, due to epidemic insect populations on adjacent lands that may not receive treatments, large-scale reductions of insect infestations cannot be expected throughout the entire watershed.

The removal of conifers from within and around aspen stands and the use of prescribed fire would revitalize these stands for a 20 to 50 year period. The placement of slash and other non-merchantable material within and or around these aspen stands would help protect aspen regeneration from browsing on a localized basis. This has been found to be effective in reducing ungulate browse pressure on at least one past salvage sale treatment. Ground based yarding would further enhance aspen regeneration response by disturbing the aspen root system and promoting sprouting. Helicopter yarding would have no additional beneficial effect upon aspen regeneration response except by removal of conifer competition.

In the lodgepole pine types, openings created by patch cuts with small patches of trees within them would increase the structural diversity. It would promote a new cohort of lodgepole pine seedlings in these openings that would not be susceptible to mountain pine beetle activity at endemic levels for the next 80 years. Creating breaks in continuous stands would decrease the potential for widespread stand replacing wildfires and enhance suppression opportunities.

Salvage on the BLM administered lands alone would have limited effect on the current mountain pine beetle epidemic because the majority of activity is occurring above BLM administered lands on USFS lands. Currently there are no plans to implement large scale forest management on Forest Service lands.

Opening small patches in or around Engelmann spruce would promote a younger cohort of this species and increase stand diversity in this forest type. Snow deposition would

increase in disturbed areas. This would provide more available moisture on a localized basis during the growing season.

Treatments to reduce conifer encroachment into sagebrush would result in short-term loss of sagebrush habitat, converting these sagebrush/forested areas to a grassland aspect, with a minor forest canopy. Recovery of sagebrush would facilitate the BLM's goals and objectives of maintaining and improving sagebrush/grassland habitat, but based on past prescribed fires in the watershed, it may take at least 30 years before sagebrush is reestablished at current levels and structure. Deferring slash burning for up to five years could be detrimental to sagebrush responding to a more open forest canopy. Post-treatment herbaceous vegetation would be dominated by grasses and forbs, and potentially cheatgrass, which may attract increased wildlife use. These conditions would favor increased elk use and displace mule deer and other sagebrush dependent species, particularly on winter ranges.

Herbaceous vegetation would increase within all forest health, upland conifer and prescribed fire treatment areas. The BLM does not intend to increase authorized livestock use as a result of increased herbaceous vegetation. However, it is expected there would be increased ungulate use in the treated areas because of the increase in palatability as well as production of herbaceous vegetation. This would change distribution and use patterns of herbivory (both wild and domestic) within the affected allotments for five or more years. There may be a short term increase in soil erosion within treated areas, but the long term effect would be decreased soil erosion due to increased cover of herbaceous vegetation.

Proposed treatments would reduce long term fuel loading to resemble levels similar to historical conditions in areas treated. The net effect would be a decrease in intensity and rates of spread of wildfire within the treated area. Reducing fuels would improve the effectiveness of wildfire suppression efforts during the summer burning season. Removal of standing dead trees would reduce some of the material that could be recycled by fire and/or biological breakdown and as a result, some of the small mammal habitat that would be provided. However it would also reduce the potential for soil sterilization that could occur during the summer burning season due to the exceptionally high fuel loading. Whether or not Douglas-fir trees less than 8" DBH are removed for biomass utilization, the stipulation to retain 10 to 20 tons of slash per acre would be sufficient for long-term nutrient recycling and small mammal habitat. The larger slash material (generally 3" and greater) that remains following prescribed burning would create microsites of shading and moisture that promote regeneration of Douglas-fir.

Allowing public access to units WIS 4, RAM 1, RAM 2, GRA 3, and GRA 4 on a one-at-a-time basis for up to five years to remove wood products would generate some temporary wildlife disturbance on a localized basis. Utilizing right-of-way debris to close roads in the Dillon Field Office has been a useful tool for over 15 years with nearly 100% success in prohibiting unauthorized road use and it is anticipated this would also be the case in the STR Watershed. Weed monitoring/treatment would be ongoing during the period of use for these roads. Physically closing new temporary roads rather than

recontouring allows for future entry by maintaining the road prism with proper long term drainage, revegetates quicker by not disturbing established vegetation, and keeps post treatment sediment movement to a minimum. Road(s) that may be left open for a period of time Under Alternative C would be determined in a subsequent NEPA document.

Issue # 2: Wildland Urban Interface (WUI) and Protection of Private Property from Wildland Fire

The implementation of prescribed fire and/or fuel reduction treatments would reduce fuel loading and create buffer areas to slow or eliminate wildfire spread onto private property. Treatment unit locations were strategically identified to protect private lands near BLM administered land and to provide fire managers maximum fire suppression flexibility. Active management on the landscape scale that includes a mix of thinning, surface fuel treatments, and prescribed fire with proactive treatment in areas with high risk to wildfire is the best general approach for mitigating wildfire damage (Graham et al, 1999).

Issue # 3: Riparian, Wetland, Aquatic Habitat and Associated Species

Under both Action Alternatives, impacts of livestock grazing on riparian vegetation composition are expected to be positive relative to the No Action Alternative.

Regardless of the grazing treatment (alternative) selected, successful riparian management ultimately depends on the livestock manager's cooperation or support of the grazing management plan (Erhart and Hansen 1998, Evans Draft). Ehrhart and Hansen (1997), analyzed 71 stream reaches located throughout Montana and concluded that "the manager is more important than a particular approach". Revised grazing systems included in the action alternatives were generally developed in cooperation with the grazing permittees in order to increase support in implementation and success in meeting resource objectives.

Proposed livestock management changes, rangeland improvements and utilizing vegetative use guidelines as tools to indicate livestock movements would help improve overall watershed conditions in the STR. This analysis is based on the assumption that these allowable use levels and associated livestock rotations are employed in a timely manner. Clary and Webster (1989) recommend that a minimum herbage stubble height be present at the end of the growing season or the end of the grazing season, whichever comes later. The residual should be 4 to 6 inches to provide sufficient herbaceous forage biomass to meet the requirements of plant vigor maintenance, bank protection, and sediment entrapment. Clary and Leninger (2000) recommend a 4" residual stubble height as a starting point for improved riparian grazing management while acknowledging that 6" of stubble height may be required to reduce browsing of willows or limit bank disturbance on vulnerable streambanks. Improvements in stream channel morphology and reduced impacts to streamside wetlands would reduce sediment input associated with channel erosion.

Most streams supporting fisheries in the STR currently do not have a large enough sedge component to use residual stubble height as an indicator of habitat conditions. However,

if riparian juniper treatments are implemented sedge populations would be expected to increase and stubble height would be a useful tool to measure seasonal riparian utilization and relative impacts on fish habitat.

Where sedges are not present or in limited composition, using the duration and timing of grazing treatments to improve habitat conditions may not be sufficient to mitigate streambank disturbances and browsing on deciduous woody species in every pasture, every year.

Design features for spring developments listed in Section 2.3.3 would mitigate the potential of spring developments drying up or measurably reducing the amount of wetlands associated with springs. Installing wildlife escape ramps in all water troughs would minimize mortalities to small mammals and avian wildlife, as well as provide clean drinking water. Ensuring adequate flows are retained for maintenance of wetland hydrology and fencing springs sources and associated wet meadows would potentially conserve habitat for rare plants and improve existing habitat for wildlife. The level of human activity needed to implement the proposed projects may increase wildlife disturbance or displacement on a localized and/or short term basis.

Water development in uplands lacking water is a key factor in reducing livestock concentrations in riparian areas. The proposed water developments would improve site conditions at springs by fencing the source and protecting the associated wetland habitat. A common effect within riparian or spring exclosures is an increase in Canada thistle if it occurs at the site prior to fencing. (Dewey, USU pers. comm. 2003). New exclosures would be monitored for noxious weeds and treated where necessary.

The development of offsite water is expected to reduce trailing along streams and grazing/loitering in the riparian zone. Clawson (1993) found that installation of a water trough substantially reduced the duration of use of a perennial stream and also reduced the use of a spring in the same pasture. Cattle watered out of the trough 73.5% of the time, compared to only 3% from the stream and 23.5% from the spring. Reducing the duration of riparian area use would vary depending on water location and topography, but is expected to help improve channel morphology and increase composition of deep rooted riparian vegetation along the greenline. Ehrhart and Hansen, (1997) state “The one quantifiable factor which was highlighted in successful riparian management was *the presence of off-stream water*. Case studies, controlled experiments, and common experience all confirm that, unless discouraged from doing so, cattle tend to spend a disproportionate amount of time in the riparian portion of any pasture. Alternate sources of water appear to be an important tool to encourage livestock to move away from the riparian area”. Alternative water provides cleaner water for livestock and releases pressure off streams and wetlands reducing waste inputs to streams, soil compaction, channel damage and grazing on riparian vegetation.

The planned spring developments could de-water low flowing springs and decrease riparian habitat if overflow from the watering troughs are not routed back into the channel. Obtaining flow measurements prior to developing these springs would provide

important feasibility data that would be used in the engineering design. Augmenting the water development with shade, such as placing the watering trough near existing juniper trees, would also help to reduce the time livestock spend in riparian areas (TR-1737-20, 2006).

Proposed water developments in the uplands in the Cal-Creek, Virginia City Hill, and Mill Gulch Isolated Allotments would reduce impacts to riparian areas, and would allow broader livestock distribution and more dispersed utilization on upland forage plants.

Impacts associated with new water developments would include:

- Soil and vegetation disturbance during construction activities and increased utilization and disturbance within ½ mile of the new watering locations.
- Loss of vegetation from concentrated livestock use in the immediate vicinity of the watering trough.
- Increased potential for invasive herbaceous plant species such as houndstongue, knapweed, or cheatgrass in the disturbed areas.
- Use on two-track ways, along new pipeline routes in Water Gulch (Cal-Creek Allotment) and V.C. Hill Allotment would be authorized routes for administrative and maintenance purposes by permit holders and BLM employees only.

All proposed forest health, prescribed fire, upland and riparian conifer treatments would result in short term effects which would diminish as vegetation responds to new conditions. Changes in forest structure would reduce snow and rainfall interception, and increase infiltration and runoff. According to Robichaud et al. (2006), “no measurable increase in runoff can be expected from thinning operations that remove less than 15 percent of the forest cover or in areas with less than 18 inches of annual precipitation”. Data from 95 watershed experiments conducted in the United States shows that, on average, streamflow increases by nearly 2.5 mm for each percent of watershed harvested (Troendle, et al. 2006). Streamflow is quite variable and basal area change within affected watersheds is well below the threshold necessary to detect statistically significant change.

The potential for runoff, erosion, and sediment input into streams increases with the amount of soil disturbance associated with treatments. Treatments using ground-based equipment (i.e. forest health units with conventional yarding, some upland conifer treatments), and those requiring construction of new temporary roads would result in more soil disturbance. Riparian and upland conifer treatments (to be completed with herbicide, chainsaws and/or hand tools), prescribed burns, and forest health treatments utilizing helicopter yarding would result in less soil disturbance. Use and maintenance of BMPs are likely to mitigate the effects of increased runoff and minimize erosion thus reducing the likelihood of sediment entering streams. Forest management practices following BMPs would generate minimum amounts of sediment when placing temporary crossings in streams.

