United States Department of the Interior
Bureau of Land Management

Environmental Assessment MT- DOI-BLM-MT-B050-2016-0009-EA

Big Sheep Creek Watershed Environmental Assessment

June 3, 2016

Big Sheep Creek Canyon September 9, 2015

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Chapter 1

1.0 Purpose of and Need for the Proposed Action

1.1 Introduction and Background

Big Sheep Creek, 2015.

The Big Sheep Creek Watershed (BSCW) is located 35 - 60 miles southwest of Dillon, Montana and 3 - 20 west of Dell, Montana in Beaverhead County. The watershed drains the Beaverhead mountain range on the west side of the Big Sheep Creek basin and portions of the Tendoy mountain range on the north side of the Big Sheep Creek watershed. (See Map #1) Elevations range from 6,000 feet at the mouth of Big Sheep Creek to nearly 11,000 feet on top of the Continental Divide near Italian Peak. The watershed lies within Townships 12-15 South and Ranges 9-12 West, Montana Principal Meridian (M.P.M.).

The entire BSCW contains approximately 181,302 acres of BLM, private, State of Montana and Forest Service administered land. About 54,667 acres (30%) is public land administered by the BLM. With the exception of two allotments, only BLM administered land was physically assessed for this document. The Crystal Creek and Muddy Creek Allotments are co-managed with the Forest Service through a Memorandum of Understanding which identifies the BLM as the lead management agency for these allotments. Therefore, 6,123 acres of Forest Service Lands were also assessed in these allotments. Pine Creek and Simpson Creek FS are also co-managed allotments which identify FS as the lead management agency. In these two allotments only the BLM administered land was assessed. Twenty-three grazing allotments contain about 51,165 acres of BLM administered land. An additional 3,502 acres of un-allotted public tracts are scattered throughout the watershed.

In 2015, an interdisciplinary team (IDT) assessed BLM administered land in the BSCW for the five Standards of Rangeland Health (Standards). The Standards are: Upland Health, Riparian Health, Water Quality, Air Quality, and providing for Biodiversity. The BSCW Assessment Report described the condition/function of resources within the assessment area to the Authorized Officer. The BSCW Assessment Report has 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 BSCW Assessment Report, along with comments and information 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.

Condition/function declarations regarding the Standards are made as either:

- Proper Functioning Condition (PFC)
- Functioning At Risk (FAR); which is assigned a trend of up, down, static, or not apparent, or
- Nonfunctioning (NF)

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 Purpose and Need

The purpose of this EA is to improve land health and enhance biodiversity within the Big Sheep Creek Watershed while maintaining the BLM's multiple use mandate. This would be done by:

- Restoring, improving and/or maintaining riparian, wetland and aquatic health through revised livestock grazing management, construction and/or maintenance of structural projects, road maintenance and stream crossing improvement and/or implementing vegetative treatments.

- Maintaining and/or enhancing upland health including sagebrush steppe habitat (species composition and structure) through revised livestock grazing management, construction, maintenance or modification of structural projects, and/or vegetation treatments.

- Restoring and/or maintaining historic density, structure, and species composition of forest and woodland habitats.

- Eradicating new and containing/controlling existing noxious weed and invasive species infestations as well as preventing the spread of noxious and invasive species.

- Mitigating resource impacts from recreational activities while providing access to public lands through modifications to motorized travel route designations.

Additionally the purpose is for the BLM to renew term grazing permits/leases as mandated by legislation from the Taylor Grazing Act of 1934 and the Federal Land Management and Policy Act of 1976.

The need for the actions proposed in this EA is in direct response to land health condition/function and recommendations identified in the BSCW Assessment Report. In that document, the IDT described several causal factors, which, when combined, negatively impact

the biological, physical, and/or ecological processes within specific areas or allotments within the watershed.

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 that one or more of the Land Health Standards are not being met (43 CFR 4180.1(a)).

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

Allotment Name, Number, & BLM Acres	**Are Healthy Rangelands Standards Being Met?**				
	Upland	Riparian Wetland	Water Quality*	Air Quality	Bio-diversity
Alkali Creek #30024 Acres: 950	YES	YES	Unknown[1]	YES	YES
Cabin Creek #20704 Acres: 190	YES	YES	Unknown[1]	YES	YES
Cottonwood #30638 Acres: 359	YES	N/A	N/A	YES	YES
Crystal Creek #30102 Acres: 1287	YES	YES	Unknown[1]	YES	YES
Dixon Mountain #30022 Acres: 2229	YES	YES	NO[2]	YES	YES
Four Eyes #30269 Acres: 5342	YES	YES	Unknown[1]	YES	YES
Four Eyes Isolated #20612 Acres: 308	YES	YES	Unknown[1]	YES	YES
Indian Creek #10741 Acres: 2330	YES	YES	Unknown[1]	YES	YES
Indian Creek Isolated #30653 Acres: 703	YES	YES	Unknown[1]	YES	YES

Allotment Name, Number, & BLM Acres	Are Healthy Rangelands Standards Being Met?				
	Upland	Riparian Wetland	Water Quality*	Air Quality	Bio-diversity
Junction #20009 Acres: 2509	YES	YES	Unknown[1]	YES	YES
Meadow Creek #20042 Acres: 1149	YES	YES	Unknown[1]	YES	YES
Meadow Creek Isolated #30611 Acres: 160	YES	N/A	N/A	YES	YES
Muddy Creek #30039 Total Acres: 17969	YES	YES	NO[2]	YES	YES
Contours Pasture	NO	NO	Unknown[1]	YES	NO
Nicholia #10699 Acres: 280	YES	YES	Unknown[1]	YES	YES
North Dixon #30602 Acres: 29	YES	N/A	N/A	YES	YES
Pine Creek #30001 Acres: 2132	YES	NO	Unknown[1]	YES	YES
Porcupine Canyon #20107 Acres: 1693	YES	NO	Unknown[1]	YES	NO
Rio Puerco #10700 Acres: 5567	YES	YES	NO[2]	YES	YES
Rock Creek Isolated #20698 Acres: 14	YES	NO	Unknown[1]	YES	YES
Rock Creek Seeding #20041 Acres: 467	YES	N/A	N/A	YES	YES

Allotment Name, Number, & BLM Acres	Are Healthy Rangelands Standards Being Met?				
	Upland	Riparian Wetland	Water Quality*	Air Quality	Bio-diversity
Simpson Creek #20158 Acres: 3068	YES	YES	Unknown[1]	YES	YES
Simpson Creek FS #30207 Acres: 746	YES	NO	Unknown[1]	YES	YES
Whitworth #20720 Acres: 1684	YES	YES	Unknown[1]	YES	YES
Unalloted Acres: 3502	YES	YES	Unknown[1]	YES	YES

*The Montana Department of Environmental Quality (DEQ) has been given the responsibility for making water quality determinations. The BLM and the State of Montana have detailed how they will cooperate in the assessment and planning process through a formalized Memorandum of Understanding.

[1] These allotments contain streams which are not on the 303(d) list and currently have no beneficial use determinations. Therefore, the water quality standard cannot be determined at this time. The DEQ is planning on conducting beneficial use assessments for all tributaries of the Red Rock River that have high risk over the next several years. All streams within the basin will have some type of evaluation. At a minimum the DEQ will be conducting risk assessments to determine if a more detailed beneficial use assessment is warranted.

[2] Allotments have DEQ 303(d) listed streams that have failed the water quality standard as determined by the DEQ. 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 three 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 other actions are necessary and cannot be implemented before the next grazing season interim adjustments will be made prior to the next grazing season and a schedule for final changes must be developed and documented (H-4180-1). Allotments requiring livestock management changes to address specific resource concerns are: Muddy Creek (Contours pasture), Pine Creek, Porcupine Canyon, and Simpson Creek FS. Alternatives related to livestock grazing will also be analyzed for eight additional allotments (Indian Creek & Indian Creek Isolated, Junction, Rio Puerco, Alkali, Meadow Creek AMP, Meadow Creek Isolated and Dixon Mountain) that met all of the Land Health Standards, but either had site-specific resource concerns or the permittee has proposed management changes to facilitate more efficient or effective use.

1.3 Key Issues and Resource Concerns

Description of Issues, Resource Concerns and Objectives
Issues and resource concerns were identified during the BSCW 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.

Two primary land health issues and eight 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 BSCW 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
Standard #2 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). The Dillon Resource Management Plan and Record of Decision of 2006 predict the achievement of desired future condition in 20 to 50 years. Use of the PFC methodology is recognized as an early indicator of water quality trends (Aron et al. 2013). 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 Big Sheep Creek Watershed are discussed in the BSCW Assessment Report which is incorporated into this EA by reference.

The riparian health standard was not met in four grazing allotments including Pine Creek, Porcupine Canyon, Rock Creek Isolated and Simpson Creek FS. Muddy Creek allotment met as a whole however, the Contours pastures did not meet the riparian health standard. The BSCW 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 conifer cover on some stream reaches is crowding out the deciduous riparian woody species and limiting the establishment of bank stabilizing sedge communities. These conditions were attributable to several factors including impacts to vegetation and stream banks and channels from livestock activity, conifer expansion, 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.
- Maintain/enhance existing aspen and promote successful regeneration of aspen.

Issue #2: Upland and Sagebrush Steppe Habitat

Standard #1 of the Western Montana Standards for Rangeland Health is "Uplands are in Properly Functioning Condition". 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 BSCW Assessment Report.

The upland health standard was met in 23 of the 23 grazing allotments in the watershed, with the exception of Contours pasture which is one of the seven pastures in the Muddy Creek allotment. 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 described in chapter 2. Resource concerns include a shift in the dominant herbaceous vegetation communities from large cool season bunchgrasses to smaller or less palatable (increaser) vegetation, less vegetative cover, increased bare ground, wind and water erosion, invasive species and noxious weed infestations.

Sagebrush habitat in the BSCW was determined to be in suitable condition and is not identified as a resource issue in this watershed. However, the BLM recognizes the value of healthy sagebrush habitats, and will continue to rigorously monitor conditions within the BSCW with the intent of maintaining or improving sagebrush habitat.

Due primarily to the exclusion of fire, low to mid-elevation forests and woodlands within the BSCW have been altered from the historic range of variation. Conifer densities have increased

within forested stands, particularly within Douglas-fir forest types. Conifers have expanded into sagebrush/grassland resulting in conversion to conifer forest, and a decrease in extent of mountains meadows and sagebrush/grassland steppe. Also due in part to fire exclusion, conifers have established within aspen stands, outcompeted existing aspen trees for available resources, which has resulted in the conversion of former aspen communities to conifer-dominated forest.

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 incurring conifer expansion.
- Maintain/enhance existing aspen and promote successful regeneration of aspen.
- Return fire to the landscape as a natural disturbance agent for the purpose of resiliency and diversity of seral classes (age, structure), through the use of prescribed fire.

Resource Concern #1: 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 2006 Dillon RMPs (as amended) first recreation goal is to provide a diverse array of quality, resource based recreation opportunities' while protecting the resource values. Recreation use within the BSCW occurs year round and includes; hunting (big game, birds, and predators), trapping, fishing, hiking, wildlife viewing, camping, recreational driving and rock hounding.

Objectives:

- Effectively implement the 2006 amended 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 and invasive weed species.

Resource Concern #2: 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 Biodiversity section of the BSCW 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.

The special status species list was updated in 2014. The guidance the DFO received is as follows: In accordance with the BLM Special Status Species Policy (Manual-6840), the Special Status Species List has been updated to assist in addressing conservation management needs and to help establish priorities. The 6840 manual gives the State Director the responsibilities of designating the Bureau of Land Management (BLM) sensitive species and periodically reviewing/updating the list in cooperation with states and with the Natural Heritage Programs. The sensitive species designation is used for species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the Endangered Species Act (ESA).

Objective:

- Enhance/improve/protect "Priority Habitats" including aspen, whitebark pine and limber pine.
- Improve streambank stability, vegetative cover and width/depth ratio on westslope cutthroat trout (WCT) streams.
- Maintain existing sagebrush habitat so that 80% or more of big sagebrush communities provide vegetative composition and structure for sage grouse nesting/early brood rearing, >40% sagebrush habitat meets summer/late brood habitat characteristics, and >80% meets winter habitat characteristics where appropriate (relative to ecological site potential, etc.).
- Maintain an average 7 inches herbaceous understory within site potential within sage grouse nesting/early brood rearing habitat.
- Maintain or increase composition of highly nutritious forbs (e.g. composites and legumes) in sage grouse nesting/early brood rearing habitat.
- Maintain or enhance habitat for sensitive plant species and provide ample opportunity for reproduction and seedling establishment.
- 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.

Resource Concern #3: Noxious and Invasive Species
Spotted knapweed, houndstongue, Canada thistle, black henbane, common mullein, cheatgrass and leafy spurge occur as relatively small patches or scattered individual plants in various locations within the Big Sheep Creek Watershed. These noxious and invasive species can affect

upland health, riparian health and biodiversity. Noxious and invasive species are discussed in the BSCW 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 #4: Cultural & Paleontological Resources

A detailed summary and description of the cultural and paleontological resources occurring on each allotment in the BSCW 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 and paleontological resources in compliance with Section 106 of the National Historic Preservation Act and the Paleontological Resources Preservation Act.
- Preserve and protect Muddy Creek/Big Sheep Creek Area of Critical Environmental Concern.
    - Preserve and protect cultural resources/archaeological districts that are important to both archaeologists and Native Americans.

Resource Concern #5: 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 Beaverhead County.

The revenue generated from recreational uses, especially non-commercial hunting and fishing activities, on BLM administered lands in the BSCW contribute substantially to the economic health of communities in Southwest Montana. In addition, the BLM currently authorizes two commercial recreation providers under Special Recreation Permits within the watershed. Both are authorized to conduct big game hunting and summer horseback activities within the area. One of those businesses averages approximately 100 – 150 user days per year while the other averages less than 30.

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 #6: Forest and Woodland Habitat
Forests and woodlands provide habitat for a large variety of fish and wildlife species, opportunities for diverse recreational activities, and a renewable source of forest products. 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 Douglas-fir beetle and spruce budworm infestations have resulted in extensive mortality of Douglas-fir. Whitebark pine is rapidly declining throughout its range, and all whitebark pine habitats in the BSCW are at high risk of loss due to extensive region-wide mortality and lack of disturbance to stimulate regeneration. Limber pine in these areas is also experiencing high mortality.

Objectives:

- Increase diversity of seral stages and structures in forested habitats
- Reduce hazard rating for spruce budworm and Douglas-fir bark beetle activity
- 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
- Utilize forest products where feasible

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).

Hidden Pasture WSA (16,197 acres) is managed according to VRM Class I objectives. Nearly 9,000 acres adjacent to the WSA and along the corridor of the Big Sheep Creek Back Country Byway are identified as VRM Class II. The rest of the planning area is managed as VRM Class III.

Objectives:

- Limit management activities or projects within the Hidden Pasture WSA in accordance with 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."
- Limit management activities within the VRM Class II corridor to retain the existing character of the landscape in accordance with VRM Class II objectives. Class II objectives are to retain the existing character of the landscape. Activities or modifications of the environment should not be evident or attract the attention of the casual observer, and changes should repeat the basic elements of the predominant natural features of the landscape.

- Manage the remaining 29,473 acres within the BSCW so as not to detract from the existing landscape and other objectives stipulated under VRM Class III guidelines. "The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape may 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."

Resource Concern #8: Wilderness Characteristics

There is no designated wilderness area within the BSCW. The BSCW does include 16,197 acres of public land located within the Hidden Pasture Wilderness Study Area (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 the WSA is released by Congress it will be managed to emphasize other multiple uses and for semi-primitive non-motorized recreation. Visual Resource Management objectives would be changed to Class III objectives to allow for additional multiple uses to occur with less restriction while continuing to retain much of the existing character of the landscape.

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 BSCW 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. Although no specific management is required of lands identified as having wilderness characteristics, any impacts to those characteristics must be identified and disclosed within any environmental analysis that proposes to affect those characteristics.

Objectives:

- Maintain wilderness characteristics of the Hidden Pasture Wilderness Study Areas.
- Manage the WSA to the non-impairment standard as outlined in BLM Manual 6330 - Management of Wilderness Study Areas, until congress either releases it or designates it as wilderness.
- Maintain, on a continuing basis, an inventory of wilderness characteristics as describe in BLM Instruction Memorandum No. 2011-154.

1.3.1 Key Issues and/or Resource Concerns considered, but eliminated

Water, Water Quality and Total Maximum Daily Loads (TMDL)

Water, specifically water appropriation, and water rights were considered but eliminated from further analysis.

Water in Montana is the property of the State of Montana. The Montana Constitution has the following to say about water, "All surface, underground, flood, and atmospheric waters within the boundaries of the state are the property of the state…" (Montana Code Annotated 2014, Article IX, Section 3, (3)). State Rights to appropriate water are recognized by the Federal Government in the Federal Water Pollution Control Act of 1972 (33 U.S.C. 1251 et seq.) more commonly known as the Clean Water Act (Title 1, Section 101 (g)) The Bureau of Land Management respects the State of Montana's authority to appropriate water. Except in minor instances, which are discussed where necessary in Chapter 2, water and water appropriation has been considered, but eliminated from further analyses.

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

The Clean Water Act (CWA) 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 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. 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 this document.

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).

Standard #2 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). As described in the previous paragraph, use of the PFC methodology to assess function is recognized as an early indicator of water quality trends. Streams or wetlands that are categorized as PFC or Functional-At-Risk (FAR) with an upward trend are heading in the right direction towards meeting desired future condition, but may not necessarily meet water quality standards. The Dillon Resource Management Plan and Record of Decision of 2006 predicts the achievement of desired future condition in 20 to 50 years.

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 the 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.

Soil Compaction

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

riparian areas and was part of the reason that some wetlands were rated as FAR. The ID team agreed that soil compaction wasn't an issue in upland habitats and further agreed that although it is a resource concern in wetland areas that were rated as FAR or NF, it would be adequately addressed and analyzed under Key Issue #1: Riparian, Wetland and Aquatic Health. 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. Therefore, since soil compaction will be addressed under issue #1, it was not carried forward as a separate issue.

Wildlife

Wildlife species and their habitats in the BSCW 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).

Areas of Critical Environmental Concern (ACECs)

One ACEC is located within the BSCW. This ACEC was considered to be included as an Issue or Resource Concern, but was eliminated because it has special management outlined in the Record of Decision (ROD) and the 2006 Amended Dillon RMP. The ROD and Dillon RMP as amended can be found at: http://www.blm.gov/mt/st/en/fo/dillon_field_office/rmp/rod.html The special management identified for this ACEC will be adhered to in the development of management alternatives. In addition, the relevant and important values within this ACEC will be addressed in other Issues and Resource Concerns (ie. Cultural and Paleontological Resources and Visual Resource Management).

The Muddy Creek/Big Sheep Creek Area of Critical Environmental Concern (ACEC) lies four miles southwest of Dell, Montana, including portions of the Muddy Creek drainage and continuing upstream along the Big Sheep Creek drainage to its confluence with Deadman Creek. The area contains approximately 22, 289 acres of public land with relevant and important scenic values along Big Sheep Creek and the cultural resource values throughout. Portions of the ACEC fall within the Hidden Pasture Wilderness Study Area (WSA). The geomorphology along Muddy Creek proper has resulted in deeply stratified buried cultural deposits located on public lands. There is also a high concentration of rock art pictograph sites. The geomorphological regime and highly erodible soils coupled with the density of known archaeological sites in the area results in circumstances that make the area vulnerable to adverse change. The area provides spectacular scenery, characterized by high palisades and timbered peaks that rise dramatically from the canyon floor. Big Sheep Creek passes through three narrow canyons with intervening open valleys and contains scenic values not typically found in the planning area. (See map 1)

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 vegetation treatments, prescribed burning, wetland restoration and minor changes in travel management within the BSCW. 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 Resource Management Plan (RMP) as amended, approved in 2006 and the BLM's Idaho and Southwestern Montana Greater Sage-Grouse Approved RMP Amendment (ARMPA) approved in 2015. The management alternatives considered are in conformance with both the RMP and the RMP Amendment. Applicable guidance is in the Record of Decision (ROD) and Approved Dillon RMP as amended, which may be accessed on the internet at http://www.blm.gov/mt/st/en/fo/dillon_field_office/rmp.html. The Idaho and Southwestern Montana Greater Sage-Grouse Approved RMO Amendment and ROD can be accessed on the internet at https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=42003

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 and 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 Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Lands in 17 Western States Programmatic EIS (Federal Registry notice published on April 8, 2016 and expected to be finalized and signed before this documents final decision is issued), 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.

This document is not tiered to the 1984 Mountain Foothills EIS, but the Mountain Foothills EIS serves as a reference for this document. Applicable portions of the information and analysis found in the Mountain Foothills EIS is a valuable resource and was used during the development of the Big Sheep Creek Watershed EA.

Also considered and adhered to 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
- BLM's Idaho and Southwestern Montana Greater Sage-Grouse Approved RMP Amendment
- Sage-Grouse Habitat Assessment Framework
- 2010 Nonpoint Source Memorandum of Understanding between the BLM and the Montana Department of Environmental Quality (DEQ)
- IM No. MT-2014-067, Montana/Dakotas Special Status Species List.
- BLM Manual 6840 - Special Status Species Policy.

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	Discussed under Resource Concern #8 – Air Quality
Areas of Critical Environmental Concern (ACEC)			X	Alternatives within the Muddy Creek/Big Sheep Creek ACEC will be analyzed to meet special management prescribed for this ACEC in the Dillon RMP as amended. Discussed under 1.3.1 Key Issues of Resource Concerns considered but eliminated.
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 3.2.6.
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 #3 - Noxious and Invasive Species
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 BLM Sensitive Species in Appendix C. Also discussed under Resource Concern #2 – Special Status Species Habitat
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			

Critical Element	Not present	Present, but not affected	May be affected*	Comments
Wilderness Characteristics			X	Discussed under Resource Concern #8 – Wilderness Characteristics
* 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 permits. Revised grazing permits would contain appropriate terms and conditions to initiate significant and measurable progress towards achieving the Land Health Standards and established goals and objectives within the BSCW.

The Dillon Field Manager will choose the alternative(s) that best addresses issues and resource concerns identified by the BLM and through public scoping, and allow for multiple uses. 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 determines that it is, then an EIS must be prepared before the BSCW management plan can proceed.

Implementation of the Decisions issued as a result of this EA may begin in 2017, 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
- Idaho and Southwestern Montana Greater Sage-Grouse Approved RMP Amendment, September 2015
- Sage-Grouse Habitat Assessment Framework, June 2015

1.7 Coordination Requirements

The Council on Environmental Quality (CEQ) regulations require that agencies "make diligent efforts to involve the public in preparing and implementing their NEPA procedures" (40 CFR 1506.6(a)). Scoping is a form of public involvement in the NEPA process. External (or public) scoping is optional for EAs (40 CFR 1501.7). However, the BLM has found public scoping to be very beneficial. External scoping involves notification and opportunities for feedback from other agencies, organizations, tribes, local governments, and the public. External scoping is used to identify coordination needs, refine issues through public, tribal and agency feedback on preliminary issues; gather additional information, identify new issues and develop additional alternatives. Public scoping serves to build agency credibility and promote constructive dialogue and relations with tribes, agencies, local governments and the public.
External scoping for the Big Sheep Creek Watershed was done by announcing the initiation of the watershed assessment process in May, 2015 via a media release and letters to a comprehensive mailing list inviting input and participation and by announcing completion of the Watershed Assessment Report in December, 2015 through a media release and mailing it to all interested parties with a cover letter asking for comments. The watershed assessment report was also posted on BLM's external web page (eplanning). Many meetings were held by various IDT members with other agencies, public land users, land owners in the watershed and other interested parties to gather information and develop management alternatives.

In addition, according to 43 CFR subparts 4110, 4120, 4130 and 4160, coordination requirements identified in the Range regulations 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" in the context of the Range Regulations 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 BSCW Assessment Report, BLM met with other federal agencies, state agencies, permittees and the interested public while developing this EA. A full list of persons and agencies consulted is included 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 four management alternatives will be fully analyzed: the No Action Alternative (continuation of current management) and up to three 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 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 (issues, resource concerns, objectives) defined 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 key issues and resource concerns used 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), are not technically or economically feasible, 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 production or protection of one resource at the expense of other resources are not considered. FLPMA mandates the BLM to manage public lands for multiple use and sustained yield. This eliminates alternatives such as closing all public land to livestock grazing, oil and gas leasing, or managing only for wildlife values at the exclusion of other considerations. In addition, resource conditions do not warrant watershed-wide prohibitions of any specific use. Each alternative considered in this EA allows for some level of support, protection, and/or use of 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 in the Big Sheep Creek Watershed

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 Big Sheep Creek Watershed do not warrant elimination of livestock grazing on a watershed wide basis (i.e., Upland health was met on all 23 allotments with the exception of Contours pasture in Muddy Creek allotment which wasn't due to livestock impacts. All five Rangeland Health Standards were met on nineteen of the twenty-three allotments within the watershed).
- The amended Dillon RMP, approved in 2006, identifies 51,165 acres of public land in the BSCW as open to livestock grazing and 3,502 acres of land as unavailable or closed to livestock grazing. Therefore, an allocation of this level of use has been analyzed and approved for this watershed in the Land Use Plan.
- Due to the intermixed land ownership pattern in the BSCW grazing allotments, at least 62 miles of fence would need to be constructed between private, Forest Service, and/or state land 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 62 miles of fence along BLM boundaries would be economically unfeasible. In addition, 62 miles of fence along BLM boundaries would cause an unacceptable level of barrier/entanglement hazard for big game and a hazard for sage grouse by increasing the chance of collision. Access to public land may be reduced due to locked gates located along boundary fences that cross private roads.
- A Land Use Planning level "No Grazing" alternative was previously analyzed in the Mountain Foothills EIS (March 1980). Although this EIS is 36 years old, 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; the area would still need to be monitored to ensure compliance to non-use, etc.). This EA is not tiered to the Mountain Foothills EIS; we are merely using relevant information in that EIS.
- 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 the future 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, wildlife habitat, timber harvest, fire wood gathering and other multiple use activities.
- Eliminating livestock grazing on all public within the Big Sheep Creek Watershed would have a substantial adverse economic and social impact on the ranch operations and many of the landowners in the watershed. The economic impact would carry over to some degree to the businesses in the local area and tax revenue within Beaverhead County. The permittees may be forced to operate with fewer livestock, graze private and/or other available lands more, or even sell a portion of, or the entire livestock operation. If the business is sold, private lands associated with the ranch have the potential to be sold and developed.

- Eliminating livestock grazing would also result in a build-up of fine fuels which would increase the likelihood of wildfires (both natural and man-caused) moving faster and spreading further within the public lands as well as adjacent private lands.

2.2.2 Commercial Timber Harvest on BLM-Administered Lands in the Big Sheep Creek Watershed

Commercial harvest was considered but eliminated from detailed study due to the associated resource concerns and the low value of potential products. Commercial harvest is not an economically feasible option. Most of the Douglas-fir trees are small diameter and/or are standing dead. Existing roads that would access areas with merchantable timber are not usable due to permanent road closures, unstable soils, and wildlife timing restrictions.

2.2.3 Mechanical and Prescribed Fire Treatment in Forested Habitat within Tendoy Mountains Bighorn Sheep Habitat

In addition to utilizing mechanical and prescribed fire treatments to reduce conifer expansion within bighorn sheep habitat, the BLM also considered a project proposal submitted by the MFWP area biologist to reduce forested habitat within Tendoy Mountains bighorn sheep habitat. Since bighorn sheep prefer vegetation types with greater horizontal visibility and avoid closed forests (Tilton and Willard, 1982), the project proposed to use mechanical and prescribed fire treatments to reduce forested habitat on a couple of ridgelines/tops to increase bighorn sheep habitat. This forest habitat is limited within the Tendoy Mountains bighorn sheep habitat area and elk, mule deer, moose, bobcats, mountain lions, black bears, raptors, migratory birds, and other wildlife species utilize these forested areas for nesting, foraging, and cover. Using prescribed burns in these remote, heavily forested areas is more difficult to execute and control, particularly in this steep terrain. While reducing forest cover would enhance habitat with greater visibility that bighorn sheep prefer, considering the difficulty of implementation, limited forest cover in this area, and the habitat value to several wildlife species, this alternative was not included for analysis at this time.

2.2.4 Relocate the Access Road to the Deadman Gulch Campground Site

A portion of the Deadman Gulch campground access road runs directly against an outside meander of Big Sheep Creek. The channel is migrating in the direction of the road and streambank that segregates the road from the creek is eroding. The horizontal distance to the creek is approximately 15 feet at its closest point and the vertical distance is approximately 12 feet. The steep slope is sloughing into the channel and eventually the road and aquatic habitat will be impacted.

The alternative to relocate the access road to the campground was investigated by BLM engineering staff but was eliminated due to no other suitable egress off of the County road.

South of the current egress the County road makes a relatively abrupt curve around a rock outcrop that protrudes from the north. Moving the egress closer to this curve would not meet county or BLM specifications for sight distance. In addition, a topographical survey revealed the topography between the current access route and curve on the County road makes a new alignment infeasible.

2.3 Description of Alternatives

2.3.1 Features Common to All Alternatives, Including the No Action

Livestock Management:
New ten-year term grazing permits/leases will be reissued for eleven grazing allotments, 15,186 BLM administered acres, which 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 permits/leases, and/or new rangeland improvement projects will be proposed or analyzed for these allotments. The allotments are: Alkali Creek, Cabin Creek, Cottonwood, Four Eyes, Four Eyes Isolated, Nicholia, North Dixon, Rock Creek Seeding, Simpson Creek, and Whitworth.

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 will be placed on ridges or terraces at least ¼ mile from the nearest livestock water source. Supplement will be placed in existing disturbed areas to reduce impacts to sage grouse habitat.

Continue to manage the unallotted parcels as unavailable for livestock grazing. No term grazing permits or leases will be issued within the unallotted parcels.

Amend term grazing permits to state that depredation losses from wolves may occur.

During years when precipitation is below average and biomass production is considerably reduced, the Dillon Field Office will follow the BLM drought policy Titled "Bureau of Land Management, Policy for Administering Public Land Grazing in Montana, North and South Dakota During Periods of Drought and the BLM's National Drought Policy which is outlined in Washington Office Instruction Memorandum 2013-094.

Projects

- All water developments and troughs no longer in use will be removed, but spring exclosure fences may be retained and maintained. Annual maintenance will be completed, as agreed to in Cooperative Agreement, to assure that water developments, including spring boxes, pipelines, troughs, valves, shutoff devices, and exclosures are functioning and in good condition.
- Continue to maintain and install wildlife escape ramps in all stock tanks in the watershed.
- 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, modified, and/or rebuilt.

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

- Left unsigned unless there is evidence of regular use.
- Signed closed if there is evidence of regular use.
- If signing is ineffective at discouraging use, roads will 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 unacceptable resource impacts or user conflicts.

Noxious and Invasive Species:
Management of noxious weeds will continue in cooperation with Beaverhead County, federal and state agencies, private landowners and other partners. All invasive species on the Montana noxious weed list would be treated on a prioritized basis to the degree financial resources allow. Any new noxious weed infestations will be targeted for prompt eradication before they have a chance to get well established. When a biological control becomes available for houndstongue it will be considered for release on infestations within the watershed.

An average of 25 acres in the Big Sheep Creek Watershed 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 will be conducted to search for special status plant species prior to authorizing surface disturbing activities. If rare plants are found in the course of the botanical survey, adverse impacts will be mitigated through project redesign or abandonment.

The BLM, in cooperation with other agencies and partners, will continue to monitor sage grouse leks. In areas where sage grouse use may be more concentrated, such as within ¼ mile of leks or wintering areas, depending on topography, vegetation, visibility, etc., fences will be marked so they are more visible and collision with wires is reduced (USDA, 2012). Seasonal habitat objectives from the BLM's Idaho and Southwestern Montana Greater Sage-Grouse Approved RMP Amendment will be incorporated including maintenance of existing habitat so that 80% or more of big sagebrush communities provide vegetative composition and structure for sage grouse nesting/early brood rearing, >40% sagebrush habitat meets summer/late brood habitat characteristics, and >80% meets winter habitat characteristics where appropriate (relative to ecological site, etc.), an average of 7 inches herbaceous understory within site potential within sage grouse nesting/early brood rearing habitat, and composition of highly nutritious forbs (e.g. composites and legumes) in sage grouse nesting/early brood rearing habitat will be maintained or increased (USDI, 2015a). As stated in the RMP Amendment (page 2-4): "*These habitat objectives are not obtainable on every acre within the designated GRSG habitat management*

areas. Therefore, the determination on whether the objectives have been met will be based on the specific site's ecological ability to meet the desired condition identified in the table".

West Nile Virus (WNV) has been linked to sage grouse mortality in multiple areas. WNV has not been documented on BLM lands within the DFO, nor in sage grouse in Beaverhead County. Appendix C in the Idaho and Southwestern Montana Greater Sage-Grouse Approved RMP Amendment provides guidance for West Nile Virus. 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 in water development projects can reduce mosquito production through modifying and eliminating mosquito breeding sites.

Projects:

- Continue stream temperature monitoring of WCT streams on a 5 year basis.
- Continue WCT population monitoring on 5-10 year basis
- Coordinate with MT fish wildlife and parks on the design for the construction of a fish passage barrier in the lower reaches of Meadow Creek to preserve the genetic integrity of this population.
- Replace the Muddy Creek fish barrier either at the existing location or a short distance downstream if a suitable location can be located.
- Continue monitoring of the four sensitive plant species within the BSCW.

See ***Forest and Woodland Treatments*** section below for continued 5-needle pine treatments.

Wilderness:

The Hidden Pasture Creek Wilderness Study Area will continue to be managed in accordance with BLM Manual 6330, "*Management of BLM Wilderness Study Areas*" until such time as Congress either designates the area as wilderness or releases it for more traditional multiple use management. Management in accordance with the current policy requires that the wilderness conditions that existed at the time of the inventory in 1979 be unimpaired until such time as Congress can make that determination, no matter how long that may take. Should the area be released from further consideration by Congress, it will be managed in accordance with Appendix Q of the Dillon RMP, as amended, to emphasize semi-primitive non-motorized recreation opportunities.

Recreation:

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

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 project. 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 permittees during the course of operations on public lands.

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.

Monitoring:
Under all alternatives, resource monitoring will be completed to measure progress toward meeting site-specific as well as watershed level and land use plan level 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 “no change” or 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 twenty-three grazing allotments (Table 2.1). No new range improvement projects would be constructed. Total active AUMs authorized would be maintained at 5,879.

Table 2.1: Grazing Allotments Summary

Allotment number category	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[1]	Total Acres
Alkali Creek 30024 M	2505662	140 Cattle	6/1-7/31	DEFERRED REST ROTATION	4.9	194	950	PVT=337	1287
Cabin Creek 20704 C	2504668	11 Cattle	6/15-11/30	CUSTODIAL USE	3.1	61	190	PVT=151	341
Cottonwood 30638 C	2505071	24 Cattle	6/15-11/30	CUSTODIAL USE	2.7	133	359	--	359
Crystal Creek 30102 I	2504668	154 Cattle	6/15-10/15	REST ROTATION	3.8	343	1287	PVT=637 FS=1544	3468
Dixon Mountain 30022 I	2505060	190 Cattle	5/5-6/5 11/1-12/31	REST ROTATION	5.3	146 278	2229	PVT=514	2743
Four Eyes 30269 I	2501975	50 Cattle	6/15-10/15	REST ROTATION	26.8	200	5342	PVT=302	5644
Four Eyes Isolated 20612 I	2501975	50 Cattle	6/15-10/15	SEASONAL (no more than 30 days within listed season of use)	3.9	80	308	--	308
Indian Creek 10741 I	2504762	140 Cattle	6/15-10/15	REST ROTATION	4.6	509	2330	PVT=118	2448
Indian Creek Isolated 30653 C	2504762	23 Cattle	6/15-11/30	CUSTODIAL USE	5.6	126	703	--	703
Junction 20009 I	2504668	127 Cattle	6/15-11/30	REST ROTATION	3.7	670	2509	PVT-153	2662
Meadow Creek 20042 M	2504668	103 Cattle	7/1-11/8	REST ROTATION	6.0	191	1149	PVT=209 FS=5721 ST=1279	8358
Meadow Creek Isolated 30611 I	2504668	7 Cattle	6/15-11/30	CUSTODIAL USE	4.1	39	160	--	160
Muddy Creek 30039 I	2504702	350 Cattle	6/20-10/15	REST ROTATION	14.5	1154	17969	PVT=1740 FS=4579	24288
Nicholia 10699 I	2505071	9 Cattle	6/15-11/30	SEASONAL (no more than 30 days within listed season of use)	5.6	50	280	--	280
North Dixon 30602 C	2505060	5 Cattle	6/15-11/30	CUSTODIAL USE	5.8	5	29	--	29
Pine Creek 30001 I	2505100	342 Cattle	6/16-7/11 9/25 – 10/15	REST ROTATION	9.5	225 182	2132	PVT=431 FS=1606 ST=640	4809
Porcupine Canyon 20107 I	2500037	112 Cattle 3 Cattle (C)	6/15-8/31	DEFERRED ROTATION	6.9	247	1693	PVT=681 FS=14	2388
Rio Puerco 10700 I	2504747	82 Cattle 4 Horses	9/15-12/15 5/1 – 12/31	SEASONAL (no more than 30 days within listed season of use)	25.0	222 32	5567	--	5567
Rock Creek Isolated 20698 C	2505100	1 Cattle	6/15-11/30	CUSTODIAL USE	1.8	8	14	--	14
Rock Creek Seeding 20041 M	2505100	33 Cattle	6/1-10/15	SEASONAL (no more than 15 days within listed season of use)	3.3	143	467	PVT=32	499

Allotment number category	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[1]	Total Acres
Simpson Creek 20158 I	2505153	250 Cattle	6/1-7/15	DEFERRED REST ROTATION	8.3	370	3068	PVT=7	3075
Simpson Creek FS 30207 M	2505153	130 Cattle	7/16-9/30	REST ROTATION	5.5	135	746	FS=6822	7568
Whitworth 20720 M	2505083	75 Cattle	7/1-8/31	REST ROTATION	12.4	136	1684	PVT=168	1852
Unalloted	--	--	--	--	--	--	3502	--	--
BLM Totals	**--**	**--**	**--**	**--**	**AVG=7.5**	**5879**	**54,667**	**27,685**	**82,352**

[1]PVT=Private, FS=US Forest Service, ST=Montana Department of Natural Resources

*Crystal Creek Allotment and Muddy Allotment are fenced in with National Forest lands and are administered by the BLM. Pine Creek and Simpson Creek FS Allotments are fenced in with National Forest lands and are grazed in conjunction with Forest Service grazing allotments administered by the B-D National Forest.

Under the No Action Alternative, all other currently authorized activities (recreation permits, mineral development, etc.) would continue as permitted. No forest and woodland treatments, changes to travel management designations, or other vegetative treatments would be implemented. Treatment of noxious weeds would continue as in the past with roads, trails, and washes (spread vectors) being the primary targets. An average of 25 acres would be treated with herbicides annually within the BSCW under the No Action Alternative.

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

Rangeland Improvement Projects

- Livestock management changes would be initiated during the 2017 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 Permits.
- Annual utilization thresholds on cool season bunch grasses would be 50% (to maintain plant health/vigor and leave adequate residual cover for sage grouse) OR when livestock use on sedges averages four inches along the greenline (to prevent excessive trailing along streams) on non-fisheries or non-native fisheries streams and six inches on WCT streams, whichever occurs first. These thresholds would be added to the terms and conditions of the term grazing permits, and would be applicable to all allotments included

in the BSCW 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. For example, when a threshold is met, livestock would be moved to the next pasture or off of the allotment.

- 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. Also, 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.
- Permittees or lessees shall provide reasonable administrative access across private and leased lands to the BLM for the orderly management and protection of the public lands.

Fences

- Any new or replacement allotment 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.
- 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.
- Avoid building new wire fences within 2 km of occupied leks. If this is not feasible, ensure that high risk segments are marked to avoid collisions (USDI, 2015a, Appendix C).
- New fence construction that is determined to be in a high use area for sage grouse (i.e. fences within ¼ mile of a lek and/or winter concentration areas; considering topography, vegetation, visibility, etc.) would be marked with flight diverters to reduce collisions (USDA, 2012).

Water Developments

- All applicable State and Federal Permits would be obtained and the terms and conditions applied.

- Spring sources and associated riparian wetland habitat would be fenced to exclude

livestock use on developed springs.

- Flow measurements would be gathered at springs proposed for new development. Springs that have inadequate flows to provide a reliable water source for authorized livestock, while maintaining 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.
- New spring developments in sage grouse habitat would be designed to maintain or enhance the free flowing characteristics of springs and wet meadows. Modify developed springs, seeps and associated pipelines to maintain predevelopment riparian areas within sage grouse habitat where necessary (USDI, 2015a, Appendix C).
- No new roads would be authorized as a result of water developments. Permit holders may be authorized to travel along pipeline routes to perform maintenance as defined in the term grazing permit.
- All old materials (pipeline, troughs, head boxes, etc.) would be cleaned up and removed when springs are re-developed, maintained or abandoned.
- Any proposed pipelines and water troughs would be located in existing disturbed areas or unsuitable sage grouse habitat to the extent practical.
- Design features to mitigate potential for West Nile Virus would be incorporated into new water developments (USDI, 2015a, Appendix C).
- Soil disturbance resulting from pipeline installation would be seeded with a native seed mix during the fall, following construction.
- State of Montana Water Right laws and administrative procedures would be followed in applications for Water Rights on Public Land. The BLM would limit maximum flow rates to 35 gallons per minute or less and maximum volumes to 10 acre-feet or less for new developments. The BLM would submit proposed changes to Montana DNRC and comply with Public Notice requirements for changes to existing water rights. Approvals would be obtained prior to construction where additional Stock Tanks resulting in new points of use are to be added to existing systems and changes to existing water right claims would occur. Applications for new water rights would be after construction in most cases. The BLM is committed to respect water rights of all parties and would not knowingly infringe on other water rights holders.

Fire Management

Wildland fire management within the Big Sheep Creek watershed will be implemented in accordance with the 2006 Dillon RMP as amended. The Big Sheep Creek watershed is classified under fire management Category C within the RMP. Category C identifies "areas where fire is desired to manage ecosystems, but there are significant constraints that must be considered for its use." Those constraints may include: loss of livestock forage, wildlife seasonal habitat and migration corridors, sensitive species habitat, and the fragmentation of sagebrush habitat from private land uses.

Non-Commercial Mechanical/Prescribed Fire

- As per the amended 2006 Dillon Resource Management Plan, use both prescribed fire and mechanical treatments to treat conifer expansion in the non-forested habitat types including expansion in the Wilderness Study Areas where it is determined wilderness values would be enhanced.
- A burn plan would be prepared and approved prior to implementing prescribed fire treatments.
- Treatments within Wilderness Study Area boundaries will be limited to primarily prescribed fire to ensure protection and enhancement of wilderness characteristics.
- 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. At least 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.
- Treatment units would be monitored for noxious weeds and cheatgrass, and treated both pre and post treatment. Areas where cheatgrass or noxious weed densities are greater than 50% of vegetative composition and the size of the infestation is larger than five acres would be excluded from the treatment unit.
- Staging areas to complete treatment would be located in areas free of, or treated for, noxious weeds.
- 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 managers 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.
- Treatment would not occur from 6:00 pm to 9:00 am within 2 miles (3.2 km) of sage grouse leks during the lekking season from March 1 – May 15.
- The implementation of prescribed fire treatments would occur over the next ten years.
- Burn units would be surveyed for special status species prior to the burning event and appropriate stipulations would be implemented to mitigate impacts to these species.
- In allotments where prescribed burns occur, grazing AUMs would not be increased. However, livestock grazing distribution may change within the allotment due to increased palatability and availability of forage. No increases in authorized AUMs are proposed in any grazing allotment in the BSCW where a prescribed burn is proposed.
- Off-road vehicles and equipment would be required to be pressure washed to remove weeds and weed seeds prior to starting operations.

Riparian, Wetland and Aquatic Habitat

- Prior to action that would disturb any riparian or aquatic habitat, all applicable State and Federal permits would be obtained.
- Surveys for botanical sensitive species would be completed prior to implementation of any project. Results of the survey would be incorporated into project design to enhance and/or protect identified populations; or an area would be eliminated from action if survey results indicate disturbance would be detrimental to known sensitive species.
- Surveys for cultural resources would be completed prior to implementation of any project. Results of the survey would be incorporated into project design to protect identified resources; or an area would be eliminated from action if disturbance to an identified resource would be unavoidable.
- Surveys for noxious weeds and cheatgrass would be completed prior to implementation of any project. Results of the survey would be incorporated into the design to limit the spread and/or propagation of the species identified.
- Off-road vehicles and equipment would be required to be pressure washed to remove weeds and weed seeds prior to starting operations.
- As determined by resource specialists on a site by site basis, a native seed mix and/or erosion control material in the form straw/coconut fiber blankets and/or rolls (wattles) would be used on an as needed basis to stabilize and minimize loss of soil and sediment contribution to any adjacent aquatic habitat.

Wetland Restoration

Sites for proposed wetland restoration are identified within the *Projects* section of the allotment descriptions for Alternatives B and C and on the Junction, Pine Creek and Porcupine Canyon allotment maps. Sites were selected due to extensive hummocking that has led to an alteration in site hydrology and degraded wetland function as further described in Chapter 3.

The restoration proposed would include the use of a tracked heavy equipment to physically eliminate the hummocks and restore soil elevations across the wetland complex to more closely resemble pre-disturbance conditions. Site specific design will incorporate features to encourage and improve diversity in wetland vegetative species composition and distribution. This would be accomplished by matching existing topography of the valley, drainage, or meadow and if applicable, slight undulations within portions of the restored wetland area would provide for further variation in duration of saturation. Existing vegetation would not be directly removed but may be partially redistributed as the vegetated hummocks are knocked down or tracked into the inter-hummock channels. The exposure of bare soil would be minimized.

If the wetland area has a defined outlet that has degraded and lost elevation, restoration would include action to restore the outlet elevation and the affected water table at the site. This would require work with a tracked excavator or with hand tools.

Ground disturbing activity would occur during driest possible conditions following the growing season (typically between but not limited to August 1 and September 30) and/or in the spring immediately before start of the next growing season, when the ground may be partially frozen (for example but not limited to; February 15 through April 1). This timing will minimize ground disturbance, maximize growth in the first season following disturbance, and provide equipment access to a greater amount of area. Duration of activity at each site would vary on site size but would consist of approximately 4-8 acres per day.

Following restoration, the area restored would be fenced off from the surrounding pasture for a minimum of two growing seasons. Electric fence may be used for this project. This would allow adequate time for the area to vegetate and become a productive, sustainable portion of a grazing rotation again. If after two growing seasons, BLM evaluation of the site indicates that vegetation has not recovered to a level that would meet the BLM's land health standard for riparian and wetland areas, the area would remain segregated and re-evaluated after each growing season thereafter.

Streambank Stabilization

Stabilization of approximately 150 feet of streambank on Big Sheep Creek is proposed. The site is located along the access road to the Deadman Gulch Campground approximately 150 feet after leaving the county road (Map 2, Figure 2.1). The streambank proposed for stabilization is on the outside bend of a meander and any further migration of the channel into this eroding bank will likely capture the road, introducing excess sediment and aggregate used for road construction. Currently the edge of water (at base flow) is about 15 feet from the edge of the road at its closest location, with nearly a 1:1 slope from the road to the water (Figure 2.1). This slope is almost completely devoid of vegetation with very little grass and willow at the toe of bank and sage brush at the top (Figure 2.1). The current conditions provide no vegetative buffer between road surface runoff and the active stream channel.

Figure 2.1: View looking upstream on Big Sheep Creek at the bank to be stabilized.

The bank would be stabilized using a combination of installing rock at the toe of bank and a bioengineering technique utilizing biodegradable woven coconut fiber fabric to encapsulate the existing soil above the rock. The bioengineered portion of the bank would include planted willow cuttings sourced from adjacent riparian areas, native grass seed, and possibly sod mats or willow clumps from the adjacent point bar. The rock toe would be constructed from either imported angular rock, imported cobble, native cobble that can be collected from the channel, or from a combination of all of the above. Whichever source is deemed appropriate, the size of the material would be large enough to withstand shear stresses at the bank without mobilizing. The

intent would be to use a gradation of material that does not deviate by more than approximately 50% from the largest cobbles naturally occurring within this reach of Big Sheep Creek.

Figure 2.2. Conceptual plan view of bank stabilization on Big Sheep Creek along the Deadman Gulch Campground access road.

A tracked hydraulic excavator would be used to complete the project. The excavator will work from both above the bank and from within the channel to install the rock toe and the soil encapsulated fabric lifts. Access to the channel would be from a single location downstream of the site where the bank elevation would allow entry with negligible disturbance to the bank or existing bank vegetation (approximate location shown on Figure 2.2). Only the tracked excavator would utilize this temporary access route therefore the dimensions are estimate at approximately 12 feet wide and 150 feet long. The access would be stabilized and reclaimed as needed immediately upon completion of the instream work. The campground access road surface adjacent to the site would be disturbed during construction but would be repaired upon completion.

The project would take place in the late winter or early spring during low water, while willows are dormant. The duration of the project would depend slightly on the rock source utilized as well as weather but it is estimated to take approximately 6 – 12 days. The access road to the campground would be closed during the implementation of this project.

Noxious and Invasive Species
Three herbicides that have been analyzed in the "Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Lands in 17 Western States" Programmatic EIS would be used, where appropriate. All applicable Standard Operating Procedures and Best Management Practices discussed in the EIS would be followed.

The BLM will work with other federal, state and county agencies, both in Montana and Idaho, as well as other interested organizations and landowners to form a collaborative where noxious weed inventory data would be shared. This would allow for everyone on both sides of the Montana – Idaho border to know what threats may be headed their way. Cooperative treatment days could also be held in any area that is of concern to the parties involved.

Travel Management
Stream Crossings
Stream crossings currently identified for improvement are identified in the *Projects* section of the allotment descriptions included in Alternatives B and C. Stream crossing improvements are not limited to these sites but these and all stream crossings projects would adhere to the following guidelines:

- Install culverts appropriately sized for fish passage on stream crossings on all open routes that cross the main stem of Muddy Creek.
- All applicable State and Federal Permits would be obtained and all permit conditions would be followed for construction of stream crossings.
- Implementation of stream crossing improvements would take place during low flow conditions.
- The most appropriate stream crossings, e.g. culverts or hardened crossings would be selected based on site specific conditions and impacts: floodplain fill, economics, road safety as well as long term impacts to stream channel function (e.g.; scour/deposition) and vegetation.
- Temporary and/or permanent culverts placed under roads would be adequately sized to maintain stream dimensions, patterns and profiles.
- Hardened crossings would be constructed to match the approximate dimensions and profile of the channel upstream and downstream.

Forest and Woodland Habitat
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 (non 5-needle pine species) 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 four grazing allotments and one pasture within another allotment in which current 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: Pine Creek, Porcupine Canyon, Simpson Creek FS, Rock Creek Isolated and the Contours pasture of Muddy Creek allotment. 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.

In addition, livestock management revisions, range improvement projects and/or administrative changes are being proposed for eight allotments: Crystal Creek, Dixon Mountain, Indian Creek, Indian Creek Isolated, Junction, Meadow Creek, Meadow Creek Isolated, and Rio Puerco. All eight of these grazing allotments met all five Land Health Standards during the 2015 assessment. Changes for these eight allotments are proposed under Alternative B.

Please refer to allotment maps 1-10 in Appendix A to see the location and extent of the proposed rangeland improvement projects and administrative actions.

<u>Crystal Creek #30102 (map #1)</u>
Grazing Administration and Management:

- AUMs would be adjusted from the current permitted AUMs of 343 to 240. The grazing rotation would remain the same rest rotation system. Each pasture would be rested one in three years.

<u>Dixon Mountain #30022 (map #2)</u>
Grazing Administration and Management:

- The spring grazing period would be lengthened to provide more flexibility for the permittee. It would change from 5/5 – 6/5 to 5/1 – 7/1 Spring use would not exceed 30 days within the new grazing period. Fall grazing use would remain 30 days within the grazing period of 11/1 – 12/31.
- Early, late, rest rotation would continue on this allotment.

- Adjust the allotment boundary to reflect the actual boundary on the ground.

