Middle Ruby River Watershed Environmental Assessment

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Dillon Field Office

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Chapter 1

1.0 Purpose of and Need for the Proposed Action

1.1 Introduction and Background

The Middle Ruby River Watershed (MRRW) is located in Madison County Montana. The Ruby River bisects the watershed as it flows into the Ruby Reservoir before continuing downstream toward Alder, Montana (Map#1, Appendix A). The watershed drains the east slope of the Ruby Mountains and portions of the west slope of the Gravelly and Greenhorn ranges. The MRRW lies within Townships 5-8 South and Ranges 3-5 West, Montana Principal Meridian. The watershed area contains approximately 161,869 acres of BLM, private, State of Montana and Forest Service administered land. Thirty two percent of the watershed, 51,107 acres, is public land administered by the BLM. The MRRW encompasses thirteen grazing allotments containing 42,252 acres of BLM land. In addition there are 7,819 acres of un-allotted public land located primarily within the Ruby Mountain and Axolotl Wilderness Study Areas (WSAs).

In some locations the watershed border follows BLM 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). Grazing allotment boundaries have been determined by previous BLM decisions and land ownership. These administrative boundaries may not follow topographical features. Therefore, some of the grazing allotments in the assessment area fall within one or more hydrologic unit or watershed.

In 2013, an interdisciplinary team (IDT) assessed BLM administered land in the MRRW for the five Standards of Rangeland Health. The Standards are: Upland Health, Riparian Health, Water Quality, Air Quality, and providing for Biodiversity. The MRRW Assessment Report, issued in December of 2013, described the condition/function of resources within the assessment area to the Authorized Officer. The MRRW Assessment Report and the Authorized Officer's Summary and Determination (December 2013) have been made available to the public and may be reviewed at the Dillon Field Office, or on the internet at http://www.blm.gov/mt/st/en/fo/dillon_field_office.html.

The condition/function and recommendations in the MRRW Assessment Report, along with comments received through public scoping, have been used to develop a range of management alternatives (Chapter 2), designed to initiate progress towards Proper Functioning Condition (PFC) of the Standards and address site specific resource concerns. This Environmental Assessment (EA) was completed in accordance with established procedures to propose and analyze allotment, landscape or site specific changes.

Resource management on a watershed basis facilitates decisions and projects on a landscape scale. It is the BLM's intent to implement management cooperatively, and all proposed changes will be initiated through the BLM's decision process.

1.2 Proposed Action, Purpose and Need

The BLM Dillon Field Office proposes to improve land health, including water quality, and enhance biodiversity by:

- Restoring and/or maintaining riparian, wetland and aquatic habitats, and upland grassland and sagebrush steppe habitats, through revised livestock grazing management, construction and/or maintenance of structural projects, and/or implementing vegetative treatments.
- Restoring and/or maintaining historic density, structure, and species composition of forest and woodland habitats through mechanical and chemical treatments, commercial timber harvest and/or prescribed fire.
- Eradicating new and containing existing noxious weed and invasive species infestations.
- Mitigating resource impacts from recreational activities while providing access to public lands through modifications to motorized travel route designations.

The BLM also proposes to renew term grazing permits/leases, initiate treatments to salvage harvest dead and dying timber and reduce fuel loading in the wild land urban interface (WUI).

This Environmental Assessment (EA) is in direct response to land health condition/function and recommendations identified in the MRRW Assessment Report. In that document, the IDT described several causal factors, which, when combined, negatively impact the biological, physical, and ecological processes. As a result, the Authorized Officer determined that one or more of the Standards are not met in six of the 13 grazing allotments.

The Fundamentals of Rangeland Health and 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…," if an assessment determines one or more of the Land Health Standards are not being met (43 CFR 4180.1(a)).

Table 1.1 shows the Authorized Officer's determination of each standard in each grazing allotment in the MRRW.

Table 1.1: Determination of Standards by Allotment

Allotment, Number, Category*	Are Land Health Standards Met?				
	Uplands	Riparian	Water Quality	Air Quality	Biodiversity
Barton Gulch #10490 I	Yes	No	1*	Yes	Yes
Belmont #10469 I	Yes	No	No**	Yes	Yes
Belmont South Isolated #20320 C	Yes	NA	NA	Yes	Yes
Davey Creek #10497 I	Yes	Yes	1*	Yes	Yes
Fossil Basin #10667 I	No	Yes	1*	Yes	Yes

Allotment, Number, Category*	Are Land Health Standards Met?				
	Uplands	Riparian	Water Quality	Air Quality	Biodiversity
Garden Creek #20479 I	Yes	Yes	No**	Yes	Yes
Garnet #20492 C	No	NA	NA	Yes	Yes
Idaho Isolated #20676 C	Yes	NA	NA	Yes	Yes
Idaho Jack #20499 I	Yes	No	1*	Yes	No
Laurin Canyon #10463 C	Yes	NA	NA	Yes	Yes
North Fork AMP #10482 M	Yes	Yes	Yes	Yes	Yes
Pierce Canyon #10493 C	Yes	NA	NA	Yes	Yes
Ruby Dam Isolated #30682 C	Yes	NA	NA	Yes	Yes

* Categories are assigned to allotments based on resource management goals: I=improve, M=maintain, C=custodial
*1-These allotments contain tributary streams which are not on the 303(d) list, are not priority streams, are not scheduled to be evaluated by the DEQ and have no beneficial use determinations. Therefore, the water quality standard cannot be determined.
** The Montana Department of Environmental Quality (DEQ) has been given the responsibility for making water quality determinations and has completed its evaluation of 303(d)-listed streams. Allotments with listed streams failed the water quality standard, but BLM authorized activities are not necessarily a causal factor.

The Authorized Officer determined that livestock grazing impacts are contributing to one or more of the Standards not being met in six grazing allotments. Pursuant to 43 CFR 4180.2(c), livestock-caused failure to meet any of the Standards mandates the BLM to change the terms and conditions of the grazing permit/lease 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 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). Livestock management proposals on the six allotments that failed to meet at least one of the standards; Barton Gulch, Fossil Basin, Belmont, Idaho Jack, Garden Creek and Garnet, and two additional allotments where site specific resource concerns were identified; Idaho Isolated and Davey Creek will be analyzed.

1.3 Issues and Resource Concerns

Description of Issues, Resource Concerns and Objectives
Issues and resource concerns were identified during the MRRW Assessment and the public scoping process. Issues, as described below, have a direct bearing upon the proposed action and the process of how the purpose and need will be achieved. The development of management alternatives are in direct response to the identified issues. Resource concerns do not necessarily drive the development of alternatives, but may be affected by proposed actions in the alternatives.

A range of management alternatives to address the resource issues and concerns are described in Chapter 2. The predicted effects on the environment of the various alternatives, and their relative effectiveness in meeting objectives, are analyzed in Chapter 4.

Four primary land health issues and seven additional resource concerns are identified below. A brief description and explanation of the issues and concerns, as well as the management objectives for each issue and resource concern are defined.

Progress toward meeting some objectives can be quantifiably measured, e.g. acres of prescribed burns completed. Others, like reducing stream bank impacts and sediment input into streams, are evaluated over time by long term trend indicators such as relative changes in riparian vegetation composition and abundance and/or channel width/depth ratio.

Additional information about methodologies and documented resource concerns can be found in the MRRW Assessment Report which is available at the Dillon Field Office or on the internet at http://www.blm.gov/mt/st/en/fo/dillon_field_office.html.

Issue #1: Riparian, Wetland and Aquatic Habitat

One of the Western Montana Standards for Rangeland Health is "Riparian and Wetland Areas are in Proper Functioning Condition (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. PFC is a prerequisite to achieving desired condition (USDI 1998). Streams or wetlands that are categorized as Functional-At-Risk (FAR) with an upward trend also meet the riparian health standard. The methods and procedures used to determine riparian health in the Middle Ruby River Watershed are discussed in the MRRW Assessment Report.

The riparian health standard was not met in three grazing allotments. Two additional allotments have site specific riparian concerns but overall met the standard. The MRRW Assessment Report documents several reasons the riparian health standard was not met including; alteration of stream morphology (channel shape and gradient) with resultant over-widening, reduced access to floodplains, and/or channel entrenchment. Impacts to vegetation included limited species recruitment and regeneration, reduced structural diversity and/or decreased vigor of streamside vegetation. Increasing Rocky Mountain juniper (juniper) cover on some stream reaches is crowding out the deciduous riparian woody species and limiting the establishment of bank stabilizing herbaceous (sedges and rushes) communities. These conditions were attributable to several factors including impacts to vegetation, stream banks and channels from livestock activity, conifer expansion, historic mining, wildlife browsing and sedimentation and/or confinement from roads.

Objectives:

- Improve streambank stability and width/depth ratio of streams within the natural range of variability based on Rosgen Stream Types.
- Mitigate excessive head cutting and restore vertical channel stability.
- Restore deciduous woody and herbaceous riparian habitat types, with emphasis on reducing conifer and non-native species composition.

- Increase deep-rooted riparian vegetation (sedges, willows) where decreased composition was documented.
- Reduce sediment inputs into streams where human activities such as authorized grazing, recreational impacts and roads are contributing to unacceptably high sediment loads.
- Maintain/enhance habitat for cold water fisheries in occupied streams.
- Restore, maintain and/or enhance native vegetation and hydrology of springs, seeps and wet meadows with emphasis on ecological function and biodiversity.
- Protect the water source of developed springs from impacts (hoof action) by livestock.

Issue #2: Upland and Sagebrush Steppe Habitat
"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 MRRW Assessment Report.

The upland health standard was met in 11 of the 13 grazing allotments in the watershed. The IDT did, however, identify some localized concerns within allotments that overall, met the upland health standard. Upland resource issues and concerns will be addressed through a range of grazing management alternatives in chapter 2.

Resource concerns include a shift in the dominant herbaceous vegetation communities from cool season bunchgrasses to less productive grasses, annual invasive species and/or unpalatable vegetation, increased bare ground, wind and water erosion, invasive species, e.g., cheatgrass *(Bromus tectorum),* and noxious weed infestations.

Sagebrush habitat in the MRRW is in good condition and is not a resource issue. However, the BLM recognizes the value of healthy sagebrush habitats, and will continue to rigorously monitor conditions within the MRRW with the intent of maintaining or improving sagebrush habitat.

Objectives:

- Restore the soil/site stability, hydrological function, and biotic integrity of upland sites in allotments where one or more of these attributes of rangeland health was determined to be reduced.
- Increase cover and frequency of native perennial cool season herbaceous species where concerns were documented, which will improve the hydrological function and site productivity.
- Restore/maintain open sagebrush communities in habitats with conifer expansion.

Issue #3: Forest and Woodland Habitat
Forests and woodlands provide habitat for a large variety of species, including many special status species. As a result of timber harvest associated with historic mining and the exclusion of fire, forest and woodland habitats have been altered from the historic range of variation. Conifer densities have increased within forested stands, particularly within Douglas-fir forest types,

resulting in a decrease of mountain meadows and aspen. The majority of forested stands, in all habitat types, are in late-seral stages and are experiencing mortality from insects and disease, or are highly susceptible to insect outbreaks. Epidemic mountain pine beetle infestations have resulted in extensive mortality of lodgepole pine. Whitebark pine is rapidly declining throughout its range, and all whitebark pine habitats in the MRRW are at high risk of loss due to extensive mortality and lack of disturbance to stimulate regeneration.

Objectives:

- Maintain/enhance existing aspen and promote successful regeneration of aspen.
- Mitigate mortality of whitebark and limber pine from insects and disease in priority areas and priority individual trees (PLUS trees) and promote successful regeneration of whitebark and limber pine.
- Increase diversity of seral stages and structures in forested habitats.
- Reduce hazard rating for spruce budworm and Douglas-fir bark beetle activity.

Issue #4: Special Status Species Habitat

Special Status Species (SSS) include federally listed Threatened, Endangered, Proposed and Candidate Species, and BLM Sensitive Species. See the Biological Evaluations (BE) on Threatened and Endangered (T&E) species, Special Status plants, wildlife, and fish in Appendix C for additional information. Special Status Species are discussed in the MRRW Assessment Report, as well as chapters 3 and 4 of this EA. Objectives for Riparian Health, Upland Health and Forest and Woodland Health also include objectives related to fish, wildlife and special status species habitat.

Candidate species in the MRRW are wolverine and sage grouse. Threatened species in the watershed are grizzly bear and possible transient Canada lynx. The SSS issues identified for this EA are sage grouse and Westslope cutthroat trout (WCT).

Objective:

- Enhance/improve/protect "Priority Habitats" including aspen, whitebark pine and limber pine.
- Improve streambank stability, vegetative cover and width/depth ratio on WCT streams.
- Maintain >70% mountain big sagebrush habitat in canopy closure of 5 to 25 percent.
- In habitats that are predominately Wyoming big sagebrush, manage sites with the ecological potential to maintain sagebrush over at least 60% of those areas in a canopy closure of 5 to 25 percent.
- Maintain an herbaceous understory in sagebrush steppe habitat emphasizing multiple species of native forbs and grasses.
- Maintain or enhance habitat for sensitive plant species and provide ample opportunity for reproduction and seedling establishment.

Resource Concern #1: Noxious and Invasive Species

Spotted knapweed, houndstongue, Canada thistle, black henbane, common mullein, and whitetop occur as relatively small patches or scattered individual plants in various locations within the

Middle Ruby River Watershed. These noxious and invasive species can affect upland health, riparian health and biodiversity. Noxious and invasive species are discussed in the MRRW Assessment Report, as well as chapters 3 and 4 of this EA.

Objectives:

- Reduce the composition of noxious and invasive vegetative species within the watershed.
- Mitigate the spread of noxious and invasive plants into, within, or from the watershed.

Resource Concern #2: Wilderness

There is no designated wilderness area within the MRRW. The MRRW does include 14,217 acres of the Ruby Mountains Wilderness Study Area (WSA) and a small segment, about 610 acres, of the Axolotl Lakes WSA. These lands are managed in accordance with the BLM Manual 6330 – Management of Wilderness Study Areas, published in July, 2012. WSAs are to be managed as to not impair their suitability for preservation as wilderness until such time as Congress either designates them as wilderness or releases them from further study. If either WSA is released by Congress they will be managed as Special Recreation Management Area (SRMA) as described on page 53 of the Dillon RMP.

BLM Instruction Memorandum No. 2011-154 emphasizes that, "Section 201 of FLPMA requires the BLM to maintain on a continuing basis, an inventory of all public lands and their resources and other values, which includes wilderness characteristics". In accordance with this direction, an inventory was conducted of all lands within the MRRW that met the minimum criteria for wilderness characteristics set forth in that policy. In order for an area to qualify as lands with wilderness characteristics, it must possess sufficient size, naturalness, and outstanding opportunities for either solitude or primitive and unconfined recreation.

Two areas of land within the MRRW were identified as potentially meeting the requirements for lands with wilderness characteristics (See Map 1). These areas will be called the Sweetwater unit (inventory # MT- 076-070) and the Jasmine Creek unit (inventory # MT-076-068) for the purpose of this report. Both units were inventoried for wilderness values in the past, and were determined to lack wilderness characteristics at that time. However, in 2014 both units were reevaluated in their current condition to determine if they may now meet minimum requirements for further consideration and both units qualified as lands with wilderness characteristics.

Objectives:

- Maintain wilderness characteristics of the Ruby Mountains and Axolotl Lakes Wilderness Study Areas.
- Manage the WSAs to the non-impairment standard as outlined in BLM Manual 6330 - Management of Wilderness Study Areas, until congress either releases them or designates them as wilderness.
- Maintain, on a continuing basis, an inventory of wilderness characteristics as describe in BLM Instruction Memorandum No. 2011-154.

Resource Concern #3: Recreation and Travel Management
The goals for both Travel Management and OHV Use and Transportation in the Approved Dillon Resource Management Plan for Recreation collectively say; "to manage roads and trails and manage motorized travel to provide for public access or administrative needs, while maintaining or protecting resource values in conjunction with other federal agencies, state and local governments, and private landowners."

The Dillon RMPs first recreation goal is to provide a diverse array of quality, resource based recreation opportunities' while protecting the resource values. Recreation use within the MRRW occurs year round and includes; hunting (big game, birds, and predators), trapping, fishing, hiking, wildlife viewing, camping, recreational driving and rock hounding. Ruby Reservoir is a popular place to recreate and allows opportunities for camping, and is a popular ice fishing lake. Some off road motor vehicle use occurs at Ruby Reservoir. Some recreational mining occurs in the watershed. There are four commercial use permits issued in the watershed and their activities include, mountain lion hunting, horseback riding, interpretive jeep tours, big game hunting and big game retrieval but no hunting.

Objectives:

- Effectively implement the Dillon RMP Travel Management Plan.
- Revise motorized route designations as necessary to correct mapping errors and improve route designations.
- Reduce unauthorized (non-designated route travel) motor vehicle use on closed routes.
- Maintain motorized wheeled vehicle access to those areas where it already exists, and improve access to public land where appropriate and where opportunities are currently limited.
- Reduce resource impacts caused by recreationists, including spread of noxious weeds.

Resource Concern #4: Socioeconomics
Ranches that hold BLM grazing leases in the watershed have developed operations dependent on a combination of public and private land grazing. Livestock and hay production are important components to the economic well-being and social fabric of local communities and families throughout Madison County.

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

The revenue created by non-commercial hunting and fishing activities on BLM administered lands in the MRRW contribute substantially to the economic health of communities in Southwest Montana. The BLM currently authorizes four commercial Special Recreation Permit (SRP) operators to utilize public land in the watershed.

Objectives:

- 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 activities.
- Recover economic value of dead/dying timber before it is lost due to decay, where feasible.

Resource Concern #5: Wildland Urban Interface
The wildland urban interface (WUI) is defined in the Dillon RMP as; the line, area or zone where structures and other human developments meet or intermingle with undeveloped wildland or vegetative fuels. Live and dead fuels pose a wildfire threat to scattered permanent homes, seasonally-used dwellings, and numerous historic sites/structures in the MRRW.

Objectives:
- Reduce fuel loading and continuity to modify potential wildfire behavior and provide greater opportunity for management actions during future wildfire events.
- Coordinate with private landowners and other affected agencies to maximize effectiveness of fuel reduction treatments.

Resource Concern #6: Cultural & Paleontological Resources
A detailed summary and description of the cultural resources occurring on each allotment in the MRRW is on file in the Dillon Field Office

Objectives:
- Preserve and protect significant cultural and paleontological resources and ensure that they are available for appropriate uses by present and future generations.
- Reduce imminent threats from natural or human-caused deterioration, or potential conflict with other resource uses.
- Ensure that all authorizations for land and resource use avoid inadvertent damage to federal and nonfederal cultural resources in compliance with Section 106 of the National Historic Preservation Act and the Paleontological Resources Preservation Act.

Resource Concern #7: Visual Resource Management
The Visual Resources goal of the Approved Dillon Resource Management Plan is to manage scenic values in accordance with the objectives established in the four VRM classes (see page 65 of the Record of Decision and Approved Dillon Resource Management Plan).

The Ruby Mountain and Axolotl WSAs are managed according to VRM Class I objectives. "Preservation of the landscape is the primary management goal in Class I areas. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention."

The rest of the planning area is managed as VRM Class III. "The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not

dominate the view of the casual observer. Changes caused by management activities may be evident but should not detract from the existing landscape."

Objectives:

- Limit management activities or projects within the Ruby Mountain and Axolotl WSAs to avoid "attracting attention" in accordance with VRM Class I objectives.
- Manage the rest of the MRRW so as not to detract from the existing landscape and other objectives stipulated under VRM Class III guidelines.

1.3.1 Key Issues and/or Resource Concerns Considered, but Eliminated

Water Quality and Total Maximum Daily Loads (TMDL)

Water Quality and Total Maximum Daily Loads were considered but eliminated from further analysis.

The Clean Water Act set a new national goal "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters", with interim goals that all waters be fishable and swimmable where possible. The Act embodied a new federal-state partnership, where federal guidelines, objectives and limits were to be set under the authority of the U.S. Environmental Protection Agency, while states, territories and authorized tribes would largely administer and enforce the CWA programs, with significant federal technical and financial assistance (USEPA 2012). The federal government recognized that Montana's waters belong to the State (Montana Code Annotated 2011). The 1987 Amendments to the Clean Water Act (CWA) require States to develop plans for controlling non-point sources of water pollution and to develop Total Maximum Daily Loads (TMDLs) (EPA 1972). To comply with the CWA, Montana has divided the State into water quality planning areas. The MRRW assessment area is located within the Ruby TMDL Planning Area (TPA). The Ruby River Watershed Total Maximum Loads and Framework for a Water Quality Restoration Plan was completed in 2006 and approved by EPA in 2007 (MTDEQ 2006). This plan provides guidance for achieving Total Maximum Daily Load targets. Other guidance includes Montana' Nonpoint Source Management Plan (DEQ, 2012), which is updated every five years. The plan was most recently updated in 2012. The Dillon Field Office follows the guidance set out in these two documents.

In an effort to meet its obligations under the Clean Water Act, the Montana Dakotas BLM entered into a memorandum of understanding with the State of Montana titled, *Memorandum of Understanding Regarding Water Quality Management on Bureau of Land Management (Administered) Lands in Montana Between the Montana Department of Water Quality and the United States Department of the Interior Bureau of Land Management* (USDI, 2010). This MOU documents the BLM's strategy for managing and controlling non-point source (NPS) water pollution from the BLM managed lands and authorizations. The goal of this MOU is discussed in detail in a paper titled, *Using watershed function as the leading indicator for water quality* (Aron et al 2013). There is growing support for this approach (Hall et.al. 2014, Koslowski et. al. 2013) In short, there is growing concern that the goal of the Clean Water Act to 'restore and maintain the chemical, physical and biological integrity of the nation's waters' is not being fully achieved (USEPA, 2012), that traditional TMDL approaches are ineffective and inappropriate in many settings and that methodologies that assess watershed function such as

Proper Functioning Condition (PFC) are appropriate for land management agencies seeking to identify causes and solutions (Hall et al. 2014, Koslowski et al. 2013).

The BLM's watershed approach of assessing land health, also known as ecosystem function, can be a leading (early) indicator to guide adaptive management as opposed to traditional water quality monitoring which is seen as a lagging indicator. Land health assessments are very well designed to assess the physical and biological integrity of our Nations waters. As part of the MOU, the BLM reports to DEQ actions taken to address NPS water pollution as well as effectiveness of Best Management Practices (BMPs). Water Quality Monitoring is conducted on Public Land by Montana DEQ as part of their responsibilities under the Clean Water Act. Additionally, as discussed in the Aron paper, the BLM has entered into a cooperative water quality monitoring agreement shifting some of the workload to Montana DEQ and freeing the BLM to focus more attention to watershed function.

In conducting watershed assessments with respect to nonpoint water pollution, upland, forest, wetland and riparian assessments are used to determine how BLM management is affecting water quality. The BLM evaluates uplands for land cover condition (ability of plants, rocks, and litter to protect soil from erosion, promote infiltration and reduce runoff). Wetlands are assessed to determine their extent and condition and their ability to recharge ground water, cycle nutrients, filter sediments, promote infiltration and mitigate flooding. Streams and their adjacent riparian areas are evaluated to determine channel morphology and stability, access to floodplains, ability to move sediment, species composition and condition of riparian vegetation. Wells, pipelines and spring developments are recognized as BMPs, and are evaluated to determine condition and effectiveness. Due to the extent of stream miles in the Dillon Field Office, temperature monitoring is limited to selected streams. PFC assessments also provide clues to stream temperature. Shallow, over-widened streams with limited vegetation receive more solar radiation and are more at risk for thermal impacts than deep, narrow, well vegetated streams. Improvements in channel condition and riparian cover directly correlate to reductions in thermal impacts. As stated above, PFC is an early indicator of water quality and a prerequisite to achieving desired condition. The assessment team also looks at current and historic mining, timber harvests, abandoned beaver dams, erosion from roads, and concentrated livestock waste.

Since the BLM uses the Land Health Assessment process to identify early indicators of nonpoint pollution as well as BMP assessments, and since these areas are covered by other key issues in this document, Water Quality and TMDLs have been considered and eliminated from further consideration as key issues in this document.

Abandoned Mine Lands

The Abandon Mine Lands (AML) program is an ongoing program which has been addressing legacy mining issues throughout southwest Montana. The BLM will continue to address AML features in the MRRW on a priority basis. Separate NEPA documentation will be completed to address legacy mining issues.

Soil Compaction

Soil compaction was rated as none to slight on the upland sites assessed during upland health assessments in the watershed, but was noted as a minor concern in some localized riparian and

wetland areas. The ID team agreed that soil compaction wasn't an issue in upland habitats and that it would be adequately analyzed under Key Issues. Changes in riparian/wetland vegetation cover, composition and vigor and the relative amount of bare ground will be measured as a surrogate to measure soil compaction in riparian and wetland areas. Activities to improve forest health may cause localized, short term soil compaction that would be mitigated through project design and BMPs. Therefore, soil compaction was not carried forward as a separate issue.

Wildlife
Wildlife species and their habitats in the MRRW were considered during the assessment. Since not all wildlife and their associated habitat had concerns, not all were included in this EA as an issue or resource concern, and are not analyzed if they are not affected. Several wildlife species, including a variety of birds, utilize the same habitats that are included as issues. While not every species is mentioned in the impact analysis, the effect to those species is similar to that of species that are included and analyzed (i.e. impact on foraging, cover, nesting, etc.). Particular habitat requirements and levels of dependence on these habitats vary by species and in general, the group is often represented by an "umbrella" or "focal" species whose habitat needs represent the needs of other species (i.e. sagebrush obligate species represented by sage grouse since they use a diversity of habitat).

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

1.4.1 Scope
The scope of the proposed action includes authorizing livestock grazing, implementing commercial and non-commercial vegetation treatments, prescribed burning, and minor changes in travel management within the MRRW. The proposed action addresses several program areas that affect land health. 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, water developments for livestock, road construction, and stream crossings (including culvert placement or replacement).

1.4.2 Conformance with BLM Land Use Plans, Programs, and Policies
This document is tiered to the Dillon RMP, approved in 2006, and the management alternatives considered are in conformance with the RMP. Applicable guidance is in the Record of Decision (ROD) and Approved Dillon RMP, which may be accessed on the internet at http://www.mt.blm.gov/dfo/rmp/index.html.

The ROD identified goals, objectives, land use allocations, and management actions for each program area on public lands managed by the BLM Dillon Field Office. All alternatives in this EA, except the No Action Alternative, propose management actions in support of these identified actions, allocations, and objectives.

The proposed actions are 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), Manual 6330-Management of Wilderness Study Areas, BLM policies and Federal regulations.

All treatments of invasive species in the proposed action will conform to the guidance and standards set forth in the Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States Programmatic EIS approved on September 29, 2007 and the Noxious Weed Control on Public Lands EA (MT-050-08-12) approved April 2008, to which this EA is tiered.

Also considered during alternative development were the goals, objectives and management recommendations specified in these documents:

- Interagency Memorandum of Understanding and Conservation Agreement for Cutthroat Trout in Montana.
- BLM's National Sage Grouse Strategy
- Greater Sage-Grouse Interim Management Policies and Procedures No. 2012-043
- Management Plan, Conservation strategies for Sage Grouse in Montana
- 2010 Nonpoint Source Memorandum of Understanding between the BLM and the Montana Department of Environmental Quality (DEQ)

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 (EISs). The scoping process indicated which Critical Elements may be affected by the alternatives.

Table 1.2: 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 (ACEC)	X			
Cultural & Paleontological Resources		X		See features common to all alternatives in section 2.3.1, and a broader discussion of Cultural & Paleontological Resources in section 3.2.10.
Environmental Justice		X		No low income or minority groups would be disproportionately affected.
Farmland (prime or unique)		X		Prime or unique farmland will be conserved through actions that address Land Health Standards
Floodplains[1]			X	Discussed under Issue # 1 – Riparian, Wetland and Aquatic Habitat.
Hazardous and Solid Wastes	X			
Invasive Non-native Species			X	Discussed under Resource Concern #1 - Noxious and Invasive Species

Critical Element	Not present	Present, but not affected	May be affected*	Comments
Native American Religious Concerns	X			Tribes familiar with the area have expressed no religious concerns.
T&E species			X	See BE for T&E and Sensitive Species in Appendix C, or in EA file MT-B050-2014-0005-EA at the Dillon Field Office.
Water Quality (drinking or ground)			X	Discussed under Issue # 1 – Riparian, Wetland and Aquatic Habitat and also 1.3.1 Issues considered but eliminated.
Wetlands/Riparian Zones			X	Discussed under Issue # 1 – Riparian, Wetland and Aquatic Habitat.
Wild and Scenic Rivers	X			
Wilderness Characteristics			X	Discussed under Resource Concern #2 – Wilderness
* 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.				

1.5 Decisions to be Made

The BLM is preparing this EA to allow the Authorized Officer to make a reasoned and informed decision regarding improving riparian habitat, improving upland habitat, maintaining/enhancing sagebrush steppe habitat, improving forest and woodland conditions, enhancing biodiversity, adjusting motorized route designations, and revising or renewing term grazing leases. Revised grazing leases would contain appropriate terms and conditions to initiate significant and measurable progress towards achieving the Standards and established goals and objectives within the MRRW.

The Dillon Field Manager will choose the alternative that best addresses issues and resource concerns identified by the BLM and through public scoping, and allows for multiple use. The Dillon Field Manager must also determine if a selected alternative is a major Federal Action that significantly affects the quality of the human environment. If she/he determines that it is, then an EIS must be prepared before the MRRW management plan can proceed.

Implementation of the Decisions issued as a result of this EA may begin in 2015, but full implementation may take several 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
- Management of Wilderness Study Areas (manual 6330), 2012
- Paleontological Resources Preservation Act of 2009

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

Chapter 2

2.0 Description of Alternatives

This chapter describes the alternative development process, alternatives considered but eliminated from further analysis, and alternatives carried forward and fully analyzed. As many as three management alternatives will be fully analyzed: the No Action Alternative (continuation of current management) and up to two action alternatives. Alternatives may apply to individual allotments (e.g., grazing management changes), or across a broader landscape (e.g., noxious and invasive species mitigation). Based on identified issues, combinations of allowable use levels, grazing systems, stocking rates, vegetative treatments and program specific projects, were discussed at length and carefully considered during scoping and the formulation of the management alternatives by the Interdisciplinary Team (IDT).

2.1 Process Used to Formulate Alternatives

The development of management alternatives for the Watershed was guided by provisions of FLPMA and NEPA, as well as planning criteria described in Chapter 1, and public input received during scoping. Other laws, as well as BLM planning regulations and policy, also directed alternative considerations and focused the alternatives on appropriate watershed-level decisions. Chapter 1 discusses the issues and resource concerns considered during the alternative development. The Affected Environment (Chapter 3) discusses existing resource conditions related to the issues and resource concerns identified in Chapter 1.

2.2 Alternatives Considered but Eliminated from Further Analysis

Alternatives that would not make significant progress toward meeting the objectives of the proposed action (section 1.2), or are not consistent with the intent of current BLM legal and regulatory requirements or policy, are not fully analyzed in this document. Alternatives that propose exclusive utilization, development 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, oil and gas leasing, or managing only for wildlife values at the exclusion of other considerations. In addition, resource conditions in the MRRW 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. The following alternatives were considered, but eliminated from detailed study.

2.2.1 Elimination of Livestock Grazing on BLM Administered Lands on all grazing allotments in the MRRW

Eliminating livestock grazing from all BLM administered lands in the watershed was considered, but eliminated from detailed study for the following reasons:

- Eliminating livestock grazing from all BLM administered lands in the watershed does not meet the purpose and need of this EA.

- Resource conditions within the MRRW do not warrant elimination of livestock grazing on a watershed wide basis. (i.e., Upland health was met on 11 of the 13 allotments and all five Rangeland Health Standards were met on 7 of the 13 allotments within the watershed).
- The recently updated and approved Dillon RMP identifies 42,252 acres of public land in the MRRW available for livestock grazing and 7,819 acres (15%) of land as unavailable or unalloted to livestock grazing, so a watershed wide "No Grazing" alternative would not be consistent with the Dillon RMP.
- A "No Grazing" alternative was previously analyzed in the Mountain Foothills EIS (March 1980). Important portions of the analysis within the EIS are still relevant, (i.e., approximately 2,700 miles of new fence construction would be necessary to eliminate livestock grazing on public land within the Dillon Field Office, this amount of fence would create unacceptable barriers in wildlife movement and be cost prohibitive; monitoring use on public lands would be a major workload; eliminating grazing on BLM administered lands would have an adverse social and economic impact on the local community).
- Due to the intermixed land ownership pattern in the MRRW grazing allotments, at least 125 miles of fence would need to be constructed between private and/or state land, patented mining claims and BLM administered land to effectively implement a "No Grazing" alternative. This figure does not include fencing around parcels that are essentially unavailable to livestock due to topography. Surveying and constructing 125 miles of fence along BLM boundaries would be cost prohibitive and cause an unacceptable level of barrier/entanglement hazard for big game. Access to public land may be reduced due to locked gates located in boundary fences that cross private roads.
- Fencing public lands would create numerous small isolated parcels, and management of these tracts would be problematic. Isolated and publically inaccessible tracts could result in an expanded public land exchange and/or sales policy in an attempt to block up public land and provide access. This process would be very time consuming, extremely expensive and could result in a net loss of public land for recreation, timber harvest, fire wood gathering or other multiple use activities.

2.2.2 Elimination of Livestock Grazing on the Belmont Allotment

A no grazing alternative was considered for the Belmont allotment. This alternative was considered because the riparian health standard was not met on several stream reaches within the allotment due to livestock grazing. Eliminating livestock grazing would facilitate improvement of riparian, and site specific upland conditions, across the allotment more rapidly than the proposed action alternatives. However, due to the intermixed land pattern of private, state and BLM administered lands throughout this 21,956 acre allotment, approximately 30 miles of fence would need to be constructed to eliminate grazing by domestic livestock on BLM administered lands. There are 12,034 acres of BLM administered land within the allotment. Surveying and constructing 30 miles of fence along BLM boundaries at approximately $9,000/mile ($270,000) would be cost prohibitive. These fences would also cause an unacceptable level of barrier/entanglement hazard for big game. The additional 30 miles of fence would also pose a serious hazard for sage grouse by increasing the chance of collision. The southern portion of the Belmont allotment lies within priority sage grouse habitat and the remainder is within general

sage grouse habitat. Eliminating livestock grazing would have an adverse economic impact on the ranch operation currently authorized to graze livestock in the Belmont Allotment and decreased tax revenue for Madison County. In addition, the BLM would still incur a workload to monitor compliance to non-use on the public land in this allotment. A build-up of fine fuels would increase the likelihood of wildfires (both natural and man-caused) moving faster and spreading further within the allotment. For these cumulative reasons, elimination of livestock grazing on the Belmont allotment was eliminated from full analysis.

2.2.3 Elimination of Livestock Grazing on the Garden Creek Allotment

A no grazing alternative was considered for the Garden Creek Allotment. It was considered because this allotment contains 6,398 acres of the Ruby Mountain Wilderness Study Area, did not meet the water quality standard and had some site specific riparian concerns caused by livestock grazing. There are 10,414 acres of BLM administered land within the Garden Creek Allotment. However, because of the intermixed land pattern of private, state and BLM land within this 21,020 acre allotment, approximately 32 miles of fence would need to be constructed to prevent grazing by domestic livestock on BLM administered lands. Surveying and constructing 32 miles of fence along BLM boundaries at approximately $9,000/mile ($288,000) would be cost prohibitive. These fences would be dangerous barriers and entanglement hazards for big game, as well as a serious collision hazard for sage grouse within the Garden Creek Allotment (general sage grouse habitat).

Eliminating livestock grazing would have an adverse economic impact on the ranch operation currently authorized to graze livestock in the Garden Creek Allotment and decreased tax revenue for Madison County. In addition, the BLM would incur a substantial workload to monitor non-use compliance on the public land in the allotment. A build-up of fine fuels would increase the likelihood of wildfires (both natural and man-caused) moving faster and spreading further within the allotment. In addition, although the Garden Creek Allotment did not meet the water quality standard and had some site specific riparian concerns, conditions across the allotment were found to be improving (upward trend) since the last assessment. For these cumulative reasons, elimination of livestock grazing within the Garden Creek allotment was eliminated from full analysis.

2.3 Description of Alternatives

2.3.1 Features Common to All Alternatives, Including the No Action

Livestock Management
New ten year term grazing leases will be reissued for four grazing allotments that have been determined to not have resource issues or concerns relating to current livestock management. No changes to the mandatory terms and conditions of the leases, and/or new rangeland improvement projects will be proposed or analyzed for these allotments. The allotments are: Belmont South Isolated, Laurin Canyon, Pierce Canyon and Ruby Dam Isolated.

The BLM encourages, and if warranted, will require use of temporary electric fence, livestock supplement (e.g., salt, protein block) placement, riding, and herding 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.

Fences

- Existing BLM fences that impede wildlife movement will be modified or rebuilt to BLM specifications on a prioritized schedule.
- Dysfunctional or unnecessary fences on public land will be removed.
- Lessees shall provide reasonable administrative access across private and leased lands to the BLM for the orderly management and protection of the public lands.

Water Developments

- Pierce Canyon: clean up abandoned spring development on public land in T6S R5W section 24.
- All water developments and troughs no longer in use will be removed, but spring exclosure fences may be retained and maintained.
- Functional spring developments will be maintained prior to the livestock grazing season of use for each specific allotment (4130.3-1(c). Annual maintenance projects could include: repairing wire or wood exclosure fences, cleaning out head boxes, removing dirt and debris from water troughs, repairing plumbing hardware, fixing damaged posts and braces and ensuring wildlife escape ramps are present, accessible and functional.

Forest and Woodland Treatments

Personal use firewood permits and Christmas tree permits will continue to be issued. The following will also continue for 5-Needle Pine Treatments:

- Cones will be collected on whitebark and/or limber pine trees suspected to be resistant to white pine blister rust and will be sent for testing to determine their resistance level and/or stored for future planting.
- Pheromones (e.g., verbenone) will be applied to selected trees to protect them from attack by mountain pine beetle. (Refer to Pheromone Use in the Dillon Field Office EA #DOI-BLM-B050-2011-007-EA).
- Additional cones will be collected as funding and cone crops allow. This seed may be sent to the national seed bank and genetic restoration program and/or incorporated into an office-wide operational collection that has been banked for future management efforts.

Fire Management

- The management of naturally occurring wildfire in the southern 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.

Travel Management and Roads

Travel management will be implemented as prescribed in the Dillon RMP. Roads identified as open to public use will be signed with a white arrow symbol on a flexible sign post. Roads not identified as open to public use would be:

- Left unsigned unless there is evidence of regular use.
- Signed closed if there is evidence of regular use.

- If signing is ineffective at discouraging use, roads would be obliterated to the extent possible (made unnoticeable), at least at the intersection with an open route, or physically closed when continued use is causing significant unacceptable resource impacts or user conflicts.

Up to four culverts located along the Davey Creek road on BLM land will be maintained or replaced. BLM engineering staff will remove and replace two culverts on the lower end of the road. The new appropriately sized culverts will be designed to withstand high stream flow events. The increased capacity of the culverts will reduce the potential for erosion of the road bed above or adjacent the culverts from seasonal high flows and large storm events. Heavy sediment inputs into the riparian system, a noted concern at these crossings, will be reduced. Two additional culverts under the upper section of the road will be re-set, and the road bed maintained to reduce sediment into Davey Creek.

Noxious and Invasive Species
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 noxious weed list will be treated to the degree financial resources allow. An average of 50 acres would be treated with herbicides annually, pending funding. Roads, trails and washes as well as areas where private landowners actively cooperate, participate, and support the BLM's weed management strategies, will be given a higher priority for treatment.

Special Status Species
Activities that disturb mineral soil (such as blading, plowing, ripping, etc.) may not be allowed within the boundaries of populations of special status plant species. In habitats likely to support rare plants, field inspections would 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 would be mitigated through project redesign or abandonment.

The MRRW provides year-round habitat for sage grouse. There is one active lek on private land in the watershed. The BLM, in cooperation with other agencies and partners, will continue to monitor this lek. In areas where sage grouse use may be more concentrated, such as in close proximity to the lek or wintering areas, fences will be marked so they are more visible and collision with wires is reduced. On allotments with sagebrush habitat throughout the MRRW, BLM will maintain existing sagebrush habitat so that 70% or more of big sagebrush communities provide vegetative composition and structure for sagebrush obligate species. BLM will maintain nesting/early brood rearing canopy cover of 15-25% sagebrush and an average of 6 to 7 inches herbaceous understory within site potential, and maintain or increase composition of highly nutritious forbs (e.g. composites and legumes) in nesting/early brood rearing habitat.
West Nile Virus (WNV) has been linked to sage grouse mortality in several areas. WNV has not been documented on BLM lands within the DFO, nor in sage grouse in southwest Montana. BLM Information Bulletin (IB) No. MT-2011-033 provides guidance for WNV and Water Developments. Management to reduce impacts of WNV focuses on eliminating man-made water sources that support breeding mosquitoes known to vector the virus. Whether the water development is for livestock water, wildlife habitat, fish, or storm water management, potential habitat for mosquitoes may be increased. Incorporating applicable design and mitigation

measures, described in the IB, on water development projects can reduce mosquito production through modifying and eliminating mosquito breeding sites.

Term grazing permits shall be amended to state that depredation losses from wolves and grizzly bear are possible. A stipulation will also be added to grazing leases stating that the lessee, agency personnel, and Montana FWP will jointly determine how to properly treat or dispose of livestock carcasses to reduce the potential for attracting predators.

Within the MRRW, westslope cutthroat trout are found in three drainages located on BLM managed land. Two of these, Jack Creek and Dark Hollow (Greenhorn drainage) support genetically pure populations. The other population located in Idaho Creek is slightly hybridized. BLM will continue water temperature and habitat monitoring on a 5-year rotation on WCT streams in the assessment area. Additionally, BLM will continue to participate with cooperative WCT restoration projects within the watershed. The BLM will continue to look for cooperative opportunities to improve riparian habitat adjacent to Jack Creek on private lands downstream of BLM

Wilderness
The Ruby Mountains and Axolotl Lakes WSAs will continue to be managed in accordance with BLM manual 6330-Mangement of Wilderness Study Areas, until Congress acts upon them. If Congress decides to release them from further wilderness consideration they will be managed as Special Recreation Management Areas as described in Chapter 3. If either of the WSAs is designated as Wilderness by Congress they will be managed accordingly at that time.

The BLM will continue to monitor Lands with Wilderness Characteristics and will analyze any impacts from any proposed projects on those Wilderness Characteristics.

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. Opportunities for big game hunting, wildlife viewing, horseback riding, and other backcountry recreation would be maintained.

The developed recreation site along Ruby Reservoir will continue to be maintained and improved to the extent allowed by the private landowners.

Cultural and Paleontological 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, impacts would be mitigated through project abandonment or redesign. Care would be taken to avoid and protect significant cultural resources and any standing structures (should they be present) during the course of any proposed project. As required by the Paleontological Resources Preservation Act, a paleontological inventory is required in areas with a high potential for paleontological resources prior to the implementation of any proposed range or habitat improvement projects. Should paleontological resources be identified, impacts would be mitigated through project

abandonment or redesign. In addition, personnel from the BLM should be notified of the presence and location of any cultural or paleontological resources encountered by contractors or lessees during the course of operations on public lands.

Monitoring
Under all alternatives, resource monitoring will be implemented 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.

Livestock Grazing Management
Under Alternative A, livestock management would continue under the current Terms and Conditions in all 13 grazing allotments (Table 2.1). No new range improvement projects would be constructed.

Table 2.1: Grazing Allotments Summary

Allotment number category[1]	Grazing Authorization Number	Livestock Number and Kind	Season of Use	Grazing System	Stocking Rate on BLM	BLM Active AUMs	BLM Acres	Acres in Other Ownerships	Total Acres
Barton Gulch #10490 (I)	2505741	138 cattle	06/15/ 07/30	seasonal	67 acres/ AUM	52	3467	2739	6206
Belmont #10469 (I)	2505705	varies by pasture; 20 to 488 cattle	05/10-12/15	partial rest rotation	9 acres/ AUM	1288	12034	9922	21956
Belmont South Isolated #20320 (C)	2500150	70 cattle	07/01-11/15	seasonal	7 acres/ AUM	38	255	5620	5875
Davey Creek #10497 (I)	2505748 & 2505770	172 cattle	07/01-10/15	seasonal	17 acres / AUM	351	5983	3632	9615
Fossil Basin # 10667 (I)	2500182	6 cattle	05/15-11/01	seasonal	34 acres/AUM	31	1066	3191	4257
Garden Creek #20479 (I)	2505730	1200 cattle	08/01-09/15 08/26-10/10	seasonal	10 acres/ AUM	1062	10414	10606	21020
Garnet #20492 (M)	2502481	23 cattle	08/01-12/01	seasonal	8 acres/ AUM	93	744	510	1269

Allotment number category[1]	Grazing Authorization Number	Livestock Number and Kind	Season of Use	Grazing System	Stocking Rate on BLM	BLM Active AUMs	BLM Acres	Acres in Other Ownerships	Total Acres
Idaho Jack #20499 (I)	2505750	varies during season from 375 to 125 cattle	07/01-09/28	seasonal	12 acres/ AUM	400	4881	2501	7382
Idaho Jack Isolated #20676 (C)	2505750	13 cattle	07/01-09/30	seasonal	8 acres/ AUM	39	318	2200	2518
Laurin Canyon #10463 (C)	2504136	28 cattle	08/15-12/16	seasonal	9 acres/ AUM	114	1061	800	1861
North Fork AMP #10482 (M)	2505733	371 bison	12/01-04/30	seasonal	8 acres/ AUM	222	1736	5587	7323
Pierce Canyon #10493 (C)	2502495	12 cattle	06/01-07/31	seasonal	25 acres/ AUM	24	602	242	844
Ruby Dam Isolated #30682 (C)	2505768	1 cattle	05/10-12/31	seasonal	61 acres/ AUM	5	304	0	304

[1] Allotment Category: I = Improve, M = Maintain, C = Custodial

Other Authorized Activities

Under the No Action Alternative, all other currently authorized activities (recreation permits, mineral development, etc.) would continue as permitted. No new forest and woodland treatments, other vegetative treatments, or changes to travel management designations would be implemented.

2.3.3 Features Common to All Action Alternatives

This section covers proposed actions and project design features that would be implemented regardless of the action alternative or combination of alternatives chosen by the Authorized Officer.

Livestock Management

Grazing Management and Permit Administration

- Livestock management changes would be initiated during the 2015 grazing season. Implementation which is dependent on other proposals, e.g. rangeland projects, may take up to five years, due to financial, logistical, or other constraints.
- AUMs reduced from current active use would be held in suspended non-use on the revised Term Grazing Leases.
- Annual utilization guidelines on cool season upland and riparian bunch grasses would be 50% (to maintain plant health/vigor).
- Utilization by livestock of sedge species in the riparian greenline (area of vegetation adjacent to the channel) on non-fisheries or non-native fisheries streams would be four inches. On WCT streams the guideline would be to maintain a herbaceous stubble height

of at least 6 inches along the greenline and 3 inches on the flood plain to manage for the long term viability of remaining Westslope Cutthroat trout populations,.

- Annual use guidelines would be added to the terms and conditions of the term grazing leases, and would be applicable to all allotments included in the MRRW as a tool to determine moves between pastures and/or off the allotment, and in conjunction with long term trend data to determine management effectiveness.
- With prior approval, flexibility would be authorized for the season of use on each allotment if annual weather conditions and forage production warrant. The season of use begin and end dates may be adjusted up to seven days earlier or later than specified on the permit due to yearly variations in weather affecting forage production. Livestock may need to be removed from a specific pasture prior to the maximum number of days specified in the grazing schedule. If this occurs, the time allocated in subsequent pastures would be adjusted proportionally. Conversely, if annual production is unusually high, livestock may be allowed to remain in a given pasture for up to five additional days and the remainder of the rotation schedule adjusted accordingly.
- After consultation with the BLM, and written approval, the planned pasture grazing sequence (AMP) may be adjusted due to drought or other unforeseen natural events.
- With prior approval, more livestock may be grazed for a shorter period within the authorized season of use. However, the maximum authorized AUMs, or season of use, as specified in the Term Grazing Leases cannot be exceeded by allowing this flexibility.

Rangeland Improvement Projects

Fences

- Any new or replacement boundary fences would normally be a four-wire fence and any new interior (pasture) fences would normally consist of three wires, constructed in conformance with BLM Fencing Handbook H-1741-1.
- All old materials (wire, steel and wood posts, etc.) would be cleaned up and removed when fences are re-built, maintained or abandoned.
- High tensile electric fences would be considered in areas where they may provide an effective alternative to traditional barbed wire construction. These would also be constructed in conformance with BLM Fencing Handbook H-1741-1.
- Fences around springs or tanks would be modified to prevent avian predators from using posts as hunting perches. Modifications include installing spikes or cone-tops to wood posts, replacing wood posts with metal t-posts, and using metal t-posts instead of wood posts and jack and rail, where practical.

Water Developments

- Spring sources and associated riparian wetland habitat would be fenced to exclude livestock use on new spring developments.
- Application for Beneficial Water Use Permit, Montana Department of Natural Resource Conservation (DNRC), DNRC form 600, would be filed prior to construction for surface water appropriations. DNRC would be consulted early in the process in an effort to achieve successful projects.
- Notice of Completion of Groundwater Development, DNRC Form 620 aka Exempt Well, would be submitted for groundwater developments (developed springs and drilled wells), with a maximum use of 35 GPM and 10 AC-FT or less post construction.
- Application to Change a Water Right, DNRC Form 606, would be filed prior to adding

new tanks to projects with existing Statements of Claim, Beneficial Water Use Permits or Notices of Completion of Groundwater Development.

- All old materials (pipeline, troughs, head boxes, etc.) would be cleaned up and removed when springs are re-developed, maintained or abandoned.
- Prior to developing water resources all applicable State and Federal Permits would be obtained and the terms and conditions applied.
- Flow measurements, i.e., gallons per minute, would be collected on all springs which are being considered for development. Springs that have inadequate flows to provide a reliable water source for authorized livestock, while maintaining wetland/riparian habitat would not be developed. Adequate water would be left at the spring source to maintain wetland hydrology, hydric soils, and hydric vegetation.
- No new permanent roads would be authorized in conjunction with new water developments. Permit holders may be authorized to travel along pipeline routes to perform maintenance as defined in the term grazing lease.
- Soil disturbance resulting from pipeline installation would be seeded with a native seed mix during the fall, following construction.
- Maintain, abandon and clean up, or re-construct the following spring developments in the Garden Creek allotment following an engineering feasibility study: Drift Fence Spring (#476765), Left Fork Mormon Spring (#477235), Lightning Spring (#476768), Mormon Peak Spring (#476767), South Mormon Spring (#477260), Taylor Canyon Spring (#000553) and Tukudika Spring (#477053).