Following prescribed fire, there would be a positive vegetative response which would reduce the amount of bare ground and reduce the potential for erosion and runoff. Over the long term, treatment of juniper in specified riparian areas is expected to increase

deep-rooted riparian vegetation and improve stream channels. Treatment of western juniper using chainsaws and/or herbicides in riparian zones in northeastern California and western Nevada was followed by “greater than expected” release of deep rooted herbaceous and deciduous woody vegetation within three years (pers. comm. 2007).

Restoring deciduous riparian woody species is expected to have a beneficial impact to riparian health as well as wildlife/fisheries habitat. Soil disturbance during manual treatment of juniper may allow localized increases of cheatgrass or noxious weeds (houndstongue, Canada thistle, spotted knapweed).

Issue # 4: Upland Health, Sagebrush Steppe Habitat and Associated Species

On the majority of BLM uplands within the STR, utilization of upland forage plants was found to be less than 50% under current management. For areas where upland utilization levels was an identified concern, managing for <50% livestock utilization in the uplands during spring and summer treatments is expected to benefit water infiltration, plant vigor, reduce soil loss through overland erosion and leave adequate residual cover and forage for wildlife.

Prescribed fire and forest treatments in Wisconsin Creek would remove approximately half of the tree and shrub cover within the unit. Sagebrush in Units WIS 1 and WIS 3 are the tallest and densest mountain big sagebrush communities available in this area. Burning would displace winter use by mule deer, and most seasonal use by other sagebrush dependent wildlife species until sagebrush habitat is reestablished. However, treatments to reduce conifer encroachment would result in long term maintenance of sagebrush habitat. Re-introducing natural disturbance regimes would provide for a diversity of successional stages in sagebrush habitats.

Any activities along the road in Wet Georgia Gulch that reduce Basin or mountain big sagebrush may displace pygmy rabbits.

The site-specific impact of fences depends on design, location, type of vegetation affected, and the distribution of seasonal wildlife uses. Wildlife habitat in some uplands may improve if additional fences provide more effective livestock management. Fences constructed to manage livestock, establish ownership, or as part of habitat treatment projects may fragment wildlife habitat in localized areas.

Issue # 5: Noxious and Invasive Species

Using Early Detection, Rapid Response (EDDR) would more effectively prevent new invasive plants from becoming established in the STR. Dividing the STR into three sections would allow for existing infestations to be treated more effectively on a rotating basis, which is expected to reduce the size and density of existing populations of noxious weeds within approximately 10 years.

While the proposed forest health/fuels treatments may allow opportunities for increases in non-native species by reducing canopy cover and increasing soil exposure, research indicates that the increase in non-native species is much greater with a severe wildfire. Therefore, fuel treatments that effectively reduce wildfire severity may also reduce the risk of post-fire invasion by non-native plants (Omi et al, 2006).

Design features for forest health/fuels treatments and construction of structural projects is expected to mitigate cheatgrass and noxious weed spread resulting from soil disturbance during treatment/project implementation.

Acquiring additional funding to treat abandoned mine land would allow for more aggressive treatment in these areas. Treating abandoned mine land, including dredged streams, would reduce a major source of noxious weed seeds making prevention, containment and control more effective in the areas adjacent to these relatively large infestations.

Biological controls for spotted knapweed including seed head weevils, root boring weevils and root boring moths, and for dalmation toadflax including a stem-boring weevil that feed exclusively on the target species are expected to reduce the seed production, vigor and competitiveness of existing population of these species. There would be fewer seeds to expand the infestation and reduced vigor would allow native vegetation to compete better with these aggressive invaders and mitigate further spread within and adjacent to existing infestations.

In addition, targeting control efforts towards the dalmation toadflax infestation in the Brandon Pasture and the knapweed in the Hungry Hollow Allotment is expected to slowly reduce these populations both in size and density. Because of the long seed viability of these two noxious weed species and the amount of seed that is already distributed within these sites, substantial reduction in the existing infestation levels would not be realized for at least ten years.

Resource Concern # 1: Special Status Species

Implementing a 6”sedge stubble height use guideline is expected to reduce bank alteration impacts to WCT habitat on streams where sedge is present.

Resource Concern # 2: Socioeconomics

Shortened or changed authorized use periods in specific pastures or within the allotment(s), incorporating additional rest or deferment, and/or reducing numbers of livestock would economically impact ranchers who rely on public land grazing. Operators may have to use private pastures or other areas for longer periods of time, during different times of the grazing seasoning and may be required to reduce herd size. Additional range improvement projects would add increased construction and maintenance expenses for the permittees and the BLM. In addition, use guidelines in the uplands and riparian areas may necessitate increased labor inputs by the permittees in

order to harvest authorized AUMs. During periods or years of drought, total authorized AUMs may not be available for harvest.

The forest health treatments under Alternatives B and C most closely resemble Alternative B of the Dillon RMP. The latter specifically identified the STR as a priority treatment area. Alternative C would create more short term employment opportunities than Alternative B.

BLM expenditures would increase under both action alternatives.

Socioeconomics was fully analyzed under Alternative B in Chapter 4 pp 331-332 of the Final EIS for the Dillon RMP.

4.2.4 Predicted Effects of Alternative B

Issue # 1: Forest Health and Fuels Management

Alternative B proposes treatments to restore and/or maintain historic, density, structure, and species composition of forests and woodlands on approximately 14% of BLM administered lands in the STR Watershed. Treatments would be implemented on 9 allotments where the Biodiversity Standard was not met due to forest health, conifer expansion and/or heavy fuel loading conditions.

Treatments in units with extensive Douglas-fir mortality (**GRA 4** and the portions of units **MEA 2**, **MEA 3**, and **MEA 4** that were not previously managed) would recover additional wood product value that would be lost without treatment. Fuel loading would be decreased, and treatment would promote a new stand of Douglas-fir in the long-term. Treatment in units **CAL 3**, **GRA 3**, **NUG 2**, **RAM 1**, **RAM 2**, and **WIS 4** would open up the stand and increase vigor of leave trees. The residual stand would be more likely to survive attack by insects, and would exhibit less mortality than untreated areas with epidemic spruce budworm populations. Refer to Section 4.2.3, Predicted Effects Common to Alternatives B and C for description of predicted effects by stand type.

Alternative B would make progress toward meeting Goal 1, Actions 4 and 5, and all actions under Goal 2 of the Forest and Woodland Vegetation and Forest Products section of the Dillon RMP by providing opportunities for forest products and implementing treatments on 1,715 acres of Warm/Dry and Warm/Very Dry habitat types and 731 acres of Cool/Moist habitat types.

Proposed forest treatments would remove conifer cover on 31% of BLM administered forests/woodlands. This would displace fall and winter big game use, and general seasonal wildlife uses that rely on the canopy and cover provided by Douglas-fir habitats.

Issue # 2: Wildland Urban Interface (WUI) and Protection of Private Property from Wildland Fire

Fuels reduction treatments utilizing commercial harvest, prescribed fire and mechanical/herbicide methods would occur on up to 4,487 acres. All treatments would have some benefits associated with protecting WUI from the threat of wildfire. One of the primary benefits of reducing fuel loads are to decrease the intensity of potential wildfire, thus offering fire managers and firefighters more opportunity for direct fire suppression or other appropriate response. These benefits would prove effective until fuels loads reach pretreatment levels. This may be up to 30 years, depending on other disturbances that affect fuels loads (i.e. wildland fire, insects/disease outbreaks, windthrow).

Visual impacts associated with prescribed burning include blackened ground and upright dead trees. These impacts are relatively short term as grasses and forbs respond to the nutrient flush as a result of fire. Standing dead trees that are killed by fire generally weather to a light grey color within several years. The length of time these snags remain upright depends on the environmental influences, the integrity of the root system and the tree/shrub species. Herbicide treatments in the uplands would result in similar visual impacts. Mechanical treatments would vary depending on the method used to dispose of slash. Lopping and scattering would result in slash on the ground until it decays. Piling the slash and burning it under high moisture conditions would result in visible piles for several years. Untreated areas within upland treatment unit boundaries would provide some visual obstructions to limit sight distances and to visually break up the treatment continuity.

Issue # 3: Riparian, Wetland, Aquatic Habitat and Associated Species

Forest Health and Fuels Management

Commercial harvest treatments would be implemented in six Level 6 hydrologic units. These treatments would impact 0.64 to 2.55% in the affected Level 6 hydrologic units within the watershed. Treatments increase the potential for runoff, erosion, sediment yield, and water yield. However, the reduction in basal area and the percent change in forest cover would be well below the threshold for detectable change.

Riparian Juniper Treatments

Approximately 5 miles of stream reaches (~120 acres) in three allotments would be treated to remove riparian juniper under Alternative B as shown in Table 9. Predicted effects would be an increase in deep-rooted riparian vegetation (aspen, willows, red-osier dogwood, sedges, etc.) which would be followed by stream channel improvements, increased water storage capability and widening riparian zones. Sediment input into the treated reaches may increase for the first couple of years and then decrease from current levels due to an increase in vegetative cover along the greenline. The increased cover would be more effective at trapping sediment coming from both instream

and upland sources. The amount of increased riparian vegetation and subsequent improvement and length of time to realize this response is dependant on the current composition and vigor of the vegetation along these reaches. Where juniper canopy cover is greater than 40%, seeding of native upland and riparian seed mixes may be necessary to achieve desired results and prevent cheatgrass and noxious weeds from spreading into these areas.

Livestock Management

Cal-Creek # 10507

Under this Alternative the BLM pasture would be rested one in three years. A spring in the uplands would be developed to provide livestock offsite water away from riparian areas in Threemile Creek (RU-279), Butcher Creek (RU-280 and 281), and Daylight Creek (RU-282). A drift fence across Daylight Creek would be constructed on the BLM boundary.

The Cal-Creek Allotment contains 18 pastures that are managed as three distinct grazing units. Under current management each unit has one pasture rested every year with the full rotation taking six years. To address specific riparian concerns in the BLM pasture in grazing unit # 2, that pasture would be rested one in three years as part of a comprehensive rest-rotation system for the entire unit. Plants would be grazed at different times during the year with treatments limited to no more than 25 days and the use period rotated annually from late June to October 1. A study by Myers (1989A) found that successful riparian management in southwest Montana limits duration of use in riparian areas to 28 days or less. Limiting grazing intensity, frequency, and season of use would encourage plant vigor, regrowth, and energy storage and minimize soil compaction. For plants to remain vigorous and productive they must have time for growth, seed development, and storage of carbohydrates. Continual grazing during the plant's growing season eventually causes roots to die back, the plant to lose vigor, and seed development to cease.

Developing the spring in the uplands would pull cattle out of the riparian habitats on all three impaired stream reaches. Myers (1989a) found that during the hot-season (July 1 to September 15) livestock watered frequently and preferred shade while loafing. Currently, cattle in the BLM Pasture have to go to streams for water at least once a day. During the heat of mid-summer they tend to spend a disproportional amount of time in shaded riparian areas. The interior of the BLM pasture is heavily populated with juniper and other conifers that would provide excellent shade. If cattle have water and shade in the uplands they would be less motivated to travel long distances to drink out of streams.