Projects:

- Harden existing water gap with rock and install sediment traps in pasture #3 on Big Sheep Creek reach #108.
- Stabilize streambank on Big Sheep Creek along the Deadman Gulch Campground access road as further described under the heading *Aquatic Habitat Improvement* in Section 2.2.3, *Features Common to All Action Alternatives.*

Table 2.2: Proposed Authorized Use for Dixon Mountain Allotment, Alternative B

	PASTURE #1 (&2)	**PASTURE #3 (&2)**	**PASTURE #4**
2017	11/1 – 12/31 (30 days)	REST	5/1 – 7/1 (30 days)
2018	REST	5/1 – 7/1 (30 days)	11/1 – 12/31 (30 days)
2019	5/1 -7/1 (30 days)	11/1 – 12/31 (30 days)	REST
2020	REPEAT		

<u>Indian Creek #10741(map #3)</u>

Grazing Administration and Management:

- Grazing period would change from 6/15 – 10/15 to 7/1 – 10/31 and the authorized AUMs for this allotment would remain the same at 509.
- Each pasture would continue to be rested every fourth year.
- Simpson Creek pasture would not be grazed during WCT spawning/egg incubation period of July1 – August 1.

Projects:

- Install a culvert at road crossing on Indian Creek (Riparian Reach #127; Map 3). For further description see the heading *Stream Crossings* in Section 2.2.3, *Features Common to All Action Alternatives*.
- Remove approximately 0.5 miles of dysfunctional sheep fence that at one time separated the Sawlog pasture of Indian Creek allotment from Indian Creek Isolated allotment and combine that portion of Indian Creek Isolated with the Sawlog pasture. A portion of the existing fence between BLM and private may need be modified and/or improved to keep cattle in the Indian Creek allotment.
- Remove the Cutthroat Exclosure, approximately 0.3 miles of fence, now that the vegetation and stream channel inside of the exclosure matches the outside.

Table 2.3: Proposed Authorized Use for Indian Creek Allotment, Alternative B

	SIMPSON CREEK	**INDIAN CREEK RIPARIAN (10 days)**	**ELK TRACK**	**SAWLOG**
YEAR 1	REST	7/1 – 7/10	7/11 – 8/14	8/15 – 9/13
YEAR 2	9/4 – 10/8	REST	7/1 – 8/4	8/5 – 9/3
YEAR 3	8/10 – 9/13	7/31 – 8/9	REST	7/1 – 7/30
YEAR 4	8/16 – 9/19	8/5 – 8/15	7/1 – 8/4	REST
YEAR 5	REPEAT			

Indian Creek Isolated #30653 (map #3)

Grazing Administration and Management:

- Combine the northwest portion of this isolated allotment with the Indian Creek allotment.

Projects:

- Remove dysfunctional sheep fence that at one time separated the Sawlog pasture of Indian Creek allotment from Indian Creek Isolated allotment and combine that portion of Indian Creek Isolated with the Sawlog pasture. A portion of the existing fence between BLM and private may need be modified and/or improved to keep cattle in the Indian Creek allotment.

Junction #20009 (map #4)

Projects:

- Up to 100 acres of wetland restoration on Tex Meadow (Riparian Reach #1447). Please see description under the heading *Wetland Restoration* in Section 2.2.3, *Features Common to All Action Alternatives*.
- Up to 10 acres of riparian wetland restoration adjacent to Lower Cabin Creek (Riparian Reach #179). Please see description under the heading *Wetland Restoration* in Section 2.2.3, *Features Common to All Action Alternatives*.

Meadow Creek AMP #20042 (map #9)

Grazing Administration and Management:

- The Meadow Creek Isolated allotment would be combined with the Meadow Creek AMP. This would combine the AUMs which would then change the Meadow Creek AMP AUMs from 191 to 230. The number of livestock permitted would change from 103 cattle to 110 cattle. The total BLM acres would be combined changing the Meadow Creek AMP from 1149 to 1309 BLM acres.
- The Meadow Creek AMP allotment boundary would be adjusted.

Projects:

- Approximately 1.2 miles of fence would be removed between the Meadow Creek AMP and Meadow Creek Isolated allotments.

Meadow Creek Isolated #30611 (map #9)

Grazing Administration and Management:

- This allotment would be eliminated because this allotment would be combined with the Meadow Creek AMP.

Projects:

- Approximately 1.2 miles of fence would be removed between the Meadow Creek AMP and Meadow Creek Isolated allotments.

Muddy Creek #30039 (map #5)

Grazing Administration and Management:

- Since the last time this allotment was assessed, Wilson pasture has been removed from the Muddy Creek allotment. The grazing system would not be changed from current use. The current rotation is outlined in Table 2.4 below for clarification.
- The grazing management would continue as a rest-rotation system allowing rest in each pasture every third year. The number of livestock authorized on this allotment would be up to 350 cow/calf pair and the grazing period would remain June 20 – October 15. The permitted AUMs would remain 1154.
- Little Water pasture would continue to be used for trailing cattle only. The trailing would consist of one day in the spring and one day in the fall.
- Upper and Lower Wet Meadow pastures are made up of mostly private land. For this reason, these pastures are not included in the rest rotation system but are utilized at the operator's discretion so long as resources are not adversely affected on BLM administered land within these two pastures.

Projects:

- Improve stream crossings. For further description see the heading *Stream Crossings* in Section 2.2.3, *Features Common to All Action Alternatives*.
- A prioritized list would be created for extensive fence maintenance throughout the Muddy Creek allotment. This work would be the responsibility of the permittee.
- Build an approximately 0.2 mile exclosure fence around spring in section 11 of McNinch pasture to protect the source.
- Frequent riding would keep cattle pushed off of the small stream reach in the mostly private pasture known as the Lower Wet Meadow pasture.
- Redevelop Red Dirt Spring in the Hidden pasture. Install a new 1,000 gallon water trough and complete maintenance on the existing pipeline that runs into the Rio Puerco allotment supplying water to the Red Dirt pasture. Expand the existing spring exclosure to include a portion of the small spring brook. New exclosure fence would be approximately 0.2 miles of 4 four wire fence. The existing dysfunctional exclosure would be removed. Two new 1,000 gallon tanks would be installed to replace old rusted out troughs in the Red Dirt pasture of Rio Puerco allotment.
- Redevelop Willow Spring in the Timber Butte pasture. Install a new 1,000 gallon water trough.
- Abandon and clean-up Willow Spring and Hidden Pasture Spring.

Contour pasture projects:

- Develop Lower Lou Gulch Spring on the south end of Contours pasture, T13s R10w section 28 and construct a larger spring exclosure consisting of approximately 0.2 miles of 4-wire fence, which would incorporate the small wetland and spring brook #1421. A short pipeline, approximately 250 feet, would extend off the spring box to a 1,000 gallon

watering trough. This pasture is rested every third year and grazed for only 9 days the other two years.

- Approximately 0.5 miles total of temporary fence would be constructed around wetlands #140 and #1414. Frequent riding would be required to keep cattle pushed out of the corner of the pasture and off of reaches #142 and #1411.
- Clean-up and abandon the dysfunctional Wyatt Spring. Removal of approximately 0.2 miles of old dysfunctional spring exclosure fence.
- Explore ideas to rehab the uplands that have been contour plowed and seeded with hard fescue. Small plots would be identified for use with hand tools to prepare the soil for seeding with native sage grouse preferred forbs and grasses.

Table 2.4: Proposed Authorized Use for Muddy Creek Allotment, Alternative B

	CONTOURS	MUDDY RIPARIAN	MUDDY BOTTOM	MCNINCH	TIMBER BUTTE	SOURDOUGH	HIDDEN
2017	REST	REST	6/20 – 7/26	7/27 – 8/9	REST	8/10 – 8/30	8/31 – 9/29
2018	6/20 – 6/29	6/30 – 7/6	7/7 – 8/9	8/10 – 8/23	8/24 – 9/25	REST	REST
2019	9/10 – 9/19	9/20 – 9/27	REST	REST	7/20 – 8/18	8/19 – 9/9	6/20 – 7/19
2020	REPEAT						

Pine Creek #30001 (map #7)

Grazing Administration and Management:

- Implement an early, late, rest grazing system.
- One out of every three years the BLM pasture would be rested.
- Permitted AUMs on the BLM pasture would stay the same in the spring, 225. But would change during the fall use from 182 to 122. A total reduction of 60 AUMs.
- On years where late season grazing is scheduled, 160 yearling cattle would graze this pasture.
- Late season use would be changed from 9/25 – 10/15 to 9/25 – 11/1 to provide more flexibility to the permittee. Grazing would be authorized for up to thirty days within this grazing period.

Projects:

- Up to 0.25 miles of new pipeline across BLM administered land off of the existing FS Pass Creek Spring development and a 1,000 gallon water trough would be installed on the Southeast corner of the BLM pasture to provide more reliable water and therefore better cattle disbursement in this pasture.
- Up to 10 acres of wetland restoration on the wet meadow Nicholia (Riparian Reach #1440, Map 7). Please see description under the heading *Wetland Restoration* in Section 2.2.3, *Features Common to All Action Alternatives*.
- Improve stream crossings at the following locations. For further description see the heading *Stream Crossings* in Section 2.2.3, *Features Common to All Action Alternatives*.

- Install culvert at the upstream end of Deadman Creek (Riparian Reach #123; Map 7).
- Remove culvert on the downstream end of Pine Creek (Reach #126, Map 7) just upstream of its confluence with Deadman Creek.

Table 2.5: Proposed Authorized Use for Pine Creek Allotment, Alternative B

LIVESTOCK NUMBER	YEAR	GRAZING PERIOD	AUMs
342 160 Yearling (Fall)	1	REST	
	2	6/16 – 7/11	225
	3	9/25 – 11/1 (up to 30 days)	122
	4	REPEAT	

<u>Porcupine Canyon #20107 (map #8)</u>

Grazing Administration and Management:

- A new pasture would be created by building a fence that would separate the existing Porcupine Pasture. This fence would create the North Porcupine Riparian pasture of approximately 450 acres of BLM administered land and the South Porcupine pasture of approximately 350 acres of BLM administered land.
- Yearlong rest would be afforded the North Porcupine Riparian, South Porcupine, and the Island Butte pasture every third year.
- The newly created North Porcupine Riparian pasture would be grazed up to 14 days on the years it is not rested.
- Permitted kind of livestock would change from 112 cattle to 100 Yearling. Permitted AUMs would change from 247 to 181. Grazing period would change from 6/15 – 8/31 to 6/15 – 8/17.

Projects:

- Create North Porcupine Riparian pasture by building a new 3-wire 1.4 mile fence to divide the current Porcupine Pasture. Fence would be built so that existing water troughs could be accessed from both North Porcupine Riparian and South Porcupine pastures.
- If it is determined to be necessary an additional trough would be installed on the Island Butte spring for an additional water source.
- Construct an exclosure fence around wetland #1460 and spring brook #746. This would consist of approximately 1.25 miles of new 4-wire fence and enclose approximately 25 acres.
- Consider installing a water gap in the new South Porcupine pasture if determined that existing water troughs are not sufficient. This water gap would be on Cabin Creek on private land and it would only be implemented if needed and with landowner consent.
- Up to 6 acres of wetland restoration on Island Butte Wetland (Wetland #1460, Map 8). Please see description under the heading *Wetland Restoration* in Section 2.2.3, *Features Common to All Action Alternatives*.
- Remove old dysfunctional culvert at the bottom of Island Butte Spring (Reach #746).

- Install culvert on the road crossing over Porcupine Creek (between Reach #159 and Reach #161, Map 8). For further description see the heading *Stream Crossings* in Section 2.2.3, *Features Common to All Action Alternatives*.

Table 2.6: Proposed Authorized Use in the Porcupine Canyon Allotment, Alternative B

	NORTH PORCUPINE RIPARIAN	**SOUTH PORCUPINE**	**ISLAND BUTTE**	**CORRAL**
YEAR 1	REST	6/15 – 7/12	7/13 – 7/27	7/28 – 8/17
YEAR 2	6/15 – 6/28	6/29 – 7/27	REST	7/28 – 8/17
YEAR 3	7/21 – 8/3	REST	7/6 – 7/20	6/15 – 7/5
YEAR 4	REPEAT			

<u>Rio Puerco #10700 (map #10)</u>

Grazing Administration and Management:

- Grazing season would be changed from 9/15 – 12/15 to 7/1 – 10/1
- Implement a deferred grazing rotation. One year cattle would be turned out on the south end of the Muddy Creek pasture and by riding would be kept to this end for thirty days, and then pushed to the north end and held their by riding for another thirty days. The Red Dirt pasture would be a part of this deferred rotation. See table below
- Increase number of permitted livestock from 82 cattle to 100 cattle
- Increase permitted AUMs to 275. This would reinstate 53 of the suspended AUMs.
- Change type of livestock in the Shearing Pen pasture from horses to cattle. Permitted AUMs would remain 32. Grazing period would be changed from 5/1 – 12/31 to 7/1 – 10/1 and could be grazed for up to 20 days within this grazing period.
- If water was found in the Shearing Pen pasture, this pasture would create flexibility to rest one of the other three pastures, if needed for drought, etc.

Projects:

- Extend exclosure around reach # 149 to enclose reach #1491. This exclosure would meet up with private boundary fence and would consist of approximately 0.2 miles of additional 4-wire fence. A hardened water gap would be built in to continue to allow cattle to access water.
- Install up to 1.5 miles of temporary electric fence to divide the west side of the allotment into two separate pastures.
- If feasible drill and facilitate a well on the south end of the Shearing Pen pasture.
- If feasible permittee would redevelop spring on the Northwest corner of the allotment in Rock Canyon. No new fence would be needed. Up to 300 feet of pipeline would be reinstalled along with a new spring box and 1,000 gallon watering trough.

Table 2.7: Proposed Authorized Use in the Rio Puerco Allotment, Alternative B

	MUDDY CREEK (SOUTH)	MUDDY CREEK (NORTH)	RED DIRT
YEAR 1	7/1 – 7/30	7/31 – 8/29	8/30 – 9/28
YEAR 2	7/31 – 8/29	8/30 – 9/28	7/1 – 7/30
YEAR 3	8/30 – 9/28	7/1 – 7/30	7/31 – 8/29

Rock Creek Isolated #20698 (map #4)

Grazing Administration and Management:

- Change the grazing period in this custodial allotment from 6/15 – 11/30 to 4/15 – 6/30. This allotment would only be grazed for up to thirty days within this new grazing period. There are 14 acres of BLM administered land within this mostly private allotment.
- Monitoring would be implemented along reach # 133, if monitoring shows measurable improvement within three years, the new proposed grazing plan would be continued. If monitoring results don't show improvement with the new proposed grazing plan within three years, a fence would be constructed with a water gap built in. This would eliminate grazing on most of this 0.3 mile stream reach.

Projects:

- A 0.3 mile jack and rail fence would potentially be constructed to enclose reach #133. A hardened water gap would be included to allow a continued water source for livestock.

Simpson Creek FS #30207 (map #9)

Grazing Administration and Management:

- Decrease the number of grazing days in Coyote pasture by 14 days which would add 14 days to the Forest Service Morrison Lake pasture. The Coyote pasture would be grazed up to 25 days two out of three years.
- Grazing rotation would continue as an early, late, rest system. Each pasture is afforded rest every third year.
- Permitted AUMs would stay the same at 135.
- On years when Simpson Creek pasture is grazed, cattle would be herded and pushed out of the north corner of the pasture. If herding efforts are unsuccessful in the Simpson Creek pasture, permittee would be prepared to come off early when Forest Service allowable use levels are met.
- Continue to graze 130 cattle with a grazing period of 7/16 – 9/30
- Allotment boundary and pasture boundaries would be changed to reflect correct placement.

Projects:

- Four wire, approximately 0.2 mile, 3 acre exclosure fence would be constructed around bottom portion of Coyote Creek reach #119

- A riparian pasture would be created around reach #117 by building a 4-wire approximately 1.7 mile fence and 25 acres to enclose the stream. This pasture could be grazed up to two days every third year.
- One mile of temporary polywire fence enclosing approximately 85 acres would be constructed around Crystal Creek reach # 170 if conditions don't improve in the next three years.

Table 2.8: Proposed Authorized Use in the Simpson Creek FS Allotment, Alternative B

	COYOTE	SIMPSON CREEK	MORRISON LAKE
YEAR 1	REST	8/25 – 9/28	7/16- 8/24
YEAR 2	7/16 – 8/9	REST	8/10 – 9/23
YEAR 3	8/20 – 9/13	7/16 – 8/19	REST

Non-Commercial Mechanical/Prescribed Fire

Conifer Expansion Treatments –

Up to 1,319 acres of non-commercial mechanical/prescribed fire treatment is proposed under Alternative B. The treatment units are shown on Table 2.9. 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. Actual prescribed fire treatment boundaries within the units identified on Appendix A, map 11 would be based on topographic features such as ridges and drainages, and man-made features such as trails and roads. 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.

Table 2.9 Non-Commercial Mechanical/Prescribed Fire Units, Alternative B

Unit Name	Allotment	Acres	Objective(s)	Treatment Type(s)
McNinch 1	Muddy Creek	245	Reduce conifer expansion into sagebrush/grassland	Non-commercial mechanical/Broadcast Rx fire
McNinch 2	Muddy Creek	233		
McNinch 3	Muddy Creek	447		
Johnson	Muddy Creek	166		
Thompson	Muddy Creek	228		

Travel Management (Maps 3, 6 & 10)

In addition to the provisions for travel management provided in the amended 2006 RMP, minor changes would be made to the designated routes to correct mapping errors or achieve consistency with adjacent lands route designations. BLM would also work with adjoining landowners, especially within the Muddy Creek area to improve compliance with existing travel management regulations.

Specifically, BLM would

- Install hiker and horse-accessible gates at key locations to allow horseback travel while restricting motorized travel on routes closed to motorize use.
- Install an informational kiosk at key access locations.
- Obliterate or reclaim approximately 1-2 miles of user-created routes by scarifying the route surface and planting live and placing dead brush within the linear disturbance to obscure the visual presence of the route from the adjoining route junction.
- Barricade or obstruct access to closed routes that have been habitually traveled and/or routes that have been physically obliterated.

If access into Indian Creek is denied by the private landowners at the county road junction, construct routes around the private land to allow continued public access into this area. Approximate locations of these routes are shown on Map 3.

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.

Muddy Creek #30039 (map #5)
Grazing Administration and Management:

- The Contours Pasture would not be authorized for livestock grazing for the next 10 year grazing cycle.
- Active AUMs within the Muddy Creek allotment would be reduced from 1154 to 1066.
- The other nine pastures within the allotment would be managed the same as the no action alternative.

Projects:

- Conduct fence maintenance along the approximate 7 miles of fence that encloses the Contours pasture to eliminate livestock grazing on BLM administered lands within the pasture.
- Clean-up and abandon the dysfunctional Wyatt Spring. This would remove ~0.2 miles of fence.
- Clean-up and abandon Hidden Spring.
- Redevelop Willow Spring in the Timber Butte pasture.
- Explore ideas to rehab the uplands that have been contour plowed and seeded with hard fescue. Small plots would be identified for use of hand tools to prepare the soil for seeding with native sage grouse preferred forbs and grasses.

- Improve stream crossings. For further description see the heading *Stream Crossings* in Section 2.2.3, *Features Common to All Action Alternatives*.

Table 2.10: Proposed Authorized Use for Muddy Creek Allotment, Alternative C

	MUDDY RIPARIAN	MUDDY BOTTOM	MCNINCH	TIMBER BUTTE	SOURDOUGH	HIDDEN
2017	REST	6/20 – 7/26	7/27 – 8/9	REST	8/10 – 8/30	8/31 – 9/29
2018	6/20 – 6/27	6/28 – 7/31	8/1 – 8/14	8/15 – 9/16	REST	REST
2019	9/10 – 9/17	REST	REST	7/20 – 8/18	8/19 – 9/9	6/20 – 7/19
	REPEAT					

*Little Water Pasture is not part of the rotation. It is only used by cattle when trailing in the spring and the fall.

<u>Pine Creek #30001</u> <u>(map #7)</u>

Grazing Administration and Management:

- Implement an early, late, rest grazing system.
- One out of every three years the BLM pasture would be rested.
- Permitted AUMs would change from 225 to 106 in the spring and stay at 182 in the fall. A reduction of 119 AUMs. Total authorized grazing days would change from 47 days to 35 days.
- A riparian pasture would be created by constructing a 3.5 mile temporary fence along Pine Creek and would be approximately 100 acres in size. This riparian pasture would include both BLM and FS administered land and would be managed by the FS. It could be grazed once every three years for seven days.
- Permitted number of cattle would change from 342 cattle to 300 cattle.

Projects:

- BLM, FS, and permittee would construct an approximate 3.5 mile temporary fence around Pine Creek. This would create a riparian pasture that would enclose up to 100 acres of BLM and FS administered land.
- Up to 0.25 miles of new pipeline across BLM administered land off of the existing FS Pass Creek Spring development and a water trough would be installed on the Southeast corner of the BLM pasture to provide more reliable water and therefore better cattle disbursement in this pasture.
- Up to 10 acres of wetland restoration on the wet meadow Nicholia (Riparian Reach 1440, Map 7). Please see description under the heading *Wetland Restoration* in Section 2.2.3, *Features Common to All Action Alternatives*.
- Improve stream crossings at the following locations. For further description see the heading *Stream Crossings* in Section 2.2.3, *Features Common to All Action Alternatives*.
    - Install culvert at the upstream end of Deadman Creek (Riparian Reach #123; Map 7).
    - Remove culvert on the downstream end of Pine Creek (Reach #126, Map 7) just upstream of its confluence with Deadman Creek.

Table 2.11: Proposed Authorized Use for Pine Creek Allotment, Alternative C

LIVESTOCK NUMBER	YEAR	GRAZING PERIOD	AUMs
300 Cattle	1	REST	
	2	6/16 – 6/29	106
	3	9/25 – 10/15	182
	4	REPEAT	

Porcupine Canyon #20107 (map #8)

Grazing Administration and Management:

- Permitted AUMs would change from 247 to 101. Livestock number would change from 112 Cattle to 85 Yearling, and the grazing period would change from 6/15 – 8/31 to 6/15 – 7/26.
- A rest-rotation grazing system would be implemented. Each of the three pastures would be completely rested once every third year.

Projects:

- Up to 6 acres of wetland restoration on Island Butte Wetland (Wetland #1460, Map 8). Please see description under the heading *Wetland Restoration* in Section 2.2.3, *Features Common to All Action Alternatives*.
- Install culvert on the road crossing over Porcupine Creek (between Reach #159 and Reach #161, Map 8). For further description see the heading *Stream Crossings* in Section 2.2.3, *Features Common to All Action Alternatives*.
- Remove old dysfunctional culvert at the bottom of Island Butte Spring (Reach #746).
- If it is determined to be necessary a short pipeline and trough would be installed off of the Island Butte spring for an additional water source.
- Construct an exclosure fence around wetland #1460 and spring brook #126. This would consist of approximately 1.25 miles of new 4-wire fence and enclose approximately 25 acres.

Table 2.12: Proposed Authorized Use in the Porcupine Canyon Allotment, Alternative C

	PORCUPINE	ISLAND BUTTE	CORRAL
YEAR 1	REST	6/15 – 6/24	6/25 – 7/15
YEAR 2	6/15 – 7/5	REST	7/6 – 7/26
YEAR 3	6/26 – 7/16	7/17 – 7/26	REST
YEAR 4	REPEAT		

Rock Creek Isolated #20698 (map #4)

Grazing Administration and Management:

- The 14 acres in the Rock Creek Isolated allotment parcel that has Meadow Creek reach #133 running through it would not be authorized for livestock grazing for the next 10 year grazing cycle.

- Active AUMs within the Rock Creek Isolated allotment would be reduced from 8 to 0.

Projects:

- Construct approximately 0.3 miles of new 4-wire fence to eliminate livestock grazing.

<u>Simpson Creek FS #30207</u> <u>(map #9)</u>

Grazing Administration and Management:

- Livestock numbers would be reduced to 100 Cattle and grazing period would change from 7/16 – 9/30 to 7/16 – 9/15.
- Permitted AUMs would change from 135 to 84.

Table 2.13: Proposed Authorized Use for Simpson Creek FS Allotment, Alternative C

	COYOTE	SIMPSON CREEK	MORRISON LAKE
YEAR 1	REST	8/25 – 9/13	7/16- 8/24
YEAR 2	7/16 – 8/4	REST	8/5 – 9/18
YEAR 3	8/10 – 9/9	7/16 – 8/9	REST

Non-Commercial Mechanical/Prescribed Fire

The 2,301 acres of treatments identified in Alternative C include all units from Alternative B plus the addition of the Dixon and Little Water units. Additional objectives for non-commercial mechanical/prescribed fire treatments identified in Alternative C include returning fire to the landscape as a disturbance agent to improve resiliency and increase seral diversity/composition within the Hidden Pasture WSA. Design features would remain the same as described in Alternative B. Treatments identified within wilderness study area boundaries would be confined to mainly broadcast fire with little or no mechanical modification to ensure protection and enhancement of wilderness characteristics. Treatments would occur in early spring or late fall to ensure existing fuels are readily available to support fire spread. Prescribed fire treatments proposed in Alternative C are summarized in the table below.

Table 2.14: Non-Commercial Mechanical/Prescribed Fire Units, Alternative C

Unit Name	Allotment	Acres	Objective(s)	Treatment Type(s)
McNinch 1	Muddy Creek	245	Reduce conifer expansion into sagebrush/grassland	Non-commercial mechanical/Broadcast Rx fire
McNinch 2	Muddy Creek	233		
McNinch 3	Muddy Creek	447		
Johnson	Muddy Creek	166		
Thompson	Muddy Creek	228		
Dixon	Dixon Mountain	315	Improve diversity/composition Reduce conifer expansion	Non-commercial mechanical/Broadcast Rx fire
Little Water	Muddy Creek	667	Improve diversity/composition Reduce conifer expansion	Non-commercial mechanical/Broadcast Rx fire

2.3.6 Description of Alternative D

<u>Porcupine Canyon #20107 (map #8)</u>

Grazing Administration and Management:

- The allotment would be rested from livestock grazing for the next 10 years.
- Authorized AUMs would change from 247 to 0.

Projects:

- Construct approximately 1.25 miles of 4-wire fence on BLM/private boundary to effectively eliminate cattle from this allotment.
- Maintenance on 4.5 miles of existing fence between BLM and private lands would need to be ongoing to effectively eliminate cattle from allotment.
- Up to 6 acres of wetland restoration on Island Butte Wetland (Wetland #1460, Map 8). Please see description under the heading *Wetland Restoration* in Section 2.2.3, *Features Common to All Action Alternatives*.
- Remove old dysfunctional culvert at the bottom of Island Butte Spring (Reach #126).
- Install culvert on the road crossing over Porcupine Creek (between Reach #159 and Reach #161, Map 8). For further description see the heading *Stream Crossings* in Section 2.2.3, *Features Common to All Action Alternatives*.

2.4. Summary Comparison of Alternative Actions

Table 2.15: Comparison of Proposed Livestock Grazing or Administrative Alternatives

Crystal Creek #30102	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**
Season of Use	6/15 – 10/15	Same as alternative A	--	--
Livestock Number and Kind	154 cattle	Same as alternative A	--	--
Active BLM AUMs	343	240	--	--
Grazing System	Rest Rotation	Same as alternative A	--	--
Projects	None	Same as alternative A	--	--
Administrative and Management Action	None	AUMs would be adjusted from 343 to 240.	--	--
Dixon Mountain #30022	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**
Season of Use	5/5 – 6/5 11/1 – 12/31	5/1 – 7/1 11/1 – 12/31	--	--
Livestock Number and Kind	190 Cattle	Same as alternative A	--	--
Active BLM AUMs	146 278	Same as alternative A	--	--
Grazing System	Rest Rotation	Same as alternative A	--	--
Projects	None	1. Harden existing water gap in pasture #3 on Big Sheep Creek reach #108. 2. Stabilize streambank on Big Sheep Creek reach #108.	--	--
Administrative and Management Action	None	Adjust the spring season of use from 5/5 – 6/5 to 5/1 – 7/1 to create more flexibility for permittee. Spring use would not exceed 30 days within the listed season of use.	--	--
Indian Creek #10741	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**
Season of Use	6/15 – 10/15	7/1 – 10/31	--	--
Livestock Number and Kind	140 Cattle	Same as alternative A	--	--
Active BLM AUMs	509	Same as alternative A	--	--
Grazing System	Rest Rotation	Same as alternative A	--	--

Projects	None	1. Install culvert at road crossing on Indian Creek (Riparian Reach #127). 2. Remove dysfunctional sheep fence that at one time separated the Sawlog pasture of Indian Creek allotment from Indian Creek Isolated allotment and combine that portion of Indian Creek Isolated with the Sawlog pasture. A new fence would be built on the BLM/private boundary. 3. Remove the Cutthroat Exclosure, now that the vegetation and stream channel inside of the exclosure matches the outside.	--	--
Administrative and Management Action	None	Adjust season of use to avoid grazing Simpson Creek pasture during WCT spawning/egg incubation period.	--	--
Indian Creek Isolated #30653	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**
Season of Use	6/15 – 11/30	Same as alternative A	--	--
Livestock Number and Kind	23 Cattle	Same as alternative A	--	--
Active BLM AUMs	126	Same as alternative A	--	--
Grazing System	Custodial Use	Same as alternative A	--	--
Projects	None	Remove dysfunctional sheep fence that at one time separated the Sawlog pasture of Indian Creek allotment from Indian Creek Isolated allotment and combine that portion of Indian Creek Isolated with the Sawlog pasture. A new fence would be built on the BLM/private boundary.	--	--
Administrative and Management Action	None	Combine the northwest portion of this isolated allotment with the Indian Creek allotment.	--	--

Junction #20009	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**
Season of Use	6/15 – 11-30	Same as alternative A	--	--
Livestock Number and Kind	127 Cattle	Same as alternative A	--	--
Active BLM AUMs	670	Same as alternative A	--	--
Grazing System	Rest Rotation	Same as alternative A	--	--
Projects	None	1. Up to 100 acres of wetland restoration on Tex Meadow (Riparian Reach 1447). 2. Up to 10 acres of riparian wetland restoration adjacent to Lower Cabin Creek (Riparian Reach 179).	--	--
Administrative and Management Action	None	Same as alternative A	--	--
Meadow Creek AMP #20042	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**
Season of Use	7/1 – 11/8	Same as alternative A	--	--
Livestock Number and Kind	103 Cattle	110 Cattle	--	--
Active BLM AUMs	191	230	--	--
Grazing System	Rest Rotation	Same as alternative A	--	--
Projects	None	Approximately 1.2 miles of fence would be removed between the Meadow Creek AMP and Meadow Creek Isolated allotments.	--	--
Administrative and Management Action	None	1. The Meadow Creek Isolated allotment would be combined with the Meadow Creek AMP. This would combine the AUMs which would then change the Meadow Creek AMP AUMs from 191 to 230. The number of livestock permitted would change from 103 cattle to 110 cattle. The total BLM	--	--

		acres would be combined changing the Meadow Creek AMP from 1149 to 1309 BLM acres. 2. The Meadow Creek AMP allotment boundary would be adjusted.		
Meadow Creek Isolated #30611	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**
Season of Use	6/15 – 11/30	See Meadow Creek AMP	--	--
Livestock Number and Kind	7 Cattle	See Meadow Creek AMP	--	--
Active BLM AUMs	39	See Meadow Creek AMP	--	--
Grazing System	Custodial	See Meadow Creek AMP	--	--
Projects	None	Approximately 1.2 miles of fence would be removed between the Meadow Creek AMP and Meadow Creek Isolated allotments.	--	--
Administrative and Management Action	None	This allotment name would be eliminated because this allotment would be combined with the Meadow Creek AMP.	--	--
Muddy Creek #30039	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**
Season of Use	6/20 – 10/15	Same as alternative A	Same as alternative A	--
Livestock Number and Kind	350 Cattle	Same as alternative A	Same as alternative A	--
Active BLM AUMs	1154	Same as alternative A	1066	--
Grazing System	Rest Rotation	Same as alternative A	Same as alternative A	--
Projects	None	1. Improve stream crossings on Muddy Creek. 2. Redevelop Willow Spring in the Timber Butte pasture. 3. Clean-up Hidden pasture spring. *Contour pasture projects:* • Develop Lower Lou Gulch Spring on the	1. Conduct fence maintenance along the approximate 7 miles of fence that encloses the Contours pasture to eliminate livestock grazing on BLM administered lands within the pasture. 2. Clean-up and abandon the dysfunctional Wyatt Spring. This would	--

		south end of Contours pasture, T13s R10w section 28 and construct a larger spring exclosure ~0.2 miles, which will incorporate the small spring brook. ~250 feet of pipeline would extend from the spring box to the new trough. This pasture is rested every third year and grazed for only 9 days the other two years. • Clean-up and abandon the dysfunctional Wyatt Spring. This would remove ~0.2 miles of fence • ~0.5 miles of temporary fence would be constructed around reach #140 and #1414. • Explore ideas to rehab the uplands that have been contour plowed and seeded with hard fescue. Small plots would be identified for use of hand tools to prepare the soil for seeding with native sage grouse preferred forbs and grasses.	remove ~0.2 miles of fence. 3. Explore ideas to rehab the uplands that have been contour plowed and seeded with hard fescue. Small plots would be identified for use of hand tools to prepare the soil for seeding with native sage grouse preferred forbs and grasses. 4. Improve stream crossings on Muddy Creek. 5. Clean-up and abandon dysfunctional Hidden pasture spring.	
Administrative and Management Action	None	1. Since the last time this allotment was assessed Wilson pasture has been removed from the Muddy Creek allotment. 2. The grazing management would continue as a rest-rotation system allowing rest in each pasture every third year. The number of livestock authorized on this allotment would be up to 350 cow/calf pair and the grazing period would	1. The Contours Pasture would not be authorized for livestock grazing for the next 10 year grazing cycle. 2. Active AUMs within the Muddy Creek allotment would be reduced from 1154 to 1066. 3. The other nine pastures within the allotment would be managed the same as the no action alternative.	--

		remain June 20 – October 15. The permitted AUMs would remain 1154. 3. Little Water pasture would continue to be used for trailing cattle only. The trailing would consist of one day in the spring and one day in the fall.		
Pine Creek #30001	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**
Season of Use	6/16 – 7/11 9/25 – 10/15	6/16 – 7/11 9/25 – 11/1	6/16 – 6/29 9/25 – 10/15	--
Livestock Number and Kind	342 Cattle	342 Cattle (spr. rotation) 160 yearling (fall rotation)	300 Cattle	--
Active BLM AUMs	225 (spring) 182 (fall)	225 122	106 160	--
Grazing System	Rest Rotation	Same as Alternative A	Same as Alternative A	--
Projects	None	1. Up to 0.25 miles of new pipeline across BLM administered land off of the existing FS Pass Creek Spring development and a water trough would be installed on the Southeast corner of the BLM pasture to provide more water and therefore better cattle disbursement in this pasture. 2. Up to 10 acres of wetland restoration on the wet meadow Nicholia (Riparian Reach 1440). 3. Install culvert at the upstream end of Deadman Creek (Riparian Reach #123). 4. Remove culvert on the downstream end of Pine Creek (Reach #126).	1. BLM, FS, and permittee would construct an approximate 3.5 mile temporary electric fence around Pine Creek. This would create a riparian pasture. 2. Up to 0.25 miles of new pipeline across BLM administered land off of the existing FS Pass Creek Spring development and a water trough would be installed on the Southeast corner of the BLM pasture to provide more water and therefore better cattle disbursement in this pasture. 3. Up to 10 acres of wetland restoration on the wet meadow Nicholia (Riparian Reach 1440). 4. Install culvert at the upstream end of Deadman Creek (Riparian Reach #123). 5. Remove culvert on the downstream end of Pine Creek (Reach #126).	--
Administrative and Management	None	1. Implement an early, late, rest grazing system. 2. One out of every three	1. Implement an early, late, rest grazing system. 2. One out of every three	--

Action		years the BLM pasture would be rested. 3. Permitted AUMs on the BLM pasture would change from 407 to 347. 4. On years where late season grazing is scheduled, 160 yearling cattle would graze this pasture. 5. Late season use would be changed from 9/25 – 10/15 to 9/25 – 11/1 to provide more flexibility to the permittee. Grazing would be authorized for up to thirty days within this grazing period.	years the BLM pasture would be rested. 3. Permitted AUMs would change from 407 to 266. Total authorized grazing days would change from 47 days to 35 days. 4. Permitted number of cattle would change from 342 cattle to 300 cattle.	
Porcupine Canyon #20107	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**
Season of Use	6/15 – 8/31	6/15 – 8/17	6/15 – 7/26	No Grazing
Livestock Number and Kind	112 Cattle	100 Yearling Cattle	85 Yearling Cattle	0
Active BLM AUMs	247	181	101	0
Grazing System	Deferred Rotation	Rest Rotation	Rest Rotation	No Grazing
Projects	None	1. Create North Porcupine Riparian pasture by building a new 3-wire 1.4 mile fence to divide the current Porcupine Pasture. Fence would be built so that existing water troughs could be accessed from both North Porcupine Riparian and South Porcupine pastures. 2. If it is determined to be necessary an additional trough would be installed on the Island Butte spring for an additional water source. 3. Construct an exclosure fence around wetland #1460 and spring brook #746. This would consist of approximately 1.25 miles of new 4-wire fence and enclose approx. 25 acres.	1. Up to 6 acres of wetland restoration on Island Butte Wetland (Wetland 1460). 2. Install culvert on the road crossing over Porcupine Creek (between Reach #159 and Reach #161). 3. Remove old dysfunctional culvert on Island Butte Spring (Reach #126). 4. If it is determined to be necessary a short pipeline and trough would be installed off of the Island Butte spring for an additional water source. 5. Construct an exclosure fence around wetland #1460 and spring brook #746. This would consist of approximately 1.25 miles of new 4-wire fence	1. Construct approximately 1.25 miles of 4-wire fence on BLM/private boundary to effectively eliminate cattle from this allotment. 2. Maintenance on 4.5 miles of existing fence between BLM and private lands would need to be ongoing to effectively eliminate cattle from allotment. 3. Up to 6 acres of wetland restoration on Island Butte Wetland 4. Remove old dysfunctional culvert at the

		4. Consider installing a water gap in the new South Porcupine pasture if determined that existing water troughs are not sufficient. This water gap would be on Cabin Creek on private land and it would only be implemented if needed and with landowner consent. 5.Up to 6 acres of wetland restoration on Island Butte Wetland (Wetland 1460). 6. Install culvert on the road crossing over Porcupine Creek (between Reach #159 and Reach #161). 7. Remove old dysfunctional culvert on Island Butte Spring (Reach #746).	and enclose approx. 25 acres.	bottom of Island Butte Spring (Reach #746). 5. Install culvert on the road crossing over Porcupine Creek (between Reach #159 and Reach #161).
Administrative and Management Action	None	1. A new pasture would be created by building a fence that would separate the existing Porcupine Pasture. 2. Yearlong rest would be afforded the North Porcupine Riparian, South Porcupine, and the Island Butte pasture every third year. 3. The newly created North Porcupine Riparian pasture would be grazed 14 days on the years it is not rested. 4. Kind of authorized livestock would change from 112 cattle to 100 Yearling. Permitted AUMs would change from 247 to 181. Grazing period would change from 6/15 – 8/31 to 6/15 – 8/17.	1. Permitted AUMs would change from 247 to 101. Livestock number would change from 112 Cattle to 85 Yearling, and the grazing period would change from 6/15 – 8/31 to 6/15 – 7/26. 2. A rest-rotation grazing system would be implemented. Each of the three pastures would be completely rested once every third year.	1. The allotment would be rested from livestock grazing for the next 10 years. 2. Authorized AUMs would change from 247 to 0
Rio Puerco #10700	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**
Season of Use	5/1 – 12/31(shearing pen pasture)	7/1 – 10/1 7/1 10/1	--	--

	9/15 – 12/15			
Livestock Number and Kind	4 Horses (shearing pen pasture) 82 Cattle	100 cattle	--	--
Active BLM AUMs	32 222	32 275	--	--
Grazing System	Seasonal (no more than 30 days within listed season)	Deferred Rotation	--	--
Projects	None	1.Extend exclosure around reach # 149 to enclose reach #1491. This exclosure would meet up with private boundary fence and consist of ~0.2 miles of 4-wire fence. A hardened water gap would be built in to continue to allow cattle to access water. 2.If feasible and if the topography would allow, a water gap would be installed on Big Sheep Creek in the southeast portion of the allotment T14s R10w section 10. Up to .15 miles of fence would be constructed. This would create better cattle disbursement on the south end of the Muddy Creek pasture. 3.Install up to 1.5 miles of temporary electric fence to divide the west side of the allotment into 2 separate pastures. 4.If feasible install a well on the south end of the Shearing Pen pasture. 5. If feasible develop spring on the Northwest corner of the allotment in Rock Canyon. No new fence would be needed. Up to 300 feet of pipeline would be installed along with a spring box and new watering trough.	--	--
Administrative and	None	1. Grazing season would be changed from 9/15 –	--	--

Management Action		12/15 to 7/1 – 10/1 2. Implement a deferred grazing rotation. One year cattle would be turned out on the south end of the Muddy Creek pasture and by riding would be kept to this end for thirty days, and then pushed to the north end and held their by riding for another thirty days. The Red Dirt pasture would be a part of this deferred rotation. See table below 3. Increase number of permitted livestock from 82 cattle to 100 cattle 4. Increase permitted AUMs to 275. This would increase authorized AUMs by 53. 5. Change type of livestock in the Shearing Pen pasture from horses to cattle. Permitted AUMs would remain 32. Grazing period would be changed from 5/1 – 12/31 to 7/1 – 10/1 and could be grazed for up to 20 days within this grazing period. 6. If water was found in the Shearing Pen pasture, this pasture would create flexibility to rest one of the other three pastures.		
Rock Creek Isolated #20698	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**
Season of Use	6/15 – 11/30	4/15 – 6/30	No Grazing	--
Livestock Number and Kind	1 cattle	Same as alternative A	0	--
Active BLM AUMs	8	Same as alternative A	0	--
Grazing System	Custodial Use	Same as alternative A	No Grazing	--
Projects	None	If monitoring results do not show improvement along reach #133 a 0.3 mile Fence would be constructed with a hardened water gap	Construct approx. 0.3 miles of 4 wire fence to eliminate livestock grazing.	--

		installed.		
Administrative and Management Action	None	This custodial allotment would be grazed up to 30 days within the season of use.	No livestock grazing would be authorized for the next 10 years.	--
Simpson Creek FS #30207	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**
Season of Use	7/16 – 9/30	Same as alternative A	7/16 – 9/15	--
Livestock Number and Kind	130 Cattle	Same as alternative A	100 Cattle	--
Active BLM AUMs	135	Same as alternative A	84	--
Grazing System	Rest Rotation	Same as alternative A	Same as alternative A	--
Projects	None	1. Four wire, approximately 0.2 mile exclosure fence would be constructed around bottom portion of Coyote Creek reach #119 2. A riparian pasture would be created around reach #117 by building a 4-wire approximately 1.7 mile fence to enclose the stream. This pasture could be grazed up to 2 days every third year. 3. One mile of temporary polywire fence would be constructed around Crystal Creek reach # 170 if conditions don't improve in the next three years.	None	--
Administrative and Management Action	None	1. Decrease the number of grazing days in Coyote pasture by 14 days which would add 14 days to the Forest Service Morrison Lake pasture. The Coyote pasture would be grazed up to 25 days two out of three years. 2. Grazing rotation would continue as an early, late, rest system. Each pasture is afforded rest every third year. 3. Permitted AUMs would stay the same at 135. 4. On years when Simpson Creek pasture is grazed cattle would be herded and	1. Livestock numbers would be reduced to 100 Cattle and grazing period would change from 7/16 – 9/30 to 7/16 – 9/15. 2. Permitted AUMs would change from 135 to 84.	--

		pushed out of the north corner of the pasture. If herding efforts are unsuccessful in the Simpson Creek pasture, permittee would be prepared to come off early when Forest Service allowable use levels are met. 5. Continue to graze 130 cattle with a grazing period of 7/16 – 9/30 6. Allotment boundary and pasture boundary fencelines will be updated in our system to reflect correct placement.		

Table 2.16: Comparison of Non-Commercial Mechanical/Prescribed Fire Treatments by Alternative

	Alternative A Acres	**Alternative B Acres**	**Alternative C Acres**
Non-commercial Mechanical/Prescribed Fire	0	1319	2301

Table 2.17: Comparison of Travel Management Actions by Alternative

	Alternative A	**Alternatives B + C**
Change to Open	0	1.96
Change to Closed	0	2.6
Develop If Necessary	0	0.7
Re-route	0	0

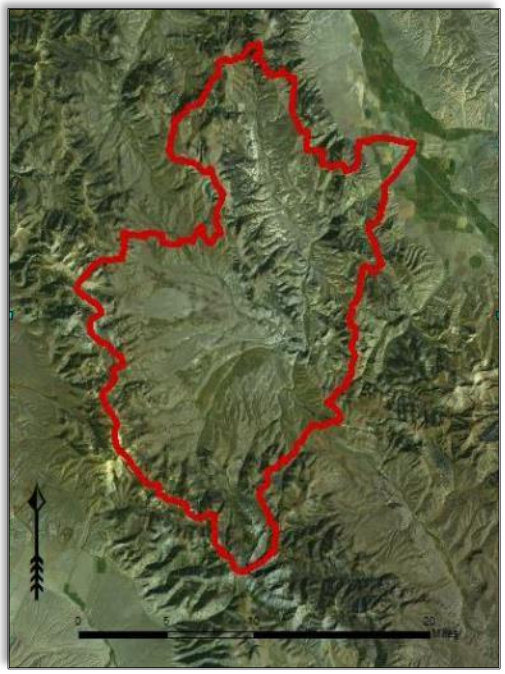
Chapter 3

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 Big Sheep Creek Watershed. 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 Big Sheep Creek Watershed Assessment Report (December 16, 2015), 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 BSCW is located in Beaverhead County, Montana and drains portions of the Tendoy and Beaverhead Mountain ranges. Elevations range from 6,000 feet at the mouth of Big Sheep Creek to nearly 11,000 feet on top of the Continental Divide near Italian Peak. The watershed lies within Townships 12-15 South and Ranges 9-12 West, Montana Principal Meridian (M.P.M.). (**See Map 1: Big Sheep Creek Vicinity Map and Allotments).**



Big Sheep Creek Watershed Boundary

The entire BSCW contains approximately 181,302 acres of BLM, private, State of Montana and Forest Service administered land. About 54,667 acres (30%) is public land administered by the BLM. With the exception of two allotments, only BLM administered land was physically assessed for this document. The Crystal Creek, Muddy Creek, Pine Creek and Simpson Creek FS Allotments are co-managed with the Forest Service through a Memorandum of Understanding. Therefore, 14,551 acres of Forest Service Lands were also assessed in these four allotments. Twenty-three grazing allotments contain about 51,165 acres of BLM administered land. An additional 3,502 acres of un-allotted public tracts are located within the watershed.

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 Big Sheep Creek watershed, from wetland and riparian species dependent on water and moist soils to sagebrush and grassland 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.

The Big Sheep Creek Assessment Area is dominated by structural complexity as the Medicine Lodge Thrust Plate, including a mélange of Precambrian, Paleozoic and Paleogene sediments were thrust eastward over younger sedimentary rocks. This complexity is enhanced by the presence of older Precambrian quartzofeldspathic gneiss and schist and Paleozoic granitic rocks of the Beaverhead pluton. The oldest rocks in the area, and some of the oldest rocks in Montana, are the Precambrian Archean schists and gneisses that appear to form the basal unit for the Medicine Lodge Thrust Plate (Ruppel et al. 1981). These Archean rocks date to over 2 billion years ago and are found in structural settings overlain by a variety of Paleozoic and Paleogene sediments and Paleogene volcanic rocks of the Challis and Medicine Lodge Volcanics. Virtually all the major contacts between the various sedimentary, intrusive igneous and metasedimentary rocks are fault contacts. The Challis and Medicine Lodge Volcanics are overlain on top of this mélange of lithologies. The most recent (Quaternary) deposits include hot springs deposits and various glacial deposits as well as landslides, alluvial fan and modern alluvial/floodplain deposits.

Perhaps the most notable feature of the Paleogene sedimentary units (TS on the map) is a strong tendency for mass wasting/landslide features which can be a critical factor in land use decisions. More detailed maps (Ruppel, 1998) show extensive areas of Quaternary landslides. The three MBMG Open File Reports referenced have more detailed maps which should be used in the event a project needs more detailed geologic input.

3.2 Description of Affected Key Issues/Resource Concerns

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 Big Sheep Creek Watershed that are expected to be achieved over the ten year life of the EA were described. The goals and objectives for riparian and wetland condition are described in the amended 2006 Dillon RMP. The goal is to initiate an upward trend in 20 years; the objective is to move resource conditions forward toward reaching Desired Future Conditions (DFC) in 20 to 50 years. Streams that are achieving Proper Functioning Condition (PFC) are not necessarily at DFC, however, PFC is a prerequisite to achieving desired condition (USDI 1998).

There is approximately 53 miles of stream in the BSCW, consisting of numerous smaller intermittent and perennial reaches in the higher elevations that feed the larger perennial streams down in the valley bottoms. Stream flow in the BSCW fluctuates annually and seasonally in response to precipitation in the form of rain and snow. The major streams (creeks) within the assessment area are Alkali, Big Sheep, Cabin, Deadman, Meadow, Muddy, Nicholia, and Simpson Creek. The vegetation community type along these streams is dominated by Geyer willow/beaked sedge with a few streams winding through open meadows consisting mostly of beaked sedge. Red-osier dogwood and water birch is found along the main reach of Big Sheep Creek and a few spruce habitat types are found mostly along steeper north facing aspects of small perennial reaches in the higher elevations.

Many streams within the BSCW have extensive wet meadows. The ID Team used the Lentic methodology for many of these streams. Sixty-five stream reaches, totaling approximately 53

miles, were assessed for functional condition. Forty two reaches, totaling 38 miles, were rated PFC. Eleven reaches, totaling 9 miles, were rated FAR with an upward trend. Ten reaches, totaling approximately 6 miles, were rated FAR with a static or no apparent trend. One reach, totaling 0.55 miles, rated FAR with a downward trend. One short reach (0.1 miles) was rated NF.

Riparian habitat along Coyote Creek.

Riparian/mesic shrubs make up 5% of the BLM administered lands in the BSCW. Riparian areas provide important habitat for moose, elk, beaver, songbirds, and sage grouse. Columbia spotted frogs and western toads were observed at different sites within the watershed. Columbia spotted frogs are the most common frog in mountainous regions of Montana and frequent wetlands in both forested and non-forested habitat. Adults overwinter in larger ponds and in extremely dry conditions they become inactive and burrow in the mud or under rocks (Werner et al., 2004). Riparian, aquatic, and wetland habitat offers habitat diversity and are crucial water sources for wildlife. Succulent forbs, largely found in riparian areas, are a key component of sage grouse brood diets. Wildlife and livestock concentrate in riparian habitat, as it provides green vegetation later into the summer and fall, resulting in a disproportionate amount of use in these areas.

Aspen in the BSCW is also an important forage, cover, and nesting component for various species including elk, moose, and ruffed grouse. Riparian woodlands support the highest diversity of landbird species of all habitats. Riparian corridors are crucial to several northern-breeding Neotropical migrants and breeding or wintering species, even though they may not carry water year-round (Rich et al., 2004). Most species are summer residents that use habitats ranging from lower elevation wetlands to high elevation forests for breeding and raising young. Some species are migratory, but small populations may stay yearlong depending on seasonal conditions.

Beaver play a keystone role in creating and maintaining riparian habitat and can have a profound effect on habitats that are essential to sustain the migrant songbirds as well as amphibian populations. Beavers have declined significantly region-wide, but both historic and active beaver dams were found on BLM administered lands across the watershed. Private lands also contain active beaver complexes in the BSCW. Historically, beaver populations were much higher as evidenced by the number and size of breached beaver dams within the watershed. Existing beaver colonies could provide beaver recruitment elsewhere into vacant streams and

into adjoining watersheds but suitable habitat to sustain long-term occupancy is generally lacking, with many aspen communities transitioned into willow dominated systems. The aspen is either no longer existent along these reaches, with the beaver having cut them all down, or colonies of mature aspen remain with little regeneration or heavy browsing reducing the vigor of the regeneration.

The percentage of total stream miles in each functional class is illustrated below.