Forest and Woodland Treatments

Commercial Harvest Treatments

The following design features would be common to all commercial harvest treatments.

- State of Montana Best Management Practices (BMPs) and the Streamside Management Zone (SMZ) laws would be followed for all treatments or road activities in or near riparian areas. Guidelines as described in the Montana SMZ law (available at http://www.mt.nrcs.usda.gov/technical/ecs/forestry/technotes/forestryMT18/) would be the minimum standard design features unless alternative practices authorizations are obtained.
- If market conditions permit, biomass material may be removed from within treatment units. Sufficient residual biomass material would be left on site to maintain nutrient recycling and desirable micro-site conditions.
- Existing roads which are not designated open routes may be used for Forest and Woodland Treatments, and would be physically closed following completion of use.
- Forest and Woodland Treatment units would be monitored for noxious weeds and cheatgrass and treated if necessary.
- Forest and Woodland Treatment units would be surveyed for goshawk and great gray owl nesting prior to implementation. If a goshawk or great gray owl nest is found in a treatment unit, timing stipulations would be enforced to avoid disturbing nesting activity.
- Foresters, fuels specialists, and wildlife biologists would coordinate the timing of forest and woodland treatments (seasonally and yearly), and the area treated per year to minimize conflicts with wildlife (i.e. elk calving habitat).
- A food storage stipulation would be included in timber harvest contracts to reduce conflicts with bears.

- Treatment areas for commercial harvest are shown on Map 2, Appendix A. Actual harvest units would be within these areas identified, but would not cover the entire acreage within. In addition, some commercial harvest unit boundaries may overlap with prescribed burn units.
- Sale contract terms would be between 12 -36 months. Factors influencing timing would be dependent on the size of the treatment unit, wildlife issues, and/or area closures.
- Proposed commercial harvests would not be offered simultaneously. Depending on the alternative selected, units would be packaged by drainage, timing, and/or access to limit disturbance across the entire watershed.
- Conventional ground-based harvesting equipment would be used. Ground based harvest techniques would include hand or machine felling (on slopes <45%) and then tractor and/or cable yarding the merchantable timber to landings. Ground-based harvest equipment generally requires yarding distances of up to 1,500' for practical operations and access to log landings.
- Standard timber sale contract provisions which provide protection from erosion, sedimentation, and soil compaction would be adhered to. Timber sale contracts would be made available to the general public upon advertisement.
- Off road vehicles and equipment would be required to be pressure washed to remove weeds and weed seeds prior to starting operations.
- Log landings would be located in areas free of, or treated for, noxious weeds. Upon completion of use, landings would be reseeded with native grasses/forbs.
- Use of existing roads would be evaluated on a case-by-case basis to determine if additional safety and/or watershed protection measures would be needed. Upgrades may include but would not be limited to: blading, filling in low spots, installing drain dips, removal of established vegetation within the ROW for sighting distances, and minor re-routes of up to 500 feet.
- 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. Exact road locations may be adjusted for archaeological and/or sensitive plant clearances, to avoid wet areas, to adhere to SMZ laws, to provide best access for yarding, or to reduce the amount of road building. Road mileage amounts identified in this EA would not be exceeded without additional NEPA clearance.
- All applicable State and Federal Permits required for the installation of stream crossings within the project area would be obtained, and permit conditions would be followed.
- All currently closed two track and new temporary roads used for forest health treatments would be closed upon the completion of forest management activities. Post-treatment road closures would be accomplished by constructing berms and/or placing slash material on the road surface to preclude vehicle use and reseeding with native grasses/forbs.
- Prescribed burning treatments to consume residual slash and/or to kill understory conifers less than 30 feet tall may be completed within all commercial harvest units; predominantly in Douglas-fir/mixed conifer stands, and would take place within five years following completion of harvest operations.
- Disturbance to regeneration in old harvests would be minimized as far as is practicable. Exceptions may include but are not limited to; clearing of road ROW vegetation, landing areas, and designated temporary skid trails.

- Contract stipulations for temporary skid trails would address spacing and slopes allowed for trails as well as avoidance areas. Constructed trails may be allowed where necessary with restrictions based on local site conditions. Rehabilitation of constructed trails and any other main trails would be required upon completion of harvest operations.
- Haul routes for removal of commercial product would be determined by utilizing public access routes where feasible. Sale purchasers may elect to utilize access through private lands.

Non-Commercial Mechanical/Prescribed Fire

- A burn plan would be prepared and approved prior to implementing prescribed fire treatments.
- One season of rest from livestock grazing may be needed prior to burning to allow sufficient growth of fine fuels (grasses) to ensure a successful burn. Generally, two growing seasons of rest from livestock grazing would be required following burns to allow re-growth and re-establishment of vegetation in the treated areas.
- Temporary fencing or hot tape (electric fence) may be used to allow the appropriate rest before or after a prescribed fire treatment.
- Units would be burned as fuel and weather conditions allow. Fire mangers would coordinate the timing of prescribed fire treatments (seasonally) and the area treated per year to minimize public resource use conflicts.
- Fire managers and wildlife biologists would coordinate the timing of prescribed fire treatments (seasonally and yearly), and the area treated per year to minimize conflicts with wildlife (i.e. elk calving habitat).
- The implementation of prescribed fire treatments would occur over the next ten years.
- Burn units would be surveyed for special status species and appropriate stipulations would be implemented to reduce impacts to these species.

Stream Crossings

- All applicable State and Federal Permits would be obtained and all permit conditions would be followed for construction of stream crossings.
- The most appropriate stream crossings, e.g. culverts, hardened crossings or temporary bridges would be selected based on site specific conditions and impacts: floodplain fill, economics, road safety as well as impacts to stream channel and vegetation.
- Temporary and/or permanent culverts placed under roads would be adequately sized to maintain stream dimensions, patterns and profiles.

Riparian Conifer Treatments

A variety of tools would be used to treat up to 5 miles of riparian habitat to reduce/remove conifers within riparian zones. Treatments would primarily target Rocky Mountain juniper, but may also include smaller diameter Douglas-fir (< 18” dbh). The high density of Rocky Mountain juniper in affected riparian areas was determined to be a primary cause for identified stream reaches being rated FAR or NF condition. Without active management juniper expansion within riparian habitat would prevent these stream reaches from ever attaining PFC. Removing juniper from the riparian zone would provide the deciduous woody component an opportunity to regenerate and expand. No five-needle pine, Engelmann spruce or larger Douglas-fir (>18” dbh) would be removed.

Table 2.2 outlines the proposed units, objectives, and treatment types for riparian conifer treatments. Unit locations and boundaries are shown on Map 3, 5 & 8, Appendix A.

- SMZ laws would be followed for vegetation treatments in or near riparian areas.
- In riparian conifer treatments, the goal would be to kill/remove 100% of the Rocky Mountain juniper and smaller diameter Douglas-fir within the riparian zone. The width of the riparian zone varies depending on valley type, landform and vegetation, but is generally less than 100' wide
- Depending on the tool(s) used, a range of 80 – 95% mortality of targeted conifer trees 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 conifer treatments.
- Mechanical treatment would consist of cutting down or masticating the targeted conifer trees with chainsaws or mechanical equipment (including, but not limited to feller/buncher, masticator). Some of the felled conifer trees would be left on site to provide a browse barrier and stream bank protection. The felled trees that are left on site would be oriented along the stream bank and not left across or within the high water mark of the stream channel.
- Mechanical equipment would not get closer than 20' from the stream and would operate only under frozen or dry (<20% moisture) conditions. Access into the riparian zone would be perpendicular to the stream. If equipment entry in the riparian zone is necessary only one track for entry and exit would be permissible. No vehicle turning in the riparian zone would be allowed.
- Severed Douglas-fir trees between 10" dbh to 18" dbh would be masticated, chipped or removed from the site to prevent the felled trees from drawing Douglas-fir bark beetle to the site.
- Trees to be removed from the site would be piled outside the SMZ and burned or removed using a masticator or chipper to mitigate excess biomass left on site.
- No mechanical equipment would be allowed on site during wet conditions or on hydric (wetland) soils.
- Herbicide treatment may include Spike 20P or Spike 80 DF under the drip line, Tordon 22K applied around the basal bark of individual juniper trees or a "hack and squirt" treatment using Velpar or Tordon 22K. Labels would be strictly adhered to (i.e. distance from water, etc). Trees treated using herbicides would be left standing on site.
- Pre-treatment weed inventory/control and post treatment weed control would be completed within each unit.
- Prior to treatment implementation, 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.
- Cultural surveys would be completed prior to any treatments using mechanical equipment.
- Effectiveness monitoring would be established in each treatment unit (refer to Appendix B for details)

Table 2.2: Riparian Conifer Treatments

Unit Name	Allotment	Reach Name & #	Miles	Objective(s)*	Treatment Type(s)
DAV	Barton Gulch	Davey Creek 827	~1.0	↓ conifer to improve riparian function and water quality and enhance biodiversity	Mechanical, RX (piles), herbicides. In approx. lower 1.0 mile of reach 827
BG	Barton Gulch	Barton Gulch 805	.65	↓ conifer to improve riparian function and water quality and enhance biodiversity.	Mechanical, RX (piles), herbicides.
JCT	Idaho Jack	Jack Creek tributary 856	.53	↓ conifer to restore riparian function, increase aspen and enhance biodiversity.	Mechanical, RX fire (piles)
NFGH	Greenhorn Unallotted	North Fork Greenhorn Creek 841	1.51	↓ conifer to maintain riparian function and biodiversity and improve fisheries habitat.	Mechanical, RX fire (piles)
SFGH	Greenhorn Unallotted	South Fork Greenhorn Creek 840	.58	↓ conifer to maintain riparian function and biodiversity and improve fisheries habitat.	Mechanical, RX fire (piles)
IDA	Idaho-Jack	Idaho Creek 851	~.25	↓conifer to improve riparian health and fisheries habitat and enhance biodiversity.	Mechanical, RX fire (piles). In approx. lower .25 miles of the reach.
SWT	Belmont	Sweetwater Creek tributary 885	.29	↓ juniper to restore riparian function and enhance biodiversity.	Mechanical, RX fire (piles), herbicides, seeding.
WIL	Davey Creek	Williams Creek 2404	.16	↓ juniper to restore riparian function and enhance biodiversity	Mechanical, RX fire (piles) and/or herbicides
TOTAL MILES			**~4.81**		

* Abbreviations: ↑=increase ↓=decrease

Special Status Species

Special Status Plants (including five needle pine)

- Planting of whitebark and/or limber pine seeds or seedlings may be completed on a case-by-case basis in suitable habitats including, but not limited to: areas burned by wildfire, areas that have experienced extensive over-story mortality from mountain pine beetle and/or white pine blister rust, areas with low age class diversity, or where natural regeneration is not occurring within existing five needle pine habitat.
- Competing conifers may be cut within the immediate vicinity of healthy whitebark and/or limber pine trees to reduce the likelihood of being damaged in the event of a wildfire.
- Where natural whitebark pine regeneration is establishing, dead trees may be hand felled to protect against trampling (wildlife and/or livestock) in areas of concern. This would be isolated to small areas less than one acre in size and within areas that protection of the regeneration is a high priority (i.e. where mature tree mortality from MPB is high).

2.3.4 Description of Alternative B

Livestock Management
Livestock management changes are being proposed for six grazing allotments in which current and/or historic livestock use has been determined to be one of the causal factors in at least one Rangeland Health Standard not being met. These allotments are: Barton Gulch, Belmont, Fossil Basin, Garden Creek, Garnet and Idaho Jack. In addition to the actions described above under 2.3.3, one or a combination of the following actions would be implemented: administrative changes, modification of grazing management plans, the construction or modification of range improvement projects, and/or the implementation of vegetative treatments.

This EA is also an opportunity to adjust grazing management plans on allotments that met all Five Land Health Standards, but have livestock related impacts to localized areas. Two grazing allotments are in this category: Davey Creek and Idaho Isolated.

The North Fork AMP grazing allotment met all five Land Health Standards in 2008 (East Bench Assessment Report; December 2008) and again in 2013 (Middle Ruby Assessment Report; Dec. 2013). However, in response to the BLM's scoping request for input by all affected parties, the grazing lessee for the allotment has requested the BLM consider an adjustment to the season of authorized use. Changes for the North Fork AMP are proposed under Alternative B.

Please refer to the allotment maps 3-8 in Appendix A to see the location and extent of the proposed rangeland improvement projects and administrative actions.

<u>Barton Gulch #10490 (map3)</u>
Grazing Management:

- The allotment would be completely rested every third grazing season, which would reduce forage harvested and impacts to riparian areas by 33% over three years.
- The number of authorized cattle/pairs would be reduced from 138 to 100.
- If the lessee runs the full authorized number of cattle/pairs (100), the period of use would be 45 days long. If the lessee choses to run 80 or fewer animal units, the period of use would be increased up to a maximum of 55 days.
- Season of use would begin on July 1 and end August 24 (55 day window).
- Initial turn out would alternate annually between the Davey Creek and Barton Gulch drainages (pastures). Pastures would be used for approximately half of each grazing season.
- Reflecting the reduction in livestock numbers, active AUMs would be reduced from 52 to 40). Twelve AUMs would be held in suspension.

Projects:

No projects proposed.

Table 2.3: Current Terms and Conditions for Barton Gulch allotment

Allotment/ Category	Number/Kind	Begin Date	End Date	% Public Land	Active AUMs
Barton Gulch I	138 cattle	06/15	07/30	25	52

Table 2.4: Proposed Terms and Conditions for Barton Gulch allotment; Alternative B

Allotment/ Category	Number/Kind	Year	Begin Date	End Date	% Public Land	Active AUMs
Barton Gulch I	100 cattle	2015	07/01	08/24	25	40
		2016	07/01	08/24		
		2017	REST			

<u>Belmont #10469 (map #4)</u>

Grazing Management:

- North 3 pasture:
  - The North 3 pasture would be rested every third grazing season, which would decrease riparian use and associated impacts by 33% during the three year grazing cycle.
  - The grazing use period would begin on 07/15 and end 09/08 (55 days).
- South 1, South 2 and Upper Sage pastures:
  - These three pastures would continue to be used in a three pasture rest-rotation system in the spring. Two pastures would be used and one rested annually.
  - Season of use in these pastures would be reduced by 10 days. The period of use would begin 05/15 and end on 07/05 (51 days).
- Lower Sage pasture
  - Terms and conditions in the Lower Sage pasture would be unchanged.

Projects:

- A riparian exclosure fence around the lower portion of stream reach #885 in the Lower Sage pasture would be constructed.
- The debris associated with the abandoned water development located on BLM land on reach #885 would be cleaned up.
- If sufficient water flow is present (>3 gpm), the spring at the head of reach #422 in the North 3 pasture would be developed. The project would include placing a headbox in the ground to gather water from the spring source, a small fence exclosure to protect the spring source and a short buried pipeline (200-300 feet) to a water trough on a flat bench southeast of the spring.
- A corridor fence, with a water gap, would be constructed on reach #822, Upper Cottonwood Creek.
- The Smith-Williams fence, project # 0154, located adjacent to Cottonwood Creek, reach #891, would be removed and a new post and rail fence installed along the lower end of the reach (approximately 0.4 miles). The new fence would be located on the west side of the stream in the Belmont allotment. The upper portion of the fence would be repaired/rebuilt as needed on the east side of the creek in the Garden Creek allotment.

Table 2.5: Current Terms and Conditions for the Belmont allotment

Allotment/ Category	Pasture	Number/ Kind	Year	Begin Date	End Date	% Public Land	Active AUMs
Belmont I	South 1	264 cattle	2012	05/10	07/10	62	334
			2013	REST			
			2014	05/10	07/10		
	South 2	242 cattle	2012	05/10	07/10	68	335

			2013	05/10	07/10		
			2014	REST			
	Upper Sage	448 cattle	2012	REST		25	228
			2013	05/10	07/10		
			2014	05/10	07/10		
	North 3	109 cattle	All	07/15	09/30	100	280
	Lower Sage	180 cattle	All	10/01	12/15	25	112

Table 2.6: Proposed Terms and Conditions for the Belmont allotment; Alternative B

Allotment/ Category	Pasture	Number/ Kind	Year	Begin Date	End Date	% Public Land	Active AUMs
Belmont I	South 1	264 cattle	2015	05/15	07/05	62	274
			2016	REST			
			2017	05/15	07/05		
	South 2	242 cattle	2015	05/15	07/05	68	276
			2016	05/15	07/05		
			2017	REST			
	Upper Sage	448 cattle	2015	REST		25	188
			2016	05/15	07/05		
			2017	05/15	07/05		
	Lower Sage	180 cattle	All	10/01	12/15	25	112
	North 3	109 cattle	2015	07/15	09/08	100	197
			2016	07/15	09/08		
			2017	REST			

<u>Davey Creek #10497 (map#5)</u>

Grazing Management:

- The official allotment boundary would be updated/corrected to include approximately 646 acres in Alder Gulch that is currently fenced in with the allotment.
- The number of AUMs on public land in the allotment would remain 351.
- Spring Pasture
  - A fence would be constructed to divide the Spring pasture, containing Dryden Creek, into two units: Upper and Lower.
  - Grazing use in the Upper and Lower pastures would be limited to two of three seasons. Each would be rested one year in three.
  - The Lower Spring pasture would be used for up to 21 days in the first year (2015), and the Upper Spring pasture rested. The Upper pasture would be used for up to 21 days in second year (2016), and the Lower pasture rested. Both pastures would be authorized for grazing in the third year of the plan (2017) for up to 28 total days. The three year cycle would begin again in 2018.
  - The number of animal units (AU), cow/calf pairs, in the Spring pasture would be limited to 72.
  - Season of use in the Spring Pasture would begin on 07/01 and end no later than 07/28 (years when both Upper and Lower pastures used).
- Davey Creek Pasture
  - Season of use would be 07/01-10/15.

- Up to 100 AUs would be authorized to use the pasture for most of July, with an additional 72 AUs authorized after the annual period of use in the Spring pasture ends.

Projects:

- Pasture division fence would be constructed in the Spring pasture; located in section 36, T6S, R4W. The 4 strand barbed wire fence would be approximately one-half mile long.
- The Dryden Creek spring development, BLM project #06434, would be re-constructed.
- A riparian exclosure fence around reach #829 would be constructed.
- If BLM determines it is feasible, a second trough, and extension pipeline, would be added to the Davey #7 Spring development (BLM project #02401).

Table 2.7: Current Terms and Conditions for Davey Creek allotment

Allotment/ Category	Number/Kind	Begin Date	End Date	% Public Land	Active AUMs
Davey Creek I	172 cattle	07/01	10/15	58	351

Table 2.8: Proposed Terms and Conditions for Davey Creek allotment; Alternative B

Allotment/ Category	Number/ Kind	Pasture	Year	Begin Date	End Date	% Public Land	Active AUMs
Davey Creek I	172 cattle	Upper Spring	2015	REST		58	351
			2016	07/01	07/20		
			2017	07/14	07/28		
		Lower Spring	2015	07/01	07/20		
			2016	REST			
			2017	07/01	07/13		
		Davey Creek	Annual use	07/01	10/15		

<u>Fossil Basin #10667 (map #1)</u>

Grazing Management:

- The period of use would be changed from season long, to a two year deferred schedule. In odd years grazing would be from 06/01 to 08/15. In even years the period of use would be 08/15-10/29.
- Twelve cattle/pairs would be authorized to harvest the 31 public land AUMs.

Projects:

- No new projects.

Table 2.9: Current Terms and Conditions for Fossil Basin allotment

Allotment/ Category	Number/Kind	Begin Date	End Date	% Public Land	Active AUMs
Fossil Basin I	6	05/15	11/01	100	31

Table 2.10: Proposed Terms and Conditions for Fossil Basin allotment; Alternative B

Allotment/ Category	Number/Kind	Year	Begin Date	End Date	% Public Land	Active AUMs
Fossil Basin I	12	Even	08/15	10/29	100	31
		Odd	06/01	08/15		

Garden Creek #20479 (map #6)

Grazing Management:

- The number of authorized cattle would be 850 cow/calf pairs or equivalent animal units.
- Period of use would be 55 days annually. In even years the season of use would be 08/1-09/25. In odd years the season of use would be 08/26-10/20.
- The number of authorized AUMs on BLM administered land would be 723.
- Riding would be required to move cattle out of sensitive riparian habitat in all the major drainages: Mormon Creek, Peterson Creek, Garden Creek and Hinch Creek (Cottonwood Creek would be fenced).

Projects:

- Construct a riparian exclosure fence, with up to three water gaps, along approximately one mile of Cottonwood Creek from the cattle guard at the allotment boundary at section 18, T7S R5W to the private land boundary in section 19.
- The Hinch Creek spring would be protected with an exclosure fence constructed with wooden jacks and rails.
- Dismantle and remove the un-necessary/un-used portions of the upper Hinch Creek holding pasture fence complex.

Table 2.11: Current Terms and Conditions for Garden Creek allotment

Allotment/ Category	Number/Kind	Year	Begin Date	End Date	% Public Land	Active AUMs
Garden Creek I	1200 cattle	odd	08/01	09/15	50	1062
		even	08/26	10/10		

Table 2.12: Proposed Terms and Conditions for Garden Creek allotment; Alternative B

Allotment/ Category	Number/Kind	Year	Begin Date	End Date	% Public Land	Active AUMs
Garden Creek I	850 cattle	odd	08/01	09/25	50	768
		even	08/26	10/20		

Garnet #20492 (map #1)

Grazing Management:

- The allotment category would change from Custodial (C) to Improve (I).
- The percent public land would change from 100% to 59% to account for 510 acres of private land and 15 acres of State land within the 1,269 acre allotment.
- Period of use would be for 90 days (currently 123 days).
- The season of use would begin on 08/01 and end on 10/29.
- AUMs would remain 93.
- Because the grazing period would be reduced to 90 days, and the percentage of public land reduced to 59%, the number of authorized cattle would be increased 53 to harvest 93 AUMs of forage on public land.
- The entire allotment would be rested every third year, which would reduce forage harvested by 33% over three years.

Projects:

- No new projects.

Table 2.13: Current Terms and Conditions for Garnet allotment

Allotment/ Category	Number/Kind	Begin Date	End Date	% Public Land	Active AUMs
Garnet C	23 cattle	08/01	12/01	100	93

Table 2.14: Proposed Terms and Conditions for Garnet allotment; Alternative B

Allotment/ Category	Number/Kind	Year	Begin Date	End Date	% Public Land	Active AUMs
Garnet C	53 cattle	2015	REST		59	93
		2016	08/01	10/29		
		2017	08/01	10/29		

<u>Idaho Isolated #20676 (map #7)</u>

Grazing Management:

- The allotment would be rested every other year, coinciding with the Montana Department of Natural Resources and Conservation (DNRC) grazing plan for the state land within the allotment. It would be rested in even years and grazed in odd years.
- Season of use would be 30 days, 08/15- 09/14.
- Number of cattle would be 40 cattle/pairs.

Projects:

- No new projects.

Table 2.15: Current Terms and Condition for Idaho Isolated allotment

Allotment/ Category	Number/Kind	Year	Begin Date	End Date	% Public Land	Active AUMs
Idaho Isolated C	13	1 (2014)	07/01	09/30	100	39
		2 (2015)	07/01	09/30		
		3 (2016)	REST			

Table 2.16: Current Terms and Condition for Idaho Isolated allotment; Alternative B

Allotment/ Custodial	Number/Kind	Year	Begin Date	End Date	% Public Land	Active AUMs
Idaho Isolated C	40	1 (2015)	08/15	09/14	100	39
		2 (2016)	REST			

<u>Idaho Jack #20499 (map#8)</u>

Grazing Management:

- The allotment would be divided into two pastures: Idaho Creek pasture and Jack Creek pasture (see projects below).
- The three year rest-rotation grazing season would limit use in each pasture to 30 days, two of three years (60 days total). The pasture grazed first in year one would be grazed second in year two.
- Season of use would begin on July 10 and end on September 9.
- The entire allotment would be rested in year three, which would reduce forage harvested and impacts to riparian areas by 33%.
- The number of cattle/pairs would be 250.
- Percent public land would change from 64% to approximately 80%. The precise number would be determined after BLM/private boundary fence is completed.

Projects:

- A boundary fence between private and public land would be constructed. The lessee or their contractor would be required to complete this fence prior to the 2015 grazing season. The fence would be run north and south along common boundaries between sections 22 and 23, 27 and 26, 34 and 35, T7S R4W. To allow cattle access to water, a portion private land in sections 27 and 34 would be fenced in with BLM land. The BLM would work cooperatively with the private land owner to ensure that the existing private boundary fence in the southern portion of the allotment (sections 11 and 2, T8S, R4W), would be reconstructed and/or maintained as necessary to control livestock access to the public land.
- A pasture division fence would be constructed between the Idaho and Jack Creek drainages. The lessee, or their contractor, would be required to complete this project prior to the 2016 grazing season. Beginning at the Forest Service boundary the fence would run WSW through portions of sections 36 (T7S R4W) and sections 1 & 2 (T8S R4W).
- The spring located in the NE ¼ of section 25, T7S R4W, in the Idaho Creek pasture would be developed, if it is determined by BLM technical staff that sufficient water flow is present (> 3 gpm).
- Up to two small earthen "push up" dams would be considered north of Idaho Creek in the NE¼, section 25, T7S R4W.
- The BLM, Forest Service and grazing lessee would work cooperatively to maintain, re-construct and/or extend the common boundary fence between BLM and Forest Service administered land (T8S R4W sections 1, 12 and 13).

Table 2.17: Current Terms and Condition for Idaho Jack allotment

Allotment/ Category	Number/Kind	Begin Date	End Date	% Public Land	Active AUMs
Idaho Jack I	375	07/01	07/31	64	400
	125	08/01	09/28		

Table 2.18: Proposed Terms and Conditions for Idaho Jack allotment; Alternative B

Allotment/ Category	Number/ Kind	Pasture	Year	Begin Date	End Date	% Public Land	Active AUMs
Idaho Jack I	250 cattle	Idaho Cr.	1 (2015)	07/10	08/09	81	400
			2 (2016)	08/10	09/09		
			3 (2017)	REST			
		Jack Cr.	1 (2015)	08/10	09/09		
			2 (2016	07/10	08/09		
			3 (2017)	REST			

<u>North Fork AMP (map #1)</u>

Grazing Management

- Dormant season of use (winter) two out of three grazing seasons; 12/20-02/28.
- Once every third grazing season the period of use would be split to include 30 days during the summer season; 08/03-09/01, and 37 days during the dormant season; 01/23-02/28.
- The number of authorized indigenous species (bison) animal units would be 395.
- The percent public land within the allotment would increase from 12% to 24%.

Projects:

No new projects

Table 2.19: Current Terms and Condition for North Fork AMP allotment

Allotment/ Category	Number/Kind	Begin Date	End Date	% Public Land	Active AUMs
North Fork AMP M	371 Indigenous	012/01	04/30	12	222

Table 2.20: Proposed Terms and Condition for North Fork AMP allotment; Alternative B

Allotment/ Category	Number/Kind	*Grazing and Billing Year	Begin Date		End Date		# Days	% Public Land	Active AUMs
North Fork AMP M	395 Indigenous	2015	12/20/15		02/28/16		71	24	222
		2016	Summer	Winter	Summer	Winter	67		
			08/03/16	01/23/17	09/01/16	02/28/17			
		2017	12/20/17		02/28/18		71		

***The grazing season and billing period for all BLM allotments begins on March 1 of the year and ends on February 28 the following calendar year. The season of use for the North Fork AMP spans two calendar years, but only one grazing/billing cycle. Accordingly, the number of AUMs harvested under Alternative B are calculated for a grazing season and billing cycle, not a calendar year.**

Forest and Woodland Treatments

Commercial Harvest

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. Non-commercial mechanical treatments and/or prescribed fire would also be allowed to reduce residual slash after harvest activities, promote aspen, and reduce conifer expansion into aspen, sagebrush and grasslands.

The MRRW, particularly the Barton Gulch/Idaho/Davey drainages, were identified in the Dillon RMP as high priority for forest management. Maximum treatment acres within each drainage are proposed.

Table 2.21 outlines by drainage the proposed treatment acres, objectives, miles of temporary road, number of crossings and the affected allotments under Alternative B. Treatable acres are shown on Maps 2, Appendix A.

Table 2.21: Forest and Woodland Treatments by Drainage, Alternative B

Drainage	Allotment(s)	Acres	Objective(s)	Miles of Temporary Road	Crossings
Cottonwood Creek	Belmont/Garden Creek	260	Salvage dead/dying timber, Decrease Future Insect & Disease Hazard, Increase Vigor & Stand Diversity of age/size classes, Maintain Late Seral Stands, Aspen Enhancement	1.5	--
Davey Creek	Davey Creek	415		2	--
Dryden Creek	Davey Creek	--		--	--
Barton Gulch	Davey Creek/Barton Gulch	695		5.5	2
Idaho Creek	Idaho Jack	--		--	--
Jack Creek	Idaho Jack	--		--	--
TOTAL		1,370		9	2

Also see section 2.3.3, Features Common to all action Alternatives for additional design features.

Up to 1,370 acres within the Cottonwood, Davey, Dryden, Barton Gulch, Idaho, and Jack Creek drainages are proposed for commercial harvest under Alternative B. The silvicultural prescription would focus on the salvage harvest of dead and dying trees, removing up to 90% of dead trees. Up to 100% of green trees with evidence of successful beetle attack would also be harvested and removed. In mixed conifer and Douglas-fir stands, green trees would be thinned across all diameters < 32" DBH, with focus on leaving those with healthy crowns and minimal budworm damage to create a residual stand with an average basal area of 80ft^2/acre with a range from 20-100ft^2/acre.

Where viable aspen stands exist (defined as five or more live stems greater than 1" DBH and/or greater than 5' tall within a one hundred foot radius), all merchantable size conifers < 32" DBH within one hundred feet from the edge of the aspen stand would be cut. Where possible, non-merchantable conifers within the same areas would be cut and left on-site as a browse barrier.

Healthy spruce and five needle pines (limber and/or whitebark pine) would not be cut unless they were deemed a safety hazard. At a minimum, an average of two to five existing snags or green recruitment snags would be left per acre within treatment units. Priority of snags to be left would be given to those with evidence of wildlife use or with wildlife-use characteristics such as forks, broken tops, or large horizontal branches. Scattered patches of uncut timber would be left within treatment units to provide hiding cover and break up sighting distances.

Up to 9 miles of temporary road construction would be required under Alternative B. Up to 2 crossings would be required within the Barton Gulch drainage: one would be located on the main Barton Gulch Creek, the other would be installed on a tributary Barton Gulch Creek.

Conifer Expansion Treatments

Up to 3,187 acres of non-commercial mechanical/prescribed fire treatment is proposed under Alternative B. Conifer expansion treatments utilizing mechanical methods and/or prescribed fire

would focus on areas where conifers have most noticeably expanded into sagebrush/grassland compared to historic aerial photographs and field reconnaissance. The primary goal would be to kill/remove 60% or more of conifers less than 30 feet tall. Treatment methods would be a combination of cutting (lop and scatter) and/or prescribed fire. When using prescribed fire to reduce conifer expansion into sagebrush habitat, an emphasis would be placed on maintaining 50% or more of the mature sagebrush canopy cover on a drainage (HUC 6) basis. Prescribed fire treatments that include privately owned land adjacent BLM-administered land would only be considered where treating the private land facilitates the overall project. Written landowner approval would be required prior to burn plan development.

Actual prescribed fire treatment boundaries within the units identified on Map 2 would be based on topographic features such as ridges and drainages, and man-made features such as trails and roads. Not all areas identified within unit boundaries would be treated.
Acreages shown below in Table 2.22 include proposed treatments on both private and BLM administered land.

Table 2.22: Conifer Expansion Treatment Units, Alternative B

Unit Name	Allotment	Acres	Objective(s)	Treatment Type(s)
Laurin Canyon	Laurin Canyon	104	Reduce conifer expansion into sagebrush/grassland	Non-commercial mechanical/Broadcast Rx fire
Cottonwood	Garden Creek	355		
Dryden	Davey Creek	123		
Davey West	Davey Cr/Barton Gulch	254		
Davey East	Davey Creek	648		
Idaho Creek	Idaho Jack	506		
Jack North	Idaho Jack	255		
Jack South	Idaho Jack	581		
South Greenhorns	Greenhorn Unallotted	361		
TOTAL		**3,187**		

Travel Management
Cottonwood Creek road has a proposed change to address a lack of parking areas and to reflect and accommodate the existing use of the area. The segment of Cottonwood Creek Road is located in Township 7 South, Range 6 West, and Section 12 (map 4, Appendix A). The proposed action would designate an open route (yearlong) that branches off of the primary road just north of the hairpin corner. The newly opened route would head east/southeast to an open meadow where a parking area would be created. This area receives substantial motorized vehicle use and the meadow is a popular parking area during hunting season. The road leading to the meadow may need to be improved by heavy machinery to be a viable option.

One travel route in the Hinch Creek drainage (T6S R5W, section 28) would be re-designated from closed to open to wheeled motorized vehicle use, yearlong (map 6, Appendix A). This is to correct a mapping error in the 2006 Dillon RMP. The route is within the boundary of the Ruby Mountains WSA, although it is outside the area that is proposed to become designated Wilderness. The route is currently closed at the western boundary of section 27 as it leaves private property. The route travels roughly 1/2 mile in a northwest direction following Hinch

Creek across the northeast quarter of section 28. The road terminates at a designated parking area near the confluence of stream reaches 842 and 872, just south of the section 21.

2.3.5 Description of Alternative C

Livestock Management
There are some proposed administrative, grazing management and project features listed under alternative C that are carried over from alternative B. Please, refer to table 2.4, *Comparison of Proposed Livestock Grazing or Administrative Alternatives by Allotment*, to compare specific proposals under alternatives A, B and C.

Barton Gulch #10490 (map #3)
Grazing Management:

- The number of authorized cattle would be reduced from 138 to 80 cow/calf pairs.
- The Season of Use would be 30 days long, from 07/01 to 07/31.
- Reflecting the reduction in livestock numbers and duration of grazing season, active AUMs would be reduced from 52 to 20. Thirty two AUMs would be held in suspension.
- Initial turn out would alternate annually between the Davey Creek and Barton Gulch drainages (pastures). Pastures would be used for approximately half of each grazing season.
- The allotment would be completely rested every third grazing season, which would reduce forage harvested and impacts to riparian areas by 33% over three years.

Projects:

- Approximately three quarters of a mile long drift fence, adjacent to the Barton Gulch road in section 19, T7S, R3W, would be constructed.

Table 2.23: Current Terms and Conditions for Barton Gulch allotment

Allotment/ Category	Number/Kind	Begin Date	End Date	% Public Land	Active AUMs
Barton Gulch I	138 cattle	06/15	07/30	25	52

Table 2.24: Proposed Terms and Conditions for Barton Gulch allotment; Alternative C

Allotment/ Category	Number/Kind	Year	Begin Date	End Date	% Public Land	Active AUMs
Barton Gulch I	80 cattle	2015	07/01	07/31	25	20
		2016	07/01	07/31		
		2017	REST			

Belmont #10469 (map #4)
Grazing Management:

- North 3 pasture:
  - Beginning in 2015 the North 3 pasture would be rested every third grazing season.
  - Season of use would be reduced to 30 days; beginning 07/15 and ending 08/14.
- South 1, South 2 and Upper Sage pastures:
  - These three pastures would continue to be used in a three pasture rest-rotation system in the spring. Two pastures would be used and one rested annually.

- Season of use in these pastures would be reduced by 14 days. The period of use would begin 05/15 and end on 07/02 (48 days).

- Lower Sage pasture
  - The period of use in Lower Sage pasture would be reduced to 60 days (currently 76 days). Season of use would be 10/01 to 11/30.

Projects:

- A riparian exclosure fence around the lower portion of stream reach #885 in the Lower Sage pasture would be constructed.
- The debris associated with the abandoned water development located on BLM land on reach #885 would be cleaned up.
- If sufficient water flow is present (>3 gpm), the spring at the head of reach #422 in the North 3 pasture would be developed. The project would include placing a headbox in the ground to gather water from the spring source, a small fence exclosure to protect the spring source and a short buried pipeline (200-300 feet) to a water trough on a flat bench southeast of the spring.
- A corridor fence, with a water gap, would be constructed on reach #822, Upper Cottonwood Creek.
- The Smith-Williams fence, project # 0154, located adjacent to Cottonwood Creek, reach #891, would be removed and a new post and rail fence installed along the lower end of the reach (approximately 0.4 miles). The new fence would be located on the west side of the stream in the Belmont allotment. The upper portion of the fence would be repaired/rebuilt as needed on the east side of the creek in the Garden Creek allotment.

Table 2.25: Current Terms and Conditions for the Belmont allotment

Allotment/ Category	Pasture	Number/ Kind	Year	Begin Date	End Date	% Public Land	Active AUMs
Belmont I	South 1	264 cattle	2012	05/10	07/10	62	334
			2013	REST			
			2014	05/10	07/10		
	South 2	242 cattle	2012	05/10	07/10	68	335
			2013	05/10	07/10		
			2014	REST			
	Upper Sage	448 cattle	2012	REST		25	228
			2013	05/10	07/10		
			2014	05/10	07/10		
	North 3	109 cattle	All	07/15	09/30	100	280
	Lower Sage	180 cattle	All	10/01	12/15	25	112

Table 2.26: Proposed Terms and Conditions for the Belmont allotment; Alternative C

Allotment/ Category	Pasture	Number/ Kind	Year	Begin Date	End Date	% Public Land	Active AUMs
Belmont I	South 1	264 cattle	2015	05/15	07/02	62	258
			2016	REST			
			2017	05/15	07/02		
	South 2	242 cattle	2015	05/15	07/02	68	259
			2016	05/15	07/02		
			2017	REST			
	Upper Sage	448 cattle	2015	REST		25	176
			2016	05/15	07/02		
			2017	05/15	07/02		
	Lower Sage	180 cattle	All	10/01	11/30	25	89
	North 3	109 cattle	2015	REST		100	107
			2016	07/15	08/14		
			2017	07/15	08/14		

<u>Davey Creek #10497 (map#5)</u>

Grazing Management:

- The official allotment boundary would be updated/corrected to include approximately 646 acres in Alder Gulch that is currently fenced in with the allotment.
- The number of AUMs on public land in the allotment would remain 351.
- The entire allotment would be completely rested every third grazing season.
- Spring Pasture
  - Spring pasture would be used for up to 28 days two years out of three.
  - The number of animal units (AU), cow/calf pairs, in the Spring pasture would be limited to 72.
  - Season of use in the Spring Pasture would begin on 07/01 and end on 07/28.
- Davey Creek Pasture
  - Season of use would be 07/01-10/15.
  - Up to 100 AUs would be authorized to use the pasture in July, with an additional 72 AUs authorized after the annual period of use in the Spring pasture ends.

Projects:

- The Dryden Creek spring development, BLM project #06434, would be re-constructed.
- If it is determined that sufficient water is available a second trough would be added to the Dryden Creek spring development.
- A riparian exclosure fence around reach #829 would be constructed.
- If BLM determines enough water is available, a second trough, and extension pipeline, would be added to the Davey #7 spring development (BLM project #02401).

Table 2.27: Current Terms and Conditions for Davey Creek allotment

Allotment/ Category	Number/Kind	Begin Date	End Date	% Public Land	Active AUMs
Davey Creek I	172 cattle	07/01	10/15	58	351

Table 2.28: Proposed Terms and Conditions for Davey Creek allotment; Alternative C

Allotment/ Category	Number/ Kind	Pasture	Season/ Year	Begin Date	End Date	% Public Land	Active AUMs
Davey Creek I	172 cattle	Spring	1 (2015)	07/01	07/28	58	351
			2 (2016)	REST			
			3 (2017)	07/01	07/28		
		Davey Creek	1 (2015)	07/01	10/15		
			2 (2016)	REST			
			3 (2017)	07/01	10/15		

Fossil Basin #10667 (map #1)

Grazing Management:

- The period of use would be changed from season long, to a two year deferred schedule. In odd years grazing would be from 06/01 to 08/15. In even years the period of use would be 08/15-10/29.
- Twelve cattle/pairs would be authorized to harvest the 31 public land AUMs.
- The allotment would be rested every third grazing season beginning in 2015.

Projects:

- No new projects.

Table 2.29: Current Terms and Conditions for Fossil Basin allotment

Allotment/ Category	Number/Kind	Begin Date	End Date	% Public Land	Active AUMs
Fossil Basin I	6	05/15	11/01	100	31

Table 2.30: Proposed Terms and Conditions for Fossil Basin allotment; Alternative C

Allotment/ Category	Number/Kind	Year	Begin Date	End Date	% Public Land	Active AUMs
Fossil Basin I	12	2015	REST		100	31
		2016	08/15	10/29		
		2017	06/01	08/15		

Garden Creek #20479 (map #6)

Grazing Management:

- The number of authorized cattle would remain 1200 cow/calf pairs or equivalent animal units.
- Period of use would be 45 days annually if between 801 and 1200 pairs are grazed in allotment.
- Period of use would be 55 days annually if cattle numbers are reduced to less than 800 pairs.
- In even years the season of use would be 08/1-09/15 (full numbers) or 08/01-09/25 (reduced numbers). In odd years the season of use would be 08/26-10/13 (full numbers), and 08/26-10/23 (reduced numbers).
- Allotment will be completely rested every third season.
- Riding would be required to move cattle out of sensitive riparian habitat in all the major drainages: Mormon Creek, Peterson Creek, Garden Creek, Hinch Creek and Cottonwood Creek.

Projects:

- Construct a riparian exclosure fence isolating reach #823, with up to three water gaps, along approximately one mile of Cottonwood Creek from the cattle guard at the allotment boundary at section 18, T7S R5W to the private land boundary in section 19.
- The Hinch Creek spring would be protected with an exclosure fence constructed with wooden jacks and rails.
- Dismantle and remove the un-necessary/un-used portions of the upper Hinch Creek holding pasture fence complex.

Table 2.31: Current Terms and Conditions for Garden Creek allotment

Allotment/ Category	Number/Kind	Year	Begin Date	End Date	% Public Land	Active AUMs
Garden Creek I	1200 cattle	even	08/01	09/15	50	1062
		odd	08/26	10/10		

Table 2.32: Proposed Terms and Conditions for Garden Creek allotment; Alternative C

Allotment/ Category	Number/Kind	Year	Begin Date	End Date	% Public Land	Active AUMs
Garden Creek I	000- 800 cattle	1 (2015)	08/01	09/25	50	1062*
		2 (2016)	08/26	10/20		
		3 (2017)	REST			
	801-1200 cattle	1 (2015)	08/01	09/25		
		2 (2016)	08/26	10/10		
		3 (2017)	REST			

*Because the number of livestock using the allotment will vary annually, the number of total AUMs of forage harvested will fluctuate also, but would not exceed 1062). The number of permitted AUMs will remain 1,062, but billing will reflect the number of AUMs of forage actually harvested based on annual Actual Use Reports.

<u>Garnet #20492 (map #1)</u>

Grazing Management:

- The allotment category would change from Custodial (C) to Improve (I).
- The percent public land would change from 100% to 59% to account for 510 acres of private land and 15 acres of State land within the 1,269 acre allotment.
- The entire allotment would be rested every third year.
- Season of use would be reduced to 75 days. The seasonal grazing period would begin on 08/01 and end on 10/15.
- AUMs would remain 93, but because the grazing period would be reduced to 75 days, and the percentage of public land reduced to 59%, the number of authorized cattle would be increased 64 to harvest 93 AUMs of forage on public land.

Projects:

- No new projects.

Table 2.33: Current Terms and Conditions for Garnet allotment

Allotment/ Category	Number/Kind	Begin Date	End Date	% Public Land	Active AUMs
Garnet C	23 cattle	08/01	12/01	100	93

Table 2.34: Proposed Terms and Conditions for Garnet allotment; Alternative C

Allotment/ Category	Number/Kind	Year	Begin Date	End Date	% Public Land	Active AUMs
Garnet C	64 cattle	2015	REST		59	93
		2016	08/01	10/15		
		2017	08/01	10/15		

<u>Idaho Isolated #20676 (map #7)</u>

Grazing Management:

- A three year rest-rotation grazing schedule would be implemented. Early summer use in year one, followed by late summer use in year two, followed by complete rest.
- Period of use would be 45 days.
- Authorized cattle/pairs would increase to 26.
- AUM of forage authorized to harvest would remain at 39.

Projects:

- One mile allotment boundary fence would be constructed to isolate 320 acres of BLM land from State of Montana DNRC land. Fence would be located in the middle of section 28, T7S R4W.
- A well would be drilled and a trough put in place to provide livestock water.

Table 2.35: Current Terms and Condition for Idaho Isolated allotment

Allotment/ Category	Number/Kind	Season (year)	Begin Date	End Date	% Public Land	Active AUMs
Idaho Isolated C	13 cattle	1 (2014)	07/01	09/30	100	39
		2 (2015)	07/01	09/30		
		3 (2016)	REST			

Table 2.36: Current Terms and Condition for Idaho Isolated allotment; Alternative C

Allotment/ Custodial	Number/Kind	Season (year)	Begin Date	End Date	% Public Land	Active AUMs
Idaho Isolated C	26 cattle	1 (2015)	07/01	08/15	100	39
		2 (2016)	08/15	09/29		
		3 (2017)	REST			

<u>Idaho Jack #20499 (map #8)</u>

Grazing Management:

- The livestock grazing lease for the Idaho Jack allotment would be canceled. The 4,885 acres public land would be designate as unallotted for livestock grazing.
- The 400 AUM preference attached to the lessees base property would be cancelled.

Projects:

- A boundary fence between private and public land would be constructed. The fence would be run generally north and south along common boundaries in sections 23, 26 and 35, T7S R4W and sections 2 and 11, T8S R4W. Two 160 acre private parcels in section 23, T7S R4W and section 2, T8S R4W would also be fenced on ownership boundaries. Total length of the fence would be approximately 6.75 miles.

Table 2.37: Current Terms and Condition for Idaho Jack allotment

Allotment/ Category	Number/Kind	Begin Date	End Date	% Public Land	Active AUMs
Idaho Jack I	375	07/01	07/31	64	400
	125	08/01	09/28		

Table 2.38: Proposed Terms and Conditions for Idaho Jack allotment; Alternative C

Allotment/ Category	Number/ Kind	Begin Date	End Date	% Public Land	Active AUMs
Idaho Jack I	0	No authorized season of use		100	0 (400 suspended)

Forest and Woodland Treatments

Commercial Harvest

Under Alternative C, the areas identified for forest and woodland treatments are carried forward as proposed in Alternative B, and additional treatment areas are proposed. Alternative C 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. Non-commercial mechanical treatments and/or prescribed fire would also be allowed to reduce residual slash after harvest activities, promote aspen, and reduce conifer expansion into aspen, sagebrush and grasslands.

Table 2.39 outlines by drainage the proposed treatment acres, objectives, miles of temporary road, number of crossings and the affected allotments under Alternative C. Treatable acres are shown on Map 2, Appendix A.

Table 2.39: Forest and Woodland Treatments by Drainage, Alternative C

Drainage	Allotment(s)	Acres	Objective(s)	Miles of Temporary Road	Crossings
Cottonwood Creek	Belmont/Garden Creek	260	Salvage dead/dying timber, Decrease Future Insect & Disease Hazard, Increase Vigor & Stand Diversity of age/size classes, Maintain Late Seral Stands, Aspen Enhancement	1.5	--
Davey Creek	Davey Creek	542		3	2
Dryden Creek	Davey Creek	421		3	1
Barton Gulch	Davey Creek/Barton Gulch	1243		13.5	4
Idaho Creek	Idaho Jack	560		6.5	2
Jack Creek	Idaho Jack	143		1.5	2
TOTAL		3,169		29	11

Also see section 2.3.3, Features Common to all action Alternatives, and the Forest and Woodland Treatments Description section under Alternative B for additional design features.

Up to 3,169 acres within the Cottonwood, Davey, Dryden, Barton Gulch, Idaho, and Jack Creek drainages are proposed for commercial harvest under Alternative C. Treatment areas proposed for commercial harvest under Alternative B (totaling 1,370 acres) are carried forward and included in the total acreage proposed for treatment under Alternative C.

Up to 29 miles of temporary road construction would be required under Alternative C. The installation of up to 11 crossings would be required: 1 on Davey Creek and one on a tributary to Davey Creek; 1 on Dryden Creek; 2 on Barton Gulch Creek and 2 on tributaries to Barton Gulch Creek; 1 on Idaho Creek and 1 on a tributary to Idaho Creek; 1 on Jack Creek and 1 on a tributary to Jack Creek.

Conifer Expansion Treatments

Design features, treatment descriptions, treatment units and objectives would remain the same As described in Alternative B, with the addition of the Garden Creek unit. Conifer expansion treatments proposed in Alternative C would include up to 4,568 acres.

Table 2.40: Conifer Expansion Treatment Units, Alternative C

Unit Name	Allotment	Acres	Objective(s)	Treatment Type(s)
Laurin Canyon	Laurin Canyon	104	Reduce conifer expansion into sagebrush/grassland	Non-commercial mechanical/Broadcast Rx fire
Cottonwood	Garden Creek	355		
Dryden	Davey Creek	123		
Davey West	Davey Cr./Barton Gulch	254		
Davey East	Davey Creek	648		
Idaho Creek	Idaho Jack	506		
Jack North	Idaho Jack	255		
Jack South	Idaho Jack	581		
South Greenhorns	Greenhorn Unallotted	361		
Garden Creek	Garden Creek	1,381		
TOTAL		**4,568**		

2.4 Summary Comparison of Alternative Actions

Nine of the thirteen grazing allotments in the watershed have proposed grazing management changes. Up to three management alternatives are compared in Table 2.41 for these allotments.