A drift fence across Daylight Creek would reduce trailing impacts to RU-282. The fence would block most downstream livestock drift but access to the stream is available through a number of low swales coming down off the ridge above the drainage and some livestock trailing and trampling damage would continue in the stream corridor. Lack of forage beneath the forested overstory makes this steep drainage susceptible to bank

impacts by cattle seeking shade and water. By reducing access, the drift fence would reduce sediment inputs into the stream and grazing pressure on localized riparian herbaceous plant communities.

In Water Gulch Pasture # 1, Alternative B proposes fencing out the spring at the head of RU-283 and piping water to a trough approximately ¼ mile down drainage. This spring and stream reach were determined to be NF due to cattle trailing up and down the narrow drainage to water. This drainage has a high juniper canopy cover with little herbaceous understory and consequently higher than expected bare ground. Enclosing the spring and associated riparian/wetland habitat would protect the water source from impacts by livestock. Cattle would continue to have access to approximately ½ mile of riparian habitat below the protected spring. Trailing would continue to some degree, but would be reduced because of the lack of available forage in the riparian zone and the presence of off site water.

Piping water to a trough on the adjacent upland bench would provide water and decrease trailing behavior. As noted above in section 4.2.3 livestock prefer to drink easily assessable water from a trough if given an opportunity. Not only would livestock spend less time in the Water Gulch drainage, which has no forage, but they would disperse more uniformly across the uplands which have abundant cool season grasses like bluebunch wheatgrass and Idaho fescue. Although impacts to the riparian area would be decreased, use would increase in the vicinity of the water trough located on dry juniper uplands.

Fletcher-Moore # 30428

Constructing a riparian exclosure fence on ¼ mile of Fletcher Creek flowing through public land would maximize potential for survival of willow and aspen recruitment, and improvement in herbaceous plant composition and streambank stability. This relatively small portion of the Allotment would be excluded from livestock grazing to initiate riparian habitat recovery. Skovlin (1984) found that exclusion of livestock has produced improved riparian and aquatic habitat following 4 to 7 years of rest, woody plant recovery following 5 to 8 years of rest, and attendant positive responsive in birds and small mammals.

Authorized grazing in the Fletcher-Moore allotment would stipulate complete rest every other year.

Granite-Moore # 10468

To address Riparian Health concerns on three stream reaches in the Allotment several rangeland projects are proposed.

A hardened stream crossing would be constructed on the East Fork of Granite Creek (RU-209) adjacent to the National Forest boundary fence where cattle tend to drink and cross. The crossing would ease livestock access to the stream, keep the water clean,

prevent silt and erosion, allow good animal footing for drinking and crossing and minimize bank disturbances in other areas. Hardened crossings are readily used by livestock to cross streams if they are located in sites currently used to water or cross.

In conjunction with the hardened stream crossing, selected Douglas-fir and lodgepole pine would be cut and oriented along the upper ½ mile of RU-209. Cattle are known to avoid sites where access is difficult, especially if suitable forage is available elsewhere. This project would reduce access to the stream by livestock and wildlife which is expected to decrease chiseling of exposed streambanks, utilization of herbaceous and woody vegetation, and alterations to stream channel morphology. Some larger diameter trees would be limbed and laid across the creek to prevent ungulates from trailing up and down in the channel disturbing fish spawning habitat.

In the south pasture of Granite-Moore Allotment Postlewaite Creek (RU-200) would be fenced into a riparian pasture and livestock use reduced to promote riparian vegetation and stream channel improvement. This action would control livestock utilization of riparian plants and increase distribution in the rest of the pasture by forcing behavior modifications. Livestock tend to stay in familiar locations on the landscape. Cattle have favorite home ranges and generally do not stray far from favored watering areas because of time required to return to watering sites (Roath, 1980; Platts and Nelson, 1985a). Numerous researchers have shown that riparian habitats managed as riparian pastures have shown measurable improvements when compared to similar unfenced areas.

Mill Gulch Isolated # 20450

Incorporating a deferred-rotation grazing system, limiting the duration of use, and developing a spring on private land would mitigate livestock impacts on Mill Gulch tributary RU-79.

This Allotment contains 325 acres of private and state land and 98 acres of land administered by the BLM. Working with the operator in a cooperative effort to mitigate livestock impacts to the riparian habitat and stream channel is critical for success in this mostly privately owned pasture. The operator's willingness to work with the BLM to develop a private spring and pipe water ½ mile to a trough, also on private land, would provide much needed offsite water for cattle grazing the upland benches above the stream. The predicted effect would be that cattle spend more time grazing and watering in the uplands rather than spend time and energy traveling down to water in the riparian area.

Grazing moderate numbers of livestock for 30 days rotated through the season would allow the operator to utilize forage on their private and state lands and limit impacts to the riparian area associated with Mill Gulch tributary. "Hot season" use, roughly mid July to mid September, would be limited to one in three years. During the hot season cattle tend to stay in riparian areas longer because they have access to forage, water and shade. Also, stress levels on individual plants from herbivory are greatest during this period because there is less time for regrowth and replenishment of carbohydrate

reserves. Continuous hot season grazing can also favor invasive plants and reduce residual ground cover. Early season use (prior to mid July) two of three years would reduce impacts on the riparian vegetation because upland forage is more palatable than riparian forage during the spring and early summer.

Ramshorn Creek # 10552

Livestock impacts on several tributaries in the Ramshorn Creek drainage would be mitigated through rangeland improvement projects and changes in livestock management. Tributaries of Ramshorn Creek that were determined to not be meeting the Riparian Health Standard are RU- 74, 75, 76, 77 and RU-276.

Constructing a 2.5 mile pasture division fence on the ridge above (south) Ramshorn Creek would create two pastures. Season of use would be limited to 30 days in either pasture. The fence would allow for completely resting the Ramshorn drainage one out of three grazing seasons. It would also prevent cattle grazing the ridge south of Ramshorn Creek from dropping down into the drainage to water. Once cattle go down off the ridge to drink they do not climb back up but remain in the creek bottoms. This fence would also facilitate more uniform distribution and utilization of upland forage across the landscape. However, the fence would bisect mule deer and elk winter foraging habitat and would potentially be an entanglement hazard. The most logical location to build the fence would isolate small tracts of public land and big game winter habitat in a large private pasture that would be grazed annually.

Impacts on RU-75 (which was determined to be NF) from watering and loafing livestock, would be eliminated by a riparian exclosure fence. A hardened water gap at the top of the reach would provide a place for livestock to drink and stabilize an area that has been negatively impacted by watering cattle.

Early spring motorized vehicle travel on a small two-tract road adjacent to RU-75 has also contributed to the degraded riparian conditions in two ways. One, the vehicles have driven directly into the riparian zone as they go through a gate built adjacent the reach, and two, travelers frequently do not shut the gate which allows cattle on an adjacent BLM allotment access to the stream to water. These additive impacts would be mitigated by erecting physical barriers across the two-tract as it leaves the main Ramshorn Creek road. This is not a BLM designated open route, so no net loss of roads on public land administered by the BLM would result from this action.

Sand Coulee # 20679

The spring development at the head of Sand Coulee Creek would be reconstructed to reduce impacts to riparian vegetation, stream banks, and channel morphology. This action, combined with changes in livestock management (see Issue # 3, Upland Health, Sagebrush Steppe Habitat and Associated Species below), would mitigate livestock impacts to the riparian zone along the creek.

Browsing on deciduous woody species would increase during the late season treatment (9/1 to 10/15) every third year. The primary advantages of late season grazing are that soils are drier, which reduces the probability of compaction and bank trampling; most plants have completed their growth cycle, and grazing would not adversely affect plant development. Willows may be impacted on a localized basis, but are expected to be maintained within the pasture. Use of low-moisture protein blocks would be encouraged as a supplement in the uplands which would mitigate browsing on willows and other palatable woody vegetation. Bailey et al. (2001), showed that placing dehydrated molasses (protein) supplement in under grazed rangeland was an effective tool to modify cattle grazing distribution (from riparian to upland areas) during late summer, autumn, and winter.

Virginia City Hill # 10521

Three pastures in the Allotment contain stream reaches that did not meet the Riparian Health Standard. Because riparian areas comprise only a small portion of the area in the Allotment, they are best addressed in the context of an overall management plan. Tohill and Dollerschell (1990) state; “Proper upland management is essential for obtaining a healthy riparian area, the two go hand in hand.”

A combination of a short duration deferred-rotation grazing system, fencing, a pipeline extension, and several spring developments are proposed to address riparian habitat issues and improve riparian health in the Allotment. The advantages of this system are explained in TR-1737-20 (2006); “The grazing season is shorter and changes in the timing, frequency, and intensity of grazing decrease the likelihood of multiple defoliations of desired riparian plant species, allowing for longer periods of plant recovery. Livestock may be less selective in pastures where use is concentrated into shorter periods.” Kovalchik and Elmore (1991), indicated that deferred rotation grazing systems are moderately compatible for willow-dominated plant communities (highly compatible for sedge management and showed no change to highly compatible for willows depending on duration of season and topography).

Working cooperatively with the NRCS, the operator on the Allotment has developed a comprehensive grazing program that incorporates 10 pastures in a relatively short duration deferred-rotational system. Using 3 private pastures with 7 pastures containing some land administered by the BLM allows for maximum flexibility and short periods of use in each. As the grazing management plan in Table 17 shows, all 7 pastures that have public land are used every season but for periods of use that vary from as little as 2 days to a maximum of 22 days, based on pasture size, forage resources, and available water. The length of time cattle spend in riparian areas is an important factor in sustainable management. According to Marlow (1991), “The most critical aspect in any grazing plan for the protection of riparian areas is the length of time cattle have access to a particular stream reach.” Myers (1989) agrees, reviewing 34 allotments in southwest Montana he concluded, “Duration in grazing treatments becomes a key factor in determining the severity of damage” because cattle tend to hang out in riparian areas even when not

feeding. Short duration grazing also ensures adequate residual vegetation cover or time to re-grow following grazing.

Increasing grazing intensity (numbers of authorized livestock would be increased due to merger with Benchmark allotment) and AUMs (AUM's from the Benchmark allotment would be incorporated into V.C. Hill) due to implementing shorter duration grazing periods may inhibit riparian recovery and response in juniper treatment units depending on the length of time that these areas are effectively rested post treatment.

To help manage duration of use in the pasture that contains Slade Creek (RU-199), the operator, in cooperation with the NRCS, would construct a fence dividing the Slade Pasture into the West Slade and Bobcat Pastures. This division fence would limit season of use to no more than thirteen days in any given year on Slade Creek in the West Slade pasture.

Extending an existing pipeline from an adjacent pasture to a new trough located in the upper Slade Creek drainage, which is dry, would further reduce time cattle spend watering and grazing in the riparian habitat adjacent the flowing portion of the creek (RU-199). This watering site would also help distribute cattle more evenly in the uplands benefiting riparian and upland plant communities.

The headwaters of Postlewaite Creek flow from a spring in the BLM Pasture. To eliminate impacts from livestock and wildlife, the spring source and associated riparian and wetland habitat would be fenced. The spring would be developed and water piped outside the enclosure to a trough nearby. This would not only reduce riparian vegetation impacts on public land, but also along that portion of the stream reach with flows onto private land less than 1/8 mile below the spring.