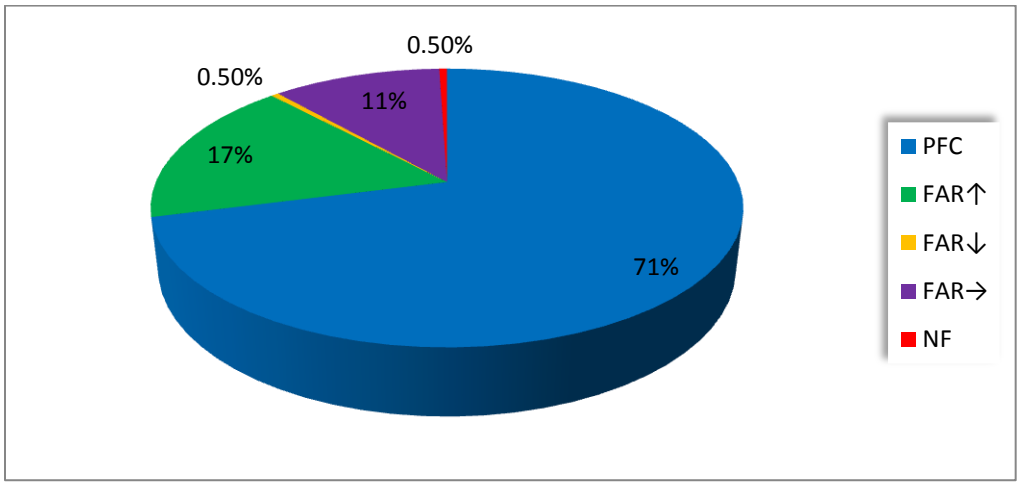


Figure 3.1: Percentage of Stream Miles Assessed by Functionality Calls

As mentioned in Chapter 1, The Authorized Officer determined that livestock grazing impacts are contributing to riparian standards not being met in four grazing allotments: Pine Creek, Porcupine Canyon, Simpson Creek FS, Rock Creek Isolated; and one pasture, Contours pasture, in the Muddy Creek allotment. Alternatives will also be analyzed for eight allotments (Crystal Creek, Indian Creek & Indian Creek Isolated, Junction, Dixon Mountain, Rio Puerco, Meadow Creek AMP & Meadow Creek Isolated) that met all of the Land Health Standards, but either had site-specific resource concerns or the permittee has proposed management changes to facilitate more efficient or effective use.

Table 3.1: Functional Status of Stream Reaches in the BSCW

Stream Name	Allotment	BLM Reach ID	Vegetative Community Type	Functional Rating & Trend*	Miles
Meadow Creek	Alkali Creek	130	Geyer willow/Beaked sedge	FAR↑	0.61
Meadow Creek	Alkali Creek	134	Geyer willow/Beaked sedge	FAR↑	0.92
Meadow Creek	Alkali Creek	131	Beaked sedge	PFC	0.52
Meadow Creek	Alkali Creek	132	Beaked sedge	PFC	0.31
Alkali Creek	Cabin Creek	1442	Beaked sedge	FAR↑	0.67
Cabin Creek	Crystal Creek	182	Beaked sedge	FAR→	1.9

Stream Name	Allotment	BLM Reach ID	Vegetative Community Type	Functional Rating & Trend*	Miles
Big Sheep Creek	Dixon Mountain	108	Geyer willow/Beaked sedge	PFC	2.85
Big Sheep Creek	Four Eyes	107	Geyer willow/Beaked sedge	PFC	1.4
Cabin Creek	Four Eyes	178	Shrubby cinquefoil	PFC	0.96
Big Sheep Creek	Four Eyes	105	Geyer willow/Beaked sedge	PFC	0.73
Deadman Creek	Four Eyes	122	Geyer willow/Beaked sedge	PFC	0.72
Big Sheep Creek	Four Eyes Isolated	106	Geyer willow/Beaked sedge	PFC	0.8
Simpson Creek	Indian Creek	169	Geyer willow/Beaked sedge	PFC	1.1
Sawlog Creek	Indian Creek	128	Geyer willow/Beaked sedge	PFC	0.6
Sawlog Creek Trib.	Indian Creek	1459	Geyer willow/Beaked sedge	FAR↑	0.5
Indian Creek	Indian Creek	127	Geyer willow/Beaked sedge	PFC	1.26
Simpson Creek Trib.	Indian Creek	168	Geyer willow/Beaked sedge	Upper FAR↑, Lower PFC	1.33
Simpson Creek	Indian Creek Isolated	167	Geyer willow/Beaked sedge	FAR↑	0.26
Tex Creek	Junction	174	Beaked sedge	FAR↑	1.11
Cabin Creek	Junction	179	Beaked sedge	FAR↑	1.09
Cabin Creek	Junction	181	Geyer willow/Beaked sedge	FAR↑	0.46
Cabin Creek	Junction	180	Geyer willow/Beaked sedge	FAR↑	0.30
Coyote Creek Trib.	Meadow Creek AMP	120	Geyer willow/Beaked sedge	PFC	0.5
Coyote Creek Trib.	Meadow Creek AMP	121	Geyer willow/Beaked sedge	PFC	0.1
Muddy Creek	Muddy Creek	145	Geyer willow/Beaked sedge	PFC	1.54
Muddy Trib.	Muddy Creek	139	Beaked Sedge	PFC	1.2
Muddy Trib.	Muddy Creek	177	Geyer willow/Beaked sedge	FAR↑	1.51
McNinch Creek	Muddy Creek	156	Geyer willow/Beaked sedge	PFC	1.36
McNinch Creek	Muddy Creek	154	Geyer willow/Beaked sedge	PFC	1.21
McNinch Trib.	Muddy Creek	1418	Spruce	PFC	0.45
McNinch Trib.	Muddy Creek	1417	Geyer willow/Beaked sedge	PFC	0.5
McNinch Trib.	Muddy Creek	1419	Geyer willow/Beaked sedge	PFC	0.52
McNinch Trib.	Muddy Creek	1420	Spruce	PFC	0.73

Stream Name	Allotment	BLM Reach ID	Vegetative Community Type	Functional Rating & Trend*	Miles
McNinch Trib.	Muddy Creek	155	Geyer willow/Beaked sedge	PFC	0.44
Muddy Creek Trib.	Muddy Creek	1415	Geyer willow/Beaked sedge	FAR→	0.54
Muddy Creek Trib.	Muddy Creek	138	Beaked sedge	PFC	0.92
Muddy Creek Trib.	Muddy Creek	1422	Beaked sedge	PFC	0.40
Muddy Creek Trib.	Muddy Creek	1423	Beaked sedge	PFC	0.32
Muddy Creek Trib.	Muddy Creek	1411	Geyer willow/Beaked sedge	FAR→	0.22
Muddy Creek Trib.	Muddy Creek	142	Geyer willow/Beaked sedge	FAR→	0.56
McKnight Creek	Muddy Creek	195 & 196	Spruce	PFC	0.89
Sourdough Creek	Muddy Creek	172	Geyer willow/Beaked sedge	PFC	1.52
Sourdough Trib.	Muddy Creek	1402	Geyer willow/Beaked sedge	PFC	1.2
Wilson Creek Trib.	Muddy Creek	1408	Geyer willow/Beaked sedge	PFC	0.35
Muddy Creek	Muddy Creek	157	Geyer willow/Beaked sedge	PFC	1.4
Muddy Creek	Muddy Creek	148	Beaked sedge	PFC	0.21
Meadow Creek	Nicholia	135	Geyer willow/Beaked sedge	PFC	0.35
Meadow Creek Trib.	Nicholia	136	Geyer willow/Beaked sedge	PFC	0.39
Deadman Creek	Pine Creek	123	Geyer willow/Beaked sedge	PFC	1.0
Pine Creek	Pine Creek	126	Geyer willow/Beaked sedge	FAR→	0.43
Big Sheep Creek Trib.	Pine Creek	158	Geyer willow/Beaked sedge	FAR→	0.55
Porcupine Creek	Porcupine Canyon	161	Geyer willow/Beaked sedge	FAR→	0.6
Porcupine Creek	Porcupine Canyon	159 & 160	Geyer willow/Beaked sedge	FAR→	1.56
Cabin Creek spring brook	Porcupine Canyon	746	Geyer willow/Beaked sedge	NF	0.1
Muddy Creek	Rio Puerco	1491	Beaked sedge	PFC	0.19
Muddy Creek	Rio Puerco	1433	Beaked sedge	PFC	0.10
Muddy Creek	Rio Puerco	149	Beaked sedge	PFC	0.68
Meadow Creek	Rock Creek Isolated	133	Beaked sedge	FAR→	0.3
Coyote Creek	Simpson Creek FS	118 & 119	Geyer willow/Beaked sedge	FAR→	0.44

Stream Name	Allotment	BLM Reach ID	Vegetative Community Type	Functional Rating & Trend*	Miles
Coyote Trib.	Simpson Creek FS	117	Geyer willow/Beaked sedge	FAR↓	0.55
Crystal Creek	Simpson Creek FS	170	Geyer willow/Beaked sedge	FAR→	0.51
Tex Creek	Simpson Creek FS	175	Geyer willow/Beaked sedge	PFC	0.63
Alkali Creek	Simpson Creek	100	Beaked sedge	PFC	2.3
Big Sheep Creek	Unalloted	109	Douglas fir/Red osier dogwood	PFC	2.32
Big Sheep Creek	Unalloted	104	Geyer willow/Beaked sedge	PFC	1.3
Total stream miles					**53.29**

Where streams were not 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, roads and road crossings and irrigation ditches and diversions were the most frequently observed causal factors.

Stream morphology (channel shape and dimensions, including width and depth, and gradient) and bed materials provide important information to determine a stream's function. Critical shear stress must be achieved before a stream channel is capable of reshaping and maintaining itself. Stream power is reduced as a channel becomes wider. With reductions in critical shear stress and stream power, the ability of a stream to maintain riffles and pools and move channel materials is diminished. As these reductions continue, sediments often accumulate which force the stream to widen even more (TR1737-15 2015). The BLM's regulations require streams to have the ability to maintain stable dimensions, patterns and profiles.

Forty-three lentic (wetland) areas totaling roughly 523 acres were also assessed in the BSCW. Of the 43 lentic areas assessed, 32 totaling roughly 152 acres, were rated PFC. Four lentic areas, totaling nearly 311 acres, rated FAR with an upward trend. Approximately 89% of the acres were PFC or FAR with an upward trend. Six lentic areas, totaling approximately 55 acres, were rated FAR with a static or no apparent trend. One lentic area was rated FAR with a downward trend. Zero lentic areas, rated NF.

Frequently observed wetland impacts which resulted in departures from PFC, included: hummocking and soil compaction which lead to drying and alterations to hydrology as well as loss of the 'sponge.' Reduction in species diversity and composition, reduced vegetative cover, limited vegetative species recruitment and regeneration, reduced structural diversity, and/or decreased vigor of wetland vegetation were also observed. Generally, ungulate grazing and browsing was the most frequently observed causal factor.

The percentage of total wetland acres in each functional class is illustrated below.

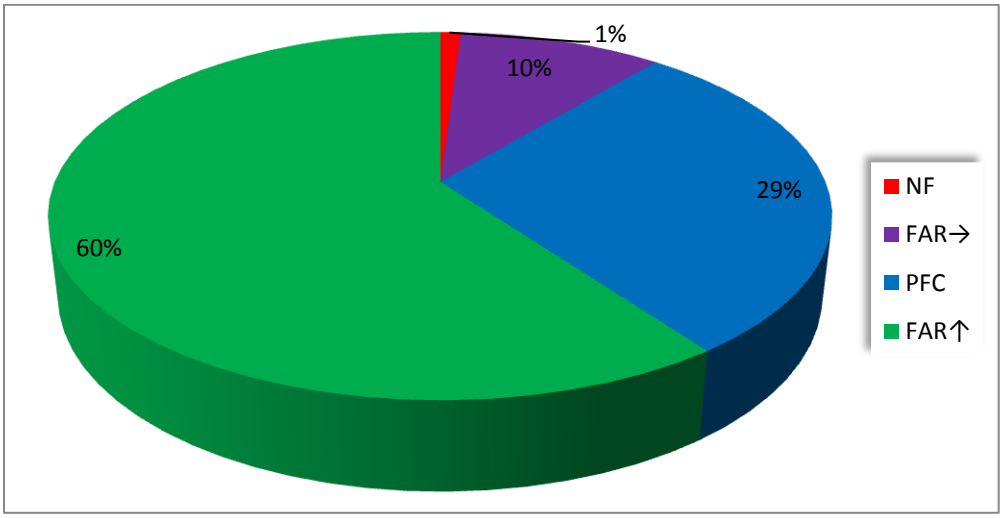


Figure 3.2: Functional Condition, by proportion of acres, for lentic areas within the Big Sheep Creek Watershed

Table 3.2: Wetland Functional Calls by Allotment

Allotment	Wetland Number	Functional Call	Wetland Acres
Crystal Creek	1450	PFC	41.2
Indian Creek	1453	PFC	2.2
Indian Creek	1452	PFC	9.43
Indian Creek	1456	PFC	0.36
Indian Creek	1477	FAR→	2.19
Junction	1447	FAR↑	200
Junction	1443	FAR↑	90
Muddy Creek	191	PFC	6.87
Muddy Creek	1431	PFC	1.93
Muddy Creek	1429	PFC	1.67
Muddy Creek	1431	PFC	1.93
Muddy Creek	1429	PFC	1.67
Muddy Creek	1425	PFC	2.34
Muddy Creek	191	PFC	2
Muddy Creek	192	PFC	1.5
Muddy Creek	186	PFC	5.92
Muddy Creek	1409	PFC	0.69
Muddy Creek	1414	FAR→	0.87
Muddy Creek	1410	PFC	1
Muddy Creek	1416	PFC	2.3
Muddy Creek	138	PFC	1
Muddy Creek	139	PFC	1.2
Muddy Creek	140	FAR→	2.92
Muddy Creek	187	FAR↑	3.34
Muddy Creek	184	PFC	10.64
Muddy Creek	188	FAR↑	17.26
Muddy Creek	1427	PFC	2.15
Muddy Creek	1421	Spring Source PFC,	2.44-PFC

		Brook NF	1.5-NF
Muddy Creek	141	PFC	3.1
Muddy Creek	185	PFC	6.4
Muddy Creek	1407	PFC	0.67
Pine Creek	1490	PFC	12.2
Pine Creek	1440	PFC	11.28
Porcupine Canyon	1464	FAR→	2.66
Porcupine Canyon	163	FAR→	4
Porcupine Canyon	1460	FAR↓	6
Porcupine Canyon	1463	FAR→	42
Rio Puerco	152	PFC	3.01
Rock Creek Seeding	1441	PFC	1
Simpson Creek FS	1446	PFC	3.61
Simpson Creek FS	1445	PFC	.81
Simpson Creek FS	166	PFC	7.27
		TOTAL ACRES	**522.53 acres**

Allotments in which the majority of the riparian and wetland resources rated as PFC or FAR with and upward trend and met the riparian health standard are not discussed in this section, but information on these resources is available upon request. Additional stream reach specific data for any of the riparian/wetland areas in the BSCW is available at the Dillon Field Office. Four allotments, Pine Creek, Porcupine Canyon, Simpson Creek FS, Rock Creek Isolated and the Contours pasture of the Muddy Creek allotment did not meet the riparian/wetland health standard and are discussed in more detail below.

Pine Creek

There are roughly two stream miles and 23 acres of wetlands in the Pine Creek allotment. Fifty percent of the stream miles (Deadman Creek) rated PFC and 50 percent (Pine Creek and a tributary of Big Sheep Creek) rated FAR-Static. Streams were overwidened resulting in reduced shear stress and a reduction in the streams ability to transport its bedload and maintain dimensions, patterns, and profiles within natural ranges of variability. Livestock impacts were a causal factor resulting in the FAR-Static calls. Wetlands were given a low PFC rating with some concerns of drying on the fringes, also resulting from livestock impacts.

Pine Creek #126

Porcupine Canyon

There are roughly two stream miles (Porcupine Creek) and 55 acres of wetland resources in the Porcupine Canyon Allotment. These include three reaches and four wetlands. Two reaches rated FAR-Static and one short spring brook rated NF. Three wetlands totaling 49 acres were

also FAR-Static. One wetland totaling 6 acres was rated FAR↓. Livestock grazing is the causal factor.

Simpson Creek FS

Simpson Creek FS has four reaches totaling approximately two miles and two wetlands totaling approximately four acres. One of the reaches, Tex Creek (0.6 miles) rated PFC. Crystal Creek, 0.5 miles was rated FAR. The trend was not apparent. Coyote Creek and a tributary rated FAR-Static (0.4 miles) and FAR Down (0.5). As with Pine Creek and Porcupine Canyon, these ratings were the result of grazing impacts.

Tex Creek #175

Rock Creek Isolated

Rock Creek Isolated is a custodial allotment with only 14 acres of BLM administered land. There is a small section, 0.3 miles of Meadow Creek that flows through this isolated allotment. This reach rated FAR-Static.

Contours Pasture of Muddy Creek

Contours pasture has one reach totaling approximately 0.4 miles which is PFC, and one spring brook totaling 1.5 acres that was rated non-functioning. The spring source associated with the brook is fenced off and rated PFC. There are four lentic wetland areas that total approximately 6.94 acres. Two lentic areas totaling 3.15 acres rated PFC, and two rated FAR-static, totaling 3.79 acres.

Developed Springs

The BLM's Rangeland Improvement Project System (RIPS) database shows 25 spring developments in the BSCW. BLM staff visited most of these developments to determine resource condition, condition of infrastructure, and water production (flow). Table 7 lists the spring developments on BLM administered land in the watershed.

Table 3.3: Developed Springs

Spring Name	Project Number	Allotment
Elk Track Spring	000804	Indian Creek
Dixon Mountain Spring	470759	Dixon Mountain
Eagle Spring	470593	Dixon Mountain
Kelner Spring	000795	Indian Creek
Burnt Log Spring	476623	Muddy Creek
Contours West Spring	470691	Muddy Creek
Elk Pocket Spring	476625	Muddy Creek
Hidden Pasture Spring*	470093	Muddy Creek

Spring Name	Project Number	Allotment
Hidden Pasture Spring*	476625	Muddy Creek
Little Water Spring	470391	Muddy Creek
Little Water West Spring	476648	Muddy Creek
Lou Creek Spring	476663	Muddy Creek
Muddy Creek Spring 2/North Contours	470692	Muddy Creek
North 49 Spring	477390	Muddy Creek
Red Dirt Spring	476424	Muddy Creek
Rufous Spring	477288	Muddy Creek
Willow Spring	470088	Muddy Creek
Wyatt Spring	470087	Muddy Creek
Sweeney Spring	470398	Pine Creek
Island Butte Spring	002423	Porcupine Canyon
Carr Spring	470105	Rio Puerco
Y A Bar Spring	470556	Rio Puerco
Caboose Spring	476522	Whitworth
Patterson Spring	002421	Whitworth
Whitworth Spring	476261	Whitworth

*Note there are two springs named Hidden Pasture Spring.

Maintenance of water developments was a noted concern on several developments 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 can negatively impact wetland hydrology and do not help attain 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. Though not related to maintenance per se, troughs may present wildlife hazards and escape ramps help mitigate the hazard. Properly maintained water developments are considered Best Management Practices for riparian resources. The BLM must report on BMP effectiveness as part of our participation in Montana's Nonpoint Source Management Strategy. Permittee partnership and cooperation is critical to achieve these goals.

Fish Habitat

Fishery habitat conditions on streams within the BSCW are generally in good condition. Several streams have localized issues caused by livestock and/or roads. In many cases, streams were surveyed multiple times over the last 10 years to address data gaps in past fishery related surveys. These include evaluating WCT genetic purity, assessing suitability for WCT restoration and monitoring general fishery habitat condition.

Table 3.4: Fisheries Streams and Fish Species Present on BLM

Stream	Stream Reach (s)	Fish Species Present on BLM	BLM Stream miles
Big Sheep Creek	107,106, 104,105,1438 108,109,1434,	Rainbow, brown, brook and cutthroat trout, whitefish, mottled sculpin, longnose dace, mountain and white sucker	9.4
Meadow Creek	135	WCT, mottled sculpin	.35
Rock Creek	1441	Hybridized cutthroat trout, mottled sculpin	<0.10
Simpson Creek	169	WCT, mottled sculpin	1.1
Deadman Creek	122,123,126	WCT, mottled sculpin, cutthroat trout hybrids, rainbow, brown and brook trout	1.72
Muddy Creek	1491,149, 157,145,154	WCT, mottled sculpin	3.81
Tex Creek*	120	Species undetermined-2016 survey planned	.63
Indian Creek	168	Rainbow trout hybrids	1.26

During the 2015 BSCW assessment, "trout" were observed in relative abundance above the road while assessing Tex Creek. Prior fishery surveys in 1993 and 2002 did not document a fish population within the stream. A 2016 fish survey is planned to identify species present, abundance and distribution.

3.2.2 Issue #2: Upland and Sagebrush Steppe Habitat

Uplands are defined as land at a higher elevation than the alluvial plain or low stream terrace; all lands outside the riparian-wetland and aquatic zones (USDI 1996). Properly Functioning Condition (PFC) for uplands is defined as the condition in which vegetation and ground cover maintain soil conditions that can sustain natural biotic communities. The functioning condition of uplands is influenced by geomorphic features, soil, water, and vegetation (USDI 1994).

The Big Sheep Creek Watershed is extensive and encompasses several major drainages and their associated tributaries including: Muddy Creek, Cabin Creek, Nicholia Creek, and Big Sheep Creek itself. Soils in the BSCW are primarily affected by climate (temperature and precipitation), topography (slope and aspect), and parent material (geology and geomorphology). The soils in the BSCW are in the Frigid (generally below 6,600 feet elevation) and Cryic (generally above 6,600 feet elevation) soil temperature regimes. Lands administered by

Beaverhead Mountains/Continental Divide on west side of the Big Sheep Creek watershed. Glacial moraine landforms extending out into the valley.

BLM within the BSCW receive about 12 to 30 inches of Relative Effective Annual Precipitation, commonly referred to as REAP, and fall into the Aridic (driest), Ustic, and Udic (wettest) soil moisture regimes; most BLM administered land in the BSCW falls into the Cryic soil temperature and Ustic (15 to 24 inch REAP) soil moisture regimes and have a 50 to 90 day growing season. Within the BSCW boundary, elevations range from about 6,000 feet at Dell, to almost 11,000 feet at the head of the Nicholia watershed. The soils within the BSCW in general formed from alluvium, slope alluvium, colluvium, residuum, and glacial till mainly from quartzite, limestone, sandstone, other sedimentary & metamorphic rock, conglomerate, and some igneous rock sources including volcanic ash. Soil depth and development is quite variable throughout the BSCW and is tied more specifically to parent materials, landform, position, slope steepness and slope shape.

The Cabin Creek and Nicholia Creek watersheds are rimmed and bound by the Continental Divide to the west and south respectively. Steep and very steep mountain slopes with skeletal soils, rock outcrop, and rubbleland define this rugged area. Broadly spreading below these mountain slopes, glacial till is most pronounced on the west side of the Cabin Creek drainage and well up into the Nicholia Creek watershed and is evidenced by a series of moraine landforms extending out into the valley. A wide variety of rock types influence the parent material origin of the till. Surface textures associated with this till material vary, but lie predominately within the sandy loam to loam textural classes. Due to the large amount of fragments inherent to glacial till, gravelly to extremely stony soil surface classes are common. The moraines eventually give way to hills, low hills, and alluvial fan remnants composed of uplifted sedimentary beds that run parallel to the main drainageways. The beds themselves are composed of calcareous sediments (siltstone, mudstone, shales, and a minor component of sandstone), as well as weathered, mostly calcareous, conglomerate. Soil depth within the glacial till is almost all very deep, with the sedimentary beds showing a mix of shallow to very deep, due to the bedrock expression near the soil surface in some areas. Minor components of salt and sodium affected soils also occur in these drainage areas. A majority of the soils here are very deep, range widely in texture, and are mostly gently sloping.

Muddy Creek is also rimmed by steep and very steep, rocky, mountain slopes that formed in a variety of parent materials including limestone, sandstone, quartzite, volcanic ash, andesite, rhyolite, and complex landslide deposits. The soils range widely in depth and texture but include significant areas of heavy clay, fine textured soils. Below these mountain slopes, the Muddy Creek landforms are composed of more highly weathered and calcareous sedimentary parent materials. Landforms include mountain slopes, hills, and fan remnants; soil depths range from shallow to very deep, and soil textures include more loamy and loamy-skeletal families. Muddy Creek also has a small component of salt and sodium affected soils that are associated with the drainageways and can usually be identified by the salt tolerant vegetation. Soil surface textures existing within these landforms are generally loam and silt loam to clay loam and silty clay loam. Extensive areas of limestone dominated geology and soils occur within several locations of the BSCW and exhibit silt loam to loam surface textures. They mostly occur in the Muddy Creek and Big Sheep Creek areas and exist on the steeper mountain slope, escarpment and hillslope landforms. Calcium carbonate levels high enough to affect plant growth are restricted mainly to convex and linear/convex landform positions.

The canyon portions of BSCW are dramatic and dominated by sedimentary and metamorphic parent materials including: limestone, sandstone, and quartzite. These areas have significant rock outcrop, rubbleland, and shallow soils as well as deeper colluvial soil deposits. Slopes are predominately steep to very steep and surface rock fragments are commonly more than 50 percent. The dominant landforms along the drainageways throughout the BSCW include: flood plains, flood plain steppes, and stream terraces. Soils formed within the flood plain and flood plain steppe landforms are generally very poorly to poorly drained with widely variable soil textures; sandy-skeletal substratum underlays a significant portion of these soils and is indicative of the variable alluvial parent material deposition through time. Ecosites within the drainageway include Riparian Wet Meadow within the very poorly drained flood plain and Wet Meadow or Riparian Subirrigated which are generally restricted to the flood plain steppe and lower stream terrace landforms and reflect poorly drained to somewhat poorly drained soil drainage classes.

Within the watershed as a whole, slopes range from nearly level and undulating (1 to 8 percent), rolling and hilly (8 to 30 percent), to steep and very steep (25 to more than 45 percent). Soil properties include sandy loam, loam, and clay loam soil surface textures; 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 relative amount of lime or calcium carbonate within the rooting zone, as measured by observable effervescence with hydrochloric acid, ranges from none to more than 40 percent; salinity and sodicity (alkalinity) occur within the assessment area to a minor extent; rock fragments, both on the soil surface and within the soil profile, range from none to more than 65 percent.

Soil classifications and ecological sites within the assessment area reflect these soil physical and chemical properties and associated variables. The main soil Orders encountered within the assessment area include: Alfisols, Entisols, Inceptisols, and Mollisols. Major Ecological Sites associated within the upland areas include: Very Shallow, Shallow, Shallow Limy Droughty, Limy Droughty, Droughty, Droughty Steep, Clayey, Saline Upland, Loamy Steep, and Loamy; within the riparian areas the major Ecological Sites include: Wet Meadow, Riparian Wet Meadow, Riparian Subirrigated, Subirrigated, Saline Subirrigated, and Overflow.

Some unique soil and landform features of the BSCW include: glacial moraines (Cabin Creek & Nicholia Creek), small areas of organic soils associated with very poorly drained conditions & perched water tables mostly west side of Cabin Creek, minor components of salt and sodium affected soils with associated salt tolerant vegetation (found throughout BSCW usually in the lowest parts of drainageways), cliffs & solution overhangs in the limestone geology mostly around the Big Sheep canyon area, other very steep areas of rock outcrops and rubble land in early stages of soil formation, and alpine tundra at the highest elevations along the Continental divide.

As is the case across all landscapes, the upland plant composition in the BSCW is dynamic as the result of ecological succession. The natural progression from early seral stage plant communities towards a climax plant community is inevitable without disturbance. The spread of primarily Douglas-fir can be attributed, in part, to the reduced frequency of wildfire which has changed the dominant plant species and habitat types on some of the BLM administered lands in the BSCW.

Sagebrush and grassland areas are considered uplands for purposes of this report. According to satellite imagery, 83% of the watershed is classified as sagebrush-steppe and grassland uplands (81% sagebrush, 2% grasslands). Forest and woodland habitats are discussed under Standard #5 Biodiversity.

Most of the watershed's BLM administered uplands are dominated by either forests (10%) or sagebrush (81%), including mountain big sagebrush, Wyoming big sagebrush, basin big sagebrush, black, low, alkali, silver and three-tip sagebrush. Winterfat and Gardner's saltbush are also found on many alkaline sites in the watershed. Grasslands make up 2% of the public land acreage. Some of the prominent herbaceous species included in the grasslands are bluebunch wheatgrass, bearded wheatgrass, western wheatgrass, green needlegrass, Sandberg's bluegrass, prairie junegrass, and Idaho fescue. Rubber rabbitbrush, green rabbitbrush, fringed sagewort, and gray horsebrush are common native shrubs found on numerous ecological sites throughout the watershed, they are included in the sagebrush/mountain shrub category in table 1 above. If any of these shrubs have greater than 5% canopy cover on a site, it usually indicates that site has been subject to some kind of past disturbance.

The mountain big sagebrush/Idaho fescue plant association is the most extensive upland plant community type within the watershed. Less common is the three-tip sagebrush/Idaho fescue community type which generally occupies a drier site than the mountain big sagebrush/Idaho fescue plant community. Since mountain big sagebrush is killed by fire, and three-tip sage resprouts after a fire, fire history may play a role in determining the distribution of these two plant communities across the landscape. Data collected in 2014 indicate that mountain big sagebrush has increased slightly in the watershed since the 1970s, when the studies were established.

The uplands on 23 of the 23 allotments of the BLM-administered uplands in the BSCW assessment area were found to be functioning properly under existing management. The Muddy Creek allotment which consists of 24,288 acres met the upland standard as a whole however; one pasture out of the nine pastures that are part of the grazing rotation did not meet the upland standard. Contours pasture is approximately 1,850 acres of BLM administered land. Livestock grazing was not a causal factor of this upland standard not being met. Contours pasture was contour plowed back in the 1960s and then seeded with hard fescue. Hard fescue (*Festuca brevipila*) has very low palatability for livestock and wildlife and therefore has out-competed almost all other species in the Contours pasture, creating a monoculture of hard fescue.

3.2.3 Resource Concern #1: Recreation and Travel Management

Recreation uses in the Big Sheep Creek watershed are dominated by the big game hunting season in the mountainous areas, and the fishing season along Big Sheep Creek. Recreational visitation in the Deadwood Gulch campground is estimated at nearly 5,000 visits in 2014, and the total recreation visitation in the Big Sheep Creek area at over 44,000 visits. The highest use periods for camping at Deadwood Gulch campground coincide with the fishing season from May 1 – July 15 and hunting season from approximately mid-September through December 1. The Big Sheep Creek Back Country Byway is also considered to generate a small amount of additional recreational use of the area for recreationists driving for pleasure as well as camping, OHV use, wildlife viewing, bicycling, etc. Other legitimate forms of recreational activities include:

hunting, fishing, hiking, horseback riding, photography, and various types of motorized recreation (i.e. ATV, motorcycle, and 4wd along designated routes in the area.)

There is also substantial illegitimate recreational use within this watershed in the form of motorized vehicle use off of designated open routes, primarily during the big game hunting season. This is a growing concern throughout southwest Montana for all agencies involved in travel management (USFS, DNRC, FWP, etc.). The off-route use during the 2015 hunting season was reportedly worse than ever due in part, perhaps to a special big horn sheep hunting season which was intended to eradicate the remnant population of a diseased big horn sheep herd. This bighorn sheep season attracted hunters from far and wide, and the season lasted well into the deer and elk rifle hunting season. Public and landowner complaints regarding off-road travel in this area was at an all-time high during this past hunting season.

There are also issues periodically with public recreational access to the Morrison Lake area on the US Forest Service up Indian Creek where the private landowners sometimes post their private land, denying public recreational access beyond the county road up Indian Creek. In the past, the private property signs are taken down after a short time and public access is allowed to resume as it has historically. There is a possibility that, at some point, the landowners could post and deny access, at least until the issue is resolved through the courts.

3.2.4 Resource Concern #2: Special Status Species Habitat

Fish

Overall, riparian habitat condition on surveyed streams was in good condition, with stable banks and low levels of bank disturbance. Within the assessment area sediment levels in some streams was an identified concern. Most of this is likely natural, and due to either high levels of clay and fines present in the soil, as is the case in Muddy Creek or as in Simpson Creek, an old beaver complex a short distance upstream of the habitat survey area was identified as the source of elevated sediment within the survey reach.

WCT habitat surveys were conducted on BLM administered lands within the BSCW during the 2012, 2013 and 2014 field seasons. Surveys were conducted on random 500 foot reaches on selected streams. Habitat was identified to type (pool, riffle, run) with habitat length, width and residual pool depth measurements taken. Stream substrate data was collected using a 500 point "zig zag" pebble count method within riffle habitats within each reach.

Several studies have indicated that cutthroat trout reproduction can be impacted by low levels of fine sediment (Ringler and Hall 1975; Irving and Bjornn 1984; Weaver and Fraley 1991; Horan et al. 2000; Bjornn et. Al 1977). These studies found that as the percentage of fine sediment exceeds 20% to 30% in spawning riffles, salmonid reproduction begins to decline. Bryce, et al. (2010) evaluated fine sediment impacts on fish and macro-invertebrates and found that sediment impacts begin at 13% for fish and 10% for macro-invertebrates. As indicated in table 15 below, sediment levels in some surveyed streams are higher than optimum. With the sediment levels observed, it is probable that salmonid spawning success and pool quality is being impacted.

Using baselines identified in the "Beaverhead Sediment Total Maximum Daily Loads and Framework Water Quality Protection Plan" (Montana DEQ. 2012), streams < 15 foot wetted width would be expected to have a minimum of ≥ 90 pools per stream mile while streams 15-30 feet bankfull width would be expected to have ≥ 52. Residual pool depth would be expected to be approximately 10 inches and % fines (<6mm) would be expected to be between 10% and 30% depending on stream gradient and channel type. Steeper gradient "B" channels would be expected to have slightly more or less than 10% fines < 6mm while lower gradient "E" type channels are expected to have up to 30% fines < 6mm. Stream size and gradient will affect pool number, residual depth and the percentage of fine sediment present. Generally, as stream size decreases pool frequency increases and pool depth decreases. Using the data in Table 15 below, the surveyed streams are likely within the natural range of variability expected based on stream size with the exception of elevated sediment levels in Muddy and Simpson Creeks. The elevated sediment levels are likely inhibiting pool frequency and quality in these streams, especially in the lower reach of Muddy Creek.

Table 3.5: Pool Frequency, Depth and % Fines

Stream	Primary Channel Type	Average Stream width (feet)	Pool Frequency (per mile)	Residual Pool Depth (inches)	% Fines (<6mm)	Riparian Habitat Condition 2015
Meadow Creek	B/E	4.6	139	8.6	20	PFC
Simpson Creek	B/E	3.5	174	8	37	PFC
Muddy Creek-lower reach	E	4.6	70	7	90	PFC
Muddy Creek-upper reach	E	3.25	139	12.75	44	PFC

Throughout the west, the threat of 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 2012 on selected streams to track potential changes in summer stream temperatures. Data collected to date shows that both average and summer peak temperatures have remained relatively consistent since temperature monitoring began (see Table 16 below). However, several streams have shown an increase in the number of days where water temperatures reached or exceeded 60 degrees. In most cases this can likely be attributed to variations in summer temperatures. With only a few years of temperature data, it's difficult to say whether this is normal climatic fluctuation or the beginnings of a long term trend. In most cases where temperatures reached or exceeded 60 degrees F, it was for short periods of a few hours during the day with temperatures in most streams dropping back into the 40 or 50 degree range overnight. However in the case of Big Sheep Creek, it would appear that the high stream temperatures within the drainage may be the natural norm rather than the exception. The landscape setting in

the big sheep drainage is likely a strong contributor to the elevated temperatures. The drainage is located in a confined, rocky, low elevation valley. This likely does not allow release of the days thermal input very rapidly. The thermograph data shows that generally the summer nighttime lows were usually in the mid 50 degree range spiking back into the 70s by mid-morning.

Table 3.6: Big Sheep Creek Watershed Stream Temperature Data

Stream/Year	Avg. temperature 6/1-9/1	Peak temperature 6/1-9/1
Meadow Creek 2012	47.5	58.7
Meadow Creek 2014	48.5	60.6
Meadow Creek 2015	47.5	58.1
avg	***47.8***	***59.1***
Simpson Creek 2013	51.6	68.7
Simpson Creek 2015	48.8	60
avg	***50.2***	***64.35***
Big Sheep Creek 2013	51.5	68.7
Big Sheep Creek 2014	58.8	72.7
Big Sheep Creek 2015	59.5	72.9
avg	***56.6***	***71.4***
Muddy Creek 2011	54.3	64.1
Muddy Creek 2013	54.2	69.3
Muddy Creek 2014	53.6	68.8
Muddy Creek 2015	57.5	72.3
avg	***54.9***	***68.6***
Deadman Creek 2015	55.9	71.7
avg	***55.9***	***71.7***

Meadow Creek

Meadow Creek supports one of two genetically pure WCT populations remaining within the watershed. A 2010 population estimate conducted on BLM land found ~14 WCT per 100 feet of stream in one reach and ~2 WCT/100' in a reach on the lower end of BLM. Heavy vegetation and high flow was noted as likely impacting collection efficiency in the lower reach and WCT numbers were assuredly higher than the estimate indicates. WCT were found to be distributed in about 5 miles of habitat within the drainage.

A habitat survey was conducted within the BLM reach in 2014. Habitat conditions were found to be in very good condition. Stream bed substrate was primarily comprised of gravels and small cobble. Substrate fines were found to be ~20%, which is within the normal range expected for the channel type. Stream banks were found to be stable and well vegetated and comprised primarily of willow with scattered sedge and herbaceous vegetation. Spawning habitat was present throughout most of the BLM stream length.

Simpson Creek

Simpson Creek supports one of two genetically pure WCT populations remaining within the watershed. The drainage supports a relatively large population of WCT in relation to stream

size. A 2014 population estimate conducted on BLM administered land found ~ 13 WCT per 100 feet of stream and WCT were distributed through about 5 miles of habitat.

Habitat surveys were conducted on BLM administered land in 2014, with conditions found to be in good condition overall. Fine sediment was found to be at elevated levels (~ 37%), but can be primarily linked to a degrading beaver complex in close proximity upstream of the survey area. Stream banks were overall found to be stable and well vegetated. The vegetative community was comprised primarily of willow and sedges with scattered herbaceous vegetation. High quality spawning gravels were found to be present in several areas upstream of the beaver complex.

Muddy Creek

Muddy Creek supports a population of slightly hybridized WCT (98%) and a large population of mottled sculpin in approximately nine miles of stream. A population estimate was attempted in 2010 and again in 2015. Due to the very low shocking efficiency related to water chemistry, the estimates are low quality. The 2010 estimate found very low numbers (<0.3 WCT/300') of large adult WCT in the lower reach. A survey/genetic collection in a reach near the headwaters found fair numbers with multiple age classes present. The 2015 survey collected no WCT in a 300'reach in the lower drainage, but found sculpin to be abundant. An additional population survey was conducted within the area of the 2010 genetic collection and found low numbers of WCT (~4.5 WCT/300' of stream). During 2015 the Muddy Creek drainage was experiencing low flows and high stream temperatures. These conditions may have forced WCT to seek refuge in cooler tributary habitat upstream of the stream reaches surveyed.

Between 2007 and 2011, a non-native brown trout removal was conducted within the drainage that removed approximately 200 brown trout. No brown trout were collected during the 2015 surveys. This may indicate successful eradication or that brown trout numbers have been suppressed to levels where odds of detection are low.

Fish habitat surveys were conducted in two portions of the drainage in 2014, one in the lower portion and one in the upper portion of the drainage. Stream bank conditions in both were found to be in good condition with heavily vegetated banks consisting primarily of rushes and sedges. Sediment levels throughout the drainage were found to be very high. Within the lower reach substrate surveys found fine levels of around 90%. Fines within the upper basin were much lower at around 44%, but still excessive even for a low gradient E channel such as Muddy Creek. Overall, this is primarily related to a naturally high level of sediment within the system. The parent material within the basin contains high levels of clays and fines (rhyolite soil). However, there are several areas of anthropogenic sediment sources which are contributing sediment. There are three primitive road crossings that at times are contributing additional sediment to the stream. These areas also tend to encourage livestock to congregate which has degraded the stream banks and over widened the stream at localized locations. With these sediment levels, it is unlikely that any successful spawning takes place within Muddy Creek proper. Any successful spawning most likely takes place in one or two headwater tributaries.

There is an existing fish barrier located on BLM administered land that is reaching the end of its functionality. In 2010, high flows damaged the structure and yearly maintenance has since been

required to maintain it as a fish barrier. A new fish passage barrier will be required in the near future to prevent the loss of the WCT population in Muddy Creek.

Wildlife

In September, 2015 after reviewing petitions to list the greater sage grouse as Threatened on the Endangered Species List, the U.S. Fish and Wildlife Service (USFWS) announced that listing of the greater sage grouse was not warranted (USDI, 2015b). The BLM completed Resource Management Plan (RMP) amendments and revisions to demonstrate to the USFWS that protections for sage grouse have been improved. The Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region, Including the Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana (USDI, 2015a) and Sage-Grouse Habitat Assessment Framework (HAF) (Stiver et al., 2015) are used as guidance for sage grouse habitat management.

There are at least six active leks within the watershed. Numbers of male sage grouse attending leks is relatively stable in the Cabin Creek and Simpson Creek areas, with a higher than average count in the Alkali Creek area. Other leks have not shown persistent attendance over the years, with some leks moving locations. Resident and migratory sage grouse are present in Big Sheep Creek Basin during the year. Some birds are present yearlong and may travel no further than two to three miles from leks. Some birds, particularly males, breed and spend the summer in the Basin and then migrate to southeastern Idaho during the winter. Other birds, primarily females with broods, breed in southeastern Idaho and migrate to Montana during late spring and summer with their broods, and return to Idaho during the winter. The DFO radio-collared sage grouse throughout the Field Office from 1999-2012. Based on the telemetry data gathered, some sage grouse captured from leks within the BSCW wintered in the watershed, mainly in the Crystal Creek and Simpson Creek allotments.

BLM administered lands in the BSCW provide year-round sage grouse habitat. There are over 113,000 acres of sage grouse priority habitat management area (PHMA) in the BSCW, making up 62% of the total watershed acreage and 84% of BLM administered acres. There are over 29,000 acres of sage grouse general habitat management area (GHMA) in the watershed, which is 16% of the total and 12% of the BLM administered acreage in BSCW (see Map 3). Sagebrush is an important habitat component for sage grouse. It comprises nearly 100% of sage grouse winter diets and provides thermal, hiding, and nesting cover. Broods require a high protein diet of forbs and insects, usually found in riparian habitats. Sage grouse typically nest within 2-3 miles of leks. Habitat plots were completed during the 2015 brood rearing season, within three miles of leks in the watershed. All of the indicators, except shrub cover (32%), are within the "suitable" habitat range for sage grouse breeding habitat outlined in the Sage-Grouse Habitat Assessment Framework (Stiver et al., 2015). Suitable habitat guidelines for shrub cover are 15-25% shrub cover (marginal includes >25). It is important to remember that the BSCW provides year-round sage grouse habitat and sagebrush cover ≥10% is considered "suitable" winter habitat.

West Nile Virus (WNV) has been linked to sage grouse mortality in multiple areas. The RMP Amendments for Greater Sage-Grouse provides guidance for West Nile Virus and required design features to reduce WNV. 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 Appendix C of the RMP Amendment, 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 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. Under normal temperature conditions, the risk of WNV transmission to sage grouse in Beaverhead County is low (Johnson 2012, personal communication).

Big Sheep Creek Watershed also provides year-round pygmy rabbit habitat. Pygmy rabbits also require sagebrush for forage and cover, as well as deep alluvial soil to dig burrows. Sagebrush comprises nearly 100% of their winter diet and over half of their summer diet. Pygmy rabbits are endemic to sagebrush and are one of only two Leporids on the continent to dig their own burrows, the other being the volcano rabbit (*Romerolagus diazi*) found in central Mexico (USDI, 2003). Pygmy rabbits have been documented in several allotments throughout BSCW. Active burrows were found in a variety of sagebrush communities, including areas where they hadn't previously been documented. Pygmy rabbits still occupy all of their historical range in the Dillon Field Office.

Fringed myotis occur in a variety of habitats, from low- to mid-elevation grass, woodland, and desert regions. They are found primarily in desert shrublands, sagebrush-grassland, and woodland habitats, roosting in caves, mines, rock crevices, buildings, and other protected sites (Foresman, 2012; MNHP, 2015a). 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-curlleaf mountain mahogany vegetative types (Foresman, 2012). Spotted Bats have been found in open arid habitats oftentimes dominated by sagebrush (*Artemisia tridentata* and *A. nova*), sometimes intermixed with limber pine or Douglas-fir. They roost in caves, and in cracks and crevices in cliffs and canyons (MNHP, 2015a). None of these species have been documented in BSCW, including during a study done in cooperation with Montana Natural Heritage Program. During the nearly two year timespan, an SM2 Bat+ detector/recorder was deployed along Big Sheep Creek to document year-round bat echolocation calls (Maxell et al., 2016). Out of a total of 12,269 bat call sequences recorded, six species of bats were definitively confirmed: big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*), hoary bat (*Lasiurus cinereus*), western small-footed myotis (*Myotis ciliolabrum*), long-eared myotis (*Myotis evotis*), and little brown myotis (*Myotis lucifugus*).

The Brewer's sparrow, sage sparrow, and sage thrasher utilize sagebrush habitats. McCown's longspur and long-billed curlew nest in dry, shortgrass prairies. Veerys are found in willow thickets and cottonwoods in riparian areas (MNHP, 2015a). Great gray owl habitat consists of mature forests with clearings such as bogs, meadows, and wetlands for foraging. Loggerhead shrikes are associated with open woodlands, and have also been documented nesting in

sagebrush, bitterbrush, and greasewood. Black-backed woodpeckers inhabit early successional, burned forests of mixed conifer, lodgepole pine, Douglas-fir, and spruce-fir. This burned forest habitat is lacking in the BSCW. Western toads breed in any clean standing water and may wander miles from their breeding sites through coniferous forests and subalpine meadows, lakes, ponds, and shoreline (Werner et al., 2004).

The bald eagle and golden eagle are protected under the Bald and Golden Eagle Protection Act, and are BLM sensitive species. Cooperative interagency monitoring is occurring through the Montana Bald Eagle Management Plan. Golden eagles, bald eagles, ferruginous hawks, and Swainson's hawks are found throughout the watershed. While there are no known peregrine falcon nest sites in the BSCW, nests are typically located on cliff ledges, ideally in areas with a wide view, near water, and close to plentiful prey (MNHP, 2015a).

Lynx are primarily restricted to northwestern Montana from the Purcell Mountains east to Glacier National Park, then south through the Bob Marshall Wilderness complex to Highway 200 (Interagency Lynx Biology Team, 2013). The Dillon Field Office does not contain any lynx critical habitat. 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, 2014b). 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, 2014b). Forest habitat in BSCW isn't considered adequate lynx habitat. The watershed may be used as a lynx linkage zone between suitable habitats. However, lynx have not been documented within the BSCW.

According to the Interagency Grizzly Bear Study Team (IGBST), the current Greater Yellowstone Ecosystem (GYE) grizzly bear population is roughly 757 individuals (Haroldson et al, 2014). BSCW is outside the Occupied Range of the Yellowstone Grizzly Bear, as well as the Distinct Population Segment (DPS) boundary. The DPS boundary distinguishes the population of grizzly bears in the GYE as distinct from the remaining populations in the lower 48 states. The DPS boundary includes all landscapes where genetically distinct Yellowstone grizzly bear occur and may occur given future range expansion, delineated along easily identifiable boundary features (i.e. Interstate 15). The Dillon Field Office is outside the Grizzly Bear Recovery Zone, which depicts an area surrounding Yellowstone National Park where inter-agency grizzly bear recovery efforts are concentrated for the long-term conservation of the distinct Yellowstone grizzly bear population (IGBST, 2016). Although reports claiming grizzly sightings within the watershed have occurred over the years, there has not been a confirmed grizzly bear located in the BSCW. A study completed during the spring and summer of 2009, using barbed-wire DNA hair stations and cameras, did not document grizzly bears in the Beaverhead Mountains between Monida and Eighteen Mile Peak (Servheen et al., 2010). Less than 20% of the black bears detected in this study were black. The various color phases of black bears in this area can make accurate species identification difficult. On March 3, 2016 the USFWS announced plans to remove the GYE grizzly bear population from the Federal List of Endangered and Threatened Wildlife (USDI, 2016). A news release on this same date from USFWS states that "*Determining recovery is based on more than just the number of bears in the ecosystem. It includes the quantity and quality of habitat, adequate regulatory mechanisms to maintain a healthy and*

viable population, and a good balance of male and female bears that are well-distributed throughout the ecosystem."

In 2014 the United States Fish and Wildlife Service withdrew a proposal to list the North American wolverine in the contiguous United States as a threatened species under the ESA (USDI, 2014c). Wolverines occur in coniferous montane forest types, preferring rugged, roadless, isolated habitats. 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 Beaverhead Mountains and Tendoy Mountains, with transient individuals on BLM lands. However, the Tendoy Mountains likely do not have enough high elevation alpine habitat to sustain the large home range females require for natal areas.

The Northern Rocky Mountain population of gray wolves, including Montana wolves, was delisted from the list of Endangered and Threatened Wildlife in 2011 as part of the Appropriations Act. To avoid relisting, Montana will comply with federal regulations to manage wolves in a manner that will guarantee that the state maintains at least a minimum of 150 wolves and 15 breeding pairs (MFWP, 2013). Since delisting, a hunting season for wolves has been implemented in Montana. The combined maximum hunting and trapping bag limit is five wolves per person during the 2015 season. At the end of 2014, a minimum estimate of 94 wolves and 20 packs were documented in the Montana portion of the Central Idaho Experimental Area. There was one newly identified pack in 2014 (Bradley et al., 2015). Conflicts between wolves and livestock have been an issue in the southwest Montana.

Bighorn sheep core habitat covers the east side of the Tendoy Mountains within BSCW. There was a population die-off in 1993, an augmentation of nearly 20 sheep from Rock Creek in 1997, and another die-off in 1999. The population was augmented in 2002 with around 30 bighorns relocated from the Sun River population. Another 49 bighorn sheep were relocated to the Tendoys from Flathead Lake's Wildhorse Island in 2012. Since then, the population has steadily declined due to endemic pneumonia (pers. comm. Fager, 2015). From September 5th through November 29th, 2015 MFWP opened a hunt to the public to remove all individuals from the population. After the population is gone, MFWP plans to reintroduce a new healthy population into the area, since adding individuals to a sickly population has not worked. To reduce the possibility of disease transmission between domestic and wild sheep, there are no BLM authorized domestic sheep allotments within the BSCW.

Bighorn sheep in the BSCW, 2015.

Conifer has expanded into sagebrush grassland habitat within bighorn sheep core habitat. As conifer cover increases, it may act as a barrier to bighorn sheep movement, as bighorns prefer vegetation types with greater horizontal visibility and avoid closed forests (Tilton and Willard, 1982). Overall, bighorn sheep core habitat provides adequate forage and escape terrain.

Net-wire and barbed-wire fences are common throughout BSCW. These fences represent an entanglement hazard and travel barrier, especially for antelope, and deer, elk and moose calves. Barbed wire fences with more than four wires, wires spaced too closely, or wires higher than 40-inches or lower than 16-inches hinder wildlife movement between pastures and are also an entanglement hazard. Fences for modification, removal, or rebuilding have been identified in several BSCW allotments.

Spring developments are an important water source for wildlife, but associated tanks can be fatal when escape ramps for birds and small mammals are not installed in them. Escape ramps will be installed in stock tanks that were lacking them. Fences near sage grouse leks or in areas with low visibility can be a collision hazard for sage grouse. Fence markers have already been placed near some leks in BSCW and will be placed in additional locations as needed.

Wildlife, including special status species, are discussed further under the Biodiversity section of the Sage Creek Watershed Assessment Report, pages 42-68. See the Biological Evaluation in Appendix C of this document for Threatened, Endangered, and special status species.