Table 2.41: Comparison of Proposed Livestock Grazing or Administrative Alternatives

Barton Gulch #10490	**Alternative A (No Action)**	**Alternative B**	**Alternative C**
Season of Use	06/15 – 07/30	07/01 – 08/24 (45 days use with 100 AUs, 55 days use with 80 AUs)	07/01 -07/31
Livestock Number and Kind	138 cattle	100 cattle	80 cattle
Active BLM AUMs	52	40	20
Grazing System	Annual use	Allotment rested every third year; (2017, 2020, 2023)	Allotment rested every third year; (2017, 2020, 2023)
Projects	None	None	1. A three quarter of a mile drift fence adjacent to the Barton Gulch road in section 19, T7S, R3W, would be constructed.

Belmont #10469	Alternative A (No Action)		Alternative B		Alternative C	
Season of Use	South 1	05/10 - 07/10	South 1	05/15 – 07/05	South 1	05/15 – 07/02
	South 2	05/10 - 07/10	South 2	05/15 – 07/05	South 2	05/15 – 07/02
	Upper Sage	05/10 - 07/10	Upper Sage	05/15 – 07/05	Upper Sage	05/15 – 07/02
	Lower Sage	10/01 - 12/15	Lower Sage	10/01 – 12/15	Lower Sage	10/01 – 11/30
	North 3	07/15 - 09/30	North 3	07/15 – 09/08	North 3	07/15 – 08/14
Livestock Number and Kind	South 1	264 cattle	South 1	264 cattle	South 1	264 cattle
	South 2	242 cattle	South 2	242 cattle	South 2	242 cattle
	Upper Sage	448 cattle	Upper Sage	448 cattle	Upper Sage	448 cattle
	Lower Sage	180 cattle	Lower Sage	180 cattle	Lower Sage	108 cattle
	North 3	109 cattle	North 3	109 cattle	North 3	109 cattle
Active BLM AUMs	1,288		1,047		889	
Grazing System	South 1	3 pasture rest-rotation	South 1	3 pasture rest-rotation	South 1	3 pasture rest-rotation
	South 2		South 2		South 2	
	Upper Sage		Upper Sage		Upper Sage	
	Lower Sage	Annual use	Lower Sage	Annual use	Lower Sage	Annual use
	North 3	Annual use	North 3	Pasture rested every third year; (2017, 2020, 2023)	North 3	Pasture rested every third year; (2017, 2020, 2023)
Projects	None		1. A riparian exclosure fence around the lower portion of stream reach #885 in the Lower Sage pasture would be constructed. 2. The debris associated with the abandoned water development located on BLM land on reach #885 would be cleaned up. 3. If sufficient water flow is present (>3 gpm), the spring at the head of reach #422 in the North 3 pasture would be developed. 4. A corridor fence, with a water gap, would be constructed on reach #822, Upper Cottonwood Creek. 5. The Smith-Williams fence, project # 0154, located adjacent to Cottonwood Creek, reach #891, would be removed and a new post and rail fence installed.		Same as Alternative B	
Davey Creek #10497	**Alternative A**		**Alternative B**		**Alternative C**	
Season of Use	07/01 – 10/15		Upper Spring Pasture	2015 REST	Spring Pasture	2015 07/01-07/28
				2016 07/01-07/20		2016 REST
				2017 07/14-07/28		2017 07/01-07/28

		Lower Spring Pasture	2015	07/01-07/20	Davey Creek Pasture	2015	07/01-10/15
			2016	REST		2016	REST
			2017	07/01-07/13			
		Davey Creek Pasture	07/01 – 10/15			2017	07/01-10/15
Livestock Number and Kind	172 cattle	172 cattle			172 cattle		
Active BLM AUMs	351	351			351		
Grazing System	Annual use	Upper and Lower Spring Pastures	3 year rest-rotation		Entire allotment on 3 year rest-rotation cycle		
		Davey Creek Pasture	Annual use				
Projects	none	1. The Dryden Creek Spring development # 06434, would be re-constructed. 2. A riparian exclosure fence around reach #829 would be constructed. 3. Consider a pipeline extension and second trough on Davey #7 Spring development (#02401). 4. Pasture division fence would be constructed in the Spring pasture; located in section 36, T6S, R4W.			1. The Dryden Creek Spring development, BLM project #06434, would be re-constructed. 2. If it is determined that sufficient water is available a second trough would be added to the Dryden Creek spring development. 3. A riparian exclosure fence around reach #829 would be constructed. 4. If BLM determines enough water is available, a second trough, and extension pipeline, would be added to the Davey #7 Spring development (BLM project #02401).		
Fossil Basin #10667	**Alternative A**	**Alternative B**			**Alternative C**		
Season of Use	05/15 – 11/01	Even years	08/15-10/29		2015	REST	
					2016	08/15-10/29	
		Odd years	06/01-08/15		2017	06/01-08/15	
Livestock Number and Kind	5 cattle	12 cattle			12 cattle		
Active BLM AUMs	31	31			31		
Grazing System	Annual use	Deferred use every other year			Allotment completely rested every third grazing season		

Projects	None	None	None		
Garden Creek #20479	**Alternative A**	**Alternative B**	**Alternative C**		
Season of Use	Even years: 08/26 – 10/10	Even years: 08/26 – 10/20 (55 days)	0 - 800 cattle	Yr. 1 (2015)	08/01 -09/25 (55 days)
				Yr. 2 (2016)	08/26 – 10/20 (55 days)
				Yr. 3 (2017)	REST
	Odd years: 08/01 – 09/15	Odd years: 08/01 – 09/25 (55 days)	801 - 1200 cattle	Yr. 1 (2015)	08/01 – 09/15 (45 days)
				Yr. 2 (2016)	08/26 – 09/25 (45 days)
				Yr. 3 (2017)	REST
Livestock Number and Kind	1200 cattle	850 Cattle	Up to 1200 cattle		
Active BLM AUMs	1062	768	Up to 1062		
Grazing System	Deferred Annual Use	Deferred Annual Use	3 year rest-rotation system: allotment completely rested every third grazing season		
Projects	None	1. Construct a riparian exclosure fence, with up to three water gaps, along approximately one mile of Cottonwood Creek (reach # 823). 2. The Hinch Creek spring would be protected with an exclosure fence constructed with wooden jacks and rails. 3. Dismantle and remove the un-necessary/un-used portions of the upper Hinch Creek holding pasture fence complex.	Same as Alternative B		
Garnet #20492	**Alternative A**	**Alternative B**	**Alternative C**		
Season of Use	08/01 – 12/01	08/01 – 10/29 (90 days)	08/01 – 10/15 (75 days)		
Livestock Number and Kind	23 cattle	53	64		

Active BLM AUMs	93	93		93	
Grazing System	Annual use	Allotment completely rested every third grazing season (2015, 2018, 2021, 2024)		Allotment completely rested every third grazing season (2015, 2018, 2021, 2024)	
Projects	None	None		None	
Administrative Actions	None	1. Percentage of public land would change from 100% to 59%. 2. Allotment category would change from C (custodial) to I (improve).		1. Percentage of public land would change from 100% to 59%. 2. Allotment category would change from C (custodial) to I (improve).	
Idaho Isolated #20676	**Alternative A**	**Alternative B**		**Alternative C**	
Season of Use	07/01 – 09/30	Even years	REST	2015	07/01 – 08/15
		Odd years	08/15 – 09/14	2016	08/15 – 09/29
				2017	REST
Livestock Number and Kind	13 cattle	40		26	
Active BLM AUMs	39	39		39	
Grazing System	Annual use	Allotment completed rested every other grazing season		Allotment completed rested every third grazing season	
Projects	None	None		1. One mile fence separating BLM and State DNRC land would be constructed. 2. A well would be drilled and trough installed to provide livestock water.	
Idaho Jack #20499	**Alternative A**	**Alternative B**		**Alternative C**	
Season of Use	07/01 – 09/28	Idaho Creek Pasture	2015	07/10-08/09	Lease not re-issued
			2016	08/10-09/09	
			2017	REST	
		Jack Creek Pasture	2015	08/10-09/09	
			2016	07/10-08/09	
			2017	REST	
Livestock Number and Kind	400 cattle	250 cattle		0	
Active BLM AUMs	400	400		0 (400 suspended)	

Grazing System	Annual use	3 year rest-rotation system; allotment completely rested every third grazing season.	Not Applicable
Projects	None	1. A boundary fence between private and public land would be constructed. The lessee or their contractor would be required to complete this fence prior to the 2015 grazing season. The fence would be run north and south along common boundaries between sections 22 and 23, 27 and 26, 34 and 35, T7S R4W. 2. A pasture division fence would be constructed between the Idaho and Jack Creek drainages. The lessee, or their contractor, would be required to complete this project prior to the 2016 grazing season. Beginning at the Forest Service boundary the fence would run WSW through portions of sections 36 (T7S R4W) and sections 1 & 2 (T8S R4W). 3. The spring located in the NE ¼ of section 25, T7S R4W, in the Idaho Creek pasture would be developed, if it is determined by BLM technical staff that sufficient water flow is present (> 3 gpm). 4. Up to two small earthen "push up" dams would be considered north of Idaho Creek in the NE¼, section 25, T7S R4W. 5. The BLM, Forest Service and grazing lessee would work cooperatively to maintain, re-construct and/or extend the common boundary fence between BLM and Forest Service administered land (T8S R4W sections 1, 12 and 13).	1. A boundary fence between private and public land would be constructed. The fence would be run generally north and south along common boundaries in sections 23, 26 and 35, T7S R4W and sections 2 and 11, T8S R4W. Two 160 acre private parcels in section 23, T7S R4W and section 2, T8S R4W would also be fenced on ownership boundaries.
Administrative Actions	None	1. Percent public land would change from 64% to approximately 80%. The precise number would be determined after BLM/private boundary fence is completed.	Public land would be designated as unallotted.
North Fork AMP #10482	**Alternative A**	**Alternative B**	**Alternative C**
***Season of Use**	12/01-04/30	2015: 12/20/15-02/28/16 2016: 08/03/16-09/01/16 and 01/23/16-02/28/17 2017: 12/20/17-02/28/18	Same as Alternative B
Livestock Number and Kind	371 Indigenous	395 Indigenous	395 Indigenous

Active BLM AUMs	222	222	222
Grazing System	Annual use	Deferred Rotation	Annual use
Projects	None	None	None
Administrative Actions	None	1. Change percent public land to 24%.	1. Change percent public land to 24%.

***The grazing season and billing period for all BLM allotments begins on March 1 of the year and ends on February 28 the following calendar year. The season of use for the North Fork AMP falls within two calendar years, but one grazing/billing cycle. Accordingly, the number of AUMs harvested under Alternative B are calculated for each grazing season and billing cycle, and not based on a particular calendar year.**

Table 2.42: Comparison of Forest and Woodland Treatments by Alternative

Drainage	**Allotment(s)**	**Acres**			**Miles of Temporary Road**			**Crossings**		
		Alt A	**Alt B**	**Alt C**	**Alt A**	**Alt B**	**Alt C**	**Alt A**	**Alt B**	**Alt C**
Cottonwood Creek	Belmont/Garden Creek	0	260	260	0	1.5	1.5	0	--	--
Davey Creek	Davey Creek	0	415	542	0	2	3	0	--	2
Dryden Creek	Davey Creek	0	--	421	0	--	3	0	--	1
Barton Gulch	Davey Creek/Barton Gulch	0	695	1243	0	5.5	13.5	0	2	4
Idaho Creek	Idaho Jack	0	--	560	0	--	6.5	0	--	2
Jack Creek	Idaho Jack	0	--	143	0	--	1.5	0	--	2
TOTAL		0	1370	3169	0	9	29	0	2	11

Table 2.43: Comparison of Conifer Expansion Treatment Units by Alternative

Unit Name	**Allotment**	**Alternative A**	**Alternative B Acres**	**Alternative C Acres**
Laurin Canyon	Laurin Canyon	0	104	104
Cottonwood	Garden Creek	0	355	355
Dryden	Davey Creek	0	123	123
Davey West	Davey/Barton G.	0	254	254
Davey East	Davey Creek	0	648	648
Idaho Creek	Idaho Jack	0	506	506
Jack North	Idaho Jack	0	255	255
Jack South	Idaho Jack	0	581	581
S. Greenhorns	Greenhorn Unallotted	0	361	361
Garden Creek	Garden Creek	0	0	1,381
TOTAL		**0**	**3,187**	**4,568**

Table 2.44: Comparison Travel Management Actions by Alternative

Travel Management (Designated Route changes, in miles)			
	Alternative A	**Alternative B**	**Alternative C**
Change to Open	0	~0.5 miles in Hinch Creek drainage, Garden Creek allotment. ~0.25 miles in Belmont North pasture, Belmont allotment.	0

Chapter 3

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 MRRW. This chapter is a summary of the baseline environment. A more detailed and comprehensive description of the current conditions in the watershed is provided in the MRRW Assessment Report (December 23, 2013), which is incorporated by reference into this document, and is available for review at the Dillon Field Office or online at http://www.blm.gov/mt/st/en/fo/dillon_field_office.html.

3.1 General Setting

The Middle Ruby River Watershed is located in Madison County and drains the east slope of the Ruby Mountains, the Greenhorn mountains and northwestern perimeter of Gravelly mountain range. Elevations within the MRRW range from approximately 5,200 feet in the Ruby River valley south of Alder, to 9,500 feet on Baldy Peak in the Gravelly Mountains. Topography varies from rolling sagebrush and grass covered bench lands to high alpine slopes. Much of the watershed is characterized by deep, narrow canyon drainages and dense forested slopes, especially in the Greenhorn and Gravelly mountains.

The Ruby River bisects the watershed as it flows into the Ruby Reservoir before continuing downstream, eventually combining with the Beaverhead and Big Hole Rivers near Twin Bridges, Montana to form the Jefferson River. Numerous secondary stream systems begin in the mountains and flow down into the Ruby River and Reservoir. These streams, and their tributaries include; Greenhorn, Jack, Idaho, Barton Gulch, Davey, Williams, Sweetwater, Cottonwood, Mormon, Hinch, Peterson and Garden Creeks.

Present 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 within the MRRW, from wetland and riparian species dependent on water and moist soils to sagebrush and grass plant communities that thrive on relatively 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 12 inches on the lower benches to more than 24 inches on the higher mountain peaks (USDA. 1989).

3.2 Description of Affected Resources/Issues

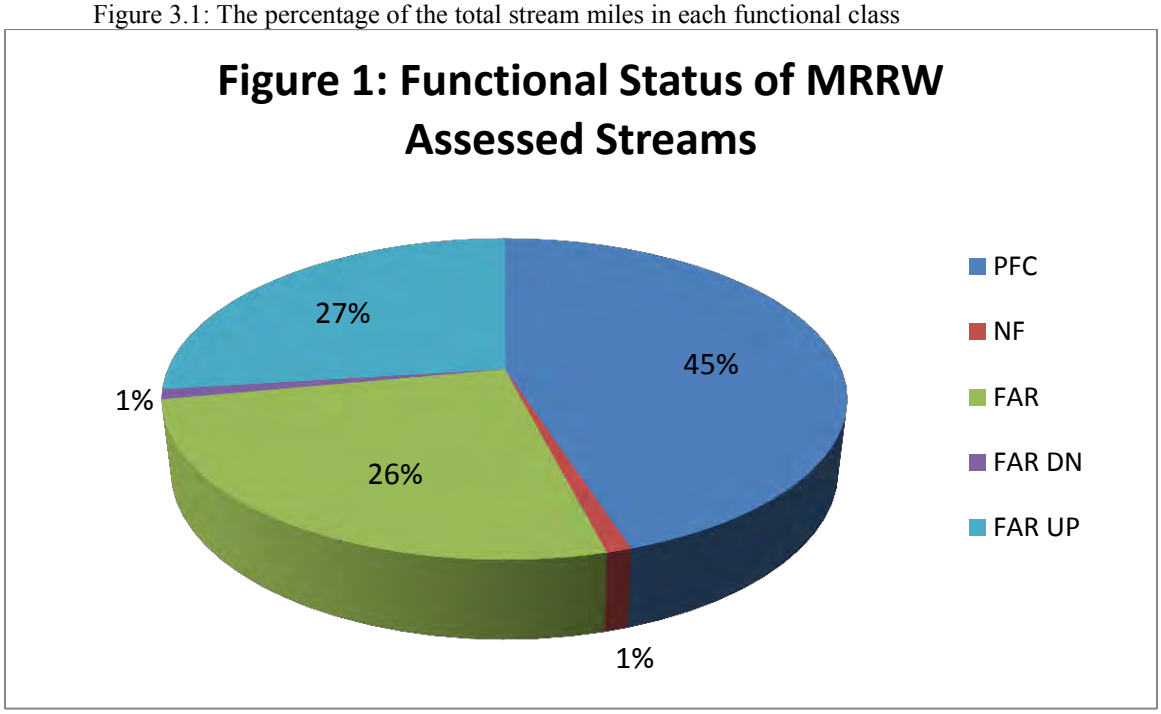
3.2.1 Issue # 1: Riparian, Wetland and Aquatic Habitat

In Chapter 1 of this EA, the riparian, wetland and aquatic habitat objectives for the MRRW that are expected to be achieved over the ten year life of the EA were described. These objectives are expected to move resource conditions forward toward reaching the Desired Future Conditions described in the Dillon RMP. Streams that are achieving PFC are not necessarily at DFC, however PFC is a prerequisite to achieving desired condition (USDI 1998).

Major streams within the MRRW area are Barton Gulch, Cottonwood Creek, Dark Hollow Creek, Davey Creek, Garden Creek, Greenhorn Creek, Hinch Creek, Idaho Creek, Jack Creek, Mormon Creek and Peterson Creek.

Ninety-two stream reaches, totaling 57.6 miles, were assessed for functional condition. Forty-seven reaches, totaling 26.2 miles, were rated PFC. Eighteen reaches, totaling 13.8 miles, were rated FAR with an upward trend. Twenty one reaches, totaling 15.2 miles, were rated FAR with a static or no apparent trend. Four reaches, totaling 1.5 miles, rated FAR with a downward trend. Two reaches, totaling 0.90 miles were rated NF. Functional ratings for every stream reach in the watershed are listed on page 21, table 4, in Middle Ruby River Watershed Assessment Report.

Figure 3.1: The percentage of the total stream miles in each functional class



Where streams were not at PFC, some of the concerns included: alteration of stream morphology, reduced access to floodplains, down cutting, reduction in species diversity and composition, reduced vegetative cover, limited vegetative species recruitment and regeneration,

reduced structural diversity, and/or decreased vigor of streamside vegetation. Generally, ungulate grazing and browsing, historic mining, sedimentation from roads, trailing and stream crossings, de-watering or diversion of streams for irrigation and conifer expansion were the causal factors. The IDT observed remnants of willows and aspen on most of the streams within the watershed that are now dominated by conifers. Impacts to riparian habitat were documented on some low energy (headwater spring seep) streams flowing through spruce habitats. Spruce, typically, do not have deep binding root masses and stream banks under spruce over-stories are more susceptible to livestock trailing and crossing impacts. Headwater streams have a relatively small drainage area and do not develop sufficient stream power (shear stress) to recover as is found on streams with higher stream flow (Saar et al. 1996).

Fisheries Habitat

Throughout the west, the threat of impacts from increasing water temperatures on fisheries habitat due to climate change is a growing concern. Studies have linked water temperature with lower cutthroat performance in water temperatures >59F (DeStatso and Rahel 1994; Dunham et al. 1999; Novinger 2000). Water temperature monitoring within the assessment area was initiated in 2011 on some streams. An early snow melt in 2013 combined with below normal spring precipitation, had area streams entering the summer in low flow conditions. As a result, streams endured extended periods of elevated water temperatures in 2013. Comparing data with that between years indicates that stream temperatures were somewhat higher in 2013 vs 2011 which was a "relatively" normal year in terms of precipitation and summer weather. This increase in temperature was consistent across the field office in all streams monitored in 2013. Therefore, the minor variations in elevated temps are probably attributable to the year rather than streams habitat conditions. However, additional monitoring needs to be conducted on those streams exhibiting a high number of elevated temperature readings. These extended temperatures may be indicators of habitat issues. In most cases where temperatures peaked above 60 degrees F it was for short periods of one to 3 hours during midday with temperatures in most streams dropping back into the 40's or 50's overnight. The exceptions were NF Greenhorn, Cottonwood and Barton Gulch, which experienced extended periods of elevated water temperatures.

Table 3.1: Upper Ruby Water Stream Temperature Monitoring

Stream/Year	Ave temperature 6/1-9/1	Max temperature 6/1-9/1	# of days stream temperatures reached or exceeded 60 f
Dark Hollow Creek 2011	46	57	0
Dark Hollow Creek **2013**	50	61	3
N. Fork Greenhorn Creek **2013**	50	63	14
S. Fork Greenhorn Creek **2013**	48	56	0
Jack Creek 2011	45	56	0
Jack Creek **2013**	50	63	7
Cottonwood Creek **2013**	54	66	32
Hinch Creek **2013**	51	63	9
Barton Gulch **2013**	51	63	17
Idaho Creek	49	61	6

Allotment-specific riparian health concerns are discussed below. Allotments in which riparian and wetland resources rated as PFC or FAR with and upward trend are not discussed in this

section, but information on these resources is available in the MRRW Assessment Report and is available at the Dillon Field Office. Additional stream reach specific data for any of the riparian/wetland areas in the MRRW is available at the Dillon Field Office. In addition to the concerns identified below, Rocky Mountain juniper expansion along streams was noted as a concern in reach 841, North Fork Greenhorn Creek (15 – 25% cover) and South Fork Greenhorn Creek (25 – 35% cover).

Barton Gulch

Twelve reaches covering almost eight miles flow through the Barton Gulch allotment. Four of these reaches, 4.7 miles, were rated FAR with a static trend by the IDT.

- Reach # 800 is about a mile long and flows through a narrow constricted drainage under a spruce dominated over-story. This low energy system was rated FAR with a static trend due to over-widening of the channel caused by livestock trailing. These impacts on the lower half of the reach have raised the sediment inputs slightly. The upper half of the reach is well armored and in very good condition.
- Reach # 803 is 1.3 miles long and was also rated FAR static. The lower portion of the reach is in PFC, but the upper portion has been impacted by historic mining and roads. The upper portion is over-widened in places, and the roads, trails and an undersized culvert are resulting in extraordinary sediment inputs and deposits. The historic impacts to this stream have changed its potential and are outside the control of the BLM.
- Reach #805 was rated as PFC. However, composition of Rocky Mountain juniper was identified as a resource concern. The cover class of juniper was 3 (25 – 35%) along this reach.
- Reach # 813 is steep and flows through forested habitat. Decadent willows in the riparian area have been crowded out by the spread of conifer species (mostly spruce) into drainage from above. Several livestock crossings and trailing have over-widened the channel in some locations and are contributing sediment to the system.
- Reach # 827 was also rated as FAR static. This reach is the main stem of Davey Creek and flows west into the Ruby Reservoir after leaving BLM land. The lower half mile of this two mile reach is comprised of a series of inactive beaver dams causing braided channels and is dominated by sedge, grass, willows and other deciduous plants. Above the beaver dams, the stream flows beneath a heavy forested canopy. The banks lack herbaceous cover and are susceptible to impacts by cattle and wildlife. Conifer encroachment is also crowding out riparian deciduous woody species limiting biodiversity. Livestock crossings and trailing has over-widened the channel is some places which adversely impacts the natural sinuosity of the stream. Sediment run off into the reach from the road that runs adjacent to the stream is substantial during spring run-off and storms. Rocky mountain juniper composition in this reach was a cover class 2 (15 – 25%)
- Fishery habitat in Barton Gulch is in fair condition. In addition to heavy historic gold placer mining, there is a county road adjacent to the stream over nearly its entire length. Pool quality is fair to good and it appears that most of the sediment is passing through the system. However, this sediment is depositing in Ruby reservoir, which is experiencing issues with sediment. Stream bank conditions overall were in poor to fair condition. Current livestock use is having some impact on stream banks where they have access to the stream. The road and past channel modifications from historical mining are also

impacting habitat conditions in the drainage. Barton Gulch experienced a relatively high number of elevated temperature days (17days), but still maintained a summer average temperature of 51 degrees which is within the preferred range for cold water species. The elevated temperature days experienced are likely a result of both the geology of the drainage, and to a lesser extent, reduced temperature buffering ability which is a result of reduced habitat quality.

Belmont

The MRRW Assessment Report incorrectly stated that there were eleven stream reaches, totaling 6.5 stream miles in the Belmont allotment that rated FAR static, FAR down or Non-Functional (NF). The correct information is 12 reaches totaling 6.1 miles. Four reaches, totaling 1.9 miles rated PFC or FAR with an upward trend.

- Eight stream reaches in the allotment, covering about 5 miles, are rated FAR with a static trend (# 867, 822, 816, 821, 815, 817, 888, and 422). This means that the hydrological functions of the streams and health and vigor of the associated riparian plant communities are neither improving nor declining. The reasons for current conditions are varied and complex. Livestock utilization has impacted some of the reaches, but other factors such as conifer encroachment, forested habitat that limits the amount and diversity of bank stabilizing vegetation, historic mining, roads which contribute sediment, browsing by wildlife and man-made push up dams all have additive impacts to the riparian resources.
- Reach # 885, a short reach (0.3 mi.) located in a very narrow and rocky drainage rated FAR with a downward trend. One of the primary reasons is the lack of plant diversity. Heavy juniper encroachment (65 to 75%) into the riparian zone has eliminated most other woody and herbaceous species. There are small sedge stands along the channel in the steep upper portion of the reach, but in the lower portion of the reach, the channel is over-widened and sediment laden due, primarily, to livestock impacts.
- Reach # 887 is non-functional, because the water from Sweetwater Creek is being diverted by a head-gate directs the flow into a ditch leading to Williams Reservoir. According to Montana DNRC Water Rights Query, the headgate and ditch are associated with water rights claims dating to 1883 and 1884. The flow rate and period of diversion associated with the claims is 505 miners inches from April 15 to October 15. Vegetation on this reach include Basin wildrye, baltic rush and narrowleaf cottonwood. The functional rating of this reach is outside the Authorized Officer's control.
- Reaches # 891 and 820 rated FAR with a downward trend. These two reaches are both part of Cottonwood Creek, are located next to the Cottonwood Creek road, and easily accessible to campers, hunters and livestock. Noted resource concerns are: lack of age-class diversity in the riparian vegetation community, spruce over-story shading out bank holding woody and herbaceous species, browsing of young aspen trees by wildlife and livestock, numerous over-widened crossings and raw banks stemming from cattle utilization and excessive sediment inputs.

Davey Creek

The Davey Creek allotment contains 17 individual streams reach that flow through 10.5 miles of public land. Of those only three reaches covering less than 2 miles, are not in PFC.

- Reach # 809, the main channel of Davey Creek, is rated FAR with a static trend. Conditions observed by the IDT that led to this rating include: sediment from adjacent

road, numerous cattle crossing resulting in over-widened and shallow places in the stream and impacts from historic placer mining activities.

- Reach # 2404 is a short quarter mile stretch of Williams Creek. It is rated FAR with a slight downward trend primarily because of excessive sediment inputs from grading the adjacent county road and heavy juniper encroachment.
- Reach # 829 is located on upper Dryden Creek and flows under a spruce/dogwood habitat type. Very little bank stabilizing vegetation is present and the channel is deeply entrenched. This is a low energy spring fed system that does not have sufficient flow to flush excess sediments. The system is not vertically stable and the lateral stream movement and natural sinuosity of the creek are being negatively impacted by the steep terrain and livestock impacts.

Garden Creek

The Garden Creek allotment has 33 stream reaches covering 21 miles on BLM administered public land. Many streams in the allotment are on an upward trend since last assessed in 1998. Twenty nine reaches were rated either PFC or FAR with an upward trend, four reaches (1.96 miles) were rated FAR with a static trend and no reaches were rated FAR down or NF.

- Reach #823 on Cottonwood Creek was rated FAR with an upward trend because of improved channel dimensions, an increase in the herbaceous plant community including bank stabilizing, deep-rooted sedge plants and decreased sediment inputs.
- Reach #834 was rated FAR static by the IDT. It is a short spring brook covering about a third of a mile. It begins in a willow stand and runs through a grassy high mountain meadow. The willows growing around the spring source have been hedged by browsing wildlife and livestock. Also, trampling by livestock and wildlife has caused hummocking, channel over-widening and degradation in some sections of the reach.
- Reach # 860, rated FAR static, runs beneath a spruce dominated forested canopy which shades out other riparian vegetation. Plant biodiversity is limited and the channel banks are susceptible to disturbance from livestock. The stream is not vertically stable as evidenced by active head-cuts in the channel. The bottom section of the reach is being impacted by grazing resulting in stream bank impacts, channel over-widening and high sediment loads. Reaches # 873 and 874 are located within a quarter mile of each other on a north facing steep forested slope. These two reaches are almost identical and both were rated FAR static by the team. Current stream channel and vegetative conditions are not a result of present grazing pressure, but evidence of historic grazing and natural succession as conifers have expanded and shaded out most other vegetation. Decadent willows are evidence of the succession process. Most of the two channels are inaccessible to livestock because of heavy timber down fall. Reach 873 has one active head-cut created by a high flow event (storm, flood) in the relatively recent past.
- Fish distribution surveys were conducted on Cottonwood Creek in 2013. Eastern brook trout were present throughout the entire drainage.
- Fishery habitat was noted as lacking, specifically, a lack of stream bank riparian vegetation, low pool quality, excessive levels of bank disturbance and the lower reach was noted as having high levels of sediment. A majority of this sediment is originating from the county road which parallels the stream for much of its length. However, based on riparian conditions, some of the sediment is originating from stream banks. Fish habitat on this stream on BLM administered land is in poor condition.

- Cottonwood Creek experienced a high number (32 days) of elevated temperature days in 2013 while maintaining an average summer temperature of 54 degrees. Several factors are likely contributing to the temperature spikes within this drainage. The single biggest factor can likely be traced to poor riparian habitat condition along most of the reach located on BLM administered land.

Idaho Jack

Eight stream reaches, covering a little more than 5 miles, are located in the Idaho Jack allotment. Jack Creek and its tributaries are occupied by 100% pure population of westslope cutthroat trout (WCT). Reaches 856 & 857 were rated FAR static in 2013. Idaho Creek, reach 851, was rated as PFC. However, the very lower end of this reach was noted to have increasing conifer composition outcompeting deciduous woody riparian vegetation.

- Reach # 857, the main stem of Jack Creek, is 1.4 miles in length and supports a population of genetically pure WCT. Several smaller tributaries flow into Jack Creek from the timber slopes above. This upper section of Jack Creek flows through open, relatively flat meadows. Cattle watering activities are concentrated in this area which results in hoof disturbances to the stream banks and increased sediment inputs into the channel.
- Reach #856 is a small low energy interrupted tributary flowing into the main stem of Jack Creek from the south. The reach is comprised of several springs and short disconnected spring brooks. The overstory is dominated by conifers, but there are healthy aspen stands present also. Rocky mountain juniper expansion along this reach was identified as a concern and was found at 25 – 35% composition. Aspen regeneration and recruitment is good, in spite of encroaching juniper. Impacts are being caused by livestock watering at the springs. Hoof action in the small wet meadows near the springs has caused extensive hummocking in places. Hummocking disperses the water, precludes the formation of a brook or channel and dries out the soil.

Developed Springs

The BLM's Rangeland Improvement Project System (RIPS) database shows 12 spring developments in the MRRW. BLM staff visited these developments to determine resource condition, condition of infrastructure, water production (flow) and condition of the wetland resource. Table 6: Developed Springs on page 28 of the assessment report lists the springs, their respective allotments, year constructed and condition of infrastructure and wetland resource. The Belmont allotment has two springs. The Davey Creek allotment has four springs and of the four, the Dryden Creek is in need of maintenance. The Garden Creek allotment has seven springs. These springs require further evaluation by the BLM engineering staff with the goal of either redevelopment or abandonment.

Routine maintenance of livestock water developments is not consistent in the watershed. Maintenance problems include lines not being drained, sediment in troughs, plumbing not properly working, lack of float valves and or shutoff valves, and leaking troughs. These maintenance issues may negatively impact wetland hydrology and hinder the objective(s) that the development was originally intended to achieve (i.e., livestock distribution or mitigation of impacts to perennial streams). They may also impact water rights since water right holders are

expected to conserve water. Properly maintained water developments are considered Best Management Practices (BMP) for riparian resources.

BLM must report on BMP effectiveness as part of our participation in Montana's Nonpoint Source Management Strategy. Working with grazing lessees to achieve BMP goals is essential to success.

In accordance with the Montana Water Use Act of 1973, the BLM filed Statements of Claim for springs developed prior to June 30, 1973 and Notices of Completion of Groundwater Development for springs developed after that date.

Springs and Wetlands

Numerous isolated springs and wetlands exist within the assessment area. The Dillon Field Office has not developed its own wetland inventory, but rather supports the Montana Natural Heritage Program wetland mapping program. Approximately 4.5% of inventoried wetlands in the MRRW are located on Public Land. For the most part they are associated with streams and as such were evaluated in association with the stream assessments.

3.2.2 Issue #2: Upland and Sagebrush Steppe Habitat

The vast majority of the watershed assessment area is classified as uplands. For the purpose of the BLM's analysis, grassland communities and sagebrush steppe are considered uplands.

The uplands in the MRRW are comprised of a wide range of plant communities that provide a diversity of habitats and niches occupied by an abundance of wildlife species. The upland plant composition in the MRRW is changing as the result of ecological processes that lead to plant community succession. The natural progression from early seral to a climax plant community is inevitable without disturbance.

The Madison County Soil Survey shows eight different soil complexes-each made up of more than one soil-located in the MRRW assessment area. They vary across the diverse topography from the nearly level to gently sloping flood plains adjacent the Ruby River to the steep rocky slopes of the mountain ranges. In the uplands the soils are well drained, vary from shallow to deep, and course fragment composition range from silty and/or sandy to gravelly material (USDA. 1989).

The soils within the watershed formed from a variety of parent materials and the major landforms include: flood plains, stream terraces, outwash terraces, alluvial fans, escarpments, hills, moraines and mountain slopes. Slopes range from undulating (1 to 8 percent) to very steep (more than 45 percent). Soil textures are mainly sandy loams, loams, and clay loams; soil depths vary from shallow (less than 20 inches to a root restrictive layer) to very deep (more than 60 inches to a restrictive layer). The most common soil types encountered by the IDT at upland study sites were Silty or Silty-Limey, 10-14 and/or 15-19 inch precipitation zones.

During an average water year the potential production of total vegetative biomass varies widely in the assessment area based on soils, elevation, aspect and precipitation. The high steep rocky slopes on Mt. Baldy may only produce about 300 pounds per acre, while on the grass and sage

covered benches of the Ruby Mountains 2,000 pounds of vegetation is expected during an average precipitation year (USDA. 1989).

The mountain ranges were formed by complex faulting and uplifting. The consequent valleys filled with sediment transported by streams draining the uplifted terrain. The major streams occupying the basin bottoms were overloaded and could not carry sediment away as fast as it was being provided. In addition, volcanic ash and breccia were added to the excessive sediment loads. The resulting basin-fill material is a complex mixture of debris from erosion and volcanic material. Alluvium that blankets the flood plains and the terraces adjacent the streams varies from fine-textured clay, silt and sand to more coarse gravel and cobble (USDA. 1989).

Approximately 44% of BLM administered uplands are dominated by forest habitats. Large stands of Douglas-fir *(Pseudotsuga menziesii)*, lodgepole pine *(Pinus contorta)*, limber pine *(Pinus flexilis)*, Englemann spruce *(Picea engelmannii)*, subalpine fir *(Abies lasiocarpa)*, whitebark pine *(Pinus albicaulis)*, and Rocky Mountain juniper *(Juniperus scopulorum)* are present on much of the public land in the watershed. Also, numerous aspen *(Populus tremuloides)*, black cottonwood *(Populus balsamifera)* and thin-leaved alder *(Alnus icana)* contribute to structural diversity and canopy cover. The abundance of Douglas-fir and Rocky Mountain juniper encroaching into sage/grass habitat in the watershed can be partially attributed to the reduced frequency of wildfire. Less fire on the landscape has changed the relative dominance of species within the vegetative community, resulting in shifts in the habitat types.

Fifty one percent of the BLM uplands are sagebrush and mountain shrub habitat type. Sagebrush species, and subspecies, occupy different niches based on habitat type, elevation, annual precipitation and soil types. Mountain big sagebrush *(Artemisia tridentata vaseyana)* is found in the higher elevations in habitats that receive greater than 14 inches of annual precipitation. Mountain big sagebrush habitat supports a diversity of sagebrush-dependent wildlife species (Wambolt. 2002). Several other sagebrush subspecies: Wyoming big sagebrush *(Artemisia tridentata wyomingensis)*, tall threetip sagebrush *(Artemesia tripartita tripartita)* and black sagebrush *(Artemisia nova),* grow in the foothills that receive about 10-14 inches of rainfall each year. And the subshrub, fringed sage *(Artemesia frigida),* is found primarily in the foothills growing in a variety of soils that are in the 10-14 inch precipitation zone. Some of the prominent understory herbaceous species include bluebunch wheatgrass *(Pseudoroegneria spicata),* western wheatgrass *(Pascopyrum smithii),* Sandberg bluegrass *(Poa secunda),* needle-and-thread grass *(Hesperostipa comate),* Prairie junegrass *(Koeleria macrantha)* and Idaho fescue *(Festuca idahoensis)*. Winterfat *(Krascheninnikovia lanata)* and gray horsebrush *(Tetradymia canescens)* are found in limey soils along with Indian ricegrass *(Achnatherum hymenoides),* western wheatgrass and needle-and-thread grass. Rubber rabbitbrush *(Ericameria nauseosa),* green rabbitbrush *(Ericameria teretifolia)*, and broom snakeweed *(Gutierrezia sarothrae)* are common native shrubs found on ecological sites in the watershed.

Scattered patches of curl-leaf mountain mahogany *(Cercocarpus ledifolius)* are found on rocky slopes and ridges throughout the watershed. It provides year-round cover and forage for deer and is a crucial source of winter forage for many wildlife species.

The uplands within 11 of the 13 grazing allotments, 41,056 acres, 96% of the total allotted BLM acres, are in PFC or FAR with an upward trend. Further, all the uplands in the un-allotted and un-leased tracts, approximately 7,819 acres, are in PFC. The uplands in two relatively small grazing allotments were rated FAR with a static or downward trend. These allotments are Garnet (744 acres) and Fossil Basin (1066 acres). Site specific upland evaluations indicated numerous conditions of concern including: slight shift in the dominant plant communities, reduced herbaceous vegetation production and vigor, localized areas of increased bare ground, higher potential for wind and water erosion and decreased water infiltration efficiency.

3.2.3 Issue #3: Forest and Woodland Habitat

Forest and woodland habitats comprise approximately 27% of all ownerships, and approximately 44% of BLM-administered lands within the MRRW. Effective precipitation and aspect influences the establishment and composition of forests and woodlands. Species in the MRRW forested stands include; Douglas-fir, lodgepole pine, limber pine, Englemann spruce, subalpine fir, whitebark pine, and Rocky Mountain juniper. Scattered aspen, black cottonwood and thin-leaved alder stands contribute to structural diversity and canopy cover of these forest and woodland types.

The harvesting of forest products to support mining and agricultural activities in the late 1800s and early 1900s has affected forest distribution, species composition and structure. In addition, fire exclusion has caused some big sagebrush and low elevation forest communities to stall in mid to late-development succession classes, with little representation of an early seral class. Due to favorable stand conditions, the hazard for insect and disease activity in many areas in the MRRW is high, and many forested stands have high levels of recent mortality.

The xeric Douglas-fir forest type primarily exists on lower foothills located immediately above grasslands/shrublands in elevation. Slopes in this forest type range from gentle to steep and are generally dominated by Douglas-fir trees with an understory of graminoides and sparse shrubs. Historically, these stands were typically open and dominated by moderate to large diameter Douglas-fir. This forest type corresponds with cool, dry Douglas-fir and limber pine habitat types and often forms an ecotone with mountain grasslands/sagebrush habitat type. Lodgepole pine can co-dominate with Douglas-fir in cooler portions of the forest type. Higher elevations of this forest type border dry subalpine fir systems and persistent lodgepole pine can be found in frost pockets and cooler areas of the map zone (LANDFIRE, 2011a). Limber pine was also sporadically present in this forest type.

Throughout the MRRW, western spruce budworm is present at moderate to high levels. Defoliation caused by spruce budworm is most evident in densely stocked stands of co-dominant Douglas-fir and younger trees. These trees are generally less than 100 years old and have expanded outside of their normal range that persisted prior to European settlement. After several years of heavy defoliation, branch dieback and top kill, tree mortality can occur. If mortality does not occur, cones and seeds of all host species are often destroyed (Hagle, 2003).

Trees that have been heavily defoliated and are drought stressed are more susceptible to Douglas-fir beetle (DFB). The DFB is a native bark beetle and is currently at endemic population levels in the MRRW. At low or endemic levels, mortality is typically found in

scattered larger diameter Douglas-fir growing in mixed or pure stands that have been stressed due to drought, windfall, fire scorch, defoliation, or root disease (Schmitz and Gibson 1996; Weatherby and Their 1993). Douglas-fir trees most susceptible to attack from DFB are those larger than 14" DBH, older than 120 years, and growing in dense stands (Weatherby and Their 1993). In areas where susceptible trees are abundant, DFB populations can build and spread rapidly to adjacent trees (Schmitz and Gibson 1996).

Douglas-fir stands in the MRRW were observed with a diversity of successional stages; however, the structure has made a shift from the historic reference condition due to lack of fire. Early seral and mid successional stages within this forest type are under-represented. Most Douglas-fir stands are late-seral closed canopies that average 100 years or greater and are comprised of densely stocked Douglas-fir. These trees have poor growth form (taper) and are suppressed due to local stressors including drought, competition, and severe defoliation and damage due to western spruce budworm. Stands with heavy defoliation from western spruce budworm are at high risk for future DFB infestations. Late seral stands across all ownerships within the watershed have high mortality due to past epidemic Douglas-fir beetle infestations within the last five years. Pockets of larger diameter Douglas-fir within areas of heavy defoliation from western spruce budworm were noted on the southeastern edge of the MRRW (Cottonwood Creek) which suggests that DFB activity is currently at high endemic levels rather than outbreak levels, however additional mortality can be expected (Steed & Jackson, 2012). The IDT noted recent Douglas-fir expansion in the transition zone between foothill sagebrush communities and mature Douglas-fir forests. The IDT also noted that within recent timber harvest units, trees exhibited high vigor and showed few signs of current insect and disease activity.

The Lodgepole Pine/Spruce-fir Forest and Woodland type occurs in a relatively high precipitation zone (15-35 inches/year). Precipitation usually comes in the winter months as snow. Lodgepole pine, subalpine fir and Engelmann spruce are the dominant species in this forest type and can be found within the subalpine zone. The elevation range of this forest and woodland type is 6500ft to 8500ft. Lodgepole pine comprises a greater component of the forest on dryer sites where there are earlier successional stages present. Once established, lodgepole pine can be a canopy dominant for over 250 years. Pockets of pure lodgepole pine trees with shrub, grass or barren understories are common. At high elevations and southerly aspects, whitebark pine may occur. Douglas-fir may be an early seral component at lower elevations of this forest type. Aspen may be present especially located east of the Continental Divide. Understory shrubs will be more prevalent on east and north-facing aspects. At lower elevations, this forest type is located adjacent to the Upper Montane forest type, and includes Douglas-fir species. At higher elevations, this forest type is located adjacent to Subalpine Woodland and Parkland forest type (LANDFIRE, 2011a). Following disturbance, lodgepole will rapidly colonize and develop into dense, even-aged stands. At approximately 100 years of age, insect, disease, and/or blow down can create small openings in lodgepole forest canopy, mirroring a mid-development closed stand.

Mountain pine beetle (MPB) is present at epidemic levels throughout the MRRW. Stands most susceptible to attack from MPB are mature lodgepole pine stands that are densely stocked (Sturdevant, 2009). The MPB is a native insect to western pine forests found in North America

and endemic population levels of MPB are almost always present in host stands (Thompson 2009). Larger diameter (greater than 8 inch Diameter at Breast Height (DBH)) pines are usually targeted by the beetle because of the thick layer of phloem which provides an adequate food source while beetle populations build. After the larger trees of a stand have been killed off, beetles will infest smaller diameter trees (Amman et al. 2002). Trees as small as 3 inch DBH on the Helena NF were reported as being infested in the current outbreak (N. Sturdevant, pers. comm., 2009). Beetle populations, after infesting large and small diameter tress, decline to endemic levels in the host stand (Amman et al. 2002). MPB can influence successional stage, species composition and stand density by accelerating succession as the lodgepole pine is removed and more shade-tolerant species are promoted. Large scale insect infestations may create large patches of early seral conditions and/or create conditions that lead to large, stand-replacement fires (LANDFIRE, 2011a).

The lodgepole pine/spruce-fir type has a large number of successional stages; however, the forest structure has made a shift from the historic reference condition due to lack of natural disturbance. Early seral stages were only noted in old harvest units throughout the watershed. The majority of pure lodgepole pine stands observed during the assessment had just a mid-seral, closed canopy structure represented with one age class present. Lodgepole pine cored during pre-assessment ranged between +/- 90 years old (~4.5 inches at DBH) to +/-130 years on the older and larger diameter trees. These stands are currently experiencing high mortality rates due to MPB.

There is also an over-representation of the late development, closed spruce-fir class of this forest type. This age class includes high density tree stands dominated by large diameter spruce-fir with lodgepole pine trees declining in composition. Some spruce was observed with galls produced by the Cooley spruce gall adelgids. Galls usually do not cause any serious harm to the tree. Extremely heavy infestations may cause minor delayed and distorted growth of the tree (Cranshaw, 2008).

The Subalpine Woodland and Parkland forest type occurs in the upper subalpine zone (6000-9500ft) on moderate to steep terrain (e.g. 40-70% slope). Landforms include; ridgetops, mountain slopes, glacial trough walls and moraines, talus slopes, land and rock slides, and cirque headwalls and basins. Some sites have little snow accumulation because of high winds and sublimation which increases summer drought conditions. Lower subalpine forests border this forest type at lower elevations and the lower subalpine forest include tree species such as; lodgepole pine, Douglas-fir, Engelmann spruce and subalpine fir types (LANDFIRE, 2011a).

Forest communities range from nearly homogeneous stands of five-needled pines on the harshest, highest elevation sites, to mixed stands with species such as shade tolerant firs on the less harsh, lowest elevation sites. On harsh sites, vegetation is stunted with short, dwarfed trees, including krummholz vegetation. In this harsh windswept environment, trees are often stunted and flagged from wind damage. Historically, whitebark pine dominated on southerly aspects, while northerly aspects were dominated by subalpine fir and Engelmann spruce. Lodgepole pine may be present as an early succession species in this type. Whitebark pine is a keystone species in many of these forests. Mature whitebark pine trees improve local conditions on harsh sites and facilitate the establishment of less hardy subalpine species. In the absence of fire, this system shifts to a more shade tolerant forest through succession (LANDFIRE, 2011a).

Whitebark pine has been recognized as keystone species of high elevation habitats. They are important resources for wildlife food sourcing, snowpack retention, and watershed protection. The cones and seeds of whitebark are a primary food source for several wildlife species due to their high caloric and fat content. Seed dispersal is done almost entirely by the Clark's nutcracker. It is a bird that caches the seeds that will eventually germinate if not found again by the Clark's nutcracker, bears, rodents or other birds.

Warming temperatures have allowed pine beetles to move higher in elevation, where they are devastating whitebark pine. Unlike lodgepole, whitebark pine is not expected to regenerate and recover in many places after beetle populations decline due to lack of disturbance (i.e. fire). The loss of this keystone species has serious implications for snow pack retention, wildlife and fisheries, as well as the function and structure of our entire western subalpine ecosystem. Whitebark and limber pine are rapidly declining across their range due to the exotic white pine blister rust (WPBR) that eventually girdles the tree leading to top kill or death of severely infected trees (Hagle, 2003). Whitebark pine is present in all successional stages in the MRRW and appears to have high genetic diversity. Field surveys indicated that a notable amount of recent natural whitebark pine regeneration was present in stands with complete over-story mortality. This may be an indicator that the current MPB outbreak is providing enough of a disturbance with the resulting over-story mortality to create seed cache sites for the Clark's nutcracker. Competing conifer species were absent, or found in very few numbers in the understory of some of these areas. The effect that WPBR will have on young whitebark pine regeneration is not known at this time.

Whitebark pine is present in all successional stages in the MRRW. Epidemic MPB activity within the watershed occurred at landscape levels in recent years with greater than 90% mortality of the mature overstory in some places. Field surveys conducted indicate that many of these decadent stands are being regenerated with more shade-tolerant conifer species. Subalpine-fir and spruce are dominant, and whitebark pine regeneration is present, but with little representation in the understory. Five-needled pine mortality within the Ruby Mountains WSA was very high, with WPBR also evident. There were also several five-needled pine seedlings that appeared to be uninfected by WPBR noted in the understory of some of the mature lodgepole pine stands (Steed & Jackson, 2012).

Aspen Forest and Woodlands type are dominated by aspen without a significant conifer component (<25% relative conifer tree cover). Elevations generally range from 5000-10,000ft, but occurrences can be found at lower elevations in some regions. Distribution of this ecological type is primarily limited by adequate soil moisture required to meet its high evapotranspiration demand. It is secondarily limited by the length of the growing season or low temperatures. The understory structure may be complex with multiple shrub and herbaceous layers, or simple with just an herbaceous layer. The herbaceous layer may be dense or sparse and dominated by graminoids or forbs. Aspen decline varies across the region. Conifer expansion, drought and nearly a hundred years of fire suppression, as well as uncharacteristic ungulate browsing has reduced the productivity of some aspen clones or created stands lacking suckers needed for regeneration (LANDFIRE, 2011a).

Aspen stands within the MRRW were observed to be lacking a middle age component and aspen regeneration appeared to be heavily browsed. The IDT noted evidence of poplar borer activity in some aspen stands. The larvae of this insect bore into the stems, roots and branches causing the tree to weaken and break. Fungi, another threat to aspen, often enter through galleries and woodpecker holes, and can contribute to the tree's death. The ID Team also noted that nearly all of the aspen stands had Douglas-fir and/or juniper expanding into the stands.