A developed spring and livestock watering trough are located on private land in the West Slade Pasture only a few hundred feet west of the Elbow Pasture. The Elbow Pasture contains RU-198, another reach on Slade Creek that has been impacted by livestock. Even though the Elbow Pasture is only used 2-3 days per season, modifying the boundary fence between the two pastures would allow cattle access to this offsite water and mitigate impacts to the stream channel and its riparian habitat.

Fisheries

Impacts to fish habitat within the STR related to commercial timber harvests and prescribed burns under Alternative B would be negligible with proper mitigation such as buffers, landing setbacks, standard erosion control methods and installation of temporary fish passable culverts. Forest health and fuels treatments would reduce the impacts to fish habitat from a stand replacing fire if one should occur. In some cases it may be desirable to remove conifers from the riparian zone to stimulate deciduous woody species regeneration, such as willows or aspen. However, there remains the risk of increased sediment resulting from runoff from road use and landings.

Changes in livestock management under Alternative B would be expected to reduce livestock impacts and improve fish habitat on the East Fork of Granite Creek. Changing to a rest rotation system and implementing the proposed projects is expected to result in improvement.

Issue # 4: Upland Health, Sagebrush Steppe Habitat and Associated Species

Livestock Management

Cow Creek # 20446

Maintaining the boundary fence between private land and the Allotment would prevent unauthorized grazing by horses. Also, maintaining the common boundary fence between the Cow Creek Allotment and the Brandon Allotment would prevent cattle authorized to graze the Brandon Allotment from drifting into the Cow Creek Allotment. These measures are expected to facilitate increased vigor, canopy and cover of cool season grasses, reduce bare ground and ameliorate erosive conditions.

Sand Coulee # 20679

Long term spring grazing has contributed to fewer and less vigorous grasses, increased juniper, more bare ground and increased soil erosion. Research shows that consistent spring use allows sagebrush to increase while perennial grasses and forbs decline. On the other hand, fall grazing maintains upland plant communities in good ecological condition (Mueggler 1950, Laycock 1967). Implementing a moderate level of spring and fall use following by a season of rest would allow cool season grasses to complete their physiological processes two of three years. This system would increase the vigor, production and cover of cool season bunchgrasses, decrease bare ground, shorten water flow patterns and decrease soil erosion.

Mid season use between 7/15 and 09/01 would be eliminated. Many researchers have shown that defoliation during mid growing season, particularly during early flower development usually has the most negative impact on cool season herbaceous plants growing in the intermountain sagebrush steppe (SRM. 1994. Ecological Implications of Livestock Herbivory in the West). Not authorizing use during the “hot season” would also reduce the time that livestock spent in riparian areas associated with Sand Coulee and Horse Creeks.

Virginia City Hill # 10521

The short duration deferred-rotation grazing system would allow vigor, composition and cover of cool season grasses to increase. “Combinations of rotation, deferment, and rest all seem to be beneficial provided they allow periodic protection from grazing during the critical period of spring plant growth” (Blaisdell and Holmgren, 1984). Increased production in these areas may provide additional forage or cover for wildlife. Increased cover and density of cool season bunchgrasses would also improve hydrologic processes

by allowing better water infiltration and less run-off and erosion. Shortening the duration and providing growing-season rest, deferment, or recovery in all pastures lessens animal impacts, provides for growth or regrowth, and causes livestock to be less selective in grazing (Provenza 2003).

Deferring spring turnout and reducing duration of grazing in each pasture should maintain condition of sagebrush for sage grouse, mule deer, migratory birds and other sagebrush dependent species. Wet meadows and swales would likely continue to receive a disproportionately higher level of grazing utilization. Maintaining canopy of existing sagebrush habitat would contribute to the integrity of the wildlife movement corridor between the Gravely Range and the Tobacco Root Mountains. Additional fences in this area could represent additional impediments to wildlife movement through this movement corridor.

Issue # 5: Noxious and Invasive Species

Refer to predicted effects Common to Alternatives B and C under 4.2.3.

Working with cooperative land owners increases the positive effects of weed treatment on both BLM administered and private lands. These effects include increased ground cover, reduced soil erosion, improved water infiltration, and increased forage for livestock and wildlife.

Aerial treatments are expected to reduce large, inaccessible infestations and make them more manageable and feasible for ground based treatments. Impacts, including mortality may occur on existing non-target broad leaf plants in the areas treated aerially. Without treatment these native plants would eventually be eliminated from the plant community from competition and allelopathic effects of spotted knapweed and dalmation toadflax.

Resource Concern # 1: Special Status Species

The proposed juniper treatments on WCT habitat - specifically Horse Creek- are expected to result in a pronounced improvement in habitat conditions. An 85% or more reduction in the amount of viable riparian zone juniper would allow for an improvement in desirable woody and herbaceous vegetation. This would result in improved bank stability and increased productivity in the treated stream reaches. Post treatment re-seeding of the treated uplands would reduce sediment runoff. Recovery would be dependent on the amount of post treatment rest and livestock exclusion methods implemented (i.e. fencing, felled juniper orientation, hot tape, etc.) Although felled juniper is intended to protect stream banks from livestock impacts, channel degradation could occur if junipers get into and clog stream channels, creating unnatural pools or reservoirs, and giving way (blowing out) under pressure.

Impacts to WCT habitat on Nugget and California Creeks relating to commercial timber harvests and prescribed burns under alternative B should be negligible with proper mitigation such as buffers, landing setbacks and standard erosion control methods.

Timber and fuels treatments in these units would reduce the threats to WCT habitat from a stand replacing fire if one should occur. In some cases it may be desirable to remove conifers from the riparian zone to stimulate deciduous woody growth in the form of willows or aspen. The number of log landings and their close proximity to Ramshorn Creek has the potential to have a short term negative impact on WCT habitat and the Ramshorn Creek WCT population. Ramshorn Creek is already impacted with high sediment runoff from the road that runs adjacent to it for its entire length. The potential for additional sediment runoff is increased with the proposed 6 log landings along the creek.

Changing to a rest rotation system along with the proposed projects in Ramshorn Creek is expected to result in less stream bank disturbance and better woody and herbaceous vegetation in the riparian area which would improve fish habitat.

Resource Concern # 2: Socioeconomics

Refer to analysis Common to Alternatives B and C under 4.2.3.

4.2.5 Predicted Effects of Alternative C

Issue # 1: Forest Health and Fuels Management

The anticipated effects of Alternative C would be similar to Alternative B but would be more widespread throughout the watershed. Alternative C proposes treatments to restore and/or maintain historic density, structure, and species composition of forests and woodlands on approximately 23% of BLM administered lands in the STR Watershed. Treatments would be implemented on 14 allotments to address concerns where the Biodiversity Standard was not met due to forest health, conifer expansion and heavy fuel loading conditions. The additional treatment units in this alternative would require agreements for access across private lands to be worked out on a case-by-case basis with willing landowners. This process would take additional time and would result in some additional loss of potential product values as decay continues in dead Douglas-fir and lodgepole pine. This delay in treatment would also result in a longer lag time to get Douglas-fir reproduction, however there would still be an increased regeneration response compared to the No Action Alternative.

Effects of treatment units also proposed under Alternative B are discussed in Section 4.2.4 above. For additional units proposed under Alternative C, treatments in Units **GIB 1**, **GRA 5**, **MIL 2**, **MIL 3**, and **MIL 4** would recover additional wood product value that would be lost without treatment. Fuel loading would be decreased, and treatment would promote a new stand of Douglas-fir in the long-term. Treatment in Units **BIV 1** and **MEA 5**, if implemented before additional substantial mortality occurs, would open up the stand and increase vigor of leave trees. The residual stand would be more likely to survive attack by insects, and would exhibit less mortality than untreated areas with epidemic spruce budworm populations. Refer to Section 4.2.3, Predicted Effects Common to Alternatives B and C, for description of predicted effects by stand type.

Additional units proposed in Alternative C would require additional temporary road construction and existing road upgrade. This would increase the amount of surface disturbance associated with these activities.

Alternative C would make the most progress toward meeting Goal 1, Actions 4 and 5, and all actions under Goal 2 of the Forest and Woodland Vegetation and Forest Products section of the Dillon RMP by providing opportunities for forest products and implementing treatments on 2,423 acres of Warm/Dry and Warm/Very Dry habitat types and 993 acres of Cool/Moist habitat types.

Proposed forest treatment units would remove conifer cover on 46% of BLM administered forests/woodlands. This would displace fall and winter big game use, and general seasonal wildlife uses that rely on the canopy and cover provided by Douglas-fir habitats.

Upland Juniper Treatments

Juniper removal from the Hungry Hollow tract (HUN1) and Water Gulch (WAT1) would convert an area of taller conifer overstory with very little understory to a shorter stature shrub grassland. Big game fall and winter security cover would be lost but potentially-increased herbaceous productivity would be expected. The benefit to birds, small mammals, mule deer, antelope and elk would depend on how much, and how quickly, that increased production occurred.

Issue # 2: Wildland Urban Interface (WUI) and Protection of Private Property from Wildland Fire

Fuels reduction treatments utilizing commercial harvest, prescribed fire and mechanical/herbicide methods would occur on up to 7,189 acres. The effects of these treatments are similar to those described above under Predicted effects of Alternative B, Issue #2, but would occur on approximately 60% more area.

Issue # 3: Riparian, Wetland, Aquatic Habitat and Associated Species

Forest Health and Fuels Management

Commercial harvest treatments would be implemented in eight Level 6 hydrologic units (individual drainages). These treatments would impact from 1.24 to 6.32% of affected Level 6 hydrologic units within the watershed. On a watershed basis, runoff, erosion, sediment yield and water yield would be greater in Alternative C than Alternative B proportionate to the additional treated areas. However, the reduction in basal area and the percent change in forest cover would be well below thresholds for detectable change.

Riparian Juniper Treatments

Approximately 17 miles of stream reaches (~412 acres) would be treated to remove juniper in eight allotments under Alternative C as shown in Table 20. Predicted effects would be the same as described under Alternative B, except on a larger scale which would be more beneficial to riparian health and biodiversity within the STR Watershed.

Livestock Management

Grazing management changes are proposed under Alternative C for the same Allotments as in Alternative B but are generally more intense and/or aggressive in response to resource issues or concerns. The proposed range improvement projects for both Alternative B and C are shown on individual Allotment Maps in Appendix A.

Cal-Creek # 20466

A four year rest-rotation grazing system is proposed for the BLM Pasture under Alternative C. Spring use (6/15 to 7/14), followed by a rest year, followed by fall use (9/15 to 10/14) and another season of rest (Table 21, Chapter 2) would mitigate resource issues in the riparian and wetland habitats along Butcher Gulch and Threemile Creek. The combination of a shorter grazing season and rest every other year would allow plants to complete their growth cycle 3 out of 4 years.

Fencing out the public land portion of Daylight Creek would eliminate livestock trailing and utilization in the stream corridor and allow reestablishment of riparian plant communities and streambank stability within site potential.