Plants

Alkali primrose (*Primula alcalina*) is found in moist to wet alkaline meadows near headwaters streams at 6,300 to 7,200 feet elevation. It appears to be restricted to wet meadow habitats associated with relatively stable water tables. Soils remain moist to saturated throughout the growing season, but there is little or no inundation. The density of Alkali primrose declines with increased abundance of rhizomatous graminoids such as sedge and rushes. It is often most abundant on the tops and sides of hummocks where little other vegetation is present. Hummock habitats are moist without being wet and are more open than the wetter microhabitats dominated by sedges and rushes. Livestock congregate near wetlands in the summer for the lush vegetation and proximity to water. The effects of livestock grazing on Alkali primrose are both positive and negative. Because the leaves of Alkali primrose are all at ground level, livestock grazing can prevent seed production, however it will not kill the plant or remove significant photosynthetic tissue. Grazing can also be positive by partially removing the overtopping canopy of grasses and sedges, allowing more light to reach the leaf rosettes. Livestock grazing can also indirectly affect wetland vegetation by altering hydrologic regimes. Trampling by livestock may benefit this species by creating microhabitats

Alkalie primrose – *Primula alcalina*

on the tops and sides of the hummocks. Loss of wetlands would likely result in population declines. This can be minimized by restricting livestock grazing to later summer in as many years as possible to reduce trampling and grazing in these hummocked wetland habitats. Alkali primrose trend monitoring data that was collected in 2014 indicates that populations occurring in the Big Sheep Creek basin are maintaining or slightly increasing in density. Grazing by livestock has been present at both study sites for years and in one case is managed under a deferred grazing system while managed under a deferred rest rotation system at the other study site.

Idaho sedge (*Carex idahoa*) is found in a few different riparian habitat locations throughout the BSCW. It is found in wet to moist alkaline meadows, is palatable, and sensitive to intensive grazing, especially during spring and early summer. Repeated herbivory, particularly between mid-May and mid-July may lead to population declines. Rest-rotation grazing regimes may allow enough recruitment to maintain stable populations of these palatable sensitive plants. Kentucky bluegrass and common dandelion are present in most wet meadow habitat and along many stream reaches. Kentucky bluegrass may compete with Idaho sedge. Canada thistle and houndstongue are scattered throughout the BSCW and were observed in many riparian and wetland habitats, especially along intermittent stream reaches. These noxious weeds may also compete with Idaho sedge which prefers these streamside and meadow habitats.

Chicken sage (*Sphaeromeria argentea*) prefers sparsely vegetated habitats with low competition. The known populations of this plant species, in the BSCW, face no anthropogenic threats. They appear to tolerate and may benefit from disturbances that reduce competition such as livestock grazing.

Cusick's horse-mint (*Agastache cusickii*) is known in Montana from only a few locations in the Tendoy and Beaverhead Mountains. One large population of Cusick's horse-mint exists in the Big Sheep Creek canyon on talus limestone slopes above the county road, these slopes can be vulnerable to destabilization if impacted by activities such as quarrying of limestone and road maintenance. The steepness of this habitat tends to make it inaccessible to cattle, and the timber on these slopes is not of commercial quality. Future road improvement or maintenance will continue to be managed to avoid impacting the populations and habitat.

Cusick's horse-mint – *Agastache cusickii*

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. The most recent review of the species status of whitebark pine was in December of 2015. The FWS lowered the priority from 2 to 8. For background, each candidate species is assigned a priority number from 1 to 12 based on factors such as the magnitude of threats facing the species, the immediacy of the threat and the species' taxonomic status. A lower priority number means that the species is under greater threat. For example, a number of 2 indicate a higher degree of concern than a number of 8. The basis for this change in listing priority for whitebark pine is due to "… the reduced magnitude of the threat from mountain pine beetle; the beetle epidemic appears to be subsiding, and the Service no longer considers this threat to be having the high level of impact that was seen in recent years." (Endangered and Threatened Wildlife and Plants, 2015). (For a complete description of whitebark pine in the BSCW see Forest and Woodland Habitat section below).

3.2.5 Resource Concern #3: 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 38 weeds on the statewide noxious weed list that infest about 7.6 million acres in Montana. Of these 38 there are two species of major concerns in the BSCW; spotted knapweed and houndstongue. Canada thistle, another state declared noxious weed, is also found in the BSCW. It is widespread throughout the Dillon Field Office and mostly found in riparian areas, making treatment difficult.

Spotted knapweed (*Centaura maculosa*) is one of the more aggressive noxious weeds in the area administered by the Dillon Field Office. Spotted knapweed is found scattered in small infestations throughout the BSCW primarily along roads and in other disturbance areas. Because of where it is found, the potential is high for knapweed to be spread by vehicles, livestock, wildlife, recreation and other activities.

Houndstongue *(Cynoglossum officinale),* a noxious weed that is toxic to animals due to high levels of alkaloids contained in the plant, is found scattered throughout the BSCW in moderate sized infestations along roads, trails, and streams. Because of its seeds ability to cling to hair and clothing, the potential is high for it to be spread rapidly within the watershed.

Other noxious or invasive weeds present in isolated locations are cheatgrass (*Bromus tectorum),* black henbane *(Hyoscyamus nigar),* and Common teasel (*Dipsacus fullonum*). Cheatgrass appears to be expanding along roadsides but is also present on a few steep slopes with southern exposures. Black henbane is also common along major roads and disturbed sites, but doesn't appear to be invading adjacent habitat. Presently less than 10 acres of private ground is infested by teasel and the landowner is actively treating the site.

Two small infestations of leafy spurge (*Euphorbia esula*) have been found in the BSCW. The first is located near an old building foundation and was last treated in 2004. The site has been visited every year since and to date no re-occurrence of spurge has been noticed. The site will continue to be visited for at least another five years before declaring the infestation eradicated.

The second was found on a closed road in Muddy creek by a Beaverhead County employee in 2008 and is about ten feet in diameter. This infestation has been treated yearly since and has slowly decreased in size.

Since 1989, BLM has been involved in cooperative control efforts with Beaverhead County. A cooperative spray day has been held each year with Beaverhead County, the Nature Conservancy, the BLM and private landowners participating. Throughout this period, the goal has been to prevent new noxious weed infestations and control or eradicate existing infestations in Beaverhead County using Integrated Pest Management. Due to the small size of the noxious weed infestations, the harshness of the climate and the elevation of the valley, no biological controls have been released.

The bighorn sheep hunt that was conducted during the fall of 2015 increased the amount of off road travel in the area and has raised concerns about noxious weed spread. The leafy spurge infestation in Muddy creek was driven through numerous times by off-road vehicles and other closed roads were used by both local and out of area recreationists. This disturbance could create new infestations by either spreading current infestations further or by introducing new invaders from outside of the watershed.

3.2.6 Resource Concern #4: Cultural and 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 Big Sheep Creek Planning Area were lower than that observed in other planning areas, with archaeological sites located on 1.79% of BLM managed lands within the watershed.

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 BSCW analysis area. Within the study area, approximately 1,330 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 294 acres in extent. Public lands within 15 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 56 recorded cultural properties within the BSCW study area. Of that number, 90% are prehistoric, 5% are historic, and 5% have a combined prehistoric and historic component. A total of 11 paleontological sites are known within the watershed.

3.2.7 Resource Concern #5: Socioeconomics

Ranching and farming (i.e., hay production) are critical components to the economic well-being of the various communities in Beaverhead County. Of Montana's 56 counties, Beaverhead County is the largest livestock producer. The USDA 2007 Census of Agriculture Inventory (http://www.agcensus.usda.gov/publications) indicated that there were 212,412 head of cattle

and calves and beef cattle in the county. Beaverhead County was also third in sheep production with 14,065 sheep and lambs inventoried. Very few grain-fed cattle were produced. The focus was on calves and feeder steers along with beef cows or breeding stock. This type of ranching requires large expanses of grazing land.

According to the National Agricultural Statistical Service (http://www.nass.usda.gov/mt/), overall cattle production in Montana has been relatively stable since 1986. The January inventories in 1986 and 2002 reported 2.45 million head with a peak of 2.75 million during 1996. Sheep production, on the other hand, showed a general decline across the state, reflecting a broader national pattern. The data from 2010 reports that, of Montana's 56 counties, Beaverhead county ranked 1st in total hay production. The data from 2011 reports that, Beaverhead county ranked 1st in total cattle numbers; and 3rd in sheep numbers.

Within the BSCW, there are 12 different business entities or individuals currently authorized to graze livestock on the 51,165 acres of BLM administered lands on the 23 grazing allotments. Those grazing permittees are authorized to harvest about 5,747 public land AUMs annually. Qualified individuals and business enterprises are authorized to graze livestock through a ten year term grazing lease/permit (43 CFR 4110). Many ranches 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.

3.2.8 Resource Concern #6: Forest and Woodland Habitat

Forested habitats occupy 10% of BLM administered land in the BSCW, primarily at higher elevations and on north-facing slopes. Species include Douglas-fir, lodgepole pine, limber pine, Englemann spruce, subalpine fir, whitebark pine, and Rocky Mountain juniper. Also, scattered stands of aspen contribute to structural diversity and canopy cover. The close association of forests with adjoining sagebrush and riparian habitats supports a broad array of wildlife species. This habitat provides important thermal and hiding cover, including security habitat for big game. Forest and woodland habitat offers high protein browse species in the fall and winter, as well as year-round, for deer, elk, and moose. Forests in the BSCW provide habitat for a large variety of species including mountain lions, dusky grouse, ruffed grouse, northern goshawk, black bear, and bobcat. This habitat provides important linkage corridors for large carnivores. It also provides foraging, nesting, and/or roosting habitat for numerous bird species including great-horned owls, sharp-shinned hawks, great gray owls, and northern goshawks. Several bird species help protect forests by eating millions of damaging insects, such as the western spruce budworm.

Scattered patches of curl-leaf mountain mahogany are found on rocky slopes and ridges throughout the watershed. The Big Sheep Creek canyon has some very healthy stands of curl-leaf mountain mahogany. Mountain mahogany provides important winter forage for mule deer,

bighorn sheep, and moose. It is heavily browsed in some areas within the watershed, however rockier and steeper slopes such as along Big Sheep Creek, are not as accessible for browsing.

Douglas-fir expansion in McNinch Creek, 2015.

The majority of forested areas identified in the BSCW are found in the Muddy Creek drainage including: McNinch Creek, Johnson Creek, Thompson Creek, and Trail Creek. Conifer forests here, primarily on northern aspects, are dominated by single story Douglas-fir. The IDT noted, in the BSCW, that many Douglas-fir along these drainages were found to be in the gray-phase with standing dead and/or decadent trees that appear to have been affected by Douglas-fir beetle and/or spruce budworm. The stands here appear to be dense with smaller diameter trunks (approximately ~8-10" DBH) and relatively short (approximately ~50 feet tall). Conifer density appears high in many of these areas, and has resulted in "dog-hair" stands of Douglas-fir. In areas where Douglas-fir is in the gray phase of standing dead, a dense cover of tall grass is present in the understory. 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).

Western spruce budworm is a native defoliating insect which is present in the BSCW, and has caused heavy defoliation on many Douglas-fir trees in the assessment area. Western spruce budworm is favored by dry summer conditions and mild winters, and has the greatest impact on trees that are stressed from dense stocking, found in multi-storied stands, and/or are impacted by drought conditions (Kamps et al., 2008). Budworms grow more vigorously in stressed trees, and budworm populations can increase dramatically during drought conditions. Prolonged budworm epidemics cause reduced diameter and height growth (Bulaon and Sturdevant, 2006). While spruce budworm does not usually cause direct tree mortality, it will predispose trees to attacks by other insects or diseases.

Douglas-fir beetle is a native bark beetle which kills Douglas-fir trees, preferring mostly large diameter trees growing in mixed or pure stands. Douglas-fir trees most susceptible to attack from Douglas-fir beetle are those larger than 14 inches diameter at breast height (DBH), older than 120 years, and growing in dense stands (Weatherby and Their, 1993). Douglas-fir beetle normally kills small groups of trees, but at epidemic levels may kill groups of 100 trees or more (Schmitz and Gibson, 1996).

Both whitebark pine (WBP) and limber pine are found on the Big Sheep Creek Watershed. The IDT identified whitebark pine in the southwest corner of the watershed. WBP was present on the lower ends of slopes along Indian Creek mixed with Douglas-fir. Whitebark in this area showed little to no sign of mountain pine beetle and/or white pine blister rust. Cone crops were found on many trees. WBP was also found in the Indian Creek Isolated allotment. WBP on the tops of these slopes appear to have been affected by mountain pine beetle and/or white pine blister rust, and many trees were dead and/or dying. Within the stands though, there is a good representation of age classes and tree vigor.

The cones and seeds of whitebark pine 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, a bird that caches the seeds which will eventually germinate, if not found again by the Clark's nutcracker, bears, rodents or other birds. Whitebark pine has been recognized as a keystone species of high elevation habitats. They are important resources for wildlife food, snowpack retention, and watershed protection. 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.

Mountain pine beetle (MPB) is a native bark beetle, that affects many species of pine including: lodgepole pine, ponderosa pine, and whitebark and limber pines. This beetle, unlike some others, must kill the host tree in order to successfully reproduce. Outbreaks tend to occur when climatic conditions are favorable, and in mature forests, typically associated in lodgepole pine stands. More recently, MPB outbreaks are occurring in whitebark and limber pines, where previous climatic conditions, mainly cold temperatures, were thought to be inhospitable to the insect. MPB outbreaks can be rather extensive, and many areas in the Greater Yellowstone Ecosystem are currently experiencing declines in whitebark pine stands due to outbreaks of MPB (Logan et al. 2010)

White pine blister rust is a non-native pathogen which attacks white pines. Blister rust originated somewhere in Asia. The life-cycle requires two stages of spore production: from whitebark pine and the alternate hosts from either *Ribes* or *Pedicularis* spp. This fungus causes the tree to create cankers on the branches and bole that eventually girdle the tree leading to top-kill, and eventually kills the stem above the canker (Campbell and Antos, 2000). White pine blister rust has led to declines in abundance and extent of whitebark pine populations in the United States.

The IDT identified limber pine on the north corner of the Big Sheep Creek Watershed in the Muddy Creek Allotment. Limber pine is found in much of Montana on rocky slopes and ridges on a wide range of elevations from montane to subalpine zones. Limber pine found on the BSCW was found mixed with Douglas-fir and Rocky Mountain Juniper. There were many age classes of limber pine present, as well as varying levels of tree vigor. Many trees showed signs of mountain pine beetle and are dead and/or dying, but there are also many healthy trees present on the landscape with good cone crops, and regeneration is occurring as evidenced by seedlings.

Although aspen represents a small proportion of the forested area in these drainages, these stands have a great impact on the local biodiversity. Conifer stands have expanded their previous range greatly, and have since crowded the aspen. Quaking aspen is classified as being very shade

intolerant, and as a result of the conifer expansion, the IDT found aspen stands to be declining in coverage and vigor.

Many animals browse aspen year-round, but it is especially valuable during fall and winter when protein levels are high relative to other browse species (Howard, 1996). Aspen is an important browse species for ungulates including deer, elk, and moose. It also provides hiding cover, summer shade and some thermal cover for ungulates in the winter, as well as hiding and thermal cover for many small mammals. Aspen also provides nesting and foraging habitat for a variety of bird species including dusky grouse, dark-eyed junco, house wren, chipping sparrow, and pine siskin. Aspen buds, flowers, and seeds are palatable to many bird species. Ruffed grouse depend on aspen for foraging, courting, breeding, and nesting throughout most of its range. Aspen buds, catkins, and leaves provide year-round food for ruffed grouse.

3.2.9 Resource Concern #7: Visual Resource Management

The Hidden Pasture Wilderness Study Area (16,197 acres) will be managed as Class I. 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.

Another 8,984 acres adjacent to the WSA and along the scenic byway corridor will be managed as Class II. The objective of this class is to retain the existing character of the landscape. Activities or modifications of the environment should not be evident or attract the attention of the casual observer. Changes should repeat the basic elements of form, line, color and texture found in the predominant natural features of the characteristic landscape.

The remaining 29,473 acres will be managed under Class III guidelines. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape may 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.

The visual resource contrast rating system will be used during project level planning to determine whether or not proposed activities will meet VRM objectives. Projects will identify mitigation measures to reduce visual contrasts and prepare rehabilitation plans to address landscape modifications on a case-by-case basis.

3.2.10 Resource Concern #8: Wilderness Characteristics

The BSCW was inventoried for lands with wilderness characteristics in accordance with BLM Manual 6310 – Conducting Wilderness Characteristics Inventory on BLM Lands, published in March, 2012. Wilderness characteristics inventories are available at the Dillon Field Office. The purpose of an inventory is to determine the presence or absence of wilderness characteristics. The BLM must document existing conditions and evaluate wilderness characteristics as defined in Section 2(c) of the Wilderness Act and incorporated in FLPMA. 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. In addition, it may also possess supplemental values.

There were three units identified within the BSCW as having the potential minimum size for wilderness; a minimum of 5,000 contiguous acres. Two of those were inventoried in 2015. One unit was dismissed for not meeting the size requirements. Two of these units were part of the original inventory from 1979, and one is a new unit. Each unit has a unique identifier in a number and name. As a result of this inventory, none of the areas were determined to possess wilderness characteristics as defined in that guidance. Below are brief descriptions of the units and the findings of the inventory.

Coyote Lakes #MT-076-020 was dismissed from further consideration as it is only 1,200 acres.

Caboose Canyon #MT-076-021 does not meet the size requirement as it is split in the center by a wilderness inventory road. The Caboose Canyon Road bisects the unit, making two separate units, neither of which is of sufficient size to be further considered for wilderness characteristics. This road was constructed and will be maintained if necessary to ensure regular and continuous use. Two other roads bisect the two remaining units further reducing their size. Both of these roads were constructed and would be maintained if needed. The remaining parcels are 3,450 acres, 3,110 acres, 1,706 acres and 234 acres.

Old Bannock Pass #MT-050-100 is located mostly within the Medicine Lodge Watershed with 2,460 acres extending into the Big Sheep Creek Watershed. This unit is 5,356 acres and it primarily appears to be natural. Due to the shape of the unit and the amount of vehicle ways (routes) that bisect the unit, there are not outstanding opportunities for solitude. Some opportunities exist for primitive and unconfined recreation, primarily in the form of big game hunting; however these recreation opportunities are not outstanding within this region.

Hidden Pasture Creek Wilderness Study Area

The Hidden Pasture Creek WSA contains 15,509 acres inventoried and studied for wilderness characteristics in the late 70's to early 80's. Although the BLM recommended the area for uses other than wilderness, the WSA must be managed to prevent impairment of wilderness characteristics until such time as Congress either designates it as wilderness or releases it to be managed for more traditional multiple uses. The BLM released BLM Manual 6330 – *Management of BLM Wilderness Study Areas* in 2012 to provide for future management of WSAs to ensure protection, or enhancement of wilderness characteristics until Congress acts on BLM's recommendations, which were made in 1991. Wilderness characteristics identified in the area included sufficient size, naturalness and outstanding opportunities for solitude.

3.3 Description of Relevant Non-Affected Resources

3.3.1 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. Climate change may be due to natural internal processes or external forcings

such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use." (IPCC 2014). Climate change and climate science are discussed in detail in the Bureau of Land Management *Climate Change Supplementary Information Report for Montana, North Dakota, and South Dakota* (Climate Change SIR 2010). This document is incorporated by reference into this EA.

The IPCC states: "Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and sea level has risen." (IPCC 2014) Global average temperature has increased approximately 1.5°F from 1880 to 2012 (IPCC 2014). Warming has occurred on land surfaces, oceans and other water bodies, and in the troposphere. A few of the many indications of global climate change include the following (IPCC 2014).

- Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850. The period from 1983 to 2012 was likely the warmest 30-year period of the last 1400 years in the Northern Hemisphere.
- Globally averaged atmospheric CO_2 concentrations have increased from approximately 285 ppm in 1850 to more than 380 ppm in 2010.
- Since the beginning of the industrial era, oceanic uptake of CO_2 has resulted in a 26% increase in ocean acidity.

As summarized in the Climate Change SIR, the Earth has a natural greenhouse effect wherein naturally occurring gases such as water vapor, carbon dioxide (CO_2), methane, and nitrous oxide (N_2O) absorb and retain heat. Without the natural greenhouse effect, the Earth would be approximately 60°F cooler. Current ongoing global climate change is caused, in part, by the atmospheric buildup of greenhouse gases (GHGs), which may persist for decades or even centuries. 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 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 as would be the case with lower 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 in land use, and changes to radiative forces and reflectivity (albedo) (UNFAO 2013). Each GHG has a different global warming potential that accounts for the intensity of its heat trapping effect and its longevity in the atmosphere. For example, methane has an average atmospheric lifetime of 12.4 years and N_2O has a lifetime of 121 years, but no single lifetime is given for CO_2 (IPCC 2014). Atmospheric GHGs will have a sustained climatic impact. 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.

The USEPA published an inventory of U.S. GHG emissions reporting gross U.S. 2012 emissions of 6,526 million metric tons of carbon dioxide equivalent (CO_2e), and net emissions (considering carbon sinks) of 5,546 million metric tons (USEPA 2014). CO_2e emissions are determined by aggregating multiple types of GHGs by multiplying the quantity of each GHG by its global warming potential. Global GHG emissions during 2010 were estimated to be approximately 49 gigatonnes (10^9 metric tons) of CO_2e (IPCC 2014). The CO_2e quantities estimated by the USEPA and IPCC reflect conversion of GHGs to CO_2e based on 100-year global warming potentials from the IPCC Second Assessment Report published in 1995, which were 21 for methane and 310 for N_2O. In the IPCC Fifth Assessment Report, the 100-year global warming potentials of methane and N_2O have been revised to 28 and 265, respectively. When warming over a shorter time period is considered, the 20-year global warming potentials of 84 for methane and 264 for N_2O may be more relevant. However, most GHG inventories used to determine GHG emission trends use 100-year global warming potentials.

Chapter 3 of the Climate Change SIR describes impacts of climate change in detail at various geographic scales. The following summary describes potential changes identified by the USEPA (USEPA, 2008) that are expected to occur within the Mountain West region.

- 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 will be earlier, weeks before the peak needs of ranchers, farmers, recreationalist, and others. In late summer, rivers, lakes, and reservoirs will be drier.
- More frequent, more severe, and possibly longer-lasting droughts are expected to occur.
- Ecosystems will 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.
- Large-scale shifts have occurred in the ranges of species and the timing of the seasons and animal migrations. These shifts are likely to continue (USGCRP 2009). 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.
- Crop and livestock production patterns could shift northward; less soil moisture due to increased evaporation may increase irrigation needs.
- Fires, 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 are also on the rise. The combination of higher temperatures and dry conditions has increased insect populations such as pine beetles, which have killed trees on millions of acres in the western U.S. Warmer winters allow beetles to survive the cold season, which would normally limit populations; while drought weakens trees, making them more susceptible to mortality due to insect attack.

More specific projected changes associated with climate change in Montana include the following (Climate Change SIR (2010).

- 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.

- Winter and spring precipitation may increase by up to 25 percent in some areas of Montana. Precipitation decreases of 20 percent or more may occur during summer, with potential increases or decreases in the fall.
- For most of Montana, annual median runoff is expected to decrease between 2 and 5 percent. Mountain snowpack is expected to decline, reducing water availability in localities supplied by meltwater.
- Water temperatures are expected to increase in lakes, reservoirs, rivers, and streams. Fish populations are expected to decline due to warmer temperatures, which could 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 (1.8°F) global average temperature increase to be 241 to 515 percent.

While climate change will continue to occur within the analysis area, it is extremely difficult to predict the precise location, timing, and impacts of climate change.

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 and resource concern. 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 Habitat
Issue #2: Upland and Sagebrush Steppe Habitat

Resource Concern #1: Recreation and Travel Management
Resource Concern #2: Special Status Species Habitat
Resource Concern #3: Noxious and Invasive Species
Resource Concern #4: Cultural and Paleontological Resources
Resource Concern #5: Socioeconomics
Resource Concern #6: Forest and Woodland Habitat
Resource Concern #7: Visual Resource Management
Resource Concern #8: Wilderness Characteristics

Carefully planned resource specific monitoring under all alternatives will provide data for adaptive management within the watershed. The monitoring plan for the BSCW 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

There are nineteen grazing allotments that contain riparian habitat in the Big Sheep Creek Watershed. Fifteen of the nineteen are in compliance with the Riparian Health Standard. The allotments not in compliance are: Pine Creek, Porcupine Canyon, Rock Creek Isolated, Simpson Creek FS and the Contours Pasture of the Muddy Creek Allotment. The other eight pastures of the Muddy Creek allotment are in compliance. Current livestock grazing management in these allotments is contributing to these allotments not meeting the riparian health standard.

Depending on topography and timing of use, livestock are generally expected to utilize riparian and wetland areas more than upland areas. Domestic ungulates, livestock, are drawn to and tend to congregate in riparian areas for the forage and water availability as well as favorable topography which they prefer over drier and often rougher characteristics of upland areas (Clary and Leninger, 2000). 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). Ungulates will effect riparian and wetland vegetation, channel substrates, suspended sediment, and channel morphology under all alternatives including the no action alternative to some degree.

The long-term presence of ungulates in a riparian area can result in an undesirable shift in vegetative community as deep rooted species like sedges, may be replaced with shallow rooted species such as Kentucky bluegrass. Along a stream channel this can cause streambank instability which could induce physical changes to channel shape that diminish a streams ability to properly provide its major ecological function to route water, energy, sediment, and nutrients. Diminished riparian and stream function has a detrimental effect on the associated aquatic habitat attributes such as channel substrate composition and embeddedness, streamside vegetation, and stream temperatures (Clary and Leninger, 2000; Clary and Webster, 1989). The shift in vegetative community and the resultant described effects may be considered a direct and/or indirect effect to riparian function and channel morphology. Livestock can also have a direct effect on riparian health and channel morphology by inputting sediment through hoof action along streambanks which may result in increased width/depth ratios (reducing the streams ability to process sediment), and create banks more susceptible to erosion (Bengeyfield 2004).

In wetland habitat, the long term presence or intense use of livestock can alter the attributes that define wetland condition including: water quality, water regime, soils, physical form, invasive flora, and vegetation health, structure, and composition (Morris and Reich, 2013). Livestock treading can physically damage wetland plants and soils which can affect all of the above. Saturated or near saturated soils associated with wetlands have low mechanical strength and easily breakdown under the intense use by ungulates. Pugging can often be the result and pugging depth will increase with repeated treading in wet soils. Pugging and the direct breakdown of plants through livestock treading can create bare ground and alter surface elevations which can adversely affect infiltration rates, duration of inundation, water holding

capacity, vegetative health and composition, erosion of soils, and risk for invasive species (Morris and Reich, 2013).

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).

Herbivore grazing is a natural process that has shaped the evolution of plants for millennia (Hendrickson and Olson 2005). Grazing, along with fire, was the first vegetation manipulation tool ever applied by humans. Plants have evolved mechanisms to promote their growth after a single grazing event. At proper intensities, timing of use, durations and adequate rest before a repeated grazing event, livestock grazing can have a beneficial effect on plants found in riparian and wetland areas and every plant can prosper in a grazed system (Hendrickson and Olson 2005). Planned grazing management promotes healthy riparian plants and a healthy community by facilitating natural processes such as nutrient cycling and decomposition which often leads to a more diverse system (Laycock 1994). In wetland plant communities that have no grazing, plants can become choked or suppressed by the accumulation of litter (dead plant material) which slows plant decomposition and nutrient cycling and stifles plant diversity. Livestock grazing can be successfully used to reduce litter and promote new plant growth (Evans, 1986). Under a planned grazing management system, riparian and wetland plants can meet the riparian health standard as well as site specific objective. 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. Where necessary to meet defined objectives, BLM will require riding as a term and condition of the Term Grazing Permit. 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).

Predicted effects of climate change relevant to all issues in this section are described in section 3.3.1.

Issue #2: Upland and Sagebrush Steppe Habitat

The Upland Health Standard in 23 of the 23 allotments in the BSCW is being met under current livestock management. However one pasture within the Muddy Creek allotment is not meeting the upland standard. Current grazing management is NOT contributing to this pasture not meeting the standard. Because the upland health standard was met, no changes to the terms and

conditions of 23 grazing permits 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 in these areas.

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).

In the absence of wildfire, conifer expansion will continue resulting in a reduction in mountain big sagebrush and three-tip sagebrush vegetative communities. This will largely affect vegetative (composition, age class, seral state) diversity along the west side of the Muddy Creek allotment, with isolated affects occurring within the Little Water drainage and Hidden Pasture WSA areas to the east.

Resource Concern #1: 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, most of those proposed changes reflect corrections to mapping errors and/or designation of routes most commonly used by the public for recreation.

Resource Concern #2: Special Status Species Habitat
Removing, modifying, or rebuilding BLM fences and fences bordering BLM lands will enhance wildlife and bird movement through the area and reduce entanglement and collision hazards. Modifications will be made to existing fences not meeting BLM specifications, which will reduce barriers to wildlife movement and mortality. Modification of wildlife barrier fences 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 in water developments 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 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, however plants were not grazed by livestock during the growing season and therefore able to complete reproduction and enter dormancy.

Likewise, on allotments that are grazed 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% annual utilization and 7-inch stubble height standard would provide adequate residual forage and cover. Various migratory birds have different requirements for foraging and nesting, with some species nesting in shrubs and bunchgrasses while others nest on the ground, preferring more open habitat. Habitat heterogeneity across the landscape accommodates the numerous species' needs. A review of published research found that livestock nest trampling is possible, however it's probably uncommon on sagebrush grassland habitats such as is found in BSCW, compared to grasslands without sagebrush cover (Schultz, 2009). Balph et al. (1989) documented that the elevation of vegetation was the visual cue that cattle use to choose hoof placement, avoiding taller vegetation. This suggests that birds nesting beneath shrub canopy or in the crown of bunchgrasses have a low probability of being trampled if livestock stocking rates are not unacceptably high (Schultz, 2009). Incorporating rest and deferred seasonal use outside of the nesting season and bunchgrass growing season at least every couple years would improve plant vigor, benefiting nesting habitat and forage availability. Livestock tend to graze certain areas more regularly than other areas within an allotment, leading to more patchy grazing, which can increase forb availability and stimulate forb growth in uplands (Adams et al., 2004). 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). Although spring livestock grazing increases potential disturbance to nesting birds, impacts would be minimal to individuals and habitat, without contributing to a loss of viability to the population or species.

Treating noxious weeds will reduce their potential to dominate a site, retaining native vegetation for wildlife cover and forage.

Habitat data was collected during the 2015 sage grouse brood rearing season, within three miles of leks in the watershed. All of the indicators, except shrub cover, are within the "suitable" habitat range for sage grouse breeding habitat outlined in the Sage-Grouse Habitat Assessment Framework (Stiver et al., 2015). Average shrub cover (32%) is slightly higher than the suitable habitat guideline of 15-25% shrub cover (marginal includes >25). Based on this data and the IDT field inspections, none of the sagebrush obligate species that rely on sagebrush to fulfill all or part of their lifecycle would be impacted by the proposed alternatives.

Continuation of lek monitoring within the BSCW 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, incorporating habitat guidelines from the Sage Grouse RMP Amendment (USDI, 2015a), relative to ecological site potential etc., will maintain and enhance sage grouse habitat in the BSCW, including maintaining or increasing big sagebrush communities, sagebrush canopy cover, herbaceous height, and forb diversity. Maintaining these habitat guidelines will also 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. 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 Appendix C of the Sage Grouse RMP Amendment (USDI, 2015a), for water development projects can reduce mosquito production through modifying and eliminating mosquito breeding sites.

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 will create awareness, and minimize conflicts between lessees and agencies responsible for managing the predator population.

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

Continuation of stream temperature, population and habitat monitoring will 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 management. Additionally, temperature data would allow managers to identify drainages that could act as thermal refugia for cold water species should climate change alter stream temperatures beyond preferred thresholds.

Reconstruction of the fish barrier on Muddy Creek is required to maintain the genetic integrity of this population and essential to the long term persistence of the WCT population in the drainage. Without a fish barrier this drainage would rapidly be colonized by nonnative rainbow and brown trout.

Installation of a small fish passage barrier on the lower reaches of Meadow Creek would provide additional protection to the WCT population with the drainage. Currently this drainage is considered unprotected in that under the right stream flows nonnatives, specifically rainbow trout, could access the drainage from Big Sheep Creek. Placement of a barrier in the lower reaches would greatly reduce the likelihood of nonnatives gaining access into the headwaters of Meadow Creek. This would help to preserve the long term persistence of this WCT population.

Current and proposed livestock management under alternative B &C within the Muddy Creek allotment #30039 in regards to WCT habitat and management would stay essentially the same. Under all three alternatives current habitat conditions and trends would continue. Under all three alternatives livestock management would provide favorable riparian habitat conditions.

The Biological Evaluation for Special Status Fish and Wildlife Species in Appendix C provides a summary of effects to special status fish and wildlife species from the proposed alternatives. None of the alternatives would impact BLM sensitive status wildlife species in a way that would lead to a downward trend in populations and toward federal listing.

See whitebark pine discussion in Resource Concern 4.2.1 #6 below.

Resource Concern #3: Noxious and Invasive Species
Human activities, such as road maintenance activities, recreation, off road vehicle use, mining, utility corridors and other disturbances and natural events, such as livestock, wildlife, wind, water and wildfire will continue to contribute to the spread of noxious and invasive species into and within the watershed. Noxious weeds will continue to be treated as resources allow through the existing cooperative effort between the BLM, Beaverhead 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 #4: Cultural and 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 also 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 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 Resources Preservation Act of 2009.

Resource Concern #5: 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 2016 BLM AUM cost is $2.11 and an additional $7.31/AUM surcharge for grazing cattle owned by another operator on BLM administered lands. Private non-irrigated land lease rates in Montana for 2016 average $23.00 per animal unit or cow/calf pair. MT DNRC leases rates are currently $19.57/AUM.

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 BSCW by any of the alternatives.
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.

Refer to Chapter 4 on page 302 and Table 56 on page 286 in the amended 2006 Dillon Proposed RMP and Final EIS for further information.

Resource Concern #6: 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 BSCW, 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 BSCW. 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.

Natural succession would continue with more shade-tolerant species replacing aspen. Some aspen forests may eventually be replaced by coniferous forests and other non-forest vegetation in the absence of disturbance to the clone. Natural disturbance events damage existing trees, but may also promote sprouting. Wind can sometimes severely impact an aspen grove as would a severe forest fire. Trees are blown down and broken, the area is opened up, and aspen suckering is stimulated. Snowstorms may do extensive damage to aspen if the snow is wet and clings to the aspen crowns. Limbs may break, sapling to pole size trees may be broken off, bent to the

ground, and sometimes partially uprooted. Weather-related phenomenon, such as hail and lightning, temperature extremes, and drought may damage aspen (USDA, 2016). Insect and diseases affecting invading conifers (ex. Mountain Pine Beetle, Douglas-fir Beetle, Western Spruce Budworn) could indirectly promote the survival of aspen by creating natural mortality of those conifers in and around the clone.

Resource Concern #7: Visual Resource Management
Changes to the visual characteristics of the landscape will continue throughout the planning area that 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. 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. There are no projects proposed within this environmental assessment that would impact the Class II objective that applies to the corridor surrounding the Big Sheep Creek Back Country Byway. If no vegetation management actions are taken, gradual changes to the characteristic landscape will be within the visual resource management objectives for this area.

Resource Concern #8: Wilderness Characteristics
Wilderness characteristics within the Hidden Pasture Creek WSA would continue to be maintained. The WSA is managed in accordance with BLM Manual 6330, *Management of BLM Wilderness Study Areas*, to ensure that wilderness characteristics are maintained or improved until such time as Congress can make a final determination on whether to designate the area as wilderness, or release it from further consideration. Because projects are proposed to occur within the WSA in different alternatives, the specific analysis of the consistency of those projects with the policy will be addressed in the various alternative analyses.

There were no other lands within the watershed that were determined to possess wilderness characteristics, and potential impacts to other wilderness characteristics within this watershed will not be considered any further.

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. The riparian issues or concerns identified by the IDT and documented in the BSCW Assessment Report would not be addressed or mitigated. 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.

Four grazing allotments did not meet the Riparian Health Standard; Pine Creek, Porcupine Canyon, Rock Creek Isolated, and Simpson Creek FS. While Muddy Creek Allotment met the riparian standard overall, the Contours Pasture did not. Livestock grazing was determined to be a causal 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. Where resource concerns were found, negative impacts from ungulate trampling to wet meadows 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.

Under the No Action alternative, no management changes would be implemented. Therefore, site-specific objectives would not be met and these four allotments and one pasture would continue being out of conformance with the Standards for Rangeland Health (43 CFR 4180). In addition, no new stream crossings (culverts), road improvements or projects (fences, water developments, bank stabilizations, wetland restoration) would be initiated to address concerns on stream reaches or wetlands that did not meet the Riparian Health Standard.

Current trends and conditions of fish habitat would continue under the no action alternative. Habitat conditions on streams not meeting habitat requirements, 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 majority of fish habitat would be expected to continue to improve or stabilize in PFC condition. Habitat concerns such as sediment input from road crossings and site specific issues related to livestock would not be addressed and would continue to have impacts to fish and aquatic habitat.

Issue #2: Upland and Sagebrush Steppe Habitat

Existing conditions and trends in sagebrush and upland habitats would continue under this alternative. Overall the mountain big sagebrush community in portions the BSCW 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 is establishing in some areas historically occupied by sagebrush and are converting 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. Continued conifer colonization is expected in the western side of the Muddy Creek allotment, most notably in the area of McNinch, Thompson, and Johnson creeks. Isolated conifer colonization is expected to expand within the Little Water drainage and portions of Hidden Pasture WSA as well. The 2,301 acres of conifer removal would not be implemented and existing late seral mountain big sagebrush habitat would eventually be converted to Douglas-fir forest and no longer provide for sage grouse summer habitat.

Continuation of current grazing practices on the one pasture of the Muddy Creek allotment that failed to meet the Upland Health standard (Contours pasture) would not have much of an impact on documented upland health issues. This pasture was contoured plowed back in the 1960s and then seeded with non-native species which were to help control soil erosion. The results are a monoculture of hard fescue. Some of the upland conditions noted in the BSCW Assessment Report, December, 2015 (http://www.blm.gov/mt/st/en/fo/dillon_field_office.html) are: water flow patterns that are slightly longer than expected, minor erosion and soil instability, slight active pedestalling in the flow patterns, increased bare ground causing increased litter movement and/or presence of noxious and invasive species.

High PFC conditions would continue on the majority of the uplands and sagebrush steppe habitat in the BSCW.

Resource Concern #1: Recreation and Travel Management
Recreational uses would continue to occur as they have historically. 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 #2: Special Status Species Habitat
Under the No Action alternative, wildlife habitat in allotments that didn't meet riparian/wetland standards would continue to be affected by reduced vegetative and woody cover, vegetative species composition, and structural diversity. Decreased aspen, willow and sedge dominated communities limit biodiversity by reducing habitat available for fish, amphibians, migratory birds, nesting waterfowl, and browse for wild ungulates. The quality and quantity of sage grouse brood rearing habitat may be reduced on the four allotments due to riparian standards not being met and continuation of existing trends.

Suitable sagebrush habitat exists for sagebrush obligate species throughout BSCW. These habitat conditions would not change appreciably under Alternative A. Conifer expansion into sagebrush/grassland habitat 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, sagebrush sparrow, and sage thrasher. Elk and mule deer winter range, and bighorn sheep habitat would also transition into forest in certain locations. The hard fescue seeding in the Contours Pasture of the Muddy Creek allotment will continue to limit herbaceous diversity and palatability for wildlife.

Current trends on WCT would continue. All WCT habitat within the watershed was found to be in PFC. However, in some instances, opportunities to improve WCT habitat were found during the field assessments. Under alternative A, these opportunities would not be addressed.

See whitebark pine discussion in 4.2.1 #6 above.

Resource Concern #3: Noxious and Invasive Species
The spread of noxious and invasive species outside of known infestations would be prevented or mitigated to the degree that resources allow. If there are resource constraints, density and/or size

of current infestations may not be reduced. Where they occur, noxious and invasive species would continue to affect vegetative composition and cover, causing increased run-off and soil erosion, reducing forage and affecting biodiversity as well as upland and riparian health in small, localized areas within the watershed.

Resource Concern #5: Socioeconomics
Under Alternative A, forage availability and number of authorized AUMs would continue at current levels. Economic benefits attributed to livestock use of BLM administered lands would remain unchanged. Livestock grazing on about 54,667 acres of public lands would provide approximately 5,879 AUMs of forage on 23 grazing allotments in Beaverhead 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.

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 amended 2006 Proposed Dillon RMP and Final EIS.

Resource Concern #7: Visual Resource Management
Changes to the visual characteristics of the landscape would continue throughout the planning area that would be consistent with the Visual Resource Management objectives for the area. Without the vegetation treatments proposed in the action alternatives, the characteristic viewshed would change over time through gradual ecological changes.

Resource Concern #8: Wilderness Characteristics
Wilderness characteristics would continue to be maintained as lands within the Hidden Pasture WSA continue to be managed in accordance with BLM policy mandating the protection of those characteristics until Congress acts on either designating as wilderness or releasing the area from further consideration as wilderness. In all likelihood, wilderness characteristics would continue to be maintained even if the area were released by Congress from further consideration because similar future management is provided for in the amended Dillon RMP even after it is released.

4.2.2.1 Climate Change
Predicted effects would be the same as described in Section 3.3.1.

4.2.3 Predicted Effects Common to All Action Alternatives

Issue #1: Riparian, Wetland and Aquatic Habitat
Livestock Management
Revised grazing systems, included in all the action alternatives, were developed in conjunction with the grazing operators 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 permittees 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. 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 (Sarr, 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 where thresholds have not been crossed, changes would not be irreversible. 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). 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 including 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, but improvement is expected in all stream types where livestock grazing revisions are proposed.

Utilizing thresholds 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 thresholds and associated livestock rotations (response) 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. Leaving a 4" or 6" stubble height, whichever is applicable, would also leave adequate succulent forbs in the riparian/wetland areas to provide for sage grouse brood rearing needs. Thresholds 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 as well as improve the channels ability to process indirect sediment input from upland erosion.

Fishery habitat is tied to riparian habitat conditions. Implementing management changes with the goal of improving riparian conditions will in nearly all cases improve fishery habitat. For fish streams not in PFC, changes in management are expected to improve habitat. Improvements would include increases 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 via improved bank vegetative stability and cover. In-stream sediment issues may continue where point sources continue to contribute sediment

Stream Crossings

Improvement of road/stream interactions would contribute to achieving properly functioning riparian areas and maintain or improve aquatic habitat conditions. Selection of the most appropriate stream crossings, i.e. culverts or hardened crossings, based on sites geomorphic characteristics and use, would minimize the detrimental effects crossings can have on stream channel function and associated aquatic habitat.

Where applicable, and as identified in the proposed action, culverts should be sized adequately for fish passage. All culverts should be sized with enough capacity to handle large flow events (2 year to 50 year return interval depending site specific conditions and needs) so as not to restrict flow at the site. If a culvert is undersized it will have adverse effects on sediment transport, bank stability, and vertical stability due to manipulation of flow velocities. A culvert may not be appropriate if a channel has a broad floodplain and installation of the culvert would eliminate access to the floodplain or interrupt connectivity of floodplain flows (e.g.; channel types C & E, (Rosgen, 2006)). Restricting floodplain access can have a damaging effect to the riparian corridor and aquatic habitat by manipulating the streams natural scour and deposition patterns. This effect can induce erosion at the culvert site and may cause a chain reaction of accelerated erosion throughout the reach (Wargo and Weimann, 2006).

Hardened low water crossings or "fords" can often be the best fit for a site if the channel is well connected to its floodplain, carries high amounts of debris or sediment, has large flow fluctuations, or there is low frequency of use (USDA, 2006b). Low water crossings can be a direct source of sediment as wheeled vehicles transport material through the channel and can disturb the streambed and banks. If the streambed and/or approaches are comprised of fine grain material and the ford is not properly armored and stabilized, the site can be a chronic source of sediment with each passing vehicle. Compared to a natural (unimproved) ford, much less sediment appeared downstream of a hardened ford (streambed excavated and replaced with

compacted rock and gravel) after vehicles crossed (USDA, 2006b). The longer-term effects of fords on water quality depends on factors such as type of surfacing on the ford and its approaches, vehicle type and use level, and time since disturbance for reconstruction or maintenance (USDA, 2006b). As vehicles cross through the water, there is also the potential for chemical pollutants (e.g.; oil, grease, copper, and nickel from brake wear) but there is no evidence that these constituents cause detectable or significant water quality problems at fords (Hyman and Vary 1999).

During installation of a culvert or low water crossings there can be and usually is a short spike in sediment concentration downstream. The same is true following the first high flow event following installation as disturbed soils are washed into the channel. Within an evaluation of numerous studies that measured change in sediment concentrations downstream during installation of either structure; Taylor et al. 1999 determined the contribution is typically a fraction of the total amount of sediment produced by a stream during a regular high flow event (Taylor, 1999).

As stated initially, the improvement of stream crossings would have a positive effect on riparian and aquatic resources within the assessment area. If selection of the type of crossing is based accurately upon the sites geomorphic characteristics, with adequate design, the stream reach and watershed should experience a reduction in sediment introduction from stream crossings. It is difficult to quantify the reduction at this time as exact site selection and final design at each site is not complete.

Wetland Restoration

Four wetland areas (up to 126 acres) are identified for potential restoration. The purpose of the proposed restoration is to expedite the wetlands progression to proper functioning condition by physically eliminating wetland hummocks induced by historic grazing. Wetland meadows degraded by livestock exhibit hummocks and microchannels that can drain the wetland and lower the water table (Booth, 2014). Cattle can form hummocks through wetlands by compacting organic wetland matter into trails that dewater the wetland so that drying and erosion create and maintain hummocks (Corning, 2002). In contrast a properly functioning wetland, absent of channels caused by trailing of livestock, will slow, spread, and store water and are highly effective at sequestering carbon (Booth, 2014). Restoring surface elevations across a wetland area would eliminate inter-hummock channels and encourage the area to slow, spread, and retain water at rates that matches local topography, thus expedite the wetlands return to properly functioning condition or desired future condition. The improvement of water storage would have beneficial effect on aquatic habitat and the hydrograph downstream as water may be released later into the summer. Reduction in concentrated flow paths would also eliminate erosion around the base of hummocks which would reduce the long term contribution of sediment to downstream aquatic habitat and reduce loss of productive soils.

The use of tracked equipment during dry or partially frozen conditions would minimize surface disturbance and soil compaction. A piece of tracked equipment exerts less ground pressure than that of cattle. For example a D8 dozer weighing almost 90,000 pounds exerts half (13 pounds per square inch) the force than that of a cattle hoof (CAT, 2016; Higgins et al., 2011). It is also expected that the next season's freeze-thaw action would act as means to loosen and "de-

compact" the soils as mitigation for any minor superficial compaction that occurs. There are no expected adverse effects to soils due to compaction.

The exposure of bare soil is to be minimal as vegetation will not be removed but possibly redistributed as hummocks are leveled into surrounding low spots. There would therefore not be large contiguous area of bare soil following construction, only patches and spots throughout. The existing vegetation is expected to quickly colonize any available bare soil created. These wetlands sites do not have a high gradient from one end to the other and in some cases may be concave in vertical relief. Without channelized flow, this reduces the opportunity for surface flow to have the energy to maintain velocities to transport soils offsite. Regardless, seed and structural erosion control measures will be applied if needed to reduce or eliminate erosion and sediment transport offsite as a result of these projects.

Streambank Stabilization

Stabilization of an eroding streambank is proposed along approximately 150 feet of Big Sheep Creek adjacent to a maintained, open road. The work would cease migration of the channel into the road, and create a vegetative buffer between the road surface and the stream channel.

The proposed action would have direct effects to aquatic resources both temporarily and in the long term. Direct negative effects would be short term, localized, and minimized by the design features incorporated into the proposed project (Chapter 2, page 34). The excavator entering and working within the channel would cause turbidity. There is no expected long term detrimental effect expected as the turbidity created would be temporary, intermittent, and would not exceed turbidity levels experienced during storm events or typical spring runoff. Sediment load that is suspended may not be transported, deposited, and sorted appropriately due to the timing of the project. It is expected that the ensuing spring runoff would remobilize and sort this material appropriately mitigating for any adverse effects this may cause. Streambank disturbance would be minimized as the single identified point of entry into the channel is a low bank directly onto a hard riffle (Chapter 2, Figure 2.2); therefore there is very little vertical relief for the equipment to traverse which would limit disturbance to soils and vegetation.

Increased turbidity and streambed disturbance could negatively impact aquatic macro-invertebrates but should not cause long-term changes in abundance and have little effect on food availability for fish. If there is a direct reduction to aquatic macro-invertebrates populations within the disturbed reach, aquatic macro-invertebrates recolonize disturbed areas very quickly through both active and passive drift (Svendsen et al. 2004).

Incidental fish mortality may occur from equipment tracks in the stream, but both juvenile and adult fish are expected to and should actively vacate the area during equipment operation. Any fish mortality would have direct negative impacts to individual fish. However, given the relatively short length of reach to be impacted and duration of the project there should be little effect in the long-term to overall fish populations.

In order to avoid any impacts to water quality, the excavator would refuel a minimum of 100 feet from active stream channels and a spill containment kit would be kept on site during construction. In addition, oil-absorbent hydraulic booms would be deployed across the channel,

downstream of the excavator while it is working within the channel. This work is not expected to result in any long term, adverse effects from spills, streambank and bed disturbance, turbidity, or fish mortality.
Direct and indirect positive effects of stabilizing this streambank would benefit aquatic resources in both the short-term and long-term by:

- Reducing a direct source of sediment from bank erosion,
- Creating a narrow vegetative buffer between the road and the stream,
- Improving/increasing streamside vegetation,
- Reducing the likelihood of introducing a mass amount of road material into the creek.

Sedimentation is a natural process and channel migration is also a natural process. The DEQ has identified Big Sheep Creek from its mouth to its confluence with Muddy Creek as not fully supporting it aquatic life beneficial use and has included sedimentation/siltation as a probable cause (DEQ, 2015). A one hundred foot vegetated buffer is suggested to measurably remove sediment from water running off of developed ground and 50 feet is the minimum for protecting certain aspects of water quality (Ellis, 2008). Within the assessment area approximately 57% of the total road miles (430 of 750 miles) are within 50 feet of stream channel; 408 miles are within 25 feet (these figures include all land ownership). Given the watersheds natural sediment load and the addition of human induced sediment load (e.g.; roads), a reduction at this source would not adversely affect the streams sediment load but rather make small change in the positive direction. In addition, decreasing the likelihood of road material being captured is a benefit that outweighs the effect of stopping the channels migration at this meander. This meander has reached the outer limit of the valley as this bank is the upland terrace and the channel does not have the potential to migrate significantly further. Therefore, this project would not disrupt the streams natural progression of meander migration.

The introduction of imported rock would have no detrimental effect to aquatic resources as the material would be sized to avoid displacement during high flows. If a catastrophic event occurred and the material was mobilized, the introduced rock may pose minimal risk to aquatic resources as a percentage of the material may be large enough to exceed the streams typical capacity for transport. Introducing bedload the stream cannot move poses a risk as stream flow would be forced around the large substrate which may cause stress on banks and induce further erosion. For this project the risk is minimal as the largest material would not exceed what is naturally occurring by more than 50% and a gradation of material would be used. The largest material would likely remain within the project reach, settling in adjacent pools or being embedded in downstream riffles and bars.

The introduction and improvement of riparian vegetation along the bank would improve cover for fish as willows, sedges and other riparian vegetation would eventually hang over the channel. While the width of vegetative buffer cannot meet the suggested 100 foot minimum; currently there is zero buffer and buffer effectiveness for capturing sediment increases with width in every case (Ellis, 2008).

Non-commercial Mechanical/Prescribed Fire Treatments
Non-commercial mechanical/prescribed fire treatments are not specifically planned for riparian areas. Often, riparian areas are found on the perimeter of the prescribed burn areas because they

make a relatively safe boundary due to the wet-green vegetation and standing water. Prescribed burns are not expected to affect the riparian areas although the burn may meander down into the greater riparian area as it dies out at the end of the burn period.