The Limber Pine-Juniper Woodland type occurs in foothill and lower montane zones into the western Great Plains at elevations from 3300-7900ft. This woodland type is commonly associated with Rocky Mountain juniper. Open canopies dominated by limber pine are found in shallow soils with high rock component. The shrubs layer is sparse to moderately dense and herbaceous layers are sparse, often different than the surrounding community. Wildfires are less frequent in limber pine communities compared to other conifer habitats because of low fuel accumulation associated with poor soil development and limited grass and forb productivity. Limber pine found at lower elevation appear to be shorter lived compared to those found at high elevation (LANDFIRE, 2011a). Limber pine seeds provide critical food for rodents and birds, including squirrels and Clark's nutcrackers, which also cache the seeds for later use. Other birds, small mammals, and bears benefit from these caches.

Limber pine in the MRRW does not have a diverse age class. Individual trees and isolated pockets were noted with MPB mortality and/or WPBR present. There were also several trees that appeared healthy and unaffected by either disease.

3.2.4 Issue #4: Special Status Species Habitat

Grizzly bears are resident in the Gravelly Range portion of the watershed, which is also within the Demographic Monitoring Area used by the Interagency Grizzly Bear Study Team (IGBST) to assess all demographic criteria for the population. The Dillon Field Office is outside the Grizzly Bear Recovery Zone, an area surrounding Yellowstone National Park where inter-agency grizzly bear recovery efforts are concentrated to restore viability of the grizzly bear population to the point where federal protections offered under the ESA are no longer necessary (USDI, 2013b).

Canada lynx are listed as threatened under the ESA. The Dillon Field Office does not contain any lynx critical habitat. The nearest critical habitat is on the Gallatin National Forest, east of highway 191. Forested areas may provide temporary habitat for transient lynx dispersing from established lynx populations, but these areas likely do not contain all physical and biological features in adequate quantities and spatial arrangements to support lynx populations over time (USDI, 2013a). The forest habitat within the DFO is generally drier than the preferred moist boreal forests that include dense understories that provide foraging habitat and cover for the lynx's main prey, snowshoe hare (USDI, 2013a).

The wolverine is proposed to be listed as threatened under the ESA. Wolverines occur in coniferous montane forest types, preferring rugged, roadless, isolated habitats. Wolverines are more likely to occur at higher elevations on Forest Service land in the Gravelly Range, with transient individuals on BLM lands.

No issues were identified in the MRRW for these listed species. See the BE in Appendix C for further discussion. Consultation with FWS will occur if required due to impacts from proposed projects in this EA.

Overall, throughout MRRW sensitive wildlife species habitat is adequate. In allotments that didn't meet riparian/wetland standards, an improvement in this habitat will enhance conditions for cover, forage, and nesting. Some areas that are currently sagebrush grassland habitat may be converted to forest or woodland cover types with continued expansion of Douglas-fir and juniper. In the continued absence of fire, mountain sagebrush and grasslands in southwestern Montana are likely to become more homogenous as Douglas-fir trees continue to encroach (Heyerdahl et al., 2006). Cheatgrass concerns were also noted, specifically in the Garden Creek allotment. If cheatgrass continues to expand, reducing native herbaceous species, it would be detrimental to sagebrush grassland wildlife species with the loss of forage and cover, and possible increase in fire frequency.

Remnant pygmy rabbit sign was documented in a couple of locations within the MRRW nearly a decade ago. No pygmy rabbits or sign were documented during surveys at these sites, as well as additional sites, in 2013. Sagebrush at these pygmy rabbit sites is healthy however native cool season bunchgrasses have been reduced in the Garnet allotment. The BLM will continue to survey for pygmy rabbits within the watershed.

Sage grouse are currently a candidate species under the Endangered Species Act. The *Management Plan and Conservation Strategies for Sage Grouse in Montana* (MFWP 2005), is used as a guideline for sage grouse habitat management. Approximately 21% of the total watershed and 23% of BLM land in the MRRW is within a sage grouse Priority Management Area. Approximately 40% of the total watershed and 26% of BLM land in the watershed is within a sage grouse General Management Area. There is one sage grouse lek in the watershed, and several leks within ten miles of it. The lek within the watershed is on private land. The lek, nesting habitat, and brood-rearing habitat have been documented in the Belmont allotment. Sagebrush habitat in the MRRW is in good condition. Sage grouse typically nest within two miles of a lek.

West Nile Virus (WNV) has been linked to sage grouse mortality in multiple areas. BLM Information Bulletin (IB) No. MT-2011-033 provides guidance for West Nile Virus and Water Developments. Management to reduce impacts of WNV focuses on eliminating man-made water sources that support breeding mosquitoes known to vector the virus. The primary mosquito species associated with WNV is the Western Encephalitis mosquito (*Culex tarsalis*). *Culex tarsalis* likes river drainages, extensive wetlands and areas irrigated for agriculture. Whether the water development is for livestock water, wildlife habitat, fish, or storm water management, potential habitat for mosquitoes may be increased. Incorporating applicable design and mitigation measures, described in the IB, for water development projects can reduce mosquito production through modifying and eliminating mosquito breeding sites. More infected mosquitoes have been found in eastern Montana than western Montana. WNV has been documented in a couple of horses in Beaverhead County (Veterinary Hospital of Dillon); however the Public Health Department has not documented WNV in humans or animals in the

county. WNV has not been documented on BLM lands within the DFO, nor in sage grouse in Beaverhead County.

Night-time temperatures at higher elevations in southwest Montana may preclude WNV transmission, as temperature drives WNV cycles. Temperature affects *Culex tarsalis* biology and production, and determines the extrinsic incubation period which is the length of time required for a mosquito to become infective (i.e. transmit the virus) after it has ingested the virus in a blood meal (i.e. at 30˚C the incubation period is 6 days and at 20˚C it's 16 days). If summer temps are cool there is little risk of WNV being transmitted. However, if summer temps are hot, the potential for an outbreak increases, assuming there are adequate mosquito numbers, the virus is present, and susceptible hosts are present, etc. Mosquito surveillance near Dillon found that *C. tarsalis* populations were not extremely high, which is another factor necessary for WNV transmission. Under normal temperature conditions, the risk of WNV transmission to sage grouse in Beaverhead County is low (Johnson 2012, personal communication).

In addition to sage grouse and pygmy rabbits mentioned above, there are several other sagebrush obligate special status species in the MRRW, including Brewer's sparrow, sage sparrow, and sage thrasher. In areas where conifer expansion is converting sagebrush into forest, sagebrush obligate sensitive species' habitat would eventually be lost. Elk calving, antelope, and mule deer winter range would also transition into forest.

Westslope cutthroat trout population estimates have been conducted on Jack and Dark Hollow Creeks. These streams support isolated but relatively healthy populations of WCT in relation to stream size. Populations in these two streams ranged from 12 individuals per 300' in Jack Creek, to 6 per 300' feet in Dark Hollow Creek. Population monitoring has not been conducted in Idaho Creek. However, based on WCT numbers observed while completing genetic collections, overall numbers appear to be healthy.

Water temperature monitoring within the assessment area was initiated in 2011 on some streams. An early snow melt in 2013 combined with below normal spring precipitation, had area streams entering the summer in low flow conditions. As a result, streams endured extended periods of elevated water temperatures in 2013. Comparing 2011 data (see table 3.1 above in the Riparian Health section) with that collected in 2013 indicates that stream temperatures were consistently higher in 2013 across the watershed. This increase in temperature was consistent across the field office in all streams monitored in 2013. Therefore, the minor variations in elevated temps are likely attributable to the year rather than issues with an individual stream's habitat condition. However, additional monitoring should be given to those streams exhibiting a high number of elevated temperature readings. These extended temperatures may be indicators of habitat issues. In most cases where temperatures peaked above 60 degrees F, it was for short periods of one to 3 hours during midday with temperatures in most streams dropping back into the 40's or 50's overnight. The exceptions were NF Greenhorn Creek, Cottonwood Creek and Barton Gulch, which experienced extended periods of elevated water temperatures.

The elevated temperatures in the North Fork of Greenhorn Creek are most likely not related to low quality habitat conditions. This drainage is heavily vegetated throughout its entire length

with habitat conditions generally in excellent condition. The elevated water temperatures experienced can most likely be attributed to extended low stream flows in 2013.

WCT habitat surveys conducted on BLM lands during the 2012/2013 field season within the MRRW indicate that overall WCT habitat in the assessment area is in good condition. However, riparian vegetative conditions on Jack Creek are less than desired and need to be addressed. Jack Creek experienced a small number (7 days) of days when stream temperatures exceeded 60 f. This may reflect some level of habitat degradation, but is likely primarily a result of the warm dry summer of 2013.

Wildlife and fisheries, including special status species, are discussed further under the Biodiversity section of the MRRW Assessment Report, pages 36-63. See the Biological Evaluation in Appendix C of this document for Threatened and Endangered and special status species.

Buff fleabane and Taper-tip desert-parsley prefer a habitat with rugged topography such as steep talus slopes and sparse vegetation. Due to the fact that livestock don't prefer this type of terrain and because there is not much forage in these types of habitats, livestock grazing is not a direct threat to these species. The known populations of these plant species in the MRRW face no anthropogenic threats.

Mealy primrose, beaked spikerush, and Ute ladies' tresses all prefer wetland/riparian habitats. All three of these species are found within the MRRW, but none of the three species have been found on BLM administered land. Thorough inventory of these wetland/riparian habitats has been completed on BLM administered lands. The only documented populations of these three species are found on privately owned land. Ute ladies' tresses is a threatened plant species and is known from only a handful of occurrences in southwest and south-central Montana on private land. Habitat types occupied by Ute ladies' tresses are; seasonally flooded river terraces, subirrigated or spring-fed abandoned stream channels and valleys, and lakeshores. In addition, 26 populations have been discovered along irrigation canals, berms, levees, irrigated meadows, excavated gravel pits, roadside barrow pits, reservoirs, and other human-modified wetlands. (USFWS, 2013)

During the summer of 2010, the U.S. Fish and Wildlife Service announced a 90-day finding on a petition to list whitebark pine (*Pinus albicaulis*) as endangered or threatened and to designate critical habitat. In July of 2011, the finding was released; whitebark was given a warranted but precluded listing with a priority of 2, and is currently on the candidate species list. See section 3.2.3 for additional whitebark pine discussion.

3.2.5 Resource Concern #1: Noxious and Invasive Species

Noxious weeds are defined in the Montana Weed Management Plan as "plants of foreign origin that can directly or indirectly injure agriculture, navigation, fish or wildlife, or public health." Currently there are 35 weeds on the statewide noxious weed list that infest about 7.6 million acres in Montana. Of these 35, the only one of major concern in the MRRW is spotted knapweed.

Spotted knapweed (*Centaura stoebe*), is one of the more aggressive noxious weeds in the Dillon Field Office. Spotted knapweed is found scattered throughout the MRRW especially along roads and in other disturbance areas. Motor vehicles, livestock, wildlife, and recreation activity can all spread knapweed seeds.

Biological controls such as the Urophora fly (*Cyphocleonus achates*), a knapweed root-boring weevil, and *Larinus minutus*, a knapweed flower weevil are present at release sites within the watershed. These insects help to control seed production and help to limit the spread and competitiveness of spotted knapweed

Other invasive and/or noxious weeds present in isolated locations are Houndstongue *(Cynoglossum officinale)*, Hoary cress (Whitetop) *(Cardaria draba)*, Black henbane *(Hyoscyamus nigar),* Canada thistle *(Cirsium arvense)* and Cheatgrass *(Bromus tectorum).*

Cheatgrass is established in disturbed areas throughout the watershed. Relatively large infestations were observed by the IDT in the major stream corridors, especially within the lower elevations adjacent to the streams and on south facing slopes. Cheatgrass is an extremely competitive early cool season species that flourishes in disturbed sites. Old mining sites, roads, construction locations, and other disturbed areas provide cheatgrass with the opportunity to establish and spread into adjacent habitats upon disturbance.

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

3.2.6 Resource Concern #2: Wilderness Characteristics

Ruby Mountains Wilderness Study Area (WSA) contains a total of 26,611 acres, of which 14,217 acres are within the MRRW. A total of 15,615 acres of the WSA was recommended suitable for designation as wilderness as part of the National Wilderness Preservation System in the 1991 Montana Statewide Wilderness Study Report. The wilderness qualities of naturalness, opportunities for solitude and primitive and unconfined types of recreation were identified as important attributes of this WSA. Other special features identified include scenic quality and variety, including steep canyons, rock walls, caves, etc.

The Axolotl Lakes WSA covers approximately 7,804 acres, of which only 610 acres are within the MRRW. All of Axolotl Lakes WSA was recommended as not suitable for wilderness designation in the 1991 Montana Statewide Wilderness Study Report. That report stated, “The WSA has significant scenic value and wildlife features, and a diversity of primitive recreation opportunities. Human imprints reduce the WSA’s wilderness qualities significantly, however.”

Any changes in management, including potential range developments, changes in livestock management, prescribed fires or forest health treatments, road management, etc. should be evaluated to ensure that they do not impair the wilderness character of the WSAs. Wherever possible, and consistent with other management objectives, management actions should enhance the wilderness character of the WSAs.

Two areas of land within the MRRW were identified as potentially meeting the requirements for lands with wilderness characteristics (See Map 1). These areas will be called the Sweetwater unit (inventory # MT- 076-070) and the Jasmine Creek unit (inventory # MT-076-068) for the purpose of this report. Both units were inventoried 2014 and it was determined that both units possess wilderness characteristics.

The Sweetwater unit is located within all or parts of: Township 8 South, Range 6 West, Sections 13, 24 and 25; and Township 8 South, Range 6 West, Sections 19, 20, 21, 22, 30, 29, 28, 31 and 32; and Township 9 South, Range 5 West, Sections 4, 5, 6, 7 and 8. The Sweetwater unit totals approximately 7,856 acres. The Jasmine Creek unit is located within all or parts of the following: Township 8 South Range 4 West Sections 1, 2, 11, 12, 13, 14, 23, 24 and 25; and Township 7 South Range 4 West Sections 23, 24, 25, 26 and 35; and Township 7 South, Range 3 West Sections 19 and 20. The Jasmine Creek unit totals 16,910 acres.

3.2.7 Resource Concern #3: Recreation and Travel Management

The MRRW includes portions of the Ruby Mountains WSA and Axolotl Lakes WSA; both of these areas are Special Recreation Management Areas (SRMAs). The Dillon RMP specifies the types of recreation opportunities available in all SRMAs. Axolotl Lakes has a recreational emphasis on semi-primitive non-motorized summer recreation use, and both motorized and non-motorized winter use. Axolotl Lakes WSA allows seasonal snowmobile use on a designated trail. Ruby Mountains SRMAs emphasis is placed on primitive and semi-primitive non-motorized recreation. Ruby Mountains has also been identified as a priority area for non-motorized recreational trail construction; however funding and staffing levels have not allowed this to be accomplished in the past, and will likely continue to prevent any work from occurring in the near future.

The Dillon RMP says that the BLM will "manage Ruby Reservoir as a developed recreation site within the Dillon Extensive Recreation Management Area." Much of what is consider the Ruby Reservoir recreation site is on private property. The BLM will continue to manage the site for the duration and to the extent allowed by the private property owners. If the BLM has the opportunity to acquire the property, the agency should consider all reasonable and feasible options. If the private landowners prohibit further public access to the reservoir and site, the BLM should explore other options to provide public access or look at developing other BLM lands in order to provide access to the reservoir.

Clarification of route designations and sign improvements throughout the watershed will continue to be a travel management priority.

3.2.8 Resource Concern #4: Socioeconomics

Ranching and farming (i.e., hay production) are critical components to the economic well-being of the various communities in Madison County. In the 2012, the National Agricultural Statistical Service estimated that there were 77,000 head (all cattle and calves) in the county (www.nass.usda.gov). This ranks Madison County eleventh in the state in number of cattle. In addition, Madison County ranked second in tons of hay produced, 206,000 tons. Most of this hay is either used by local producers or sold for feeding livestock in the winter.

In the MRRW, there are 12 different business entities or individuals authorized to graze livestock and harvest 3,719 public land AUMs on the 13 grazing allotments. Qualified individuals and business enterprises are authorized to graze livestock through a ten year term grazing lease (43 CFR 4110). Many use allotments that combine public and private land pastures in a comprehensive management plan. In most cases, private land owned by the lessees is adjacent to, or intermingled with, BLM administered land. All aspects of the ranching operation including calving, breeding, haying, feeding, shipping, summer pasturing, and marketing schedules are planned and implemented with reliance on annual use of public land allotments during a portion of the grazing season. Changes in numbers of livestock, seasons of use, and/or increased labor inputs may have a considerable economic impact on individual operators.

Recreation and tourism is an important component of the economy of the MRRW. Recreation use within the MRRW occurs year round and includes; hunting (big game, birds, and mountain lion), fishing, hiking, wildlife viewing, camping, recreational driving, rock hounding and some recreational mining. Ruby Reservoir is a popular recreational site providing the opportunity for summer camping and fishing, and ice fishing in the winter. Some off road vehicle use occurs at Ruby Reservoir.

One outfitter is permitted to hunt mountain lions in the watershed. They typically hunt less than 25 user days a year, during the winter months. One outfitter is permitted for commercial horseback rides in the Axolotl Lakes WSA. These are day trips that occur during the summer months.

The Ruby Mountains and Axolotl WSA's are designated as Special Recreational Management Areas (SRMAs).

There is one current Categorical Exclusion (CX), active through March 2014, which allows the Warm Springs Production Company to apply for filming permits in the Ruby Mountains. Each permit is issued for a specific period of use through an application process. Filming is not authorized within the Ruby Mountain WSA.

The BLM sells permits authorizing firewood removal and Christmas tree cutting which may be utilized in areas of the MRRW. Approximately 703 acres were commercially harvested in the MRRW over the last 45 years on BLM-administered lands.

On page 252 of the Proposed Dillon RMP/Final EIS, Table 48, Employment and Labor Earnings by Major Type and Sector in 2000, reports that private on-farm employment accounted for 14 % of total employment in Madison County. The National Agricultural Statistics Service data from 2007 reports that, of Montana's 56 counties, Madison county ranked 4thin total hay production; 10th in total cattle numbers; and 12th in sheep numbers. Please refer to Table 56 on page 286 of the Proposed Dillon RMP and Final EIS, which shows employment and labor income response coefficients related to livestock grazing, timber management and recreation use for the area influenced by the Dillon Field Office.

In addition, page 251 of the EIS presents personal income statistics from 2000 that indicate that labor earnings are the largest source of income in Madison County.

The Proposed Dillon RMP/Final EIS is available at http://www.blm.gov/mt/st/en/fo/dillon_field_office/rmp/Final.html.

3.2.9 Resource Concern #5: Wildland Urban Interface

Private land at the foothills of the Greenhorn and Ruby Mountains has experienced relatively rapid residential development in the past ten to fifteen years and this is expected to continue. Field reconnaissance coupled with vegetation modeling (Landfire 2011a) found that 67%-76% of the MRRW analysis area is in a Fire Regime Condition Class of 2 or 3, which corresponds to a moderate-high departure from historic pre-European settlement conditions. The resultant continuous fuels surrounding private lands and structures and limited access put these properties at an elevated risk of being threatened by large-scale fire growth. The occurrence of a large wildfire between the irrigated agricultural lands located in the valley bottoms and the higher elevation, unpopulated BLM, State and National Forest lands 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.

3.2.10 Resource Concern #6: Cultural & Paleontological 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 Middle Ruby Planning Area were lower than that observed in other planning areas, with the average site density of approximately two sites for every 135 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 inventories conducted on public lands within the MRRW analysis area. Within the study area, approximately 276 acres of public land have been intensively inventoried for cultural resources at the Class III level. Inventories are subject to specific project compliance in advance of all proposed federal undertakings including: small range improvements (fences, water developments), road rights-of-way, timber sales, fuels projects, and land exchanges. The inventory projects vary from as little as one acre, to as much as 118 acres in extent. Public lands within five 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 80 recorded cultural properties within the MRRW study area. Of that number, 50% are prehistoric, 38% are historic, and 2% have a combined prehistoric and historic component. A total of 21 paleontological sites are known within the watershed.

3.2.11 Resource Concern #7: Visual Resource Management

The Ruby Mountains and Axolotl Lakes WSAs are managed according to VRM Class I objectives. "Preservation of the landscape is the primary management goal in Class I areas. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention."

The rest of the planning area is managed as VRM Class III. "The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic

landscape should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes caused by management activities may be evident but should not detract from the existing landscape."

3.3 Description of Relevant Non-Affected Resources

3.3.2 Air Quality

For most of the year, air quality in rural southwestern Montana is excellent. Air quality issues in the MRRW develop predominantly during wildfires and are limited to $PM_{2.5}$ emissions, which can travel hundreds and even thousands of miles. Consequently, air quality in the MRRW can be affected by fires located far from the MRRW. Because pollutant emissions associated with wildfires are largely beyond human control, going beyond air quality standards that are associated with large wildfires is considered to be a natural event and is typically exempted from consideration when determining NAAQS compliance. Air quality concerns in the planning area are primarily related to smoke. Smoke contributors in the planning area include wildfire, prescribed fires, private debris burning, agricultural burning, slash burning, and wood burning stoves and fireplaces. Prescribed burning is conducted in accordance with the Montana/Dakotas Fire Management Plan and is coordinated with MT DEQ and the Montana/Idaho Airshed Group.

3.3.3 Climate Change

Climate change is defined by the Intergovernmental Panel on Climate Change (IPCC) as "a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and persist for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity" (IPCC 2007a). Climate change and climate science are discussed in detail in the Climate Change Supplementary Information Report for Montana, North Dakota, and South Dakota, Bureau of Land Management (Climate Change SIR, 2010). This document is incorporated by reference into this EA.

The Intergovernmental Panel on Climate Change (Climate Change SIR, 2010) states, "Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level." Global average temperature has increased approximately 1.4°F since the early 20th century (Climate Change SIR 2010). Warming has occurred on land surfaces, oceans and other water bodies, and in the troposphere (lowest layer of earth's atmosphere, up to 4-12 miles above the earth). Other indications of global climate change described by IPCC 2007b (Climate Change SIR 2010) include:

- Rates of surface warming increased in the mid-1970s and the global land surface has been warming at about double the rate of ocean surface warming since then;
- Eleven of the last 12 years rank among the 12 warmest years on record since 1850;
- Lower-tropospheric temperatures have slightly greater warming rates than the earth's surface from 1958-2005.

As discussed and summarized in the Climate Change SIR, earth has a natural greenhouse effect wherein naturally occurring gases such as water vapor, CO_2, methane, and N_2O absorb and retain heat. Without the natural greenhouse effect, earth would be approximately 60°F cooler (Climate

Change SIR 2010). Current ongoing global climate change is believed by scientists to be linked to the atmospheric buildup of greenhouse gases (GHGs), which may persist for decades or even centuries. Each GHG has a global warming potential that accounts for the intensity of each GHG's heat trapping effect and its longevity in the atmosphere (Climate Change SIR 2010). The buildup of GHGs such as CO_2, methane, N_2O, and halocarbons since the start of the industrial revolution has substantially increased atmospheric concentrations of these compounds compared to background levels. At such elevated concentrations, these compounds absorb more energy from the earth's surface and re-emit a larger portion of the earth's heat back to the earth rather than allowing the heat to escape into space which would be the case under more natural conditions of background GHG concentrations.

A number of activities contribute to the phenomenon of climate change, including emissions of GHGs (especially carbon dioxide and methane) from livestock production, fossil fuel development, large wildfires, activities using combustion engines, changes to the natural carbon cycle, and changes to radioactive forces and reflectivity (albedo) (UNFAO 2013). It is important to note that GHGs will have a sustained climatic impact over different temporal scales due to their differences in global warming potential (described above) and lifespans in the atmosphere. For example, CO_2 proper may last 50 to 200 years in the atmosphere while methane has an average atmospheric life time of 12 years (Climate Change SIR, 2010). Land use and/or land management activities that increase the ability of vegetation and soil to sequester carbon can help mitigate the effects of climate change. Such activities include improving/restoring riparian and wetland areas, improving age class diversity, health and resiliency of forests, mitigating the size and intensity of wildfires and maintaining/improving livestock grazing management.
North Dakota, Montana, and South Dakota are all in the lower third of GHG-emitting states (by volume). North Dakota ranks 37, Montana ranks 42, and South Dakota ranks 43. Only Hawaii and Idaho have lower emissions than Montana and South Dakota among western states (http://assets.opencrs.com/rpts/RL34272_20071205.pdf, Ramseur 2007). Montana, North Dakota, and South Dakota combine for 1.8 percent of the U.S.'s GHG emissions.

Montana's GHG inventory from 2007 at the Center for Climate Strategies, http://www.eia.doe.gov/oiaf/1605/archive/gg04rpt/emission.html, shows that activities within the state contribute 0.6 percent of U.S. and 0.076 percent of global GHG emissions (based on 2004 global GHG emission data from the IPCC, summarized in the Climate Change SIR 2010). Based on 2005 data in the state-wide inventory, the most pronounced source of Montana's emissions is combustion of fossil fuels to generate electricity, which accounts for about 27 percent of Montana's emissions. The next largest contributors are the agriculture and transportation sectors (each at approximately 22 percent) and fossil fuel production (13.6 percent).

Greenhouse gas emissions from all major sectors in Montana in 2005 added up to a total of approximately 36.8 million metric tons of CO_2e (Center for Climate Strategies (CCS) 2007). The EPA (USEPA 2010, as summarized by the Climate Change SIR 2010) published an inventory of U.S. GHG emissions, indicating gross U.S. emissions of 6,957 million metric tons, and net emissions of 6,016 million metric tons (when CO_2 sinks were considered) of CO_2e in 2008 Global GHG emissions for 2004 (IPCC 2007, summarized by the Climate Change SIR 2010) indicated approximately 49 gigatonnes (10^9 metric tons) of CO_2e emitted.

Information and projections of impacts beyond the project scale are becoming increasingly available. Chapter 3 of the Climate Change SIR describes impacts of climate change in detail at various scales, including the state scale when appropriate. The following bullet points summarize potential changes identified by the EPA (EPA, 2008) that are expected to occur within the Mountain West region, where the Alternatives in this EA are proposed to take place. The EPA identifies this area as part of the Mountain West and Great Plains region (http://www.epa.gov/Region8/climatechange/pdf/ClimateChange101FINAL.pdf):

- The region is expected to experience warmer temperatures with less snowfall.
- Temperatures are expected to increase more in winter than in summer, more at night than in the day, and more in the mountains than at lower elevations.
- Earlier snowmelt means that peak stream flow would be earlier, weeks before the peak needs of ranchers, farmers, recreationalist, and others. In late summer, rivers, lakes, and reservoirs would be drier.
- More frequent, more severe, and possibly longer-lasting droughts are expected to occur.
- Crop and livestock production patterns could shift northward; less soil moisture due to increased evaporation may increase irrigation needs.
- Drier conditions would reduce the range and health of ponderosa and lodgepole pine forests, and increase the susceptibility to fire. Grasslands and rangelands could expand into previously forested areas.
- Ecosystems would be stressed and wildlife such as the mountain lion, black bear, westslope cutthroat trout, Montana arctic grayling, marten, and bald eagle could be further stressed.

Other impacts could include:

- Increased particulate matter in the air as drier, less vegetated soils experience wind erosion.
- Shifts in vegetative communities which could threaten plant and wildlife species.
- Changes in the timing and quantity of snowmelt which could affect both aquatic species and agricultural needs.

Projected and documented broad-scale changes within ecosystems of the U.S. are summarized in the Climate Change SIR. Some key aspects include:

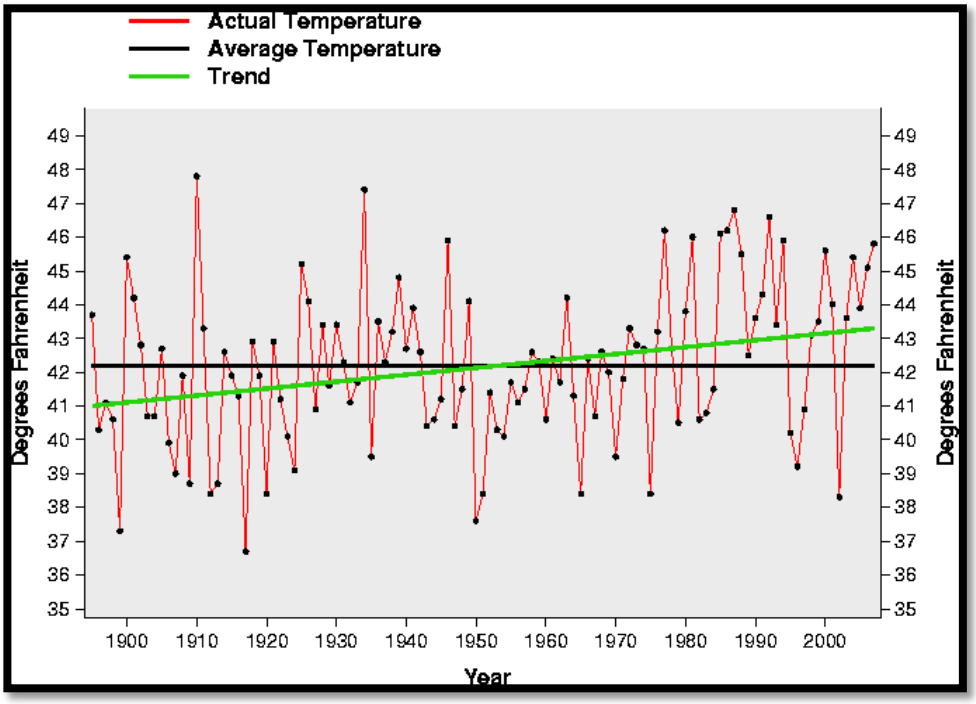
- Large-scale shifts have already occurred in the ranges of species and the timing of the seasons and animal migrations. These shifts are likely to continue (USGCRP 2009, as cited by Climate Change SIR 2010). Climate changes include warming temperatures throughout the year and the arrival of spring an average of 10 days to two weeks earlier through much of the U.S. compared to 20 years ago. Multiple bird species now migrate north earlier in the year.
- Fires, insect epidemics, disease pathogens, and invasive weed species have increased and these trends are likely to continue. Changes in timing of precipitation and earlier runoff increase fire risks.
- Insect epidemics and the amount of damage that they may inflict have also been on the rise. The combination of higher temperatures and dry conditions have increases insect populations such as pine beetles, which have killed trees on millions of acres in western U.S. and Canada. Warmer winters allow beetles to survive the cold season, which would normally limit populations; while concurrently, drought weakens trees, making them more susceptible to mortality due to insect attack.

More specific to Montana, additional projected changes associated with climate change described in Section 3.0 of the Climate Change SIR (2010) include:

- Temperature increases in Montana are predicted to be between 3 to 5°F at mid-21st century and between 5 to 9°F at the end of the 21st century. As the mean temperature rises, more heat waves are predicted to occur. In the late 21st century, the number of days per year with temperatures above 100°F is predicted to be between 10 and 45, depending on the level of GHG emissions, with the largest increase in the number days over 100°F occurring in the eastern portion of the state.
- Precipitation increases in winter and spring in Montana may be up to 25 percent in some areas. Precipitation decreases of up to 20 percent may occur during summer, with potential increases or decreases in the fall. In the fall western Montana may see little change in precipitation while the northwestern portion of the state may experience 5 to 10 percent increases.
- For most of Montana, annual median runoff is expected to decrease between 2 and 5 percent, but northwestern Montana may see little change in annual runoff. Mountain snowpack is expected to decline, reducing water availability in localities supplied by meltwater.
- Glaciers are already known to be melting, and all glaciers in Glacier National Park are expected to be completely melted by 2030 or sooner.
- Wind power production potential is predicted to decline in Montana based on modeling focused on the Great Falls area.
- Conditions in Montana wetlands across much of the northern part of the state are predicted to remain relatively stable, although some wetland habitat near Cut Bank is predicted to degrade to less favorable conditions.
- Water temperatures are expected to increase in lakes, reservoirs, rivers, and streams. Fish populations are expected to decline due to warmer temperatures, which could also lead to more fishing closures.
- Wildland fire risk is predicted to continue to increase due to climate change effects on temperature, precipitation, and wind. One study predicted an increase in median annual area burned by wildland fires in Montana based on a 1°C global average temperature increase to be 241 to 515 percent.

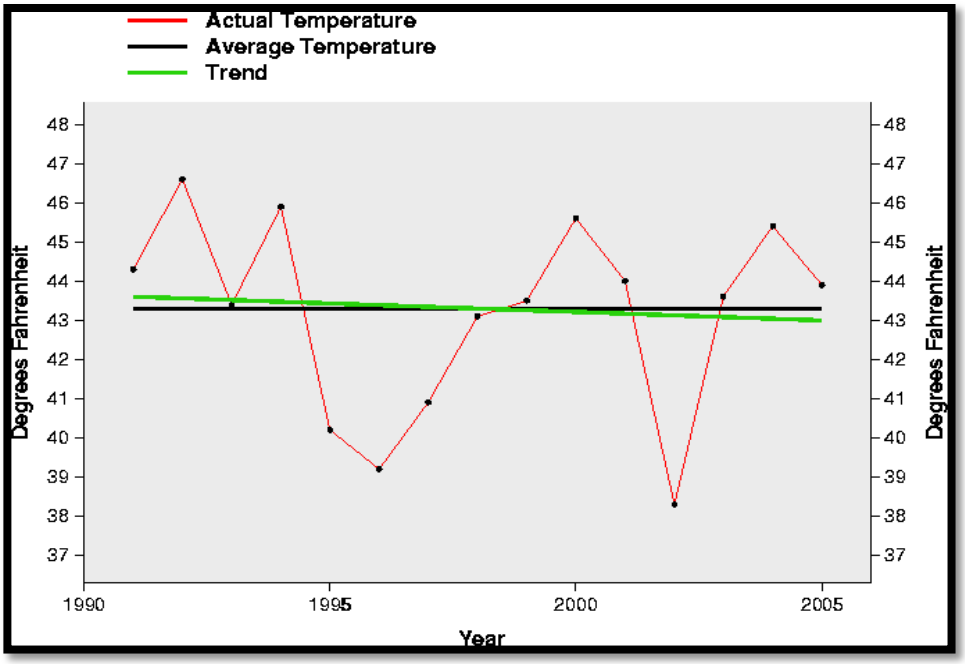
While long-range regional changes might occur within this analysis area, it is impossible to predict precisely when they could occur. The following example summarizing climate data for the West North Central Region (MT, ND, SD, WY) illustrates this point at the regional scale. A potential regional effect of climate change is earlier snowmelt and associated runoff. This is directly related to spring-time temperatures. Over a 112-year record, overall warming is clearly evident with temperatures increasing 0.21 degrees per decade (Figure 3.2). This would suggest that runoff may be occurring earlier than in the past. However, data from 1991-2005 indicates a 0.45 degree per decade cooling trend (Figure 3.3). This example is not an anomaly, as several other 15-year windows can be selected to show either warming or cooling trends. Some of these year-to-year fluctuations in temperature are due to natural processes, such as the effects of El Ni os, La Ni as, a nd the eruption of large volcanoes (Climate Change SIR 2010). This information illustrates the difficulty of predicting actual regional or site-specific changes or conditions which may be due to climate change during any specific time frame.

Figure 3.2: Regional climate summary of spring temperatures (March-May) for the West North Central Region (MT, ND, SD, WY), from 1895-2007.



(Source: NOAA website – http://www.ncdc.noaa.gov/oa/climate/research/cag3/wn.html)

Figure 3.3: Regional climate summary of spring temperatures (March-May) for the West North Central Region (MT, ND, SD, WY), from 1991-2005.



(Source: NOAA website – http://www.ncdc.noaa.gov/oa/climate/research/cag3/wn.html)

Chapter 4

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 identified in Chapter 1. The environmental consequences are disclosed and analyzed by alternative for each issue. This chapter also discloses the cumulative, or combined, impacts of alternative actions with past, present and reasonably foreseeable actions within the watershed.

Not every Key Issue and/or Resource Concern is relevant under each specific heading and therefore will not be discussed. And not every component within the Key Issues and/or Resource Concerns will be affected by the alternatives (i.e. not every species of wildlife in the watershed will be affected). If Key Issues, Resource Concerns and/or specific components within an issue are not discussed, they were either not present or present but minimally affected.

For each alternative where management changes or administrative actions are proposed, the predicted effects of each applicable action alternative(s) are presented for each identified issue or resource concern in the following order:

Issue #1: Riparian, Wetland and Aquatic Health
Issue #2: Upland and Sagebrush Steppe Habitat
Issue #3: Forest and Woodland Habitat
Issue #4: Special Status Species Habitat

Resource Concern #1: Noxious Weeds and Invasive Species
Resource Concern #2: Wilderness
Resource Concern #3: Recreation and Travel Management
Resource Concern #4: Socioeconomics
Resource Concern #5: Wildland Urban Interface
Resource Concern #6: Cultural and Paleontological Resources
Resource Concern #7: Visual Resource Management

Carefully planned resource specific monitoring under all alternatives will provide data for adaptive management within the watershed. The monitoring plan for the MRRW 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: Riparian, Wetland and Aquatic Habitat
Four grazing allotments containing riparian habitat are in compliance with the Riparian Health Standard. These allotments are: Davey Creek, Fossil Basin, Garden Creek and North Fork AMP. Current authorized uses, including grazing management in these allotments is facilitating the maintenance of proper functioning and/or improving riparian habitat. These trends are expected to continue.

Depending on topography and timing of use, livestock are expected to utilize riparian areas more than upland areas. Ungulates will impact riparian vegetation, channel substrates, suspended sediment and channel morphology under all alternatives including the no action alternative to some degree. Domestic ungulates, livestock, are drawn to riparian areas by forage and water as well as relatively favorable topography, which they prefer over steeper terrain and drier forage (Clary and Leninger, 2000), The authors, Clary and Leninger, discuss livestock behavior and their tendency to congregate in riparian areas. Their long-term presence can result in changes to stream channel profiles, channel bottom embeddedness, channel substrates, and streamside vegetation as well as lowering of water tables and replacement of plants with deep roots like sedges with shallow rooted species, like Kentucky bluegrass. In "*Quantifying the Effects of Livestock Grazing on Suspended Sediment and Stream Morphology*" (Bengeyfield 2004), the author describes the effects of livestock grazing on channel morphology and streambed materials, while acknowledging the difficulty of quantifying sediment loading attributable to livestock. "Livestock trampling on streambeds leads to two major adverse effects on the functioning of the channel." Suspended sediment levels increase and channels become wider and shallower. Stream power is reduced as channels became wider and shallower. In two separate studies in Oregon, cattle were found to use the riparian zone 12 to 20 times more than upland areas and 80% of the forage came from the riparian zone (Skovlin 1984).

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. Proper salting, and the efficient placement of supplements, like dehydrated molasses, improves cattle distribution and forage utilization away from sensitive riparian areas (Bailey, Welling and Miller 2001).

Riding and herding will continue to be emphasized and utilized to improve livestock distribution, reduce the amount of time cattle spend in riparian areas and increase animal production. BLM technical reference # 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 lead to improved riparian conditions that benefit fisheries and wildlife while improving water quality."
Regulating livestock use around live water sources and wet meadows by fencing, grazing or herding management to restrict overuse protects vulnerable forbs and grasses for a variety of

wildlife species. However, livestock grazing could periodically be used inside riparian exclosures to reduce old vegetation, thereby exposing and rejuvenating succulent forbs (Evans 1986).

Replacing four culverts along the Davey Creek Road and ensuring they are properly sized will reduce sediment input from the road into Davey Creek and will mitigate downstream impacts resulting from the existing culverts.

Removing, maintaining and/or redeveloping seven spring developments within the Garden Creek Allotment will increase their effectiveness as BMPs or remove all infrastructure and leave the wetland and spring in a more natural condition.

Large amounts of large woody debris from dead and dying trees are expected to continue to accumulate in and along some riparian reaches flowing through forested habitat in the MRRW. These reaches are primarily located in steep, narrow, forested drainages. Downfall will reduce or eliminate both big game and livestock access to these reaches, resulting in reduced impacts to the vegetative cover and stream banks. However, grazing pressure will increase proportionately on near-by accessible reaches. Increased woody debris will also increase step pool habitat and sediment storage and deposition zones.

Additional fuel loading within these steep, narrow drainages will increase fire probability and wildfires will burn more intensely. In addition, beetle kill areas in these drainages are even more susceptible to severe fire damage. Sediment storage would be released very rapidly in the event of a wildfire causing excessive sediment deposition lower in the stream system.

Without disturbance, vegetation succession will continue to move towards conifer dominance along many riparian reaches throughout the watershed and will result in a decrease in deciduous woody riparian species including aspen and willows.

Predicted effects of climate change relevant to all issues in this section are described in section 3.3.3.

Issue #2: Upland and Sagebrush Steppe Habitat

The Upland Health Standard in 11 allotments in the MRRW is not being adversely impacted by BLM authorized activities, including livestock grazing. Although noxious weeds issues may be present on some of these allotments, current grazing practices are not contributing to Upland Habitat concerns. Therefore, no changes to the terms and conditions of these grazing leases will be implemented based exclusively on the condition of the upland habitat. The health of the uplands and associated upland species, including sagebrush obligate species, is expected to remain in PFC.

As conifer expansion continues within the watershed the upland plant communities and overall biodiversity in several allotments would be adversely affected. Conifer expansion and its effect on Forest and Woodland Health is discussed in more detail in section 4.2.2, Issue #3.

Temporary electric fence, livestock supplement placement (salt, protein block), riding and herding are encouraged, and may be required as a means of improving livestock distribution under all alternatives. 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 other commonly used supplements such as low-moisture blocks. The use of dehydrated molasses supplements is an effective way to lure cattle into underutilized uplands. In a study conducted on two Montana ranches, cattle remained within 600 meters of supplements, even when located on steep rugged terrain and relatively far from water (Bailey, Welling and Miller 2001).

Issue #3: Forest and Woodland Habitat

Public use of wood products on BLM administered lands will result in the removal of dead/dying materials within 300 feet of existing designated open routes. Impacts of personal-use firewood gathering will be minimal. Slashing stipulations may be required in addition to the existing stipulations and regulations required by the permit. Prescribed burning of slash piles may be required to reduce slash concentrations in areas of frequent use.

Permits for Christmas trees will be issued for the removal of small size-class trees. Impacts to resources from Christmas tree harvesting will be minimal. On a very small scale, the removal of these smaller trees will make progress towards meeting management objectives to maintain existing openings by removing young conifers that are expanding into sagebrush/grassland habitats.

The current mountain pine beetle epidemic will continue under all alternatives including the no action. At the current epidemic level of activity, vegetation management is unlikely to stop the spread of mountain pine beetle (Colorado State Forest Service, 2009). The epidemic is expected to continue until the majority of mature lodgepole pine trees have been killed by the beetle. Throughout the MRRW, 5-needled pines (limber pine and whitebark pine) will continue to decline due to mountain pine beetle and/or 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). Individual and/or groups of 5-needled pines (limber and whitebark pines) that are suspected to be blister rust resistant will be protected from bark beetle infestation where pheromones are applied.

Douglas-fir will continue to be defoliated and damaged due to western spruce budworm. Heavy defoliation will predispose stands to future Douglas-fir beetle infestations. Late seral stands will continue to be lost as a result of drought, defoliation, and bark beetle infestation. Current Douglas-fir beetle activity is at endemic levels, but is likely to increase due to suitable stand conditions in certain areas of the MRRW. In the absence of wildfire, conifer expansion into sagebrush communities and aspen will continue across all ownerships.

Collecting cones from individual five needle pine trees (limber and/or whitebark pine) that are suspected of being blister rust resistant would contribute to the genetic breeding program, and could help the long-term sustenance of these species on the landscape. Applying pheromones to selected areas will deter bark beetles from attacking mature trees. This will protect special value

individual trees, as well as their genetics, to persist on the landscape as an important feature of forest and woodland habitats.

Issue #4: Special Status Species
See whitebark pine discussion in Issue #3 above.

Removing, modifying, or rebuilding BLM fences, and fences bordering BLM land, will enhance wildlife and bird movement within and through the watershed, and reduce entanglement, collision hazards and mortality. Modifications to meet BLM specifications will improve seasonal movements by elk, mule deer, moose and antelope in specific areas within the watershed, particularly for young of all species. Adjusting wire spacing, removing wires or providing gaps will allow animals to pass over or under these fences with a reduced risk of entanglement. Installing wildlife escape ramps enhances the ability of birds, bats, and other small mammals to get out of water developments and avoid drowning.
Herbaceous forage and cover would be reduced over winter and early spring on allotments that are grazed by cattle in the fall. However, removing decadent herbaceous foliage late in the season would improve the nutritional value and forage quality of grasses for wildlife as well as livestock the following spring. On allotments with big game winter range that are grazed following the cool season bunchgrass growing season, herbaceous forage may be reduced for wintering big game. Likewise, on allotments that are grazed earlier in the spring and summer, herbaceous nesting cover may be reduced for sage grouse and migratory birds. However, in both cases with big game winter range and nesting cover, implementing a 50% utilization standard would provide adequate residual forage and cover. Various migratory birds have different requirements for foraging and nesting, with some species nesting in shrubs while others nest on the ground, preferring more open habitat. Habitat heterogeneity across the landscape accommodates the numerous species' needs.

Livestock grazing can also provide habitat for brown-headed cowbirds, a brood parasitic species that lays its eggs in the nests of other birds, the majority of which are Neotropical migrants. Brown-headed cowbirds mostly feed on seeds and insects in short grass or bare ground. Historically, cowbirds followed herds of nomadic bison. Cowbirds may have depended upon grazing by large ungulates to create suitable feeding conditions. Since forests have been cleared for agriculture and livestock have been introduced across the region cowbirds have expanded their geographical range as new feeding areas became available (Robinson et al. 1993). Cowbirds also increase in bird communities in juniper woodlands (Rienkensmeyer 2000, Noson 2002). Removing juniper and Douglas fir expansion in sagebrush grasslands may reduce cowbird parasitism in these areas.

There is potential for conflicts between livestock and large carnivores, especially when livestock are calving or have young offspring. Amending grazing leases to state that livestock losses may occur from wolves and grizzly bear will create awareness, and minimize conflicts between lessees and agencies responsible for managing the predator population. Grazing leases also include a stipulation obliging the lessee, BLM, and Montana FWP to jointly determine how to properly treat or dispose of livestock carcasses to reduce the potential for attracting grizzly bears. Later turnout date (e.g. July) for cattle and older calves at time of turnout can help reduce potential grizzly conflicts. However, a grizzly may predate any age or size of livestock.

Improving whitebark and limber pine, including contributing whitebark pine cones to the genetic breeding program, would promote habitat and encourage this food source for wildlife species, such as squirrels, Clark's nutcrackers, and bears.

Continuation of lek monitoring within the MRRW will contribute to long-term population trend data for male sage grouse lek attendance. Marking fences to make them more visible in areas where sage grouse use may be more concentrated will reduce collisions with wires. While sagebrush cover was found to be in adequate amounts for sagebrush obligate species during the assessment, maintaining or increasing big sagebrush communities, sagebrush canopy cover, herbaceous height, and forbs will provide vegetative composition and structure for sagebrush obligate species. to fulfill all or part of their life cycle.

West Nile Virus has not been documented in the area administered by the Dillon Field Office (BLM Information Bulletin (IB) No. MT-2011-033). Guidance for West Nile Virus and Water Developments, will be implemented where applicable. Management to reduce impacts of WNV focuses on eliminating man-made water sources that support breeding mosquitoes known to vector the virus. Whether the water development is for livestock water, wildlife habitat, fish, or storm water management, potential habitat for mosquitoes may be increased. Incorporating applicable design and mitigation measures, described in the IB, for water development projects can reduce mosquito production through modifying and eliminating mosquito breeding sites.

The Record of Decision and Approved Dillon Resource Management Plan (February 2006) designated the public land through which Greenhorn and Dark Hollow Creeks flow as "unavailable for grazing." Maintaining the no grazing designation will prevent riparian habitat conditions from being impacted by livestock grazing. Streams are expected to remain in PFC or better condition. WCT habitat is expected to continue to improve or reach potential condition.

Continuation of stream temperature monitoring would provide long term data on WCT streams. This data would be used to track any changes in stream temperature related to climate change or changes in land use practices within monitored drainages. This data would also allow managers to identify drainages that may become critical thermal refugia for WCT should climate change increase stream temperatures beyond desired levels

A Short Form Biological Evaluation (BE) for Special Status Fish and Wildlife Species (Appendix C) provides a summary of whether or not special status fish and wildlife species are affected by the proposed alternatives and potential impacts. Potential site-specific impacts to special status wildlife species are included in the allotment discussions below where appropriate. Although wildlife species that are not considered special status were not identified as an issue, if these species may be impacted, they are discussed under Issue #4. If any wildlife species is unlikely to be impacted, they are not discussed.

Resource Concern #1: Noxious and Invasive Species

Human activities, such as road maintenance activities, recreation, mining, and other disturbances, as well as livestock, wildlife, wind, water and fire will continue 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.

This will likely maintain noxious weed infestations at current levels or result in a slow decrease in plant densities. This continued treatment will reduce the spread of existing infestations and targeting new infestations for eradication will keep them from becoming well established.

Resource Concern #2: Wilderness
There is no designated wilderness area within the MRRW. The MRRW does include 14,217 acres of the Ruby Mountains Wilderness Study Area (WSA) and a small segment, about 610 acres, of the Axolotl Lakes WSA. There are no proposed projects that would impact the Axolotl WSA, and no impacts to wilderness characteristics are anticipated as a result.

The abandoned Pierce Canyon Spring development in the Ruby Mountains WSA will be cleaned up and all debris removed. Currently the spring development is not functioning and the infrastructure is lying on the ground rotting. This project will have a positive long term impact to the wilderness characteristics of the WSA. During the clean-up process there will be short term negative impacts to wilderness characteristics from the use of vehicles and equipment to dismantle and haul debris. Removing this abandoned project will return the immediate area into more natural condition.

In the northern portion of the Ruby Mountain WSA, the BLM will manage naturally occurring wildfire as defined in the Dillon RMP. This Wildland Fire Use policy will not adversely affect wilderness characteristics within the WSA because fire is a natural disturbance which would return the environment to a more natural condition. The BLM WSA Manual says, "The overall goal of managing fire in WSAs is to allow the frequency and intensity of the natural fire regime to play its inherent role in the ecosystem."