Maintaining the interior pasture fence on the east edge of the BLM pasture (T7S R3W section 1) would provide an opportunity to limit time of grazing to 5 days per season on riparian habitat in Butcher Gulch and tributary. Limiting access would benefit riparian plants, especially woody species which are being heavily browsed, and stream channel morphology which is being impacted by trailing livestock. Designating the Butcher Gulch riparian pasture would include and allow improvements along approximately 1 mile of riparian habitat. However, leaving the old pasture boundary fence, would affect wildlife movement and safety.

Protecting the entire public land reach on Water Gulch from livestock grazing would allow this spring and one-half mile of nonfunctional riparian habitat to reestablish riparian plant communities and streambank stability within site potential. Capturing water at the lower end of the enclosure and diverting it to a tank on the adjoining bench near the existing road would minimize additional disturbances. Recovery of herbaceous and woody components of the system would be faster under this proposal but would be limited if not combined with juniper removal treatments. Erosion and sediment inputs into the stream would also be reduced but not eliminated entirely because of the large areas of bare ground in the drainage and on adjoining uplands.

Fletcher Moore # 10468

If the BLM decides to pursue the proposed land exchange, no riparian enclosure would be constructed on Fletcher Creek (Alt. B) because that land would be transferred to private ownership upon completion of the exchange.

Granite-Moore # 10468

The grazing system proposed under Alternative C would allow 45 days use in the spring (06/01 to 07/15), 45 days the next fall (10/15 to 11/30), followed by a season of complete rest.

Grazing impacts to riparian vegetation during the spring treatment would be minimal because cattle spend more time foraging in the uplands on cool season grasses during the early part of the growing season. Spring time soil moisture in the streambanks is relatively high and banks are more susceptible to shearing or erosion from hoof action by large ungulates.

During the fall treatment utilization on riparian woody species would increase because dietary preference in herbivores shifts to woody plants after upland cool season grasses cure. But, stream side impacts are reduced because soil moisture is very low.

Mill Gulch Isolated # 20450

This alternative would isolate the public land portions of the Allotment by constructing two separate riparian pastures around Mill Gulch tributary RU-79 and limiting grazing by livestock to 5 days within the authorized annual season of use. Duration of grazing in riparian pastures would be limited based on available forage in the upland areas of the pastures. These changes are expected to improve riparian conditions along RU-79 relatively quickly.

Ramshorn Creek # 10552

Together with the suite of rangeland improvement projects proposed under both alternatives B& C, resting the Ramshorn Creek pasture every other year would benefit both riparian and upland plants. Riparian conditions along several reaches would be expected to improve more rapidly under Alternative C. More frequent rest would further reduce trailing and stream crossing impacts, decrease sediment inputs and limit utilization by livestock on herbaceous and woody riparian species.

Virginia City Hill # 10521

Alternative C would incorporate a season of rest every fourth year for three pastures that have riparian reaches that are not meeting the Riparian Standard. Rest and the short duration grazing system discussed under Alternative B, would facilitate the most rapid improvement of riparian vegetative communities and stream channel restoration.

Also, two additional small springs would be fenced and water moved into offsite troughs for livestock. These projects would not only eliminate impacts that may decrease biodiversity and cause hydrologic functional changes, but also help distribute livestock more evenly within pastures and across the Allotment. Moderate grazing by livestock or wildlife across a landscape can create patchiness of vegetation increasing diversity of both plants and animals.

Fisheries

Predicted effects to fish habitat in relation to livestock management changes and riparian vegetation treatments under alternative C would be similar to alternative B.

The impacts associated with commercial timber treatments under Alternative C would be essentially the same as those under Alternative B. With the additional acres identified for harvest there is greater potential for impacts to fish habitat from additional sediment. With implementation of mitigation measures as needed, such as extended streamside buffers, the impacts can be reduced. In some cases it may be deemed desirable to remove conifers from the riparian zone to stimulate deciduous woody growth in the form of willows or aspen. Stream conditions would be reviewed on a case by case basis and deviations from standard SMZ rules would be recommended by the DFO fisheries biologist.

Issue # 4: Upland Health, Sagebrush Steppe Habitat and Associated Species

Livestock Management

Granite-Moore # 10468

Because the public land portion of the Allotment is not fenced separately from adjacent private land, approximately 7 miles of new fence would be needed to implement this grazing plan. Fences have many beneficial livestock management functions, but can also cause disruptions to wildlife behavior. The upper Granite Creek drainage is a heavily traveled elk migration corridor and additional fences would be expected to conflict with normal herd behavior. Also, maintenance would be high as large migrating herds would be expected to damage or tear down portions of some fences.

Ramshorn Creek # 10552

The Horse Pasture would be rested every third grazing season allowing upland cool season grasses the opportunity to complete their annual physiological processes. This pasture has been used annually during June before livestock move on the National Forest pastures. Although individual plants get partially grazed, ample numbers of seed heads remain sustaining healthy and vigorous individuals and communities. With occasional rest, vigor, production, recruitment, and cover of cool season forage grasses is expected to increase.

Sand Coulee # 20679

Predicted effects would be similar to those described under Alternative B, but reducing the season of use to 30 days would more rapidly facilitate improvement in the vigor, abundance and complexity of the upland plant community. As the herbaceous understory increases the amount of soil erosion would be expected to decrease proportionately.

Issue # 5: Noxious and Invasive Species

Predicted effects would be similar to those described under predicted effects common to Alternatives B and C and those described under Alternative B above. The difference being that 50 more total acres (>250 acres) would be treated annually within the watershed and all large infestations would initially be treated aerially. This alternative would allow the quickest response to meeting objectives for noxious and invasive species, but would also impact more non-target species (broadleaf plants) within aerial treatments. The additional treatment areas are also dependant on obtaining the additional resources (budget) to treat these areas.

Resource Concern # 1: Special Status Species

If the proposed land exchange in the Granite/Moore allotment in Alternative C is completed, the acquisition of a large segment of the upper East Fork of Granite Creek would allow for a native WCT re-introduction into the headwater reaches of the stream. This action would allow for the re-introduction of native WCT into approximately 3 miles of habitat, which be a substantial increase in the amount of habitat occupied by 100% pure WCT within the Tobacco Root mountains. A natural barrier to upstream fish movement already occurs on the identified acquisition parcel which would facilitate a reintroduction effort, making this a very desirable WCT project.

Impacts to WCT habitat from riparian vegetation treatments would be the same as Alternative B.

Resource Concern # 2: Socioeconomics

Forest management activity would create the greatest short term positive economic impacts under this alternative.

Economic impacts to livestock permittees are described under 4.2.3 Predicted Effects common to Alternatives B and C. Because this alternative is more conservative than Alternative B, it would cause proportionately more economic impacts to affected permittees.

BLM expenditures would be the highest under this alternative.

4.3 Cumulative Effects for All Alternatives

Cumulative effects are those that result from adding the anticipated direct and indirect effects of the proposed action, to impacts from other past, present and reasonably foreseeable future actions. These additional impacts are considered regardless of what agency or person undertakes such actions. The cumulative impacts area for this EA is defined as the STR watershed assessment area and any adjacent continuous habitats. The STR contains historical information that is applicable to this section. Also, some past, present and reasonably foreseeable actions are discussed in Chapter 3 (Affected Environment) and/or Chapter 2 (Features Common to all Alternatives).

These effects or actions are common to all alternatives:

Historical Events

- Severe over-trapping of beavers and unregulated livestock use during the late 1800s and early 1900s changed the character (hydrologically and vegetatively) of most mountain streams in the Intermountain West (Elmore and Beschta, 1987; Elmore and Kaufman, 1999; Naiman, 1988). Although there are still active beaver colonies in the STR, beaver activity is substantially reduced from historical levels.
- In the late 1890's and early 1900s, wolves and other large predators in the western United States were hunted, trapped and poisoned. In 1915 Congress authorized the Bureau of Biological Survey to eliminate the remaining wolves and other predators. Ripple and Beschta (2005) indicate that the presence of top trophic level predators significantly affects herbivores and that this interaction alters or influences vegetation (aspen, willow, cottonwood).
- The Ruby and Madison Valleys were used by Native Americans in their travels to and from the plains to hunt buffalo but it appears not to have been the permanent home of any Indian tribes. Lewis and Clark are believed to be the first "white" men to visit the area. Occupation of the South Tobacco Roots began with the fur trapper trade in the 1830s and intensified with the discovery of gold in the region and the implementation of placer mining and eventually hard rock mining. Placer mining started in Virginia City in 1863 and includes the mining districts of Tidal Wave, Sheridan, and Virginia City. Hydraulic placer mining has channelized many of the streams in the watershed significantly impacting stream gradients and permanently altering the potential of these streams.

Past Management and Current Use Trends

- Watershed-wide under all management schemes on all land ownerships, there has been and continues to be a decline in aspen. This is a west wide phenomenon that can be attributed primarily to a combination of successional processes including reduction (or elimination) of fire, loss of predator influence on herbivores, and long-term overuse by ungulates (Bartos and Campbell, 1998; Beschta, 2003; Ripple and Beschta, 2004).

- Exclusion of fire from the landscape (e.g. removal of fine fuels by livestock, coupled with fire suppression over the past century), has resulted in the increase in accumulation of fuel loads and reduced forest health.
- The total estimated forested area treated on all ownerships in the past 30 years is about 3,400 across the watershed. The majority of this was lodgepole pine clearcuts either in the southeast portion of the watershed south-southwest of Virginia City. Of this an estimated 80% has lodgepole pine regeneration 15' to 20' or taller. All are judged to be stabilized from a soil movement perspective.
- Elk and moose populations in southwest Montana have increased over the past 20-25 years, primarily as a result of light snow conditions during fall and winter and low hunter harvest.
- Road use and maintenance adjacent to or crossing streams have impacted some streams in the watershed by adding sediments and/or removing vegetation at the crossing or adjacent to the stream. Roads in the uplands allow opportunities for noxious and invasive weeds to become established and in isolated areas (steep slopes) contribute to soil erosion.
- Increased recreation has adversely impacted isolated areas within the watershed (camp sites, new trails and roads, spreading of weed seed, etc.).
- The economic situation of the permittees is effected by changes in cattle prices, hay prices, fuel prices, interest rates, land prices, labor costs, labor inputs, equipment costs, equipment maintenance costs, facilities maintenance costs, costs of feed supplements, irrigation costs and availability of irrigation water, livestock loss, private land lease rates, veterinary costs, local weather and other miscellaneous factors. Cumulative economic impacts to permittees could add pressure to permittees to subdivide private land to maintain a cash flow.