Negative effects of the burn on riparian areas are not predicted because prescribed burns are planned only in the early spring and later fall periods. During this time period, fire intensities are lessened as air temperatures are less than summer temperatures and typically fuels have higher moistures compared to summer fuel moistures. The exception may be in the fall when fuel moistures are similar to summer fuel moisture conditions. However, if fuel moistures are low in the fall burn period, the prescribed burns would not be implemented unless appropriate weather conditions as outlined in the burn plans are met, to be able to safely implement the burn and meet identified objectives. Additionally, adequate vegetative buffers would be planned between the burn units and the streams to mitigate short term sediment input in the streams. More palatable and productive upland vegetation within the treated areas are expected to attract ungulate use to these areas and reduce use within adjacent riparian habitat helping to reduce impacts and improve conditions of the riparian habitat.

Issue #2: Upland and Sagebrush Steppe Habitat

Utilization of key forage plants (eg. bluebunch wheatgrass, Idaho fescue, needle and thread) on the majority of BLM lands in the BSCW was found to be less than 50%. For those areas where site specific concerns were identified, limiting use of upland forage to 50% during seasonal grazing would benefit water infiltration, plant vigor, and leave adequate residual cover and forage for wildlife, including forbs and hiding cover for greater sage grouse. Because of the topography and/or distance from water, many areas of pastures or allotments are considered secondary range for livestock grazing. Livestock grazing in these areas is none to slight. In addition, even though cattle graze the interspaces between sagebrush plants, forage under the sagebrush is not or only slightly grazed. Therefore, it is very rare that use of key forage plants reaches 50% on a pasture wide basis and this threshold would require that livestock are moved before use exceeds 50% within the pasture. This threshold is expected to result in leaving the required average 7” residual cover to provide for sage grouse habitat needs. Residual cover height will be measured within PHMA as part of the BSCW Monitoring Plan (Appendix B). Moderate use would also enhance herbaceous plant community cover and composition. Increased cover improves precipitation infiltration and subsequently decreases 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 forbs.

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 occurs on under-utilized upland forage plants and less in the riparian areas. Watering troughs would be placed in already disturbed areas or unsuitable sage grouse habitat to the extent practical. 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. Use in the uplands is not expected to reach the 50% utilization threshold on a pasture wide basis.

The grazing flexibility provision would provide the BLM and affected permittees' tools to more efficiently manage the herbaceous resources on public lands. Having the ability to respond to annual variations in weather 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 appropriate timing of resource use.

The Contours pasture in the Muddy Creek allotment would be seeded with a sage grouse preferred native seed mix in study plots in specific areas within the contour plowed/hard fescue uplands of this pasture. The native seed would be seeded the fall before the rest year so plants can become established without herbivory from livestock. The native plant species, once established will be able to compete with the non-native hard fescue which would provide better habitat for wildlife while maintaining ecological function of soils including: nutrient cycling, soil stabilization and help with groundwater recharge.

The BSCW is comprised of 181,302 acres, 33,000 acres of which are classified as forest, 113,415 as Sagebrush/Mountain Shrubs and 8,956 as grassland cover type (2015 Big Sheep Creek Watershed Assessment Report pg 5). Conifer treatments were identified using direction established in the 2015 Idaho and Southwestern Montana Greater Sage Grouse RMP Amendment (specifically management decision MD Fire 31 found on p.2-22).

- *Why alternative techniques were not selected as viable options*

Through prior treatments in similar fuel types, it has been found that alternative techniques such as piling slash, or lop-scatter without broadcast burning does not meet objectives of reducing conifer expansion into sage steppe habitat. Concentrating fuels in piles to be burned could create multiple microsites of high severity fire effects that are more conducive to non-native, invasive plant species establishment, and greatly reduces economic feasibility of treating sufficient acres to achieve seral diversity at the landscape scale. Lop-scatter treatments are effective at reducing larger established conifers, but the absence of fire through follow up broadcast burning allows many sapling sized conifers within sagebrush canopy cover to thrive after daylighting of competition, resulting in no net loss of existing conifers. See Special Status Species section below for additional discussion.

- *How GRSG goals and objectives will be met by its use*

Proposed treatments meet the goals and objective of GRSG by reducing loss of existing habitat through conifer expansion, and enhancing early seral sagebrush habitat to match expected potential for the ecological site. Furthermore, treatments accomplished across a larger landscape create potential for lower fire severity and intensity should a large scale fire event occur by reducing existing fuel loads in or adjacent to existing sage grouse habitat. This results in greater

management options with regard to unwanted wildfire, including anchor points and/or control lines, aiding suppression actions that maintain and protect sagebrush ecosystems. See Special Status Species section below for additional discussion.

- *How the COT Report objectives will be addressed and met*

The COT Report objective specific to fire states "Retain and restore healthy native sagebrush plant communities within the range of sage grouse." The purpose and need contained within chapter 1.2 echoes the COT Report objective.

- *A risk assessment to address how potential threats to GRSG habitat will be minimized*

Current risks to GRSG habitat are addressed by proposed treatments that identify greatest conifer expansion into, and resulting loss of existing GRSG habitat. This is discussed in detail below under Resource Concern #2 Special Status Species Habitat. The design features contained within chapter 2.3.3 are mitigations for the potential risks associated with proposed treatments. Non-commercial mechanical/prescribed fire treatments include up to 1,319 acres (Alternative B) and up to 2,301 acres (Alternative C), approximately 0.7% and 1% (respectively) of the total acres in the BSCW. Non-commercial mechanical/prescribed fire treatments would focus on increasing seral/age class diversity at the landscape scale, and reducing conifer expansion into sagebrush/grasslands. 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 and three tip 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 similar sites throughout southwest Montana, it would take 20- 30 years to move through early and mid seral stages to get back to current sagebrush cover, seral and structural diversity within sagebrush habitats across the landscape. By creating a mosaic of age classes in the sagebrush canopy, more edge is created. Removing the conifer expansion would maintain this seral and structural diversity of the sagebrush steppe habitat for up to 30 years (Lesica, Cooper and Kudray 2007).

These prescribed fire treatments would also affect livestock grazing. Increased palatability and abundance of forage for both wildlife and livestock following prescribed fire would shift more use to burned areas with increased production and proportionately less use in non-burned areas within the allotments for up to five years following the treatments. The design features listed in chapter 2.3.3 require livestock grazing rest one year prior and two growing seasons post any prescribed fire treatment.

It is possible to expect some invasive plant species to invade the recently burned areas. Design features in chapter 2.3.3 include protocols for locating and treating any invasive or noxious weeds both pre and post prescribed fire. Also see Resource Concern #3: Noxious and Invasive Species section below. These design features would mitigate the expansion or introduction of noxious and invasive plant species as a result of these treatments.

The proposed prescribed burns may result in short term air quality deterioration. The BLM is a member of the Montana/Idaho Airshed Group and coordinates with the Montana DEQ to prevent/reduce the impact of smoke on communities and other areas with smoke impact restrictions, especially when it could contribute to a violation of national air quality standards. Coordination with the Airshed Group would be addressed in site specific burn plans prior to any ignition.

Resource Concern #1: Recreation and Travel Management
Recreational uses would continue to occur as they have historically. 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. Efforts to barricade and/or provide hiker and horse accessible gates on routes closed to motor vehicles would help to reduce unauthorized/illegal motorized vehicle use and should improve opportunities for more ethical hunters to enjoy their sport without motorized disturbances. Other hiking and horseback riding opportunities will also be improved by reducing conflicts with motorized uses.

Resource Concern #2: Special Status Species Habitat
The ongoing monitoring of the four sensitive plants in the BSCW would/will provide baseline data for future trend monitoring and provide BLM the information to appropriately manage the habitat associated with these rare plant species.

Restoring riparian health is expected to have a beneficial impact on wildlife and fisheries habitat by increasing forage and thermal and hiding 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 into moist areas that still support succulent vegetation, including wetland and riparian areas. Revising livestock grazing to improve riparian conditions, building exclosures around springs, as well as implementing the wetland restoration project, would benefit all wildlife species that utilize riparian habitats. This is especially true for sage grouse during brood-rearing when forbs and insects are essential to their diet. The wetland restoration projects would occur outside of nesting and brood-rearing seasons, reducing the likelihood for disturbance to sage grouse and migratory birds. If restoration was implemented between February 15 and April 1 on big game winter range, the project sites are fairly isolated, short duration, and small scale in relation to available winter range, making impacts to wintering big game unlikely and minimal.

Coordinating the timing (seasonally and yearly) of prescribed fire treatments between fire managers and wildlife biologists will minimize conflicts with wildlife, including in big game wintering areas. Surveying for special status species prior to these treatments would also reduce impacts to these species through avoidance and timing stipulations. Impacts to migratory birds would be negligible since the prescribed fire treatments would be implemented outside of nesting season. As covered in the Monitoring Plan (Appendix B), if prescribed burns are implemented after May 15, migratory bird surveys would be completed prior to burning activities. As covered in the Biological Evaluation (Appendix C), habitat or individuals may be impacted by these treatments, however treatments will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species. If left untreated, sagebrush grassland

habitat with conifer expansion would transition into forest habitat, eliminating sagebrush obligate species (such as sage grouse, sagebrush sparrow, Brewer's sparrow, and sage thrasher) 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 long-term.

Reducing conifer encroachment, with prioritization of treatments closest to occupied sage grouse habitat and near occupied leks, is an objective listed in the RMP Amendment (pgs 2-16 and 2-18). As is also listed as a management decision in the Amendment, fuel treatments identified in alternatives B and C of this EA have been *designed through an interdisciplinary process to expand, enhance, maintain, and protect sage grouse habitat, considering a full range of cost effective fuel reduction techniques including mechanical and prescribed fire treatments* (USDI, 2015a, pg 2-21).

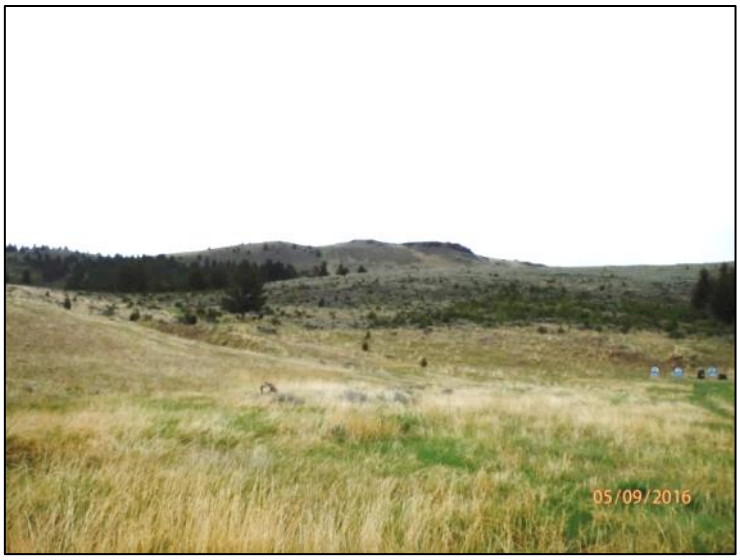
Sagebrush grassland habitat would be restored in the long-term in areas where prescribed fire and/or mechanical methods are utilized to reduce conifer expansion in sagebrush habitat. An increase in forb production associated with these treatments would provide for sage grouse foraging, essential during brood-rearing. 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 and mule deer winter range, and bighorn sheep habitat would prevent conversion to forest habitat and retain sagebrush/grassland in the long-term.

Sagebrush habitat loss to conifer expansion can be detrimental to sagebrush obligates, especially species of conservation concern, such as the sage grouse (Baruch-Mordo et al. 2013, Knick et al. 2013). Baruch-Mordo et al. (2013) found that sage grouse incur population-level impacts at a very low level of conifer expansion, as no leks were active in areas where conifer canopy cover exceeded 4%. This study also found that sage grouse have a negative response to areas of active conifer expansion in addition to areas with more established stands. These results align with other studies' findings of sage grouse avoidance of conifer habitats during all stages of life (i.e. nesting, brood-rearing, and wintering) (Doherty et al., 2008, Atamian et al., 2010, Casazza et al., 2011).

Miller et al. (2000) documented that mountain big sagebrush cover is reduced by 80% when juniper cover increases to half of its maximum potential for the site. Over the past 150 years conifers have expanded their range by as much as 600% in the western U.S. (Romme et al., 2009). Because fire removes sagebrush cover it seems counter-productive to burn existing sagebrush habitat, however periodic fires in mountain big sagebrush is critical to reduce conifer expansion (Davies et al. 2011). Disadvantages of using mechanical treatments alone include follow-up treatment for small trees that were not initially removed, fuel loads can be increased by leaving cut trees/slash on the site, and treatment can be difficult to implement and costly when working in areas with rough terrain (Miller et al. 2007, Davies et al. 2011). Prescribed fires are more efficient than mechanical treatments across large landscapes because they control tree seedlings that would otherwise be missed with mechanical treatments and woodland development is less rapid than where fire surrogates are used (Miller, Bates, Svejcar, Pierson, & Eddleman, 2007; Miller, Chambers, Pyke, Pierson, & Williams, 2013). The USFS Beaverhead-

Deerlodge National Forest has utilized prescribed fire to treat conifer expansion in southwest Montana and found that burning provides at least 20 years of treatment effectiveness over mechanical treatments alone, and 150 trees/acre seems to be the cost effective breakpoint in deciding to burn versus lop and scatter only (pers. comm. Hutton, 2016). Within these USFS treatment units, conifers are in need of retreatment within unburned patches that had conifers only mechanically removed, whereas adjacent burned areas have not had conifers return. Burning is more effective at conifer control than just mechanical treatments because small (< 1 m) conifers are not easily seen, especially when sheltered under sagebrush, and burning the seed-bank will forestall conifer recruitment; thus, extending the desired results from the proposed treatments and treatments that leave residual woodland cover are unlikely to establish sagebrush birds (Knick, Hanser, & Leu, 2014). The photos below show Alder Gulch, an area bordering Virginia City, Montana where mechanical treatment was the only method used to reduce conifer expansion. Based on all of the seedling/sapling conifers in the 2016 photo, using mechanical alone was a totally ineffective treatment, with more conifers expanding onto the site eight years post-treatment compared to pre-treatment.

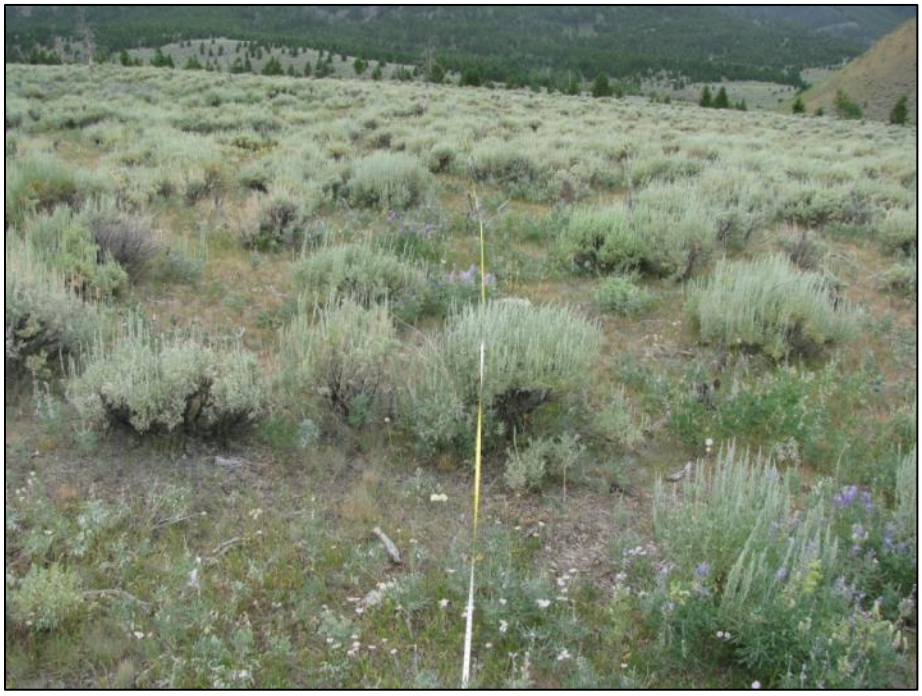
Alder Gulch, Dillon Field Office. Pre-Mechanical Treatment, 2008.



Alder Gulch, Dillon Field Office. Post-Mechanical Treatment, 2016.

Utilizing mechanical treatment and fire to reduce juniper and other conifers that have invaded sage grouse habitat is recommended by Connelly et al. (2000). Maintaining productive sagebrush plant communities for sagebrush obligate wildlife species, while burning acreages necessary to stop conifer expansion is crucial (Davies et al. 2011). Lesica et al (2007) note that while studying 28 prescribed and wildfire sites in southwest Montana, mountain big sagebrush returned to pre-burn canopy cover and height 32 years later on average and in as little as 7 years on some sites. Across ten sagebrush sites where spring prescribed burns were used to reduce conifer encroachment in southwestern Montana (Dillon Field Office) and eastern Idaho, 13-27 years were required for burned areas to be indistinguishable from undisturbed reference areas (Woods, 2012).

Herbaceous cover and species richness, including forbs and arthropod abundance, have been documented to recover quickly following fire in mountain sagebrush habitat (Davies et al., 2014; Pyle & Crawford, 1996; Beck et al., 2011; Bates et al., 2009; VanDyke & Darragh, 2006; Seefeldt et al., 2007; Davies et al., 2012). Burning has potential to enhance mountain big sagebrush nesting and brood-rearing habitat in small patches (Beck et al. 2011). Connelly et al. (2000) suggest using fire to create a mosaic of openings in mountain big sagebrush communities used as late brood-rearing habitats, with 10-20% sagebrush canopy cover and ≤25% total shrub cover providing adequate summer sage grouse habitat. Danvir (2002) found that sage grouse broods readily used burns with broad-leaved forbs and that cool season controlled burns in summering areas were beneficial to sage grouse. While forbs and insects are a major component of sage grouse brood diets and typically increase following fire, the goal of utilizing prescribed fire is for long-term retention of sagebrush habitat, because once sagebrush habitat that has conifer expansion transitions into forested habitat, the sagebrush habitat is lost.



Mountain big sagebrush site, prescribed fire, 2000. Dillon Field Office. Photo taken July, 2013.

This photo shows a line-intercept transect running through a prescribed burn unit in the Dillon Field Office in July, 2013 that was burned in spring of 2000. At the time of this photo, mountain big sagebrush cover at this transect was 23.3%, with an average height of 52.3 cm. Within the burn unit, average mountain big sagebrush cover was 23.5% and 49 cm tall. Conifers were not returning on any of the transects. This is thirteen years post-burn. Forb and herbaceous cover, especially forbs in the legume family (lupine) that are preferred sage grouse forage, can be noted in the photo.

Planting of whitebark and/or limber pine would promote this habitat, including the production of seeds which are an important food source for wildlife species, such as squirrels, Clark's nutcrackers, and bears.

Seeding study plots in specific areas of the Contours Pasture of the Muddy Creek allotment with a sage grouse preferred native seed mix would reduce the unpalatable hard fescue and increase herbaceous diversity for wildlife forage and cover.

Construction of new fences may impede movement and be an entanglement and collision hazard for wildlife. 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. Marking new fences with a high risk of collision will increase visibility for sage grouse and other wildlife, reducing the risk for collisions with the wires.

Installing culverts on all primitive stream crossings located on open routes within the Muddy Creek drainage would reduce the sediment input associated with the existing crossings. Muddy Creek sediment levels throughout the main stem proper are considerably higher than what is considered suitable for salmonids. A high proportion of sediment within the drainage can be related to natural sources; however the primitive crossings proposed for culverts are identified point sources of sediment related to road use.

Incorporating the utilization threshold on WCT streams that requires maintaining a 6" vegetative buffer along the greenline and/or a 3" vegetation standard within the flood plain would provide a vegetation buffer to reduce sediment from entering the stream as well as indirectly 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.

Continuation of stream temperature, population and habitat monitoring will 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 management. Additionally, temperature data would allow managers to identify drainages that could act as thermal refugia for cold water species should climate change alter stream temperatures beyond preferred thresholds.

Reconstruction of the fish barrier on Muddy Creek is required to maintain the genetic integrity of this population and essential to the long term persistence of the WCT population in the drainage. Without a fish barrier this drainage would rapidly be colonized by nonnative rainbow and brown trout.

Installation of a small fish passage barrier on the lower reaches of Meadow Creek would provide protection to the WCT population. Currently this drainage is considered unprotected in that under the right stream flows nonnative hybridizing species, specifically rainbow trout, could access the drainage from Big Sheep Creek. Placement of a barrier in the lower reaches would greatly reduce the likelihood of nonnatives gaining access into the headwaters of Meadow Creek. This would help to preserve the long term persistence of this WCT population.

Potential site-specific impacts to special status species habitat are included in the allotment discussions where appropriate, as well as in the Biological Evaluation (Appendix C).

Resource Concern #3: Noxious and Invasive Species
The treatment of invasive species both before and after prescribed burning and excluding infested areas where the density is 50% or greater and size is greater than five acres would reduce the probability of expansion of existing infestations or the establishment of new invasive species within the treated areas..

Power washing of equipment before entering a project area would reduce the probability of a new invader being introduced into an area.

Limiting the utilization on upland forage to 50% in the spring and summer as well as use on sedges to four inches along the greenline on non-fisheries or non-native fisheries streams and six inches on WCT streams would increase the competitiveness of the native vegetation and reduce the spread of noxious weeds. Livestock management revisions designed to improve riparian/wetland health would increase the competitiveness of native vegetation and reduce the opportunity for spread of noxious and invasive species.

Reseeding disturbed areas after a project is completed would reduce the risk of the area being invaded by noxious weeds or cheatgrass.

Improving compliance to travel management within the Big Sheep Creek Watershed would substantially reduce the probability of introducing new noxious and invasive species and well as reducing the spread of noxious and invasive species into and within the watershed.

Surveying for noxious weeds and cheatgrass before any Riparian or Wetland project and incorporating the results into the project would reduce their spread.

Addition of the three new herbicides would allow more options for noxious weed control and increase the effectiveness of application in some cases.

Resource Concern #5: Socioeconomics
The economy of the state of Montana in general and Beaverhead 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 individual grazing permittees and cumulatively on the economic and social fabric of the larger community.

The No grazing alternative analyzed for the Porcupine Canyon allotment and the Contours Pasture of the Muddy Creek Allotment would have a very adverse economic impact the specific ranchers that rely on public land grazing in these two allotments. 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 permittees and the BLM in the short term. In addition, use thresholds 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 or unforeseen natural events, affecting forage production, may benefit grazing permittees economically by allowing more consistent available forage for their operations.

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, hiring contractors to complete work and long term maintenance requirements of new structural projects..
Socioeconomics was fully analyzed under Alternative B in Chapter 4 (p 331) of the Final EIS for the amended 2006 Dillon RMP.

Resource Concern #6: Forest and Woodland Habitat
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, etc.). 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.

In existing or relic aspen clones, prescribed fire would reduce the overstory, stimulate shoots to sprout, and would also kill invading conifers growing in and around the aspen clone. Since aspen can sprout from existing roots and these suckers grow faster than the new, slow growing conifers, aspen could dominate in a grove for many years after a fire. A fire intense enough to kill the aspen overstory would stimulate abundant suckering, though some suckers arise after any fire. As many as 50,000 to 100,000 suckers can sprout and grow on a single acre after a fire (USDA, 2016)

Resource Concern #7: Visual Resource Management
All of the action alternatives propose activities that would impact visual resources to some degree. All of these activities are considered to be consistent with existing visual resource

management objectives for these areas. Specific consideration and analysis of impacts to visual resources are considered within the analysis for each of the specific alternatives.

Resource Concern #8: Wilderness Characteristics
Wilderness characteristics would be maintained in accordance with BLM policy in all action alternatives within the Hidden Pasture WSA. Because the different alternatives vary, specific discussion and analysis of these impacts is considered within each of the alternatives.

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 forcings (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 BSCW. 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 2014).

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 through revised livestock grazing, riparian/wetland enhancement projects such as wetland restoration projects and installing/replacing culverts to reduce point source sediment to the streams 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). Continuing livestock grazing while maintaining or improving the health of the rangeland within allotments in the BSCW is predicted to maintain or improve the soils capability to sequester carbon.

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 wildfire. Because of the timing of the prescribed 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, therefore resulting in higher carbon sequestration capability than after a wildfire.

The proposed action alternatives are expected to incrementally increase carbon sequestration in the soil and vegetation within the BSCW. 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 severity and size of potential damaging wildfires within, and adjacent to treatment areas. The amount of increased carbon sequestration across the watershed cannot be quantified with current technology and its effect on climate change would be undetectable.

Continuation of stream temperature monitoring would provide long term data on 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 cold water species should climate change increase stream temperatures beyond preferred thermal levels.

4.2.4 Predicted Effects of Action Alternatives B, C, and D 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.

Separate sections below discuss the predicted effects of alternatives B and C for: Non-Commercial Mechanical/Prescribed Fire Treatments; Wilderness; Recreation and Travel Management. Refer to Appendix C for a more in-depth Special Status Species (SSS) analysis.

Crystal Creek #30102
Alternative B:
Crystal Creek allotment met the Rangeland Health standards and therefore did not require any management changes. However, alternative B is being analyzed to adjust AUMs in this allotment. Over the last several years that this allotment was grazed the operators were not able to harvest more than 240 AUMs while staying within established thresholds. This adjustment is an accurate representation of available AUMs and would not change how the allotment is currently being grazed.

Issue #1: Riparian, Wetland, Aquatic Habitat
Riparian areas are meeting riparian standards in the Crystal Creek allotment under current management and we expect these conditions to continue as the rest rotation grazing system would continue as before.

Issue #2: Upland and Sagebrush Steppe Habitat
The uplands in the allotment were in excellent condition and met the upland standard. We expect these conditions to continue as the grazing rotation is not being changed.

Dixon Mountain #30022
Alternative B:
Dixon Mountain allotment met the Rangeland Health standards and therefore did not require any management changes. However, alternative B is being analyzed in response to the permittee's request and site specific concerns. This alternative would expand the grazing period allowing more flexibility for the permittee. This would not change the number of grazing days within the grazing period or AUMs.

Issue #1: Riparian, Wetland, Aquatic Habitat
Hardening the water gap with rock and gravel in pasture #3 and stabilizing the streambank on a portion of Big Sheep Creek would reduce sediment input to Big Sheep Creek from these sources and thereby reduce sediment aggradation and deposition downstream in the long term.

Issue #2: Upland and Sagebrush Steppe Habitat
The uplands in the allotment were in excellent condition and met the upland standard. We expect these conditions to continue as the grazing rotation the same as Alternative A.

<u>Indian Creek #10741</u>
Alternative B:
Indian Creek allotment met the Rangeland Health standards and therefore did not require any management changes. However, alternative B is being analyzed in response to site specific concerns. The allotment would continue to be managed under a rest rotation grazing system

Issue #1: Riparian, Wetland, Aquatic Habitat
Installing a culvert on stream reach # 127 would reduce sediment input from this source and therefore reduce sediment aggradation and deposition downstream.

Issue #2: Upland and Sagebrush Steppe Habitat
The removal of approximately 0.5 miles of dysfunctional fence between the Sawlog pasture of Indian Creek allotment and the North portion of Indian Isolated allotment and the removal of 0.3 miles of exclosure fence would reduce the wildlife entanglement hazard and provide for more effective cattle disbursement. It would also remove a visual impact from this area.

Resource Concern #2: Special Status Species Habitat
Changing the grazing period from 6/15-10/15 to 7/1-10/31 would remove livestock grazing in this allotment during elk calving season, reducing disturbance to calving elk. It would also move livestock grazing during sage grouse nesting/early brood-rearing to the late brood-rearing/summer season. This would eliminate disturbance to nesting sage grouse. Perennial forbs in the uplands and riparian areas are important during late brood-rearing. Adhering to annual utilization thresholds would help retain preferred forbs for sage grouse broods.

Removing the 0.3 miles of fence associated with the Cutthroat Exclosure would be beneficial for wildlife access to this riparian source. Removing 0.5 miles of dysfunctional page wire fence would eliminate this barrier for elk and moose calves, and antelope and deer fawns. Building 0.5 miles of new fence would add a potential collision and entanglement hazard in an area where it hadn't previously existed. Building this new fence to wildlife-friendly standards (not the page wire that would be removed) would reduce collision and entanglement risks. The fence would be marked for visibility if collisions with wires are documented.

Changing the authorized grazing period within the Simpson Creek Pasture from 6/15 – 10/15 to 8/10 – 10/8 would provide protection to WCT redds during the spawning/incubation period from physical disturbance associated with livestock. Additionally, it would allow herbaceous stream bank vegetation season long growing. This would allow for more vigorous plants which would provide more over hanging cover and sediment trapping potential associated with thicker vegetative cover.

<u>Indian Creek Isolated #30653</u>
Alternative B:
Indian Creek Isolated allotment met the Rangeland Health standards and therefore did not require any management changes. However, alternative B is being analyzed in response to site specific concerns. A small portion of this isolated allotment would be combined with the Indian Creek allotment.

Issue #2: Upland and Sagebrush Steppe Habitat
The removal of approximately 0.5 miles of dysfunctional fence between the Sawlog pasture of Indian Creek allotment and the North portion of Indian Isolated allotment would reduce wildlife entanglement hazard and provide for more effective cattle disbursement. A portion of the existing fence between BLM and private may need be modified and/or improved to keep cattle in the Indian Creek allotment.

Resource Concern #2: Special Status Species Habitat
Removal of the dysfunctional fence would eliminate collision and entanglement hazards for wildlife including sage grouse, elk, moose, and mule deer. Building a new fence between the private land and BLM administered land would add a potential collision and entanglement hazard in an area where it hadn't previously existed. Building this new fence to wildlife-friendly standards would reduce the likelihood for collision and entanglement. If collisions with wires are documented, the fence would be marked to make the wires more visible.

Junction #20009
Alternative B:
Junction allotment met the Rangeland Health standards and therefore did not require any management changes. However, alternative B is being analyzed in response to site specific concerns.

Issue #1: Riparian, Wetland, Aquatic Habitat
Wetland restoration on Tex Meadow and adjacent to Lower Cabin Creek would improve wetland function by eliminating inter-hummock channels that may drain wetlands prematurely and erode organic soils. By restoring the hydrologic regime to the area it is expected to improve the quantity and quality of wetland plant species present. Further analysis is included in the *Predicted Effects Common to All Action Alternatives*.

Resource Concern #2: Special Status Species Habitat
Alkali primrose and Idaho sedge are two BLM sensitive plant species that inhabit this type of wetland environment in the Big Sheep Creek basin. Plant clearances would be completed before any ground disturbance occurs. If sensitive plants are found in the project area the site would be avoided. The wetland restoration project would be small scale and monitoring would be implemented to document habitat conditions before and after the restoration efforts.

Meadow Creek AMP #20042
Alternative B:
Meadow Creek AMP allotment met the Rangeland Health standards and therefore did not require any management changes. However, alternative B is being analyzed in response to the permittee's request. There is currently no water available for livestock in this isolated allotment due to recent fencing on adjacent deeded land. Approximately 1.2 miles of fence would be removed between Meadow Creek AMP and Meadow Creek Isolated allotment. Meadow Creek Isolated allotment would be combined with Meadow Creek AMP. This would allow cattle to continue to graze this area but disburse out to get to water.

Issue #2: Upland and Sagebrush Steppe Habitat
The uplands in the allotment were in excellent condition and met the upland health standard. Rangeland Health standards would be expected to continue to be met. By combining Meadow Creek Isolated with Meadow Creek AMP it would add 160 acres of BLM administered land to Meadow Creek AMP. Removing the fence between these two allotments would eliminate 1.2 miles of entanglement or collision hazard for wildlife such as sage grouse, elk, antelope, and moose.

Resource Concern #2: Special Status Species Habitat
Removing 1.2 miles of fence would eliminate collision and entanglement hazards for wildlife including sage grouse, elk, moose, and mule deer.

Meadow Creek Isolated #30611
Alternative B:
Issue #2: Upland and Sagebrush Steppe Habitat
Upland and sagebrush steppe habitat conditions are expected to remain in excellent condition when this parcel is included in the Meadow Creek Allotment. The upland conditions within the Meadow Creek allotment were in excellent condition under current management.

Resource Concern #2: Special Status Species Habitat
Removing 1.2 miles of fence would eliminate collision and entanglement hazards for wildlife including sage grouse, elk, moose, and mule deer.

Muddy Creek #30039
Alternative B:
Muddy Creek allotment met the Rangeland Health standards on nine of the ten pastures within this 24,288 acre allotment and therefore these nine pastures did not require any management changes. However, alternative B is being analyzed for management changes in the Contours pasture which did not meet standards and also in response to the permittee's request for other range improvement projects and some other site specific concerns.

Issue #1: Riparian, Wetland, Aquatic Habitat
Constructing an exclosure fence around the spring source in section 11 of the McNinch pasture would benefit the hydrology, hydric soils, and hydric vegetation by eliminating impacts associated with livestock grazing.

Removing the infrastructure from the dysfunctional Wyatt and Hidden Pasture spring, would improve ecological conditions by allowing the vegetative recolonization of this area.

Improving stream crossings on Muddy Creek would reduce sediment input from these sources and therefore reduce sediment aggradation and deposition downstream.

Developing Lower Lou Gulch Spring on the south end of Contours Pasture, T13sR10w sec. 28 and installing a new 1000 gallon tank off-site, would provide a clean source of livestock water on this end of an otherwise dry portion of the pasture. A larger exclosure fence would be built to include the small spring brook. This would eliminate livestock impacts to the non-functional

spring brook and facilitate expansion of riparian vegetation around the spring source as well as along the brook. Contours pasture has moderately rugged topography and has limited water sources. Cattle underutilize certain portions of the pasture and overutilize areas that provide a source of water. Providing this additional clean water source to the Contours pasture would help with better cattle disbursement throughout this pasture and most importantly reduce impacts to wetlands and small, low energy streams scattered throughout the pasture. Ehrhart and Hanson (1997) state, "The one quantifiable factor 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. 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. Riding the cattle out of the riparian/wetland habitat would also be required and is expected to decrease impacts to these small riparian/wetland areas, especially once there is available water off-site due to the proposed water development.

Deliberate riding and herding along reaches #1411, #142 and #1415 is expected to improve conditions in these site specific reaches. All other reaches within the nine pastures that met the riparian health standard are expected to be maintained (or improve) in properly functioning condition.

Issue #2: Upland and Sagebrush Steppe Habitat
Improving and/or maintaining existing fences throughout the Muddy Creek allotment would ensure that the rest rotation grazing system continues to work by keeping cattle in the authorized pastures on any given year and out of pastures that have already been utilized or are rested. It would also ensure long-term ecological sustainability of resources and the continuation of health standards being met.

Small test plots (up to 1 acre each) within the uplands of Contours pasture would be identified and soil samples would be taken and put through lab analysis to determine the most appropriate native seed mix based on soil capability. Once it is determined that the soil is capable, hand tools would be used to prepare the seed bed within the contour-plowed soil for seeding with native sage grouse preferred forbs and grasses. Since native seed generally has narrow germination and establishment requirements, a higher seeding rate would be used to increase the probability of success of the seeding. Initially, up to 25 acres would be seeded. Monitoring would be established at these sites to determine the effectiveness of the test plots. If effectiveness monitoring shows positive results, and if feasible, this protocol would be expanded incrementally to include the entire area that was once contour plowed (735 acres). If the seeding is successful, upland conditions, including cover and composition of cool-season bunchgrasses and infiltration, would improve within the test plots and additional plots would be seeded. The seeded mix of native cool-season grasses and forbs would enhance native herbaceous biodiversity and improve hydrologic conditions. The runoff/recharge equation would be

expected to favor more recharge and less runoff as hard fescue is replaced by cool-season grasses and forbs. If the seeding effort fails, the upland sites of Contours Pasture would continue to be dominated by non-native hard fescue and would not be expected to make significant or measurable progress towards PFC.

Resource Concern #2: Special Status Species Habitat
Removing approximately 0.2 miles of old dysfunctional fence around Wyatt Spring would reduce wildlife entanglement and collision hazards. Constructing a larger spring exclosure at Lower Lou Gulch Spring would add a wildlife entanglement and collision hazard, however building to wildlife-friendly standards would reduce these risks and protecting the spring would benefit wildlife through improved riparian conditions, including forb diversity for sage grouse broods. Constructing roughly 0.5 miles of temporary fence around reaches #140 and #1414 would protect the riparian area, benefiting wildlife forage and cover. The temporary one-wire electric fence would be a minor collision and entanglement hazard compared to other wire fences (i.e. four-strand barbed wire) and would only be up while cattle are in this pasture, reducing the amount of time the hazard would be on the landscape. Using a high-visibility wire/tape would further reduce the risk of collision.

If the seeding in the Contours pasture is successful, replacing the unpalatable hard fescue with native perennial forbs and grasses would add palatable forage on elk and mule deer winter range, and in bighorn sheep habitat. Nesting, hiding, and thermal cover would also be improved for sage grouse and migratory birds.

Resource Concern #8: Wilderness Characteristics
There are two projects being proposed in the Contours Pasture that are within the Wilderness Study Area (WSA) boundary. These projects are the native grass/forb seeding project in the hard fescue dominated uplands, and the Lower Lou Gulch spring development. Both of these projects would benefit the natural resources in the site specific areas and improve the wilderness characteristics of the area.

The general guidance regarding vegetation management within WSAs in BLM Manual 6330 addresses vegetation management within WSAs as follows,

"Whenever possible, natural processes will be relied on to maintain native vegetation and to influence natural fluctuations in populations. Natural disturbance processes, including fire, insect outbreaks, and droughts, are important functions of the ecosystem." (p. 1-33)

However, as described in the assessment report released in December, 2015, "Contours pasture was treated in the 1960s by first furrowing the soil and then reseeding with grasses, one of which was hard fescue. Hard fescue has since then, out-competed most all other species, creating a monoculture." Hard fescue is a non-native, introduced species that permanently altered the composition of the native vegetation in this WSA, and would continue to out-compete native vegetation without human intervention to restore the natural vegetative landscape and processes in this area.

In relevant part, the policy addresses this action with regard to "restoration" and "broad-scale landscape function" on page 1-34 of the manual;

"The vegetation of some of the landscapes in which WSAs are located has undergone intentional and unintentional human caused transformation during the modern industrialized era. In some cases, these activities have resulted in a departure from the natural composition, structure, and density of native species, with impacts to habitat quality, soil stability, and watershed function."…

"Where it meets the non-impairment standard or one of the exceptions, management action may be taken to restore vegetation to characteristic conditions of the ecological zone in which the area is situated where:

I. natural successional processes have been disrupted by past human activity, to the extent that intervention is necessary in order to return the ecosystem to a condition where natural process can function.

II. restoration through natural processes would require lengthy periods of time during which the impacted area would receive unwanted human use or be susceptible to significant soil loss without intervention, or further ecological departure would occur…"

The fact that the introduction of the hard fescue some fifty years ago has resulted in "a monoculture" suggests that it is unlikely to ever be replaced by native vegetation without additional intervention. The proposal at hand would begin in a very small plot to assess the effectiveness of this approach but, if successful, would be advocated over much, if not all of the area that was disturbed during this 1960's effort. Care would be taken to limit the surface disturbance throughout the restoration process to reduce visual impacts and discourage increased soil erosion that could result from eradication of the existing non-native grasses. If successful, the project could restore natural vegetative conditions and other natural processes to some 700 acres of the southwest portion of the Hidden Pasture WSA.

So much of the policy for management of WSAs is supportive of such a proposal that it would be difficult to include all of the relevant passages. It goes on to say that, "Restoration projects are based on landscape assessments that identify historical range of variability, current conditions, restoration targets, and cumulative effects of management." This is just such an assessment process. And, "Treatments should allow for natural processes to resume." All of these things are true of the current proposed action, and would support the proposal to try to restore the native vegetative conditions to this portion of the WSA.

The proposal to develop Lower Lou Gulch spring on the south end of the Contours pasture would also affect wilderness characteristics within the Hidden Pasture WSA. Policy guidance relative to this proposal is less clear. In fact, it is difficult to determine which portions of the policy should apply to this proposal. The policy addresses livestock developments differently depending on whether they are "Pre-FLPMA livestock developments" or "New livestock developments." (pp. 1-16 and 1-17). This project was initially developed in 2003, many years after the wilderness inventory (and therefore clearly not a pre-FLPMA livestock development),

without very much consideration of the policy at that time. Although this is now an existing project, it does not qualify as a pre-FLPMA (or grandfathered) project, so should probably be considered under the policy pertaining to new livestock developments.

"New livestock developments may only be approved if they meet the non-impairment standard or one of the exceptions, such as protecting or enhancing wilderness characteristics. In determining whether a development meets the protecting or enhancing wilderness characteristics exception, the BLM will determine if the structure's benefits to the natural functioning of the ecosystem outweigh the increased presence of human developments and any loss of naturalness or outstanding recreational opportunities caused by the new development."

Additionally, "…BLM should consider whether or not the development will be substantially unnoticeable. The project must not require new motorized access…" And finally, "In order to allow new grazing development under the grandfathered use exception, there can be no increase in the AUMs existing prior to the new development as the result of any new permanent livestock management development."

Therefore, it is worth considering whether the project should have been allowed in 2003 as a new livestock development, and perhaps apply the same test to the proposal to enlarge the project. The project could not have met the nonimpairment standard since it would involve surface disturbance and placement of a permanent structure – neither of which satisfies the nonimpairment standard. Therefore, it would have to satisfy the exception allowed for projects that protect or enhance wilderness characteristics. Historical records and file photos clearly show that the riparian areas surrounding the springs in this area were severely impacted by livestock grazing, and that the installation of the existing structures in 2003 has reduced those impacts. (Can we include some photos here showing the visual impacts of the exclosure from the 2005 file, etc. and impacts prior to construction, current impacts that warrant expanding it, etc.?)

These photos show that the project is substantially unnoticeable, built of weathered jack and rail fencing, and located at the end of an open motorized vehicle route where new motorized access is not required. When these photos were taken there was no water flowing from the spring into the spring brook. The exclosures were built around the impacted spring and did not include the brook because at

Lower Lou Gulch exclosure 9/2005. Photo looking north. No water flowing from spring.

Lower Lou Gulch exclosure 9/2005. Photo looking south. No water flowing from spring.

the time there was no water flowing in the brook and therefore no impacts. As a result of building the exclosure, the spring has healed itself creating more available water and therefore a flowing spring brook. When the site was visited last summer, 2015, the spring brook was rated by the ID team as non-functional. Expanding the size of this exclosure would extend the protected area with little additional visual impact. Benefits to the vegetation and the spring source would enhance the natural function of this area and protect the long term natural processes by allowing the native vegetation community to thrive while allowing use of the water source by wildlife and livestock. These impacts would both enhance, and detract from the existing wilderness characteristics. The installation of a water development which includes a small 0.2 mile exclosure fence and one 1,000 gallon water trough would impair wilderness values by adding a permanent man-made structure within the WSA. Location of the water trough within a dry drainage with sparse vegetative cover would reduce the potential for noticeable trampling around the water source, and its location near an existing open motorized route would confine the impacts to an area where man-made impacts already exist. Users of the open motorized route would notice the trough, but would not be using the area in the context of a wilderness experience if they are driving along that route. Users in the area for wilderness would be no more impacted by the presence of the trough than the nearby motorized route.

Current impacts to spring brook warranting the exclosure expansion directly outside the existing small exclosure on Lower Lou Gulch Spring.

The benefit to wilderness values would be the improvement of this non-functional riparian habitat both ecologically and visually. This site is immediately adjacent to an open motorized access route, and is very visible. When cattle are in this pasture this area gets heavily used and the riparian area is trampled outside of the exclosure, creating a small, but visible non-functional area of wetland. The water development and exclosure fence would keep cattle off of the riparian area and they would have a clean off-site source of water at the trough.

<u>Muddy Creek #30039</u>

Alternative C:

Issue #1: Riparian, Wetland, Aquatic Habitat

Alternative C would eliminate livestock grazing for the next ten years in the Contours pasture where the riparian health standard was not met. AUMs would be reduced in the allotment from 1154 to 1066.

Resting the Contours pasture would give wetlands #1421, 140, and 1414 an opportunity to improve/recover. 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. Livestock exclusion has shown to be the most effective way to recover a riparian zone (Elmore and Kauffman 1994). Improvements to stream reaches #378 and #1600 would improve conditions more quickly under this alternative than Alternatives A or B.

Deliberate riding and herding along reaches #1411, #142 and #1415 is expected to improve conditions in these site specific reaches. All other reaches within the nine pastures that met the riparian health standard are expected to be maintained (or improve) in properly functioning condition.

Issue #2: Upland and Sagebrush Steppe Habitat
All uplands in all pastures except Contours pasture, with in this 24,288 acre allotment were PFC. Grazing use in the Contours pasture would be eliminated for the next 10 years. We expect the nine other pastures to continue to be in PFC.

Removing domestic livestock from the Contours pasture 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. The no grazing alternative would also result in a build-up of fine fuels. An increase in fine fuel loading could result in higher intensity, size, and/or severity should a fire event occur. While returning fire to the landscape as a natural disturbance agent has positive ecological benefits, a high severity wildfire could also lead to some negative impacts to upland and riparian habitat (eg. sediment input, down cutting, erosion) depending on the location and size of the fire in the drainage. Soils in the Contours pasture are rhyolite, which is a very erosive soil type.

Resource Concern #2: Special Status Species Habitat
The expected improvement of riparian areas due to eliminating livestock grazing on BLM administered lands within the Contours pasture would likely increase forb availability for wildlife, including sage grouse broods, and herbaceous and riparian shrub nesting, thermal, and hiding cover. The uplands would also have an increase in herbaceous cover and forage, including for elk and mule deer winter range, as well as bighorn sheep habitat. In the absence of livestock grazing, forage quality may be reduced if decadent bunchgrasses buildup, hindering the release and growth of new bunchgrasses and forbs in the spring.

Removing 0.2 miles of fence associated with Wyatt Spring would remove the collision and entanglement hazard for wildlife, providing easier access to the spring area. See predicted effects under Alternative B for rehab of hard fescue seeding.

Resource Concern#5: Socioeconomics
Livestock grazing would be eliminated from the Contours pasture for the next 10 years. This would reduce the authorized use by 88 AUMs. Montana State University has shown that a single AUM on private land is worth about $20-25. To replace these lost AUMs, the permittee would have to spend at least $1,760- 2,200 assuming the permittee could find available pasture within a reasonable distance to his existing operation. This action would reduce the flexibility in the permittees operations and either result in increasing grazing on private land or reducing the herd size.

Eliminating livestock grazing from public lands has mixed social effects. For the segment of public land users, who make their living in agriculture and understand the benefits and effects of properly managed herbivory on the land, removing livestock grazing from public land generally has a negative social impact. For the segment of public land users who do not make their living in agriculture and like to use their public land for other uses (e.g recreation, solitude), removing livestock grazing from public land generally has a positive social impact.

In order to implement the no grazing alternative on the BLM administered lands in the Contours pasture for the next 10 years, the BLM would have to rebuild or maintain about seven miles of fence to separate this pasture from the surrounding pastures within the Muddy Creek allotment. The fence needed to keep Contours pasture separate from the rest of Muddy Creek allotment is located in rugged, steep topography. A reasonable estimate to rebuild and/or maintain seven miles of fence for the next ten year would exceed approximately $50,000.

Resource Concern #8: Wilderness Characteristics
Under Alternative C, there would be no grazing authorized in the Contours pasture within the Hidden Pasture Creek WSA for the next 10-year grazing cycle and AUMs would be reduced within the Muddy Creek allotment to address the loss of this pasture. Livestock grazing within wilderness is often referred to as a "non-conforming permitted use" because domestic livestock are not a natural component of any wilderness ecosystem, but the continuation of grazing in wilderness was specifically authorized within the Wilderness Act subject to the grazing regulations. Wilderness characteristics would be enhanced by the elimination of a non-conforming use, and the need for expansion of the Lou Gulch exclosure would most likely be deemed unnecessary. It might even be reasonable to predict that the exclosure could be removed, further enhancing wilderness characteristics by removing a man-made structure. This would be the preferred alternative for management of the WSA for wilderness characteristics.

Also proposed within Alternative C is the use of prescribed fire treatments within the WSA. "Treatments identified within wilderness study area boundaries would be confined to mainly broadcast fire with little or no mechanical modification to ensure protection and enhancement of wilderness characteristics" (Chapter 2).

<u>Pine Creek #30001</u>
Alternative B:
Issue #1: Riparian, Wetland, Aquatic Habitat
Incorporating a rest-rotation grazing season would afford the BLM pasture of Pine Creek allotment rest one out of every three years. This pasture would also have a total reduction of 60

AUMs. Enforcing a full year of rest one out of every three years would help facilitate natural stream restoration. Sedges would replace brook grass along stream banks and browsing of willows by livestock would decrease. Physical improvements to stream channels would take time, however, and vary depending on stream characteristics such as amount of water, gradient, substrate, etc. Over time channels would be expected to narrow and water tables to rise. Impacts from cattle on stream banks, resulting in sediment inputs, vary with the season of use. Research indicates that impacts to channel morphology appear related to the seasonal trend in soil moisture. As stream bank moisture levels decline during the summer, the extent of channel alteration also declines. Rotating season of use in pastures containing riparian habitat would prevent consecutive early season riparian use and reduce channel changes caused by hoof action. The duration of grazing is a critical factor in managing riparian habitat. Studies have shown that limiting the duration of grazing days is successful in maintaining or improving riparian conditions (Myers 1989a). Also, season of use effects cattle distribution relative to riparian habitat with late summer pastures having more concentrated use of riparian vegetation (Parson et al. 2003). More uniform distribution occurs either early or late in the season, so a seasonal rest-rotation system would distribute more uniformly varying levels of utilization across pastures and riparian habitat.

Changing the kind of livestock from cow/calf cattle to yearling cattle during fall use is expected to benefit the issues related to riparian health because yearling cattle better utilize the uplands and don't linger in the riparian areas as often as cow/calf pair do.

The proposed installation of another off-site watering source in the southeastern portion of the BLM pasture would help distribute cattle in the uplands and lessen time spent in the riparian/wetland habitat along Pine Creek, Deadman Creek, and Nicholia Creek. Locating the water trough in an already disturbed site would mitigate the impacts to sage grouse habitat in this area. Providing an alternative watering site, in a suitable location, is an effective tool for limiting the amount of time cattle spend in riparian areas. Adding a watering site in the southeastern portion of the pasture would encourage cattle distribution in the uplands and away from the sensitive riparian areas in need of improvement.

Installing a culvert on stream reach #123 and removing a culvert on reach #126 would reduce sediment input from these sources and therefore reduce sediment aggradation and deposition downstream.

Wetland restoration on the wet meadow would improve wetland function by eliminating inter-hummock channels that may drain wetlands prematurely and erode organic soils. By restoring the hydrologic regime to the area it is expected to improve the quantity and quality of wetland plant species present.

Issue #2: Upland and Sagebrush Steppe Habitat
The uplands in the allotment were in good condition and met the upland health standard.

Yearling cattle utilize pastures more uniformly over variable terrain than cows with calves. During the fall use yearling cattle would utilize this pasture and some areas of the uplands would see more use, while other areas nearer to water would have less use. The uplands in this

allotment are very healthy and are expected to maintain this state even with increased utilization under a rest rotation grazing system.

The new livestock watering trough would be placed in the southeastern portion of the pasture in the uplands to reduce grazing pressure off of the three stream reaches below. We expect increased grazing use in the immediate vicinity (1/4 mile) of the trough in the uplands after the project is completed. However, the reduction in authorized grazing AUMs and complete rest once every three years in the pasture should compensate for any increase in grazing use in the vicinity of the livestock trough in the uplands.

Resource Concern #2: Special Status Species Habitat
Alkali primrose and Idaho sedge are two BLM sensitive plant species that inhabit wetland environments in the Big Sheep Creek basin. Plant clearances would be completed before any ground disturbance occurs. If sensitive plants are found in the wetland restoration project area the site would be avoided. The wetland restoration project would be small scale and monitoring would be implemented to document habitat conditions before and after the restoration efforts.

Pine Creek allotment provides some mule deer and elk winter range. Potential reduction in forage available on winter range following fall grazing would have negligible effects on wintering big game since a vast amount of winter range is available throughout the area. The reduction of 60 AUMS and change to yearling cattle during the fall would also reduce impacts for wintering big game, with more uniform utilization and the expected maintenance of healthy upland conditions.

The proposed ten acres of wetland restoration would likely occur between February 15 and April 1 on big game winter range. The short duration, small scale disturbance of this restoration in relation to available big game winter range, reduces the likelihood that wintering big game would be negatively impacted.