Two areas of land within the MRRW were identified as meeting the requirements for lands with wilderness characteristics (Map 1, Appendix A). These areas are called the Sweetwater unit (inventory #MT-076-070) and the Jasmine Creek unit (inventory #MT-076-068). There are no projects planned for the Sweetwater unit and therefore no impacts to the wilderness characteristics of the unit. The Jasmine Creek unit proposed projects will be discussed in the appropriate sections.

Resource Concern #3: Recreation and Travel Management
Recreational uses will continue to occur as they have historically within this area under all alternatives. Although there would be some relatively minor changes to certain designated motorized travel routes under the action alternatives, those proposed changes reflect corrections of mapping errors and designations of routes most commonly used by the public for recreation and that would have no additional impacts than what are currently occurring. The proposed changes in travel management are discussed under Alternative B, under the Belmont and Garden Creek allotment headings.

Resource Concern #4: Socioeconomics
The BLM does not have access to financial or business records for public land users authorized to 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 2014 BLM AUM cost is $1.35 and an additional $6.88/AUM surcharge for grazing cattle owned

by another operator. Private non-irrigated land lease rates in Montana for 2014 will range from $20 to $24 per animal unit or cow/calf pair.

Current trends in the livestock and timber markets and associated expenses will continue. Economic impacts to businesses and commercial outfitting operations in the area are not expected to be affected from recreation in the MRRW 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.

Resource Concern #5: Wildland Urban Interface
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 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.

Resource Concern #6: Cultural & Paleontological Resources
The BLM will continue to focus on preservation and protection of cultural and paleontological resources to ensure they are available for appropriate uses by present and future generations. The BLM will continue to reduce imminent threats from natural or human-caused deterioration, or potential conflict with other resource uses, by identifying areas for new field inventory. The BLM will also continue to ensure that all authorizations for land and resource use avoid inadvertent damage to federal and nonfederal cultural and paleontological resources in compliance with Section 106 of the National Historic Preservation Act and the Paleontological Resource Protection Act.

Resource Concern #7: Visual Resource Management
Changes to the visual characteristics of the landscape throughout the planning area would be consistent with the Visual Resource Management objectives for the area. With or without the vegetation treatments proposed in the action alternatives, the characteristic viewshed will change over time due in part to epidemic insect and disease impacts to the forests. With no management actions, stands of timber will gradually change in color from dominantly green to reddish, brown, and gray. The Class III objective that applies to the majority of the watershed planning area allows for moderate changes to the characteristic landscape, and for management activities that "…may attract attention but should not dominate the view of the casual observer." The various vegetation management actions proposed within the action alternatives would attract attention to varying degrees according to the particular proposal, but none would be likely to "dominate the view of the casual observer" within the context of the overall landscape in this watershed. If no vegetation management actions are taken, gradual changes to the characteristic landscape will be within the visual resource management objectives for this area.

The Ruby Mountain and Axolotl WSAs are managed according to VRM Class I objectives. "Preservation of the landscape is the primary management goal in Class I areas. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention." There are no proposed projects that would affect the Axolotl WSA. The proposed projects within the Ruby Mountains WSA would not attract attention, and would be done to preserve the landscape or to improve the natural characteristics. Naturally occurring wildfire, as defined in the Dillon RMP, would be allowed in the northern portion of the Ruby Mountain WSA. Wildfire in the WSA could potentially have immediate negative impacts to the viewshed, but in the long term a healthier forest would improve the viewshed.

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

Issue #1: Riparian, Wetland and Aquatic Habitat
The No Action Alternative would not meet riparian, wetland, or aquatic habitat objectives along stream reaches and/or at springs where resource concerns were identified. Also, the riparian issues or concerns identified by the IDT and documented in the MRRW Assessment Report would not be addressed. The effects of current livestock grazing practices on the riparian areas would be perpetuated because the current grazing practices in the affected allotments would be continued.

Three grazing allotments did not meet the Riparian Health Standard; Barton Gulch, Belmont and Idaho Jack, and two others, Garden Creek and Davey Creek, met the Standard but have site-specific riparian health concerns. Livestock grazing was determined to be a casual factor contributing to impaired riparian function. A variety of impacts were noted by the IDT, including, the alteration of stream morphology (i.e., channel shape and gradient), vegetative composition, vigor, structure and cover, and/or excess sediment inputs. Negative impacts from ungulate trampling to wet meadows, spring sources, and spring brooks would continue, and ecological functions would continue to be degraded in these areas. Riparian vegetation would continue to be impacted by ungulate browsing on palatable woody species resulting in limited recruitment and regeneration.

Alternatives proposed in Chapter 2 that would implement new allotment management plans (AMP) on some allotments that did not meet one or more of the Standards for Rangeland Health would not be implemented. 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). In addition, no new stream crossings, road improvements or projects (fences, water developments) would be initiated to address concerns on stream reaches that failed to meet the Riparian Health Standard. Some site specific riparian habitats would continue to be impacted by ungulate browsing on palatable woody species resulting in limited recruitment and regeneration.

Current trends and conditions of fishery habitat would continue under the no action alternative. Habitat conditions on fishery streams not meeting habitat requirements such as on Cottonwood Creek would not be expected to appreciably improve over the life of this plan. Fishery habitat in

an upward trend or PFC condition such as found in the Greenhorn complex would be expected to continue to improve or stabilize at a high PFC condition.

Under this alternative, Rocky Mountain juniper would continue to increase at the expense of other riparian woody and herbaceous species along some streams. Rocky mountain juniper has an extensive stoloniferous root system which is very efficient in competing for limited water and soil nutrients. The elimination of the understory, resulting in more bare ground, would increase erosion potential resulting in increased sediment inputs into the streams.

Issue #2: Upland and Sagebrush Steppe Habitat
Existing conditions and trends in sagebrush and upland habitats would continue under this alternative. Throughout the watershed conifers are expanding into sagebrush and grassland habitat and that trend is expected to continue. Overall the mountain big sagebrush community in the MRRW is slightly departed from reference conditions due to fire exclusion and conifer expansion. The proportions of mid- to late-development mountain big sagebrush are near reference conditions, however the early development sagebrush component is lacking throughout the watershed. Douglas-fir and juniper are establishing in areas historically occupied by sagebrush and are converting some of those areas into forested habitat.

As stated in Hyerdahl et al. (2006), "in the continued absence of fire, mountain big sagebrush and grasslands in southwest Montana are likely to become more homogenous as Douglas-fir trees continue to encroach." 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.

Continuation of current grazing practices on the two allotments that failed to meet the Upland Health standard, Garnet and Fossil Basin, would not address documented upland health issues. Some, but not all, of the upland conditions noted in the MRRW Assessment Report, December, 2013, are: water flow patterns that are slightly longer than expected, minor erosion and soil instability, slight active pedestalling in the flow patterns and the amount of bare ground is elevated in places facilitating increased litter movement.

Issue #3: Forest and Woodland Habitat
Under the No Action Alternative, forest and woodland stands would not have treatments as proposed in the action alternatives. Current conditions and forest trends would continue until interrupted by natural events (e.g. wildfire, windthrow), insects and disease, and/or changes in weather or climate. Fuel loading as a result of insect/disease-killed conifers would increase at a natural rate (i.e. remain unaffected by commercial salvage harvest).

Mature lodgepole pine trees would continue to be killed by mountain pine beetle. "Mountain pine beetle epidemics can substantially alter the ecosystem by reducing crown, thermal, and hiding cover, increasing forage production, releasing or converting to other tree species, creating large amounts of dead trees and logs, limiting access for large ungulates and recreationists, increasing fire danger, and providing a different mix of habitats for a variety of animal species" (Worrall, 2000). Where lodgepole pine trees have died in and around aspen stands, aspen are expected to benefit through increased vigor due to increased sunlight, water, and nutrients. The

vigor, condition and health of understory plants would also improve with increased light, moisture, and nutrients.

Generally, it takes five to ten years for a beetle killed lodgepole pine to fall to the ground. While the trees are standing and have red needles on them, crown fire hazard is greatly increased. As the needles, and then the trees, fall to the ground, crown fire hazard is reduced and surface fire hazard is increased (Bentz et al, 2009). Mountain pine beetle population outbreaks in lodgepole pine are usually stand-replacing events, and are usually followed by fire within 15 years following the outbreak (Samman and Logan, 2000). If the outbreak is not followed by a fire, understory conifers that are generally less fire resistant (e.g. spruce, subalpine fir) would be released and become dominant in the stand.

Under the No Action Alternative, aspen would continue to decline due to conifer expansion and competition for resources where it is found intermixed with Douglas-fir. High density Douglas-fir and mixed conifer stands have high hazard ratings for western spruce budworm and Douglas-fir beetle. Continuation of spruce budworm activity would result in additional defoliation, reduced growth and predisposition to attack by other insects and diseases. Repeated defoliation by spruce budworm may result in top-killing and tree mortality (Fellin and Dewey, 1986). The continued epidemic of spruce budworm in the MRRW would allow for "natural" thinning of the Douglas-fir forest which would reduce densities towards more historic stocking levels. However, defoliation by spruce budworm would also weaken trees and make them more susceptible to bark beetles. This increased susceptibility, in combination with suitable stand conditions, may cause Douglas-fir beetle activity to increase. During Douglas-fir beetle outbreaks, large-scale tree mortality can cause substantial economic losses, degradation of wildlife habitat, increased wildfire risk, and diminished aesthetic values associated with forests (Dodds et al., 2006). In outbreak conditions, groups of dead trees may total 100 or more and yearly mortality may extend into the millions of board feet.

Mountain pine beetle and white pine blister rust would continue to cause mortality of limber and whitebark pine. In some areas, limber pine habitats may undergo a species conversion to Douglas-fir and/or juniper. Whitebark pine habitats are at high risk of loss due to extensive mortality and lack of disturbance required for the promotion of successful regeneration. If whitebark pine is extirpated from these areas, they may either be replaced by subalpine fir, or the areas may remain bare due to the harsh environment from which this species is found. The prostrate growth form of whitebark pine provides shade and results in a decreased rate of snowmelt beneath the tree. Further losses of whitebark pine would also reduce the snow holding capacities in high elevation sites where it is found (Tomback et al, 2001).

Issue #4: Special Status Species

Buff fleabane – *Erigeron parryi* and taper-tip desert-parsley – *Lomatium attenuatum* populations would be expected to persist under the no action alternative. Populations of these species would be monitored as described in Appendix B, and would provide baseline and trend data for the known populations on BLM administered lands. See whitebark pine discussion in Issue #3 above.

Wildlife habitat in allotments that didn't meet riparian/wetland standards 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. Riparian areas in less than PFC may limit sage grouse brood rearing habitat as well. If juniper expansion continues in riparian areas, wildlife use of these areas would be impacted by loss of browse and forage. However, juniper would continue to provide hiding and thermal cover for big game species.

Suitable sagebrush habitat exists for sagebrush obligate species on allotments meeting upland and biodiversity standards. These habitat conditions throughout the MRRW would not change appreciably under Alternative A. The expansion of Douglas-fir and juniper into sagebrush/ grassland habitats would convert these sites into forest or woodland cover types. This would reduce habitat for sagebrush obligate species including sage grouse, pygmy rabbit, Brewer's sparrow, sage sparrow, and sage thrasher. Elk calving, elk, antelope and mule deer winter range would also transition into forest. The continued expansion of cheatgrass, reducing native herbaceous species, would be detrimental to sagebrush/grassland wildlife species due to loss of forage, cover and a possible increase in fire frequency. No changes to livestock management in Fossil Basin and Garnet allotments would limit the potential for expansion of native cool season bunchgrasses, which would limit herbaceous cover for sagebrush/grassland species.

The various bird species that eat millions of forest damaging insects, and woodpeckers that feed on insects under the bark of dead trees, would benefit from these food sources. However, once the beetle and budworm outbreak is over and the trees are dead and on the ground, these bird species would lose this food source. Deadfall would provide habitat for small mammals, including denning sites but would also hinder big game movement through the area. Loss of cover, as a result of fire or bug kill, may cause short term displacement of big game species such as moose, deer, and elk. However, increased forage production and palatability, and the opening of the forest canopy, would lure big game species back into burned areas. If fire does not move through the area, the deadfall would remain on the ground for many years, hindering big game movement and reducing hiding and thermal cover until increased sunlight reaching the ground beneath the deadfall stimulates stand regeneration.

Whitebark and limber pine seeds provide critical food for rodents and birds, including squirrels and Clark's nutcrackers, which also cache the seeds for later use. Other birds, small mammals, and bears benefit from these caches. This food source would be reduced as whitebark and limber pine dies.

Current trends in WCT habitat would continue under the No Action alternative. Habitat conditions in Greenhorn, Dark Hollow and Idaho Creeks were found to be in PFC. However, WCT habitat conditions on Jack Creek were not being met under current management. Under this alternative, habitat would not be expected to appreciably change in Jack Creek and would continue to have an impact on the WCT populations in Jack Creek.

Resource Concern #1: Noxious and Invasive Species
Continuation of current grazing practices on the two allotments that failed to meet the Upland Health standard, Garnet and Fossil Basin would lead to less vegetative diversity and more bare ground. This could lead to an increase in the size and density of existing noxious weed infestations as well as an increased probability of the establishment of new invasive species.

Resource Concern #2: Wilderness
Under the No Action alternative, current management policies for wilderness characteristics would continue.

Resource Concern #3: Recreation and Travel Management
Various recreational activities in the MRRW would persist at current or increased levels. People would continue to drive on the routes that are proposed to be designated as open, and there would be no new barriers to prevent this activity. Travel management regulations would continue to be difficult to enforce due to the minimal law enforcement presence available. Travel management signing would continue to be improved to encourage compliance.

Resource Concern #4: 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. Livestock grazing on about 42,000 acres of public lands would provide approximately 3,700 AUM's of forage on 13 grazing allotments in Madison County. The dependency of livestock operators on BLM forage would remain unchanged. Because authorized grazing use on public land allotments would remain static, the real estate values of private base properties would not be influenced by BLM actions.

Without commercial harvest treatments, there would be no removal of forest products, and the economic value of the timber resource would not be recovered. Under the No Action Alternative, there would be no short-term job opportunities created to treat forests and woodlands on BLM-administered lands and no additional opportunities for public utilization of wood products.

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.

Resource Concern #5: Wildland Urban Interface
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.

Resource Concern #7: Visual Resource Management
With no additional management actions, stands of timber will gradually change in color from dominantly green to reddish, brown, and gray as the epidemic insect and disease conditions continue to impact the timber in the watershed. The timber would then become increasingly

susceptible to large wildfires which might be ignited either naturally through lightning strikes and/or accidentally by recreationists or other visitors by a variety of means. All of these changes in the visual character of the landscape would be consistent with the visual resource management objectives within the watershed. Even in the VRM Class I area, which includes the Ruby Mountain and Axolotl WSAs, these changes would be considered "natural ecological changes", and would be consistent with the objective for that area.

4.2.2.1 Climate Change

Predicted effects would be the same as described in Section 3.3.3.

4.2.3 Predicted Effects Common to All Action Alternatives

Issue #1: Riparian, Wetland and Aquatic Habitat
Revised grazing systems, included in all the action alternatives, were developed in conjunction with the grazing lessees in an effort to increase cooperative implementation and success in meeting resource objectives. Ehrhart and Hansen (1997) concluded that successful management of riparian areas is a reflection of operators' efforts to discourage livestock loitering in the riparian zones, and that active management is more important than either season of use or length of time in the pasture. A subsequent paper by Ehrhart and Hansen in 1998 acknowledged that there are "numerous techniques available for developing and implementing an appropriate prescription to address any given riparian ecosystem." The only required ingredient which portends potential success was "serious commitment and personal involvement on the part of the operators and managers." Alternatives developed in consultation with affected lessees have an improved chance for success.

Revised livestock management is predicted to improve riparian vegetation, stream channel morphology and sediment transport at varying degrees and timeframes in relation to the No Action alternative. As discussed in Chapter 3, 3.2.1 Issue #1, headwater and spruce habitats are more sensitive to impacts than other habitat types and areas with more flow. Recovery is expected to be slower in these areas (Saar et al.1996). Where additional rest is incorporated into grazing systems, recovery is expected to improve proportionately. Wyoming Game and Fish Department published a report which included pre and post exclusion photography which documents the improvements in condition associated with livestock exclusion and short duration grazing (Jellison et al., 2007). Recovery was observable in many cases over the five year interval between photographs. Results were not as favorable where the floodplain had become disconnected from the channel.

While different opinions exist within the scientific community regarding the best season of use, there is consensus that the length of time animals spend in a riparian area can be a significant factor in the condition of that area. According to Marlow and his colleagues (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." Extended grazing during the hot summer season is generally considered most injurious to riparian zones. Therefore, wherever the alternative includes reducing the amount of time that cattle have access to riparian areas, impacts are predicted to be reduced.

Channel adjustment recovery is expected to lag vegetative recovery (Kondolf, 1993). Exclosure research over three decades has been conducted in an effort to predict recovery rates of riparian systems under revised management (Saar 2002). Drawing conclusions based upon this research has been problematic. Sarr discusses scientific uncertainty, research assumptions and interpretive challenges, "riparian systems may show very different recovery trajectories…" Our assumption is that revised livestock management will improve riparian vegetation and stream channel morphology and that thresholds have not been crossed that would result in irreversible changes. Deep rooted riparian vegetation, unless overgrazed, will recover from grazing. Willows, likewise, unless over browsed will recover. Stream morphology is more problematic. Channel recovery typically lags riparian recovery (Cowley 1997). Spruce habitats do not have deep binding root masses and present another challenge. For overwidened streams to develop the patterns, profiles and dimensions of self-maintaining streams, bank building must occur. Vegetation must capture sediment and channels must narrow. At times channels must undergo an evolution of unstable channel types before a stable channel returns (Rosgen 1996). Recovery depends on the magnitude and frequency of flooding. Given the uncertainty surrounding channel recovery, it is difficult to predict the effects and timeline of recovery to specific stream reaches.

Utilizing use guidelines as tools to indicate livestock movements would help improve overall watershed conditions along with the other proposed management changes. This analysis is based on the assumption that these allowable use levels and associated livestock rotations are employed in a timely manner. A four inch stubble height guideline would benefit stream channel morphology by reducing impacts to stream banks and bank-holding riparian vegetation in most areas, but is not expected to initiate significant progress toward PFC on its own. Clary and Leininger (2000) recommend a four inch residual stubble height as a starting point for improved riparian grazing management while acknowledging that six inches of stubble height may be required to reduce browsing of willows or limit trampling impacts to vulnerable stream banks. Annual use guidelines may reduce excessive wetland hummocking and drying. Improvements in stream channel morphology and reduced impacts to streamside wetlands would reduce sediment input associated with channel erosion.

For fisheries streams that were not in PFC, changes in management are expected to improve habitat. Improvements would include improvement in riparian vegetative diversity and cover, a reduction in bare ground, stabilization of stream banks as well as a decrease in the level of localized sediment input. In-stream sediment issues resulting from channel formation may continue where conditions upstream continue to contribute sediment. As that sediment moves through the stream system it will continue to influence stream conditions downstream of the point source.

Water development in upland areas is often a key factor in reducing livestock watering in riparian areas. Fencing the source would protect the associated habitat in the immediate vicinity. 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. Where offsite water is

located a sufficient distance from streams to draw livestock away from these areas and to spend less time loafing and grazing in riparian areas, there would be a reduction in waste inputs to streams, soil compaction, channel impacts and grazing on riparian vegetation. Augmenting the water development with shade, such as placing the watering trough near existing trees, would also help to reduce the time livestock spend in riparian areas (TR-1737-20, 2006). Design features for springs developments, listed in Section 2.3.3, would mitigate the potential of drying up or shrinking the wetland areas associated with spring sources.

Non-Commercial Mechanical/Prescribed Fire treatments are being proposed within the Barton Gulch, Davey Creek, Idaho Jack and Garden Creek allotment to remove conifer trees expanding into sagebrush steppe habitat. These treatments would change distribution patterns of livestock for several years following implementation of these treatments. The forage in the burned areas has increased palatability and livestock would spend more time grazing in these areas and less time within the adjacent riparian habitat. This shift in distribution would reduce impacts to riparian areas within the drainage in which the prescribed fires are implemented and help improve riparian habitat conditions.

Riparian Conifer Treatments

Riparian conifer treatments would be implemented in four grazing allotments; on seven stream reaches covering approximately 5 linear miles (see Chapter 2, section 2.3.3, table 2.2).

Reducing sediment in the stream systems, increasing plant community biodiversity and improving bank stability are important riparian management objectives. Decreasing encroaching conifers (juniper and Douglas fir) in riparian areas would benefit competing riparian woody and herbaceous species. Removing the juniper would provide an opportunity for the deciduous woody and herbaceous plant community to expand and prosper because of reduced competition for soil nutrients, available water and increased sunlight. Vegetative structure and species diversity decline in sites where plants compete with juniper for limited resources (Miller et al. 2000), because juniper can out-compete shrubs and herbaceous plants for water leading to reduced plant density and cover (Wilcox & Breshears 1994). Decreased vegetation structure in the areas adjacent streams dominated by conifer could result in larger areas of bare soil which can impact infiltration rates and accelerate surface transport of water, nitrogen and other nutrients (Breshears & Barnes 1999; Reid et al. 1999). Reduced infiltration rates leads to higher erosion rates and elevated sediment suspension in water run-off (Davenport et al. 1998). Over the long term, treatment of juniper in specified riparian areas is expected to increase deep-rooted riparian vegetation (aspen, willows, red-osier dogwood, sedges, etc.), decrease erosion and sediment, improve stream channel geomorphology and increase systematic water storage capability. Sediment input into the treated reaches may increase for the first couple of years and then decrease as vegetative cover along the greenline improves. The increased cover would be more effective at trapping sediment coming from both in-stream and upland sources.

The composition and vigor of the pre-treatment vegetative community would determine the rate and amount of vegetative response on individual streams. In locations where conifer canopy cover is greater than 40%, seeding of native upland and riparian seed mixes may be necessary to achieve desired results and prevent the establishment of noxious and invasive species.

Speed of riparian improvement 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 expected to protect stream banks from livestock impacts, if juniper clogs the channel severe channel degradation could occur if a temporary "dam" blows out.

Riparian juniper removal treatments on fisheries streams would increase the diversity and density of desirable woody and herbaceous species that typically are more desirable for fishery habitat. These species, in most cases, stabilize stream banks and provide habitat supporting a diversity of terrestrial and aquatic insect populations.

The proposed treatments on WCT streams, specifically the North and South forks of Greenhorn Creek (reaches #840 and 841), would similarly benefit fisheries habitat. Reducing expanding juniper/conifers would result in increased desirable woody and herbaceous vegetation. Riparian vegetation directly controls the food chain of the ecosystem by shading the stream and providing organic debris and insects for the streams organisms (Meehan et al. 1977).

Because of their proximity to fisheries streams, the proposed prescribed fire and commercial harvest units are unlikely to result in any negative impacts to fisheries habitat. It is likely that both could have some beneficial effects through changes in livestock distribution. As new forage becomes available in treatment areas, livestock would be drawn to the treated areas and spend less time grazing riparian areas.

Issue #2: Upland and Sagebrush Steppe Habitat

Utilization of forage plants on the majority of BLM lands in the MRRW was found to be less than 50%. For those areas where site specific concerns were identified, limiting use of upland forage to 50% during spring and summer grazing would benefit water infiltration, plant vigor, reduce soil loss from erosion and leave adequate residual cover and forage for wildlife. Moderate use would also enhance herbaceous plant community cover and composition. Increased cover would improve precipitation infiltration and subsequently decrease soil lost via wind and water erosion. Sediment delivery to near-by streams would also be reduced. Grazing earlier in the season would allow sufficient time for plant re-growth while later deferred treatments enhance seedling establishment and species composition. Deferring livestock use until after the growing season mitigates grazing impacts to cool-season bunchgrasses and reduces trampling of forbs.

With the exception of the range improvement projects that would be removed, existing improvements would remain permanent features within the watershed.

Water troughs, mineral placement, and trailing along fences would cause some incidental localized impacts to vegetation and soil compaction. The proposed water developments are designed to improve livestock distribution and are expected to change utilization patterns so that more use would occur on upland forage plants and less in riparian areas. New livestock water troughs may also provide increased water for wildlife if they are available when livestock are not present. Soil compaction and loss of vegetation is expected in the immediate vicinity of the new water trough and increased forage utilization can be expected within ¼-mile of the troughs due to concentrated livestock use within close proximity to these watering locations.

The grazing flexibility provision would provide the BLM and affected lessees' tools to more efficiently manage the herbaceous resources on public lands. Having the ability to respond to annual variations in precipitation and forage production would be practical and ecologically sensible. Flexibility is the hallmark of successful range management in arid regions. Strict adherence to animal numbers and livestock movement dates without regard to variations in precipitation and forage production can be counterproductive to both rangeland and livestock production. Adjusting stocking rates and rotation dates so that livestock numbers are in balance with forage supply is recommended (Howery, 1999). Upland health would benefit with more applicable timing of resource use.

Re-introducing natural disturbance regimes i.e., prescribed fire, would result in a mosaic of plant communities and diversity of successional stages in sagebrush habitats. Treatments to reduce conifer expansion into mountain big sagebrush would result in short-term change within sagebrush habitat, converting these sagebrush/forested areas to early seral stage sagebrush habitat with a grassland aspect and a minor forest canopy. Recovery of sagebrush habitat would facilitate the BLM's goals and objectives of maintaining and improving sagebrush/grassland habitat. Based on past prescribed fires in the watershed, it would take up to 30 years to move through early and mid seral stages to get back to current sagebrush cover. This creates seral and structural diversity within sagebrush habitats across the landscape. By creating a mosaic in the sagebrush canopy, more edge is created and removing the conifer expansion would maintain this open park for future use. These prescribed fire treatments would also change livestock distribution patterns within five allotments (Barton Gulch, Davey Creek, Garden Creek, Idaho Jack and Laurin Canyon). Increased palatability of forage following prescribed fire would shift more use to these areas and proportionately less use in other areas within the allotments.

Air quality concerns in the planning area are primarily related to smoke. Smoke contributors in the planning area include wildfire, prescribed fires, private debris burning, agricultural burning, slash burning, and wood burning stoves and fireplaces. Wildfire can produce short-term adverse effects on air quality. Air quality and visibility can deteriorate due to temporary air stagnation during wildfire events, which are most common during the months of July, August, and September. Smoke from wildland and prescribed fire is the primary concerns affecting human health.

Prescribed burning is conducted in accordance with the Montana/Dakotas Fire Management Plan and is coordinated with MT DEQ and the Montana/Idaho Airshed Group. During prescribed fire season, the Smoke Monitoring Unit supports the Montana/Idaho Airshed Group to prevent or reduce the impact of smoke on area communities, especially when that smoke could contribute to a violation of national air quality standards. During the summer wildfire season, the Smoke Monitoring Unit assists state and local governments in monitoring smoke levels and providing information about smoke to the public, firefighters, and land managers.

Non-Commercial Mechanical/Prescribed Fire treatments would be expected to alter hydrology to some degree. Researchers have long studied the impact of timber harvest on hydrology. Over 80 years of watershed research has shown that a vegetation removal results in a reduction of evapotranspiration and an increase in stream flow (Troendle, C.A. and J.M. Nankervis 2000). Because the scale of conifer expansion treatments (up to 4,568 acres) in relation to the size of the

Middle Ruby River Watershed (161,869 acres), 2.84 percent, is relatively small, and because grasses and shrubs compete for the limited available moisture, changes to hydrology would not be measurable.

Issue #3: Forest and Woodland Habitat

The MRRW is comprised of 161,869 acres. Commercial harvest treatments include up to 1,370 acres (Alt B) and up to 3,169 acres (Alt C), roughly 3.1% and 7.2% (respectively) of the total forested acres in the MRRW. Commercial harvesting would reduce the potential severity of wildfire and the associated risk of excessive erosion and runoff rates. Groundwater infiltration would be improved as forest canopy is opened, reducing losses due to evapotranspiration. Removal of dead trees would allow for new trees to establish more rapidly and would increase herbaceous understory within all forest and woodland habitat treatment areas. 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. The BLM does not intend to increase authorized livestock use as a result of increased herbaceous vegetation.

The use of temporary roads and/or skid trails to complete harvest activities would result in localized soil compaction within treatment areas. Design features for road construction and maintenance would be followed in accordance with State of Montana BMPs and SMZ Law and Rules to a minimum standard necessary for the removal of products and safe travel operations. Standard timber sale contract provisions address protection from erosion, sedimentation, and soil compaction and would minimize these impacts with active sale administration. Limiting operations to frozen or reasonably dry road conditions would eliminate rutting greater than six inches deep. Preventive maintenance at the end of each hauling season would decrease the potential for erosion and sedimentation associated with road construction.

Physically closing roads using berms and slash is anticipated to effectively prevent use by motorized vehicles. 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. Physically closing new temporary roads would allow for future entry by maintaining the road prism with proper long term drainage. This would also allow for faster re-vegetation (by not disturbing the established vegetation), and would keep post treatment sediment movement to a minimum.

Disturbances within treatment areas have the potential to facilitate the spread and/or introduction of noxious and invasive species. Weed monitoring/treatment would be ongoing during the period of use of temporary roads. The contractual requirement to pressure wash equipment prior to entering the project area, as well as completing noxious weed monitoring for a minimum of three years post-harvest, would mitigate the potential for noxious weed spread into the watershed.

Treatments would result in short term effects to vegetation which would diminish as vegetation responds to new conditions. Commercial harvest and salvage would decrease intra-stand competition on the areas treated and would increase moisture available for residual vegetation due to the change in forest structure. Snow and rainfall interception would be decreased which would result in an increase in infiltration and runoff. Data from 95 watershed experiments

conducted in the United States shows that, on average, stream flow increases by nearly 2.5 mm for each percent of watershed harvested (Troendle, et al. 2006). Commercial harvest treatments would be implemented in two and four Level 6 hydrologic units for Alternatives B and C, respectively. See table 4.1 below for percentages affected.

Table 4.1: The Percentages of HUC 6 Watersheds Treated In Middle Ruby River Watershed (HUC 5)

HUC 6 Watershed & Acres		Allotment (s)	Alternative B Proposed Acres	% Of HUC 6 Affected	Alternative C Proposed Acres	% Of HUC 6 Affected
Dryden	8,620	Davey Creek	-	0.0%	421	4.9%
Barton	31,108	Davey/Barton Gulch	1,110	3.6%	1,785	5.7%
Idaho	18,331	Idaho Jack	-	0.0%	703	3.8%
Cottonwood-Ruby	12,192	Belmont/Garden Creek	260	2.1%	260	2.1%
Total Proposed Treatment Acres			**1,370**		**3,169**	

Treatments would increase the potential for runoff, erosion, sediment yield, and water yield. However, the reduction in basal area and the percent change in forest would be well below the threshold for detectable change. Post-harvest stands would have increased availability of water and nutrients due to decreased competition, which would improve tree vigor and future stand resilience to insects and/or disease.

Where aspen are found within stands identified for treatment, the amount of sunlight available to the aspen would increase post-harvest. Understory vegetation within the aspen stands would also increase. 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. Ground based yarding would further enhance aspen regeneration response by disturbing the aspen root system and promoting sprouting.

The use of prescribed fire within treatment units post-harvest may be utilized to reduce residual dead/down fuel loading to between 5 to 20 tons per acre. Slash loading in excess of residual target may be broadcast burned or piled and burned. If aspen are present within treatment units, prescribed fire may also be used to promote suckering and clone expansion.

Burning of slash materials may result in short term air quality deterioration. 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.

Timing of slash disposal post-harvest varies from less than one, up to several summer seasons. During this time, potential fire severity and/or intensity are increased. 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.

Removal of standing dead trees would reduce material that could be recycled by fire and/or biological breakdown, as well as some of the small mammal habitat. However, the removal of standing dead trees would also reduce the potential for soil impacts that could occur in the event of a wildfire during the summer fire season due to the exceptionally high fuel loading.

Whether or not sub-merchantable materials are removed for biomass utilization, the stipulation to retain 5 to 20 tons of dead/down woody debris per acre would be sufficient for long-term nutrient recycling and small mammal habitat. The larger remaining slash material (generally 3" and greater) following prescribed burning would create microsites of shading and moisture retention. The action alternatives would make varying amounts of progress toward fulfilling goals and actions of the Forest and Woodland Vegetation and Forest Products section in the Record of Decision and Approved Dillon Resource Management Plan.

Planting 5-needle pine seedlings would promote a new cohort of 5-needle pines in areas where acceptable levels of natural regeneration establishment is not occurring (i.e. post wildfire, insect & disease outbreak). Selective cutting of standing dead material around areas with existing natural regeneration would result in higher down woody debris locally, but would not exceed the 5-20 tons per acre. This would also protect establishing seedlings from being trampled by livestock and/or wildlife.

Conditions in forest and woodland habitats not proposed for treatment under the action alternatives would undergo effects similar to those described under the No Action Alternative.

Issue #4: Special Status Species
Potential site-specific impacts to special status species habitat are included in the allotment discussions where appropriate. Special status plants, fish and wildlife are discussed in the Biological Evaluation (Appendix C).

Restoring riparian health, including changes in livestock grazing and riparian conifer treatments, is expected to have a beneficial impact on wildlife and fisheries habitat by increasing forage and security cover as well as reducing sediment input into streams. Forbs are an important summer food source for sage grouse broods. Later in the summer, as palatability of forbs declines, sage grouse move to moist areas that still support succulent vegetation, including wetland and riparian areas. Altering livestock grazing to improve riparian conditions would benefit sage grouse, especially during brood-rearing when forbs and insects are essential to their diet. Removal of the encroaching juniper from riparian habitat would increase wildlife use of these areas due to an increase in browse and forage, and nesting habitat for riparian associated and obligate migratory birds. Since cowbirds increase in bird communities in juniper woodlands (Rienkensmeyer 2000, Noson 2002), removing juniper and Douglas fir expansion in sagebrush grasslands may reduce cowbird parasitism in these areas.

Construction of new fences may impede movement and be an entanglement hazard for wildlife, but following BLM Handbook H-1741-1 specifications for constructing wildlife friendly fences and livestock exclosures would reduce the risks to birds, elk, mule deer, antelope, and moose. Modifying and building fences around springs or tanks that prevent avian predators from using

posts as hunting perches would provide safer sage grouse brood-rearing habitat when the birds are foraging on forbs in these areas.

Sagebrush grassland habitat would be restored in the long-term in areas where prescribed fire is utilized to reduce conifer expansion in sagebrush habitat. This habitat currently provides sage grouse use and an increase in forb production would provide for sage grouse foraging. An increase in big game use is also expected within the units after the burn treatments during green up and winter range forage would be improved as well. Reducing conifer expansion through prescribed fire in elk calving areas would prevent conversion to forest habitat and retain sagebrush/grassland in the long-term. Mountain big sagebrush and mountain mahogany habitat would benefit from a reduction in conifer expansion. These species provide crucial big game winter browse.

The BLM will maintain existing sagebrush habitat so that 70% or more of big sagebrush communities provide vegetative composition and structure for sagebrush obligate species. BLM will maintain nesting/early brood rearing canopy cover of 15-25% sagebrush and an average of 6 to 7 inches herbaceous understory within site potential, and maintain or increase composition of highly nutritious forbs (e.g. composites and legumes) in nesting/early brood rearing habitat. Residual grass cover following grazing is important for sage grouse and other sagebrush grassland bird species nesting habitat. Light to moderate cattle grazing or managed grazing systems can improve quantity and quality of summer forage (i.e. forbs) for sage grouse (MFWP 2005). Implementing an annual utilization guideline of 50% on cool season bunchgrasses to maintain plant health and vigor would provide residual herbaceous nesting cover.

Improving whitebark and limber pine would promote habitat and encourage this food source for wildlife species, such as squirrels, Clark's nutcrackers, and bears. Harvesting timber with beetle infestations would reduce the food source available to black-backed, three-toed and downy woodpeckers that feed on wood-boring beetle larvae in those treatment units. The loss of dead/dying trees would remove habitat for cavity nesting birds. However, the acreage proposed for timber harvest is not large enough to limit this habitat availability since adequate dead/dying trees exist throughout the watershed. The benefits of salvage harvesting these units include regeneration of healthy trees used by foliage and bark gleaning bird species. Enhanced and improved aspen stands would benefit large carnivores, ungulates, and migratory birds which use this habitat.

Harvesting trees would remove big game thermal and hiding cover. However, regeneration of new stands would occur faster than if the dead and dying trees are left standing for many years eventually becoming deadfall. It would take many more years before enough sunlight could reach the soil surface to promote regeneration. Harvesting the trees opens the canopy and facilitates regeneration sooner, providing hiding and thermal cover in an area surrounded by standing dead trees and/or deadfall. Buffers and timing stipulations would be established if active goshawk and/or owl nests are located within treatment units.

Herbaceous vegetation would increase within all forest and woodland treatment areas. It is expected there would be increased ungulate use in the treated areas because of the increase in palatability as well as production of shrubs and herbaceous vegetation. This would change

distribution and use patterns of herbivory (both wild and domestic) within the affected allotments.

Incorporating the utilization guideline on WCT streams that requires maintaining a 6" vegetative buffer along the greenline and/or a 3" vegetation standard within the flood plain would allow for a vegetation buffer to reduce sediment from entering the stream as well as reduce bank trampling effects associated with excessive livestock use. This guideline provides a vegetative use trigger to the permittee to indicate when livestock use is reaching maximum allowable use within the riparian area and livestock need to be moved.

Because of their proximity to WCT streams, the proposed prescribed fire and commercial harvest units are unlikely to result in any negative impacts to WCT habitat. It is likely that both would have some beneficial effects through changes in livestock distribution. As new forage becomes available in treatment areas, livestock would be drawn to the treated areas and spend less time grazing riparian areas.

Treating conifer encroachment in areas adjacent to streams would allow for increased diversity and density of desirable woody and herbaceous species that typically are more desirable for fisheries habitat as well as more effective at stabilizing streambanks and providing vegetative buffers to reduce sediment input.

Special status plants are discussed in the Biological Evaluation (Appendix C). See whitebark pine discussion in Issue #3 above.

Resource Concern #1: Noxious and Invasive Species
The treatment of invasive species both before and after burning and commercial harvest would reduce the probability of expansion of existing infestations or the establishment of new species.

Targeting new noxious weed infestations for eradication would help keep new populations or new plant species from becoming established. Using biological control and/or aerial application on larger established infestations would reduce the size and density to more manageable levels.

Limiting the utilization on upland forage to 50% in the spring and summer would increase the competitiveness of the native vegetation and reduce the spread of noxious weeds.

Resource Concern #2: Wilderness
There would be no impacts to the wilderness characteristics of the Axolotl Lakes WSA.

Actions proposed under common to all action alternatives that impact the Ruby Mountains WSA include spring abandonment and clean up, maintenance, and/or re-construction of the following springs; Lightning Spring #476768, Mormon Peak Spring #476767, Taylor Canyon Spring #000553 and Tukudika Spring # 477053. These actions would have a positive effect on the natural quality of the WSA by removing abandoned or dysfunctional water developments, and/or reducing impacts from livestock and wildlife to spring sources with small exclosures. However some short term negative impacts would be associated with the projects from vehicles, equipment and environmental disturbance from the work activity. Additional short-term impacts

to recreation and solitude would be expected but would only last the duration of the project. The long-term positive impacts of improving natural conditions would outweigh the short term negative impacts. Fence removal of all dysfunctional and unnecessary fences at the head of Hinch Creek would improve naturalness of the area. Constructing a spring exclosure around Hinch Creek Spring would add a new project in this area. However, there would be a measurable net reduction in fence in the vicinity and the exclosure fence would allow the spring and associated wetland to recover to a natural condition. This spring exclosure would be unnoticeable in the Ruby Mountain WSA as a whole.

Fence maintenance, replacement and/or reconstruction would have minor short term negative impacts to the wilderness characteristics of the Ruby Mountains WSA.

Laurin Canyon Allotment has a proposed 104 acres conifer expansion treatment in both Alternative B and C. This action would have short-term negative impacts to the wilderness character primarily while the work is being performed but in the long-term the area would return to a more natural condition. "The BLM may utilize prescribed fire in WSAs where the natural role of fire cannot be returned solely by reliance on wildfire or where relying on wildfires might create unacceptable risks to life, property, or natural resources outside the WSA" (BLM WSA Manual 6330). In order to mitigate the visual/human impacts of the project trees would be cut low to the ground and mechanical treatments would be followed by prescribed burning as soon as possible.

Conifer expansion treatments are proposed in all action alternatives in the Jasmin Creek unit of lands with wilderness characteristics. These proposed actions would be located in Idaho Creek (506 acres), Jack Creek North (255 acres) and Jack Creek South (581 acres). These actions would have short-term negative impacts to the wilderness character of the unit but would benefit in the long run by improving the natural condition. Prescribed fire mimics a natural ecological change while it removes the expanding conifers. Mechanical treatments would be followed by burning as soon as possible so the imprints of human activity (stumps, etc…) would be less noticeable. Stumps would be cut low to the ground to mitigate the impacts also.

Resource Concern #3: Recreation and Travel Management
There are no proposed actions common to all alternatives for Recreation or Travel Management.

Resource Concern #4: Socioeconomics
The economy of the state of Montana in general and Madison County specifically are highly dependent on agriculture. Jobs and tax revenue generated by livestock associated activities are important economic drivers. The alternative or combination of alternatives selected by the BLM Authorized Officer may have a financial impact on an individual grazing lessee and cumulatively on the economic and social fabric of the larger community.

Modifications of use periods in specific pastures or within an allotment, incorporating additional rest or deferment, reducing AUMs and/or reducing numbers of livestock would economically impact ranchers who rely on public land grazing. Authorized AUMs would change in some allotments as shown in Table 2.4.1, Chapter 2. Operators may have to use private pastures or other areas for longer periods of time. Additional range improvement projects would increase

construction and maintenance expenses for the lessees and the BLM in the short term. In addition, use guidelines in the uplands and riparian areas may necessitate increased labor inputs by the lessees (riding) in order to harvest authorized AUMs. During periods or years of drought, total authorized AUMs may not be available for harvest. Providing flexibility in the period of use to adjust to seasonal weather conditions, affecting forage production, may benefit grazing lessees economically by increased weight gain of calves.

A variety of projects are proposed on BLM-administered lands to improve land health. Completion of these projects would affect socioeconomics in various ways including, but not limited to: changing use authorizations, purchasing supplies, providing materials and/or labor, and hiring contractors to complete work.

Alternatives B and C propose differing levels of treatment in forest and woodland habitats. Implementing commercial harvest treatments would recover the economic value of the timber resource before it is lost due to mortality and decay. The action alternatives would also create short term job opportunities in the woods and at mills within the region and provide opportunities for public utilization of wood products.

BLM expenditures would temporarily increase under both action alternatives during the implementation period. Socioeconomics was fully analyzed in the Final EIS for the Dillon RMP, Alternative B in Chapter 4 (p 331).

Table 4.2: Summary of Proposed Projects on All Grazing Allotments by Action Alternative

Proposed Project	Alternative B	Alternative C
AUMs changes (units)	-583	-831
New fence construction, including riparian exclosures/ pastures (miles)	~10.25 miles 1.25 mi.-Garden Creek 1.5 mi.-Davey Creek 2.5 mi.-Belmont 5.0 mi.-Idaho Jack	~13.75 miles 1.25 mi.-Garden Creek 1.5 mi.-Davey Creek 2.5 mi.-Belmont 6.75 mi.-Idaho Jack 0.75 mi.-Barton Gulch 1.0 mi.-Idaho Isolated
Fence removal (miles)	1.5 mi.-Garden Creek	1.5.mi.-Garden Creek
New spring developments (units)	1-Belmont 1-Idaho Jack	1-Belmont 1-Idaho Jack 1-Idaho Isolated (well)
New 1,000g troughs (units)	1-Belmont 1-Idaho Jack 1 or 2-Davey Creek	1-Belmont 1-Idaho Jack up to 3-Davey Creek 1-Idaho Isolated
New stock water pipelines (miles)	~0.5 mi.-Davey Creek (potential extension)	~0.75 mi.-Davey Creek (2 potential extensions)
Spring exclosure reconstruction (units)	1-Garden Creek	1-Garden Creek
Spring developments abandoned (units)	1-Pierce Canyon	1-Pierce Canyon
Stream crossing installation/replacement (number)	2	11
Treat riparian conifers (miles/acres)	~6 miles/73 acres	~6 miles/73 acres
Re-designate roads (miles)	~0.75 (open)	0
Commercial timber harvest (acres)	1,370	3,169
Non-commercial mechanical/prescribed fire (acres)	3,187	4,568

Resource Concern #5: Wildland Urban Interface
Residential development is expected to continue in the area. Increasing numbers and densities of privately owned structures would result in more complex fire suppression efforts in the event of a wildfire.

The management of naturally occurring wildfire in 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.

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 management opportunities during future wildfire events. 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).

Air quality impacts relating to implementation of prescribed fire and/or fuel reduction treatments within the Wildland Urban Interface are discussed above under Issue #2: Upland and Sagebrush Steppe Habitat.

Resource Concern #7: Visual Resource Management
With the exception of the Ruby Mountains and Axolotl Lakes WSAs, the entire planning area is managed as VRM Class III. "The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes caused by management activities may be evident but should not detract from the existing landscape." Proposed projects within this EA that would impact visual resources include a variety of projects with relatively minor anticipated visual impacts, as well as some with more noticeable visual impacts. Minor projects such as barbed wire fences, spring developments, relocation of troughs, etc. will be consistent with much of the rest of the landscape, largely unnoticed by the casual observer, and are clearly consistent with management objectives for VRM Class III. The minor proposed actions within the Ruby Mountains WSA are consistent with VRM Class I. Conifer expansion treatment proposal for Alternative C in the Garden Creek allotment is within the Ruby Mountains WSA, and will be discussed in the appropriate section.

Commercial timber harvests and non-commercial timber treatments (mechanical and prescribed fire) are proposed for up to approximately 7,700 acres within the planning area. Many of these units would be conducted within the view of the general public along existing open routes (i.e., Barton Gulch, Davey Creek). Although the scale of these activities is likely to attract the attention of the casual observer over the short term, it would not likely "dominate the view" since the activities would generally not occur directly adjacent to the primary travel corridors. Treating more acres in Alternative C would perhaps attract more attention, but neither of the

proposed actions would be likely to exceed the threshold to "dominate the view of the casual observer" that would cause the activity to exceed the management objective for the visual resources in this area. Careful routing of any temporary roads, skid trails, and other major disturbances away from the county road, and making use of topographical screening would avoid any substantially noticeable visual impacts even over the short term. Within five years of project completion, these treatments would be unnoticeable to most casual observers. Through the life of the project these would be within the management objectives for VRM Class III as they would not dominate the view of the casual observer.

Ruby Mountains and Axolotl WSAs are managed according to VRM Class I objectives. "Preservation of the landscape is the primary management goal in Class I areas. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention." One conifer expansion treatment (prescribed burn) is proposed in Alternative C within the Ruby Mountains WSA within the Garden Creek drainage (1,381 acres). Another conifer expansion treatment within the Ruby Mountains WSA is proposed in both Alternative B and C, and is located in the Laurin Canyon area and is proposed to be 104 acres. These actions would attract attention but they would be performed to preserve the landscape and would return the viewshed to a more natural state. Prescribed fire mimics a natural ecological change. The treated area would attract attention when viewed from the immediate surroundings but would likely not attract attention when viewed from key observation points such as Montana Highway 287 running through the valley or the Upper Ruby Road or from the county roads nearby. Mechanical treatments would be followed as soon as possible by burning, to reduce the visual imprint of human activity on the landscape.

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. 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.

Within the Jasmin Creek unit there are two commercial timber harvests proposed in Alternative C, and they are located in Idaho Creek (560 acres, 6.5 road miles) and Jack Creek (143 acres, 1.5 road miles). There are three conifer expansion treatments proposed (same for both Alternative B and C) and they are located in Idaho Creek (506 acres), Jack Creek North (255 acres) and Jack Creek South (581 acres). All of these treatments would have impacts on the wilderness characteristics of the Jasmin Creek unit as well as impacts to the viewshed. Jasmin Creek unit is VRM Class III.

4.2.3.1 Predicted Effects of Action Alternatives related to Climate Change

As summarized in the Climate Change Supplementary Information Report (SIR), climate change impacts can be predicted with much more certainty over global or continental scales. Existing models have difficulty predicting temperature changes at small scales. On smaller scales, natural climate variability is relatively larger, making it harder to distinguish changes expected due to external force (such as contributions from local activities to GHGs). Uncertainties in local forcings and feedbacks also make it difficult to estimate the contribution of GHG increases to observed small-scale temperature changes (Climate Change SIR 2010).

It is currently not possible to know with certainty the net changes to climate caused from activities related to improving land health in the MRRW. The inconsistency in results from scientific models used to predict climate change at the global scale coupled with the lack of scientific models designed to predict climate change on regional or local scales, limits the ability to quantify potential future impacts of decisions made at the HUC 5 watershed level. It is therefore beyond the scope of existing science to relate a specific source of greenhouse gas emission or sequestration with the creation or mitigation of any specific climate-related environmental effects. Although the effects of greenhouse gas emissions in the global aggregate are well-documented, it is currently impossible to determine what specific effect GHG sequestration or emissions resulting from a particular activity might have on the environment.

Healthy forests with a diversity of age classes sequester more carbon than mature, even age, decadent and/or unhealthy stands (overstocked, insects, disease) (Millar et al. 2007). Salvaging forest products from dead/dying timber stands, also adds to our carbon storage capability. "Focusing solely on forest's sequestration benefits misses the important (and substantial) carbon storage and substitution GHG benefits of harvested forest products, as well as other benefits of active forest management" (Malmsheimer et al. 2011). "Unmanaged forests do not provide additional climate benefits indefinitely. The age when annual forest carbon storage increment begins to decline varies but generally occurs in the first 100 – 150 years as tree mortality losses increase."

In most of the American West, fire and insects pose a very immediate threat of catastrophic loss of live tree carbon, turning affected forests into carbon emitters" (Malmsheimer et al. 2011). "For more than 70 continuous years, US forest cover has increased and net growth has exceeded removals and mortality. Therefore, carbon storage is increasing in the United States. In some forests (e.g., old-growth), other considerations and other benefits will outweigh carbon benefits. However, forests will change with or without management, and choosing not to manage has its own carbon consequences. Young, healthy forests are carbon sinks. As forests mature, they generally become carbon-cycle neutral or even carbon emission sources because net primary productivity declines and the decay of trees killed by natural disturbances – windstorms, fire, ice storms, hurricanes and insect and disease infestations – emits carbon without providing the carbon benefits available through product and energy substitution" (Malmsheimer et al. 2011). "In the long-term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stock, while producing an annual sustained yield of timber, fiber or energy from the forest, will generate the largest sustained mitigation benefit" (IPCC 2007a p.543).