Anticipated Future Actions

- The risk of wildfire on all ownerships will continue.
- An estimated 800 acres of private land adjacent to proposed forest health treatments may be harvested in conjunction with either Action Alternative.
- The Forest Service is planning a fuels reduction treatment in the Meadow Creek drainage, outside of the STR Watershed boundary. This project includes up to 300 acres of timber harvest and up to 700 acres of prescribed fire, to protect the WUI in this area.
- Potential future harvest operations may occur on up to 100 acres on land owned by the State or Montana in the Mill/Granite Creek drainages.
- Increasing loss of Basin and mountain big sagebrush habitat through Douglas-fir or juniper expansion can be anticipated. These sagebrush habitats are also changed for up to thirty years in areas that are treated to remove competing conifers.
- Sub-dividing of private land within the watershed is ongoing and expected to increase in the foreseeable future. Land use patterns on private and public lands in Madison County are changing. As traditional agricultural lands are converted to residential and recreational properties fewer large scale ranching operations

- remain. The number of cattle grazing public land in the STR is expected to decrease relative to the loss of private land based ranching operations.
- Residential development in the STR is causing wildlife habitat fragmentation, increasing vehicle traffic and other human uses and may increase the demand for water.
 - Restricted habitat and very small isolated populations will continue to place WCT within the STR at high risk of extinction. To protect pure populations of WCT, fish barriers will be constructed on Harris, Upper California and any other streams if genetic testing confirms these streams support populations of 100% pure WCT and there is a threat from non-native species. Brook trout removal may occur on streams that are determined to be genetically pure.
 - The intermingling of private and state lands with public lands throughout the watershed ensures that activities outside the control of BLM will continue. Grazing on these lands at various times throughout the year will influence forage and cover availability, and distribution of seasonal wildlife uses. Although wildlife habitat needs are generally met within the watershed, this grazing may influence suitability and availability of that habitat on a localized basis or during a specific time-frame.

4.3.1 Cumulative Effects of Alternative A – No Action (Continuation of Current Management)

The loss of Douglas-fir canopy and cover is likely to continue across all ownerships with accompanying loss of wildlife habitat.

The intermingling of private and state lands with public lands throughout the watershed ensures that activities outside the control of BLM will continue. Grazing on these lands at various times throughout the year would influence forage and cover availability, and distribution of seasonal wildlife uses. Although wildlife habitat needs are generally met within the watershed, this grazing may influence suitability and availability of that habitat on a localized basis or during a specific time-frame.

With no grazing management changes or new projects cattle induced riparian health concerns identified in the STR Assessment would not be addressed and objectives for improving riparian health would not be accomplished. Downward trends would continue on stream reaches in 9 grazing allotments.

Fisheries habitat conditions and trends would continue on the public land portions of streams in the STR watershed.

4.3.2 Cumulative Effects All Action Alternatives

The effects of implementation of the selected alternative would be quantitatively determined by monitoring physical and vegetative indicators of riparian and upland function, and monitoring vegetative components of habitat.

Forest health treatments completed on BLM-administered lands and other ownerships would increase the diversity of forest structure and composition throughout the STR Watershed. This increase in structural diversity across the landscape would likely result in a more patchy spruce budworm outbreak regime in the future (Swetnam and Lynch, 1989). Treatment in lodgepole pine to remove bark beetle infested trees and promote regeneration of a new stand would result in patches of lodgepole pine across the landscape that would be resistant to mountain pine beetle for up to 80 years (Mata et al, 2003). Increasing structural and compositional diversity across the landscape as a result of forest treatments and prescribed burning decreases the probability of large-scale disturbances that produces negative impacts over a large area. Large-scale disturbances would still have the potential to occur; however, areas treated would create buffers of less susceptible (in terms of insects/disease) and more fire resilient habitats.

Slightly increased labor costs are assumed under Alternatives B and C to check and employ the allowable use guidelines. During drought periods, total authorized AUMs may not be available. All reduced AUMs would be held in suspended non-use on the Term Grazing Permits.

Managing to improve riparian conditions throughout the watershed would allow for better dispersal of wild ungulates and reduce site specific riparian impacts. The proposed changes in livestock management would generally improve riparian function on BLM administered land and other lands within BLM allotments at varying degrees and timeframes. The expected effect to downstream riparian habitats and water quality would be decreased sediment load, lower energy flows and lower water temperatures.

Managing the uplands for more productive cool season grasses by changing the frequency, timing, duration and/or intensity of livestock grazing on some allotments would leave more cover and forage for wildlife species and may slightly alter use in site specific areas within the watershed. Additional off-site water locations would better disperse livestock use and reduce use in specific riparian areas.

Incorporating the Benchmark Allotment into V.C. Hill and Granite-Moore would increase management flexibility and efficiency, consequently improving riparian habitat on several stream reaches in these allotments.

4.3.3 Cumulative Effects of Alternatives B

Generally, additional impacts or predicted effects other than those described in section 4.2.4, Predicted Effects of Alternative B, are not expected on a landscape scale.

However, additional positive ecological benefits would be expected on private lands that are managed in conjunction with public land in the V.C Hill Allotment. V.C. Hill is part of a larger comprehensive grazing unit that combines private, state and public lands administered by the BLM. The allotment has 10 pastures, seven of which contain some public land. The lessee and the Natural Resource Conservation Service (NRCS) have worked on a ranch plan for several years incorporating water developments, pipelines,

water storage tanks, fences and a grazing management plan to improve livestock distribution on private and public lands within the entire grazing unit. The ranch plan was revised after the STR assessment to address riparian resource concerns. The proposed shorter duration pasture rotation and season of use, under both alternatives B & C, would benefit upland and riparian habitat and resources on private land as well as public land in the Allotment. This, larger, more holistic approach is expected to improve habitats for wildlife and improvement to water quality (via riparian and upland health) in a substantially larger geographic area.

4.3.4 Cumulative Effects of Alternatives C

If the proposed Fletcher-Moore land exchange is completed the BLM would obtain private land in the upper East Fork of Granite Creek. The timber on this property was harvested in the 1980's and additional forest health treatments may be needed again in 20 to 40 years. The acquired lands would also provide an opportunity to expand WCT populations within the watershed.

Impacts in addition to those described above under Alternatives C (4.2.5) are not expected.

4.2.6 Comparative Effects for All Alternatives by Issue

This section summarizes predicted progress towards meeting the objectives for each issue as identified in Chapter 1 and summarized overall predicted effects.

Table 33: Issue # 1 – Forest Health and Fuels Management

Alt.	
A	Progress would not be made toward meeting any of the identified objectives or specified goals in the Dillon RMP. Spruce budworm and bark beetles would continue to cause tree mortality, leading to decreased canopy cover, increased fuel loading, and potential for more severe impacts from wildland fire and insects/disease. Forest health would continue to decline, especially in Douglas-fir habitats. Douglas-fir would cease to exist on a localized basis for 20-40 years; return to current stocking and size distribution would not be expected for at least 80-100 years. Fire behavior would progress toward a long interval stand replacement fire regime. This could reduce vegetative diversity, values for wildlife habitat, watershed protection, and esthetics. Forested cover and security habitat for wildlife would decline throughout all forested lands. Use by species favoring more open habitat would increase; use by species requiring denser forest canopies would decrease. Juniper encroachment would continue, aspen would continue to decline, and sagebrush/grassland meadows would fill in with conifers. Biodiversity would continue to be negatively impacted on a landscape level at least in the short to mid term.
B	Objectives would be met on approximately 2,900 acres of forested lands and 1,560 acres of woodlands and sagebrush/grassland habitat and progress would be made toward meeting specified goals in the Dillon RMP. Treatment in Douglas-fir stands would retain the presence of this species across portions of the watershed and promote Douglas-fir regeneration. Residual stands would exhibit increased vigor and would be more resilient to insect/disease and wildfire. Treatments would reduce canopy cover and change wildlife preference to those that favor more open conditions. Fuel loading would be reduced, leading to decrease in intensity and rates of spread, and improved effectiveness of fire suppression efforts. Treated aspen stands would be revitalized for 20-50 years. Treatments to reduce conifer encroachment into sagebrush would result in short term loss of sagebrush habitat, but long term maintenance/improvement of sagebrush/grassland habitat. Short-term adverse impacts may impact habitat for some species of wildlife during and for varying timeframes after treatments on a treatment or localized basis. Wildlife would be displaced during project implementation within and adjacent

	to proposed units. Overall biodiversity and habitat needs (structural, vegetative and seral diversity) would be improved on a landscape level as projects are completed.
C	Objectives would be met on up to approximately 4,000 acres of forested lands and 3,200 acres of woodlands and sagebrush/grassland habitat and the most progress would be made toward meeting specified goals in the Dillon RMP. Effects would be similar to those described under Alternative B but more widespread throughout the watershed. Additional treatments identified in this Alternative would require coordination with landowners for access and subsequent NEPA documentation. This delay in implementation would result in additional product value loss and a longer lag time for Douglas-fir regeneration.

Table 34: Issue # 2 – Wildland Urban Interface (WUI) and Protection of Private Property from Wildland Fire

Alt.	
A	Progress would not be made toward reducing fuel loading and continuity except by natural or accidental ignitions. Risks posed by wildfire to private property and historic cultural values would continue to rise as fuel loading continues to increase. During a wildfire event, the risk associated with high fuel loading along primary access routes to and from private property would continue to have the potential to restrict emergency fire suppression vehicles from timely access.
B	The summarization of predicted progress for forest health and fuels management above applies directly to the protection of private property, historic cultural values and critical ingress/egress routes. All treatment methods would reduce fuel loading and/or continuity, therefore contributing to the protection from wildland fire. Short-term adverse impacts may impact habitat for some species of wildlife during and for varying timeframes after treatments on a treatment or localized basis. Wildlife would be displaced during project implementation within and adjacent to proposed units. Wildlife use is expected to increase in the burn units as soon as they start greening up after project implementation. Some accelerated soil loss would be expected in treatment units in the short term (up to 3 years), but is expected to be less than is currently occurring in the longer term.
C	Effects would be similar to those described under Alternative B but more widespread throughout the watershed (see forest health and fuels management summarization for Alternative C).

In addition to the statements below, progress toward objectives would be expected as a result of successful implementation of forest/fuels treatments in upland areas and a “healthier watershed”. Increased flow is expected in streams in the drainages where treatment units are located as a result of more run-off in the short term and more effective precipitation and snowmelt infiltration in the longer term. In the short term (up to 2 years) sediment inputs are expected to increase as a result of forest and upland treatments, but after that initial timeframe, sediment inputs are expected to be less than under Alt A.

Table 35: Issue # 3– Riparian, Wetland and Aquatic Habitat and Associated Species

	Brandon Pasture	Cal-Creek	Georgia Gulch
A	No progress expected	No progress expected	No progress expected
B	Progress would be expected in reduction of noxious weeds. Juniper would continue to increase along Spring Park Creek (RU52).	Progress towards objectives is expected at Water Gulch RU283, Three-mile RU279, Butcher Gulch RU281 and Daylight Creeks RU282 due to off-site water, spring enclosures, drift fence on Daylight Creek and additional rest in BLM Pasture. Riparian juniper treatments on Upper California Creek, Upper Harris Creek, and Three-mile Creek is expected to cause an increase in deep rooted riparian vegetation and initiate channel healing within three years.	Progress would be expected in reduction of noxious weeds. Juniper would continue to increase along Wet Georgia Creek (RU35 & RU132).