<u>Pine Creek #30001</u>
Alternative C:
Issue #1: Riparian, Wetland, Aquatic Habitat
Alternative C is the same as Alternative B only it reduces the number of grazing days in the pasture even more, and reduces the number of authorized cattle. The predicted effects would be the same as Alternative B only the shorter duration of use and fewer cattle, followed by rest one out of every three years, is expected to enhance deep rooted riparian species and improve stream bank stability more quickly, while reducing sediment inputs into streams.

Constructing a 3.5 mile temporary fence to create an approximate 100 acre riparian pasture that includes both BLM and FS administered land on Pine Creek would reduce livestock impacts to Pine Creek and facilitate expansion of riparian vegetation along the creek. Exposed banks along the creek would quickly re-vegetate making them less susceptible to erosion. Sediments suspended in the creek would be trapped and bank building would occur. Over time, Pine Creek's channel would narrow and the creek would deepen along this short section of stream. Grazing one every three years for seven days would be sustainable if the streambanks have dried sufficiently before cattle graze inside the exclosure.

Issue #2: Upland and Sagebrush Steppe Habitat
The predicted effects are the same as Alternative B.
Resource Concern #2: Special Status Species Habitat
Predicted impacts would be the same as Alternative B, with upland and riparian conditions likely improving more with a reduction in the number of authorized cattle and grazing days. Constructing 3.5 miles of temporary fence would improve riparian vegetation for wildlife forage, nesting, hiding, and thermal cover. Although adding fencing to the landscape creates a collision and entanglement hazard for wildlife, a temporary electric fence utilizing high visibility wire or tape is less of a hazard than a three or four-strand barbed wire fence.

Porcupine Canyon #20107
Alternative B:
Issue #1: Riparian, Wetland, Aquatic Habitat
Alternative B would create a riparian pasture that would include reaches 161,159, 160, 163, and wetland 1463 and 1464 that failed the riparian standard. A deferred rest rotation system would be implemented and three of the four pastures would receive complete rest once every third year. AUMs would be reduced from 247 to 181. The newly created riparian pasture would be grazed no more than fourteen days on the years it is scheduled to be grazed. Wetland 1460 and spring brook 746 in the Island Butte pasture would be fenced out from grazing with a four wire exclosure fence.

Excess streambank impacts cause channels to widen and become shallow and reduces the streams ability to efficiently transport sediments. Micro-habitats, such as riffles and pools, can be impacted as channel bottom embeddedness increases and pools are lost (Clary and Leninger 2000). Incorporating a three pasture rest-rotation grazing system, reducing the season of use by fourteen days, and limiting the grazing time in the North Porcupine Riparian pasture to fourteen days would help facilitate natural stream restoration. Pastures receiving a full year of rest once every third year would respond favorably, sedges would replace brook grass along stream banks and browsing of willows by livestock would decrease. Reducing the amount of time that cattle spend in the riparian zone would reduce impacts to the stream channel and riparian vegetation. Physical improvements to stream channels would take time, however. Over time channels would be expected to narrow and water tables to rise. Impacts from cattle on stream banks, resulting in sediment inputs, vary with the season of use. Research indicates that impacts to channel morphology appear related to the seasonal trend in soil moisture. As stream bank moisture levels decline during the summer, the extent of channel alteration also declines. Rotating season of use in pastures containing riparian habitat would prevent continuous early season riparian use and reduce channel changes caused by hoof action. Also, season of use affects cattle distribution relative to riparian habitat with late summer pastures having more concentrated use of riparian vegetation (Parson et al. 2003). More uniform distribution occurs either early or late in the season, so a seasonal rest-rotation system would distribute more uniformly varying levels of utilization across pastures and riparian habitat.

Expanding the Island Butte Spring exclosure to incorporate the small spring brook, installing an exclosure around the wetland #1460, and assuring that the flow is regulated at the spring would

benefit long-term ecological sustainability of these resources, including hydrology, hydric soils and hydric vegetation.

Wetland restoration on Island Butte Wetland would improve wetland function by eliminating inter-hummock channels that may drain wetlands prematurely and erode organic soils. By restoring the hydrologic regime to the area it is expected to improve the quantity and quality of wetland plant species present.

Improving the identified stream crossings on Reach #746 and on Porcupine Creek would reduce sediment input at the crossings and therefore reduce sediment aggradation and deposition downstream.

Issue #2: Upland and Sagebrush Steppe Habitat
The rest that would occur one out of every three years in three of the four pastures would give upland plants a chance to recover from the previous year's grazing event and result in improved plant health. This deferred rest-rotation grazing system would allow livestock grazing during active growing season only one in three years and is expected to increase vigor, composition and cover of cool season grasses and reduce erosion. Cyclic movement of livestock through pastures allows plants to carry out photosynthetic processes and assist in seed dissemination and seedling establishment (Mccarthy, J.J, 2003). The Corral pasture met all health standards, it would continue to be used every year as before, but it would be grazed at a different time each year of the grazing cycle.

Resource Concern #2: Special Status Species Habitat
Resting the Idaho sedge (*Carex idahoa*) and Alkali primrose (*Primula alcalina*) populations occurring within the North Porcupine Riparian pasture from livestock grazing one out of every three years and limiting grazing to no more than 14 days (that may or may not occur during the growing season) should allow for maintenance if not expansion of this population. The grazing management proposed under alternative B is expected to at least maintain this population of Idaho sedge and Alkali primrose because sedges are adapted to grazing and can persist with light to moderate grazing pressure and grazing can be positive by partially removing the overtopping canopy of grasses and sedges, allowing more light to reach the leaf rosettes of the alkali primrose. Light to moderate trampling by livestock may benefit alkali primrose by creating micro habitats on the tops and sides of the hummocks. The proposed grazing management changes in alternative B would create a good balance of livestock grazing and rest from grazing for the habitat for these sensitive plants to thrive in. Trend monitoring would be established in these sites to determine how/if management changes effect these sensitive plants.

Plant clearances would be completed before any ground disturbance occurs. If sensitive plants are found in the wetland restoration project area the site would be avoided. The wetland restoration project would be small scale and monitoring would be implemented to document habitat conditions before and after the restoration efforts.

Implementing a rest rotation grazing system and reducing permitted AUMs, as well as constructing a new 3-wire, 1.4 mile fence to create a riparian pasture to be grazed 14 days on the years it is not rested, would improve riparian and upland habitat conditions for wintering elk and

antelope, pygmy rabbits, and sage grouse. The fence would be built within less than a mile from a sage grouse lek. Segments with a high risk for collision would be marked for visibility, especially in this high use area for sage grouse. This fence and the 1.25 miles of 4-wire exclosure fence around wetland #1460 and spring brook #746 would be built to wildlife-friendly specifications to reduce entanglement and the potential for the fences to be barriers for calves and fawns, as well as antelope. The construction of these fences adds a movement barrier and risk for entanglement and collision to big game winter range and sage grouse breeding habitat. Livestock grazing during sage grouse and migratory bird nesting season may reduce herbaceous nesting cover. See Resource Concern #2: Special Status Species Habitat under section 4.2.1 above for additional discussion about livestock grazing during the nesting season.

<u>Porcupine Canyon #20107</u>
Alternative C:
Issue #1: Riparian, Wetland, Aquatic Habitat
Alternative C is the same as Alternative B only there would not be a riparian pasture created. There would be three pastures which would receive complete rest from grazing every third year. The Porcupine pasture would be grazed up to 21 days on years that it was scheduled to be grazed. AUMs would be reduced from 247 to 101. The predicted effects would be the same as Alternative B only riparian improvement time would be slower in the Porcupine pasture due to the higher number of grazing days.
Issue #2: Upland and Sagebrush Steppe Habitat
The predicted effects are the same as Alternative B. Each of the three pastures would receive complete rest from grazing every third year.

Resource Concern #2: Special Status Species Habitat
The predicted effects are the same as Alternative B, without the 1.4 mile riparian pasture fence creating an entanglement and collision hazard, and adding a potential barrier for calves, fawns, and antelope.

<u>Porcupine Canyon #20107</u>
Alternative D:
Issue #1: Riparian, Wetland, Aquatic Habitat
Alternative D would eliminate livestock grazing for the next ten years in the Porcupine Canyon allotment where the riparian health standard was not met. AUMs would be reduced in the allotment from 247 to 0.

Resting the Porcupine Canyon allotment would give riparian reaches #161, 159, 160 and 746 and wetlands #1464, 163, 1460, and 1463 an opportunity to improve/recover. 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. Livestock exclusion has shown to be the most effective way to recover a riparian zone (Elmore and Kauffman 1994). Improvements to the above mentioned stream reaches and wetlands would transpire more quickly under this alternative than Alternatives A, B, or C.

Issue #2: Upland and Sagebrush Steppe Habitat
The uplands in the allotment were in good condition and met the upland standard. Grazing use in the allotment would be eliminated for the next 10 years, so we would expect uplands to be maintained in PFC. The no grazing alternative would result in an increase of fine fuels. This additional fuel loading could increase the intensity, severity, and fire size within the watershed, should a fire event occur. While returning fire to the landscape as a natural disturbance agent has positive ecological benefits (eg. seral diversity), a high severity wildfire could also lead to some negative impacts (eg. stream sedimentation, erosion, noxious weed establishment) within the watershed.

Resource Concern #2: Special Status Species Habitat
This no grazing alternative could have a negative effect on alkali primrose populations within this allotment. Alkali primrose prefers to grow on the tops and sides of more exposed hummocks in wetland habitats. If grazing from livestock is completely removed from this area for the next ten years, a thick canopy of sedges, grasses and forbs would develop due to the lack of grazing. This canopy would block these small plant species from getting sunlight and eliminate specific micro habitats that these rare plants prefer and thrive in.

Alternative D would increase herbaceous forage available for wintering elk, as well as forbs in riparian areas for sage grouse and antelope, and herbaceous nesting cover for sage grouse and migratory birds, as well as pygmy rabbit cover and summer forage. 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. Constructing 1.25 miles of 4-wire fence on the BLM/private boundary would add a barrier and collision and entanglement hazard to the landscape. Building the fence to wildlife-friendly standards and marking high collision risk segments would reduce these impacts.

Resource Concern#2: Socioeconomics
The Porcupine Canyon allotment would be rested for the next 10 years. This would reduce the authorized use from 247 to 0 AUMs. Montana State University has shown that a single AUM on private land is worth about $20-25. To replace these lost AUMs, the permittee would have to spend at least $4,940 - $6,175 assuming the permittee could find available pasture within a reasonable distance to his existing operation. This action would reduce the flexibility in the permittees operations. The lessee may be forced to operate with fewer livestock, graze private and/or other available lands more, or even possibly sell the 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).

Eliminating livestock grazing from public lands has mixed social effects. For the segment of public land users, who make their living in agriculture and understand the benefits and effects of properly managed herbivory on the land, removing livestock grazing from public land generally has a negative social impact. For the segment of public land users who do not make their living in agriculture and like to use their public land for other uses (e.g recreation, solitude), removing livestock grazing from public land generally has a positive social impact.

In order to rest the BLM administered lands in the Porcupine Canyon allotment for the next 10 years, approximately 1.25 miles of fence would need to be constructed and approximately 4.5 miles of existing fence would need to be maintained annually to effectively control livestock for accessing BLM administered lands from the private lands in the allotment. The normal cost for a mile of fence in flat, non-rocky ground is about $10,000.00. However, the fence needed to fence out private lands within the Porcupine Canyon allotment would be located in some rocky areas and steep terrain. In addition, the fence would be in a fairly remote area in the Big Sheep Creek basin about 60 miles away from most fencing contractors. A reasonable estimate to build a mile of fence in this location would be around $18,000.00. In addition, BLM would still incur monitoring costs to monitor compliance to no grazing in this allotment.

<u>Rio Puerco #10700</u>

Alternative B:

Issue #1: Riparian, Wetland, Aquatic Habitat

Rio Puerco allotment met all five standards for a healthy rangeland and therefore did not require any management changes. However, alternative B is being analyzed in response to the permittee's request. This alternative would change the grazing period to fit within the new permittee's operation more effectively and to avoid livestock grazing during the general hunting season, therefore reducing user conflicts. Due to the excellent condition of the resources within this allotment BLM is proposing to increase authorized cattle number from 82 to 100 and reinstate 53 of the suspended AUMs.

Reach #1491 of Muddy Creek is the only "live" stream watering source in the Rio Puerco allotment currently and it was rated PFC. Alternative B would propose to fence this section of Muddy Creek in with the adjacent Muddy Creek Exclosure and install a hardened water gap. This would ensure that the only watering source on this end of the pasture would continue to meet BLM standards while at the same time continue to provide a well armored watering source for cattle on this portion of the allotment. Constructing a hardened water gap along Muddy Creek would reduce livestock impacts to the creek by limiting access by livestock. This would reduce streambank trampling and allow riparian vegetation more opportunity to colonize the sediment deposits associated with the annual flooding of Muddy Creek and build streambanks. As a result of the 2004 Big Sheep Creek Watershed Assessment and 2005 Decision, active AUMs were reduced in the Rio Puerco Allotment from 852 to 222 (74% reduction) due to the

riparian health standard not being met on Muddy Creek. Since then, Muddy Creek has been fenced and along with the proposed extension of the corridor fence, cattle no longer have access to Muddy Creek (or other riparian habitat within the allotment). Therefore, we are proposing to authorize 275 AUMs to be able to harvest a little more of the ample forage within this allotment. This is still a 68% reduction from the pre-2005 authorized grazing use.

Issue #2: Upland and Sagebrush Steppe Habitat
The uplands in the Rio Puerco allotment were rated PFC and are in excellent condition. The current authorized AUMs in the Muddy Creek and Red Dirt pastures in this allotment are 222 and the stocking rate is 25 acres per AUM (see Table 2.1 in Chapter 2); this alternative would be to reinstate 53 AUMs on the Muddy Creek and Red Dirt pastures, for a total of 275 AUMs. This would change the stocking rate to 20 acres per AUM. Due to the excellent condition of the uplands and the ample available forage, this grazing management change would be expected to have little effect on the health of the uplands and would be expected to continue to meet the upland standard.

Redeveloping the YA Bar Spring in Rock Canyon, in the Northwest Corner of the allotment and the Red Dirt Spring which originates in the Muddy Creek allotment would provide good upland watering sources for cattle. These water developments are crucial to create good distribution of cattle throughout the uplands of this allotment by providing dependable water.

Changing the type of livestock authorized in the Shearing Pen pasture from horses to cattle but keeping the authorized AUMs the same at 32 would be expected to maintain the PFC condition of the uplands.

If the permittee is successful at drilling a well and finding water in the Shearing Pen pasture it would improve the grazing system in the entire Rio Puerco allotment by providing an opportunity to graze this pasture while resting one of the other three pastures within the allotment.

Resource Concern #2: Special Status Species Habitat
Adding 0.2 miles of 4-wire fence to the exclosure around reach #149 to include reach #1491 would have a negligible impact since the exclosure already exists and is only being extended. Likewise, constructing 0.15 miles of fence for a water gap would likely not impact wildlife as much as a water gap and associated riparian improvement would benefit habitat. If collisions are documented, the fence would be marked for visibility. Installing up to 1.5 miles of temporary electric fence would create a minor collision and entanglement hazard for wildlife. However, utilizing high visibility wire or tape would reduce these risks. This fence design is more wildlife-friendly than other designs (i.e. page wire or four-strand barbed wire).

<u>Rock Creek Isolated #20698</u>
Alternative B:
Issue #1: Riparian, Wetland, Aquatic Habitat
Changing the grazing period in this custodial allotment from 6/15 – 11/30 to 4/15 – 6/ 30 and limiting the days grazed to not more than thirty days would reduce the length of time that cattle have access to the riparian area and reduce livestock impacts. The riparian area along Meadow

Creek reach #133 would be expected to improve. Monitoring would be implemented to detect if this new grazing plan is improving riparian conditions. If no improvements are detected within three years, a 0.3 mile fence would be constructed to fence out these 14 acres of BLM administered land within the Rock Creek Isolated allotment. A hardened water gap would be installed along this fence to continue to provide a watering source for cattle. If riparian conditions don't improve in three years and the 0.3 mile fence is built then improvements in riparian vegetation would be expected over the short term. Over the long term, stream channel morphology (sinuosity, width/depth ratio) would be expected to approach reference condition.

Resource Concern #2: Special Status Species Habitat
Changing the grazing season from 6/15-11/30 to 4/15-6/30 moves cattle into the allotment earlier in the sage grouse and migratory bird nesting season. This 14 acre allotment of BLM administered land is largely riparian habitat and is unlikely to accommodate very much sage grouse nesting. Cattle would be out of the allotment during late brood rearing when riparian forbs are essential for sage grouse chick diets. Construction of a jack and rail fence would reduce collision and entanglement hazards for wildlife. Raptor perching opportunities would be increased with this fence design, which may affect sage grouse broods potentially foraging along the riparian area.

<u>Rock Creek Isolated #20698</u>
Alternative C:
Issue #1: Riparian, Wetland, Aquatic Habitat
The predicted effects are the same as if a 0.3 mile fence has to be built in Alternative B.

Resource Concern #2: Special Status Species Habitat
Predicted impacts would be the same for 0.3 miles of jack and rail fence construction. No livestock grazing during the nesting season would increase the amount and height of herbaceous cover available for migratory birds.

<u>Simpson Creek FS #30207</u>
Alternative B:
Issue #1: Riparian, Wetland, Aquatic Habitat
The combination of decreasing the number of grazing days in the Coyote pasture by 14 days, continuing complete pasture rest every third year, constructing riparian exclosures, and increasing riding by permittee would improve riparian conditions along reach #118, 119, 117, and 170 that did not meet the riparian health standard. Tex Creek #175 would be expected to remain in PFC.

The construction of an exclosure around the bottom of Coyote Creek #119 would exclude it from grazing except for minimal use trailing in and out of the allotment. The exclosure would eliminate livestock related impacts within the riparian area. Eliminating grazing impacts from this riparian area would result in increased cover and composition of deep rooted vegetation, along with a reduction in bare ground. In addition, protecting the hydric soils from hoof impacts would ameliorate soil compaction, pugging and hummocking within the riparian area and allow more effective ground water recharge within this area.

Constructing a 1.7 mile four wire fence to create a 25 acre riparian pasture to protect reach #117 would reduce livestock impacts to the creek and facilitate expansion of riparian vegetation along it. Exposed banks long the creek would quickly vegetate making them less susceptible to erosion. Sediments suspended in the creek would be trapped and bank building would occur. Over time, the channel on reach #117 would narrow and the creek would deepen. Grazing once every third year for up to 2 days would be sustainable and have negligible impacts to the riparian habitat.
Resource Concern #2: Special Status Species Habitat
Constructing two four-wire fences around the riparian reaches #119 and #117 creates a potential barrier and entanglement or collision hazard in a habitat that is highly used by wildlife. Building to wildlife-friendly specifications would reduce these hazards. If collisions are documented, the fences would be marked for visibility. Installing one mile of temporary polywire fence around reach #170 would add a minimal collision and entanglement hazard for wildlife. Using high visibility polywire would reduce collision risk and is a more wildlife-friendly fence design compared with others, such as page wire or four-strand barbed wire.

<u>Simpson Creek FS #30207</u>
Alternative C:
Issue #1: Riparian, Wetland, Aquatic Habitat
Alternative C would reduce the number of cattle by 35, the number of grazing days by 15, and the AUMs by 51. These reductions would reduce grazing impacts to riparian vegetation, the stream channel and reduce sediment inputs into the streams. No exclosure fences would be built in this alternative so the improvements to the riparian areas would be slower, because although impacts would be reduced they would still be occurring but would be less than alternative A.
Resource Concern #2: Special Status Species Habitat
The collision and entanglement hazards, as well as movement barriers for wildlife would not be added to the landscape under Alternative C, compared to the proposed fence construction under Alternative B.

4.2.5 Predicted Effects of Non-Commercial Mechanical/Prescribed Fire Treatments
Alternative B:
Resource Concern #2: Special Status Species Habitat
Acreage within the non-commercial mechanical/prescribed fire treatment units is conservative in relation to the surrounding sage grouse habitat and landscape. Under alternative B, the treatment units comprise 0.7% of the total acreage and 2.4% of BLM administered acreage in the watershed . These units comprise 1.2% of total and 2.9% of BLM administered sage grouse PHMA acreage in BSCW. There is one active (on BLM administered land) and one unconfirmed (on private property) sage grouse lek in the Muddy Creek allotment. The unconfirmed status means that data is insufficient to classify it as an active lek and there hasn't been activity at this lek for over seventeen years. There is actually no documentation of displaying males at this location. Distance of the nearest unit boundaries to the active lek range from 1.2 to 4.2 miles. Sage grouse breeding habitat is considered within 11 miles of a lek for migratory populations and 3.1 miles for nonmigratory populations (Stiver et al. 2015, pg. 24). Although these units are within breeding habitat, areas with conifer encroachment are considered unsuitable habitat if conifer canopy cover is greater than 4% and marginal habitat if the seasonal habitat exhibits some degree of conifer encroachment (Stiver et al. 2015, pg. 16). Since these units are being treated for conifer expansion and are unsuitable sage grouse habitat, hens are

unlikely to use these areas for nesting and brood-rearing. See Resource Concern #2: Special Status Species Habitat above under section 4.2.3 for additional discussion about sage grouse, conifer expansion, and prescribed fire treatment.
To retain sagebrush habitat for the long-term, the temporary disturbance of prescribed fire treatment during sage grouse lek season would occur. Treatment would not occur between 6:00 p.m. and 9:00 a.m. to reduce disturbance to lekking birds. Units would not all be treated at the same time nor during the same year. While fall burning is an option, spring burning is more commonly utilized since more personnel are available, vegetation is dormant at the higher elevations, spring precipitation is more assured, green-up ensures more foliar moisture, and there is more soil moisture which reduces impacts to soil and cryptograms. All of these factors make fires easier to control and less likely to escape, while burning the desired vegetation without negatively impacting soils. While vegetation is also dormant in the fall, there is less soil moisture and chances for precipitation are more inconsistent, which increases the amount of time and resources needed to control and monitor the fire.

Due to the conifer expansion creating unsuitable habitat and deterring sage grouse from using the treatment units, disturbance to sage grouse within these units is unlikely. While individuals and habitat may be impacted, treatment would not contribute to a trend towards federal listing or cause a loss of viability to the population or species. Overall, utilizing mechanical/prescribed fire treatments would transition this habitat that is currently unsuitable for sage grouse into more suitable seasonal sage grouse habitat. Without treatment this would transition into forested habitat and not be suitable for sage grouse again in the foreseeable future. These treatments have been planned with full interdisciplinary input and coordination with the local MFWP wildlife biologist.

All of the units are within elk winter range and one unit is within mule deer 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 potentially 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.

Pygmy rabbits have not been documented within any of the treatment units. Special status species surveys would occur prior to implementation to reduce impacts to these species through avoidance or timing stipulations.

Resource Concern #3: Noxious and Invasive Species
Burning could increase the size and density of any noxious or invasive species in the area in the short term, but the mitigation measures being implemented before treatment and after would reduce the risk of spread.

Alternative C:
Resource Concern #2: Special Status Species Habitat
Impacts would be the same as listed above under Alternative B and section 4.2.3 Resource Concern #2: Special Status Species Habitat, with an additional 982 acres of non-commercial mechanical/prescribed fire units. Under Alternative C, the treatment units comprise 1.3% of total acreage and 4.2% of BLM administered acreage in the watershed. These units comprise 1.8% of total and 4.3% of BLM administered sage grouse PHMA acreage in BSCW. Alternative C also has one treatment unit within a sage grouse general habitat management area (GHMA), comprising 1% of total GHMA acreage and 4.7% of BLM administered GHMA in the watershed. The one additional unit within PHMA is roughly 2.2 miles from the active lek in this allotment and within bighorn sheep habitat and mule deer winter range. Reducing conifer expansion and susceptibility for this habitat to transition into forest would retain sagebrush grassland habitat with greater visibility and preferred forage (grasses, forbs and shrubs, including sagebrush for winter forage) for bighorn sheep. Both additional units under this alternative are within elk winter range.

Resource Concern #3: Noxious and Invasive Species
Burning could increase the size and density of any noxious or invasive species in the area in the short term, but the mitigation measures being implemented before and after treatment would reduce the risk of spread.

4.2.6 Predicted Effects of Travel Management Alternatives B and C

Alternatives B & C
Under all action alternatives, stream crossings would be improved on all designated open routes. This would reduce sediment to the streams and make it easier for motorized vehicles to cross the streams.

Also, BLM would install hiker and horse-accessible gates at key locations to allow horseback and foot travel while restricting motorized travel on routes closed to motorized use. This would allow recreationists to continue to use the public lands for recreational uses appropriate for this area. The locations of these gates would be on routes that have been closed to motorized travel for more than ten years, but have continued to be used. Most of this use has been by recreationists who are either unaware or unconcerned about the regulations and the impacts of their use on other recreationists, habitat and wildlife. Physically blocking the illegal and inappropriate use of these lands should help ensure quality recreation opportunities and more secure wildlife habitat.

Installation of informational kiosks at key locations within the watershed should help to reduce motorized travel violations by that segment of the populations that violates the travel restrictions because they are unaware that the regulations exist. At the very least, it would eliminate one of the excuses for illegal off-road vehicle use within the watershed.

Obliteration or reclamation of user-created routes would also help to reduce illegal off-road travel. The objective of this action is to eliminate the visual impact of the route to reduce the temptation for users to drive on previously-driven, albeit illegal, routes. If the users don’t notice

a previously used route, they would be less likely to drive it. If this is done effectively, it could prove more useful than signing routes closed since people who don't really care just drive around, or over those signs to get where they want to go.

Finally, barricading or obstructing closed routes that have continued to be heavily used would at least cause violators to reconsider before proceeding on those routes. Depending on the extent of the barricade or obstruction, determined violators would at least need to take the time to dismantle or move it, and would clearly demonstrate intent to violate the closure. This should help law enforcement to create fool-proof cases for their citations and possibly elevate the fines for violators. Over time, if the public becomes aware of the cost of the violations, unethical users may reconsider the wisdom of violating the travel restrictions in the area.

Resource Concern #3: Noxious and Invasive Species
Limiting access to closed routes would reduce the spread of noxious weeds within those areas, which is the most prevalent source of weed spread within the watershed.

4.2.7 Comparative Effects for All Alternatives by Issue or Resource Concern

Table 4.1: 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	Alternative D
Crystal Creek	No Change	No effect.	No Alternative C	No Alternative D
Dixon Mountain	No Change	Sediment from water gap and streambank would be reduced.	No Alternative C	No Alternative D
Indian Creek	No Change	Reduce sediment from road crossings.	No Alternative C	No Alternative D
Indian Creek Isolated	No Change	No effect.	No Alternative C	No Alternative D
Junction	No Change	Wetland restoration would improve wetland function and the quantity and quality of wetland plants.	No Alternative C	No Alternative D
Meadow Creek AMP	No Change	No discernable effect.	No Alternative C	No Alternative D
Meadow Creek Isolated	No Change	No discernable effect.	No Alternative C	No Alternative D
Muddy Creek	No Change	Improvement of ecologic conditions at developed spring.	Alternative C would eliminate livestock	No Alternative D

		Removing the infrastructure from the dysfunctional Wyatt and Hidden Spring would improve ecological conditions by allowing the vegetative recolonization of this area. Improving stream crossings on Muddy Creek would reduce sediment input from these sources and therefore reduce sediment aggradation and deposition downstream. Developing Lower Lou Gulch Spring on the south end of Contours Pasture would provide a clean source of livestock water on this end of an otherwise dry portion of the pasture and eliminate livestock impacts to the non-functional spring brook and facilitate expansion of riparian vegetation around the spring source as well as along the brook.	grazing for the next ten years in the Contours pasture where the riparian health standard was not met. AUMs would be reduced in the allotment from 1154 to 1066. Resting the Contours pasture would give wetlands #1421, 140, and 1414 an opportunity to improve/recover.	
Pine Creek	No Change	This pasture would have a total reduction of 60 AUMs. Incorporating a full year of rest one out of every three years would help facilitate natural stream restoration. Sedges would replace brook grass along stream banks and browsing of willows by livestock would decrease. Over time channels would be expected to narrow and water tables to rise.	Alternative C is the same as Alternative B only it reduces the number of grazing days in the pasture even more, and reduces the number of authorized cattle. The predicted effects	No Alternative D

		Changing the kind of livestock from cow/calf cattle to yearling cattle during fall use is expected to benefit the issues related to riparian health because yearling cattle better utilize the uplands and don't linger in the riparian areas as often as cow/calf pair do. The proposed installation of another off-site watering source would help distribute cattle in the uplands and lessen time spent in the bottoms along Pine Creek, Deadman Creek, and Nicholia Creek. Wetland restoration would improve wetland function and the quantity and quality of wetland plants.	would be the same as Alternative B only the shorter duration of use and fewer cattle, followed by rest one out of every three years, is expected to enhance deep rooted riparian species and improve stream bank stability more quickly, while reducing sediment inputs into streams. Constructing a 3.5 mile temporary fence to create an approximate 100 acre riparian pasture that includes both BLM and FS administered land on Pine Creek would reduce livestock impacts to Pine Creek and facilitate expansion of riparian vegetation along the creek.	
Porcupine Canyon	No Change	Incorporating a three pasture rest-rotation grazing system, reducing the season of use by fourteen days, and limiting the grazing time in the North Porcupine Riparian pasture to	Alternative C is the same as Alternative B only there would not be a riparian pasture created.	Alternative D would eliminate livestock grazing for the next ten years in the Porcupine

		fourteen days would help facilitate natural stream restoration. Pastures receiving a full year of rest once every third year would respond favorably, sedges would replace brook grass along stream banks and browsing of willows by livestock would decrease. Reducing the amount of time that cattle spend in the riparian zone would reduce impacts to the stream channel and riparian vegetation. Rotating season of use in pastures containing riparian habitat would prevent continuous early season riparian use and reduce channel changes caused by hoof action. Expanding the Island Butte Spring exclosure to incorporate the small spring brook, installing an exclosure around the wetland #1460, and assuring that the flow is regulated at the spring would benefit long-term ecological sustainability of these resources, including hydrology, hydric soils and hydric vegetation. Wetland restoration on Island Butte Wetland will improve wetland function by eliminating inter-hummock channels that may drain wetlands prematurely and erode organic soils. Improving the identified stream crossings on Reach #746 and on Porcupine Creek	The predicted effects would be the same as Alternative B only riparian improvement time would be slower in the Porcupine pasture due to the higher number of grazing days.	Canyon allotment where the riparian health standard was not met. AUMs would be reduced in the allotment from 247 to 0. Resting the Porcupine Canyon allotment would give riparian reaches #161, 159, 160 and 746 and wetlands #1464, 163, 1460, and 1463 an opportunity to improve/recover. Improvements to the above mentioned stream reaches and wetlands would transpire more quickly under this alternative than Alternatives B or C.

		would reduce sediment input at the crossings and therefore reduce sediment aggradation and deposition downstream.		
Rio Puerco	No Change	Expanding the existing exclosure and constructing a hardened water gap along Muddy Creek would reduce livestock impacts to the creek by limiting access by livestock. This would reduce streambank trampling and allow riparian vegetation more opportunity to colonize the sediment deposits associated with the annual flooding of Muddy Creek and build streambanks.	No Alternative C	No Alternative D
Rock Creek Isolated	No Change	Changing the grazing period in this custodial allotment from 6/15 – 11/30 to 4/15 – 6/ 30 and limiting the days grazed to not more than thirty days would reduce the length of time that cattle have access to the riparian area and reduce livestock impacts. The riparian area along Meadow Creek reach #133 would be expected to improve. If riparian conditions don't improve in three years and the 0.3 mile fence is built then improvements in riparian vegetation would be expected over the short term. Over the long term, stream channel morphology (sinuosity, width/depth ratio) would be expected to approach reference condition.	The predicted effects are the same as if a 0.3 mile fence has to be built in Alternative B.	No Alternative D
Simpson Creek FS	No Change	The combination of decreasing the number of grazing days in the Coyote pasture by 14 days,	These reductions would reduce grazing impacts	No Alternative D

		continuing complete pasture rest every third year, constructing riparian exclosures, and increasing riding by permittee would improve riparian conditions along reach #118, 119, 117, and 170 that did not meet the riparian health standard. Tex Creek #175 would be expected to remain in PFC.	to riparian vegetation, the stream channel and reduce sediment inputs into the streams. No exclosure fences would be built in this alternative so the improvements to the riparian areas would be slower, because although impacts would be reduced they would still be occurring.	

Table 4.2: 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	Alternative D
Crystal Creek	No Change	No Change	No Alternative C	No Alternative D
Dixon Mountain	No Change	No Change	No Alternative C	No Alternative D
Indian Creek	No Change	The removal of approximately 0.5 miles of dysfunctional fence between the Sawlog pasture of Indian Creek allotment and the North portion of Indian Isolated allotment and the removal of 0.3 miles of exclosure fence would reduce the wildlife entanglement hazard and provide for more effective cattle disbursement. It would also remove a visual impact from this area.	No Alternative C	No Alternative D
Indian Creek Isolated	No Change	The removal of approximately 0.5 miles of dysfunctional fence between the Sawlog pasture of	No Alternative C	No Alternative D

		Indian Creek allotment and the North portion of Indian Isolated allotment would reduce wildlife entanglement hazard and provide for more effective cattle disbursement. A portion of the existing fence between BLM and private may need be modified and/or improved to keep cattle in the Indian Creek allotment.		
Junction	No Change	No Change	No Alternative C	No Alternative D
Meadow Creek AMP	No Change	Rangeland Health standards would be expected to continue to be met. By combining Meadow Creek Isolated with Meadow Creek AMP it would add 160 acres of BLM administered land to Meadow Creek AMP. Removing the fence between these two allotments would eliminate 1.2 miles of entanglement or collision hazard for wildlife such as sage grouse, elk, antelope, and moose.	No Alternative C	No Alternative D
Meadow Creek Isolated	No Change	Upland and sagebrush steppe habitat conditions are expected to remain in excellent condition when this parcel is included in the Meadow Creek Allotment.	No Alternative C	No Alternative D
Muddy Creek	No Change	Improving and/or maintaining existing fences throughout the Muddy Creek allotment would ensure that the rest rotation grazing system continues to work by keeping cattle in the authorized pastures on any given year and out of pastures that have already been utilized or are rested. It would also ensure long-term ecological sustainability of resources and the continuation of health standards being met.	Removing domestic livestock from the Contours pasture would be beneficial to rangeland vegetation in the short term because residual vegetation would increase. The	No Alternative D

		The seeded mix of native cool-season grasses and forbs would enhance native herbaceous biodiversity and improve hydrologic conditions. The runoff/recharge equation would be expected to favor more recharge and less runoff as hard fescue is replaced by cool-season grasses and forbs. If the seeding effort fails, the upland sites of Contours Pasture would continue to be dominated by non-native hard fescue and would not be expected to make significant or measurable progress towards PFC.	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. After a certain point is reached however, the buildup of litter will begin to inhibit the growth of vegetation This could cause a decrease in the productivity, palatability and overall plant health to many of the native bunchgrasses on some of these sites. The no grazing alternative would also result in a build-up of fine fuels.	
Pine Creek	No Change	The uplands in this allotment are very healthy and are expected to maintain this state even with increased utilization from yearling cattle under a rest rotation grazing system.	The predicted effects are the same as Alternative B.	No Alternative D

		The new livestock watering trough would be placed in the southeastern portion of the pasture in the uplands to reduce grazing pressure off of the three stream reaches below. We expect increased grazing use in the immediate vicinity (1/4 mile) of the trough in the uplands after the project is completed. However, the reduction in authorized grazing AUMs and complete rest once every three years in the pasture should compensate for any increase in grazing use in the vicinity of the livestock trough in the uplands.		
Porcupine Canyon	No Change	The rest that would occur one out of every three years in three of the four pastures would give upland plants a chance to recover from the previous year's grazing event and result in improved plant health. This deferred rest-rotation grazing system would allow livestock grazing during active growing season only one in three years and is expected to increase vigor, composition and cover of cool season grasses and reduce erosion.	The predicted effects are the same as Alternative B.	Grazing use in the allotment would be eliminated for the next 10 years, so we would expect uplands to be maintained in PFC. The no grazing alternative would result in an increase of fine fuels. This additional fuel loading could increase the intensity, severity, and fire size within the watershed, should a fire event occur. While

				returning fire to the landscape as a natural disturbance agent has positive ecological benefits (eg. seral diversity), a high severity wildfire could also lead to some negative impacts (eg. stream sedimentation, erosion, noxious weed establishment) within the watershed.
Rio Puerco	No Change	The current authorized AUMs in the Muddy Creek and Red Dirt pastures in this allotment are 222 and the stocking rate is 25 acres per AUM (see Table 2.1 in Chapter 2); this alternative would be to reinstate 53 AUMs on the Muddy Creek and Red Dirt pastures, for a total of 275 AUMs. This would change the stocking rate to 20 acres per AUM. Due to the excellent condition of the uplands and the ample available forage, this grazing management change would be expected to have little effect on the health of the uplands and would be expected to continue to meet the upland standard. Redeveloping the YA Bar	No Alternative C	No Alternative D

		Spring in the Northwest Corner of the allotment and the Red Dirt Spring which originates in the Muddy Creek allotment would provide good upland watering sources for cattle. These water developments are crucial to create good distribution of cattle throughout the uplands of this allotment by providing dependable water. Changing the type of livestock authorized in the Shearing Pen pasture from horses to cattle but keeping the authorized AUMs the same at 32 would be expected to maintain the PFC condition of the uplands. If the permittee is successful at drilling a well and finding water in the Shearing Pen pasture it would improve the grazing system in the entire Rio Puerco allotment by providing an opportunity to graze this pasture while resting one of the other three pastures within the allotment.		
Rock Creek Isolated	No Change	No Change	No Change	No Alternative D
Simpson Creek FS	No Change	No Change	No Change	No Alternative D

Table 4.3: Resource Concern #1: Recreation and Travel Management

No Action	Alternative B	Alternative C	Alternative D
No Change	Add ±2 miles of designated open route Remove ±2.5 miles of designated open route Construct if necessary .7 miles of designated open route to secure access around private lands Add gates, closed road barricade, obliteration, kiosks, etc.	Add ±2 miles of designated open route Remove ±2.5 miles of designated open route Construct if necessary .7 miles of designated open route to secure access around private lands Add gates, closed road barricade, obliteration, kiosks, etc.	No Change

Table 4.4: Resource Concern #2: Special Status Species Habitat
Habitats are expected to remain in the condition and along the same trends under the No Action Alternative.

Allotment	Alternative A (No Action)	Alternative B	Alternative C	Alternative D
Crystal Creek	No Change	No Change	No Alternative C	No Alternative D
Dixon Mountain	No Change	No Change	No Alternative C	No Alternative D
Indian Creek	No Change	Grazing would occur after 8/1 each year in the Simpson Creek pasture. This would eliminate red trampling/sedimentation impacts related to livestock during the WCT spawning and incubation period on years grazing occurs. Changing the grazing period from 6/15-10/15 to 7/1-10/31 would remove livestock grazing in this allotment during elk calving season. It would also move livestock grazing from sage grouse nesting/early brood-rearing to the late brood-rearing/summer season	No Alternative C	No Alternative D

		Removing the 0.3 miles of fence associated with the Cutthroat Exclosure would be beneficial for wildlife access to this riparian source. Removing 0.5 miles of dysfunctional page wire fence would eliminate this barrier for elk and moose calves, and antelope and deer fawns. Building 0.5 miles of new fence would add a potential collision and entanglement hazard in an area where it hadn't previously existed.		
Indian Creek Isolated	No Change	Removal of the dysfunctional fence would eliminate collision and entanglement hazards for wildlife. Building a new fence between the private land and BLM administered land would add a potential collision and entanglement hazard.	No Alternative C	No Alternative D
Junction	No Change	Plant clearances would be completed before any ground disturbance occurs. If sensitive plants are found in the project area the site would be avoided. The wetland restoration project would be small scale and monitoring would be implemented to document habitat conditions before and after the restoration efforts.	No Alternative C	No Alternative D
Meadow Creek AMP	No Change	Removing 1.2 miles of fence would eliminate collision and entanglement hazards for wildlife.	No Alternative C	No Alternative D
Meadow Creek Isolated	No Change	Removing 1.2 miles of fence would eliminate collision and entanglement hazards for wildlife.	No Alternative C	No Alternative D
Muddy	No Change	Removing approximately 0.2	Eliminating	No

Creek		miles of old dysfunctional fence around Wyatt Spring would reduce wildlife entanglement and collision hazards. Constructing a larger spring exclosure at Lower Lou Gulch Spring would add a wildlife entanglement and collision hazard, however protecting the spring would benefit wildlife through improved riparian conditions, including forb diversity for sage grouse broods. Constructing roughly 0.5 miles of temporary fence around reaches #140 and #1414 would protect the riparian area, benefiting wildlife forage and cover. The temporary one-wire electric fence would be a minor collision and entanglement hazard compared to other wire fences (i.e. four strand barbed wire) and would only be up while cattle are in this pasture, reducing the amount of time the hazard would be on the landscape. Using a high-visibility wire/tape would further reduce the risk of collision. If the seeding in the Contours pasture is successful, replacing the unpalatable hard fescue with native perennial forbs and grasses would add palatable forage on elk and mule deer winter range, and in bighorn sheep habitat. Nesting, hiding, and thermal cover would also be improved for sage grouse and migratory birds.	livestock grazing in the Contours pasture would likely increase forb availability for wildlife, including sage grouse broods, and herbaceous and riparian shrub nesting, thermal, and hiding cover. The uplands would also have an increase in herbaceous cover and forage. In the absence of livestock grazing, forage quality may be reduced if decadent bunchgrasses buildup, hindering the release and growth of new bunchgrasses and forbs in the spring. Removing 0.2 miles of fence associated with Wyatt Spring would remove the collision and entanglement hazard for wildlife,	Alternative D
Pine Creek	No Change	Plant clearances would be	Predicted	No

		completed before any ground disturbance occurs. If sensitive plants are found in the project area the site would be avoided. The wetland restoration project would be small scale and monitoring would be implemented to document habitat conditions before and after the restoration efforts. Potential reduction in forage available on winter range following fall grazing would have negligible effects on wintering big game since a vast amount of winter range is available throughout the area. The reduction of 60 AUMS and change to yearling cattle during the fall would also reduce impacts for wintering big game, with more uniform utilization and the expected maintenance of healthy upland conditions. The proposed ten acres of wetland restoration would likely occur between February 15 and April 1 on big game winter range. The short duration, small scale disturbance of this restoration in relation to available big game winter range, reduces the likelihood that wintering big game would be negatively impacted.	impacts would be the same as Alternative B, with upland and riparian conditions likely improving more with a reduction in the number of authorized cattle and grazing days. Constructing 3.5 miles of temporary fence would improve riparian vegetation for wildlife forage, nesting, hiding, and thermal cover. Although adding fencing to the landscape creates a collision and entanglement hazard for wildlife, a temporary electric fence utilizing high visibility wire or tape is less of a hazard than a three or four-strand barbed wire fence.	Alternative D
Porcupine Canyon	No Change	Resting the Idaho sedge (*Carex idahoa*) and Alkali primrose (*Primula alcalina*) populations occurring within the North Porcupine Riparian pasture from	The predicted effects are the same as Alternative B, without the 1.4	Alternative D would increase herbaceous forage

		livestock grazing one out of every three years and limiting grazing to no more than 14 days (that may or may not occur during the growing season) should allow for maintenance if not expansion of this population. The grazing management proposed under alternative B is expected to at least maintain this population of Idaho sedge and Alkali primrose. Plant clearances would be completed before any ground disturbance occurs. If sensitive plants are found in the project area the site would be avoided. The wetland restoration project would be small scale and monitoring would be implemented to document habitat conditions before and after the restoration efforts. Implementing a rest rotation grazing system and reducing permitted AUMs, as well as constructing a new 3-wire, 1.4 mile fence to create a riparian pasture to be grazed for 14 days, would improve riparian and upland habitat conditions for wintering elk and antelope, pygmy rabbits, and sage grouse. The fence would be built within less than a mile from a sage grouse lek and within big game winter range. Livestock grazing during sage grouse and migratory bird nesting season may reduce herbaceous nesting cover.	mile riparian pasture fence creating an entanglement and collision hazard, and adding a potential barrier for calves, fawns, and antelope.	available for wintering elk, as well as forbs in riparian areas for sage grouse and antelope, and herbaceous nesting cover for sage grouse and migratory birds. Constructing 1.25 miles of 4-wire fence on the BLM/private boundary would add a barrier and collision and entanglement hazard to the landscape.
Rio Puerco	No Change	Adding 0.2 miles of 4-wire fence to the exclosure around reach	No Alternative C	No Alternative D

		#149 to include reach #1491 would have a negligible impact since the exclosure already exists and is only being extended. Likewise, constructing 0.15 miles of fence for a water gap would likely not impact wildlife as much as a water gap and associated riparian improvement would benefit habitat. Installing up to 1.5 miles of temporary electric fence would create a minor collision and entanglement hazard for wildlife. However, utilizing high visibility wire or tape would reduce these risks. This fence design is more wildlife-friendly than other designs (i.e. page wire or four-strand barbed wire).		
Rock Creek Isolated	No Change	Changing the grazing season from 6/15-11/30 to 4/15-6/30 moves cattle into the allotment earlier in the sage grouse and migratory bird nesting season. Cattle would be out of the allotment during late brood rearing when riparian forbs are essential for sage grouse chick diets. Constructing 0.3 miles of fence would add a potential barrier and collision or entanglement hazard for wildlife.	Predicted impacts would be the same for 0.3 miles of fence construction, however the construction of a jack and rail fence would reduce collision and entanglement hazards for wildlife. Raptor perching opportunities would be increased with this fence design, which may affect sage grouse broods potentially foraging along	No Alternative D

			the riparian area. No livestock grazing during the nesting season would increase the amount and height of herbaceous cover available for migratory birds.	
Simpson Creek FS	No Change	Constructing two four-wire fences around the riparian reaches #119 and #117 creates a potential barrier and entanglement or collision hazard in a habitat that is highly used by wildlife. Installing one mile of temporary polywire fence around reach #170 would add a minimal collision and entanglement hazard for wildlife. Using high visibility polywire would reduce collision risk and is a more wildlife-friendly fence design compared with others, such as page wire or four-strand barbed wire.	The collision and entanglement hazards, as well as movement barriers for wildlife would not be added to the landscape under Alternative C, compared to the proposed fence construction under Alternative B.	No Alternative D

Table 4.5: Resource Concern #3: Noxious and Invasive Species

Alternative A	Alternative B	Alternative C	Alternative D
No Change	Burning could increase the size and density of any noxious or invasive species in the area but the mitigation measures being implemented before and after treatment would reduce the risk of spread. Limiting access to closed routes would reduce the spread of noxious weeds within those areas	Burning could increase the size and density of any noxious or invasive species in the area but the mitigation measures being implemented before and after treatment would reduce the risk of spread	No Change

Table 4.6: Resource Concern #4: Cultural and Paleontological Resources

Alternative A	Alternative B	Alternative C	Alternative D
No Change	No predicted impacts to cultural resources. Conducting cultural and paleontological inventories prior to project construction and vegetation treatments would avoid or mitigate any potential impacts.		

Table 4.7: Resource Concern #5: Socioeconomics

Alternative A	Alternative B	Alternative C	Alternative D
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 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.	A no grazing alternative is analyzed for the Porcupine Canyon Allotment. This alternative would likely have an adverse social and economic impact to the affected permittee and base property owner. It may have a positive social effect on some recreationalists.

Table 4.8: Resource Concern #7: Visual Resource Management

Alternative A	Alternative B	Alternative C	Alternative D
No change	Consistent with objectives	Consistent with objectives	No Change

Table 4.9: Resource Concern #8: Wilderness Characteristics

Alternative A	Alternative B	Alternative C	Alternative D
No change	Wilderness characteristics would be maintained at current levels. Expansion of Lower Lou Gulch exclosure would increase the size of a man-made structure, but would improve riparian and vegetative conditions. Location of a trough in the dry drainage within the WSA would create some visual impacts to an area near an open motorized route. Two other range projects within the WSA would be removed and cleaned up, improving wilderness characteristics. Overall, the benefits and impacts to wilderness characteristics are approximately neutral.	Wilderness characteristics would be substantially improved by elimination of the grazing in the Contours pasture for at least 10 years, removal of unneeded range projects, and restoration of native vegetation.	

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 BSCW assessment area (map 1) for all issues and resource concerns except Socioeconomics, for which the cumulative impacts area is Beaverhead 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 are the proposed actions. Below is a list of potential or proposed actions that may occur in the BSCW and their cumulative impacts.

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. Livestock grazing occurs on private, state and federally managed lands within the watershed.
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.).
Introduction of non- native sport fish such as brook trout and rainbow trout 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 within SW Montana.
Severe over-trapping of beavers and unregulated livestock use during the late 1800s and early 1900s changed the character (hydrologically and vegetatively) of most mountain streams in the Intermountain West (Elmore and Beschta, 1987; Elmore and Kaufman, 1994; Naiman, 1988). Although there are still active beaver colonies in the BSCW, 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). Over the past decade, wolves have moved back into the BSCW.

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).

Excluding fire from the landscape, by removing fine fuels via livestock grazing and suppressing fire over the past century, has increased the 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.

The number of water developments, including pipelines, located on other ownerships is unknown as is their condition and functionality. Historically, water developments were designed with one objective, to provide water for livestock. Where sources were unprotected, designs were poor, or where the developments were not maintained, hydrology, hydric soils, and hydrophytic vegetation were often impacted. Impacts frequently observed under such conditions include lowered water tables, conversion of hydric soils to upland soils and reduction in hydrophytic vegetation. Some of these historic developments and designs along with the described impacts may still exist in the BSCW.

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.

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:

Livestock grazing

Livestock grazing is expected to continue on all land ownerships within the watershed. Stocking rates, kind of livestock and grazing systems are expected to be comparable to present numbers and management in the foreseeable future. Structural projects associated with livestock grazing are expected to remain constant or increase slightly in the foreseeable future within the watershed. Structural projects associated with livestock grazing are expected to remain constant or increase slightly in the foreseeable future within the watershed.

Water Use

Water use and irrigation is expected to continue at comparable rates within the Big Sheep Creek Watershed. Annual weather patterns and drought cycles will affect the quantity of water available on an annual basis.

Recreation

Recreation, especially hunting and fishing, is expected to increase in the BSCW in the future.

Roads

Beaverhead County plans to replace six bridges on Big Sheep Creek Road over the next two years. The span of each bridge will increase at each site effectively increasing hydraulic capacity. Each new bridge has been designed to handle a minimum of a 50 year discharge event and at some sites a 100 year discharge event (Great West, 2016). Up to 120 linear feet of channel per site may be affected and up to 240 cubic yards of Class II and III riprap (2.82 feet max diameter) may be used at each bridge replacement (ACOE, 2015). The county will use gravel to resurface the road adjacent to each new bridge site at a minimum and may resurface a longer length.

Travel Management
The BLM is working collaboratively with MT DNRC, MT FWP and private landowners to improve compliance to travel management within the Big Sheep Creek Watershed.

Oil and Gas Exploration
The BLM and the Forest Service are in the process of conducting an Environmental Assessment on an Application for Permit to Drill, submitted by the Lima Operating Company, LLC. One possible location for the well pad is on BLM near Shearing Pen Gulch and is accessed by Big Sheep Creek Road. Another alternative well pad location is on Forest Service land on White Pine Ridge and is accessed by Little Sheep Creek Road. A "no action" alternative is also being evaluated. Drilling of the exploration well would probably take one summer to complete but reclamation could carry over to the next season. If successful, production would occur along with the potential for additional wells to be drilled on or near the original site.

Vegetation Changes
Vegetation changes will continue to occur due to natural succession as well as unnatural processes. Unnatural processes include altered fire return interval, presence of noxious and invasive species, anthropogenic disturbances (roads, development, etc.).

- Decrease in mountain big and three tip habitat through Douglas-fir and Rocky mountain juniper expansion can be anticipated in some areas of the watershed.
- Aspen is expected to continue to decline within the watershed
- There may be timber harvest on State or private land within the watershed

Wildfire
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.

Economics
The economic situation of the land users is expected to remain relatively constant in the foreseeable future.

Development
Development and population growth in the Big Sheep Creek watershed is expected to increase slowly.

Special Status Species
The State of Montana has completed a Sage Grouse conservation plan. Other federal agencies also have sage grouse conservation plans (USFS, NRCS). The BLM intends to work cooperatively and collaboratively with other agencies and landowners on sage grouse conservation.