Overall, research studies agree that carbon storage is enhanced in wet systems. Also, evidence suggests more carbon is sequestered by a richer mix of native species. Species-rich ecosystems

are more stable over time and may provide a faster, stronger response to future changes in atmospheric carbon dioxide concentration. (Lennon et al. 2006.) Improving and/or restoring riparian and wetland systems is predicted to increase their carbon storage capability.

Healthy native rangelands are also carbon sinks and properly managed livestock grazing at moderate levels can increase the soils capability to sequester carbon. (Liebig et al. 2010). Benefits of livestock grazing include increased litter incorporation into the soil and higher productivity of grazed vs. un-grazed grasses (varies with timing, intensity and frequency of grazing). Within allotments in the MRRW where adding rest or deferment into the grazing systems is proposed, predicted effects are increased vigor, production and composition of cool season bunchgrasses.

In addition to maintaining/restoring sagebrush steppe habitat, the proposed prescribed burns under the action Alternatives would create landscape scale "fire breaks" that would reduce fuel continuity, thus allowing fire managers a greater range of opportunities for the management of wanted and unwanted wildfire. Because of the timing of the burns (e.g., spring) carbon release due to the burns would be decreased as compared to wildfires, which generally burn during the hottest part of the summer. More litter (duff) would remain on the top soil in a cooler spring burn.

The proposed action alternatives are expected to incrementally increase carbon sequestration in the soil and vegetation within the MRRW. This would be accomplished by improving the health and resiliency of forest and woodland habitats, improving/restoring riparian/wetland areas, continuing and improving livestock grazing on rangelands, which is expected to maintain or improve upland conditions, and reducing the potential for damaging wildfires within, and adjacent to treatment areas. In addition, salvaging wood products will prevent the carbon in these products from being lost to decay or wildfire. The amount of increased carbon sequestration across the watershed cannot be quantified with current technology and its effect on climate change would be undetectable.

4.2.4 Predicted Effects of Action Alternatives B and C by Grazing Allotment

Introduction:
Headings are omitted under those allotments within which certain issues are not present, are present, but not affected, or were previously addressed under section 4.2.3, Predicted Effects Common to All Action Alternatives. Effects of alternatives to Wilderness and Recreation and Travel Management are discussed under the allotments in which proposed management changes occur.

Separate sections below discuss the predicted effects of alternatives B and C for: Commercial Forest Harvests and Non-Commercial Mechanical/Prescribed Fire Treatments.

<u>Barton Gulch #10490</u>
Alternative B:
Issue #1: Riparian, Wetland, Aquatic Habitat
The Barton Gulch allotment would be completely rested every third grazing season. The length of rest to initiate recovery in degraded riparian areas depends upon the vegetative composition and streambank condition (Clary and Webster 1990). Stream reaches # 800 and 827 were determined to be functioning at risk with a static trend. Current riparian condition suggests that resting the allotment one year in three is sufficient to promote improved riparian function. Resting one year in three would also allow a full growing season for riparian plants to recover and complete their physiological processes. Studies show resting pastures favors low energy stream systems with herbaceous bank forming vegetation (Elmore and Kauffman 1994), like the riparian habitat of lower Barton Gulch and Davey Creek. The upper reaches flow under forested habitats and are typically well armored with woody debris and rock substrate. If a stream is in mid-or high-seral vegetative status-which these streams are-rotational grazing may allow habitats to remain in good condition while being grazed (Winward1989).

Removing the juniper encroaching heavily into the riparian area of stream reaches 827 and 805 would reduce inter-species competition for soil nutrients, available water and sunlight, creating favorable conditions for the woody and herbaceous plant community to expand and prosper (see 4.2.3, Issue #2, Riparian, Wetland and Aquatic Habitat).

Delaying the season of use to July would reduce stream bank shearing by livestock in the spring. In a study on southwest Montana streams, bank damage occurred during spring grazing when soil moisture was greater than 10% (Marlow and Pogacnik 1985). Marlow (1985) also found that livestock in SW Montana spend most of their time in the uplands until late July. The riparian areas of Barton Gulch and Davey Creek should retain sufficient soil moisture and have time to allow for herbaceous plant regrowth after cattle are removed the third week of August.

Hot season grazing in southwest Montana typically begins in mid to late July. Myers (1989a) analyzed the duration of grazing during “hot season” and found the length of the grazing period is important in regard to physical damage in riparian areas because livestock water frequently and prefer to loaf in the cool shady places riparian zones typically provide. Most of the Barton Gulch allotment is heavily forested which provides plenty of shade in the uplands as well as riparian areas. Livestock tend to disperse evenly across private and public lands to graze because the forage quality in the uplands remains relatively high until late summer.

Prescribed burns within the Barton Gulch Allotment would change distribution of authorized livestock for several years following implementation. It would result in less use in riparian habitat and proportionately more use in the treated areas due to increase palatability of forage. This would help improve riparian habitat condition.

Issue #4: Special Status Species
Incorporating a year of rest every third grazing season would improve herbaceous forage and cover for wintering big game and nesting migratory birds.

<u>Barton Gulch #10490</u>
Alternative C:
Issue #1: Riparian, Wetland, Aquatic Habitat
As discussed under Alternative B, the entire allotment would benefit from complete rest from livestock use every third year. The benefits of rest would be the same under Alternative C and B.

Reducing the number of authorized livestock from 138 (current) to 80 and grazing for a shorter duration (45 to 30) would have a relatively greater positive effect on the riparian habitat. The most critical aspect in any grazing plan for the protection of riparian areas is the length of time cattle spend on a stream reach (Myers 1989). In Myers' study of southwest Montana allotments less than 20 % of the operations evaluated had healthy riparian zones if grazing duration exceeded 45 days.

Utilization of riparian herbaceous species (grass, sedge, rush, forbs) would be proportionally lower and livestock use on woody riparian species would be minimal because herbaceous species would be at peak nutritional value and abundantly available. Livestock preference for woody species like willows and aspen tends to increase later in the season as protein levels and other nutritional values in herbaceous species decrease, and are maintained in woody species.

Physical damage to stream banks from cattle would be within acceptable levels because soil moisture levels would be lower during early and mid-summer periods of use. A study on southwest Montana streams indicated, bank damage occurred during spring grazing when soil moisture was greater than 10%.

Under the proposed changes to management there would be an expected decrease in the livestock impacts along the riparian corridor. This would result in improvements to stream bank stability, increased stream bank vegetation and a corresponding decrease in sedimentation. A three-quarter mile drift fence along the road adjacent reach #803 would discourage livestock from spending time in the riparian area. This fence, combined with physical barriers and fences already on private property boundaries, would essentially keep cattle north of Barton Gulch Creek. The benefits to the riparian habitat would include a reduction in: physical impacts to the banks, channel widening from sedimentation, trailing and the number and magnitude of livestock created stream crossings.

As discussed under 4.2.3, Riparian Conifer Treatments and Non-Commercial Mechanical/Prescribed Fire Treatments would have long term benefits to the entire riparian plant community and dependent wildlife species.

Issue #4: Special Status Species
Impacts would be the same as Alternative B, however herbaceous forage and cover for wintering big game and nesting birds would likely further improve with a shorter season of use between 7/01 – 7/31. Constructing three quarters of a mile long drift fence would add a barrier and entanglement and collision hazard for big game. Constructing it to wildlife-friendly fence specifications would reduce these risks.

Belmont #10469

Alternative B:

Issue #1: Riparian, Wetland, Aquatic Habitat

The North 3 pasture is unique to the allotment because it is 100% BLM administered land. Several stream reaches in this pasture were rated FAR with a static or downward trend. Localized areas of bank damage from livestock resulting in high levels of sediment inputs are the primary concern. This pasture is currently grazed annually, but a rest would be provided every third year under Alternative B. This alone is a 33% reduction in use over the three year cycle. Also, the duration of the grazing period would be reduced from 77 days to 55 days. Clary and Webster (1989) said that "the level of utilization occurring on a site-including riparian areas-is the most important consideration." Van Poollen and Lacey (1979) reviewed 18 studies and concluded, that stressed riparian vegetation is more affected by grazing intensity than by grazing system. It is apparent that length of grazing and the numbers of livestock is very critical. The combination of rest, reduced duration of grazing and a reasonable number (109) based on carrying capacity would promote riparian vegetative health and reduce stream bank damage.

Higher elevation, cool mesic sites, like the North 3 pasture, can respond well to summer grazing if stocking rate is moderate, season of use is limited and management is active (riding). Stream banks are most susceptible to damage from livestock when grazed early in the season because soil moisture is relatively high. By delaying grazing until mid-July soil moisture levels would be declining. In a study at the Red Bluff Research station in southwest Montana, Marlow (1985), found the greatest bank damage occurred in late June and early July when soil moisture was 18-25%. By August, moisture content had declined to 8-10% and bank damage in the grazed pasture was no greater than on an un-grazed reach. While streambanks are more stable in the summer, frequently there is enough soil moisture to allow for regrowth after grazing.

Providing alternative watering sites, in suitable locations, is an effective tool for limiting the amount of time cattle spend in riparian areas. Adding a watering site at the head of spring creek #422 (map #4), would encourage cattle distribution in the uplands and away from the sensitive riparian areas in need of improvement. This new development would be in addition to the two that are already in the pasture. In addition to alternative watering opportunities, shade in the uplands is also an important factor in reducing riparian loafing. Along Greyson Creek south of Townsend, cattle did little browsing on riparian willows and had not appreciably impacted either herbaceous vegetation or streambanks because the pasture contained wooded upland and alternative water, and the operator distributed salt along ridgetops (Ehrhart and Hansen 1998). A riparian corridor fence would be constructed along reach #822, Upper Cottonwood Creek, with one water gap to allow cattle access to water. This would protect the stream bank from cattle induced disturbances, reduce the amount of sediment in the system, and eliminate livestock grazing and associated impacts to bank stabilizing riparian vegetation. Also, re-constructing the fence along reach #891 would protect the lower portions of the stream from direct physical impacts from livestock. Because the lower half mile or so of the reach flows beneath forested habitat, the potential for herbaceous species to colonize is limited even with protection from grazing. Some increase in grass, sedge, forbs and riparian woody species like willows and birch would be expected over time.

The South 1, South 2 and Upper Sage Creek pastures would be used in a 3 pasture rest-rotation in the spring for 48 days. Stream reaches #867 (Bum Creek), 888 (Sage Creek trib.) and 885 (Sweetwater Creek trib.) are within these pastures and were rated as Functional-at-Risk (FAR) with a Static or downward trend (885). Two of the three would be grazed and the third rested. The problem with rest-rotation grazing in many places is that the benefits from rest may be nullified by the extra use that occurs on the grazed pastures (Holechek 1983). This would not be a problem in the Belmont allotment because, each of the four pastures in the allotment are authorized for a specific number of cattle, has specific carrying capacity and each pasture has a specific percentage of public land (see table 2.6, Chapter 2). In other words, the number of livestock is not increased in the two grazed pastures in order to compensate for the one rested pasture.

Building a riparian exclosure fence around stream reach #885 in the South 2 pasture would be beneficial in eliminating bank trampling and sedimentation caused by livestock. Livestock browsing would be eliminated in the fall which would promote aspen-and other woody species-recruitment, expansion and age class diversity. In places where herbaceous species are established, eliminating herbivory from livestock would promote vigorous plant communities and improved riparian function through; an increase in sediment trapping during high flow events, bank building, channel stabilization and expansion of the water table. Removing the juniper encroaching heavily into this riparian area would reduce inter-species competition for soil nutrients, available water and sunlight, creating favorable conditions for the woody and herbaceous plant community to expand and prosper (see 4.2.3, Issue #2, Riparian, Wetland and Aquatic Habitat).

Issue #2: Upland and Sagebrush Steppe Habitat

Although the upland health standard was met in the Belmont allotment some localized areas of BLM administered land are over utilized. The season of use in the South 1, South 2 and Upper Sage pasture rotation is May through June. Because they are used in the early spring, resting pastures is very important for sustainable yield. In one study evaluating the effects of bluebunch wheatgrass defoliation, the most damage occurred during early spring use. Basal area, stem numbers and root and forage yields are reduced under continual spring grazing and plant mortality can be high. Bluebunch wheatgrass relies on carbohydrate reserves for spring growth. Defoliation during the early spring does not give the plants sufficient time to replenish reserves before entering dormancy, thus ensuring they enter the winter in a carbohydrate depleted state which makes them susceptible to spring grazing.

BLM administered land in the Lower Sage pasture comprises only about 25% of total acreage. Although this pasture would continue to be used annually, the late season of use, October 1 to November 30, would ensure that all the upland plants have the full growing season every year to maximize leaf area production critical to photosynthesis which provides the energy for root and vegetative growth and maintenance (Briske et al. 2008). Deferring the grazing season until the fall would benefit the composition, vigor, and canopy cover of cool-season bunchgrasses. Clipping studies determined that defoliation of mature bluebunch wheatgrass plants late in the growing season is best for sustainable stand vigor because root food storage reaches it maximum level in un-grazed plants after the active growing season ends. Grass species are not greatly affected by use in the dormant period because at this time their tops are cured and not important

locations for stored food reserves. If grazing occurs in the dormant season, when the plant has no use for the leaves and stems of the past season, it loses nothing and gains an uncluttered start on the new season. In the dormant season, grazing benefits the grazed grass (Savory, 1988).

Reducing the length of grazing in the North 3 pasture, and incorporating rest one year in three, is primarily proposed to benefit riparian health, but would also provide the upland plants more time for regrowth following defoliation. Periodic rest from grazing, especially during rapid growth (summer), would enhance both shoot and root growth by promoting both the recovery and maintenance of greater leaf area (Holechek et al. 2001). Rest-and deferment-to promote plant growth is the most fundamental long-standing corollary of the unifying principles and is a central assumption of all grazing systems.

Issue #4: Special Status Species
Sage grouse typically nest within two miles of leks and the Belmont allotment borders the only active lek within the MRRW. This allotment is mostly within sage grouse priority habitat, and the remaining area is within general habitat. In South 1, South 2, and Upper Sage pastures, grazing between 5/15 and 7/05 may reduce herbaceous nesting cover for sage grouse every two of three years. Grazing the North 3 pasture between 7/15 and 9/08 could reduce elk winter range forage, but the reduction in days permitted, and rest years would result in more residual herbaceous forage for wintering elk.

Building a riparian exclosure fence around the lower portion of stream reach #885 and removing juniper would facilitate an improvement in riparian vegetation condition, including forb species that are important for sage grouse brood rearing. The construction of a post and rail fence adjacent to reach #891 may increase raptor perching opportunities on rails compared to wire.

Resource Concern #3: Recreation and Travel Management
Changing the designation of the closed two-tract road to open to wheeled motorized vehicle traffic would provide easier access to a meadow adjacent Cottonwood Creek and provide a much needed safe parking area. The parking area is already being used by the public, primarily during hunting season. This proposal would maintain about ½ mile more open road for motorized use, and would provide more convenient access to popular hunting areas. The parking area would not require additional fencing, but would require installing extra signage to stop traffic from continuing through the meadow on a faint two track. If the new signs are not effective other measures would need to be taken, e.g., physical barriers. The safety issues regarding the sharp hairpin turn and the ice flow would not be resolved. Motorized vehicles would still have to cross an ice flow created by a spring north of the road, and vehicles would have to navigate the hairpin corner. The turn is so severe that drivers have to make a 3 point turn to head down the road toward the meadow. .

<u>Belmont #10469</u>
Alternative C:
Issue #1: Riparian, Wetland, Aquatic Habitat
Season of use in the North 3 pasture would be 30 days during two of three seasons. As in Alternative B, North 3 would be rested completely every third year. Thirty days would limit utilization of riparian vegetation and bank disturbances by livestock. Myers (1989a) analyzed

duration of summer grazing treatments and found that grazing duration of 30 days or less was more successful in meeting riparian objectives than longer treatments. In another study, Marlow (1985), found the with the exception of winter grazing, less than 20% of operations evaluated with healthy riparian zones exceeded 45 days utilization in a specific pasture.

The rotation and length of use in the South 1, South 2 and Upper Sage pastures would be the same as alternative B.

Range projects, including riparian juniper treatments, proposed under Alternative B would also be implemented under Alternative C. Benefits to the riparian resources would be the same.

Issue #2: Upland and Sagebrush Steppe Habitat
Thirty days use in the North 3 pasture would limit the number of AUMs of forage harvested to 107, which is a 62% decrease from current authorization in this pasture (280). The shorter period of grazing would provide the upland plants even more time for regrowth following defoliation. Resting the pasture one in three seasons is important for sustainable use because, periodic rest from grazing, especially during rapid growth (summer), would enhance both shoot and root growth by promoting both the recovery and maintenance of greater leaf area. Rest-and deferment-to promote plant growth is the most fundamental long-standing corollary of the unifying principles and is a central assumption of all grazing systems.

Shortening the time cattle graze the uplands in the Lower Sage pasture would reduce the number of AUMs of forage harvested on BLM administered land to 89, a 21% reduction from the current 112 AUM authorization. Overall, Alternative C would reduce AUMs harvested in the allotment to 889, a decrease of 31% from the 1,288 AUMs currently authorized. This pasture would continue to be used annually but the late season of use, October 1 to November 30, would ensure that all the upland plants have the full growing season every year to maximize leaf area production critical to photosynthesis which provides the energy for root and vegetative growth and maintenance. Deferring the grazing season until fall would benefit the composition, vigor, and canopy cover of cool-season bunchgrasses. Clipping studies determined that defoliation of mature bluebunch wheatgrass plants late in the growing season is best for sustainable stand vigor because root food storage reaches it maximum level in un-grazed plants after the active growing season ends. Grasses are little affected by use in the dormant period because at this time their tops are cured and not important locations for stored food reserves. If grazing occurs in the dormant season, when the plant has no use for the leaves and stems of the past season, it loses nothing and gains an uncluttered start on the new season. In the dormant season, grazing benefits the grazed grass.

Issue #4: Special Status Species
Impacts are the same as Alternative B, except a further reduction in season of use to 30 days in the North 3 pasture would increase residual herbaceous forage for wintering elk.

<u>Davey Creek #10479</u>
Alternative B:
Issue #1: Riparian, Wetland, Aquatic Habitat
Overall the Riparian, Wetland and Aquatic Habitat in the allotment met the Land Health Standard. However, stream reach #829, upper Dryden Creek, in the Upper Spring pasture, was determined to be non-functional. The division of the pasture into two grazing units, would reduce use to moderate levels and incorporate rest for each grazing unit (Upper and Lower) every third year. Moderate numbers, short duration grazing (up to 21 days) and rest every third season would promote healthy and vigorous riparian vegetation and reduce physical damage by livestock to both Dryden and Williams Creeks.

A riparian exclosure fence would be constructed to give the riparian area of reach #829 an opportunity to heal. This would be effective because, livestock exclusion from riparian areas for greater than 10 years resulted in colonization of bare soil by grasses and sedges, in turn replaced by riparian shrubs and trees (Hosten and Whitridge, 2007). Protecting soils from hoof impacts would increase the rate of recovery of riparian shrubs in the area also.

The dysfunctional spring development at the head of reach #829 would be reconstructed to provide cattle an alternative watering site. Two spring developments were constructed in 2006 in the Davey Creek pasture after the assessment of 2003 indicated unacceptable levels of riparian impacts on Davey Creek. These projects have been effective in lessening the amount of time cattle spend in the lowlands and increasing the time spent on the ridges and meadows grazing upland forage. The repair of the Dryden Creek spring would similarly reduce riparian area impacts and promote more efficient cattle distribution across the landscape. Adding a half mile of pipeline and second trough to the Davey #7 spring development would provide cattle another alternative watering site in the uplands above the main channel of Davey Creek. Cattle would not be as inclined to spend the time and energy to come down off the ridge into the Davey Creek drainage to drink and forage on riparian vegetation. Less concentration of livestock in the riparian area would also reduce bank disturbances from hoof action, widening of stream crossings and excess sediment inputs into the system. Shade in the uplands is also an important factor in reducing riparian loafing. And, as mentioned above under Belmont allotment, shade in the uplands, combined with water is very effective in reducing riparian use. Along Greyson Creek south of Townsend, cattle did little browsing on riparian willows and had not appreciably impacted either herbaceous vegetation or streambanks because the pasture contained wooded upland and alternative water, and the operator distributed salt along ridgetops.

Removing expanding juniper from the riparian area associated with steam reach #2404, Williams Creek, in the Lower Spring pasture would reduce inter-species competition for soil nutrients, available water and sunlight, creating favorable conditions for the woody and herbaceous plant community to expand and prosper (see 4.2.3, Issue #2, Riparian, Wetland and Aquatic Habitat).

Issue #4: Special Status Species
The season of rest provided by grazing the Upper Spring and Lower Spring pastures two out of three years would improve fall and winter herbaceous forage for elk winter range that year and the following spring and early summer. Constructing a ½ mile long pasture division fence would increase entanglement and collision hazards for big game moving through the area. Building to

wildlife-friendly fence specifications would reduce these risks. The same is true for constructing a riparian exclosure fence around reach #829, however excluding livestock from this section would improve riparian vegetation, including forb production, for various wildlife and bird species.

Davey Creek #10479

Alternative C:

Issue #1: Riparian, Wetland, Aquatic Habitat

Alternative C would incorporate complete rest for the entire allotment every third grazing season. Although it was determined in the Middle Ruby Watershed Summary and Determination that all five Standards of Rangeland Health were met in the allotment, complete rest every third year would be beneficial for riparian, and upland, resources. The physiological needs of plant species would be emphasized. Vegetative cover is essential for maintaining almost all types of healthy riparian ecosystems. Myers (1989) concluded that, through a combination of rest and removing cattle in sufficient time to provide for regrowth, successful grazing systems provided residual cover 75 percent of the years. Thilenius (1979) emphasized the importance of knowing how much residual herbage should be left after grazing for ecosystem maintenance. "Approaching utilization from this standpoint provides for the physiological needs of the plant species" as well as for their capacity to perform riparian functions.

The entire Spring pasture would still be utilized for up to 28 days, two of three years, instead of limiting use to just one of the units, upper or lower, for 21 days as in Alternative B. The entire pasture would be rested every third year also and the associated benefit consistent with the discussion above.

All the proposed projects, including juniper reduction on reach #2404, under Alternative B would be carried forward under Alternative C. The benefits are discussed above. In addition, a pipeline and second trough would be added to the Dryden Spring development, #06434, if the amount of water produced at the headbox is sufficient. As discussed above, watering alternatives reduces the time cattle spend in riparian areas and associated impacts.

Issue #4: Special Status Species

Impacts would be the same as Alternative B, however the entanglement and collision hazards of constructing a pasture division fence would be eliminated and wildlife would continue to move through the area unimpeded.

Fossil Basin #10667

Alternative B:

Issue #2: Upland and Sagebrush Steppe Habitat

Total number of days would be 75 per year, a 66% reduction from the current 170 day grazing season. As a small Custodial allotment, Fossil Basin has been managed under a continuous grazing system. Continuous grazing involves grazing a particular pasture throughout the grazing season year after year. The primary problem with continuous grazing is that livestock have preferred plants and areas for grazing (Holechek 1983). Even under light stocking rates preferred areas receive excessive use.

Shortening and deferring the season of use to late summer-fall every other year would benefit the preferred upland cool season grasses because the key forage plants would not be harvested until after maturation. Deferring grazing until after the critical growing season (June and July); would allow plants to complete their growth cycle. Vegetative growth, root maintenance and seed production would be complete prior defoliation. Clipping studies determined that defoliation of mature bluebunch wheatgrass plants late in the growing season is best for sustainable stand vigor because root food storage reaches it maximum level in un-grazed plants after the active growing season ends.

Issue #4: Special Status Species
Reducing the season of use and alternating season of use between years would enhance the potential for cool season bunchgrasses to mature, especially during even years when grazing occurs after the growing season. Herbaceous forage and nesting cover would be improved as a result, including for elk winter range.

Fossil Basin #10667
Alternative C:
Issue #2: Upland and Sagebrush Steppe Habitat
The ecological benefits described under Alternative B would be the same under Alternative C. In addition, resting the pasture one in three seasons is important for sustainable use because, periodic rest from grazing, especially during rapid growth (summer), would enhance both shoot and root growth by promoting both the recovery and maintenance of greater leaf area (Holechek et al. 2001). Other benefits of not grazing for a whole season include: carbohydrate storage in the roots of the preferred cool season herbaceous species provides nutrition and energy for early spring growth; deferment and resting provides plants the opportunity for vegetative growth, seed production and dissemination, and seedling establishment; upland forage species would be more vigorous, healthy and productive; the upland plant community would produce more pounds per acre of biomass; stands of key upland bunchgrasses like bluebunch wheatgrass and Indian ricegrass would increase and expand which in turn would reduce loss of soils to wind and water erosion and; increased diversity of the entire upland flora and fauna community would be expected.

Issue #4: Special Status Species
Impacts would be the same as Alternative B, however adding a year of rest would further improve cool season bunchgrass productivity and cover for nesting and wildlife forage.

Garden Creek #20479
Alternative B:
Issue #1: Riparian, Wetland, Aquatic Habitat
Several stream reaches in the Garden Creek allotment were determined to be FAR with an upward trend by the 2013 assessment team. Reducing the number of authorized cattle by 29% under alternative B (1,200-850) would continue this trend. The level of utilization occurring on a site-including riparian areas-is the most important consideration in the management of livestock grazing. Most riparian grazing results suggest that the specific grazing system used is not of dominant importance, but good management is (Clary and Webster 1989). Specifically designed grazing systems that control degree and timing of use in the riparian area and a

minimum herbage stubble height on all streamside areas at the end of the growing season, or at the end of the grazing season, is important. Clary and Webster suggest the residual stubble or regrowth should be at least 4 to 6 inches in height to provide sufficient herbaceous forage biomass to meet the requirements of plant vigor maintenance, bank protection, and sediment entrapment. The main stream reaches in the Garden Creek allotment-where applicable-have had a 4 inch residual stubble height requirement on bank binding sedge in place since 2002. Annual compliance measurements indicate that meeting this objective has been instrumental in the upward trend of the primary stream reaches in the allotment.

Constructing a fence along Cottonwood Creek to exclude cattle would promote bank healing and riparian vegetation diversity. Over time the vegetation would capture sediments and channel dimensions would begin to change. As the channel narrowed and deepened, its ability to develop stream power and perform its functions of water and sediment transport would begin to resemble reference conditions. Water quality improvement would accompany these changes to geomorphology. Hoof impacts to banks and adjacent wet meadows are more pronounced in riparian areas comprised of alluvial soils like those found along Cottonwood Creek. Recovery and establishment of riparian shrubs and trees, e.g., willows, birch and alder would also be a likely response along portions of the reach that are not dominated by conifers. Riparian areas that have been excluded from livestock have also been observed to successfully increase riparian herbaceous vegetation and vegetative production by aspen that are located near water.

A spring exclosure fence, protecting Hinch Creek spring, would be constructed. This project would protect a substantial water resource from direct physical impacts, pugging and trampling, by livestock. The 1 to 2 acre wet meadow adjacent the spring would heal, recruit riparian vegetation and more efficiently filter and store water.

As riparian conditions improve, fishery habitat conditions would likewise improve. Corridor fencing the proposed portions of Cottonwood Creek would allow for a faster and more effective recovery for this portion of stream. Improved stream bank and riparian conditions would reduce sediment, improve spawning habitat as well as increase the amount of stream bank hiding cover for resident fish species.

Issue #2: Upland and Sagebrush Steppe Habitat
Garden Creek allotment was found to be in compliance with the upland health standard by the IDT in 2013. The start of the grazing season is delayed until August 1 (odd years) or August 25 (even years). Deferring livestock use until August provides key forage species the opportunity to complete their entire growth cycle every year before grazing. Pastures that are deferred until after growing season have higher forage production and range condition than season long grazing (Owensby et al. 1973).

Issue #4: Special Status Species
Delaying livestock grazing until after the nesting season would improve herbaceous cover for special status species. Constructing one mile of riparian exclosure fence along Cottonwood Creek would improve riparian vegetation, including forb production, for various wildlife and bird species. As with any fence, potential for big game collisions and entanglements are increased. Building to wildlife-friendly specifications alleviates this risk. Removing portions of

the upper Hinch Creek holding pasture fence would eliminate these risks for big game and birds moving through the area.

Resource Concern #2: Wilderness
The Hinch Creek drainage within the Ruby Mountains WSA has two proposed actions under Alternative B. The first, protecting the Hinch Creek Spring with an exclosure fence constructed of wooden jack and rail would prevent continued heavy impacts by cattle. The current exclosure does not adequately prevent livestock or wildlife from accessing the spring which limits the natural healing process. This project would protect a substantial water resource from direct physical impacts, pugging and trampling, by livestock. The one to two acre wet meadow adjacent the spring would heal, recruit riparian vegetation and more efficiently filter water. The construction of the new exclosure and removal of the old materials would disturb the wilderness characteristics of the area during the construction of the project but the long-term benefits of the spring returning to a more natural condition out-weigh those negative short term impacts.

The second project is to dismantle and remove the un-necessary and un-used portions of the upper Hinch Creek holding pasture fence complex. Short term impacts to the wilderness character of the local area during the process would be experienced but the naturalness of the WSA would be vastly improved once the fence is removed from the landscape.

The travel management change to the Hinch Creek road would not have any significant impact to the wilderness characteristics of the Ruby Mountains WSA. This route change is to correct a mapping error from the 2006 Dillon RMP. The fence and gate that would be needed to prevent further travel by motorized vehicles is already there but would need to be repaired, therefore it would not be a new development.

Resource Concern #3: Recreation and Travel Management
Opening an additional ½ mile of the Hinch Creek road would correct a mapping error from the 2006 Dillon RMP and would reflect the actual wheeled motorized vehicle use that is occurring, facilitate legal public access and address continual concerns and confusion regarding the road's designation. The current closure does not effectively prevent motorized use or vehicle encroachments within the WSA, and is not where the route was originally intended to be closed. The proposed parking area at the route's terminus will effectively prevent motorized vehicles from continuing into the WSA. There currently is a fence and gate in the location, which would need reconstruction to serve as an effective barrier.

<u>Garden Creek #20479</u>
Alternative C:
Issue #1: Riparian, Wetland, Aquatic Habitat
If the option to run 1,200 cattle/pairs on the allotment is implemented, the benefits of a season's rest every third year may be negated. The upward trend to the riparian and wetland habitat health, observed/determined during the 2013 assessment process, would not be expected to continue under a heavier stocking rate. If impacts to riparian habitat are excessive during the two seasons of authorized use, it may take several years for recovery. The length of rest to initiate the recovery process in degraded riparian areas depends upon vegetation composition and streambank condition. Degraded streambanks usually require more time than plant community

composition recovery (Swanson1989). Excessive livestock impacts, through heavy grazing and trampling, affect riparian-stream habitats by reducing or eliminating riparian vegetation, changing streambank and channel morphology, and increasing stream sediment transport (Clary and Webster 1990). Often heavy utilization will result in the lowering of the surrounding water tables (Platts 1986). In addition to the directs impacts to livestock forage and stream morphology, heavier stocking rates may affect high value fisheries and wildlife habitats and contribute to water quality impairment of the major stream systems in the allotment.

Additionally, residual stubble height on streamside sedge communities would be expected to be less than the recommended 4 inches at the end of the grazing period during two out of three years. Maintaining sufficient amounts of vegetation biomass encourages trapping and deposition of sediments for maintaining or rebuilding streambanks and limits hoof trampling and bank disturbances.

The benefits of building a riparian exclosure fence on Cottonwood Creek (reach #822), and around Hinch Creek Spring, would be the same as under Alternative B.

Issue #2: Upland and Sagebrush Steppe Habitat
Although utilization of the upland plants would increase by authorizing 1,200 cattle/pairs two of three grazing seasons, resting the allotment every third season would provide the upland plant species a much needed opportunity for recovery and maintenance. But even with the increased number of livestock utilizing the range plants, deferring the start of the grazing period until August every year provides the critical upland forage species the opportunity to complete their entire growth cycle every year before grazing. A study by Ownesby in 1973 demonstrated that pastures that are deferred until after growing season have higher forage production and range condition than season long grazing. Deferring grazing and rest also provides key plants the opportunity for seed dissemination and seedling establishment.

Issue #4: Special Status Species
Impacts would be the same as Alternative B, but adding a rest year would further improve herbaceous cover, including in the early spring following the prior fall season of rest. Elk winter range forage would also improve during rest years.

Resource Concern #2: Wilderness
The Ruby Mountains WSA would be impacted by the conifer expansion treatment (prescribed burn) proposed in Garden Creek Allotment in Alternative C. This action would have short-term negative impacts to the wilderness character primarily while the work is being performed but in the long-term the area would return to a more natural condition. “The BLM may utilize prescribed fire in WSAs where the natural role of fire cannot be returned solely by reliance on wildfire or where relying on wildfires might create unacceptable risks to life, property, or natural resources outside the WSA” (BLM WSA Manual 6330). Without the proposed treatments natural change wouldn’t occur. In order to mitigate the obvious signs of mankind’s imprint the stumps will be cut low to the ground and any mechanical treatments will be followed by prescribed burning as soon to as possible to reduce the signs of human impacts.

<u>Garnet #20492</u>
Alternative B:
Issue #2: Upland and Sagebrush Steppe Habitat
Defoliation is most harmful to the herbaceous upland plant species found in the allotment when food reserves are lowest in the spring and the plants are rapidly growing. The key upland forage species bluebunch wheatgrass is susceptible to basal area loss and decreased vigor if grazed during the inflorescence emergence stage of development (Clark et. al. 1998). Beginning the grazing period in the Garnet allotment on August 1 would facilitate the phenological development of key cool season bunch grasses during the spring (May-June). By the first of August cool season bunchgrasses in the Garnet allotment would be cured out and not adversely affected if grazed moderately for ninety days. Resting the allotment one year in three would provide key herbaceous species an opportunity establish new seedlings, increase vigor and increase upland plant productivity. Bare ground would be decreased, plant interspaces contracted and the potential for wind and water erosion reduced.

Issue #4: Special Status Species
Some remnant pygmy rabbit sign was documented in this allotment a decade ago. While no pygmy rabbits or sign were documented in 2013, allowing cool season bunchgrasses to mature and adding a rest year would improve herbaceous cover and forage for pygmy rabbits that may inhabit the allotment. Delaying livestock grazing until after the nesting season would improve herbaceous cover for special status species. Adding a rest year would further improve herbaceous nesting cover, including in the early spring following the prior fall season of rest. Herbaceous forage available for elk on winter range would also increase with a reduction in period of use and during rest years.

<u>Garnet #20492</u>
Alternative C:
Issue #2: Upland and Sagebrush Steppe Habitat
Reducing the number of days to 75, (39% reduction) would hasten the recovery and vigor of the cool season upland plant community. The benefits discussed above for Alternative B would be accentuated. Late season use, two of three years would increase seedling establishment, increase overall biomass production, decrease bare ground interspaces, increase herbaceous litter, reduce wind and water erosion and increase the diversity and number of species in the major functional structural plant group. Resting the allotment one year in three would provide key herbaceous species an opportunity establish new seedlings, increase vigor and increase upland plant productivity. Bare ground would be decreased, plant interspaces contracted and the potential for wind and water erosion reduced. Key forage species like bluebunch wheatgrass, would eventually increase in abundance and relative canopy cover, while the less desirable increaser species, like broom snakeweed and rubber rabbitbrush, would decline.

Issue #4: Special Status Species
Predicted effects would be the same as Alternative B, but further reduction in the period of use would provide more residual herbaceous cover for elk winter range and herbaceous cover for pygmy rabbits potentially inhabiting this allotment.

<u>Idaho Isolated #20676</u>
Alternative B:
Issue #2: Upland and Sagebrush Steppe Habitat
Limiting grazing to a maximum of 30 days from mid-August to mid-September would facilitate the phenological development of key cool season bunch grasses during the spring (May-June). Hormay (1970) found defoliation is most harmful when food reserves are lowest in the spring when plants are rapidly growing. The key upland forage species bluebunch wheatgrass is susceptible to basal area loss and decreased vigor if grazed during the inflorescence emergence stage of development. By the middle of August, bluebunch and other cool season bunchgrasses on the benches of the Gravelly mountains have set seed and would not be adversely affected by moderate grazing.

The allotment would be rested every other year. Resting rangelands occasionally from the beginning of growth until key forage plants have matured, or until vegetative reproduction is completed is biologically sensible. Benefits include, seed production, seedling establishment and restoration of individual plant vigor. 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).

Iss*ue #4: Special Status Species*
Delaying livestock grazing until 8/15, resting the allotment every other year, and reducing the season of use to 30 days would further improve herbaceous cover and forage available for elk on winter range.

<u>Idaho Isolated #20676</u>
Alternative C:
Issue #2: Upland and Sagebrush Steppe Habitat
The pasture three rest-rotation grazing plan would promote an increase in preferred cool season bunch grasses. Key forage species in the allotment, specifically bluebunch wheatgrass, would only be grazed early in the season one year in three. Complete rest every third year, followed by late use the next, would give herbaceous forage species two consecutive seasons to complete their growth cycle, produce and set seeds and establish seedlings. Bluebunch wheatgrass stands can be reduced or impaired if grazed every spring. This schedule would also provide the upland community the opportunity to increase overall production and diversity.

This alternative would require the construction of one mile of boundary fence separating BLM from the State of Montana, Department of Natural Resource Conservation (DNRC) land. Also, a well would have to be drilled, and a tank put in place, to provide livestock water.

Resource Concern #1: Special Status Species
Building one mile of fence would increase entanglement and collision hazards, as well as potentially impede movement for wildlife. The reduced period of use to 45 days and rest year would further improve herbaceous cover and elk winter range forage, although not as substantial as 30 day period of use and every other year of rest proposed in Alternative B.

<u>Idaho Jack #20499</u>
Alternative B:
Issue #1: Riparian, Wetland, Aquatic Habitat
Reducing the time cattle spend in stream drainages to 30 days, two of three years, would improve the riparian habitat in the Jack Creek drainage that was determined to be functioning but at risk due to grazing pressure. Duration, timing and frequency of use are all important components of successful grazing programs. Myers (1989a) studied the grazing systems in 34 Montana ranching operations and suggested that duration should be 25-30 days on riparian areas. Resting the allotment every third season would provide sufficient opportunity for enhanced plant vigor, regrowth, and energy storage in both the riparian zones and uplands. Shortening the grazing period and rest would also ensure that sufficient vegetation is present to protect banks, dissipate energy and trap sediments during high flow events. The timing of grazing affects cattle distribution relative to riparian areas. Cattle tend to concentrate more in riparian area during late summer (Parsons 2003). Late summer, or "hot season" in the Gravelly Range where the allotment is located is August and September. The revised schedule would limit cattle use during August to one year in three for each pasture.

To lessen the impacts to riparian resources, and balance livestock nutritional needs and available upland forage, the number of cattle authorized to graze public land would be reduced from 400 to 250. Stocking rates should be determined by residual vegetation, distribution patterns, historical use and management objectives. Use in riparian areas in most of the reaches in the Jack Creek drainage has been historically heavy. Improved management of the fisheries resource in Jack Creek is a primary BLM management objective because it contains the special status species Westslope cutthroat trout. Reducing numbers would reduce physical bank disturbances and associated pugging and hummocking of wetlands. Fewer cattle in riparian zones would also reduce sediment inputs into Jack Creek and its tributaries. Livestock utilization of bank binding herbaceous species, and browsing of riparian woody vegetation, would also be diminished.

Control of timing, duration and frequency of grazing in the allotment would be possible because of two proposed fence projects. Fencing, when properly located, constructed well and maintained, can be an effective tool for controlling distribution of livestock. Fencing also facilitates the management of riparian areas by either including or excluding livestock use. The boundary between private land and public land administered by the BLM would be secured if the fence proposed in both alternatives is constructed. Also, an allotment division fence proposed in Alternative B would divide the public land into two units of relatively equal size and facilitate the pasture rotation and rest. If these fence projects are not completed the grazing system proposed could not be successfully implemented and impacts to riparian resources recorded by the IDT to riparian resources would not be mitigated.

The proposed water development in the upper Idaho Creek pasture would affectively distribute cattle in the uplands and lessen time spent in the bottoms along Idaho Creek. Of course there still would be watering and impacts to Idaho Creek and its tributaries but an off-site watering alternative would mitigate these impacts.

Removing expanding juniper from the riparian area associated with steam reaches #851 and #856 would reduce inter-species competition for soil nutrients, available water and sunlight, creating favorable conditions for the woody and herbaceous plant community to expand and prosper (see 4.2.3, Issue #2, Riparian, Wetland and Aquatic Habitat).

Issue #4: Special Status Species
Constructing the boundary fence and pasture division fence would increase entanglement and collision hazards, as well as potentially impede movement for wildlife. Delaying livestock grazing until after the nesting season would improve herbaceous cover for special status species. Herbaceous forage available for elk on winter range would also increase during rest years and with a reduction in season of use.

Changing livestock use from the current 90 days and annual use to 30 days with a rest year every third year should result in rapid improvement to riparian habitat within the allotment. Incorporating the stubble height requirements, reduction in time, incorporation of rest and a change in timing would reduce conflicts with WCT reproduction within the Jack Creek allotment and have a positive affect to WCT.

Resource Concern #2: Wilderness
A several projects are proposed within the Jasmin Creek unit of Lands with Wilderness Characteristics. These projects include a fence being constructed on a ridge separating the Idaho Creek and Jack Creek drainages, a boundary fence in the southeast corner of the unit separating the BLM from the USFS, a potential spring development and the construction of one or two small earthen push up dams. All of these projects would have negative impacts to the wilderness characteristics of the unit, since they are man-made developments. However, none would have significant impacts on the wilderness characteristics of the unit.

<u>Idaho Jack #20499</u>
Alternative C:
Issue #1: Riparian, Wetland, Aquatic Habitat
Changing the status of the public land in the Idaho Jack allotment to unavailable to grazing or unalloted would have measurable ecological benefits to the riparian habitat. Bank disturbances by livestock to stream channels, sediment inputs in streams, trailing and crossing impacts and grazing and browsing of riparian vegetation by cattle would all be eliminated. Improved conditions of the vegetative community would precede the physical improvements to the stream channels, banks and adjacent wet meadows. Herbaceous and woody riparian species would be expected to respond favorably to a reduction in herbivory from domestic ungulates. Deep rooted sedge communities, where present, would protect stream banks more effectively during high flow events, aspen stands would become healthier and larger as suckers have the opportunity to establish and grow to maturity. The age classes of all woody riparian plants would become more diverse with the reduction in late season browsing.

The no grazing alternative would result in a build-up of fine fuels. Additional fuel loading would increase the probability of a wildfire within this area. An increase in fine fuels in the allotment could facilitate fires (both natural and man caused) moving faster and further than in the other alternatives. While putting fire back into these systems has some positive ecological

benefits (e.g. diversity on the landscape), a wildfire could also lead to some negative impacts to riparian habitat (e.g. sediment input, down cutting, erosion) depending on the location and size of the fire in the drainage.

The boundary fence proposed under Alternative B separating the private land from public land would still be necessary. The division fence creating two grazing pastures, Idaho Creek and Jack Creek, would not be needed because there would be no grazing and therefore no grazing plan/rotation necessary. The other projects proposed in Alternative B would also be superfluous if Alternative C is implemented.

The juniper removal project on reach #856 and #851 would still be implemented. The ecological benefits to the stream and riparian vegetation would be the same regardless of grazing by livestock. Removing expanding juniper from the riparian area would reduce inter-species competition for soil nutrients, available water and sunlight, creating favorable conditions for the woody and herbaceous plant community to expand and prosper (see 4.2.3, Issue #2, Riparian, Wetland and Aquatic Habitat).

Issue #2: Upland and Sagebrush Steppe Habitat
Removing domestic livestock from the grazing allotment would be beneficial to rangeland vegetation in the short term because residual vegetation would increase. The accumulation of dead plant material would initially be beneficial by providing additional protection to the soil from erosion as well as leading to an increase in the organic matter in the soil. Grasses evolved with periodic removal of vegetation from various causes (including fire, wild ungulate grazing, insects, etc.). After a certain point is reached however, the buildup of litter will begin to inhibit the growth of vegetation (Knapp, et al., 1986). This could cause a decrease in the productivity, palatability and overall plant health to many of the native bunchgrasses on some of these sites. Also as discussed above, additional fuel loading of fine fuels would increase the probability of wildfire in this area which may have both positive and negative impacts.

Issue #4: Special Status Species
Suspending the livestock grazing lease would increase herbaceous nesting cover and forage for wintering elk. In the absence of livestock grazing, forage quality and quantity may be reduced if wildlife grazing is not enough to remove the buildup of decadent bunchgrasses. However, this area is important elk winter range that was highly utilized during the winter preceding the MRRW assessment. Fences that impede wildlife movement and present entanglement and collision hazards on the landscape could possibly be removed. Constructing a boundary fence between private land and BLM would increase entanglement and collision hazards, as well as potentially impede movement for wildlife, especially being on well-utilized elk winter range.

Alternative C would be the most beneficial to WCT populations within the allotment. With livestock use along Jack and Idaho Creeks eliminated, areas currently in less than PFC condition would improve most quickly under this alternative and overall riparian conditions throughout the allotment would be expected to trend towards a more natural condition in the short term. Under this alternative, there would be no impacts to WCT reproduction from livestock through redd trampling, whereas under Alt B, there would likely be some limited impacts. Also, in the event of a wildfire, short term negative impacts to riparian habitat would also negatively affect WCT.

Resource Concern #2: Wilderness
In Alternative C there is a commercial timber harvest proposed within the Jasmin Creek unit. The proposed project would have negative impacts on the wilderness character of the unit. But because the timber unit is limited to a maximum of 703 acres, the overall effect to the wilderness character of the entire unit would be marginal. The area would recover from the harvest and be a healthier, more resilient and more natural forest in the long term.

In Alternative C the Idaho Jack allotment would no longer allow grazing. This would benefit the natural character of the unit. A boundary fence separating the public land from the adjacent private property would still be constructed to prevent unauthorized livestock access. However, the additional rangeland improvement projects proposed under Alternative B, and the visual and physical impacts they would impose, would be eliminated.

Resource Concern #4: Socioeconomics
The cancellation of grazing on the Idaho Jack allotment would force the operator to look for alternative forage and would increase the cost of their ranching operation. Private land leases are costing ranchers an estimated $22 to $24/AUM, compared to $1.35/AUM for BLM forage. For example; a rancher with 200 cow/calf pairs could pay $13,310 to $14,520 to pasture those livestock from July 1 to September 30 (605 AUMs). In contrast that cost would be only about $816 on a BLM allotment.

The lessee may be forced to operate with fewer livestock, graze private and/or other available lands more, or even sell the entire livestock operation. If the business is sold, private lands associated with the ranch have the potential to be sold and developed. Ranches build connections between public and private land, and between rural and urban communities. "Private lands are disproportionately important to the maintenance of our region's natural heritage because they are disproportionately more productive" (Knight 2007). Private lands often contain springs, riparian, rich soils, and/or critical habitat that wildlife depends on. A few of the consequences from development of rural lands are landscape level fragmentation, decreased access to public lands, decrease in biodiversity, loss of important wildlife habitat and development in the Wildland Urban Interface.

The elimination of grazing from public land can have a long term effect on the environment and economy by forcing ranchers to produce more meat on private or leased land, thus increasing the potential need for fertilizers, supplement feeds and water for irrigation that requires more energy from fossil fuels and electricity than on rangelands (Journal of Range Management 27(3), May 1974).

<u>North Fork AMP #10482</u>
Alternative B:
Issue #2: Upland and Sagebrush Steppe Habitat
Defoliation is most harmful to the herbaceous upland plant species found in the allotment when food reserves are lowest in the spring, and the plants are rapidly growing. The key upland forage species bluebunch wheatgrass is susceptible to basal area loss and decreased vigor if grazed during the inflorescence emergence stage of development (late spring-early summer) (Clark et.

al. 1998). Continued winter use (11/15 to 02/28) would enhance the upland herbaceous plant community. The key forage species bluebunch wheatgrass would have the opportunity to complete its physiological processes each growing season. Also winter grazing would not affect the amount of carbon stored in the roots by growing plants, a critical food source for early spring growth.

On the grassland benches of the upper Ruby River basin, cool season bunch grasses like bluebunch wheatgrass and needle and thread have completed their annually developmental processes by the beginning of August. So, incorporating a thirty day summer grazing period one year in three, 08/03-09/01, would not adversely affect the ability, or opportunity, of the key herbaceous upland plants to send up above ground vegetative tillers, preform photosynthesis, maintain or expand healthy root systems and invest in seed production.

Issue #4: Special Status Species
Dormant season livestock grazing would improve herbaceous nesting cover for special status species. This allotment is several miles north of the Robb Ledford Wildlife Management Area, which provides critical elk winter range. Winter grazing would reduce herbaceous forage available to wintering elk that may travel north to this allotment. However, not exceeding 50% utilization would alleviate the potential for forage to be substantially reduced. This allotment is within an important ferruginous hawk nesting area. Once every third grazing season when bison would graze from 8/03-9/01, ferruginous hawk young would likely be fledged, so impacts to nesting would be minimal, if at all. This allotment is also within sage grouse priority habitat, however it is largely grassland with very few sagebrush, so sage grouse nesting is unlikely.

North Fork AMP #10482
Alternative C:
Issue #2: Upland and Sagebrush Steppe Habitat
Alternative C is the same as Alternative B**.**

4.2.5 Predicted Effects of Commercial Forest Harvests and Non-Commercial Mechanical/Prescribed Fire Treatments

Alternative B:
Under Alternative B, implementation of proposed commercial harvest and prescribed fire would result in a 3% decrease of acres found in FRCC 2-3, which represent moderate to high departures from historic conditions. Implementation would shift those acres back into a FRCC 1, which represents ecosystems with low departure. By removing these acres out of the higher departure classification, diversity of age classes and disturbance would be reintroduced to the watershed on a small scale.