C	Progress towards objectives would be expected upon implementation of riparian juniper treatments on Spring Park Creek. This treatment is expected to facilitate an increase in deep rooted riparian vegetation and initiate channel healing within three years.	Progress towards objectives is expected to happen more quickly than under Alt B. at Water Gulch, Three-mile, Butcher Gulch and Daylight Creeks due to the two off-site water developments, spring enclosures and reach enclosure on Water Gulch, Riparian Enclosure Fence above Daylight Creek and additional rest in BLM Pasture. Riparian juniper treatments would be the same as Alt B and in addition, California Creek and Browns Gulch would be treated. Expected progress resulting from these treatments is described under Alt B.	Progress towards objectives would be expected relatively quickly upon implementation of riparian juniper treatments on Wet Georgia Creek. These treatments are expected to facilitate an increase in deep rooted riparian vegetation and initiate channel healing within three years.
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	Fletcher Moore	Granite Moore	Hungry Hollow
A	No progress expected	No progress expected	Primary causes for failure to meet the riparian health standard in the Hungry Hollow Allotment were determined to be outside of the Authorized Officer's control (upstream mining), therefore no specific alternatives were developed for the Hungry Hollow Allotment. Noxious weed management would facilitate some progress towards meeting objectives at varying degrees as described under Noxious and Invasive Weeds.
B	Progress towards objectives is expected to occur quickly as livestock use would be eliminated along MA110 upon construction of a riparian enclosure.	Progress towards objectives is expected to occur along Postlewaite Creek RU200 because it would be included in a riparian pasture. Incorporation of rest every other year would allow slower improvements on the other riparian areas within the allotment. Reaches RU200 and MA109 (in which increasing juniper was determined to be a primary resource concern) would not be treated under this alternative; juniper is expected to continue to increase while deciduous woody and herbaceous riparian vegetation declines.	
C	This parcel of land would be exchanged.	Progress towards objectives is expected to occur relatively quickly along Postlewaite Creek RU200 and Moore Creek trib. MA109 upon implementation of riparian juniper treatments. Implementing a 3 pasture rest rotation grazing system with no hot season use would also facilitate progress towards meeting objectives.	

	McGovern	Mill Gulch Isolated	Ramshorn Creek
A	No progress expected	No progress expected	No progress expected
B	Progress would be expected in reduction of noxious weeds as described under Issue 5. Juniper would continue to increase along Browns Gulch (RU186).	Progress expected towards objectives due to off-site water, reducing duration of use to 30 days and implementing deferred rotation grazing system.	Progress expected towards meeting objectives by incorporating rest 1 in three years and reducing duration of use to 30 days (no hot season use).

			Riparian juniper treatments on Horse Creek (RU1, RU73), Ramshorn Creek tribs and Currant Creek are expected to cause an increase in deep rooted riparian vegetation and initiate channel healing within three years. WCT habitat is expected to improve.
C	Progress towards objectives would be expected upon implementation of riparian juniper treatments on Browns Gulch. This treatment is expected to facilitate an increase in deep rooted riparian vegetation and initiate channel healing within three years.	Progress expected towards objectives relatively quickly by reducing duration of use to 21 days and implementing rest rotation grazing system.	Progress from Riparian Juniper treatments would be the same as Alternative B but with two additional reaches (the lower portion of RU3 and RU111). Livestock rest every other year would allow quicker response in riparian improvement than under Alternative B.

	Sand Coulee	Virginia City Hill	Wisconsin Creek
A	No progress expected	No progress expected	No progress expected.
B	Progress towards objectives would be expected upon implementation of riparian juniper treatments on Horse Creek (RU2). Treatments are expected to facilitate an increase in deep rooted riparian vegetation and initiate channel healing within three years. Proposed livestock management changes (3 year rest rotation with no hot season use) would also allow improvement of riparian conditions.	Reducing duration of use and incorporating deferment into the grazing system is expected to result in good progress towards objectives. Off-site water and spring enclosure is expected to contribute to this improvement. Juniper would continue to increase along Slade Creek (RU198 & RU199) and Postlewaite Creek (RU201), with a corresponding decrease in deciduous woody and herbaceous vegetation.	Spring/wetland enclosure(s) at RU135 would facilitate progress toward meeting riparian objectives.
C	Progress expected in a similar fashion to Alternative B.	Reducing duration of use and incorporating rest into the grazing system is expected to result in good progress towards objectives. Off-site water and spring enclosure is expected to contribute to this improvement. Riparian juniper treatments on Slade Creek and Postlewaite Creek are expected to facilitate an increase in deep rooted riparian vegetation and initiate channel healing within three years.	

Table 36: Issue # 4 – Upland Health, Sagebrush Steppe and Associated Species

Alt	Brandon Pasture	Cal – Creek	Cow Creek
A	Under current weed management, weed infestation would be kept from spreading further.	The upland standard was met in the Cal-Creek Allotment. No change expected.	No progress expected.
B	See Issue #5 Noxious and Invasive Species below for expected progress under Alternatives B and	Upland objectives would be met. With the incorporation of additional rest in the BLM pasture,	Progress expected towards upland objectives by following Terms and Conditions of Term

	C.	vigor of cool season grasses would increase. An increase of fine fuels during rest years would increase the chance of wildfire near VC. Off-site water would increase the use of upland forage in proportion to the decreased use in riparian areas.	Permit and eliminating horse use.
C		Similar to Alternative B, but Rest every other year.	Good progress expected towards upland objectives.

Alt	Granite-Moore	Hungry Hollow	Mill Gulch Isolated
A	Upland health standard was met. No change expected.	Under current weed management, weed infestation would be kept from spreading further.	Upland standard was met. No change expected.
B	Objectives would be met. Incorporating rest every other year would allow forage plants to become more vigorous and productive.	See Issue #5 Noxious and Invasive Species below for expected progress under Alternatives B and C.	Upland objectives would be met. Implementing a deferred rotation grazing system and reducing duration of use to 30 days would allow increased vigor and production of forage plants. Off-site water would increase the use of upland forage in proportion to the decreased use in riparian areas.
C	Objectives would be met. Implementing a 3 pasture rest rotation would promote increased vigor of forage plants and leave more herbaceous cover and forage for wildlife.		Upland objectives would be met. Changing use to short duration and incorporating rest would allow increased vigor and production of forage plants in these small parcels.

Alt	Ramshorn Creek	Sand Coulee	Virginia City Hill
A	Upland health standard was met. No change expected in the uplands.	Upland standard was not met, but new permittee has been applying for non-use. Progress toward objectives would be expected under Alt A.	Upland standard was met. No change expected.
B	Dividing the unit into two pastures, limiting use to 30 days per pasture, and incorporating rest every third year in the riparian pasture would allow upland conditions to be maintained in the upland pasture and increased vigor of upland forage species in the riparian pasture. Additional herbaceous cover and forage would be available for wildlife.	Implementing a 3 pasture rest rotation is expected to facilitate good progress towards meeting the upland objectives.	Upland objectives would be met. Short duration use and more deferment would facilitate more vigorous forage species. Off-site water would increase the use of upland forage in proportion to the decreased use in riparian areas.
C	Objectives would be met as described under Alternative B, but with additional rest in the riparian pasture.	Progress expected similar to Alternative B in the Uplands.	Upland objectives would be met. Short duration use and incorporation of rest into the system would facilitate more vigorous forage species. Off-site water would increase the use of

		upland forage in proportion to the decreased use in riparian areas.
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Table 37: Issue # 5 – Noxious and Invasive Species

Alt.	
A	Some progress towards objectives would occur. Noxious weeds would continue to be treated as resources allow, which is expected to prevent the spread and contain existing infestations.
B	Progress towards objectives would occur in most areas within the STR watershed. EDDR and more intensive focus every third year in each area would allow, not only containment, but reduction in density and size of existing infestations within ten years.
C	Similar to Alternative B, but more timely progress would be made in the larger, denser infestations with more use of aerial application. This would have more impact to non-target broadleaf plants (forbs and shrubs) within the areas treated by aerial application.

Table 38: Resource Concern #1 – Special Status Species

Alt	
A	Existing ecological trends would continue. Where objectives are being met for special status species, they would likely continue to be met. Conversely, where objectives are not being met due to land health conditions, they would not be met on the short term.
B	Progress towards objectives is expected. Improved land health is expected to increase structural, vegetative, and seral stage diversity which would logically provide more habitat or niches for special status species on a landscape level. The forest health and fuels projects are expected to facilitate an increase in the number of species of neo-tropical migratory birds that use this area. Habitat for rare plants is expected to improve in the Lake Pasture (only documented population of Idaho sedge in the STR).
C	Progress is expected similar to that described under Alternative B, but on a larger scale.

Table 39: Resource Concern #2 – Socioeconomics-Comparison of Effects on Socioeconomics

Alt	
A	Current economic trends and fluctuations related to livestock grazing management, timber management, and recreational use within the STR watershed are expected to continue. BLM expenditures would be the least of the three alternatives analyzed. Opportunities for BLM receipts from the sale of forest products would be foregone. This alternative poses the greatest risk for a large, intense wildfire. Depending on the location, this may cause substantial economic impacts to individual landowners (homeowners) and local communities.
B	The objective for socio-economics would be met with the following expectations. Additional jobs would be temporarily available during implementation of forest health treatments. Timber would be available during the life of forest health implementation to local/regional logging companies and milling facilities. Other forest products would be available to local communities (fire wood, post and poles, decorative wood, biomass material). Areas may be temporarily closed to recreation within the vicinity of active prescribed fires. Localized, temporary closures may impact hunting concessions and support services for a short time. Shortened authorized livestock use periods, incorporating more rest, and/or changing season of use would necessitate using private pastures or other areas for longer times if herd size stays the same. Finding alternative pasture would likely increase costs. Additional range improvement projects would add increased construction and maintenance expenses for the permittees and the BLM. Employing use guidelines in the uplands and riparian areas may necessitate increased labor inputs by the permittees in order to harvest authorized AUMs. In drier years, total authorized AUMS may not be available for harvest. To implement prescribed burn treatments, pastures or allotments would need to be rested from livestock grazing, generally one year prior to, and two growing seasons following the prescribed burn. Riparian juniper treatments would be rested generally for two growing seasons following the treatment. Implementing these treatments would necessitate finding alternative pasture for two to three years. Prevention, containment and control of noxious and invasive species would have a positive long term economic benefit. BLM expenditures would be increased over Alt A to implement

	projects. BLM would also generate receipts from the sale of forest products.
C	The objective for socio-economics would be met. Recreational use, livestock grazing management and timber management economics would be similar to those described in Alt B, but to a greater degree because of the additional units proposed for treatments, additional projects, more conservative authorized use levels, etc. BLM expenditures to implement structural and vegetative projects would be the highest under this alternative. BLM receipts generated by the sale of forest products and the availability of other forest products such as fuelwood would also be the highest under this Alternative.