The BLM will continue to monitor WCT habitat, populations and long term stream temperatures within the watershed. 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. There is potential to conduct a cooperative fishery project to improve WCT spawning habitat along the lower 1/2 mile of McNinch Creek. The project would take place primarily on private land and would encompass a large portion of the spawning habitat available for WCT use within the Muddy Creek drainage.

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.

Conservation measures for five-needle pine will continue in a collaborative manner with other agencies and partners.

Climate change
Climate will continue to change, however local changes are not predicable within the spatial and temporal scale of this plan.

4.3.3 Cumulative Effects of All Alternatives, Including the No Action

Livestock
Impacts resulting from livestock grazing can be beneficial or adverse depending on the location, stocking rate, timing and duration of use. Any reductions in AUMs on BLM administered 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.

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.

Livestock production and sustainability will continue to be important in Beaverhead 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" (UNFAO 2014). Livestock production and sustainability, as well as food security, will continue to be important issues locally, regionally and globally.

A slight increase in structural projects (fences, water developments) within the watershed would change distribution of livestock in the immediate vicinity of the water development. Since

livestock numbers are not being increased, impacts within the watershed as a whole from water developments would not measurably change. Livestock grazing in underutilized upland sites is not expected to have adverse effects on other resources or wildlife at the intensity and frequency that livestock grazing is proposed. Fences can affect wildlife movement or pose collision and entanglement hazards, but with the design features identified in Chapter 2, these effects would be mitigated. Improvements to riparian and upland conditions as a result of improved livestock management and control would outweigh the unmitigated risk of the fence.

Water Use

Water use will continue to have similar impacts as is currently occurring. Other than changing places of use due to off-site water developments proposed in some of the action alternatives and changes in numbers of livestock on public land allotments in some of the action alternatives, the effects of water use within the BSCW is not expected to measurably change as a result of this EA.

Recreation

Impacts expected from increased dispersed recreational use are new camp sites, spreading of weed seed, more use of roads (including driving on closed, undesignated roads), increased wildlife disturbance and increased users conflicts.

Roads

The DEQ has identified Big Sheep Creek from its mouth to its confluence with Muddy Creek as not fully supporting it aquatic life beneficial use and has included sedimentation/siltation as a probable cause (DEQ, 2015). A one hundred foot vegetated buffer is suggested to measurably remove sediment from water running off of developed ground and 50 feet is the minimum for protecting certain aspects of water quality (Ellis, 2008). Within the assessment area approximately 57% of the total road miles (430 of 750 miles) are within 50 feet of stream channel; 408 miles are within 25 feet (these figures include all land ownership). Though individual actions related to roads may cause short term increases in turbidity during implementation; cumulatively, road related actions are expected to have a net positive effect on sedimentation in Big Sheep Creek (improved travel management compliance, road crossings and culverts, streambank stabilization project, bridges along Big Sheep Creek road).

Travel Management

The effort to improve compliance to travel management and better educate public land users will be more effective due to the collaborative effort between state agencies, private landowners and the BLM. Improved compliance to travel management will reduce the spread of noxious weeds, improve wildlife security, improve hunter success and recreational opportunity and reduce soil compaction, loss of vegetation and soil erosion and reduce sedimentation in streams due to unauthorized road crossings. Less use of unauthorized routes will have a positive social impact on hunters that like to hike or ride horseback, but would likely have a negative social impact on hunters that favor motorized use because they feel they are being limited in the areas they can drive.

Oil and Gas Exploration
A separate NEPA document, Tendoy Unit: Lima Exploration Exploratory Well: DOI-BLM-MT-M040-2016-0005-EA, is being prepared to analyze the impacts of the proposed oil and gas exploration well being analyzed in the BSCW. This NEPA document will not be complete until the summer or fall of 2016. There will be a public comment period once the EA is completed and released to the public.

Vegetation changes
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 change in wildlife habitat. Large-scale mortality of trees across forested portions of all ownerships within the BSCW 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).

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 up to 30 years to progress back to late seral plant communities. This creates seral stage and structural diversity within sagebrush habitats across the landscape. These burns are also expected to result in a release of aspen within and perhaps adjacent to the burned areas. These projects will help incrementally with the region wide aspen decline.

Since BLM is not proposing any timber harvest, this EA would not add any cumulative effects to timber harvest on state and/or private land.

Wildfire
Fire severity has increased during the past decades due to fuel loading resulting from altered fire return intervals and epidemic insect infestation in forested habitat. This trend is expected to continue until/unless the fire is returned to the landscape through either wildfire or prescribed burn treatments. More severe fires have greater and longer lasting impacts on vegetation, soils, sedimentation in streams (and therefore aquatic species). The prescribed burn treatments proposed within the action alternatives of this EA would help break up fuel continuity at the landscape level and re-set the fire return interval within the treated areas.

Economic situation of landusers
The permittees economic situation 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 permittees to sell or subdivide private land to maintain economic viability. Actions in this EA may add result in adverse economic impacts to specific landowners or permittees within the BSCW, but will likely be minor in Beaverhead County as a whole.

Cumulative economic impacts on other segments of the population are not expected to be affected by any alternatives in the EA.

Development
Some sub-dividing of private land within the watershed is occurring and is expected to continue or increase in the foreseeable future. Land use patterns on private and public lands in Beaverhead County are slowly changing. As traditional agricultural lands are converted to residential and recreational properties fewer large scale ranching operations will remain. Access to public land across private land is becoming more restricted and will likely continue as traditional ranches are subdivided into smaller parcels.

Development and population growth may fragment wildlife habitat. Other impacts may include: higher levels of vehicle traffic, newly established or expanded areas of noxious and invasive species, reduced open space, increased outdoor recreation, reduce access or difficulty in obtaining access to public land, visual impacts, and perhaps an increased demand for water.

Special Status Species
The cumulative effect of collaborative sage grouse conservation efforts within the watershed are expected to result in improvements to sagebrush steppe habitat and stable or increasing sage grouse populations within the area. Other sagebrush obligate species will also benefit from these conservation efforts.

Collaborative efforts in managing WCT habitat and populations are expected to maintain or increase habitat and population of WCT within the BSCW.

Collaborative conservation on five needle pine, specifically white bark pine are expected to slowly restore this important habitat type.

Climate Change
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; Stott 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.

Climate change may also 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).

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 BSCW 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 four 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.

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 of 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. Sub-dividing of private land within the watershed is expected to continue or increase in the foreseeable future to some degree on private lands without conservation easements. Land use patterns on private and public lands in Beaverhead County are slowly 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.

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.

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 severe as a result of the heterogeneous fuel loading.

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.

Where 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 Beaverhead County tax revenues would 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.

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.

Cumulative efforts to improve the quality of occupied WCT habitat and expand their range in the watershed 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.

Without reconstruction of the Muddy Creek fish barrier, the Muddy Creek population would quickly become highly hybridized through invasion of rainbow trout from Big Sheep Creek.

Nearly all of occupied WCT habitat within the watershed occurs on federally managed lands. Improvement of riparian resource conditions on public land administered by the BLM within this watershed would have a positive impact on WCT habitat and populations.

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 (2014), 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 2014). 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 BSCW. 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 BSCW 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 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 BSCW 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.

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, and recreation on private and State lands, which are not subject to BLM Standards, would continue. Any reductions in authorized AUMs on BLM lands would increase grazing pressure on private and state lands within the watershed.

The economic impacts to individual ranchers and on a cumulative basis 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.

4.3.8 Cumulative Effects of Alternatives D

This alternative only affects one allotment, the Porcupine Canyon allotment. Impacts in addition to those described under section 4.2.4 are not expected because the no grazing alternative would not have any effects outside of the Porcupine Canyon allotment.

Chapter 5

5.0 List of Preparers - Consultation/Coordination

5.1 List of Preparers

Core IDT members:
Kelly Savage, Rangeland Management Specialist/TES Plants – ID Team Leader
Pat Fosse, Supervisory Natural Resource Specialist
Katie Benzel, Wildlife Biologist
Sean Claffey, Hydrologist (Soil, Water, & Air)
Paul Hutchinson, Fisheries Biologist

Support IDT members:
Rick Waldrup, Outdoor Recreation Planner/Wilderness Specialist
Jason Strahl, Archaeologist
Michael Mooney, Weeds Specialist
Emily Guiberson, Forester
Ashley Wells, Forestry Technician
Joe Sampson, Fuels Specialist
Laurie Blinn, GIS Specialist
Steve Armiger, Hydrologist (Soil, Water & Air), Retired
Dave Williams, Geologist, Butte Field Office
Bob Gunderson, Geologist/Mining
Keith Johnson, Supervisory Land Use Specialist
Wendy Velman, Montana/Dakotas BLM Botanist Lead
Dave Ruppert, FS Soil Scientist
Ken Scalzone, NRCS Soil Scientist
Kyle Schmitt, USFS Rangeland Management Specialist
Katie Bonogofsky, USFS Rangeland Management Specialist

Other support personnel:
Kate Allder, Administrative Assistant
Ellen Daugherty, Administrative Assistant
Floyd Thompson, Montana/Dakotas BLM Range Program Lead
Mike Philbin, Branch Chief for Biological Resources & Science, Montana/Dakotas BLM State Office
Alden Shallcross, Montana/Dakotas BLM Hydrology Program Lead
LeeAnn Pallett, Soils Science Technician, Butte Field Office
Berett Erb, Range Technician
Leah Anderson, Range Technician
Cari Forsgren, Range Technician
Haleigh Stott, Range Technician
Melanie Finch, Biological Technician
Tempe Regan, Biological Technician
Jed Berry, Fisheries Technician

Brand Browning, Recreation Technician
Chris Carparelli, Beaverhead Conservation District

5.2 Consultation/Coordination

5.2.1 Persons and Agencies Consulted

Kyle Schmitt	US Forest Service – B-D Range Mgt. Specialist
Craig Fager	Montana Fish, Wildlife & Parks- Wildlife Biologist
Diane Hutton	US Forest Service- B-D Fire Management Officer
Amie Shovlain	US Forest Service- B-D Wildlife Biologist
Mona Welborn	Land Owner
Jeff Welborn	Land Owner
Troy & Joy Smith	Permittee
Ross Hansen	Ross Hansen Ranch (Permittee)
Travis Hansen	Ross Hansen Ranch
Pete Hansen	Ross Hansen Ranch
Craig Hildreth	Land Owner
Gordon & Gladys Martinell	Permittee
Bill Martinell	Permittee
George Hurst	Smith's Elk Meadows Ranch (Permittee)
Chad Hansen	Permittee
Matt Jaeger	Montana Fish, Wildlife & Parks- Fisheries Biologist
Cory Manseau	Law Enforcement Officer, BLM Dillon Field Office
Rick Schmauch	FWP Warden
Matt Mickelson	Law Enforcement Officer, FS Beaverhead-Deerlodge
Scot Shuler	District Ranger, FS Dillon Ranger District
Randy Apfelbeck	Montana Department of Environmental Quality - Water Quality Monitoring and Assessment Section
Garth Haugland	Beaverhead County Commissioner
Karl Yakawich	Great West Engineering – Project Manager

5.2.2 Notifications

Assessment Initiation Notice; Big Sheep Creek Watershed mailing list – May, 2015
Media Release; Assessment Initiation Notice – May, 2015
Internet NEPA Log – Dillon Field Office – December, 2015
Media Release; Big Sheep Creek Watershed Assessment Report Completion and EA Initiation Notice – December, 2015
Montana/Dakotas External Website - Assessment Report – December, 2015

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. IDT members coordinated/consulted with many members of the public, conservation groups and local, state and federal agencies during alternative development.

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) amended 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.

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

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 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)

Pugging: is tracking depressions left by large animals (typically hooved animals, but occasionally humans) left in fine textured soil. Moist clay or silt usually has a consistency to hold tracks. Upon drying, pugged areas will have a hard, irregular surface difficult to walk across.

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.

Rosgen Classification System: A classification system for natural rivers in which a morphological arrangement of stream characteristics is organized into relatively homogeneous stream types. Morphologically similar stream reaches are divided into 7 major stream type categories that differ in entrenchment, gradient, width/depth ratio, and sinuosity in various landforms. Within each major category are six additional types delineated by dominant channel materials from bedrock to silt/clay along a continuum of gradient ranges.

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.

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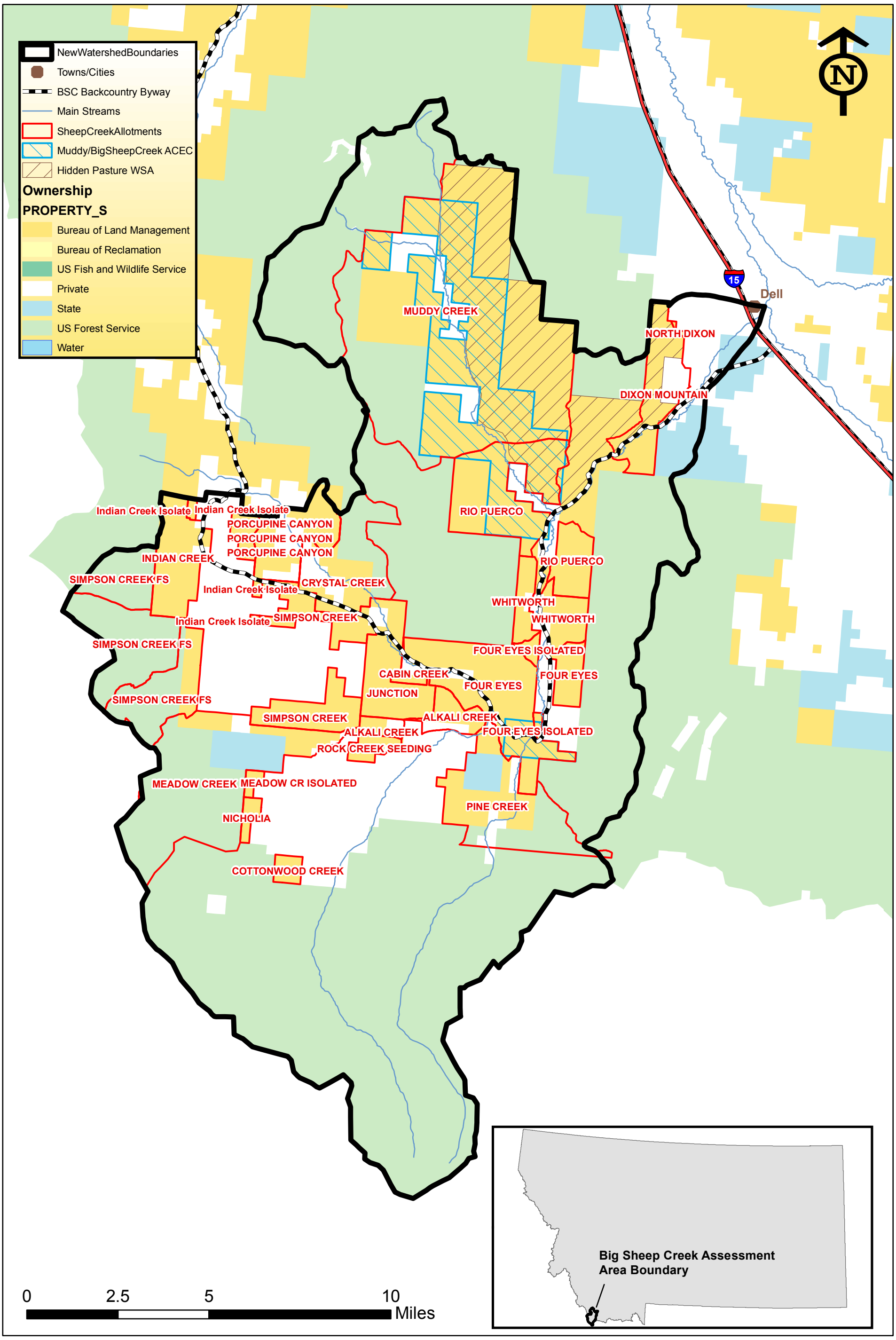
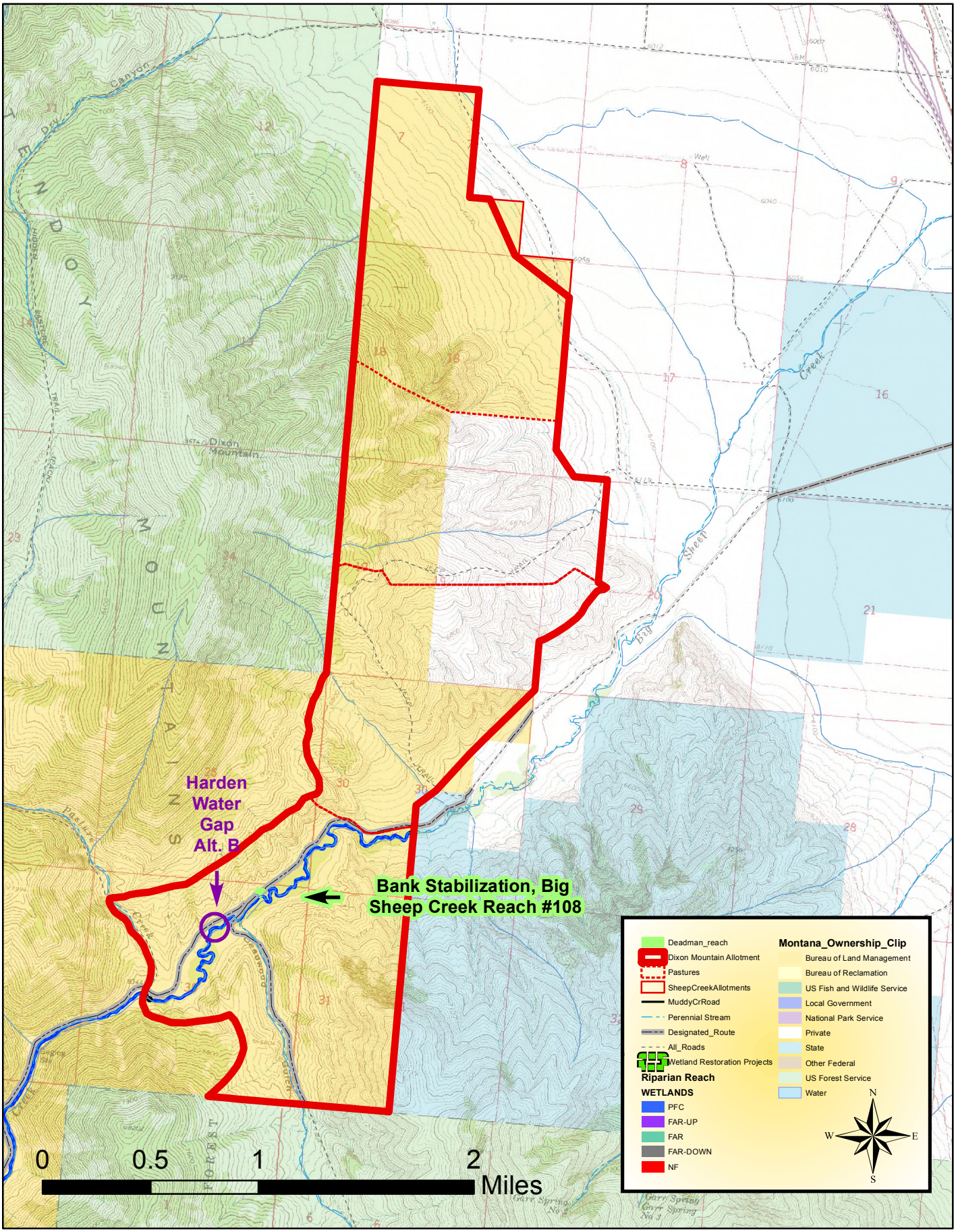
Appendix A

Big Sheep Creek Watershed

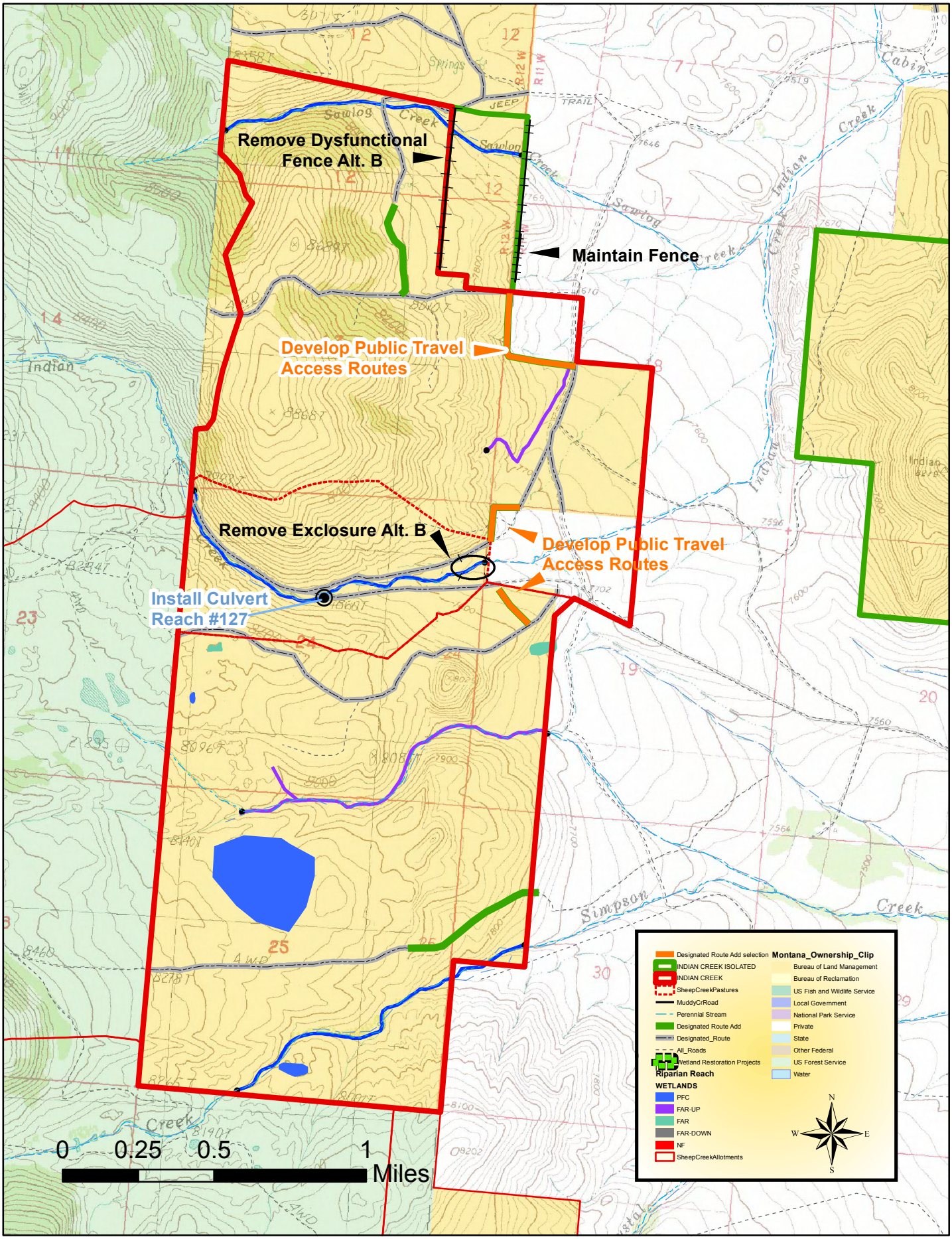
Maps



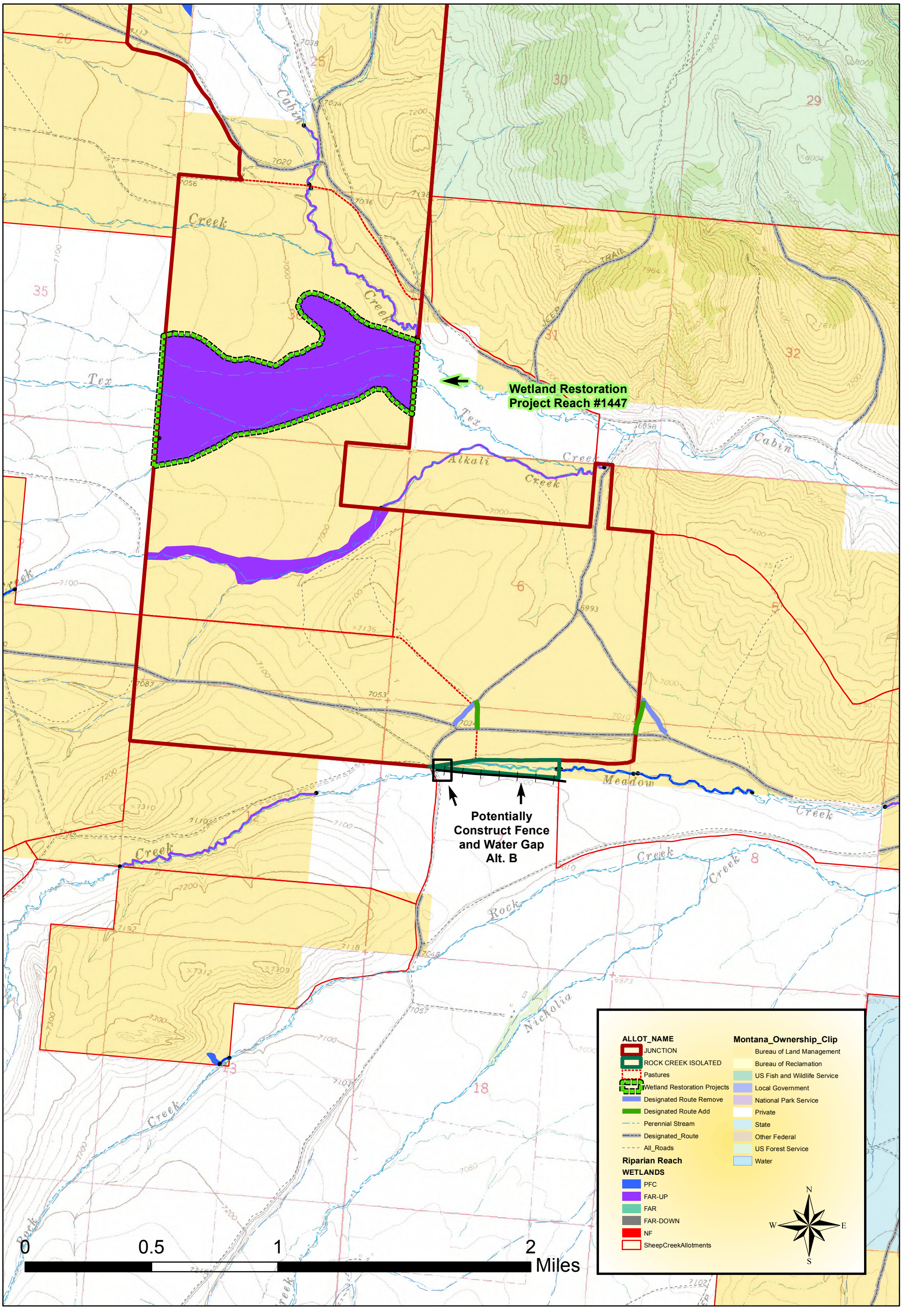
Map 1 - Big Sheep Creek Assessment Area - Allotments, WSA and ACEC



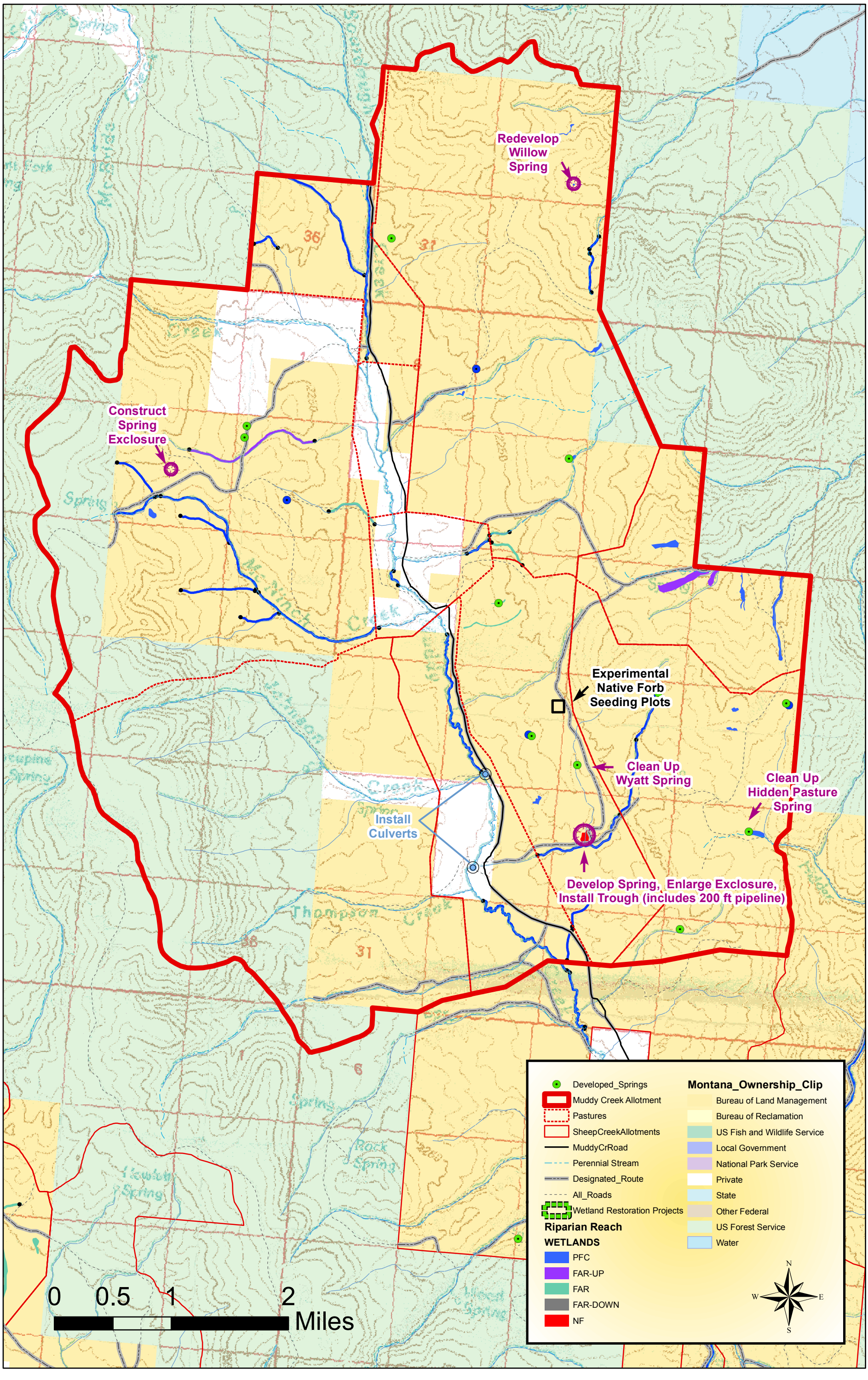
Map 2 - Dixon Mountain Allotment 30022



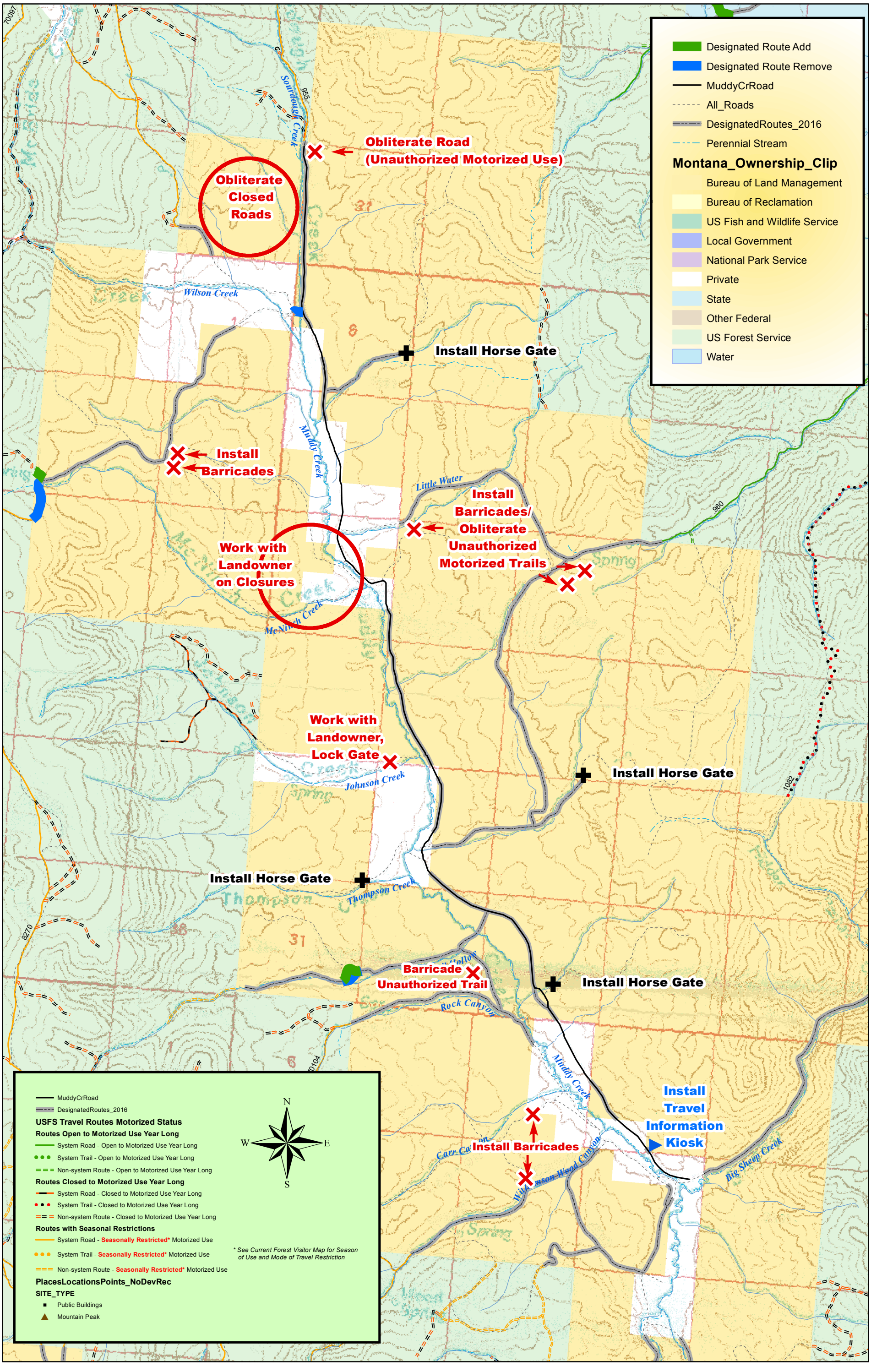
Map 3 - Indian Creek 10741 and Indian Creek Isolated 30652



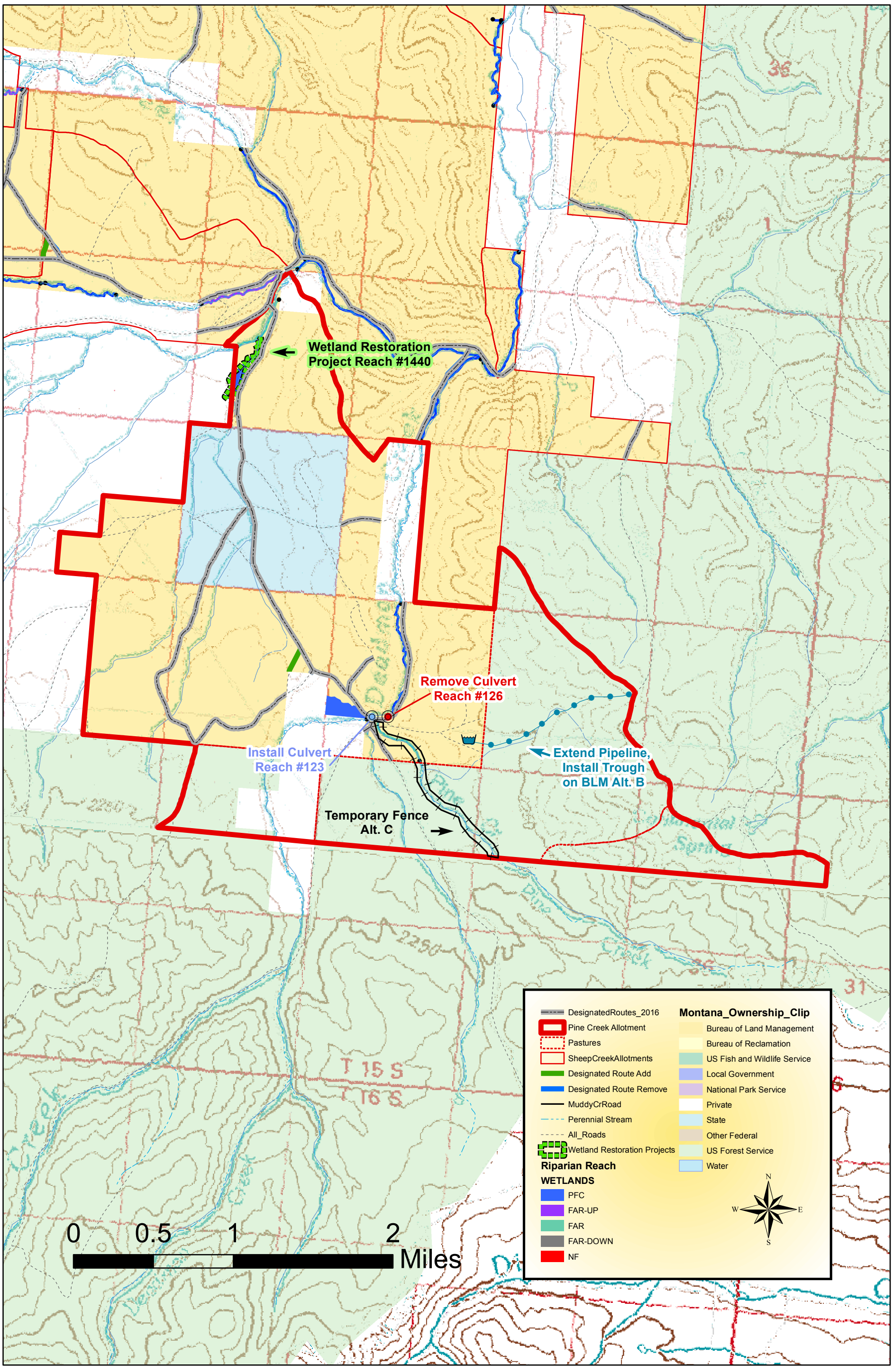
Map 4 - Junction Allotment 20009 and Rock Creek Isolated 20698



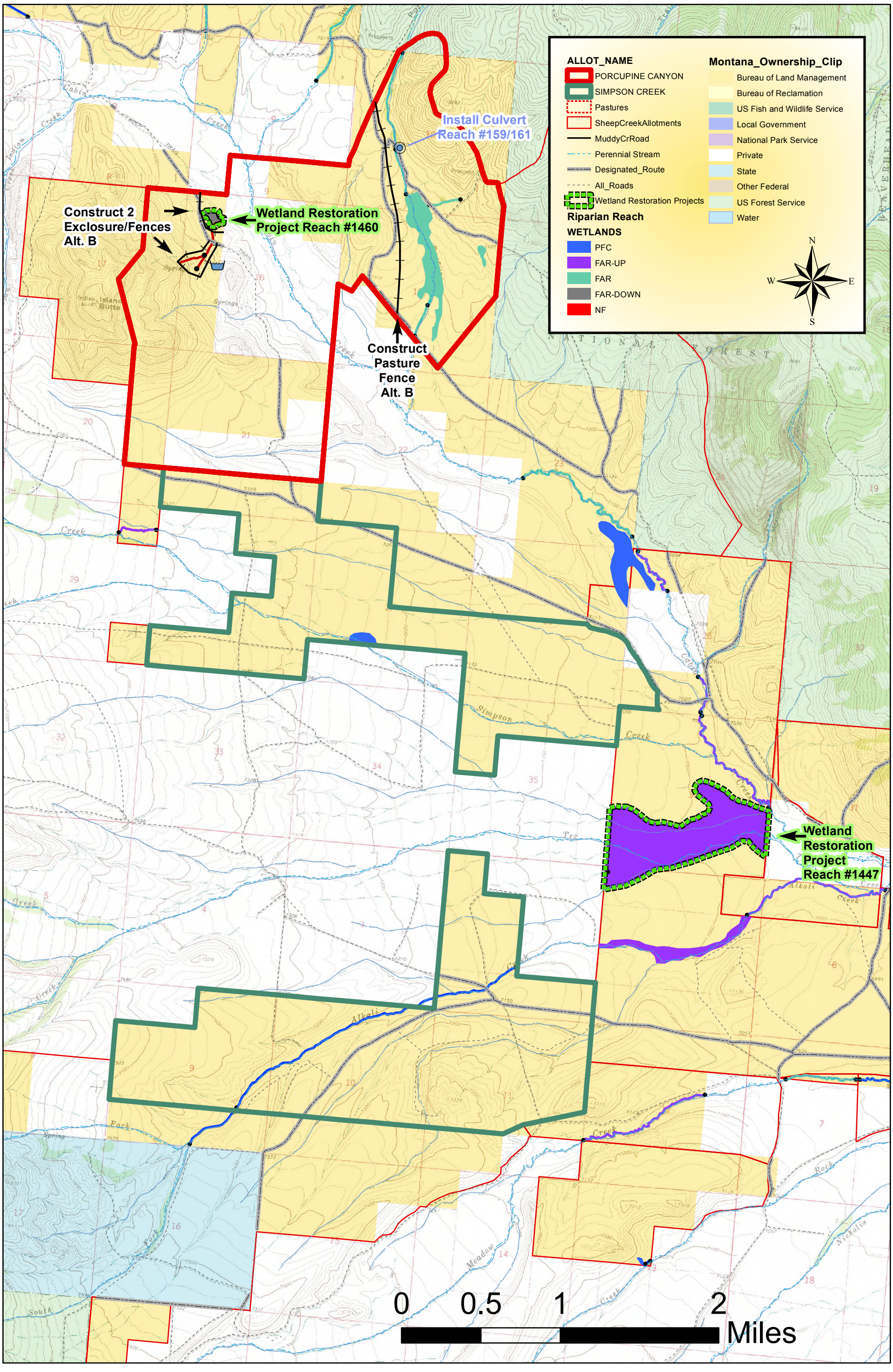
Map 5 - Muddy Creek Allotment 30039



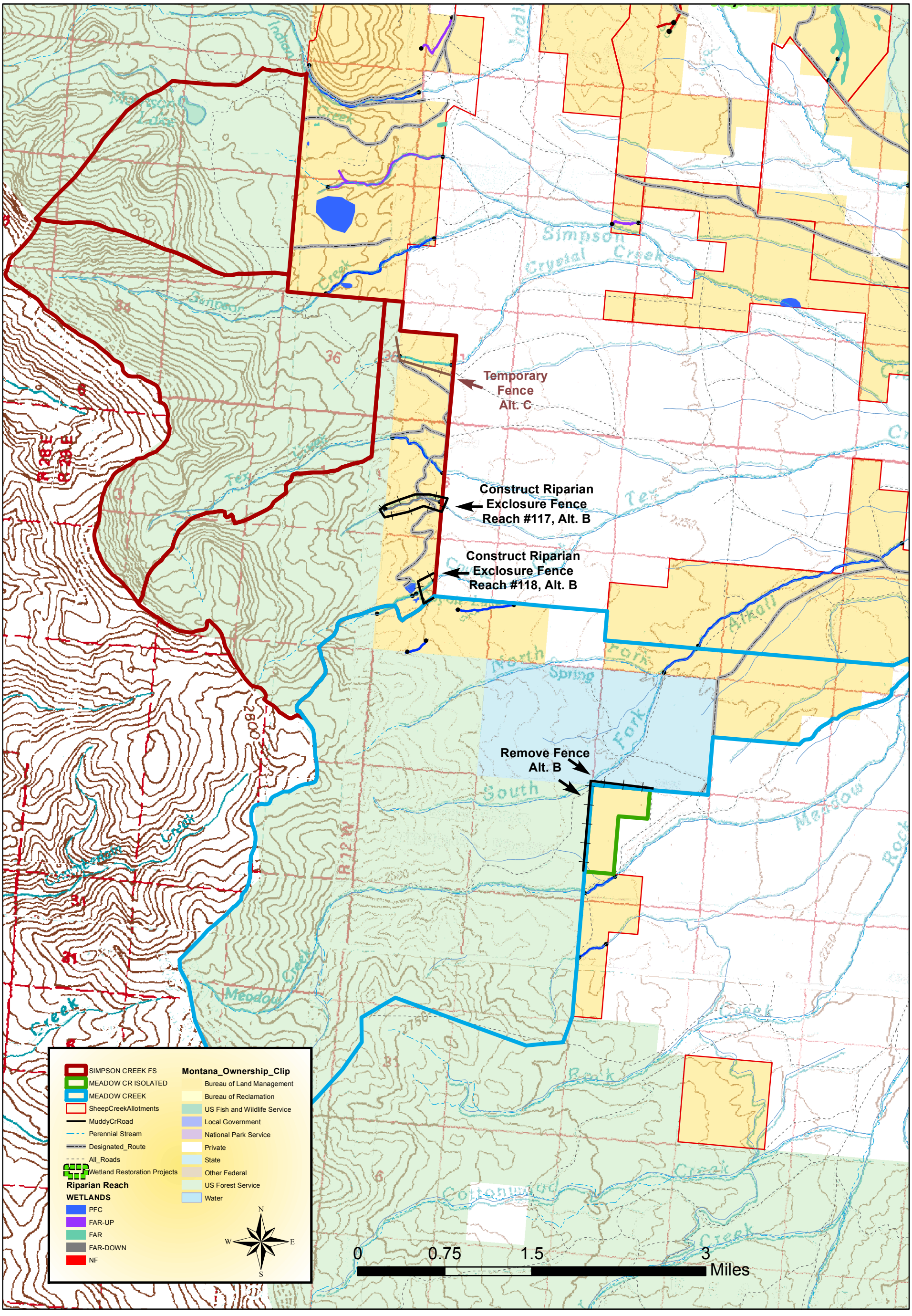
Map 6 - Muddy Creek Travel Management



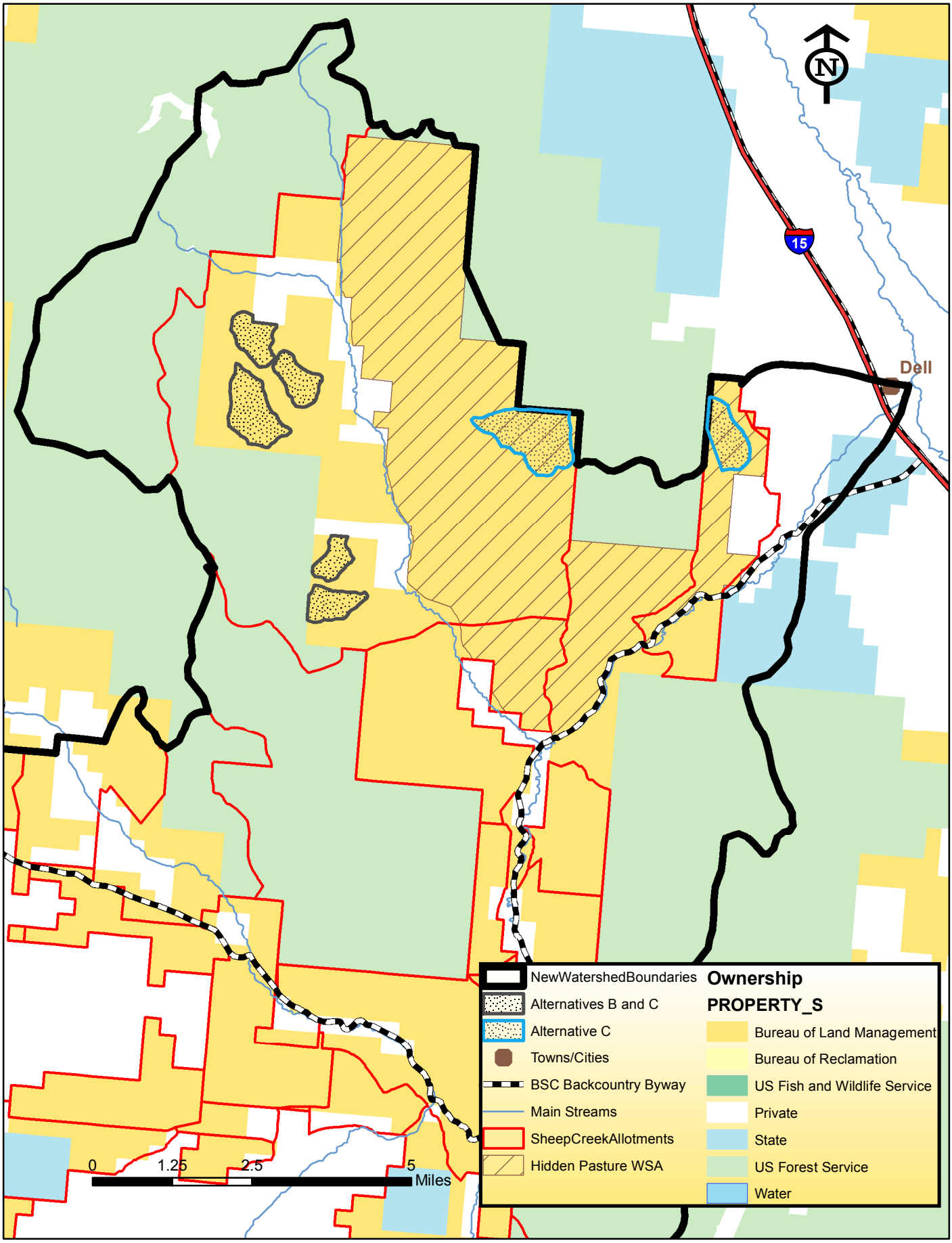
Map 7 - Pine Creek Allotment 30001



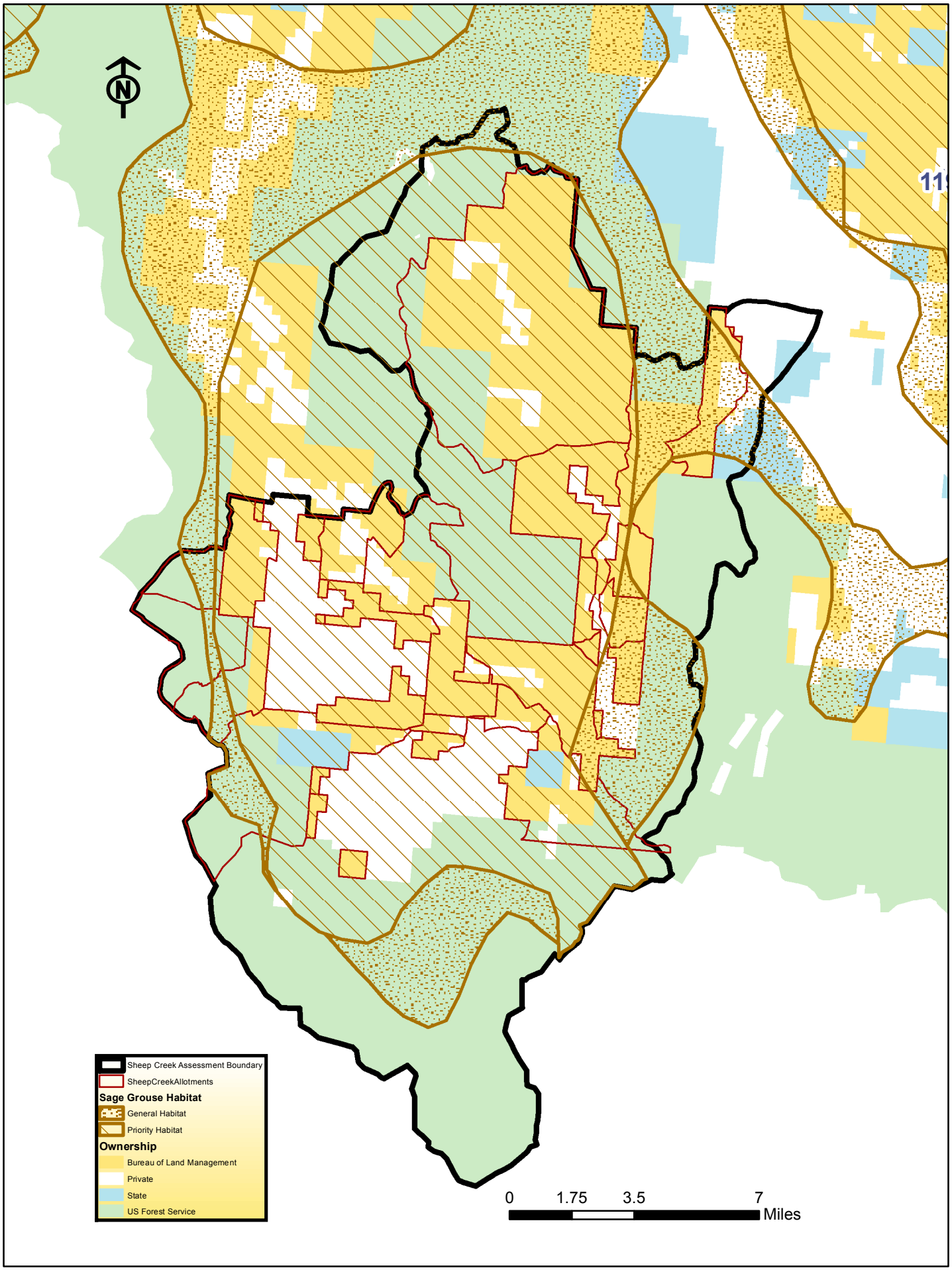
Map 8 - Porcupine Canyon 20107 and Simpson Creek Allotment 20158



Map 9 - Simpson Creek FS 30207, Meadow Creek Isolated 30611 and Meadow Creek AMP 20042



Map 11 - Proposed Fuels Units



Map 12 - Sage Grouse Habitat Management Areas

Appendix B

Big Sheep Creek Watershed

Monitoring Plan

Monitoring Plan for Big Sheep Creek Watershed

Introduction

The purpose of this resource monitoring plan is to measure the effectiveness of existing management, where applicable, management changes, structural projects and vegetative treatments in meeting the goals and objectives developed for the Big Sheep Creek Watershed (BSCW). This plan has been designed to measure progress towards site specific objectives developed by an ID team where resource concerns were identified during the Big Sheep Creek 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. In addition to the watershed and site specific monitoring, AIM transects will be established within the next adaptive management cycle throughout the Dillon Field Office to measure Land Use Plan Effectiveness at the watershed scale.