Table 4.3: Changes to FRCC Class Rating, Alternative B

Condition Class Rating	Current Watershed Distribution	Implementation of Alternative B	% Change
FRCC 1	~25%	~28%	+3%
FRCC 2/3	~75%	~72%	-3%

Issue #2: Upland and Sagebrush Steppe Habitat
Fuels reduction treatments utilizing prescribed fire and mechanical methods would occur on up to 3,187 acres. Re-introducing natural disturbance regimes i.e., prescribed fire, would result in a mosaic of plant communities and diversity of successional stages in sagebrush habitats. Treatments to reduce conifer expansion into mountain big sagebrush would result in short-term change within sagebrush habitat, converting these sagebrush/forested areas to early seral stage sagebrush habitat with a grassland aspect and a minor forest canopy. Recovery of sagebrush habitat would facilitate the BLM's goals and objectives of maintaining and improving sagebrush/grassland habitat. Based on past prescribed fires in the watershed, it would take up to 30 years to move through early and mid seral stages to get back to current sagebrush cover. This creates seral and structural diversity within sagebrush habitats across the landscape. By creating a mosaic in the sagebrush canopy, more edge is created and removing the conifer expansion would maintain this open park for future use.

Issue #3: Forest and Woodland Habitat
Up to 1,370 acres of commercial harvest would be implemented within the MRRW. Salvage harvest of lodgepole pine would remove mountain pine beetle infested dead and dying trees, allowing sunlight to reach the forest floor. When a new cohort of lodgepole pine trees becomes established, it would form a new age class that would not be susceptible to mountain pine beetle for the next 40 to 80 years. Thinning trees in mixed conifer and Douglas-fir stands would open up the stands and increase the vigor of leave trees. Douglas-fir beetle and spruce budworm hazard would be reduced. The residual stand would be more likely to survive future attacks by insects, and would exhibit less mortality than untreated areas during epidemic insect populations. These effects would occur only within the acres identified for treatment.

Allowing up to nine miles of road construction, and the use of mechanized equipment has potential to cause soil disturbance, and introduce or spread noxious and invasive weeds. Design features which require power washing equipment before being used off-road, along with monitoring and treating weeds if found, would reduce the likelihood of noxious and invasive species becoming established or getting spread as a result of this activity. Roads constructed for treatments would be minimally constructed, and would be physically closed to preclude vehicle use following harvest activity. Additionally, adherence to standard timber sale contract provisions, which provide protection from erosion, sedimentation, and soil compaction, would be required. These design features would reduce the potential for erosion and future spread of weeds by vehicles.

The installation of up to two temporary crossings would result in minor sediment inputs to the streams during the process of installation and removal. By acquiring all applicable State and Federal Permits required for the installations of temporary stream crossings within the project area, appropriate mitigation measures would be taken to ensure minimal impacts from this activity.

Issue #4: Special Status Species
Design features outlined in Chapter 2, Section 2.3.3 were designed to mitigate impacts to all resources including wildlife. Big game use in the harvest areas would be disrupted during harvest activities. To mitigate this impact, harvest activities would be offset by limiting the

timing of offering sales in these areas to mitigate concerns associated with wildlife security and movement corridors on the landscape. By staggering the disturbance, adjacent drainages would become sanctuaries for wildlife without disturbance. Timing restrictions, during hunting season and on winter range, specific to each of the areas identified through coordination with the local MFWP biologist will be incorporated into the projects during lay-out and timber sale contract preparation. All temporary skid trails and temporary roads would be physically closed and/or re-contoured post-harvest and not open to the public. The open road density would remain the same, or less than prior to commercial harvest.

Harvesting timber with beetle infestations would reduce the food source available to black-backed, three-toed and downy woodpeckers that feed on wood-boring beetle larvae in those treatment units. The loss of dead/dying trees would remove habitat for cavity nesting birds. Retaining two to five snags per acre within treatment units will alleviate this impact. The acreage proposed for timber harvest is not large enough to limit this habitat availability since adequate dead/dying trees exist throughout the watershed and adjacent habitat. The benefits of salvage harvesting these units include regeneration of healthy trees used by foliage and bark gleaning bird species. Enhanced and improved aspen stands would benefit large carnivores, ungulates, and migratory birds which use this habitat.

Harvesting trees would remove big game thermal and hiding cover. However, regeneration of new stands would occur faster than if the dead and dying trees are left standing for many years and eventually becoming deadfall. It would take many more years before enough sunlight could reach the soil surface to promote regeneration. Harvesting the trees opens the canopy and facilitates regeneration sooner, providing hiding and thermal cover in an area surrounded by standing dead trees and/or deadfall. Scattered patches of uncut timber within treatment units would provide some hiding cover. Implementing timing stipulations during hunting season would eliminate further disturbance, in addition to hunters on the landscape, during this season.

The units in the western Greenhorn Mountains are bighorn sheep habitat. Bighorn sheep prefer open habitat where they have visibility of the surrounding area. They also mainly forage on grasses, with forbs and shrubs, including mountain mahogany, serviceberry, mountain maple, and sagebrush providing winter forage (Foresman, 2012). Opening the forested habitat would likely improve big horn sheep habitat with an increase in herbaceous cover, forbs, and shrubs. The Greenhorn Mountains units are within critical big game winter range. Implementing a winter range timing stipulation would reduce stress to wintering elk, mule deer, and bighorn sheep and reduce the pressure for them to move onto private property. Harvesting trees would reduce big game hiding and thermal cover in the short-term. Wildlife seeking cover would be displaced from these units until regeneration occurs. The increase in herbaceous and shrub cover would enhance big game forage, including winter range.

Constructing 9 miles of temporary road is a concern for wildlife security, including grizzly bear habitat, with increased motorized access to areas previously inaccessible. Roads constructed for timber harvest would all be temporary and closed upon completion of harvest, not adding to mileage of open roads in the DFO. The temporary roads would therefore not lead to increased motorized use and wildlife disturbance in the long term.

Prescribed fire can create spatial and temporal herogeneity in sagebrush communities (Davies et al 2014). Utilizing prescribed fire and/or mechanical methods to reduce conifer expansion promotes sagebrush grassland habitat in the long-term. If left untreated, sagebrush grassland habitat would transition into forest habitat, eliminating sagebrush obligate species (such as sage grouse, sage sparrows, Brewer's sparrows, and sage thrashers) habitat. Forage and cover would initially be reduced in the short-term. However, as sagebrush cover returns to the burned areas and the potential for forest habitat to expand has been reduced, habitat for these species would be restored for the longer-term.

The units in the western Greenhorn Mountains are bighorn sheep habitat. Bighorn sheep prefer open habitat where they have visibility of the surrounding area. They also mainly forage on grasses, with forbs and shrubs, including mountain mahogany, serviceberry, mountain maple, and sagebrush providing winter forage (Foresman, 2012). Completing conifer expansion treatments would improve bighorn sheep habitat.

Nearly all of the conifer expansion treatments are within mule deer and elk winter range. Prescribed burns may occur as early as March, which may disrupt big game on winter range. However, all units would not be burned at the same time or during the same year. Burns would be patchy and wouldn't cover the entire area, although wildlife would be pushed out of the area during implementation. With treatment implementation staggered across locations and years, and winter range surrounding the units, big game would have adequate winter range if pushed out of an area during implementation. During high snowpack years when green-up is limited, treatments would not be implemented that year or until conditions facilitate elk movement into nearby suitable habitat. Big game forage would improve following prescribed fire, enhancing winter range in the long term. The Cottonwood unit is within an elk calving area. There is a large area of suitable calving habitat surrounding the treatment unit, so displacement of calving elk would be temporary without long-term impacts to elk production and recruitment. Offsetting years and locations of burns would reduce impacts to elk calving areas as well. Elk tend to calve in open sagebrush parks and meadows near the forest edge. Elk calving areas with conifer expansion into sagebrush habitat would be maintained/restored and prevented from transitioning into a forest type.

Resource Concern #5: Wildland Urban Interface
Fuels reduction treatments utilizing prescribed fire and mechanical methods would occur on up to 3,187 acres. 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). All treatments would have some benefits associated with protecting WUI from the threat of wildfire.

Resource Concern #7: Visual Resource Management
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. 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.

Alternative C:
Under Alternative C, implementation of proposed commercial harvest and prescribed fire would result in a 5% decrease of acres found in FRCC 2-3, which represent moderate to high departures from historic conditions. Implementation would shift those acres back into a FRCC 1, which represents ecosystems with low departure. By removing these acres out of the higher departure classification, diversity of age classes and disturbance would be reintroduced to the watershed on a small scale.

Table 4.4: Changes to FRCC Class, Alternative C

Condition Class Rating	Current Watershed Distribution	Implementation of Alternative C	% Change
FRCC 1	~25%	~30%	+5%
FRCC 2/3	~75%	~75%	-5%

Issue #2: Upland and Sagebrush Steppe Habitat
Fuels reduction treatments utilizing prescribed fire and mechanical methods would occur on up to 4,568 acres. The effects of these treatments are similar to those described above under Predicted effects of Alternative B.

Issue #3: Forest and Woodland Health
Up to 3,169 acres of commercial harvest would be implemented within the MRRW. The 1,370 acres identified for commercial harvest Alterative B would be carried forward for implementation.

In addition, a total of up to 29 miles of temporary road (including those proposed under Alternative B) and up to 11 temporary crossings (including those proposed under Alternative B) would be allowed. The predicted effects of these activities would be similar to effects described in Alternative B, but increased proportionally with additional acres and additional temporary roads and crossings.

Issue #4: Special Status Species
Impacts related to commercial timber harvest would be the same as Alternative B, however the possibility of an additional 20 miles of road construction would be substantial and would further reduce wildlife security. As with Alternative B, these roads would be temporary and not lead to increased motorized use in the long-term.

Impacts related to noncommercial mechanical/prescribed fire would be the same as Alternative B, but with the addition of the Garden Creek unit. The Garden Creek unit is within an elk

calving area and big game winter range. Impacts would be the same as those covered for calving areas and winter range under Alternative B.

Resource Concern #7: Visual Resource Management
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. 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.

4.2.6 Comparative Effects for All Alternatives by Issue or Resource Concern

Table 4.5: Issue #1: Riparian, Wetlands and Aquatic Habitat (only allotments not meeting the Riparian Health Standard, or site-specific riparian issues or projects included)

Allotment	Alternative A (No Action)	Alternative B	Alternative C
Barton Gulch #10490	Causes and conditions affecting public land resources would be perpetuated.	Improved riparian habitat health expected on approximately 4.7 stream miles rated FAR. Increased flora and fauna diversity in juniper reduction project areas (about 30 acres)	Reduced duration of grazing would accelerate improvement of riparian habitat health on 4.7 stream miles rated FAR. Increased flora and fauna diversity in juniper reduction project areas (about 30 acres)
Belmont #10469	Causes and conditions affecting public land resources would be perpetuated.	Improved riparian habitat health expected on about 6 stream miles rated FAR Riparian fences and one new water development would reduce cattle impacts to riparian areas. Riparian juniper removal would increase deciduous woody and herbaceous vegetation along the reach.	Duration of grazing reductions would accelerate improvement of riparian habitat health on about 6 stream miles rated FAR Riparian fences and one new water development would reduce cattle impacts to riparian areas Riparian juniper – same effects as Alternative B.
Davey Creek #10497	Causes and conditions affecting public land resources would be perpetuated.	Improved riparian habitat health expected on about 1.0 stream miles rated FAR or NF. One half mile pasture division fence, one riparian corridor fence and one re-built spring development and one additional trough would help distribute cattle and	Improved riparian habitat health expected on about 1.0 stream miles rated FAR or NF. One half mile pasture division fence, one riparian corridor fence, one re-built spring development and up to two additional troughs would help distribute cattle and

		reduce livestock impacts to riparian areas. Increased flora and fauna diversity in juniper reduction project area (about 3 acres).	reduce livestock impacts to riparian areas. Increased flora and fauna diversity in juniper reduction project area (about 3 acres).
Garden Creek #20479	Causes and conditions affecting public land resources would be perpetuated.	Riparian fence would facilitate continued upward trend on about 1.0 mile of riparian habitat. Reduced numbers of livestock would facilitate improved riparian habitat conditions on 1.25stream miles rated FAR, and maintain or improve riparian habitat on an additional 18 stream miles rated PFC or FAR Up.	Fence along reach #823, would facilitate continued upward trend on about 1.0 mile of riparian habitat. Reduced numbers of livestock and complete rest for the entire allotment every third year would facilitate improved riparian habitat conditions on 1.25stream miles rated FAR, and maintain or improve riparian habitat on an additional 18 stream miles rated PFC or FAR Up.
Idaho Jack #20499	Causes and conditions affecting public land resources would be perpetuated.	Allotment boundary fence and pasture division fence, facilitating reduced duration of livestock use in riparian areas, would improve fisheries habitat for special status species WCT on about 1.5 stream miles. And an uptrend would be expected on an additional one-half mile of habitat rated FAR. Three miles of riparian habitat rated PFC would continue to improve. Juniper treatments on about 6 acres adjacent stream reach #856 would increase flora and fauna diversity.	Allotment boundary fence and pasture division fence, facilitating reduced duration of livestock use in riparian areas, would improve fisheries habitat for special status species WCT on about 1.5 stream miles. And an uptrend would be expected on an additional one-half mile of habitat rated FAR. Three miles of riparian habitat rated PFC would continue to improve. Juniper treatments on about 6 acres adjacent stream reach #856 would increase flora and fauna diversity.

Table 4.6: Issue #2: Upland and Sagebrush Steppe Habitat (only allotments not meeting the Upland Health Standard, or site-specific upland issues or projects included)

Allotment	Alternative A (No Action)	Alternative B	Alternative C
Belmont #10469	Causes and conditions affecting public land resources would be perpetuated	Localized impacts to public land in the South 2 pasture that are over utilized by cattle would improve. Habitat responses anticipated: the abundance and vigor of plants in key functional-structural groups would	The affects similar to Alternatives B. No differentiation in management changes between alternative for the impacted upland areas.

		increase; bare ground and plant interspaces decrease; soil surface resistance to wind and water erosion would improve; litter would replace bare ground; total plant biomass production would increase.	
Fossil Basin #10667	Causes and conditions affecting public land resources would be perpetuated	Anticipated positive affects to upland habitat attributes would include: reduction in the size of water flow patterns, decreased plant pedestals, reduced bare ground, less litter movement and an increase to biomass production.	The positive effects in Alternative B would be accentuated by resting every third year.
Garnet #20492	Causes and conditions affecting public land resources would be perpetuated	Anticipated positive affects to upland habitat attributes would include: improved soil resistance to erosion, improved infiltration of soil, increased key plant species, reduction in the size of water flow patterns, decreased plant pedestals, reduced bare ground, less litter movement and an increase to biomass production.	Accelerated recovery of upland attributes described under Alternative B expected with shorter duration grazing season.
Idaho Isolated #20676	Causes and conditions affecting public land resources would be perpetuated	Anticipated positive affects to upland habitat attributes would include: decreased plant pedestals, improved precipitation infiltration, reduced bare ground, increase in key herbaceous species, reduction of invasive plants and an increase to biomass production.	Alternative C would slow down the recovery of upland attributes compared to Alternative B. Less frequent rest and longer period of use would slow down improvement.
North Fork AMP #10482	Causes and conditions affecting public land resources would be perpetuated	Uplands would remain in proper functioning condition. No adverse impacts anticipated.	Same as Alternative A

Table 4.7: Forest and Non-Commercial Mechanical/Prescribed Fire Treatments conditions will continue along the same trends under the No Action Alternative (A).

Treatment Type	**Alternative B**	**Alternative C**
Commercial Harvest	Increase in Diversity of age classes, Increased resilience to future Insect and Disease Outbreaks, increase in early seral stands, decrease in intrastand competition, decreased fuel loading on up to 1,370 acres	Effects would be similar to those described in Alternative B, on up to 3,169 acres.
Non-Commercial Mechanical/Prescribed Fire		

Table 4.8: Issue #4: Special Status Species Habitat Habitats are expected to remain in the condition and along the same trends under the No Action Alternative.

Allotment	**Alternative B**	**Alternative C**
Barton Gulch #10490	Incorporating a year of rest and season of use from 7/01 – 8/24 would improve herbaceous forage and cover for wintering big game and nesting birds.	Herbaceous forage and cover would be further improved from a shorter season of use from 7/01 – 7/31. Constructing a three quarter mile long drift fence would add a barrier, entanglement and collision hazard to the landscape for big game.
Belmont #10469	In South 1, South 2, and Upper Sage pastures, grazing between 5/15 and 7/05 may reduce herbaceous nesting cover for sage grouse every two of three years. Grazing the North3 pasture between 7/15 and 9/08 could reduce elk winter range forage, but the reduction in days permitted, and rest years would result in more residual herbaceous forage for wintering elk. Building a riparian exclosure fence around the lower portion of stream reach #885 would improve forb species that are important for sage grouse brood rearing. The construction of a post and rail fence adjacent to reach #891 may increase raptor perching opportunities on rails compared to wire.	Impacts are the same as Alternative B, except a further reduction in season of use to 30 days in the North 3 pasture would increase residual herbaceous forage for wintering elk.
Davey Creek #10497	The season of rest in the Upper Spring and Lower Spring pastures two out of three years would improve forage for elk winter range. Constructing a ½ mile long pasture division fence and riparian exclosure around reach #829 would increase entanglement and collision hazards for big game moving through the area. However excluding livestock from this section of reach #829 would improve riparian vegetation, including forb production, for	Impacts would be the same as Alternative B, however the entanglement and collision hazards of constructing a pasture division fence would be eliminated and wildlife would continue to move through the area unimpeded.

	various wildlife and bird species.	
Fossil Basin #10667	Reducing the season of use and alternating season of use between years would enhance the potential for cool season bunchgrasses to mature, especially during even years when grazing occurs after the growing season. Herbaceous forage and nesting cover would be improved as a result.	Impacts would be the same as Alternative B, however adding a year of rest would further improve cool season bunchgrass productivity and cover for nesting and wildlife forage.
Garden Creek #20479	Delaying livestock grazing until after the nesting season would improve herbaceous cover for special status species. Constructing one mile of riparian exclosure fence along Cottonwood Creek would improve riparian vegetation, including forb production, for various wildlife and bird species. The potential for big game collisions and entanglements are increased. Removing portions of the upper Hinch Creek holding pasture fence would eliminate these risks for big game and birds moving through the area.	Impacts would be the same as Alternative B, but adding a rest year would further improve herbaceous nesting cover. Elk winter range forage would also improve during rest years.
Garnet #20492	Delaying livestock grazing until August, adding a rest year, and reducing the period of use would improve herbaceous forage and cover for pygmy rabbits, nesting birds, and wintering elk.	Impacts would be the same as Alternative B, but further reduction in the period of use would provide more residual herbaceous cover for elk winter range and herbaceous cover for pygmy rabbits and nesting birds.
Idaho Isolated #20676	Delaying livestock grazing until August, resting the allotment every other year, and reducing the season of use would improve herbaceous cover and forage for special status species and wintering elk.	Building one mile of fence would increase entanglement and collision hazards, as well as potentially impede movement for wildlife. The rest year will further improve herbaceous forage and cover, although not as substantial as every other year of rest proposed in Alternative B.
Idaho Jack #20499	WCT habitat would improve with the proposed management changes and projects. Constructing the boundary fence and pasture division fence would increase entanglement and collision hazards, as well as potentially impede movement for wildlife. Delaying livestock grazing until 7/10 or 8/10, adding a rest year, and reducing the season of use would improve forage and cover for wintering elk and nesting.	Same as Alt B but much faster rate of improvement. Redd tramping impacts associated with livestock would be eliminated. Suspending the livestock grazing lease would increase herbaceous nesting cover and forage for wintering elk and other big game. Fences that impede wildlife movement and present entanglement and collision hazards could possibly be removed.

		Constructing a boundary fence between private land and BLM would increase entanglement and collision hazards, as well as potentially impede movement for wildlife, especially being on well-utilized elk winter range.
North Fork AMP #10482	Dormant season livestock grazing would improve herbaceous nesting cover for special status species.	Impacts would be the same as Alternative B.

Table 4.9: Resource Concern #3: Recreation and Travel Management

Alternative A	Alternative B	Alternative C
Travel management designations to roads on public land would remain unchanged (no additional open or closed roads).	Two additional routes, covering approximately 0.75 miles, would be designated open.	No additional routes opened and no closures.

Table 4.10: Resource Concern #4: Socioeconomics

Alternative A	Alternative B	Alternative C
The BLM no action alternative would perpetuate whatever influences current management activities are having on the local/regional socioeconomic environment.	Revising management by reducing duration of use, adding more rest, or reducing AUMs may increase costs to the lessee. Constructing the structural projects in this alternative would require an investment from the BLM and the lessees. Proposed projects may create job opportunities for local individuals. The commercial timber harvests would provide employment and short term economic stimulus to the regional economy.	The shortened seasons of use and increased rest proposed in this alternative would have a higher cost to grazing lessees. Fewer structural projects are proposed so the costs of materials and labor would be less than under Alternative B. The commercial timber would provide employment and short term stimulus to the regional economy

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 all land, regardless of ownership, in the MRRW assessment area (map 1) for all issues and resource concerns except Socioeconomics, for which the cumulative impacts area is Madison County. Climate change is analyzed at the regional level. The temporal boundary when analyzing cumulative impacts is 10 years. Some past, present and reasonably foreseeable actions are discussed in Chapter 3 (Affected Environment) and/or Chapter 2 (Features Common to all Alternatives).

4.3.1 Past and Present Actions

Past or ongoing actions that are common to all alternatives and affect the same components of the environment as the proposed actions are: Exclusion of fire from the landscape i.e., 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 altered forest conditions.

Impacts on lands upstream from BLM administered land may contribute sediment to streams and subsequently may adversely affect downstream water quality on public land. 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.

Recreational use has occurred, will continue to occur and is expected to increase within the watershed in the future. Increased recreation has adversely impacted isolated areas within the watershed (camp sites, new trails and roads, spreading of weed seed, etc.).

Severe over-trapping of beavers and unregulated livestock use during the late 1800s and early 1900s changed the character (hydrological and vegetative) 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 watershed, 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 nearly to extinction 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 reintroduction of wolves into Yellowstone National Park in 1995 and subsequent increase in wolf numbers in southwest Montana may have an effect on reversing these impacts

Moose numbers are down throughout MFWP Region 3, with parasites as a primary concern. Elk populations in southwest Montana have increased over the past 20-25 years, and numbers are within objectives in Region 3.
Livestock grazing has occurred within the watershed since the 1860s. Until the passage of the Taylor Grazing Act in 1934, livestock grazing was unregulated and overgrazing on the public lands was rampant. Livestock grazing management has become increasingly more intensive as other resource values and uses have become more important over the years.

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).

There has been timber harvest, post and pole utilization, Christmas tree cutting, and firewood collecting in the past throughout the watershed.

Montana DNRC has completed a total of 162 acres of commercial harvest utilizing; 102 acres including 1.1 miles of new road construction in Idaho Creek, and 60 acres including 1.5 miles of

new road construction. USFS-administered lands in the MRRW have had an unknown acreage of commercial harvest adjacent to the watershed. An unknown acreage of forested land has been harvested on private lands.

Whitebark pine is declining rapidly across many parts of its range due to the combined effects of the exotic white pine blister rust, the native mountain pine beetle, and the exclusion of fires (Arno 1986; Kendall and Keane 2000; Tomback et al. 2001).

Introduction of non- native sport fish in the early-mid 1900's has resulted in the loss of most populations of native WCT within the watershed. Recent efforts have begun to re-introduce native WCT back into historic habitat.

Historic mining impacts to natural resources in the MRRW were, and continue to be, extensive. Several streams in the watershed were completely degraded, re-routed and/or de-watered. The hydrological impacts are still evident in upper Barton Gulch where man made walls of stone limit the streams ability to meander or access flood plains. Water quality was severely compromised during the period of mining activities. Forest habitat was affected substantially with the cutting of trees to be used in mill and mine construction and maintenance. The visual resource on public and private land in the watershed is still being impacted by the debris and refuse of past mining activity.

4.3.2 Reasonably Foreseeable Future Actions

Reasonably foreseeable future actions that would cumulatively affect the same resources in the cumulative impact area as the proposed actions and alternatives are discussed below.

Impacts resulting from grazing, vegetative projects and/or recreation on private and State lands, which are not subject to BLM Standards, would continue. This could impact wildlife migration and dispersal depending on timber harvests planned on State and private lands in the future. Any reductions in AUMs on BLM lands would increase grazing use on private or state land within the watershed if herd numbers remain consistent. Fencing on other land ownerships and on BLM boundaries may lessen the benefit of fence modification efforts on public lands to improve wildlife movements.

Recreation, especially hunting and fishing, is expected to increase in the MRRW in the future. Impacts expected from this increased use are new camp sites, spreading of weed seed, more use of roads and increased wildlife disturbance.

Increasing loss of Basin and mountain big sagebrush habitat through Douglas-fir or juniper expansion can be anticipated. In areas that are treated to remove competing conifers, the seral stage of sagebrush steppe habitat would be set back to early seral and would take about 30 years to progress back to late seral plant communities. This creates seral stage and structural diversity within sagebrush habitats across the landscape.

The potential for wildfire ignitions on all ownerships will continue. The appropriate fire management response will be implemented on federally-administered lands throughout the

watershed based on relative values to be protected commensurate with fire management costs. The long-term benefits of fire will also be considered on case-by-case basis.
The economic situation of the lessees is affected 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 could influence grazing lessees to subdivide private land to maintain economic viability. Substantial sub-dividing of private land within the watershed is expected to continue or 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. Access to public land across private land is becoming more restricted and will likely continue as traditional ranches are subdivided into smaller parcels.

Cooperative efforts between the State, FS and BLM to re-establish WCT populations on Greenhorn Creek and its tributaries, without affecting local sport fishing opportunities, would be expected to continue during the next five to ten years. The BLM will continue to monitor WCT habitat, populations and long term stream temperatures. Additionally, the BLM will continue to explore opportunities to work with private landowners, the State and other federal agencies to expand WCT populations within the watershed.

High probability habitats will be surveyed for sensitive plants prior to any ground disturbing activities of federal land but botanical surveys aren't required on private and state lands even on cooperative projects.

The AML program will continue to inventory and assess the impacts of abandoned mines on BLM lands. Once the mines have been evaluated the appropriate closures, reclamation, or mitigation will be conducted as funding and staffing allow. Closure methods, determined through evaluating the mine safety, accessibility, animal and or plant species present, and cultural significance, will be assessed on an individual basis through separate EAs as work progresses.

Livestock production and sustainability will continue to be important in Madison County and the State of Montana. According to the 2012 Revision of the official United Nations World Population Prospects, the world population of 7.2 billion in mid-2013 is projected to increase by almost one billion people within the next twelve years, reaching 8.1 billion in 2025, and to further increase to 9.6 billion in 2050 (UN 2013). Given this projection, food security is and will continue to be an important issue and livestock are integral to addressing food security. The United Nations Food and Agriculture Organization (UNFAO), on their Livestock and the Environment webpage project "growing populations, rising affluence and urbanization are translating into increased demand for livestock products, particularly in developing countries. Global demand is projected to increase by 70 percent to feed a population estimated to reach 9.6 billion by 2050" (UNFAO2014). Livestock production and sustainability, as well as food security, will continue to be important issues locally, regionally and globally.

Climate change may impact food production. The USEPA, citing papers published from 2007 through 2009, predicts several impacts of climate change on agriculture and food supply. Moderate warming and more CO_2 may help plants grow faster, however these effects may be offset by severe warming, floods and drought. Livestock production may be reduced. Livestock may be at risk directly by heat stress and indirectly from reduced quality of their food supply (USEPA, USGCRP 2009). Forage quality in pastures and rangelands generally declines with increasing carbon dioxide concentration because of the effects on plant nitrogen and protein content, reducing the land's ability to supply adequate livestock feed (USGCRP 2009). Livestock production is a major contributor to "climate change, air pollution, land, soil and water degradation and to the reduction of biodiversity."(Steinfeld et al.2006). The Bureau of Land Management recognized this fact with the passage of the Taylor Grazing Act and subsequent legislation. In Livestock's Long Shadow: Environmental Issues and Options (Steinfeld et al. 2006), mitigation measures that would reverse soil organic carbon losses and reduce enteric CH4 emissions are discussed. Alternatives B and C would implement the recommended mitigation measures applicable to Public Land Grazing: improved grazing management, providing appropriate water sources and improving water quality.

4.3.3 Cumulative Effects of All Alternatives, Including the No Action

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.

Development and population growth in the Ruby Valley and throughout MRRW area will continue to cause wildlife habitat fragmentation (roads, utilities). Other impacts may include: high levels of vehicle traffic, newly established or expanded areas of noxious and invasive species, reduced open space, increased outdoor recreation, difficulty in obtaining access to public land, and perhaps an increased demand for water.

High probability habitats will be surveyed for sensitive plants prior to any ground disturbing activities on federal land but botanical surveys aren't required on private and state lands even on cooperative projects (e.g. a pipeline that crosses multiple-ownership).

The loss of forest canopy and cover, due to insect and disease mortality, is likely to continue across all ownerships in untreated forested habitat resulting in the accompanying loss of wildlife habitat. Large-scale mortality of trees across forested portions of all ownerships within the MRRW may increase annual stream flows and change the timing of water delivery, due to decreased water uptake by trees and reduced interception of precipitation resulting from the loss of canopy (Colorado State Forest Service, 2009).

Large amounts of large woody debris are expected in and along riparian reaches in forested habitat as dead and dying trees fall. These reaches are primarily steep, narrow valley types (A channels). This will reduce or eliminate both big game and livestock access along these reaches which will reduce or eliminate any impacts from grazing along these reaches and increase use proportionately on adjacent accessible reaches. Increased woody debris in these stream reaches will increase step pool habitat and sediment storage along these areas. Fire hazard is increased in beetle kill areas and with the additional fuel loading these steep, narrow valleys would burn more

intensely. Sediment storage would be released very rapidly in the event of a wildfire causing excessive sediment deposition lower in the stream system.

Commercial timber harvests provide economic benefits, including helping to pay for management for diverse values. America's wood products and paper manufacturing sector employs approximately 900,000 workers, representing nearly 7% of manufacturing jobs in the United States (U.S. Census Bureau, 2011). Jobs in logging, trucking, road construction and forest and management services also benefit indirectly from commercial harvest. Employment related to forest products remains in urban areas of America, but it is especially important in rural communities where there are few other high-wage jobs (Society of American Foresters, 2012). It was estimated in 2002 that the direct forest industry employment in Washington and Oregon produced 13.2 workers per million board feet (MMBF) of annual timber harvest (Lippke & Mason, 2005). A similar study by Keegan et al. (2004) found that harvesting and processing saw timber generates 9 direct full-time jobs per MMBF annually in Montana. Both studies indicated that some mill activity may depend on imported materials from other states and may not be directly linked to local harvests.

The projects and actions proposed by the BLM in this environmental assessment would have undetectable influences on climate change. There is growing scientific evidence that climate change is a reality and human activities are contributing. The recent *National Climate Assessment* (Melillo et al. 2014) (nca2014.globalchange.gov), compiled by over 300 experts on climate change states; "The majority of the warming at the global scale over the past 50 years can only be explained by the effects of human influences, especially the emissions from burning fossil fuels (coal, oil, and natural gas) and from deforestation" (Gillett et al. 2012; Santer et al. 2013; Scott et al. 2010). "The conclusion that human influences are the primary driver of recent climate change is based on multiple lines of independent evidence. The first line of evidence is our fundamental understanding of how certain gases trap heat, how the climate system responds to increases in these gases, and how other human and natural factors influence climate. The second line of evidence is from reconstructions of past climates using evidence such as tree rings, ice cores, and corals. These show that global surface temperatures over the last several decades are clearly unusual, with the last decade (2000-2009) warmer than any time in at least the last 1300 years and perhaps much longer" (Mann et al. 2008). However, there is uncertainty about the local effects during the foreseeable future. While the long-term (100 year) trend clearly shows warming, local climatic records show great variability for any particular 15 year period. This would make any analysis of short-term impacts from climate change purely hypothetical. While it would be nearly impossible to accurately predict short-term climatic conditions, the land health standards remain relevant during either warm/dry or cool/wet periods.

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

Without grazing management changes and new range improvement projects cattle-induced riparian health concerns identified in the MRRW Assessment Report would not be addressed and objectives for improving riparian health would not be accomplished. Static or downward trends would continue on stream reaches in seven grazing allotments which could affect riparian health, fisheries habitat and/or water quality downstream from BLM administered lands. Conversely, on

those allotments that were meeting rangeland health standards, resource conditions are expected to continue meeting or making progress toward management objectives.

The loss of whitebark pine habitat has landscape-level ecological consequences, including decline of biodiversity, alteration of successional pathways, changes in distribution of subalpine vegetation, and increased rates of snowmelt in high elevation areas (Tomback et al, 2001). This could also affect bear, rodent, Clark's nutcracker, and other bird species' as this food source declines.

The loss of sagebrush steppe habitat as a result of conifer expansion would continue under the no action alternative. This would result in continued departure of seral stages and increased fuel loadings associated with FRCC 2 &3 as identified in Predicted Effects for Alternative B&C above.

The expansion of conifers into the riparian habitat in the watershed would persist. Increasing juniper and Douglas fir would continue to crowd out other riparian obligate woody and herbaceous plant species and communities. Loss of flora diversity in the riparian areas would have direct, detrimental impacts to critical wildlife habitat. Reduced plant community diversity would decrease the abundance and variety of riparian dependent birds, mammals, insects and amphibians within specific drainages and throughout the entire watershed.

Current impacts and trends to fish habitat would continue under Alternative A. Fish habitat in an upward, downward or static trend would likely continue. In situations where habitat conditions are limiting populations, habitat requirements for fisheries would not be met and could result in long term declines.

The predicted effects of climate change would be the same as described in section 3.3.3.

4.3.5 Cumulative Effects All Action Alternatives

The proposed changes in livestock management would improve riparian function, and water quality on BLM-administered land and other lands (private, state) within watershed. The timing and degree of change would vary based on specific resources issues and concerns and treatments implemented. The anticipated benefits to riparian habitat function would be improved sediment transport, better access to floodplains, dissipation of energy and, over time, improvements in channel morphology. Improved riparian function and health would improve water quality. The effects of implementing the selected alternative would be quantitatively determined by monitoring physical and vegetative indicators of riparian and upland function, and monitoring vegetative components of habitat.

Cumulative economic impacts could influence grazing lessees to subdivide private land to maintain economic viability. Substantial sub-dividing of private land within the watershed is expected to continue or 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. Access to public land across private land is becoming more restricted and will likely continue as traditional ranches are subdivided into smaller parcels.

Forest health treatments completed on BLM-administered lands, and other ownerships, would increase the diversity of forest structure and composition throughout the MRRW. 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 and mechanical treatments decreases the probability of large-scale disturbances that produces widespread negative impacts. 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.

Since whitebark pine seeds are a food source for a variety of wildlife species including grizzly bears, actions to maintain or enhance whitebark pine would also enhance an important wildlife habitat component. Maintaining/enhancing whitebark pine habitat on BLM administered lands would sustain connectivity to other whitebark habitats in the Greater Yellowstone Ecosystem and beyond.

The implementation of the land health standards, site specific rangeland improvements, and site-specific mitigation would maintain or improve vegetative composition, diversity, vigor and cover, maintain or restore soil function and limit bank disturbance and associated soil loss where these concerns were noted. As areas not meeting the land health standards move towards proper functioning condition, the BLM anticipates an increase in vegetative cover, a reduction in bare ground, mitigation of noxious weed spread, a reduction in soil compaction and soil erosion and an increase in bank stability.

If fewer AUMs were authorized on BLM-administered lands livestock would have to be pastured elsewhere for part of the grazing season or the herd size may have to be reduced. Reducing authorized AUMs may increase livestock use on private property adjacent to or near public lands. When viewing the watershed as a whole, the potential impacts to private property may offset the benefits to public land. If private livestock numbers were permanently reduced, a decrease in Madison County tax revenues may result.

It's possible that sensitive plant species could be accidentally or inadvertently impacted by construction or placement of range improvement projects on non-federal lands. Indiscriminate or random placement of livestock supplements could also cause impacts to individual plants or populations across all ownerships.

Inevitably recreational use in the MRRW will continue to increase. The threat of new aquatic invasive species entering the area, specifically the Ruby Reservoir, will be high. Education of fishermen, boater and other recreationists remains the primary way to reduce the risk. A cooperative effort between federal state and local authorities will be required to prevent the establishment of new species.
Slightly increased labor costs are assumed under Alternatives B and C to implement and check the allowable use grazing 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 Leases.

Efforts to improve the quality of occupied WCT habitat in the Ruby drainage will help decrease the threat of localized extirpations as well as improve the species resiliency to long term events outside of our control, such as climate change. Nearly all the occupied WCT habitat within the watershed occurs on federally managed lands located upstream of private property. Improvement of riparian resource conditions on public land administered by the BLM within this watershed would have a positive impact on WCT habitat.

Insect and disease mortality would continue unmitigated in untreated forest stands within the watershed. Proposed treatments would result in an increase in the short term and long term diversity of seral stages and FRCC rating distributions of forested habitats on BLM administered lands in the MRRW. Creating breaks in continuous stands would decrease the potential for widespread stand replacing wildfires and enhance suppression opportunities. Implementing treatments which increase structural diversity of forest types would decrease the potential for large-scale epidemic infestations. Salvage and thinning treatments on the BLM administered land alone would have limited effect on the current bark beetle populations because the majority of activity is occurring adjacent to BLM administered lands on the Forest Service. However, where treatments have been completed, residual stands are expected to be more resilient to future insect and disease outbreaks. Wildfires would continue to occur, but in treated areas the intensity would be reduced due to the lesser amount of fuel that would be available. The treatments on BLM administered land would increase diversity at the landscape level within the watershed.

Implementing the proposed conifer expansion treatments in conjunction with past and reasonably foreseeable future actions, would increase the structural and seral heterogeneity within the watershed and result in more discontinuous fuel loading within the sagebrush steppe habitat. As future disturbances (e.g., wildfire, insects) occur, the effects would be more varied across the landscape. Future wildfires would still occur but would be expected to be smaller and less intense as a result of the heterogeneous fuel loading.

As previously discussed above in Section 4.2.3.1, it is difficult, if not impossible to identify specific impacts of climate change on specific resources within the analysis area. As summarized in the Climate Change SIR (2010), climate change impacts can be predicted with much more certainty over global or continental scales. Existing models have difficulty predicting temperature changes at small scales. On smaller scales, natural climate variability is relatively larger, making it harder to distinguish changes expected due to external forces (such as changes from local activities to GHGs). Uncertainties in local forces and feedbacks also make it difficult to estimate the contribution of GHG changes to observed small-scale temperature changes (IPCC 2007b, as cited by the Climate Change SIR 2010). Effects of climate change on resources are described in Chapter 3 of this EA (section 3.3.3) and in the Climate Change SIR (2010).

The BLM expects only minor changes in the form of increased carbon sequestration capability of vegetation and soil with regard to climate change from actions implemented by the BLM within

the Middle Ruby Watershed. In fact, given current technology, any change would likely be undetectable. Regarding impacts from climate change, there is a great deal of uncertainty over what to expect during the life of the Watershed Plan (10 years). While the long-term (100 year) trend clearly shows warming, local climatic records show great variability for any particular 15 year period. This would make any analysis of short-term impacts from climate change purely hypothetical.

The implementation of the selected alternative would improve the ability of affected public land within the MRRW to perform their physical and biological functions including carbon sequestration. As discussed above under 4.2.3.1, healthy forests, riparian/wetland areas, and rangelands mitigate GHGs in the atmosphere by storing carbon in the soil and vegetation. Proper livestock management on rangelands increases carbon sequestration in these areas and decreases the number of livestock produced in feedlots that contribute to GHGs (at least for a portion of their life cycle).

The alternatives in this EA reduce the number of livestock on public land overall in the Middle Ruby Watershed and along with other actions expected to improve riparian/wetland, upland and forest health conditions. Therefore, the limited emissions associated with livestock digestion and excretion would decrease from current levels and carbon sequestration in the soil and vegetation would increase as land health conditions improve. The proposed alternatives and projects are not expected to contribute to climate change.

The application of the land health standards requires that they are met regardless of climatic conditions. While it would be nearly impossible to accurately predict short-term climatic conditions, the land health standards remain relevant during warm/dry or cool/wet periods. Progress towards meeting Land Health Standards is expected regardless of fluctuations in climate over the life of this plan. The Dillon Field Office's Watershed Assessment and planning process facilitates adaptive management over ten year increments. By reviewing land health across the watershed(s) and adjusting management to account for documented land health issues, impacts or effects from climate change (as well as other causes/uses) will be accounted for and alternatives developed to mitigate impacts and continue to maintain, or progress towards, site specific objectives and Land Health Standards.

Please refer to Chapter 3, section 3.3.3 for a more thorough discussion of climate change and its effects on resources.

4.3.6 Cumulative Effects of Alternatives B

Generally, additional impacts or predicted effects other than those described in section 4.2.4 and 4.2.5 are not expected on a landscape level. Because many allotments within the MW are intermingled with state and private lands, improvements to resource conditions resulting from management changes and projects would produce benefit across all ownerships. Impacts resulting from grazing, vegetative projects and/or recreation on private and State lands, which are not subject to BLM Standards, would continue. This could impact wildlife migration and dispersal depending on timber harvests planned on State and private lands in the future. Any reductions in AUMs on BLM lands would increase grazing use on private or state land within the watershed if herd numbers stay the same.

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

No additive or cumulative effects are expected for special status plants under this alternative.

Socioeconomic impacts to livestock operators other than those discussed above are not expected.

The cumulative effects for recreation, wilderness, and visual resources of future actions on private or state lands would be similar to the effects discussed in Section 4.2.4. The nature and scale of these activities would vary according to the objectives of the landowners or administrators.

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

Fencing the BLM land from the private land in the Idaho Jack allotment may cause increased grazing to occur on the private lands to compensate for a reduction in BLM authorized use.

Corridor fencing segments of BLM riparian reaches along Cottonwood Creek would eliminate grazing on BLM administered lands and result in improved riparian health on these reaches, but may increase the use and impacts on the portions of the stream on adjacent un-fenced private lands if livestock numbers stay the same.

The cumulative effects for recreation, wilderness, and visual resources of future actions on private or state lands would be similar to the effects discussed in Section 4.2.4. The nature and scale of these activities would vary according to the objectives of the landowners or administrators.

4.3.7 Cumulative Effects of Alternatives C

Impacts in addition to those described under section 4.2.4 and 4.2.5 are not expected. The investment in projects is similar to that in Alternative B. Alternative C, generally, contains more intensive management practices and/or more structural projects to help mitigate resource concerns.

Impacts resulting from grazing, timber harvest and/or recreation on private and State lands, which are not subject to BLM Standards, would continue. This could impact wildlife migration and dispersal depending on timber harvests planned on State and private lands in the future. Any reductions in authorized AUMs on BLM lands would increase grazing pressure on private and state lands within the watershed.

The cumulative economic impacts to livestock producers in the MRRW are expected to be relatively greater under Alternative C than under the other alternatives. Alternative C generally has more added rest, decreased duration of use and fewer livestock numbers than either Alternative A or B.

Chapter 5

5.0 List of Preparers - Consultation/Coordination

5.1 List of Preparers

Core IDT members:
Pat Fosse, Assistant Field Manager for Renewable Resources
Joe Sampson, Fuels Specialist
Paul Hutchinson, Fisheries Biologist
Steve Armiger, Hydrologist/Riparian Coordinator (Soil/Water/Air)
Katie Benzel, Wildlife Biologist
Emily Guiberson, Forester
Chris McGrath, Outdoor Recreation Planner/Wilderness Specialist
David Early, Rangeland Management Specialist, IDT Leader

Support IDT members:
Laurie Blinn, GIS Specialist
Jason Strahl, Archaeologist
Michael Mooney, Weeds Specialist
Kelly Savage, TES plants
Bob Gunderson, Mining
Dave Williams, Geology

Other Support Personnel
Leea Anderson, Range Technician
Berett Erb, Range Technician
Joe Dunn, Range Technician
Bryce Nelson, Range Technician
Kate Allder, Administrative Assistant
Ellen Daugherty, Administrative Assistant
Floyd Thompson, Range Program Lead MT/Dakotas
Mike Philbin, Riparian Program Lead MT/Dakotas
Jake Chaffin, Wildlife/Fisheries Program Lead MT/Dakotas

5.2 Consultation/Coordination

5.2.1 Persons and Agencies Consulted

Dean Waltee, Montana Fish, Wildlife, and Parks

5.2.2 Notifications

Assessment Initiation Notice; Middle Ruby mailing list – May, 2013
Media Release; Assessment Initiation Notice – May, 2013
Internet NEPA Log – Dillon Field Office – December, 2013
Media Release; Assessment Completion and EA Initiation Notice – December, 2013
Montana/Dakotas External Website - Assessment Report – December, 2013
Montana/Dakota External Website – Executive's Summary and Authorized Determination – December, 2013

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.

5.3 Glossary of Terms

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.

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.

Anthropogenic: relating to, or influenced by the impact of man on nature.

Application for Beneficial Water Use Permit: Montana DNRC Application for Beneficial Use Permit, Form 600, is used for surface water appropriations and groundwater developments in excess of 35 GPM or 10 AC-FT per year ten acre.

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.

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

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.

Climax plant community: the final or stable biotic community in a successional series; it is self-perpetuating and in equilibrium with the physical habitat.
Cool season species: Plants whose major growth occurs during the late fall, winter and early spring.

DBH: Diameter at Breast Height: the diameter measurement of a tree at 4 ½ feet above the ground, on the uphill side of the tree.

Desired Future Condition: Stream channels display the dimensions, pattern and profile that are representative of site potential (Rosgen) Dillon RMP 2006.

Ecological processes: include the water cycle (the capture, storage, and redistribution of precipitation), energy flow (conversion of sunlight to plant and animal matter), and nutrient cycle (the cycle of nutrients such as nitrogen and phosphorus through the physical and biotic components of the environment). Ecological processes functioning within a normal range of variation will support specific plant and animal communities.

Ecotone: 1. the transition zone between two adjoining communities, 2. an edge habitat.

Evapotranspiration: the conversion of water, whether surface water, soil moisture (both by evaporation), or within plants (by transpiration) into water vapor that is released to the atmosphere.

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.

Gall: a pronounced swelling or abnormal growth, usually localized, of greatly modified tissue structure arising on plants in response to irritation by a foreign organism, commonly an insect or pathogen.

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

Greenline: The first perennial vegetation that forms a lineal grouping of community types on or near the water's edge. Most often it occurs at or slightly below the bankfull stage.

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.

Hummocking: a form of micro-topographic relief characterized by raised pedicels of vegetated soil as much as 0.6 m (2ft) higher than the surrounding ground which results from long term large animal trampling and tracking in soft soil. Vegetation on the pedicels usually differs from that on the surrounding lower area due to moisture difference between the two levels. Hummocking is also caused by abnormal hydrologic heaving.

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.

Krummholz: the shrubby, multistemmed form assumed by trees and other woody vegetation near the treeline.

Landing: A place in or near the harvest area where felled timber or logs are gathered for further processing or transport.

Lek: Traditional arenas where male prairie grouse, e.g. sage grouse, gather during early spring to conduct a courtship display, attract females, and breed. For sage grouse, the lekking arena often is referred to as a "strutting ground".

Mesic: characterized by, relating to, or requiring a moderate amount of moisture.

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

Notice of Completion of Groundwater Development: Montana DNRC Notice of Completion of Groundwater Development, Form 602, is used for completed groundwater developments

where the water has been put to use with a maximum use of 35 GPM not to exceed 10 AC-FT per year.

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, ant the outputs or achievements that are measurable and quantifiable, are specified. (See goal)

Overstory: The canopy or upper layer of the habitat zone. This is generally referred to as the mature tree crowns of a forested habitat, but is also applied to uppermost layer of foliage in shrub dominated habitats.

Phloem: a layer of cells just inside the bark of plants that conducts food from the leaves to the stem and roots.

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)

Riparian zone: the banks and adjacent areas of water bodies, water courses, 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: of, relating to, or constituting an ecological sere.

Sere: a series of ecological communities that succeed one another in the biotic development of an area or formation.

Shear stress: the force exerted by flowing water on the bed or banks of a stream. Shear stress may be estimated as the product of mean flow depth or hydraulic radius, channel slope, and the density of water.

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.

Statement of Claim: a sworn statement for an existing water right, as defined in § 85-2-224, MCA, filed with the department upon order of the Montana supreme court.

Sublimination: the transition of a substance (such as water) from the solid phase (ice) directly to the vapor phase, or *vice versa*, without passing through an intermediate liquid phase.

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

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.

Total Maximum Daily Loads: A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that load among the various sources of that pollutant.

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.

Yarding: The hauling of felled timber or logs from the harvest area to a central loading area or landing.

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Appendix A

Middle Ruby Watershed Maps: 1-8

Appendix B

Middle Ruby River Watershed Monitoring Plan

Monitoring Plan for Middle Ruby River Watershed

Introduction

The purpose of this resource monitoring plan is to measure the effectiveness of management changes, structural projects and vegetative treatments in meeting the goals and objectives developed for the Middle Ruby River Watershed (MRRW). This plan has been designed to measure progress towards site specific objectives developed by an ID team where resource concerns were identified during the Middle Ruby River Watershed Assessment.

This plan will identify when, where and how studies will be conducted, as well as the types of data that will be collected, how the data will be evaluated, and who will participate in the process. All monitoring methodologies are approved BLM monitoring methodologies and are described in various BLM or Interagency Handbooks. This information, including technical references, BLM policy and procedure handbooks, and monitoring guidelines and methodology descriptions are available for review at the Dillon Field Office. Technical references and BLM procedural handbooks are also available on the BLM library website; http://web.nc.blm.gov/blmlibrary.

All *existing* monitoring studies that are needed to measure progress towards objectives or Standards will continue to be read on the same time schedule as any identified new studies.

Site Specific Objectives

Four Key Issues and seven additional Resource Concerns were identified during the Middle Ruby River Watershed Assessment and through public scoping and were analyzed in the Middle Ruby River Watershed Environmental Assessment (EA). Site specific objectives have been developed based on each key issue and resource concern. The amount of change desired for each of the objectives will be determined once additional baseline data is gathered during the 2014 or 2015 field seasons. The goal is to make measurable progress towards site specific objectives to be able to meet all Rangeland Health Standards by 2023.