5.0 List of Preparers - Consultation/Coordination

5.1 List of Preparers

Core IDT members:

Steve Armiger	Hydrologist, Riparian, Air & Water Quality
Kipper Blotkamp	Fuels Management Specialist
Joe Casey	Forester
David Early	Range Management Specialist, IDT Leader
Pat Fosse	Assistant Field Manager – Renewable Resources
Paul Hutchinson	Fisheries Biologist
Aly Piwowar	Forester
Jim Roscoe	Wildlife Biologist

Support IDT members:

Laurie Blinn	GIS Specialist
Brian Hockett	Rangeland Mgt. Specialist – Sensitive Plants
Susan James	Recreation Specialist
George Johnson	Fire Management Specialist
Mike Mooney	Noxious Weeds
Jason Strahl	Archaeologist/Cultural Resources
Rick Waldrup	Outdoor Recreation Planner

5.2 Consultation/Coordination

5.2.1 Persons and Agencies Consulted

John Murray	THPO, Blackfeet Tribe
Arlene Caye	Confederated Salish and Kootenai Tribes
Carolyn Boyer Smith	Cultural Res. Coord., Shoshone-Bannock Tribes
Bob Brannon, Dick Oswald	Montana Fish, Wildlife and Parks
Sherm Anderson	Sun Mountain Lumber
Al Kyles, Mark Petroni	USFS – Madison Ranger District
Marnie Thompson	USDA – NRCS Sheridan Office
Margie N. Edsall	Madison County Weed Coordinator
Ruby Watershed Committee	
Todd France	
Bill Buyan	
Norman Flamm	
Jerry Ryan	
Rob Miller	
Greg Rice	
Steve Woods	
Billie Ratcliffe	
Ellis Boyd	

5.2.2 Notifications

Media Release in Southwest Montana – May, 2006

Internet NEPA Log – Dillon Field Office – February, 2007

Mailing List for South Tobacco Roots Watershed Assessment

5.2.3 Statement of Public Interest

Several individuals and groups have expressed interest in this proposed action. The mailing list of individuals and groups who have expressed interest to date is available at the Dillon Field Office.

GLOSSARY OF TERMS

actual use: a report of the actual livestock grazing use certified to be accurate by the permittee or lessee. Actual use may be expressed in terms of animal months or animal months.

adaptive management: management in which monitoring measures progress toward or success at meeting an objective and provides the evidence for management change or continuation. In practice, most monitoring measures the change or condition of the resource; if objectives are being met, management is considered effective.

allelopathy: release of substance by a plant that typically inhibits the germination or growth of another plant.

allotment: An area of land designated and managed for grazing livestock.

allotment management plan (AMP): a documented program which applies to livestock grazing on the public lands, prepared by consulting, cooperating, and coordinating with the permittee(s), lessee(s), or other interested publics.

analysis: (1) a detailed examination of anything complex in order to understand its nature or determine its essential features; or (2) a separating or breaking up of any whole into its component parts for the purpose of examining their nature, function, relationship, etc. A rangeland analysis includes an examination of both biotic (plants, animals, etc.) and abiotic (soils, topography, etc.) attributes of the rangeland.

animal unit month(AUM): the amount of dry forage required by one animal unit for one month, based on a forage allowance of 26 pounds per day.

apparent trend: an assessment, using professional judgment, based on a one-time observation. It includes consideration of such factors as plant vigor, abundance of seedlings and young plants, accumulation or lack of plant residues on the soil surface, and soil surface characteristics (i.e., crusting, gravel pavement, and sheet or rill erosion).

authorized officer: The manager of a defined portion of public land. For example, the Dillon Field Manager is the Authorized Officer or line manager for the public lands administered by the Dillon Field Office.

basal area: the cross-sectional area (in square feet at diameter at breast height) of all tree stems, expressed on a per-acre basis; a measurement used to express stand density.

base acres: forestlands where commercial timber harvest activities are determined to be environmentally and economically suitable and available for the continuous production of timber under the existing Management Framework Plan or the Proposed Resource Management Plan.

biomass: all vegetative materials grown in forest, woodland, or rangeland environments that are the by-products of management, restoration, or fuel reduction treatments (historically non-utilized or under-utilized material). This term usually refers to such material that can be gathered and transported to cogeneration plants, and utilized for the production of energy.

browse: (1) the part of shrubs, half shrubs, woody vines, and trees available for animal consumption; or (2) to search for or consume browse.

browse plant or browse species: a shrub, half shrub, woody vine, or tree capable of producing shoot, twig, and leaf growth suitable for animal consumption.

burn boss: The person directly responsible for implementing a prescribed fire.

canopy cover: the percentage of ground covered by a vertical projection of the outermost perimeter of the natural spread of foliage of plants. Small openings within the canopy are included. Canopy cover is synonymous with crown cover.

cation exchange: chemical trading of cations between the soil minerals and organic matter with the soil solution and plant roots; often used as a measure of potential soil fertility.

community: an assemblage of populations and/or animals in a common spatial arrangement.

cool season species: plants whose major growth occurs during the late fall, winter and early spring.

diameter at breast height (DBH): the diameter of a tree measured at a height of 4.5 feet above ground.

evaluation: (1) an examination and judgment concerning the worth, quality, significance, amount, degree, or condition of something; or (2) the systematic process for determining the effectiveness of on-the-ground management actions and assessing progress toward meeting objectives.

forage: (1) browse and herbage which is available and can provide food for animals or be harvested for feeding; or (2) to search for or consume forage.

forb: (1) any herbaceous plant other than those in the Gramineae (true grasses), Cyperaceae (sedges), and Juncaceae (rushes) families—i.e., any non-grass-like plant having little or no woody material on it; or (2) a broadleaved flowering plant whose above ground stem does not become woody and persistent.

functional at risk (FAR): Riparian wetland areas that are functional, but an existing soil, water, or vegetation attribute makes them susceptible to degradation.

goal: the desired state or condition that a resource management policy or program is designed to achieve. A goal is usually not quantifiable and may not have a specific date by which it is to be completed. Goals are the base from which objectives are developed. (See objective)

grazing system: A systematic sequence of use and non use of an allotment.

herbaceous: vegetation growth with little or no weedy component; non-woody vegetation such as graminoids and forbs.

herbivore: a plant eating animal

herbivory: the act of feeding on plants by an herbivore

historical range of variation (HRV): The “HRV” concept refers to the expected variation in physical and biological conditions caused by natural climatic fluctuations and disturbance regimes (i.e. flooding, fire and windthrow). HRV is derived from an ecological history of the landscape and is estimated from the rate and extent of change in selected physical and biological variables. For example, in the Douglas-fir forest, HRV was determined by looking at existing fire scar evidence which indicated one to several fire events during the life of the older to oldest trees. The relatively uniform age groups of younger trees found in the direct vicinity of older fire scarred trees that have seeded in and grown since the last major historical fire disturbance event(s) also indicate a lack of fire in recent history.

hot season: In southwest Montana, hot season grazing use is generally considered to include July 1 through September 15.

hummock: A mound rising above the surrounding land, usually overgrown with vegetation. In the southeast, a small hill or mound, also referred to as hammock. Often used in reference to marsh lands.

hydrologic heaving: The lifting of a surface by the internal action of frost or hydrostatic pressure. The result is the hummocked appearance of plants being elevated above the normal ground surface, root shearing between plants, and exposure of interspaces to increased erosional forces.

hydrophobicity: the property of being water-repellent; tending to repel and not absorb water.

interested public: An individual, group or organization that has submitted a written request to the authorizing officer to be provided an opportunity to be involved in the decision making process for the management of livestock grazing on specific grazing allotments, or has submitted written comments to the authorized officer regarding the management of livestock grazing on a specific allotment.

inventory: the systematic acquisition and analysis of information needed to describe, characterize, or quantify resources for land-use planning and management or the public lands.

key area: “Key areas are indicator areas that are able to reflect what is happening on a larger area as a result of on-the-ground management actions. A key area should be a representative sample of a larger stratum, such as a pasture, grazing allotment, wildlife habitat area, herd management area, etc., depending on the management objectives being addressed by the study....”

lentic: standing water riparian-wetland areas such as lakes, ponds, seeps, bogs, and meadows

line officer: The manager of a defined portion of public land. For example, the Dillon Field Manager is the Authorized Officer or line manager for the public lands administered by the Dillon Field Office.

lotic: running water riparian-wetland areas such as rivers, streams and springs

monitoring: the orderly collection, analysis, and interpretation of resource data to evaluate progress toward meeting objectives.

objective: planned results to be achieved within a stated time period. Objectives are subordinate to goals, are narrower in scope and shorter in range, and have increased possibility of attainment. The time periods for completion, and the outputs or achievements that are measurable and quantifiable, are specified. (See goal)

pasture: a grazing area enclosed and separated from other areas by a fence or natural barrier.

proper functioning condition (PFC): A riparian-wetland area is considered to be in proper functioning condition when adequate vegetation, landform, or large woody debris is present to:

- Dissipate stream energy associated with high waterflow, thereby reducing erosion and improving water quality;
- Filter sediment, capture bedload, and aid floodplain development;
- Improve flood-water retention and ground-water recharge;
- 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;
- Support greater biodiversity

public lands: any land interest in land outside of Alaska owned by the United States and administered by the Secretary of the Interior through the Bureau of Land Management (see 43 CFR 41000.0-5)

resource reserve allotment: A unit of public land that will not have term grazing permits issued. Such an allotment would only be grazed on a temporary nonrenewable basis. The use of these allotments would be to provide temporary grazing to rest other areas following wildfire, habitat treatments, or to allow for more rapid attainment of rangeland health. The allotment must be of sufficient size to be managed as a discrete unit.

riparian zone: the banks and adjacent areas of water bodies, water coursed, seeps, and springs whose waters provide soil moisture sufficiently in excess of that otherwise available locally so as to provide a moister habitat than that of contiguous flood plains and uplands.

salvage harvest: the cutting and removal of dead or dying timber resources.

sanitation harvest: the cutting and removal of diseased trees or trees damaged by stress or mechanical agents such insects or wind.

seral stage: the developmental stages of an ecological succession; synonymous with successional stage.

shrub: a plant that has persistent woody stems and a relatively low growth habit, and that generally produces several basal shoots instead of a single bole. It differs from a tree by its low stature—less than 5 meters (16 feet)—and non-arborescent form.

shrubland: land on which the vegetation is dominated by shrubs. Non-forested lands are classified as shrubland if shrubs provide more than 20 percent of the canopy cover, excluding trees. Lands not presently shrubland that were originally or could become shrubland through natural succession may be classified as potential natural shrubland.

succession: the orderly process of community change; it is the sequence of communities that replace one another in a given area.

thin from below: a method of thinning in which stand density is reduced by harvesting trees in the lower diameter classes.

trend: the direction of change in ecological status or in resource value ratings observed over time. Trend in ecological status is described as “toward” or “away from” the potential natural community or as “not apparent.” Appropriate terms are used to describe trends in resource value ratings. Trends in resource value ratings for several uses on the same site at a given time may be in different directions, and there is no necessary correlation between trends in resource value ratings and the trend in ecological status.

understory: plants growing beneath the canopy of other plants; usually refers to grasses, forbs, and low shrubs under a tree or shrub canopy.

use guideline: (1) a degree of utilization of current year's growth which , if continued, will achieve objectives and maintain or improve the long-term productivity of the site; or (2) the percentage of a plant that is utilized when the rangeland as a whole is properly utilized. This use level can vary with time and systems of grazing.

utilization: the proportion or degree of the current year's forage production by weight that is consumed or destroyed by animals (including insects). The term may refer either to a single plant species, a group of species, or the vegetation community as a whole. Utilization is synonymous with use.

vigor: relates to the relative robustness of a plant in comparison to other individuals of the same species. It is reflected primarily by the size of a plant and its parts in relation to its age and the environment in which it is growing.

volatilization: the process where a solid or liquid substance is converted into a gas.

yarding: the hauling of felled timber to the landing or temporary storage site from where trucks (usually) transport it to the mill site. Yarding methods include cable yarding, ground skidding, and aerial methods such as helicopter and balloon yarding.

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