Site Specific Objectives

Two Key Issues and eight additional Resource Concerns were identified during the Big Sheep Creek Watershed Assessment and through public scoping and were analyzed in the Big Sheep Creek 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 2016 field season. The goal is to make measurable progress towards site specific objectives to be able to meet all Rangeland Health Standards and site specific objectives by 2025.

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 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.
- Maintain/enhance exiting aspen and promote successful regeneration of aspen.

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.
- New culverts, hard water crossings or water gaps will be photographed before and after implementation of the projects.
- The streambank restoration project on reach 108 on access road to Deadwood Gulch Campground would be monitored by established photo points (before and after).
- Wetland restoration projects on wetlands 1440, 1447, 1460 and adjacent to stream #179 would be monitored by delineating the current wetlands; setting up vegetation transects perpendicular to the existing edge that extend from outside the current wetland into treated wetlands; and/or setting up vegetation transects completely within the current wetland perimeter; and/or setting up photo points to measure vegetative changes within and adjacent to the wetlands and overall effectiveness of wetland restoration projects.
- Wetlands will also be monitored through aerial photos to determine if they are increasing or decreasing in size.

Table 1: Additional Site Specific Riparian and Wetland and Aquatic Habitat Monitoring

Allotment Name and #	Stream or Wetland and Number	Objective	Monitoring Methodology
Junction #20009	#1447 – Cabin Creek wetland #179 wetlands adjacent to Lower Cabin Creek	Enlarge wetland area and increase wetland vegetation.	Delineate wetland; Daubenmire transect perpendicular to wetland to measure change in vegetation composition and/or photo points.
Muddy Creek #30039	#1415 Muddy Creek trib. #1411 and #142 Muddy Creek tribs. #1414 and #140 wetlands	Reduce streambank impacts Reduce streambank impacts, increase sedges along the greenline. Reduce impacts to wetlands	Cumulative width-depth transect and/or photo points. Greenline transect and/or Photo point(s) Photo points
Pine Creek #30001	#126 Pine Creek	Reduce impacts to stream and wetlands	Cumulative width/depth ratio near the top of the reach

Allotment Name and #	Stream or Wetland and Number	Objective	Monitoring Methodology
	#158 Big Sheep Creek trib. #1440 Pine Creek Wetland	Improve width/depth ratio, increase sedges along the greenline Increase wetland vegetation	MIM Delineate wetland; photo points
Porcupine Canyon #20107	#161 Porcupine Creek #159&160 Porcupine Creek #746 Cabin Creek Spr. brook #1460 Island Butte Wetland	Improve width/depth ratio, reduce streambank impacts Reduce streambank impacts, increase deep rooted riparian vegetation Increase wetland vegetation, increase size of the wetland.	Cumulative width/depth ratio, greenline and/or photo points Photo points Delineate wetland, Daubenmire transect, and/or photo points.
Rock Creek Isolated #20698	#133 Meadow Creek	Decrease streambank impacts and improve channel width/depth ratio.	Cumulative width/depth ratio and/or photo points
Simpson Creek FS #30207	#118 & #119 Coyote Creek #117 Coyote trib. #170 Crystal Creek	Decrease streambank impacts; improve width/depth ratio; increase aspen regeneration in lower portion of #117. Reduce streambank impacts	MIM; cumulative width/depth or photo points. Woody browse regeneration transect for aspen. 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 incurring conifer expansion.
- Maintain/enhance existing aspen and promote successful regeneration of aspen.
- Return fire to the landscape as a natural disturbance agent for the purpose of resiliency and diversity of seral classes (age, structure), through the use of prescribed fire.

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.

- Monitor area for noxious weeds and cheatgrass prior to prescribed burns, treat any occurrence of noxious and invasive weeds before prescribed burn occurs; recheck and re-treat as necessary: during the fall following the prescribed burn and annually for as long as necessary to prevent seed production and mitigate noxious and invasive species expansion.
- 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.

Table 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)
Muddy Creek, Contours Pasture	Increase composition and cover of cool season perennial bunchgrasses	Daubenmire or Quadrat Frequency transects and/or photo points
Muddy Creek	Reduce 60% or more of conifers less than 30 feet tall that have recently expanded into previously open sagebrush-dominated communities	-Habitat Assessment Framework (HAF) - Line Point Intercept plots to measure canopy cover of sagebrush, and herbaceous and forb understory.

Resource Concern #1: Recreation and Travel Management

Objectives:

- Effectively implement the amended 2006 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 Hidden Pasture 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 throughout the year 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 #2: 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 westslope cutthroat trout (WCT) streams.
- Maintain existing sagebrush habitat so that 80% or more of big sagebrush communities provide vegetative composition and structure for sage grouse nesting/early brood rearing, >40% sagebrush habitat meets summer/late brood habitat characteristics, and >80% meets winter habitat characteristics where appropriate (relative to ecological site potential, etc.).
- Maintain an average 7 inches herbaceous understory within site potential within sage grouse nesting/early brood rearing habitat.
- Maintain or increase composition of highly nutritious forbs (e.g. composites and legumes) in sage grouse nesting/early brood rearing habitat.
- Maintain or enhance habitat for sensitive plant species and provide ample opportunity for reproduction and seedling establishment.
- 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.

Monitoring Activities to measure progress towards meeting Fish, Wildlife and Special Status Species Habitat objectives:

Table 3: Site Specific Monitoring for Sagebrush Obligate Species Habitat

Allotment Name	Objective	Monitoring Methodologies
All Priority and General Sage Grouse Habitat	-Maintain existing sagebrush habitat so that 80% or more of big sagebrush communities provide vegetative composition and structure for sage grouse nesting/early brood rearing, >40% sagebrush habitat meets summer/late brood habitat characteristics, and >80% meets winter habitat characteristics where appropriate (relative to ecological site, etc.). -Maintain or increase composition of highly nutritious forbs (e.g. composites and legumes) in sage grouse nesting/early brood rearing habitat.	-Habitat Assessment Framework (HAF) - Line Point Intercept plots to measure canopy cover of sagebrush, and herbaceous and forb understory. -Forage utilization and

Allotment Name	Objective	Monitoring Methodologies
	-Maintain an average 7 inches herbaceous understory within site potential within sage grouse nesting/early brood rearing habitat.	herbaceous understory cover will be measured within staff constraints.

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.
- Implement trend monitoring for alkali primrose and Idaho sedge in the Porcupine Canyon allotment in wetland #1463.
- Continue existing trend monitoring for sensitive plants (alkali primrose, Idaho sedge).
- Coordinate with MTFWP and USFS biologists to continue delineating seasonal habitat for sage grouse.
- Coordinate with MTFWP to continue annual sage grouse lek monitoring (male lek attendance counts).
- Coordinate with MTFWP and USFS biologists to continue monitoring population trends of WCT in within the Big Sheep Creek Watershed.
- Maintain a 6" herbaceous stubble height threshold 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.

Resource Concern #3: 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 projects causing any soil disturbance will be seeded with a native seed mix and inventoried for noxious and invasive species until the disturbed area is re-vegetated and infestation by noxious or invasive species is no longer a concern due to the disturbance.

Resource Concern #4: 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.
- Preserve and protect Muddy Creek/Big Sheep Creek Area of Critical Environmental Concern.
    - Preserve and protect cultural resource/archaeological districts that are important to both archaeologists and Native Americans.

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.

All sites within the Muddy Creek/Big Sheep Creek ACEC will be monitored in order to determine if adverse impacts are occurring due to human or environmental impacts.

Resource Concern #5: 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 #6: Forest and Woodland Habitat

Objectives:

- Increase diversity of seral stages and structures in forested habitats
- Reduce hazard rating for spruce budworm and Douglas-fir bark beetle activity
- 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
- Utilize forest products where feasible

Monitoring activities to measure progress towards meeting forest and woodland habitat objectives:

Pre- Implementation:

- Whitebark and Limber Pine Treatments:
  - For trees suspected of being blister rust resistant, GPS and tag tree. Measure DBH, height, and crown ratio.
  - 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.

Post Implementation:

- Whitebark and Limber Pine Treatments:
  - Complete re-application of pheromones. 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 for new insect and disease activity.

Resource Concern #7: Visual Resources Management

Objectives:

- Limit management activities or projects within the Hidden Pasture WSA in accordance with 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."
- Limit management activities within the VRM Class II corridor to retain the existing character of the landscape in accordance with VRM Class II objectives. Class II objectives are to retain the existing character of the landscape. Activities or modifications of the environment should not be evident or attract the attention of the casual observer, and changes should repeat the basic elements of the predominant natural features of the landscape.
- Manage the remaining 29,473 acres within the BSCW so as not to detract from the existing landscape and other objectives stipulated under VRM Class III guidelines. "The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape may 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."

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.

Resource Concern #8: Wilderness Characteristics

Objectives:

- Maintain wilderness characteristics of the Hidden Pasture Wilderness Study Areas.
- Manage the WSA to the non-impairment standard as outlined in BLM Manual 6330 - Management of Wilderness Study Areas, until congress either releases it or designates it 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.

Types of Data Collected

The established permanent vegetative and physical trend transects in the Big Sheep Creek Watershed were read and data was updated during 2014. 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 2016 or 2017 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 2017 (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 (2024), 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.
- Land Use Plan effectiveness monitoring. The AIM methodology will be phased in within the Dillon Field Office during the next planning cycle. This data can be used at multiple scales and will be used to measure land use plan effectiveness and may also be used to measure effectiveness of landscape level assessments (e.g. Big Sheep Creek Watershed) and project level projects (e.g. prescribed burns) as they are implemented. This data will be stored via TerraDat, which will be available to the public.

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 2024, unless specified otherwise for specific objectives. The Big Sheep Creek Watershed will be re-assessed or evaluated during 2025. In this process, all monitoring data will be summarized, analyzed, interpreted, and evaluated to measure progress toward meeting objectives. Trend data gathered in 2024 will be compared to baseline (established in 2016 or 2017) and existing trend data gathered or updated in 2014. 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 2024, 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 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 Outdoor Rec Planner.	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 Habitat Assessment Framework (HAF) in priority and general habitat, elk calving and winter 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 Wildlife population monitoring (MFWP has lead)	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** Assessment, Inventory and Monitoring (AIM) Quadrat Frequency Daubenmire Line Point 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 2016. Trend data (new and existing studies) will be gathered again in **2024 or 2025.**
	Physical Cumulative width/depth ratio, MIM, site specific soils interpretation.		
Watershed Assessment	Analysis, Interpretation, Evaluation, Recommendations followed by NEPA	ID team	FY2025

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 technicians 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

BLM DILLON FIELD OFFICE

Biological Evaluation for Special Status Fish and Wildlife Species.

Form Revised August 2014 - Updated September 2014

Project: Big Sheep Creek Watershed Environmental Assessment [DOI-BLM-MT-B050-2016-0009-EA]

Step 1a.	Step 1b.	Step 1c.	Step 2	Step 3.	Step 4.	Step 5.	Step 5.	Step 5.	Step 6.
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**	**Alt D level of effect**
Canada Lynx (*Lynx canadensis*)	Threatened	N	Y	N	--	--	--	--	--
Grizzly Bear (*Ursus arctos horribilus*)	Threatened	N	Y	N	--	--	--	--	--
Mammals									
Fringed myotis (*Myotis thysanodes)*	Sensitive	N	Y	N	--	--	--	--	--
Gray Wolf (*Canis lupus*)	Sensitive	Y	Y	Y	N	MIIH	MIIH	MIIH	BI
Great Basin pocket mouse (*Perognathus parvus*)	Sensitive	N	Y	N	--	--	--	--	--
North American Wolverine (*Gulo gulo luscus*)	Sensitive	Y	Y	N	--	--	--	--	--
Pygmy Rabbit (*Brachylagus idahoensis*)	Sensitive	Y	Y	Y	N	MIIH	MIIH	MIIH	MIIH
Spotted Bat (*Euderma maculatum*	Sensitive	N	Y	N	--	--	--	--	--
Townsend's Big-eared Bat (*Plecotus townsedii)*	Sensitive	N	Y	N	--	--	--	--	--
Birds									
American Bittern (*Botaurus lentiginosus*)	Sensitive	N	Y	N	--	--	--	--	--
Bald Eagle (*Haliaeetus leucocephalus*)	Sensitive	Y	Y	N	--	--	--	--	--
Black Tern (*Chlidonias niger*)	Sensitive	N	Y	N	--	--	--	--	--

Black-backed Woodpecker *(Picoides arcticus)*	Sensitive	Y	Y	Y	N	MIIH	MIIH	MIIH	--
Brewer's sparrow *(Spizella breweri)*	Sensitive	Y	Y	Y	N	MIIH	MIIH	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**	**Alt D level of effect**
Burrowing Owl (*Athene cunicularia*)	Sensitive	N	Y	N	--	--	--	--	--
Caspian Tern (*Hydroprogne caspia*)	Sensitive	N	Y	N	--	--	--	--	--
Chestnut-collared Longspur (*Calcarius ornatus*)	Sensitive	N	N	N	--	--	--	--	--
Common Tern (*Sterna hirundo*)	Sensitive	N	Y	N	--	--	--	--	--
Ferruginous Hawk (*Buteo regalis*)	Sensitive	Y	Y	N	--	--	--	--	--
Flammulated Owl (*Otus flammeolus*)	Sensitive	Y	Y	N	--	--	--	--	--
Forster's Tern (*Sterna forsteri*)	Sensitive	N	Y	N	--	--	--	--	--
Franklin's Gull *(Larus pipixcan)*	Sensitive	N	Y	N	--	--	--	--	--
Golden Eagle *(Aquila chrysaetos)*	Sensitive	Y	Y	N	--	--	--	--	--
Great Gray Owl (*Strix nebulosa*)	Senstive	Y	Y	N	--	--	--	--	--
Greater Sage Grouse (*Centrocercus urophasianus*)	Sensitive	Y	Y	Y	N	MIIH	MIIH	MIIH	MIIH
Lewis's Woodpecker (*Melanerpes lewis*)	Sensitive	Y	Y	N	--	--	--	--	--
Loggerhead Shrike (*Lanius ludovicianus*)	Sensitive	Y	Y	Y	N	MIIH	MIIH	MIIH	MIIH
Long-billed Curlew (*Numenius americanus)*	Sensitive	Y	Y	N	--	--	--	--	--
McCown's longspur *(Calcarius mccownii)*	Sensitive	Y	Y	N	--	--	--	--	--
Mountain Plover (*Charadrius montanus*)	Sensitive	N	N	N	--	--	--	--	--

(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	Alt D level of effect
Peregrine Falcon (*Falco peregrinus anatum*)	Sensitive	Y	Y	N	--	--	--	--	--
Sagebrush Sparrow (*Artemisiospiza nevadensis*)	Sensitive	Y	Y	Y	N	MIIH	MIIH	MIIH	MIIH
Sage thrasher *(Oreoscoptes montanus)*	Sensitive	Y	Y	Y	N	MIIH	MIIH	MIIH	MIIH
Sprague's Pipit (*Anthus spraugueii*)	Sensitive	N	N	N	--	--	--	--	--
Trumpeter Swan (*Cygnus buccinator*)	Sensitive	N	Y	N	--	--	--	--	--
Veery (*Catharus fuscescens*)	Sensitive	Y	Y	Y	N	MIIH	BI	BI	BI
White-faced Ibis (*Plegadis chihi*)	Sensitive	N	N	N	--	--	--	--	--
Yellow billed cuckoo *(Coccyzus americanus)*	Sensitive	N	N	N	--	--	--	--	--
Amphibian/reptiles									
Boreal/Western toad *(Bufo boreas)*	Sensitive	Y	Y	Y	N	MIIH	MIIH	MIIH	MIIH
Northern leopard frog *(Rana pipiens)*	Sensitive	N	N	N	--	--	--	--	--
Fish									
Westslope cutthroat trout *(Onchorhynchus clarkii lewisi)*	Sensitive	Y	Y	Y	N	MIIH	BI	--	--
Fluvial Arctic Grayling (*Thymallus arcticus montanus*)	Sensitive	N	N	N	--	--	--	--	--
Invertabrates									
Western Pearlshell *(Margaritifera falcatea)*	Sensitive	N	N	N	--	--	--	--	--

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).

Signed: /s/*Katie Benzel*___ **Date:** 5-6-2016_____ **Signed:** /s/ *Paul Hutchinson* **Date:** 5-17-2016

Printed Name and Title: Katie Benzel, Wildlife Biologist and Paul Hutchinson, Fisheries Biologist

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

NARRATIVE of POTENTIAL IMPACTS

Federally Listed Species:

Canada Lynx:
The Dillon Field Office does not contain any lynx critical habitat and no lynx have been documented within the BSCW. 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, 2014a). 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, 2014a). The USFWS provided evidence that the Beaverhead-Deerlodge National Forest (USFS managed lands in southwestern Montana where the DFO manages BLM administered lands) was likely not occupied by lynx at the time of listing and is not currently occupied by lynx, indicating that lynx do not occupy this area or this area is lacking in either quantity or spatial arrangement (or both) of one or more of the essential features. USFWS has determined that forests in southwestern Montana and the DFO are not essential to the conservation of lynx, and does not meet the definition of critical habitat (USDI, 2014a). Snow-tracking surveys designed to detect presence of multiple forest carnivores, including lynx, conducted by the Idaho Department of Fish and Game from 2004 to 2006 detected no lynx in the Beaverhead Mountains Section, just west of the DFO (USDI, 2014a). Forest habitat in BSCW isn't considered adequate lynx habitat. The watershed may be used as a lynx linkage zone between suitable habitats. The fuels treatments are proposed to reduce conifer expansion in sagebrush grassland habitat. Lynx prefer to move through continuous forests, and have been observed to avoid large openings until shrubs and trees provide enough cover to hide them (Ruggiero et al. 2000; USDI, 2003). Although sagebrush grassland habitat may provide connectivity, it is not typical lynx habitat and the conifers expanding into this habitat are generally not dense enough or tall enough to protrude above the snow for winter snowshoe hare habitat or to hide lynx moving through the area. The amount of fuels treatments proposed are minimal in comparison to the sagebrush grassland and forested habitat available across the landscape in this area. Therefore, no alternatives proposed in this EA are anticipated to affect Canada lynx.

Grizzly Bear:
Grizzly bear are not known to inhabit the BSCW. The BSCW is outside of the Occupied Range of the Yellowstone Grizzly Bear, as well as the Distinct Population Segment (DPS) boundary. The DPS boundary includes all landscapes where genetically distinct Yellowstone grizzly bear occur and may occur given future range expansion, delineated along easily identifiable boundary features (i.e. Interstate 15). The Dillon Field Office is outside the Grizzly Bear Recovery Zone, which depicts an area surrounding Yellowstone National Park where inter-agency grizzly bear recovery efforts are concentrated for the long-term conservation of the distinct Yellowstone grizzly bear population (IGBST, 2016). Although reports claiming grizzly sightings within the watershed have occurred over the years, there has not been a confirmed grizzly bear located in the BSCW. A study completed during the spring and summer of 2009, using barbed-wire DNA hair stations and cameras, did not document grizzly bears in the Beaverhead Mountains between Monida and Eighteen Mile Peak (Servheen et al., 2010). On March 3, 2016 the USFWS announced plans to remove the Greater Yellowstone Ecosystem grizzly bear population from the Federal List of Endangered and Threatened Wildlife (USDI, 2016). Potential future habitat exists within the BSCW. Since whitebark pine seeds are an important component of grizzly bear diets, actions for whitebark pine trees in this EA would promote habitat and this food source for grizzly bear. Actions include planting whitebark, protecting individual trees, cutting competing conifers around healthy whitebark pine trees, and contributing cones to the genetic breeding program. Since grizzly bear are not known to

inhabit the watershed and none of the proposed actions would impact grizzly bear habitat, a No Effect determination was reached for actions covered in this EA.

BLM Sensitive Species:

Gray Wolf:
The Northern Rocky Mountain population of gray wolves, including Montana wolves, was delisted from the list of Endangered and Threatened Wildlife in 2011 as part of the Appropriations Act. To avoid relisting, Montana will comply with federal regulations to manage wolves in a manner that will guarantee that the state maintains at least a minimum of 150 wolves and 15 breeding pairs (MFWP, 2013). Since delisting, a hunting season for wolves has been implemented in Montana. At the end of 2014, a minimum estimate of 94 wolves and 20 packs were documented in the Montana portion of the Central Idaho Experimental Area.

Gray wolves move seasonally following migrating ungulates within their territory. They disperse widely and exhibit no particular habitat preference except for the presence of native ungulates within its territory on a year-round basis. They are opportunistic carnivores that predominantly prey on large ungulates. Primary prey species in the BSCW include deer, elk and moose. Alternative prey sources include rodents, vegetation and carrion as well as domestic livestock such as cattle and sheep. They commonly hunt in packs, but lone animals and pairs are able to kill prey as large as adult moose. They are territorial throughout the year and packs generally consist of a socially dominant pair, their offspring of the previous year, and new pups, although other breeding-age adults that may or may not be related to the alpha pair may also be present. Conflicts between wolves and livestock are an issue. BLM administered land in BSCW does not include any authorized sheep grazing. Livestock grazing permits will be amended to make permittees aware that losses to livestock could occur from gray wolves. Even with the introduction of hunting and trapping seasons in MT since de-listing, wolf populations have continued to increase. While individuals may be impacted, no alternatives proposed in this EA are anticipated to impact the gray wolf population that would lead to re-listing. Alternative D in the Porcupine Canyon allotment may have a beneficial impact on gray wolves with the elimination of potential conflicts between wolves and cattle with the removal of grazing from this allotment. This would only affect this one allotment however, and since gray wolves utilize a large landscape, beneficial impacts would be minimal.

Great Basin Pocket Mouse:
Great Basin pocket mouse habitat does occur in areas of the watershed, however this species has not been documented in BSCW. Habitats in Montana are arid and sometimes sparsely vegetated, including grassland-shrubland with less than 40% cover, and landscapes with sandy soils. Other areas of its range include arid and semiarid habitats, including pine woodland, juniper-sagebrush scablands, sandy short-grass steppes, and shrubland covered with sagebrush, bitterbrush, greasewood, and rabbitbrush; heavily forested habitats are avoided. They usually are found in habitats with a higher percent of sand and are not found in areas with more clayey soils (MNHP, 2016a). Alternatives that work towards maintaining a mosaic of sagebrush cover and promote herbaceous and forb species within sagebrush habitat will improve possible Great Basin pocket mouse habitat. Since Great Basin pocket mice are not known to occur in BSCW, alternatives proposed in this EA are not expected to reduce viability to the population or species, or lead to federal listing.

North American Wolverine:

In 2014 the United States Fish and Wildlife Service withdrew a proposal to list the North American wolverine in the contiguous United States as a threatened species under the ESA (USDI, 2014b). Wolverines occur in coniferous montane forest types, preferring rugged, roadless, isolated habitats. 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 Beaverhead Mountains and Tendoy Mountains, with transient individuals on BLM lands. However, the Tendoy Mountains likely do not have enough high elevation alpine habitat to sustain the large home range females require for natal areas. The small scale non-commercial mechanical/prescribed fire treatments proposed in this EA are in areas with conifer expansion into sagebrush, on the periphery of wolverine habitat. While wolverines may move through these areas, these treatments and other alternatives in this EA would not impact wolverines in the watershed. Addressing travel management issues in BSCW will be beneficial for wolverines moving through the area.

Pygmy Rabbit:
Big Sheep Creek Watershed provides year-round pygmy rabbit habitat. Pygmy rabbits are found throughout the BSCW in suitable sagebrush habitat. Pygmy rabbits are endemic to sagebrush habitat and require sagebrush for forage and cover, as well as deep alluvial soil to dig their burrows. Sagebrush comprises nearly 100% of their winter diet and over half of their summer diet. Pygmy rabbit populations in Montana are genetically linked to populations in Idaho, proving they are much more mobile than previously thought (Estes-Zumpf 2008). A recent study in the DFO (Camp et.al. 2014) concluded that the presence of cattle did not markedly influence properties of vegetation related to predation risk or integrity of burrow systems when grazing is permitted at sustainable levels. Pygmy rabbits are not known to occupy any of the prescribed fire treatment units. Surveys will be completed prior to implementation within treatment units and if pygmy rabbits are found, unit boundaries would be modified to exclude their habitat. The removal of livestock grazing in Alternative D in the Porcupine Canyon allotment would increase herbaceous cover within the allotment, increasing summer forage and concealment for pygmy rabbits. With increased concealment comes a tradeoff of visibility of predators (Camp et al., 2013). Whether or not an increase in decadent herbaceous cover has an effect on this tradeoff is unknown. While individuals or habitat may be impacted, none of the alternatives are anticipated to contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Fringed Myotis, Spotted Bat, and Townsend's Big-Eared Bat:
All three BLM sensitive species of bats are found in a variety of habitat types and roost in caves, mines, rock crevices, buildings, and other protected sites (Foresman, 2012; MNHP, 2016a). None of these species have been documented in BSCW, including during a recent study done in cooperation with Montana Natural Heritage Program. During the nearly two year timespan, an SM2 Bat+ detector/recorder was deployed along Big Sheep Creek to document year-round bat echolocation calls (Maxell et al., 2016). Out of a total of 12,269 bat call sequences recorded, six species of bats were definitively confirmed, not including these species. While their presence has not been documented, habitat does exist within BSCW. None of the alternatives are expected to impact these three species.

Bald Eagle:
Bald eagles were down-listed from Endangered to Threatened in 1995, and delisted in 2007. The Montana Bald Eagle Management Plan and addendum (MBEWG 1994, MBEWG 2010) directs management of this species in the state. Currently, bald eagles continue to receive protection from the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act. In 1980, Montana had 31 known or suspected bald eagle territories. There were over 700 nesting pairs reported in 2014 (MBEWG, 2016). The specific population recovery objective for nesting bald eagles in Montana was 99 nesting pairs, which was reached in 1990. Nesting sites are generally located within larger forested areas near large lakes

and rivers where nests are usually built in the tallest, oldest, large diameter trees. Nests are also commonly found in cottonwoods along rivers in the DFO. The majority of their diet is comprised of fish. Important prey for bald eagles includes waterfowl, especially in the winter, salmonids, suckers, whitefish, carrion and small mammals and birds. General objectives for bald eagle habitat management in Montana include: maintaining prey bases; maintaining forest stands currently used or suitable for nesting, roosting, and foraging; planning for future potential nesting, roosting, and foraging habitat; and minimizing disturbances from human activities in nest territories (MNHP, 2016a). None of the alternatives in this EA are expected to impact habitat or prey for bald eagles to the extent that would lead to federal listing.

Black-backed Woodpecker:
Black-backed woodpeckers inhabit early successional, burned forests of mixed conifer, lodgepole pine, Douglas-fir, and spruce-fir. Black-backed woodpeckers are highly responsive to forest fire and other processes, such as spruce budworm outbreaks, resulting in high concentrations of wood-boring insects invading dead trees. The burned forest habitat is lacking in the BSCW, however wood-boring insect breakouts have occurred in the watershed, contributing potential black-backed woodpecker habitat. Prescribed fire treatments proposed in this EA, targeted to kill colonizing Douglas-fir, would increase foraging opportunities for this species. No alternatives are expected to impact black-backed woodpecker populations that would cause a loss of viability or contribute to federal listing.

Brewer's Sparrow, Loggerhead Shrike, Sagebrush Sparrow, and Sage Thrasher:
Site specific sagebrush losses from prescribed burns proposed under Alternatives B and C could displace loggerhead shrike, sage thrasher, sagebrush sparrow, and Brewer's sparrow but vast amounts of 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 reduction 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. 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. complete prescribed fire prior to migratory bird nesting season). This project MIIH, however in the long-term the prevention of sagebrush habitat from becoming conifer habitat would benefit these species, and actions in Alternatives B and C would not cause a loss of viability for the populations or species, or contribute to federal listing. Under Alternative A, sagebrush habitat would be lost in the long-term as it continues to convert to forested habitat. Under Alternative D in the Porcupine Canyon allotment, removing grazing would increase herbaceous cover for these species.

Ferruginous Hawk:
Ferruginous hawks that breed in Montana are migratory. Fall migration begins in August through early September. Young birds will migrate south earlier than, and independent of, adults. Restani (1991) reported most ferruginous hawks return to the Centennial Valley, which is southeast of BSCW, in April and May. Ferruginous hawks construct nests on the ground on hill slopes or crests, on rocky outcrops and cliffs, and in trees and shrubs (usually mountain mahogany and juniper in the DFO). Nests are largely made with sagebrush stems and lined with cow dung, sod, and bark that the female strips from trees. According to the North American Breeding Bird Survey, ferruginous hawk numbers are stable or slightly increasing (Cornell Lab of Ornithology, 2016). Possible threats to ferruginous hawks include reduction in prey, competition from other hawks (mainly Swainson's and red-tailed hawks), loss of prairie habitat, nest site disturbance, or impacts in wintering areas. In southwestern Montana, primary prey include ground squirrels, passerines, grasshoppers, and voles (Restani 1991). Vulnerability of prey is an important factor in ferruginous hawk habitat suitability. Ferruginous hawks avoid dense vegetation that reduces their ability to see prey (MNHP, 2016a). None of the alternatives are expected to

reduce prey availability or habitat, including nesting habitat, for ferruginous hawks in BSCW that would lead to federal listing or loss of population or species viability.

Flammulated Owl:
In the northern part of their range flammulated owls are a Neotropical migrant arriving in late April-early May and departing by October. Flammulated owls are obligate cavity nesters and prefer mature open canopy ponderosa pine and Douglas-fir forests but have also been documented using cavities in pure aspen stands. No food habit data exists for flammulated owls in Montana, however information gathered from other areas of the species' range indicate flammulated owls mainly hunt at night foraging on nocturnal arthropod prey along the interface between forest or woodland and grassland. Most studies have shown that flammulated owls have a preference of ponderosa pine and although they have not been documented in the BSCW, they have been documented using Douglas-fir in other watersheds in the DFO. The primary goal of the non-commercial mechanical/prescribed fire treatments proposed under Alternatives B and C in this EA would be to kill/remove 60% or more of conifers less than 30 feet tall. This would not impact the mature trees that flammulated owls prefer. The alternatives in this EA are not expected to have any impacts to this species that would lead to federal listing.

Golden Eagle:
Golden eagles are protected under the Bald and Golden Eagle Protection Act of 1940 and the Migratory Bird Treaty Act. Some golden eagles remain in Montana year-round, but vertical migration from mountains to valleys occurs in the winter. They generally nest on cliffs when available, or in large trees associated with sagebrush/grassland. This open shrub/grassland is used for hunting jackrabbits, ground squirrels, and carrion. They occasionally prey on deer and pronghorn (mostly fawns), waterfowl, grouse, weasels, skunks, and other animals. Management of healthy golden eagle populations requires maintaining prey habitat where eagles forage. This involves sustaining native grasslands and shrub-steppe landscapes which are the prime habitats for jack rabbits. Shooting and poisoning from the ingestion of lead fragments in carrion that have been shot with lead bullets are the primary threats to golden eagles in BSCW. Golden eagles are regularly observed in the BSCW. None of the alternatives in this EA are expected to impact nesting habitat or prey abundance to any degree that would lead to Federal listing.

Great Gray Owl:
Great gray owls are a resident species in Montana, both during the breeding season and in winter. During periods of low prey abundance and/or large snowfalls birds may move from higher to lower altitudes within the state. Also, birds from Canada may move into the state during winter for similar reasons (MNHP, 2016a). They inhabit a wide range of habitats and elevations, preferring mature coniferous and deciduous forests near meadows. Great gray owls do not build their own nests. Nest sites include large, broken-top trees, debris platforms from dwarf mistletoe, and stick nests from other raptors. Great gray owls prefer natural forest openings such as meadows, bogs, and fens for foraging as well as subclimax, old-growth, selectively logged, and small clear-cut forests. They usually forage in open areas where scattered trees or forest margins provide suitable sites for visual searching and perching. Their main prey is small mammals, especially rodents, such as voles. The primary goal of the non-commercial mechanical/prescribed fire treatments proposed under Alternatives B and C in this EA would be to kill/remove 60% or more of conifers less than 30 feet tall. This would not impact the mature trees that great gray owls prefer. None of the alternatives proposed in this EA would have an impact on great gray owls that would lead to loss of the population or species viability.

Greater Sage Grouse:

BLM administered lands in the BSCW provide year-round sage grouse habitat. There are over 113,000 acres of sage grouse priority habitat management area (PHMA) in the BSCW, making up 62% of the total watershed acreage and 84% of BLM administered acres. There are over 29,000 acres of sage grouse general habitat management area (GHMA) in the watershed, which is 16% of the total and 12% of the BLM administered acreage in BSCW. Important sage grouse seasonal habitat is centered on breeding and winter complexes. Sagebrush is an important habitat component for sage grouse. It comprises nearly 100% of sage grouse winter diets and provides thermal, hiding, and nesting cover. Broods require a high protein diet of forbs and insects, usually found in riparian habitats. Sage grouse typically nest within 2-3 miles of leks. There are at least six active leks within the watershed. Numbers of male sage grouse attending leks is relatively stable in the Cabin Creek and Simpson Creek areas, with a higher than average count in the Alkali Creek area. Other leks have not shown persistent attendance over the years, with some leks moving locations. Resident and migratory sage grouse are present in Big Sheep Creek Basin during the year. Some birds are present yearlong and may travel no further than two to three miles from leks. Some birds, particularly males, breed and spend the summer in the Basin and then migrate to southeastern Idaho during the winter. Other birds, primarily females with broods, breed in southeastern Idaho and migrate to Montana during late spring and summer with their broods, and return to Idaho during the winter. The DFO radio-collared sage grouse throughout the Field Office from 1999-2012. Based on the telemetry data gathered, some sage grouse captured from leks within the BSCW wintered in the watershed, mainly in the Crystal Creek and Simpson Creek allotments.

Maintaining the integrity of all seral stages of sagebrush habitats on public lands is important for sage grouse viability. "Suitable" seasonal sagebrush cover and height objectives for sage grouse are 15-25% cover and 12-31 inches (arid sites) or 16-31 inches (mesic sites) for nesting/early brood-rearing, 10-25% cover and 16-32 inches for late brood-rearing/summer, and ≥10% cover and ≥ 10 inches for winter habitat (USDI, 2015). Habitat plots were completed during the 2015 brood-rearing season, within three miles of leks in BSCW. Average shrub cover was slightly higher (32%) than the 15-25% range for nesting/early brood-rearing, and average sagebrush height was 19.4 inches. The perennial grass cover objective for breeding habitat is ≥10% on arid sites and ≥15% on mesic sites, with a height objective of ≥ 7 inches. Perennial forb cover objectives for breeding habitat are ≥5% on arid sites and ≥10% on mesic sites (USDI, 2015). The average perennial grass and forb cover combined for these plots was 64% and an average height of 11.7 inches, meeting perennial grass and forb nesting/early brood-rearing habitat objectives. The canopy cover and heights of shrubs and herbaceous vegetation is highly variable based on species composition and soil types.

Under Alternative A, current conditions would largely be maintained. The quality and quantity of sage grouse brood rearing habitat may be reduced on the four allotments that didn't meet riparian standards. The removal of livestock grazing in Alternative D in the Porcupine Canyon allotment would increase herbaceous cover within the allotment, and likely increase forb availability for broods. Prescribed fire treatments proposed under Alternatives B and C would cause a short-term loss of sagebrush cover in the treated areas, but sagebrush cover is available adjacent to the treated areas, and in the long-term sagebrush habitat would be enhanced once conifer expansion is eliminated. Sagebrush habitat loss to conifer expansion can be detrimental to sagebrush obligates, especially species of conservation concern, such as the sage grouse (Baruch-Mordo et al. 2013, Knick et al. 2013). Baruch-Mordo et al. (2013) found that sage grouse incur population-level impacts at a very low level of conifer expansion, as no leks were active in areas where conifer canopy cover exceeded 4%. This study also found that sage grouse have a negative response to areas of active conifer expansion in addition to areas with more established stands. These results align with other studies' findings of sage grouse avoidance of conifer habitats during all stages of life (i.e. nesting, brood-rearing, and wintering) (Doherty et al., 2008, Atamian et al., 2010, Casazza et al., 2011).

Acreage within the non-commercial mechanical/prescribed fire treatment units is conservative in relation to the surrounding sage grouse habitat and landscape. Under alternative B, the treatment units comprise 0.7% of the total acreage and 2.4% of BLM administered acreage in the watershed. These units comprise 1.2% of total and 2.9% of BLM administered sage grouse PHMA acreage in BSCW. Under Alternative C, the treatment units comprise 1.3% of total acreage and 4.2% of BLM administered acreage in the watershed. These units comprise 1.8% of total and 4.3% of BLM administered sage grouse PHMA acreage in BSCW. Alternative C also has one treatment unit within a sage grouse general habitat management area (GHMA), comprising 1% of total GHMA acreage and 4.7% of BLM administered GHMA in the watershed.

Distance of the nearest treatment unit boundaries to an active lek range from 1.2 to 4.2 miles. Sage grouse breeding habitat is considered within 11 miles of a lek for migratory populations and 3.1 miles for non-migratory populations (Stiver et al. 2015, pg. 24). Although these units are within breeding habitat, areas with conifer encroachment are considered unsuitable habitat if conifer canopy cover is greater than 4% and marginal habitat if the seasonal habitat exhibits some degree of conifer encroachment (Stiver et al. 2015, pg. 16). Since these units are being treated for conifer expansion and are unsuitable sage grouse habitat, hens are unlikely to use these areas for nesting and brood-rearing. Disturbance to lekking sage grouse would be minimized by implementing the burns outside of 6:00 pm and 9:00 am.

Due to the conifer expansion creating unsuitable habitat and deterring sage grouse from using the treatment units, disturbance to sage grouse within these units is unlikely. Overall, utilizing mechanical/prescribed fire treatments would transition this habitat that is currently unsuitable for sage grouse into more suitable seasonal sage grouse habitat. Without treatment this would transition into forested habitat and never be suitable for sage grouse again. A longer-term view of restoration is needed, where short-term loss of sagebrush dominance to reduce early conifer encroachment is acceptable and practiced where it will not result in a devastating decline in habitat for sagebrush-associated wildlife (Davies et.al, 2011). These treatments have been planned with full interdisciplinary input and coordination with the local MFWP wildlife biologist. While alternatives proposed in this EA may impact individuals or habitat, they would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

<u>Lewis's Woodpecker:</u>
Lewis's Woodpecker breeding habitat includes open forest and woodland, often logged or burned, including coniferous forest; primarily ponderosa pine (*Pinus ponderosa*), riparian woodland and orchards, and less commonly in pinyon-juniper. Important habitat features include an open tree canopy, a brushy understory with ground cover, dead trees for nest cavities, dead or downed woody debris, perch sites, and abundant insects. Unlike other woodpeckers, Lewis's Woodpeckers are not morphologically well adapted to excavate cavities in hard wood. They tend to nest in a natural cavity, abandoned Northern Flicker (*Colaptes auratus*) hole, or previously used cavity. Lewis's Woodpeckers feed on adult emergent insects (e.g., ants, beetles, flies, grasshoppers, tent caterpillars, mayflies) in summer, and ripe fruit and nuts in fall and winter. They are opportunistic and may respond to insect outbreaks and grasshopper swarms by increasing breeding densities. Unlike other woodpeckers, the Lewis's Woodpecker does not bore for insects but will flycatch and glean insects from tree branches or trunks; they also drop from a perch to capture insects on the ground (MNHP, 2016a). Specific needs of the Lewis's Woodpecker at the microsite and site level could be met in the form of interspersed zones of shrubby understory within the overall habitat mosaic (Casey, 2000). None of the alternatives would impact this species to any degree that would cause a loss of viability to the population or species.

Long-billed Curlew:
Long-billed curlew populations have declined throughout much of their range (Casey, 2013). The DFO is participating in spring curlew survey efforts organized by MFWP. The long-billed curlew is migratory and arrives in Montana in mid-April. Breeding habitat includes mixed grass prairie habitats and moist meadows, preferring to nest in open, short-statured grasslands and avoiding trees, dense shrubs, or tall, dense grasses (MNHP, 2016a). Curlews are opportunistic foragers, feeding primarily on invertebrates and small vertebrates such as bird eggs and nestlings, foraging in open prairie grasslands and meadows, at the edges of prairie ponds and sloughs (Dugger and Dugger 2002). Virtually all studies have indicated that relatively short graminoid vegetation is among the key habitat variables selected by nesting curlews (Casey, 2013.) Livestock grazing, particularly early season grazing, typically has a positive benefit on nesting long-billed curlews, although year-round grazing can be detrimental (Dugger and Dugger, 2002.) Improving riparian habitat would improve foraging conditions and hiding cover for brood rearing. The alternatives in this EA would not impact this species or lead to federal listing.

McCown's Longspur:
The McCown's longspur is migratory in Montana, arriving in late April to mid-May and leaving in September. Nesting habitat is characteristically open with sparse vegetation on semi-arid shortgrass steppe, structurally similar to habitats like overgrazed pastures (With 2010). Grazing may actually benefit McCown's longspur. Threats to this species include habitat disruptions like plowing, pesticide use, and suppression of grassland fires that maintain shortgrass prairie (With 2010). McCown's longspur primarily eat grass and forb seeds, insects, and other arthropods. Short grass prairie habitat for McCown's longspur is very limited in the BSCW and no active habitat conversion is expected. None of the alternatives in this EA would impact McCown's longspur that would lead to federal listing.

Peregrine Falcon:
Peregrine falcons are migratory in Montana and arrive to breeding areas in late April to early May; departure begins late August-early September. The peregrine falcon was delisted from the list of Endangered and Threatened Species in 1999. Peregrine falcons feed primarily on birds, mostly medium-size passerines up to small waterfowl as well as sage grouse. They have occasionally been reported to prey on small mammals (e.g., bats, lemmings), lizards, fish, or insects. Nests typically are situated on ledges of vertical cliffs, often with a sheltering overhang. Ideal locations include undisturbed areas with a wide view, near water, and close to plentiful prey. While there are no known eyries in BSCW, there is nesting habitat available in the watershed. None of the alternatives in this EA would impact peregrine falcons that would lead to federal listing.

Veery:
Veery are summer migrants that breed in moist, low elevation deciduous forests with a dense understory. They are also found in very thick and wide willow or alder shrub riparian habitat near water. Veerys feed on insects, fruit, and spiders. They mostly feed on the ground, swoop from a perch to the ground to capture prey, foliage glean, and occasionally grab insects from the air. Veery are a fairly common host for cowbird parasitism, making them vulnerable to landscape changes and disturbances (Casey, 2000). Over grazing can lead to an increase in cowbirds which in turn leads to increased parasitism. All of the grazing AMP's are managed for moderate grazing and would not have a significant impact. Managing or improving the riparian habitat to meet PFC and increase riparian woody regeneration would be beneficial. Under the No Action alternative, wildlife habitat in allotments that didn't meet riparian/wetland standards would continue to be affected by reduced vegetative and woody cover, vegetative species composition, and structural diversity, which may impact individuals or habitat, but would not lead to federal listing or a loss of population or species viability.

Western Toad:
Western toad habitat includes low elevation beaver ponds, reservoirs, streams, marshes, lake shores, potholes, wet meadows, and marshes, to high elevation ponds, fens, and tarns at or near treeline (MNHP, 2016a). Western toads may wander miles from breeding sites through coniferous forests and subalpine meadows, lakes, ponds, and marshes (Werner et al. 2004). They are active between April and October, with adult's diets consisting of flies, ants, and sometimes smaller individuals of their own species. They breed in any clean standing water, with mating season between May and July. While no breeding sites have been identified on BLM administered land within BSCW, breeding habitat probably occurs within the allotments with various springs, and wetlands. Reduced access by livestock to breeding sites within grazing allotments can prevent undue trampling mortality. Maintaining existing and constructing new livestock exclosures to improve riparian habitat can benefit breeding populations. While individuals and habitat may be impacted, impacts would not likely contribute to federal listing or cause a loss of viability to the population or species.

Westslope cutthroat trout (WCT):
Current management of occupied WCT habitat is resulting in habitat reaching PFC. However, a fish barrier in place in Muddy Creek is failing due to age and needs to be reconstructed. Under Alternative A, no action would be taken to improve this issue. Alternatives proposed under All Action Alternatives would lead to reconstruction of this barrier. Under Alternative B, Indian Creek allotment, it's proposed to change livestock management to preclude use during WCT spawning and egg incubation periods. This would eliminate impacts related to redd trampling. If installation of a small fish passage barrier on the lower reaches of Meadow Creek is possible it would provide additional protection to the WCT population in the drainage. Currently this drainage is considered unprotected in that under the right stream flows nonnatives, specifically rainbow trout, could access the drainage from Big Sheep Creek. Placement of a barrier in the lower reaches would greatly reduce the likelihood of nonnatives gaining access into the headwaters of Meadow Creek. This would help to preserve the long term persistence of this WCT population.

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APPENDIX D

Biological Evaluation for
Special Status Plants on BLM Lands in the Big Sheep Creek Watershed
(Big Sheep Creek Watershed Environmental Assessment)
DOI-BLM-MT-B050-2016-0009-EA

Prepared by
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May 2016

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. Thirteen sensitive plant species inhabit BLM-administered lands within the Dillon Field Office. Five of those species are known to occur within the Cumulative Impact Area of the Big Sheep Creek Watershed (BSCW) Environmental Assessment. One of the five sensitive plant species is whitebark pine which is discussed in section 3.2.8. 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 Big Sheep Creek 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.

Biological Evaluation Summary for Special Status Plants for the Big Sheep Creek Watershed Environmental Assessment (DOI-BLM-MT-B050-2016-0009-EA)

Common Name *Genus species*	Does the species occur on Public Lands within the Centennial 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	NO	--	--		
Cusick's horse-mint *Agastache cusickii*	YES	YES	NO	NI		
Sapphire rockcress *Arabis fecunda*	NO	NO	--	--		
Painted milkvetch *Astragalus ceramicus var. apus*	NO	NO	--	--		
Bitterroot milkvetch *Astragalus scaphoides*	NO	NO	--	--		
Railhead milkvetch *Astragalus terminalis*	NO	NO	--	--		
Idaho sedge *Carex idahoa*	YES	YES	NO	MIIH	BI	BI
Fendler cat's-eye *Cryptantha fendleri*	NO	NO	--	--		
Beautiful bladderpod *Lesquerella pulchella*	NO	NO	--	--		
Sand wildrye *Leymus flavescens*	NO	NO	--	--		
Alkali primrose *Primula alcalina*	YES	YES	NO	MIIH	BI	BI
Silver chicken sage *Sphaeromeria argentea*	YES	YES	NO	NI		

* 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 Big Sheep Creek Watershed

The amended 2006 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 four alternatives considered in the EA are anticipated for silver chicken sage or Cusick's horse-mint. Silver chicken sage inhabits sagebrush steppe habitats. The known populations of this plant species, in the BSCW, face no anthropogenic threats. They appear to tolerate and may benefit from disturbances that reduce competition such as livestock grazing. One large population of Cusick's horse-mint exists in the Big Sheep Creek canyon on talus limestone slopes above the county road, these slopes can be vulnerable to destabilization if impacted by activities such as quarrying of limestone and road maintenance. The steepness of this habitat tends to make it inaccessible to cattle, and the timber on these slopes is not of commercial quality. Beaverhead county plans to do a road upgrade through the Big Sheep Creek canyon starting this summer 2016, if road maintenance causes destabilization of the limestone slopes where this plant inhabits, it could have major impacts on this known population.

The effects of livestock grazing on Alkali primrose are both positive and negative. Because the leaves of Alkali primrose are all at ground level, livestock grazing can prevent seed production, however it will not kill the plant or remove significant photosynthetic tissue. Grazing can also be positive by partially removing the overtopping canopy of grasses and sedges, allowing more light to reach the leaf rosettes. Livestock grazing can also indirectly affect wetland vegetation by altering hydrologic regimes. Trampling by livestock may benefit this species by creating microhabitats on the tops and sides of the hummocks. Loss of wetlands would likely result in population declines. The livestock management changes proposed under alternative B & C would be beneficial for this sensitive species because both would provide needed rest for the riparian area that this plant flourishes in while at the same time allowing for some grazing which is beneficial by removing canopy cover to allow light to reach these tiny plant. Alternative D in the Porcupine allotment proposes a no grazing alternative. This alternative could have a negative impact on this sensitive plant over the long term because no grazing would allow competing vegetation to thicken and block sunlight to these plants. The proposed wetland restoration projects under both alternative B & C within the Big Sheep Creek watershed could have a negative impact on the habitat for this species. However, the project is small scale and monitoring will be implemented to determine how it would affect the wetland habitat. The goal is to restore wetland habitat which would benefit this species. If monitoring shows a negative impact the project would not be expanded. This project would not be implemented in areas with known populations of alkali primrose but may be implemented on the fringes of known populations.

Idaho sedge (*Carex idahoa*) is found in a few different riparian habitat locations throughout the BSCW. It is found in wet to moist alkaline meadows, is palatable, and sensitive to intensive grazing, especially during spring and early summer. Repeated herbivory, particularly between mid-May and mid-July may lead to population declines. Rest-rotation grazing regimes may allow enough recruitment to maintain stable populations of these palatable sensitive plants. The grazing management changes proposed under both alternative B & C would be beneficial for this species because both alternatives introduce rest into the pastures where this species exists. The proposed wetland restoration projects under both alternative B & C within the Big Sheep Creek watershed could have a negative impact on the habitat for this species. However, the project is small scale and monitoring will be implemented to determine how it would affect the wetland habitat. The goal is to restore wetland habitat which would benefit this species. If monitoring shows a negative impact the project would not be expanded. This project would not be implemented in areas with known populations of Idaho sedge but may be implemented on the fringes of known populations. Kentucky bluegrass and common dandelion are present in most wet meadow habitat and along many stream reaches. Kentucky bluegrass may compete with Idaho sedge. Canada thistle and houndstongue are scattered throughout the BSCW and were observed in many riparian and wetland habitats, especially along intermittent stream reaches. These noxious weeds may also compete with Idaho sedge which prefers these streamside and meadow habitats.

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 BSCW see Forest and Woodland Habitat section 3.2.8).

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 BSCW to control grasshoppers or other insects may affect pollinators that visit sensitive plant species on BLM lands.

Kelly Savage	5/17/2016
Signature	Date

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