Key Issue # 1: Riparian, Wetland, and Aquatic Habitat

Objectives:

- Improve streambank stability and width/depth ratio of streams within the natural range of variability based on Rosgen Stream Types.
- Mitigate excessive head cutting and restore vertical channel stability.
- Restore deciduous woody and herbaceous riparian habitat types, with emphasis on reducing conifer and non-native species composition.
- Increase deep-rooted riparian vegetation (sedges, willows) where decreased composition was documented.
- Reduce sediment inputs into streams where human activities such as authorized grazing, recreational impacts and roads are contributing to unacceptably high sediment loads.
- Maintain/enhance habitat for cold water fish in occupied streams.
- Restore, maintain and/or enhance native vegetation and hydrology of springs, seeps and wet meadows with emphasis on ecological function and biodiversity.

- Protect the water source of developed springs from impacts (hoof action) by livestock.

Monitoring activities to measure progress towards meeting Riparian, Wetland and Aquatic Habitat objectives:

- Continue monitoring existing riparian studies to measure progress towards objectives.
- Springs that are developed/redeveloped will be photographed before and after development and inspected and photographed periodically after development (every 2-3 years), including prior to the next scheduled assessment.
- Spring developments will be checked at least annually during compliance inspections to verify that maintenance is being completed as agreed to in Cooperative Agreements.
- Dysfunctional spring developments that are removed/cleaned up will be photographed before and after project clean-up.

Table B-1: Site Specific Riparian and Wetland and Aquatic Habitat Monitoring

Allotment Name and #	Stream and Stream Reach	Objective	Monitoring Methodology
Barton Gulch #10490	Barton Gulch trib. 800 Barton Gulch 803 Barton Gulch 805 Barton Gulch trib. 813 Davey Creek 827	Improve streambank stability and channel morphology. Reduce sediment input Increase woody riparian vegetation along the greenline Improve streambank stability and channel morphology. Increase woody and herbaceous vegetation along the greenline	Cumulative width/ depth transect and/or photo point Greenline transect Photo point(s) Multiple Indicator Monitoring
Belmont #10469	Cottonwood Creek 822 Cottonwood Creek 891 Cottonwood Creek 820 Sage Creek trib. 888 Bum Creek 867 Sweetwater Creek trib. 885 Stone Crk Upper L. Fk. 422	Improve streambank stability and channel morphology. Increase riparian vegetation along the greenline. Improve streambank stability and channel morphology. Improve streambank stability and channel morphology. Increase riparian vegetation. Reduce impacts at spring source	Cumulative width-depth transect Photo point(s) Photo point(s) Photo point(s)
Davey Creek #10497	Davey Creek 809 Williams Creek 2404 Dryden Creek 829	Improve streambank stability and channel morphology; reduce sediment Improve streambank stability and channel morphology, increase riparian vegetation along the greenline	Cumulative width/depth transect, pebble count and/or photo point(s) Photo point(s)
Garden Creek	Garden Creek 831 far up	Continue improvements channel	Multiple Indicator

Allotment Name and #	Stream and Stream Reach	Objective	Monitoring Methodology
#20479		morphology and riparian vegetation along the greenline	Monitoring
	Mormon Creek trib. 860	Improve streambank stability and channel morphology	Photo point(s)
	Cottonwood Creek 823	Continue improvements in channel morphology and riparian vegetation along the greenline	Existing monitoring plus pebble counts
Idaho Jack #20499	Jack Creek trib. 856	Improve channel morphology and increase deciduous woody vegetation.	Greenline transect and/or Photo point(s)
	Jack Creek 857	Improve streambank stability and channel morphology and reduce sediment input.	DEQ Monitoring Protocol
	Idaho Creek 851 (lower .25 miles)	Increase composition of riparian vegetation along the greenline	Greenline or Woody Browse Transect and/or Photo points
North Fork AMP #10482	N. Fork Greenhorn Cr. 841 S. Fork Greenhorn Cr. 840	Increase composition of deciduous woody vegetation along the greenline	Greenline or Woody Browse Regen. transect; and/or Photo points

Key Issue #2: Upland and Sagebrush Steppe Habitat

Objectives:

- Restore the soil/site stability, hydrological function, and biotic integrity of upland sites in allotments where one or more of these attributes of rangeland health was determined to be reduced.
- Increase cover and frequency of native perennial cool season herbaceous species where concerns were documented, which will improve the hydrological function and site productivity.
- Restore/maintain open sagebrush communities in habitats with conifer expansion.

Monitoring activities to measure progress towards meeting upland habitat and associated species objectives:

- Continue monitoring existing upland studies to measure progress towards objectives.
- Non-commercial mechanical/prescribed fire treatments:
    - Gather fuels and vegetation transect data on up to five representative sites. Photographic documentation should include pre and post-treatment photos from a designated point to verify ocular estimates. If prescribed burns are conducted after May 15, complete migratory bird surveys prior to burning activities.
    - Directly after prescribed fire treatments, retake photographs at established points and/or retake measurements along each pre-treatment transect to determine if treatment objectives have been attained.
    - One to four years after treatment: Re-measure transects and photo points to show vegetative response to the treatment and progress towards meeting objectives. Changes in use by big game, specifically elk, within a sample of the treatment

areas will be measured by conducting pellet group transects prior to treatment and then, at least annually, for up to five years following treatment.

Table B-2: Site Specific Upland and Sagebrush Steppe Habitat Monitoring

Allotment Name	Objective	Monitoring Methodologies
All allotments	Maintain or increase composition and cover of cool season perennial bunchgrasses	Daubenmire or Quadrat Frequency transects and/or Photo points (most of this monitoring is already in place, but will be continued)
Garnet #20492 Fossil Basin #10667 Belmont #10469	Increase composition and cover of cool season perennial bunchgrasses	Daubenmire or Quadrat Frequency transects and/or photo points
Laurin Canyon Garden Creek Davey Creek Barton Gulch Idaho Jack Greenhorn Unallotted	Reduce 60% or more of conifers less than 30 feet tall that have recently expanded into previously open sagebrush-dominated communities	See bullet points above Table 2 and in addition Line Point Intercept transect to measure sagebrush canopy cover pre and post treatment .

Key Issue #3: Forest and Woodland Habitat

Objectives:

- Maintain/enhance existing aspen and promote successful regeneration of aspen.
- Mitigate mortality of whitebark and limber pine from insects and disease in priority areas and priority individual trees (PLUS trees) and promote successful regeneration of whitebark and limber pine.
- Increase diversity of seral stages and structures in forested habitats.
- Reduce hazard rating for spruce budworm and Douglas-fir bark beetle activity.

Monitoring activities to measure progress towards meeting forest and woodland habitat objectives:

<u>Pre- Implementation:</u>

- Commercial Harvest Units:
  - Complete Forest Vegetation Information System (FORVIS) walkthrough survey to classify the existing vegetation type within a representative sample of each stand type. Walkthrough survey data includes canopy species composition and density, understory vegetation, fuel loading, and density and size class of snags and down wood.
  - Establish GPS photo points within a representative sample of stand types, and document general stand conditions with photos. Documentation will reflect the particular objectives of individual units.

    - Establish GPS photo point(s) showing approximate percent cover of habitat type species and any occurrence of insect/disease at the landscape-scale.
- Whitebark and Limber Pine Treatments:
    - For trees suspected of being blister rust resistant, GPS and tag tree. Measure DBH, height, and crown ratio.
    - Complete Forest Vegetation Information System (FORVIS) walkthrough survey to classify the existing vegetation type within a representative sample of each stand type. Walkthrough survey data includes canopy species composition and density, understory vegetation, fuel loading, and density and size class of snags and down wood.
    - Establish GPS photo points within a representative sample of stand types, and document general stand conditions with photos. Documentation will reflect the particular objectives of individual units.
    - Establish GPS photo point(s) showing approximate percent cover of habitat type species and any occurrence of insect/disease at the landscape-scale.

<u>Post Implementation:</u>

- Commercial Harvest Units:
    - Within two years after implementation on a given unit, re-visit each stand to obtain the same data measurements described above and evaluate if the stand objectives were reached.
    - Monitor post-harvest stands for new insect and disease activity.
    - Ungulate browse monitoring of aspen regeneration may be implemented if excessive browsing appears to be restricting new aspen suckers from growing taller than browse height.

- Whitebark and Limber Pine Treatments:
    - Complete re-application of pheromones or insecticide. Inspect trees for evidence of mountain pine beetle attack and/or blister rust.
    - Complete stocking surveys in areas planted with whitebark pine.
    - Within two years after implementation on a given unit, re-visit each stand to obtain the same data measurements described above and evaluate if the stand objectives were reached.
    - Monitor post-harvest stands for new insect and disease activity.

Monitoring of prescribed fire treatments to reduce slash post-harvest, and following whitebark pine day-lighting treatments are the same as described for prescribed fire monitoring activities listed under Key Issue #2: Upland Health and Sagebrush Steppe Habitat.

Key Issue #4: Special Status Species Habitat

Objectives:

- Enhance/improve/protect "Priority Habitats" including aspen, whitebark pine and limber pine.
- Improve streambank stability, vegetative cover and width/depth ratio on WCT streams where site specific issues were identified.
- Maintain >70% mountain big sagebrush habitat in canopy closure of 5 to 25

percent.

- In habitats that are predominately Wyoming big sagebrush, manage sites with the ecological potential to maintain sagebrush over at least 60% of those areas in a canopy closure of 5 to 25 percent.
- Maintain an herbaceous understory in sagebrush steppe habitat emphasizing multiple species of native forbs and grasses.
- Maintain or enhance habitat for sensitive plant species and provide ample opportunity for reproduction and seedling establishment.

Monitoring Activities to measure progress towards meeting Fish, Wildlife and Special Status Species Habitat objectives:

Table B-3: Site Specific Monitoring for Sagebrush Obligate Species Habitat

Allotment Name	Objective	Monitoring Methodologies
All Priority and General Sage Grouse Habitat	-Maintain 15 – 25% sagebrush cover in nesting/early brood rearing habitat. -Maintain an average of 6-7 inch residual understory within site potential on the majority of the area.	-Line Point Intercept plots to measure canopy cover of sagebrush, and herbaceous and forb understory. -Forage utilization and herbaceous understory cover will be measured annually within time constraints of staff.

Related objectives and monitoring activities to measure progress towards fish, wildlife and special status species habitat are included above under Key Issues for Riparian, Wetland, and Aquatic Health, Upland Health and Sagebrush Steppe Habitat, and Forest and Woodland Habitat.

Additional monitoring activities specific to fish, wildlife and special status species habitat include:

- Document and establish baseline inventory for any new "unmapped" populations of sensitive plants that are found.
- The inventory should include the number of individual plants, a description of the habitat (e.g., associated species, soils, aspect and elevation) and an assessment of any existing and potential threats to the population.
- Coordinate with MTFWP and USFS biologists to continue delineating seasonal habitat for sage grouse.
- Coordinate with MTFWP and Montana Audubon to continue sage grouse lek counts.
- Coordinate with MTFWP and USFS biologists to continue monitoring population trends of WCT in Jack Creek, Idaho Creek, Dark Hollow and North and South Forks of Greenhorn Creek.
- Maintain a 6" herbaceous stubble height along greenline and/or three inches on the floodplain by reach, whichever occurs first to provide a sediment buffer on all WCT stream
- Continue habitat monitoring on WCT Habitat every 5-10 years to include temperature

data and habitat surveys using the DEQ protocol for monitoring.

- Inventory harvest units for northern goshawk and great gray owl to identify any nesting territories and determine nesting activity.

Resource Concern #1: Noxious and Invasive Species

Objectives:

- Reduce the composition of noxious and invasive vegetative species within the watershed.
- Mitigate the spread of noxious and invasive plants into, within, or from the watershed.

Monitoring activities to measure progress towards meeting noxious and invasive species objectives are included in above under Riparian, Wetland, and Aquatic Habitat and Upland and Sagebrush Steppe Habitat.

Any aerial weed treatment areas will be monitored or evaluated for site specific objectives through photo points, ocular observation, and/or vegetative transects. Site specific objectives for aerial treatment will be to reduce composition of spotted knapweed with negligible reduction of non-target species.

Resource Concern #2: Wilderness

Objectives:

- Maintain wilderness characteristics of the Ruby Mountains and Axolotl Lakes Wilderness Study Areas.
- Manage the WSAs to the non-impairment standard as outlined in BLM Manual 6330 - Management of Wilderness Study Areas, until congress either releases them or designates them as wilderness.
- Maintain, on a continuing basis, an inventory of wilderness characteristics as describe in BLM Instruction Memorandum No. 2011-154.

Planned monitoring will consist of compliance checks and continuation of existing monitoring. WSA monitoring forms will be completed, and photographic documentation will be used where applicable.

Resource Concern #3: Recreation and Travel Management

Objectives:

- Effectively implement the Dillon RMP Travel Management Plan.
- Revise motorized route designations as necessary to correct mapping errors and improve route designations.
- Reduce unauthorized (non-designated route travel) motor vehicle use on closed routes within the Ruby Mountains WSA.
- Maintain motorized wheeled vehicle access to those areas where it already exists, and improve access to public land where appropriate and where opportunities are currently limited.
- Reduce resource impacts caused by recreationists, including spread of noxious weeds.

The goals for both Travel Management and OHV Use and Transportation in the Approved Dillon Resource Management Plan for Recreation collectively say; "to manage roads and trails and manage motorized travel to provide for public access or administrative needs, while maintaining or protecting resource values in conjunction with other federal agencies, state and local governments, and private landowners."
Monitoring will consist of compliance checks to determine if closed roads show signs of use, as well as the enforcement of the travel management plan, specifically during the big game hunting season.

Resource Concern #4: Socioeconomics

Objectives:

- 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 activities.
- Recover economic value of dead/dying timber before it is lost due to decay, where feasible.

Trends in socioeconomics will not be monitored by the local BLM office.

Resource Concern #5: Wildland Urban Interface

Objectives:

- Reduce fuel loading and continuity to modify potential wildfire behavior and provide greater opportunity for management actions during future wildfire events.
- Coordinate with private landowners and other affected agencies to maximize effectiveness of fuel reduction treatments.

Monitoring Activities to measure progress towards meeting Wildland Urban Interface objectives are:

- Designate photo points to record fuel conditions pre and post treatment. Plots may be established to estimate the stem count of conifers before and after treatments if the information is necessary to quantify treatment effectiveness.

Resource Concern #6: Cultural and Paleontological Resources

Objectives:

- Preserve and protect significant cultural and paleontological resources and ensure that they are available for appropriate uses by present and future generations.
- Reduce imminent threats from natural or human-caused deterioration, or potential conflict with other resource uses.
- Ensure that all authorizations for land and resource use avoid inadvertent damage to federal and nonfederal cultural resources in compliance with Section 106 of the National Historic Preservation Act and the Paleontological Resources Preservation Act.

Monitoring activities to measure progress towards meeting cultural and paleontological resource objectives include:

Cultural Resources: Visit a minimum of 10 previously recorded cultural resource

properties that are listed on the National Register of Historic Places or determined eligible for listing, on an annual basis, to update the site form to current professional standards and to assess the current condition and trend of significant resource values.

Paleontological Resources: Of the five major geographic paleontological areas in the field office, visit one of the geographic areas on an annual basis to identify if any adverse impacts are occurring.

Resource Concern #7: Visual Resources

Objectives:

- Limit management activities or projects within the Ruby Mountain and Axolotl WSAs to avoid "attracting attention" in accordance with VRM Class I objectives.
- Manage the rest of the MRRW so as not to detract from the existing landscape and other objectives stipulated under VRM Class III guidelines.

Monitoring activities to measure progress towards meeting visual resource objectives include: Reviewing proposed activities for consistency, and encouraging field staff to look around when they are in the area and report unauthorized activities that may be impacting visual resources.

Types of Data Collected

The established permanent vegetative and physical trend transects in the Middle Ruby River Watershed were read and data was updated during 2012. The date when these studies were initially established and read is considered baseline data. However, in order to adequately measure progress towards site specific objectives, additional studies will be established in key areas during 2014 or 2015 and baseline data will be gathered on the newly established studies. Baseline data is considered the starting point from which to measure progress towards meeting objectives or effectiveness of management changes implemented beginning in 2015 (on the new studies only). Data from existing studies will be compared and evaluated from the time they were established and data was initially collected.

Key areas are defined as relatively small areas that reflect or have the capability to reflect the effectiveness of management of the resources of a larger area. Depending on management objectives, a key area may be a representative sample of a large stratum, pasture, allotment, or a particular management area. Key areas or monitoring sites should represent the high variability of riparian, upland and forest habitat types, patterns of use, and conditions of forest, rangeland or riparian health. Over the next several years the following data will be collected (See Table 4).

- Actual livestock and wildlife use. Actual use is the grazing use of an area by all classes of forage consumers. This information is necessary to provide a correlation between utilization and trend data. Considered alone, actual use data are essentially meaningless. However, when considered in conjunction with climate and utilization data, this data is necessary to interpret trend data accurately.
- Annual compliance, including utilization of upland forage, browse levels on willows and aspen, measurement of sedge stubble heights and/or measurement of stream bank alteration. This monitoring will occur primarily at established key areas, but may occur in other areas as well. Annual compliance monitoring will be done on a prioritized basis with I category allotments being the highest priority, followed by M, and then C category

allotments. In areas where competition for resources may occur between livestock and big game, pre-livestock data may also be collected. This annual data will be used to help determine pasture moves, accurately interpret trend data, and serve as an early indicator on whether implemented changes are effective. If annual monitoring reveals resource degradation or ineffective management changes (as determined by BLM specialists), trend studies may be read at any time prior to the next scheduled assessment (2023), and adjustments in management analyzed in the interim.

- Local precipitation and temperature. This data is necessary to interpret trend data accurately.
- Long term trend. Trend data will be used to measure progress towards meeting objectives as described above.

Trend refers to the direction of change and indicates whether the forest, rangeland, riparian area or other resource is being maintained or is moving toward or away from the desired plant community or other specific management objectives. Trend studies are important in the long term for determining the effectiveness of management actions in meeting or moving towards management objectives.

Trend data will be collected again in 2022 or 2023, unless specified otherwise for specific objectives. The Middle Ruby River Watershed will be re-assessed or evaluated during 2023. In this process, all monitoring data will be summarized, analyzed, interpreted, and evaluated to measure progress toward meeting objectives. Trend data gathered in 2022 will be compared to baseline (established in 2014 or 2015) and existing trend data gathered or updated in 2012. The measured change in the data will be used to measure progress toward meeting objectives, thereby evaluating management and making informed decisions regarding subsequent management (continuation or change). This is called adaptive management. For example, if monitoring data shows that progress is being made toward established objectives, current management will be continued or modified slightly as warranted, according to the data. However, if data shows a downward trend (change away from objectives) or does not show any progress toward meeting objectives by 2022, and it is determined that current livestock management is a significant factor in precluding progress toward meeting objectives, then management will be adjusted by implementing an alternate system, changing the season of use and/or reducing authorized AUMs. The level of adjustment will be determined by the degree of divergence from the objectives.

Monitoring methodology descriptions are available for review at the Dillon Field Office. Technical references and BLM procedural handbooks are also available on the BLM library website; http://web.nc.blm.gov/blmlibrary.

Table B-4: Planned Resource Monitoring Activities

Type	Method	Responsibility	Frequency
Actual Use	Actual Use Reports submitted by grazing lessees Wildlife observations Wildlife population monitoring in cooperation with the MFWP Recreation user days	Range, Wildlife and Recreation Staff	Annually
Compliance/ Utilization	Utilization – Grazed/Ungrazed Method or Key Forage Plant Method	Range, Wildlife or Fisheries Biologists, Hydrologist	Annually on a prioritized basis
	Stubble height – Stubble Height Method		
	Bank alteration – Stream bank Alteration Methodology as defined by Idaho State Office BLM, 2000		
	Browse use – Extensive Browse Method		
Climate	Precipitation data available from National Oceanic and Atmospheric Administration and other sources	Available from external sources	Annually
Habitat Characterization	Inventory for leks and seasonal habitats Sagebrush canopy and herbaceous understory measurements along established transects in sage grouse, elk calving and mule deer winter habitats	Wildlife Staff, MFWP, NWF	Annually on a prioritized basis
Population(s)	Sage Grouse – male lek attendance WCT – periodic population sampling through electro-fishing Pygmy rabbit surveys	MFWP and BLM Biologists will coordinate and assist, where applicable	Annually for sage grouse; 5 year intervals for WCT
Trend (also see Table 3)	**Biotic** Quadrat Frequency Daubenmire Line Intercept Cover Board Woody Species Regeneration Greenline Multiple Indicator Monitoring (MIM) Macroplots/Belt Transects Photopoints Fire Regime Condition Class (FRCC) LANDFIRE (as applicable)	Range, Wildlife or Fisheries Biologists, Hydrologists, Foresters, Fuels Specialists	Any new trend monitoring studies will be established during 2013. Trend data (new and existing studies) will be gathered again in **2022 or 2023.**
	Physical Cumulative width/depth ratio		
Watershed Evaluation	Analysis, Interpretation, Evaluation and Recommendations	ID team	FY2023

Budget Requirements

This monitoring plan was prepared with the assumption that funding will remain at or near existing levels for the foreseeable future. In this light, it is anticipated that the bulk of the monitoring workload will have to be borne by the existing range, wildlife, fisheries, forestry, fuels, hydrology, recreation, wilderness and cultural resource specialists along with a minimum of six seasonal employees each field season for the duration of this plan.

Litigation workload associated with Watershed Assessments also directly effects how much monitoring the existing staff is able to complete.

Appendix C

Biological Evaluations for Special Status Plants and Special Status Fish and Wildlife Species

Biological Evaluation for
Special Status Plants on BLM Lands in the Middle Ruby River Watershed
(Middle Ruby River Watershed Environmental Assessment)
DOI-BLM-MT-B050-2014-0005-EA

Prepared by
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May 2014

None of the plants currently listed as endangered or threatened under the Endangered Species Act inhabit BLM lands in the Dillon Field Office. However, Ute ladies' tresses, which is listed as threatened in Montana, is known to occur on private and state lands in Beaverhead, Madison, Gallatin, and Jefferson counties. Fifty-three sensitive plant species inhabit BLM-administered lands within the Dillon Field Office. Nine of those species are known to occur within the Cumulative Impact Area of the Middle Ruby River Watershed (MRRW) Environmental Assessment. The potential effects that the various alternatives may have on these species are summarized in the following table. A detailed discussion of predicted effects and potential impacts to special status plant species and their habitat is provided in the attached "Supplemental Information on Special Status Plants on BLM Lands in the Middle Ruby River Watershed."

Definitions of Abbreviations used in the Table.

NI - No Impact

BI - Beneficial impact to populations or habitat

MIIH - May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

* **WIFV** - Will impact individuals or habitat with a consequence that the action may contribute to a trend toward federal listing or cause a loss of viability to the population or species.

* Consultation with the U.S. Fish and Wildlife Service will be initiated if an alternative is selected that may contribute to a loss of viability to a population of species reviewed in this evaluation.

Table C-1: Biological Evaluation Summary for Special Status Plants for the Middle Ruby River Watershed Environmental Assessment (DOI-BLM-MT-B050-2014-0005-EA)

Common Name *Genus species*	Does the species occur on Public Lands within the Middle Ruby River Watershed?	Is the species or its habitat found in the Cumulative Impact Area?	Are irreversible or irretrievable resources involved?	What effect could this proposal have? *		
				Alt. A	Alt. B	Alt. C
Ute ladies' tresses *Spiranthes diluvialis*	NO	YES	NO	NI		
Cusick's horse-mint *Agastache cusickii*	NO	NO	--	--	--	--
Western joepye-weed *Ageratina occidentalis*	NO	NO	--	--	--	--
Tapertip onion *Allium acuminatum*	NO	NO	--	--	--	--
Sitka columbine *Aquilegia formosa*	NO	NO	--	--	--	--
Sapphire rockcress *Arabis fecunda*	NO	NO	--	--	--	--
Painted milkvetch *Astragalus ceramicus var. apus*	NO	NO	--	--	--	--
Lesser rushy milkvetch *Astragalus convallarius var. convallarius = A. junciformis*	NO	NO	--	--	--	--
Bitterroot milkvetch *Astragalus scaphoides*	NO	NO	--	--	--	--
Railhead milkvetch *Astragalus terminalis*	NO	NO	--	--	--	--
Large-leafed balsamroot *Balsamorhiza macrophylla*	NO	NO	--	--	--	--
Red sage *Bassia americana*	NO	NO	--	--	--	--
Mojave brickellbush *Brickellia oblongifolia*	NO	NO	--	--	--	--
Idaho sedge *Carex idahoa*	NO	NO	--	--	--	--
Lesser Indian paintbrush *Castilleja minor* ssp. *minor*	NO	NO	--	--	--	--
Fendler cat's-eye *Cryptantha fendleri*	NO	NO	--	--	--	--
Beavertip draba *Draba globosa*	NO	NO	--	--	--	--
Wind River draba *Draba ventosa*	NO	NO	--	--	--	--
Beaked spikerush *Eleocharis rostellata*	NO	YES	NO	NI		
Long-sheath waterweed *Elodea bifoliata*	NO	NO	--	--	--	--
Idaho fleabane *Erigeron asperugineus*	NO	NO	--	--	--	--

Common Name *Genus species*	Does the species occur on Public Lands within the Middle Ruby River Watershed?	Is the species or its habitat found in the Cumulative Impact Area?	Are irreversible or irretrievable resources involved?	What effect could this proposal have? *		
				Alt. A	Alt. B	Alt. C
Linearleaf fleabane *Erigeron linearis*	NO	NO	--	--	--	--
Buff fleabane *Erigeron parryi*	YES	YES	NO	NI		
Mat buckwheat *Eriogonum caespitosum*	NO	NO	--	--	--	--
Railroad Canyon wild buckwheat *Eriogonum soliceps*	NO	NO	--	--	--	--
Hiker's gentian *Gentianopsis simplex*	NO	NO	--	--	--	--
Many-flowered viguirea *Heliomeris multiflora var. multiflora*	NO	NO	--	--	--	--
Prostrate hutchensia *Hornungia procumbens*	NO	NO	--	--	--	--
Ballhead ipomopsis *Ipomopsis congesta ssp. crebrifolia*	NO	NO	--	--	--	--
Simple bog sedge *Kobresia simpliciuscula*	NO	NO	--	--	--	--
Beautiful bladderpod *Lesquerella pulchella*	NO	NO	--	--	--	--
Sand wildrye *Leymus flavescens*	NO	NO	--	--	--	--
Taper-tip desert-parsley *Lomatium attenuatum*	YES	YES	NO	NI		
Marsh felwort *Lomatogonium rotatum*	NO	NO	--	--	--	--
Dwarf purple monkeyflower *Mimulus nanus*	NO	NO		--	--	--
Primrose monkeyflower *Mimulus primuloides*	NO	NO	--	--	--	--
Low northern – rockcress *Neotorularia humilis*	NO	NO	--	--	--	--
Small-flowered pennycress *Noccaea parviflora*	NO	NO	--	--	--	--
Meadow lousewort *Pedicularis crenulata*	NO	NO	--	--	--	--
Lemhi beardtongue *Penstemon lemhiensis*	NO	NO	--	--	--	--
Whipple's beardtongue *Penstemon whippleanus*	NO	NO	--	--	--	--
Hoary phacelia *Phacelia incana*	NO	NO	--	--	--	--

Common Name *Genus species*	Does the species occur on Public Lands within the Middle Ruby River Watershed?	Is the species or its habitat found in the Cumulative Impact Area?	Are irreversible or irretrievable resources involved?	What effect could this proposal have? *		
				Alt. A	Alt. B	Alt. C
Slender-branched popcorn flower *Plagiobothrys leptocladus*	NO	NO	--	--	--	--
Spiny skeletonweed *Pleiacanthus spinosus*	NO	NO	--	--	--	--
Alkali primrose *Primula alcalina*	NO	NO	--	--	--	--
Mealy primrose *Primula incana*	NO	YES	NO	NI		
James stitchwort *Pseudostellaria jamesiana*	NO	NO	--	--	--	--
Lemmon's alkaligrass *Puccinellia lemmonii*	NO	NO	--	--	--	--
White-stemmed globe-mallow *Sphaeralcea munroana*	NO	NO	--	--	--	--
Silver chicken sage *Sphaeromeria argentea*	NO	NO	--	--	--	--
Rocky Mountain dandelion *Taraxacum eriophorum*	NO	NO	--	--	--	--
Alpine meadowrue *Thalictrum alpinum*	NO	NO	--	--	--	--
Slender thelypody *Thelypodium sagittatum*	NO	NO	--	--	--	--
Showy townsendia *Townsendia florifera*	NO	NO	--	--	--	--

* The livestock management and project proposals are not consistent across alternatives. For example, the season of use for one allotment under Alternative B may not be the same as the season of use for another allotment under the same alternative. For the purposes of this biological evaluation if a proposed grazing treatment (numbers, duration, time of year, frequency of rest), project or vegetative treatment within a given alternative is likely to adversely affect a sensitive plant or its habitat, then that effect is reflected in the table.

Supplemental Information on Special Status Plants on BLM Lands in the Middle Ruby River Watershed

The Dillon Resource Management Plan provides guidance that requires project sites in high probability habitats to be surveyed for sensitive plants prior to any ground disturbing activities. This reduces the possibility that sensitive plant species would be accidentally or inadvertently impacted by BLM activities.

No impacts from any of the three alternatives considered in the EA are anticipated on the three plant species that are known only from the cumulative impact area. They either occupy habitats not normally frequented by cattle or are located far enough away from the project area that the livestock management, range improvement projects or vegetation

treatments proposed on allotments in the Middle Ruby River Watershed will be of little or no consequence.

Buff fleabane and taper-tip desert-parsley aren't likely to be impacted by any of the alternatives. Neither of these plants is considered palatable and their habitats typically receive light grazing use. Generally these plants occupy dissimilar habitats than those proposed for fuels and healthy forest treatments. The risk of any management proposals impacting these two species is relatively low.

During the summer of 2010, the U.S. Fish and Wildlife Service announced a 90-day finding on a petition to list whitebark pine (*Pinus albicaulis*) as endangered or threatened and to designate critical habitat. In July of 2011, the finding was released; whitebark was given a warranted but precluded listing with a priority of 2 and is currently on the candidate species list (For a complete description of whitebark pine in the MRRW see Forest and Woodland Health section 3.2.3).

Cumulative Considerations:
High probability habitats will be surveyed for sensitive plants prior to any ground disturbing activities on federal land but botanical surveys aren't required on private and state lands even on cooperative projects (e.g. a pipeline that crosses multiple ownerships). It's possible that sensitive plant species could be accidentally or inadvertently impacted by construction or placement of range improvement projects on non-federal lands.

The invasion of introduced species and noxious weeds near and into special plant species habitat across all ownerships poses a direct threat to these plants through competition, habitat degradation and the potential impact of herbicides. The use of insecticides on private lands within the MRRW to control grasshoppers or other insects may affect pollinators that visit sensitive plant species on BLM lands.

_____ _____
Signature Date

Printed Name and Title: Kelly Savage , Rangeland Management Specialist/TES Plants

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BLM DILLON FIELD OFFICE
Biological Evaluation for Special Status Fish and Wildlife Species
Form Revised May 2009 - Updated Oct 2011

Table C-2: Middle Ruby River Watershed Assessment Biological Evaluation Special Status Species

Step 1a.	Step 1b.	Step 1c.	Step 2	Step 3.	Step 4.	Step 5.	Step 5.	Step 5.
List of all Special Status Species that are known or suspected to occur on the DFO.	**Current Management Status of the Species.**	**Does the species occur on this portion of the Field Office?**	**Is the species or its habitat found in the Surrounding area?**	**Could this proposal have any effect?**	**Are Irreversible or Irretrievable Resources involved?**	**Alt A level of effect**	**Alt B level of effect**	**Alt C level of effect**
Canada Lynx (*Lynx canadensis*)	Threatened	N	Y	N	--	--	--	--
Grizzly Bear (*Ursus arctos horribilus*)	Threatened	Y	Y	Y	N	NE	NLAA	NLAA
Greater Sage Grouse (*Centrocercus urophasianus*)	Canidate	Y	Y	Y	N	MIIH	MIIH	MIIH
North American Wolverine (*Gulo gulo luscus*)	Proposed Threatened	Y	Y	N	--	--	--	--
Mammals								
Fisher (*Martes pennanti*)	Sensitive	N/A	N/A	--	--	--	--	--
Fringed myotis (*Myotis thysanodes)*	Sensitive	N/A	Y	N	--	--	--	--
Gray Wolf (*Canis lupus*)	Sensitive	Y	Y	Y	N	MIIH	MIIH	MIIH
Great Basin pocket mouse *(Perognathus parvus)*	Sensitive	N/A	Y	N	--	--	--	--
Long-eared Myotis *(Myotis evotis)*	Sensitive	Y	Y	Y	N	NI	MIIH	MIIH
Long-legged Myotis *(Myotis volans)*	Sensitive	Y	Y	Y	N	NI	MIIH	MIIH
Pygmy Rabbit	Sensitive	Y	Y	Y	N	NI	BI	BI

(*Brachylagus idahoensis*)								
Townsend's Big-eared Bat *(Plecotus townsedii)*	Sensitive	N/A	Y	Y	N	NI	MIIH	MIIH

(cont.) List of all Special Status Species that are known or suspected to occur on the DFO.	**Current Management Status of the Species.**	**Does the species occur on this portion of the Field Office?**	**Is the species or its habitat found in the surrounding area?**	**Could this proposal have any effect?**	**Are Irreversible or Irretrievable Resources involved?**	**Alt A level of effect**	**Alt B level of effect**	**Alt C level of effect**
Birds								
Bald Eagle (*Haliaeetus leucocephalus*)	Sensitive	Y	Y	N	--	--	--	--
Black Tern *(Chlidonias niger*)	Sensitive	Y	Y	N	--	--	--	--
Black-backed Woodpecker *(Picoides arcticus)*	Sensitive	Y	Y	N	--	--	--	--
Black-crowned Night Heron *(Nycticorax nycticorax)*	Sensitive	N/A	Y	N	--	--	--	--
Bobolink *(Dolichonyx orysivorus)*	Sensitive	Y	Y	N	--	--	--	--
Brewer's sparrow *(Spizella breweri)*	Sensitive	Y	Y	Y	N	NI	MIIH	MIIH
Burrowing Owl (*Athene cunicularia*)	Sensitive	N	Y	N	--	--	--	--
Common Loon (*Gavia immer*)	Sensitive	Y	Y	N	--	--	--	--
Ferruginous Hawk (*Buteo regalis*)	Sensitive	Y	Y	N	--	--	--	--
Flammulated Owl (*Otus flammeolus*)	Sensitive	N/A	Y	N	--	--	--	--
Franklin's Gull *(Larus pipixcan)*	Sensitive	N/A	Y	N	--	--	--	--
Golden Eagle	Sensitive	Y	Y	N	--	--	--	--

(Aquila chrysaetos)								
Great Gray Owl (*Strix nebulosa*)	Senstive	Y	Y	Y	N	NI	MIIH	MIIH
Harlequin Duck (*Histrionicus histrionicus)*	Sensitive	N	Y	N	--	--	--	--
Loggerhead Shrike (*Lanius ludovicianus*)	Sensitive	Y	Y	Y	N	NI	MIIH	MIIH
(cont.) List of all Special Status Species that are known or suspected to occur on the DFO.	Current Management Status of the Species.	Does the species occur on this portion of the Field Office?	Is the species or its habitat found in the surrounding area?	Could this proposal have any effect?	Are Irreversible or Irretrievable Resources involved?	Alt A level of effect	Alt B level of effect	Alt C level of effect
Long-billed Curlew (*Numenius americanus)*	Sensitive	Y	Y	N	--	--	--	--
Marbled Godwit *(Limosa fedoa)*	Sensitive	Y	Y	N	--	--	--	--
McCown's longspur *(Calcarius mccownii)*	Sensitive	Y	Y	N	--	--	--	--
Northern Goshawk *(Accipiter gentilis)*	Sensitive	Y	Y	Y	N	NI	MIIH	MIIH
Peregrine Falcon (*Falco peregrinus anatum*)	Sensitive	Y	Y	N	--	--	--	--
Sage Sparrow (*Amphispiza belli*)	Sensitive	Y	Y	Y	N	NI	MIIH	MIIH
Sage thrasher *(Oreoscoptes montanus)*	Sensitive	Y	Y	Y	N	NI	MIIH	MIIH
Sedge Wren *(Cistothorus platensis)*	Sensitive	N/A	N/A	--	--	--	--	--
Swainson's Hawk (*Buteo swainsoni*)	Sensitive	Y	Y	N	--	--	--	--
Three-toed Woodpecker (*Picoides tridactylus*)	Sensitive	Y	Y	Y	N	NI	MIIH	MIIH
Trumpeter Swan (*Cygnus buccinator*)	Sensitive	N/A	Y	N	--	--	--	--
White-faced Ibis (*Plegadis chihi*)	Sensitive	N/A	Y	N	--	--	--	--
Amphibian/reptiles								

Boreal/Western toad *(Bufo boreas)*	Sensitive	Y	Y	N	--	--	--	--
Plains Spadefoot (*Spea bombifrons)*	Sensitive	N	N	--	--	--	--	--
Northern leopard frog *(Rana pipiens)*	Sensitive	N	N	--	--	--	--	--
Fish								
Westslope cutthroat trout *(Onchorhynchus clarkii lewisi)*	Sensitive	Y	Y	Y	N	MIIH	BI	BI

Step 6. Are there any specific recommendations to avoid significant effects (if any)? These are mitigation measures needed to avoid determinations of: LAA, LJ, WIFV. If so, the narrative describing these recommendations would be discussed in the NEPA document.
Step 7. Documentation: This short form is intended to follow a seven-step process to provide basic biological evaluations. Judgments must not be arbitrary but should be reasoned. This form provides a "road map" of that reasoning and assumes the judgments are drawn from numerous sources. Any species-specific impacts should be discussed in the NEPA document or below under the Narrative of Potential Impacts.

The signature below certifies that:

1. The wildlife biologist has reviewed the proposed action and its alternatives, but may or may not have provided input to alternative design, depending on the issues.

2. The wildlife biologist has an understanding of the specific conditions found in the affected area. Column 1a lists all possible Special Status Species in the Dillon Field Office. Column 1b identifies the species' current management status. Column 1c indicates whether there are no records (N/A), or whether the species is considered a Transient (T) or Resident (R) {for our purposes, resident includes migratory species that fulfill a portion of their life history here}. Step 2 is satisfied by field visits or knowledge of local conditions from previous visits resulting in enough information to determine if the area is potential habitat for species listed in Step 1. Extensive surveys are not necessary if the conservative approach is taken that: "suitable habitat" means the potential for occupancy.

3. The wildlife biologist has an understanding of the species habitat needs and other attributes important to the determination. This can be a combination of literature review, professional experience, and consultation with others.

4. The wildlife biologist has assimilated the above information in making the "determinations" (i.e. final judgments about the scientific significance of the effects).

Printed Name and Title: Katie Benzel, Wildlife Biologist
Signed__\s\ Katie Benzel_____Date_5-21-14_____

Paul Hutchinson, Fisheries Biologist
Signed___\s\ Paul Hutchinson_____Date___5-14-14___

N/A – "Not Applicable." Indicates this species does not occur in the project area or that the project would have no bearing on its potential habitat. These species were removed from detailed analysis after field review of existing and potential habitats and consideration of distribution records.

FEDERALLY LISTED SPECIES

NE - No Effect
***LAA** - May Effect - Likely to Adversely Affect (formal consultation required)
NLAA - May Effect, Not Likely to Adversely Affect (informal consultation - concurrence with determination - required)
BE - Beneficial Effect (informal consultation - concurrence with determination - required)

SPECIES PROPOSED FOR LISTING

NE - No Effect
NLJ - Not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of proposed critical habitat
***LJ** - Likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of proposed critical habitat

SENSITIVE SPECIES

NI - No Impact
MIIH - May Impact Individuals or Habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.
***WIFV** - Will Impact Individuals or habitat with a consequence that the action may contribute to the need for federal listing or cause a loss of viability to the population or species.
BI - Beneficial Impact
* triggers formal consultation process revised 10/11

NARRATIVE OF POTENTIAL IMPACTS

FEDERALLY LISTED and PROPOSED SPECIES:

Canada Lynx:
The Dillon Field Office does not contain any lynx critical habitat. The nearest critical habitat is on the Gallatin National Forest, east of highway 191. Forested areas may provide temporary habitat for transient lynx dispersing from established lynx populations,

but these areas likely do not contain all physical and biological features in adequate quantities and spatial arrangements to support lynx populations over time (USDI, 2013a). The forest habitat within the DFO is generally drier than the preferred moist boreal forests that include dense understories that provide foraging habitat and cover for the lynx's main prey, the snowshoe hare (USDI, 2013a). Due to the unlikelihood of lynx being more than transient through the watershed, actions implemented under this EA will not affect Canada lynx. Regeneration following timber harvest would provide cover and forage for snowshoe hares, however the small scale of these treatments are unlikely to lead to snowshoe hare and lynx colonization.

Grizzly Bear:
Grizzly bears are resident in the Gravelly Range portion of the MRRW, which is also within the Demographic Monitoring Area used by the Interagency Grizzly Bear Study Team (IGBST) to assess all demographic criteria for the Greater Yellowstone Area (GYA) grizzly bear population. The Dillon Field Office is outside the Grizzly Bear Recovery Zone, which depicts an area surrounding Yellowstone National Park where interagency grizzly bear recovery efforts are concentrated to restore viability of the grizzly bear population to the point where federal protections offered under the ESA are no longer necessary (USDI, 2013b).

Whitebark pine seeds are an important component of grizzly bear diets. Actions for whitebark pine trees under Features Common to All Alternatives, Including No Action Alternative include collecting cones and testing for white pine blister rust resistance and planting whitebark pine. These actions promote whitebark pine habitat and this food source for grizzly bears. These actions would have a beneficial effect for grizzly bear.

To reduce the potential for attracting grizzly bears in areas where grizzly bear conflicts with livestock are more likely to occur, a stipulation will be added to grazing leases stating that the lessee, agency personnel, and MFWP will jointly determine how to properly treat or dispose of livestock carcasses. Amending grazing leases to state that livestock losses may occur from grizzly bears would create awareness and reduce conflicts between lessees and agencies responsible for managing grizzlies.

Harvesting up to 1,370 acres of timber and constructing up to 9 miles of temporary road is proposed under Alternative B. Up to 3,169 acres of timber would be harvested and up to 29 miles of temporary road constructed under Alternative C. The construction of roads for timber harvest is a common concern for grizzly bears. Roads constructed would be temporary and closed after harvest activity is concluded, and therefore would not lead to increased wildlife disturbance from improved motorized vehicle access in the long-term. A food storage stipulation will be included in timber harvest contracts to reduce the potential of attracting bears. Cover will be lost for grizzlies within the timber harvest units, until regeneration occurs. The opening up of the forest canopy will provide grizzly bear forage as grasses, forbs, and shrubs increase. Grizzly bears would be displaced from the areas where timber harvests are implemented. Not all units would be treated at the same time, or during the same years. Offsetting the timing of treatment between units provides habitat for grizzlies to be displaced to if they are in the area.

Overall, actions under alternatives B and C may effect, not likely to adversely affect (NLAA) grizzly bear.

North American Wolverine:
The distinct population segment (DPS) of wolverines in the contiguous United States was proposed for listing as Threatened in the Federal register on February 4, 2013. Home range size in western Montana averages 150 mi^2 for females and 163 mi^2 for males (Foresman, 2012). Wolverines are more likely to occur at higher elevations on Forest Service land in the Gravelly Range, with transient individuals on BLM administered land. The primary listing factor was "Reduction in Habitat Due to Climate Change." Due to the large home ranges, small scale treatments that may fragment habitat do not have a significant effect on wolverine. Activities identified in Alternatives B and C fall into the category outlined in the Federal Register on page 26 as follows: "*Land management activities (principally timber harvest, wildland firefighting, prescribed fire, and silviculture) can modify wolverine habitat, but this generalist species appears to be little affected by changes to the vegetative characteristics of its habitat. In addition, most wolverine habitat occurs at high elevations in rugged terrain that is not conducive to intensive forms of silviculture and timber harvest. Therefore, we anticipate that habitat modifications resulting from these types of land management activities would not significantly affect the conservation of the DPS, as we described above."* Therefore the commercial timber harvest and prescribed fire activities proposed under the action alternatives would not have an effect on habitat conditions for wolverines.

CANDIDATE SPECIES:

Greater Sage Grouse:
Alternative A the "no action" would maintain the current conditions. Allotments not meeting habitat requirements for nesting and brood rearing would not see any improvements. If any of the prescribed burns occurred as proposed under Alternatives B and C, they may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species. The burns would cause a short-term loss of sagebrush cover in the treated area, but sagebrush cover is available adjacent to the treated area and in the long-term sagebrush habitat would be enhanced once conifer encroachment is eliminated. Sage grouse typically nest within two miles of a lek. The closest burn unit to the one active lek in the watershed or leks in the adjacent watershed are over seven miles away. Sage grouse habitat would be restored in the long-term, as opposed to conversion to forest habitat. After the burn, sage grouse brood-rearing habitat would be enhanced with the increase in forbs in the treated area. Suitable habitat conditions exist for sagebrush obligate species within sagebrush habitat on MRRW allotments. BLM would maintain >70% mountain big sagebrush habitat in canopy closure of 5 to 25 percent. In habitats that are predominately Wyoming big sagebrush, BLM would manage sites with the ecological potential to maintain sagebrush over at least 60% of those areas in a canopy closure of 5 to 25 percent and maintain an herbaceous understory in sagebrush steppe habitat emphasizing multiple species of native forbs and grasses. Residual grass cover following grazing is important for sage grouse nesting habitat. Light to moderate cattle grazing or managed grazing systems can improve quantity and quality of summer forage (i.e. forbs) for sage grouse (MFWP

2005). Implementing an annual utilization guideline of 50% on cool season bunchgrasses to maintain plant health and vigor would provide residual herbaceous nesting cover.

BLM SENSITIVE SPECIES:

Gray Wolf:
Since wolves were delisted from the list of Endangered and Threatened Wildlife in 2011, a hunting season for wolves has been implemented in Montana. The combined maximum hunting and trapping bag limit was five wolves per person in 2013-2014. Conflicts between wolves and livestock are an issue and were an issue before delisting. The wolf population in the Dillon Field Office was listed as non-essential experimental and was managed when conflicts with livestock occurred. Under all alternatives, no actions proposed in this EA will impact the wolf population or species, especially given the past and current management of wolves and hunting season quotas.

Long-eared Myotis, Long-legged Myotis, Fringed myotis, and Townsend's Big-eared Bat:
Long-eared and long-legged myotis are associated with forests containing old-growth characteristics, but are also found in many habitats where suitable roosts exist. They roost in buildings, caves, mines, trees, and rock outcrops. Townsend's big-eared bats are found in a variety of habitats from western mesic Douglas-fir forests to more arid Rocky Mountain juniper-limber pine-currleaf mountain mahogany vegetative types (Foresman, 2012). Fringed myotis are not known to occur in the watershed but use a variety of habitats, from low to mid-elevation grass, woodland, and desert regions (Foresman, 2012). Timber harvest and prescribed fire treatments would remove trees that may be suitable roosts and alter foraging habitat. Since suitable habitat spans the watershed and the treatment units occur on a small portion of the landscape, individuals or habitat may be impacted, but a trend towards federal listing or loss of viability to the population or species would not likely occur.

Westslope cutthroat trout (WCT):
Current management in the majority of occupied WCT habitat is resulting in habitat reaching PFC. However, in Jack Creek habitat conditions are not improving. Under Alternative A, no action would be taken to improve these issues. Alternatives proposed under B and C would improve WCT habitat in these streams by reducing or eliminating livestock impacts. These changes should result in increased stream bank vegetation and improvements to stream banks and channel morphology as well as reduce sedimentation. The changes in proposed permitted use would reduce livestock redd trampling impacts in alternative B and eliminate the potential in Alternative C. The proposed timber harvest and burn units are unlikely to have a negative impact to WCT. It is likely that they will have a beneficial impact by creating off water livestock forage that will draw livestock away from WCT habitat.

Pygmy Rabbit:
Pygmy rabbits and/or sign were documented in a couple of locations within the MRRW nearly a decade ago. No pygmy rabbits or sign were documented during surveys at these sites, or additional sites in 2013. Sagebrush cover is in good condition throughout the watershed. Improving herbaceous cover in the Garnet allotment under Alternatives B

and C would increase herbaceous cover and forage for pygmy rabbits. If Alternative A is implemented, the potential for herbaceous cover to increase is limited and no impact beyond current conditions would occur.

Loggerhead Shrike, Sage Thrasher, Brewer's Sparrow, and Sage Sparrow:
Site specific sagebrush losses from prescribed burns proposed under Alternatives B and C could displace loggerhead shrike, sage thrasher, sage sparrow, and Brewer's sparrow but adjacent suitable habitat is available. While sagebrush cover would be lost in the treatment area in the short-term, sagebrush habitat would be restored to the area with the elimination of conifer expansion. The treated area would be converted to early seral sagebrush habitat and progress to mid-late seral in about 20 years. This would provide for seral and structural diversity within sagebrush steppe habitat on a landscape level. This project MIIH, however in the long-term the prevention of sagebrush habitat from becoming conifer habitat would benefit these species.

Great Gray Owl and Northern Goshawk:
Northern goshawks and great gray owls occupy forest habitat. Great gray owls nest on broken topped dead trees or take over the existing nest of another species, including Northern goshawk nests. Goshawks nest in larger mature trees. Timber harvests proposed under Alternatives B and C MIIH, with the loss of nesting habitat. However, opening these canopies could enhance foraging opportunities. Prior to any timber treatments, surveys for goshawks and great gray owls would identify nesting stands. If either of these species are nesting in the area, yearly monitoring would determine occupancy before harvest activities and buffers and timing stipulations would be applied to avoid disturbance during the nesting season.

Three-toed Woodpecker:
Under alternatives B and C, if the prescribed burns occurred, it would have a beneficial impact (BI) for this woodpecker species. The increase in wood-boring beetles in burned areas attracts three-toed woodpeckers. If the salvage harvest of dead/dying timber in alternatives B and C occur, it MIIH with a loss in foraging habitat for wood boring beetle larvae, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species, especially since there is adequate beetle-impacted timber acreage throughout the watershed.

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